Species assessement of the Red List of Belgian wild bees

by Kevin Lambaere, Maxime Drossart, Clément Tourbez , Pierre Rasmont, Jens d'Haeseleer, Marc Dufrêne, Alain Pauly , Pieter Vanormelingen, Nicolas Vereecken, Sarah Vray, Ella Zambra & Denis Michez

8 November 2021

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Contributions

Kévin Lambaere, Maxime Drossart and Clément Tourbez edited the content of the present publication. The assessments of Belgian wild bees following IUCN red list criteria were dependent on following expertise (see details in Drossart *et al.*2019). Maxime Drossart has been coordinator of this work and assessor for all bee species. The other contributing authors are :

- Jens d'Haeseler: assessor of Andrenidae, *Bombus* (Apidae), other Apidae, Colletidae, Halictidae, Megachilidae and Melittidae species.
- Marc Dufrêne: assessor of *Bombus* species; also provided the applied methodology and the management of statistical analyses.
- Denis Michez: assessor of Andrenidae, *Bombus*, other Apidae, Colletidae,Halictidae, Megachilidae and Melittidae species.
- Alain Pauly: assessor of Halictidae and Megachilidae species.
- Pierre Rasmont: assessor of *Bombus*, other Apidae and Halictidae species; manager of the database.
- Pieter Vanormelingen: assessor of Andrenidae, *Bombus* (Apidae), other Apidae, Colletidae, Halictidae, Megachilidae and Melittidae species.
- Nicolas J. Vereecken: assessor of *Bombus*, other Apidae, Andrenidae and Melittidae species.
- Sarah Vray: data provider for*Bombus* species.
- Ella Zambra: Support in the coordination and assessor for all bee species

Summary

The "species assessment of the red list of Belgian wild bees" is a development of the "Belgian red list of bees" (Drossart *et al.*2019). These assessments present the conservation status of Belgian species according to the IUCN guidelines for application of the international IUCN Red List criteria at regional and national levels (IUCN 2012a,b). It identifies the extinction threat of species at this level. These results can be used to implement conservation actions to improve the threatstatus of species. Moreover we added the information supporting and justiying the assessments: (i) Taxonomic Source(s), (ii) Assessment Information (i.e. red list category and criteria, date of assessment, assessor(s), Facilitator/Compiler(s), justification, European red list assessment), (iii) Geographic Range, (iv) Population trend, (v) Habitat and Ecology, (vi) Threats (i.e. reduction of resources), (vii) Conservation Actions; (viii) Research needed. Reduction of food ressources. When available, we provided data at national and Europea levels. All bee species recorded in Belgium until the first half of 2017 have been included in this Red List. The geographical scope is nation-wide.

Background

Bee species recorded in Belgium are divided into six families: (i) Apidae and Megachilidae form the group of long-tongued bees, (ii) Andrenidae, Colletidae, Halictidae and Melittidae represent the short-tongued bees (Michez *et al.*2019). The most prominent and species-rich family of bees in Belgium is the Apidae family (101 species) including the honeybee (*Apis mellifera*) and bumblebees (*Bombus* spp.), while the least diverse family is the Melittidae with only 9 species. Halictidae and Andrenidae can be the most species diverse groups encountered on the field, especially the genera *Lasioglossum* (Halictidae) and *Andrena* (Andrenidae) (e.g. Rasmont *et al.*1990).

Overall, 32.8% of bees (i.e. 113 species) are considered threatened in Belgium (Drossart *et al.*2019). Considering the Near Threatened (i.e. 26 species; 6.8%) and Regionally Extinct (i.e. 45 species; 11.8%) bees,the present study suggests that 1

bee species out of 2, i.e. 53.3% of the assessed species (i.e. 184 species), are (nearly) threatened or extinct in Belgium. A further 42.3% of bees (i.e. 161 species) are considered as Least Concern. However, out of a total of 403 bee species that arerecorded for Belgium, 22species that were observed only once with one specimen were assigned to the category Not Applicable (NA). It is unclear whether they ever had a population in Belgium. Consequently, they are considered as non-native. Another 36 species (i.e. 9.4%) were classified as Data Deficient, as there was not enough information to evaluate their risk of extinction.

The main threats identified are habitat loss and fragmentationdue to agricultural intensification (e.g. changes in agricultural practices including the use of pesticides and fertilisers) and urban development, as well as climate change.

It is hoped that by presenting the information related to these assessments, regional research will be stimulated to provide new data and to improve the quality of that already given (Nieto *et al.*2014). The Red List of Threatened Species constitutes a powerful tool for conservation planning, management, monitoring and decision making (Rodrigues *et al.*2006). It is namely used to support monitoring, guide management of natural resources, national development policies and legislation as well as multilateral agreements [e.g., the Convention on International Trade in Endangered Species of Wild Fauna and Flora (i.e. CITES) (Rodrigues *et al.*2006)].

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Family Andrenidae Latreille, 1802

Genus *Andrena* Fabricius, 1775

Andrena agilissima (Scopoli, 1770)

Common Name(s): French – *Andrène des crucifères* ; English – Violet-winged Mining Bee ; Dutch - *Blauwe Zandbij*; German - *Senf-Blauschillersandbiene*.

Figure 1. *Andrena agilissima*. A, female specimen; B, male specimen; C, *in copula* on *Sinapis arvensis* (Devant-Bouvigne, Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: EN (A2bc; B2ab(iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline

in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of the area of occupancy (B2). This is inferred from a severely fragmented AOO and continuing decline in the number of mature individuals ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: *Andrena agilissima* is distributed from southwestern and central Europe to north Africa ; National scale: mostly occurs in Gaume and Meuse valley, EOO = 500 km², AOO = 9 km².

Population. Continental scale: the population is thought to be decreasing (Tomozei 2014) ; National scale: lots of area (especially around Visé) have been lost, Rasmont *et al.* (1993) qualified the species as very highly significantly decreasing ; Current population trend: decrease.

Habitat and Ecology. Flying period: the species has one generation flying from late March to September ; Habitat: in whole Europe it is found in sandy areas, river banks, coastal grasslands, hollow ways, ruderal areas and field margins where Brassicaceae can be found (Tomozei 2014) ; Visited flowers: very few records in Belgium, in Europe females collect pollen mainly from Brassicaceae flowers (*Sinapis, Brassica, Erysimum, Barbarea vulgaris*), but also from Resedaceae (*Reseda lutea*), Asteraceae (*Hieracium, Taraxacum*), Grossulariaceae (*Ribes*) and Boraginaceae (*Myosotis*) (Kocourek 1966, Westrich 1996, Dylewska 1987, 2000, Osytshnjuk *et al.* 2005) ; Records on cultivated plants: in Belgium the species has been observed on *Crataegus sp.* and *Sinapis arvensis* (P. Rasmont pers. comm.), in Netherland on *Brassica napus* and *Sinapis alba* (Peeters *et al.* 2012) ; Nesting habits: this species is communal and nests in the crevices of sandstones and clay walls, outside house walls forming large aggregations (Rode 1962, Paxton *et. al.* 1999, Westrich 1996, Dylewska and Wisniowski 2003, Giovanetti *et al.* 1999, 2003) ; Parasites: *Nomada melathoracica* (Westrich 1996).

Threats. Reduction of food ressources: agricultural intensification (monoculture, intensive use of herbicides and nitrogen fertilizers) leaves no place for wild Brassicaceae on which the species depends ; **Reduction in the number of potential nesting sites:** decline in the number of clay walls and old vertical walls. The number of areas combining appropriate nesting sites and appropriate food ressources is extremely reduced in the actual Belgian agricultural landscape.

Conservation Actions. Present: this species is legally protected (LCN, annexe IIb) ; this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Endangered; Amiet 1994), Germany (Vulnerable; Westrich *et al.* 2008), Netherlands (Near Threatened; Peeters & Reemer 2003) and Slovenia (Rare; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and including a softer maintenance of fields borders) ; promotion of the conservation of old vertical walls ; promotion of an extensive rotation of cultivated fields including a one or two year fallow in order to allow annual plants to regenerate ; promotion of an early spring or late autumn plough in order to promote wild mustard or overwintering annuals to germinate ; establish a legal protection status of the few areas where the species occurs.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend ; specify the life history and ecology at the national scale.

Andrena alfkenella **Perkins, 1914**

Common Name(s): French – *Micrandrène d'Alfken* ; English – Alfken's Mini-miner ; Dutch - *Matte Dwergzandbij* ; German - *Alfkens Zwergsandbiene*.

Figure 2. *Andrena alfkenella*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Data Deficient due to a lack of identified samples ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe and the Caucasus region to Asia Minor and north Africa (Morocco) ; National scale: around Brussels, Liège and Vresse-sur-Semois, EOO = 200 km², AOO = 2 km².

Population. Continental scale: populations are small, there is no information available on the population trend of this species (Tomozei 2014) ; National scale: too few occurrence to establish any trend ; Current population trend: unknown.

Habitat and Ecology. Flying period: bivoltine from May to June and from July to August ; Habitat: in whole Europe it has a preference for the moist biotopes (verges, meadows) (Tomozei 2014), in Great-Britain it can be found in coastal sites and heaths (Perkins 1914), calcareous grassland (Else & Edwards 2018) ; Visited flowers: very few records in Belgium, in whole Europe it is thought to be polylectic, females forage on plants from Brassicaeae (*Berteroa incana*, *Capsella bursa-pastoris, Cardaria draba, Thlaspi, Isatis* sp., *Brassica* sp.), Rosaceae (*Potentilla verna, Fragaria* sp.), Asteraceae (*Bellis perennis, Matricaria inodora, Hieracium* sp.), Boraginaceae (*Echium vulgare, Veronica chamaedrys*), Apiaceae (*Pimpinella* sp., *Daucus carota, Angelica sylvestris, Pastinaca* sp., *Anthriscus* sp., *Falcaria* sp.) and Campanulaceae (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987) ; Records on cultivated plants: *Fragaria sp., Prunus spinosa, Pastinaca sativa, Daucus carota* ; Nesting habits: moderately sloppy loamy and sandy bands (Kocourek 1966) ; Parasites: unknown.

Threats. The threats to this species are unknown. The species may presumably be threatened by the reduction of suitable habitats (heaths, calcareous grasslands,

meadows, coastal sites, verges) and the loss of potential nesting sites due to agricultural intensification, urbanization of coastal areas and intensive mowing of verges.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Czech Republic (Endangered; Farkac *et al.* 2005), Switzerland (Regionally Extinct; Amiet 1994), Germany (Near Threatened; Westrich *et al.* 2008), Great Britain (Rare; Shirt 1987), Netherlands (Critically Endangered; Peeters and Reemer 2003) and Sweden (Near Threatened; Gärdenfors 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; more conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and including more polycultures, lower maintenance of fields borders …) ; promotion of diversified and extensive vegetable cultivation and orchards as this species can be found on many cultivated plants ; promotion of the conservation and restauration of heaths and calcareous grasslands (cf. Delescaille 2005) ; moderation of the urbanization of coastal sites.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend ; specify the life history and ecology of the species at the national scale.

Andrena angustior **(Kirby, 1802)**

Common Name(s): French – *Andrène étroite* ; English – Groove-faced Mining Bee ; Dutch - *Geriemde Zandbij* ; German - *Westliche Zangensandbiene*.

Figure 3. *Andrena angustior*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Taxonomic Notes:** While Warncke (1967) divided *A. angustior* into three subspecies, *Andrena angustior angustior* (Kirby, 1802), *Andrena angustior impressa* Warncke, 1967, and *Andrena angustior fulvata* Stöckhert, 1930, almost all authors after him regard *A. fulvata* as a distinct species from *A. angustior* (T. Wood pers. comm. 2019), and this approach is followed here for this assessment.

Assessment Information. Red List Category & Criteria: NT (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: Listed as Nearly Threatened because of a population decline (between 20% and 30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the extent of occurrence (EOO) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from south and central Europe eastwards to the western part of Germany ; National scale: formerly found everywhere in Belgium but has now disappeared from most its localities, EOO = 11,700 km², AOO = 116 km².

Population. Continental scale: populations are small, but there is no information available on the trend of this species (Tomozei 2014) ; National scale: Rasmont *et al.* (1993) qualified the species as very highly significantly increasing but a strong regression has been observed since this period ; Current population trend: decrease.

Habitat and Ecology. Flying period: from May to June ; Habitat: in whole Europe it occurs in humid habitats such as forest edges or mesophilous grasslands (Tomozei 2014), in Great-Britain it is associated with sandy open woodland, meadows and sometimes heaths (Perkins 1923) ; Visited flowers: in Belgium there are too few records to establish any clear floral preferences but females are

mostly associated with *Crataegus sp., Cytisus scoparius* and *Veronica chamaedrys*, males with *Carpinus betulus* and *Taraxacum sp.* (P. Rasmont pers. comm.), in whole Europe the species is considered as polylectic with records on Salicaceae (*Salix*), Asteraceae (*Taraxacum officinale, Hieracium pillosela*), Rosaceae (*Potentilla erecta, Fragaria vesca*), Scrophulariaceae (*Veronica chamaedrys*), Onagraceae (*Epilobium angustifolium*), Ranunculaceae (*Ranunculus*), Rhamnaceae (*Rhamnus catharticus*), Alliaceae (*Alium ursinum*), Brassicaceae (*Brassica napus*), Caryophillaceae (*Stellaria holostea*) and Fabaceae (*Cytisus*) (Dylewska 1987) ; Records on cultivated plants: *Crataegus sp., Iris germanica, Malus domestica, Petunia sp., Sinapis arvensis, Tulipa sp., Viburnum opulus* (P. Rasmont pers. comm.) ; Nesting habits: a compact nesting aggregation was observed in the face of a vertical cutting (R.C.L Perkins pers. obs. 1919) ; Parasites: *Nomada fabriciana* (R.C.L Perkins pers. obs. 1919).

Threats. Reduction of suitable habitats: intensive forestry practices (deletion of edges and clearings, closing of the vegetation), intensification in the use of grasslands (intensive grazing practices, silage) ; destruction of grasslands and heaths in agricultural, forestry or urbanization purposes ; drainage of humid habitats in agricultural, forestry or urbanization purposes.

Conservation Actions. Present: this species is included in the National Red List of Ireland (Vulnerable; Fitzpatrick *et al.* 2006). ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive forestry practices (*i.e.* including stepped edges and clearing) ; promotion of the conservation and restauration of mesophilous grasslands, open sandy woodlands and heaths.

Research Needed. Impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to clarify the actual population size, distribution and trends ; specify the ecology and life history at the national scale.

Andrena anthrisci Blüthgen, 1925

Common Name(s): French – *Micrandrène du Cerfeuil* ; German - *Kerbel-Zwergsandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Data Deficient due to a lack of identified samples ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Roberts (2014)

Geographic Range. Continental scale: widely distributed across the western and central parts of continental Europe, from Spain north eastwards to northern Germany and Slovakia, the species is endemic to Europe ; National scale: last observations around Vresse-sur-Semois and Virton (before 1990).

Population. There are no details available on either the overall population size or any trends at the European scale nor at the national scale.

Habitat and Ecology. Flying period: from the end of April until mid-August ; Habitat: in Germany it is known to inhabit meadows, field edges and ruderal places (Westrich 1989) ; Visited flowers: no records for Belgium but certainly a polylectic species, in Germany females have been observed on *Anthriscus sylvestris* (Apiaceae) and *Veronica chamaedrys* (Plantaginaceae) (Westrich 1989) ; Nesting habits: unknown ; Parasites: unknown.

Threats. The threats to this species are unknown. However, since it is associated with ruderal habitats, the agricultural intensification (monoculture, intensive use of herbicides and nitrogen fertilizers) probably has an impact on the species.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of Switzerland as Endangered (Amiet 1994) and the Czech Republic as Regionally Extinct (Farkac *et al*. 2005) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and including more polycultures and lower maintenance of fields borders).

Research Needed. Further sampling in order to specify the population size, distribution and trends ; determine the ecology and life history of the species.

***Andrena apicata* Smith, 1847**

Common Name(s): French – *Andrène sacrée* ; English – Large Sallow Mining Bee ; Dutch - *Donkere Wilgenzandbij* ; German - *Dunkle Lockensandbiene*.

Figure 4. *Andrena apicata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Taxonomic Notes:** While Warncke (1967) synonymized *A. batava* with *A. apicata* and was followed by some authors, Schmid-Egger and Scheuchl (1997), examined copious material of both taxa, reaching the conclusion that they are distinct species.

Assessment Information. Red List Category & Criteria: DD ; Red List Category & Criteria: EN (A2bc; B2ab(iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Data Deficient due to a lack of identified samples ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe and the Caucasus region to Asia Minor and Central Asia (Kazakhstan) ; National scale: mostly in northern Sambre-Meuse line (except Polders), EOO = 700 km², AOO = 9 km².

Population. There is no information available for the population size and trend of this species.

Habitat and Ecology. Flying period: from March to May ; Habitat: in whole Europe it occurs in humid biotopes such as river valleys, forest glades and edges, road sides or orchards (Tomozei 2014), in Great-Britain it has been observed in open woodland, heaths and moors, abandoned sand and chalk quarries (Else & Edwards 2018) ; Visited flowers: very few records for Belgium exclusively on *Salix caprea and S.* aurita (P. Rasmont pers. comm.), in whole Europe the species can be found on Asteraceae (*Taraxacum officinale, Tussilago farfara*), Salicaceae (*Salix*) and Rosaceae (*Prunus*) (Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2008) ; Records on cultivated plants: in whole Europe the species has been observed on *Prunus spp* and is recognized as an effective pollinator of fruit trees (such as cherry trees) (Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2008) ; Nesting habits: small and scattered aggregations (Perkins 1943, Chambers 1949,

Else pers. obs.) in open sandy areas (Else & Edwards pers. obs.) or solitarily at woodland edges (Dylewska 1987) ; Parasites: *Nomada leucophtalma* and *Stylops sp.* (Perkins 1919).

Threats. Reduction of suitable habitats: intensive forestry practices (deletion of edges and clearings, closing of the vegetation), agricultural intensification (monoculture, intensive grazing practices, drainage of humid biotopes), reduction in the number of extensive orchards, intensive mowing of verges, reconfiguration and scrub-encroachment of old sand and chalk quarries. **Reduction in the number of potential nesting sites**: reduction in the number of bare sandy areas due to scrub encroachment.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following seven European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Regionally Extinct; Farkac *et al.* 2005), Germany (Data Deficient; Westrich *et al*. 2008), Ireland (Data Deficient; Fitzpatrick *et al*. 2006), Netherlands (Vulnerable; Peeters and Reemer 2003), Norway (Critically Endangered; Kålås *et al*. 2010) and Sweden (Near Threatened; Gärdenfors 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; more conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promote extensive forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings) ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and including more polycultures, lower maintenance of fields borders) ; promotion of the rehabilitation of traditional orchards (*i.e.* including many different varieties and species) ; promotion of the conservation / rehabilitation of old sand and chalk quarries.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size, distribution and trends ; specify the life history and ecology of the species at the national scale.

Andrena argentata **Smith, 1844**

Common Name(s): French – *Andrène argentée* ; English – Small Sandpit Mining Bee ; Dutch - *Zilveren Zandbij* ; German - *Silber-Sandbiene*.

Figure 5. *Andrena argentata*. Male specimen (Photo : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2bc; B1ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: Listed as Nearly Threatened due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of the extent of occurrence (B1). This is inferred from a severely fragmented EOO and continuing decline in the number of locations or subpopulations ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe to the Caucasus region, Asia Minor, Central Asia (Kazakhstan) and the Russian Far East ; National scale: found in sandy areas of the northern Sambre-Meuse line, EOO = 200 km², AOO = 3 km².

Population. Continental scale: unknown ; National scale: recent regression in the number of populations and locations of subpopulations. Rasmont *et al.* (1993) qualified the species trend as stable ; Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from July to September ; Habitat: in whole Europe it occurs in humid biotopes such as forest edges, glades and roadsides (Tomozei 2014), in Great-Britain it has been observed in dry, ericaceous heaths and acidic grasslands (Else & Edwards 2018) ; Visited flowers: in Belgium most records are on *Crataegus spp.* and *Salix* caprea (P. Rasmont pers. comm.), in whole Europe it is thought to be polylectic, records on Asteraceae (*Achillea*

millefolium, Crepis paludosa, Taraxacum officinale, Tussilago farfara, Hieracium, Cirsium, Eryngium campestre), Ericaceae (*Calluna vulgari*a), Onagraceae (*Epilobium angustifolium*), Alismataceae (*Sagittaria sagitifolia*) Brassicaceae (*Brassica*), Dipsacaceae (*Succisa pratensis*), Rosaceae *(Sorbus, Crataegus, Potentilla verna, Prunus*), Salicaceae (*Salix*), Ranunculaceae (*Ranunculus*) and Apiaceae (*Heracleum, Selinum carvifolia, Sicum latifolium*) (Osytshnjuk *et al.* 2008) ; Records on cultivated plants: in Belgium on *Crataegus sp.* (P. Rasmont pers. comm.), in Great-Britain on *Pastinaca sativa* (Else & Edwards 2018), in Netherland on *Brassica oleracea, Crataegus sp., Prunus sp.* (Peeters *et al.* 2012) ; Nesting habits: nests in sandy soils in small aggregations (Osytshnjuk *et al.* 2008), found along sandy paths traversing heaths and sandpits (Else & Edwards 2018) ; Parasites: *Nomada baccata* and potentially *Sphecodes reticulatus* (Perkins 1919) and *Sphecodes ephippius* (Westrich 1989).

Threats. Reduction of suitable habitats: intensive forestry practices (deletion of edges and clearings, closing of the vegetation, drainage), intensive mowing of verges, destruction of ericaceous heaths in agricultural, forestry or urbanization purposes ; **Reduction in the number of potential nesting sites:** reduction in the number of bare sandy areas, trampling.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following seven European countries: Switzerland (Critically Endangered; Amiet 1994), Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008), Netherlands (Endangered; Peeters and Reemer 2003), Norway (Near Threatened; Kålås *et al.* 2010), Sweden (Near Threatened; Gärdenfors 2010) and Slovenia (Regionally Extinct; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; more conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promote extensive forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings and avoiding drainage) ; promotion of the conservation and restauration of ericaceous heaths and acidic grasslands.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size, distribution and trends at the national scale ; specify the ecology and life history of the species at the national scale.

Andrena assimilis Radoszkowski, 1876

Common Name(s): French – *Andrène ressemblante* ; German - *Gallische Düstersandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.
Taxonomic Notes: There are problems regarding the taxonomic status of *Andrena gallica* and *Andrena assimilis* which need further investigation. While Warncke (1967) and E. Scheuchl (pers. comm. 2014) consider *A. gallica* as a subspecies of *A. assimilis,* Osytshnuk (1978) treats *Andrena gallica* as separate species. F. K. Stoeckhert (1954) however, considered both taxa as conspecific (Gusenleitner and Schwarz 2002). For the purposes of this assessment, *A. gallica* and *A. assimilis* are treated as distinct species. The status of *Andrena barnei* Cockerell, 1931 remains unclear, since it could be either a subspecies or a distinct species. Cockerell (1931: 344-345) described *A. barnei* from Morocco. Warncke (1967: 255) regarded it as a subspecies of *A. assimilis*. Grünwaldt (1976: 273) tended to regard it as a valid species, but he wanted to await further examinations of the *A. assimilis-gallica*-complex. For the purposes of this assessment, the species will be treated as a subspecies of *Andrena assimilis* until this issue is solved.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: further research is needed in order to establish the status of this species throughout its range, based on new updated data ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: present in the Caucasus region, Greece, Macedonia, Bulgaria, Turkey, Kazahstan and Kirgistan ; National scale: no valid records.

Population. There is no information available on the population size and trend.

Habitat and Ecology. Due to the issues regarding the taxonomy, it is not known if the habitat and ecology information found in the literature is addressed to *Andrena assimilis* or *A. gallica.*

Threats. The threats to this species are unknown.

Conservation Actions. Given its uncertain taxonomic status, the ecological requirements of the species remain unknown.

Research Needed. Further research should be conducted to determine the taxonomy, population size and trend, habitat and ecology, and threats to this species.

Andrena barbareae Panzer, 1805

Common Name(s): French – *Andrène barbare* ; German - *Rauchflügelige Düstersandbiene.*

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Taxonomic Notes:** one of a group of very closely related sibling species including *A. barbareae*, *A. cineraria* and *A. danuvia*. The taxonomic status of these taxa is uncertain.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Not Evaluated due to a lack of identified samples ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Kemp *et al*. (2013).

Geographic Range. Continental scale: this taxon is believed to be endemic to upland regions of south-central Europe or at low altitudes in north Europe ; National scale: only one record around Arlon (Leclercq 1982).

Population. Population size and trend are not known.

Habitat and Ecology. Flying period: supposed bivoltine, in the south Alps, Czech Republic and Slovakia from April to May and from July to August (Kocourek 1966) ; Habitat: in whole Europe it is known to inhabit temperate grasslands (Kemp *et al.* 2013) ; Visited flowers: in whole Europe it is known as a polylectic species (Schmid-Egger and Scheuchl 1997) ; Nesting habits: unknown ; Parasites: unknown.

Threats. Mostly unknown as it is a rare species. It may suffer from a reduction of habitat and food ressources (destruction or intensification in the use of grasslands).

Conservation Actions. Present: this species is not listed in any National Red Lists or Red Data Books and it is not the subject of any targeted conservation action. Future: promotion of the conservation of grasslands, promotion of extensive grazing practices and hay production instead of silage.

Research Needed. Further research is needed into the taxonomy, distribution, population size and trends, ecology and threats ; further sampling in order to specify the population size and trend at the national scale.

Andrena barbilabris **(Kirby, 1802)**

Common Name(s): French – *Andrène barbue* ; English – Sandpit Mining Bee ; Dutch – *Witbaardzandbij* ; German - *Bärtige Sandbiene*.

Figure 6. *Andrena barbilabris*. A, female specimen; B, male specimen (Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Taxonomic Notes:** Although Warncke (1967) synonymized *Andrena pauperata* Pérez 1902 with *A. ruficrus* Nylander 1848, Gusenleitner and Schwarz (2002) synonymized it with *A. barbilabris*, and this is the reason why *A. pauperata* appears listed as a synonym of *A. barbilabris* in this assessment.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: in the Palearctic region, it is distributed through Europe, Asia Minor, west and eastern Siberia, the Russian Far East (Yakutia and Primorje Kraj) and Japan ; National scale: everywhere in northern Sambre-Meuse line, in southern Sambre-Meuse line there are records between Dinant and Charleroi and around Arlon, EOO = 8,200 km², AOO = 83 km².

Population. Continental scale: populations are presumed to be large, no information available on the population trend of this species ; National scale: stable populations, abundant in cities, Rasmont *et al.* (1993) qualified the species as very highly significantly increasing ; Current population trend: stable.

Habitat and Ecology. Flying period: from April to August ; Habitat: in whole Europe it occurs mainly in humid areas, including river valleys, meadows, forest edges and orchards (Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2008) ; Visited flowers: in Belgium females seem to forage almost exclusively on *Crataegus spp.* and males on *Salix sp.* (P. Rasmont pers. comm.), in whole Europe it is considered as polylectic, records on Asteraceae, Brassicaceae, Salicaceae (*Salix*), Ranunculaceae (*Ficaria verna*), Rosaceae (*Potentilla verna, Crataegus oxyachanta, Spirea, Sorbus, Rosa canina, Rubus, Pyrus*), Rhamnaceae (*Rhamnus cathartica, R. frangula*), Caryophyllaceae (*Stellaria media*), Grossulariaceae (*Ribes grossularia*), Berberidaceae (*Berberis*), Lamiaceae (*Salvia pratensis*), Fabaceae (*Lotus*

corniculatus) and Ericaceae (*Erica*) (Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2008) ; Records on cultivated plants: in Belgium on *Crataegus sp., Prunus cerasus, Rubus idaeus, Brassica oleracea* (P. Rasmont pers. comm.), in Great-Britain on *Pinus sylvestris, Brassica nigra, Sinapis sp., Crataegus monogyna, Smyrnium olusatrum* (Else & Edwards 2018), in whole Europe on *Pyrus sp., Ribes grossularia* (Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2008), this species has been identified as a pollinator of cherry trees (Tomozei 2014); Nesting habits: exposed sandy areas, footpaths, sandpits, between paving stones (Else & Edwards 2018), occasionally found in enormous and compact aggregation (Perkins 1919) ; Parasites: *Sphecodes pellucidus* (Perkins 1919, Edwards pers. obs.)

Threats. No major threat to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific conservation actions have to be taken.

Andrena bicolor **Fabricius, 1775**

Common Name(s): French – *Andrène bicolore* ; English – Gwynne's Mining Bee ; Dutch - *Tweekleurige Zandbij* ; German - *Zweifarbige Sandbiene*.

Figure 7. *Andrena bicolor*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging(Liège, Photo : J.M. Michalowski).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: all over Europe ; National scale: everywhere in Belgium, EOO = 17,900 km², AOO = 244 km².

Population. Continental scale: populations are presumed to be large, no information available on the population trend ; National scale: stable and

widespread populations, Rasmont *et al.* (1993) qualified the species as very highly significantly increasing ; Current population trend: increase.

Habitat and Ecology. Flying period: two generations from the end of March to August ; Habitat: in whole Europe it occurs in a variety of humid and dry habitats including open woodlands, calcareous grasslands and orchards (Osytshnjuk 1977, Else 2006) ; Visited flowers: polylectic, females forage mainly on *Campanula spp., Tussilago farfara, Salix spp., Taraxacum spp.* and males on *Tussilago spp.* and *Salix spp.* (P. Rasmont pers. comm.) ; Records on cultivated plants: *Brassica napus, Prunus spinosa, Iris sp., Narcissus sp., Ribes rubrum, Aubrieta deltoidea, Brassica oleracea, Coriandrum sativum, Eschscholzia californica, Prunus laurocerasus, Prunus avium, Rhododendron sp., Thymus spp., Trifolium repens, Crocus sp., Ribes uva-crispa* (P. Rasmont pers. comm.), considered as one of the main pollinators of *Prunus spp.* (Tomozei 2014) ; Nesting habits: nests solitarily in exposed soil (Westrich 1989, Kocourek 1966) ; Parasites: *Nomada fabriciana* (Westrich 1989).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific conservation actions have to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources ; impact of pesticides on behaviour ; specify the ecology and life history at the national scale.

Andrena bimaculata **(Kirby, 1802)**

Common Name(s): French – *Andrène à deux taches* ; English – Large Gorse Mining Bee ; Dutch - *Donkere Rimpelrug* ; German - *Schwarzbeinige Rippensandbiene*.

Figure 8. *Andrena bimaculata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2c) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Nearly Threatened because of a population decline (between 20% and 30% between 1900-1969 and 1970-2017) based on a decline in the area of occupancy (AOO) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: widely distributed in Europe ; National scale: typical from the natural region of Campine, EOO = 300 km², AOO = 3 km².

Population. Continental scale: although the species is widespread, it is generally scarce and very local (Falk 1991); National scale: populations are scattered and restricted to a specific biotope, a recent decline has been observed in the areas they are usually encountered, Rasmont *et al.* (1993) qualified the species trend as stable ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, the first generation from end of March to May and the second one from July to August ; Habitat: in whole Europe it can be found in a variety of humid habitats including mesophilous grasslands, crop borders and orchards (Tomozei 2014), in Great-Britain it is associated with well-exposed sandy soil such as heaths and sandpits (Else and Edwards 2018) ; Visited flowers: very few records from Belgium, in whole Europe the first generation can be observed on Salicaceae (*Salix*) and the second one on Brassicaceae (*Sinapis, Brassica napus, Sisymbrium)*, Resedaceae (*Reseda lutea*), Rosaceae (*Rosa*), Rhamnaceae (*Rhamnus*) and Asteraceae (*Succisa pratensis*) (Osytshnjuk 1977, Dylewska 1987) ; Records on cultivated plants: in Great-Britain it has been observed on *Prunus spinosa, Castanea sp., Rubus spp., Allium* cultivars (Else & Edwards 2018) and it is considered as an effective pollinator of orchards by Osytshnjuk (1977) and Dylewska (1987) ; Nesting habits: nests are scattered or

in small aggregations on banks (Perkins 1919) or solitarily in grassy slopes (Kocourek 1966, Westrich 1989) ; Parasites: *Nomada fulvicornis* (Chambers 1949).

Threats. Intensification in the use of grasslands (intensive grazing practices, silage) ; eutrophication of mesophilous habitats ; over-maintenance of verges ; destruction of heathlands for agricultural, forestry and urbanization purposes ; reconversion (urbanization, afforestation) or scrub encroachment of sandpits.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Regionally Extinct; Farkac *et al*. 2005), Germany (Near Threatened; Westrich *et al*. 2008), Netherlands (Endangered; Peeters and Reemer 2003), Sweden (Vulnerable; Gärdenfors 2010) and Slovenia (Endagered; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; more conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of the conservation / rehabilitation of mesophilous grasslands, sandpits and heathlands ; promotion of the rehabilitation of traditional orchards (*i.e.* wide range of species and varieties extensively grown).

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size, distribution and trends at the national scale ; specify the ecology and life history at the national scale.

Andrena carantonica **Pérez, 1902**

Common Name(s): French – *Andrène sociable* ; Dutch – *Meidoornzandbij* ; German - *Gesellige Sandbiene*.

Figure 9. *Andrena carantonica*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging (Nismes, Photo : Y. Barbier).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.
Taxonomic Notes: there are different taxonomic issues regarding this species. While Rasmont *et al*. (2013) treats *Andrena carantonica* as a junior synonym of *Andrena sabulosa*, which is the first given name of the species (*Apis sabulosa* Scopoli 1763), Gusenleitner and Schwarz (2002) use *Andrena sabulosa* as a synonym of *Andrena carantonica*. However, *Andrena sabulosa* (Scopoli, 1763) is a nomen dubium according to E. Scheuchl (pers. comm. 2014), since the type material is destroyed and the description is very vacuous. Indeed, it was synonymized with *Osmia bicornis* (*O. rufa*) by Rogenhofer and Dalla Torre 1882. Some specialists consider existing problems in discriminating *Andrena carantonica* and *Andrena trimmerana*. Warncke considers *Andrena trimmerana* as a summer generation of *Andrena carantonica*.

Schmid-Egger and Scheuchl (1997) treat the species separately. This issue is largely disscused by Gusenleitner and Schwarz (2002).

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: whole Europe ; National scale: no available data.

Population. Continental scale: there is no information available on the populational size and trend ; National scale: Rasmont *et al.* (1993) qualified the species trend as very highly significantly increasing ; Current population trend: increase.

Habitat and Ecology. Flying period: univoltine, from late March to early June ; Habitat: in whole Europe it occurs in humid habitats, including gardens, orchards, mesophilous grasslands and forest edges (Tomozei 2014), heathland, agricultural areas, parks, ditch walls, railway sites, city gardens and floodplains (Peeters *et al.*2012) ; **Visited flowers**: polylectic (P. Rasmont pers. comm.) ; Records on cultivated plants: *Crataegus monogyna, Pyrus sp., Brassica napus, Prunus spp., Malus sp., Fragaria sp., Rubus idaeus* (P. Rasmont pers. comm.); Nesting habits: the species is communal, nesting in aggregations in the soil of gardens, forest edges and meadows (Osytshnjuk *et al.* 2008) ; Parasites: *Nomada marshamella*, *Nomada flava* (Westrich 1989).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific conservation actions have to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources ; impact of pesticides on behaviour ; determine potential other threats on the species ; further sampling in order to specify the actual population size, distribution and trends ; determine potential threats to the species ; clarify the taxonomic status of the species.

Andrena chrysopus Pérez, 1903

Common Name(s): French – *Andrène de l'Asperge* ; German - *Spargel-Sandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: mainly central Europe and eastwards to the Caucasus region, Asia Minor and Central Asia (Kazakhstan) ; National scale: one record in Sint-Martens-Voeren, EOO = 100 km², AOO = 1 km².

Population. Continental scale: populations are small, but there is no information available on the trend of this species ; National scale: only one record ; Current population trend: unknown.

Habitat and Ecology. Flying period: from May to June, and occasionally from late April to July ; Habitat: in whole Europe the species is known to inhabit xeric habitats (Tomozei 2014) ; Visited flowers: no data for Belgium, in whole Europe there are females records on Asparagaceae (*Asparagus officinalis, Asparagus tenuifolius*), and they are rarely found on Brassicaceae and Rosaceae, male records on *Taraxacum officinale* (Osytshnjuk 1977, Osytshnjuk *et al.* 2008) ; Records on cultivated plants: *Asparagus officinalis* ; Nesting habits: the species nests solitary in soil (Osytshnjuk 1977, Osytshnjuk *et al.* 2008) ; Parasites: unknown.

Threats. Reduction of *Asparagus* species in xeric habitats, the effect of certain pathogens, such as *Fusarium,* is one of the influencing factors of this decline (Wong and Jeffries 2006).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Critically Endangered; Farkac *et al.* 2005) and Germany (Near Threatened; Westrich *et al.* 2008). Future: promote extensive polycultures instead of intensive monocultures ; promotion of the conservation of xeric habitats.

Research Needed. Quantify the impact of pathogens on food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size, distribution and trends at the national scale ; specify the ecology and life history at the national scale.

Andrena chrysopyga **Schenck, 1853**

Common Name(s): French – *Andrène cul-d'or* ; Dutch – *Goudstaartzandbij* ; German - *Goldafter-Bindensandbiene*.

Figure 10. *Andrena chrysopyga*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from southern and central Europe eastwards to European Russia (Bashkiria), the Caucasus region, Asia Minor and Central Asia (Kazakhstan, Kirgizstan) ; National scale: listed as RE but there are recent records around Vresse-sur-Semois and Mons (9 specimens in Mons by William Fiordaliso in 2019).

Population. Continental scale: although populations are presumed to be small, there is no information available on their actual size and trend ; National scale: too few records to establish the size and trend ; Current population trend: unknown.

Habitat and Ecology. Flying period: from May to the beginning of July ; Habitat: in whole Europe it occurs in dry habitats (Tomozei 2014), in warm locations such as dry grasslands and heathlands (Dylewska 1987, Peeters *et al*. 2012) ; Visited flowers: polylectic (Osytshnjuk 1977, Dylewska 1987) ; Nesting habits: nests in small aggregations (Peeters *et al*. 2012) ; Parasites: *Nomada mutabilis* (Kocourek 1966), possibly *Nomada stigma* and *Sphecodes ephippius* (Westrich 1989).

Threats. The threats to this species are not known. It may however potentially suffer from the reduction of suitable habitats through changes in land uses due to the intensification of agricultural and forestry practices.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Czech Republic (Vulnerable; Farkac *et al*. 2005), Germany (Endangered; Westrich *et al*. 2008), Estonia (Rare; Lilleleht 2001), Netherlands (Endangered; Peeters and Reemer 2003) and Sweden (Endangered; Gärdenfors 2010) ; development of agro-

environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; Future: promote extensive forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings), promote extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the actual population size, distribution and trends at the national scale ; specify the ecology and life history of the species at the national scale.

Andrena chrysosceles **(Kirby, 1802)**

Common Name(s): French – *Andrène pattes-d'or* ; English – Hawthorn Mining Bee ; Dutch – *Goudpootzandbij* ; German - *Gelbbeinige Kielsandbiene*.

Figure 11. *Andrena chrysosceles*. A, female specimen; B, male specimen; C, foraging on *Potentilla sterilis.* (Auderghem, Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from southern and central Europe eastwards to the Caucasus region and Central Asia (western Kazakhstan) ; National scale: everywhere in Belgium, EOO = 12,300 km², AOO = 161 km².

Population. Continental scale: there is no information available on the population size and trend of this species ; National scale: Rasmont *et al.* (1993) qualified the species as very highly significantly increasing ; Current population trend: increase.

Habitat and Ecology. Flying period: from late March to late June or early July ; Habitat: in whole Europe it is considered as ubiquitous (Tomozei 2014) ; Visited flowers: polylectic (P. Rasmont pers. comm.) ; Records on cultivated plants: in Belgium on *Crataegus monogyna, Aurinia saxatilis, Brassica napus, Fragaria vesca, Lactuca sativa, Malus domestica, Prunus laurocerasus, Ribes nigrum, Trifolium repens, Prunus spinosa, Wisteria floribunda* (P. Rasmont pers. comm.), in Great-Britain on *Crataegus, Castanea sativa, Prunus spinosa, Smyrnium olusatrum* and *Allium* cultivars (Else & Edwards 2018) ; Nesting habits: few information, seems to nest in isolated burrows (Else & Edwards 2018) and reported in both sandy and loamy banks (Kocourek 1966) ; Parasites: *Nomada fabriciana* (Stöckhert 1933, Yarrow 1941).

Threats. No major threats to this species.

Conservation Actions. Present: this species is included in the National Red Lists of Slovenia (Endangered; Anonymous 2002). Future: no future specific conservation actions have to be taken at the national scale.

Andrena cineraria **(L., 1758)**

Common Name(s): French – *Andrène cinéraire* ; English – Ashy Mining Bee ; Dutch – *Asbij* ; German - *Grauschwarze Düstersandbiene*.

Figure 12. *Andrena cineraria*. A, female specimen; B, male specimen; C, foraging on *Crataegus sp.* (Sart-Tilman, Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe to the Caucasus region, southwestern Asia (Turkey, Israel, Iran), Central Asia (Turkmenistan, Kazakhstan, Afghanistan), Siberia until Khabarovsk Kray, India, Mongolia and China ; National scale: everywhere in Belgium, EOO = 10,100 km², AOO = 80 km².

Population. Continental scale: there is no information available on the trend and size of the species ; National scale: Rasmont *et al* (1993) qualified the species as stable ; Current population trend: decrease.

Habitat and Ecology. Flying period: from late March to early June ; Habitat: ubiquitous species, in whole Europe it occurs in various habitats such as uncultivated fields, grasslands, road sides, gardens and valleys (Osytshnjuk 1977), sandy sites (open woodland, moorland, coastal sites, river banks, old quarries), friable chalk, silt and clay sites, urban areas (garden lawns, golf courses) and calcareous grasslands (Archer and Else 2002) ; Visited flowers: polylectic (P. Rasmont pers. comm.) ; Records on cultivated plants: in Belgium *Brassica napus, Prunus spinosa, Crataegus sp., Brassica rapa, Malus sp., Prunus mahaleb, Aesculus hippocastanum* and *Prunus spinosa* (P. Rasmont pers. comm.), in Great-Britain on *Prunus spinosa, Pyrus sp.* and *Crataegus* (Else & Edwards 2018), considered an effective pollinator of fruit trees (Osytshnjuk 1977, Osytshnjuk *et al.* 2008) ; Nesting habits: often nest in large and compact aggregation but nests sometimes isolated or in small aggregation (Else & Edwards 2018, Tomozei 2014) ; Parasites: *Nomada lathburiana* (Westrich 1989), *Nomada goodeniana* (G.M. Spooner & G.R. Else pers. obs.).

Threats. No major threats to species.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following two European countries: Switzerland (Vulnerable; Amiet 1994) and Slovenia (Regionally Extinct; Anonymous 2002). Future: no future specific conservation actions have to be taken at the national scale.

Andrena cinerea Brullé, 1832

Common Name(s): French – *Andrène cendrée*

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from southern Europe, Asia Minor and Caucasus to north Africa (Morocco, Algeria, Tunisia, Egypt) ; National scale: Unknown, EOO = 100 km², AOO = 1 km².

Population. There is no information available on the and trends of this species.

Habitat and Ecology. Flying period: spring species ; Habitat: in whole Europe it occurs in grasslands and forest edges (Tomozei 2014) ; Visited flowers: no data for Belgium, in whole Europe it is considered as polylectic, female records on *Salix, Taraxacum officinalis, Prunus cerasifera* (Tomozei 2014) ; Nesting habits: unknown ; Parasites: unknown.

Threats. The threats to this species are not known.

Conservation Actions. The species is not subject to any targeted conservation action. No future conservation actions can be taken given the lack of knowledge about the ecology of the species.

Research Needed. Determine the ecology and life history of the species at the national scale ; further sampling in order to specify the actual population size, distribution and trends at the national scale.

Andrena clarkella **(Kirby, 1802)**

Common Name(s): French – *Andrène à pattes rouges* ; English – Clarke's Mining Bee ; Dutch - *Zwart-rosse Zandbij* ; German - *Rotbeinige Lockensandbiene*.

Figure 13. *Andrena clarkella*. A, female specimen; B, male specimen; C, foraging on *Salix caprea* (Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through the north and central areas eastwards to European Russia ; **National scale**: everywhere in Belgium, EOO = 12,700 km², AOO = 107 km².

Population. Continental scale: there is no information available on the size and trend of this species ; National scale: Rasmont *et al.* (1993) qualified the species as stable ; Current population trend: stable.

Habitat and Ecology. Flying period: from early March to late May ; Habitat: in whole Europe it occurs in humid biotopes, including woods, heaths, moors and disused sand and gravel pits (Tomozei 2014), in Great-Britain it occurs in open woodlands, sandpits, heaths and moors with scrub or scattered trees (Else & Edwards 2018) ; Visited flowers: preferably on *Salix spp.* and *Taraxacum spp.* (P. Rasmont pers. comm) ; Records on cultivated plants: in Belgium on *Prunus spinosa, Prunus avium, Pyrus communis, Crocus sp.* (P. Rasmont pers. comm) ; Nesting habits: nests are excavated in banks, between buttress roots of standing trees, in small assemblages or in dense and compact aggregations (Else & Edwards 2018), nests can be found in forest edges, glades and parks (Tomozei 2014) ; Parasites: *Nomada leucophtalma* (Else 2001, Osytshnjuk *et al.* 2005).

Threats. No major threats to this species.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Regionally Extinct; Amiet 1994), Czech Republic (Vulnerable; Farkac *et al.* 2005) and Germany (Endangered; Westrich *et al.* 2008). Future: no future specific conservation actions have to be taken at the national scale.

Research Needed. Specify the ecology and life history of the species at the national scale.

Andrena coitana **(Kirby, 1802)**

Common Name(s): French – *Andrène greffée* ; English – Small Flecked Mining Bee ; Dutch – *Boszandbij* ; German - *Bergwald-Sandbiene*.

Figure 14. *Andrena coitana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: EN (B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to a limited geographic range in the form of (B1) the extent of occurrence (comprised between 500 and 1500 km²) as well as in the form of (B2) the area of occupancy (comprised between 5 and 15 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the EOO, AOO and number of locations of subpopulations (only three remaining locations where it can be found) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: whole Europe ; National scale: mostly in the natural region of Ardenne, EOO = 900 km², AOO = 8 km².

Population. Continental scale: there is no information available on the trend of this species ; National scale: Rasmont *et al.* (1993) qualified the species as stable ; Current population trend: stable.

Habitat and Ecology. Flying period: from early June to late August ; Habitat: in whole Europe it occurs in humid habitats (open woodlands, moorlands, commons, lowlands, fens and coastal habitats) (Tomozei 2014) ; Visited flowers: very few records for Belgium, in whole Europe it can be found on Asteraceae (*Leontodon hispidus, Centaurea carpatica, Cirsium, Hypocaeris radicata*), Campanulaceae (*Campanula rapunculoides*), Rosaceae (*Rubus, Potentilla erecta*), Apiaceae (*Heracleum sphondylium, Angelica sylvestris)*, Onagraceae (*Oenothera*), Ranunculaceae (*Ranunculus flammula*), Caryophyllaceae (*Stellaria graminea*) and Malvaceae (*Malva*) (Osytshnjuk 1977, Else 2005) ; Nesting habits: nests solitarily (Else & Edwards 2018) ; Parasites: *Nomada obtusifrons* (Hallett 1928), *Nomada roberjeotiana* (Westrich 1989).

Threats. Reduction of suitable habitats: intensive forestry practices (deletion of edges and clearings, closing of the vegetation, drainage), agricultural intensification (monoculture, overgrazing, drainage of wetlands), intensive urbanization of coastal areas, intensification in the uses of grassland (intensive grazing practices, silage).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008), Ireland (Vulnerable; Fitzpatrick *et al.* 2006), Netherlands (Critically Endangered; Peeters and Reemer 2003) and Slovenia (Endangered; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015 ; Terzo & Rasmont, 2007). Future: promote extensive forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings and restriction of drainage for cultivation purposes) ; promote extensive agricultural (*i.e.* excluding intensive use of pesticides and liquid fertilizer) and grazing practices ; promote the conservation of coastal habitats.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend ; specify the life history and ecology of the species at the national scale.

Andrena combinata **(Christ, 1791)**

Common Name(s): French – *Andrène combine* ; Dutch – *Rimpelsnuit* ; German - *Dichtpunktierte Körbchensandbiene*.

Figure 15. *Andrena combinata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from southern and central Europe and north Africa (Algeria) to the Caucasus region (Armenia, Azerbaijan), southwestern Asia (Turkey, Israel), Central Asia and Siberia ; National scale: around Brussels and Maasmechelen, EOO = 300 km², AOO = 5 km².

Population. Continental scale: there is no information available for the population size and trend of this species ; National scale: recent drastic decline in the number of population as well as in the AOO and EOO. Rasmont *et al.* (1993) qualified the species trend as very highly significantly decreasing ; Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from the end of April to August (Dylewska 1987, Tomozei 2014), univoltine (Westrich 1989, Peeters *et al.* 2012) ; Habitat: in whole Europe it occurs in a variety of habitats, including vegetation along railroad tracks, roadsides and forests borders (Tomozei 2014), in the Netherland it occurs in xeric habitats such as chalky grasslands, dry and nutrient-poor grasslands (Peeters *et al.* 2012) ; Visited flowers: very few records for Belgium, in whole Europe it is considered as polylectic (Osytshnjuk 1977,

Dylewska 1987) ; Records on cultivated plants: *Daucus carota* (Peeters *et al.* 2012) ; Nesting habits: in the ground, solitarily or in small aggregations (Peeters *et al.* 2012) ; Parasites: *Nomada piccioliana* (Stöckhert 1941, 1954).

Threats. Afforestation of nutrient-poor soils on forestry purposes ; agricultural intensification (monoculture, intensive grazing practices, eutrophication of nutrient-poor habitats).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008) and Netherlands (Critically Endangered; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015 ; Terzo & Rasmont, 2007). Future: promote extensive agricultural (*i.e.* excluding intensive use of pesticides and liquid fertilizer) and grazing practices, especially in nutrient-poor soils ; promote the conservation and restauration of chalky and nutrient-poor grasslands (cf. Delescaille 2005).

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend ; specify the life history and ecology of the species at the national scale.

Andrena curvungula **Thomson, 1870**

Common Name(s): French – *Andrène à griffes courbes* ; Dutch - *Gewone Klokjeszandbij* ; German - *Braune Schuppensandbiene*.

Figure 16. *Andrena curvungula*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (A2c; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: Listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of (B1) the extent of occurrence (< 500 km²) as well as in the form of (B2) the area of occupancy (< 5 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the EOO, AOO and number of locations of subpopulations ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe to the Caucasus region, Asia Minor and Central Asia (western Kazakhstan) ; National scale: in the natural region of Fagne-Famenne.

Population. Continental scale: there is no actual information available on the population size and trend of this species. National scale: very few and scattered subpopulations, drastic and continuous decline in the EOO, AOO and number of locations of subpopulations. Rasmont *et al.* (1993) qualified the species as significantly decreasing ; Current population trend: decrease.

Habitat and Ecology. Flying period: from May to June ; Habitat: in whole Europe it occurs in various habitat, preferring humid ones (mesophilous grasslands, forest borders, woodlands, wetlands) (Tomozei 2014), in Netherland it occurs in dry warm areas (Peeters *et al.* 2012) ; Visited flowers: oligolectic, in Belgium females occur on *Geranium sanguineum* and *Campanula spp.* (P. Rasmont pers.

comm.), in whole Europe on Campanulaceae (*Campanula*), occasionally visiting flowers of Geraniaceae (*Geranium*), Rosaceae (*Potentilla*), Scrophulariaceae (*Veronica*) and Malvaceae (*Lavatera*) (Tomozei 2014) ; Nesting habits: in large aggregations in the soil (Dylewska 1987, Osytshnjuk *et al.* 2008) ; Parasites: *Nomada braunsiana* and possibly *Nomada fulvicornis*, *Nomada succincta* (Dylewska 1987, Westrich 1989).

Threats. Reduction of suitable habitats: intensive forestry practices (deletion of edges and clearings, closing of the vegetation, drainage), agricultural intensification (monoculture, intensive grazing practices, drainage) ; destruction of xerothermic habitats in agricultural, forestry or urbanization purposes.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Endangered; Amiet 1994), Germany (Vulnerable; Westrich *et al*. 2008), Netherlands (Regionally Extinct; Peeters and Reemer 2003) and Slovenia (Endangered; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015 ; Terzo & Rasmont, 2007) ; this species is legally protected (LCN, annexe IIb). Future: promote extensive agricultural (*i.e.* excluding intensive use of pesticides and liquid fertilizer), grazing and forestry practices, especially in humid and xerothermic habitats ; restriction of drainage in agricultural or forestry purposes ; promote the conservation and restauration of dry habitats (cf. Delescaille 2005).

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend ; specify the life history and ecology of the species at the national scale.

Andrena decipiens **Schenck, 1861**

Common Name(s): French – *Andrène décevante* ; German - *Mannstreu-Sandbiene*.

Figure 17. *Andrena decipiens*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Taxonomic Notes:** *Andrena decipiens* Schenck, 1859 and *Andrena flavilabris* Schenck, 1874, formerly regarded as two generations of one species, seem to be two distinct species (Mandery *et al*. 2008).

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Not Evaluated in view of the lack of information on the population size and trend, and specific threats to the species ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from south and central Europe to European Russia, the Caucasus region, north Africa and southwestern Asia ; National scale: no data.

Population. There is no information available on the population size and trend of this species.

Habitat and Ecology. Flying period: from May to September ; Habitat: in whole Europe it mainly occurs in xerophilous habitats (steppe slopes and grasslands) and is also found in clover crops (Tomozei 2014) ; Visited flowers: no data for Belgium, in whole Europe it is thought to be polylectic, females have been reported collecting pollen on Apiaceace, Asteraceae, Brassicaceae, Fabaceae, Lamiaceae, Rosaceae and Salicaeace species (Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al*.2008) ; Records on cultivated plants: *Trifolium spp.* (Tomozei 2014) ; Nesting habits: unknown ; Parasites: unknown.

Threats. The threats to this species are unknown at the national scale. However it may have suffered from the reduction of clover crops (from 160,000 ha in 1910 to 5,000 ha in 2014), from the intensification in the uses of grasslands (intensive grazing practices, silage instead of hay production) and from the eutrophication of nutrient-poor habitats due to the agricultural intensification.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Regionally Extinct; Amiet 1994), Czech Republic (Critically Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2008) and Slovenia (Endangered; Anonymous; 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; Future: promote extensive agricultural (*i.e.* excluding intensive use of pesticides and liquid fertilizer) and grazing practices ; promote the reintegration of leguminous cropping into crop rotation , promote the conservation and restauration of xerothermic habitats (cf. Delescaille 2005).

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to determine the existence of potential populations in Belgium ; specify the life history and ecology of the species at the national scale.

Andrena denticulata **(Kirby, 1802)**

Common Name(s): French – *Andrène de la Tanaisie* ; English – Grey-banded Mining Bee ; Dutch – *Kruiskruidzandbij* ; German - *Rainfarn-Herbstsandbiene*.

Figure 18. *Andrena denticulata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2c) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Nearly threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from central and north Europe to the mountainous regions of southwestern Europe, northern Kazakhstan, Mongolia and Russia, including southern Siberia, Primorye and Sakhalin ; National scale: around Overslag, Ghent, Malines, Leuven, Vresse-sur-Semois and eastern Campine, EOO = 600 km², AOO = 6 km².

Population. Continental scale: there is no information available on the population size and trend of this species ; National scale: decline in the extent of occurrence (EOO). Rasmont *et al.* (1993) qualified the species as very highly significantly decreasing ; Current population trend: stable.

Habitat and Ecology. Flying period: univoltine, late summer species flying from July to the end of August or beginning of September ; Habitat: in whole Europe it occurs in moist habitats (mesophilous grasslands and forest edges), where there is a good representation of yellow Asteraceae flowers (Tomozei 2014) ; Visited flowers: in Belgium it is oligolectic on various Asteraceae (P. Rasmont pers. comm.), in whole Europe the species is oligolectic on Asteraceae (records on *Solidago virgo aurea, Solidago canadensis, Senecio jacobaea, Achillea millefolium, Heracleum sphondilium, Hypochaeris radicata, Tanacetum vulgare, Cichorium intybus, Leontodon, Centaurea jacea, Hieracium pilosella* and *Senecio* species) (Osytshnjuk 1977, Dylewska 1987), Chambers (1968) and Else & Edwards (2018) consider it

polylectic as there are records on Rosaceae, Fabaceae, Onagraceae, Apiaceae and Campanulaceae ; Nesting habits: solitarily at forest edges, clearings and on paths (Dylewska 1987) ; Parasites: *Nomada rufipes* (Chambers 1949).

Threats. Intensive forestry practices (deletion of edges and clearings, closing of the vegetation, drainage) ; intensification in the uses of grasslands (intensive grazing practices, silage instead of hay production).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Endangered; Amiet 1994), Czech Republic (Vulnerable; Farkac *et al*. 2005), Germany (Near Threatened; Westrich *et al*. 2008), Ireland (Vulnerable; Fitzpatrick *et al*. 2006) and the Netherlands (Endangered; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promote extensive forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings) ; promote extensive grazing practices ; promote hay production instead of silage ; promote the conservation and rehabilitation of mesophilous grasslands.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend at the national scale; specify the life history and ecology of the species at the national scale.

Andrena distinguenda Schenck, 1871

Common Name(s): French – *Andrène distinguée* ; Dutch – *Kruisbloemzandbij* ; German - *Glanzlose Riefensandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.
Taxonomic Notes: Warncke (1992) split *A. obsoleta* into three subspecies: ssp. *obsoleta,* ssp. *nitidula* and ssp. *spongiosa.* However, Gusenleitner and Schwarz (2002) assumes that there are two species: *A. distinguenda* and *A. nitidula*, the taxa *spongiosa* and *obsoleta* being synonyms of *A. distinguenda*. Burger and Herrmann (2003) again recognized three species: *A. distinguenda, A. nitidula and A. obsoleta,* and E. Scheuchl (pers. comm. 2014) also considers *A. distinguenda* and *A. obsoleta* as different species, the latter one being restricted to northwestern Africa and Iberia. However, for the purposes of this assessment, Gusenleitner and Schwarz (2002) criteria will be applied.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through south and central Europe eastwards to Romania and Bulgaria. It has also been recorded in north Africa in Morocco, Algeria and Tunisia, these records referring to *A. obsolete.* National scale: last observation in Woluwé 1899.

Population. Continental scale: there is no actual information on the population size and trends ; National scale: extinct.

Habitat and Ecology. Flying period: from April to June ; Habitat: in whole Europe it occurs in mesophilous grasslands and set-aside fields (Beláková 1972, Steffan-Dewenter and Tscharntke 2001), in Netherland it occurs in chalky grasslands (Peeters *et al*. 2012) ; Visited flowers: no records for Belgium, in whole Europe there are records on Brassicaceae (*Cardaria draba, Barbarea vulgaris, Capsella bursa-pastoris, Brassica, Crame tatarica*), Asteraceae (*Crepis, Leontodon, Taraxacum*) and Fabaceae (*Melilotus*) species (Dylewska 1987) ; Nesting habits: solitarily in the ground (Kocourek 1966) ; Parasites: unknown.

Threats. The extinction of this species is probably due to the intensification in the uses of grasslands (intensive grazing practices, silage), monoculture without set-aside, destruction of grasslands in agricultural, forestry or urbanization purposes, eutrophication of nutrient-poor or mesophilous grasslands.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008), Netherlands (Near Threatened; Peeters and Reemer 2003), Slovenia (Endangered; Anonymous 2002) and Switzerland (Regionally Extinct; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promote extensive agricultural (*i.e.*

excluding intensive use of pesticides and nitrogen fertilizers) and grazing practices, promote the conservation and rehabilitation of mesophilous or chalky grasslands.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to determine the existence of potential remaining populations ; specify the life history and ecology of the species.

Andrena dorsata **(Kirby, 1802)**

Common Name(s): French – *Andrène dorsale* ; English – Short-fringed Mining Bee ; Dutch – *Wimperflankzandbij* ; German - *Rotbeinige Körbchensandbiene*.

Figure 19. *Andrena dorsata*. Foraging on *Pyrus communis* (Gembloux, Photo : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: widespread through Europe, except for the northern part, eastwards to the Caucasus region and the Ural Mountains (Bashkiria). It has also been recorded in north Africa (Morocco, Algeria) and southwestern Asia (Turkey, Iran, Israel). National scale: mostly in the northern Sambre-Meuse line, EOO = 4,100 km², AOO = 40 km².

Population. Continental scale: there is no information available on population size and trends of this species ; National scale: Rasmont *et al.* (1993) qualified the species as stable ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from late March to late May and from July to September ; Habitat: in whole Europe the species is considered as ubiquitous (Tomozei 2014) ; Visited flowers: in Belgium the species is considered as polylectic, males are often found on *Prunus spinosa* (P. Rasmont pers. comm.) ; Records on cultivated plants: *Crataegus monogyna, Daucus carota, Brassica nigra, Prunus spinosa, Prunus serotina, Trifolium repens, Allium sp., Brassica napus, Fagopyrum esculentum, Prunus avium, Castanea spp., Primula auricula* cultivars,

Cucurbita pepo pepo ; Nesting habits: solitarily or in aggregations of scattered nests (Perkins 1919, Dylewska 1987) ; Parasites: *Nomada zonata* (Kocourek 1966).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red Lists of Sweden (Regionally Extinct; Gärdenfors 2010). Future: no future conservation actions have to be taken at the national scale.

Andrena falsifica Perkins, 1915

Common Name(s): French – *Micrandrène falsifiée* ; English – Thick-margined Mini-miner ; Dutch – *Zadeldwergzandbij* ; German - *Fingerkraut-Zwergsandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through Europe, the Caucasus region, the south of the Urals (Bashkiria) and the Altai region in Siberia ; National scale: last observation in Mechelen-aan-de-Maas in 1975, EOO = 100 km², AOO = 1 km².

Population. There is no information available on population size and trends of this species.

Habitat and Ecology. Flying period: from mid-April to mid-June ; Habitat: in whole Europe it occurs in forest borders, sub-alpine grasslands, calcareous grasslands, heathlands (Osytshnjuk 1977, Falk 1991) ; Visited flowers: in Belgium only 7 records on *Potentilla spp.* (P. Rasmont pers. comm.), in whole Europe it occurs on Asteraceae (*Taraxacum, Crepis, Bellis perenis*), Brassicaceae (*Lepidium draba, Sisymbrium loeselii, Alyssum tortuosum*), Cistaceae (*Helianthemum hirsutum*), Liliaceae (*Tulipa ophiophilla, Allium jajle*), Ranunculaceae (*Ranunculus, Ficaria verna, Anemone, Adonis*), Rosaceae (*Potentilla humifisa, P. erecta, P. anserina, P. argentata, Fragaria vesca, Rosa, Spirea, Prunus spinosa*) and Salicaecae (*Salix*) (Osytshnjuk 1977, Dylewska 1987) ; Records on cultivated plants: *Fragaria vesca, Prunus spinosa* ; Nesting habits: nests solitarily (Peeters *et al.* 2012) ; Parasites: *Nomada flavoguttata* (Westrich 1989).

Threats. Destruction of heathlands and calcareous grasslands in agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of nutrient-poor grasslands ; intensification of forestry practices (deletion of edges and clearings, closing of the vegetation).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following two European countries: Great Britain (Rare; Shirt 1987) and Norway (Vulnerable; Kålås *et al.* 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings) ; promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices ; promotion of hay production instead of silage ; promotion of the conservation and rehabilitation of calcareous grasslands and heathlands.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further

sampling in order to specify the population size and trend at the national scale; specify the life history and ecology of the species at the national scale.

Andrena ferox Smith, 1847

Common Name(s): French – *Andrène du Chène* ; English – Oak Mining Bee ; Dutch – *Eikenzandbij* ; German - *Eichen-Sandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a limited geographic range in the form of (B1) the extent of occurrence (< 500 km²) as well as in the form of (B2) the area of occupancy (< 5 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the EOO, AOO and number of locations of subpopulations. ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from south and central Europe to the Caucasus region, Asia Minor and the Middle East in Syria and Jordan ; National scale: around Wesemaal, EOO = 200 km², AOO = 2 km².

Population. Continental scale: there is no information available for the population size and trend of this species ; National scale: Rasmont *et al.* (1993) qualified the species as stable ; Current population trend: stable.

Habitat and Ecology. Flying period: from late April to early June ; Habitat: in whole Europe it is mainly found in open, deciduous woodlands (Osytshnjuk *et al.* 2008, Else 2012) ; Visited flowers: in whole Europe it occurs on Rosaceae (*Crataegus oxyachanta, Prunus, Cerasus, Ribes grossularia*), Quercianeae (*Quercus robur*) and Aceraceae (*Acer pseudoplatanus*) (Kocourek 1966, Dylewska 1987, Osytshnjuk 1977, Osytshnjuk *et al.* 2008, Else 2012) ; Records on cultivated plants: *Crataegus spp., Pinus spp., Juglans regia, Rhamnus cathartica, Ribes grossularia* ; Nesting habits: nests solitarily or in large communal aggregations (Westrich 1989) with a single common entrance burrow (Else 2012) in sunny woodland rides and clearings (Tomozei 2014) ; Parasites: *Nomada marshamella* (Yarrow 1941, G.R. Else pers. obs.), *Nomada flava* (G.R. Else pers. obs.), *Nomada striata* (Leys 1978).

Threats. Loss of open oak woodlands and adjacent unimproved open habitats due to intensive forestry (deletion of edges and clearings, closing of the vegetation) and agricultural intensification (monoculture, overgrazing).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Regionally Extinct; Farkac *et al*. 2005), Germany (Endangered; Westrich *et al*. 2008), Great Britain (Endangered; Shirt 1987), Netherlands (Near Threatened; Peeters and Reemer 2003) and Slovenia (Endangered; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015 ; Terzo & Rasmont, 2007) especially the plantations of hedgerows and species-rich

flower bands in open areas located close to woodlands. Future: promotion of extensive forestry and agricultural practices ; promotion of the conservation, rehabilitation and extensive management of open deciduous woodlands ; establish a legal protection status of the areas where the species occurs.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend at the national scale; specify the life history and ecology of the species at the national scale.

Andrena flavilabris Schenck, 1874

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.
Taxonomic Notes: Blüthgen (1920: 39-42) produced a detailed analysis of the morphological characters separating *A. decipiens* and *A. flavilabris*. Enslin (1922: 239) was the first to regard *A. flavilabris* as the spring generation of *A. decipiens*. This conception was accepted until Schuberth (1995: 819) pointed out that the two taxa may be two distinct species, because in many locations where melittologists have collected specimens during the whole vegetation period, only one of the taxa could be found. Mandery *et al.* (2008) verified the autonomy of the two species by DNA analysis.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Not Evaluated due to the taxonomic issues and the probable misidentification of this species; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: disjunct distribution, through central and south western Europe but also in Crimea, Cyprus and Asia Minor. National scale: no available data.

Population. There is no information available on population size and trends of this species.

Habitat and Ecology. Flying period: from the end of April to the beginning of June ; Habitat: in whole Europe it occurs on mesophilous meadows and forest borders (Tomozei 2014) ; Visited flowers: in whole Europe it occurs on Rosaceae, Brassicaceae, Aceraceae (*Acer platanoides*), Fabaceae (*Hippocrepis comosa, Vicia*) and Cornaceae (*Cornus sanguinea*) (Mandery *et al*. 2008) ; Nesting habits: unknown ; Parasites: unknown.

Threats. The threats to this species are not known. However it may suffer from the destruction of its habitats through agricultural and forestry intensification.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; Future: promote extensive agricultural and forestry practices ; promote the conservation and rehabilitation of mesophilous grasslands.

Research Needed. Clarify the taxonomic issues of the species ; specify the ecology and life history of the species ; further sampling is needed in order to specify the population size and trend at the national scale ; clarify the threats and conservation actions needed for the species.

Andrena flavipes **Panzer, 1799**

Common Name(s): French – *Andrène à pattes jaunes* ; English – Yellow-legged Mining Bee ; Dutch - *Grasbij* ; German - *Gewöhnliche Bindensandbiene*.

Figure 20. *Andrena flavipes*. A, female specimen; B, male specimen; C, foraging on *Tussilago farfara* (Bruxelles, Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: widely distributed through Europe, north Africa, Asia Minor, Near and Middle East and Central Asia eastwards to India, Nepal and China ; National scale: everywhere in Belgium, EOO = 20,000 km², AOO = 327 km².

Population. Continental scale: large populations, expanding range (Edwards 2002), the most frequent *Andrena* species in the south of Europe (Pesenko 1974). National scale: Rasmont *et al.* (1993) qualified the species as very highly significantly increasing ; Current population trend: increase.

Habitat and Ecology. Flying period: bivoltine, from late March to mid-June and from late June to early August ; Habitat: in whole Europe the species is considered as ubiquitous (Edwards 2002) ; Visited flowers: in whole Europe and in Belgium the species is broadly polylectic (P. Rasmont pers. comm., Dylewska 1987) ; Records on cultivated plants: *Brassica napus, Trifolium repens, Crataegus monogyna, Trifolium pratense, Daucus carota, Prunus spinosa, Brassica nigra, Fagopyrum esculentum, Medicago sativa, Prunus cerasus, Prunus avium, Lavandula angustifolia, Allium spp., Ribes uva-crispa, Malus sp., Pyrus domestica, Aesculus hippocastanum, Narcissus* ; Nesting habits: compact and extensive nesting aggregations on exposed banks, steeps slopes, cliff faces (Else & Edwards 2018) ; Parasites: *Nomada fucata, Nomada fabriciana* (Chambers 1949).

Threats. No major threats to this species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

***Andrena florea* Fabricius, 1793**

Common Name(s): French – *Andrène de la Bryone* ; English – Bryony Mining Bee ; Dutch – *Heggenrankbij* ; German - *Zaunrüben-Sandbiene*.

Figure 21. *Andrena florea*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting on *Bryonia dioica* (Liège, Photo : J.M. Michalowski).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from central and southern Europe to European Russia, the Caucasus region, Asia Minor, Central Asia (Turkmenistan) and north Africa. National scale: everywhere in northern Sambre-Meuse line except in Campine where it is much scarcer, EOO = 5,400 km², AOO = 49 km².

Population. Continental scale: no information available on the population trend of this species ; National scale: Rasmont *et al.* (1993) qualified the species as stable ; Current population trend: stable.

Habitat and Ecology. Flying period: from early May to early August ; Habitat: in whole Europe it occurs on bare or sparsely vegetated sandy soil in sunny situations, its presence depends on the one of *Bryona dioica* (Falk 1991, Else 2001) ; Visited flowers: mutualistic association with *Bryonia dioica* or *Bryona alba* (Falk 1991). Males records on Asteraceae (*Hieracium*), Boraginaceae (*Echium vulgare*) and Rosaceae (*Rubus, Crataegus oxyachanta*) (Dylewska 1987, Else 2001) ; Nesting habits: nests solitarily or in aggregation, nests have been found on hard sandy soils (Westrich 1989) ; Parasites: unknown.

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: *Andrena florea* is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Vulnerable; Amiet 1994), Great Britain (Rare; Shirt 1987) and Slovenia (Vulnerable; Anonymous 2002). The species is also included into the Wild Bees Action Plans in Switzerland (Neumeyer 2004). Future: no future conservation actions have to be taken at the national scale.

Andrena floricola **Eversmann, 1852**

Common Name(s): French – *Micrandrène de la Moutarde* ; English – Chilterns Mini-miner ; German - *Senf-Zwergsandbiene* **.**

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through Europe, the Caucasus region, Asia Minor and the Urals. National scale: last observation in 1883 Buizingen.

Population. There is no information available for the population size and trend of this species.

Habitat and Ecology. Flying period: bivoltine, from April to May and from July to August ; Habitat: in whole Europe it has a preference for mesophilous habitats (Tomozei 2014) ; Visited flowers: in whole Europe it occurs on Brassicaceae (*Isatis tinctoria, Arabidopsis thaliana, Capsella bursa pastoris, Brassica, Berteroa incana, Alyssum tortuosum, A. desertorum, Raphanus)*, Apiaceae (*Anethum graveolens, Daucus*), Scrophulariaceae (*Veronica chamaedrys*), Salicaceae (*Salix*) and Asteraceae (*Taraxacum officinale*) (Dylewska 1987, Osytshnjuk 1977) ; Nesting habits: solitarily on sandy or loamy soils (Else & Edwards 2018) ; Parasites: unknown.

Threats. The threats to this species are unknown at the national scale.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Vulnerable; Amiet 1994), Germany (Endangered; Westrich e*t al.* 2008), Great Britain (Endangered; Shirt 1987) and Slovenia (Endangered; Anonymous 2002). There are no conservation actions in place for this species. Future: no future conservation actions can be taken at the national scale.

Research Needed. Sampling expeditions should be led in order to confirm the presence / absence of the species at the national scale ; specify the life history and ecology of the species ; determine the threats to the species.

Andrena fucata **Smith, 1847**

Common Name(s): French – *Andrène teinte* ; English – Painted Mining Bee ; Dutch - *Gewone Rozenzandbij* ; German - *Wald-Lockensandbiene*.

Figure 22. *Andrena fucata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: VU (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017). ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe to the Caucasus region, Asia Minor, Central Asia (Kazachstan) and Siberia in Oblast Kemerowo and Transbaikalia. National scale: strongly scattered distribution in northern and southern Sambre-Meuse line, formerly present everywhere in southern Sambre-Meuse line, EOO = 8,800 km², AOO = 48 km².

Population. Continental scale: There is no information available for the population size and trend of this species ; National scale: Rasmont *et al.* (1993) qualified the species as highly significantly increasing ; Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-April to late July ; Habitat: in Great-Britain it occurs on mesophilous grasslands, heaths, coastal dunes and broad-leaved woodlands clearings (Else 2005, Else & Edwards 2018) ; Visited flowers: polylectic (Tomozei 2014) ; Records on cultivated plants: *Allium schoenoprasum, Rubus idaeus, Rubus caesius, Prunus spp., Crataeus spp., Trifolium repens* ; Nesting habits: solitarily (Westrich 1989) or in small aggregations

(Perkins 1919) in soil on slopes with southern exposure and forest edges (Kocourek 1966) ; Parasites: *Nomada panzeri* (Westrich 1989).

Threats. Reduction of suitable habitats: destruction of grasslands and heathlands in agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage, drainage) ; eutrophication of mesophilous grasslands due to agricultural effluent ; vegetational succession of heathlands ; intensification of forestry practices (deletion of edges and clearings, closing of the vegetation, drainage) ; urbanization of coastal habitats. **Reduction of suitable nesting sites:** homogenisation of the agricultural landscape has led to a reduction of the bare southern exposed slopes.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following two European countries: Ireland (Endangered; Fitzpatrick *et al.* 2006) and Slovenia (Endangered; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) for the conservation of flowered grasslands could benefit to this species. Future: promotion of the conservation and rehabilitation of coastal habitats, heaths and mesophilous grasslands ; promotion of extensive agricultural (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) and forestry practices (*i.e.* including a wide variety of timber species, multistage edges and clearings) ; promotion of hay production instead of silage and extensive grazing practices.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on habitats and food ressources ; impact of pesticides on behaviour ; further sampling in order to specify the population size and trend at the national scale ; specify the life history and ecology of the species at the national scale.

Andrena fulva **(Müller, 1766)**

Common Name(s): French – *Andrène fauve*, *Andrène rousse* ; English – Tawny Mining Bee ; Dutch – *Vosje* ; German - *Fuchsrote Lockensandbiene*.

Figure 23. *Andrena fulva*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting. (Liège, Photos : J.M. Michalowski).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through central and southern Europe eastwards to Romania and Bulgaria. National scale: everywhere in Belgium, EOO = 22,600 km², AOO = 503 km².

Population. Continental scale: there is no information available for the population size and trend of this species. National scale: Rasmont *et al.* (1993)

qualified the species as very highly significantly increasing, Current population trend: increase.

Habitat and Ecology. Flying period: from early March to late May ; Habitat: every flower-rich open habitats ; Visited flowers: widely polylectic ; Records on cultivated plants: *Ribes spp., Crataegus sp., Prunus spp., Malus sp., Pyrus sp., Tulipa sp., Brassica napus, Narcissus sp., Rubus idaeus* (P. Rasmont pers. Comm.) ; Nesting habits: nest in large aggregations where the vegetation is low and sparse (Else 2005, Osytshnjuk *et al*. 2005, Else & Edwards 2018) ; Parasites: *Nomada signata, Nomada panzeri* (Westrich 1989), *Bombylius major* (Paxton & Pohl 1999), *Leucophora obtusa* (Paxton pers. comm.), *Stylops nevinsoni* (Straka *et al.* 2015).

Threats. No major threats to this species at the national scale.

Conservation Actions. No conservation actions have to be taken at the national scale.

Andrena fulvago **(Christ, 1791)**

Common Name(s): French – *Andrène blonde* ; English – Hawk's-beared Mining Bee ; Dutch - *Texelse Zandbij* ; German - *Pippau-Sandbiene*.

Figure 24. *Andrena fulvago*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as Neat threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: above 60°N, in the south it is only present in mountainous regions up to 2,000m (in the Alps). National scale: mainly in Brabant region, EOO = 1,500 km², AOO = 17 km².

Population. Continental scale: there is no information available on the population size and trend of this species ; National scale: decline in the number of populations, area of occupancy and extent of occurrence. Rasmont *et al.* (1993) qualified the species as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: late April to early July ; Habitat: humid biotopes (woods, mesophilous meadows and alpine meadows) (Tomozei 2014), matinal species associated with chalky and sandy soils (warm and well drained) (Else & Edwards 2018) ; Visited flowers: apparently oligolectic on Asteraceae (*Hieracium, Taraxacum, Leontodon, Senecio, Crepis, Hypochoeris*) (Tomozei 2014, Else & Edwards 2018) ; Nesting habits: various soil on forest edges, meadows, planes

and mountains (Osytshnjuk *et al.* 2005) ; Parasites: *Nomada integra* (Grünwaldt 1939)

Threats. The threats to this species are unknown. *A. fulvago* may presumably be threatened by the reduction of suitable habitat through intensive forestry, transformation of rich flower areas into monospecific agricultural fields.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Germany (Vulnerable; Westrich *et al.* 2008), Great Britain (Rare; Shirt 1987), Netherlands (Endangered; Peeters and Reemer 2003), Norway (Vulnerable; Kålås *et al.* 2010), Sweden (Near Threatened; Gärdenfors 2010) and Finland (Critically Endangered; Rassi *et al*. 2010). Future: promotion of the conservation and rehabilitation of humid biotopes ; promotion of extensive forestry practices (*i.e.* excluding drainage) ; promotion of hay production and extensive grazing practices.

Research Needed. Quantify the impact intensive agricultural and forestry practices on habitats and food ressources ; further sampling in order to specify the population size and trend at the national scale ; specify the threats occurring on the species.

Andrena fulvata Stoeckhert, 1930

Common Name(s): French – *Andrène fulvette* ; Dutch – *Beemdzandbij* ; German - *Östliche Zangensandbiene*.

Taxonomic Notes: While Warncke considers *Andrena fulvata* as a subspecies of *A. angustior*, *Andrena angustior fulvata* Stöckhert, 1930, almost all the other authors after him recognize *Andrena fulvata* as a distinct species (E. Scheuchl pers. comm. 2014), and this will be the criteria applied for the purposes of this assessment. **Taxonomic Source(s): Patiny S. & Terzo M.** 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: Listed as Not Evaluated due to the gaps in knowledge of population size, trends and specific threats ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: *Andrena fulvata* is a European species distributed through south and central Europe to eastern Europe (Romania). National scale: one record around Binche, EOO = NE, AOO = NE.

Population. There is no information available on the population size and trend of this species.

Habitat and Ecology. Flying period: from late March to early July ; Habitat: meadows, alpine grasslands and shrublands (Schmid-Egger 2011) ; Visited flowers: polylectic, records on Asteraceae (*Taraxacum, Tussilago*), Brassicaceae (*Brassica rapa*), Fabaceae (*Cytisus*), Polygonaceae (*Rumex acetosella*), Rhamnaceae (*Rhamnus cathartica*), Salicaceae (*Salix*), Ranunculaceae (*Anemone nemorosa*), Rosaceae (*Fragaria vesca*) and Scrophulariaceae (*Veronica chamaedrys*) (Kocourek 1966) ; Nesting habits: solitarily in the ground (Herrmann 1996, Westrich 1989). ; Parasites: *Nomada fabriciana* (Gogala 1999).

Threats. The threats to this species are unknown.

Conservation Actions. No conservation actions have to be taken at the national scale.

Andrena fulvida **Schenck, 1853**

Common Name(s): French – *Andrène fulvide* ; Dutch – *Sporkehoutzandbij* ; German - *Waldrand-Sandbiene*.

Figure 25. *Andrena fulvida*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: EN (A2bc; B1ab(i,ii,iii, iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of (B1) the extent of occurrence (comprised between 500 and 1500 km²) as well as in the form of (B2) the area of occupancy (comprised between 5 and 15 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the EOO, AOO, area, extent and/or quality of habitat and number of locations of subpopulations ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al*. (2013).

Geographic Range. Continental scale: member of the European boreo-montane element of the bee fauna. The extent of occurrence (EOO) is 3,217,824 km² and the area of occupancy (AOO) is unknown, but is likely to be around 2,000 km². National scale: few records, occurs around the cities of Anvers and Gent and in the natural regions of Campine and Condroz, EOO = 100 km², AOO = 1 km².

Population. Continental scale: there is no information available on the populational size and trend. National scale: drastic and continuing decline in the number of populations, EOO, AOO. Populations are highly scattered. Rasmont *et al.* (1993) qualified the species as very highly significantly decreasing, Current population trend: decrease.

Habitat and Ecology. Flying period: from early May to mid-July (Peeters *et al.* 2012). Habitat: forest edges, paths and clearings, heathland with scattered tree vegetation (Kocourek 1966, Westrich 1989, Kemp *et al.* 2013). Visited flowers: polylectic, records on Pinaceae (*Pinus*), Ranunculaceae (Ranunculus), Rosaceae (Rubus fruticosus, Rubus idaeus), Asteraceae (Hypochaeris), Rhamnaceae (Rhamnus, Frangula alnus) (Kocourek 1966, Dylewska 1987, Westrich 1989, Söderman and Leinonen 2003, Peeters & Reemer 2003). Nesting habits: solitarily in the ground and in well-exposed open areas. Parasites: *Nomada opaca* (Kocourek 1966).

Threats. Heathland are threatened by scrub and woodland development as part of the succession process. If woodland and tree cover shade out nesting sites, the habitat will become unsuitable for this species (Kemp *et al*. 2013).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Switzerland (Near Threatened; Amiet 1994), Czech Republic (Endangered; Farkac *et al*. 2005), Germany (Vulnerable; Westrich 2011), Netherlands (Endangered; Peeters and Reemer 2003), Slovenia (Vulnerable; Anonymous 2002). Future: promotion of the conservation and rehabilitation of heathlands, appropriate management of sites to prevent vegetational succession is important ; promotion of extensive forestry practices.

Research Needed. Further sampling in order to specify the population size and trend at the national scale.

Andrena fuscipes **(Kirby, 1802)**

Common Name(s): French – *Andrène des Bruyères* ; English – Heather Mining Bee ; Dutch – *Heidezandbij* ; German - *Heidekraut-Herbstsandbiene*.

Figure 26. *Andrena fuscipes*. A, female specimen; B, male specimen (Photos: A. Pauly); C, resting (Neerpelt, Photo : Y. Barbier).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from Europe to the Caucasus region. National scale: mainly in the natural region of Campine, EOO = 2,200 km², AOO = 33 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: stable populations, Rasmont *et al* (1993) qualified the species as stable. Current population trend: stable.

Habitat and Ecology. Flying period: from mid-July to late September ; Habitat: in xerothermic habitats, especially in heathlands (Exeler *et al.* 2010), in humid wooded biotopes (Osytshnjuk *et al.* 2005) ; Visited flowers: females depend on Ericaceae (*Calluna vulgaris*) pollen source (Exeler *et al*. 2010, Else & Edwards 2018) but also found on Asteraceae, Caryophyllaceae, Fabaceae and Oenotherraceae species (Osytshnjuk *et al.* 2005) ; Nesting habits: in large and compact aggregations (Perkins 1919) or solitarily (Kocourek 1966, Dylewska 1987, Gebhardt & Röhr 1987) ; Parasites: *Nomada rufipes* (Westrich 1989).

Threats. Fragmentation and reduction of heathlands (Exeler *et al.* 2010), intensive uses of nitrogen fertilizers and vegetational succession (Sedláková and Chytrý 1999).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Czech Republic (Regionally Extinct; Farkac *et al*. 2005), Germany (Near Threatened; Westrich *et al*. 2008), Ireland (Vulnerable; Fitzpatrick *et al*. 2006), Netherlands (Vulnerable; Peeters and Reemer 2003) and Slovenia (Endangered; Anonymous 2002). Future: promotion of the conservation and rehabilitation of heathlands, appropriate management of sites to prevent vegetational succession is important ; promotion of extensive forestry practices.

Research Needed. Further sampling in order to specify the population size and trend at the national scale ; evaluation of the impact of herbicides on food ressources.

Andrena fuscosa Erichson, 1835

Taxonomic Notes: this species it is very variable in hair and integument color, which is the reason why it was described several times as different separated species and also containing different subspecies (*A. fuscosa fuscosa* Erichson 1835, *A. fuscosa rutila* Spinola 1838 and *A. fuscosa turcestanica* Morawitz 1876). *Andrena turcestanica* is considered in fact a color variety (with red clypeus, abdomen, antenna and legs) of *Andrena fuscosa* (Gusenleitner and Schwarz 2002).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: through southern and central Europe. National scale: unknown.

Population. There is no information available on the populational size and trend.

Habitat and Ecology. Flying period: bivoltine, from May to mid-September (Tomozei 2014) ; Habitat: xeric biotopes (Tomozei 2014) ; Visited flowers: polylectic, preferring Brassicaceae and Apiaceae, but also Euphorbiaceae, Fabaceae and Valerianaceae (Kocourek 1966, Osytshnjuk *et al.* 2008) ; Nesting habits: solitarily in the ground, nest entrance in the deserted burrows of rodents (Pesenko *et al.*, 1980). Parasites: unknown.

Threats. The threats to this species are unknown.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Switzerland (Critically Endangered; Amiet 1994) and Czech Republic (Regionally Extinct; Farkac *et al.* 2005). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Specify the taxonomy, population size and trend as well as the threats occurring to this species.

Andrena gelriae van der Vecht, 1927

Common Name(s): French – *Andrène du Sainfoin* ; Dutch - *Gelderse Zandbij* ; German - *Esparsetten-Kleesandbiene*.

Taxonomic Notes: the females of *Andrena gelriae* are difficult to differentiate from the females of the other species of subgenus *Taeniandrena*. Gusenleitner and Schwarz (2002: 313) say that possibly all three of Warncke's subspecies of *A. gelriae* (*gredana, producta and vocifera*) are distinct species.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe. National scale: last observation in Lommel 1960.

Population. Continental scale: there is no information available for the population size and trend of this species. National scale: extinct.

Habitat and Ecology. Flying period: from late May to early August ; Habitat: xeric and nutrient-poor grasslands (Westrich 1989, Peeters & Reemer 2003) ; Visited flowers: after Westrich (1989) the species is oligolectic on Fabaceae, after Osytshnjuk (1977), Dylewska (1987) and Banaszak *et al.* (2006) the species is polylectic with records on Adoxaceae (*Sambucus*), Asteraceae (*Leucanthemum vulgare*), Boraginaceae (*Symphytum*), Brassicaceae (*Brassica nigra*), Fabaceae (*Melitotus, Vicia, Trifolium, Medicago, Anthylis vulneraria, Lathyrus montanus, Cytisus, Lotus corniculatus*), Scrophulariaceae (*Veronica*) and Rosaceae (*Potentilla*) ; Nesting habits: no known soil type preference, nests can be surrounded by high vegetation (Dylewska 1987) ; Parasites: *Nomada rhenana, Nomada striata, Nomada villosa* (Westrich 1989).

Threats. The threats to this species are unknown. However fragmentation and decrease in size of xeric and nutrient-poor grasslands may have play a role in the national extinction of the species.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008), Netherlands (Critically Endangered; Peeters and Reemer 2003) and Sweden (Critically Endangered; Gärdenfors 2010). Future: promotion of the conservation and rehabilitation of nutrient-poor grasslands (*e.g.* through the promotion hay production) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of nitrogen fertilizers).

Research Needed. Further research should be conducted regarding the species taxonomic status and threats.

Andrena gravida **Imhoff, 1832**

Common Name(s): French – *Andrène gravide* ; English – White-bellied Mining Bee ; Dutch – *Weidebij* ; German - *Weisse Bindensandbiene*.

Figure 27. *Andrena gravida*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe. National scale: everywhere in Belgium, EOO = 6,200 km², AOO = 58 km².

Population. Continental scale: There is no information available for the population size and trend of this species. National scale: Rasmont *et al* (1993) qualified the species as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from late March to June ; Habitat: low vegetation areas (Peeters *et al.* 2012) ; Visited flowers: polylectic ; Records on cultivated plants: *Trifolium spp., Fragaria sp., Prunus spp., Allium spp., Malus sp.* Considered to be an important pollinator of apple crops in central Europe (Osytshnjuk 1977, Dylewska 1987) ; Nesting habits: in small aggregation in warm and well-exposed sandy or loamy slopes with sparse vegetation (Kocourek 1966, Westrich 1989, M. Edwards pers. obs.) ; Parasites: *Nomada bifasciata* (Westrich 1989), *Stylops sp.* (Else & Edwards 2018).

Threats. The threats to this species are unknown. However the reduction in size and quality of orchards and any low vegetation areas may play a role in the current decrease of the population.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Great Britain (Endangered; Shirt 1987), Netherlands (Endangered; Peeters and Reemer 2003) and Sweden (Data Deficient; Gärdenfors 2010). Future: promotion of the conservation and rehabilitation of low vegetation areas and orchards.

Research Needed. Quantify the impact of pesticides and intensive uses of nitrogen fertilizers on the quality and quantity of food-ressources.

Andrena haemorrhoa **(Fabricius, 1781)**

Common Name(s): French – *Andrène cul-rouille* ; English – Orange-tailed Mining Bee, Early Mining Bee ; Dutch – *Roodgatje* ; German - *Rotschopfige Sandbiene*.

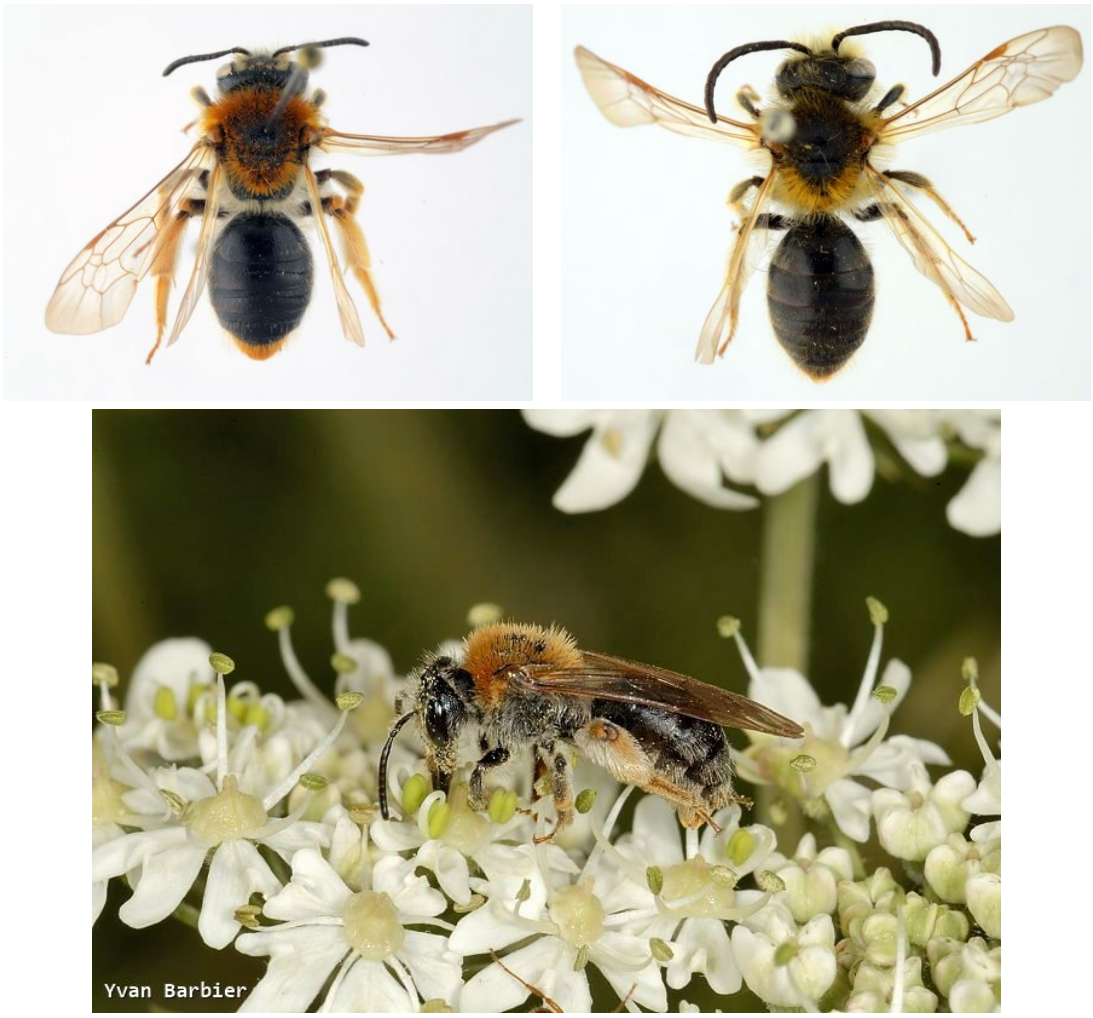

Figure 28. *Andrena haemorrhoa*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Heracleum sphondylium* (Vaucelles, Photo : Y. Barbier).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: widely distributed in Europe ; National scale: everywhere in Belgium, EOO = 26,800 km², AOO = 582 km².

Population. Continental scale: there is no information available on the population trend of the species. National scale: large and increasing populations. Rasmont *et al* (1993) qualified the species as very highly significantly increasing. Current population trend: increase.

Habitat and Ecology. Flying period: univoltine, from late March to mid-June (Peeters *et al.* 2012) ; Habitat: high variety of habitats (Peeters *et al.* 2012,Tomozei 2014, Else & Edwards 2018) ; Visited flowers: polylectic, records on Apiaceae (*Carum carvi*), Asteraceae (*Taraxacum, Tussilago, Petasites*), Brassicaceae (*Rapistrum, Barbarea arucata*), Campanulaceae (*Campanula patula*), Ericaeae (*Vaccinium*), Ranunculaceae (*Ficaria verna*), Rosaceae (*Potentilla, Malus, Rubus, Prunus, Crataegus, Pyrus*) and Salicaeae (*Salix*) (Osytshnjuk 1977, Dylewska 1987) ; Records on cultivated plants: *Fagus, Quercus, Sinapis, Prunus* cultivars, *Crataegus, Onobrychis, Acer* (Else & Edwards 2018) ; Nesting habits: solitarily in banks and overhangs (Kocourek 1966) or in small aggregations (Westrich 1989) ; Parasites: *Nomada ruficornis* (Perkins 1919), *Stylops melittae* (Smit & Smit 2005).

Threats. No specific threats to this species at the national scale.

Conservation Actions. No conservation actions have to be taken at the national scale.

Andrena hattorfiana **(Fabricius, 1775)**

Common Name(s): French – *Andrène de la Knautie* ; English – Large Scabious Mining Bee ; Dutch – *Knautiabij* ; German - *Knautien-Sandbiene*.

Figure 29. *Andrena hattorfiana*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Scabiosa sp.* (Xhoris, Photo : J.M. Michalowski).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2bc; B1ab(i,iii) +2ab(i,iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: Listed as Near Threatened due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) (2) a limited geographic range in

the form of (B1) the extent of occurrence (comprised between 3000 and 5000 km²) as well as in the form of (B2) the area of occupancy (comprised between 30 and 50 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the EOO, area, extent and/or quality of habitat. Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Near threatened (NT) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: throughout Europe ; National scale: everywhere in southern Sambre-Meuse line, around the city of Brussels and in the natural region of Brabant, Hesbaye and Campine, EOO = 4,600 km², AOO = 40 km².

Population. Continental scale: there is no information available on the size and trend of the population. Drastic decline in western Europe (Pekkarinen 1997, Larsson 2006). National scale: continuing decline in the number of populations, EOO, AOO, fragmented locations of subpopulations. Rasmont *et al* (1993) qualified the species as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-March to mid-August (Peeters *et al.* 2012). Habitat: moist meadows and pastures next to forest habitats, open grasslands, calcareous and sandy soils in inland and coastal habitats (Tomozei 2014, Else & Edwards 2018). Visited flowers: dependant on the presence of *Knautia arvensis* but can be found on various families such as Fabaceae, Apiaceae, Gentianaceae, Geraniaceae (Osytshnjuk 1977, Osythsnjuk *et al.*2005, G.R. Else pers. obs., Else & Edwards 2018). Nesting habits: most nest burrows are single or in small aggregation in low vegetation areas (Kocourek 1966, Larsson & Franzén 2007) although Perkins (1919) has observed compact aggregation. Parasites: *Nomada armata* (Perkins 1919).

Threats. Agricultural intensification has led to the reduction and fragmentation of extensively managed pastures and meadows which may contain appropriate pollen resources (*Knautia arvensis*).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the seven following European countries: Czech Republic (Vulnerable; Farkac *et al*. 2005), Germany (Vulnerable; Westrich *et al*. 2008, Westrich *et al*. 2011), Great Britain (Vulnerable; Shirt 1987), Netherlands (Endangered; Peeters and Reemer 2003), Norway (Critically Endangered; Kålås *et al*. 2010), Sweden (Near Threatened; Gärdenfors 2010) and Finland (Near Threatened; Rassi 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and including a softer management of meadows and pastures as well as a softer maintenance of fields borders).

Research Needed. Research is needed regarding the population size, distribution and trends ; impacts of pollen resources decline on health and populations.

Andrena helvola **(L., 1758)**

Common Name(s): French – *Andrène claire* ; English – Coppice Mining Bee ; Dutch - *Valse Rozenzandbij* ; German - *Schlehen-Lockensandbiene*.

Figure 30. *Andrena helvola*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: VU (A2c) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as VU due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017).Very difficult to recognize in the field thus maybe under sampled ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: throughout Europe. National scale: has become very local but can be found in each natural region, EOO = 11,400 km², AOO = 123 km².

Population. Continental scale: there is no current information on the size and trends of the species. National scale: drastic decline in the EOO and AOO. Rasmont *et al* (1993) qualified the species as very highly significantly increasing. Current population trend: decrease.

Habitat and Ecology. Flying period: from late May to late June (Peeters *et al.* 2012). Habitat: meadows, broad-leaved forest edges and clearings (Tomozei 2014, Else & Edwards 2018). Visited flowers: Asteraceae (*Taraxacum, Tussilago, Hieracium*), Berberidaceae (*Berberis vulgaris*), Caryophyllaceae (*Stellaria media*), Grossulariaceae (*Ribes*), Paeoniaceae (*Paeonia*), Ranunculaceae (*Anemone*), Rosaceae (*Crataegus, Fragaria, Prunus, Rosa*) and Salicaceae (*Salix*) (Osytshnjuk 1977, Dylewska 1987). Particularly associated with *Euphorbia amygdaloides* flowers in forest clearings (Else & Edwards 2018). Records on cultivated plants: *Rubus idaeus, Fragaria, Prunus spinosa, Cotoneaster, Crataegus, Acer* (Else & Edwards 2018). It is known as one of the main pollinators of apple, cherry, gooseberry and

blackcurrant in the Kiev region, Ukraine (Osytshnjuk 1977, Dylewska 1987). Nesting habits: solitarily in various kind of soils (Kocourek 1966, Dylewska 1987), their abundance seems related to the variety of levels of vegetation (Else & Edwards 2018). Parasites: *Nomada panzeri* (Westrich 1989).

Threats. The threats to this species are unknown. However, *A. helvola* may be threatened by the lack of heterogeneity in the levels of vegetation caused by the agricultural landscape homogenization.

Conservation Actions. Present: this species is included in the National Red List of the Ireland (Data Deficient; Fitzpatrick *et al.* 2006). Future: promotion of a more diversified agriculture with smaller parcels of land ; promotion of extensive forestry practices including more specific variability as well as uneven-aged and uneven-sized stand structure (*e.g.* selection cutting practices).

Research Needed. Determine the population size, trends and threats to the species.

Andrena humilis **Imhoff, 1832**

Common Name(s): French – *Andrène humble* ; English – Buff-tailed Mining Bee ; Dutch – *Paardenbloembij*

Figure 31. *Andrena humilis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through Europe. National scale: everywhere in Belgium, seems scarcer in southern Sambre-Meuse line, EOO = 9,600 km², AOO = 88 km².

Population. Continental scale: there is no actual information available on the size and trends of the species. National scale: large and stable populations except in southern Sambre-Meuse line where the populations seem to be in decline, Rasmont *et al* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from mid-April to mid-July (Peeters *et al.* 2012). Habitat: in extensive meadows, abandoned orchard, river borders on sandy or chalky soils (Peeters *et al.* 2012, Else & Edwards 2018). Visited flowers: oligolectic on the Cichorioideae subfamily (Asteraceae) (Westrich 1989) but there are records on Fabaceae (*Melilotus*), Ranunculaceae (*Ranunculus*), Rosaceae (*Crataegus, Prunus*) and Scrophulariaceae (*Veronica*) (Dylewska and Wlsniowski 2003). Records on cultivated plants: *Prunus, Crataegus* (Dylewska and Wlsniowski 2003). Nesting habits: small and compact aggregations (Perkins 1919). Parasites: *Nomada integra* (Perkins 1919), *Stylops maxillaris* (Straka *et al.* 2015).

Threats. No specific threats to this species at the national scale.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following six European countries: Germany (Near Threatened; Westrich *et al*. 2008), Ireland (Critically Endangered; Fitzpatrick *et al*. 2006), Netherlands (Vulnerable; Peeters and Reemer 2003), Norway (Regionally Extinct; Kålås *et al*. 2010), Sweden (Endangered; Gärdenfors 2010)

and Finland (Endangered; Rassi 2010). No future conservervation actions have to be taken at the national scale.

Andrena hypopolia Schmiedeknecht, 1884

Taxonomic Notes: *Andrena numida* and *A. hypopolia* are closely related, and some authors regard them as being conspecific. Specimens from north Africa belong to *A. numida* Lepeletier, 1841 (E. Scheuchl pers. comm. 2014).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NA ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: throughout central and southern Europe. National scale: no available data, EOO = NE, AOO = NE

Population. There is no current information available on the trend and size of this species.

Habitat and Ecology. Flying period: bivoltine, from May to September (Tomozei 2014). Habitat: variety of habitats, such as xerothermic swards (Banaszak *et al.* 2006). Visited flowers: no data for Belgium or surrounding countries. Nesting habits: unknown. Parasites: unknown.

Threats. The threats to this species are unknown.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following four European countries: Czech Republic (Regionally Extinct; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2008), Slovenia (Endangered; Anonymous 2002) and Switzerland (Regionally Extinct; Amiet 1994). No future conservation actions can be taken for this species.

Research Needed. Research are needed into the taxonomy, ecological requirements, threats, population size and trends.

Andrena intermedia **Thomson, 1870**

Common Name(s): French – *Andrène intermédiaire* ; Dutch - *Noordelijke Klaverzandbij* ; German - *Berg-Kleesandbiene*.

Figure 32. *Andrena intermedia*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: EN (B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Endangered due to a limited geographic range in the form of (B1) the extent of occurrence (comprised between 500 km² and 1500 km²) as well as in the form of (B2) the area of occupancy (comprised between 5 km² and 15 km²). This is inferred from a continuing decline in area, extent and/or quality of habitat ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al.* (2013)

Geographic Range. Continental scale: *Andrena intermedia* is present across Europe from the Atlantic coast of France and the Netherlands to Ukraine. National scale: around Lommel, Hasselt and Philippeville, EOO = 300 km², AOO = 4 km².

Population. Continental scale: there is no precise information about the trend and size of the population. National scale: three remaining populations, Rasmont *et al* (1993) qualified the species as significantly declining, Current population trend: decrease.

Habitat and Ecology. Flying period: from early June to late July (Peeters *et al.* 2012). Habitat: Fabaceae rich forest edges, clearings, meadows, acidic heathlands, ochards (Peeters *et al.* 2012). Visited flowers: oligolectic on Fabaceae (Kemp *et al.* 2013). Records on cultivated plants: probably on cultivated Fabaceae species such as *Trifolium, Onobrychis, Vicia and Medicago*. Nesting habits: solitarily in the ground (Peteers *et al.* 2012). Parasites: *Nomada striata* (Westrich 1989).

Threats. Global decline of Fabaceae rich habitats (natural or anthropogenic) due to agricultural and forestry intensification.

Conservation Actions. Present: *Andrena intermedia* is Red Listed in Germany (Vulnerable; Westrich 2011), Netherlands (Peeters and Reemer 2003),

and the Czech Republic (Critically Endangered; Farkač *et al*. 2005). In Baden-Württemberg (Westrich *et al*. 2000) as "very rare" and "endangered" ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of the reintroduction of Fabaceae cropping in May and June, promotion of the rehabilitation of natural Fabaceae rich habitats, establish a legal protection status for the areas where the species still occurs.

Andrena labialis **(Kirby, 1802)**

Common Name(s): French – *Andrène du Trèfle* ; English – Large Meadow Mining Bee ; Dutch - *Donkere Klaverzandbij* ; German - *Rotklee-Sandbiene*.

Figure 33. *Andrena labialis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe. National scale: found in each natural region (except Ardennes and Lorraine) and particularly between Leuven and Hasselt, EOO = 4,800 km², AOO = 43 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: decline in the number of populations, EOO and AOO. Rasmont *et al* (1993) qualified the species as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from early May to early July (Peeters *et al.* 2012). Habitat: extensive and flower-rich grasslands (Peeters *et al.* 2012). Visited flowers: Fabaceae (*Trifolium, Melilotus, Medicago, Coronilla varia, Lathyrus, Vicia*), but also on flowers of Adoxaceae (*Viburnum*), Asteraceae (*Erysimum, Knautia, Taraxacum*), Brassicaceae (*Sinapis arvensis, Ballota nigra*), Compositae, Liliaceae, Rosaceae (*Crataegus, Fragaria*) and Scrophulariaceae (*Veronica*) (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987). Records on cultivated plants: *Sinapis, Rubus fruticosus, Cotoneaster horizontalis, Crataegus monogyna, Onobrychis viciifolia, Trifolium repens, Trifolium pratense* (Else & Edwards 2018). Nesting habits: in well-

exposed vertical surface, solitarily or in communal large and compact aggregations (Perkins 1919, Chambers 1949). Parasites: *Sphecodes rubicundus* (Westrich 1989), *Stylops dalii* (Straka *et al.* 2015).

Threats. Agricultural intensification has led to the reduction and fragmentation of extensively managed pastures and meadows which may contain appropriate pollen resources (*Knautia arvensis*).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Critically Endangered; Amiet 1994), Germany (Near Threatened; Westrich *et al.* 2008), Netherlands (Endangered; Peeters and Reemer 2003), Sweden (Vulnerable; Gärdenfors 2010) and Finland (Endangered; Rassi 2010) ; this species is legally protected in Wallonia ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and including a softer management of meadows and pastures as well as a softer maintenance of fields borders).

***Andrena labiata* Fabricius, 1781**

Common Name(s): French – *Andrène labiée* ; English – Red-girdled Mining Bee ; Dutch - *Ereprijszandbij* ; German - *Rote Ehrenpreis-Sandbiene*.

Figure 34. *Andrena labiata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: through Europe. National scale: everywhere in Belgium, seems scarcer in southern Sambre-Meuse line, EOO = 2,700 km², AOO = 23 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: widespread, large, stable populations, Rasmont *et al.* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from mid-April to late June (Peeters *et al.* 2012). Habitat: wide variety of habitats but dependant on sandy soils for nesting (Peeters *et al.* 2012). Visited flowers: polylectic, records on Aceraceae (*Acer tataricum*), Asteraceae (*Hieracium pilosella, Taraxacum officinale, Crepis tectorum*), Brassicaceae (*Barbarea vulgare, Alyssum trichostachium*), Caryophyllaceae (*Stellaria*), Cistaceae (*Helianthemum obscurum*), Fabaceae (*Trifolium*), Lamiaceae (*Thymus, Stachys)*, Ranunculaceae (*Ranunculus*), Rhamnaceae (*Rhamnus*), Rosaceae (*Potentilla verna, Potentilla argentea, Potentilla humifusa, Fragaria vesca*) and Scrophulariaceae (*Veronica chamaedrys*) (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987). Records on cultivated plants: *Cerastium tomentosum, Sinapis, Ribes nigrum, Pyracantha, Crataegus monogyna, Origanum vulgare* (Else & Edwards 2018). Nesting habits: solitarily or in large aggregations in sandy soils (Westrich 1989). Parasites: *Nomada guttulata* (Westrich 1989).

Threats. No specific threats to this species at the national scale.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following three European countries: Great Britain (Rare; Shirt

1987), Sweden (Near Threatened; Gärdenfors 2010) and Finland (Regionally Extinct; Rassi 2010). No future conservation actions have to be taken at the national scale.

***Andrena lapponica* Zetterstedt, 1838**

Common Name(s): French – *Andrène lappone*, *Andrène de la Myrtille* ; English – Bilberry Mining Bee ; Dutch – *Bosbesbij* ; German - *Heidelbeer-Lockensandbiene*.

Figure 35. *Andrena lapponica*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: VU (B1ab(ii,iii,iv) +2ab(ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification**:** listed as Vulnerable due to a limited geographic range in the form of (B1) the extent of occurrence (comprised between 1500 and 3000 km²) as well as in the form of (B2) the area of occupancy (comprised between 15 and 30 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the AOO, area, extent and/or quality of habitat and number of locations of subpopulations ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al*. (2013)

Geographic Range. Continental scale: from Ireland eastwards to Japan and from the Spanish mountains to Ukraine in south Europe. National scale: mainly in south-eastern Sambre-Meuse line and Campine, EOO = 2,100 km², AOO = 18 km².

Population. Continental scale: very common species, no evidence of decline. National scale: continuing decline in AOO and number of locations of subpopulations (disappeared from the Namur province), isolated populations. Rasmont *et al.* (1993) qualified the species as stable. Current population trend: stable.

Habitat and Ecology. Flying period: from early April to late June (Peeters *et al.* 2012). Habitat: woodlands with *Vaccinium* undergrowth (Peeters *et al.* 2012). Visited flowers: mainly *Vaccinium* but also Asteraceae, Brassicaceae, Rosaceae and Salicaceae (Osytshnjuk 1977). Records on cultivated plants: *Rhododendron ponticum, Vaccinium, Prunus spinosa, Thymus*. Nesting habits: in small aggregations, occasionally with *Andrena clarkella* (Westrich 1989). Parasites: *Nomada panzeri* (Perkins 1919), *Myopa buccata* (Else & Edwards 2018).

Threats. The threats to this species are unknown. Climate change is a potential threats (Nordic distribution).

Conservation Actions. Present: it is Red Listed in Moscow region of Russia as Vulnerable (Levchenko 2010).
It is known from protected areas. Future: no specific conservation actions can be taken for this species at the national scale.

Research Needed. Further research is needed to identify the possible threats affecting the species.

***Andrena lathyri* Alfken, 1899**

Common Name(s): French – *Andrène de la Gesse* ; English – Burbage Mining Bee ; Dutch – *Wikkebij* ; German - *Zaunwicken-Sandbiene*.

Figure 36. *Andrena lathyri*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Vicia sepium* (Treignes, Photo : Y. Barbier).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2b) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe. National scale: mainly in Hesbaye, Pays de Herve and Condroz although there is a regression in the

number of observations since 1991, records between Leuven and Hasselt, EOO = 3,900 km², AOO = 31 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: decline in the number of populations, Rasmont *et al* (1993) qualified the species as stable, Current population trend: decrease.

Habitat and Ecology. Flying period: from late April to late June (Peeters *et al.* 2012). Habitat: open and flower-rich xeric habitats (Kocourek 1966, Westrich 1989). Visited flowers: oligolectic on *Lathyrus spp.* and *Vicia spp.*, other records on Fabaceae (*Trifolium*) and very rarely on Asteraceae (*Taraxacum officinalis, Leontodon*), Boraginaceae (*Symphytum*), Brassicaceae (*Brassica*), Lamiaceae (*Thymus sp. Ajuga reptans*) and Salicaceae (*Salix aurita*) (Stoeckhert 1933, Pittioni and Schmidt 1943, Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Westrich 1989, Schmid-Egger and Scheuchl 1997). Records on cultivated plants: *Vicia sativa*. Nesting habits: solitarily in loamy soil (Kocourek 1966, Dylewska 1987, Westrich 1989). Parasites: *Nomada villosa* (Stöckhert 1933).

Threats. Global decline of Fabaceae rich habitats (natural or anthropogenic) due to agricultural and forestry intensification.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Vulnerable; Farkac *et al.* 2005), Great Britain (Endangered; Shirt 1987), Norway (Near Threatened; Kålås *et al.*2010) and Finland (Endangered; Rassi 2010) ;

development of agro-environmental measures (“MAE” like MC4-8 and MC10) could benefit to this species. Future: promotion of the reintroduction of Fabaceae cropping, promotion of the rehabilitation of natural Fabaceae rich habitats.

Andrena limata **Smith, 1853**

Common Name(s): French – *Andrène limée* ; German - *Schwarzhaarige Düstersandbiene*.

Figure 37. *Andrena limata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: Warncke considers *A. limata* as conspecific with *Andrena nitida*, according to E. Scheuchl (pers. comm. 2014), *A. limata* and *A. nitida* are two distinct species. This assessment considers *A. limata* and *A. nitida* as two different species.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout southern and central Europe. National scale: last observation in Chatillon (1975).

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: extinct.

Habitat and Ecology. Flying period: apparently bivoltine, from April to September (Tomozei 2014). Habitat: various biotopes (Tomozei 2014). Visited flowers: polylectic, records on Aceraceae, Apiaceae, Asteraceae, Brassicaceae, Boraginaceae, Brassicaceae, Fabaceae, Euphorbiaceae, Ranunculaceae, Rosaceae, Salicaeae and Scrophulariaceae families (Osytshnjuk 1977, Osytshnjuk *et al.* 2008). Nesting habits: unknown. Parasites: unknown.

Threats. The threats to this species are unknown.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Regionally Extinct; Amiet 1994), Czech Republic (Critically Endangered; Farkac *et al*. 2005), Germany (Endangered; Westrich *et al*. 2008) and Slovenia (Endangered, Anonymous 2002). No future conservation actions can be taken for this species.

Research Needed. Specify the taxonomic status of the species, especially through the use of molecular techniques (B. Tomozei pers. comm. 2014), specify the ecological requirements, threats, population size and trend of this species..

Andrena marginata **Fabricius, 1776**

Common Name(s): French – *Andrène de la Scabieuse* ; English – Small Scabious Mining Bee ; Dutch - *Oranje Zandbij* ; German - *Skabiosen-Sandbiene*.

Figure 38. *Andrena marginata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe. National scale: last observation in Orval in 1978.

Population. No information available on actual population size and trends.

Habitat and Ecology. Flying period: from late July to mid-September (Peeters *et al.* 2012). Habitat: open habitats containing Dipsacaceae species (Else & Edwards 2018). Visited flowers: strongly associated with Dipsacaceae (*Succisa pratensis, Knautia arvensis* and *Scabiosa columbaria*) and also forages on *Rubus, Spirea ulmaria, Epilobium sp., Leontodon, Jasone montana* and *Tanacetum vulgare* (Osytshnjuk 1977, Dylewska 1987). Nesting habits: solitarily or in small aggregations in the ground (Peeters *et al.* 2012). Parasites: *Nomada argentata* (Westrich 1989), *Physocephala rufipes* (M. Edwards pers. obs.).

Threats. Intensification in the use of meadows and pastures (especially calcareous open grasslands, moist meadows and pastures) have led to a decline in Dipsacaceae resources (Ekstam *et al.* 1998) and have probably helped in the national extinction of the species.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following seven European countries: Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2008), Ireland (Critically Endangered; Fitzpatrick *et al.* 2006), Finland (Vulnerable; Rassi *et al.* 2010), Netherlands (Regionally Extinct; Peeters and Reemer 2003), Norway (Endangered; Kålås *et al.* 2010) and Sweden (Vulnerable; Gärdenfors 2010) ; this species is legally protected in Wallonia.

Andrena minutula **(Kirby, 1802)**

Common Name(s): French – *Micrandrène commune* ; English – Common Mini-miner ; Dutch - *Gewone Dwergzandbij* ; German - *Gewöhnliche Zwergsandbiene*.

Figure 39. *Andrena minutula*. A, female specimen; B, male specimen; C, foraging on *Sedum sp.* (Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: may be over evaluated due to a lot of taxonomical confusion risks with other species of the subgenus *Micrandrena* ; Facilitator/Compiler(s): Maxime

Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe . National scale: in Belgium, strong populations in the natural region of Brabant and the city of Leuven, EOO = 9,900 km², AOO = 109 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: large and increasing populations. Rasmont *et al* (1993) qualified the species as very highly significantly increasing, Current population trend: increase.

Habitat and Ecology. Flying period: bivoltine from mid-March to late August (Peeters *et al.* 2012). Habitat: wide variety of habitats (Peeters *et al.* 2012). Visited flowers: polylectic, records on Aceraceae, Apiaceae, Asteraceae, Brassicaceae, Caryophyllaceae, Rosaceae, Salicaeae and Scrophulariaceae families (Kocourek 1966, Osythshnjuk 1977, Dylewska 1987, Schmid-Egger 2011). Records on cultivated plants: *Brassica, Vaccinium myrtillus, Fragraria, Prunus, Crataegus, Rubus, Daucus*. Nesting habits: solitarily (Dylewska 1987). Parasites: *Nomada flavoguttata* (Westrich 1989).

Threats. No specific threats to the species at the national scale.

Conservation Actions. This species is included in the National Red List of Finland (Endangered; Rassi *et al.* 2010). No future conservation actions have to be taken at the national scale.

Andrena minutuloides **Perkins, 1914**

Common Name(s): French – *Micrandrène brillante* ; English – Plain Mini-miner ; Dutch - *Glimmende Dwergzandbij* ; German - *Glanzrücken Zwergsandbiene*.

Figure 40. *Andrena minutuloides*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Data Deficient due to high identification difficulties ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: throughout Europe ; National scale: scattered records in northern Sambre-Meuse line, almost absent in southern Sambre-Meuse line, EOO = 900 km², AOO = 16 km².

Population. There is no information available for the population trends of this species, Current population trend: unknown.

Habitat and Ecology. Flying period: bivoltine from late March to early September (Peeters *et al.* 2012). Habitat: xerothermic and nutrient-poor open habitats (Peeters *et al.* 2012). Visited flowers: polylectic, records on Brassicaceae, Apiaceae, Asteraceae, Lamiaceae, Rosaceae and Scrophulariaceae species (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Schmid-Egger 2011). Records on cultivated plants: *Daucus, Brassica* (Else & Edwards 2018). Nesting habits: solitarily (Kocourek 1966, Dylewska 1987). Parasites: *Nomada flavoguttata* (Westrich 1989), *Stylops liliputanus* (Kinzelbach 1971).

Threats. The threats to this species are unknown.

Conservation Actions. No future conservation actions can be taken at the national scale.

Research Needed. Specify the population size and trend at the national scale ; specify the potential threats that might occur to this species.

Andrena mitis **Schmiedeknecht, 1883**

Common Name(s): French – *Andrène calme* ; Dutch - *Lichte Wilgenzandbij* ; German - *Auen-Lockensandbiene*.

Figure 41. *Andrena mitis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Least Concern because there are no sign of decline. The species shows however a low abundance ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: from central and southern Europe. National scale: scattered distribution mostly in the sandy natural regions of northern Sambre-Meuse line, EOO = 1,500 km², AOO = 19 km².

Population. Continental scale: no information available for the population size and trend of this species. National scale: not abundant but relatively large and stable populations, Rasmont *et al* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from mid-March to early June (Peeters *et al.* 2012). Habitat: water meadows, railway edges and dunes (Peeters *et al.* 2012). Visited flowers: oligolectic on *Salix* (Scheuchl 1997), records on Ranunculaceae (*Ficaria*), Asteraceae (*Taraxacum*), Rosaceae (*Crataegus, Prunus, Cerasus*) and Fabaceae (*Trifolium, Cytisus*) families (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2005). Records on cultivated plants: *Crataegus, Prunus cerasus, Trifolium*. Nesting habits: nests burrows are found in open sandy or sandy-loam areas (Peeters *et al.* 2012). Parasites: unknown.

Threats. No specific threats to this species at the national scale.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of Switzerland (Vulnerable; Amiet 1994), Czech Republic (Endangered; Farkac *et al.* 2005) and Germany (Near Threatened; Westrich *et al.* 2008). No future conservation actions have to be taken at the national scale.

Research Needed. Specify the life history and ecology of the species.

Andrena nana **(Kirby, 1802)**

Common Name(s): French – *Micrandrène naine* ; English – Barham Mini-miner ; German - *Punktierte Zwergsandbiene*.

Figure 42. *Andrena nana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification listed as Data Deficient due to the confusion risks with the remaining *Micrandrena* species ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al*. (2013)

Geographic Range. Continental scale: from Portugal to Sweden, and from France to east towards Ukraine. National scale: last observation in 1927 in Ooks.

Population. There is no current information available on the population size and trend of this species.

Habitat and Ecology. Flying period: from late April to early June and from mid-July to mid or late August (Else & Edwards 2018). Habitat: moist grassland (Kocourek 1966). Visited flowers: records on Euphorbiaceae, Salicaceae, Ranunculaceae and Rosaceae (Kemp *et al.* 2013). Nesting habits: unknown. Parasites: unknown.

Threats. The threats to this species are not known

Conservation Actions. *Andrena nana* is Red listed in Germany and the UK as Vulnerable (Westrich 2011, Shirt 1987), and in the Czech Republic as Endangered (Farkac *et al.* 2005). No future conservation actions can be taken at the national scale.

Research Needed. Specify the population size and trend ; specify the ecological requirements of this species ; specify the potential threats that might occur to this species.

Andrena nanula Nylander, 1848

Common Name(s): French – *Micrandrène à antennes-rouges* ; English – Red-horned Mini-miner ; German - *Rotfühler-Zwergsandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Not Evaluated in view of the lack of information on the population size and trend and the threats affecting the species. ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Kemp *et al.* (2013).

Geographic Range. Continental scale: from France to European Russia, and from Spain to Finland. National scale: no record, further sampling expeditions should be led to determine whether the species exists in Belgium or not.

Population. There is no current information available on the population size and trend of this species.

Habitat and Ecology. Flying period: from July to August (Else & Edwards 2018). Habitat: open grasslands surrounded by trees and bushes (Kemp *et al.* 2013, L.A. Nilsson, pers. comm.). Visited flowers: females depend on Apiaceae (*Pimpinella saxifraga, Angelica sylvestris, Daucus carota*) (Else & Edwards 2018). Records on cultivated plants: *Daucus carota* is the only known pollen source (Westrich 1989). Nesting habits: solitarily or in small aggregations in well-exposed soils. Parasites: unknown.

Threats. The threats to this species are unknown. Chemical treatments of *Daucus carota* crops might affect this species.

Conservation Actions. Present: *Andrena nanula* is listed in the Red Data Book and National Red Lists of Germany (Data Deficient; Westrich 2011), the Czech Republic (Endangered; Farkac *et al*. 2005) and Great Britain (Regionally Extinct; Shirt 1987). Future: promotion of pesticides-free Apiaceae crops.

Research Needed. Specify the population size and trend at the national scale ; specify the ecological requirements ; specify the potential threats that might occur on this species.

Andrena nigriceps **(Kirby, 1802)**

Common Name(s): French – *Andrène tête-noire* ; English – Black-headed Mining Bee ; Dutch - *Donkere Zomerzandbij* ; German - *Schwarzköpfige Herbstsandbiene*.

Figure 43. *Andrena nigriceps*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Taxonomic Notes: this assessment follows the taxonomic criteria of Gusenleitner and Schwarz (2002) and considers *A. jagnobensis* as a synonym of *A. nigriceps*.

Assessment Information. Red List Category & Criteria: CR (B1ab(ii,iii,iv) +2ab(ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: Listed as Critically Endangered due to a limited geographic range in the form of (B1) the extent of occurrence (< 500 km²) as well as in the form of (B2) the area of occupancy (< 5 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the AOO, area, extent and/or quality of habitat and number of locations of subpopulations ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: from north and central Europe, in mountainous parts of southern Europe to the Caucasus region, Asia Minor and Central Asia. National scale: one population remains in Lommel – Balimgronden.

Population. Continental scale: there is no information available for the population size and trend of this species. National scale: continuing decline in the number of locations of subpopulations. Rasmont *et al* (1993) qualified the species as stable, Current population trend: not evaluated.

Habitat and Ecology. Flying period: from mid-June to late August (Peeters *et al.* 2012). Habitat: heathlands, nutrient-poor meadows, dunes and sandpaths (Peeters *et al.* 2012). Visited flowers: Asteraceae, Polygonaceae, Brassicaeae, Rosaceae, Fabaceae, Ericaceae and Lamiaceae families (Osytshnjuk 1977, Osytshnjuk *et al.* 2005, Dylewska 1987, 2000). Nesting habits: solitarily or in small aggregations in sandy patches. Parasites: *Nomada roberjeotiana* and *Nomada rufipes* (Theunert 2008).

Threats. This species might suffer from heathlands and nutrient-poor grassland decline due to agricultural and forestry intensification.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following five European countries: Czech Republic (Regionally Extinct; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2008), Netherlands (Vulnerable; Peeters and Reemer 2003), Norway (Near Threatened; Kålås *et al.* 2010) and Slovenia (Vulnerable; Anonymous 2002). Future : establish a legal protection status for this species as well as for the areas where it still occurs.

Research Needed. Monitoring of the population size and trend.

Andrena nigroaenea **(Kirby, 1802)**

Common Name(s): French – *Andrène noire-bronze* ; English – Buffish Mining Bee ; Dutch - *Zwartbronzen Zandbij* ; German - *Erzfarbene Düstersandbiene*.

Figure 44. *Andrena nigroaenea*. A, female specimen; B, male specimen; C, foraging on *Potentilla sterilis.* (Auderghem, Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: throughout Europe. National scale: everywhere in Belgium, EOO = 100 km², AOO = 1 km². EOO = 12,100 km², AOO = 152 km².

Population. Continental scale: there is no information available about the actual population size and trends of this species. National scale: large and stable populations, Rasmont *et al* (1993) qualified the species as significantly increasing, Current population trend: stable.

Habitat and Ecology. Flying period: from late March to early July (Peeters *et al.* 2012).Habitat: various habitats with a well-marked preference for heathlands, nutrient-poor grasslands, sandy areas (Peeters *et al.* 2012). Visited flowers: polylectic, records on Asteraceae, Brassicaceae, Boraginaceae, Fabaceae, Geraniaceae, Grossulariaceae, Lamiaceae, Papaveraceae, Rosaceae, Ranunculaceae, Scrophulariaceae, Salicaceae (Kocourek 1966, Dylewska 1987, Osytshnjuk *et al*. 2008, Schmid-Egger 2011). Nesting habits: solitarily in loamy soils (*e.g.* Kocourek 1966), one record of a large aggregation on sandy soil. Parasites: *Nomada fabriciana, N. flava, N. fulvicornis, N. goodeniana, N. marshamella, N. succincta* and *Sphecodes rubicundus* (*e.g.* Westrich 1989), *Stylops melittae* (*e.g.* Smit & Smit 2005). Records on cultivated plants: *Trifolium spp.*

Threats. No specific threats to this species at the national scale.

Conservation Actions

Andrena nigroaenea is included in the National Red List of Ireland (Vulnerable; Fitzpatrick *et al.* 2006). No future conservation actions have to be taken at the national scale.

Andrena nitida **(Müller, 1776)**

Common Name(s): French – *Andrène limpide* ; English – Grey-patched Mining Bee ; Dutch – *Viltvlekzandbij* ; German - *Glänzende Düstersandbiene*.

Figure 45. *Andrena nitida*. A, female specimen; B, male specimen (Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: throughout Europe. National scale: everywhere in Belgium, EOO = 16,700 km², AOO = 240 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: large and stable populations, Rasmont *et al* (1993) qualified the species as very highly significantly increasing, Current population trend: stable.

Habitat and Ecology. Flying period: from late March to mid-June (Peeters *et al.*2012). Habitat: wide variety of habitats (e.g. Peeters *et al.*2012). Visited flowers: polylectic, records on Asteraceae, Boraginaceae, Cucurbitaceae, Lamiaceae, Liliaceae, Ranunculaceae, Papaveraceae, Rosaceae and Salicaceae families (Kocourek 1966, Dylewska 1987, Osytshnjuk 1977, Osytshnjuk *et al.*2008). Nesting habits: solitarily or in small aggregations in a wide variety of soils (e.g. Müller *et al.*1997). Parasites: *Nomada flava*, *N. goodeniana*, *N. succincta* (e.g. Westrich 1989), *Stylops mellitae* (Smit & Smit 2005). It is considered as an effective pollinator of fruit trees and Cucurbitaceae species (Kocourek 1966, Dylewska 1987, Osytshnjuk 1977, Osytshnjuk *et al.*2008). Records on cultivated plants: *Fagus*, *Betula*, *Brassica*, *Sinapis*, *Rubus idaeus*, *Prunus spinosa*, *Prunus avium*, *Prunus laurocerasus*, *Pyrus cultivars*, *Cotoneaster*, *Crataegus monogyna*, *Aesculus hippocastanum*, *Acer campastre* (Chambers 1968).

Threats. No specific threats to this species at the national scale.

Conservation Actions. This species is included in the National Red Lists of two European countries: Norway (Endangered; Kålås *et al.*2010) and Sweden

(Vulnerable; Gärdenfors 2010). No future conservation actions have to be taken at the national scale.

***Andrena nitidiuscula* Schenck, 1853**

Common Name(s): French – *Andrène de la Carotte* ; English – Carrot Mining Bee ; Dutch – *Schermbloemzandbij* ; German - *Sommer-Kielsandbiene.*

Figure 46. *Andrena nitidiuscula*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: *A. fulvicornis* and *A. nitiduscula* are considered as two proper species in this assessement.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: VU (B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Vulnerable due to a limited geographic range in the form of (B1) the extent of occurrence (comprised between 1500 km² and 3000 km²) as well as in the form of (B2) the area of occupancy (comprised between 15 km² and 30 km²). This is inferred from a continuing decline in area, extent and/or quality of habitat. ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei (2014).

Geographic Range. Continental scale: in central and southern Europe. National scale: around Oudenaarde, Hotton and between Leuven and Hasselt, EOO = 100 km², AOO = 1 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: scattered populations, limited and declining geographic range, Rasmont *et al* (1993) qualified the species as stable, Current population trend: not evaluated.

Habitat and Ecology. Flying period: July and August (Peeters *et al.* 2012). Habitat: xerothermic habitats such as warm forest edges, nutrient-poor meadows, gravel pit, sand pit (Peeters *et al.* 2012). Visited flowers: suggested as oligolectic on Apiaceae family (Westrich 1989, Schmid-Egger & Scheuchl 1997), record on Anacardiaceae, Apiaceae, Asteraceae, Brassicaceae, Campanulaceae, Euphorbiaceae, Fabaceae, Ranunculaceae, Rosaceae and Salicaceae families (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987). Nesting habits: solitarily (most records) or in small aggregations (Peeters *et al.* 2012). Parasites: *Nomada rufipes* (Edwards & Telfer 2002), *Stylops nitidusculae* (*e.g.* Straka *et al.* 2015). Records on cultivated plants: *Rubus, Pastinaca sativa, Daucus carota* (Else & Edwards 2018).

Threats. Global decline of xerothermic habitats due to agricultural and forestry intensification but also due to the scrub encroachment of sand and gravel pits.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2008) and Great

Britain (Rare; Shirt 1987). Future: promotion of the conservation and rehabilitation of the habitats where the species might occur.

Andrena nitidula Pérez, 1903

Common Name(s): French – *Andrène nette* ; German - *Glänzende Riefensandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Burger, F. and Herrmann, M.** 2003. Taxonomy and distribution of *Andrena distinguenda* Schenck, 1871 and *Andrena* nitidula Perez, 1903 Hymenoptera, Apidae. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 76(1/2): 137-151.

Taxonomic Notes: according to Burger & Herrmann (2003), *Andrena nitidula* and *A. distinguenda* are considered as two proper species in this assessment.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Not Evaluated in view of the lack of information on the population size and trend and the threats affecting the species. Further research is needed to establish the status of this species.; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Kemp *et al.* (2013).

Geographic Range. Continental scale: endemic to western Europe. It is recorded from Belgium, France, Germany, Italy, Spain and Portugal. National scale: no data available.

Population. There is no current information available on the population size and trend of this species.

Habitat and Ecology. Little information in known, apparently univoltine from April to July.

Threats. The threats to this species are not known.

Conservation Actions. *Andrena nitidula* is recorded as Data Deficient in Germany (Westrich *et al.* 2011).No future conservation actions can be taken at the national scale.

Research Needed. Specify the population size and trend, specify the life history and ecology, specify the potential threats that might occur to this species.

Andrena niveata Friese, 1887

Common Name(s): French – *Micrandrène neigeuse* ; English – Long-fringed Mini-miner ; Dutch - *Gebandeerde Dwergzandbij* ; German - *Weissbindige Zwergsandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Data Deficient because it is difficult to identify from other *Micrandrena* ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: throughout Europe. National scale: last observation in Omal in 1951.

Population. There is no information available for the population size and trend of this species.

Habitat and Ecology. Flying period: from April to June (Peeters *et al.* 2012). Habitat: in various habitats such as uncultivated fields, forests edges and dry slopes (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987). Peeters *et al.* (2012) report the species on disturbed, unstable environment. Perkins (1919) reports the species on coastal sandy heaths. Falk (2011) mentions the species as locally common on chalky grasslands. Visited flowers: records on Brassicaceae, Asteraceae, Fabaceae, Crassulaceae Asparagaceae, Apiaceae, and Ranunculaceae (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987). Nesting habits: solitarily in sparsely vegetated and south-faced slopes (M. Edwards pers. obs.). Parasites: probably *Nomada flavoguttata* (Peeters *et al.* 2012), *Stylops sp.* (Else & Edwards 2018). Records on cultivated plants: *Brassica napus, Matricaria chamomilla, Chrysanthemum, Trifolium pratense, Asparagus, Daucus carota, Brassica oleracea,* (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Westrich 1989).

Threats. It is not known whether the species is threatened or not at the national scale.

Conservation Actions. *Andrena niveata* is included in the National Red Lists or Red Data Books of the following seven European countries: Switzerland (Endangered; Amiet 1994), Czech Republic (Endangered; Farkac *et al*. 2005), Germany (Vulnerable; Westrich *et al*. 2008), Great Britain (Rare; Shirt 1987), Netherlands (Critically Endangered; Peeters and Reemer 2003), Sweden (Endangered; Gärdenfors 2010) and Slovenia (Rare; Anonymous 2002). Future: no conservation actions can be taken at the national scale.

Research Needed. Specify the population size and trend as well as the potential threats that might occur to this species.

Andrena nycthemera **Imhoff, 1868**

Common Name(s): French – *Andrène nocturne* ; Dutch - *Dageraadzandbij* ; German - *Graue Lockensandbiene*.

Figure 47. *Andrena nycthemera*. Specimens *In copula* (Merendree, Photo: H. Wallays).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as Least Concern because there is a lot of recent data. Probable expansion due to human activity ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei (2014)

Geographic Range. Continental scale: through central Europe and European Russia. National scale: mainly in sandy natural regions of northern Sambre-Meuse line, EOO = 800 km², AOO = 9 km².

Population. Continental scale: the overall trend in Europe and exact size of the population is unknown. National scale: Rasmont *et al* (1993) qualified the species as stable, Current population trend: unknown.

Habitat and Ecology. Flying period: from March to early May (Osytshnjuk 2005, Schönitzer and Klinksik 1990). Habitat: humid biotopes, uncultivated fields, ruderal areas, sandpits. The species seems to depend on sandy soils for nesting (Tomozei 2014, Schönitzer and Klinksik 1990). In Belgium, the species is mostly found in sandpits and heathlands. Visited flowers: oligolectic on *Salix* (Osytshnjuk 2005, Schönitzer and Klinksik 1990) and *Tussilago farfara* (Dylewska 2000). Nesting habits: in large aggregations in sandy slopes (Schönitzer and Klinksik 1990). Parasites: unknown. **Threats.** No specific threats to this species at the national scale.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following four European countries: Czech Republic (Critically Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008), Sweden (Endangered; Gärdenfors 2010) and Switzerland (Regionally Extinct; Amiet 1994). No future conservation actions have to be taken at the national scale.

Andrena ovatula **(Kirby, 1802)**

Common Name(s): French – *Andrène ovale* ; English – Small Gorse Mining Bee ; Dutch – *Bremzandbij* ; German - *Ovale Kleesandbiene*.

Figure 48. *Andrena ovatula*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2c) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Radchenko (2015)

Geographic Range. Continental scale: throughout Europe (except at the extreme north). National scale: eastern Fagne-Famenne and scattered distribution in Campine and loamy plates of Hesbaye, Brabant and Hainaut, EOO = 4,100 km², AOO = 53 km².

Population. Continental scale: populations are decreasing in most European countries, especially in northern regions of Europe. National scale: populations are decreasing due to a decline in the AOO and EOO. Rasmont *et al* (1993) qualified the species as very highly significantly decreasing, Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from late March to mid-September (Peeters *et al.* 2012). Habitat: in xerothermic habitats such as dry, nutrient-poor and flower-rich meadows, dry heathlands, dry ruderal areas, gravel pits (*e.g.* Peeters *et al.* 2012). Visited flowers: polylectic with a well-marked preference for Fabaceae (Stöckhert 1933, Pittioni and Schmidt 1943, Ponomareva 1960, Kocourek 1966, Warncke 1966, Popov 1967a, Pesenko 1972, Osytshnjuk 1977, Westrich 1989, Radchenko and Pesenko 1994), also forages on Asteraceae, Rosaceae, Brassicaceae, Ranunculaceae, Lamiaceae, Boraginaceae, Salicaceae,

Scrophulariaceae, Plumbaginaceae, Ericaceae, Campanulaceae families (Radchenko 2015, Else & Edwards 2018). Nesting habits: in small or large aggregations in warm and open slopes (M. Edwards pers. obs., Kocourek 1966, Wafa *et al.* 1972,) Parasites: *Nomada rhenana* (*e.g.* Westrich 1989), *Stylops mellitae* (Perkins 1918, 1919, Straka *et al.* 2015). Important pollinators of cultivated *Medicago* and *Trifolium* (Kocourek 1966). Records on cultivated plants: *Trifolium repens, Trifolium pratense, Prunus spinosa, Pyrus, Rubus, Thymus*.

Threats. Global decline of Fabaceae rich habitats (natural or anthropogenic) due to agricultural and forestry intensification.

Conservation Actions. Present: this species is included in the Red List of Finland (Regionally Extinct; Rassi *et al.* 2010), Ireland (Data Deficient; Fitzpatrick *et al.* 2006), the Netherlands (Vulnerable; Peeters and Reemer 2003), Germany (Least Concern; Westrich *et al.* 1998, 2008, 2011) and the Free State of Saxony (Endangered; Burger *et al.* 2004) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of the reintroduction of Fabaceae cropping in May and June, promotion of the rehabilitation of natural Fabaceae rich habitats. As the species is useful for the pollination of crops, it is necessary to preserve the plants during their flowering, prohibiting the use of insecticides on the fields during flowering and avoiding ploughing the fields immediately after their use in order to protect the species. There are are a number of techniques that can be used to increase the species on alfalfa fields (see Radchenko 1982, Pesenko and Radchenko 1993).

Andrena pandellei **Pérez, 1895**

Common Name(s): French – *Andrène des crucifères* ; English – Violet-winged Mining Bee ; Dutch - *Blauwe Zandbij* ; German - *Senf-Blauschillersandbiene*

Figure 49. *Andrena pandellei*. A, female specimen (Photo: A. Pauly); B, foraging on *Campanula sp.* (Devant-Bouvignes, Photo: Y. Barbier).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: VU (B2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: Listed as Vulnerable due to a limited geographic range in the form of (B2) the area of occupancy (comprised between 15 and 30 km²). This is inferred from a continuing decline in the area, extent and/or quality of habitat ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Radchenko (2015)

Geographic Range. Continental scale: mostly Mediterranean, from the Iberian peninsula towards Ukraine and Greece, can be found until southern England. National scale: mainly around Hastières, Han, Arlon, Virton, Huy and Visé.

Population. Continental scale: stable in most European countries. National scale: populations are found in a limited and declining geographic range, Rasmont *et al* (1993) qualified the species as stable, Current population trend: Declining.

Habitat and Ecology. Flying period: from mid-May to late July (Peeters *et al.* 2012). Habitat: variety of biotopes such as moist forested areas, forest edges and clearings, dry sloppy meadows (Osytshnjuk 1977, Osytshnjuk *et al*. 2008), nutrient-richer parts of chalky meadows (Peeters *et al.* 2012). Visited flowers: oligolectic on Campanulaceae but can easily be found foraging on Asteraceae, Fabaceae, Serophulariaceae, Rosaceae and Brassicaecae families (Kocourek 1966). Nesting habits: in small aggregations on clay soils (Radchenko 2015) but once observed by Kocourek (1966) forming a colony of more than 100 nests. Parasites: *Nomada braunsiana* (Westrich 1989). Considered to be an important pollinator of *Campanula* (incl. cultivars) (Radchenko and Pesenko 1994).

Threats. Overgrazing and uses of herbicides on habitats that may contain Campanulaceae species, especially intensive grazing practice or mowing of dry slopes where bluebells usually appear in mid-May.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al*. 2011), the Netherlands (Regionally Extinct; Peeters and Reemer 2003, De rode lijst 2012 - although the species was found in Limburg province in 2006 and 2009 by Koel (2014)) and Switzerland as Endangered (Amiet 1994, BAFU 2009) ; promotion of MAE measures might benefit to the species. Future: preservation of the Campanulaceae species from grazing and mowing.

Andrena pilipes **Fabricius, 1781**

Common Name(s): French – *Andrène pieds-poilus*, *Andrène noir-charbon* ; English – Black Mining Bee ; Dutch - *Koolzwarte Zandbij* ; German - *Schwarze Köhlersandbiene*.

Figure 50. *Andrena pilipes*. A, female specimen; B, male specimen; C, foraging on Brassicaceae. (Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Data Deficient because research should be conducted to determine population size and trends of the species ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Radchenko (2015)

Geographic Range. Continental scale: widespread throughout Europe (except the northern regions of Sweden, the United Kingdom and European Russia). National scale: mostly in the city of Brussels and in the natural region of Hesbaye, EOO = NE, AOO = NE.

Population. Continental scale: populations are stable in most European countries except in the northern part of its distribution where it is rare and in decline. National scale: there is no current information available on the population size and trend of this species, Current population trend: not evaluated.

Habitat and Ecology. Flying period: bivoltine, from early April to mid-August (Peeters *et al.* 2012). Habitat: wide variety of habitats but preferring open ones (Peeters *et al.* 2012, Radchenko 2015). Visited flowers: polylectic (Popov 1967a, Osytshnjuk 1977, Pesenko *et al.* 1982, Beil *et al.* 2008). Nesting habits: nests sandy or loamy soils in large aggregations or solitarily (Nevinson 1902). Parasites: *Nomada fulvicornis* (*e.g.* Chambers 1949), *N. melathoracica* (Westrich 1989), *Stylops mellitae* (Kocourek 1966), *Stylops nassonowi* (Straka *et al.* 2015). The species is valued as a pollinator of many different plants, including those that are cultivated by man, such as fruit and pumpkin crops (Filov 1935, Nevkryta 1950, Rymashevskiy and Rymashevskaya 1958, Rasulov 1966) and alfalfa (Radchenko 1982).

Threats. The threats to this species are not known at the national scale. However, it has been proved that fragmentation of the habitats and agricultural intensification can lead to the extinction of the species (Ronayne 2006).

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of Ireland (Data Deficient; Fitzpatrick *et al.* 2006), Finland (Endangered; Rassi *et al*. 2010), Germany (Vulnerable; Westrich *et al.* 2011), Sweden (listed as a synonym of *A. nigrospina* as Near Threatened; Gärdenfors 2010) and Switzerland (Endangered; Amiet 1994), might be extinct in Ireland (Ronayne 2006). Future: promotion of the conservation of wild plants during their flowering period and prohibition of the use of insecticides and herbicides on fields when wild plants are flowering.

***Andrena polita* Smith, 1847**

Common Name(s): French – *Andrène polie* ; English – Maidstone Mining Bee ; Dutch - *Grote Glimmende Zandbij* ; German - *Polierte Sandbiene*.

Figure 51. *Andrena polita*.
Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of (B1) the extent of occurrence (< 500 km²) as well as in the form of (B2) the area of occupancy (< 5 km²). This is inferred from very few and fragmented locations of subpopulations, continuing decline in the EOO, AOO, area, extent and/or quality of habitat and number of locations or subpopulations ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Radchenko (2015).

Geographic Range. Continental scale: central and southern parts of Europe. In the north it can be found from England, the Netherlands and northern Poland to Moscow in Russia. In the south, it is present from the Pyrenees to Sicily (Italy), Crete (Greece) and further east to the Urals. National scale: a single population in Montagne Saint-Pierre, EOO = 300 km², AOO = 3 km².

Population. Continental scale: appears to be stable and overall can be presumed to be large in Europe except in the northern part of its range. National scale: only one population left, Rasmont *et al* (1993) qualified the species as stable, Current population trend: decrease.

Habitat and Ecology. Flying period: from early June to mid-August (Peeters *et al.* 2012). Habitat: xerothermic habitats, especially chalky grasslands (Peeters *et al.*

2012). Visited flowers: oligolectic on yellow Asteraceae but can rarely be found foraging on Rosaceae, Cucurbitaceae (Osytshnjuk 1977), Fabaceae (Radchenko 1982) and Apiaceae (Demyanova *et al.* 2007). Nesting habits: nests in small aggregations in bare shallowly inclined slopes (*e.g.* Westrich 1989). Parasites: *Nomada pleurosticta* (*e.g.* Westrich 1989).

Threats. The main threats to this species are the ploughing of fields on which it builds its nests, processing of fields with insecticides and herbicides and mowing flowering plants during the time when adult bees forage.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Straka 2005, Bogusch 2014), Germany (Endangered; Westrich *et al.* 2011), Great Britain (Regionally Extinct; Falk 1991), the Netherlands (Vulnerable; Peeters and Reemer 2003, although Koel (2014) only mentioned that this species is rare), Poland (Vulnerable; Banaszak 2002) and Switzerland (Vulnerable; Amiet 1994) ; the species can be found in natural reserve (montagne Saint-Pierre). Future: promotion of extensive agricultural practices (*i.e.* reduction in the ploughing intensity, late mowing practices and reduction in the uses of herbicides), establish a legal protection status for the species as well as for the areas where it still occurs.

Andrena potentillae Panzer, 1809

Common Name(s): French – *Andrène des potentilles* ; German - *Rote Fingerkraut-Sandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification listed as Critically Endangered due to a limited geographic range in the form of (B1) the extent of occurrence (comprised between 500 km² and 1500 km²) as well as in the form of (B2) the area of occupancy (comprised between 5 km² and 15 km²). This is inferred from a continuing decline in area, extent and/or quality of habitat. ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Radchenko (2015)

Geographic Range. Continental scale: throughout Europe from France to Lithuania, south to Italy and Greece, extending east to the Urals. National scale: one population around Han-sur-Lesse (Pauly & Vereecken 2018).

Population. Continental scale: The populations seem to have decreased in most European countries (Pressehintergrund 2012). National scale: Rasmont *et al* (1993) qualified the species as stable, Current population trend: not evaluated.

Habitat and Ecology. Flying period: from April to May (Radchenko 2015). Habitat: dry habitats, found in chalky grasslands in Belgium (Osytshnjuk 1977, Pauly & Vereecken 2018). Visited flowers: oligolectic on *Potentilla spp.* (Radchenko and Pesenko 1994), records on *Cornus mas* and *Prunus spinosa* (Pauly & Vereecken 2018). Nesting habits: unknown. Parasites: unknown.

Threats. Reduction in the number and quality of chalky grasslands due to agricultural and forestry intensification.

Conservation Actions. Present: the species occurs in protected areas (Belvédère natural reserve) ; *Andrena potentilla* is listed in Red List of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al*. 2011), Slovenia (Rare; Anonymous 2002) and Switzerland (Critically Endangered; Amiet 1994, BAFU 2009). It is also listed in the Regional Red Data Book of Ulyanovsk region of Russia (Rare; Popova 2008). Future: establish a legal protection status for the species as well as for the areas where it still occurs, promotion of an extensive use of meadows and pastures.

Andrena praecox (Scopoli, 1763)

Common Name(s): French – *Andrène précoce* ; English – Small Sallow Mining Bee ; Dutch - *Vroege Zandbij* ; German - *Frühe Lockensandbiene*.

Figure 52. *Andrena praecox*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (LC) (Europe) in Radchenko (2015).

Geographic Range. Continental scale: through Europe, from the northern parts of Finland and Sweden to the central parts of Spain and Italy, and from Ireland east to the Urals. National scale: everywhere in Belgium but mostly in northern Sambre-Meuse line, EOO = 3,200 km², AOO = 27 km².

Population. Continental scale: population status of this widely distributed bee seems to be stable. National scale: Rasmont *et al* (1993) qualified the species as stable, Current population trend: decrease.

Habitat and Ecology. Flying period: from early March to late May (Peeters *et al.* 2012). Habitat: wide variety of habitats (*e.g.* Westrich 1989) but prefers heathlands and open woodlands with *Salix* (Radchenko 2015). Visited flowers: oligolectic on *Salix spp.* (Warncke 1981), records on *Ranunculus bulbosus* and *Pyrus* (Chambers 1968). Nesting habits: nests in small aggregations in sparsely vegetated deciduous woodland (Edwards and Telfer 2002) or solitarily (*e.g.* Westrich 1989) Parasites: *Nomada ferruginata* (*e.g.* Westrich 1989), *Stylops melittae* (Smit & Smit 2005), *Stylops praecocis* (Straka *et al.* 2015).

Threats. No specific threats to this species at the national scale.

Conservation Actions. The species is listed in the National Red Lists or Red Data Books of Ireland (Vulnerable; Fitzpatrick *et al.* 2006) and Switzerland (Vulnerable; Amiet 1994, BAFU 2009). No future conservation actions have to be taken at the national scale.

Andrena propinqua Schenck, 1853

Common Name(s): French – *Andrène parente* ; .German - *Schwarzbeinige Körchensandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Taxonomic Notes: as Osytshnjuk (1977), Schmid-Egger and Scheuchl (1997), Nilsson (2003), Dubitzky (2005), Straka *et al.* (2007), Dubitzky *et al.* (2010), Gusenleitner *et al*. (2012), Hazir *et al.* (2014), the present assessment considers *A. dorsata* and *A. propinqua* as two separated species.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Data Deficient as this species was included as a synonym of *Andrena dorsata* and therefore the separate populations of *Andrena propinqua* have been poorly studied. There is currently little or no information available on the population size, trends and specific threats to the species. ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Radchenko (2015).

Geographic Range. Continental scale: throughout most of Europe, except in northern Europe. National scale: records around the cities of Brussels and Sint-Niklaas, EOO = NE, AOO = NE.

Population. Continental scale: population trend appears to be stable but its status might be unclear as this species is often synonymized with *A. dorsata*. National scale: there is no current information available on the population size and trend of this species in Belgium.

Habitat and Ecology. Flying period: bivoltine, from April to August (Radchenko 2015) Habitat: occurs in a wide variety of both natural and agricultural habitats (Radchenko 2015) Visited flowers: polylectic, records on 11 different families, but mostly on Brassicaceae and Rosaceae families (Osytshnjuk 1977, Radchenko 1982, Kuznetsova 1990). Nesting habits: unknown. Parasites: *Nomada zonata* (Kocourek 1966). Important pollinator of fruit crops (Muzichenko 1937, Nevkryta 1957, Breitbach *et al*. 2012), some cultivated plants of Brassicaceae and *Medicago sativa* (Wu 1960, Kocourek 1966).

Threats. The threats to this species are not known at the national scale.

Conservation Actions. This species is not listed in any National Red Lists or Red Data Books. No future conservation actions can be taken at the national scale.

Research Needed. Resolution of the taxonomic issues ; specify the population size and trend ; specify the threats that might occur to this species at the national scale.

Andrena proxima **(Kirby, 1802)**

Common Name(s): French – *Andrène rapprochée* ; English – Broad-faced Mining Bee ; Dutch – *Fluitenkruidbij* ; German - *Frühe Doldensandbiene*.

Figure 53. *Andrena proxima*. A, female specimen; B, male specimen; C, foraging on *Anthriscus sylvestris* (Woluwé-St-Lambert, Photos : A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Radchenko (2015)

Geographic Range. Continental scale: central-European species. National scale: in the natural regions of Flandre Sablonneuse, Flandre sablo-limoneuse,

Campine, Brabant and to a minor extent in the natural regions of Fagne-Famenne, Condroz and Hesbaye, EOO = 1,300 km², AOO = 14 km².

Population. Continental scale: wide range and stable population. National scale: Rasmont *et al* (1993) qualified the species as stable, Current population trend: decrease.

Habitat and Ecology. Flying period: from early April to early July (Peeters *et al.* 2012). Habitat: wide variety of open and flower-rich ruderal habitats (Peeters *et al.* 2012). Visited flowers: oligolectic on Apiaceae (*e.g.* Westrich 1989). Few records on Asteraceae, Brassicaceae, Campanulaceae and Euphorbaceae (Radchenko 2015). Nesting habits: solitarily or in small aggregations, usually avoiding sandy soils (Kocourek 1966, Westrich 1989), one record on a very steep slope where the species behavior was suggesting a communal nest burrow (G.R. Else, pers. obs.). Parasites: *Nomada conjugens* (*e.g.* Westrich 1989). Records on cultivated species: *Pastinaca, Daucus, Anthriscus, Smyrnium* and to a minor extent *Brassica oleracea, Crataegus* (Else & Edwards 2018). The species is a valued pollinator of cultivated Apiaceae.

Threats. No specific threats to the species at the national scale.

Conservation Actions. Listed as Vulnerable in the Red List of Great Britain (Shirt 1987). No future conservation actions have to be taken at the national scale.

Andrena pusilla **Pérez, 1903**

Common Name(s): French – *Micrandrène minime* ; Dutch – *Breedbanddwergzandbij* ; German - *Winzige Zwergsandbiene*.

Figure 54. *Andrena pusilla*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Taxonomic Notes: in this assessment *A. pusilla* and *A. spreta* are considered as two valid species although the considerable amount of taxonomic uncertainty with this species (Dardon *et al*. 2010, Dardón 2010, Dylewska 1987, Gusenleitner & Schwarz 2002, Schmid-Egger & Scheuchl 1997, Warncke 1967, 1981).

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as Data Deficient (DD) as the taxonomic status of this species is still unclear and the data for the distribution and population need to be reassessed once the taxonomic status has been confirmed ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al*. (2013).

Geographic Range. Continental scale: taxonomic issues with this species does not allow the determination of its real area of distribution. National scale: one confirmed population around Leuven, EOO = NE, AOO = NE.

Population. Taxonomic issues with this species does not allow the determination of the current status of the populations.

Habitat and Ecology. Flying period: probably bivoltine, records from late March to early July (Peeters *et al.* 2012). According to Dardón (2010) the first generation flies from April to May, and the second from July to August. Habitat: open sandy habitats (Raemakers *et al.* 2004). Visited flowers: probably oligolectic on Brassicaceae although there are records on the Asteraceae, Rosaceae, Caryophyllaceae and Plantaginaceae families (Dylewska 1987). Nesting habits: in clay soils (Radchenko 2015). In France it has been recorded as a pollinator of *Brassica napus* (Chifflet *et al*. 2011).

Threats. The threats are not known at the national scale.

Conservation Actions. The species is listed in the National Red Lists or Red Data Books of Germany (Data Deficient; Westrich *et al.* 2011), the Netherlands (Endangered; Peeters and Reemer 2003), Poland (Vulnerable; Banaszak 2002) and Switzerland (Regionally Extinct; Amiet 1994, BAFU 2009). No future conservation actions can be taken at the national scale.

Research Needed. Specify the population size and trend ; resolution of taxonomic issues regarding this species.

Andrena ranunculorum Morawitz, 1877

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Not Evaluated as there is no information available on the population size, trends and threats to the species ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Radchenko (2015).

Geographic Range. Continental scale: locally distributed across the middle of Europe, from the Pyrenees to the Urals. National scale: no available data, EOO = NE, AOO = NE.

Population. The current population status of this rare species is unknown.
Habitat and Ecology. Flying period: from April to June (Radchenko 2015). Habitat: foothill and mountain habitats that are both wet and dry (Radchenko 2015). Visited flowers: oligolectic on Brassicaceae but there are records on Rosaceae, Umbelliferae, Asteraceae, Ranunculaceae and Cistaceae (unpublished data Osytshnjuk, V. Radchenko pers. comm. 2014). Nesting habits: unknown. Parasites: unknown. This species is valued as a pollinator of different plants. It was also recorded as pollinator of fruit trees (Özbek 2008).

Threats. The main threats to this species are unknown.

Conservation Actions. The species is not listed in any National Red Lists or Red Data Books. No future conservation actions can be taken at the national scale.

Research Needed. Further research should be conducted to determine the population size and trends, habitat and ecology, and threats to the species.

***Andrena rosae* Panzer, 1801**

Common Name(s): French – *Andrène rosée* ; English – Perkin's Mining Bee ; Dutch – *Roodrandzandbij*; German - *Bärenklau-Sandbiene*.

Figure 55. *Andrena rosae*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Taxonomic Notes: as Reemer *et al*. (2008), this assessment considers *A. rosae* and *A. stragulata* as synonym species.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Least Concern because populations are stable. However, the species is restricted to localised and fragmented habitats (hilly areas in Flanders); Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Radchenko (2015).

Geographic Range. Continental scale: widely distributed but rare trans-palaearctic species. Distributed from Ireland to Japan, in southern Europe it is found mainly in mountainous areas. National scale: mostly aggregated around the cities of Brussels, Leuven and Malines, the rest of the distribution is highly scattered, EOO = 200 km², AOO = 2 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: Rasmont *et al* (1993) qualified the species as very highly significantly decreasing, Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from March to early September (Peeters *et al.* 2012). Habitat: open polders with wet meadows and groves (Peeters *et al.* 2012), stone quarries (I. Wright pers. obs.), wet *Salix* and *Prunus spinosa* scrubs (P. Saunders pers. comm.), moist meadows, floodplain forests edges and clearings and river valleys (Osytshnjuk *et al.* 2008). Visited flowers: polylectic, records on 13 families (Kuznetsova 1990). However the Spring brood prefers various species of Salicaceae and *Prunus* spinosa, the Summer brood prefers various Apiaceae species and *Filipendula ulmaria* (Meer *et al.* 2006). Nesting habits: solitarily on bare slopes or on paths (Kocourek 1966, Dylewska 1987) or in

small aggregations in sparsely vegetated banks (Westrich 1987). Parasites: *Nomada marshamella* (Stöckhert 1933), *Nomada fabriciana* (F. Meer pers. obs.). Records on cultivated plants: *Prunus spinosa, Crataegus, Ribes uva-crispa, Prunus cerasus, Malus, Fragaria vesca* (Kuznetsova 1990), *Rubus fruticosus, Daucus carota* (Else & Edwards 2018).

Threats. The threats to this species are not known. However it may suffer from the deterioration of the mosaic of habitats necessary for nesting and foraging of both generations of this species (Popova 2008, Horsley *et al*. 2013).

Conservation Actions. Present: The species is listed in Ireland as Regionally Extinct (Fitzpatrick *et al.* 2006; Ronayne 2006). However, its junior synonym, *Andrena stragulata*, is listed in the National Red Lists or Red Data Books of Estonia (Vulnerable; Lilleleht 2001), Germany (Endangered; Westrich *et al.* 2011), Great Britain (Vulnerable; Falk 1991, Howe 2002, Horsley *et al.* 2013), the Netherlands (Critically Endangered; Peeters and Reemer 2003), Switzerland (Endangered; BAFU 2009) and Slovenia (Rare, Anonymous 2002). Future: promotion of a more extensive and diversified agriculture with smaller parcels of land.

Andrena ruficrus **Nylander, 1848**

Common Name(s): French – *Andrène à croix rouge* ; English – Northern Mining Bee ; Dutch – *Roodscheenzandbij* ; German - *Rostschienen-Sandbiene*.

Figure 56. *Andrena ruficrus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2b) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Data Deficient (LC) (Europe) in Kemp *et al.* (2013).

Geographic Range. Continental scale: widespread species in Europe, from the UK to the Moscow region and from Finland south to the Balkans, largely absent from the Mediterranean zone. National scale: mostly in the natural region of Campine, EOO = 1,900 km², AOO = 27 km².

Population. Continental scale: the population is assumed to be large but details of its size and trend are unknown. National scale: very localised populations, Rasmont *et al* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from early March to early June (Peeters *et al.* 2012). Habitat: dry or moist forest edges, edges of sandy heathlands, its presence depends on the one of willows (Kemp *et al.* 2013). Visited flowers: oligolectic on Salicaceae (Westrich 1989). Nesting habits: solitarily on open sandy soils (Peeters *et al.* 2012). Parasites: *Nomada obscura* (*e.g.* Stöckhert 1933).

Threats. The threats to this species are unknown. However The mosaic of habitats that are necessary for the species' foraging and nesting might be threatened by agricultural and forestry intensification.

Conservation Actions. Present: *Andrena ruficrus* is considered to be Rare in Great Britain (Macadam *et al.* 2012, Shirt 1987). It is also listed in Slovenia (Rare; Anonymous 2002) and in Germany (Vulnerable; Westrich *et al.* 2011). Future:

promotion of a more extensive and diversified agriculture with smaller parcels of land.

Research Needed. Specify the threats that might occur to the species.

Andrena schencki Morawitz, 1866

Common Name(s): French – *Andrène de Schenck* ; Dutch - *Rode Zandbij* ; German - *Schenks Sandbiene*.

Figure 57. *Andrena schencki*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: EN (A2bc; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (comprised between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (comprised between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (comprised between 50% and 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of (B1) the extent of occurrence (between 500 km² and 1500 km²) as well as in the form of (B2) the area of occupancy (between 5 km² and 15 km²). This is inferred from very few and fragmented locations of subpopulations, continuing decline in the EOO, AOO, area, extent and/or quality of habitat and number of locations or subpopulations ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Radchenko (2015)

Geographic Range. Continental scale: widely distributed in most parts of Europe except for the northernmost regions. National scale: 3 populations in the province of Namur and one record in Brussels (Jardin Botanique Jean Massart), EOO = 800 km², AOO = 7 km².

Population. Continental scale: it can be assumed that the population is reduced (threatened or extinct in the national red lists of four European countries). National scale: Rasmont *et al* (1993) qualified the species as very highly significantly declining, Current population trend: decrease.

Habitat and Ecology. Flying period: from late April to mid-July (Peeters *et al.* 2012). Habitat: nutrient-poor extensive grasslands, ruderal habitats (Peeters *et al.* 2012). Visited flowers: polylectic, records on Asteraceae, Lamiaceae, Brassicaceae,

Rosaceae, Ranunculaceae and preferably Fabaceae (Ponomareva 1960, 1967, Warncke 1966, Osytshnjuk 1977, Westrich 1989). Nesting habits: solitarily, in small or in large aggregations (Radchenko 2015) and preferably on hard and compact ground (Westrich 1989). Parasites: *Nomada stigma* and perhaps *Nomada goodeniana* (Stöckhert 1933, Kocourek 1966, Celary 1995). Records on cultivated plants: *Trifolium spp.* (Warncke 1966, Osytshnjuk 1977).

Threats. The species might be threatened by the decline in surface and quality of nutrient-poor grasslands.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2011), the Netherlands (Regionally Extinct; Peeters and Reemer 2003) and Switzerland (Critically Endangered; Amiet 1994). Future: establish a legal protection status on the areas where the species still occur.

Research needed. Monitoring of the population size and trend ; specify the threats that might occur to the species.

***Andrena semilaevis* Pérez, 1903**

Common Name(s): French – *Micrandrène demi-lisse* ; English – Shiny-margined Mini-miner ; Dutch - *Halfgladde Dwergzandbij* ; German - *Glattrandige Zwergsandbiene*.

Figure 58. *Andrena semilaevis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification listed as Data Deficient due to identification difficulties (*Micrandrena*, confusion with *A. antrhisci*) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015)

Geographic Range. Continental scale: distributed throughout Europe (except southern Europe) to the Urals. National scale: one record in each of the following natural regions: Flandre Sablo-Limoneuse, Brabant and Campine, EOO = 5,300 km², AOO = 37 km².

Population. There is no clear information available on the actual population size and trend of this species.

Habitat and Ecology. Flying period: from mid-April to early August (Peeters *et al.* 2012). Habitat: wide variety of habitats (Peeters *et al.* 2012) but mostly in humid ones (woods edge, valleys, nutrient-rich meadows and grasslands, ruderal field borders and fences, and plantations). Visited flowers: polylectic, records on Ranunculaceae, Scrophulariaceae, Apiaceae, Asteraceae, Brassicaceae, Salicaceae, Rosaceae, Ericaceae, Crassulaceae, Euphorbiaceae, Boraginaceae, Rubiaceae (Osytshnjuk 1977, Dylewska 1987, Else & Edwards 2018). Nesting habits: solitarily in loamy soil (Kocourek 1966). Parasites: *Nomada flavoguttata* (*e.g.* Kocourek 1966), *Stylops spreta* (Perkins 1918). Records on cultivated plants: *Rubus, Fragaria, Crataegus, Pastinaca sativa, Daucus* (Else & Edwards 2018).

Threats. Except general threats (changes in land use, inappropriate field management, losing proper nesting sites due to agricultural activities and chemical exposure due to pesticide and herbicides treatments), the threats to the species are not known.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Germany (Vulnerable; Westrich *et al*. 2008); Ireland (Vulnerable; Fitzpatrick *et al*. 2006); Poland (Vulnerable; Głowaciński 2002); and Slovenia (Endangered; Anonymous 2002). Future: promotion of extensive agricultural practices.

Research Needed. Specify the threats that might occur to this species ; specify the population size and trend.

Andrena sericata Imhoff, 1868

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NA ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Not Evaluated due to the gaps in knowledge of the actual population size, trends and specific threats to the species ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: distributed from central and southern Europe eastwards to European Russia (Volvograd, Bashkortostan), the Caucasus region (Armenia, Georgia), and Asia Minor to the Ural Mountains. National scale: no record.

Population. No information available on the population size and trend of this species.

Habitat and Ecology. *Andrena sericata* is found mainly in humid habitats such as meadows, grassland slopes, and road sides. It is an early spring species flying from April to May. The species is polylectic, in that it prefers to forage upon a wide range of flowering plants species, visiting different flowers blooming in early spring plants: *Salix* sp., *Taraxacum officinale, Cerasus, Hieracium, Lepidium draba, Viburnum, Pyrus communis, Armeniaca vulgaris, Cerastium* and *Cardaria draba* (Osytshnjuk 1977, Dylewska 1987).

Threats. Except general threats (changes in land use, inappropriate field management, losing proper nesting sites due to agricultural activities and chemical exposure due to pesticide and herbicides treatments), the threats to the species are not known.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Critically Endangered; Amiet 1994), Czech Republic (Regionally Extinct; Farkac *et al*. 2005), Germany (Endangered; Westrich *et al*. 2008) and Poland (Endangered; Głowaciński 2002). It occurs in protected areas such as Duna Drava National Park in Hungary (Jozan 1998) and the Karadag Nature Reserve in Ukraine (Osytshnjuk 1977). Future: promotion of extensive agricultural practices.

Research Needed. Specify the threats that might occur to this species ; specify the population size and trend.

***Andrena similis* Smith, 1849**

Common Name(s): French – *Andrène rouge-vétue* ; English – Red-backed Mining Bee ; Dutch – *Roodstaartklaverzandbij* ; German - *Rothaarige Kleesandbiene*.

Figure 59. *Andrena similis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of (B1) the extent of occurrence (< 500 km²) as well as in the form of (B2) the area of occupancy (< 5 km²). This is inferred from very few and fragmented locations of subpopulations and continuing decline in the EOO, AOO and number of locations of subpopulations ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: throughout Europe (except in the extreme north). National scale: only one remaining population in the natural reserve of Montagne Saint-Pierre, EOO = 900 km², AOO = 11 km².

Population. Continental scale: there is no information available on the population size and trend of this species. National scale: populations and habitats are both extremely reduced and declining. Rasmont *et al* (1993) qualified the species as highly significantly declining, Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-April to early July (Peeters *et al.* 2012). Habitat: variety of habitats on dry and nutrient-poor soils (flower-rich grasslands, forest edges and clearings, orchards …) (*e.g.* Westrich 1989). Visited flowers: oligolectic on Fabaceae but many other records on Rosaceae, Salicaceae, Brassicaceae and Euphorbiaceae, Ericaceae, Aceraceae, Menyanthaceae,

Lamiaceae and Scrophulariaceae. (Warncke 1966, Andreyev *et al.* 1986, Osytshnjuk 1977, Gogala 1999, Calabuig and Madsen 2009, Else & Edwards 2018). Nesting habits: solitarily or in large and compact aggregations (Perkins 1919) in sandy or clay soil (Perkins 1919, Dylewska 1987, Westrich 1989). Parasites: *Nomada striata, Nomada fulvicornis* (Kocourek 1966), *Stylops thwaitesi* (Straka *et al.* 2015). Records on cultivated plants: *Malus domestica, Trifolium pretense, Medicago, Vaccinium myrtillus, Pyrus, Crataegus, Acer pseudoplatanus* (Radchenko 2015, Else & Edwards 2018).

Threats. Decline in surface and quality of dry and nutrient-poor grasslands due to agricultural and forestry intensification.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following six European countries: the Czech Republic (Endangered; Farkac *et al.* 2005), Finland (Endangered; Rassi 2010), Germany (Vulnerable; Westrich *et al.* 2008), the Netherlands (Endangered; Peeters and Reemer 2003), Poland (Data Deficient, Głowaciński 2002) and Sweden (Endangered; Gärdenfors 2010) ; it occurs in protected areas (montagne Saint-Pierre). Future: establish a legal protection status for this species as well as for the areas where it still occurs.

Research Needed. Monitoring of the population size and trend of the species.

Andrena simillima Smith, 1851

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification listed as Not Evaluated because further research is needed to establish the population size and trend for this species and identify the threats ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al.* (2013)

Geographic Range. Continental scale: widespread in Europe, from the UK to Ukraine, and from Greece to Sweden. National scale: no available data, EOO = NE, AOO = NE.

Population. Continental scale: widely but patchily, distributed and rarely frequent. It can be assumed that there is a decline of populations in parts of the range (included in the red list statements from four countries). National scale: there is no current information available on the population size and trend of this species, Current population trend: not evaluated.

Habitat and Ecology. Flying period: from July to September (Peeters *et al.* 2012). Habitat: heathlands (Westrich 1989), open wooded biotopes and extensive calcareous grasslands (Kemp *et al.* 2013, Else & Edwards 2018). Visited flowers: few records but supposed polylectic with a preference for *Rubus fruticosus* and *Centaurea scabiosa* (Else & Edwards pers. obs.), records on Asteraceae, Rosaceae, Lamiaceae, Campanulaceae and Ericaceae families (Kemp *et al.* 2013). Nesting habits: solitarily in loamy banks (Kocourek 1966). Parasites: *Nomada rufipes* (Kocourek 1966). Records on cultivated plants: *Rubus fruticosus, Origanum vulgare* (Else & Edwards 2018).

Threats. The specific threats to this species are not known, although in extensive calcareous grasslands (e.g., in the UK), inappropriate summer grazing can reduce the availability of forage.

Conservation Actions. Present: *Andrena simillima* is listed in the National Red Lists or Red Data books of the Czech Republic (Regionally Extinct; Farkac *et al.* 2005), Germany (Regionally Extinct; Westrich *et al.* 2011), the Netherlands (Regionally Extinct; Peeters and Reemer 2003), and Great Britain (Vulnerable; Shirt 1987). Future: promotion of extensive grazing and mowing practices on the habitats where the species occurs.

Research Needed. Specify the population size and trend ; specify the threats that might occur to this species.

Andrena spreta Pérez, 1895

Common Name(s): French – *Micrandrène méprisée*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p. **Taxonomic Notes:** many taxonomic issues with this species, this has led to much confusion in establishing its real area of distribution.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Data Deficient due to the complex taxonomy and identification issues of the species of *Micrandrena* subg. ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: south European species. National scale: no available recent data, EOO = 700 km², AOO = 7 km².

Population. There is no information available on the population size and trend of this species.

Habitat and Ecology. Flying period: unknown for northern Europe. Habitat: few information available, probably xerothermic habitats (Tomozei & Radchenko 2015). Visited flowers: unknown for northern Europe. Nesting habits: unknown. Parasites: unknown.

Threats. The threats are not known.

Conservation Actions. The species is not listed in any National Red Lists or Red Data Books. No future conservation actions can be taken at the national scale.

Research Needed. Resolution of the taxonomic issues ; specify the population size and trend ; specify the ecological requirements and threats.

Andrena strohmella **Illiger, 1806**

Common Name(s): French – *Micrandrène de Strohm* ; Dutch - *Gekielde Dwergzandbij* ; German - *Leisten-Zwergsandbiene*.

Figure 60. *Andrena strohmella*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification**:** listed as Data Deficient due to the complex taxonomy and identification issues of the species of *Micrandrena* subg. ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Roberts (2014)

Geographic Range. Continental scale: European endemic species with a widespread distribution across much of central and western Europe. Its range extends from France and the Low Countries, eastwards to Hungary, and south to the Mediterranean coast of France and northern Italy. National scale: scattered distribution in the natural regions of Flandre Sablo-Limoneuse, Hesbaye, Condroz, Fagne-Famenne, several populations in and around the city of Brussels, EOO = 2,600 km², AOO = 22 km².

Population. There is no information available on the populational size and trend

Habitat and Ecology. Flying period: from mid-March to mid-June (Peeters *et al.* 2012). Habitat: warm fallow ground in river floodplains (Peeters *et al*. 2012), urban areas (Pittioni *et al*. 2014) and grasslands (M. Kuhlmann pers. comm. 2004). Visited flowers: probably polylectic, records on Salicaceae, Brassicaceae, Euphorbiaceae, Asteraceae, Scrophulariaceae, Rosaceae, Ranunculaceae, Apiaceae, Buxaceae (Dylewska 1987, N.J. Vereecken pers. obs. 2013, E. Scheuchl, pers. comm. 2014) Nesting habits: in the ground in self excavated burrows (Peeters *et al.* 2012). Parasites: unknown. Records on cultivated plants: *Brassica rapa, Fragaria vesca, Daucus carota, Buxus sempervirens*.

Threats. The specific threats to this species are not known.

Conservation Actions. *A. strohmella* is listed in the National Red List or Red Data Book of Slovenia (Endangered; Anonymous 2002). No future conservation actions can be taken for this species.

Research Needed. Specify the population size and trend ; specify the ecological requirements ; specify the threats.

Andrena subopaca **Nylander, 1848**

Common Name(s): French – *Micrandrène sub-opaque* ; English – Impunctate Mini-miner ; Dutch – *Witbaarddwergzandbij* ; German - *Glanzlose Zwergsandbiene*.

Figure 61. *Andrena subopaca*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: widely distributed in Europe, seems scarcer under the latitude of south France and above the latitude 65°N. National scale: formerly present everywhere in Belgium, especially in southern Sambre-Meuse line. Populations are now aggregated mostly between the cities of Brussels and Hasselt, EOO = 11,800 km², AOO = 116 km².

Population. Continental scale: there is no current information available on the population size and trend of this species but they are presumably large across Europe. National scale: populations are obviously decreasing even though it is not sufficient to assign a threat status. Rasmont *et al* (1993) qualified the species as very highly significantly increasing, Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine or at least partially bivoltine (Westrich 1989), from mid-March to late August (Peeters *et al.* 2012) Habitat: wide variety of habitats (*e.g.* Peeters *et al.* 2012). Visited flowers: polylectic with a preference for Rosaceae and Asteraceae, records on Apiaceae, Asteraceae, Brassicaceae, Campanulaceae, Caryophyllaceae, Ericaceae, Euphorbiaceae, Lamiaceae, Liliaceae, Plantaginaceae, Ranunculaceae, Rosaceae, Salicaceae and Scrophulariaceae (Kocourek 1966, Osytshnjuk 1977, Westrich 1989, Else & Edwards 2018). Nesting habits: in small aggregations in sparsely vegetated banks (Kocourek 1966, Westrich 1989). Parasites: *Nomada flavoguttata* (Perkins 1919), *Stylops spreta* (Perkins 1918). Records on cultivated plants: *Brassica, Vaccinium, Fragaria, Crataegus* (Else & Edwards 2018).

Threats. No specific threats to this species at the national scale.

Conservation Actions. This species is not included in any National Red Lists or Red Data Books of any European country. No future conservation actions have to be taken.

Andrena synadelpha **Perkins, 1914**

Common Name(s): French – *Andrène synadelphe* ; English – Broad-margined Mining Bee ; Dutch – *Breedrandzandbij* ; German - *Breitrandige Lockensandbiene*.

Figure 62. *Andrena synadelpha*.
Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification Listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited geographic range in the form of (B1) the extent of occurrence (< 500 km²) as well as in the form of (B2) the area of occupancy (< 5 km²). This is inferred from very few and fragmented locations of subpopulations, continuing decline in the EOO, AOO, area, extent and/or quality of habitat and number of locations or subpopulations ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Radchenko (2015).

Geographic Range. Continental scale: locally distributed from Spain and the United Kingdom to the west to Hungary, Slovakia and Poland in the east. To the north it reaches Scotland, and to the south, central Spain. National scale: one population remains south from Verviers, EOO = 1,300 km², AOO = 17 km².

Population. Continental scale: few information available for the population size and trends of the species at the continental scale. Depending on the country the populations are whether stable or decreasing. National scale: drastic decline in the number of populations (only one remains), Rasmont *et al* (1993) qualified the species as significantly increasing, Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-March to early July (Peeters *et al.* 2012). Habitat: sandbanks along large rivers (Pauly A. pers. obs.) , sandpits, gravel pits, floodplains, forest edges (J. smit pers. obs.). Visited flowers:

polylectic, records on Salicaceae, Rosaceae, Asteraceae, Caprifoliaceae, Rhamnaceae, Fagaceae, Brassicaceae, Primulaceae, Aquifoliaceae, Aceraceae, Apiaceae, Caryophyllaceae, Ericaceae, Fabaceae, Euphorbiaceae (Jordano 1990, Peeters *et al.* 1999, Dylewska 2000, Banaszak 2010, Else & Edwards 2018). Nesting habits: mostly in large aggregations (Westrich 1989) along roadside bands (Chambers 1949) or in sandy banks along rivers (Pauly A. pers. obs.). Parasites: *Nomada panzeri* (Westrich 1989), *Stylops nevinsoni* (Straka *et al.* 2015). Records on cultivated plants: *Prunus, Crataegus, Quercus, Brassica* cultivars, *Rubus idaeus, Acer, Vaccinium myrtillus, Cotoneaster, Acer*. Radchenko (2015) qualify it as a valuable pollinator of cultivated entomophilous plants.

Threats. Except general threats, the threats to the species are unknown.

Conservation Actions. Present: *Andrena synadelpha* is included in the National Red Lists or Red Data Books of the Czech Republic (Critically Endangered; Farkac *et al.* 2005), Poland (Data Deficient; Banaszak 2002) and Switzerland (Critically Endangered; Amiet 1994, BAFU 2009). Future: promotion of extensive agricultural and forestry practices ; establish a legal protection status for this species as well as for the areas where it still occurs.

Research Needed. Specify the threats, better understanding of its drastic decline.

Andrena tarsata **Nylander, 1848**

Common Name(s): French – *Andrène tarsue* ; English - Tormentil Mining Bee ; Dutch – *Tormentilzandbij* ; German - *Blutwurz-Sandbiene*.

Figure 63. *Andrena tarsata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: EN (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (comprised between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (comprised between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (comprised between 50% and 80% between 1900-1969 and 1970-2017). ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: locally distributed in Europe from south France to 65°N and from British isles to Caucasus Region. National scale: formerly well established in the natural region of Ardenne. Nowadays it is scarcely distributed around the cities of Brussels, Huy and Spa, EOO = 200 km², AOO = **2** km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: decline of more than 90% of the population, Rasmont *et al* (1993) qualified the species as very highly significantly decreasing, Current population trend: decrease.

Habitat and Ecology. Flying period: from late June to early September (Peeters *et al.* 2012). Habitat: sparsely vegetated sand and peat on heathlands and moorlands (Fowles 1996, Peeters & Reemer 2003, Peeters *et al.* 2012), moist habitats (mesophilous meadows, forest edges) (Tomozei & Radchenko 2015). Visited flowers: oligolectic on *Potentilla* species (*Potentilla cinerea, P. erecta, P. fruticosa*) (Westrich 1989, Peeters and Reemer 2003), also recorded on Orobanchaceae (*Melampyrum nemorosum*) (Osytshnjuk 1977), *filipendula*

ulmaria (Chambers 1968), *Crataegus* sp., *Calluna* sp. (Warncke 1981, Dylewska and Bąk 2005), *Rubus idaeus, Rubus fruticosus, Veronica chamaedrys, Campanula rotundifolia* and various Asteraceae (Else & Edwards 2018). Visitor of many species from different families (Kocourek 1966). Nesting habits: in small aggregations (*e.g.* Westrich 1989), nests are excavated in well-exposed vertical or sloping bare ground (Potts & Wilmer 1998). Parasites: *Nomada roberjeotiana* and *N. obtusifrons* (*e.g.*Westrich 1989). Records on cultivated plants: *Rubus fruticosus, Rubus idaeus*.

Threats. Loss, fragmentation and degradation of the heathland and moorland habitats. This can be linked to the widespread and rapid intensification of agricultural practices and urban expansion. Boreo-alpine species that might be threatened by global warming (Belgium is the extreme southern edge of its distribution).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following seven European countries: the Czech Republic (Critically Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al*. 2008), Great Britain (Rare; Falk 1991), Hungary (Regionally Extinct; Józan 2011), Netherlands (Critically Endangered; Peeters and Reemer 2003), Poland (Vulnerable; Banaszak 2002) and Slovenia (Rare; Anonymous 2002). Future: promotion of the conservation of its suitable habitats, establish a legal protection status for the areas where the species still occur.

Andrena thoracica **(Fabricius, 1775)**

Common Name(s): French – *Andrène thoracique* ; English - Cliff Mining Bee ; Dutch – *Zwartflankzandbij* ; German - *Rothaarige Düstersandbiene*.

Figure 64. *Andrena thoracica*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: widespread in Europe under the latitude of 60°N. National scale: last observation in 1951 in Ciergnon.

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: extinct

Habitat and Ecology. Flying period: bivoltine, from mid-March to mid-May and from late June to late August (Peeters *et al.* 2012). Habitat: nutrient-poor grasslands, coastal dunes (Peeters *et al*. 2012), sandy coastal cliffs (Edwards & Broad 2006), dry slopes, sandy grasslands, edges of humid forests (Tomozei & Radchenko 2015), heaths (Baldock 2008, G.R. Else pers. obs.). Visited flowers: polylectic on Aceraceae, Asteraceae, Apiaceae, Brassicaceae, Boraginaceae, Cucurbitaceae, Fabaceae, Fagaceae, Lamiaceae, Liliaceae, Oleaceae, Onagraceae, Plumbaginaceae, Primulaceae, Polygonaceae, Ranunculaceae, Rosaceae, Salicaeae, Tamaricaceae, Tiliaceae, Ulmaceae (Warncke 1966, Gusenleitner 1985, Tanács *et al*. 2008, Osytshnjuk 1977, Else & Edwards 2018). Nesting habits: in large and compact aggregations in horizontal or vertical sandy surfaces (*e.g.* Westrich 1989) or solitarily (Dylewska 1987), Tomozei & Radchenko (2015) report the species to nest in many different types of soils. Parasites: *Nomada goodeniana* (Perkins 1919), *Nomada fulvicornis* (*e.g.* Westrich 1989), *Stylops melittae* (Straka *et al.* 2015). According to Osytshnjuk (1977) the species is a valuable pollinator of fruit and pumpkin crops. Records on cultivated plants: *Prunus, Pyrus, Acer, Narcissus, Castanea, Rubus, Trifolium pratense, Allium, Brassica, Daucus, Thymus, Mentha* (Else & Edwards 2018).

Threats. Except general threats, the threats are not known.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following seven countries: the Czech Republic (Critically Endangered; Farkač 2005), Germany (Endangered; Westrich *et al.* 2008), the Netherlands (Regionally Extinct; Peeters and Reemer 2003), Norway (Regionally Extinct; Hansen *et al.*2010), Slovenia (Rare; Anonymous 2002), Sweden (Regionally Extinct; Gärdenfors 2010) and Switzerland (Vulnerable; Amiet 1994).

Research Needed. Better understanding of the causes of extinction.

Andrena tibialis **(Kirby, 1802)**

Common Name(s): French – *Andrène tibiale* ; English – Grey-gastered Mining Bee ; Dutch - *Grijze Rimpelrug* ; German - *Rotbeinige Rippensandbiene*.

Figure 65. *Andrena tibialis*. A, female specimen; B, male specimen; C, foraging on *Taraxacum sp.* (Bruxelles, Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: distributed from Spain to the far-east of Russia (Primorsky region), the northern limit of its range is southern England, southern Norway and southern Finland, the southern limit is the Balkans.

National scale: everywhere in northern Sambre-Meuse line. Scattered distribution In southern Sambre-Meuse line, it can be found near the towns of Namur, Spa, Virton and Vresse-sur-Semois, EOO = 4,200 km², AOO = 50 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: large and stable populations. Rasmont *et al* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from mid-March to late June (Peeters *et al.* 2012). Habitat: mostly in polders in Belgium but according to Westrich (1989), Tomozei & Radchenko (2015) and Else & Edwards (2018) the species occurs in a wide variety of habitats (forest edges, dikes, sand pits, gravel pits, ruderal areas, garden …). Visited flowers: polylectic, records on Rhamnaceae, Brassicaceae, Ranunculaceae, Aceraceae, Rosaceae, Euphorbiaceae, Fabaceae, Salicaceae, Cruciferae, Asteraceae, Apiaceae, Papaveraceae and Hypericaceae families (Tomozei & Radchenko 2015, Else & Edwards 2018). Nesting habits: solitarily in well-exposed grassy slopes (Kocourek 1966, Dylewska 1987). Parasites: *Nomada fulvicornis* (*e.g.* Guichard & Yarrow 1948), *Stylops mellitae* (Smit & Smit 2005), *Stylops aterrimus* (Straka *et al.* 2015). Records on cultivated plants: *Prunus* cultivars, *Acer, Brassica, Crataegus, Malus*. Kocourek (1966) and Osytshnjuk (1977) recognize this species as an important pollinator of fruit crops.

Threats. There are no specific threats at the national scale.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following three European countries: Great Britain (Rare; Shirt 1987), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Slovenia (Regionally Extinct; Anonymous 2002). No future conservation actions have to be taken.

Andrena trimmerana (Kirby, 1802)

Common Name(s): French – *Andrène de Trimmer* ; English – Trimmer's Mining Bee ; Dutch – *Doornkaakzandbij* ; German - *Atlantische Sandbiene*.

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Taxonomic Notes: very similar to *A. carantonica* Perez, 1902. This can affect the distribution range of both species.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification listed as Data Deficient due to probable misidentification (confusion risks with *A. carantonica, scotica, sabulosa* and on the field *rosae*). ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: in northern Europe it reaches England, Denmark and northern European Russia, in southern Europe it reaches Spain, Italy and Balkans. National scale: little amount of observations in the natural regions of Polders, Flandre Sablonneuse, Campine, Ardenne Centrale et du Sud.

Population. There is no current information available on the population size and trend of this species.

Habitat and Ecology. Flying period: bivoltine, from March to April and from July to September (Pauly A. pers. comm.) Habitat: wide variety of open biotopes (rocky coastal areas, heathlands, open woodlands, chalky grasslands, fallow grounds, gardens, abandoned gravel and sand pits, wetlands, forest edges and clearings, river valleys) (Peeters *et al.* 2012, Tomozei & Radchenko 2015, Else & Edwards 2018). Visited flowers: polylectic, records on Rosaceae, Salicaceae, Asteraceae, Lamiaceae, Brassicaceae, Aceraceae, Ericaceae, Ranunculaceae, Fabaceae, Apiaceae, Cucurbitaceae (Kocourek 1966, Osytshnjuk 1977, Else & Edwards 2018). Nesting habits: nests solitarily (Kocourek 1966, Dylewska 1987). Parasites: *Nomada marshamella*, *Nomada flava* (Perkins 1919, 1923, Osytshnjuk *et al.* 2008), *Stylops aterrimus* (Straka *et al.* 2015). Records on cultivated plants: *Rubus fruticosus, Rhododendron, Vaccinium myrtillus, Prunus spinosa, Prunus cerasus, Ribes grossularia, Brassica napus, Acer campestre*.

Threats. Except general threats, the threats are not known.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following two European countries: the Czech Republic (Regionally Extinct; Farkac *et al*. 2005; but it was recently found in Moravia, as per Bogusch *et al*. (2009)) and Ireland (Critically Endangered; Fitzpatrick *et al*. 2006). No future conservation actions can be taken at the national scale.

Research Needed. Specify the population size and trend ; specify potential threats.

***Andrena vaga* Panzer, 1799**

Common Name(s): French – *Andrène vague* ; English – Grey-backed Mining Bee ; Dutch - *Grijze Zandbij* ; German - *Grosse Weiden-Sandbiene*.

Figure 66. *Andrena vaga*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting (Grande Bruyère de Blaton, Photo : Y. Barbier).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei & Radchenko (2015)

Geographic Range. Continental scale: distributed from south France to 65°N, it reaches the northern coast of south east England westwards and eastwards the Caucasus and Ural. National scale: everywhere in Belgium, EOO = 5,200 km², AOO = 46 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: large and stable

populations, Rasmont *et al* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from early March to late May (Peeters *et al.* 2012). Habitat: in *Salix spp.* rich open to semi-open sandy or sandy-clay habitats (Peeters *et al.* 2012, P. Rasmont pers. comm., Else & Edwards 2018). Visited flowers: oligolectic on *Salix* species, also found on Apiaceae, Asteraceae, Caryophyllaceae, Ranunculaceae and Rosaceae families. Nesting habits: in very large aggregations in well-exposed bare to sparsely vegetated sandy or sandy-clay soils (Osytshnjuk 1977, Dylewska 1987, Falk 1991, Banaszak 2010, Rezkova *et al.* 2012). Parasites: *Nomada lathburiana* (*e.g.* Westrich 1989), potentially *Sphecodes gibbus* (Möschler 1938), *Bombylius major, Leucophora cinerea* (Vleugel 1947), *Stylops melittae* (Smit & Smit 2005), *Stylops ater* (Straka *et al.* 2015), *Meloe decorus, Meloe proscarabaeus* and *Meloe violacea* (Tomozei & Radchenko 2015). Records on cultivated plants: *Prunus cerasus, Crataegus, Malus* (Tomozei & Radchenko 2015).

Threats. No specific threats.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of Great Britain (Endangered; Shirt 1987) and Norway (Near Threatened; Kålås *et al.* 2010). No future conservation actions have to be taken.

Andrena varians **(Kirby, 1802)**

Common Name(s): French – *Andrène variante* ; English – Blackthorn Mining Bee ; Dutch - *Variabele Zandbij* ; German - *Veränderliche Lockensandbiene*.

Figure 67. *Andrena varians*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: CR (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Critically Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017). ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: from south France until 65°N and from British isles to European Russian, Caucasus and Central Asia. National scale: very few recent observations (3), EOO = 4,100 km², AOO = 40 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: drastic decline in the number of populations and distribution. Rasmont *et al* (1993) qualified the species as stable, Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-March to early July (Peeters *et al.* 2012). Habitat: wide variety of habitats (Tomozei & Radchenko 2015) such as forests edges, cultures, orchards, open grasslands and coastal areas (Peeters *et al* 2012, Else & Edwards 2018). Visited flowers: polylectic, records on Salicaceae, Asteraceae, Rosaceae, Brassicaceae, Fabaceae, Ranunculaceae, Valerianaceae, Betulaceae, Grossulariaceae, Aquifoliaceae, Aceraceae, Apiaceae (Osytshnjuk 1977, Osytshnjuk *et al*. 2005, Else & Edwards 2018). Parasites: *Nomada panzeri* (*e.g.* Perkins 1919), probably *Nomada fabriciana* and *Nomada ferruginata,* (Chambers 1949) and *Stylops melittae* (Perkins 1918). *Andrena varians* occurs in various

habitats (virgin land, fallows, meadows, forest edges, roadsides, gardens and parks) at altitudes up to and over 1,000 m asl. In Ukraine it is found on forest steppes and steppe plains. It is a spring species that flies from April to early June. It nests in the soil of gardens and forest edges. Its nest is parasitised by *N. panzeri* (Osytshnjuk 1977, Osytshnjuk *et al.* 2005). The species is a valuable pollinator of fruit crops as females have a preference for fruit tree like *Prunus* cultivars, *Malus domestica* and *Pyrus communis* (Chambers 1946).

Threats. Except general threats, the threats to this species are not known. However global warming may play a role in its decline (Nordic species).

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following five European countries: Germany (Least Concern and has not changed status from 1998 until 2011 - Westrich *et al.* 1998, 2011), the Netherlands (Vulnerable; Peeters and Reemer 2003), Slovenia (Rare; Anonymous 2002), Sweden (Least Concern; Cederberg 2010) and Switzerland (Near Threatened; Amiet 1994). Future: establish a legal protection status for this species as well as for the areas where it still occurs.

Research Needed. Evaluate the species tolerance to global warming ; specify the threats.

Andrena ventralis **Imhoff, 1832**

Common Name(s): French – *Andrène ventral* ; Dutch – *Roodbuikje* ; German - *Rotbauch-Sandbiene.*

Figure 68. *Andrena ventralis*. A, female specimen; B, male specimen (Photos : A. Pauly); C, *in copula* (Bellem, Photo : H. Wallays).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: throughout Europe (except Scandinavia and British Isles) from Spain to Ukraine, European Russia. National scale: not available, EOO = 800 km², AOO = 13 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: large and stable

populations, Rasmont *et al* (1993) qualified the species as stable, Current population trend: stable.

Habitat and Ecology. Flying period: from mid-March to early June (Peeters *et al.* 2012). Habitat: every habitats with willows, on sandy or clay soils (Peeters *et al.* 2012) Visited flowers: oligolectic on *Salix* but is able to use the pollen of other plants too, records on Asteraceae, Brassicaceae, Rosaceacae, Ranunculaceae, Salicaceae and Euphorbiaceae (Westrich 1989, Peeters *et al.* 2012, Tomozei & Radchenko 2015). Nesting habits: solitarily or in small aggregations in sparsely vegetated sandy or clay soils (Peeters *et al.* 2012, Tomozei & Radchenko 2015). Parasites: *Nomada ruficornis, N. zonata, N. panzeri* (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Osytshnjuk *et al.* 2008), *Sphecodes pellucidus* and *Nomada alboguttata* (Tomozei & Radchenko 2015). It is known as a good pollinator of fruit trees (Tomozei & Radchenko 2015).

Threats. There are no specific threats.

Conservation Actions. It is listed in the National Red List of Germany as Least Concern and has not changed its status from 1998 until 2011 (Westrich *et al.* 1998, 2011). No future conservation actions have to be taken.

Andrena viridescens **Viereck, 1916**

Common Name(s): French – *Andrène viridescente* ; Dutch - *Groene Zandbij*.

Figure 69. *Andrena viridescens*. Specimen foraging (Photo: D. De Grave).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Least Concern because it shows a recent expansion. However it is still a very rare species, populations seem restricted to Brussels (more scattered around it) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: throughout Europe from north Spain to Perm Krai (south Ural) in Russia, including the European part of Turkey and Anatolia and as far north as Denmark. National scale: scattered distribution, found around the cities and towns of Ghent, Brussels, Leuven, Visé and Virton, around the junction of Nèthe and Grande Nèthe, EOO = NE, AOO = NE.

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: formerly a very rare species (observed 2 times in 19th, 1 time in 20th) but many recent records, the population is probably increasing, Current population trend: NE.

Habitat and Ecology. Flying period: from April to June (Pauly A. pers. comm.). Habitat: in forested habitats (forest edges, clearings and glades) (Peeters *et al.*

2012, Tomozei & Radchenko 2015), Smit (1997) found specimens along a grazed meadow and near a forested area. Visited flowers: oligolectic on *Veronica*, other records on Asteraceae, Fabaceae, Lamiaceae and Rosaceae (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Schmid-Egger and Scheuchl 1997). Nesting habits: solitarily or in small aggregations in sparsely vegetated sandy or loamy soils and in forested areas (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Schmid-Egger and Scheuchl 1997, Peeters *et al.* 2012). Parasites: *Nomada atroscutellaris* (not known from Belgium) (Westrich 1989).

Threats. There are no specific threats.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following five European countries: the Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Near Threatened; Westrich *et al.* 2008), the Netherlands (Near Threatened; Peeters and Reemer 2003), Poland (Vulnerable; Banaszak 2002) and Switzerland (Vulnerable; Amiet 1994). No future conservation actions have to be taken.

Research Needed. Specify the population size and trend.

Andrena wilkella **(Kirby, 1802)**

Common Name(s): French – *Andrène de Wilke* ; English – Willke's Mining Bee ; Dutch – *Geelstaartklaverzandbij* ; German - *Grobpunktierte Kleesandbiene*.

Figure 70. *Andrena wilkella*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Patiny S. & Terzo M. 2010. Catalogue et clé des sous-genres et espèces du genre *Andrena* de Belgique et du nord de la France (Hymenoptera, Apoidea). Laboratoire de Zoologie, Université de Mons, 39 p.

Assessment Information. Red List Category & Criteria: NT (A2c) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Tomozei & Radchenko (2015).

Geographic Range. Continental scale: holoarctic distribution (until 60°N). National scale: not available, EOO = 4,900 km², AOO = 58 km².

Population. Continental scale: there is no current information available on the population size and trend of this species. National scale: decline in the AOO and EOO, Rasmont *et al* (1993) qualified the species as stable, Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-April to early August (Peeters *et al.* 2012). Habitat: forest borders, nutrient-poor and mesophilic flower-rich extensive grasslands, heathlands, gravel and sandpits (Peeters *et al.* 2012, Tomozei & Radchenko 2015, Else & Edwards 2018). Visited flowers: prefers Fabaceae but can also be found on Brassicaceae, Apiaceae, Berberidaceae, Rhamnaceae, Polygonaceae, Salicaceae, Aceraceae, Poaceae, Caryophyllaceae, Plumbaginaceae, Rosaceae, Euphorbiaceae, Menyanthaceae, Scrophulariaceae, Asteraceae and Dipsacaceae (Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Peeters and Reemer 2003, Else & Edwards 2018). Nesting habits: solitarily or in large and compact aggregations in sandy or clay soils (Perkins 1919, Kocourek 1966, Osytshnjuk 1977, Dylewska 1987, Peeters

and Reemer 2003). Parasites: *Nomada striata* (*e.g.* Perkins 1919), *Sphecodes ephippius* (Bogusch *et al.* 2006), *Stylops thwaitei* (Straka *et al.* 2015). Fabaceae (*Trifolium, Medicago sativa, Lotus corniculatus*) but can also be found on Brassicaceae (*Sinapis arvensis*), Apiaceae (*Daucus*), Berberidaceae (*Berberis vulgaris*), Rhamnaceae (*Frangula alnus)* and Dipsacaceae (*Knautia arvensis*). Records on cultivated plants: *Trifolium pratense, Trifolium repens, Medicago sativa, Daucus, Prunus, Crataegus, Onobrychis viciifolia, Vicia faba, Acer*.

Threats. Except general threats, the threats are not known.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Finland (Least Concern; Nieminen and Sundell 2005), Germany (Least Concern and has not changed status from 1998 until 2011; Westrich *et al*. 1998, 2011), Ireland (Data Deficient; Fitzpatrick *et al.* 2006, but simultaneously it is noted for Ireland as Vulnerable, according to National Status IUCN Category; Ronayne 2006) and the Netherlands (Vulnerable; Peeters and Reemer 2003). Future: promotion of extensive agricultural and forestry practices.

Research Needed. Specify the threats that might occur to this species.

Genus *Panurgus* Panzer, 1806

Panurgus banksianus (Kirby, 1802)

Common Name(s): French – *Panurge de Banks* ; English – Large Shaggy Bee ; Dutch - *Grote Roetbij* ; German - *Grosse Zottelbiene*.

Figure 71. *Panurgus banksianus*. A, female specimen; B, male specimen (Photos : A. Pauly); C, male foraging on *Hypochaeris radicata* (Izel, Photo : J.Y. Baugnée).

Taxonomic Source(s): Amiet F., Herrmann M., Müller A. & Neumeyer R. 2010. *Fauna Helvetica 26: Apidae 6: Andrena, Melitturga, Panurginus, Panurgus*. Centre Suisse de Cartographie de la Faune & Schweizerische Entomologische Gesellschaft, Neuchâtel, 316 p. **Patiny S.** 2001. Monographie des Panurginae de l'ancien monde (Hymenoptera: Apoidea, Andrenidae). FuSaGx. Ph-D thesis.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Least Concern because it shows a recent expansion. However it is still a very rare species, populations seem restricted to Brussels (more scattered around it) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto (2013)

Geographic Range Continental scale: very widespread, from the United Kingdom to Bulgaria. The extent of occurrence (EOO) is 4,152,227 km² and the area of occupancy (AOO) is 2,072 km². National scale: widespread in the sandy natural regions of Belgium as well as in the natural regions of Ardenne and Gaume.

Population: Continentals scale: very widespread with a stable population. National scale: large and stable / increasing populations. Rasmont *et al* (1993) qualified the species as stable. Current population trend: Stable.

Habitat and Ecology. Flying period: from early May to late August and sometime early September (Peeters *et al.* 2012). Habitat: nutrient-poor meadows, heaths, roadsides on sandy or loess soils, acidic grasslands, coastal dunes and landslips, rarely on calcareous soils and absent from clay soils (Perkins 1923, Peeters *et al.* 2012, Else & Edwards 2018). Visited flowers: oligolectic on yellow Asteraceae (Perkins 1919, Peeters *et al.* 2012, Else & Edwards 2018) Nesting habits: in extensive aggregations in firm sandy soil. Parasites: *Nomada similis* (*e.g.* Westrich 1989), *Nomada fabriciana* (*e.g.* Gardner 1901), *Sphocodes sp.* (O'Toole pers. obs.), *Miltogramma punctata* (*e.g.* Gardner 1901).

Threats. This species is threatened by the elimination of flowers in edges, the intensive use of pesticides and the exploitation of heathland for commercial forestry, mineral extraction and infrastructure development.

Conservation Actions

This species is included in the National Red Lists or Red Data Books of the following two European countries: Norway (Endangered; Kålås *et al.* 2010); Sweden (Vulnerable; Gärdenfors 2010) ; the species is protected in Wallonia. No direct conservation measures are currently needed for this species.

Panurgus calcaratus **(Scopoli, 1763)**

Common Name(s): French – *Panurge calcaire* English – Small Shaggy Bee Dutch - *Kleine Roetbij* German - *Stumpfzähnige Zottelbiene***.**

Figure 72. *Panurgus calcaratus*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting on Asteraceae. (Boffres, Photos : M. Rocca).

Taxonomic Source(s): Amiet F., Herrmann M., Müller A. & Neumeyer R. 2010. *Fauna Helvetica 26: Apidae 6: Andrena, Melitturga, Panurginus, Panurgus*. Centre Suisse de Cartographie de la Faune & Schweizerische Entomologische Gesellschaft, Neuchâtel, 316 p. **Patiny S.** 2001. Monographie des Panurginae de l'ancien monde (Hymenoptera: Apoidea, Andrenidae). FuSaGx. Ph-D thesis.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Least Concern because it shows a recent expansion. However it is still a very rare species, populations seem restricted to Brussels (more scattered around it) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto (2013)**.**

Geographic Range. Continental scale: widely distributed through Europe from 60°N to south Spain and from east Spain to the eastern Palearctic. The extent of occurrence (EOO) is 8,519,466 km² and the area of occupancy (AOO) is 2,788 km². National scale: everywhere in Belgium but seems less abundant in the loamy natural regions.

Population. Large and stable / increasing populations in Europe and Belgium. Rasmont *et al* (1993) qualified the species as very highly significantly decreasing in Belgium.

Habitat and Ecology: Flying period: from early June to early September (Peeters *et al.* 2012). Habitat: on sandy or loess soils and in the following habitats: nutrient-poor grasslands, herbaceous heaths and roadsides (Peeters *et al.* 2012). Visited flowers: oligolectic on yellow flowered Asteraceae (Perkins 1923, Peeters *et al.* 2012, Else & Edwards 2018). Nesting habits: communal species that nests in aggregations in sandy soils (Else & Edwards 2018). Parasites: *Nomada fuscicornis* (*e.g.* Richards 1979, Stöckhert 1933).

Threats. The exploitation of heathland for commercial forestry, mineral extraction and infrastructure development pose threats to the species in parts of its range.

Conservation Actions. This species is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Vulnerable; Amiet 1994); Norway (Near Threatened; Kålås *et al.* 2010); Sweden (Near Threatened; Gärdenfors 2010). The species is legally protected in Wallonia. No direct conservation measures are currently needed for this species.

Research Needed. Additional studies are needed into the taxonomy, abundance, and general ecology of this species.

Panurgus dentipes **Latreille, 1811**

Common Name(s): French – *Panurge pattes-dentées* German - *Spitzzähnige Zottelbiene***.**

Figure 73. *Panurgus dentipes*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Amiet F., Herrmann M., Müller A. & Neumeyer R. 2010. *Fauna Helvetica 26: Apidae 6: Andrena, Melitturga, Panurginus, Panurgus*. Centre Suisse de Cartographie de la Faune & Schweizerische Entomologische Gesellschaft, Neuchâtel, 316 p. **Patiny S.** 2001. Monographie des Panurginae de l'ancien monde (Hymenoptera: Apoidea, Andrenidae). FuSaGx. Ph-D thesis.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Justification: listed as Least Concern because it shows a recent expansion. However it is still a very rare species, populations seem restricted to Brussels (more scattered around it) ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto (2013)**.**

Geographic Range Continental scale: widespread from Belgium to south Spain. The extent of occurrence (EOO) is 1,656,951 km² and the area of occupancy (AOO) is 1,356 km². National scale: the species can be found around the towns of Mouscron, Couvin and south from Dinant.

Population. Continental scale: abundant and stable population. National scale: large and stable / increasing populations. Rasmont *et al* (1993) qualified the species as stable. Current population trend: Stable

Habitat and Ecology. This species prefers crops and road margins, and grasslands where they exist, females forage on Asteraceae (Michez & Nieto 2013).

Threats. There are no major threats affecting this species.

Conservation Actions This species is included in the National Red Lists or Red Data Books of the following two European countries: Switzerland (Vulnerable; Amiet 1994); Germany (Near Threatened; Westrich *et al.* 2008) ; the species is legally protected in Wallonia. No direct conservation measures are currently needed for this species.

Family Apidae Latreille, 1802

Genus *Anthophora* Latreille, 1803

Anthophora aestivalis (Panzer, 1801)

Common Name(s): French - *Anthophore estivale*. Dutch - *Mooie Sachembij*. German - *Sommerpelzbiene*.

Diagnosis. The genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora aestivalis* has the unique combination of the following traits (Chorein 2007). Females: black cuticle on the face, T2 – T4 with white and discontinuous band of hairs at their apex, white scopa. Males: presence of a pygidial plate, gonocoxite with a well-developed lateral lobe, brush of hairs on basal and apical side of the mesotarsus. Taxonomic Notes: this taxon was synonymized with *Anthophora retusa* (L.) by Brooks (1988). However, it is nevertheless a valid species with different genitalia, colour pattern and ecological choices (Alfken 1927), as it is recognized now by most European authors.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: RE (Last observation in 1942 in Montagne St Pierre (Visée). Previously published Red List assessments: 2015 – Least Concern (LC) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: This species can be found from northern Spain north eastwards to northern Germany, and eastwards to Lake Baikal in eastern Russia. National scale: Last observation in 1942 in Montagne St Pierre (Visé).

Population. Continental scale: very abundant in several large areas of its distribution but decreasing in other areas (Rasmont & Dehon, 2015). National scale: Rasmont *et al*. (1993) qualified the species as very highly significantly decreasing, Chorein (2007) qualified the species as very highly significantly decreasing between the before 1950 and 1951-1981 periods and as very highly significantly decreasing between the 1951-1981 and the after 1981 periods. Current population trend: extinct.

Habitat and Ecology. Flying period: from early April to June. Habitat: not known for Belgium, in Deutschland Westrich (1989) observed the species in a quarry, an area with old loamy walls, a south-exposed forest edge with old vertical wall, in Italy Quaranta *et al.* (2004) report it from a range of semi-natural and agricultural habitats and in Romania Iuga (1958) states that species appears to have a preference towards dry grasslands and woodlands edges. Visited flowers: very few records from Belgium on *Anthyllis, Lamium and Glechoma*, in Romania the species is assumed to be polylectic, records on *Trifolium pratense* (Fabaceae), *Lamium purpureum, Ajuga reptans* (Lamiaceae) and *Borago officinalis* (Boraginaceae) (Iuga 1958). Records on cultivated plants: *Trifolium pratense*. Nesting habits: in Nederland the species is reported to nest in old vertical walls, in small aggregation (Peeters *et al.*, 2012). Parasites: *Melecta lectuosa* (Schmid-Egger *et al.*, 1995. Westrich, 1989).

Threats. The regional extinction of the species might have been caused by the reduction of food ressources (intensive grazing practices, silage, intensive uses of herbicides and nitrogen fertilizer and deletion of leguminous crops) as well as by the reduction in the number of potential nesting sites (restauration or suppression of old vertical walls).

Conservation Actions. Present: this species is legally protected (LCN 1973, Annexe IIb). It is included in the National Red Lists or Red Data Books of the following European countries: Germany (Vulnerable. Westrich *et al.* 2011), Netherlands (Regionally Extinct. Peeters and Reemer 2003), Slovenia (Rare. Anonymous 2002) and Switzerland (Vulnerable, Amiet 1994), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could promote the return of this species at the national. Future: the return of this species could be favoured by the promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing practices. Promotion of the conservation and restauration of dry grasslands. Promotion of the conservation of old vertical walls. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces.

Research Needed. Better understanding of the national extinction. Conduct sampling expeditions in order to confirm / infirm the national extinction.

Anthophora bimaculata **(Panzer, 1798)**

Common Name(s): English - Little Flower-Bee, Green-eyed Flower Bee. French – *Héliophile commune*. Dutch - *Kleine Sachembij*. German - *Zweifleck-Pelzbiene*.

Figure 74. *Anthophora bimaculata* . A, female specimen; B, male specimen (Photos : P. Rasmont); C, resting (Avensan, Photo : E. Léglise).

Diagnosis. The genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora bimaculata* has the unique combination of the following traits (Chorein 2007). Females: A3 = A4 + A5, whitish-yellow mask on the cuticle of the face. Males: A3 < A4 + A5, well-developed whitish-yellow cuticular mask on the face, gonocoxite with a well-developed apical lobe and a small lateral lobe, no brush of hairs on mesotarsus.

Assessment Information. Red List Category & Criteria: CR (A2bc. B1ab(i,ii,iii,iv) + B2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited Geographic Rangein the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO

and AOO and continuing decline in the EOO, AOO, quality of habitat and number of observations. Previously published Red List assessments: 2015 – Least Concern (LC) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: in most parts of Europe, from southern England, Belgium, central Germany and Poland to western Mediterranean countries, seems absent from most of the eastern Mediterranean. National scale: in western Région Limoneuse Hennuyère, around Brussels and south western Campine, the last observations occurred in Braine-le-Comte and close to Malones (2017), EOO = 300 km². AOO = 7 km².

Population. Continental scale: one of the most widespread of the *Anthophora*, locally very abundant. The overall trend is presumed to be stable (Rasmont & Dehon, 2015). National scale: Rasmont *et al*. (1993) qualified the species as very highly significantly decreasing, Chorein (2007) qualified the species as very highly significantly decreasing between the before 1950 and 1951-1981 periods and as significantly increasing between the 1951-1981 and the after 1981 periods. Current population trend: decrease.

Habitat and Ecology. Flying period: from late June to mid-September. Habitat: from the whole Europe there are records in open areas, shrublands, grasslands, lowland heathlands, coastal soft-rock cliffs and undercliffs (Rasmont & Dehon 2015), in Belgium it is observed on old heaps (Rasmont & Barbier 1998). Visited flowers: very few records from Belgium, mainly on *Centaurea, Echium vulgare* and *Senecio inaequidens*, similar floral choices have been recorded in England (S. Roberts pers. obs. 1995) and Poland (Pawlikowski and Kruszynski 1997). Records on cultivated plant: *Thymus spp.* and *Lavandula* x *intermedia.* Nesting habits: in England the species is reported to usually nest in large aggregation (Baldock, 2008) in level soil, in Germany the species is reported to nest in sandy banks and cliff faces (Westrich, 1989). Parasites: *Coelioxys rufescens* (Baldock, 2008. Westrich, 1989), *Ammobates punctatus* (Friese, 1923. Peeters *et al*., 1999).

Threats. Reduction of suitable habitats: deletion of open areas and heathlands for agricultural, forestry or urbanization purposes. Reduction of food ressources: intensive grazing practices, early mowing, agricultural intensive uses of herbicides and nitrogen fertilizer. Reduction in the number of potential nesting sites: scrub encroachment of initially sparsely vegetated sandy open areas.

Conservation Actions. Present: this species is legally protected (LCN 1973, Annexe IIb), included in the National Red Lists or Red Data Books of the following European countries: Germany (Vulnerable, Westrich *et al.* 2011), the Netherlands (Regionally Extinct. Peeters and Reemer 2003), Slovenia (Endangered. Anonymous 2002) and Switzerland (Endangered. Amiet 1994), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing practices. Promotion of the conservation and restauration of old industrial areas. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces, especially *Thymus spp.* and *Lavandula* x *intermedia. E*stablish a legal protection status for the areas where the species still occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population size and trend at the national scale.

Anthophora borealis Morawitz, 1864

Common Name(s): French – *Anthophore boréale*. Dutch - *Noordelijke Sachembij*.

Diagnosis. the genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora borealis* has the unique combination of the following traits (Chorein 2007): Females: A3 < A4 + A5 + A6, black cuticle on the face, no median carina on the clypeus, brown pubescence on last tergite. Males: no pygidial plate, brush of hairs on the ultimate article of the median legs.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Last observation in Genk in 1897. Previously published Red List assessments: 2015 – Near Threatened (NT) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: this is the only *Anthophora* species with a distinctly northern distribution, and in Europe the southernmost known locations seem to be Slovakia and Hungary. National scale: only five specimens in Genk (1897).

Population. Continental scale: this species is rare in all of its localities (Rasmont & Dehon 2015). National scale: extinct.

Habitat and Ecology. Flying period: in July and August (Rasmont & Dehon, 2015). Habitat: formerly found in sandy places in the central and southern Netherlands and Germany, occupying the edges of open pine forests, clear-felled areas and old clay quarries (Peeters 2012, citing Westrich 1989). Visited flowers: no data for Belgium, Iuga (1958) cites *Trifolium spp.*, *Stachys spp.* and *Teucrium spp. I*n Romania, Levchenko (2011) also adds *Stachys palustris* and *Echium vulgare* in the area of Moscow. Nesting habits: in Germany the nests are constructed in sunny, bare sandy places, often in small aggregations of up to a dozen nests (Westrich, 1989). Parasites: *Thyreus orbatus* and probably *Coelioxys rufescens* (Westrich, 1989).

Threats. The regional extinction of the species might have been caused by global warming (*A. borealis* is the only species of the genus species with a northern distribution).

Conservation Actions. Present: it is listed in the National Red Lists or Red Data Books of Germany as Regionally Extinct (Westrich *et al.* 2011), the Netherlands (Regionally Extinct. Peeters and Reemer, 2003) and the Czech Republic (Vulnerable. Farkac *et al*., 2005). Future: no future Conservation Actionshave to be taken for this species.

Research Needed. Evaluate the species tolerance global warming as it is the only *Anthophora* species with a northern distribution. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour.

Anthophora furcata **(Panzer, 1798)**

Common Name(s): English - Fork-tailed Flower-Bee. French - *Anthophore fourchue*. Dutch – *Andoornbij*. German – *Waldpelzbiene*.

Figure 75. *Anthophora furcata* . A, female specimen; B, male specimen (Photos: P. Rasmont).

Diagnosis. the genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora furcata* has the unique combination of the following traits (Chorein 2007): Females: black cuticle on the face, last tergite with a rusty coat. Males: A3 > A4 + A5, well-developed yellowish-white mask on the face, well-developed gonostylus, gonocoxite with a well-developed lateral lobe, no brush of hairs on mesotarsus, normal hind femora.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Previously published Red List assessments: 2015 – Least Concern (LC) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: The species occurs through the whole of Europe, reaching its northern-most distribution to the latitude of Helsinki. In European Russia, it is present from the Caucasus to the Arctic Circle. National scale: in the natural regions of Fagne-Famenne and Ardenne in the southern Sambre-Meuse line and in Hesbaye and Campine in the northern Sambre-Meuse line, EOO = 2,500 km², AOO = 23 km².

Population. Continental scale: no information available for the population size and trend of this species, although it appears to have strong and stable populations at least in parts of its range (S. Roberts pers. comm 2014). National scale: Rasmont *et al*. (1993) qualified the species as very highly significantly decreasing. Chorein (2007) qualified the species as very highly significantly decreasing between the before 1950 and 1951-1981 periods and as very highly significantly decreasing between the 1951-1981 and the after 1981 periods. Current population trend: decrease.

Habitat and Ecology. Flying period: from late May to August or early September. Habitat: ubiquitous as long as there is dead wood present in which to nest and Lamiaceae (Rasmont & Dehon 2015). Visited flowers: oligolectic on Lamiaceae and especially on *Stachys sylvatica* and *Stachys palustris* (Rasmont pers. comm.). Records on cultivated plants: *Iris pseudacorus*, *Salvia officinalis* and *Rubus*

sp. (Rasmont pers. comm.). Nesting habits: this species in unusual among *Anthophora* species in excavating its nesting burrows in dead wood. Parasites: *Coelioxys alata* (Celary, 1989. Warncke, 1992. Scheul, 1996).

Threats. Reduction of food ressources: intensive forestry practices do not take into account edges and clearings where the species should be abundant. Agricultural intensive uses of herbicides and nitrogen fertilizer might not allow the growth of Lamiaceae flowers in and around crops located next to forest borders. Drainage of wetland on forestry purposes reduces the ressources in *Stachys palustris*. Reduction in the number of potential nesting sites: intensive forest management practices (the volume of dead or senescent trees is inexistent or insufficient).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Germany (Near Threatened. Westrich *et al*. 2011) and the Netherlands (Vulnerable. Peeters and Reemer 2003). Future: promotion of extensive forestry practices (*i.e.* including the conservation of deadwood, open moist areas and multistage edges and clearings). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers). Promotion of late mowing practices of crop edges and meadows (*e.g.* hay production instead of silage).

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population size and trend at the national scale.

Anthophora plagiata **(Illiger, 1806)**

Common Name(s): French - *Anthophore des murailles*. Dutch – *Schoorsteensachembij*.

Diagnosis. the genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora plagiata* has the unique combination of the following traits (Chorein 2007): Females: A3 = A4 + A5 + A6, black cuticle on the face, opaque cuticle on the apical margin of T3 and T4, dark apical band of hairs on tergites. Males: para-clypeal spots are reduced to a small whitish-yellow line longing the clypeus, black antennal scape, gonocoxite with a well-developed lateral lobe, no pygidial plate, no brush of hairs on mesotarsus. Taxonomic Notes: the species is polytypic, including very dark forms, all black with a red abdomen type and all brownish forms. These forms are generally found in mixed populations, but there does not seem to be a pattern to their geographical distribution.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: widely distributed, from North Africa to Sweden. National scale: last observation in 1963 in the surroundings of Modave.

Population. Continental scale: extinct in certain central and occidental temperate European countries and seems to be strongly regressing in some areas of its distribution. There is no specific information available on its population size and trends (Rasmont & Dehon, 2015). National scale: extinct.

Habitat and Ecology. Flying period: From mid-April to mid-July. Habitat: in Romania this species is considered to be ubiquitous (Iuga 1958). Visited flowers: in whole Europe it is considered to be polylectic but frequently observed on *Echium vulgare*, *Anchusa* spp., *Salvia pratensis*, *Trifolium pratense*, *Vicia cracca* and *Astragalus* spp (Rasmont & Dehon, 2015). Records on cultivated plants: *Trifolium pretense, Salvia pratensis*. Nesting habits: it is often found nesting in old farm walls and in old loamy wall (Rasmont, pers. obs., 2017). Parasites: *Thyreus orbatus, Coelioxys rufescens, Melecta albifrons, Melecta lectuosa* (Peeters *et al.*, 2012).

Threats. The regional extinction of the species might have been caused by the reduction of food ressources (intensive grazing practices, early mowing, agricultural intensive uses of herbicides and nitrogen fertilizer, deletion of Fabaceae crops) as well as by the reduction in the number of potential nesting sites (restauration or destruction of old vertical walls).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Czech Republic (Critically Endangered. Farkac *et al.* 2005), Finland (Regionally Extinct. Rassi *et al.* 2010), Germany (Endangered. Westrich *et al.* 2011), Lithuania (Endangered. Rašomavičius 2007), Slovenia (Probably Extinct. Anonymous 2002), Sweden (Critically Endangered. Gärdenfors 2010) and Switzerland (Vulnerable, Amiet 1994). Legally protected (LCN 1973, annexe IIb). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could favour the return

of the species. Future: the return of the species could be favoured by the promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer and favoring Leguminous crops) and grazing practices. Promotion of adequate mowing practices (*e.g.* hay production instead of silage). Promotion of the conservation of old walls.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Better understanding of the extinction at the national scale. Conduct sampling expeditions in order to confirm / infirm the national extinction.

Anthophora plumipes **(Pallas, 1772)**

Common Name(s): English - Hairy-footed Flower Bee. French - *Anthophore plumeuse*. Dutch - *Gewone Sachembij*. German - *Gemeine Pelzbiene, Frühlings-Pelzbiene*.

Figure 76. *Anthophora plumipes*. Female foraging on *Symphytum officinale* (Gembloux, Photo: Y. Barbier).

Diagnosis. the genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora plumipes* has the unique combination of the following traits (Chorein 2007): Females: black cuticle on the face, very protruding clypeus with a well-marked carina, translucent apical margin of T3 and T4. Males: long fringe of hairs on each articles of the mesotarsus, thick penis valves, gonocoxite with a very developed and flattened lateral lobe.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Justification: Listed as Least Concern because it is the most common *Anthophora* species in Belgium with a wide distribution, large populations, increasing population trend and no major threat. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: very widespread through all Europe with the exception of Ireland, Norway and Finland. National scale: Everywhere in Belgium. Tends to be less abundant in the following natural areas: Flandre Sablonneuse, Polders and Campine, EOO = 21,700 km², AOO = 677 km².

Population. Continental scale: *Anthophora plumipes* is, by far, the most abundant *Anthophora* species in all the western Palearctic. However, its population trend is unknown (Rasmont & Dehon, 2015). National scale: Rasmont *et al*. (1993) qualified the species as very highly significantly increasing. Chorein (2007) qualified the species as very highly significantly increasing between the before 1950 and 1951-1981 periods and as not significantly increasing or

decreasing between the 1951-1981 and the after 1981 periods. Current Population Trend: Increase.

Habitat and Ecology. Flying period: From early March to late August (Chorein, 2007). Habitat: ubiquitous (Rasmont & Dehon, 2015). Visited flowers: it generally prefers flowers with long corollae like Lamiaceae, Fabaceae and Boraginaceae species (Rasmont & Dehon, 2015). Records on cultivated plants: in Belgium there are records on *Ribes sanguineum, Rosmarinus officinalis, Brassica oleracea, Narcissus pseudonarcissus, Malus domestica, Aubrieta sp., Prunus sp., Salvia pratensis, Crataegus monogyna, Aesculus hippocastanum, Brassica napus, Pyrus communis, Rhododendron spp., Ribes rubrum, Trifolium pratense, Vicia sativa, Vicia faba, Weigelia coraeensis, Acer pseudoplatanus, Fragaria sp., Prunus mahaleb, Prunus cerasifera* (P. Rasmont pers. comm.). Recognized as an important orchards pollinator by Thalmann & Dorn (1990), Bond & Kirby (1999). Nesting habits: The species nests on walls or on flat surfaces (*e.g.* traditional cob buildings, clayey slopes, sunken path and gravel quarry) (Peeters *et al.*, 2012), in aggregations (up 150 nests), the descendance nests in its birthplace (the same nest can last up to 50 years) (O'Toole & Raw, 1991). Parasites: *Melecta albifrons*, *Coelioxys rufescens Sitaris muralis, Meloe rugosus* (Iuga, 1958. Warncke, 1992. Peeters *et al.*, 2012). Both beetles are able to ruin an aggregation (Whitehead, 1987, 1992).

Threats. There are no specific threats to this species.

Conservation Actions. Present: This species is included in the National Red List or Red Data Book of Sweden (Critically Endangered. Gärdenfors 2010). No future Conservation Actionsare required for this species.

Research Needed. Evaluation of the impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour.

Anthophora quadrimaculata **(Panzer, 1798)**

Common Name(s): English - Four-spotted Flower-Bee, Four-banded Flower-Bee. French - *Anthophore rusée*. Dutch – *Kattenkruidbij*. German - *Vierfleck-Pelzbiene*.

Figure 77. *Anthophora quadrimaculata* . A, female specimen (Photo: P. Rasmont); B, male resting on *Lavandula sp.* (Photo: V. Lefebvre).

Diagnosis. the genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora quadrimaculata* has the unique combination of the following traits (Chorein 2007): Females: A3 = A4 + A5 + A6. Black cuticle on the face. Clypeus with sparse, decumbent greyish pubescence. T1-T4 without any whitish pubescence. T6 with black and white hairs intermixed. Males: well-developed whitish-yellow spots on the face. Mesotarsus without any brush of hairs. broadened metafemur. Long and translucent white metatibial spurs. gonocoxite with a well-developed lateral lobe.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Justification: Listed as Least Concern because it is the second most common *Anthophora* species in Belgium with a wide distribution and large populations. Previously published Red List assessments: 2015 – Data Deficient (DD) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: distributed through the whole of Europe from 45° to 68° latitude. To the south, it occurs in Sicily but not in southern Spain and the Balkans. National scale: everywhere in the southern Sambre-Meuse line, in Polders, Hesbaye and Région Limoneuse Hennuyère in the northern Sambre-Meuse line, EOO = 6,100 km², AOO = 57 km².

Population. Continental scale: population size and trend is unknown but seems quite rare and scattered (Rasmont & Dehon, 2015). National scale: Rasmont *et al*. (1993) qualified the species as very highly significantly decreasing. Chorein (2007) qualified the species as very highly significantly decreasing between the before 1950 and 1951-1981 periods and as not significantly decreasing or increasing between the 1951-1981 and the after 1981 periods. Current population trend: stable.

Habitat and Ecology. Flying period: from late May to late August (Chorein, 2007). Habitat: dry calcareous grassland compensated by gardens with cultivated Lamiaceae (*Lavandula* x *intermedia*) (Rasmont & Dehon, 2015). Visited flowers:

mesolectic with a clear preference for Lamiaceae and *Cymbalaria muralis* (P. Rasmont and M. Dehon pers. comm.). Records on cultivated plants: *Lavandula spp., Salvia officinalis*. Nesting habits: preferentially on vertical walls but can be found on flat loamy surfaces (Peeters *et al.* 2012, Rasmont pers. Obs.). Parasites: *Thyreus orbatus, Coelioxys rufescens* (Rasmont pers. obs.).

Threats. Reduction of suitable habitats: deletion of dry calcareous grasslands in agricultural, forestry or urbanization purposes. Reduction of food ressources: intensive grazing practices, early mowing, agricultural intensive uses of herbicides and nitrogen fertilizer. Reduction in the number of potential nesting sites: restauration or suppression of old vertical walls and tilling activities.

Conservation Actions. Present: included in the National Red Lists or Red Data Books of the following five European countries: Finland (Near Threatened. Rassi *et al.* 2010), Germany (Near Threatened. Westrich *et al.* 2011), Netherlands (Vulnerable. Peeters and Reemer 2003), Norway (Vulnerable. Kålås *et al.* 2010) and Slovenia (Rare. Anonymous 2002). The species and / or its habitat occurs in protected areas. Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit this species. Future: promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers) and grazing practices. Promotion of the conservation / restauration of dry grasslands. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces (especially Lamiaceae species).

Research Needed. Evaluate the species tolerance global warming. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour.

Anthophora retusa **(L., 1758)**

Common Name(s): English - Potter Flower-Bee. French - *Anthophore obtuse*. Dutch - *Zwarte Sachembij*.

Figure 78. *Anthophora retusa.* A, female specimen; B, male specimen resting (Vervier, Photos: P. Rasmont).

Diagnosis. the genus *Anthophora* is described in Rasmont & Terzo 2015. *Anthophora retusa* has the unique combination of the following traits (Chorein 2007): Females: black cuticle on the face. Clypeus with a barely visible median carina. Cuticle of T3 & T4 with opaque apical margins. Orange scopa. Males: presence of a pygidial plate. gonocoxite with a poorly-developed lateral lobe. Basal side of mesotarsus with a brush of hairs. Taxonomic Notes: the females of this species show two very different color patterns. In northern and central Europe, females are all black with yellow corbiculae (nominal form) while in the south, they show greyish banded fur with yellow corbiculae (*A. retusa* var. *meridionalis* Pérez, 1879).

Assessment Information. Red List Category & Criteria: EN (A2c). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Justification: Listed as Endangered due to: a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont & Dehon (2015).

Geographic Range. Continental scale: this species is widely spread over Europe, being present from central Spain, Sardinia and Sicily to the south, northwards to southern Sweden and Estonia (Rasmont 2014). National scale: mostly present in the northern Sambre-Meuse line, principally around eastern Hesbaye, EOO = 280 km², AOO = 38 km².

Population. Continental scale: wide distribution, regressing in western Europe, abundant in eastern Europe (Rasmont & Dehon 2015). National scale: Rasmont *et al*. (1993) qualified the species as very highly significantly decreasing. Chorein (2007) qualified the species as very highly significantly decreasing between the before 1950 and 1951-1981 periods and as very highly significantly decreasing

between the 1951-1981 and the after 1981 periods. This species has never been abundant in Belgium and has strongly regressed in the areas it was usually found. Current population trend: Decrease.

Habitat and Ecology. Flying period: males from mid-March to late June, females from mid-March to mid-July (Chorein, 2007). Habitat: in Romania it occurs in open areas such as grasslands (Iuga, 1958), in Nederland it occurs in sunny forest borders, ruderal fields and quarries (Peeters *et al.*, 2012). Visited flowers: it seems to have a noticeable preference for Lamiaceae and Fabaceae in Belgium (P. Rasmont and M. Dehon pers. comm.). Records on cultivated plants: in Belgium there are records on *Trifolium pratense* and *Medicago sativa* (Rasmont P. pers. comm.), in Great-Britain there are records on *Trifolium pratense* and *Vicia sativa* (Else & Edwards 2018). Nesting habits: The species nests in small aggregations (5 – 90 individuals) (Litt, 1996) on naked or sparsely vegetated loamy or sandy soils (Peeters *et al.*, 2012). Parasites: *Melecta luctuosa* (Peeters *et al.* 2012), *Anthrax anthrax* (Litt 1996), *Meloe proscarabeus* (Knight 1995).

Threats. Reduction of suitable habitats: (1) agricultural intensification (monoculture, intensive grazing practices) have led to a reduction of flower-rich open or ruderal areas (2) intensive forestry do not take into account edges and clearings (3) scrub encroachment or afforestation of old quarries. Reduction of food ressources: (1) intensive grazing practices, early mowing, agricultural intensive uses of herbicides and nitrogen fertilizer have led to a loss in the flower diversity (2) deletion of Leguminous crops have led to a loss of a probably important food resource. Reduction in the number of potential nesting sites: scrub encroachment and tilling activities.

Conservation Actions. Present: legally protected in Belgium. The species is listed in the National Red Lists or Red Data Books of the following eight European countries: the Czech Republic (Endangered. Farkac *et al*. 2005), Estonia (Critically Endangered. Lilleleht 2001), Germany (Near Threatened. Westrich *et al*. 2011), Great Britain (Vulnerable. Shirt 1987), Netherlands (Endangered. Peeters and Reemer 2003), Slovenia (Rare. Anonymous 2002), Sweden (Vulnerable. Gärdenfors 2010) and Switzerland (Regionally Extinct. Amiet 1994). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive forestry practices (*i.e.* including a wide variety of timber species and multistage edges and clearings). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Genus *Ammobates* Latreille, 1809

Ammobates punctatus (Fabricius, 1804)

Common Name(s): French - *Ammobate ponctué*. Dutch – *Zandloperbij*. German - *Grosse Sandgängerbiene.*

Figure 79. *Ammobates punctatus*. Female specimen (Photo: A. Pauly).

Diagnosis. Black cuticle on head and thorax. Reddish cuticle on the first tergites and sternites. White spot of hairs on thorax and tergites. Unidentate mandible. Two submarginal cells on forewings. S6 of females forming a distinctive fork. Absence of scopa. **Taxonomic Source(s):** Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: CR (A2bc. B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited Geographic Rangein the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the EOO, AOO, quality of habitat and number of observations. Previously published Red List assessments: 2013 – Vulnerable (VU) (Europe) in Straka & Bogusch (2014)

Geographic Range. Continental scale: this species is distributed across much of Europe, to 53° North and eastwards to the Ukraine, EOO = 4,545,805 km², AOO = 668 km². National scale: EOO = EOO 100 km², AOO = 1 km², last observation on 05/25/2018, Formerly present in Brussels but now disappeared.

Population. Continental scale: the population size and trend of this species are uncertain, the species is widespread, but very local in most areas of its range.

National scale: as Belgium (as well as Netherland) is the northern edge of its distribution, populations are even scarcer, reduced and thus vulnerable to threats, Rasmont *et al*. (1993) qualified the species population trend as very highly significantly decreasing in 1991. Current population trend: decrease.

Habitat and Ecology. Flying period: from June to August. Habitat: wherever its host nests. Hosts: *Anthophora bimaculata* (CR) (Bogusch 2003).

Threats. Decline of host: *Anthophora bimaculata* (CR). Decline of habitat / food ressources: Belgium is the northern edge of its distribution, the amount of suitable habitats is thus therefore reduced. The increase of artificial land uses (*e.g.* intensive monoculture without any places left for the development of flowering plants, afforestation …) in Belgium reduce even more the amount of suitable habitats. However, some artificial land uses such as old heap and industrial wasteland have been proven to benefit the host (Rasmont & Barbier, 1998).

Conservation Actions. Present: legally protected (LCN 1973, Annexe IIb). This species is included in the following National Red Lists or Red Data Books: Czech Republic (Endangered. Straka 2005), Germany (Endangered. Westrich *et al.* 2011), the Netherlands (Extinct, with latest record in 1956. Peeters and Reemer 2003), Switzerland (Critically Endangered. Amiet 1994). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to both the species and its host (A.M. du 03/09/2015). Future: promotion of the conservation / rehabilitation of heaps and industrial wastelands as well as any other xerothermic habitats. Promote the plantation of thermophilous species in private backyards or public parcs as they seem to benefit the host. Anything else likely to benefit its host.

Research Needed. Further research is needed to specify the population size and trend, habitat, ecological requirements and threats.

Genus *Biastes* Panzer, 1806

Biastes truncatus (Nylander, 1848)

French - *Biaste tronqué*. Dutch - *Gewone Pantserbij*

Figure 80. *Biastes truncatus*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. 2014 – Vulnerable (VU) (Europe) in Bogusch & Straka (2014).

Geographic Range. Continental scale: the species is found in central Europe, north to Denmark, Finland, Sweden and Estonia, while elsewhere in Europe such as, Ukraine, Russia, and Turkey, the species is very rare, EOO = 2,977,189 km^2, AOO = 312 km^2, although this is suspected to be larger but no more than 1,500 km^2. National scale: last observations: several females in Plombières in August 1971, 1972 et 1973, one male in 1973 in Wéris.

Population. Continental scale: very fragmented and localized populations, decrease in the number of records (J. Straka and P. Bogusch pers. obs. 2000-2013). National scale: extinct. Current population trend: extinct.

Habitat and Ecology. Flying period: July and August. Habitat: open, sloped habitats on sandy or rocky acidic substrate. The species can inhabit grassland, shrubland, or forest. Its most preferred habitat is probably a mosaic of various biotopes at a single site (Bogusch & Straka 2014). Hosts: *Dufourea dentiventris* (EN) and *Dufourea inermis* (CR) (Warncke 1982).

Threats. The threats to this species are uncertain, but it is bound to its host bee species (and the various *Campanula* plants they depend on for pollen) which are drastically declining at the national scale.

Conservation Actions. Present: this species is listed in the National Red List of the Czech Republic (Endangered. Straka 2005), Finland (Near Threatened. Rassi *et al.* 2010), Germany (Vulnerable. Westrich *et al.*2011), the Netherlands (Regionally Extinct, with latest record in 1952. Peeters and Reemer 2003).

Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species and its hosts (A.M. du 03/09/2015. Terzo & Rasmont, 2007). Future: anything likely to benefit its hosts.

Research Needed. Further research is needed into the population trends, habitat, ecological requirements and threats, both to the bee itself and its hosts.

Genus *Bombus* Latreille, 1802

Bombus barbutellus Kirby, 1802

Common Name(s): English - Barbut's Cuckoo Bee. French - *Psithyre barbu*. Dutch - *Lichte Koekoekshommel*. German - *Bärtige Kuckuckshummel*.

Figure 81. *Bombus barbutellus*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo 2015 and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). Females: black with two yellow bands at the front and at the rear of the thorax and a yellowish abdominal tip, can be separated from *B. campestris* only by microscopic examination of abdominal articles. Males: white abdominal tip, can be separated from other *Psithyrus* by a microscopic examination of the genitalia.

Assessment Information. Red List Category & Criteria: CR A2bc. B1ab(i,ii,iii,iv). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered because of a population decline (more than 80% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO) and in the extent of occurrence (EOO). This species has also a small extent of occurrence (<5km²) with considerable fragmentation of its area and continuing decline in its EOO, AOO, quality of habitat and number of observations. This statement could potentially be due to the decline of one of its hosts (*B. hortorum* (NT) and *B. Ruderatus* (CR)). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: *Bombus barbutellus* has a distribution extending from Spain in the South to mid-Finland in the North and from Ireland in the West to Far-East of Russian in the East (Rasmont *et al.*2015b), EOO = 9,456,695 km², AOO = 11,344 km². National scale: before 1990, *B. barbutellus* seemed to have a large distribution in Belgium but was difficult to observe (Rasmont et Pauly, 2010), since 1990, only one observation in Marche-en-Famenne (2001) and one observation in Havré (2018), EOO = 160 km², AOO = 16km².

Population. Continental scale: This species is declining and not considered as common (Rasmont *et al.*2015b). National scale: Ball (1914, 1920) cite this species as

was one of the most abundant *Psithyrus* of Belgium, Rasmont & Mersch (1988) assess this species as significantly decreasing, Rasmont *et al.* (1993) assess this species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. barbutellus* has decreased from 0.95% to 0.01% between the 1910-1930 (P1) and 1990-2016 (P3) periods and assessed that the species has very highly significantly decreased . Current population trend: decrease.

Habitat and Ecology. Flying period: females emerge in mid-April, new females and males from late May to September. Habitat: cf. host. Visited flowers: females are mostly found on *Taraxacum* and various Lamiaceae, males on *Cirsium spp., Trifolium spp.* and *Rubus sp.* (Rasmont P. pers. comm.). Records on cultivated plants: *Trifolium pratense, Trifolium repens, Rubus sp.* (Rasmont P. pers. comm.). Host: *Bombus hortorum* (*e.g.* Postner 1952), *Bombus ruderatus* (*e.g.* Rasmont & Adamski 1996), *Bombus hypnorum*, *Bombus pratorum* (*e.g.* Pouvreau 1973) and potentially *Bombus jonellus, Bombus ruderarius* (*e.g.* Skorikov 1922), *Bombus subterraneus* (Knetchel 1955), *Bombus distinguendus, Bombus pascuorum* (*e.g.* Popov 1931).

Threats. Decrease of hosts: *B. hortorum* (NT), *B. ruderatus* (CR). Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of leguminous crops, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]). Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007).

Conservation Actions. Present: this species is listed as threatened in several National Red Lists/ Red Data Books (Denmark, Finland, Netherlands, Ireland and Czech Republic) (Wind and Pihl 2010. Rassi *et al.*2010. Peeters and Reemer 2003. Fitzpatrick *et al.*2006. Farkac *et al.*2005. Rasmont *et al.*2015a). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit this species. Future: national regulation against thistles should also be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of Leguminous cropping. Taking conservation measures for the hosts as the abundancy of cuckoo bumblebees is directly linked to the one of their hosts (Suhonen, 2015).

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. National monitoring of the population trend. Confirmation of potential hosts.

Bombus bohemicus **Seidl, 1838**

Common Name(s): English - Ashton's Cuckoo Bumblebee, Gypsy Cuckoo Bee, Bohemian Cuckoo Bumblebee. French - *Psithyre bohémien*. Dutch - *Tweekleurige Koekoekshommel*. German - *Angebundene Kuckuckshummel*.

Figure 82. *Bombus bohemicus*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Carduus crispus.* (Liège, Photo : J.Y. Baugnée).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo 2015 and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). This species is black with one yellow band at the front of the thorax and a whitish abdominal tip. Females: can be separated from *B. vestalis* by their long and irregular fringe of hairs on the hind basitarsus. Males: can be separated from other *Psithyrus* by a microscopic examination of the genitalia and particularly from *B. vestalis* by their shaggy pubescence.

Assessment Information. Red List Category & Criteria: NT (A2bc). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Near Threatened given the fact that in spite of its great abundance in Belgium, it has been noticed a decline of population (between 20%

and 30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO), in the extent of occurrence (EOO) and an increase in the fragmentation of its range. It could potentially be due to the regression of its main host (*B. lucorum*). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: This species is considered as one of the most common cuckoo-bumblebee species in Europe, EOO = 9,701,817 km², AOO = 17,736km². National scale: *B. bohemicus* mainly occurs in southern Sambre-Meuse line but can also be found in the Hainaut and Brabant loamy plateau as well as in Polders, EOO = 15900 km², AOO = 172 km².

Population. Continental scale: common species with stable populations in Europe but declining in North-America (Williams *et al.*2014). National scale: Rasmont & Mersch (1988) assessed the species as significantly increasing, Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Vray (2018) evaluates that the proportional abundance of *B. bohemicus* has decreased from 13.09% to 5.82% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: females emerge in April, new females and males from June until early September. Habitat: cf. host. Visited flowers: females are mostly found on *Taraxacum* and *Vaccinium spp.*, males are mostly found on *Centaurea* (Rasmont P. Pers. comm.). Records on cultivated plants: *Lavandula angustifolia, Origanum vulgare, Prunus spinosa, Prunus persica, Trifolium sp., Thymus praecox* (Rasmont P. pers. comm.), in Great-Britain it can be found on *Rubus idaeus, Trifolium repens, Acer pseudoplatanus, Thymus spp.* (Else & Edwards 2018), in Nederland it can be found on *Origanum vulgare* (Peeters *et al.* 2012). Host: *Bombus lucorum* (*e.g.* Pouvreau 1973) and potentially *B. terrestris*, *B. cryptarum* (Kreuter *et al.* 2010), *B. magnus* (*e.g.* Edwards & Broad 2006).

Threats. Decrease of hosts: *B. lucorum* (NT), *B. cryptarum* (EN), *B. magnus* (EN). Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of hedgerows, deletion of leguminous cropping, reduction in the number of vegetable gardens. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. It is included in the National Red Data Book of Ireland (Fitzpatrick *et al.*2006. Rasmont *et al.*2015a). Future: promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces (especially *Centaurea*). Promotion of Leguminous cropping. Taking conservation measures for the hosts as the abundancy of cuckoo bumblebees is directly linked to the one of their hosts (Suhonen, 2015).

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale. Confirmation of potential hosts.

Bombus campestris **(Panzer, 1801)**

Common Name(s): English - Field Cuckoo Bee. French - *Psithyre des champs*. Dutch - *Gewone Koekoekshommel*. German - *Feld-Kuckuckshummel*.

Figure 83. *Bombus campestris*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging (Ferrieres, Photo : J.M. Michalowski).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo 2015 and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). Females: black with two yellow bands at the front and at the rear of the thorax and a yellowish abdominal tip, can be separated from *B. barbutellus* only by microscopic examination of abdominal articles. Males: unique coloration pattern among other *Psithyrus*, can be separated from other *Psithyrus* by a microscopic examination of the genitalia.

Assessment Information. Red List Category & Criteria: VU (A2bc). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Vulnerable because of a population decline (more than 30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO). This statement could

potentially be due to the decline of its hosts (*B. humilis* (CR). *B. pomorum* (RE). *B. sylvarum* (CR). *B. ruderarius* (EN). *B. subterraneus* (RE)) except *B. pascuorum*. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: very widespread in Europe with an extent of occurrence (EOO) of 8,327,914 km² and an area of occupancy (AOO) of 17,436 km². National scale: widely distributed species in Belgium but absent from the agricultural landscape, EOO = 14900 km², AOO = 152 km².

Population. Continental scale: one of the most common cuckoo-bumblebee in Europe (Rasmont *et al.*2015a). National scale: Ball (1914, 1920) assessed this species as one of the three most abundant cuckoo-bumblebees, Rasmont & Mersch (1988) assessed this species as stable, Rasmont *et al.* (1993) assessed this species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. campestris* has decreased from 2.01% to 0.58% between the 1910-1930 (P1) and 1990-2016 (P3) periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: females emerge in April, males and new females in June, both can persist until September. Habitat: found especially on slag heaps but absent from agricultural landscapes in Belgium (Rasmont & Pauly 2010). Visited flowers: females are especially found on *Trifolium pratense, Lamium album* and *Taraxacum spp.*, males are especially found on *Cirsium spp.*, *Centaurea spp.* and *Trifolium sp.* (Rasmont pers. comm.). Records on cultivated plants: *Trifolium pratense*. Hosts: *B. pascuorum, B. humilis, B. muscorum, B. ruderarius, B. sylvarum, B. pratorum, B. hortorum* (*e.g.* Pouvreau 1973), *B. pomorum* (*e.g.* Løken 1984) and potentially *B. veteranus* (Hoffer 1889).

Threats. Reduction of suitable habitats: rehabilitation of old heaps and agricultural modification of the landscape. Decrease of hosts: *B. humilis* (CR), *B. pomorum* (RE), *B. ruderarius* (EN), *B. sylvarum* (CR), *B. subterraneus* (RE). Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of Leguminous cropping, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]). Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. It is included in the National Red Data Book of Ireland and Denmark (Fitzpatrick *et al.*2006. Wind & Pihl 2010. Rasmont *et al.*2015a). Future: national regulation against thistles should also be revised given their great nutritional interest for males (Vray *et al.* 2017), promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of Leguminous cropping. Taking conservation measures for the hosts as the abundancy of cuckoo bumblebees is directly linked to the one of their hosts (Suhonen, 2015). Promote the conservation and restauration of old heaps.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. National monitoring of the population trends. Confirmation of potential hosts.

***Bombus confusus* Schenck, 1861**

Common Name(s): French - *Bourdon velouté*. Dutch - *Boloog, Vloerhommel*. German – *Samthummel*.

Figure 84. *Bombus confusus*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015). *Bombus confusus* is the only representative of the subgenus *Confusibombus* in Belgium (Rasmont & Terzo 2017). *Bombus confusus* is black with a red abdominal tip, it can be separated from other similar coloration patterns by its particularly short and regular pubescence. Taxonomic Notes: two subspecies with different colour patterns were recognized in Belgium: *B. confusus confusus* and *B. confusus paradoxus*.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: last observations in Belgium in 1947 and 1957 (Visé). Previously published Red List assessments: 2014 – Vulnerable (VU) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: distributed in central Europe, being absent from the Mediterranean area as well as British Isles and Fennoscandia, EOO = 4,910,210 km², AOO = 4,336 km². National scale: last observation in 1957 in Visé for *B. confusus confusus* and *B. c. paradoxus* was only present in Dworp (Flemish Brabant) before the first World War.

Population. Continental scale: populations are currently declining (more than 30% in the last ten years and then assessed as VU) (Rasmont & Iserbyt 2012. Rasmont *et al.*2015ab). National scale: Ball (1920) assessed this species as rare (*i.e.* 125 specimens collected), 64 of these collected specimens came from surroundings of Hal (Dworp, Buizingen – Flemish Brabant), the last observations

of this species was in Visé in 1947 and 1957 (Rasmont & Pauly 2010). Current population trend: extinct.

Habitat and Ecology. Flying period: very few records, 2 males in September, 1 male in April, 2 queens in May, 2 workers in August (Lemoine *et al.* 2018, Rasmont & Pauly 2010). Habitat: the species can be found in a wide range of habitats (e.g. dry places, vineyards, bare waste grounds) (Rasmont *et al.*2015a).. Flowers visited: while females are closely related to Fabaceae, males forage on thistles (Rasmont *et al.*2015a). Records on cultivated plants: *Trifolium spp.*. Nesting habits: under the ground in existing cavities as well as above the ground in nests made of mosses and grasses. Parasites: unknown.

Threats. Reduction of suitable habitats: (1) agricultural intensification (monoculture, intensive grazing practices) have led to a reduction of flower-rich open areas (2) reforestation of open areas. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]), abandonment of polyculture. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is listed as threatened/ extinct in several National Red Lists/ Red Data Books (Germany, Switzerland, Estonia, Hungary, Latvia, Lithuania, Moldova and Czech Republic) (Westrich *et al.* 2008. Amiet 1994. Lilleleht 2001. Sárospataki *et al*. 2005. Anonymous 1992. Rašomavičius 2007. Anonymous 2002. Farkac *et al.* 2005. Rasmont *et al.*2015a). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Understanding of the population extinction at the national scale.

Bombus cryptarum **(Fabricius, 1775)**

Common Name(s): English - Cryptic Bumblebee. French - *Bourdon cryptique*. Dutch – *Wilgenhommel*. German - *Kryptarum-Erdhummel*

Figure 85. *Bombus cryptarum*. Foraging (Westerlo, Photo: P. Rasmont).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Bombus s.s.* is described in Rasmont & Terzo (2017). *Bombus s.s.* are hard to separate, *B. cryptarum* has been regarded as a valid species by Rasmont (1981) and Williams *et al.* (2012). However the species can be separated from other *Bombus s.s.* by the small black comma on the first yellow band. This character is difficult to observe on small workers.

Assessment Information. Red List Category & Criteria: EN (A2b A2c AOO). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: Listed as Endangered because of a decline of population (between 50% and 80% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO). Previously published Red List assessments: 2015 – Least Concern (LC) (Europe).

Geographic Range. Continental scale: from the northern Balkan, the Alps and Massif Central to the Barents Sea and from Ireland to the Pacific, EOO = 6,372,833 km², AOO = 4,784 km². National scale: was present and abundant elsewhere in Belgium during the last century, nowadays it is locally present in Campine but particularly in the climatic region of Haute-Belgique, EOO = 10,800 km², AOO = 119 km².

Population. Continental scale: due to the difficulty in recognising this species and its relatively recent redescription, there is no useful information available on

the population trends in this species. National scale: results shown below could be biased by the misidentification of workers. Rasmont *et al.* (1993) did not assessed the trend of this species, Vray (2018) evaluates that the proportional abundance of *B. cryptarum* has decreased from 0.85% to 0.35 % between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: Queens can emerge from April. The species can be observed until September. Habitat: in blueberry- and heather-rich habitat (Rasmont & Pauly 2010). Flowers visited: queens seem particularly attracted by *Brassica napus* and *Vaccinium myrtillus*, males by *Calluna vulgaris* and *Cirsium spp.*, workers seem more polylectic but with a preference for *Calluna vulgaris* and *Epilobium angustifolium.* Records on cultivated plants: *Brassica napus*, *Crataegus monogyna*, *Ribes sanguineum, Thymus spp., Trifolium spp., Rhododendron ponticum*. Nesting habits: existing cavities in the ground. Parasites: potentially *Bombus bohemicus* (Kreuter *et al.* 2010).

Threats. Reduction of suitable habitats and food resources: (1) deletion of habitats with *Calluna spp.* (*i.e.* heaths and moors) and *Vaccinium spp.* (*i.e.* acidic forests) for agricultural or forestry purposes. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015. Terzo & Rasmont, 2007). It is included in the National Red Data Book of Czech Republic (CR), Poland (DD), Germany (DD) and Ireland (DD) (Farkac *et al*., 2005. Glowacinski *et al*., 2002 Westrich *et al*., 2008). Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.*2017). Promotion of the conservation and restauration of moorlands, heathlands and forest bogs.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Impact of chemical treatments of *Brassica napus* crops on queens. National monitoring of the population trends.

Bombus cullumanus (Kirby, 1802)

Common Name(s): English - Cullum's Bumblebee, Cullum's Humble-bee. French - *Bourdon des causses*. Dutch – *Waddenhommel*.

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015). *Bombus cullumanus* is the only representative of the subgenus *Cullumanobombus* in Belgium (Rasmont & Terzo 2017). *Bombus cullumanus* is black with a red abdominal tip, it can be separated from *B. confusus* by their long and shaggy pubescence. Females: they can be separated from *B. lapidarius* by their sparsely pubescent and shiny hind basitarsus. Males: they can be separated from other similar coloration patterns by a microscopic examination of genitalia.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Regionally Extinct given the last observations in Belgium in 1917 and 1918 (Dworp, Gradelles, Trivières, Rhode-Saint-Genèse and Francorchamps). Previously published Red List assessments: 2014 – Critically Endangered (CR) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: *B. cullumanus* occurs in disparate areas of Europe (e.g. in Spain, Hungary, Poland and in steppic landscapes of countries in eastern Europe like Serbia, Montenegro, Romania, Belarus, Moldova, Russia and Ukraine), EOO = 6,547,161 km², AOO = of 964 km². National scale: last observations in 1917 in Francorchamps and in 1918 Dworp, Gradelles, Rhode-Saint-Genèse and Trivières.

Population. Continental scale: decline of more than 80% over the last ten past years for this species (Rasmont *et al.*2015a, Williams *et al.* 2012a). National scale: this species has always been considered as rare (Rasmont & Pauly 2010), Rasmont (1982) has confirmed its presence in Belgium, only six historical data prior to 1918 have been recorded in Belgium (Rasmont & Pauly 2010). Current population trend: extinct.

Habitat and Ecology. Flying period: queens emerge in May, males from late July to early September. Habitat: open grassy habitat such as dry fields, unimproved chalk grasslands and grass heathlands (Rasmont *et al.*, 2015a). Visited flowers: queens and workers are associated with clovers (Fabaceae) and males with Cardueae (Rasmont *et al.* 2015a, Vray 2018). Nesting habits: not known but probably in existing cavities in the ground. Parasites: unknown.

Threats. Reduction of suitable habitats: (1) agricultural intensification (monoculture, intensive grazing practices) have led to a reduction of flower-rich open areas (incl. clover crops) (2) reforestation of open areas, urbanization. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]), abandonment of polyculture and leguminous cropping. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to

global warming. Concurrence of other species: the tongue length is very similar to that of the honeybee (*Apis mellifera*) and competition between this species and *Apis* is believed likely to have caused declines in Sweden.

Conservation Actions. Present: this species is listed as threatened/ extinct in several National Red Lists/ Red Data Books (Denmark, Germany, Great Britain, Netherlands and Sweden) (Wind and Pihl 2010. Westrich et al. 2008. Shirt 1987. Peeters and Reemer 2003. Gärdenfors 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping. Conservation and restauration of dry grasslands.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Understanding of the population extinction at the national scale.

Bombus distinguendus **Morawitz, 1869**

Common Name(s): English - Great Yellow Bumblebee, Northern Yellow Bumble Bee. French - *Bourdon distingué*. Dutch - *Gele Hommel*. German – *Deichhummel*.

Figure 86. *Bombus distinguendus*. A, from left to right, worker, queen and male specimen (Photos : A. Pauly); B, resting (Sweden, Photo : P. Rasmont).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Subterraneobombus* is described in Rasmont & Terzo (2017). *Bombus distinguendus* has rusty-yellow pubescence with a black line between the wings. Females: they can be separated from *B. subterraneus* by their pale pubescence on face and vertex. Males: they can be separated from *B. subterraneus* by a microscopic examination of genitalia and sternite 6.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Regionally Extinct given the last observations in Belgium in 1971 (Antwerpen and Mazy). Previously published Red List assessments: 2014 – Vulnerable (VU) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: *Bombus distinguendus* is a Nearctic and a Palearctic species which is globally distributed in the west-Palearctic in central Europe, from the 45th parallel to past the Arctic Circle, EOO = 7,921,424 km², AOO = 8,864 km². National scale: extinct, last observations in 1971 in Antwerpen and Mazy (Rasmont and Pauly 2010).

Population. Continental scale: declining populations in the southern part of its range but has stable ones in the northern part of its range, it has been estimated a decline of more than 30% over the last ten past years for this species (Rasmont *et al.*2015a). National scale: Ball (1920) assessed this species as rare in high Belgium (*i.e.* 536 specimens collected and almost everyone coming from Flanders or Brabant) (Rasmont and Pauly 2010). Current population trend: extinct.

Habitat and Ecology. Habitat: open flowery meadows and woodland edge, flower rich coastal habitats (records in Germany, Ireland, Scotland), Fabaceae fields, dry calcareous grassland (Rasmont *et al.*, 2015a). Visited flowers: very few records for Belgium but in whole Europe it seems strongly associated with Clover (*Trifolium* spp.) for forage (Rasmont *et al.*, 2015a), males are strongly associated with Cardueae (Vray, 2018). Records on cultivated plants: *Trifolium spp.* (Rasmont *et al.* 2015a), *Daucus carota, Phacelia tanacetifolia, Allium schoenoprasum, Rhododendron spp., Hyacinthoides* (Else & Edwards 2018). Nesting habits: existing cavities under the ground as well as above the ground in self-constructed grass nests. Parasites: potentially *B. barbutellus* (Hoffer 1889, Popov 1931).

Threats. Reduction of suitable habitats: (1) agricultural intensification (monoculture, intensive grazing practices) have led to a reduction of flower-rich open areas (2) reforestation of open areas (3) intensive forestry practices (deletion of edges and clearings). Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Cardueae (regulated by law [A.R. du 19/11/1987]), abandonment of polyculture, deletion of Fabaceae crops. Genetic isolation: a lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is listed as threatened/ extinct in several National Red Lists/ Red Data Books (Switzerland, Czech Republic, Denmark, Germany, Estonia, Great Britain, Hungary, Irelands, Netherlands, Norway and Sweden) (Amiet 1994. Farkac *et al.*2005. Wind and Pihl 2010. Westrich *et al.*2008. Lilleleht 2001. Shirt 1987. Sárospataki *et al.*2005. Fitzpatrick *et al.*2006. Peeters and Reemer 2003. Kålås *et al.*2010. Gärdenfors 2010. Rasmont *et al.*2015a). This species is legally protected in Wallonia. Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Understanding of the population extinction at the national scale.

Bombus hortorum **(L., 1761)**

Common Name(s): English - Small Garden Bumblebee. French - *Bourdon des jardins*. Dutch – *Tuinhommel*. German – *Gartenhummel*.

Figure 87. *Bombus hortorum*. A, from left to right, worker, queen and male specimen.; B, Foraging on *Fumaria sp.* (Photos : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Megabombus* is described in Rasmont & Terzo (2017). Very similar to *Bombus ruderatus*. Three yellow band, white abdominal end, very long head, can be separated from *B. ruderatus* by its long and shaggy coat (Rasmont & Pauly 2010).

Assessment Information. Red List Category & Criteria: NT. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis

Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Near Threatened because of a population decline (20-30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO) and in the extent of occurrence (EOO). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*(2015a)

Geographic Range. Continental scale: widely distributed west-Palearctic species. National scale: everywhere in Belgium. EOO = 3540 km². AOO = 1198 km².

Population. Continental scale: common and abundant in its range, populations seem stable in the major part of its range (Rasmont *et al.*2015a). National scale: Ball (1914) assessed this species as abundant, Rasmont & Mersch (1988) assessed this species as stable, Rasmont *et al.* (1993) assessed this species as very highly significantly decreasing, Rasmont & Pauly (2010) assessed this species as strongly decreasing since 1990, Vray (2018) evaluates that the proportional abundance of *B. hortorum* has decreased from 9.06% to 3.84% between the 1910-1930 and 1990-2016 periods but assessed the species trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: queens emerge in late March, workers in late April, males in May, new queens from May, persist until September. Habitat: ubiquitous, incl. towns and cities (except moorlands and heaths) (Rasmont *et al.*2015a). Visited flowers: polylectic species, favouring plants with long corollas like Fabaceae or Lamiaceae (Rasmont *et al.*2015a. Terzo & Rasmont, 2007). Records on cultivated plants: *Trifolium pratense, Trifolium repens, Rhododendron spp., Ribes sanguineum, Rubus fruticosus, Prunus spinosa, Malus spp., Vicia sativa, Vicia faba, Fuchsia spp., Origanum vulgare, Lavandula spp., Digitalis purpurea, Narcissus spp., Iris spp*. Nesting habits: above the ground or just under the ground. Parasites: *Bombus barbutellus* (*e.g.* Ball 1914), *B. campestris* (Pouvreau 1973) and potentially *B. sylvestris* (von Hagen & Aichorn 2003)

Threats. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of leguminous crops, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]), suppression of hedges, abandonment of polyculture, orchards, vegetable gardens. Genetic isolation: a lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007) . Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of polycultures, extensive orchards, vegetable gardening and Leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus humilis **Illiger, 1806**

Common Name(s): English - Brown-banded Carder Bee. French - *Bourdon variable*. Dutch – *Heidehommel*. German - *Veränderliche Hummel*.

Figure 88. *Bombus humilis*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). *Bombus humilis* can be separated from other *Thoracobombus* by its unique coloration patterns and, for males, by a microscopic examination of the genitalia. Taxonomic Notes: there are three subspecies of *B. humilis* (*B. h. humilis, B. h. tristis, B. h. quasimuscorum*) and four forms of *B. humilis humilis* (*B. h. h. notomelas, B. h. h. foreli, B. h. h. staudingerioides, B. h. h. sordidus*) that can all be distinguished by their own unique coloration patterns.

Assessment Information. Red List Category & Criteria: CR (A2bc. B1ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez & Maxime Drossart. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: Listed as Critically Endangered due to (1) a population decline (more than 80% between 1900-1969 and 1970-2017), inferred from a population reduction observed, a reduction of its area of occupancy (AOO), a reduction of its extent of occurrence (EOO) as well as (2) a small extent of occurrence (EOO < 500 km²), severely fragmented populations and extreme fluctuations of the extent of occurrence, the area of occupancy, the number of locations or subpopulations and the number of mature individuals. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*(2015a).

Geographic Range. Continental scale: from southern Spain, Greece and Turkey to 65°N in Scandinavia and Russia and from Scotland and NW Spain to the Pacific coast, absent from all Mediterranean islands. National scale: formerly present in all Belgium but actually observed in very localised places in the Luxembourg and Namur provinces (*e.g.* Rochefort), EOO = 1500 km², AOO = 16 km².

Population. Continental scale: The populations are patchy but can be particularly abundant, especially in leguminous rich landscapes (Rasmont *et al.*, 2015a). National scale: Rasmont & Mersch (1988) assessed this species as significantly declining, Rasmont *et al.* (1993) assessed this species as very highly significantly declining, Vray (2018) evaluates that the proportional abundance of *B. humilis* has decreased from 1.31% to 0.03% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens from May, workers and males from late May or early June, can persist until late September. Habitat: in Europe it is found in many open flower-rich grassland habitats throughout its range (Rasmont *et al.*, 2015a). Visited flowers: very few records from Belgium, in Europe females forage especially on *Trifolium pratense*, *Viccia cracca, Echium vulgare* and *Lathyrus pratense*, males forage on thistles (Rasmont *et al.*, 2015a). Records on cultivated plants: *Erica spp., Rubus fruticosus, Onobrychis viciifolia, Vicia sativa, Trifolium repens, Trifolium pratense* (Else & Edwards 2018), *Prunus sp., Thymus spp., Lavandula x intermedia, Lavandula angustifolia, Origanum vulgare* (P. Rasmont pers. comm.). Nesting habits: most of the time above the ground in self-constructed moss and grass nests but sometimes in tree cavities, in birdhouses or under the ground in existing cavities. Parasites: *Bombus campestris* (*e.g.* Pouvreau 1973).

Threats. Reduction of suitable habitats: (1) agricultural intensification (monoculture, intensive grazing practices) have led to a reduction of flower-rich open areas (2) reforestation of open areas. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]), abandonment of polyculture, deletion of Fabaceae cropping. Genetic isolation: a lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following seven National Red lists: Czech Republic (VU, Farkac *et al.*, 2005), Estonia (DD, Lilleleht, 2001), Poland (VU, Glowacinski *et al.*, 2002), Carpathian Mountains (VU, Witkowski *et al.*, 2003), Finland (NT, Rassi *et al.*, 2010), Norway (VU, Kålås, *et al.*, 2010), Germany (VU, Westrich *et al.*, 2008). Legally protected (LCN 1973, annexe IIb). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of

late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus hypnorum **(L., 1758)**

Common Name(s): English - Tree Bumblebee. French - *Bourdon des arbres*. Dutch – *Boomhommel*. German – *Baumhummel*.

Figure 89. *Bombus hypnorum*. A, from left to right, worker, queen and male specimen.; B, Foraging on *Symphytum officinale.* (Auderghem, Photos : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Pyrobombus* is described in Rasmont & Terzo (2017). *Bombus hypnorum* can be distinguished from other Belgian *Pyrobombus* by the following traits

(Rasmont & Terzo 2017): males and females have a whitish abdominal tail and a completely brown or black coat on the thorax.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Least Concern because it is one of the most common bumblebee species in Belgium with a wide distribution, large populations, increasing population trend and no major threat. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a

Geographic Range. Continental scale: *B. hypnorum* is a quite common bumblebee in west Europe with a very wide and increasing distribution (Rasmont *et al.*2015a), this species seems to expand toward the west since one century (i.e. Britain, Scotland, Wales, Iceland). National scale: In the early 19th century, *B. hypnorum* already occurred in the whole territory and seems currently expanding its range, especially in cities and gardens of suburbs, expansion of wooded areas could benefit to this species, EOO = 21,700 km², AOO = 720 km².

Population. Continental scale: common species with expanding populations everywhere in Europe (Rasmont *et al.*2015a). National scale: Ball (1914) described this species as rare but present on the whole territory, in 1920, this species was already more common (i.e. 500 collected specimens in many localities whose 132 in Moorsel) (Ball, 1920), Rasmont & Mersch (1988) assessed the species as significantly increasing, Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Vray (2018) evaluates that the proportional abundance of *B. hypnorum* has increased from 1.52% to 8.01 % between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly increasing. Current population trend: increase.

Habitat and Ecology. Flying period: queens emerge in March, workers and males in April. Habitat: *B. hypnorum* is primarily associated with wooded or shrubby biotopes but is also considered as a synanthropic species which can be found in gardens of suburbs, cities and many places inhabited by people (Rasmont *et al.*2015a). Visited flowers: broadly polylectic but especially found on *Rubus idaeus* and *R. fruticosus* agg. Records on cultivated plants: *Rosa, Malus, Mahonia, Hypericum calycinum, Rhododendron, Erica, Vaccinium, Deutzia, Escallonia, Ribes, Physocarpus, Spiraea, Rubus, Prunus, Malus, Crataegus monogyna, Onobrychis, Trifolium pratense, Trifolium repens, Fuchsia, Ceanothus, Skimmia, Phacelia tanacetifolia, Allium, Crocus, Fagus, Cotoneaster…* This species seems to be an important pollinator of decorative flowers. Nesting habits: it nests in tree trunks and aerial cavities (*e.g.* attics, birdhouses) (Rasmont & Pauly 2010). Parasites: *Bombus barbutellus*, *B. norvegicus, B. Sylvestris* (*e.g.* Pouvreau 1973).

Threats. There are no direct or immediate threat on this species. However, Rasmont *et al.* (2015b) project a noticeable future reduction of its suitable area due to global warming.

Conservation Actions. No conservation action need to be taken for this species.

Research Needed. Species tolerance to pesticides. Better understanding of the population expansion.

Bombus jonellus **(Kirby, 1802)**

Common Name(s): English - Heath Bumblebee. French - *Bourdon des lands*. Dutch – *Veenhommel*. German – *Heidehummel*.

Figure 90. *Bombus jonellus*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Pyrobombus* is described in Rasmont & Terzo (2017). *Bombus hypnorum* can be distinguished from other Belgian *Pyrobombus* by the following traits (Rasmont & Terzo 2017): males and females have a whitish abdominal tail and two yellowish or greyish bands on the thorax.

Assessment Information. Red List Category & Criteria: VU A2bc. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: listed as Vulnerable because of a population decline (more than 30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO). Large populations remain but only in restricted area. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: from Pyrenees and Cantabrian mountains to Barents Sea coast and from Iceland to Kamchatka, in Europe, *B. jonellus* lives in the lowlands north of latitude 50°N and in mountains and hills south of latitude 41°N, EOO = 2,342,477.33 km², AOO = 18,992 km². National scale: it is now abundant in Campine (increase of observations) and in localised sites in Haute-Fagnes (Plateau des Tailles), EOO = 1,600 km², AOO = 21 km².

Population. Continental scale: wide distribution, presumed large overall population, and stable population trend (Rasmont *et al.* 2015a). National scale: Ball (1914) described this species as rare, Rasmont & Mersch (1988) assessed the species as stable, Rasmont *et al.* (1993) assessed the species as very highly

significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. jonellus* has decreased from 0.41% to 0.12 % between the 1910-1930 and 1970-1989 periods and has increased from 0.12% to 0.45% between the 1970-1989 and 1990-2016 periods (Vray, 2018) and that the proportion of 5km x 5km cells occupied by the species has decreased from 12.64% to 0.86% between the 1910-1930 and 1970-1989 periods and has increased from 0.86% to 4.69% between the 1970-1989 and 1990-2016 periods (Vray, 2018). Current population trend: decrease.

Habitat and Ecology. Flying period: queens emerge in March, workers and males in April, new queens in May. Habitat: ericaceous moorland and lowland heath, more rarely in other habitats (Rasmont *et al.*, 2015a). Visited flowers: particularly associated with various ericaceous plants as forage resources (Rasmont *et al.*, 2015a). Records on cultivated plants: no records for Belgium but in Great-Britain the species has been observed on *Vicia sativa, Trifolium pratense, Trifolium repens, Fuchsia* and *Iris pseudacorus* (Else & Edwards 2018). Nesting habits: existing burrows in the soil. Parasites: *Bombus quadricolor* (Cederberg 1976), *Bombus norvegicus* (Brinck & Wingstrand 1951), *Bombus sylvestris* (*e.g.* Reinig 1935) and potentially *Bombus barbutellus* (*e.g.* Skorikov 1922).

Threats. Reduction of suitable habitats and food ressources: destruction of ericaceous moorlands and lowland heaths for agricultural, forestry or urbanization purposes. Genetic isolation: a lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is protected in Belgium (LCN Annexe IIb). This species is included in the National Red Lists or Red Data Books of the following two European countries: Germany (Vulnerable. Westrich *et al.* 2008) and Netherlands (Vulnerable. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species.

Future: conservation and restauration of ericaceous moorland and lowland heaths.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus lapidarius **(L., 1758)**

Common Name(s): English - Large Red-tailed Bumblebee. French - *Bourdon des pierres*. Dutch – *Steenhommel*. German – *Steinhummel*.

Figure 91. *Bombus lapidarius*. A, from left to right, worker, queen and male specimen (Photo : A. Pauly); B, *In copula* (Septroux, Photos : J.M. Michalowski).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015), *Bombus lapidarius* is the only representative of the subgenus *Melanobombus* in Belgium. Females: black with a red abdominal tip, workers differ from *B. soroeensis proteus* by their different mandibular sculpture and from *B. ruderarius* by their black scopa. Males: black with a red abdominal tip and yellow pubescence at the front of the thorax and on most of the face, differs from males of *B. pratorum* by the black pubescence on the vertex and on the sides of the face (completely yellow in *B. pratorum*).

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Least Concern because it is one of the most common bumblebee species

in Belgium with a wide distribution, large populations, increasing population trend and no major threat. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.* (2015a)

Geographic Range. Continental scale: *Bombus lapidarius* is considered as one of the most common bumblebee species in Europe (Rasmont *et al.* 2015a), it is widespread in central Europe with different subspecies, namely throughout east – Europe. National scale: *B. lapidarius* occurs in the whole territory, EOO = 22,500 km², AOO = 1361 km².

Population. Continental scale: this species has very fluctuating populations but remains very common in its range, even expanding in Scotland (Rasmont *et al.* 2015a). National scale: Ball (1914) assessed the species as widespread, Rasmont & Mersch (1988) assessed the species as stable, Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. lapidarius* has increased from 16.96% to 24.26 % between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly increasing. Current population trend: increase.

Habitat and Ecology. Flying period: queens emerge in March, workers in May, males and new queens in June, colonies decline during August but new queens persist until October. Habitat: this species can be found in a wide variety of habitats like open habitats, meadows and pastures but also gardens and roadsides, it seems anyway preferring dry and well-drained soils (Rasmont *et al.* 2015a). Visited flowers: polylectic (Rasmont *et al.* 2015a), nevertheless, it seems preferring plants with long corollas (Terzo & Rasmont 2007). Records on cultivated plants: *Trifolium pratense, Trifolium repens, Allium schoenoprasum, Rubus fruticosus* agg., *Lavandula angustifolia, Cotoneaster dammeri, Medicago sativa, Origanum vulgare, Crataegus sp., Allium porrum, Lavandula stoechas, Lavandula* x *intermedia, Malus sp., Narcissus sp., Prunus spinosa, Prunus avium, Rhododendron sp., Thymus sp., Brassica napus, Allium cepa, Brassica oleracea, Mentha spp., Allium sphaerocephalon, Pyrus communis, Allium fistulosum, Ribes rubrum, Ribes sanguineum, Daucus carota, Prunus padus, Rubus idaeus, Phacelia tanacetifolia (P. Rasmont pers. comm.),* in Great-Britain the species has been observed on *Rubus fruticosus, Trifolium repens, Trifolium pratense, Lupinus arboreus, Berberis, Mahonia, Carpobrotus edulis, Hypericum calycinum, Malvus, Lavatera, Brassica napus, Ribes sanguineum, Prunus spinosa, Malus, Cotoneaster, Onobrychis viciifolia, Vicia sativa, Acer pseudoplatanus, Origanum, Thymus, Salvia, Dahlia, Allium schoenoprasum, Narcissus*. Nesting habits: mainly in existing cavities in the ground and rarely in sheltered sites above the ground. Parasites: *Bombus rupestris* (*e.g.* Reinig 1935).

Threats. Global warming: Rasmont *et al.* (2015b) assessed that even if the species has high dispersal aptitudes, the area of its habitats would be considerably reduced by global warming within 2100.

Conservation Actions. Present: this species is listed as threatened in the National Red Data Book of Ireland (Fitzpatrick *et al.* 2006). Future: no specific Conservation Actionshave to be taken for this species.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour.

Bombus lucorum **(L., 1761)**

Common Name(s): English - White-tailed Bumblebee. French - *Bourdon des forêts*. Dutch – *Veldhommel*. German - *Helle Erdhummel*

Figure 92. *Bombus lucorum*. Resting (Ferrières, Photo: J.M. Michalowski).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Bombus s.s.* is described in Rasmont & Terzo (2017). *Bombus s.s.* are hard to separate, the taxonomic status of *B. lucorum* has recently been clarified (distinction between *B. lucorum*. *B. terrestris*. *B. magnus* and *B. cryptarum*) (Rasmont *et al.* 2015). Males of *B. lucorum* can be separate from other *Bombus s.s.* by their two greyish-yellow bands.

Assessment Information. Red List Category & Criteria: NT. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Near Threatened given the fact that in spite of its great abundance in Belgium, it has been noticed a decline of population (between 20% and 30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO) and in the extent of occurrence (EOO). The regression has considerably increased the past 20 years. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015.

Geographic Range. Continental scale: *B. lucorum* is a widespread species in Europe but not present in the Mediterranean coast and which is restricted in hills and mountains in the southern part of its area. National scale: widespread species in Belgium, EOO = 19,700 km², AOO = 410 km².

Population. Continental scale: in view of the difficulty in discriminating this taxon from its sibling species it is not possible to determine long term trends in populations, it is generally regarded as both common and widespread and

subject to local fluctuations in abundance in parts of its range (Rasmont *et al.*, 2015). National scale: Vray (2018) evaluates that the proportional abundance of *B. lucorum* has increased from 0.94% to 11.5% between the 1910-1930 and 1970-1989 periods but has decreased from 11.5% to 2.3% between the 1970-1989 and 1990-2016 periods, Vray (2018) assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens emerge from March, workers from April, males and new queens from late May. Nests usually die off in August, males and new queens can be found until October. Habitat:: this species can be found in a wide variety of habitats, formerly, *B. lucorum* was present in forests and *B. terrestris* in open landscapes. Now, *B. terrestris* can be observed everywhere (Rasmont *et al.* 2015). Flowers visited: polylectic. Records on cultivated plants: *Trifolium pratense, Phacelia tanacetifolia, Medicago sativa, Brassica napus, Rhododendron ponticum, Ribes sanguineum, Prunus avium, Trifolium repens, Prunus cerasus, Rubus sp., Acer pseudoplatanus, Thymus praecox, Prunus laurocerasus, Ribes nigrum, Allium sphaerocephalon, Allium fistulosum, Narcissus pseudonarcissus, Origanum vulgare, Portulaca oleracea, Cucurbita maxima* (P. Rasmont pers. comm), in Nederland it can be found on *Trifolium repens, Hylotelephium telephium, Castanea sativa, Solanum lycopersicum, Capsicum spp.* (Peeters *et al.* 2012). Nesting habits: in existing cavities in the ground. Parasites: *Bombus bohemicus* (*e.g.* Pouvreau 1973).

Threats. Specific threats are presently not identified because this species is resistant to heat stress (Zambra, 2017), is generalist and has no specific habitat. An hypothesis would be to have a competition with the expanding *B. terrestris*. Global warming and genetic isolation could constitute potential threats to the species (Rasmont *et al.* 2015b, Darvill *et al*. 2006, 2007).

Conservation Actions. Present: the species is not subject to any targeted conservation action. Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: Except the potential competition with *B. terrestris* no threat have been identified and thus no Conservation Actionscan be recommended.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Impact of the potential competition with *B. terrestris* on populations. Monitoring of the population trend at the national scale.

***Bombus magnus* Vogt, 1911**

Common Name(s): English - Northern White-tailed Bumblebee. French - Bourdon large-collier. Dutch - *Grote Veldhommel*.

Figure 93. *Bombus magnus*. Foraging on *Erica tetralix* (Kalmthout, Photo: A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Bombus s.s.* is described in Rasmont & Terzo (2017). *Bombus s.s.* are hard to separate, the taxonomic status of *B. magnus* has recently been clarified (distinction between *B. lucorum*. *B. terrestris*. *B. magnus* and *B. cryptarum*) (Rasmont *et al.* 2015). Females can be separated from other *Bombus s.s.* (especially *B. cryptarum*) by its wide yellow thoracic band descending under the wings and lacking the typical black comma found in *B. cryptarum*.

Assessment Information. Red List Category & Criteria: EN A2bc. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: Listed as Endangered due to a population decline (between 50% and 80% between 1900-1969 and 1970-2017), inferred from a population reduction observed, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurence (EOO), listed as Endangered given its extreme rarefication since the last century in Belgium. Its situation is worse than *B. cryptarum* (EN) but not enough to assess this species as CR. Indeed, it remains large populations in protected areas in Campine. Previously published Red List assessments: 2014 – Least Concern (LC) in Rasmont *et al.* (2015).

Geographic Range. Continental scale: From the northern Portugal to the Arctic Circle (along the west Norwegian coast) and from Ireland to Moscow, EOO = 5,389,279 km², AOO = 6,008 km². National scale: formerly found on the coast,

Brussels, Genappes, Charleroi, now disappeared everywhere except in Campine, EOO = 700 km² and AOO = 8 km².

Population. Continental scale: The data are somewhat patchy and the true status of this species is unclear, this is partly because of the difficulty in discriminating this taxon from its sibling species (Rasmont *et al.*, 2015). National scale: *B. magnus* is a rare species or at least punctual (Rasmont & Pauly, 2010), Vray (2018) evaluates that the proportional abundance of *B. magnus* has decreased from 0.79% to 0.18 % between the 1910-1930 and 1970-1989 periods and has increased from 0.18% to 0.39% between the 1970-1989 and 1990-2016 periods, Vray (2018) assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens can emerge from April, the species can be observed until September. Habitat: found in a wide range of habitat but strongly associated with heathlands and moorlands (Rasmont *et al.*, 2015). Flowers visited: presumed to be polylectic but most of the time associated with Ericaceae (Rasmont & Pauly, 2010), in Great-Britain, summer specimens have also been observed foraging on Cardueae (Falk, 2016). Nesting habits: in existing cavities in the ground. Parasites: potentially *Bombus bohemicus* (Edwards & Broad 2006).

Threats. Reduction of suitable habitats and food resources: (1) deletion of habitats heaths and moors for agricultural or forestry purposes. Genetic isolation: a lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: this species and its habitat is considerably exposed to global warming (Rasmont *et al.* 2015b).

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015. Terzo & Rasmont, 2007). It is included in the National Red Lists or Red Data Books of the following four European countries: Czech Republic (Critically Endangered. Farkac *et al.* 2005). Germany (Data Deficient. Westrich *et al.* 2008). Ireland (Data Deficient. Fitzpatrick *et al.* 2006) and Netherlands (Endangered. Peeters and Reemer 2003). Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.*2017). Promotion of the conservation and restauration of moorlands and heathlands.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus muscorum (L., 1758)

Common Name(s): English - Moss Carder Bee. French - *Bourdon des mousses*. Dutch – *Moshommel*. German – *Mooshummel*.

Figure 94. *Bombus muscorum*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). *Bombus muscorum* has a regular brownish-rusty coat. It can be separated from the rusty form of *B. humilis* by the few number or absence of black hairs intermixed on the sides of the thorax. A microscopic examination of ocellae is necessary to separate it from *B. pascuorum*.

Assessment Information. Red List Category & Criteria: CR (A2bc). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez & Maxime Drossart. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: Listed as critically endangered due to a population decline (more than 80% between 1900-1969 and 1970-2017) inferred from a population reduction observed, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurrence (EOO). Previously published Red List assessments: 2014 – Vulnerable (VU) (Europe) in Rasmont *et al.*(2015a)

Geographic Range. Continental scale: occurs in most parts of Europe but is very rare south of latitude 40°N, EOO = 12,504,130 km² AOO = 17,296 km². National scale: only one occurrence since 1990, EOO = 400 km², AOO = 4 km².

Population. Continental scale: *Bombus muscorum* is generally uncommon to very uncommon in all its continental locations. On the other hand, it may be quite common in its maritime locations, especially along the Atlantic coasts. It is very uncommon in the southern half of the Iberian Peninsula and the south of Italy and extremely uncommon in Turkey, the Caucasus and Transcaucasia. It has never been encountered in southern Greece, northern Africa or Iran. The populations appear to be in decline over much of the range (Rasmont *et al.*, 2015a). National scale: Ball (1920) assessed this species as not abundant but spread in low and middle Belgium, Rasmont & Mersch (1988) assessed this species as significantly decreasing, Rasmont *et al.* (1993) assessed this species as very highly significantly decreasing, Vray (2018) evaluates that the proportional

abundance of *B. muscorum* has decreased from 2.31% to 0.01% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens by May, workers by June, males by July, colonies seems to decline faster than *B. pascuorum* and *B. humilis*, some individuals persisting until September. Habitat: this species is found in a range of flower-rich habitats including parks and gardens, dry calcareous grassland, damp ditchsides, sandy coastal grasslands, salt marshes (Great Britain, Ireland), *Erica* marshes and sandy fields (Norway), wet raised shores and flooded river valleys (Finland), warm places, fields and meadows, woods, market gardens and gardens (Spain) and pastures, flower-rich grasslands and heathlands (Netherlands) (Rasmont *et al.*, 2015a). Visited flowers: queens are particularly associated with *Trifolium*, workers and males with *Carduus sp.* (P. Rasmont pers. comm.), in whole Europe, the species seems polylectic but particularly associated with *Trifolium spp.* (Rasmont *et al.*, 2015a). Records on cultivated plants: in Belgium, it has been observed on *Trifolium pratense* (P. Rasmont pers. comm.), in Great-Britain, it has been observed on *Rubus fruticosus, Vicia sativa, Trifolium repens, Trifolium pratense, Daucus carota* (Else & Edwards 2018). Nesting habits: generally above ground, at the bases of tall grasses, gathering moss and other vegetal detritus to make a covering for the nest. Parasites: *Bombus campestris* (*e.g.* Pouvreau 1973).

Threats. Reduction of suitable habitats and food ressources: agricultural intensification have caused intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]) and deletion of Fabaceae cropping. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed the species as considerably exposed to global warming. Competition with other species: Isolated populations might be particularly susceptible to competition from other species, especially honeybees (*Apis mellifera*).

Conservation Actions. Present: this bumblebee is included in the National Red Lists or Red Data Books of the following 13 European countries: Belarus (Vulnerable. Prischchepchik 2008). Switzerland (Near Threatened. Amiet 1994). Czech Republic (Critically Endangered. Farkac *et al.* 2005). Germany (Endangered. Westrich *et al.* 2008). Estonia (Vulnerable. Lilleleht 2001). Finland (Near Threatened. Rassi *et al.* 2010). Hungary (Critically Endangered. Sárospataki *et al*. 2005). Ireland (Near Threatened. Fitzpatrick *et al.* 2006). Moldova (Near Threatened. Anonymous 2002). Netherlands (Endangered. Peeters and Reemer 2003). Norway (Near Threatened. Kålås *et al.* 2010). Sweden (Vulnerable. Gärdenfors 2010) and Ukraine (Rare. Monchenko *et al.* 2009). It is legally protected (LCN 1973, annexe IIb). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit this species. Future: national regulation against thistles should be revised (Vray *et al.* 2017), promotion of polycultures and Leguminous cropping, promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer).

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources and habitat. Impact of pesticides on behaviour. Monitoring of the population trend at the national scale.

Bombus norvegicus (Sparre-Schneider, 1918)

Common Name(s): French - *Psithyre norvégien*. Dutch – *Boomkoekoekshommel*. German - *Norwegische Kuckuckshummel*

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). Very similar to *Bombus sylvestris* but much scarcer. It has one yellow band at the front of the thorax and one white band on the abdomen.

Assessment Information. Red List Category & Criteria: VU B1ab(i,ii) + 2ab(i,ii). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: listed as Vulnerable because of a limited, fragmented and declining Extent Of Occurrence (1500 km² < EOO < 3000 km²) and Area Of Occupancy (15 km² < AOO < 30 km²). It remains very rare in Belgium although the population of its host (*B. hypnorum* (LC)) is increasing (Rasmont & Pauly, 2010. Vray, 2018). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: from the Cantabrian mountains and Pyrenees to the Arctic Circle. To the East, it reaches the Pacific coast of Russia. To the West it is not known from the British Isles or in the Balkan Peninsula, EOO = 6,622,879 km², AOO = 3,836 km². National scale: mainly occurs in north Ardenne, one observation in south Ardenne, Hainaut loamy plates and polders, EOO = 4100 km², AOO = 32 km².

Population. Continental scale: it is everywhere a rare species. National scale: Rasmont & Mersch (1988) assessed the species as significantly increasing, Rasmont *et al* (1993) assessed that given its scarcity, the species trend is difficult to establish, Vray (2018) evaluates that the proportional abundance of *B. norvegicus* has increased from 0.01% to 0.12% between the 1910-1930 and 1970-1989 periods and has decreased from 0.12% to 0.03% between the 1970-1989 and 1990-2016 periods, Vray (2018) assessed the species as stable. Current population trend: stable but very highly fragmented.

Habitat and Ecology. Flying period: females emerge at the end of April (probably earlier given the flying period of the host), new females emerge in mid-June, males peak occurs in early June, persist until the end of August. Habitat: in Europe the species occurs in a wide variety of habitats (Rasmont *et al.* 2015a) but in Nederland it seems to mainly occur in pinewoods with *Vaccinium spp.* undergrowth, forest borders and to a lesser extent in ruderal vegetation (Peeters *et al.* 2012). Visited flowers: very few records in Belgium on *Taraxacum spp.*, *Cirsium oleraceum* and *Rubus sp.* for females and on *Impatiens glandulifera, Centaurea spp.* and *Cirsium arvense* for males (P. Rasmont pers. comm.), in Nederland females have been observed on *Rubus spp.*, *Thymus vulgaris* and *Chamerion angustifolium* and males on Cardueae, *Centaurea spp.*, *Rubus spp.* and *Symphytum spp.* (Peeters *et al.* 2012). Hosts: *B. hypnorum* (*e.g.* Cederberg 1976) and *B. jonellus* (Brinck & Wingstrand 1951).

Threats. Decline of hosts: one of the hosts (*B. jonellus*) is declining in Belgium but the other (*B. hypnorum*) is expanding. Reduction of food ressources: intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]), intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer may have led to a reduction in *Centaurea spp.*. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed the species as considerably exposed to global warming.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. This species is included in the National Red List of the Czech Republic (Endangered. Farkac *et al.* 2005). Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.*2017). Taking conservation measures for *B. jonellus* as the abundancy of cuckoo bumblebees is directly linked to the one of their hosts (Suhonen, 2015). Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus pascuorum **(Scopoli, 1763)**

Common Name(s): English - Common Carder Bee. French - *Bourdon des champs*. Dutch – *Akkerhommel*. German – *Ackerhummel*.

Figure 95. *Bombus pascuorum*. A, from left to right, worker, queen and male specimen (Photos : A. Pauly); B, Foraging on Ericaceae (Ghlin, Photos : Y. Barbier).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). The most widespread subspecies of *Bombus* pascuorum, *B. p. Floralis*, has a tawny coat on the thorax and a tawny and black banded abdomen, the subspecies *B. p. moorselensis* has a tawny coat on the top of the thorax, a black coat on the sides of the thorax and a black coat with a rusty tip on the abdomen, the subspecies *B. p. freygessneri* has an orange coat on the thorax, and a yellow and orange coat on the abdomen. It is easily confoundable with other species having a similar colour pattern (*B. muscorum, B. humilis, B. veteranus, B. sylvarum* and some forms of *B. hypnorum*).

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez & Maxime Drossart. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Least Concern because it is the most common bumblebee species in Belgium with a wide distribution, large populations, increasing population trend and no major threat. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al*. (2015a).

Geographic Range. Continental scale: this ubiquitous species is considered as the most abundant bumblebee in west-Palearctic with a very wide distribution, the species includes 23 subspecies. National scale: everywhere in Belgium, EOO = 22,900 km², AOO = 2,190 km².

Population. Continental scale: This species is abundant in most of its wide area and is considered as likely the most common bumblebee in Europe (Rasmont *et al*. 2015a). National scale: Ball (1914) considered at that time this species as very common in Belgium, Rasmont & Mersch (1988) assessed the species as stable, Rasmont *et al.* (1993) assessed the species as highly significantly increasing, Vray (2018) evaluates that the proportional abundance of *B. pascuorum* has decreased from 32.92% to 31.7% between the 1910-1930 and 1970-1989 periods and has increased from 31.7% to 41.86% between the 1970-1989 and 1990-2016 periods, Vray (2018) assessed the species as very highly significantly increasing. Current population trend: increase.

Habitat and Ecology. Flying period: queens from late March to mid-October, workers from mid-March to mid-October, males from late May to mid-October. Habitat: very wide range of habitats (Rasmont & Pauly 2010. Rasmont *et al*. 2015a). Visited flowers: polylectic (Rasmont *et al.* 2015a). Records on cultivated plants: high variety of cultivated plants are visited by this species. Nesting habits: above the ground amongst long and dense grasses. Parasites: *Bombus rupestris* (Haeseler 1970), *B. campestris* (*e.g.* Pouvreau 1973), potentially *B. vestalis* (Hoffer 1889), potentially *B. barbutellus* (*e.g.* Cumber 1949).

Threats. Global warming: Rasmont *et al.* (2015b) assessed that the species could lose significant parts of its climatically suitable area because of global warming although it has a high dispersal capability.

Conservation Actions. No specific Conservation Actionshave to be taken for this species.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour.

Bombus pomorum **(Panzer, 1805)**

Common Name(s): English - Apple Bumblebee. French - *Bourdon fruitier*. Dutch - *Limburgse Hommel*. German – *Obsthummel*.

Figure 96. *Bombus pomorum*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). The specie has a black coat with a reddish abdominal tip which is marked with a dark central spot. It is easily confoundable with other species having the same coloration pattern

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez & Maxime Drossart. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: listed as Regionally Extinct given the last observations in Belgium in 1945 (Trivières) and 1947 (Meerbeek). Previously published Red List assessments: 2014 – Vulnerable (VU) (Europe) in Rasmont *et al.*(2015a).

Geographic Range. Continental scale: *Bombus pomorum* is distributed in plains and hills of the Western and Central Europe, EOO = 5,768,224 km², AOO = 4,152 km². National scale: last observation in 1947 in Meerbeek.

Population. Continental scale: populations are currently declining (more than 30% in the last ten years and then assessed as VU) probably caused by land use changes and climate change (Rasmont *et al.*2015a). National scale: Ball (1920) assessed this species as the rarest bumblebee in Belgium, except in Trivières (and surroundings) where 271 specimens were collected in 1915. The last observations were in Dinant (1945), Kortenberg (1945), Meerbeek (1945), Everberg (1946) and Meerbeek (1947) (Rasmont & Pauly 2010). Current population trend: extinct.

Habitat and Ecology. Flying period: queens from May, workers and males from late May or early June, can persist until late September. Habitat: it seems that grasslands of Trivières (< 1950) could constitute a suitable habitat for *B. pomorum*,

in other countries it is found in forest edges, river sand banks, and open country (Germany), sand dunes, alpine meadows (Bulgaria), and forest-steppe zone (Ukraine). Visited flowers: There is no information about flowering choices of this species in Belgium, in whole Europe, the species is described as polylectic but favouring plants with long corollas (Rasmont *et al.* 2015a), in Great-Britain Jeffers (2017) revealed that pollen of 11 different plant families was found in pollen loads. Nesting habits: existing cavtities in the ground. Parasites: *B. campestris* (May 1937, Løken 1984) and potentially *B. rupestris* (Pouvreau 1973).

Threats. Reduction of suitable habitats and food ressources: (1) agricultural intensification (monoculture, intensive grazing practices, deletion of leguminous cropping) have led to a reduction of flower-rich open areas (2) reforestation of open areas. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed the species as considerably exposed to global warming.

Conservation Actions. Present: *B. pomorum* is regressing everywhere in Europe and is listed as threatened/extinct in several National Red Lists/ Red Data Books (Switzerland, Czech Republic, Denmark, Germany, Great Britain, Hungary, Lithuania, Latvia, Netherlands, Sweden, Ukraine (Amiet 1994. Farkac et al. 2005. Wind and Pihl 2010. Westrich et al. 2008. Shirt 1987. Sárospataki *et al.*2005. Rašomavičius 2007. Anonymous 1992. Peeters and Reemer 2003. Gärdenfors 2010. Monchenko *et al.*2009. Rasmont *et al.*2015a). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Understanding of the population extinction at the national scale.

Bombus pratorum **(L., 1761)**

Common Name(s): English - Early Bumblebee. French - *Bourdon des prés*. Dutch – *Weidehommel*. German – *Wiesenhummel*.

Figure 97. *Bombus pratorum*. A, from left to right, male, queen and worker specimen.; B, Foraging on *Rubus idaeus* (Photos : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Pyrobombus* is described in Rasmont & Terzo (2017). This species always has a reddish abdominal tip and variable yellow bands: females generally have yellow bands at the front and at the back of the thorax or only at the front and males can also have yellow band at the front of the abdomen. A microscopic

examination of ocellae for females and genitalia for males is necessary to confirm the identification.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Least Concern because it is one of the most common bumblebee species in Belgium with a wide distribution, large populations, increasing population trend and no major threat. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: this species is considered as one of the most common in the west-Palearctic area and has a very wide distribution. National scale: *B. pratorum* occurs in the whole territory and was already widespread in the early 19th century (Ball 1914. Rasmont & Pauly, 2010), EOO = 22,700 km², AOO = 1,326 km².

Population. Continental scale: very common and widespread species in central Europe but uncommon and localised in the southern part of its range (*i.e.* Iberian peninsula, Italy, Balkans) (Rasmont *et al.* 2015a), this species has increasing populations in range and abundance (Rasmont *et al.* 2015a). National scale: Ball (1914) considered at that time this species as very common in Belgium, Rasmont & Mersch (1988) assessed this species as significantly increasing, Rasmont *et al.* assessed this species as very highly significantly increasing, Vray (2018) evaluates that the proportional abundance of *B. pratorum* has increased from 6.52% to 9.25 % between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly increasing. Current population trend: increase.

Habitat and Ecology. Flying period: queens emerge from March, workers and males from April, new queens from May, persist until mid-September. Habitat: ubiquitous, it is very abundant in gardens with *B. pascuorum*, *B. terrestris*, *B. hypnorum* and *B. lapidarius* (Rasmont & Pauly 2010). Visited flowers: polylectic species but not as generalist as *B. pascuorum*. Records on cultivated plants: many cultivated plants are visited by this species. Nesting habits: some nests are established in existing cavities in the ground while others are aerial (*e.g.* rot holes in trees, old bird nests, bird nest-boxes). Parasites: *B. campestris*, *B. barbutellus*, *B. quadricolor*, *B. sylvestris* (*e.g.* Pouvreau 1973) and potentially *B. rupestris* (Voveikov 1953).

Threats. There are no direct or immediate threat on this species.

Conservation Actions. No Conservation Actionshave to be taken for this species.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour.

Bombus ruderarius **(Müller, 1776)**

Common Name(s): English - Red-shanked Carder Bee. French - *Bourdon ruderal*. Dutch – *Grashommel*. German – *Grashummel*.

Figure 98. *Bombus ruderarius*. A, from left to right, worker, queen and male specime, (Photo : A. Pauly); B, Foraging on *Onobrychis viciifoliae* (Tourinnes-St-Lambert, Photo : P. Rasmont).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). The species has a black coat with a reddish abdominal tip. Females can be distinguished from other species having the same coloration pattern by their rusty scopa and males by their black pubescence on face and their very long antennae.

Assessment Information. Red List Category & Criteria: EN (A2bc). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez & Maxime Drossart. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as endangered due to a population decline (between 50% and 80% between 1900-1969 and 1970-2017) inferred from a population reduction observed, a reduction of its area of occupancy (AOO) and a reduction of its

extent of occurrence (EOO). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al*. (2015a)

Geographic Range. Continental scale: from central Spain, southern Italy and northern Greece (restricted to mountains) to the Arctic Circle and from Ireland and north-west Spain to the Altai mountains, AOO = 21,808 km², EOO = 8,965,342 km². National scale: particularly in the natural region of Fagne-Famenne, EOO = 14900 km², AOO = 155 km².

Population. Continental scale: populations have severely decreased since recent years. As for *B. sylvarum*, the abundance of *B. ruderarius* is variable. Ranging from very low (as in northern Africa), to very common: in some places in the eastern Pyrenees, the species may account for more than half of all the observed bumblebees. There is clear evidence of decline in relative abundance in parts of western Europe (Rasmont *et al*., 2015a). National scale: Ball (1920) assessed the species as not abundant, Rasmont & Mersch (1988) assessed the species as stable, Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. ruderarius* has decreased from 2.34% to 0.19% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens from April, workers from April, males and new queens from June, persist until September. Habitat: in Europe the species is most associated with flower-rich open grassland, including coastal dunes, heaths and moors, parkland and orchards, woodland edge and clearings in woodlands, it can also occur in sub-alpine areas (Rasmont *et al*., 2015a). Visited flowers: it is polylectic but workers seem to prefer *Trifolium spp., Onobrychis viciifolia* and *Lotus corniculatus* (P. Rasmont pers. comm.). Records on cultivated plants: *Trifolium spp., Onobrychis viciifolia, Ribes sanguineum, Brassica napus, Medicago sativa, Prunus avium, Origanum vulgare*. Nesting habits: on the ground, generally at the bases of rank grasses. Parasites: *B. campestris* (Pouvreau 1973) and potentially *B. rupestris*, *B. barbutellus* and *B. quadricolor* (Voveikov 1953, Pouvreau 1973).

Threats. Reduction of suitable habitats and food ressources: as it is a polylectic species, its decline indicates a general decline in resources availability probably due to agricultural intensification and urbanisation. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed the species as considerably exposed to global warming.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Denmark (Near Threatened. Wind and Pihl 2010), Germany (Vulnerable. Westrich *et al.* 2008). Ireland (Vulnerable. Fitzpatrick *et al.* 2006). Netherlands (Near Threatened. Peeters and Reemer 2003) and Norway (Near Threatened. Kålås *et al.* 2010), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit this species. Future: promotion of polycultures and Leguminous cropping, promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus ruderatus **(Fabricius, 1775)**

Common Name(s): English - Large Garden Bumblebee. French - *Bourdon des friches*. Dutch - *Grote Tuinhommel*. German – *Feldhummel*.

Figure 99. *Bombus ruderatus*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Megabombus* is described in Rasmont & Terzo (2017). Very similar to *Bombus ruderatus* but much scarcer. Three yellow band, white abdominal end, very long head, can be separated from *B. ruderatus* by its short and even pubescence.

Assessment Information. Red List Category & Criteria: CR (A2bc. B1ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered due to (1) a population decline (more than 80% between 1900-1969 and 1970-2017), inferred from a population reduction observed, a reduction of its area of occupancy (AOO), a reduction of its extent of occurrence (EOO) as well as (2) a small extent of occurrence (EOO < 500 km²), severely fragmented populations and extreme fluctuations of the extent of occurrence, the area of occupancy, the number of locations or subpopulations and the number of mature individuals. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*(2015a).

Geographic Range. Continental scale: *Bombus ruderatus* is widespread in western Europe, especially in the Mediterranean zone, EOO = 10,241,627 km², AOO = 9,800 km². National scale: since 1990 only four specimens have been found in Hainaut and Namur, EOO = 80 km², AOO = 8 km².

Population. Continental scale: common in parts of the range, but in serious decline in other parts (*e.g.* Sweden, Netherlands), typical Mediterranean species but regressing in Europe in spite of the global warming. Normally,

Mediterranean species should benefit from global warming. National scale: Ball (1920) assessed the species as probably less widespread than *B. hortorum*, Rasmont & Mersch (1988) assessed the species as significantly decreasing, Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. ruderatus* has decreased from 4.62% to 0.01% between the 1910-1930 and 1990-2016 and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens emerge in mid-April and May, workers from mid-June to the end of September, males from early June to mid-October. Habitat: in Europe the species is found in flower-rich marshes, tall calcareous and coastal grassland, and heathland, it also occurs in flower-rich low-intensity farmland, damp stream- and ditch-sides rich in forage, sub-alpine meadows and forest-steppe and steppe zones (Rasmont *et al.*, 2015a). Visited flowers: very few data for Belgium, in Europe it is polylectic and known to exploit a wide range of floral resources for both nectar and pollen, especially those with long narrow corollas (Rasmont *et al.*, 2015a). Records on cultivated plants: in Great-Britain the species has been observed on *Trifolium repens, Trifolium pratense, Petunia, Digitalis purpurea, Iris pseudacorus*. Nesting habits: under the ground in existing cavities or above the ground, hidden under dense vegetation. Parasites: *B. barbutellus* (*e.g.* Rasmont & Adamski 1996). Use and Trade: this species was taken to New Zealand (in the late 19th century) and Chile (in early 1990s) in order to pollinate clover (*Trifolium*) and other crops.

Threats. Reduction of suitable habitats: (1) agricultural intensification (monoculture, intensive grazing practices, deletion of leguminous cropping) have led to a reduction of flower-rich open areas (2) deletion of heathlands for agricultural or forestry purposes. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of Fabaceae crops. Global warming: Rasmont *et al.* (2015b) assessed the species as considerably exposed to global warming. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following nine European countries: Switzerland (Endangered. Amiet 1994). Czech Republic (Endangered. Farkac *et al.* 2005). Denmark (Critically Endangered. Wind and Pihl 2010), Germany (Data Deficient. Westrich *et al.* 2008). Hungary (Endangered. Sárospataki *et al*, 2005). Netherlands (Critically Endangered. Peeters and Reemer 2003). Sweden (Critically Endangered. Gärdenfors 2010) and Ukraine (Rare. Monchenko *et al.* 2009). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015. Terzo & Rasmont, 2007). Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping. Promotion of the conservation and restauration of heathlands.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring the population trends at the national scale.

Bombus rupestris **(Fabricius, 1793)**

Common Name(s): English - Red-tailed Cuckoo Bee, Hill Cuckoo Bee. French - Psithyre des rochers. Dutch - Rode Koekoekshommel. German - Felsen-Kuckuckshummel.

Figure 100. *Bombus rupestris*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging (Photos : J.M. Michalowski).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). The species has the same colour pattern than its host (*B. lapidarius*), its wings are strongly smoked, the pubescence is short and even, a microscopic examination of sternite 6 for females and genitalia for males are necessary to confirm the identification.

Assessment Information. Red List Category & Criteria: EN A2bc. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: listed as Endangered because of a population decline (between 50%

and 80% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: from the centre of the Iberian Peninsula, southern Italy and the northern Balkans to southern and central Scandinavia. It can be found from Ireland to the west, eastwards to China and Siberia. It remains absent from Scotland and from all Mediterranean islands (except Sicily), EOO = 8,959,527 km², AOO = 16,320 km². National scale: low amount of observations since 1990: Flandre sablo-limoneuse, Campine, région limoneuse hennuyère, Fagne-Famenne, agglomération liégeoise, Ardenne centrale et du sud, Lorraine belge, EOO = 6700 km², AOO = 66 km².

Population. Continental scale: one of the most common cuckoo-bumblebees, in Great Britain it has experienced periods of great scarcity (1970s-1990s) and periods of abundance (early 20th century and early 21st century). As a parasitic species, it is always less abundant than its host[s] (Rasmont *et al.*, 2015a). National scale: Rasmont & Mersch (1988) assessed the species as significantly increasing, Rasmont *et al* (1993) assessed the species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. rupestris* has decreased from 1% to 0.2% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: females usually emerge in May or June (somewhat later than other cuckoo-bumblebees), males and new females emerge in July. Both can persist until September. Habitat: everywhere its host species are present but seems to become rarer in more intensively farmed and urbanised area (Rasmont *et al.*2015a). Flowers visited: in Great-Britain females are polylectic (Else & Edwards 2018) but in Belgium they seem more abundant on *Trifolium pratense* (P. Rasmont pers. comm.), males are abundant on *Origanum vulgare, Trifolium repens* and *Cirsium vulgare* (P. Rasmont pers. comm.). Records on cultivated plants: *Trifolium pratense, Origanum vulgare, Trifolium repens, Lavandula angustifolia* (P. Rasmont pers. comm.), *Lavatera sp., Onobrychis viciifolia, Thymus sp.* (Else & Edwards 2018). Hosts: *B. lapidarius* (*e.g.* Reinig 1935, Bols 1939), *B. pascuorum* (Haeseler 1970) and potentially *B. pomorum* (Pouvreau 1973), *B. ruderarius*, *B. sylvarum*, *B. pratorum* (Voveikov 1953).

Threats. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of Fabaceae crops, intensive brushing of Cardueae. Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following two European countries: Ireland (Vulnerable. Fitzpatrick *et al.* 2006) and Netherlands (Endangered. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping. National regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017).

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale. confirmation of potential hosts.

Bombus soroeensis **(Fabricius, 1776)**

Common Name(s): English - Broken-belted Bumblebee. French - *Bourdon danois*. Dutch - *Late Hommel*. German – *Distelhummel*.

Figure 101. *Bombus soroeensis*. A, from left to right, worker, queen and male specimen (Photo : A. Pauly); B, Foraging (Bracht, Photo : P. Petitfrère).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015), *Bombus lapidarius* is the only representative of the subgenus *Kallobombus* in Belgium. Two subspecies can be distinguished in Belgium: *B. soroeensis proteus* (red abdominal tip) and *B. soroeensis soroeensis* (white abdominal tip). Females: workers differ from *B. lapidarius* by their different mandibular sculpture and from *B. pratorum* by the punctuation of their ocello-ocular field. Males: can be separated from *B. pratorum* by a microscopic examination of the antennae and genitalia.

Assessment Information. Red List Category & Criteria: VU A2bc. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Vulnerable because of a population decline (between 30%

and 50% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.* (2015a).

Geographic Range. Continental scale: from Spain, southern Italy and the Balkans to beyond the Arctic Circle (N – S) and from Northern Spain to the Altai and Sajan mountains in Central Siberia (E – W), restricted to the highest elevation mountains in the South, AOO = 18,980 km², EOO = 8,448,437 km². National scale: principally in the natural region of Ardennes, Fagne-Famennes and Lorraine, EOO = 8,400 km², AOO = 69 km².

Population. Continental scale: widespread and locally common but clearly in decline in parts of its range, especially areas with the most intensive agriculture and urbanisation (Rasmont *et al.* 2015a). National scale: Ball (1914) considered the species as rare in Belgium, Rasmont & Mersch (1988) assessed the species as stable, Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. soroeensis* has decreased from 0.61% to 0.25% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens in late May, workers in July but more numerous in August and September, new queens and males in September, persist until October. Habitat: heathlands and moorlands, in whole Europe populations also exist in other biotopes, including pine forests, wooded meadows, calcareous grassland, woodland and coastal cliffs and dunes, meadows, pastures and roadside, open clearings, and in the sub-alpine regions light woodland, and open hillsides (Rasmont *et al.*, 2015a). Visited flowers: it is polylectic and known to exploit a wide range of floral resources for both nectar and pollen (Rasmont *et al.*, 2015a), males seem to be more attracted by *Knautia arvensis* and *Cirsium palustre* (P. Rasmont pers. comm.). Records on cultivated plants: *Origanum vulgare, Lavandula* x *intermedia, Lavandula angustifolia, Trifolium pratense,* (P. Rasmont pers. comm.), in Great-Britain it has been recorded on *Rubus idaeus, Onobrychis viciifolia, Trifolium repens, Trifolium pratense, Salvia officinalis, Weigela* (Else & Edwards 2018). Nesting habits: in existing cavities in the ground. Parasites: unknown.

Threats. Reduction of suitable habitats and food ressources: destruction of heathlands, moorlands and calcareous grasslands for agricultural, forestry or urbanization purposes. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* 2015b assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Germany (Near Threatened. Westrich *et al.* 2008). Estonia (Near Threatened. Lilleleht 2001). Hungary (Vulnerable. Sárospataki *et al.* 2005). and Netherlands (Critically Endangered. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species (A.M. du 03/09/2015. Terzo & Rasmont, 2007). Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017), promotion of the conservation and restauration of heathlands, moorlands and calcareous grasslands. Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and forestry practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources and habitat. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus subterraneus **(L., 1758)**

Common Name(s): English - Short-haired Bumblebee. French - *Bourdon souterrain*. Dutch - *Donkere Tuinhommel*. German – *Erdbauhummel*.

Figure 102. *Bombus subterraneus*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. The genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Subterraneobombus* is described in Rasmont & Terzo (2017). *Bombus subterraneus* has rusty-yellow pubescence with a black line between the wings. Females: they can be separated from *B. distinguendus* by their mostly black pubescence on face and vertex. Males: they can be separated from *B. distinguendus* by a microscopic examination of genitalia and sternite 6.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Regionally Extinct given the last observations in Belgium in 1980 (Elsenborn) and 1982 (Torgny). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: *Bombus subterraneus* is widely distributed in western and central Europe but is restricted to the montanes stages in the Mediterranean regions, it is also encountered in the eastern Europe as well as Asia Minor, EOO = 8,694,298 km², AOO = 8,292 km². National scale: totally disappeared species from Belgium, last observations: Brugge 1M 17.V.1974, 1M 14.IV.1975, 1M 4.VIII.1976. Gembloux 1F 22.V.1974 (leg. A.Pauly). Ste-Croix 1F 19.VIII.1974. Chatillon 1F 5.VIII.1979, 1M 11.VIII.1979 (leg. A. Remacle). Elsenborn 1F 9.VIII.1980 (leg. G. Boosten). Torgny 1F 28.V.1982.

Population. Continental scale: populations are clearly declining in western and central Europe, however, the species seems expanding in other parts of its range like Norway and Sweden. It has to be noted that populations densities are low so that the species could be overlooked (Rasmont *et al.*2015a). National scale: Ball (1920) assessed this species as rare, especially found in high Belgium, it has been observed a strong decrease of observations since 1970 (Rasmont & Pauly 2010). Current population trend: extinct.

Habitat and Ecology. Flying period: queens emerge in May and could linger until September. Habitat: open habitats like heathlands, calcareous grasslands or leguminous fields (*i.e. Trifolium pratense*) (Rasmont *et al.*2015a). Visited flowers: polylectic species which, however, have a preference for plants with long corollas (*i.e.* Fabaceae, Boraginaceae), males forage on thistles (Rasmont *et al.*2015a). Records on cultivated plants: *Trifolium pratense* (P. Rasmont pers. comm.). Nesting habits: in existing or self-constructed cavities deep under the ground. Parasites: unknown.

Threats. Reduction of suitable habitats: deletion of heathlands and calcareous grasslands for agricultural, forestry or urbanization purposes, deletion of leguminous crops. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Cardueae (regulated by law [A.R. du 19/11/1987]), deletion of Fabaceae crops. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is listed as threatened/ extinct in several National Red Lists/ Red Data Books (Switzerland, Czech Republic, Denmark, Germany, Estonia, Hungary, Netherlands, Norway) (Amiet 1994. Farkac *et al.* 2005. Wind and Pihl 2010. Westrich *et al.* 2008. Lilleleht 2001. Sárospataki *et al*, 2005. Peeters and Reemer 2003. Kålås *et al.* 2010. Rasmont *et al.*2015a). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Understanding of the population extinction at the national scale.

Bombus sylvarum **(L., 1761)**

Common Name(s): English - Shrill Carder Bee. French - *Bourdon grisé*. Dutch – *Boshommel*. German – *Bunthummel*.

Figure 103. *Bombus sylvarum*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). *Bombus sylvarum* can be separated from other *Thoracobombus* by its unique coloration patterns: greyish yellow pubescence with a large black band between the wings, somewhat undefined black bands on the abdomen and a reddish abdominal tip. The abdominal tip can be discoloured and the distinction with *B. veteranus* thus requires a microscopic examination of the mandibles.

Assessment Information. Red List Category & Criteria: CR (A2bc. B1ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered due to (1) a population decline (more than 80% between 1900-1969 and 1970-2017), inferred from a population reduction observed, a reduction of its area of occupancy (AOO), a reduction of its extent of occurrence (EOO) as well as (2) a small extent of occurrence (EOO < 500 km²), severely fragmented populations and extreme fluctuations of the extent of occurrence, the area of occupancy, the number of locations or subpopulations and the number of mature. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: from central Spain, Sicily, southern Italy, Greece and Turkey (restricted to mountains) to the Arctic Circle in Scandinavia and from Ireland and northern Portugal to Mongolia, AOO = 21,808 km², EOO = 8,965,342 km². National scale: formerly present in all Belgium, now subsists in

several localities in Lorraine belge and in isolated populations in Fagne-Famenne, Haute Ardennes and east Limburg, EOO = 2500 km², AOO = 33 km².

Population. Continental scale: local population densities are variable, the distribution of the species is patchy (as for *B. ruderarius* and *B. humilis*), the species may be quite common in one place and absent from surrounding areas - especially in places with the most intensive agriculture and urbanisation (Rasmont *et al.*, 2015a). National scale: Ball (1920) assessed the species as widespread but less abundant than *B. veteranus*, Rasmont & Mersch (1988) assessed the species as significantly declining, Rasmont *et al.* (1993) assessed the species a very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. sylvarum* has decreased from 0.86% to 0.08% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens from May, workers from late June, males and new queens from August. Late peaking species (August and early September). Habitat: can be particularly abundant in landscape rich in leguminous plants and more generally in open xerophilous habitats (Rasmont *et al.*, 2015a). Visited flowers: very few records for Belgium, in whole Europe it is polylectic but queens and workers are particularly found on leguminous fodder crops and males on cardueae (Rasmont *et al.*, 2015a). Records on cultivated plants: *Trifolium pratense, Trifolium repens, Trifolium arvense, Onobrychis viciifolia, Medicago sativa, Vicia sativa.* Nesting habits: nests are established either in a slight hollow in the ground or at the end of short burrows just beneath the soil, nests are always located amongst rough vegetation. Parasites: potentially *B. rupestris* (Höppner 1901).

Threats. Reduction of suitable habitats: destruction of xerothermic open habitats for agricultural, forestry or urbanization purposes. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Cardueae (regulated by law [A.R. du 19/11/1987]), deletion of Fabaceae crops, abandonment of fodder production for silage. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al.*, 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Vulnerable. Amiet 1994). Denmark (Near Threatened. Wind and Pihl 2010), Germany (Near Threatened. Westrich *et al.* 2008). Hungary (Endangered. Sárospataki *et al.* 2005) and Ireland (Vulnerable. Fitzpatrick *et al.* 2006). Legally protected (LCN 1973, annexe IIb). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping. Promotion of fodder production. Promotion of the conservation and restauration of open xerothermic habitats.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus sylvestris **(Lepeletier, 1832)**

Common Name(s): English - Forest Cuckoo Bumblebee. French - *Psithyre sylvestre*. Dutch - *Vierkleurige Koekoekshommel*. German - *Wald-Kuckuckshummel*.

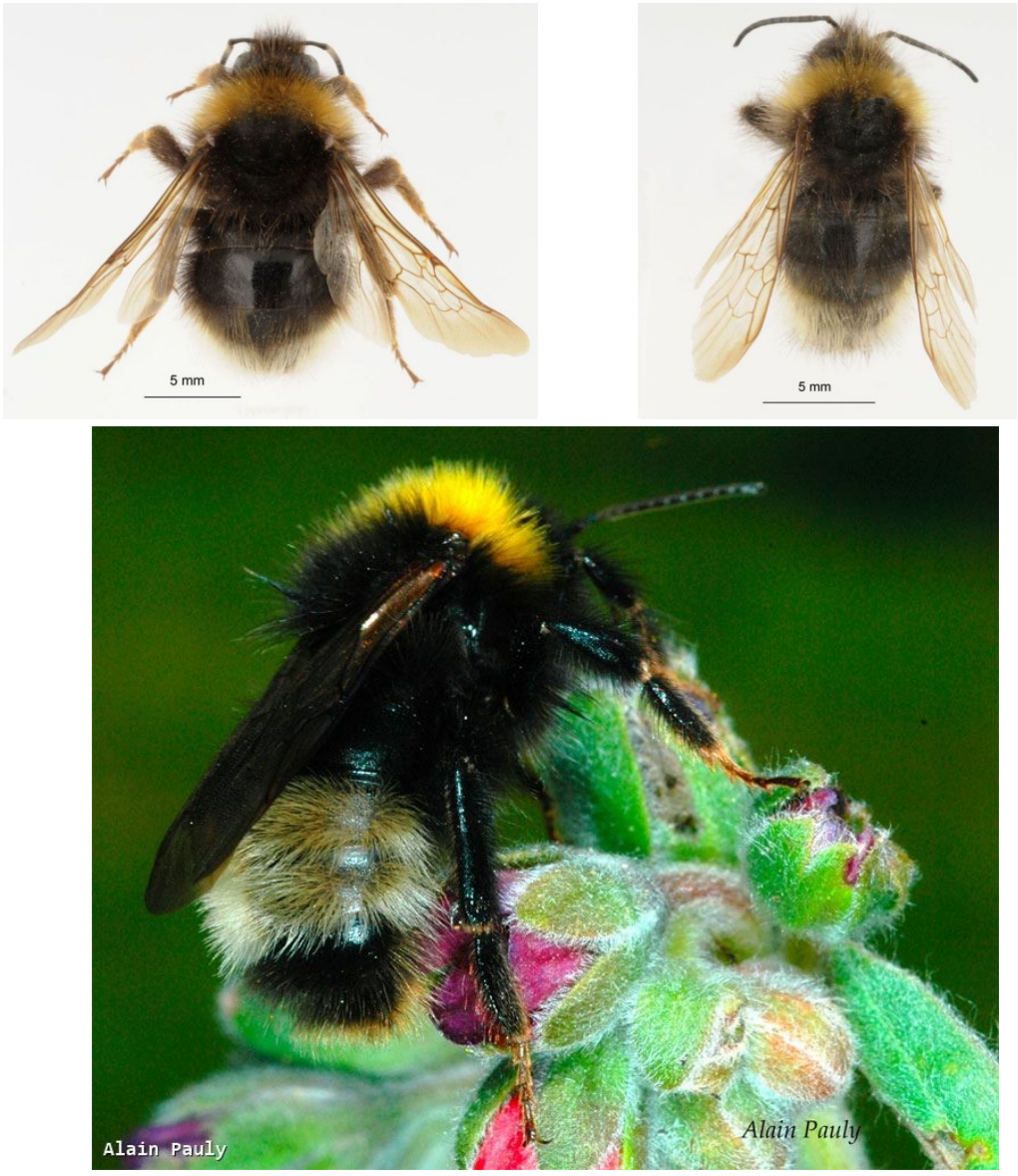

Figure 104. *Bombus sylvestris*. A, female specimen; B, male specimen; C, foraging on *Cynoglossum officinale* (Photos : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). Very similar to *Bombus norvegicus* but much more common. It has one yellow band at the front of the thorax and one white band on the abdomen.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Denis Michez & Maxime Drossart. Justification: listed as Least Concern because it is the most abundant *Psithyrus* in Belgium with

a wide distribution, large populations, stable populations trend and no major threats. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: very wide distribution, it is present from southern Spain, southern Italy and Greece (restricted to mountains) to Barents Sea and from Ireland to the Pacific coast of Siberia, EOO = 9,388,485 km², AOO = 16,472 km². National scale: everywhere in Belgium, EOO = 17,600 km², AOO = 252 km².

Population. Continental scale: as a parasitic species, it is always less abundant than its host(s) but remains anyway very common, it is the second most abundant cuckoo-bumblebee in Europe (Rasmont *et al.*, 2015a). National scale: Rasmont & Mersch (1988) assessed the species as significantly increasing, Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Vray (2018) evaluates that the proportional abundance of *B. sylvestris* has increased from 1.51% to 1.58% between the 1910-1930 and 1970-1989 periods but has decreased from 1.58% to 0.42% between the 1970-1989 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens in early March, Males at the beginning of May, new queens directly move in their hibernaculum after mating and are therefore not easily observable. Habitat: ubiquitous but always near wooded areas (*e.g.* agricultural landscapes, roadsides, woodlands, pastures, meadows) like its host (Rasmont *et al.* 2015a). Flowers visited: polylectic, males are abundant on *Rubus spp., Centaurea spp., Cirsium spp., Knautia spp.* (P. Rasmont pers. comm.). Records on cultivated plants: *Brassica napus, Prunus laurocerasus, Rubus idaeus, Rhododendron ponticum, Phacelia tanacetifolia, Origanum vulgare, Ribes rubrum, Trifolium sp.* (P. Rasmont pers. comm.), in Great-Britain it has been observed on *Malus sylvestris, Trifolium repens* and *Aesculus hippocastanum* (Else & Edwards 2018). Hosts: *B. pratorum* (Pouvreau 1973), *B. jonellus* (VU) (Reinig 1935), *B. hypnorum* (Pouvreau 1973) and potentially *B. hortorum* (NT) (von Hagen & Aichorn 2003), *B. soroeensis* (VU) (Edwards & Roy 2009).

Threats. Decline of hosts: one of the confirmed hosts (*B. jonellus*, VU) is declining in Belgium and both potential hosts are declining (*B. hortorum* NT, *B. soroeensis* VU) but the others (*B. hypnorum* and *B. pratorum*) are expanding. Reduction of food ressources: intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987]), intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer may have led to a decrease in the abundancy of *Centaurea spp.* and *Knautia spp.*. Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.*2017). Taking conservation measures for *B. jonellus, B. hortorum and B. soroeensis* as the abundancy of cuckoo bumblebees is directly linked to the one of their hosts (Suhonen, 2015). Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Confirmation the potential hosts. Monitoring of the population trend at the national scale.

Bombus terrestris **(L., 1758)**

Common Name(s): English - Buff-tailed Bumblebee. French - *Bourdon terrestre*. Dutch – *Aardhommel*. German - *Dunkle Erdhummel*.

Figure 105. *Bombus terrestris*. Foraging on *Syringa vulgaris* (Auderghem, Photo: A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Bombus s.s.* is described in Rasmont & Terzo (2017). *Bombus s.s.* are hard to separate. *Bombus terrestris* can be separated from other *Bombus s.s.* by its two dark yellow bands.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Least Concern because it is one of the most common bumblebee species in Belgium with a wide distribution, large populations, increasing population trend and no major threat. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: this species is widely spread in a large part of Europe and is the only bumblebee species which has a Mediterranean-centred distribution. National scale: *B. terrestris* occurs in the whole territory, EOO = 20,400 km² , AOO = 638 km².

Population. Continental scale: this species is very common and widespread, population is increasing and It has extended to the north (Scotland, Fennoscandia) (Rasmont *et al.*2015a). National scale: Ball (1914) assessed this species as very common in Belgium, Rasmont & Pauly (2010) evaluate that, although being very common, *B. terrestris* is now absent in many sites in Lower and Middle Belgium in flower-depleted environments (unlike *B. pascuorum*)

(Rasmont & Pauly, 2010), Vray (2018) evaluates that the proportional abundance of *B. terrestris* has increased from 2.03% to 8.92% between the 1910-1930 and 1970-1989 (P1-P2) periods but has decreased from 8.92% to 6.72% between the 1970-1989 and 1990-2016 (P2-P3) periods, Vray (2018) assessed the species as stable. Current population trend: stable.

Habitat and Ecology. Flying period: queens and workers emerge February, colonies can persist until October, males emerge from May. Habitat:: ubiquitous. It can be found in a large variety of biotopes, even in anthropogenic ones (Rasmont *et al.*2015a). Flowers visited: polylectic. Records on cultivated plants: *Bombus terrestris* has been domesticated since 1987. Its rearing aims at the commercial fruit and vegetable pollination (Rasmont *et al.*2015a). Nesting habits: in existing cavities in the ground. Parasites: *B. vestalis* (*e.g.* van Honk *et al.* 1981) and potentially *Bombus bohemicus* (Kreuter *et al.* 2010).

Threats. Specific threats are presently not identified. The genetic exchanges between local and escaped (from commercial greenhouses) specimens could constitute the most likely major threats for this species (Rasmont *et al.*2015a).

Conservation Actions. No specific Conservation Actionshave to be taken.

Research Needed. Impact of pesticides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trend at the national scale as it seems to decrease in P2-P3.

Bombus vestalis **(Geoffroy, 1785)**

Common Name(s): English - Vestal Cuckoo Bee. French - *Psithyre vestale*. Dutch - *Grote Koekoekshommel*. German - *Keusche Kuckuckshummel*.

Figure 106. *Bombus vestalis*. A, female specimen; B, male specimen (Photos : A. Pauly); C foraging (Jonfosse, Photo : J.M. Michalowski).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo 2015 and the subgenus *Psithyrus* is described in Rasmont & Terzo (2017). This species is black with one yellow band at the front of the thorax and a whitish abdominal tip. Females: can be separated from *B. bohemicus* by their short and regular fringe of hairs on the hind basitarsus and from *B. sylvestris* by their larger size. Males: can be separated from other *Psithyrus* by their even pubescence and by a microscopic examination of the genitalia.

Assessment Information. Red List Category & Criteria: NT A2bc. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Near Threatened because of a decline of population (between 20% and 30% between 1900-1969 and 1970-2017) based on a decline of the number of populations as well as in the area of occupancy (AOO) and in the extent of occurrence (EOO). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: this species is the most meridional cuckoo-bumblebee in Europe, it can be found from northern Africa to the south of Sweden in the north. It lives from the United Kingdom to the west to northern Iran to the east, EOO = 7,710,044 km², AOO = 13,980 km². National scale: *B. vestalis* mainly occurs Wallonia but has also been observed in the natural regions of Polders, Flandre sablonneuse, Hesbaye and in the city of Brussels, EOO = 9300 km², AOO = 78 km².

Population. Continental scale: a common bee and expanding in parts of its range, but, as a parasitic species, it is generally less abundant than its host[s], *B. vestalis* is characterized by extreme fluctuation in subpopulations. National scale: *B. vestalis* seems to be a fluctuating species, Rasmont & Mersch (1988) assessed this species as significantly decreasing, Rasmont *et al.* (1993) assessed this species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. vestalis* has decreased from 1.2% to 0.19% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: females usually emerge in late March, males in late May, both can persist until September. Habitat: same as its hosts (Rasmont *et al.* 2015a). Flowers visited: polylectic, males are abundant on Cardueae (P. Rasmont pers. comm.). Records on cultivated plants: *Brassica napus, Trifolium pratense, Crataegus monogyna, Lavandula angustifolia, Medicago sativa, Onobrychis viciifolia, Prunus avium, Ribes sanguineum, Origanum vulgare, Thymus praecox, Phacelia tanacetifolia, Trifolium repens* (P. Rasmont pers. comm.), in Great-Britain it has been observed on *Rhododendron ponticum, Rubus idaeus, Prunus spinosa, Malus sylvestris, Onobrychis viciifolia, Trifolium repens, Aesculus hippocastanum, Origanum vulgare, Rosmarinus officinalis* (Else & Edwards 2018). Hosts: *B. terrestris* (*e.g.* van Honk *et al.* 1981) and potentially *B. pascuorum* (Hoffer 1889).

Threats. Threats to this species are poorly understood: stable host, ubiquitous in habitat, polylectic floral choices. However the general reduction in floral ressources may have played a role in it (intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, deletion of hedgerows, deletion of leguminous cropping, monoculture, intensive brushing of Carduae (regulated by law [A.R. du 19/11/1987])). Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: it is included in the National Red Data Book of Ireland (Not Evaluated. Fitzpatrick *et al.* 2006), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.*2017). Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices.

Research Needed. Understanding of the decrease. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trend at the national scale.

Bombus veteranus **(Fabricius, 1793)**

Common Name(s): French - *Bourdon veteran*. Dutch – *Zandhommel*. German – *Sandhummel*.

Figure 107. *Bombus veteranus*. From left to right, worker, queen and male specimen (Photo : A. Pauly).

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) and the subgenus *Thoracobombus* is described in Rasmont & Terzo (2017). *Bombus veteranus* can be separated from other *Thoracobombus* by its unique coloration patterns: greyish yellow pubescence with a large black band between the wings, somewhat undefined black bands on the abdomen and a greyish-yellow abdominal tip. Easily confoundable with *B. sylvarum* when the abdominal tip of the latter tail is discoloured. A microscopic examination of the mandibles is then necessary to confirm the identification.

Assessment Information. Red List Category & Criteria: CR (A2bc). Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as critically endangered due to a population decline (more than 80% between 1900-1969 and 1970-2017) inferred from a decline in the number of populations, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurrence (EOO). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: large but highly patchy distribution: from the Massif Central to beyond the Arctic Circle in Finland and northern Russia and from Brittany to Siberia and the Pacific coast, AOO = 6,356 km², EOO = 6,734,093 km². National scale: formerly found everywhere in Belgium and seemed to be abundant, it has now considerably decreased, still present in scattered locations in the natural regions of Fagne-Famenne and Lorraine belge, EOO = 3,100 km², AOO = 24 km².

Population. Continental scale: the abundance of the species is highly variable in time and space without any obvious ecological reason (Rasmont *et al.*, 2015a). National scale: this species was common in most part of Belgium in the 20th century with thousands specimens in locations, was the fourth most abundant bumblebee in Belgium before 1950 (Rasmont *et al.* 1993), Rasmont & Mersch (1988) assessed the species as significantly decreasing, Rasmont *et al.* 1993 assessed the species as very highly significantly decreasing, Vray (2018) evaluates that the proportional abundance of *B. veteranus* has decreased from 5.98% to 0.02% between the 1910-1930 and 1990-2016 periods and assessed the species as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: queens and workers from April to September, males from July to September. Habitat: coastal biotopes, open grasslands and shrubby wood-edge (Rasmont *et al.*, 2015a). Visited flowers: associated primarily with zygomorphic flowers, males forage on thistles. (Rasmont *et al.*, 2015a). Records on cultivated plants: in Nederland it has been observed on *Trifolium pratense* (Peeters *et al.* 2012). Nesting habits: nests are established above the ground under grass and moss or slightly below the ground. Parasites: potentially *B. campestris* (Hoffer 1889), according to Voveikov (1953), *Bombus veteranus* is a facultative social parasite of other *Thoracobombus* species, as *B. sylvarum*, *B. muscorum*, *B. humilis* and *B. ruderarius.*

Threats. Reduction of suitable habitats: destruction of open or coastal habitats for agricultural, forestry or urbanization purposes. Reduction of food ressources: intensive grazing practices, intensive uses of herbicides and nitrogen fertilizer, intensive brushing of Cardueae (regulated by law [A.R. du 19/11/1987]), deletion of Fabaceae crops, abandonment of fodder production for silage. Genetic isolation: A lack of genetic diversity and inbreeding in isolated populations can increase extinction risks (Darvill *et al*., 2006, 2007). Global warming: Rasmont *et al.* (2015b) assessed this species as considerably exposed to global warming.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Vulnerable. Amiet, 1994). Czech Republic (Critically Endangered. Farkac *et al.*, 2005). Denmark (Vulnerable. Wind and Pihl, 2010), Germany (Vulnerable. Westrich *et al.*, 2008). Netherlands (Endangered. Peeters and Reemer 2003) and Sweden (Endangered. Gärdenfors, 2010). Legally protected (LCN 1973, annexe IIb). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: national regulation against thistles should be revised given their great nutritional interest for males (Vray *et al.* 2017). Promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Promotion of late mowing practices of crop edges, road edges and meadows. Promotion of leguminous cropping. Promotion of fodder production. Promotion of the conservation and restauration of open habitats.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Bombus wurflenii Radoszkowski, 1859

Common Name(s): French - *Bourdon hirsute.* German – *Bergwaldhummel*.

Diagnosis. the genus *Bombus* is described in Rasmont & Terzo (2015) *Bombus wurflenii* is the only representative of the subgenus *Alpigenobombus* in Belgium, it can be separated from other Belgian *Bombus* by its broad and right-angled mandibles (which is tridentate in males).

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2017-09-08. Assessor(s): Pierre Rasmont, Maxime Drossart, Marc Dufrêne, Sarah Vray, Pieter Vanormelingen, Nicolas Vereecken, Denis Michez. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Regionally Extinct because this species has only been recorded three times in Belgium, the last one was in 1979 (Bois-de-Villers). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont *et al.*2015a.

Geographic Range. Continental scale: this species is widely spread in Europe but limited to mountains and hills and absent from British Isles and Russia, EOO = 7,362,610 km², AOO = 12,268 km². National scale: Belgium is the limit of its distribution, it has been found three times by three observers in three different locations in Belgium (Knokke-Heist in 1874. Brussels in 1877. Bois-de-Villers in 1979).

Population. Continental scale: populations are abundant in parts of its range but tend to decline, namely those at lower altitudes (Rasmont *et al.* 2015a). National scale: this species is obviously extremely rare. While Ball (1914) mentioned only two specimens collected (1874. 1877), Debaille & Rasmont (1997) have discovered a specimen collected in 1979 initially confused with *B. pratorum*.

Habitat and Ecology. This polylectic species can be found in sub-alpine habitats (i.e., grasslands, open woodlands) (Rasmont *et al.* 2015a).

Threats. Global warming would likely impact on this species, namely through the reduction of suitable habitats in the southern part of its European range (Rasmont *et al.* 2015a, b)

Conservation Actions. Present: this species is listed as threatened in several National Red Lists or Red Data Books (Germany and Czech Republic) (Farkac *et al.* 2005. Westrich *et al.* 2008. Rasmont *et al.* 2015a). Future: as this species has only been accidently met in Belgium, no specific Conservation Actionshave to taken at the national scale. Rasmont *et al.* (2015a) suggest a continuation of traditional agropastoral techniques in sub-alpine habitats.

Research Needed. No specific research are required at the national scale. At European scale, further research are needed to establish its status in the European part of Russia and south of Norway (Rasmont *et al.* 2015a).

Genus *Ceratina* Latreille, 1802

Ceratina cyanea (Kirby, 1802)

Common Name(s): English - Little Blue Carpenter Bee. French - *Cératine bleutée*. Dutch - *Blauwe Ertsbij*. German - *Gewöhnliche Keulhornbiene*.

Figure 108. *Ceratina cyanea*. A, female specimen (Photo : J.Y. Baugnée); B, resting (Liège, Photo : J.M. Michalowski).

Taxonomic Source(s): Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Terzo & Nieto (2013).

Geographic Range. Continental scale: from Mediterranean countries to southern England and Norway, it is found eastwards until Central Asia, Iran and Kazakhstan, EOO = 7,536,889 km², AOO = 4,336 km². National scale: widespread in Belgium, scarcer in the Ardenne, EOO = 3,900 km², AOO = 51 km².

Population. Continental scale: very common and abundant, stable populations, *Ceratina cyanea* is the most widespread species of the genus (Terzo & Nieto 2013). National scale: Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: occurs during the summer, peak of females during July and peak males from May to July. Habitat: shrubby and temperate grassland vegetation and also in rural and suburban habitats (Terzo & Rasmont 2011). Visited flowers: polylectic (Terzo 2000). Nesting habits: nests in dry stems of *Rubus sp.* but also in *Sambucus sp.*, *Euphorbia characia* and *Vitis vinifera* (Terzo and Rasmont 2011).

Threats. No major threats to this species.

Conservation Actions. Present: *Ceratina cyanea* is considered as Vulnerable in the United Kingdom (Shirt 1987) where it is at the edge of its range. More conformation to the "Bord de Route" convention which was signed by most of

Walloon municipalities should bring a higher abundancy of nesting sites. Future: promotion of extensive agricultural and gardening practices should also bring a higher abundancy of nesting sites.

Genus *Epeoloides* Giraud, 1863

Epeoloides coecutiens (Fabricius, 1775)

Common Name(s): French - *Epéoloïde commun*. Dutch - *Bonte Viltbij*. German – *Schmuckbiene*.

Figure 109. *Epeoloides coecutiens*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting (Maldegemveld, Photo : H. Wallays).

Taxonomic Source(s): Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka (2014).

Geographic Range. Continental scale: from southern Europe to Finland, although it is absent from Britain and Ireland, EOO = 4,544,549 km², AOO = 716 km². National scale: very few records in Belgium, EOO = 400 km², AOO = 4 km².

Population. Continental scale: the species was previously considered to be the rarest European cuckoo bee (Schmiedeknecht 1930), the number of records is too small to establish a clear trend but the host is expanding (*Macropis*). National scale: Rasmont *et al*. (1993) qualified the species population trend as significantly decreasing, the actual number of records is too low to establish a clear population trend. However the host is expanding. Current population trend: unknown.

Habitat and Ecology. Flying period: July and August. Habitat: occurs on dry sunny slopes near to wet marshes or meadows with the hosts' provisioning plants (*Lysimachia spp* - Primulaceae) are available (Bogusch 2005). Hosts: *Macropis europaea* and *Macropis fulvipes* (Bogusch 2005).

Threats. Decline of habitat / food ressources: this species needs co-occurrence of various biotopes (*i.e.* a high biotope complexity). Such biotopes are vulnerable to changes caused by anthropogenic activities, and also by insufficient habitat management regimes. For example the conversion of wetlands to fields for agriculture through drying, draining or a lack of management (Bogusch & Straka 2014).

Conservation Actions. Present: the species is the National Red Lists of the Czech Republic (Endangered. Straka 2005) and Slovenia (Vulnerable. Anonymous 2002). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the hosts and thus to the species. Future: restrict drainage of wetlands for agricultural, forestry or urbanization purposes. Promotion of extensive polycultures instead of intensive monocultures. Anything else likely to benefit its host.

Research Needed. Further research should be conducted to determine the population size and trends, and threats to the species.

Genus *Epeolus* Latreille, 1802

Epeolus cruciger (Panzer, 1799)

Common Name(s): English - Red-thighed Epeolus. French - *Epéole croisé*. Dutch – *Heideviltbij*. German - *Heide-Filzbiene*.

Figure 110. *Epeolus cruciger*. A, female specimen; B, male specimen (Photos : A. Pauly).

Taxonomic Source(s): Bogusch P. and Hadrava, J. 2018. European bees of the genera Epeolus Latreille, 1802 and Triepeolus Robertson, 1901 (Hymenoptera: Apidae: Nomadinae: Epeolini): taxonomy, identification key, distribution, and ecology. Zootaxa, 4437(1), 1.

Assessment Information. Red List Category & Criteria: NT (A2c). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017). Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: this species is widely distributed in Europe from south to north but most of the records are based on old findings. Probably endemic to Europe. The extent of occurrence (EOO) and area of occupancy (AOO) are unknown but the AOO is probably not much larger than 2,000 km^2. National scale: disappeared from middle Belgium but was quite abundant in Campine between 1950 and 1990. New records are needed to confirm that it is still present in this area. EOO = 1,500 km^2, AOO = 21 km^2.

Population. Continental scale: most countries have reported much lower numbers of captured individuals than before (Amiet *et al.* 2007 for Switzerland, P. Bogusch pers. comm. 2014 for the Czech Republic, S. Kaluza pers. comm. 2014 for Germany). National scale: since 1950, populations have disappeared from middle Belgium, new sampling expeditions are needed to determine its actual abundancy in Campine, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from late July to early September. Habitat: sandy open biotopes, heathlands, post-industrial sites (Bogusch & Straka 2014). Hosts: one form is a kleptoparasitic species of *Colletes succinctus* (LC) (Perkins 1923, 1945, Chambers 1949, Richards 1937, Archer 1984, Peeters *et al.* 1999), the other is associated with *Colletes marginatus* (LC) (Richards 1937). Molecular studies in progress strongly suggest that the two forms could represent distinct species.

Threats. Reduction of suitable habitats: (1) loss of heathlands due to agricultural intensification (cultivation, overgrazing, nitrogen deposits), afforestation, urbanization. (2) loss of open sandy areas due to agricultural intensification (cultivation, overgrazing, nitrogen deposits), afforestation, urbanization and scrub encroachment. (3) loss of post-industrial open areas due to scrub encroachment or reconfiguration.

Conservation Actions. Present : this species is legally protected in Belgium. This species is considered Vulnerable in Germany and Switzerland and Critically Endangered in the Czech Republic (Amiet 1994, Farkač *et al*. 2005, Westrich *et al.* 2011). Future: promotion of the conservation and rehabilitation of open post-industrial areas as well as heathlands. Promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer). Conservation Actionsfor the host species should benefit the species.

Research Needed. Impact of pesticides on both hosts and parasites. confirmation of hosts. Determine the possible existence of other hosts. Determine potential other threats to the species. Elaborate sampling expeditions in order to confirm / infirm the presence of the species in middle Belgium.

Epeolus tarsalis Morawitz, 1874

Common Name(s): French - *Epéole tarsé*. Dutch – *Schorviltbij*. German - *Tarsen-Filzbiene*.

Taxonomic Source(s): Bogusch P. and Hadrava, J. 2018. European bees of the genera Epeolus Latreille, 1802 and Triepeolus Robertson, 1901 (Hymenoptera: Apidae: Nomadinae: Epeolini): taxonomy, identification key, distribution, and ecology. Zootaxa, 4437(1), 1.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iii) +2ab(i,ii,iii)). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered due to a limited Geographic Rangein the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This is inferred from a limited extent of occurrence (EOO < 500 km²), a limited area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the EOO, AOO and quality of habitat. Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: this species is distributed in central and southern Europe. The extent of occurrence (EOO) and the area of occupancy (AOO) are unknown, although the AOO is certainly less than 2,000 km². It is probably also distributed outside of Europe. National scale: there is only one known population (Het Zwin). Given the stability of the habitat in Het Zwin we can assume it is already present there for a long time. Given the rarity of the habitat (and the associated host) it may be the only population in Belgium. However, other potential locations for the species in the Scheldt estuary and other sites along the coast (mainly the mouth of the river Ijzer at Nieuwpoort) have not been thoroughly investigated. Based on the assumption that is has been present in Het Zwin for a long time already.

Population. Continental scale: The species in most countries is very rare or extinct. The population trend is unknown. National scale: known from a single population in Het Zwin. Current population trend: unknown.

Habitat and Ecology. Habitat: both coastal and inland salt marshes (Bogusch & Straka 2014). Hosts: kleptoparasitic species of *Colletes halophilus* (LC) (Van Lith 1949).

Threats. Population are under severe threat from rising sea levels and genetic isolation.

Conservation Actions. Present: this species is classified as Extinct in the Czech Republic (Farkač *et al.* 2005) , it is found in the Natura 2000 sites Westerschelde and Saeftinghe in the Netherlands and at Het Zwin in Belgium. Future: Conservation Actionsare needed to protect the habitat where the species occurs. Conservation Actionsfor the host species should benefit the species.

Research Needed. Determine the life history and the ecology of the species. Sampling expeditions are required in order to determine the potential existence

of the species in other places. Monitoring of the population trends at the national scale.

Epeolus variegatus (L., 1758)

Common Name(s): English - Black-thighed Epeolus. French - *Epéole tricolore*. Dutch - *Gewone Viltbij*. German - *Gewöhnliche Filzbiene*.

Figure 111. *Epeolus variegatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Bogusch P. and Hadrava, J. 2018. European bees of the genera Epeolus Latreille, 1802 and Triepeolus Robertson, 1901 (Hymenoptera: Apidae: Nomadinae: Epeolini): taxonomy, identification key, distribution, and ecology. Zootaxa, 4437(1), 1.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Least Concern despite its scarcity. Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka (2014).

Geographic Range. Continental scale: this species is widely distributed across Europe, its distribution probably extends into Asia. National scale: since 1990, known from a single location around Havay (Région Limoneuse Hennuyère), EOO = 300 km², AOO = 3 km².

Population. Continental scale: the species is quite common, it is more common in central and northern Europe (Scheuchl 2000, Amiet *et al.*2007), the population trend is considered stable. National scale: populations from Belgian coast, low Belgium and High Belgium seem to have disappeared since 1990. Rasmont *et al*. (1993) qualified the species population trend as stable in 1991. Current population trend: decrease.

Habitat and Ecology. Flying period: from late July to August. Habitat: open sandy habitats, it is also common at post-industrial sites (military areas, sandpits, spoil heaps, etc.) (Bogusch & Straka 2014), open woodland, heathland, coastal dunes, cliffs and margin of salt marshes (Else and Edwards 2018). Hosts: kleptoparasitic species of potentially *Colletes daviesanus* (LC) (Blair 1920, Carr 1916, Chambers 1949, Nielsen 1903, Richards 1937, 1979), *Colletes fodiens* (LC) (Chambers 1949, Hallett 1928, Perkins 1920, 1923, Richards 1937, 1979, Scheuchl 2000, Amiet *et al.* 2007), *Colletes halophilus* (Guichard 1974, G.R. Else, pers. obs.), *Colletes similis* (Perkins 1923, Richards 1937, Scheuchl 2000, Amiet *et al.* 2007) and *Colletes succinctus* (Clark 1924, Fordham 1933, O'Toole & Raw 1991).

Threats. Reduction of suitable habitats: destruction of (1) heathlands for agricultural, forestry or urbanization purposes (2) open woodlands due to forestry intensification (3) open sandy areas due to scrub encroachment (4) post-industrial habitats due to abandonment / reconfiguration of old quarries, heaps, sand pits (5) salt marshes due to the rising of sea level.

Conservation Actions. Present: this species is legally protected in Belgium. This species is considered Vulnerable in the Czech Republic and Switzerland (Farkač *et al.*2005, Amiet 1994) and Near Threatened in Germany (Westrich *et al.* 2011). Future: Conservation Actionsare needed for the protection / rehabilitation of the habitats where the species occurs. Conservation Actionsfor the host species should benefit the species.

Research Needed. Determine the life history and the ecology of the species. Sampling expeditions are required in order to determine the potential presence of the species in other places. Monitoring of the population trends at the national scale. Confirmation of hosts. Determine the possible existence of other hosts.

Genus *Eucera* Scopoli, 1770

Eucera longicornis (L., 1758)

Common Name(s): English - Long-horned Bee. French - *Eucère à longues antennes*. Dutch - *Gewone Langhoornbij*. German - *Juni-Langhornbiene*

Figure 112. *Eucera longicornis*. Foraging on *Vicia sepium* (Treignes, Photo: Y. Barbier).

Diagnosis. Aligned or almost aligned ocelli. Two submarginal cells on forewings, the second one being larger than the first one. Normal clypeus (*i.e. S*lightly domed and elongated), deeply and densely punctuated mesonotum. Males with very long antennae, deeply and densely punctuated mesonotum. **Taxonomic Source(s):** Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: VU (A2bc. B1ab(i,iii) +2ab(i,iii)). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Vulnerable due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a limited Geographic Rangein the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in EOO and quality of habitat. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp & Quaranta, 2013.

Geographic Range. Continental scale: *Eucera longicornis* is a Palearctic species recorded in almost all European countries, including those in Scandinavia.

National scale: everywhere in Belgium except northern Flanders and Ardennes, EOO = 2,200 km², AOO = 23 km².

Population. Continental scale: the species is mostly recorded from individual observations, although in some cases it can be abundant (*e.g.* in cultivated areas (Tasei 1978)). Fluctuations in the population of this species and a moderate decline in the long- and short-term population trend have been reported in the Red Data List of the Bees of Germany (Westrich *et al*. 2008, 2011). In Great Britain, the species has declined markedly since 1990 (S. Roberts pers. comm. 2013). National scale: areas where populations could be abundant (*i.e.* leguminous crops, nutrient-poor grasslands…) are drastically decreasing in Belgium. The populations are therefore less abundant and almost exclusively found in natural reserves. The EOO and AOO are highly reduced and scattered. Rasmont *et al*. (1993) qualified the population trend as stable in 1991. Current population trend: decrease.

Habitat and Ecology. Flying period: from April to July, highly protandrous (Else and Edwards 2018). Habitat: leguminous rich meadows and grasslands (*i.e.* heaths, nutrient-poor grasslands, leguminous crops …), one of the main pollinators of *Medicago sativa* (Kemp & Quaranta 2013). Visited flowers: strongly associated with diverse Fabaceae but also visits Brassicaceae, Ericaceae, Rosaceae, Polygalaceae, Geraniaceae, Boraginaceae, Lamiaceae, Iridaceae, males are associated with the sexually deceptive orchid *Ophrys fuciflora* (Gaskett 2011), Westrich (1989) observations show that collected pollen strictly belongs to the Fabaceae family. Records on cultivated plants: *Raphanus, Calluna vulgaris, Rubus, Medicago sativa, Trifolium repens, Trifolium pratense, Iris pseudacorus*. Nesting habits: nest gregariously in exposed firm and level soil or in cliffs (Else and Edwards 2018). Parasites: *Nomada sexfasciata* (Smith 1846).

Threats. Reduction of habitats / food ressources: reduction of nutrient-poor legume-rich grasslands due to the intensive grazing or mowing practices (from hay cropping to silage). Near disappearance of leguminous crop. Accidental or intentional enrichment of grasslands. Reduction of meadow or pasture surface due to afforestation, monoculture or urbanization. Reduction in the number of potential nesting sites: scrub encroachment, excessive tilling activities have led to a reduction of exposed soil.

Conservation Actions. Present: this species is legally protected (LCN 1973, annexe IIb). This species is included in the National Red Lists or Red Data Books of Germany (Vulnerable. Westrich *et al.* 2008, 2011), the Netherlands (Endangered. Peeters and Reemer 2003) and Norway (Near Threatened. Kålås *et al*. 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing practices. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of polycultures, extensive orchards, vegetable gardening and leguminous cropping.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale.

Eucera nigrescens Pérez, 1879

Common Name(s): English - Scarce Long-horned Bee. French - *Eucère noirâtre*. Dutch - *Zuidelijke Langhoornbij*. German - *Mai-Langhornbiene.*

Diagnosis. Aligned or almost aligned ocelli. Two submarginal cells on forewings, the second one being larger than the first one. Domed and elongated clypeus, slighter and scarcer (in comparison with *E. longicornis*) punctuation on mesonotum. Males with very long antennae, slight and scarcer (in comparison with *E. longicornis*) punctuation on mesonotum. **Taxonomic Source(s):** Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: EN (A2bc. B1ab(i,iii)). Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a limited Geographic Rangein the form of the extent of occurrence (EOO). This is is inferred from a reduced extent of occurrence (500 km² < EOO < 1,500 km²), severely fragmented EOO and continuing decline in EOO and quality of habitat. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp & Quaranta, 2013.

Geographic Range. Continental scale: the species is known from central and southern Europe, but it is not found in Scandinavia or the Baltic States. National scale: much scarcer than the other *Eucera* species occurring in Belgium, found in Pays de Herve, Condroz and Plateaux Limoneux Hennuyers, EOO = 700 km², AOO = 8 km².

Population. Continental scale: there is little information available on the abundance and trend of this species although repeated collecting indicates a constant presence (Quaranta *el al*. 2004. Westrich et al., 2008). National scale: areas where populations could be abundant (*i.e.* leguminous crops, nutrient-poor grasslands…) are drastically decreasing in Belgium, the populations are therefore far less abundant, EOO and AOO are highly reduced and scattered, Rasmont *et al*. (1993) qualified the population trend as stable in 1991. Current population trend: decrease.

Habitat and Ecology. Flying period: from April to June, known as an earlier flying species than *Eucera longicornis* (Westrich 1989). Habitat: leguminous rich meadows and grasslands (*i.e.* heaths, nutrient-poor grasslands, leguminous crops …) (Peeters *et al.* 2012, Kemp & Quaranta 2013, Else and Edwards 2018). Visited flowers: strongly associated with diverse Fabaceae (Friese 1896, Tasei 1978,

Standfuss 2009), Westrich (1989) observations show that collected pollen strictly belongs to the Fabaceae family, males are associated with the sexually deceptive orchid *Ophrys fuciflora* (Gaskett 2011). Records on cultivated plants: *Medicago sativa, Trifolium repens, Trifolium pratense.* Nesting habits: females excavate their nest burrow by themselves, sometimes forming large aggregations (Peeters *et al.* 2012, Else and Edwards 2018). Parasites: *Nomada sexfasciata* (Smith 1846, Stöckhert 1933, Móczár 1954, Baker 1964, Westrich 1985, Amiet *et al.* 2007).

Threats. Reduction of habitats / food ressources: reduction of nutrient-poor legume-rich grasslands due to the intensive grazing or mowing practices (from hay cropping to silage). Near disappearance of leguminous crop. Accidental or intentional enrichment of grasslands. Reduction of meadow or pasture surface due to afforestation, monoculture or urbanization. Reduction in the number of potential nesting sites: scrub encroachment, excessive tilling activities have led to a reduction of exposed soil. Genetic isolation: EOO and AOO are highly reduced and scattered.

Conservation Actions. Present: this species is legally protected (LCN 1973, annexe IIb). This species is included in the National Red Lists or Red Data Books of Germany (Least Concern. Westrich *et al*. 2008, 2011), Netherlands (Critically Endangered. Peeters and Reemer 2003) and Great Britain (Regionally Extinct. Shirt 1987). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices. Promotion of late mowing practices. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces. Promotion of polycultures, extensive orchards, vegetable gardening and leguminous cropping.

Research needed Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale. Sampling expeditions are required in order to determine the potential existence of the species in other places.

Genus *Melecta* Latreille, 1802

Melecta albifrons (Forster, 1771)

Common Name(s): English - Common Mourning Bee. French - *Mélècte commune*. Dutch - *Bruine Rouwbij*. German - *Gewöhnliche Trauerbiene*.

Figure 113. *Melecta albifrons*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging (Héron, Photos : P. Moniotte).

Diagnosis. Black cuticle, pubescence includes dense spots of hairs. Rounded scutellum, ending in two larges and backwardly turned spines. Three submarginal cells on forewings. Ovoid radial cell. Females with a prominent hump on the centre of the vertex. Males and females with A3 = 1.5 x A4. Males

and females with an outwardly turned metatarsus 3. Outer surface of metatarsus 3 of females fringed with long white hairs. **Taxonomic Source(s):** Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*. Taxonomic Notes: The species is polytypic. It includes the subspecies *Melecta albifrons albovaria* Erichson, 1840 and the subspecies *Melecta albifrons nigra* Spinola, 1806.

Assessment Information. Red List Category & Criteria: NT (A2c). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont & Dehon, 2015.

Geographic Range. Continental scale: this species is the most widespread *Melecta* in Europe. The limits to its distribution are North Africa to the south, and Denmark and Latvia to the north. It does not occur in Scotland, Ireland, Fennoscandia and northern Russia. National scale: found in large *A. plumipes* nests aggregation, EOO = 9000 km^2, AOO = 89 km^2.

Population. Continental scale: there is no information available on the population size and trend of this species. However, since its host *Anthophora plumipes* is abundant, the species is presumed to be common. National scale: Rasmont *et al*. (1993) qualified the species population trend as very highly significantly increasing, the species is however clearly regressing since 1991 despite the stable population trend of its host. Current population trend: decrease.

Habitat and Ecology. Flying period: univoltine, from late March to early June. Habitat: wherever its host nests. Hosts: *Anthophora plumipes* (LC) (Hallett 1928, van Lith 1947) and potentially *Anthophora retusa* (EN) (Smith 1845, Morice 1901).

Threats. The threats to this species are unknown since its host is very widespread and expanding in Belgium.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Netherlands (Endangered. Peeter and Reemer 2003). Future: threats to this species are unknown, no Conservation Actionscan be taken except the conservation of very large aggregations of *A. plumipes*.

Research Needed. Determine the life history and the ecology of the species, especially its host preferences. Monitoring of the population trends at the national scale.

Melecta luctuosa **(Scopoli, 1770)**

Common Name(s): English - Square-Spotted Mourning Bee. French - *Mélècte deuil*. Dutch - *Witte Rouwbij* German - *Gewöhnliche Trauerbiene*. German - *Pracht-Trauerbiene, Weißfleckige Trauerbiene*.

Figure 114. *Melecta luctuosa*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. black cuticle, pubescence includes dense spots of hairs. Rounded scutellum, ending in two larges and backwardly turned spines. Three submarginal cells on forewings. Ovoid radial cell. Females with a rounded vertex (*i.e.* without any prominent hump on the centre). Males and females with A3 = 1.25 x A4. Males and females with an almost straight metatarsus 3. Outer surface of metatarsus 3 of females fringed with numerous small black spines. **Taxonomic Source(s):** Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: CR (A2bc. B1ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a limited Geographic Rangein the form of the extent of occurrence (EOO). This is inferred from a reduced extent of occurrence (EOO < 500 km²), severely fragmented EOO and continuing decline in the EOO, AOO, quality of habitat and number of locations or subpopulations. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont & Dehon, 2015.

Geographic Range. Continental scale: in Europe, this species is widely distributed under 60° latitude (Rasmont 2014). National scale: considered as extinct in 1993, scarcely present in six areas, EOO = 100 km², AOO = 1 km².

Population. Continental scale: there is no information available for the population size and trend of this species. However, populations are thought to be in decline and the species is becoming extremely rare in some parts of its area, such as the United Kingdom, Belgium (Leclerq *et al.* 1980) and the Netherlands, and it has also been declining in Sweden (B. Cederberg pers. comm. 2014), where it is now considered extinct (Gärdenfors 2010). National scale: Rasmont *et al*. (1993) qualified the species population trend as very highly significantly decreasing in 1991. Populations are scarce and highly scattered. Current population trend: decrease.

Habitat and Ecology. Flying period: univoltine, from May to June (A. Pauly pers. obs.). Habitat: wherever its host nests. Hosts: *Anthophora retusa* (EN) (Soika 1936, Lieftinck 1980) and potentially *Anthophora plagiata* (RE) (Iuga 1958).

Threats. Drastic decline or extinction of its hosts in Belgium. Decline of its foraging plants in Belgium, which include clover (P. Rasmont pers. comm. 2014).

Conservation Actions. Present: this species is legally protected in Belgium. This species is included in the National Red Lists or Red Data Books of the following European countries: Czech Republic (Vulnerable. Farkac *et al*. 2005), Germany (Vulnerable. Westrich *et al*. 2011), Great Britain (Critically Endangered. Shirt 1987), Netherlands (Critically Endangered. Peeter and Reemer 2003), Sweden (Regionally Extinct. Gärdenfors 2010) and Switzerland (Vulnerable. Amiet 1994). It is also listed as being in regression in the first Red List of Belgian insects (Leclercq *et al.* 1980). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: anything that could benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Impact of pesticides on behaviour. Monitoring of the population trends at the national scale. Sampling expeditions are required in order to determine the potential existence of the species in other places. Specify the habitat and ecology of the species and its hosts.

Genus *Nomada* Scopoli, 1770

Nomada alboguttata Herrich-Schäffer, 1839

Common Name(s): French – *Nomade à taches blanches*. Dutch – *Bleekvlekwespbij*. German - *Weissfleckige Wespenbiene*.

Figure 115. *Nomada alboguttata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253. Taxonomic Notes: Schwarz *et al*. (1996) mentions four forms of *Nomada alboguttata*. Sann *et al*. (2010) investigated the morphological and molecular differences between form number one and form number two. They found nearly no differences between DNA-sequences of both forms although there is significant differences in external morphology.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Least Concern because it is one of the most common nomad bee species in Belgium with a wide distribution, stable populations and no major threat. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: *Nomada alboguttata* is widespread in the Palearctic region, it is not known from the following countries, but probably also occurs in: Albania, Serbia, Bosnia-Herzegovina, Croatia, Moldova, Montenegro, Slovakia and Russia, EOO = 6,665,306 km^2, AOO = 852 km^2. National scale: everywhere in northern Sambre-Meuse line, tends to be less abundant in its southern part, EOO = 4,000 km^2, AOO = 45 km^2.

Population. Continental scale: the species is abundant in most countries of Europe, the population is stable in most countries, but it is declining in Switzerland, Norway and Slovenia. National scale: Rasmont *et al*. (1993) qualified the species population trend as stable in 1991. Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from early April to mid-June and late July to late September. Habitat: bare sand, on sandy roads, inland sandy areas and on sand paths in woods and heathland. Hosts: *Andrena barbilabris* (LC) (Witt 1992), *Andrena argentata* (NT) (Schwarz *et al.* 1996) and potentially *Andrena ventralis* (LC) (Westrich 1989).

Threats. Reduction of host nesting sites: although the species does not seem threatened, it may suffer from over-maintenance of sandy roads (pavement) and sandy paths, scrub encroachment of bare sandy areas and abandonment / reconfiguration of sandpits and heaps.

Conservation Actions. Present: there are no *ad hoc* Conservation Actionsin place. This species is included in the Red Data Books of the following three European countries: Switzerland (Vulnerable. Amiet 1994). Norway (Vulnerable. Kålås *et al.* 2010). Slovenia (Endangered. Anonymous 2002). Future: elaborate biodiversity-favourable management plan for sandpits and heaps. Promotion of the conservation of sandy roads and paths.

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Confirmation of hosts. Determination of the possible existence of other hosts. Design of bee-favourable management plans for heaps and sandpits.

Nomada argentata Herrich-Schäffer, 1839

Common Name(s): English - Silver-sided Nomad Bee. French – *Nomade argentée*. Dutch - *Zwarte Wespbij*. German - *Silberhaarige Wespenbiene*.

Figure 116. *Nomada argentata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: *Nomada argentata* is endemic to Europe, it is distributed in many countries of central and eastern Europe, EOO = 3,331,122 km^2, AOO = 388 km^2. National scale: only two observations dating from before 1950 (in Fagne-Famenne and polders).

Population. Continental scale: This species is very rare and populations have always been small, and there are not many recent records . In all the countries where it occurs, the species has declined or is extinct (Smit, 2013). National scale: Extinct.

Habitat and Ecology. Flying period: univoltine, from July to September (Smit, 2013). Habitat: variety of open habitats. Hosts: *Andrena marginata* (RE) (*e.g.* Westrich 1989).

Threats. Reduction of host habitats and food ressources: reduction of open habitats due to agricultural intensification (monoculture, intensive use of herbicides and nitrogen fertilizers), forestry intensification and urbanization.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following eight European countries: Czech Republic (Endangered. Farkac *et al.* 2005). Germany (Endangered. Westrich *et al.* 2011). Ireland (Critically Endangered. Fitzpatrick *et al.* 2006). Netherlands (Regionally Extinct. Peeters and Reemer 2003). Norway (Regionally Extinct. Kålås *et al.* 2010).

Slovenia (Endangered. Anonymous 2002). Sweden (Critically Endangered. Gärdenfors 2010). Switzerland (Endangered. Amiet 1994). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: Conservation Actionsare needed to protect wet grasslands supporting *Succisa pratensis* and dry grasslands supporting both *Succisa pratensis* and *Scabiosa columbaria*. Promotion of extensive agricultural practices (*i.e.* excluding pesticides and nitrogen fertilizers).

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Confirmation of hosts. Conduct sampling expedition in order to find potential remaining populations. Understanding of the causes of extinction.

***Nomada armata* Herrich-Schäffer, 1839**

Common Name(s): English - Armed Nomad Bee. French - *Nomade armée*. Dutch – *Knautiawespbij*. German - *Bedornte Wespenbiene*, *Rote Wespenbiene*.

Figure 117. *Nomada armata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (B1ab(i,ii,iii) +2ab(i,ii,iii)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered because of a limited, fragmented and declining Extent Of Occurrence (500 km² < EOO < 1500 km²) and Area Of Occupancy (5 km² < AOO < 15 km²). Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2013.

Geographic Range. Continental scale: *Nomada armata* is endemic to Europe. It is widely distributed across Europe, but it is rare everywhere, EOO = 5,114,703 km², AOO = 696 km². National scale: only present around the Meuse in Limburg and Liège province.

Population. Continental scale: the species is rare and the population trend of the species is decreasing. This species is in significant decline inferred by the degradation of the habitat, though the decline is probably less than 30% in the past ten years (J. Smit pers. comm. 2013). National scale: extremely scarce, host presence does not imply the presence of the species. Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: univoltine, from mid-May to late July. Habitat: extensively used dry calcareous or sandy grasslands, dikes along rivers (Westrich 1989, Peeters *et al.* 2012). Host: *Andrena hattorfiana* (NT) (*e.g.* Westrich 1989).

Threats. Reduction of habitat and food ressources: intensification in the use of grasslands or destruction in agricultural, forestry or urbanization purposes. Reduction of host nesting sites: loss of low vegetation areas as host nest burrows are generally hidden by low vegetation (Hamm 1901, Kocourek 1966, Else and Roberts 1994, Larsson and Franzén 2007). Decline of host: *Andrena hattorfiana* (NT). Genetic isolation: highly scattered and reduced populations.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following eight European countries / regions: Finland (Endangered. Rassi *et al.* 2010). Germany (Endangered. Westrich *et al.* 2011). Netherlands (Endangered. Peeters and Reemer 2003). Norway (Regionally Extinct. Kålås *et al.* 2010). Slovenia (Endangered. Anonymous 2002). Sweden (Endangered. Gärdenfors 2010). Switzerland (Vulnerable. Amiet 1994). Great Britain (Endangered. Shirt 1987). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the host. Future: promotion of the conservation and restauration of dry grasslands. Promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage.

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Conduct sampling expedition in order to find potential other populations. Monitoring of the population trends at the national scale.

Nomada baccata Smith, 1844

Common Name(s): English - Bear-clawed Nomad Bee. French - *Nomade des baies*. Dutch - *Kleine Bleekvlekwespbij*. German - *Perlen-Wespenbiene*.

Figure 118. *Nomada baccata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253. Taxonomic Notes: Very similar to *N. alboguttata*, populations are possibly underestimated.

Assessment Information. Red List Category & Criteria: DD. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Very similar to *N. alboguttata*, populations are possibly underestimated. Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2013.

Geographic Range. Continental scale: this species is endemic to Europe, it is distributed across central and northern Europe, EOO = 2,005,843 km^2, AOO = 280 km$^{2.}$ National scale: one occurrence since 1990 around Hasselt.

Population. Continental scale: populations of *Nomada baccata* are small in the countries where it occurs, it is a rare species, in many countries there are strong population declines (Rassi *et al.* 2010, Gärdenfors 2010, Westrich *et al.* 2011, Peeters *et al.* 2012). National scale: insufficient amount of occurrence.

Habitat and Ecology. Flying period: univoltine, mid or late July to late August or early September. Habitat: inland heathland, especially on the sandy areas and in dune, open sandy areas, with a loose, uncompacted substrate (Smit, 2013). Hosts: *Andrena argentata* (NT) (Schwarz *et al.* 1996).

Threats. Reduction of habitat, food ressources: destruction of heathland for agricultural, forestry or urbanization purposes, urbanization of coastal areas. Reduction of host nesting sites: excessive erosion of habitat caused by motor bike and horse riding causes disturbance to the host nesting areas, pavement and over-maintenance of sandy roads and paths. Decline of host: *Andrena argentata* (NT). Genetic isolation: highly scattered and reduced populations.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. This species is included in the National Red Lists or Red Data Books of the following three European countries: Finland (Vulnerable. Rassi *et al.* 2010). Germany (Endangered. Westrich *et al.* 2011). Sweden (Endangered. Gärdenfors 2010). Future: promotion of the conservation / rehabilitation of heathlands. Prevent excessive urbanization of coastal areas.

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Impact of pesticides on behaviour. Conduct sampling expedition in order to find potential other populations. Monitoring of the population trends at the national scale. Specify the life history and ecology of the species in order to find potential other threats**.**

Nomada bifasciata Olivier, 1811

Common Name(s): French - *Nomade bifasciée*. Dutch - *Bonte Wespbij*. German - *Rotbäuchige Wespenbiene*.

Figure 119. *Nomada bifasciata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013

Geographic Range. Continental scale: the species is present in central and south Europe and in north Africa (Smit, 2013), EOO = 4,748,460 km², AOO = 732 km². National scale: everywhere in Belgium, EOO = 1,200 km² , AOO = 12 km².

Population. Continental scale: the species is rather abundant in the countries where it occurs, populations seem to be stable. National scale: Rasmont *et al.* (1993) qualified the species population trend as highly significantly decreasing but a large amount of observations were realized in numerous different locations since 1990. Current population trend: stable.

Habitat and Ecology. Flying period: univoltine, from mid-May to late July. Habitat: grasslands such as water-meadows, dikes and grass verges of unpaved roads. Hosts: *Andrena gravida* (LC) (*e.g.* Westrich 1989).

Threats. Reduction of habitat and food ressources: intensification in the use of grasslands, over-maintenance of roadsides, reduction in the number of grasslands for agricultural (monoculture), forestry or urbanization purposes.

Conservation Actions. Present: this species is included in the National Red List of the Netherlands (Vulnerable. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of the conservation and

restauration of grasslands. Promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Restrict drainage of wetlands for agricultural, forestry or urbanization purposes.

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Monitoring of the population trends at the national scale. Specify the ecology and life history of the species in order to find new potential threats.

Nomada castellana **Dusmet, 1913**

Common Name(s): English - Castell's Nomad Bee. French - *Nomade castillane*. German - *Kastilische Wespenbiene*.

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in central, eastern and southern Europe, more rarely in the west, EOO = 2,474,733 km^2, AOO = 448 km^2. National scale: known from a single location around Viroinval (1991).

Populations. Continental scale: the species has a presumed overall large population, and the populations seem to be stable. National scale: extinct.

Habitat and Ecology. Flying period: univoltine, from May to June. Habitat: unknown. Hosts: possibly *Andrena anthrisci* (DD) and *Andrena alfkenella* (DD) are hosts (Amiet *et al*. 2007), Celary (1995) states that the host is *Andrena semilaevis* (DD).

Threats. The threats to this species are not known.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Germany (Endangered. Westrich *et al.* 2011). Switzerland (Critically Endangered. Amiet 1994). Slovenia (Endangered. Anonymous 2002). Future: the threats to this species are not know, it is thus not possible to recommend any conservation action.

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Confirmation of hosts. Determine the possible existence of other hosts. Determine life history, ecology and **Threats.** Conduct sampling expedition in order to find potential remaining populations. Understanding of the species and hosts scarcity.

Nomada conjungens **Herrich-Schäffer, 1839**

Common Name(s): English - Fringeless Nomad Bee. French - *Nomade conjugée*. Dutch – *Langsprietwespbij*. German - *Dolden-Wespenbiene*.

Figure 120. *Nomada conjungens*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Least Concern because it is stable populations and no major threat. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: this species occurs in south, central and eastern Europe, EOO = 3,921,674 km² , AOO = 924 km². National scale: very scarcely distributed (host nests are very hard to find), EOO = 40 km², AOO = 5 km².

Population. Continental scale: the species seems to be rather abundant and the overall population trend is considered stable (Smit 2013). National scale: Rasmont *et al*. (1993) qualified the species population trend as stable. However, too small amount of observations to establish any population trends, highly scattered distribution. Current population trend: unknown.

Habitat and Ecology. Flying period: univoltine, from April to June. Habitat: rich flowering areas. grass verges. Hosts: *Andrena proxima* (LC) (Perkins 1919).

Threats. Reduction of habitat and food ressources: intensification in the use of grasslands, over-maintenance of roadsides, reduction in the number of grasslands for agricultural (monoculture), forestry or urbanization purposes. Genetic isolation: highly scattered and reduced populations.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following two European countries / regions: Germany

(Endangered. Westrich *et al.* 2011). Great Britain (Vulnerable. Shirt 1987). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of the conservation and restauration of grasslands. Promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Restrict drainage of wetlands for agricultural, forestry or urbanization purposes.

Research Needed. Confirmation of hosts. Determine the possible existence of other hosts. Impact of pesticides and herbicides on host and parasites food ressources. Monitoring of the population trends at the national scale. Specify the ecology and life history of the species in order to find new potential threats.

Nomada distinguenda **Morawitz, 1874**

Common Name(s): French - *Nomade distinguée*. Dutch – *Langsprietdwergwespbij*. German - *Getrennte Wespenbiene*.

Figure 121. *Nomada distinguenda*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (A2bc. B1ab(i,ii,iii) +2ab(i,ii,iii)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a Geographic Rangereduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO comprised between 500km² and 1500 km²), a reduced area of occupancy (AOO comprised between 5km² and 15km²) and severely fragmented EOO and AOO. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in Europe, north Africa and Asia eastwards to Afghanistan (Smit, 2013). In Europe, EOO = 4,754,270 km², AOO = 2,136 km². National scale: patchy distribution, five records since 1990.

Population. Continental scale: the species is abundant in many countries, the populations seem to be stable in most countries (Smit, 2013). National scale: five records since 1990, highly scattered populations, Rasmont *et al*. (1993) qualified the species population trend highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, May-June and July-August. Habitat: verges, waste lands, banks, dikes, deserted quarries (J. Smit pers. obs. 2013). Hosts: *Lasioglossum villosulum* (LC) (Schmiedeknecht 1930, Stoeckhert 1933, Stoeckhert 1943, Standfuss and Schwarz 2007) and probably *Lasioglossum parvulum* (LC) (Westrich 1989).

Threats. Reduction of suitable habitat: abandonment / reconfiguration of quarries and heaps has reduced the surface of hard and sparsely vegetated soils (nesting conditions of host). Over-maintenance of roadsides.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Endangered. Amiet 1994). Czech Republic (Endangered. Farkac *et al*. 2005). Germany (Vulnerable. Westrich *et al.* 2011). Netherlands (Critically Endangered. Peeters and Reemer 2003). Poland (Vulnerable. Glowacinski and Nowacki 2009). More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: elaborate biodiversity-favourable management plan for deserted quarries and waste lands.

Research Needed. Impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources. Monitoring of the population trends at the national scale. Specify the ecology and life history of the species in order to find new potential threats.

Nomada emarginata Morawitz, 1877

Common Name(s): French - *Nomade émarginée*. Dutch - *Doornloze Wespbij*. German - *Hecken-Wespenbiene*.

Figure 122. *Nomada emarginata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in central and eastern Europe as well as in south-western Asia, in Europe: EOO = 2,781,088 km², AOO = 652 km². National scale: few records around Liège dated from before 1950.

Population. Continental scale: populations are small and even though the species is considered threatened in some European countries, the population trend is presumably stable (Smit, 2013). National scale: extinct.

Habitat and Ecology. Flying period: from mid-May to late July. Habitat: chalky or sandy grasslands (habitat of host), edges of forests, rich flowering grasslands and gardens (Michez and Nieto, 2012), occurs in heavy metal contaminated grassland (Peeters *et al.* 2012). Hosts: probably *Melitta haemorrhoidalis* (LC) (Westrich 1989).

Threats. Reduction of habitat and food ressources: intensification in the use of grasslands (intensive grazing practices, silage). Destruction of grasslands in agricultural, forestry or urbanization purposes. Intensive forestry practices (deletion of edges and clearings). Over-maintenance of private gardens. Sanitation of heavy metals contaminated grasslands.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Germany (Endangered. Westrich *et al.* 2011). Netherlands (Endangered. Peeters and

Reemer 2003). Slovenia (Endangered. Anonymous 2002). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species and its host. Future: promotion of the conservation and restauration of dry grasslands. Promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Restriction of soil sanitation.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expedition in order to find potential remaining populations.

Nomada fabriciana **(L., 1767)**

Common Name(s): English - Fabricius' Nomad Bee. French - *Nomade de Fabricius*. Dutch - *Roodzwarte Dubbeltand*. German - *Rotschwarze Wespenbiene*.

Figure 123. *Nomada fabriciana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs widely in western, southern and central Europe and it is endemic to Europe, EOO = 7,263,989 km^2, AOO = 8,500 km^2. National scale: everywhere in Belgium, EOO = 11,100 km^2. AOO = 124 km^2.

Population. Continental scale: the species is very abundant all over the range, populations are stable. National scale: one of the most abundant *Nomada* in Belgium, Rasmont *et al.* (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from early March to early June and from June to mid-August (the two broods may overlap). Habitat: numerous lowland habitats according to its hosts preferences (Else and Edwards 2018), edges of forests, abandoned vineyards, verges, parks and gardens (Smit, 2013). Hosts: *Andrena bicolor* (LC) (Schindler 2005), *Andrena chrysoceles* (LC) (Schindler 2008) and potentially *Andrena angustior* (NT) (Perkins 1919, Tscharntke 1984).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

Nomada facilis Schwarz, 1967

Common Name(s): English - Hawk's-beard Nomad Bee. French - *Nomade facile*. German - *Waldrand-Wespenbiene*.

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Despite the lack of information (new species) the species does not seem threatened (LC host, expanding species at the European scale). Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013

Geographic Range. Continental scale: the species occurs in central and southern Europe, and the Asian part of Turkey, EOO = 2,786,398 km^2, AOO = 416 km^2. National scale: known from tree places, around Liège and 15km SW from Namur, EOO = 100 km^2, AOO = 1 km^2.

Population. Continental scale: populations are rather small but there is no information available on the population trend of this species. National scale: known from only three populations, lack of long-term informations and therefore difficult to establish any trend. Current population trend: unknown.

Habitat and Ecology. Flying period: unknown, apparently univoltine. Habitat: verges with many flowers and open vegetation (J. Smit pers. obs. 2013). Hosts: *Andrena humilis* (LC) (Amiet *et al.* 2007).

Threats. Reduction of habitat and food ressources: intensification in the use of grasslands (intensive grazing practices, silage). Destruction of grasslands in agricultural, forestry or urbanization purposes. Over-maintenance of roadsides.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Germany (Endangered. Westrich *et al.* 2011). Slovenia (Endangered. Anonymous 2002). Sweden (Endangered. Gärdenfors 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species and its host. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expedition in order to find potential other populations. Specify the ecology and life history of the species in order to find potential other threats. Monitoring of the population trend at the national scale.

***Nomada femoralis* Morawitz, 1869**

Common Name(s): French - *Nomade à gros femur*. Dutch – *Dubbeldoornwespbij*. German - *Schenkel-Wespenbiene.*

Figure 124. *Nomada femoralis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: VU (A2bc). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Vulnerable due to a population decline (between 30% and 50% between 1900-1969 and 1970-2017), inferred from a population reduction observed, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurrence (EOO). Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in central and southern Europe and Minor Asia, EOO = 4,497,979 km^{2,} AOO = 1,644 km$^{2.}$ National scale: formerly found in each natural region, at present it occurs in: Flandre Sablonneuse, Région Brabançonne, Entre Vesdre-et-Meuse, EOO = 400 km^2, AOO = 5 km^2.

Population. Continental scale: in a number of countries the species is rare, in other countries (France, Spain) it can be locally abundant (J. Smit pers. obs. 2013), the overall the population trend is considered stable (Smit, 2013). National scale: populations are decreasing in number and size, Rasmont *et al.* (1993) considered the species as highly significantly decreasing in 1991. Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-May to late June or early July. Habitat: all kinds of nutrient-poor grasslands with many flowers, abandoned diggings, edges of forests (Westrich 1989), verges of unpaved roads (J. Smit pers. obs. 2013). Hosts: *Andrena humilis* (LC) (Stöckhert 1933) and potentially *Andrena fulvago* (NT) (Kocourek 1966) and *Andrena cinerea* (LC) (M. Schwarz pers. comm. 2013).

Threats. Reduction of habitat and food ressources: intensification in the use of grasslands (intensive grazing practices, silage). Destruction of grasslands in agricultural, forestry or urbanization purposes. Eutrophication of nutrient-poor grasslands. Over-maintenance of roadsides. Intensification of forestry practices (*i.e.* deletion of edges and clearings).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Vulnerable. Amiet 1994). Czech Republic (Regionally Extinct. Farkac *et al.* 2005). Germany (Endangered. Westrich *et al.* 2011). Netherlands (Critically Endangered. Peeters and Reemer 2003). Slovenia (Endangered. Anonymous 2002). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species.. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands. Promotion of extensive forestry practices (*i.e.* including stepped edges and clearing).

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Monitoring of the population trend at the national scale.

Nomada ferruginata (L., 1767)

Common Name(s): English - Yellow-shouldered Nomad Bee. French - *Nomade ferrugineuse.* Dutch – *Geelschouderwespbij*. German - *Rötliche Wespenbiene*.

Figure 125. *Nomada ferruginata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species is endemic to Europe, it occurs in north and central Europe, EOO = 5,165,497 km², AOO = 1,500 km². National scale: everywhere in northern Sambre-Meuse line, two spots of populations in southern Sambre-Meuse line: one around Rochefort (Fagne-Famenne), the other around between Arlon and Virton (Lorrain belge), EOO = 700 km², AOO = 9 km².

Population. Continental scale: the populations of this species seem to be stable. National scale: widespread but not abundant, Rasmont *et al.* (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: from March to May. Habitat: along rivers, dykes, abandoned diggings, waste land near water (Westrich 1989, J. Smit pers. obs. 2013), margins of damp open deciduous woodland, parkland, heaths (Else and Edwards, 2018). Hosts: *Andrena praecox* (LC) (Alfken 1913, Perkins 1919, Stoeckhert 1933).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

***Nomada flava* Panzer, 1798**

Common Name(s): English - Flavous Nomad Bee. French - *Nomade jaune*. Dutch - *Gewone Wespbij*. German - *Gelbe Wespenbiene*.

Figure 126. *Nomada flava*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253. Taxonomic Notes: Males can be confounded with the ones of *N. signata*. Tergits punctuation of *N. flava* are deeper and more spaced.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species is a European endemic that occurs in north and central Europe, EOO = 4,718,651 km^2, AOO = 5,576 km^2. National scale: everywhere in Belgium, EOO = 22,000 km^2, AOO = 451 km^2.

Population. Continental scale: the species is abundant and populations are stable (Smit, 2013). National scale: seems to be an increasing species, Rasmont *et al*. (1993) qualified the species population trend as highly significantly increasing. Current population trend: increase.

Habitat and Ecology. Flying period: from March to late June, rarely July. Habitat: ubiquitous species (Else and Edward 2018). Hosts: *Andrena nigroaena* (LC) (R.C.L. Perkins 1916b, 1919d. Richards 1979), *Andrena fulva* (LC) (Richards 1979), *Andrena ferox* (CR) (G.R. Else pers. obs.).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources.

Nomada flavoguttata **(Kirby, 1802)**

Common Name(s): English - Little Nomad Bee. French - *Nomade à taches jaunes*. Dutch - *Gewone Kleine Wespbij*. German - *Gelbfleckige Wespenbiene*.

Figure 127. *Nomada flavoguttata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253. Taxonomic Notes: Females can be separated from *N. sheppardana* by the yellow baso-lateral spots on T2 as well as by their black labrum.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in Europe, northern Africa and Asia, EOO = 8,259,606 km², AOO = 9,000 km². National scale: everywhere in Belgium, EOO = 8,900 km², AOO = 89 km².

Population. Continental scale: populations can be very large and the population trend is considered stable. National scale: common species, Rasmont *et al.* (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from March to September. Habitat: ubiquitous species (Else and Edward 2018). Hosts: *Andrena falsifica* (DD), *Andrena minutula* (LC), *Andrena minutuloides* (DD), *Andrena semilaevis* (DD), *Andrena subopaca* (LC) (Perkins 1919, Stoeckhert 1933, Kocourek 1966, Westrich 1989).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific conservation actions have to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources.

Nomada flavopicta **(Kirby, 1802)**

Common Name(s): English - Blunthorn Nomad Bee. French - *Nomade à points jaunes.* Dutch – *Zwartsprietwespbij*. German - *Greiskraut-Wespenbiene*.

Figure 128. *Nomada flavopicta*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in Europe and Asia (Georgia, Kazakhstan), EOO = 4,269,758 km^2, AOO = 3,500 km^2. National scale: many occurrences in northern Sambre-Meuse line, especially around and between Brussels and Ghent, in southern Sambre-Meuse line it is sparsely distributed around Charleroi, Huy, Vresse-sur-Semois, La Roche-en-Ardenne and between Virton and Arlon, EOO = 1,800 km^2, AOO = 22 km^2.

Population. Continental scale: the species is rather abundant and the populations seem to be stable. National scale: Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: from late June to mid-September. Habitat: flower-rich chalky grasslands and also probably acid sandy grassland (Else and Edwards 2018), verges, dykes, railway areas and water meadows (Smit, 2013). Hosts: *Melitta leporina* (LC) (Stoeckhert 1933, Westrich 1989, Wolf 1950) and potentially *Melitta haemorrhoidalis* (LC), *Melitta tricincta* (VU) (Westrich 1989), *Melitta nigricans* (LC) (Amiet *et al.* 2007).

Threats. No major threats to this species except the decrease of one of its potential hosts (*Melitta tricincta*).

Conservation Actions. The species is not subject to any targeted conservation action and no future specific conservation actions have to be taken except taking conservation measures for *Melitta tricincta*.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

Nomada fucata **Panzer, 1798**

Common Name(s): English - Painted Nomad Bee. French - *Nomade fardée*. Dutch – *Kortsprietwespbij*. German - *Gewöhnliche Wespenbiene*.

Figure 129. *Nomada fucata*. A, female specimen; B, male specimen; C, resting on *Veronica sp.* (Photos : A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart &

Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in Europe, north Africa, the Near East, and eastwards across Asia to Pakistan, Kazakhstan and Kyrgyzstan, EOO = 11,138,073 km^2, AOO = 7,850 km$^{2.}$ National scale: everywhere in Belgium, EOO 5,500 km^2, AOO = 56 km^2.

Population. Continental scale: the populations of this species seem to be stable (Smit, 2013). National scale: Rasmont *et al.* (1993) qualified the species population trend as highly significantly decreasing, probably due to a lack of sampling data. Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from April to May and from July to September. Habitat: ubiquitous (Else and Edwards 2018). Hosts: *Andrena flavipes* (LC) (Schindler 2004).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources.

***Nomada fulvicornis* Fabricius, 1793**

Common Name(s): English - Orange-horned Nomad Bee. French - *Nomade fulvicorne*. Dutch – *Roodsprietwespbij*. German - *Gelbfühler-Wespenbiene*.

Figure 130. *Nomada fulvicornis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in Europe, north Africa and in Asia, eastwards toward Japan, EOO = 8,614,383 km^2, AOO = 4,500 km^2. National scale: the species mainly occurs in northern Sambre-Meuse line, especially around Brussels, Antwerpen and between Ghent and Bruges, in southern Sambre-Meuse line it occurs between Dinant and Marche-en-Famenne, Manhay, La Roche-en-Ardenne, Virton and Arlon, EOO = 1,900 km^2, AOO = 22 km^2.

Population. Continental scale: populations are small, but in most countries the populations of this species are stable. National scale: according to the range map, large spots of populations are now extinct in Hesbaye, Campine and Gaume, Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from April to mid-June and from July to September. Habitat: waste land, dykes, railway areas, verges, natural areas in river beds that are dry in summer, dry heaths, (Smit, 2013), chalky grasslands, cliffs and landslips (Else and Edwards 2018). Hosts: *Andrena agilissima* (EN), *Andrena bimaculata* (NT), *Andrena pilipes* (DD), *Andrena thoracica* (RE), *Andrena tibialis* (LC) (Alfken 1913, Perkins 1919, Stoeckhert 1933, Kocourek 1966, Standfuss and Schwarz 2007).

Threats. Decline of hosts: *Andrena agilissima* (EN), *Andrena bimaculata* (NT), *Andrena pilipes* (DD), *Andrena thoracica* (RE), this decline is probably due to the decline of their habitats and food ressources.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries / regions: Germany (Vulnerable. Westrich *et al.* 2011). Finland (Endangered. Rassi *et al.* 2010). Norway (Near Threatened. Kalas *et al.* 2010). Great Britain (Vulnerable. Shirt 1987). Netherlands (Endangered. Peeters and Reemer 2003). Slovenia (Endangered. Anonymous 2002). Future: anything that could benefit the hosts (cf. hosts assessments).

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions to determine the potential existence of other populations: monitoring of the population trend at the national scale.

***Nomada furva* Panzer, 1798**

Common Name(s): French - *Nomade funeste*. Dutch - *Glanzende Dwergwespbij*. German - *Schwärzliche Wespenbiene*.

Figure 131. *Nomada furva*.
Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (A2bc. B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a Geographic Rangereduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO between 500 and 1500 km²), a reduced area of occupancy (between 5 and 15 km²), severely fragmented EOO and AOO and continuing decline in the EOO, AOO and number of observations. Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs in central, south and east Europe, outside of Europe the species occurs in north Africa (Algeria), EOO = 6,427,381 km², AOO = 536 km², National scale: two populations around Viroinval (Fagne-Famenne) and Bernissart (Région Limoneuse Hennuyère), EOO = 200 km², AOO = 2 km².

Population. Continental scale: *Nomada furva* is rare everywhere, the populations are small and there is no information available on the population trend of this species (Smit, 2013). National scale: according to the range map, most

populations are extinct since 1990. Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from April to June and July to August. Habitat: temperate grassland and plantations (Smit, 2013). Hosts: *Lasioglossum minutulum* (VU) (Perkins 1919), *Lasioglossum leucopus* (NT), *Lasioglossum morio* (LC) and *Lasioglossum punctatissimum* (LC) (Schmiedeknecht 1930, Stoeckhert 1933, Perkins 1919).

Threats. Decline of hosts: *Lasioglossum minutulum* (VU), *Lasioglossum leucopus* (NT). Reduction of habitats and food ressources: destruction of grasslands for agricultural, forestry or urbanization purposes. Intensification in the uses of grasslands (intensive grazing practices, silage). Eutrophication of grasslands.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Endangered. Amiet 1994). Germany (Data Deficient. Westrich *et al.* 2011). Netherlands (Regionally Extinct. Peeters and Reemer 2003). Slovenia (Regionally Extinct. Anonymous 2002). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species and its host. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation and restauration of grasslands.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expedition in order to find potential other populations. Monitoring of the population trend at the national scale.

Nomada fuscicornis **Nylander, 1848**

Common Name(s): English - Small Guernsey Nomad Bee. French - *Nomade à antennes brunes*. Dutch – *Bruinsprietwespbij*. German - *Schwarzfühler-Wespenbiene*.

Figure 132. *Nomada fuscicornis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (A2bc. B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a Geographic Rangereduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO between 500 and 1500 km²), a reduced area of occupancy (between 5 and 15 km²), severely fragmented EOO and AOO and continuing decline in the EOO, AOO and number of observations. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: occurs in central, north, south and east Europe and Asia (Kazakhstan) (Smit, 2013). EOO = 7,240,620 km². AOO = 940 km². National scale: around Bernissart (Région Limoneuse Hennuyère), Hasselt (Campine) and Geel (Campine). EOO = 300 km². AOO = 4 km².

Population. Continental scale: small but seems stable (Smit, 2013). National scale: Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: from July to September. Habitat: cf. host. Host(s): *Panurgus calcaratus* (LC).

Threats. The threats to this species are not known given that the host does not seem to be regressing

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit this species and its host. Future: promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers) and grazing practices. Promotion of the conservation / restauration of dry calcareous grasslands. Promotion of the cultivation of bee-attracting plants in private gardens as well as in public spaces (especially Lamiaceae species).

Research Needed. Evaluate the species tolerance global warming. Impact of pesticides and nitrogen fertilizers on hosts and parasite food ressources. Conduct sampling expeditions to determine the potential existence of other populations. Monitoring of the population trend at the national scale.

Nomada goodeniana **(Kirby, 1802)**

Common Name(s): English - Gooden's Nomad Bee. French - *Nomade commune*. Dutch – *Smalbandwespbij*. German - *Feld-Wespenbiene*.

Figure 133. *Nomada goodeniana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Diestelhorst, O. and Lunau, K. 2008. Beitrag zur Klärung des Artstatus von *Nomada goodeniana (Kirby, 1802) und Nomada succincta Panzer, 1798 (Hymenoptera, Apidae). Entomologie heute 20: 165-171.* Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species is widely distributed in the whole of Europe to the the Near East and Asia, EOO = 7,521,111 km^2, AOO = 8,500 km^2. National scale: everywhere in Belgium, EOO = 9,700 km^2, AOO = 93 km^2.

Population. Continental scale: in most countries the species is rather abundant and populations are rather stable. National scale: Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing. Current population trend: increase.

Habitat and Ecology. Flying period: partly bivoltine, from April to August. Habitat: ubiquitous (Else and Edwards 2018). Hosts: *Andrena tibialis* (LC) (Alfken 1913, Stoeckhert 1933), *Andrena nigroaenea* (LC) (Perkins 1919, Kocourek 1966), *Andrena nitida* (LC) (Alfken 1913), *Andrena cineraria* (LC) (Kocourek 1966, Gebhart and Roehr 1987), *Andrena thoracica* (RE) (Perkins 1919).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

Nomada guttulata **Schenck, 1861**

Common Name(s): English - Short-spined Nomad Bee. French - *Nomade à petites taches*. Dutch - *Gedrongen Wespbij*.

Figure 134. *Nomada guttulata*.
Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2013.

Geographic Range. Continental scale: this species is widely distributed in Europe and Asia (Kazakhstan, Japan), EOO = 7,082,704 km^2, AOO = 1,108 km^2. National scale: populations are found around Overboelare (Flandre Sablo-Limoneuse), Steendorp (Flandre Sablonneuse), Brussels, Eghezée (Hesbaye), Han-sur-Lesse (Fagne-Famenne), Plombières (Pays de Herve), EOO = 200 km^2.

Population. Continental scale: the species is rare and populations are small but the species does not seem to be in decline in most countries, the populations seem to be rather stable. In Germany, latest investigations have proved that the species is present in many more localities as known before, therefore it has been removed from the National Red List (Smit, 2013). In the Netherlands there is no decline (Peeters *et al.* 2012). There has been an increase in the number of records from Great Britain since the early 1990s (S. Roberts pers. comm. 2013). National scale: Rasmont *et al.* (1993) qualified the species population trend as stable in 1991. Current population trend: stable.

Habitat and Ecology. Flying period: from April to June. Habitat: dry open grassland, dykes, edges of forests, parks, railway areas and waste land (Westrich 1989, J. Smit pers. obs. 2013), flower-rich grasslands including *Veronica*, especially *Veronica chamaedrys* (Else and Edwards 2018). Hosts: *Andrena labiata* (LC) (Alfken

1913, Perkins 1919, Raemakers 2000, Stoeckhert 1933, Westrich 1989), *Andrena potentillae* (CR) (Stoeckhert 1933).

Threats. Decline of hosts: *Andrena potentillae* (CR) . Reduction of habitats and food ressources: destruction of grasslands for agricultural, forestry or urbanization purpose, intensification in the uses of grasslands (intensive grazing practices, silage), eutrophication of grasslands.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries / regions: Switzerland (Vulnerable. Amiet 1994). Great Britain (Endangered. Shirt 1987). Netherlands (Endangered. Peeters and Reemer 2003). Sweden (Vulnerable. Gärdenfors 2010), Slovenia (Endangered. Anonymous 2002). The Great Britain Red List assessment is old and in need of revision in view of the increase of records (S. Roberts pers. comm. 2013). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation and restauration of grasslands.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expedition in order to find potential other populations. Monitoring of the population trend at the national scale. Evaluate the species tolerance to global warming.

***Nomada integra* Brullé, 1832**

Common Name(s): English - Cat's-ear Nomad Bee. French - *Nomade de l' Epervière*. Dutch - *Tweekleurige Wespbij*. German - *Habichtskraut-Wespenbiene*.

Figure 135. *Nomada integra*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253. Taxonomic Notes: this species was misidentified as *N. pleurosticta* in the UK, and appears under that name in the British literature before 1995.

Assessment Information. Red List Category & Criteria: VU (A2bc). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Vulnerable due to a population decline (between 30% and 50% between 1900-1969 and 1970-2017), inferred from a reduction in the number of populations, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurrence (EOO). Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Smit, 2013.

Geographic Range. Continental scale: the species occurs across Europe, north Africa, the Near East and Asia until Kazakhstan, EOO = 6,495,825 km^2, AOO = 2,678 km^2. National scale: populations remains in almost every natural regions, EOO = 1,600 km^2, AOO = 13 km^2.

Population. Continental scale: populations are small and the species is rare everywhere, in a number of countries the species is in decline. National scale: according to the range map, mains populations are now extinct, Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing in 1991. Current population trend: decrease.

Habitat and Ecology. Flying period: from late April to June. Habitat: dry open grassland, dykes, meadows, quarries, diggings, verges (Westrich 1989), principally associated with sandy soils (Else and Edwards 2018). Hosts: *Andrena humilis* (LC) (Alfken 1913, Perkins 1919, Stoeckhert 1933, Westrich 1989).

Threats. Reduction of habitat, food ressources: destruction of dry grasslands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor grasslands, urbanization or scrub-encroachment of quarries and sandpits, over-maintenance of verges.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following six European countries: Czech Republic (Vulnerable. Farkac *et al.* 2005). Germany (Vulnerable. Westrich *et al.* 2011). Finland (Regionally Extinct. Rassi *et al.* 2010). Netherlands (Endangered. Peeters and Reemer 2003). Norway (Regionally Extinct. Kålås *et al.* 2010). Sweden (Endangered. Gärdenfors 2010).. Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands. Promotion of the conservation and rehabilitation of old sandpits and quarries.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Monitoring of the population trend at the national scale.

Nomada lathburiana **(Kirby, 1802)**

Common Name(s): English - Lathbury's Nomad Bee. French - *Nomade poils-de-carotte*. Dutch - *Roodharige Wespbij*. German - *Rothaarige Wespenbiene*.

Figure 136. *Nomada lathburiana*. A, female specimen; B, male specimen (Photos: A. Pauly); C, resting (Avernas-le-Bauduin ,Photo : J.Y. Baugnée).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2014

Geographic Range. Continental scale: the species occurs in south-west, central, north and east Europe, it is rather abundant in western Europe (Peeters *et al.* 2012), central Europe (Schwarz *et al.* 1996, Celary 1995, Amiet *et al.* 2007) and east Europe (Monsevicus 1995, Jozan 2011, Levchenko 2013). It rarely occurs in south Europe (M. Schwarz pers. comm. 2014), EOO = 4,627,187 km^2. AOO = 5,000 km^2. National scale: everywhere in Belgium, EOO = 3,000 km^2, AOO = 33 km^2.

Population. Continental scale: populations can be locally very large, and the population trend is stable. There is clear evidence of spread in southern UK and an increase in abundance of both parasite and host (S. Roberts pers. comm. 2014). National scale: widespread but never abundant, Rasmont *et al*. (1993) qualified the species population trend as stable in 1991. Current population trend: stable.

Habitat and Ecology. Flying period: partly bivoltine, spring generation from late March to late May. Habitat: sandy areas, like heathland, riverbanks, sandpits, quarries, sometimes in clay, dykes (Westrich 1989), the host *Andrena cineraria* occurs in many habitats, including calcareous grasslands, town parks and gardens and in the farmed environment (S. Roberts pers. comm. 2014). Hosts: *Andrena vaga* (LC) (Friese 1923), *Andrena cineraria* (LC) (Gebhart and Röhr 1987).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

***Nomada leucophthalma* (Kirby, 1802)**

Common Name(s): English - Early Nomad Bee. French - *Nomade yeux-clairs*. Dutch - *Vroege Wespbij*. German - *Frühe Wespenbiene*.

Figure 137. *Nomada leucophthalma*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in Europe, it is present from western Europe (Peeters *et al.* 2012), through central Europe (Schwarz *et al.* 1996, Celary 1995, Amiet *et al.* 2007) to Lithuania (Monsevicus 1995) and Latvia in east Europe and in Scandinavia (except Iceland) (Madsen and Calabuig 2012, Janzon *et al.* 1991, Stenlokk 2011), EOO = 4,489,015 km^2, AOO = 3,100 km^2. National scale: everywhere in Belgium, EOO = 3,100 km^2, AOO = 23 km^2.

Population. Continental scale: populations are generally rather small but there seems to be no decline in the populations of this species, the population trend is thus considered stable (Smit, 2014). National scale: the majority of the populations seemed lost between 1950 and 1990 but many occurrences have been recorded after 1990, the population trend is thus considered as stable, Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing. Current population trend: stable.

Habitat and Ecology. Flying period: from March to early May. Habitat: the habitat is along rivers, dykes, abandoned diggings, waste land near water (Westrich 1989, J. Smit pers. obs. 2013), woodland rides and clearings, edges of heaths, moorland, abandoned sand and gravel pits (Else and Edwards 2018). Hosts: *Andrena clarkella* (LC) (Gebhart and Röhr 1987) and probably also *Andrena apicata* (DD) (Alfken 1913, Chambers 1968, Möschler 1938, Perkins 1919)

and *Andrena nycthemera* (LC) (Alfken 1913, Chambers 1968, Möschler 1938, Perkins 1919, Kocourek 1966).

Threats. Reduction of habitats / food ressources: intensification of forestry practices (deletion of edges, rides and clearings). destruction of heathlands and moorlands for agricultural, forestry and urbanization purposes. Reconversion (urbanization, afforestation) or scrub encroachment of sand and gravel-pits. Decline of hosts: *Andrena apicata* (DD).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Vulnerable. Amiet 1994). Czech Republic (Vulnerable. Farkac *et al*. 2005). Germany (Vulnerable. Westrich *et al.* 2011) and Netherlands (Vulnerable. Peeters and Reemer 2003). Future: promotion of extensive forestry practices. Promotion of the conservation and rehabilitation of heaths, moors and old sand and gravel-pits.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

Nomada marshamella **(Kirby, 1802)**

Common Name(s): English - Marsham's Nomad Bee. French - *Nomade de Marsham*. Dutch - *Donkere Wespbij*. German - *Wiesen-Wespenbiene*.

Figure 138. *Nomada marshamella*. A, female specimen; B, male specimen (Photos : A. Pauly); C, at nest entrance (Liège, Photos : J.M. Michalowski).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: the species is widely distributed in the Palearctic region, EOO = 5,859,425 km², AOO = 7,700 km² · National scale: more

widespread in middle Belgium (plateaux limoneux hennuyer, brabançon and hesbignon), EOO = 12,700 km², AOO = 135 km².

Population. Continental scale: the species is abundant in most European countries, and does not appear to be in decline (Smit, 2014). National scale: typical middle Belgium species, widespread but never abundant in this area, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: from late March to June. Data from August may indicate a small second generation (Van der Vecht 1930, Lefeber 1971, Westrich 1989). Habitat: ubiquitous (Else and Edwards 2018). Hosts: *Andrena carantonica* (LC) (Stoeckhert 1933, Westrich 1989), *Andrena ferox* (CR) (Smit 1996), *Andrena rosae* (LC) (Stoeckhert 1933) and *Andrena nigroaenea* (LC) (Moeschler 1938, Stoeckhert 1933).

Threats. No major threats to this species.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of Finland (Vulnerable. Rassi *et al.* 2010). Future: no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

Nomada melathoracica **Imhoff, 1834**

Common Name(s): French - *Nomade des Crucifères*. Dutch – *Vlekpootwespbij*. German - *Senf-Wespenbiene*.

Figure 139. *Nomada melathoracica*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: the species is a European endemic. It occurs in south-west Europe (M. Schwarz pers. comm. 2014, J. Smit pers. obs. 2014), western Europe until the south of the Netherlands (E. Dufrêne, P. Rasmont and J. Smit pers. comm. 2014), and in central Europe until Hungary (Amiet *et al.* 2007, Schwarz *et al.* 1996, Jozan 2011), EOO = 2,117,452 km^2, AOO = 380 km^2. National scale: last observations in 1955 around Tongeren.

Population. Continental scale: in southern Europe the species can be locally abundant and overall the populations seem to be stable (Smit, 2014). National scale: extinct, Rasmont *et al*. (1993) qualified the species population trend as significantly decreasing. Current population trend: extinct.

Habitat and Ecology. Flying period: from May to June. Habitat: dry open grassland, rich flowering verges and rich flowering grasslands (J. Smit pers. obs. 2013). Hosts: *Andrena agilissima* (EN) (Westrich 1989) and *Andrena pilipes* (DD) (Petit 1975).

Threats. Decline of hosts: *Andrena agilissima* (EN), *Andrena pilipes* (DD). Decline of habitat: destruction of dry grasslands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor grasslands, over-maintenance of verges.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following two European countries: Switzerland (Endangered. Amiet 1994) and Germany (Endangered. Westrich *et al.* 2011). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of remaining populations.

Nomada mutabilis **Morawitz, 1870**

Common Name(s): French - *Nomade changeante*. Dutch - *Rode Wespbij*. German - *Veränderliche Wespenbiene*.

Figure 140. *Nomada mutabilis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Smit, 2014.

Geographic Range. Continental scale: the species occurs rather rarely and scattered in south-west and western Europe, in central Europe, eastern Europe and south-east Europe the species is more abundant, EOO = 4,443,605 km^2, AOO = 420 km^2. National scale: last observation around Liège.

Population. Continental scale: populations are small and the species is in decline in a number of countries (Smit, 2014). National scale: extinct, Rasmont *et al*. (1993) qualified the species population trend as significantly decreasing. Current population trend: extinct.

Habitat and Ecology. Flying period: univoltine, from May to mid-August. Habitat: inhabits dry open grassland, dykes, unpaved roads and heathlands (Westrich 1989). Hosts: *Andrena chrysopyga* (RE) is very likely the main host (Alfken 1913, Enslin 1922, Kocourek 1966, Sanders 1950, Stoeckhert 1933) and possibly *Andrena labialis* (NT) (Moeschler 1938, Kocourek 1966), *Andrena gravida* (LC) (Standfuss and Schwarz 2007) and *Andrena polita* (CR) (Kocourek 1966, Amiet *et al*. 2007).

Threats. Decline of hosts: *Andrena chrysopyga* (RE), *Andrena labialis* (NT), *Andrena polita* (CR). Decline of habitat / food ressources: destruction of dry grasslands and heathlands for agricultural, forestry or urbanization purposes, intensification in

the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats, over-maintenance of verges.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Switzerland (Near Threatened. Amiet 1994), Czech Republic (Regionally Extinct. Farkac *et al.*2005), Germany (Critically Endangered. Westrich *et al.*2011) and the Netherlands (Regionally Extinct. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands and heathlands. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of remaining populations.

Nomada mutica **Morawitz, 1872**

Common Name(s): French - *Nomade des chênes*. Dutch - *Gele Wespbij*. German - *Eichen-Wespenbiene.*

Figure 141. *Nomada mutica*.
Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Listed as Critically Endangered because of a limited, fragmented and declining Extent Of Occurrence (EOO < 500 km²) and Area Of Occupancy (AOO < 5 km²), it is extremely scarce in Belgium probably because its host is CR. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in central and north-east Spain, in France until the central part of the Netherlands, from Germany until the west of Hungary, in Romania, in Lesvos and Cyprus, it also occurs in the Near East (Turkey), EOO = 2,922,374 km², AOO = 316 km². National scale: only one population around the town of Verviers.

Population. Continental scale: the species is rare in Europe, populations are small and in a number of countries the species is in decline (Smit, 2014). National scale: known from a single population, Rasmont *et al*. (1993) qualified the species population trend as significantly decreasing. Current population trend: unknown due to a lack of sampling data.

Habitat and Ecology. Flying period: from the end of April to early June. Habitat: edges of forests, extensively grazed meadows (Smit 2006) and quarries (I. Raemakers pers. obs. 2013). Hosts: *Andrena ferox* (CR) (Stoeckhert 1933, Kocourek 1966, Smit 2006).

Threats. Decline of hosts: *Andrena ferox* (CR). Decline of habitat: destruction of meadows for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of grasslands, intensive forestry practices (deletion of edges and clearings).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Critically Endangered. Amiet 1994), Czech Republic (Regionally Extinct. Farkac *et al.* 2005), Germany (Endangered. Westrich *et al.* 2011,. Slovenia (Endangered. Anonymous 2002) and the Netherlands (Near Threatened. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of extensive forestry practices. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

***Nomada obscura* Zetterstedt, 1838**

Common Name(s): French - *Nomade sombre.* Dutch - *Donkere Dubbeltand*. German - *Vorfrühlings-Wespenbiene.*

Figure 142. *Nomada obscura*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: the species occurs in northern, central and eastern Europe as well as in Asia (Russian Far East), EOO = 2,391,948 km^2, AOO = 544 km^2. National scale: the species occurs around Hensies and in a few locations in Campine, EOO = 400 km^2.

Population. Continental scale: populations are rather small. In northern Europe the species can be abundant, but in central Europe the species is regarded as a relic from the last glacial period (Westrich 1989) and is rare. National scale: highly scattered populations but the trend seems to be stable, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: from late March to late May. Habitat: edges of forests (Westrich 1989), dry heathland (Reemer *et al.* 1999) and sandpits (Cölln and Jakubzik 2009). Hosts: *Andrena ruficrus* (NT) (Benno 1948, Perkins 1919, Stoeckhert 1933, Kocourek 1966).

Threats. Reduction of habitats / food ressources: intensification of forestry practices (deletion of edges, rides and clearings). Destruction of heathlands and moorlands for agricultural, forestry and urbanization purposes. Reconversion (urbanization, afforestation) or scrub encroachment of sandpits. Decline of hosts: *Andrena ruficrus* (NT).

Conservation Actions. Present: this species is legally protected (LCN 1973, annexe IIb). This species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Near Threatened. Amiet 1994), Czech Republic (Critically Endangered. Farkac *et al.* 2005), Germany (Near Threatened. Westrich *et al.* 2011), Netherlands (Vulnerable. Peeters and Reemer 2003) and Poland (Vulnerable. Glowacinski and Nowacki 2009). Future: promotion of extensive forestry practices. Promotion of the conservation and rehabilitation of heaths, moors and old sandpits. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada obtusifrons **Nylander, 1848**

Common Name(s): English - Flat-ridged Nomad Bee. French - *Nomade à front obtu*. Dutch – *Platkielwespbij*. German - *Stumpfkielige Wespenbiene*.

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Critically Endangered because of a limited, fragmented and declining Extent Of Occurrence (EOO < 500 km²) and Area Of Occupancy (AOO < 5 km²), it is extremely scarce in Belgium probably because its host is EN. Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe the species is known from a few localities in France, United Kingdom and Ireland, Belgium and Netherlands, in central Europe the species is distributed from northern Italy until Romania and until northern Germany and Poland, in eastern Europe the species occurs from Lithuania to Russia and Scandinavia, EOO = 3,744,641 km². AOO = 788 km². National scale: a single occurrence around the village of Bohan, EOO = 100 km², AOO = 1 km².

Population. Continental scale: the populations are small, and the species is in decline in a number of countries, the host (*Andrena coitana*) is also in decline in a number of countries (Smit, 2014). National scale: at least three scattered spots of populations before 1990, a single spot after 1990, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from late June to late August, occasionally September. Habitat: edges of forests (Reemer *et al.* 1999) and felled areas (Baugnee 2003), heaths and open woodland (Else and Edwards 2018). Hosts: *Andrena coitana* (EN) (Alfken 1913, Perkins 1919, Stoeckhert 1933), *Andrena tarsata* (EN) (Perkins, 1919).

Threats. Decline of hosts: *Andrena coitana* (EN), *Andrena tarsata* (EN). Decline of habitat / food ressources: destruction of heathlands for agricultural, forestry or urbanization purposes, intensification of forestry practices (deletion of edges and clearings as well as open woodland).

Conservation Actions

Present: this species is included in the National Red Lists or Red Data Books of the following nine European countries: Switzerland (Regionally Extinct. Amiet 1994), Czech Republic (Regionally Extinct. Farkac *et al.* 2005), Germany (Endangered. Westrich *et al.* 2011), Finland (Vulnerable. Rassi *et al.* 2010), Ireland (Endangered. Fitzpatrick *et al.* 2006), Netherlands (Regionally Extinct. Peeters and Reemer 2003), Norway (Near Threatened. Kålås *et al.* 2010), Sweden (Near Threatened. Gärdenfors 2010) and Slovenia (Endangered. Anonymous 2002).

Future: promotion of the conservation and rehabilitation of heathlands, promotion of extensive forestry practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada opaca Alfken, 1913

Common Name(s): French - *Nomade opaque*. Dutch – *Boswespbij*. German - *Dunkle Wespenbiene.*

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (B1ab(ii,iii) + 2ab(ii,iii)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe the species is found from northern France to the Netherlands. The species is also present in southern Scandinavia, in central Europe the species occurs from Switzerland and Germany to Hungary and from Slovenia to Poland, in eastern Europe it occurs in Lithuania and Latvia, EOO = 1,569,303 km^2, AOO = 212 km^2. National scale: records around Eeklo (Flandre Sablonneuse) and Merksplas (Campine).

Population. Continental scale: populations are small and the species is rare everywhere, like the host (*Andrena fulvida*), in a number of countries the species is in decline, the overall population trend is decreasing (Smit, 2014). National scale: the species has always been extremely scarce, too few data to establish a clear population trend, Rasmont *et al*. (1993) qualified the species population trend as stable in 1991. Current population trend: unknown.

Habitat and Ecology. Flying period: from early May to late June, sometimes early July. Habitat: edges of forests (Reemer *et al.* 1999), and the host also lives in felled areas within forests (Westrich 1989). Hosts: *Andrena fulvida* (EN) (Kocourek 1966, Stoeckhert 1933).

Threats. Decline of hosts: *Andrena fulvida* (EN). Decline of habitat: intensification of forestry practices including closing of the vegetation, destruction of multistage edges and clearings.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following nine European countries: Switzerland (Near Threatened. Amiet 1994), Czech Republic (Regionally Extinct. Farkac *et al.* 2005), Germany (Endangered. Westrich *et al.* 2011), Netherlands (Endangered. Peeters and Reemer 2003), Norway (Not Evaluated. Kålås *et al.* 2010), Sweden (Near Threatened. Gärdenfors 2010), Finland (Critically Endangered. Rassi *et al.* 2010), Slovenia (Vulnerable. Anonymous 2002) and Poland (Vulnerable. Glowacinszki and Nowacki 2009). Future: promotion of extensive forestry practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada panzeri **Lepeletier, 1841**

Common Name(s): English - Panzer's Nomad Bee. French - *Nomade de Panzer*. Dutch - *Sierlijke Wespbij*. German - *Panzers Wespenbiene*.

Figure 143. *Nomada panzeri*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Smit, 2014.

Geographic Range. Continental scale: western Europe (Portugal, Spain, France, Netherlands, Great Britain and Ireland), central Europe (from Italy eastwards until Hungary and north until north Germany and north Poland), Balkan Peninsula (Romania, Bulgaria and Greece), eastern Europe (Scandinavia, Russia), EOO = 7,680,822 km^2, AOO = 9,500 km$^{2.}$ National scale: everywhere in Belgium, EOO = 11,100 km^2, AOO = 102 km^2.

Population. Continental scale: the populations of this species are stable in most countries (Smit, 2014). National scale: widespread and rather abundant, stable populations, Rasmont *et al*. (1993) qualified the species population trend as stable in 1991. Current population trend: stable.

Habitat and Ecology. Flying period: univoltine, from mid-April to late June or early July. Habitat: ubiquitous (J. Smit pers. obs. 2013), particularly associated with broad-leaved clearings supporting large amount of *Euphorbia amygdaloides* (Else and Edward 2018). Hosts: *Andrena fulva* (LC) (Paxton and Pohl 1999) and probably *A. varians* (CR), *A. helvola* (VU), *A. synadelpha* (CR), *A. fucata* (VU) and *A. lapponica* (VU) (Perkins 1919, Richards 1946, Stoeckhert 1933, Westrich 1989).

Threats. Decline of hosts: *A. varians* (CR), *A. helvola* (VU), *A. synadelpha* (CR), *A. fucata* (VU) and *A. lapponica* (VU).

Decline of habitat: Intensification of forestry practices including closing of the vegetation, destruction of structured edges and openings.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Germany (Endangered. Westrich *et al.* 2011). Ireland (Near Threatened. Fitzpatrick *et al.* 2006). Slovenia (Endangered. Anonymous 2002). Future: promotion of extensive forestry practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources.

Nomada piccioliana **Magretti, 1883**

Common Name(s): French - *Nomade mignonne*. Dutch – *Kalkgraslandwespbij*. German - *Toskanische Wespenbiene*.

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Critically Endangered because of a limited, fragmented and declining Extent Of Occurrence (EOO < 500 km²) and Area Of Occupancy (AOO < 5 km²), it is extremely scarce in Belgium probably because its host is CR. Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: the species is an European endemic, in western Europe (from South Spain to south Netherlands), in central Europe (south Italy to Germany, Hungary and Slovakia), in the Balkan Peninsula (Romania, Serbia and Greece), EOO = 2,440,415 km², AOO = 316 km². National scale: known from a single location around Rotselaar.

Population. Continental scale: populations are small and this species seems to be in decline in a number of countries (Smit, 2014). National scale: it has always been an extremely scarce species, however since 1990 some populations might have disappeared around Tongeren, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from late May to early July. Habitat: dry open grasslands, mostly on south exposed slopes (Westrich 1989). Hosts: *Andrena combinata* (CR) is a probable host (Stoeckhert 1941, Stoeckhert 1954, Kocourek 1966, Standfuss and Schwarz 2007).

Threats. Decline of hosts: *Andrena combinata* (CR). Decline of habitat / food ressources: destruction of dry grasslands and heathlands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Czech Republic (Regionally Extinct. Farkac *et al.* 2005), Germany (Vulnerable. Westrich *et al.* 2011) and Netherlands (Regionally Extinct. Peeters and Reemer 2003). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada pleurosticta **Herrich-Schäffer, 1839**

Common Name(s): French - *Nomade lichen*. Dutch – *Neushoornwespbij*. German - *Bitterkraut-Wespenbiene*.

Figure 144. *Nomada pleurosticta*. Female specimen (Photo: A. Pauly).

Taxonomic Source: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Smit, 2014.

Geographic Range. Continental scale: mostly in central Europe (from Switzerland to Hungary, Germany, Czech Republic) but also in western Europe (north Spain to central-east of Netherlands) (Smit, 2014), EOO = 1,890,668 km², AOO = 236 km² · National scale: last observations around Hensies, Plombières and Tongeren.

Population. Continental scale: populations are small and in a number of countries the species is in decline (Smit, 2014). National scale: Rasmont *et al.* (1993) qualified the species population trend as stable. Current population trend: extinct

Habitat and Ecology. Flying period: from late June or early July to mid-August. Habitat: dry open grasslands, dry waste lands, verges of unpaved roads (Westrich 1989). Hosts: *Andrena polita* (CR) (Alfken 1913, Enslin 1922, Morawitz 1872, Müller 1944, Stoeckhert 1933, Kocourek 1966, Westrich 1989).

Threats. Decline of hosts: *Andrena polita* (CR). Decline of habitat / food ressources: destruction of dry grasslands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats, over-maintenance of verges.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Regionally Extinct. Amiet 1994 - although there are data known of this species from Switzerland from the last ten years (J. Smit pers. comm. 2013)), Czech

Republic (Endangered. Farkac *et al.* 2005) and Germany (Endangered. Westrich *et al.* 2011). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of remaining populations.

Nomada rhenana Morawitz, 1872

Common Name(s): French - *Nomade rhénane*. Dutch - *Kale Wespbij*. German - *Rheinische Wespenbiene.*

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in west Europe (from south Portugal and Spain to south Netherlands), in central Europe (from Germany to Hungary, Poland, in eastern Europe (Lithuania) and in Balkan Peninsula, EOO = 3,800,488 km^2, AOO = 696 km^2. National scale: was scarcely distributed but present in almost every natural region.

Population. Continental scale: populations are small and in a number of countries the species is in decline (Farkac *et al.* 2005, Westrich *et al.* 2011, Glowacinski *et al.* 2009) or even extinct (Amiet 1994, Peeters and Reemer 2003, Anonymous 2002), the population trend of this species is apparently decreasing (Smit, 2014). National scale: Rasmont *et al.* (1993) qualified the species population trend as stable. Current population trend: extinct.

Habitat and Ecology. Flying period: bivoltine, from mid-May to late June and from late July to mid-September. Habitat: heathland (Reemer *et al.* 1999), dry open grassland, dykes, quarries, sand pits and dry wastelands (Westrich 1989). Hosts: *Andrena ovatula* (NT) (Stoeckhert 1941, Stoeckhert 1933).

Threats. Decline of hosts: *Andrena ovatula* (NT). Decline of habitat / food ressources: destruction of dry grasslands and heathlands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats, reconversion or afforestation of old quarries and sandpits.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Switzerland (Regionally Extinct. Amiet 1994), Czech Republic (Endangered. Farkac *et al.* 2005), Germany (Vulnerable. Westrich *et al.* 2011), Netherlands (Regionally Extinct. Peeters and Reemer 2003), Slovenia (Regionally Extinct. Anonymous 2002) and Poland (Vulnerable. Glowacinski and Nowacki 2009). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands and heathlands. Promotion of the conservation or rehabilitation of old quarries and sandpits. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine

the potential existence of remaining populations. Understanding of the extinction at the national scale.

***Nomada roberjeotiana* Panzer, 1799**

Common Name(s): English - Tormentil Nomad Bee. French - *Nomade des Potentilles*. Dutch - *Kleine Bonte Wespbij*. German - *Fingerkraut-Wespenbiene*.

Figure 145. *Nomada roberjeotiana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: RE. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Smit, 2014

Geographic Range. Continental scale: in western Europe (from the Pyrenees to Netherlands and United Kingdom), in central Europe (north Italy to north Germany, north Poland), in eastern Europe (from the Baltic States to European Russia and Scandinavia (Smit, 2014), EOO = 3,948,658 km^2, AOO = 1,130 km^2. National scale: extinct.

Population. Continental scale: populations are small and the species is extinct in two European countries (Peeters and Reemer 2003, Farkac *et al.*2005) and in a number of countries the species is in decline (Amiet 1994, Farkac *et al.* 2005, Westrich *et al.* 2011, Shirt 1987), the population trend in Europe is considered to be decreasing (Smit, 2014). National scale: extinct. Current population trend: extinct.

Habitat and Ecology. Flying period: from late June to late August. Habitat: heathland (Reemer *et al.* 1999), the habitat of the host is cleared areas in forests, woodland glades (Westrich 1989). Hosts: *Andrena tarsata* (EN) (Alfken 1913, Perkins 1919, Stoeckhert 1933) and probably *Andrena coitana* (EN) (Alfken 1913, Stoeckhert 1933, Petit 1977), *Andrena fuscipes* (LC) (Brechtel 1986, Schmid-Egger *et al.* 1995, Stoeckhert 1933 and Scheuchl 1995), *Andrena denticulata* (NT) (Venne and Bleidorn 2003, Smit and van der Meer 2007).

Threats. Decline of hosts: *Andrena tarsata* (EN), *Andrena coitana* (EN), *Andrena denticulata* (NT). Decline of habitat / food ressources: destruction of heathlands for agricultural, forestry or urbanization purposes, intensification in forestry practices (deletion of edges and clearings).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Switzerland (Vulnerable. Amiet 1994), Czech Republic (Endangered. Farkac *et al.* 2005), Germany (Vulnerable. Westrich *et al.* 2011), Great Britain (Vulnerable. Shirt 1987), Netherlands (Regionally Extinct. Peeters and Reemer 2003) and Norway (Data Deficient. Kålås *et al.* 2010). Future: promotion of the conservation or rehabilitation of heathlands. Promotion of extensive forestry practices.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of remaining populations.

***Nomada ruficornis* (L., 1758)**

Common Name(s): English - Fork-jawed Nomad Bee. French - *Nomade ruficorne*. Dutch - *Gewone Dubbeltand*. German - *Rotfühler-Wespenbiene*.

Figure 146. *Nomada ruficornis*. A, female specimen; B, male specimen; C, resting (Auderghem, Photos : A. Pauly).

Taxonomic Source: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from France to the north of the Netherlands, Great Britain and Ireland), in central Europe (from south Italy to north Germany, Poland, Hungary, in eastern Europe (Slovenia, Romania and Montenegro, Lithuania, European Russia), Scandinavia, EOO = 6,556,655 km², AOO = 9,250 km². National scale: everywhere in Belgium, EOO = 12,700 km², AOO = 119 km².

Population. Continental scale: populations of this species are stable (Smit, 2014). National scale: populations seemed to be decreasing between 1950 and 1990 but new records have proven that this species has widespread and stable populations, Rasmont *et al*. (1993) qualified the species population trend as very highly significantly decreasing in 1991. Current population trend: stable.

Habitat and Ecology. Flying period: from mid-April to mid-June (rarely late June, early July). Habitat: ubiquitous (Else and Edwards 2018). Hosts: *Andrena haemorrhoa* (LC) (Alfken 1913, Perkins 1919, Stoeckhert 1933, Westrich 1989).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources.

Nomada rufipes **Fabricius, 1793**

Common Name(s): English - Black-horned Nomad Bee. French - *Nomade à pattes rouges*. Dutch – *Heidewespbij*. German - Heide-*Wespenbiene, Rotbeinige Wespenbiene*.

Figure 147. *Nomada rufipes*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: NT. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Nearly Threatened due to a reduction of its area of occupancy (AOO) (between 15% and 30% between 1900-1969 and 1970-2017). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: from south-western Europe to Netherlands, England and Ireland, in central Europe (from north Italy to north Poland, Germany and Hungary), in the Balkan Peninsula (from Slovenia to Romania and Greece), in eastern Europe (from Lithuania to European Russia) and in Scandinavia, EOO = 6,250,559 km^2, AOO = 7,800 km^2. National scale: formerly present in almost each natural region, seems now almost restricted to Campine with a few scattered records in southern Sambre-Meuse line EOO = 3,500 km^2, AOO = 35 km^2.

Population. Continental scale: populations can be locally abundant, but in a number of countries the species is in decline (Smit, 2014). National scale: numerous populations are now extinct, the species is clearly declining in Belgium, Rasmont *et al*. (1993) qualified the species population trend as highly significantly. Current population trend: decrease.

Habitat and Ecology. Flying period: from mid-July to mid-September. Habitat: heathlands, and very rarely, calcareous grassland (Smit, 2014). Hosts: *Andrena fuscipes* (LC) (Alfken 1913, Stoeckhert 1933, Westrich 1989) and probably *Andrena denticulata* (NT) (Perkins 1919, Theunert 2006) and *Andrena nigriceps* (CR) (Theunert 2006).

Threats. Decline of hosts: *Andrena denticulata* (NT), *Andrena nigriceps* (CR). Decline of habitat / food ressources: destruction of heathlands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Vulnerable. Amiet 1994), Germany (Vulnerable. Westrich *et al.* 2011) and Slovenia (Endangered. Anonymous 2002). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands and heathlands. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Monitoring of the population trend at the national scale.

Nomada sexfasciata **Panzer, 1799**

Common Name(s): English - Six-banded Nomad Bee. French - *Nomade à six bandes*. Dutch - *Grote Wespbij*. German - *Langkopf-Wespenbiene*.

Figure 148. *Nomada sexfasciata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: CR (A2bc). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Critically Endangered due to a population decline (more than 80% between 1900-1969 and 1970-2017, only three populations left), inferred from a population reduction observed, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurrence (EOO), the regression of the species is at least partly due to the decline of hosts (EN, VU). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from southern Portugal and Spain until the south of England and the centre of the Netherlands), in central Europe (from Sicily to northern Germany, Poland and Hungary, in the Balkan Peninsula (from Slovenia and Romania until Rhodes, in eastern Europe (European Russia) and in Scandinavia (Sweden), EOO = 6,302,775 km^2 and the area of occupancy (AOO) is 3,500 km^2. National scale: extinct from the majority of its places of occurrence, can only be found along the Meuse around Maasmechelen and in the extreme south of Belgium, EOO = 400 km^2, AOO = 5 km^2.

Population. Continental scale: populations are rather small, in the northern part of its range it is in decline, but in central and southern Europe populations are stable (Smit, 2014). National scale: strong regression, main populations are now extinct, three populations remain, Rasmont *et al*. (1993) qualified the species population trend as very highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: from early May to mid-July. Habitat: dykes, floodplains, verges, dry open grasslands (J. Smit pers. obs. 2014) and soft rock cliffs along the coast (S. Roberts pers. comm. 2014). Hosts: *Eucera nigrescens* (EN), *Eucera longicornis* (VU) (Alfken 1913, Stoeckhert 1933, Westrich 1989).

Threats. Decline of hosts: *Eucera nigrescens* (EN), *Eucera longicornis* (VU). Decline of habitat / food ressources: destruction of dry grasslands and floodplains for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats, over-maintenance of verges.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Great Britain (Endangered. Shirt 1987), Netherlands (Critically Endangered. Peeters and Reemer 2003) and Sweden (Regionally Extinct. Gärdenfors 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10 but also MC3 concerning floodplains) could benefit to this species. More conformation to the "Bord de Route" convention which was signed by most of Walloon municipalities. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada sheppardana **(Kirby, 1802)**

Common Name(s): English - Sheppard's Nomad Bee. French - *Nomade de Sheppard*. Dutch – *Geeltipje*. German - *Sheppards Wespenbiene*.

Figure 149. *Nomada sheppardana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from south Iberian Peninsula to the north of the Netherlands and south England, the species is also found in Denmark), in central Europe (from Sicily to the north of Germany, Hungary, Czech Republic, Slovakia, Poland), in the Balkan Peninsula (Croatia, Bulgaria, Greek mainland, EOO = 4,417,648 km^2, AOO = 4,000 km^2. National scale: everywhere in Belgium except in Ardenne du Sud and Lorraine Belge, the species seems more abundant in northern Sambre-Meuse line, EOO = 5,100 km^2, AOO = 41 km^2.

Population. Continental scale: populations can be large and the population trend of this species is stable (Smit, 2014). National scale: widespread but never abundant, populations seem to be decreasing around Liège, many new occurrences in northern Sambre-Meuse line, mainly in and around large cities such as Brussels and Ghent, Rasmont *et al*. (1993) qualified the species population trend as very highly significantly decreasing. Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from April to June and from July to August. Habitat: ubiquitous (Else and Edwards 2018). Hosts: *Lasioglossum nitidiusculum* (LC) (Enslin 1922, Stoeckhert 1933, Westrich 1989), *Lasioglossum sexstrigatum* (LC) (Haeseler 1982. Vegter 1971, 1977), *Lasioglossum glabriusculum* (NT) (Noskiewicz 1930), *Lasioglossum politum* (RE) (Stoeckhert 1944), *Lasioglossum*

lucidulum (LC) (Blüthgen 1944) and *Lasioglossum semilucens* (LC) (Pittioni and Schmidt 1943).

Threats. There seem to have no major threats to species although two of its hosts are threatened.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Ireland (Regionally Extinct. Fitzpatrick *et al.* 2006) and Czech Republic (Regionally Extinct. Farkac *et al.* 2005). Future: anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to find potential other populations.

***Nomada signata* Jurine, 1807**

Common Name(s): English - Broad-banded Nomad Bee. French - *Nomade des groseillers*. Dutch – *Signaalwespbij*. German - *Stachelbeer-Wespenbiene*.

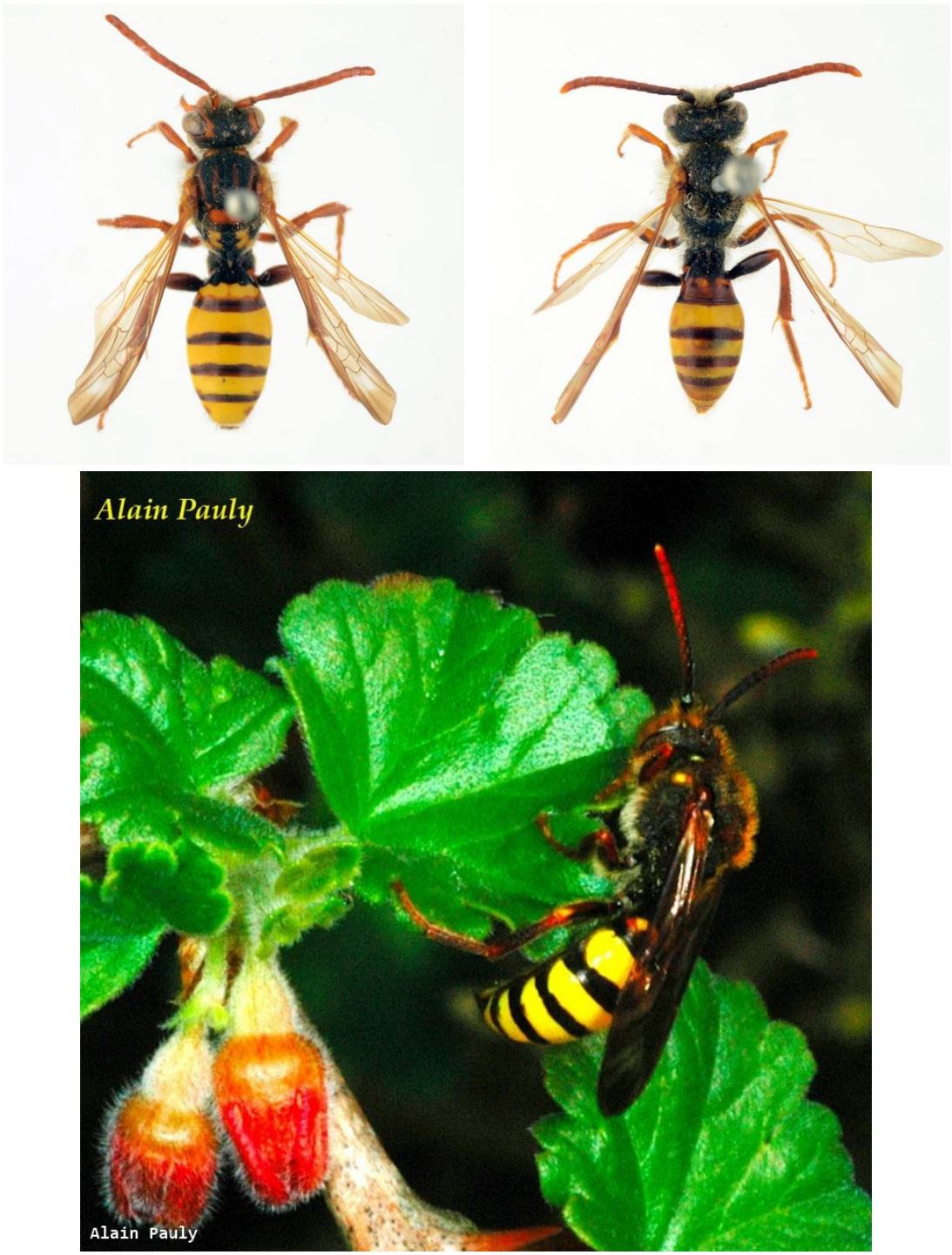

Figure 150. *Nomada signata*. A, female specimen; B, male specimen; C, resting on *Ribes sp.* (Photos : A. Pauly).

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (in the Iberian peninsula, from southern France to northern Netherlands, in southern England), in central Europe (Italy to northern Germany, Poland, Hungary), in the Balkan Peninsula, in eastern Europe (Lithuania and Denmark), EOO = 2,923,830 km^2, AOO = 3,500 km^2. National scale: everywhere in northern Sambre-Meuse line, scattered range in southern Sambre-Meuse line, EOO = 4,900 km^2, AOO = 42 km^2.

Population. Continental scale: populations are rather small, however in some countries (Germany, Netherlands) they are increasing, overall the populations are stable (Smit, 2014). National scale: many new occurrences since 1990 except around Liège and Tongeren where a decrease has been observed, Rasmont *et al*. (1993) qualified the species population trend as very highly significantly decreasing in 1991. Current population trend: stable.

Habitat and Ecology. Flying period: from April to May. Habitat: edges of forests, heathland, grasslands, quarries and sand workings and urban areas, more common on sandy areas (Smit, 2014). Hosts: probably *Andrena fulva* (LC) (Gusenleitner 1983, Perkins 1919, Schroeder 1922, Stoeckhert 1933, Kocourek 1966, Westrich 1989).

Threats. No major threats to this species.

Conservation Actions. The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

***Nomada similis* Morawitz, 1872**

Common Name(s): English - Guernsey Nomad Bee. French - *Nomade semblable*. Dutch – *Matglanswespbij*. German - *Ähnliche Wespenbiene*.

Figure 151. *Nomada similis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (A2bc. B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered due to: (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a Geographic Rangereduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO between 500 and 1500 km²), a reduced area of occupancy (between 5 and 15 km²), severely fragmented EOO and AOO and continuing decline in the EOO, AOO and number of observations. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from southern Iberian Peninsula until northern Netherlands), in central Europe (from central Italy to northern Germany and Poland), in the Balkan Peninsula (from Romania to the Greek mainland and Albania), EOO = 3,698,041 km², AOO = 1,240 km². National scale: two records since 1990 around Brugge (Flandre Sablonneuse) and Hasselt (Campine), EOO = 1,000 km², AOO = 7 km².

Population. Continental scale: populations are rather small and in a number of countries the species is in decline (Farkac *et al.* 2005, Westrich *et al.* 2011, Głowaciński and Nowacki 2009, Peeters and Reemer 2003, Gärdenfors 2010), the

population trend is decreasing (Smit, 2014). National scale: populations have always been scarce and scattered and most of them are now extinct, Rasmont *et al*. (1993) qualified the species population trend as highly significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: from June to September. Habitat: dry open grasslands (Reemer *et al.* 1999), heathland, sand, gravel pits and edges of forests (Westrich 1989). Hosts: probably *Panurgus banksianus* (LC) (Stoeckhert 1933, Westrich 1989).

Threats. Decline of habitat / food ressources: destruction of dry grasslands and heathlands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage) as well as in forestry practices (deletion of edges and clearings), eutrophication of nutrient-poor habitats, reconversion or scrub-encroachment of old sand and gravel pits.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Czech Republic (Regionally Extinct. Farkac *et al.* 2005), Germany (Vulnerable. Westrich *et al*. 2011), Poland (Vulnerable. Głowaciński and Nowacki 2009), Netherlands (Vulnerable. Peeters and Reemer 2003) and Sweden (Endangered. Gärdenfors 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of extensive forestry practices. Promotion of the conservation / rehabilitation of nutrient-poor grasslands, heathlands and sandpits.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations. Confirmation of host.

***Nomada stigma* Fabricius, 1804**

Common Name(s): French - *Nomade du Sainfoin*. Dutch – *Borstelwespbij*. German - *Esparsetten-Wespenbiene*.

Figure 152. *Nomada stigma*. A, female specimen (Photo : A. Pauly); B, resting (Chaudfontaine, Photo : J.Y. Baugnée).

Taxonomic Source(s): Mandery, K., Kosuch, J. and Schuberth, J. 2008. Untersuchungsergebnisse zum Artstatus von *Andrena decipiens* Schenck, 1861, *Andrena flavilabris* Schenck, 1874, und ihrem gemeinsamen Brutparasiten *Nomada* stigma Fabricius, 1804 (Hymenoptera: Apidae). *Nachrichtenblatt Bayerischen Entomologen* 57(1-2): 30-41. Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from southern Iberian Peninsula to centre Netherlands), in central Europe (from Sicily to northern Germany, Poland, Hungary and Slovakia), in the Balkan Peninsula (from Slovenia to Romania, Greece and Cyprus), in east Europe (Russia and Ukraine), in Scandinavia (Denmark, southern Sweden and Finland), EOO = 6,760,324 km^2 , AOO = 1,210 km$^{2.}$ National scale: in scattered locations in northern Sambre-Meuse line, particularly in Hesbaye and Campine. Around Houffalize (Ardenne Centrale) and south of Liège in southern Sambre-Meuse line, EOO = 200 km^2.

Population. Continental scale: populations are small and in a number of countries the species is in decline, but in some countries the species is increasing (Peeters *et al.* 2012, Svensson and Nilsson 2006), overall the populations are probably rather stable (Smit, 2014). National scale: populations have always been scarce and scattered in Belgium but the global trend seems to be stable, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: stable.

Habitat and Ecology. Flying period: from May to June. Habitat: sand and gravel pits (Reemer *et al.* 1999), floodplains (Raemakers 2000), dykes (J. Smit pers. obs. 2014). Hosts: *Andrena labialis* (NT) (Enslin 1922, Lefeber 1973, Moeschler 1938,

Stoeckhert 1933, Kocourek 1966, Standfuss and Schwarz 2007) and probably *Andrena schencki* (EN) (Alfken 1913, Kocourek 1966) and *Andrena humilis* (LC) (Celary 1995).

Threats. Decline of hosts: *Andrena labialis* (NT), *Andrena schencki* (EN). Decline of habitat / food ressources: reconversion or scrub-encroachment of old sand and gravel pits, destruction of floodplains for agricultural, forestry or urbanization purposes.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following six European countries: Switzerland (Critically Endangered. Amiet 1994), Czech Republic (Regionally Extinct. Farkac *et al.* 2005), Finland (Critically Endangered. Rassi *et al.* 2010), Netherlands (Near Threatened. Peeters and Reemer 2003), Slovenia (Regionally Extinct. Anonymous 2002) and Sweden (Vulnerable. Gärdenfors 2010), development of agro-environmental measures ("MAE" like MC4-8, MC10 and particularly MC3) could benefit to this species. Future: promotion of the conservation or rehabilitation of old sand and gravel pits, anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada striata **Fabricius, 1793**

Common Name(s): English - Blunt-jawed Nomad Bee. French - *Nomade striée*. Dutch – *Stomptandwespbij*. German - *Gestreifte Wespenbiene*.

Figure 153. *Nomada striata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: VU (A2c). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: Listed as Nearly Threatened due to a reduction of its area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017). Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in west Europe (from southern Iberian peninsula to northern Netherlands, United Kingdom and Ireland), in central Europe (from Sicily to northern Germany, Poland and Hungary), in the Balkan peninsula (from Slovenia until Romania and Greece, in east Europe (from Lithuania until European Russia), in Scandinavia (in Denmark and southern half of Norway, Sweden and Finland (Smit, 2014), EOO = 8,811,357 km^2, AOO = 7,795 km^2. National scale: in scattered locations in northern Sambre-Meuse line, particularly around Aarschot and three records from after 1990 in southern Sambre-Meuse line around Viroinval (Fagne-Famenne), Tellin (Fagne-Famenne) and Volaiville (Ardenne Centrale), AOO = 2300 km^2, EOO = 30km^2.

Population. Continental scale: populations are generally rather small but the population trend of this species is apparently stable (Smit, 2014). National scale: populations are scarce and scattered, large populations around Liège, Tongeren and Brussels are now extinct or have strongly decreased, Rasmont *et al*. (1993) qualified the species population trend as significantly decreasing. Current population trend: decrease.

Habitat and Ecology. Flying period: from April to July. Habitat: heathland (Reemer *et al.* 1999), edges of forests, sand and gravel pits, floodplains (J. Smit

pers. obs. 2014), calcareous grasslands (S. Roberts pers. comm. 2014). Hosts: *Andrena wilkella* (NT) (Alfken 1913, Kocourek 1966, Perkins 1919, Stoeckhert 1933, Westrich 1989), probably *A. gelriae* (RE), *A. similis* (CR) (Stoeckhert 1933, Westrich 1989), *A. intermedia* (EN), *A. pandellei* (VU) (Westrich 1989), *A. fucata* (VU) (Stoeckhert 1933).

Threats. Decline of hosts: *Andrena wilkella* (NT), *A. gelriae* (RE), *A. similis* (CR), *A. intermedia* (EN), *A. pandellei* (VU). Decline of habitat / food ressources: reconversion or scrub-encroachment of old sand and gravel pits, destruction of floodplains, dry grasslands and heahtlands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage) as well as in forestry practices (deletion of edges and clearings), eutrophication of nutrient-poor habitats.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Ireland (Endangered. Fitzpatrick *et al.* 2006), Netherlands (Endangered. Peeters and Reemer 2003) and Norway (Near Threatened. Kålås *et al.* 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10 but also MC3) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of extensive forestry practices. Promotion of the conservation / rehabilitation of nutrient-poor grasslands, heathlands and sandpits. Anything likely to benefit its hosts.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations. Monitoring of the population trend at the national scale.

***Nomada succincta* Panzer, 1798**

Common Name(s): English - Yellow-legged Nomad Bee. French - *Nomade sanglée*. Dutch - *Geelzwarte Wespbij*. German - *Gegürtete Wespenbiene*.

Figure 154. *Nomada succincta*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Notes: Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from southern Iberian Peninsula to northern Netherlands, in central Europe (from Sicily to northern Germany, Poland and Hungary, in the Balkan Peninsula (from Slovenia and Romania until Greece, in eastern Europe (in Lithuania, Latvia and European Russia), in Scandinavia (only Denmark), EOO = 5,428,444 km^2, AOO = 7,795 km^2. National scale: in each natural region, EOO = 5,400 km^2, AOO = 55 km^2.

Population. Continental scale: populations are often large and seem to be stable (Smit, 2014). National scale: according to the range map, the number of populations seems to have slightly decreased, especially in eastern Belgium. Current population trend: decrease.

Habitat and Ecology. Flying period: from April to June. Habitat: the species inhabits railway areas, dykes, floodplains, diggings, edges of forests, heathlands (J. Smit pers. obs. 2014). Hosts: *Andrena nitida* (LC) (Stoeckhert 1933, Westrich 1989) and probably *Andrena nigroaenea* (LC) (Stoeckhert 1933), *Andrena curvungula* (CR) (Kocourek 1966).

Threats. Decline of hosts: *Andrena curvungula* (CR). Decline of habitat / food ressources: destruction of heathlands and floodplains for agricultural, forestry or urbanization purposes, intensification of forestry practices (deletion of edges and clearings).

Conservation Actions. Present: this species is included in the Red Data Book of Norway (Near Threatened. Kålås *et al.* 2010). Development of agro-environmental measures ("MAE" like MC3-8 and MC10) could benefit to this species. Future: promotion of extensive forestry practices. Promotion of the conservation and rehabilitation of heathlands.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Evaluate the species tolerance to global warming.

Nomada villosa Thomson, 1870

Common Name(s): French - *Nomade velue*. Dutch - *Grote stomptandwespbij*. German - *Zottige Wespenbiene*.

Figure 155. *Nomada villosa*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: EN (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)). Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered because due to a limited, fragmented and declining Extent Of Occurrence (1500km² > EOO > 500 km²) and Area Of Occupancy (15km² > AOO > 5 km²). Previously published Red List assessments: 2014 – Nearly Threatened (NT) (Europe) in Smit, 2014

Geographic Range. Continental scale: in western Europe (from southern Iberian Peninsula to southern Netherlands), in central Europe (from northern Italy to Germany, Slovakia and Hungary), in the Balkan Peninsula (from Slovenia until Bulgaria and Greece, in Scandinavia (Denmark, southern Norway and Sweden), EOO = 4,713,587 km², AOO = 588 km². National scale: three records since 1990, around Doische (Fagne-Famenne), between Somme-Leuze and Hotton (Fagne-Famenne) and Plombières (Pays de Herve), EOO = 300 km², AOO = 4 km²

Population. Continental scale: populations are very small and this species is in a number of countries in decline (Anonymous 2002, Farkac *et al.* 2005, Westrich *et al.* 2011, Kålås *et al.* 2010, Gärdenfors 2010). National scale: populations are small and have become even more scattered since the early nineties, Rasmont *et al.* (1993) qualified the species population trend as stable. Current population trend: decrease.

Habitat and Ecology. Flying period: from April to May. Habitat: waste land, sand and gravel pits, rich flowering grasslands (Smit, 2014). Hosts: *Andrena lathyri* (NT) (Stoeckhert 1933).

Threats. Decline of host: *Andrena lathyri* (NT). Decline of habitat / food ressources: destruction of flower-rich grasslands, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor habitats, reconversion or scrub-encroachment of old sand and gravel pits.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Slovenia (Regionally Extinct. Anonymous 2002), Czech Republic (Endangered. Farkac *et al.* 2005), Germany (Vulnerable. Westrich *et al.* 2011), Norway (Endangered. Kålås *et al.* 2010) and Sweden (Near Threatened. Gärdenfors 2010). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of nutrient-poor grasslands and sandpits, anything likely to benefit its host.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Conduct sampling expeditions in order to determine the potential existence of other populations.

Nomada zonata Panzer, 1798

Common Name(s): English - Variable Nomad Bee. French - *Nomade zonée*. Dutch - *Variabele Wespbij*. German - *Binden-Wespenbiene*.

Figure 156. *Nomada zonata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Smit J. 2018. Identification Key to the European Species of the Bee Genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), Including 23 New Species. Entomofauna Monographie 3: 1-253.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-08-09. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: rare but expanding species with LC host. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Smit, 2014.

Geographic Range. Continental scale: in western Europe (from north-east Portugal and central-east Spain until the north of the Netherlands), in central Europe (Sardinia until Germany, Poland, Hungary), in the Balkan Peninsula (from Romania until Greece), in eastern Europe (from Lithuania and Ukraine to European Russia (Smit, 2014), EOO = 4.723,112 km^2, AOO = 2,140 km^2. National scale: everywhere in northern Sambre-Meuse line and around Dinant (Condroz) and Viroinval (Fagne-Famenne), EOO) = 600 km^2 and the area of occupancy (AOO) is 6 km^2.

Population. Continental scale: populations can locally be large, although in some countries this species is in decline (Smit, 2014). National scale: populations can be locally large, many new records since 1990, the population seems to be increasing, Rasmont *et al*. (1993) qualified the species population trend as stable. Current population trend: increase.

Habitat and Ecology. Flying period: bivoltine, from March to June and from July to September. Habitat: dykes, quarries, waste land, edges of forests (Westrich 1989), nature development areas in floodplains, sand and gravel pits and gardens (J. Smit pers. obs. 2014). Hosts: probably *Andrena dorsata* (LC) (Bluethgen 1951, Kocourek 1966).

Threats. No major threats to this species.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of five European countries: Switzerland (Vulnerable. Amiet 1994). Czech Republic (Vulnerable. Farkac *et al.* 2005). Germany (Near Threatened. Westrich *et al.* 2011). Netherlands (Near Threatened. Peeters and Reemer 2003) and Slovenia (Endangered. Anonymous 2002). Future: The species is not subject to any targeted conservation action and no future specific Conservation Actionshave to be taken.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Monitoring of the population trend at the national.

Genus *Thyreus* Panzer, 1806

Thyreus orbatus (Lepeletier, 1841)

Common Name(s): French – *Crocise ravisseuse, crocise deuil*. Dutch - *Bonte Viltbij*. German - *Schwarzgesichtige Fleckenbiene*.

Figure 157. *Thyreus orbatus*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s): Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: EN (A2bc). Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Justification: listed as Endangered due to a population decline (between 50% an 80% between 1900-1969 and 1970-2017), inferred from a population reduction observed, a reduction of its area of occupancy (AOO) and a reduction of its extent of occurrence (EOO), the regression of the species is at least partly due to the regional extinction of two of its hosts. Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Rasmont & Dehon, 2015.

Geographic Range. Continental scale: the species is found in west, central and southern Europe, including part of former Yugoslavia, and as far east as Anatolia, it is also found in Iceland. National scale: mainly found in Hainaut, occurrences in Gaume, Namur, Brabant and east Flanders, EOO = 200 km², AOO = 3 km².

Population. Continental scale: this is the *Thyreus* species with the largest distribution area, being the most widespread and abundant through Europe, however, it remains very rare in most of its localities (Rasmont & Dehon 2015). National scale: has been disappearing of the eastern part of Belgium. Rasmont *et al.* (1993) qualified the species population trend as very highly significantly decreasing in 1991. Current population trend: unknown.

Habitat and Ecology. Flying period: from late June to August. Habitat: there is no information available on the habitat and ecology of this species, although it can be assumed to occur on Mediterranean-type shrublands and temperate grasslands (Rasmont & Dehon 2015). Hosts: *Anthophora quadrimaculata* (LC)

(Koornneef 1930), *Anthophora plagiata* (RE), *Anthophora borealis* (RE) (P. Rasmont pers. comm.).

Threats. Decline of hosts: *Anthophora plagiata* (RE), *Anthophora borealis* (RE). Decline of habitat / food ressources: destruction of temperate grasslands for agricultural, forestry or urbanization purposes, intensification in the use of grasslands (intensive grazing practices, silage), eutrophication of nutrient-poor grasslands.

Conservation Actions. Present: this species is legally protected (LCN 1973, annexe IIb). This species is included in the National Red Lists or Red Data Books of the following European countries: Czech Republic (Vulnerable. Farkac *et al.* 2005), Germany (Endangered. Westrich *et al.* 2011), Netherlands (Regionally Extinct. Peeters and Reemer 2003) and Switzerland (Vulnerable. Amiet 1994). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the hosts and thus the species. Future: promotion of extensive grazing and mowing practices. Promotion of hay production instead of silage. Promotion of the conservation / rehabilitation of temperate grasslands.

Research Needed. Impact of herbicides and nitrogen fertilizers on host and parasite food ressources. Monitoring of the population trend at the national scale. Specify the habitat, ecology, and threats to the species.

Genus *Xylocopa* L., 1758

Xylocopa violacea (L., 1758)

Common Name(s): French – *Abeille perce-bois, xylocope violet*. English – Large Carpenter Bee, Violet Carpenter Bee. Dutch - *Blauwzwarte Houtbij*. German - *Blauschwarze Holzbiene, Große Holzbiene.*

Figure 158. *Xylocopa violacea*. Resting (Photo: Y. Barbier).

Taxonomic Source(s): Amiet, F., Hermann, M., Müller, A. and Neumeyer, R. 2007. Apidae 5: *Ammobates, Ammobatoides, Anthophora, Biastes, Ceratina, Dasypoda, Epeoloides, Epeolus, Eucera, Macropis, Melecta, Melitta, Nomada, Pasites, Tetralonia, Thyreus, Xylocopa*. *Fauna Helvetica 20*.

Assessment Information. Red List Category & Criteria: LC. Year Published: 2019. Date Assessed: 2018-06-26. Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen. Facilitator/Compiler(s): Maxime Drossart & Denis Michez. Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Terzo & Nieto, 2013.

Geographic Range. Continental scale: *Xylocopa violacea* is a west-Palearctic species, and is very abundant in the Mediterranean region, EOO = 7,743,314 km², AOO = 5,936 km². National scale: widespread in Belgium, EOO = 600 km².

Population. Continental scale: populations of *Xylocopa violacea* appears to be declining in parts of central and northern Europe where the most recent observations have been made over 20 years ago but this decline could just be an artefact due to a lack of recent data (M. Terzo pers. comm. 2012). National scale: very few observations in 1993 (Rasmont *et al.* 1993) and now quite common (M. Terzo pers. comm. 2012). Current population trend: increase.

Habitat and Ecology. Flying period: from April to early October. Habitat: *Xylocopa violacea* lives in natural habitats with Mediterranean-type woody, shrubby and temperate grassland vegetation but the species is also common in urban and suburban habitats (Terzo & Nieto 2013). Visited flowers: large flowered Fabaceae (*Genista*, *Lathyrus*, *Glycine*, etc), large thistles (Asteraceae) and

Lamiaceae such as *Lavandula* and *Salvia*, it is one of the main pollinators of flowers like *Iris* (Terzo & Nieto 2013). Records on cultivated plants: it has been observed on *Crocus vernus, Digitalis purpurea, Iris, Phacelia, Lavandula, Salvia* in Netherland (Peeters *et al.* 2012). Nesting habits: females nest in dead wood (tree trunks or beams in homes) where they excavate themselves a long gallery with their powerful mandibles (Terzo & Nieto 2013).

Threats. Reduction of nesting sites: although the species does not seem threatened, it may suffer from the intensification of forestry practices as no dead wood is left in such loggings.

Conservation Actions. Present: *Xylocopa violacea* is considered as Extinct in Poland (Głowaciński and Nowacki 2009). Vulnerable in Moldova (Dectiu 2002), the Netherlands (Peeters and Reemer 2003), Switzerland (Amiet 1994) and Ukraine (Monchenko *et al.* 2009). Development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of the conservation of dead wood in the species habitats.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources. Monitoring of the population trend at the national scale as this Mediterranean species is likely to become quite common due to global warming.

Family Colletidae Lepeletier, 1841

Genus *Colletes* Latreille, 1802

Colletes cunicularius (L., 1761)

Common Name(s): English - Early *Colletes*; French – *Collète lapin*; Dutch – *Grote Zijdebij*; German - *Frühlings-Seidenbiene*.

Diagnosis. The only Spring species in our latitudes, both sexes are relatively large (13 – 17 mm) and have long golden brown hairs on the head, thorax and abdomen. **Taxonomic Source(s).** Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. *Bzzz/HymenoVaria*, *30*(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: wide distribution range from Spain, Britain and Scandinavia in the west to the Pacific coast of Siberia and north-eastern China in the east, EOO = 7,495,992 km², AOO = 1,016 km²; National scale: widespread in Belgium, EOO = 1,300 km², AOO = 15 km².

Population. Continental scale: populations seem to be in decline, at least in western Europe, but the species is still widespread and regularly found in suitable habitats (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as highly significantly declining. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-March to late May; Habitat: in whole Europe it is mostly found in open sandy areas especially in alluvial areas but also in sandpits (Westrich 1989), in the Netherland it is a typical pioneer species of various sandy areas with willows but also in marl quarries, heaths and urban areas (Peeters *et al.* 2012); Visited flowers: polylectic with a strong preference for *Salix spp.* (Müller & Kuhlmann 2008); Nesting habits: nests are self-excavated in sandy soils, aggregations can be very dense (up to 30 nests per m²) (O'Toole & Raw 1991); Parasites: *Sphecodes albilabris* (Alfken 1912, Malyshev 1923, van der Vecht 1928).

Threats. No major threats to this species at the national scale. However, vegetational succession is likely to reduce the number of suitable habitats.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following three countries: Switzerland (Endangered; Amiet 1994), Great Britain (Rare; Shirt 1987) and Slovenia (Vulnerable; Anonymous 2002); the species is legally protected (LCN 1973 annexe IIb). Future: promotion of the conservation of suitable habitats (*e.g.* open vegetation types with bare soil), nesting sites and the host plants of this species.

Colletes daviesanus Smith, 1846

Common Name(s): English - Davie's *Colletes*; French – *Collète commun*; Dutch – *Wormkruidbij*; German - *Buckel-Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. *Bzzz/HymenoVaria*, *30*(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: wide distribution range occurring from Portugal, the British Isles and Scandinavia to Siberia and north-eastern China, EOO = 8,027,635 km², AOO = 2,068 km²; National scale: widespread in Belgium, EOO = 8,300 km², AOO = 108 km².

Population. Continental scale: one of the most common species of the genus, populations seem to be stable (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly increasing. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-June to early September; Habitat: in whole Europe the species is considered as ubiquitous including in anthropogenic habitats (Westrich 1989), in the Netherland it is considered as a pioneer species of vertical structures that can occur in various habitats (Peeters *et al.* 2012); Visited flowers: oligolectic on Asteraceae Asteroideae for pollen (Gogala 1999, Müller & Kuhlmann 2008, Peeters *et al.* 1999, Westrich 1989); Nesting habits: nests in large aggregations in various vertical surfaces (Janvier 2012, Boreham 1955, Friese 1912, Haeseler 1972, Mader 1980, 1981a, 1981b, 1982, 1999, Malyshev 1923, 1935, O'Toole & Raw 1991, Scheloske 1974); Parasites: *Epeolus variegatus, Miltogramma puncata, Bombylius minor* (Blair 1920, Esser 2005).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of Ireland (Data Deficient; Fitzpatrick *et al*. 2006). Future. No future conservation actions have to be taken at the national scale.

Colletes fodiens (Fourcroy, 1785)

Common Name(s): English - Hairy-saddled *Colletes*; French – *Collète fouisseur*; Dutch – *Duinzijdebij*; German - *Filzbindige Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. *Bzzz/HymenoVaria*, *30*(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Vulnerable (VU) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: wide distribution range from the Iberian Peninsula and western Europe through Asia Minor and Central Asia eastwards to Mongolia, western China and Pakistan, EOO = 7,005,838 km², AOO = 1,092 km²; National scale: Campine and probably along the coast, EOO = 400 km², AOO = 6 km².

Population. Continental scale: populations of this species are generally in decline in western and central Europe while in southern Europe *Colletes fodiens* is widespread but not common and populations seem to be isolated (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed the species as very localized but not declining. Current population trend: stable.

Habitat and Ecology. Flying period: from mid-June to late August; Habitat: open warm sandy habitats such as dry heaths and coastal dunes (Westrich 1989, Else & Edwards 2018, Peeters *et al.* 2012); Visited flowers: oligolectic on Asteraceae (Gogala 1999, Müller and Kuhlmann 2008, Peeters *et al.* 1999, Westrich 1989); Nesting habits: nesting habits are poorly known, the species probably nests in self-excavated burrows in sandy soil, nests probably occur singly or in very small aggregations; Parasites: *Epeolus variegatus* and possibly *Epeolus cruciger* (Peeters *et al.* 1999, Perkins 1920, Richards 1937).

Threats. No major threats to this species at the national scale. However, the few places where the species still occurs should be monitored and well-maintained.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following six European countries: Switzerland (Vulnerable; Amiet 1994), Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2008, Westrich *et al.* 2011), Ireland (Data Deficient; Fitzpatrick *et al.* 2006), Sweden (Near Threatened; Gärdenfors 2010) and Slovenia (Vulnerable; Anonymous 2002). Future: conservation of the habitats where the species still occurs (*i.e.* open sandy areas with bare soil).

Research Needed. Monitoring of the population size and trend at the national scale.

Colletes halophilus Verhoeff, 1944

Common Name(s): English - Sea Aster Bee; French – *Collète des prés salés*; Dutch – *Schorzijdebij*; German - *Strandaster-Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. Bzzz/HymenoVaria, 30(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: coastal species only known to occur from the Atlantic coast of southern France to the North Sea in north-western Germany and along parts of southern and south-eastern England, EOO = 369,667 km², AOO = 420 km²; National scale: Antwerpen estuary, salt marshes, EOO = 300 km², AOO = 6 km².

Population. Continental scale: isolated and small populations which are likely to be declining (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as significantly increasing, Michez (pers. comm. 2018) assessed the species as very localized but stable. Current population trend : stable.

Habitat and Ecology. Flying period: from early August to late September; Habitat: almost exclusively occurs at the sandy margins of salt marshes (Anonymus 2007, Calle & Jacobusse 2008, Kuhlmann *et al.* 2007, Lefeber 1979); Visited flowers: oligolectic on Asteraceae, *Aster tripolium* dominates pollens loads (Kuhlmann *et al.* 2007, Müller and Kuhlmann 2008); Nesting habits: nests in dense aggregations in bare soils, sea water may occasionally inundates nesting sites, the nest architecture is similar to the one of *Colletes succinctus*, nests have also been found between road pavements (Edwards 1997, Field & Foster 1988, De Kraker 2008, Van Lith 1937, Manning 1955, O'Toole & Raw 1991, Saxton 2009); Parasites: *Epeolus variegatus, E. tarsalis, Miltogramma punctata* (Guichard 1974, Van Lith 1949).

Threats. No major threats to this species at the national scale, populations seem to remain stable. However, populations are small and scattered and the habitat of the species is highly specific. The latter might be threatened by unadapted coastal management schemes such as urban and infrastructure development. An additional threat might be climate change induced sea level rise.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of Germany (Rare; Westrich *et al*. 2008, Westrich *et al.* 2011), the species occurs in protected areas, at least at the continental scale. Future: establish a legal protection status for the areas where the species still occurs; promotion of the conservation of coastal habitats.

Research Needed. Monitoring of the population size and trend at the national scale.

Colletes hederae Schmidt & Westrich, 1993

Common Name(s): English - Ivy Bee; French – *Collète du lierre*; Dutch – *Klimopbij*; German - *Efeu-Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. Bzzz/HymenoVaria, 30(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: from Cyprus and many parts of southern and western Europe where it is currently rapidly extending its range northwards, EOO = 3,271,208 km², AOO = 1,200 km²; National scale: probably everywhere in Belgium but currently not known, the species has been ignored from the Belgian fauna for a long time, EOO = 200 km², AOO = 2 km².

Population. Continental scale: at least in western and central Europe populations are often very large and the species is rapidly extending its range northwards and westwards (Ortiz-Sánchez *et al*. 2002; Bischoff *et al.* 2005, Kuhlmann *et al.* 2007, 2012; Roberts *et al*. 2011); National scale: Michez (pers. comm. 2018) assessed the species as currently increasing. Current population trend : unknown.

Habitat and Ecology. Flying period: from late August to mid-November; Habitat: various types of habitats where appropriate pollen resources can be found (Müller and Kuhlmann 2008, Westrich 2008); Visited flowers: *Hedera helix* dominates pollens loads, various Asteraceae and *Calluna* species can also be found in various proportions in pollen loads (Bischoff *et al.* 2005, Müller and Kuhlmann 2008, Peeters *et al.* 1993, Schmidt & Westrich 1993, Westrich 2008); Nesting habits: nests in extensive aggregations in self-excavated burrows in various types of soils, some aggregations may be considerably far from pollen sources forcing bees to fly long distances (Bischoff *et al.* 2005, Saxton 2009, Matheson *et al.* 1996, Wiering 1999); Parasites: *Epeolus variegatus, Stenoria analis* (Moenen 2009, Raemakers 2009, Vereecken *et al.* 2006, Vereecken & Mahé 2007, Wiering 1999).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of Slovenia (Endangered; Anonymous 2002). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale.

Colletes hylaeiformis Eversmann, 1852

Common Name(s): French – *Collète des Panicauts*; German - *Mannstreu-Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. Bzzz/HymenoVaria, 30(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: NE; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: known from most parts of southern and south-central Europe through the Ukraine and Asia Minor to the southern parts of Central Asia, EOO = 4,941,372 km², AOO = 760 km²; National scale: a single occurrence in 1880, EOO = NE, AOO = NE.

Population. Continental scale: one of the most widespread European species, populations at the edge of its range in central Europe are decreasing and possibly declining in southern Europe; National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: in Germany it flies from July to September; Habitat: various types of dry habitats where appropriate pollen resources can be found; Visited flowers: *Eryngium spp.* dominates pollens loads (Müller & Kuhlmann 2008); Nesting habits: in Germany it nests in self-excavated burrows in barely vegetated loess or sandy soils (Wiesbauer 2017); Parasites: unknown.

Threats. Belgium do not belong to the species distribution. In whole Europe, likely threats are the anthropogenic loss (*e.g.* agriculture, habitat destruction, change of land use) of habitat (*e.g.* open vegetation types with bare soil), nesting sites and host plants.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following four European countries: Switzerland (Regionally Extinct; Amiet 1994), Czech Republic (Regionally Extinct; Farkac *et al*. 2005), Germany (Critically Endangered; Westrich *et al*. 2008, Westrich *et al.* 2011) and Slovenia (Endangered; Anonymous 2002). Future: no future conservation actions have to be taken at the national scale.

Colletes marginatus Smith, 1846

Common Name(s): English - Margined *Colletes*; French – *Collète bordé*; Dutch – *Donkere Zijdebij*; German - *Dünen-Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. Bzzz/HymenoVaria, 30(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: occurs from southern Scandinavia, Britain and the Iberian Peninsula in the west to the Balkans, Ukraine and the Altai Mountains in the east, EOO = 6,451,248 km², AOO = 724 km²; National scale: middle Limburg, Antwerpen, few sites along the coast and Brussel Airport, EOO = 400 km², AOO = 5 km².

Population. Continental scale: rare but widespread species, populations are decreasing in northern and central Europe, populations in southern and eastern Europe are possibly declining (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed the species as rare but stable. Current population trend : stable.

Habitat and Ecology. Flying period: from early June to late August; Habitat: open sandy areas with species like *Echium* and *Melilotus* (D. Michez pers. comm. 2018); Visited flowers: polylectic species (Müller and Kuhlmann 2008); Nesting habits: poorly known, nests in self-excavated burrows in sandy soils (Janvier 2012, Richards 1937); Parasites: possibly *Epeolus variegatus* and *Epeolus cruciger* (Richards 1937, Westrich 1989).

Threats. No major threats to this species at the national scale, populations seem to remain stable. However, populations are small and scattered and the habitat of the species is highly specific.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following six European countries: Switzerland (Vulnerable; Amiet 1994), Germany (Vulnerable; Westrich *et al*. 2008, Westrich *et al.* 2011), Great Britain (Rare; Shirt 1987), Norway (Near Threatened; Kålås *et al*. 2010), Sweden (Near Threatened; Gärdenfors 2010) and Finland (Vulnerable; Rassi *et al*. 2010). Future: establish a legal protection status for the areas where the species still occurs; promotion of the conservation of sandy habitats.

Research Needed. Monitoring of the population size and trend at the national scale; specify the ecology and life history of the species.

Colletes similis Schenck, 1853

Common Name(s): English - Bare-saddled *Colletes*; French – *Collète du Pissenlit*; Dutch – *Zuidelijke Zijdebij*; German - *Rainfarn-Seidenbiene*.

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. Bzzz/HymenoVaria, 30(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: from southern Scandinavia to the Mediterranean, in parts of north Africa, the Middle East, Asia Minor to Central Asia and western China, EOO = 8,154,514 km², AOO = 2,256 km²; National scale: scattered distribution throughout Belgium, EOO = 400 km², AOO = 5 km².

Population. Continental scale: rare but widespread species, populations are decreasing in northern and central Europe, populations in southern Europe are possibly declining (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed the species as currently increasing. Current population trend : stable.

Habitat and Ecology. Flying period: from June to September; Habitat: found in a wide range of open vegetation types (Westrich 1989); Visited flowers: oligolectic on Asteraceae for pollen (Westrich 1989, Gogala 1999, Peeters *et al.* 1999, Müller and Kuhlmann 2008); Records on cultivated plants: *Daucus carota,* (G.R. Else pers. obs.); Nesting habits: nests in self-excavated burrows in the soil, in small nesting aggregations (Westrich 1989, Janvier 2012); Parasites: *Epeolus variegatus* (Perkins 1923, Richards 1937).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following three European countries: Switzerland (Vulnerable; Amiet 1994), Germany (Near Threatened; Westrich *et al*. 2008, Westrich *et al.* 2011) and Ireland (Near Threatened; Fitzpatrick *et al*. 2006). Future: no future conservation actions have to be taken at the national scale.

Colletes succinctus (L., 1785)

Common Name(s): English - Heather *Colletes*; French – *Collète des bruyères*; Dutch – *Heizijdebij*; German - *Heidekraut-Seidenbiene*.

Figure 159. *Colletes succinctus*. Foraging on *Calluna vulgaris* (Kalmthout, Photo: Y. Barbier).

Taxonomic Source(s). Smit, J. 2009. Determinatietabel voor de bijen van het genus *Colletes* in Nederland. Bzzz/HymenoVaria, 30(1), 65-68. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kuhlmann 2013.

Geographic Range. Continental scale: occurs from the Iberian Peninsula, the British Isles and southern Scandinavia in the west to Greece, western Caucasus and western Kazakhstan in the east, EOO = 9,212,447 km², AOO = 1,296 km²; National scale: localized in Wallonia, widespread in Campine, EOO = 2,000 km², AOO = 25 km².

Population. Continental scale: populations are decreasing at least in central Europe (Kuhlmann 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed the overall population as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from late July to early October; Habitat: heathlands and moorlands (Evertz 1993, Falk 2011, N.J. Vereecken pers. comm., Westrich 1989); Visited flowers: oligolectic on *Calluna* and *Erica* for pollen (Westrich 1989, Müller & Kuhlmann 2008, Peeters *et al.* 1999), however pollens of other plant families, especially Asteraceae Cichorioideae and *Senecio sp.*, can often be found in various proportions in pollen loads (Beavis 2005, Müller & Kuhlmann 2008, Perkins 1945, Edwards & Telfer 2001); Nesting habits: nests in

self-excavated burrows in the soil, occasionally in very large and compact aggregations (Albans *et al.* 1980, Edwards & Telfer 2001, Mayet 1875, O'Toole 1986, O'Toole & Raw 1991, Saxton 2008); Parasites: *Epeolus cruciger, Bombylius minor, Miltogramma punctata* (Höppner 1899, Lefeber 1979, Edwards & Telfer 2001, Peeters *et al.* 2012).

Threats. Reduction of suitable habitats: eutrophication of heathlands, change of heathland management, transformation of heathland into agricultural land or for use in commercial forestry, natural succession on heathland by trees). However, in larger heathland sites in sandy areas, *Colletes succinctus* still seems to be frequent (Kuhlmann 2013).

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of the following five European countries: Ireland (Least Concern; Fitzpatrick *et al.* 2006), Switzerland (Endangered; Amiet 1994), Czech Republic (Critically Endangered; Farkac *et al*. 2005), Germany (Near Threatened; Westrich *et al*. 2008, Westrich *et al.* 2011) and Slovenia (Endangered; Anonymous 2002); the species occurs in protected areas. Future: it is recommended to conserve suitable habitats like open heathlands, nesting sites in open, sandy soil and the host plants of this species.

Research Needed. Monitoring of the population size and trend at the national scale; specify potential other threats that may occur on the species.

Genus *Hylaeus* Fabricius, 1793

Hylaeus angustatus (Schenck, 1861)

Common Name(s): French – *Hylée étroit*; Dutch – *Gekielde maskerbij*; German - *Sandrasen-Maskenbiene*.

Figure 160. *Hylaeus angustatus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: EN (B1ab(iii) + 2ab(iii)); Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: listed as Endangered due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (500 km² < EOO < 1,500 km²), a reduced area of occupancy (5 km² < AOO < 15 km²), severely fragmented EOO and AOO and continuing decline in the EOO; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: recorded in Europe from the Mediterranean to about 60° N, EOO and AOO not evaluated at the continental scale; National scale: found at several locations in the natural region of Famenne, EOO = 0 km², AOO = 0 km².

Population. Continental scale: an abundant species in much of the west Palearctic, no information available on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed that only two populations remain stable in Belgium. Current population trend : not evaluated.

Habitat and Ecology. Flying period: too few occurrences to establish a clear phenology; Habitat: in Belgium the species is suspected to be thermophilous and found on calcareous grasslands of the natural region of Famenne (Leclercq 1979, Baugnée 1998), anywhere else it can be found in various dynamic biotopes such as industrial wasteland, fallow land, grasslands with fruit trees, woodland edge, sand and gravel pits, hedgerows, built-up areas, dry and grazed coastal meadows (Al-Ghzawi *et al.* 2006, Brechtel 1986, Feitz *et al.* 2006, Gathmann *et al.* 1994, Söderman and Leinonen 2003, Trein 2007, Westrich 1989); Visited flowers: polylectic species (Westrich 1989), in Belgium it has been collected while foraging on *Rubus sp.* and *Cirsium arvense* (Baugnée 1998); Nesting habits: nests in dry stems and sometimes in old cynipid wasps galls (Benoist 1959, Gathmann *et al.* 1994, Westrich 1989); Parasites: unknown.

Threats. Reduction of grasslands in number (urbanization, acculturation or urbanization) and quality (tilling, early mowing, fertilization, intensive grazing).

Conservation Actions. Present: included in the National Red List or Red Data Book of Estonia (Data Deficient; Lilleleht 2001), Finland (Endangered; Rassi *et al.* 2010) and Germany (Least Concern; Westrich *et al.* 1998, 2011); development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production); promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers); promotion of the conservation of grasslands; establish a legal protection on this species as well as on the areas where it still occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on habitat and food ressources; monitoring of the population size and trend at the national scale; specify the ecology of the species; specify potential other threats that might occur to this species.

Hylaeus annularis **(Kirby, 1802)**

Common Name(s): English - Single Yellow-face Bee; French – *Hylée annelé*; Dutch – *Duinmaskerbij*; German - *Geringelte Maskenbiene*.

Figure 161. *Hylaeus annularis*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.Taxonomic note(s) : inland specimens have been reclassified as *Hyaleus dilatatus* since the taxonomic revision of Nothon & Dathe (2008), only coastal specimens can be considered as *Hyaleus annularis*.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: specimens need to be re-evaluated before establishing any Red List Category; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe it occurs from the western Mediterranean region to eastern Europe, as far as Bulgaria and European Russia and north-west to the Dutch Atlantic coast and west Germany, EOO and AOO not evaluated at the continental scale; National scale: national distribution is not evaluated due to the taxonomical issues, EOO = NE, AOO = NE.

Population. Continental scale: infrequent species in the west Palearctic, populations are small, no information available on the trend of this species (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as increasing, Michez (pers. comm. 2018) assessed the species as not widespread nor common. Current population trend : NE.

Habitat and Ecology. μFlying period: June to September; Habitat: coastal habitats (Else & Edwards 2018); Visited flowers: polylectic species (Pauly *et al.* 2019); Nesting habits: nests in dry stems of *Eryngium spp., Rumex, Rubus* and *Artemisia vulgaris* (Peeters *et al.* 1999, Janvier 2012); Parasites: unknown.

Threats. The threats to this species are not known.

Conservation Actions. Given the taxonomical issues of this species, no conservation actions can be taken at the national scale. However, promotion of the conversation of coastal habitats is likely to benefit this species.

Research Needed. Monitoring of the population size and trend at the national scale; specify the ecology of the species; specify potential threats that might occur to this species.

Hylaeus annulatus (L., 1758)

Common Name(s): French – *Hylée nordique*; German – *Nördliche Maskenbiene*.

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: NE; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe it is found throughout central and northern Europe and as far east as Ukraine and Russia, EOO and AOO not evaluated at the continental scale; National scale: last observation in 1964, EOO = NE, AOO = NE.

Population. Continental scale: widely distributed but infrequent, populations are small, no further information available on the population trend (Dathe 2013); National scale: NE. Current population trend : NE.

Habitat and Ecology. There is no information regarding the habitat and ecological requirements of this species.

Threats. As this species is mostly found in high mountains, it is likely that the climatic factors will reduce its distribution.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Estonia (Data Deficient; Lilleleht 2001), Finland (Endangered; Rassi *et al.* 2010) and Germany (Least Concern; Westrich *et al.* 1998, 2011). Future: no future conservation actions can be taken at the national scale.

Research Needed. Specify the ecology and life history of the species.

Hylaeus bifasciatus **(Jurine, 1807)**

Common Name(s): French – *Hylée à deux bandes*; German - *Zweibindige Maskenbiene*.

Figure 162. *Hylaeus bifasciatus*. Female specimen (Photo : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: NE; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: occurs in southern Europe, pontic species, EOO and AOO not evaluated at the continental scale; National scale: last observations in 1938, EOO = NE, AOO = NE.

Population. Continental scale: very rare, populations are probably very small, no further information on the population size and trend (Dathe 2013); National scale: NE. Current population trend : NE.

Habitat and Ecology. There is no information regarding the habitat and ecological requirements of this species.

Threats. The threats to this species are not known.

Conservation Actions. Present: listed in the National Red List of Switzerland as Extinct (Amiet 1994). Future: no future conservation actions can be taken at the national scale. Additional studies are needed into the abundance, habitat and general ecology and threats to this little-known species. It is not known if the species occurs in any protected area.

Research Needed. Specify the ecology and life history of the species.

Hylaeus brevicornis **Nylander, 1852**

Common Name(s): English - Short-horned Yellow-face Bee : French – *Hylée à antennes courtes*; Dutch – *Kortsprietmaskerbij*; German - *Kurzfühler Maskenbiene*.

Figure 163. *Hylaeus brevicornis*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: *H. brevicornis* and *H. gredleri* are very hard to separate and considered as conspecific by some authors (*e.g.* Warncke 1972, 1992). In this study, as well as in the European assessment, the two latter are considered as separated species.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: widespread throughout Europe but since the taxonomy of the *H. brevicornis* group is unclear, the distribution is different according to the authors, EOO and AOO not evaluated at the continental scale; National scale: probably widespread throughout Belgium but some taxonomical improvements are required before confirming the distribution of the species, EOO = 4,200 km², AOO = 52 km².

Population. Continental scale: an abundant species in the whole of the west Palearctic, populations are probably large, no further information on the population size and trend (Dathe 2013). National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed that the taxonomical issues regarding this species does not allow to establish any clear population size and trend for this species. However, based on the past and present identification (and the mistakes that they may contain), the populations seem to remain stable. Current population trend : stable.

Habitat and Ecology. Flying period: from early June to early September; Habitat: pasture woodland, woodland edge, hedgerows, bramble thickets, sand-, gravel- and clay pits, sunny dry wasteground, and town and village parks and gardens (Westrich 1989); Visited flowers: polylectic species (Westrich 1989, Pauly *et al.* 2019); Nesting habits: nests in dry stems of *Rubus* and *Sambucus* or in insect gallery in *Prunus* and *Fraxinus* (Pauly *et al.* 2019), also reported to nest in the pith of twigs of *Rubus, Fraxinus, Salix, Sambucus, Rhamnus, Morus, Foeniculum* and *Eryngium spp.* (Janvier 2012); Parasites: unknown.

Threats. No known threats to this species at the national scale.

Conservation Actions. Present: included in the National Red List or Red Data Book of Estonia (Data Deficient; Lilleleht 2001), Germany (Least Concern; Westrich *et al.* 1998, 2011) and Ireland (Endangered; Fitzpatrick *et al.* 2006). Future: no future conservation actions have to be taken at the national scale.

Research Needed. A complete taxonomic revision of the *H. brevicornis* group is required in order to establish comprehensive distribution maps and determine the population size and trend; specify the ecology and life history of the species; determine the potential threats that might occur on the species.

Hylaeus clypearis **(Schenck, 1853)**

Common Name(s): French – *Hylée clypéal*; Dutch – *Gestippelde Maskerbij*; German - *Kopfschild-Maskenbiene*.

Figure 164. *Hylaeus clypearis*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: circum-Mediterranean species, sporadically found in central Europe, EOO and AOO not evaluated at the continental scale; National scale: two recent data around Leuven, EOO = 0 km², AOO = 0 km².

Population. Continental scale: a very abundant species around the Mediterranean Sea, populations are large, no information available on the population trend (Dathe 2013); National scale: data deficient. Current population trend : data deficient.

Habitat and Ecology. Flying period: June to August; Habitat: woodland edges, hedgerows, bramble brakes, vineyards and waste ground (Westrich 1989);

Visited flowers: probably polylectic (Koster 1986, Westrich 1989); Nesting habits: nests have been found in dry stems of *Rubus* and *Sambucus*, in the pith of rose stems and in the stems of *Bougainvillea* but also in insects gallery in wood (Amiet 1999, Janvier 2012, Pauly *et al.* 2019); Parasites: unknown.

Threats. The species is not threatened at the continental scale. Belgium is the extreme northern edge of its distribution.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Germany (Least Concern; Westrich *et al.* 1998, 2011), Netherlands (Endangered; Peeters and Reemer 2003), Poland (Endangered; Banaszak 2002) and Switzerland (Near Threatened; Amiet 1994). Future: no conservation actions have to be taken at the national scale.

Research Needed. Specify the ecology and life history of the species.

Hylaeus communis **Nylander, 1852**

Common Name(s): English - Common Yellow-face Bee; French – *Hylée commun*; Dutch – *Gewone Maskerbij*; German - *Gewöhnliche Maskenbiene*.

Figure 165. *Hylaeus communis*. A, female specimen; B, male specimen; C, face focus on female specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Dathe, H.H. 2000. Studien zur systematik und taxonomie der Gattung *Hylaeus* F. (3). Revision der *Hylaeus-nivalis*-Gruppe in Europa und Klärung weiterer westpaläarktischer Arten (Apidae, Colletinae). *Beiträge zur Entomologie* 50(1): 151-174. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: found throughout Europe, EOO and AOO not evaluated at the continental scale; National scale: everywhere in Belgium, EOO = 9,100 km², AOO = 92 km².

Population. Continental scale: occurs very frequently in the whole west Palearctic, and it is probably the most common species in northern and central Europe, populations are likely to be stable (Dathe 2013); National scale: Rasmont

et al. (1993) assessed the species as highly significantly increasing, Michez (pers. comm. 2018) assessed the species as one of the most common *Hylaeus* species in Belgium. Current population trend : stable.

Habitat and Ecology. Flying period: apparently univoltine from late May to mid-September, in parts of Germany this species has a second generation (Häseler 1972); Habitat: ubiquitous species (Westrich 1989), in Belgium it is often found in gardens (D. Michez pers. comm. 2018); Visited flowers: polylectic species (Pauly *et al.* 2019); Nesting habits: preferably in old wood, nests have been found in twigs of *Rubus idaeus* and *Prunus* sp., in the roots of *Arundo donax*, in the bark of *Pinus* trees, in the dry branches of *Sambucus sp.* and the pith of *Rubus* twigs (Janvier 2012); Parasites: *Sapyga quinquepunctata* (Hallett 1928), *Gasteruption jaculator*, *Coelopencyrtus* (Encyrtidae) (C R Vardy, *pers. comm*.).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Estonia (Data Deficient; Lilleleht 2001), Germany (Least Concern; Westrich *et al.* 1998, 2011) and Ireland (Least Concern; Fitzpatrick *et al.* 2006). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Investigate the taxonomy of the species.

Hylaeus conformis Förster, 1871

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: the taxonomic situation of the species of the *H. conformis* group was formerly unclear but *H. pilosulus* and *H. conformis* are now considered as two valid species (Dathe 2006).

Assessment Information. Red List Category & Criteria: NE; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: taxonomic issues, confusion with *H. conformis*, no data; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: centered in northern Africa and mostly restricted to the Mediterranean parts of western Europe, EOO and AOO not evaluated at the continental scale; National scale: the distribution needs to be re-evaluated, EOO = NE, AOO = NE.

Population. Continental scale: populations are small, no information available on the population trend of this species. National scale: NE. Current population trend : NE.

Habitat and Ecology. Habitat and Ecology need to be revised once taxonomic issues are resolved. The species has been found at flowers of Resedaceae species (Dathe 2013).

Threats. The threats to this species are not known.

Conservation Actions. Present: listed in the National Red List of Red Data Book of Switzerland as Near Threatened (Amiet 1994). Future: no future conservation actions can be taken at the national scale.

Research Needed. Investigate the taxonomy of the *H. conformis* species group; re-identification of the collection specimens based on the taxonomic revision of Dathe (2006); specify the ecology and life history of the species; evaluate the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus confusus **Nylander, 1852**

Common Name(s): English - White-jawed Yellow-face Bee; French – *Hylée confu*; Dutch – *Poldermaskerbij*; German - *Verkannte Maskenbiene*.

Figure 166. *Hylaeus confusus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Straka, J. and Bogusch, P. 2011. Contribution to the taxonomy of the *Hylaeus gibbus* species group in Europe (Hymenoptera, Apoidea, Colletidae). *Zootaxa* 2932: 51-67. Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: The taxonomy of the *H. gibbus* group was shortly revisited (Straka and Bogusch 2011). A series of problems turned out and first suggestions to solve them were given. At the national scale the species is easily confused with *H. gibbus* and *H.incongruus*.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: found throughout Europe, EOO and AOO not evaluated at the continental scale; National scale: everywhere in Belgium, EOO = 6,600 km², AOO = 63 km².

Population. Continental scale: very common species in the west Palearctic, but less abundant in the east, populations are large, no further information on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: in France it is presumably bivoltine, with spring and autumn broods (Janvier 1972); Habitat: ubiquitous species (Westrich 1989); Visited flowers: polylectic species (Pauly *et al.* 2019); Nesting habits: nests in hollow plant stems and other cavities in wood, the nests have been found in *Phragmites* straws, the pith of several other plant stems, the dead wood of trees and shrubs (Janvier 2012); Parasites: *Gasteruption jaculator* (C R Vardy, *pers. comm*.).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Germany (Least Concern; Westrich *et al.* 1998, 2011) and Ireland (Least Concern; Fitzpatrick *et al.* 2006). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Investigate the taxonomy of the species.

Hylaeus cornutus **Curtis, 1831**

Common Name(s): English - Spined Yellow-face Bee; French – *Hylée cornu*; Dutch – *Gehoornde Maskerbij*; German - *Gehörnte Maskenbiene*.

Figure 167. *Hylaeus cornutus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: almost a circum-Mediterranean distributed species, that is found in Europe from Spain to eastern Europe, and as far north as Denmark, EOO and AOO not evaluated at the continental scale; National scale: scattered distribution throughout Belgium, EOO = 1,300 km², AOO = 10 km².

Population. Continental scale: widely distributed species but not frequent, small populations, no information on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable; Current population trend : stable.

Habitat and Ecology. Flying period: early June to late August; Habitat: xerothermic habitats, calcareous grasslands, railway verges (Koster 1986a, D. Michez pers. comm. 2018); Visited flowers: polylectic species which is often found on Apiaceae, in Belgium it forages on *Pimpinella saxifraga, Seseli libanotis, Daucus carota, Artemisia vulgaris* (Baugnée 1998); Nesting habits: nests in plant stems or in loose walls, the nests have been found in the stems of *Rumex*, but also in *Eryngium campestre* and *Dipsacus silvestris* (Janvier 2012); Parasites: unknown.

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Czech Republic (Vulnerable; Farkač *et al.* 2005), Switzerland (Vulnerable; Amiet 1994), Germany (Least Concern; Westrich *et al.* 1998, 2011), Slovenia (Rare; Anonymus 2002), Great Britain (Rare; Shirt 1987), and Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions have to be taken at the national scale.

Hylaeus difformis **(Eversmann, 1852)**

Common Name(s): French – *Hylée difforme*; Dutch – *Boemerangmaskerbij*; German - *Beulen-Maskenbiene*.

Figure 168. *Hylaeus difformis*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe it occurs from Portugal and Spain towards eastern European, and north from the Balkans to Scandinavia, EOO and AOO not evaluated at the continental scale; National scale: southern Sambre-Meuse line, EOO = 100 km².

Population. Continental scale: infrequent species, small populations, no information on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as highly significantly increasing; Current population trend : stable.

Habitat and Ecology. Flying period: Summer species (Häseler 1972); Habitat: ubiquitous species (D. Michez pers. comm. 2018); Visited flowers: polylectic

species preferring *Rubus spp., Linaria vulgaris* (illegitimate forager), *Solidago virgaurea* (Baugnée 1998); Nesting habits: pre-existing cavities (Westrich 1989); Parasites: unknown.

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Czech Republic (Vulnerable; Farkač *et al.* 2005), Switzerland (Vulnerable; Amiet 1994), Norway (Regionally Extinct; Kålås *et al.* 2010), the Netherlands (Near Threatened; Peeters and Reemer 2003), Sweden (Near Threatened; Gärdenfors 2010), Slovenia (Rare; Anonymous 2002), Germany (Least Concern; Westrich *et al.* 1998, 2011) and Estonia (Data Deficient; Lilleleht 2001). Future: no future conservation actions have to be taken at the national scale.

Hylaeus dilatatus (Kirby, 1802)

Common Name(s): English - Chalk Yellow-face Bee; French – *Hylée dilaté*; Dutch – *Brilmaskerbij*; German - *Rundfleck-Maskenbiene*.

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Notton, D.G. & Dathe, H.H. 2008. William Kirby's types of *Hylaeus* Fabricius (Hymenoptera, Colletidae) in the collection of the Natural History Museum, London. *Journal of Natural History* 42(27-28): 1861-1865. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: inland specimens that were evaluated as *H. annularis* need to be re-evaluated as *H. dilatatus* (Pauly *et al.* 2019).

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: specimens need to be re-evaluated before establishing any Red List Category; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: found throughout Europe as far as 62°N, EOO and AOO not evaluated at the continental scale; National scale: many specimens need to be re-evaluated, the distribution, AOO and EOO are not up-to-date, it is likely that the species is widespread in Belgium, EOO = NE, AOO = NE.

Population. Continental scale: abundant and widely spread species in Europe, populations are not small, no information on the trend (Dathe 2013); National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: from early June to early September; Habitat: ubiquitous but mostly on sandy soils, flower-rich meadows (Koster 1986, Levchenko 2009, Westrich 1989); Visited flowers: probably a polylectic species (Westrich 1989); Nesting habits: nests in hollow plant stems, in the cavities of wood, in the pith of *Artemisia, Rubus* and sometimes in insect hotels, rotten fence posts (Janvier 2012, Benoist 1959, Peeters *et al.* 1999, Richards 1930, Tscharntke *et al.* 1998, Westrich 1989); Parasites: *Gasteruption assectator* (Höppner 1904)

Threats. The threats to this species are not known at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Finland (Least Concern; Rassi *et al.* 2010), Germany (Least Concern; Westrich *et al.* 1998, 2011), and Estonia (Data Deficient; Lilleleht 2001). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Investigate the taxonomy, ecology and life history of the species; determine the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus gibbus **Saunders, 1850**

Common Name(s): French – *Hylée gibbeux*; Dutch – *Weidemaskerbij*; German - *Buckel-Maskenbiene.*

Figure 169. *Hylaeus gibbus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Straka, J. & Bogusch, P. 2011. Contribution to the taxonomy of the *Hylaeus gibbus*species group in Europe (Hymenoptera, Apoidea, Colletidae). *Zootaxa* 2932: 51-67. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Taxonomic Notes: the taxonomic revision of Straka & Bogusch (2011) has led to the description of two similar species : *H. gibbus* and *H. incongruus*. It is not known whether Belgian specimens are *H. gibbus* or *H. incongruus* and whether both species are nationally present or not.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: specimens need to be re-evaluated before establishing any Red List Category; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: widely distributed throughout Europe, EOO and AOO not evaluated at the continental scale; National scale: many

specimens need to be re-evaluated, the distribution, AOO and EOO are not up-to-date, EOO = 600 km², AOO = 8 km².

Population. Continental scale: abundant species in Europe, sub-populations are small, no information on the trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : decrease.

Habitat and Ecology. Flying period: from early June to late August; Habitat: woodland edges, river levees, vineyards, sheep-grazed juniper heath, anthropogenic areas in villages and towns, coastal habitats (Söderman and Leinonen 2003, Westrich 1989); Visited flowers: probably a polylectic species (Koster 1986, Westrich 1989), in Belgium it appears that the species is more common on *Rubus* and *Jasione montana* (Pauly *et al.* 2019); Nesting habits: nests in hollow stems and in cavities in wood (Benoist 1959, Enslin 1933, Janvier 2012); Parasites: unknown.

Threats. The threats to this species are not known, the population seems to be declining at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Norway (Near Threatened; Hansen *et al.* 2010), Great Britain (Rare; Shirt 1987), Germany (Least Concern; Westrich *et al.* 1998, 2011), and Estonia (Data Deficient; Lilleleht 2001). Future: no future conservation actions can be taken at the national scale.

Research Needed. Investigate the taxonomy, ecology and life history of the species; determine the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus gracilicornis **(Morawitz, 1867)**

Common Name(s): French – *Hylée gracile*; Dutch – *Slanksprietmaskerbij*; German - *Zarte Maskenbiene.*

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Taxonomic Notes: the distribution information must be verified because of the previous confusion of this species with *H. paulus* Bridwell, 1919.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: too few records; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: found across much of Europe but more typical from central and eastern Europe, EOO and AOO not evaluated at the continental scale; National scale: the distribution has not been defined yet, EOO = NE, AOO = NE.

Population. Continental scale: not abundant, no further information on the population size and trend (Dathe 2013); National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: too few occurrences to establish a clear phenology; Habitat: wide range of habitats including woodland edge, hedgerows, bramble thickets, vineyards, reed beds, waste ground, dry and wet meadows, roadsides and montane habitats (Dathe *et al.* 1996, Ornosa and Ortiz-Sánchez 2004, Söderman and Leinonen 2003, Westrich 1989); Visited flowers: probably a polylectic species (Elfving 1951); Nesting habits: one occurrence in bramble twigs (Dathe 2013); Parasites: unknown.

Threats. The threats to this species are not known at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Sweden (Regionally Extinct; Gärdenfors 2010), Czech Republic (Critically Endangered; Farkač *et al.* 2005), Germany (Least Concern; Westrich *et al.* 1998, 2011) Estonia (Data Deficient; Lilleleht 2001) and Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions can be taken at the national scale.

Research Needed. Investigate the taxonomy; specify the ecology and life history of the species; determine the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus gredleri Förster, 1871

Common Name(s): French – *Hylée de Gredler*; Dutch – *Zompmaskerbij*; German - *Gredlers Maskenbiene.*

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: this is a species of the *H. brevicornis* group, which needs a fundamental taxonomic review, easy to confuse with *H. brevicornis*.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: easy to confuse with *H. brevicornis*¸ difficult to judge and distinguish the populations; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: widespread throughout Europe, informations on the distribution differ according to the authors, EOO and AOO not evaluated at the continental scale; National scale: probably widespread throughout Belgium, the distribution should be refined once taxonomic issues are resolved, EOO = NE, AOO = NE.

Population. Continental scale: very abundant species, spread throughout most of the west Palearctic (Dathe 2013); National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: May to September; Habitat: typical from warm and dry habitats (incl. post-industrial sites), in l'Estagnol (France) it occurs on dry bauxite banks surrounded by *Phragmites australis* dominated wetland (P. Bogusch, D. Genoud pers. comm. 2013); Visited flowers: probably a polylectic species (Peeters *et al.* 2012); Nesting habits: in the pith of dry *Rubus* stems, in wooden walls and fence posts and probably also in the stems of *Phragmites australis* (Celary 1999, Janvier 2012, D. Genoud pers. comm. 2013); Parasites: unknown.

Threats. The threats to species are not known at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Germany (Least Concern; Westrich *et al.* 1998, 2011) and Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions can be taken at the national scale.

Research Needed. Investigate the taxonomy of the *H. gridleri* species-group; specify the ecology and life history of the species; determine the potential threats to the species; evaluation and monitoring of the population size and trend.

***Hylaeus hyalinatus* Smith, 1842**

Common Name(s): English - Hairy Yellow-face Bee; French – *Hylée des murailles*; Dutch – *Tuinmaskerbij*; German - *Mauer-Maskenbiene*.

Figure 170. *Hylaeus hyalinatus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: common and widespread, the focus of the distribution is mainly in the central and northern regions of Europe, EOO and AOO not evaluated at the continental scale; National scale: everywhere in Belgium, EOO = 6,700 km², AOO = 80 km².

Population. Continental scale: a very abundant species of the whole west Palaearctic with its distribution centred in Europe (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as highly significantly increasing. Current population trend : decrease.

Habitat and Ecology. Flying period: from May to September; Habitat: found in a wide range of habitats (Peeters *et al*. 1999, Söderman and Leinonen 2003,

Westrich 1989); Visited flowers: probably a polylectic species (Westrich 1989); Records on cultivated plants : *Pastinaca sativa, Daucus carota, Thymus, Allium*; Nesting habits: nests are mainly found in the sand but sometimes in the marrow of blackberry stems (Janvier 2012); Parasites: unknown.

Threats. The threats to this species are not known at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Ireland (Vulnerable; Fitzpatrick *et al*. 2006) and Germany (Least Concern; Westrich *et al*. 1998, 2011). Future: no future conservation actions can be taken at the national scale.

Hylaeus incongruus (Förster, 1871)

Common Name(s): English - White-lipped Yellow-face Bee; French – *Hylée incongru*; German - *Abweichende Maskenbiene*.

Taxonomic Source(s). Straka, J. and Bogusch, P. 2011. Contribution to the taxonomy of the *Hylaeus gibbus* species group in Europe (Hymenoptera, Apoidea, Colletidae). *Zootaxa* 2932: 51-67; Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: the taxonomy of the *Hylaeus gibbus* group was shortly revisited, two species are now recognized : *H. gibbus* and *H. incongruus* (Straka and Bogusch 2011).

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: it is not known whether *H. gibbus* specimens belong to the species *H. gibbus* or *H. incongruus* ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: the distribution has to be generally re-examined, EOO and AOO not evaluated at the continental scale; National scale: the distribution has not been defined yet, EOO = NE, AOO = NE.

Population. Continental scale: A moderately abundant and widespread species probably in the whole west Palearctic (Straka and Bogusch 2011, Proshchalykin and Dathe 2012), the population trend is unknown; National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: June to August; Habitat: open woodland, chalk grassland, scrubby heaths (Else & Edwards 2018); Visited flowers: probably a polylectic species (Westrich 1989); Nesting habits: in rotten wood or in dead *Phragmites* or *Rubus* stems (Benoist 1959, Westrich 1989); Parasites: *unknown*.

Threats. The threats to this species are not known at the national scale.

Conservation Actions. Present: the species is not listed in a National Red List or Red Data Book. Future: no future conservation actions can be taken at the national scale.

Research Needed. Investigation on the taxonomy; further research is required to specify the distribution, habitat and ecology of the species.

***Hylaeus leptocephalus* (Morawitz, 1870)**

Common Name(s): French – *Hylée à petite tête*; Dutch – *Kleine Lookmaskerbij*; German - *Schmalkopf-Maskenbiene*.

Figure 171. *Hylaeus leptocephalus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)); Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: listed as Critically Endangered due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of observations; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: widespread throughout Europe, EOO and AOO not evaluated at the continental scale; National scale: last occurrence in Molenbeek, EOO = 500 km², AOO = 4 km².

Population. Continental scale: abundant species in the whole west Palearctic, no further information on the population size and trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing. Current population trend : decrease.

Habitat and Ecology. Flying period: from May to August; Habitat: ruderal areas, large gardens, hedges, forest edges (Koster 1986, Lefeber 1974, Westrich 1989); Visited flowers: probably a polylectic species (Koster 1986, Lefeber 1974, Westrich 1989); Nesting habits: nests in pre-existing cavities in the soil and in plant stems (Barrows 1975, Enslin 1933, Méhelÿ 1935); Parasites: unknown.

Threats. Reduction of suitable habitats / food resources: the precise nature of the threats are not known but it is likely that anthropogenic activities such as intensive uses of herbicides and nitrogen fertilizers have led to a global decline in the quality of ruderal habitats, intensive forestry practices (deletion of edges and clearings) may also have played a role in the decline of the species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Netherlands (Vulnerable; Peeters and Reemer 2003), Slovenia (Rare; Anonymous 2002), Germany (Least Concern; Westrich *et al.* 1998, 2011) and Poland (Data Deficient; Banaszak 2002). Future: promotion extensive agricultural and forestry practices; establish a legal protection on the species as well as on the areas where it still occurs.

Research Needed. Investigate the ecology and life history of the species; specify the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus nigritus **(Fabricius, 1798)**

Common Name(s): French – *Hylée de la Tanaisie*; German - *Rainfarn-Maskenbiene*.

Figure 172. *Hylaeus nigritus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Straka, J. & Bogusch, P. 2011. Contribution to the taxonomy of the *Hylaeus gibbus*species group in Europe (Hymenoptera, Apoidea, Colletidae). *Zootaxa* 2932: 51-67. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: EN (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)); Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: listed as Critically Endangered due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of observations; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe it is widespread in the central regions of Europe (40-62° North), EOO and AOO not evaluated at the continental

scale; National scale: three recent occurrences in Fagne-Famenne, EOO = 200 km², AOO = 2 km².

Population. Continental scale: abundant species, populations are possibly small, no information on the trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : NE.

Habitat and Ecology. Flying period: from May to September; Habitat: sand, clay- and gravel pits, quarries, in exposed sandy and loessic areas in vineyards, waste ground and in parks and gardens (Westrich 1989); Visited flowers: oligolectic on Asteraceae (Westrich 1989); Nesting habits: nest in rock crevices and walls, as well as in spherical oak galls of *Cynips argentea* (Janvier 2012); Parasites: unknown.

Threats. The threats to this species are not known.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book for Slovenia (Rare; Anonymous 2002), Finland (Least Concern; Rassi *et al.* 2010), Germany (Least Concern; Westrich *et al.* 1998, 2011), and Estonia (Data Deficient; Lilleleht 2001). Future: establish a legal protection status on the areas where the species still occurs.

Research Needed. Investigate the ecology and life history of the species; specify the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus pectoralis **Förster, 1871**

Common Name(s): English - Reed Yellow-face Bee; French – *Hylée pectoral*; Dutch – *Rietmaskerbij*; German - *Schilfgallen-Maskenbiene*.

Figure 173. *Hylaeus pectoralis*. A, male specimen; B, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: distributed throughout the Palearctic but only locally present, predominantly in central and northern Europe, EOO and AOO not evaluated at the continental scale; National scale: reed beds of the northern Sambre-Meuse line, EOO = 400 km², AOO = 4 km².

Population. Continental scale: not very abundant species, no further information on the population size and trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from June to September; Habitat: various habitats supporting stands of *Phragmites australis* such as damp ditchsides, landward edges of coastal saltmarshes, drying reed bed margins, water meadows, sea walls, dune slacks and heathlands, in Belgium it is typical from reeds (Peeters *et al.* 1999, Söderman and Leinonen 2003, Westrich 1989, D. Michez pers. comm. 2018); Visited flowers: probably a polylectic species (Westrich 1989); Nesting habits: nest in reeds (*Phragmites australis*), particularly as a tenant in the spindle-shaped galls next to the gall fly *Lipara lucens* (Janvier 2012); Parasites: *Gasteruption assectator, G. jaculator, Panurus biarmicus* (Else 1995, P. Martin pers. comm.).

Threats. The species is apparently not threatened. However, reeds are declining in number and quality.

Conservation Actions. Present: listed in the National Red Book or Red Data Book of the Czech Republic (Critically Endangered; Farkač *et al.* 2005), Germany (Vulnerable; Westrich *et al.*1998, 2011), Switzerland (Vulnerable; Amiet 1994) Netherlands (Vulnerable; Peeters and Reemer 2003), Estonia (Data Deficient; Lilleleht 2001) and Poland (Data Deficient; Banaszak 2002). Future: promotion of the conservation of reed, protection of land against artificial drainage.

Research Needed. Specify the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus pictipes **Nylander, 1852**

Common Name(s): English - Little Yellow-face Bee; French – *Hylée à pattes jaunes*; Dutch – *Kleine Tuinmaskerbij*; German - *Gezeichnete Maskenbiene*.

Figure 174. *Hylaeus pictipes*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe from Portugal to the Balkans and eastern Europe, to 60° North in Sweden, EOO and AOO not evaluated at the continental scale; National scale: very local but widespread in Belgium, EOO = 2,800 km², AOO = 34 km².

Population. Continental scale: abundant and widespread species, the distribution is centred in central and north-west Europe (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed the species as not so common but widespread. Current population trend : stable.

Habitat and Ecology. Flying period: from May to August; Habitat: in Belgium it is not known from natural habitats, occurs in urban and garden areas (D. Michez pers. comm. 2018), in whole Europe it occurs in river banks, woodland edge, orchards, clay pits, waste ground, village and town environments such as parks and gardens (Westrich 1989); Visited flowers: probably a polylectic species (Westrich 1989); Records on cultivated plants: in Great-Britain is has been observed on *Brassica sp., Geranium* cultivars, *Foeniculum vulgare, Pastinaca sativa* (Else & Edwards 2018); Nesting habits: species nests in the soil and in plant stems, such as the branches of honeysuckle, *Ailanthus glandulosa* and blackberry (Janvier 2012); Parasites: *Coelopencyrtus arenarius* (G.H.L. Dicker pers. comm.).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List or Red Data Book of Norway (Regionally Extinct; Hansen *et al.* 2010), Slovenia (Regionally Extinct; Anonymous 2002), Sweden (Vulnerable; Gärdenfors 2010), Switzerland (Vulnerable; Amiet 1994), Czech Republic (Endangered; Farkač *et al.* 2005), Finland (Endangered; Rassi *et al.* 2010), Germany (Least Concern; Westrich *et al.* 1998, 2011), Estonia (Data Deficient; Lilleleht 2001), Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions have to be taken at the national scale, the promotion of indigenous flowered parks and gardens with extensive vegetable gardens could benefit to this species.

***Hylaeus pilosulus* (Pérez, 1903)**

Common Name(s): French – *Hylée velu*; German - *Behaarte Maskenbiene*.

Figure 175. *Hylaeus pilosulus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe, H.H. 2006. Studien zur Systematik und Taxonomie der Gattung *Hylaeus* F. (5). Revision der *Hylaeus-conformis*-Gruppe (Apidae, Colletinae). *Beiträge zur Entomologie, Keltern* 56(1): 63-91. Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel. Taxonomic Notes: the taxonomic situation of the species of the *H. conformis* group was formerly unclear but *H. pilosulus* and *H. conformis* are now considered as two valid species (Dathe 2006).

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: taxonomic issues, confusion with *H. conformis*, no data; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe it is widespread in western Mediterranean countries and locally found in central Europe, EOO and AOO not evaluated at the continental scale; National scale: the distribution needs to be re-evaluated when taxonomic issues are resolved, EOO = NE, AOO = NE.

Population. Continental scale: populations are small, no information available on the population trend of this species. National scale: NE. Current population trend : NE.

Habitat and Ecology. Habitat and Ecology need to be revised once taxonomic issues are resolved. Janvier (2012) assessed that the species nests in abandoned cavities created by other Hymenoptera in sandy walls, pits and slopes with compact hard surfaces. Dathe (2013) assessed that the species is probably polylectic.

Threats. The threats to this species are not known.

Conservation Actions. Present: listed in National Red List of Germany as Extinct (Westrich *et al.* 2011). Future: no future conservation actions can be taken at the national scale.

Research Needed. Investigate the taxonomy of the *H. conformis* species group; re-identification of the collection specimens based on the taxonomic revision of Dathe (2006); specify the ecology and life history of the species; evaluate the potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus punctatus **(Brullé, 1832)**

Common Name(s): French – *Hylée ponctué*; Dutch – *Stadsmaskerbij*; German - *Grobpunktierte Maskenbiene*.

Figure 176. *Hylaeus punctatus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: common in the Mediterranean region and expanding northward, EOO and AOO not evaluated at the continental scale; National scale: occurs in the city of Brussels, EOO = NE, AOO = NE.

Population. Continental scale: very abundant species, the distribution is centred in southern Europe, populations are not small, no information on the population trend (Dathe 2013); National scale: Michez (pers. comm. 2018) assessed that the species is currently appearing in cities. Current population trend : NE.

Habitat and Ecology. Flying period: from June to September; Habitat: in Belgium the species seems to be restricted to urban areas (D. Michez pers. comm. 2018), in whole Europe it occurs in woodland edge, waste ground and in towns and

villages (Westrich 1989); Visited flowers: probably a polylectic species (Westrich 1989); Nesting habits: unknown; Parasites: *unknown.*

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List of Germany (Least Concern; Westrich *et al.* 1998, 2011) and Poland (Vulnerable; Banaszak 2002). Future: no future conservation actions have to be taken at the national scale for this this which seems to benefit from global warming.

Research Needed. Further research is needed into the habitats and ecological requirements; evaluation and monitoring of the population size and trend.

***Hylaeus punctulatissimus* Smith, 1842**

Common Name(s): French – *Hylée de l'Ail*; Dutch – *Lookmaskerbij*; German - *Lauch-Maskenbiene.*

Figure 177. *Hylaeus punctulatissimus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: in Europe from Iberia to eastern Europe and north to Denmark (55° North), EOO and AOO not evaluated at the continental scale; National scale: widespread but very scarcely distributed, EOO = 900 km², AOO = 9 km².

Population. Continental scale: widespread but not often found, populations are small, no information on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : decrease.

Habitat and Ecology. Flying period: from late May to late August; Habitat: in Belgium it occurs on calcareous grasslands (D. Michez pers. comm. 2018), in

whole Europe it occurs in dunes, vineyards, anthropogenic habitats such as onion fields and market-gardens, warm, sunny places, also found in gardens and roadside embankments (Westrich 1989, Peeters *et al.* 1999); Visited flowers: oligolectic on *Allium spp.* (Westrich 1989); Nesting habits: holes in wooden posts, *Crataegus, Salix,* (V. Lefeber pers. comm., Peeters *et al.* 1999, Müller *et al.* 1997); Parasites: unknown.

Threats. No apparent threats to this species. The ecological requirements are however poorly known.

Conservation Actions. Present: listed in the National Red List or Red Data Book of United Kingdom (Regionally Extinct; Shirt 1987), Switzerland (Vulnerable; Amiet 1994), Czech Republic (Endangered; Farkač *et al.* 2005), Germany (Threatened but level unknown; Westrich *et al.* 2011) and Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions have to be taken at the national scale. However, the promotion of extensive market gardening and vegetable gardening are likely to benefit to this species

Research Needed. Specify the ecological requirements and potential threats to the species; evaluation and monitoring of the population size and trend.

Hylaeus rinki (Gorski, 1852)

Common Name(s): French – *Hylée des bois*; Dutch – *Rinks Maskerbij*; German - *Wald-Maskenbiene.*

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: VU (A2bc; B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)); Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 30 % and 50 % between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30 % and 50 % between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30 % and 50 % between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of locations or subpopulations; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: transpalearctic-Eurosiberian species, EOO and AOO not evaluated at the continental scale; National scale: widespread but scarcely distributed, EOO = 900 km², AOO = 9 km².

Population. Continental scale: not very abundant species, populations are probably small, no information on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : decrease.

Habitat and Ecology. Flying period: from June to August; Habitat: in Belgium it is found in nutrient-poor grasslands with *Potentilla* (D. Michez pers. comm. 2018), in whole Europe it lives in forests (Janvier 2012); Visited flowers: in Belgium it is known to occur on *Potentilla spp.* (D. Michez pers. comm. 2018) but in whole Europe it is presumably polylectic (Westrich 1989); Nesting habits: nests in bramble twigs (Benno 1952, 1957, 1958, Janvier 2012); Parasites: unknown.

Threats. Reduction of grasslands in number (urbanization, acculturation or urbanization) and quality (tilling, early mowing, fertilization, intensive grazing).

Conservation Actions. Present: listed in the National Red List or Red Data Book in the Czech Republic (Endangered; Farkač *et al.* 2005), Poland (Vulnerable; Banaszak 2002), Germany (Least Concern; Westrich *et al.* 1998, 2011), and in Estonia (Data Deficient; Lilleleht 2001); development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future:

promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production); promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers); promotion of the conservation of grasslands.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on habitat and food ressources; monitoring of the population size and trend at the national scale; specify the ecology of the species.

Hylaeus signatus **(Panzer, 1798)**

Common Name(s): English - Large Yellow-face Bee; French – *Hylée du Réséda*; Dutch – *Resedamaskerbij*; German - *Reseden-Maskenbiene*.

Figure 178. *Hylaeus signatus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: recorded in Europe from the Iberian Peninsula to eastern Europe, and from the Balkans north to Sweden (at 59° North), EOO and AOO not evaluated at the continental scale; National scale: widespread in Belgium, EOO = 2,000 km², AOO = 33 km².

Population. Continental scale: an abundant species in the whole west Palearctic, no information available on the population size and trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed that the species is present as long as the host plant is present. Current population trend : decrease.

Habitat and Ecology. Flying period: from May to August; Habitat: variety of habitats which support the flowering plants that it forages upon (Shirt 1987, Peeters *et al.* 1999, Westrich 1989); Visited flowers: strictly oligolectic at *Reseda spp.*; Nesting habits: nests in the soil, in the plant stems of *Phragmites communis* and in the feeding aisles of xylophagous insects living in the dead wood of oaks (Janvier 2012); Parasites: *Gasteruption assectator* (O'Toole & Raw 1991).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red List and Red Data Book of Sweden (Near Threatened; Gärdenfors 2010), Germany (Least Concern; Westrich *et al.* 1998, 2011) and Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions have to be taken at the national scale.

Hylaeus sinuatus **(Schenck, 1853)**

Common Name(s): French – *Hylée sinué*; German - *Gebuchtete Maskenbiene*.

Figure 179. *Hylaeus sinuatus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: DD; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: too few data to assign any red list category to the species; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: distributed across the western Palearctic from Spain to the Balkans and from Crete north to Sweden (55° North), EOO and AOO not evaluated at the continental scale; National scale: found at several locations in the natural region of Fagne-Famenne, EOO = NE, AOO = NE.

Population. Continental scale: frequent species in the temperate areas of Europe, seldom found in western Europe, no information on the population size and trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed the species as extremely localised and rare in Belgium. Current population trend : not evaluated.

Habitat and Ecology. Flying period: too few occurrences to establish a clear phenology; Habitat: in whole Europe the species inhabits woodland edge and clearings, hedges and scrub, bramble thickets and waste ground (Westrich 1989); Visited flowers: probably a polylectic species (Westrich 1989); Nesting habits: unknown; Parasites: unknown.

Threats. The threats are not known at the national scale.

Conservation Actions. No future conservation actions can be taken at the national scale.

Research Needed. Specify the ecology of the species; specify potential threats that might occur to this species.

Hylaeus styriacus **Förster, 1871**

Common Name(s): French – *Hylée de Styrie*; Dutch – *Stipmaskerbij*; German - *Steirische Maskenbiene.*

Figure 180. *Hylaeus styriacus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: LC; Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Previously published Red List assessments: 2013 – Data deficient (DD) (Europe) in Dathe 2013.

Geographic Range. Continental scale: Ponto-Mediterranean species, EOO and AOO not evaluated at the continental scale; National scale: scarcely distributed across Belgium, the distribution seems to be widening, EOO = 200 km², AOO = 2 km².

Population. Continental scale: rare species, populations are small, no information available on the trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: too few occurrences to establish a clear phenology; Habitat: in Belgium the species is restricted to warm habitats (D. Michez pers. comm. 2018), in whole Europe the species inhabits clearings and

rides in woodlands, woodland edge, scrubby areas, vineyards, bramble thickets and waste ground (Westrich 1989); Visited flowers: probably a polylectic species (Westrich 1989); Nesting habits: nests in hollow stems or in galleries in dead wood or wooden posts (Baugnée 1998, Westrich 1989); Parasites: unknown.

Threats. The threats to this species are not known.

Conservation Actions. Present: listed in the National Red List of the Netherlands (Near Threatened; Peeters and Reemer 2003), Germany (Least Concern; Westrich *et al.* 1998, 2011), Estonia (Data Deficient; Lilleleht 2001) and Poland (Data Deficient; Banaszak 2002). Future: no future conservation actions can be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale; specify the ecology of the species; specify potential threats that might occur to this species.

Hylaeus variegatus **(Fabricius, 1798)**

Common Name(s): French – *Hylée rougeâtre*; Dutch – *Rode Maskerbij*; German - *Rote Maskenbiene.*

Figure 181. *Hylaeus variegatus*. A, female specimen; B, male specimen; C, face focus on female specimen; D, face focus on male specimen (Photos : A. Pauly).

Taxonomic Source(s). Dathe H.H. 1980. Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). Mitteilungen aus dem zoologischen Museum, 56(2): 207-294. Amiet F. 1999. Fauna Helvetica 4. Apidae 2. *Colletes*, *Dufourea*, *Hylaeus*, *Nomia*, *Nomioides*, *Rhophitoides*, *Rophites*, *Sphecodes*, *Systropha*. Centre suisse de cartographie de la faune. Neuchâtel.

Assessment Information. Red List Category & Criteria: NT (A2bc); Year Published: 2019; Date Assessed: 2018-08-09; Assessor(s): Ella Zambra, Maxime Drossart, Denis Michez, Pieter Vanormelingen; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 20 % and 30 % between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20 % and 30 % between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20 % and 30 % between 1900-1969 and 1970-2017); Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Dathe 2013.

Geographic Range. Continental scale: widespread throughout Europe except on British Isles and Scandinavia, EOO and AOO not evaluated at the continental scale; National scale: widespread in Campine, EOO = 300 km², AOO = 4 km².

Population. Continental scale: not a common species, population are not small, no information available on the population trend (Dathe 2013); National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Michez (pers. comm. 2018) assessed the species is very localised in terms of habitats. Current population trend : decrease.

Habitat and Ecology. Flying period: from June to August; Habitat: very dry and nutrient-poor sandy grasslands with a suitable assemblage of forage plants (Peeters *et al.* 2012, D. Michez pers. comm. 2018); Visited flowers: probably a polylectic species (Westrich 1989) with a preference for Apiaceae (D. Michez pers. comm. 2018); Nesting habits: nests in old bee nests in the ground, the females dig their breeding caves in sandy, eroded walls, which can be very compact (Janvier 2012); Parasites: unknown.

Threats. Dry and xerothermic sandy areas are locally in decline due to changes in agricultural practices. Populations recorded around Brussels and Namur are now extinct.

Conservation Actions. Present: listed in the National Red List of the Netherlands (Critically Endangered; Peeters and Reemer 2003), Switzerland (Vulnerable; Amiet 1994), Poland (Vulnerable; Banaszak 2002), and Germany (Near Threatened; Westrich *et al.* 1998, 2011); development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production); promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers); promotion of the conservation of nutrient-poor dry grasslands.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on habitat and food ressources; monitoring of the population size and trend at the national scale.

Family Halictidae Thomson, 1869

Genus *Dufourea* Lepeletier, 1841

Dufourea dentiventris (Nylander, 1848)

Common Name(s): French – *Dufourée dentée* ; Dutch - *Gewone Klokjesglansbij*.

Diagnosis. males can be distinguished from other *Dufourea* by the lateral teeth of sternite 5, females are harder to separate ; **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Figure 182. *Dufourea dentiventris*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Campanula sp.* (Rocherath, Photo : G. Loos).

Assessment Information. Red List Category & Criteria: EN (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence

(EOO) (between 50% and 80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Patiny *et al.*, 2014.

Geographic Range. Continental scale: transpalearctic distribution, EOO = 3,089,453 km², AOO = 2,004 km² ; National scale: mainly in Upper Belgium, EOO = 1,700 km², AOO = 24 km².

Population. Continental scale: very rare, highly fragmented populations, the trend is not known but thought to be highly decreasing (Söderman & Leinonen 2003, Patiny *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as probably declining ; Current population trend: decrease.

Habitat and Ecology. Flying period: July and August ; Habitat: heathlands and calamine grasslands (Pauly 2019) ; Visited flowers: in Belgium it is oligolectic on *Campanula* and sometimes *Erica* (Pauly 2019), in whole Europe the species has been recorded on *Campanula patula* (Pesenko *et al.* 2000, Banaszak 2000), *Hieracium pilosella*, *Dryas octopetala*, *Calluna vulgaris* (Ebmer 1984), *Campanula rotundifolia*, *Campanula cochleariifolia*, *Campanula glomerata* (Westrich 1989) ; Nesting habits: solitarily in the ground ; Parasites: *Biastes truncatus* (Westrich 1989, Pauly 2019).

Threats. Reduction of suitable habitats : destruction of heaths and moors / sanitation of calamine grasslands in agricultural or urbanization purposes have led to the reduction of suitable habitats ; Reduction of food ressources : intensification of agricultural practices (increase of nitrogen deposition, herbicides and silage instead of hay production) have led to the decline of foraged species.

Conservation Actions. Present: the species appears on the National Red Lists or Red Data Books of the following countries: Finland (Near Threatened; Rassi *et al.* 2010), Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Critically Endangered; Peeters and Reemer 2003), Norway (Near Threatened; Kålås *et al.* 2010), Sweden (Near Threatened; Gärdenfors 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of heaths, moors and calamine grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population and habitat trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; impact of pesticides and nitrogen fertilizers on food ressources.

Dufourea halictula **(Nylander, 1852)**

Common Name(s): English - Sheep's-bit *Dufourea* ; French – *Dufourée de la Jasione* ; Dutch – *Zandblauwtjesglansbij* ; German - *Sandglöckchen-Glanzbiene*.

Figure 183. *Dufourea halictula*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (5mm) with a dense punctuation on the scutum, females have white scopa, males have short antennae (antennal articles are as long as wide) ; **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(ii,iv) +2ab(ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to : (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO and number of observations; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Patiny *et al.*, 2014.

Geographic Range. Continental scale: very localized across the whole of Europe, EOO = 6,526,309 km², AOO = 632 km² ; National scale: very localized, known from two places in the natural region of Campine (Lommel, Westerlo) and from one place in the natural region of Gaume (Heinsch), EOO = 300 km², AOO = 3 km².

Population. Continental scale: strong decline in the northern part of its distribution, the species is considered as severely fragmented (Patiny *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly decreasing, Pauly (2019) assessed the species as very rare and threatened ; Current population trend: decrease.

Habitat and Ecology. Flying period: July ; Habitat: inhabits grasslands, shrubland (Patiny *et al.* 2014) and sandy places (inland mobile dunes, sandy heathlands, sunny woodland rides and sand pits) (Westrich 1989) ; Visited flowers: in Belgium it is apparently monolectic on *Jasione montana* (Pauly 2019), in whole Europe the species has also been recorded on *Campanula trachelium* (Pesenko *et al.* 2000) ; Nesting habits: solitarily in the sand ; Parasites: unknown.

Threats. Reduction of suitable habitats / food ressources : destruction of grasslands for agricultural, forestry or urbanization purpose ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands ; destruction or reconversion of old sandpits. Reduction in the number of potential nesting sites : decline in the number of bare sandy areas due to scrub encroachment.

Conservation Actions. Present: the species appears on the National Red Lists or Red Data Books of the following countries: Czech Republic (Critically Endangered; Farkac *et al.* 2005); Germany (Endangered; Westrich *et al.* 2011), the Netherlands (Critically Endangered; Peeters and Reemer 2003), Sweden (Vulnerable; Gärdenfors 2010), and the United Kingdom (Critically Endangered; Shirt 1987) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers) ; promotion of the conservation / rehabilitation of old sandpits.

Research Needed. Monitoring of the population and habitat trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources.

Dufourea inermis **(Nylander, 1848)**

Common Name(s): French – *Dufourée inerme* ; Dutch – *Klokjesglansbij* ; German - *Ungezähnte Glanzbiene*.

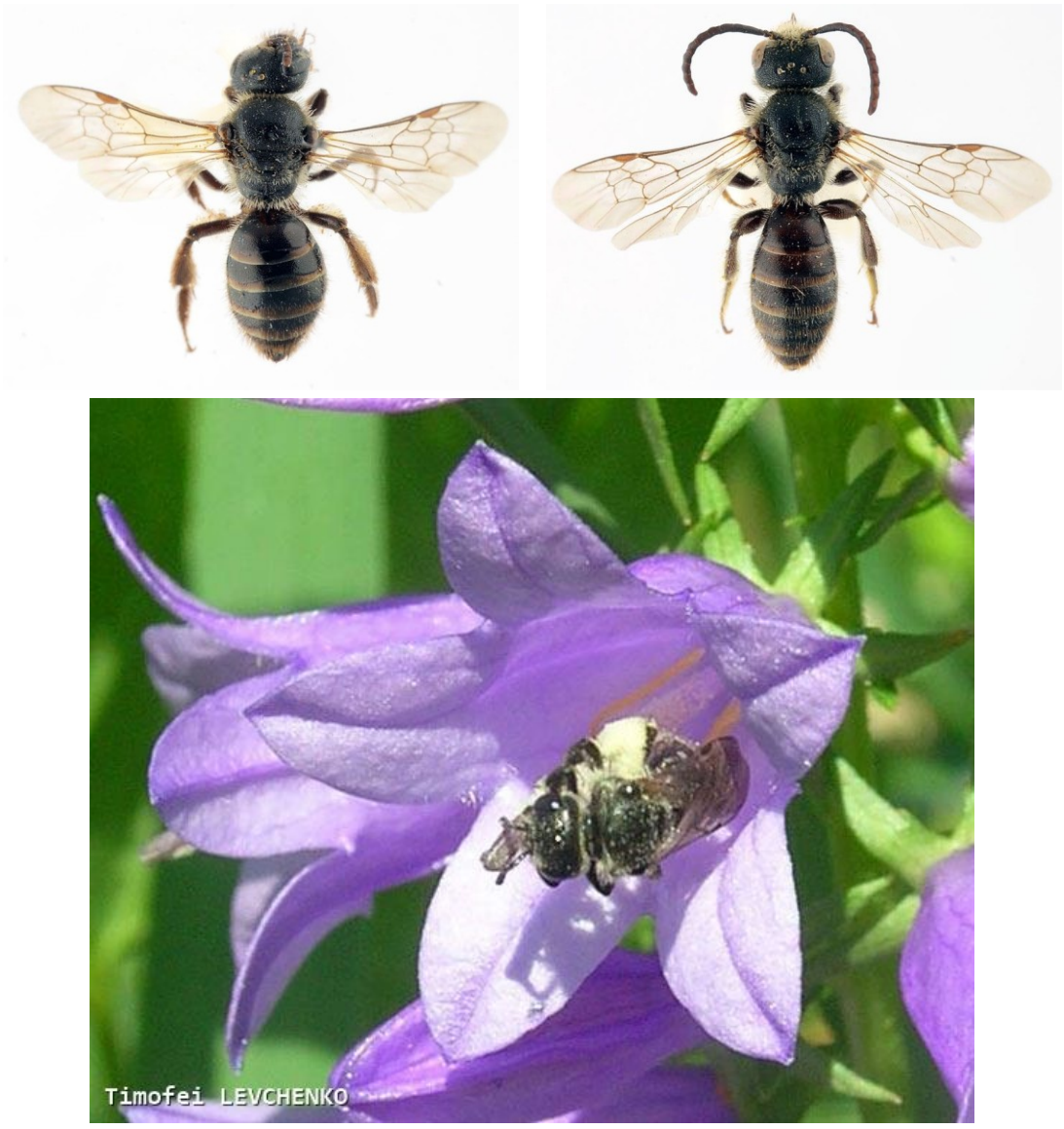

Figure 184. *Dufourea inermis*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Campanula sp.* (Moscou, Photos : T. Levchenko).

Diagnosis. males can be distinguished from *Dufourea dentiventris* by the absence of lateral teeth on sternite 5, females are harder to separate ; **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(ii,iv) +2ab(ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to : (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80%

between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO and number of observations ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Patiny *et al.*, 2014.

Geographic Range. Continental scale: very localized across the whole of Europe, EOO = 4,112,356 km², AOO = 440 km² ; National scale: very localized, known from one place in the province of Limburg (near Montagne Saint-Pierre), EOO = 200 km², AOO = 2 km².

Population. Continental scale: strong decline in the northern part of its distribution, the species is considered as severely fragmented (Patiny *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as very rare perhaps extinct ; Current population trend: decrease.

Habitat and Ecology. Flying period: August and September ; Habitat: temperate grasslands and shrublands (Westrich 1989) ; Visited flowers: in Belgium as well as in whole Europe the species is apparently oligolectic on *Campanula* (Westrich 1989, Pesenko *et al.*2000, Pekkarinen 1998, Peeters *et al*. 2012, Pauly 2019) ; Nesting habits: solitarily in the soil ; Parasites: *Biastes truncatus* (Westrich 1989, Pauly 2019).

Threats. Reduction of suitable habitats / food ressources : destruction of grasslands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands.

Conservation Actions. Present: the species appears on the National Red Lists or Red Data Books of the following countries: Czech Republic (Endangered; Farkac *et al.* 2005); Finland (Vulnerable; Rassi *et al.* 2010); Germany (Endangered; Westrich *et al.* 2011), and Sweden (Critically Endangered; Gärdenfors 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Dufourea minuta **Lepeletier, 1841**

Common Name(s): English - Shiny *Dufourea* ; French – *Dufourée des composées*; Dutch – *Composietglansbij* ; German - *Habichtskraut-Glanzbiene*.

Figure 185. *Dufourea minuta*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on Asteraceae (Abramtsevo, Photo : T. Levchenko).

Diagnosis. males and females can easily be distinguished from other *Dufourea* by their sparse puncutaiton of the scutum ; **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Patiny *et al.*, 2014.

Geographic Range. Continental scale: middle-Europe, EOO = 5,667,758 km², AOO = 460 km² ; National scale: formerly found in Brabant and in a few valley in Ardenne and Luxembourg.

Population. Continental scale: decline in most of its distribution, the species is considered as severely fragmented (Patiny *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, Pauly (2019) assessed the species as probably extinct ; Current population trend: extinct.

Habitat and Ecology. Flying period: June to September ; Habitat: grasslands and shrublands having a preference for sandy soils in UK (S. Roberts pers. comm. 2014), woodland edges, glades and clearings and sandy heathland in Germany (Westrich 1989) and in metropolitan areas in Helsinki (Söderman and Leinonen 2003) ; Visited flowers: Oligolectic on Asteraceae Cichorioidea (Pauly 2019) ; Nesting habits: in aggregation in shallow exposed slopes (Vasiljeva 1973, Pauly 2019) ; Parasites: *Biastes truncatus* (Westrich 1989).

Threats. Reduction of suitable habitats / food ressources : destruction of grasslands and heathlands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands and heathlands ; intensification of forestry practices (*i.e.* deletion of multistage edges and clearings, reduction in the number of timber species, closing of the vegetation).

Conservation Actions. Present: the species appears on the National Red Lists or Red Data Books of the following countries: Czech Republic (Critically Endangered; Farkac *et al.* 2005); Finland (Vulnerable; Rassi *et al.* 2010); Germany (Endangered; Westrich *et al.* 2011), the Netherlands (Regionally Extinct; Peeters and Reemer 2003), Norway (Regionally Extinct; Kålås *et al.* 2010), Sweden (Regionally Extinct; Gärdenfors 2010), Switzerland as *Dufourea vulgaris* (Vulnerable; Amiet 1994) and United Kingdom (Critically Endangered; Shirt 1987) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands and heathlands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources ; specify the causes of extinction at the national scale.

Genus *Halictus* Latreille, 1804

Halictus eurygnathus Blüthgen 1931

Common Name(s): English - Downland Furrow Bee ; French – *Halicte à larges mandibules* ; Dutch – *Holkopgroefbij* ; German - *Breitkiefer-Furchenbiene*.

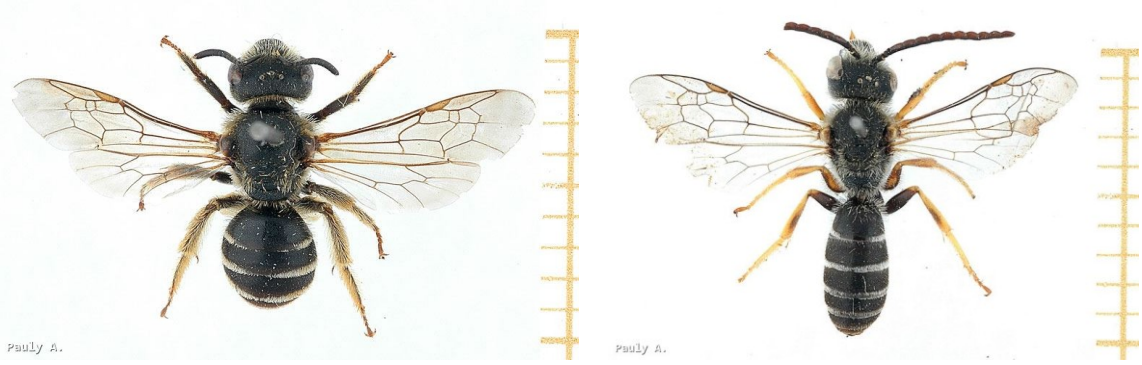

Figure 186. *Halictus eurygnathus*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. females cannot be separated from *H. langobardicus* and *H. simplex*, those three species can be separated from other *Halictus* by the punctuation of the propodeal area, males can be separated from other *Halictus* by the shape of their antennae, mandibles and genitalia. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Michez *et al.*, 2014.

Geographic Range. Continental scale: palearctic species, EOO = 7,340,948 km², AOO = 1,068 km² ; National scale: known from Montagne Saint-Pierre, formerly also found in Ave-et-Auffe, Comblain-au-Pont, Malonne, EOO = 100 km², AOO = 1 km².

Population. Continental scale: this species is rare and threatened in several countries. However, the overall population trend seems to be stable (Michez *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as very rare and highly decreasing ; Current population trend: decrease.

Habitat and Ecology. Flying period: June to September ; Habitat: dry calcareous grasslands (Pauly 2019), xerothermic shrublands and grasslands (Michez *et al.* 2014) ; Visited flowers: in Belgium it is principally found on *Centaurea scabiosa* and *Scabiosa columbaria* (Pauly 2019) ; Nesting habits: solitarily in the soil ; Parasites: *Specodes scabricollis* (Celary 1991).

Threats. Reduction of suitable habitats / food ressources : destruction of grasslands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: United Kingdom (Regionally Extinct; Shirt 1987), Netherlands (Regionally Extinct; Peeters and Reemer 2003) and Sweden (Near Threatened; Gärdenfors 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources ; specify the ecology and life history of the species.

Halictus maculatus **Smith, 1848**

Common Name(s): English - Box-headed Furrow Bee ; French – *Halicte maculé* ; Dutch – *Blokhoofdgroefbij* ; German - *Dickkopf-Furchenbiene*.

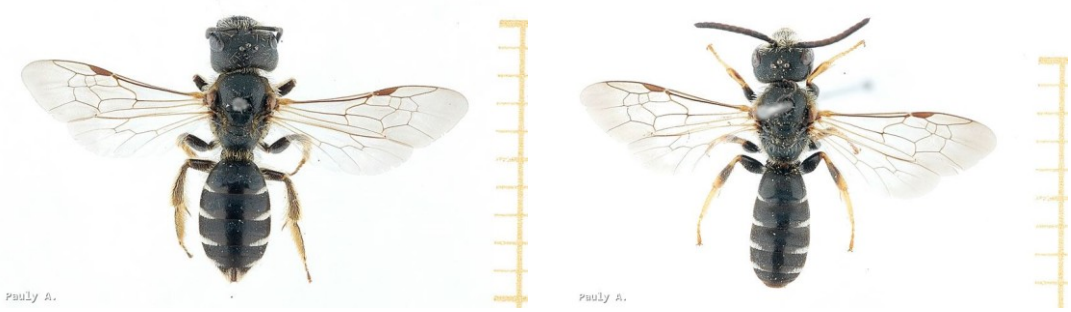

Figure 187. *Halictus maculatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. the species is quite small with a massive head and white abdominal pubescent bands which are interrupted in their centre ; **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: western-palearctic species, EOO = 8,350,815 km², AOO = 2,080 km² ; National scale: found in the warm localities of the Meuse valley, EOO = 5,000 km², AOO = 64 km².

Population. Continental scale: this species is common with a stable population trend (Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, Pauly (2019) assessed the species as quite rare ; Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from April to September ; Habitat: rocky areas, calcareous grasslands, gravel-pits (Pauly 2019) ; Visited flowers: polylectic, mostly found on *Achillea millefolium, Centaurea spp., Daucus carota, Heracleum sphondylium, Origanum vulgare, Tanacetum vulgare* (Pauly 2019) ; Records on cultivated plants : *Daucus carota, Origanum vulgare* (Pauly 2019) ; Nesting habits: social species which nests in large aggregations in the soil, nests can be communal (Perkins 1919, Pauly 2019); Parasites: *Sphecodes rufiventris* but also *S. ephippius* and *S. gibbus* (Celary 1991, Westrich 1989).

Threats. Reduction of suitable habitats / potential nesting sites: scrub-encroachment of old gravel-pits ; destruction of calcareous grasslands in forestry, agricultural or urbanization purposes ; eutrophication of calcareous grasslands

due to agricultural intensification ; intensification in the uses of grasslands (intensive grazing practices, silage instead of hay production).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Finland (Near Threatened; Rassi *et al*. 2010); United Kingdom (Regionally Extinct; Shirt 1987); Netherlands (Endangered; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation / rehabilitation of old gravel-pits ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources.

Halictus quadricinctus **(Fabricius, 1776)**

Common Name(s): English - Giant Furrow Bee ; French – *Halicte à quatre bandes* ; Dutch – *Vierbandgroefbij* ; German - *Vierbinde Furchenbiene*.

Figure 188. *Halictus quadricinctus*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. large species, females have a very sparsely punctuated scutum, males have diagnostic silks beneath the antennae. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2012 – Near Threatened (NT) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: trans-Palearctic species, EOO = 9,159,982 km², AOO = 1,320 km² ; National scale: found in the Meuse valley in the Province of Limbourg (Netherlands) and in scattered localities in Belgium (Montagne Saint-Pierre, Bekkevoort, Hautrage, Lommel), EOO = 400 km², AOO = 4 km².

Population. Continental scale: the species is common in southwest Europe while in northern Europe the subpopulations are localized and fragmented, the trend is probably declining (Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as very rare but formerly abundant in Campine ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to September ; Habitat: shrublands and grasslands (Michez *et al.* 2013) ; Visited flowers: preference for Carduae and other Asteraceae (Michez *et al.* 2013) ; Nesting habits: solitarily in banks and river banks, sometimes in extensive aggregations (Michez *et al.* 2013 ; Pauly 2019) ; Parasites: *Sphecodes gibbus* (Blüthgen 1934, Westrich 1989), *Sphecodes albilabris* (*e.g.* Celary 1991) and *Zodion cinereum* (*e.g.* Van Veen 1984).

Threats. Reduction of food resources : national regulation against thistles ; Reduction of habitats : destruction of grasslands in forestry, agricultural or urbanization purposes ; eutrophication of grasslands due to agricultural intensification ; intensification in the uses of grasslands (intensive grazing practices, silage instead of hay production).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following seven European countries: Switzerland (Vulnerable; Amiet 1994); Czech Republic (Vulnerable; Farkac *et al.* 2005); Germany (Vulnerable; Westrich *et al.* 2008); Estonia (Vulnerable; Lilleleht 2001); Netherlands (Regionally Extinct; Peeters and Reemer 2003); Sweden (Critically Endangered; Gärdenfors 2010); Slovenia (Endangered; Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers) ; national regulation against thistles should be revised given the floral choices of the species.

Research Needed. Impact of herbicides and nitrogen fertilizers on food ressources ; impact of pesticides on behaviour ; monitoring of the population trends at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; specify the ecology and life history of the species ; determine potential other threats to the species ; understanding of the drastic decline of the species in Belgium.

Halictus rubicundus **(Christ, 1791)**

Common Name(s): English - Orange-legged Furrow Bee ; French – *Halicte à pattes rouges* ; Dutch – *Roodpotige Groefbij* ; German - *Rotbeinige Furchenbiene*.

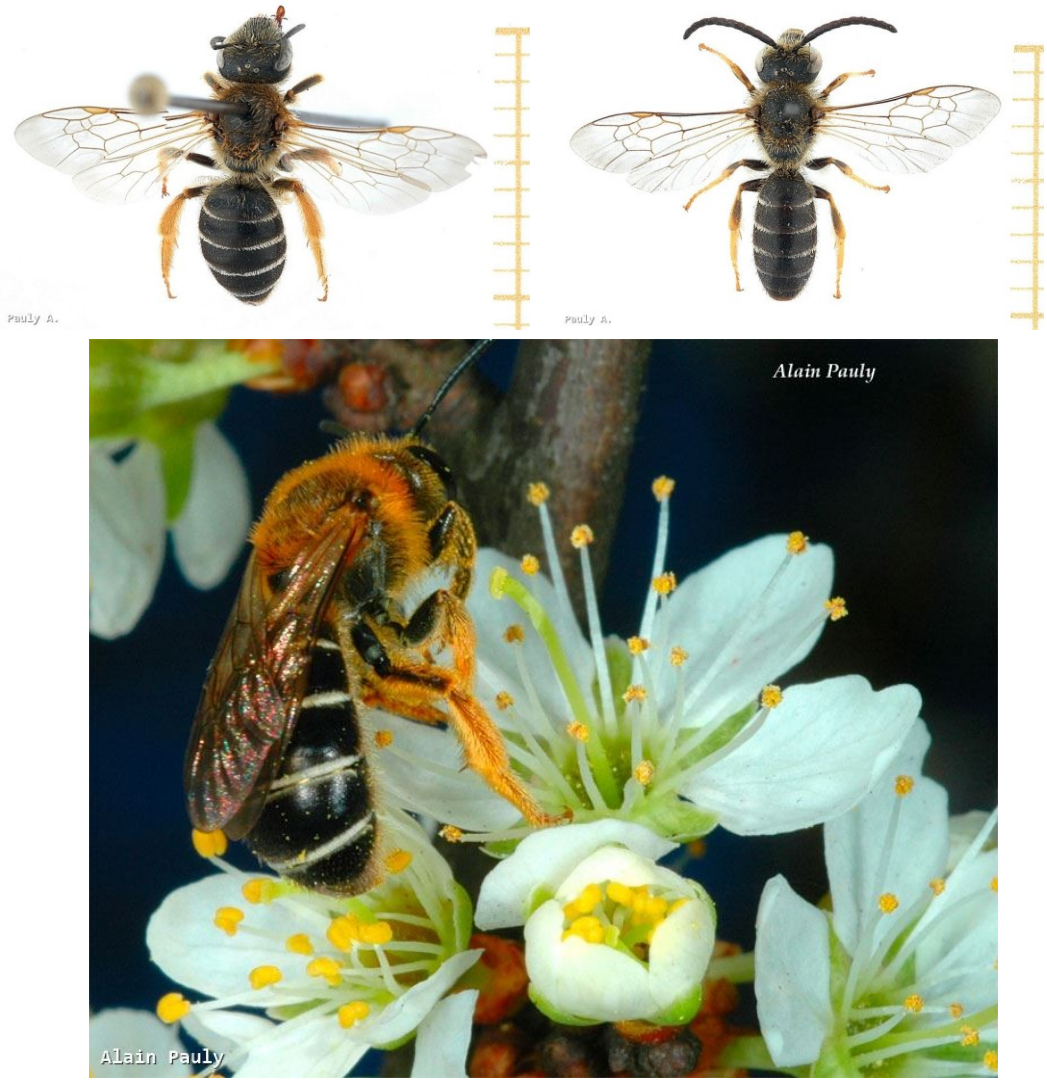

Figure 189. *Halictus rubicundus*. A, female specimen; B, male specimen; C, foraging on *Prunus spinosa* (Photos : A. Pauly).

Diagnosis. females can be separated from other *Halictus* by its rusty pubescence and cuticle on hind tibia, males have a rounded head. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: Holarctic species, EOO = 10,835,096 km², AOO = 11,328 km² ; National scale: everywhere in Belgium, EOO = 30,000 km², AOO = 503 km².

Population. Continental scale: This species is very common and the current population trend is stable (Michez *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as the most common *Halictus* in Belgium ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, April to September ; Habitat: ubiquitous ; Visited flowers: polylectic (Pauly 2019) ; Records on cultivated plants: in Belgium there are records on *Prunus avium, Brassica napus, Daucus carota* (Pauly 2019), in Great-Britain there are records on *Prunus spp., Pastinaca sativa, Daucus spp.* (Else & Edwards 2018), in whole Europe the species is recognized as an important pollinator of various fruits and leguminous crops (*e.g. Medicago sativa*) ; Nesting habits: nest in aggregation in diverse types of soils, the species is whether social or solitary according the climatic conditions (Pauly 2019) ; Parasites: *Shecodes gibbus* and *Sphecodes monilicornis* (Celary 1991).

Threats. No major threats to this species.

Conservation Actions. No specific conservation actions have to be taken.

Halictus scabiosae **(Rossi, 1790)**

Common Name(s): English - Great Banded Furrow Bee ; French – *Halicte de la Scabieuse* ; Dutch – *Breedbandgroefbij* ; German - *Gelbbindige Furchenbiene*.

Figure 190. *Halictus scabiosae*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on Asteraceae (Photos : Y. Barbier).

Diagnosis. large species (14-16mm.), can be separated from other *Halictus* by its large and ochre abdominal bands, males have a curved last antennal articles. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: west Palearctic species, EOO = 3,962,731 km², AOO = 3,048 km² ; National scale: typical from Meuse and affluents valleys, since 2000 it is also found in Brabant and Belgian Limburg, EOO = 12,700 km², AOO = 208 km².

Population. Continental scale: this species is not common but the population trend is generally stable, and even with some expansion towards the north

(Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as locally quite common, Frommer and Flugel (2005) assessed the species as expanding in Belgium and Germany ; Current population trend: increase.

Habitat and Ecology. Flying period: May to September ; Habitat: open xerothermic habitats ; Visited flowers: Carduae and *Scabiosa spp.* ; Records on cultivated plants: in Great-Britain there are records on *Daucus spp.* (Richards 1979) ; Nesting habits: social species living on clayey slopes (Pauly 2019) ; Parasites: Phoridae flies.

Threats. No major threats to this expanding species. However, national regulation against thistles may constitute a potential to the species.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following three European countries: Switzerland (Vulnerable; Amiet 1994); Czech Republic (Critically Endangered; Farkac *et al.* 2005); Netherlands (Near Threatened; Peeters and Reemer 2003). Future: no specific conservation actions have to be taken except perhaps the abrogation of the national regulation against thistles.

Halictus sexcinctus **(Fabricius, 1775)**

Common Name(s): French – *Halicte à six bandes* ; Dutch – *Zesbandgroefbij* ; German - *Sechsbinden-Furchenbiene*.

Figure 191. *Halictus sexcinctus*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting (Terril d'Hensies, Photo : Y. Barbier).

Diagnosis. similar to *H. scabiosae* but differs from it by its whiter abdominal bands. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: western-palearctic species, EOO = 7,269,268 km², AOO = 1,392 km² ; National scale: found in the Province of

Hainaut, in the Semois valley and in the natural region of Gaume, EOO = 1,500 km², AOO = 33 km².

Population. Continental scale: this species is not common but the population trend is believed to be stable. (Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as quite rare and localized ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to September ; Habitat: sandy xerothermic open habitats of south Belgium or found on heaps and sandpits in the Province of Hainaut ; Visited flowers: mostly Asteraceae flowers, records on *Carduus sp., Centaurea spp., Cirsium spp., Hieracium sp., Knautia sp., Senecio inaequidens, Taraxacum sp.* and *Trifolium repens* (Pauly 2019) ; Nesting habits: nest solitarily in sandy soil or in schlamm (Pauly 2019) ; Parasites: *Shecodes gibbus* (Westrich 1989, Celary 1991).

Threats. Reduction of habitats / potential nesting sites: reconversion or scrub-encroachment of old heaps and sandpits.

Conservation Actions. Present: This species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Vulnerable; Amiet 1994); Czech Republic (Vulnerable; Farkac *et al.* 2005); Germany (Vulnerable; Westrich *et al.* 2008); Netherlands (Critically Endangered; Peeters and Reemer 2003); Sweden (Regionally Extinct; Gärdenfors 2010). Future: promotion of the conservation and rehabilitation of old heaps and sandpits.

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources.

Halictus simplex **Blüthgen, 1923**

Common Name(s): French – *Halicte à mandibules simples* ; German - *Gewöhnliche Furchenbiene.*

Figure 192. *Halictus simplex*. A, male specimen (Photo : A. Pauly); B, foraging on Asteraceae (Photo: N. Helitas).

Diagnosis. males differ from *H. compressus, H. langobardicus* by its relatively thin mandibles and from *H. rubicundus* by the diagnostic shape of the face, females are indistinguishable from *H. compressus* and *H. langobardicus*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: EN (A2bc; B2ab(ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the area of occupancy (AOO). This reduction is inferred from a reduced area of occupancy (5 km² < AOO < 15 km²), severely fragmented AOO and continuing decline in the AOO and number of observations ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: west-Palearctic species, EOO = 6,291,424 km², AOO = 960 km² ; National scale: basin of the river Meuse and Province of Hainaut, EOO = 800 km², AOO = 16 km².

Population. Continental scale: this species is not common but the population trend is probably stable (Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as rare and restricted to natural reserves ; Current population trend: decrease.

Habitat and Ecology. Flying period: from May to September ; Habitat: thermophilous species, inhabits calcareous grasslands and heaps (Michez *et al.* 2013, Pauly 2019) ; Visited flowers: *Aster lynosiris, Clematis vitalba, Euphorbia amygdaloides, Geranium sanguineum, Hieracium lachenalii, Inula salicina, Ranunculus bulbosus, Rubus sp., Scabiosa columbaria, Senecio inaequidens, Senecio jacobaea, Solidago virgaurea, Succisa pratensis, Thymus pulegioides* (Pauly 2019) ; Nesting habits: in the soil, probably a solitary species (Pauly 2019) ; Parasites: *Sphecodes gibbus* (Pauly 2019).

Threats. Reduction of suitable habitats / food ressources : destruction of grasslands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands ; reconversion or scrub-encroachment of old heaps.

Conservation Actions. Present: development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Genus *Lasioglossum* Curtis, 1833

Lasioglossum albipes (Fabricius, 1781)

Common Name(s): English - Bloomed Furrow Bee ; French – *Lasioglosse à pattes blanches* ; Dutch – *Berijpte Geurgroefbij* ; German - *Weissbeinige Schmalbiene*.

Figure 193. *Lasioglossum albipes*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), the head is longer than *L. calceatum*, females can be separated by their sparsely punctuated tergite 1, males can be separated by their partially reddish metasoma. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: NT (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: transpalearctic species, EOO = 6,657,258 km², AOO = 14,652 km² ; National scale: very common in the natural region of Ardenne, can also be found in dunes and polders, EOO = 22,400 km², AOO = 261 km².

Population. Continental scale: common throughout its range, no information on the population size and trend (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species locally very common ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to September ; Habitat: forest scrubby areas, edges and clearings, dunes and polders (Pauly 2019), orchards (Westrich 1989) ; Visited flowers: polylectic species (Pauly 2019) ; Records on cultivated plants: in Great-Britain it is found on *Pastinaca sativa* and *Daucus carota* (Else & Edwards 2018) ; Nesting habits: in Belgium it nests solitarily in various types of soils (Pauly 2019), it is reported to nest in small aggregations and to be

primitively eusocial (Knerer 1987) ; Parasites: *Specodes monilicornis* (Westrich 1989).

Threats. Reduction of suitable habitats: intensification of forestry practices (deletion of multistage edges and clearings, deletion of general heterogeneity), intensive urbanization of the coastal areas, reduction in the number of traditional orchards.

Conservation Actions. Present: no present conservation actions ; Future: promotion of extensive forestry practices and traditional orchards, draw attention of intensive urbanization damages on biodiversity.

Research Needed. Monitoring of the population trend at the national scale.

Lasioglossum brevicorne **(Schenck, 1868)**

Common Name(s): English - Short-horned Furrow Bee ; French – *Lasioglosse à antennes courtes* ; Dutch – *Kortsprietgroefbij* ; German - *Kurzfühler-Schmalbiene*.

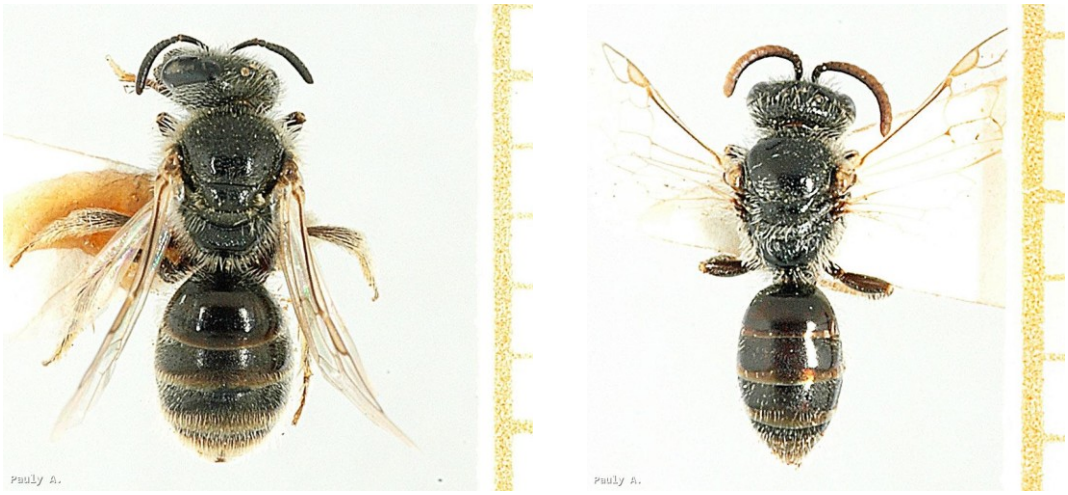

Figure 194. *Lasioglossum brevicorne*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum, similar to *L. villosulum*, can be separated from it by the shape and punctuation of tergite 1 and by the shape of the head. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: EN (A2bc; B2ab(ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the area of occupancy (AOO). This reduction is inferred from a reduced area of occupancy (5km² < AOO < 15 km²), severely fragmented AOO and continuing decline in the AOO and number of observations ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: sparsely distributed from England to the Don river in European Russia, and from Spain to Sweden (56°N), EOO = 6,425,718 km², AOO = 1,052 km² ; National scale: mainly found in sandy areas (old riverine dunes) in East-Flanders (Wetteren, Heusden,...) and in sandpits in Gaume, EOO = 900 km², AOO = 9 km².

Population. Continental scale: widespread but rare and localized, no information available on the population size and trend (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed

the species rare, localized and restricted by its habitat; Current population trend: decrease.

Habitat and Ecology. Flying period: May to September ; Habitat: old riverine dunes, sandpits (Pauly 2019) ; Visited flowers: oligolectic on *Hieracium spp., Crepis spp., Sonchus spp.* (Pauly 2019) ; Nesting habits: solitarily in bare sandy soil (Pauly 2019) ; Parasites: *Sphecodes marginatus* (Pauly 2019), *S. puncticeps* (Westrich 1989), *S. miniatus* (Celary 1991).

Threats. Reduction of suitable habitats: afforestation, scrub-encroachment, urbanization of dunal areas and old sandpits.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al*. 2005), Germany (Vulnerable; Westrich *et al.* 2011), Great Britain (Vulnerable; Shirt 1987), the Netherlands (Vulnerable; Peeters and Reemer 2003), Sweden (Vulnerable; Gärdenfors 2010) and Switzerland (Vulnerable; Amiet 1994). Future: establishment of a legal conservation status around the last population spots (*e.g.* Wetteren) ; draw attention of intensive urbanization damages on biodiversity.

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; specify the ecology and life history of the species ; determine potential other threats to the species ;

Lasioglossum breviventre **(Schenck, 1853)**

Common Name(s): French – *Lasioglosse raccourci* ; German - *Kurzbauch-Schmalbiene*.

Figure 195. *Lasioglossum breviventre*. A, female specimen; B, male specimen (Photos: A. Pauly).

Assessment Information. Red List Category & Criteria: Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Endangered (EN) (Europe) in Kemp *et al.*, 2013.

Geographic Range. Continental scale: it is present in the mountains of southern Europe (Balkans, Massif Central, Alps, Pyrenees, Sierra de Guadarrama), extinct in part of its range, especially in northern Europe lowlands (Pauly 2007), EOO = 1,414,899 km², AOO = 128 km² ; National scale: extinct, last observations in Losheimergraben (1925) and Malonne (1889).

Population. Continental scale: severely fragmented populations, isolated in alpine regions, little genetic exchange between sub-populations, the species is declining (Kemp *et al.* 2013) ; National scale: extinct.

Habitat and Ecology. Flying period: unknown ; Habitat: alpine meadows, rocky slopes (Pauly 2015) ; Visited flowers: Brassicaceae and Fabaceae (Westrich 1989), *Isatis tinctoria* (Amiet *et al.* 2001) ; Nesting habits: unknown ; Parasites: unknown.

Threats. The threats to this species are unknown.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Critically Endangered; Farkac *et al*. 2005), Germany (Critically Endangered; Westrich *et al*. 2011), and Switzerland (Near Threatened; Amiet 1994).

Research Needed. Monitoring of the population trend at the European scale ; conduct sampling expeditions to determine the potential existence of remaining populations in Belgium ; specify the ecology and life history of the species in order to establish threats and conservation actions that should be conducted.

***Lasioglossum calceatum* (Scopoli, 1763)**

Common Name(s): English - Common Furrow Bee ; French – *Lasioglosse cylindrique* ; Dutch – *Gewone Geurgroefbij* ; German - *Gewöhnliche Schmalbiene*.

Figure 196. *Lasioglossum calceatum*. A, female specimen; B, male specimen; C, foraging on *Taraxacum sp.* (Auderghem, Photos : A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), can be separated from other *Evylaeus* by its size (7.5 – 9 mm) and its sparsely punctuated tergite 1, very similar to *L. albipes*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: transpalearctic species, EOO = 8,316,071 km², AOO = 19,692 km² ; National scale: everywhere in Belgium, EOO = 31,600 km², AOO = 807 km².

Population. Continental scale: very common throughout its range, no information on the population size and trend (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly increasing, Pauly (2019) assessed the species as one of the most common species of *Lasioglossum* in Belgium ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from March to September ; Habitat: meadows with *Taraxacum spp.* (Pauly 2019) ; Visited flowers: polylectic species, in Belgium it is mostly found on *Aster linosyris, Bellis perennis, Carduus sp., Centaurea spp., Cirsium spp., Crepis spp., Epilobium spp., Eupatorium cannabinum, Geranium spp., Heracleum sphondylium, Hieracium spp., Knautia arvensis, Leontodon autumnale, Linaria vulgaris, Melilotus alba, Origanum vulgare, Picris hieracioides, Polygonum cuspidatum, Potentilla spp., Prunus spp., Ranunculus spp., Rubus sp., Salix spp., Scabiosa columbaria, Scrophularia nodosa, Senecio spp., Solidago spp., Tanacetum vulgare, Taraxacum spp., Tussilago farfara* (Pauly 2019) ; Records on cultivated plants: in Belgium it is found on *Prunus spp.* (Pauly 2019), in Great-Britain it is found on *Crataegus spp., Daucus spp., Thymus spp., Mentha spp.* (Else & Edwards 2018), it considered as an important pollinator of orchards, *Medicago sativa* crops and many other cultivated plants (Pesenko *et al.* 2000) ; Nesting habits: in Belgium it nests socially or solitarily, in aggregations in banks (Pauly 2019) ; Parasites: *Specodes monilicornis* (Perkins 1945, Pauly 2019), *Sphecodes ephippius* (Chambers 1949).

Threats. No major threats to this species.

Conservation Actions. No future conservation actions have to be taken for this species.

Lasioglossum costulatum **(Kriechbaumer, 1873)**

Common Name(s): French – *Lasioglosse de la Campanule* ; Dutch – *Klokjesgroefbij* ; German - *Glockenblumen-Schmalbiene*.

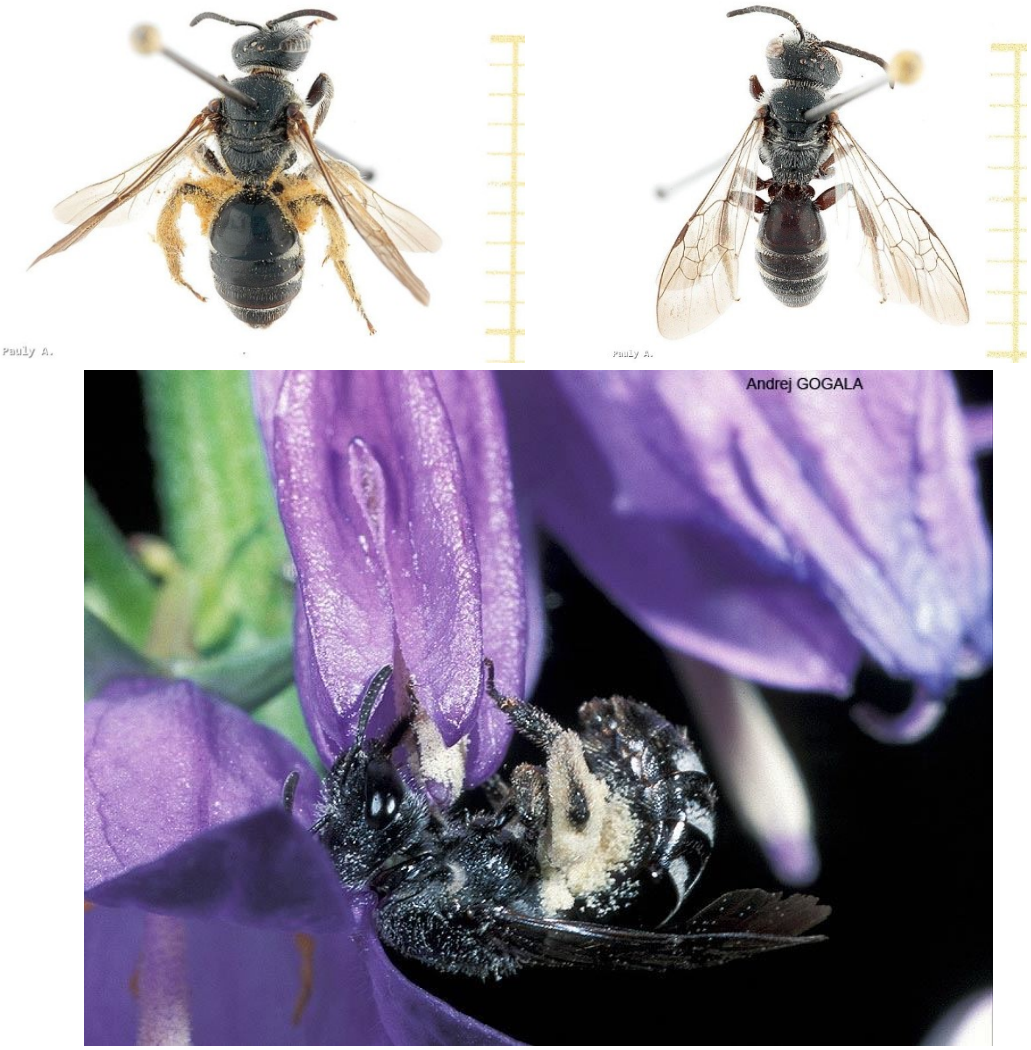

Figure 197. *Lasioglossum costulatum*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on *Campanula sp.* (Temnica (Kras), Photo : A.Gogola).

Diagnosis. non-carinated propodeum (*Lasioglossum* group), can be separated by the strong punctuation of the scutum and the strong carina of the propodeum. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of

observations ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: west Palearctic species, EOO = 3,025,297 km², AOO = 752 km² ; National scale: found in the natural region of Gaume (Torgny) and in the Grand Duchy of Luxembourg (Moselle valley), EOO = unknown, AOO = unknown.

Population. Continental scale: rare and localized throughout its range (Kemp *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly decreasing, Pauly (2019) assessed the species as very rare in Belgium ; Current population trend: too few records to establish any clear population trend.

Habitat and Ecology. Flying period: June to August ; Habitat: forest edges and grasslands (Kemp *et al.* 2013) ; Visited flowers: oligolectic on *Campanula spp.* (Pauly 2019) ; Nesting habits: in Belgium it nests solitarily in the soil (Pauly 2019) ; Parasites: unknown.

Threats. Reduction of suitable habitats / food resources: the precise nature of the threats are not known but it is likely that anthropogenic activities such as intensive use of grasslands (intensive grazing and mowing practices, silage instead of hay production), intensive forestry practices (deletion of edges and clearings) may play a role in the decline of the species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Vulnerable; Farkac *et al*. 2005), Germany (Vulnerable; Westrich *et al*. 2011), and Switzerland (Vulnerable; Amiet 1994) ; known to occur in the Torgny nature reserve. Future: promotion extensive forestry, grazing and mowing practices ; establish protected areas where the species occurs.

Research Needed. Monitoring of the population trend at the national scale ; specify the nature of the threats to the species.

***Lasioglossum fratellum* (Pérez, 1903)**

Common Name(s): English - Smooth-faced Furrow Bee ; French – *Lasioglosse petit-frère* ; Dutch – *Bosgroefbij* ; German - *Wald-Schmalbiene*.

Figure 198. *Lasioglossum fratellum*. A, female specimen; B, male specimen (Photos : A. Pauly); C, specimen pinched for focus (Bihain, Photo : J. Devalez).

Diagnosis. carinated propodeum (*Evylaeus* group), similar to *L. fulvicorne* but females have a longer head, diagnostic scutum, diagnostic propodeum and males have thick metatarsi, very similar to *L. subfulvicorne*, females are undistinguishable, males can be separated by their diagnostic genitalia. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Data Deficient due to probable misidentifications (*L. fratellum* and *L. subfulvicorne* are cryptic species) ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: boreo-alpine species, EOO = 7,133,488 km², AOO = 8,144 km² ; National scale: common in the natural region of Hautes-Fagnes, rare and localized in Campine, EOO = 4,100 km², AOO = 29 km².

Population. Continental scale: the boreal population in the north is fragmented from the southern alpine population, the species is common and stable in both populations (Pauly & Michez 2015). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as rare and localized ; Current population trend: unknown.

Habitat and Ecology. Flying period: probably bivoltine from April to September ; Habitat: in whole Europe the species occurs in boreal and alpine habitats such as tundra, heathlands and alpine meadows (Pauly & Michez 2015) ; Visited flowers: *Vaccinium myrtillus*, *Vaccinium uliginosum*, *Veronica chamaedrys*, *Campanula rotundifolia, Epilobium angustifolium, Hieracium sp., Hypochaeris sp., Leontodon autumnale, Epilobium angustifolium* (Pauly 2019) ; Nesting habits: solitarily in nearly vertical banks (Field pers. comm.) or in the ground on pathways (Crèvecoeur & Maréchal 1935), some Spring nests contain two females (polygynous), founder female live two years (Field 1996, Pesenko *et al.* 2000, Peeters *et al.* 2012) ; Parasites: *Specodes ferruginatus, S. hyalinatus, S. crassus* and probably *S. geoffrellus* (Celary 1991, Söderman and Leinonen 2003, Pauly 2019).

Threats. Global warming: this boreo-alpine species may be threatened by global warming (Pauly 2019), potential other threats to this species are not known.

Conservation Actions. No future conservation actions can be taken for this species except the conservation of boreo-alpine habitats.

Research Needed. Monitoring of the population size and trend at the national and global scales ; determine potential other threats to this species ; specify the ecology and life history of this species.

Lasioglossum fulvicorne **(Kirby, 1802)**

Common Name(s): English - Chalk Furrow Bee ; French – *Lasioglosse à antennes brunes* ; Dutch – *Slanke Groefbij* ; German - *Braunfühler-Schmalbiene*.

Figure 199. *Lasioglossum fulvicorne*. A, female specimen; B, male specimen; C, foraging on *Tussilago farfara* (Photos : A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), females can be separated by their small size (6.5-7.5mm), smooth tergite 1, rounded head and males by their black abdomen, carinated propodeum, very thick tarsi. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: transpalearctic species, EOO = 4,034,431 km², AOO = 8,888 km² ; National scale: everywhere in Belgium, EOO = 21,000 km², AOO = 319 km².

Population. Continental scale: very common and stable throughout much of its distribution (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as very common in Belgium ; Current population trend: stable

Habitat and Ecology. Flying period: bivoltine, from March to September ; Habitat: ubiquitous, one of the most common species of heathlands (Pauly 2019) ; Visited flowers: polylectic species, often found on *Calluna vulgaris, Cirsium spp., Heracleum spp., Hieracium spp., Matricaria maritima, Polygonum cuspidatum, Potentilla neumanniana, Ranunculus spp., Salix spp., Senecio spp., Seseli libanotis, Solidago canadensis, Sonchus arvensis, Taraxacum spp., Thymus spp.* ; Records on cultivated plants: in Great-Britain it is found on *Fragaria spp., Pastinaca sativa, Daucus carota, Origanum vulgare, Thymus spp.* (Else & Edwards 2018), in Germany it can be found on *Brassica napus, Malus domestica*, *Mentha spp., Pastinaca, spp.* (Ebmer 1971, Westrich 1989) ; Nesting habits: in Belgium it nests solitarily in various types of soils (Pauly 2019) ; Parasites: *Sphecodes hyalinatus*, *S. ferruginatus* (Westrich 1989, Pauly 2019), *S. crassus* (Söderman and Leinonen 2003) and probably *S. geoffrellus, S. miniatus, S. puncticeps* (Celary 1991).

Threats. No major threats to this species.

Conservation Actions. No future conservation actions have to be taken for this species.

Lasioglossum glabriusculum (Morawitz, 1872)

Common Name(s): French – *Lasioglosse glabre* ; German - *Dickkopf-Schmalbiene*.

Figure 200. *Lasioglossum glabriusculum*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), small species (4-5 mm), rounded propodeum, females have a massive head and can be separated from *L. politum* by their diagnostic tergite 1 and scutum, males are difficult to identify. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: NA ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: south west Palearctic species, EOO = 3,322,425 km², AOO = 704 km² ; National scale: only one record dating from 2000 in Lokeren, Daknamse, Meersen, EOO = 100 km², AOO = 1 km².

Population. Continental scale: common and stable species that is probably expanding northwards (A. Pauly pers. comm. 2014) ; National scale: too few records to establish the size and trend of the population ; Current population trend: too few records to establish any clear population trend.

Habitat and Ecology. Flying period: April to October ; Habitat: in Belgium it has been found on a sandy bank along a canal (Pauly 2019), in Germany it is known from gravel and clay pits, orchards, and dry grasslands (Westrich 1989) and it may inhabit steppic areas in the southeastern part of its distribution (Grace 2010) ; Visited flowers: polylectic species, in Luxemburg it is mostly found on *Eryngium campestre, Achillea millefolium, Allium schoenoprasum, Bellis perennis, Campanula pyramidalis, Centaurea jacea, Cirsium arvense, Crepis capillaris, Daucus carota, Dianthus barbatus, Eryngium agavifolium, Geranium pyrenaicum, G. rotundifolium, Heracleum sphondylium, Knautia arvensis, Malva neglecta, M. sylvestris, Matricaria maritima, Nigella damascena, Origanum vulgare, Picris hieracioides, Potentilla reptans, Pulicaria dysenterica, Rubus fruticosus, Solidago canadensis, Tanacetum vulgare, Taraxacum officinalis, Thymus sp.* (Pauly 2019) ; Records on cultivated plants:

Allium schoenoprasum, Daucus carota, Origanum vulgare, Thymus spp. (Pauly 2019) ; Nesting habits: eusocial species with polygynous nests, it nests in the soil (Knerer, 1969, Pauly 2019) ; Parasites: *Nomada sheppardana* (Westrich 1989).

Threats. No major threats to this species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Vulnerable; Farkac *et al*. 2005) and Switzerland (Vulnerable; Amiet 1994).

No future conservation actions have to be taken for this species at the national scale except the conservation of its habitat.

Research Needed. Further research should be conducted to determine the population size and trend of the species at the national scale ; confirmation of its northward expansion.

Lasioglossum interruptum **(Panzer, 1798)**

Common Name(s): French – *Lasioglosse à bandes interrompues* ; German - *Schwarzrote Schmalbiene.*

Figure 201. *Lasioglossum interruptum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), small species (7 mm), well-carinated propodeum, apical margins of tergites are black and very densely punctuated, basolateral spots of hairs on tergites 2 and 3, rounded head, some males have a partially red metasoma. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: west Palearctic species, rare and restricted to warm biotopes in the northern part of its distribution, EOO = 5,341,979 km², AOO = 1,344 km² ; National scale: last records in Arlon (1870) and Torgny (1933).

Population. Continental scale: common and stable throughout its distribution (Pauly & Michez 2015) ; National scale: extinct.

Habitat and Ecology. Flying period: May to September in Luxemburg ; Habitat: ubiquitous (Westrich 1989) ; Visited flowers: polylectic species, in Luxemburg there are records on *Echium vulgare, Origanum vulgare, Pastinaca sativa, Reseda lutea, Brassica sp., Centaurea sp., Echium vulgare,* in Germany there are records on *Achillea millefolium*, *Taraxacum officinale, Echium vulgare*, *Brassica napus*, *Sedum acre*, *Potentilla verna, Lotus spp., Pulsatilla spp., Potentilla* (Westrich 1989, Ebmer 1971) ; Records on cultivated plants: *Origanum vulgare, Pastinaca sativa, Brassica napus* ; Nesting habits: nests in sandy or clayey soils, eusocial species, nests are often polygynous (Knerer, 1968, Pauly 2019) ; Parasites: not known for Belgium.

Threats. No major threats to this species, Belgium is out of the northern edge of its distribution.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011) and Switzerland (Vulnerable; Amiet 1994).

No future conservation actions have to be taken for this species.

Research Needed. Conduct sampling expeditions to confirm / infirm the setting of the species at the national scale as it is likely to benefit from global warming.

Lasioglossum laeve **(Kirby, 1802)**

Common Name(s): English - Shiny-gastered Furrow Bee ; French – *Lasioglosse brillant* ; Dutch - *Gladde Groefbij* ; German - *Glanz-Schmalbiene*.

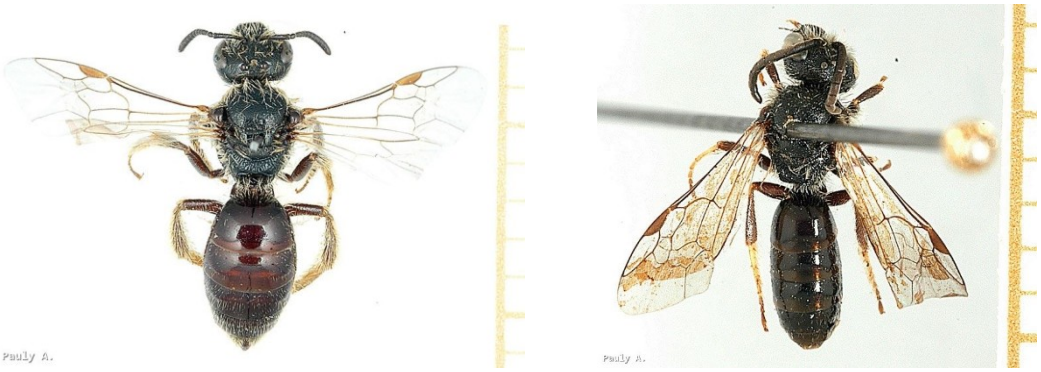

Figure 202. *Lasioglossum laeve*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), strong and well-spaced punctuation on the scutum, strongly carinated propodeum, smooth tergites 1 and 2, tergites with a black apical margins. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Endangered (EN) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: west Palearctic species, restricted to mountains , disappeared from lowlands, EOO = 1,005,251 km², AOO = 296 km² ; National scale: last records in Tournai (1877), Braine-le-Comte (1884), Groenendael (1887), Hermalle-sous-Argenteau (1890), Haccourt (1897), Wéris (1937), Pellenberg (1941).

Population. Continental scale: extremely rare and the remaining populations are severely fragmented (Pauly & Michez 2015) ; National scale: extinct.

Habitat and Ecology. Flying period: in Germany, from May to September (Westrich 1989) ; Habitat: unknown ; Visited flowers: probably polylectic (Westrich 1989) ; Records on cultivated plants: *Daucus carota* (Westrich 1989) ; Nesting habits: nests probably solitarily ; Parasites: unknown.

Threats. The causes of the decline are not known but it may probably suffer from global warming and loss of alpine pastures.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al*. 2005), Germany (Critically Endangered; Westrich *et al*. 2011), Great Britain (Regionally Extinct; Shirt 1987), the Netherlands (Regionally Extinct; Peeters and Reemer 2003) and Switzerland (Near Threatened; Amiet 1994) ; Future: no future conservation actions can be taken given the lack of ecological knowledges.

Research Needed. Specify the ecology and life history of the species ; determine the population size and trend at the continental scale ; determine the threats to this species.

Lasioglossum laevigatum **(Kirby, 1802)**

Common Name(s): English - Red-backed Furrow Bee ; French – *Lasioglosse polissé* ; Dutch - *Gedoornde Groefbij* ; German - *Bezahnte Schmalbiene*.

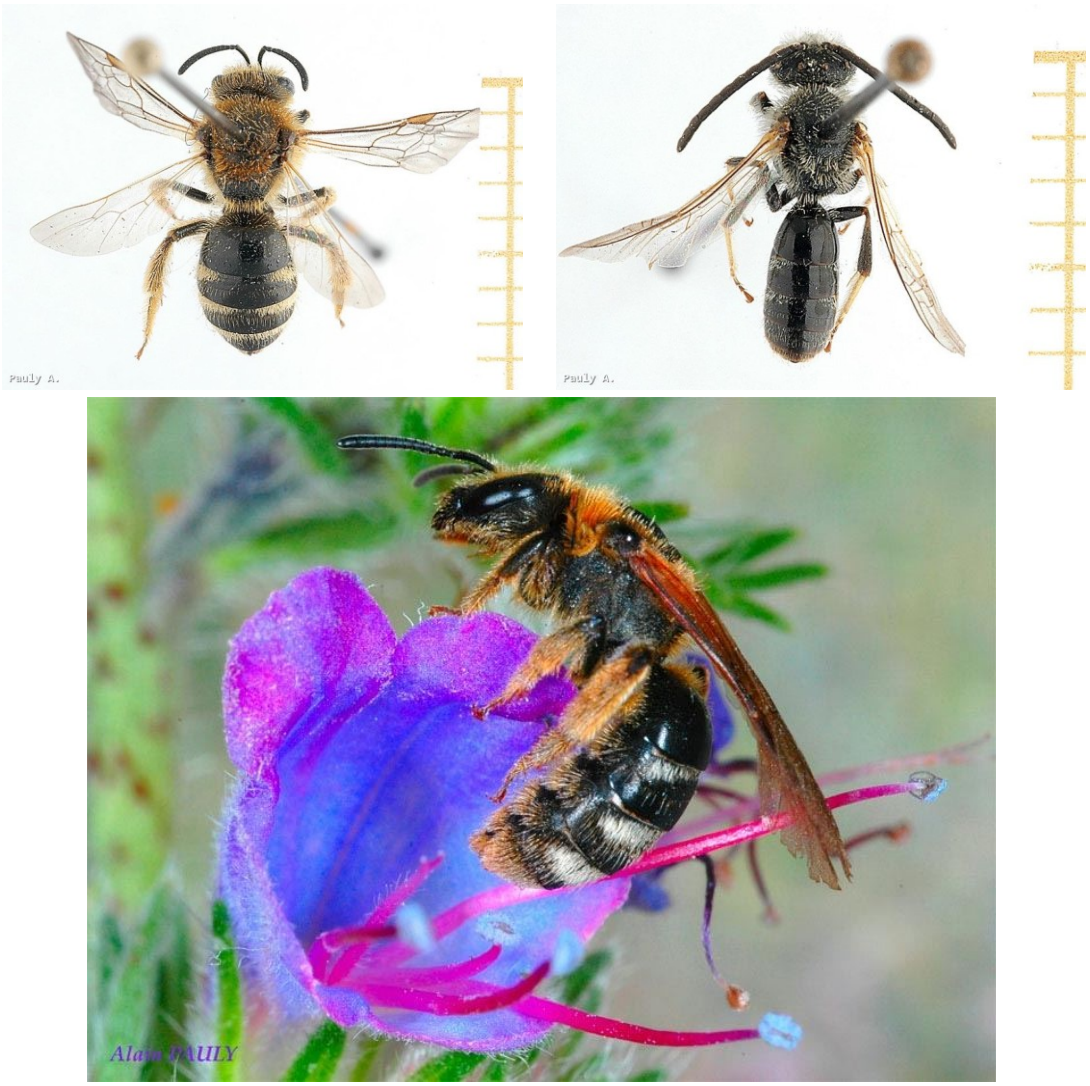

Figure 203. *Lasioglossum laevigatum*. A, female specimen; B, male specimen; C, on *Echium vulgare* (Neuville, Photos : A. Pauly).

Diagnosis. medium-sized species (8-9mm), carinated propodeum, long and rusty pubescence on scutum, sparsely punctuated scutum, broad head. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2bc; B1ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a

geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), severely fragmented distribution and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: west Palearctic species, EOO = 3,638,094 km², AOO = 2,776 km² ; National scale: southern Sambre-Meuse line, EOO = 4,100 km², AOO = 29 km².

Population. Continental scale: uncommon, population has declined (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite rare and probably declining ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to September ; Habitat: forest edges, grasslands (Pauly 2019), particularly associated with dry calcareous grassland, occasionally open woodland on chalk, wooded heathland (Kemp *et al.* 2013) ; Visited flowers: polylectic species, in Belgium it can be found on *Alliaria petiolata, Campanula persicifolia, Carduus crispus, Cornus sanguinea, Daucus carota, Dianthus barbatus, Echium vulgare, Heracleum sp., Hieracium pilosella, Knautia arvensis, Origanum vulgare, Pulmonaria sp., Rubus sp., Ranunculus sp., Senecio jacobaea, Taraxacum sp., Thymus serpyllum, Tulipa sp.* (Pauly 2019) ; Records on cultivated plants: in Belgium on *Daucus carota , Origanum vulgare, Thymus serpyllum, Tulipa sp.* (Pauly 2019), in Great-Britain on *Prunus domestica, Pastinaca sativa, Daucus carota* (Else & Edwards 2018) ; Nesting habits: solitary species, nesting habits are not known (Westrich 1989, Pauly 2019) ; Parasites: unknown.

Threats. Reduction of suitable habitats: destruction of grasslands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands ; intensive forestry practices (*i.e.* deletion of edges and clearings, closing of the vegetation) ; Genetic isolation: the fragmented distribution does not allow genetic exchanges between sub-populations.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011) and the Netherlands (Regionally Extinct; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers) ; promotion of extensive forestry practices (*i.e.* open woodland including various timber species, multistage edges and clearings).

Research Needed. Monitoring of the population trend at the national scale ; quantify the impact of pesticides and nitrogen fertilizers on food ressources ; specify the ecology and life history of the species ; better understanding of the threats to this species.

Lasioglossum laticeps **(Schenck, 1868)**

Common Name(s): English - Broad-faced Furrow Bee ; French – *Lasioglosse à tête large* ; Dutch - *Breedkaakgroefbij* ; German - *Breitkopf-Schmalbiene*.

Figure 204. *Lasioglossum laticeps*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum (*Evylaus* group), small species (6 – 7 mm), females can be separated by the diagnostic punctuation of scutum and tergite 1, the very broad head and the diagnostic shape of hind tibias, males can be separated by the diagnostic shape of the head, propodeum and metatarsi. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: west Palearctic species, EOO = 4,141,040 km², AOO = 3,488 km² ; National scale: common in Middle-Belgium, EOO = 15,300 km², AOO = 269 km².

Population. Continental scale: common in much of its range and the populations are believed to be stable (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as very common ; Current population trend: stable.

Habitat and Ecology. Flying period: March to September ; Habitat: in Belgium it is common on calcareous soils and in sandpits (Pauly 2019) ; Visited flowers: polylectic species, in Belgium it can be found on *Achillea millefolium, Calluna vulgaris, Cirsium spp., Daucus carota, Eupatorium cannabinum, Frangula alnus, Heracleum sp., Hieracium sp., Matricaria sp., Melilotus alba, Mentha sp., Pastinaca sp., Picris hieracioides, Polygonum cuspidatum, Potentilla sp., Prunus spinosa, Rubus sp., Salix spp., Senecio spp., Solidago spp., Tanacetum vulgare, Taraxacum spp., Thymus sp., Tussilago farfara* (Pauly 2019) ; Records on cultivated plants: in Belgium it can be found on *Daucus carota, Mentha sp., Pastinaca sp., Prunus spinosa, Thymus sp.* (Pauly 2019), in Germany it can be found on *Daucus carota, Brassica napus, Fragaria vesca, Malus domestica, Ribes spp., Pastinaca spp., Origanum vulgare* (Ebmer 1971,

Westrich 1989) ; Nesting habits: in Belgium it nests socially in the soil and in rocks crevices, in urban areas it nests in old walls (Pauly 2019) ; Parasites: *Sphecodes ephippius, S. ferruginatus, S. monilicornis* (Packer 1983, G.R. Else pers. obs. 1987, Pauly 2019).

Threats. There are no major threats to the species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Great Britain (Endangered; Shirt 1987). Future: no specific conservation have to be taken at the national scale.

Lasioglossum lativentre **(Schenck, 1853)**

Common Name(s): English - Furry-claspered Furrow Bee ; French – *Lasioglosse à ventre large* ; Dutch – *Breedbuikgroefbij* ; *Breitbauch-Schmalbiene*.

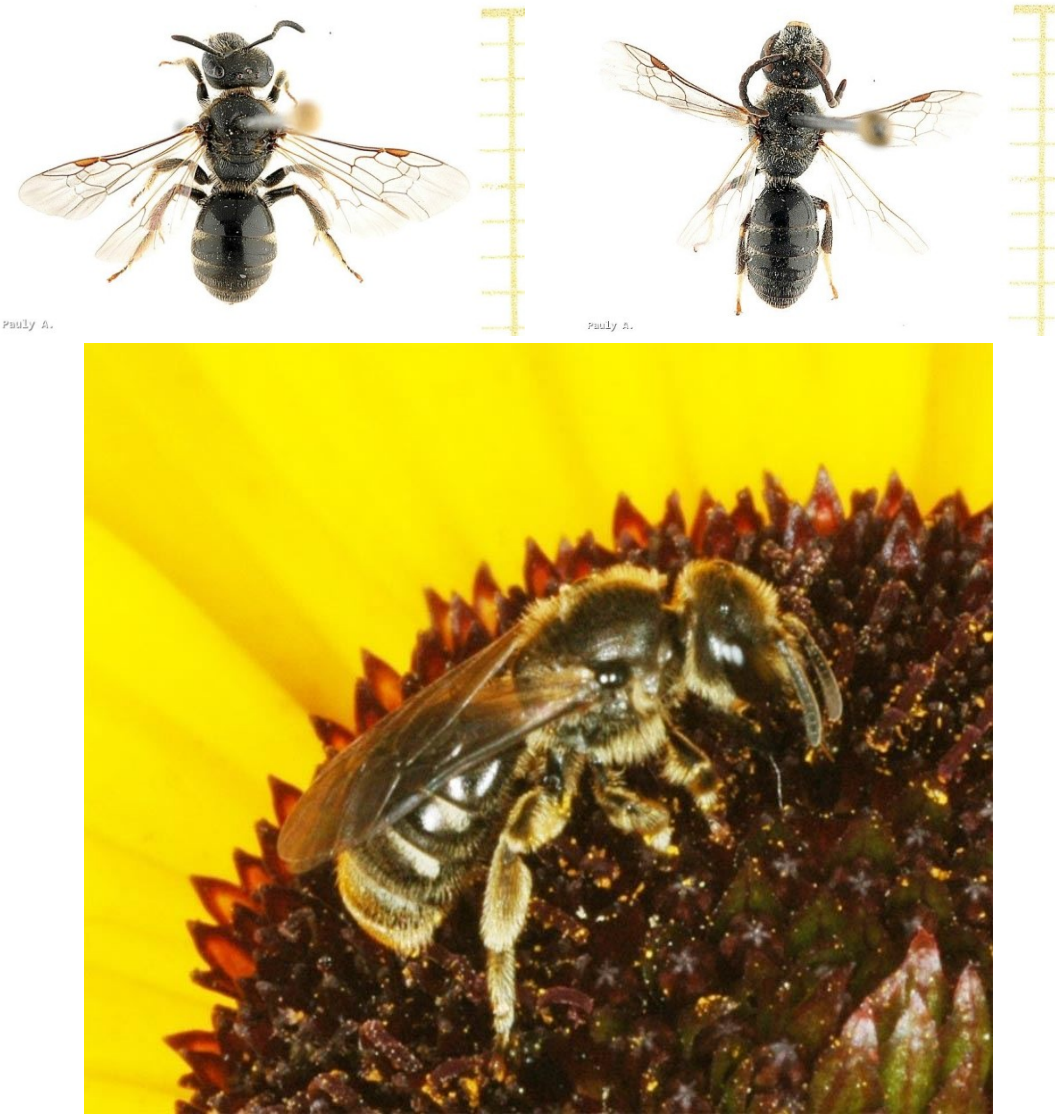

Figure 205. *Lasioglossum lativentre*. A, female specimen; B, male specimen; C, foraging on *Rudbeckia sp.* (Embourg, Photos : A. Pauly).

Diagnosis. non-carinated propodeum, males can be separated by the diagnostic pubescence of genitalia, females can be separated by the diagnostic punctuation tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: west Palearctic species, EOO = 4,516,929 km², AOO = 3,584 km² ; National scale: abundant in the natural region of Ardenne, EOO = 9,100 km², AOO = 93 km².

Population. Continental scale: not very common throughout its range, the overall population trend is however thought to be stable (Kemp *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as locally quite common ; Current population trend: increase.

Habitat and Ecology. Flying period: from March to September ; Habitat: forest edges (Pauly 2019), humid meadows, grasslands (Kemp *et al.* 2013) ; Visited flowers: polylectic species, often found on Fabaceae, in Belgium and Luxemburg there are records on *Ranunculus ficaria, Achillea millefolium, Aster lynosiris, Bellis perennis, Calluna vulgaris, Cardamine sp., Centaurea jacea, C. scabiosa, Cerstium fontanum, Crepis biennis, Geranium sp., Heracleum sphondylium, Hypochoeris radicata, Leucanthemum vulgare, Medicago lupulina, Melilotus alba, Picris hieracioides, Ranunculus acris, Saxifraga granulata, Senecio jacobaea, Senecio sp., Sonchus arvensis, Stellaria media, Taraxacum sp., Teucrium chamaedrys, Thymus pulegioides, Trifolium dubium, T. pratense, Tussilago farfara, Vicia tenuifolia* ; Records on cultivated plants: in Belgium on *T. pratense* (Pauly 2019), in Great-Britain on *Prunus domestica, Pastinaca sativa, Daucus carota* (Else & Edwards 2018) ; Nesting habits: solitary species, nesting habits are not known (Westrich 1989, Pauly 2019) ; Parasites: unknown.

Threats. Reduction of food resources: this Least Concern species may however suffer from the deletion of leguminous crops (from 160,000 ha in 1910 to 5,000 ha in 2014).

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011), Ireland (Critically Endangered; Fitzpatrick *et al.* 2006), the Netherlands (Endangered; Peeters and Reemer 2003), Sweden (Near Threatened; Gärdenfors 2010) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken except a promotion of the reintroduction of leguminous cropping in agricultural practices.

Lasioglossum leucopus **(Kirby, 1802)**

Common Name(s): English - White-footed Furrow Bee ; French – *Lasioglosse à pieds blancs* ; Dutch - *Gewone Smaragdgroefbij* ; German - *Hellfüssige Schmalbiene*.

Figure 206. *Lasioglossum leucopus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. head and metasoma with blue-green metallic sheen, can be separated from *L. morio* by its shorter head, males tarsi have ivory coloured tarsi. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: NT (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017); Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: euro-Siberian species, EOO = 6,222,388 km², AOO = 9,128 km² ; National scale: everywhere in Belgium but more common in the natural region of Ardenne, EOO = 15,100 km², AOO = 133 km².

Population. Continental scale: the species is common and the trend is assumed to be stable (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed that the species seem to be rarefacting ; Current population trend: decrease.

Habitat and Ecology. Flying period: April to September ; Habitat: meadows, forest edges, heathlands, wastelands (Pauly 2019) ; Visited flowers: in Belgium there are records on *Anthemis sp., Anthriscus sp., Berteroa incana, Calluna vulgaris, Campanula rotundifolia, Cerastium arvense, Convolvulus arvensis, Daucus carota, Echium vulgare, Geranium sp., Hieracium sp., Matricaria maritima, Picris hieracioides, Potentilla recta, Ranunculus spp., Rapistrum rugosum, Senecio sp., Silaum silaus, Sinapis arvensis, Solidago virgaurea, Stellaria media, Taraxacum sp.* (Pauly 2019) ; Records on cultivated plants: in Belgium there are records on *Daucus carota* (Pauly 2019) ; Nesting habits: solitarily in various types of soils (Pauly 2019),

according to Pesenko *et al.* (2000) it is a social species, according to Plateaux & Plateaux-Quénu (2008) the species is solitary ; Parasites: *Specodes geoffrellus* (Stöckhert 1933, Westrich 1989), *Nomada furva* (Söderman and Leinonen 2003).

Threats. The threats to this species are not known. In Belgium it might suffer from global warming.

Conservation Actions. Present: no present conservation actions ; Future: the threats to this species are not known, therefore no future conservation actions can be taken at the national scale.

Research Needed. Monitoring of the population trend at the national scale ; determine the threats to the species.

***Lasioglossum leucozonium* (Schrank, 1781)**

Common Name(s): English - White-zoned Furrow Bee ; French – *Lasioglosse à bandes blanches* ; Dutch – *Matte Bandgroefbij* ; German - *Weissbinden-Schmalbiene*.

Figure 207. *Lasioglossum leucozonium*. A, female specimen; B, male specimen (Photos : A. Pauly); C, resting (Plaine d'Alsace, Photo : M. aubert).

Diagnosis. carinated propodeum, first tergite with a diagnostic punctuation, males have a V-shaped spot of hairs of sternite 6. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: Holarctic species, EOO = 5,946,285 km², AOO = 11,276 km² ; National scale: everywhere in Belgium, EOO = 24,200 km², AOO = 373 km².

Population. Continental scale: common throughout its range, the population trend is believed to be stable (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as common ; Current population trend: stable.

Habitat and Ecology. Flying period: May to September ; Habitat: meadows, forest edges, wastelands (Pauly 2019) ; Visited flowers: in Belgium it is polylectic but mostly found on Asteraceae Cichorioideae, mostly found on *Centaurea spp., Cirsium arvense, Crepis biennis, C. capillaris, Geranium spp., Hieracium spp., Hypochoeris radicata, Jasione montana, Knautia arvensis, Leontodon autumnalis, Leucanthemum vulgare, Malva moschata, Picris hieracioides, Pulicaria dysenterica, Ranunculus spp., Scabiosa columbaria, Senecio jacobaea, Solidago virgaurea, Sonchus arvensis, Tanacetum vulgare, Taraxacum spp.* (Pauly 2019) ; Records on cultivated plants: in Great-Britain it is found on *Medicago sativa* (Else & Edwards 2018), it is believed to be an important commercial pollinator of *Medicago sativa* (Pesenko *et al.* 2000) ; Nesting habits: in Belgium it nests solitarily in various types of soils (Pauly 2019) ; Parasites: *Sphecodes ephippius* (Stöckhert 1933, Westrich 1989, Pauly 2019), *S. monilicornis* (Pauly 2019) and probably *S. reticulatus* (Loonstra 2006), *S. pellucidus* (Butterfield & Fordham 1932).

Threats. There are no major threats to this species.

Conservation Actions. No future conservation actions have to be taken for this species.

Lasioglossum lineare **(Schenck, 1868)**

Common Name(s): French – *Lasioglosse longiligne* ; Dutch – *Schoorsteengroefbij* ; German - *Schornstein-Schmalbiene*.

Figure 208. *Lasioglossum lineare*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), females can easily be confused with *L. malachurum* or *L. pauxillum* and males with *L. malachurum* and *L. subhirtum*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: West-Palearctic species, EOO = 3,913,497 km², AOO = 624 km² ; National scale: last records near Montagne Saint-Pierre (1951-1982), Arlon (1870), Auderghem (1884), Barvaux (1936), Dinant (1945), Sy (1949), Dourbes (1954), Nismes (1935-1961).

Population. Continental scale: locally abundant in certain areas of Europe but overall it is rare, no information on the population size and trend (Pauly & Michez 2015) ; National scale: extinct but able to recolonize the country when the conditions are good (eusocial species living in very large aggregations).

Habitat and Ecology. Flying period: March to September ; Habitat: temperate grasslands and shrublands, dry hillsides, sand and clay pits, vineyards, river levees and waste places (Westrich 1989) ; Visited flowers: polylectic species, in whole Europe it can be found on *Aegopodium sp., Angelica sp., Asperula sp., Bellis perennis, Brassica napus, Campanula sp., Centaurea cyanus, Cirsium sp., Echium vulgare, Eryngium sp., Geranium rotundifolia, Heracleum sp., Lonicera sp., Mentha sp., Ranunculus acris, Salix sp., Senecio jacobaea, Taraxacum sp., Tussilago sp.* (Pauly 2019) ; Nesting habits: eusocial species, can nest in large aggregations (over 100

nests), nests may be either monogynous or polygynous (Westrich 1989, Pauly 2019) ; Parasites: *Tecophora atra* (Conopidae) (Knerer 1983, Pauly 2019).

Threats. The threats to this species are unknown, populations are particularly vulnerable in Belgium because it is the northern edge of its distribution.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Critically Endangered; Peeters and Reemer 2003) and Switzerland (Vulnerable; Amiet 1994) ; Future: conservation of xerothermic habitats where the species is likely to establish.

Research Needed. Conduct sampling expeditions to determine the potential existence of remaining populations in Belgium ; specify the ecology and life history of the species at the national scale in order to establish threats and conservation actions that should be conducted.

***Lasioglossum lucidulum* (Schenck, 1861)**

Common Name(s): French – *Lasioglosse petit-brillant* ; Dutch – *Glanzende Groefbij* ; German - *Leuchtende Schmalbiene*.

Figure 209. *Lasioglossum lucidulum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. very small species (4-4.5 mm), non-carinated propodeum, smooth tergite 1, can easily be confused with *L. semilucens, L. minutissimum*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: Euro-siberian species, EOO = 4,699,117 km², AOO = 1,132 km² ; National scale: northern Sambre-Meuse line, EOO = 5,100 km², AOO = 47 km².

Population. Continental scale: a quite common species throughout its range, no information for the population size and trend of the species (Pauly & Michez 2015). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species locally quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: May to September ; Habitat: sandy areas, inland sand dunes covered with mosses ; Visited flowers: polylectic species, particularly on small cruciferous flowers, also on *Berteroa incana, Bryonia cretica, Calluna vulgaris, Cirsium vulgare, Cytisus scoparius, Daucus carota, Epilobium angustifolium, Matricaria inodora, Potentilla sp., Ranunculus repens, Rapistrum rugosum, Reseda lutea, Taraxacum sp*. (Pauly 2019) ; Records on cultivated plants: in Belgium it is found on *Daucus carota* ; Nesting habits: in Belgium it nests solitarily in sandy soils, sometimes in small aggregations (Pauly 2019) ; Parasites: probably *Sphecodes niger* (Westrich 1989, Söderman and Leinonen 2003), *S. longulus* (Vegter

1993, Pauly 2019), *S. marginatum* (Pauly 2019) and *Nomada sheppardana* (Westrich 1989, Söderman and Leinonen 2003, Pauly 2019).

Threats. The species is quite common in the habitats where it occurs.

Conservation Actions. Present: there are no present **Conservation Actions.** Future: promotion of the conservation of natural sandy areas.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and life history of the species (very small species, few ethological data).

Lasioglossum majus **(Nylander, 1852)**

Common Name(s): English - Bloomed Furrow Bee ; French – *Lasioglosse majeur* ; Dutch – *Grote Bandgroefbij* ; German - *Grosse Schmalbiene*.

Figure 210. *Lasioglossum majus*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. carinated propodeum, smooth tergite 1 with a well-spaced punctuation, females can be separated from *L. zonulum* by their greater size (11-12 mm) and its diagnostic punctuation on tergite 4, males can be separated from *L. zonulum* by their greater size and the diagnostic shape of tergite 7. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: West-Palearctic species, restricted to warm biotopes, EOO = 2,487,169 km², AOO = 484 km² ; National scale: known from Malonne (1901), marble quarry of Neuville (1998), Sint-Lievens-Houtem (2015), Auderghem (2015), Sint-Andries (2015-2016), Aalst (2017), EOO = 200 km², AOO = 3 km².

Population. Continental scale: rare and localized, the trend of this species is not known (Kemp *et al.* 2013) ; National scale: Pauly (2019) assessed that the species is very localized and has recently expanded until Belgium, probably due to global warming ; Current population trend: increase.

Habitat and Ecology. Flying period: May to October ; Habitat: meadows and grasslands (Kemp *et al.* 2013) ; Visited flowers: polylectic species, in Belgium there are records on *Eupatorium* and *Epilobium* (J. D'Haeseler, pers. comm.), in whole Europe there are records on *Aegopodium sp., Anthericum liliago, Campanula sp., Centaurea scabiosa, Eryngium campestre, Heracleum sphondylium, Lythrum salicaria, Solidago canadensis, S. virgaurea, Valeriana sp.* (Pauly 2019) ; Nesting habits: in Italy the species is reported to nest in large aggregation (Boesi *et al.* 2009), it seems to have a solitary behaviour even though polygynous nests can be found (Pauly 2019) ; Parasites: unknown.

Threats. In whole Europe the species is threatened by the intensification of agriculture which causes the reduction of suitable habitat (Kemp *et al.* 2013) and it is likely to suffer from it in the countries in which it is expanding.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2011) and Switzerland (Vulnerable; Amiet 1994) ; Future: promotion of extensive agricultural practice (*i.e.* excluding intensive of nitrogen fertilizers and herbicides).

Research Needed. Monitoring of the population size and trend at the national scale ; Specify the ecology and threats to the species.

***Lasioglossum malachurum* (Kirby, 1802)**

Common Name(s): English - Sharp-collared Furrow Bee ; French – *Lasioglosse des pavements* ; Dutch – *Groepjesgroefbij* ; German - *Feldweg-Schmalbiene*.

Figure 211. *Lasioglossum malachurum*. A, female specimen; B, male specimen (Photos : A. Pauly); C, approaching the nest (Fragnes-Cruzilles, Photo : S. Vitzthum).

Diagnosis. carinated propodeum (*Evylaeus* group), very dense punctuation on tergite 1, females can be separated from *L. subhirtum* and *L. lineare* by the diagnostic shape of their pronotum, males can be separated from *L. subhirtum* by the ochre cuticle of their antennae. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: West-Palearctic species, EOO = 7,681,109 km², AOO = 6,476 km² ; National scale: more common in Middle-Belgium, EOO = 10,600 km², AOO = 144 km².

Population. Continental scale: very common species in central and southern Europe (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species locally quite common ; Current population trend: stable, in England the species has a marked northward spread in frequency and abundance in the last 25 years (S. Roberts pers. comm. 2014).

Habitat and Ecology. Flying period: early March to September ; Habitat: in the UK, it inhabits coastal cliffs and landslips, abandoned quarries, commons, chalk grassland and private gardens (BWARS 2014), in whole Europe it can be found on temperate grasslands and shrublands (Pauly & Michez 2015) ; Visited flowers: polylectic species, it is the first Spring species to forage on *Bellis perennis*, in Belgium and Luxemburg it can be found on *Achillea millefolium, Anthemis sp., Anthriscus sylvestris, Bellis perennis, Brassica napus, Bryonia dioica, Calluna vulgaris, Carduus crispus, Centaurea spp., Chaerophyllum temulum, Chrysanthemum segetum, Cirsium spp., Convolvulus arvensis, Crepis spp., Crocus sp., Daucus carota, Eryngium campestre, Geranium pyrenaicum, Heracleum sp., Hypochoeris radicata, Isatis tinctoria, Knautia arvensis, Leucanthemum vulgare, Malva neglecta, Matricaria spp., Odontites sp., Orchis militaris, Papaver rhoeas, Picris hieracioides, Polygonum cuspidatum, Primula veris, Prunus sp., Pulicaria dysenterica, Ranunculus spp., Rubus sp., Salix spp., Scrophularia sp., Selinum carvifolia, Senecio spp., Solidago spp., Tanacetum vulgare, Taraxacum sp., Tussilago farfara* (Pauly 2019) ; Records on cultivated plants: in Belgium it can be found on *Brassica napus, Crocus sp., Daucus carota, Prunus sp.,* in Great-Britain it is found on *Foeniculum vulgare, Pastinaca sativa* (Else & Edwards 2018) ; Nesting habits: eusocial species that nests in aggregations in banks and old walls (Westrich 1989, Wyman and Richards 2003, Pauly 2019) ; Parasites: *Sphecodes monilicornis* (Legewie 1925, Pauly 2019), *S. gibbus* (Celary 1991, Pauly 2019), *S. ephippius, Bombylius spp.* (Pauly 2019).

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Netherlands (Vulnerable; Peeters and Reemer 2003) ; Future: no future conservation actions have to be taken at the national scale.

***Lasioglossum minutissimum* (Kirby, 1802)**

Common Name(s): English - Least Furrow Bee ; French – *Lasioglosse minuscule* ; Dutch – *Ingesnoerde Groefbij* ; German - *Winzige Schmalbiene*.

Figure 212. *Lasioglossum minutissimum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. non-carinated propodeum, very small species, slightly elongated head, it can be separated from *L. lucidulum* and *L. semilucens* by the punctuated apical margin of tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: West-Palearctic species, EOO = 5,522,355 km², AOO = 3,592 km² ; National scale: Low and Middle-Belgium, EOO = 6,900 km², AOO = 68 km².

Population. Continental scale: common throughout its range, no further information on the population size and trend (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species locally quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: can be found on sandy areas (Pauly 2019), sand-, gravel- and clay-pits, mobile dunes, dry grasslands, open areas and a variety of ruderal and anthropogenic habitats in Germany (Westrich 1989) ; Visited flowers: polylectic species, in Belgium it can be found on *Anthemis sp., Anthriscus sylvestris, Crepis capillaris, Dianthus barbatus, Lotus corniculatus, Malus sp., Taraxacum sp.* (Pauly 2019) ; Records on cultivated plants: in Belgium it can be found on *Malus sp.* (Pauly 2019), in Great-Britain it is found on *Brassica napus, Daucus sp., Mentha sp.* (Else & Edwards 2018) ; Nesting habits: nests solitarily in sandy soils (Knerer & Schwarz 1976, Pauly 2019), Perkins (1923) describes the species as often forming considerable nesting aggregations, although these are found today only very rarely (Pauly & Michez 2015) ; Parasites: *Specodes longulus* (Stöckhert 1933).

Threats. No major threats to this species.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Lasioglossum minutulum **(Schenck, 1853)**

Common Name(s): French – *Lasioglosse réduit* ; Dutch – *Zuidelijke Dwerggroefbij* ; German - *Kleine Schmalbiene*.

Figure 213. *Lasioglossum minutulum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum (*Evylaeus* group), can be separated from *L. pauxillum* by the diagnostic shape and colour of tergite 1 and the diagnostic punctuation of pleurae. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2bc; B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO), this reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of observations ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: European distribution, EOO = 2,328,044 km², AOO = 512 km² ; National scale: on calcareous areas of the Meuse basin, EOO = 1,900 km², AOO = 16 km².

Population. Continental scale: rare species, no further information available for the population size and trend (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite rare and localized, the species is almost exclusively found in natural reserves ; Current population trend: decrease.

Habitat and Ecology. Flying period: April to September ; Habitat: calcareous rocks and grasslands (Pauly 2019) ; Visited flowers: polylectic species, in Belgium it can be found on *Aster linosyris, Chaerophyllum temulentum, Frangula alnus, Heracleum sp., Potentilla tabernaemontani, Rhamnus cathartica, Salix sp., Scabiosa columbaria, Sedum reflexum, S. rupestre, Seseli libanotis, Tanacetum sp., Taraxacum sp., Verbascum nigrum, Veronica chamaedrys* (Pauly 2019), in Germany it can be found on *Anthriscus sylvestris, Taraxacum officinale, Ranunculus acris, Frangula alnus* and *Salix* sp. (Westrich 1989) ; Nesting habits: unknown ; Parasites: *Nomada furva* (Perkins 1919b, Pauly 2019).

Threats. Reduction of suitable habitats : destruction of calcareous grasslands in agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Endangered; Peeters and Reemer 2003) and Switzerland (Vulnerable; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of calcareous grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population and habitat trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; impact of pesticides and nitrogen fertilizers on food ressources.

***Lasioglossum monstrificum* (Morawitz 1891)**

Common Name(s): French – *Lasioglosse monstrueux* ; Dutch – *Glanzende Franjegroefbij* ; German - *Wangendorn-Schmalbiene.*

Figure 214. *Lasioglossum monstrificum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. very similar to *L. sexstrigatum*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2c) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a reduction in the quality of habitats ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: in Belgium, France, Germany, the Netherlands, Sweden and Switzerland, EOO = 477,831 km², AOO = 292 km² ; National scale: particularly in the natural region of Campine, EOO = 1,700 km², AOO = 17 km².

Population. Continental scale: rare species (Pauly & Michez 2015) ; National scale: Pauly (2019) assessed the species as quite rare and localized ; Current population trend: decrease.

Habitat and Ecology. Flying period: April to September ; Habitat: sandpits, inland dunes with heather, wooded heathlands; Visited flowers: very few data, in Belgium and France it can be found on *Cytisus scoparius, Brassica napus, Ranunculus sp.* ; Nesting habits: nests solitarily in sandy soils ; Parasites: probably *Sphecodes puncticeps* ; *Halictoxenos spencei.*

Threats. Reduction of suitable habitats: decreasing habitat in both extent and quality due to reforestation and urbanisation after the extraction of sand.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of Germany (Data Deficient; Westrich *et al.* 2011) and Sweden (Near Threatened; Gärdenfors 2010). Future: promotion of the conservation / rehabilitation of sandy natural habitats of Campine.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and life history of the species.

Lasioglossum morio **(Fabricius, 1793)**

Common Name(s): English - Green Furrow Bee ; French – *Lasioglosse bouffon* ; Dutch – *Langkopsmaragdgroefbij* ; German - *Dunkelgrüne Schmalbiene*.

Figure 215. *Lasioglossum morio.* A, female specimen; B, male specimen; C, foraging on *Sedum sp.* (Embourg, Photos : A. Pauly).

Diagnosis. head and mesosoma with metallic blue sheen, black metasoma, hard to separate from *L. nitidulum* and *L. leucopus*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: West-Palearctic species, EOO = 10,065,914 km², AOO = 11,128 km² ; National scale: everywhere in Belgium, EOO = 24,000 km², AOO = 533 km².

Population. Continental scale: very common species throughout its range (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as one of the most common in Belgium ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from March to October ; Habitat: ubiquitous (Pauly 2019) ; Visited flowers: polylectic species (Pauly 2019) ; Records on cultivated plants: *Daucus carota, Fragaria vesca, Origanum vulgare, Thymus spp., Brassica oleracea, Brassica napus, Sinapis alba, Malus domestica* (Westrich 1989, Pauly 2019) ; Nesting habits: gregarious species often nesting in large aggregations in clayey banks, cracks in clayey rocks and more rarely in dunes (Pauly 2019), the species is presumably eusocial with a summer brood of workers (Knerer 1968, 1969) ; Parasites: *Sphecodes niger* (Specific host), *S. geoffrellus, S. longulus,* and possibly *S. miniatus, Nomada furva, Nomada sheppardana; Halictoxenos tumulorum* (Alfken 1913, Stöckhert 1933, Westrich 1989, Smit & Smit 2005, Pauly 2019)

Threats. No major threats to the species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Finland (Critically Endangered; Rassi *et al.* 2001). Future: no future conservation actions have to be taken at the national scale.

Lasioglossum nigripes **(Lepeletier, 1841)**

Common Name(s): French – *Lasioglosse à pieds noirs* ; German - *Schwarzbeinige Schmalbiene.*

Figure 216. *Lasioglossum nigripes*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. the largest species (10-12 mm) among carinated propodeum *Evylaeus*, can be separated from other species by the diagnostic shape of tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: West-Palearctic species, EOO = 2,792,563 km², AOO = 1,020 km² ; National scale: St Kruis (1872), Malonne (1901).

Population. Continental scale: quite common and stable within its European range (Pauly & Michez 2015) ; National scale: only two records for Belgium.

Habitat and Ecology. Flying period: from April to September ; Habitat: temperate grasslands and Mediterranean-type shrublands (Pauly & Michez 2015), in Germany it can be found on sand and gravel pits, embankments, sparse grasslands and waste places (Westrich 1989) ; Visited flowers: polylectic species, in France it can be found on Asteraceae, Brassicaceae, *Geranium sp.*, *Potentilla sp.*, *Ranunculus sp.* (Pauly 2019), in Germany it can be found on *Leucanthemum vulgare*, *Centaurea jacea*, *Cichorium intybus*, *Taraxacum officinale*, *Leontodon autumnalis*, *Picris hieracioides*, *Hypochoeris radicata*, *Brassica napus*, *Sinapis alba*, *Convolvulus arvensis*, *Lotus corniculatus* (Westrich 1989) ; Nesting habits: nests in the soil, eusocial species, sometimes nests are polygynous (Plateaux-Quénu 1965a, b) ; Parasites: possibly *Sphecodes alternatus* (Knerer & Plateaux-Quénu 1970) and *S. pellucidus* (Grandi 1931).

Threats. There are no major threats to the species at the continental scale, Belgium is the extreme northern edge of its distribution.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Endangered; Farkac *et al*. 2005), Germany (Endangered; Westrich *et al*. 2011) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken for this species at the national scale.

Research Needed. Conduct sampling expeditions to determine the potential settlement of the species at national scale as it is likely to benefit from global warming.

Lasioglossum nitidiusculum (Kirby, 1802)

Common Name(s): English - Tufted Furrow Bee ; French – *Lasioglosse un peu luisant* ; Dutch – *Borstelgroefbij* ; German - *Glänzende Schmalbiene*.

Figure 217. *Lasioglossum nitidiusculum*.
Female specimen (Photo: A. Pauly).

Diagnosis. non-carinated propodeum, females can be separated from *L. parvulum* by their diagnostic shape of the propodeal area and males by their diagnostic pubescence on sternite 6. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: west-palearctic species, EOO = 5,402,621 km², AOO = 2,884 km² ; National scale: Middle-Belgium species, EOO = 6,300 km², AOO = 61 km².

Population. Continental scale: quite common species, no further information on the size and trend (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: wastelands, crop borders (Pauly 2019) ; Visited flowers: polylectic species preferring Brassicaceae ; Records on cultivated plants: in Belgium it can be found on *Brassica napus, Daucus carota, Sinapis alba* (Pauly 2019), in Great-Britain it can be found on *Pastinaca sativa, Daucus carota* (Else & Edwards 2018) ; Nesting habits: solitarily in the banks ; Parasites: *Sphecodes crassus, S. geoffrellus, S. miniatus, Nomada sheppardana, Halictoxenos spencei* (Pauly 2019).

Threats. No major threats to the species.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of Finland (Vulnerable; Rassi *et al.* 2001), Germany (Vulnerable; Westrich *et al.* 2011), Ireland (Vulnerable; Fitzpatrick *et al*. 2006), the Netherlands (Endangered; Peeters and Reemer 2003) and Sweden (Vulnerable; Gärdenfors 2010). Future: no future conservation action have to be taken at the national scale.

Lasioglossum nitidulum **(Fabricius, 1804)**

Common Name(s): French – *Lasioglosse vert-brillant* ; Dutch – *Glimmende Smaragdgroefbij* ; German - *Grünglanz-Schmalbiene.*

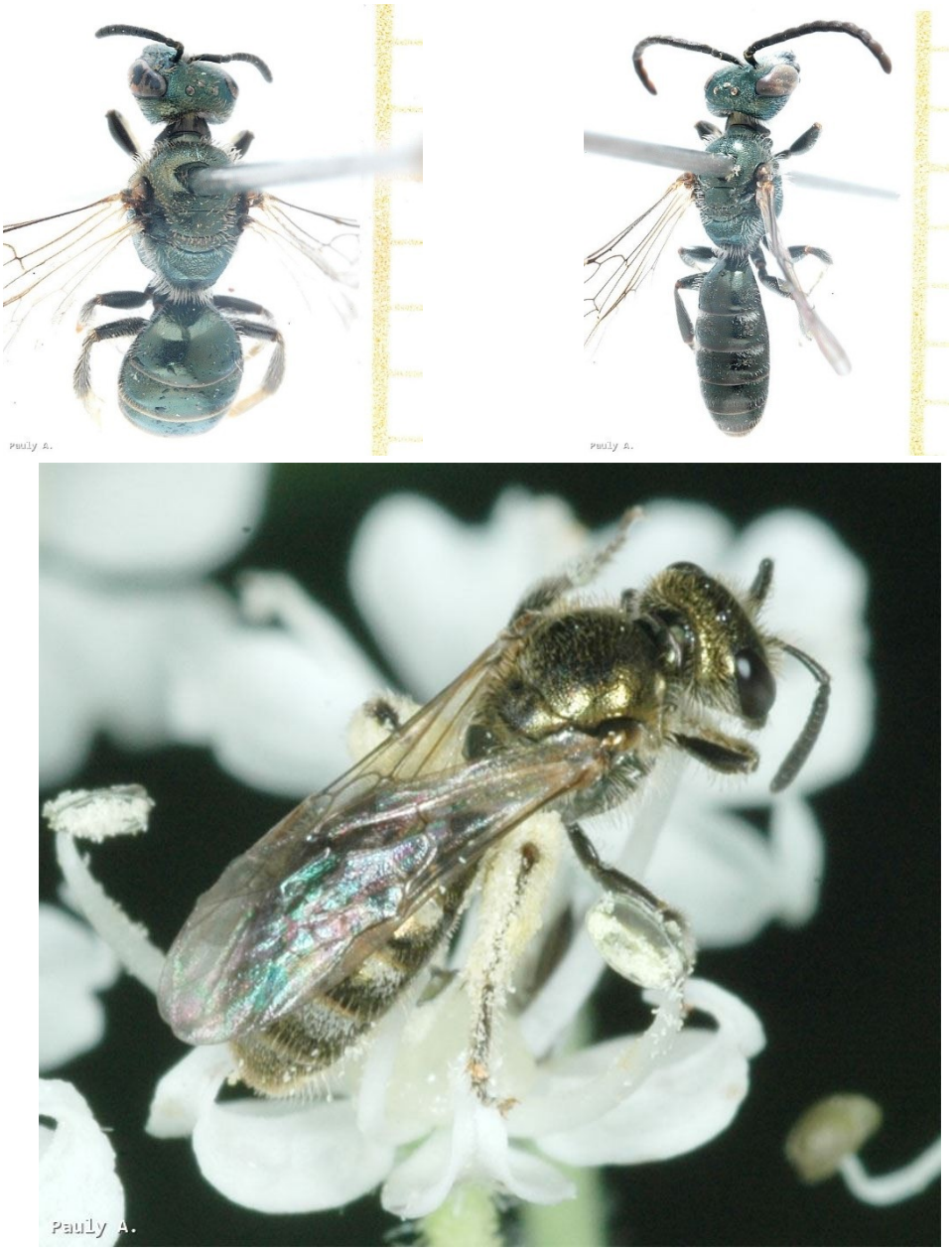

Figure 218. *Lasioglossum nitidulum*. A, female specimen; B, male specimen; C, foraging on *Heracleum montegazzianum* (Ixelles, Photos : A. Pauly).

Diagnosis. head, mesosoma and metasoma with green metallic sheen. Taxonomic Notes: there are four subspecies of *Lasioglossum* nitidulum: ssp. nitidulum (Fabricius, 1804); ssp. cretense (Warncke, 1975); ssp. fudakovskii (Noskiewicz, 1925); and ssp. hammi (Saunders, 1904). **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart,

Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: widespread throughout Europe, the nominal subspecies is found in western Europe, except the Atlantic coast and British Islands, and north to Sweden (56°N) and southward to Calabria in Italy, the subspecies *aeneidorsum*occurs in the steppes of central Germany (Berlin), eastwards to the Urals and southwards to the northern Balkans, the subspecies *fudakowskii* inhabits the Mediterranean zone of the Balkans, from Istria to Asia Minor (Bursa), the subspecies *hammi* is insular on the Balearic Islands, Sardinia, Corsica, Sicily; it has also been found on a small island near Benidorm (Spain) and on the island Guiglio on the Italian coast, the subspecies *cretense*is endemic to Crete, EOO = 6,544,335 km², AOO = 3,944 km² ; National scale: mostly found in Middle-Belgium, EOO = 18,000 km², AOO = 288 km².

Population. Continental scale: the species is very common and the populations are stable within Europe (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Pauly (2019) assessed the species as common ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from April to September ; Habitat: common in cities, gardens and rocks (Pauly 2019) ; Visited flowers: polylectic species (Pauly 2019) ; Records on cultivated plants: in Germany it can be found on *Brassica napus*, *Sinapis alba, Allium porrum* (Westrich 1989) ; Nesting habits: solitary species that nests in aggregations in rocks or old walls (Pauly 2019), Pesenko *et al.* (2000) suggests that the species may be primitively eusocial ; Parasites: possibly *Specodes geoffrellus* (Pauly 2019).

Threats. No major threats to the species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Sweden (Near Threatened; Gärdenfors 2010). Future: no future conservation actions have to be taken at the national scale.

Lasioglossum pallens **(Brullé, 1832)**

Common Name(s): French – *Lasioglosse pâle* ; Dutch – *Waaiergroefbij* ; German - *Frülings-Schmalbiene.*

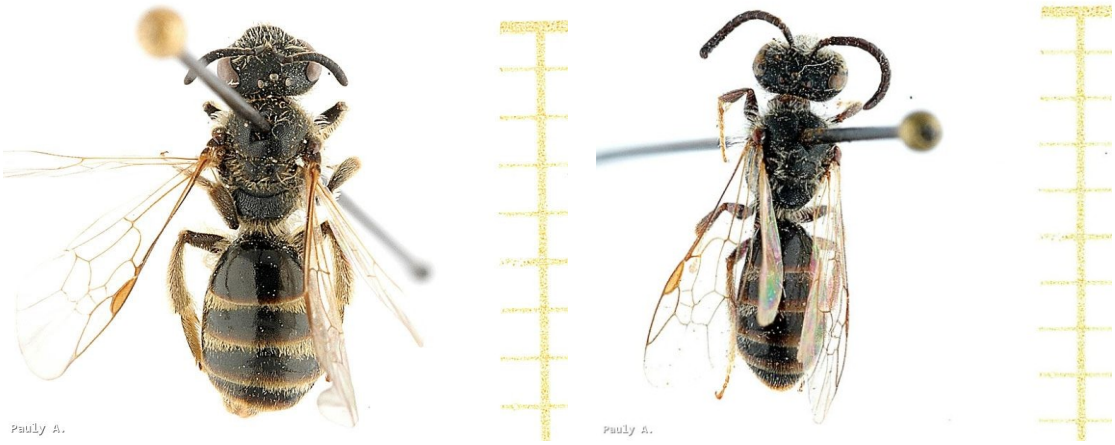

Figure 219. *Lasioglossum pallens*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. non-carinated propodeum, very broad head, apical margins of tergites with a brownish-yellow cuticle, diagnostic punctuation on tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al.*, 2013.

Geographic Range. Continental scale: west-palearctic species, restricted to warm biotopes, EOO = 2,100,824 km², AOO = 504 km² ; National scale: known from Montagne Saint-Pierre and a few localities of Flanders ; EOO = 200 km², AOO = 2 km².

Population. Continental scale: this species is stable and common (Kemp *et al.* 2013) ; National scale: Pauly (2019) assessed that the species is rare and very localized but has recently expanded until Belgium, probably due to global warming ; Current population trend: increase.

Habitat and Ecology. Flying period: Spring species ; Habitat: meadows and forest edges (Kemp *et al.* 2013) ; Visited flowers: in whole Europe it can be found on *Acer campestris, Brassica napus, Buxus sp., Cornus mas, Crataegus sp., Euphorbia sp., Helianthemum nummularium, Isatis tinctoria, Papaver sp., Prunus domestica, P. spinosa, Pyrus sp., Ranunculus bulbosus, R. ficaria, Salix caprea, S. purpurea, Taraxacum sp., Veronica chamaedrys* (Pauly 2019) ; Nesting habits: nests solitarily in large aggregations (Pauly 2019) ; Parasites: *Sphecodes majalis* (Pauly 2019).

Threats. No major threat to the species at the national scale. At the continental scale the species is threatened by climate change as sometimes the males emerge in winter (rather than spring) and, at that time of year, there is not enough forage available for the species. As the species aggregates when nesting this means that

any threat or change in habitat can affect a larger proportion of nesting individuals.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Endangered; Farkac *et al.* 2005) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale ; Determine potential threats to this species at the national scale.

Lasioglossum parvulum **(Schenck, 1853)**

Common Name(s): English - Smooth-gastered Furrow Bee ; French – *Lasioglosse petite* ; Dutch – *Kleine Groefbij* ; German - *Dunkle Schmalbiene*.

Figure 220. *Lasioglossum parvulum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (5.5 – 6 mm), carinated propodeum, females can be separated from *L. nitidiusculum* by the diagnostic shape of the propodeal area and from *L. rufitarse* by the shorter head, males can be separated from *L. nitidiusculum* by the diagnostic pubescence of sternites. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: west-palearctic species, EOO = 2,685,049 km², AOO = 4,160 km² ; National scale: everywhere in Belgium, EOO = 10,300 km², AOO = 123 km².

Population. Continental scale: quite common, populations are believed to be stable in central Europe (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: March to September ; Habitat: forest edges, sand, limestone, dolostone and marble quarries ; Visited flowers: polylectic species (Pauly 2019) ; Nesting habits: solitarily in the banks ; Parasites: *Sphecodes crassus, S. geoffrellus* and potentially *Nomada distinguenda, N. sheppardana ; Halictoxenos spencei* (Pauly 2019).

Threats. No major threats to the species.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation action have to be taken at the national

Lasioglossum pauxillum **(Schenck, 1853)**

Common Name(s): English - Lobe-spurred Furrow Bee ; French – *Lasioglosse des champs* ; Dutch – *Kleigroefbij* ; German - *Acker-Schmalbiene*.

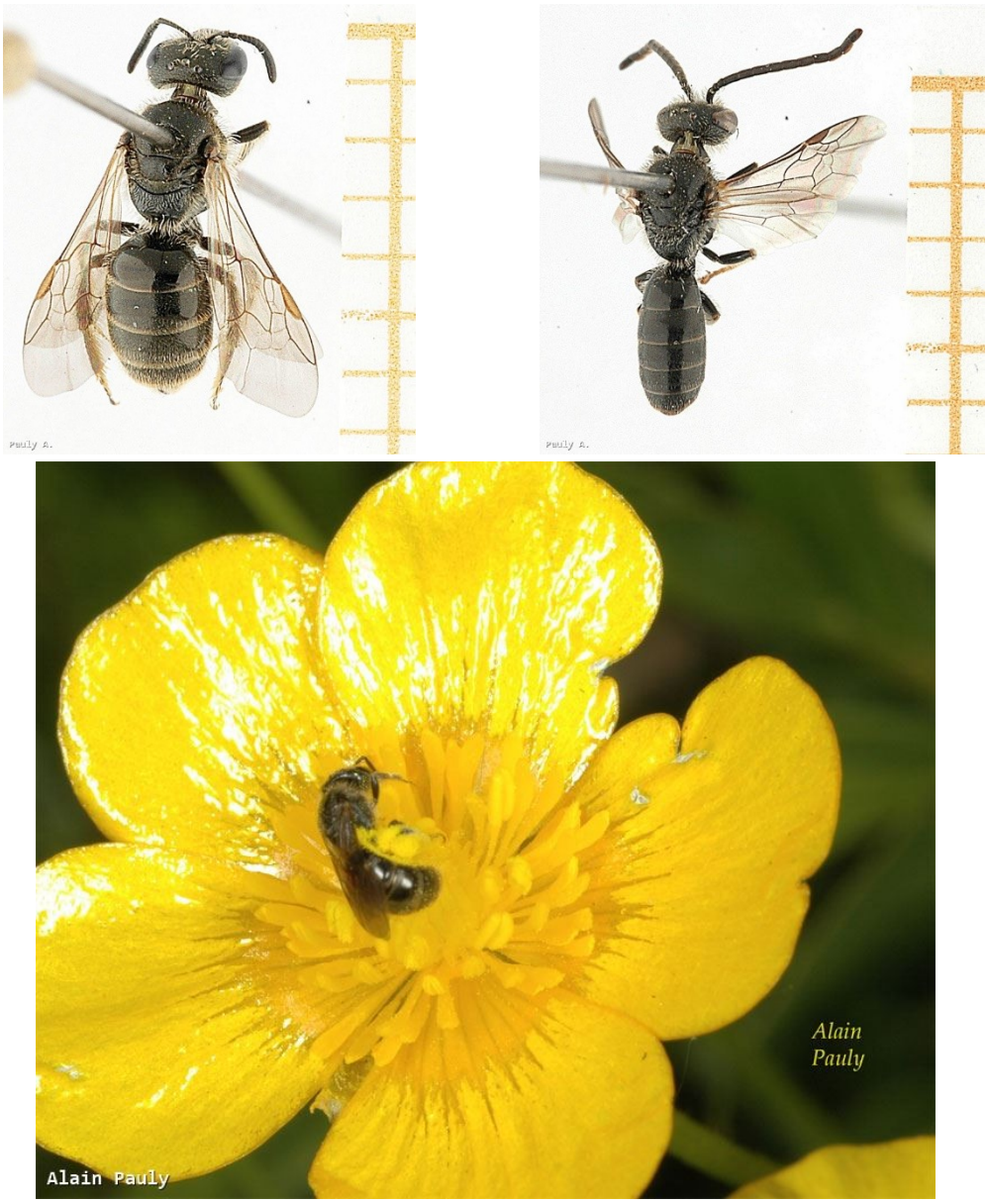

Figure 221. *Lasioglossum pauxillum*. A, female specimen; B, male specimen; C, foraging on *Ranunculus sp.* (Photos : A. Pauly).

Diagnosis. small size (5.5 – 6.5 mm), diagnostic shape of tergite 1, propodeum, pronotum. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: west-palearctic species, EOO = 4,533,180 km², AOO = 6,256 km² ; National scale: everywhere in Belgium, EOO = 16,200 km², AOO = 268 km².

Population. Continental scale: very common species, expanding range northwards (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as common and expanding ; Current population trend: increase.

Habitat and Ecology. Flying period: bivoltine, April to September ; Habitat: ubiquitous, very common on calcareous grasslands and wastelands (Pauly 2019) ; Visited flowers: polylectic species (Pauly 2019) ; Records on cultivated plants: in Belgium it can be found on *Daucus carota, Fragaria vesca* (Pauly 2019), in Germany it can be found on *Brassica napus*, *Sinapis alba, Salvia pratensis* (Westrich 1989) ; Nesting habits: eusocial species that nests in large aggregations in mono- or polygynous nests in clayey soil (Knerer & Plateaux-Quénu 1966a,b, Pauly 2019) ; Parasites: *Sphecodes crassus, S. ephippius, S. ferruginatus, S. geoffrellus,* and potentially *S. miniatus* (Pauly 2019).

Threats. No major threats to the species.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Lasioglossum politum **(Schenck, 1853)**

Common Name(s): French – *Lasioglosse poli* ; German - *Polierte Schmalbiene*.

Figure 222. *Lasioglossum politum*.
Female specimen (Photo : A. Pauly).

Diagnosis. small species (4,5 mm), females can be separated from other species by the diagnostic shape of the propodeum and the massive head and particularly from *L. glabriusculum* by the diagnostic punctuation of tergite 1 and scutum, males are harder to separate. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: transpalearctic species, EOO = 4,316,484 km², AOO = 1,268 km² ; National scale: last records on Montagne Saint-Pierre between 1954 and 1971.

Population. Continental scale: very common and stable species, especially in Mediterranean and sub-Mediterranean areas (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable ; Current population trend: extinct.

Habitat and Ecology. Flying period: April to October ; Habitat: open areas, river levees, sparsely vegetated areas and diverse landscapes with vineyards, sand and gravel pits and man-made habitats (Westrich 1989) ; Visited flowers: polylectic species, often found on Apiaceae (Pauly 2019) ; Records on cultivated plants: in France it can be found on *Brassica napus, Foeniculum vulgare, Origanum vulgare, Pastinaca sativa, Salvia officinalis* (Pauly 2019), in Germany it can be found on *Daucus carota, Brassica napus, Sinapis alba, Malus domestica* (Westrich 1989) ; Nesting habits: social species that nests in monogynous nests in the soil or in banks ; Parasites: *Sphecodes miniatus* (Pauly 2019).

Threats. No major threats to the species.

Conservation Actions. No future conservation have to be taken for this species at the national scale.

Research Needed. Monitoring of the population trend at the national scale as this species is likely to benefit from global warming.

***Lasioglossum prasinum* (Smith, 1848)**

Common Name(s): English - Grey-tailed Furrow Bee ; French – *Lasioglosse vert des dunes* ; Dutch – *Viltige Groefbij* ; German - *Steppenheide-Schmalbiene*.

Figure 223. *Lasioglossum prasinum*. A, female specimen; B, male specimen; C, foraging on *Erica tetralix* (Réserve de Kalmthout, Photos : A. Pauly).

Diagnosis. non-carinated propodeum, densely punctuated scutum with green-blue metallic sheen, dense pubescence on metasoma, males have a red cuticle on tergite 7. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: EN (B1ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (500 km² < EOO < 1,500 km²), severely fragmented distribution and continuing decline in the AOO, EOO, quality of habitats and number of observations ;

Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: sub-Atlantic distribution, EOO = 3,816,147 km², AOO = 1,292 km² ; National scale: very local distribution (Ter Yde, Oostvoorduinen, Doornpanne, Kalmthoutse heide, Klein schietveld), EOO = 900 km², AOO = 24 km².

Population. Continental scale: locally common in suitable habitat but the habitat is decreasing, the population is thus suspected to be decreasing too (Kemp *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as rare and very localized ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to August ; Habitat: coastal dunes and sandpits (Pauly 2019), ; Visited flowers: in Belgium it is principally found on *Centaurea scabiosa* and *Scabiosa columbaria* (Pauly 2019), particularly those that are covered by bryophytes or are dominated by *Erica tetralix*, *Vaccinium* spp., in Great Britain and the Netherlands, the species is very closely associated with lowland heathland, dominated by *Calluna vulgaris* and other Ericaceous dwarf shrubs (Kemp *et al.* 2013) ; Nesting habits: solitarily in moss-covered dunes, sometimes forming loose aggregations (Kemp *et al.* 2013) ; Parasites: possibly *Sphecodes reticulatus* (Pauly 2019).

Threats. Destruction of suitable habitats: the coastal dunes are threatened by the urbanization and tourist development and lowland heathland by succession to woodland, urban and infrastructure development, afforestation and mineral extraction.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2011), and Lithuania (Vulnerable; Rašomavičius 2007). Future: promotion of the conservation of coastal and inland dunes and lowland heathlands.

Research Needed. Monitoring of the population size and trend at the national scale ; quantify the impact of urbanization on habitats.

***Lasioglossum punctatissimum* (Schenck, 1853)**

Common Name(s): English - Long-faced Furrow Bee ; French – *Lasioglosse très ponctué* ; Dutch – *Fijngestippelde Groefbij* ; German - *Punktierte Schmalbiene*.

Figure 224. *Lasioglossum punctatissimum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. elongated head, short and non-carinated propodeum, males can be separated from *L. angusticeps* by the diagnostic shape of their genitalia. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez. 2015.

Geographic Range. Continental scale: West-Palearctic species, EOO = 3,990,523 km², AOO = 5,732 km² ; National scale: everywhere in Belgium, EOO = 12,000 km², AOO = 139 km².

Population. Continental scale: common species throughout central and northern Europe (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly increasing, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: ubiquitous but more common in heathlands ; Visited flowers: polylectic species, very common on brooms ; Nesting habits: nests solitarily in the soil, more often on sand ; Parasites: *Sphecodes crassus* and possibly *S. longulus*, *S. miniatus* and *Nomada furva* ; *Halictoxenos tumulorum*.

Threats. No major threats to the species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Norway (Near Threatened; Kålås *et al.* 2010). Future: no conservation actions have to be taken at the national scale.

***Lasioglossum puncticolle* (Morawitz, 1872)**

Common Name(s): English - Ridge-cheeked Furrow Bee ; French – *Lasioglosse à cou ponctué* ; German - *Runzelwangige Schmalbiene*.

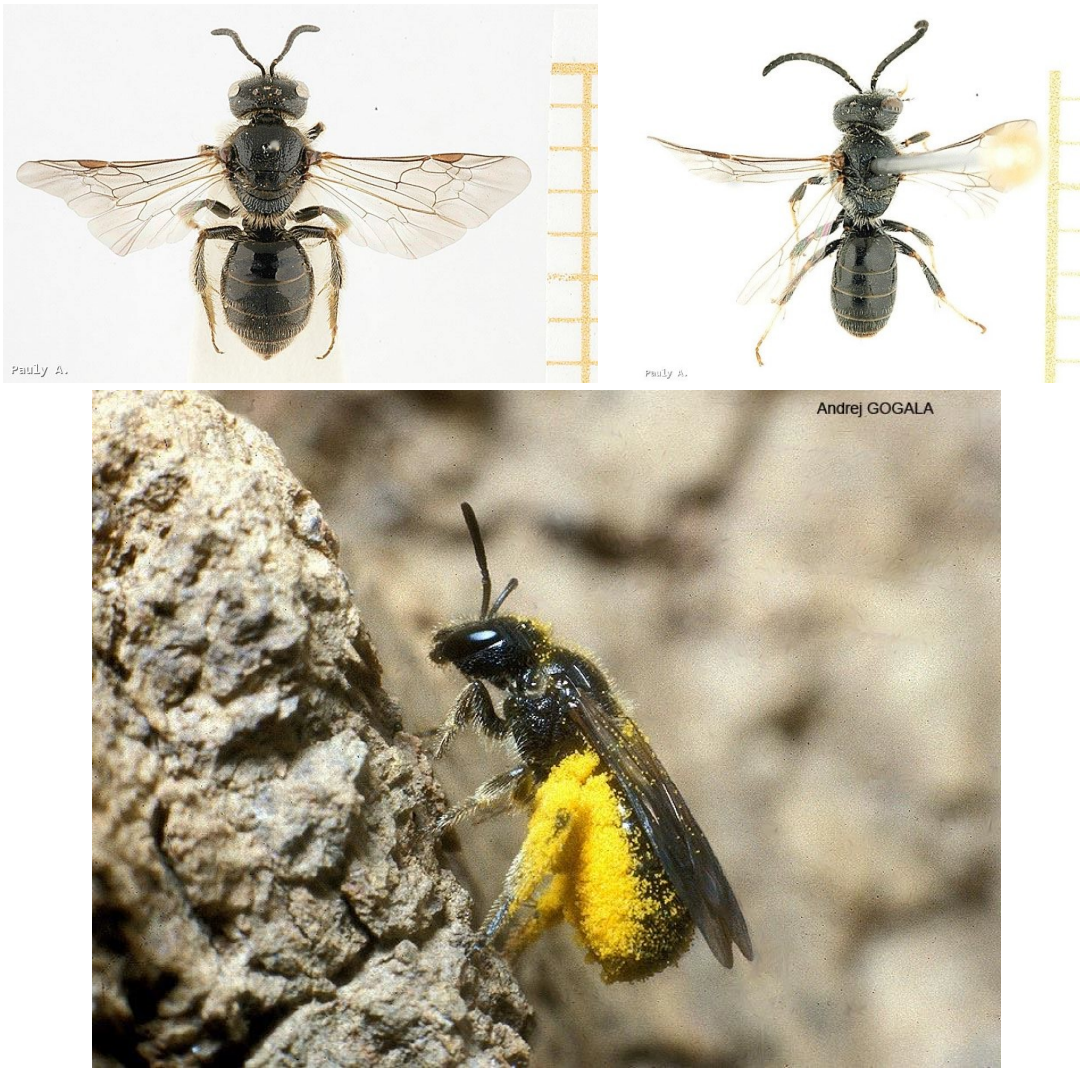

Figure 225. *Lasioglossum puncticolle*. A, female specimen; B, male specimen (Photos : A. Pauly) ; C, resting (Lokovica pri Brezovici, Photos : A. Gogola).

Diagnosis. females are very similar to *L. villosulum* by their sparsely punctuated scutum, carinated propodeum and diagnostic ridges below the head, males have a less distinctly carinated propodeum. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: NA ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: only two records for Belgium ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: west-palearctic species, EOO = 4,828,108 km², AOO = 1,172 km² ; National scale: two records for Belgium (Torgny, Lamorteau), EOO = 900 km², AOO = 24 km².

Population. Continental scale: quite common species (Pauly & Michez 2015) ; National scale: only two records for Belgium, the species is quite common in Luxemburg and Germany and seems to have a northern expansion.

Habitat and Ecology. Flying period: May to October ; Habitat: in whole Europe it can be found in meadows, open woodlands and on the coast (limestone and soft rock cliffs, grazing marshes) (S. Roberts pers. comm. 2014) ; Visited flowers: oligolectic on Asteraceae Cichorioideae, in Luxemburg it can be found on *Centaurea jacea, C. scabiosa, Crepis biennis, C. capillaris, Knautia arvensis, Leontodon hispidum, Leucanthemum vulgare, Matricaria maritima, Picris hieracioides, Senecio jacobaea, Solidago virgaurea* (Pauly 2019) ; Nesting habits: according to Pauly (2019) the species nests solitarily in clayey soils, Westrich (1989) and Ebmer (1971) state that the species is eusocial and nests in large aggregations in clayey banks ; Parasites: unknown (Pauly 2019).

Threats. There are no major threats to the species at the continental scale.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011) and Switzerland (Endangered; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the habitat and ecology of the species.

Lasioglossum pygmaeum **(Schenck, 1853)**

Common Name(s): French – *Lasioglosse pygmée* ; Dutch – *Dwerggroefbij* ; German - *Pygmäen-Schmalbiene*.

Figure 226. *Lasioglossum pygmaeum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small black species, non-carinated propodeum, diagnostic shape of the propodeal area, diagnostic punctuation of the scutum and tergite 1, short head, males have a black clypeus, can be separated from *L. pauperatum* by the smooth to barely punctuated apical margins of tergites. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (B1ab(i,ii,iii,iv) + 2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO), this reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of observations ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: warm localities of the west-palearctic, EOO = 5,283,256 km², AOO = 904 km² ; National scale: on calcareous areas of the Meuse and affluents valleys, EOO = 1,700 km², AOO = 19 km².

Population. Continental scale: rare species (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as quite rare but perhaps expanding to Brabant, the habitat is declining ; Current population trend: decrease.

Habitat and Ecology. Flying period: April to August ; Habitat: calcareous rocks and grasslands ; Visited flowers: polylectic species ; Nesting habits: solitarily in in calcareous soils ; Parasites: unknown.

Threats. Reduction of suitable habitats : destruction of calcareous grasslands in agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Threatened but level unknown; Westrich *et al.* 2011), the Netherlands (Critically Endangered; Peeters and Reemer 2003) and Switzerland (Endangered; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation and restauration of calcareous grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population and habitat trend at the national scale ; impact of pesticides and nitrogen fertilizers on food ressources ; specify the life history and ecology of the species

Lasioglossum quadrinotatulum **(Schenck, 1861)**

Common Name(s): French – *Lasioglosse à quatre points* ; Dutch – *Steilrandgroefbij* ; German - *Vierpunkt-Schmalbiene*.

Figure 227. *Lasioglossum quadrinotatulum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. black and shiny cuticle, rounded propodeum, very sparsely punctuated scutum and tergites, can be separated from *L. villosulum* by its greater size and by the diagnostic pubescence of tergite 2 - 4. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2c) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a reduction in the quality of habitats ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: Eurosiberian distribution, EOO = 3,888,883 km², AOO = 788 km² ; National scale: restricted to sandpits and sandy banks, EOO = 4,300 km², AOO = 46 km².

Population. Continental scale: rare and localized species (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite rare and localized ; Current population trend: decrease.

Habitat and Ecology. Flying period: from April to October ; Habitat: restricted to sandpits and sand banks ; Visited flowers: in Belgium it can be found on *Armeria sp., Cirsium arvense, C. vulgare, Fallopia japonica, Lysimachia vulgaris, Rubus sp., Senecio jacobaea, Sinapis sp., Tanacetum vulgare, Teucrium scorodonia, Verbascum nigrum* ; Nesting habits: solitarily in the sandy soils, sometimes forming small aggregations; Parasites: *Sphecodes ephippius, S. monilicornis.*

Threats. Reduction of suitable habitats / potential nesting sites: destruction of sandy areas in urbanization and afforestation purposes ; reconversion and scrub-encroachment of old sandpits.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Finland (Vulnerable; Rassi *et al.* 2010), Germany (Vulnerable; Westrich *et al.* 2011), Norway (Endangered; Kålås *et al.* 2010), Sweden (Endangered; Gärdenfors 2010) and Switzerland (Regionally Extinct; Amiet 1994). Future: promotion of the conservation / rehabilitation of old sandpits.

Research Needed. Monitoring of the population size and trend at the national scale.

***Lasioglossum quadrinotatum* (Kirby, 1802)**

Common Name(s): English - Four-spotted Furrow Bee ; French – *Lasioglosse à quatre taches* ; Dutch – *Kleine Bandgroefbij* ; German - *Vierflack-Schmalbiene*.

Figure 228. *Lasioglossum quadrinotatum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. can be separated from *L. lativentre* by the yellow sigma of their anterior wings and the pubescent band of T2-T3, males can be separated from *L. lativentre* by their diagnostic genitalia, females can be separated from *L. lativentre* by their diagnostic punctuation of tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.*, 2013.

Geographic Range. Continental scale: west Palearctic species, EOO = 4,179,027 km², AOO = 1,300 km² ; National scale: sandpits in Campine and Hainaut, EOO = 1,100 km², AOO = 14 km².

Population. Continental scale: rare but used to be common in the past, therefore the population trend of the species can said to be in decline (Kemp *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as much rarer than *L. lativentre* ; Current population trend: decrease.

Habitat and Ecology. Flying period: March to September ; Habitat: sandpits of Campine and Hainaut (Pauly 2019) ; Visited flowers: in Belgium it can be found on *Bellis perennis, Lotus corniculatus, Lycopus europaeus, Salix repens, Stellaria media, Tanacetum vulgare, Taraxacum spp., Tussilago farfara, Ulex europaeus* ; Nesting habits: nests solitarily, probably in sandy soils ; Parasites: *Sphecodes puncticeps.*

Threats. Reduction of suitable habitats / potential nesting sites: destruction of sandy areas in urbanization and afforestation purposes ; reconversion and scrub-encroachment of old sandpits.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Critically Endangered/Endangered; Peeters and Reemer 2003) and Switzerland (Critically Endangered; Amiet 1994). Future: promotion of the conservation / rehabilitation of old sandpits.

Research Needed. Monitoring of the population size and trend at the national scale.

Lasioglossum rufitarse **(Zetterstedt, 1838)**

Common Name(s): English - Rufous-footed Furrow Bee ; French – *Lasioglosse à tarses roux* ; Dutch – *Zadelgroefbij* ; German - *Rotfuss-Schmalbiene.*

Figure 229. *Lasioglossum rufitarse*. Female specimen (Photo: A. Pauly).

Diagnosis. black medium-sized (6-7 mm) species, non-carinated propodeum, elongated head, smooth and unpunctuated tergite 1, like *L. fratellum* males have thick hind tarsus but can be separated from it by the diagnostic shape of their genitalia. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: NT (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Least Concern (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: palearctic boreo-alpine species, EOO = 4,409,189 km², AOO = 5,432 km² ; National scale: everywhere in Belgium but abundant only in the natural region of Ardenne , EOO = 6,200 km², AOO = 44 km².

Population. Continental scale: common in northern and central Europe (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite rare except in Ardenne ; Current population trend: decrease.

Habitat and Ecology. Flying period: April to September ; Habitat: alpine meadows, wooded areas in the mountains, woodland edges and clearings, and upland moorlands (Westrich 1989) ; Visited flowers: in Belgium it can be found on *Armeria maritima, Circaea lutetiana, Crataegus sp., Epilobium angustifolium, Geranium sylvaticum, Glechoma hederacea, Lapsana communis, Limonium vulgare,*

Petasites hybridus, Rubus sp., Salix sp., Salvia sp., Taraxacum sp., Vinca minor ; Nesting habits: nests solitarily in banks ; Parasites: *Sphecodes ferruginatus* and possibly *S. geoffrellus.*

Threats. Global warming : boreo-alpine species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Ireland (Vulnerable; Fitzpatrick *et al*. 2006).

Research Needed. Monitoring of the population size and trend at the national scale.

Lasioglossum semilucens **(Alfken, 1914)**

Common Name(s): English - Small Shiny Furrow Bee ; French – *Lasioglosse semi-brillant* ; Dutch - *Halfglanzende Groefbij* ; German - *Mattglänzende Schmalbiene.*

Figure 230. *Lasioglossum semilucens*. A, female specimen; B, male specimen; C, foraging on *Lepidium draba* (Woluwé-St-Lambert, Photos : A. Pauly).

Diagnosis. very small species (4 - 4.5 mm) with a rounded propodeum, females can be separated from *L. lucidulum* by its larger scutum and by its shorter head and from *L. minutissimum* by the unpunctuated apical margin of tergite 1, both males and females can be separated from *L. lucidulum* by the well punctuated inter-ocellar field. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published

Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: Euro-Siberian species, EOO = 2,694,945 km², AOO = 2,408 km² ; National scale: everywhere in Belgium except in the natural region of Ardenne, EOO = 13,900 km², AOO = 120 km².

Population. Continental scale: quite common and the population is believed to stable in central Europe (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: ubiquitous ; Visited flowers: probably a polylectic species, in Belgium it can be found on *Achillea ptarmica, Bellis perennis, Calluna vulgaris, Cirsium sp., Hieracium sabaudum, Hypericum perforatum, Plantago sp., Rubus idaeus, Solidago virgaurea, Taraxacum sp., Veronica arvensis, V. chamaedrys* ; Records on cultivated plants: in Belgium on *Rubus idaeus* ; Nesting habits: nest solitarily in sand and sometimes in slaty soils ; Parasites: *Sphecodes marginatum* and possibly *Sphecodes longulus* and *Nomada sheppardana*.

Threats. No major threat to this species at the national scale.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Endangered; Farkac *et al.* 2005) and Great Britain (Vulnerable; Shirt 1987). Future: no future conservation action have to be taken at the national scale.

Research Needed. Specify the ecology and life history of the species.

Lasioglossum sexnotatum **(Kirby, 1802)**

Common Name(s): English - Ashy Furrow Bee ; French – *Lasioglosse de l'Asperge*, *Lasioglosse cendré* ; Dutch – *Zesvlekkige Groefbij* ; German - *Spargel-Schmalbiene*.

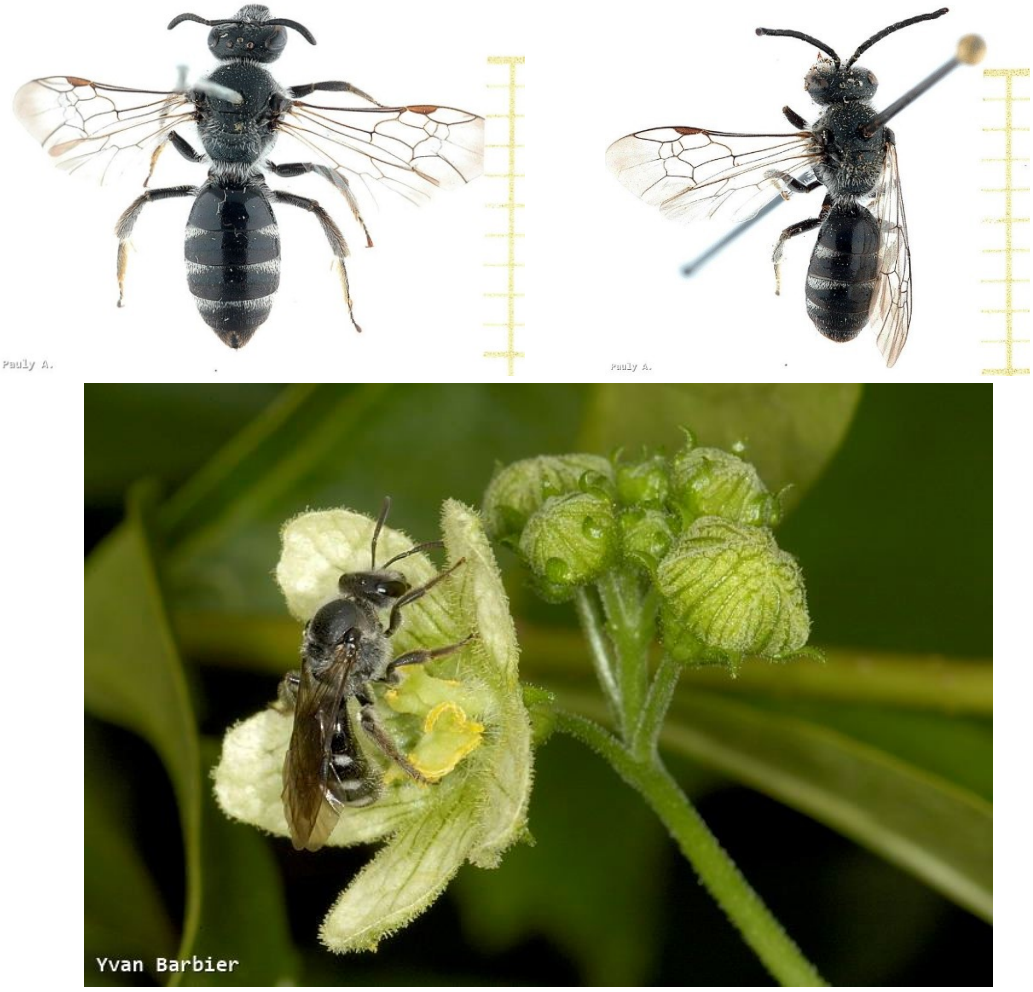

Figure 231. *Lasioglossum sexnotatum*. A, female specimen (Photos : A. Pauly); B, male specimen; C, foraging on *Bryonia dioica* (Ghlin, Photo : Y. barbier).

Diagnosis. non-carinated propodeum, mat scutum with a fine and dense punctuation, greyish-black head and thorax, shiny black abdomen with 6 spots of white pubescence, smooth tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.*, 2013.

Geographic Range. Continental scale: Euro-Siberian species, EOO = 5,348,668 km², AOO = 2,824 km² ; National scale: High and Middle Belgium, Semois valley, EOO = 10,500 km², AOO = 235 km².

Population. Continental scale: widespread but uncommon and the population trend for the species is apparently decreasing due to the decline in habitat quality

(Kemp *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as one of the most common Halictid of the before 1950 period, it has later strongly decreased due to the regression of the bocage landscape in Belgium, since 1990 it seems to be back in the agricultural landscape; Current population trend: stable.

Habitat and Ecology. Flying period: peak of abundance in May and June for females, in August for males ; Habitat: typical species of the bocage landscape ; Visited flowers: in Belgium, females are oligolectic on *Bryonia dioica* and *Scrophularia nodosa* but can also be found on *Papaver rhoeas*, *Ranunculus sp.*, *Rubus sp.*, males seems monolectic on *Scrofularia nodosa* ; Nesting habits: unknown, it seems to be a solitary species.

Threats. Reduction of suitable habitats: the species is threatened by the intensification of agriculture that has led to more open landscapes and the destruction of hedgerows.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al*. 2011), Great Britain (Critically Endangered; Shirt 1987), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Switzerland (Endangered; Amiet 1994), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species, governmental funding for hedges plantation in Wallonia (A.G.W. 2016/09/08), governmental agreement on the plantation of 4,000 km of hedges in Wallonia. Future: hedgerows should either be restored or protected to conserve this species.

Research Needed. Further research should be conducted on the habitat and ecology of this species, in particular its nesting behaviour.

***Lasioglossum sexstrigatum* (Schenck, 1868)**

Common Name(s): English - Fringed Furrow Bee ; French – *Lasioglosse à six franges* ; Dutch - *Gewone Franjegroefbij* ; German - *Sechsstreifige Schmalbiene*.

Figure 232. *Lasioglossum sexstrigatum*. A, female specimen; B, male specimen (Photos : A. Pauly); C, *in copula* (Rotterdam, Photos : K. Van Der Krieke).

Diagnosis. small species (5 – 6 mm) with a short and rounded propodeum, females have fringes of white hairs on the apical margin of tergites, males have sharpened genae, can be confounded with the much rarer *L. monstrificum*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: central European species, EOO = 2,099,938 km², AOO = 2,260 km² ; National scale: northern Sambre-Meuse line, in the South of the Province of Luxemburg and Namur, EOO = 15,100 km², AOO = 161 km².

Population. Continental scale: common species in central Europe and a recent arrival in southern England (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common on sandy areas ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: inland dunes, sandpits ; Visited flowers: polylectic species ; Records on cultivated plants: in Belgium on *Brassica nigra, Crataegus monogyna,* in Germany on *Malus domestica, Pyrus communis*, *Prunus armeniaca* (Westrich 1989) ; Nesting habits: solitary or social species according to the authors, nests in small to large aggregations (up to 34 nests per square metre) in the sand (Grozdanic 1966, Vasic 1966, Westrich 1989) ; Parasites: *Sphecodes miniatus, S. geoffrellus, S. longulus* and possibly *S. marginatum, Nomada sheppardana*.

Threats. The species is likely to be threatened by the destruction of inland dunes and sandpits in urbanization or forestry purposes.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Norway (Near Threatened; Kålås *et al.* 2010) and Switzerland (Vulnerable; Amiet 1994). Future: promotion of the conservation and restauration of sandy natural or artificial areas.

***Lasioglossum subfasciatum* (Imhoff, 1832)**

Common Name(s): French – *Lasioglosse à bandes ventrales* ; German - *Blauschimmernde Schmalbiene.*

Figure 233. *Lasioglossum subfasciatum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. non-carinated propodeum, scutum with a long rusty pubescence, the head is as long as wide, tergite 2 with a broad yellowish pubescent band. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Endangered (EN) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: warm localities of the west Palearctic, EOO = 2,444,330 km², AOO = 516 km² ; National scale: last record in Malonne (1899), Saint Marc (1896), Stree (1896), Rixensart (1880), Arlon (1870).

Population. Continental scale: very rare and the population trend is decreasing (Kemp *et al.* 2013) ; National scale: extinct.

Habitat and Ecology. Flying period: March to May ; Habitat: in whole Europe it can be found in alpine meadows (Kemp *et al.* 2013) ; Visited flowers: in whole Europe it can be found on *Salix spp.*, *Centaurea sp., Knautia sp., Pulsatilla vulgaris, Ranunculus ficaria, Taraxacum spp.* ; Nesting habits: unknown ; Parasites: unknown.

Threats. Reduction of suitable habitats: the threats are unknown but it is likely that destruction of grasslands for agricultural, forestry or urbanization purposes, intensification in the uses of grasslands (intensive grazing practices, silage) and eutrophication of grasslands may have played a role.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Germany (Endangered; Westrich *et al.* 2011) and Switzerland (Vulnerable; Amiet 1994). Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion

of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers)

Research Needed. Further research should be conducted on the life history, ecology and threats to this species.

Lasioglossum subfulvicorne **(Blüthgen, 1934)**

Common Name(s): French – *Lasioglosse subalpin* ; Dutch - *Bergbosgroefbij* ; German - *Bergheiden-Schmalbiene*.

Figure 234. *Lasioglossum subfulvicorne*. Male specimen (Photo : A. Pauly).

Diagnosis. very similar to *L. fratellum*, females are undistinguishable, males can be separated by their diagnostic genitalia. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Data Deficient due to probable misidentifications (*L. fratellum* and *L. subfulvicorne* are cryptic species) ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: boreo-alpine species, EOO = 2,486,189 km², AOO = 272 km² ; National scale: Hautes-Fagnes, Campine, EOO = 0 km², AOO = 0 km².

Population. Continental scale: quite common at high altitudes in the Swiss and Austrian Alps but rare elsewhere in Europe (Pauly & Michez 2015). National scale: Pauly (2019) assessed the species as rare ; Current population trend: unknown.

Habitat and Ecology. Flying period: probably the same as *L. fratellum* ; Habitat: in whole Europe the species occurs in temperate and boreal forests and shrublands, alpine meadows and grasslands (Pauly & Michez 2015) ; Visited flowers: probably a polylectic species that forages on the same species than *L. fratellum* ; Nesting habits: probably in small aggregations along pathways, the social behaviour of this species is not known ; Parasites: unknown.

Threats. Global warming: this boreo-alpine species may be threatened by global warming (Pauly 2019), potential other threats to this species are not known.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of the Czech Republic (Critically Endangered; Farkac *et al.* 2005) and Germany (Rare; Westrich *et al.* 2011). Future: no future conservation actions can be taken for this species except the conservation of boreo-alpine habitats.

Research Needed. Monitoring of the population size and trend at the national and global scales ; determine potential other threats to this species ; specify the ecology and life history of this species.

***Lasioglossum subhirtum* (Lepeletier, 1841)**

Common Name(s): French – *Lasioglosse* ; German - *Struppige Schmalbiene*.

Figure 235. *Lasioglossum subhirtum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum, similar to *L. malachurum*, females can be separated from it by the somewhat more discoloured apical margins of tergites, the diagnostic punctuation of the scutum and the stronger propodeal carina, males can be separated from *L. malachurum* by their entirely dark coloured antennae and from *L. malachurum* and *L. lineare* by the white pubescence of the face. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez, 2015.

Geographic Range. Continental scale: west-Mediterranean species, EOO = 1,490,044 km², AOO = 384 km² ; National scale: last records in Malonne (1900, 1901) and Les Epioux (1985), can be found in the Moselle valley (Luxemburg) and around Paris.

Population. Continental scale: quite common species that could be expanding into the north of France (Pauly & Michez 2015). National scale: extinct.

Habitat and Ecology. Flying period: June to October in Luxemburg ; Habitat: in whole Europe the species occurs in Mediterranean-type shrubland, temperate forests, flower rich meadows and temperate grasslands. (Pauly & Michez 2015) ; Visited flowers: polylectic species ; Nesting habits: nest in the soil, probably a social species ; Parasites: unknown.

Threats. There are no major threats to this species.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011) and Switzerland (Regionally Extinct; Amiet 1994). Future: no future conservation actions can be

taken for this species except the conservation of Mediterranean and sub-Mediterranean habitats.

Research Needed. Monitoring of the population size and trend at the national scale as it is likely to benefit from global warming ; determine potential threats to this species ; specify the ecology and life history of this species.

Lasioglossum tarsatum (Schenck, 1868)

Common Name(s): French – *Lasioglosse des dunes* ; Dutch – *Duingroefbij* ; German - *Dünen-Schmalbiene*.

Figure 236. *Lasioglossum tarsatum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. very small species (4 – 4.5 mm), rounded propodeum, similar to *L. semilucens*, can be separated from it by the small diagnostic pubescence of tergites and by the shinier mesopleurae. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (B2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a geographic range reduction in the form of the area of occupancy (AOO). This reduction is inferred from a reduced area of occupancy (AOO < 5 km²), severely fragmented distribution and continuing decline in the AOO, EOO, quality of habitats and number of observations ; Previously published Red List assessments: 2014 – Neart Threatened (NT) (Europe) in Quaranta & Michez, 2015.

Geographic Range. Continental scale: Eurasian species, restricted to sandy areas, EOO = 2,491,430 km², AOO = 752 km² ; National scale: coastal dunes and a few sandy areas in the Meuse valley (Netherland), EOO = unknown, AOO = unknown.

Population. Continental scale: rare species with a fragmented population throughout Europe (Quaranta & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as rare and very localized ; Current population trend: too few records to establish any clear population trend.

Habitat and Ecology. Flying period: in whole Europe from April to September ; Habitat: coastal dunes, in the sandy soils of river banks, sandpits of Limburg ; Visited flowers: in whole Europe it is oligolectic on Asteraceae Cichorioideae such as *Cerastium sp., Doronicum sp., Hieracium sp., Jasione sp., Potentilla sp., Veronica sp.* ; Nesting habits: in Belgium it nests solitarily in sandy soil ; Parasites: *Sphecodes longulus*.

Threats. Reduction of suitable habitats: continuing decline of coastal dunes due to the impacts of tourism and urbanization, destruction of sandpits after excavation in urbanization of afforestation purposes.

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al*. 2011), Sweden (Near Threatened; Gärdenfors 2010) and Switzerland (Regionally Extinct; Amiet 1994). Future: promotion of the conservation and restauration of coastal biotopes.

Research Needed. Monitoring of the population size and trend at the national scale ; determine any potential other threats to the species.

***Lasioglossum villosulum* (Kirby, 1802)**

Common Name(s): French – *Lasioglosse de la Campanule* ; Dutch – *Klokjesgroefbij* ; German - *Glockenblumen-Schmalbiene*.

Figure 237. *Lasioglossum villosulum*. A, female specimen; B, male specimen; C, foraging on *Ranunculus repens* (Woluwé-St-Lambert, Photos : A. Pauly).

Diagnosis. small species (5 – 6.5 mm), rounded propodeum, can easily be recognised by the sparsely punctuated scutum and the triangle-shaped head of females (the one of males is rectangular), this species can be confounded with the much rarer *L. brevicorne* and *L. limbellum*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Pauly & Michez 2015.

Geographic Range. Continental scale: widespread species found from the Azores and the Canary Islands east to Ukraine and Greece and north to Finland (64° N), it is also found outside of Europe, EOO = 6,789,528 km², AOO = 11,416 km² ; National scale: everywhere in Belgium, EOO = 24,800 km², AOO = 390 km².

Population. Continental scale: very common species (Pauly & Michez 2015) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as common ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine species, from April to October ; Habitat: ubiquitous, depending on the presence of Asteraceae Cichorioideae ; Visited flowers: oligolectic on Asteraceae Cichorioideae ; Nesting habits: in Belgium it nests solitarily in freshly tilled clayey soil or in bare soil close from mammals burrows ; Parasites: *Sphecodes puncticeps, Nomada distinguenda; Halictoxenos spencei.*

Threats. No major threats to this species.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Finland (Near Threatened; Rassi *et al.* 2001). Future: no future conservation actions have to be taken at the national scale.

Lasioglossum xanthopus **(Kirby, 1802)**

Common Name(s): English - Orange-footed Furrow Bee ; French – *Lasioglosse à pattes jaunes* ; Dutch – *Roodbruine Groefbij* ; German - *Grosse Salbei-Schmalbiene*.

Figure 238. *Lasioglossum xanthopus*. A, female specimen; B, male specimen; C, foraging on *Carduus cripsus (*Devant-Bouvigne, Photos : A. Pauly).

Diagnosis. the largest species of the genus (12 mm), non-carinated propodeum, long rusty pubescence on mesosoma, rusty pubescence on hind tibias, elongated head, can be confounded with *Halictus rubicundus*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: EN (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification listed as Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the area of occupancy (AOO) (between 50% and

80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2013 – Near Threatened (NT) (Europe) in Kemp *et al.* 2013.

Geographic Range. Continental scale: warm localities of the west-Palearctic, EOO = 3,787,668 km², AOO = 1,872 km² ; National scale: scarcely distributed in Middle Belgium, EOO = 1,200 km², AOO = 20 km².

Population. Continental scale: rare and decreasing species (A. Pauly pers. comm. 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as quite rare ; Current population trend: decrease.

Habitat and Ecology. Flying period: April to August ; Habitat: crops borders, verges, well-flowered banks ; Visited flowers: in Belgium there are records on *Brassica napus, Carduus crispus, Centaurea cyanus, Leontodon sp., Leucanthemum vulgare, Linum sp., Matricaria chamomilla* ; Records on cultivated plants: in Belgium there are records on *Brassica napus, Prunus spinosa, Trifolium spp.* and *Linum sp.* ; Nesting habits: solitarily in various types of soils ; Parasites: *Specodes spinulosus*.

Threats. Reduction of food resources: agricultural intensification (*e.g.* intensive uses of nitrogen fertilisers and herbicides) had led to a decline in the number of available forage plants.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Netherlands (Vulnerable; Peeters and Reemer 2003), Norway (Regionally Extinct; Kålås *et al.* 2010) Sweden (Endangered; Gärdenfors 2010) and Switzerland (Vulnerable; Amiet 1994), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species, more conformation to the "Bords de route" convention could benefit to the specie. Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population size and trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources ; determine how climate change may affect the phenology of the males

Lasioglossum zonulum **(Smith, 1848)**

Common Name(s): English - Bull-headed Furrow Bee ; French – *Lasioglosse à larges bandes* ; Dutch – *Glanzende Bandgroefbij* ; German - *Breitbindige Schmalbiene*.

Figure 239. *Lasioglossum zonulum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. carinated propodeum, smooth and sparsely punctuated tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Kemp *et al.*, 2013.

Geographic Range. Continental scale: Holarctic species, EOO = 5,603,501 km², AOO = 5,704 km² ; National scale: everywhere in Belgium, EOO = 20,100 km², AOO = 216 km².

Population. Continental scale: this species is common and the population trend is stable (Kemp *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to October ; Habitat: ubiquitous but very widespread in meadows dominated by *Ranunculus spp.* ; Visited flowers: polylectic ; Nesting habits: solitarily in the soil ; Parasites: *Sphecodes scabricollis, Sphecodes monilicornis.*

Threats. No major threats to this species.

Conservation Actions. No future conservation action have to be taken at the national scale.

Genus *Rhophitoides* Schenck, 1861

Rhophitoides canus (Eversmann, 1852)

Common Name(s): French – *Rophite de la Luzerne* ; German - *Luzerne-Graubiene*.

Figure 240. *Rhophitoides canus*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. both sexes differ from *R. quinquespinosus* by their shorter labial palps, females can be separated by the absence of thorny silks on the face. Taxonomic Notes: Pesenko and Astafurova (2006) consider *Rophites* and *Rhophitoides* as separated genera although Michener (2000) considered *Rophitoides* as a subgenus of *Rophites*. **Taxonomic source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Patiny *et al.*, 2014.

Geographic Range. Continental scale: very localized species found in Eurasiatic steppes, from Belgium to European Russia and from Bulgaria to Poland, EOO = 2,820,137 km², AOO = 504 km² ; National scale: last records around Brussels (1830), Gaesbeek (1830), Essebeek (1884) and Wollersheim (Eifel Germany, 1975).

Population. Continental scale: no information available on population size but the populations are large and seem more or less stable (Patiny *et al.* 2014). National scale: extinct.

Habitat and Ecology. Flying period: in Europe it is found from June to August ; Habitat: *Medicago* crops (Pauly 2019) ; Visited flowers: in Belgium it is oligolectic on *Medicago spp.* (Pauly 2019), in whole Europe there are records on *Coronilla varia, Medicago sativa, Trifolium pratense, Trifolium repens, Medicago falcata, Medicago media, Lotus corniculatus, Knautia arvensis, Convolvulus arvensis, Symphytum officinale, Scrophularia nodosa, Ballota nigra, Plantago media, Allium cepa, Centaurea cyanus, Taraxacum officinale, Cirsium arvense* and *Tanacetum vulgare* ; Records on cultivated plants: *Trifolium spp., Medicago spp.*, Zharinov (1979) cites this species as an effective pollinator of *Medicago sativa* and suggest to exploit it on commercial purposes ; Nesting habits: in bare soils, solitarily, forming large aggregations (Pauly 2019) ; Parasites: unknown.

Threats. Reduction of food ressources: abandonment of leguminous crops in Belgium.

Conservation Actions. Present: the species appears on the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011), Moldova (Vulnerable; Dectiu 2002) and Switzerland (Critically Endangered; Amiet 1994). Future: promotion of extensive agricultural practices, hay productions including Leguminous cropping.

Research Needed. Conduct sampling expeditions to determine the potential existence of remaining populations.

Genus *Rophites* Spinola, 1808

Rophites quinquespinosus Spinola, 1808

Common Name(s): English - Five-spined *Rophites* ; French – *Rophite à cinq épines* ; Dutch – *Slurfbij* ; German - *Späte Ziest-Schlürfbiene*.

Figure 241. *Rophites quinquespinosus*. A, female specimen; B, male specimen (Photos : A. Pauly).

Diagnosis. can be separated from *Rophitoides canus* by their longer labial palps, females have thorny silks on the face. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc B1ab(i)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), severely fragmented EOO and continuing decline in the EOO ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Patiny *et al.*, 2014.

Geographic Range. Continental scale: west-Palearctic species, EOO = 3,331,882 km², AOO = 896 km² ; National scale: found in the natural reserves of Viroinvalle, Han-sur-Lesse and Parc de Furfooz, EOO = 300 km², AOO = 4 km².

Population. Continental scale: decreasing or going extinct in a significant part of its range, the population is severely fragmented (Patiny *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as very rare and restricted to natural reserves ; Current population trend: decrease.

Habitat and Ecology. Flying period: July ; Habitat: calcareous grasslands with flowering *Stachys* spp. (Pauly 2019) ; Visited flowers: in Belgium it is principally found on *Stachys officinalis* and *Ballota nigra* (Pauly 2019), in whole Europe it is found on *Ballota nigra, Betonica officinalis, Stachys sylvatica, Stachys*

recta and *Campanula rotundifolia* (Ebmer and Schwammberger 1989), in Poland it is found on *Ballota nigra, Stachys officinalis, S. palustris, S. recta, Clinopodium vulgare, Potentilla spp., Medicago spp., Geranium pratense, Echium vulgare, Leonurus cardiaca, Lamium purpureum, Scrophularia nodosa, Campanula spp., Knautia arvensis, Centaurea scabiosa, C. jacea, Taraxacum officinale, Senecio jacobaea, Allium cepa* (Pesenko *et al.* 2000) ; Records on cultivated plants: *Medicago spp., Allium cepa* ; Nesting habits: solitarily in the soil in small aggregations (Stöckhert 1922) ; Parasites: not known for Belgium.

Threats. Reduction of suitable habitats / food ressources : destruction of grasslands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands.

Conservation Actions. Present: the species appears on the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Regionally Extinct; Peeters and Reemer 2003), Sweden (Regionally Extinct; Gärdenfors 2010) and Switzerland (Critically Endangered; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species, the species is legally protected (LCN 1973, annexe IIb) ; Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; quantify the impact of pesticides and nitrogen fertilizers on food ressources ; specify the ecology and life history of the species.

Genus *Seladonia* Robertson, 1918

Seladonia confusa perkinsi (Blüthgen 1926)

Common Name(s): English - Southern Bronze Furrow Bee; French – *Halicte confus* ; Dutch – *Heidebronsgroefbij* ; German - *Verkannte Furchenbiene*.

Figure 242. *Seladonia confusa perkinsi*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. females are similar to *S. tumulorum* but the vertex is less developed and the pubescent bands of the tergites are thicker, males have an ochre pubescence on antennae and sternite 6. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (A2c) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a reduction in the quality of habitats ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: the subspecies *perkinsi* is distributed from Pyrénées and southern England to Ural mountains, the whole species (*i.e.* including all the subspecies) has an EOO = 4,650,619 km², AOO = 2,012 km² ; National scale: in the northern sandy natural regions (especially dunes of Campines) and in the province of Luxembourg (in sandpits) , EOO = 5,100 km², AOO = 60 km².

Population. Continental scale: this species is common in most of its range and the overall population trend seems to be stable (Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite rare and localized ; Current population trend: decrease.

Habitat and Ecology. Flying period: bivoltine, from April to September ; Habitat: shrublands and grasslands on sandy soils (Michez *et al.* 2013, Pauly 2019) ; Visited flowers: polylectic, records on *Achillea millefolium, Armeria sp., Berteroa incana, Bryonia cretica, Calluna vulgaris, Calystegia sepium, Cardamine pratensis, Centaurea thuillieri, Cystisus scoparius, Epilobium sp., Helianthus sp., Hieracium pilosella, Hypochoeris radicata, Jasione montana, Potentilla neumanniana, Salix repens,*

Senecio inaequidens, S. jacobaea, Thlaspi sp., Trifolium aureum, Vaccinium sp. (Pauly 2019) ; Nesting habits: solitarily in the sandy soils, considered as solitary or social according to the authors and subspecies (Pauly 2019) ; Parasites: not known for Belgium.

Threats. Reduction of suitable habitats / potential nesting sites: destruction of sandy areas for urbanization, infrastructure development (including for tourism), afforestation and mineral extraction purposes ; reconversion and scrub-encroachment of old sandpits.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Switzerland (Endangered; Amiet 1994); Finland (Vulnerable; Rassi *et al.* 2010); Slovenia (Vulnerable; Anonymous 2002); United Kingdom (Rare; Shirt 1987) and Sweden (Near Threatened; Gärdenfors 2010). Future: promotion of the conservation / rehabilitation of old sandpits.

Research Needed. Research is needed to clarify the taxonomic status of the species.

Seladonia leucahenea arenosa **(Ebmer, 1976)**

Common Name(s): French – *Halicte de bronze* ; Dutch – *Zuidelijke Bronsgroefbij* ; German - *Sand-Goldfurchenbiene*.

Figure 243. *Seladonia leucahenea arenosa*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. bigger than *S. tumulorum*, females can be separated from other *Seladonia* by the diagnostic shape of their face, males can be separated from other *Seladonia* by the diagnostic shape of their sternites 5, 6 and genitalia. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2012 – Vulnerable (VU) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: the subspecies *arenosa* is distributed from 57°N until the mountains of Pyrénées and Alps, the whole species (*i.e.* including all the subspecies) has an EOO = 2,881,324 km², AOO = 748 km² ; National scale: formerly found in Montagne Saint-Pierre and in two places in Brabant (Haasrode, Heverlee), recently found in the Netherland in the Meuse valley near Venlo (Smit & Pijfers 2006), EOO = 100 km², AOO = 2 km².

Population. Continental scale: very rare and fragmented populations but abundant where it is found (forming large aggregations), the species is strongly decreasing (Michez *et al.* 2013) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as very rare ; Current population trend: decrease.

Habitat and Ecology. Flying period: from April to August ; Habitat: sandy areas and dry grasslands (Michez *et al.* 2013, Pauly 2019) ; Visited flowers: polylectic but often found on *Berteroa incana*, records on *Achillea millefolium, Calluna vulgaris, Centaurea jacea, Melilotus officinalis* (Pauly 2019) ; Nesting habits: solitarily in sandy soils, sometimes found in extremely large aggregations (an aggregation of four millions nests was found by Blagoveschenkaya (1963)) (Pauly 2019) ; Parasites: unknown.

Threats. Reduction of suitable habitats / potential nesting sites: destruction of sandy areas for urbanization, infrastructure development (including for tourism), afforestation and mineral extraction purposes ; reconversion and scrub-encroachment of old sandpits ; destruction of dry grasslands in forestry, agricultural or urbanization purposes ; eutrophication of dry grasslands due to agricultural intensification ; intensification in the uses of grasslands (intensive grazing practices, silage instead of hay production).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following four European countries: Czech Republic (Vulnerable; Farkac *et al.* 2005); Germany (Vulnerable; Westrich *et al.* 2008); Netherlands (Critically Endangered; Peeters and Reemer 2003); Sweden (Endangered; Gärdenfors 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of the conservation / rehabilitation of old sandpits ; promotion of the conservation and restauration of sandy grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Conduct sampling expeditions to determine the potential existence of other populations ; specify the ecology and life history of the species.

Seladonia subaurata **(Rossi, 1792)**

Common Name(s): English - Golden Furrow Bee ; French – *Halicte semi-doré*.

Figure 244. *Seladonia subaurata*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on Asteraceae (Photo : D. Genoud).

Diagnosis. golden green species, females can be separated from *S. tumulorum* by its very fine and dense punctuation of the scutum and its crescent-shaped propodeal area. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: NA ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: warm localities of the west-Palearctic, EOO = 5,351,265 km², AOO = 2,424 km² ; National scale: last observation in Heyst in 1873, inhabits Moselle valley in the Grand Duchy of Luxembourg.

Population. Continental scale: the species is very common in southern Europe and less common in the north, the population trend is increasing as the species is expanding its range northwards (Michez *et al.* 2013). National scale: Belgium is the northern edge of its distribution, this species is thus likely to benefit from global warming (Pauly 2019).

Habitat and Ecology. Flying period: from July to October ; Habitat: ubiquitous but restricted to warm habitats in the northern edge of its distribution (Michez *et al.* 2013) ; Visited flowers: polylectic but mostly found on Asteraceae, in the Grand Duchy of Luxembourg there are records on *Matricaria maritima, Picris hieracioides, Senecio jacobaea, Solidago canadensis* (Pauly 2019) ; Nesting habits: social species which nests in large aggregations in sandy or clayey soils ; Parasites: unknown.

Threats. There are no major threats affecting this species.

Conservation Actions. Continental scale: this species is included in the National Red Lists or Red Data Books of the following two European countries: Switzerland (Vulnerable; Amiet 1994); United Kingdom (Regionally Extinct; Shirt 1987). National scale: no conservation have to be taken at the national scale except the conservation of warm habitats that could potentially host the species.

Research Needed. Conduct sampling expeditions to determine the potential existence of populations at the national scale ; determine potential threats that are likely to affect the species at the national scale.

Seladonia tumulorum **(L., 1758)**

Common Name(s): English - Bronze Furrow Bee ; French – *Halicte dorée commune* ; Dutch – *Parkbronsgroefbij* ; German - *Gewöhnliche Goldfurchenbiene*

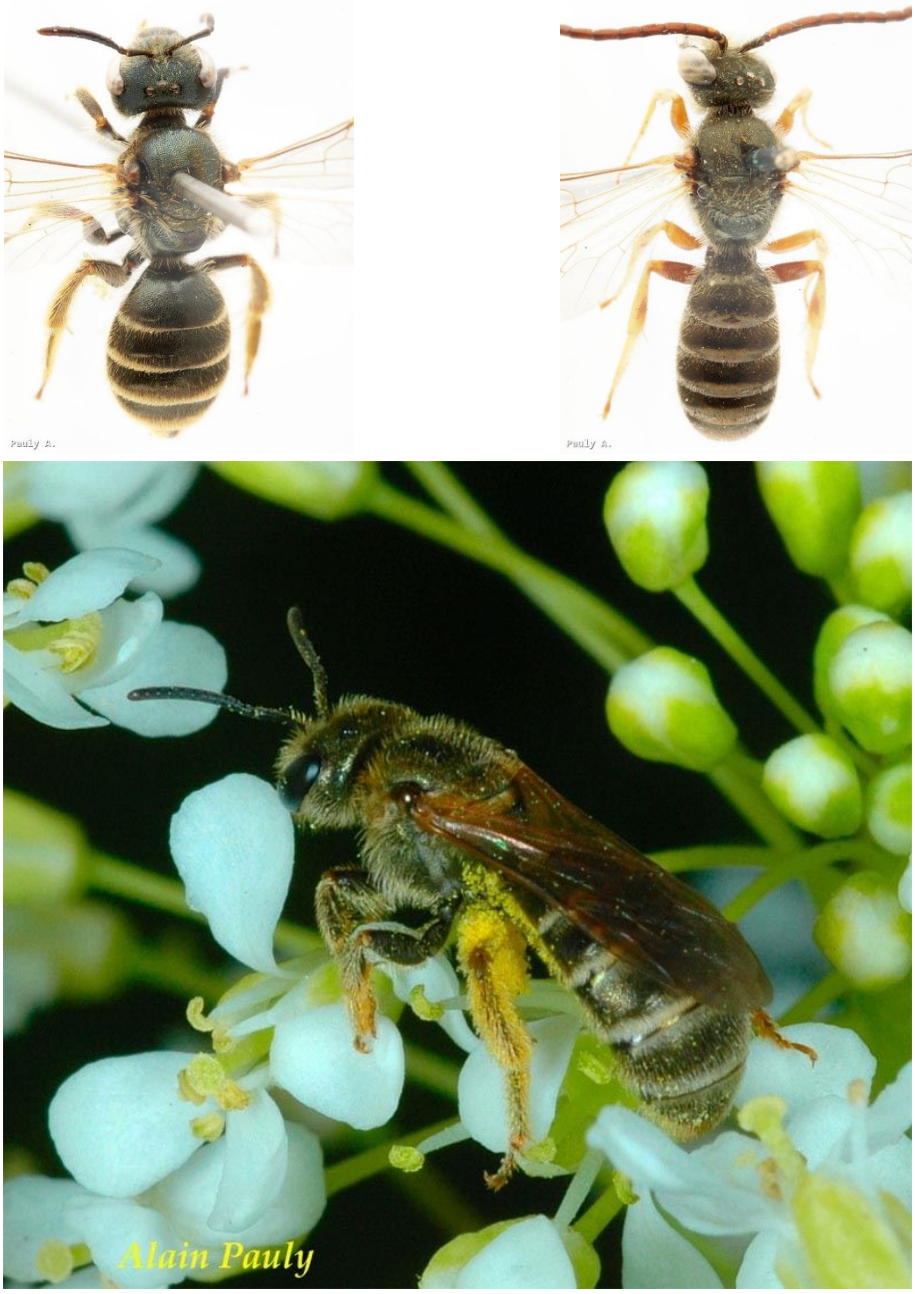

Figure 245. *Seladonia tumulorum*. A, female specimen; B, male specimen; C, foraging on *Lepidium draba* (Woluwé-St-Lambert, Photos : A. Pauly).

Diagnosis. medium-sized species (7mm), rusty green cuticle, males can be separated from *S. confusa perkinsi* by its dark antennae. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ;

Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez *et al.*, 2013.

Geographic Range. Continental scale: trans-Palearctic species, EOO = 8,593,187 km², AOO = 6,560 km² ; National scale: everywhere in Belgium, EOO = 19,500 km², AOO = 255 km².

Population. Continental scale: this is a very common species and has a stable population trend. (Michez *et al.* 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Pauly (2019) assessed the species as very common ; Current population trend: stable.

Habitat and Ecology. Flying period: bivoltine, from April to September ; Habitat: ubiquitous (Michez *et al.* 2013, Pauly 2019); Visited flowers: polylectic species, mostly found on Fabaceae and Asteraceae, records on *Achillea millefolium, Allium spp., Anthriscus sp., Aster lynosiris, Bellis perennis, Brassica napus, Campanula spp., Centaurea spp., Cirsium spp., Convolvulus sp., Daucus carota, Fragaria vesca, Geranium spp., Heracleum sp., Hieracium sp., Hypericum perforatum, Hypochoeris radicata, Knautia arvensis, Leontodon autumnale, Leucanthemum vulgare, Lotus corniculatus, Malva sylvestris, Matricaria maritima, Medicago sp., Melilotus spp., Origanum vulgare, Picris hieracioides, Polygonum cuspidatum, Potentilla spp., Pulicaria dysenterica, Ranunculus spp., Reseda lutea, Rubus sp., Scabiosa columbaria, Sedum spp., Senecio jacobaea, Solidago canadensis, Tanacetum vulgare, Taraxacum spp., Thymus pulegioides, Trifolium pratense, Veronica spp* (Pauly 2019) ; Records on cultivated plants: in Belgium there are records on *Allium spp., Brassica napus, Daucus carota, Fragaria vesca, Medicago sp., Origanum vulgare, Trifolium pratense* (Pauly 2019), in Great-Britain there are records on *Trifolium pratense, Pastinaca sativa, Daucus spp., Thymus spp.* (Else & Edwards 2018) ; Nesting habits: nest in the soil, banks and calcareous rocks, according to the authors the species is social or solitary (Pauly 2019) ; Parasites: *Sphecodes ephippius, Sphecodes geoffrellus, Halictoxenos tumulorum* (Bischoff 1927, Stelfox 1927, Westrich 1989, Pauly 2019).

Threats. No major threats to this species.

Conservation Actions. Present: this species is included in the National Red Data Book of Ireland (Near Threatened; Fitzpatrick *et al.* 2006). Future: no future conservation actions have to be taken for this species.

Research Needed. Quantify the impact of pesticides and nitrogen fertilizers on food ressources.

Genus *Sphecodes* Latreille, 1804

Sphecodes albilabris (Fabricius, 1793)

Common Name(s): French – *Grand Sphécode* ; Dutch – *Grote Bloedbij* ; German - *Riesen-Blutbiene.*

Figure 246. *Sphecodes albilabris*. A, female specimen; B, male specimen; C, at the nest entrance (Braine l'Alleud, Photos : A. Pauly).

Diagnosis. largest species of the genus (11 – 15 mm), diagnostic punctuation of the scutum and tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published

Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: central and southern Europe, EOO = 8,090,968 km², AOO = 5,232 km² ; National scale: sandy areas of Low and Middle Belgium, EOO = 9,300 km², AOO = 101 km².

Population. Continental scale: locally highly abundant (Bogusch & Straka 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, Pauly (2019) assessed the species as formerly quite rare but now expanding ; Current population trend: increase.

Habitat and Ecology. Flying period: April to September ; Habitat: sandy areas ; Hosts: *Colletes cunicularius* is the main hosts, when it is no longer available, *S. albilabris* is able to parasitize the nests of *Melitturga clavicornis* (absent from Belgium) and *Halictus quadricinctus*.

Threats. No major threats to this species.

Conservation Actions. Present: the species is listed in National Red Lists of Switzerland as Vulnerable (Amiet *et al.* 1994). Future: no future conservation actions have to be taken at the national scale.

***Sphecodes crassus* Thomson, 1870**

Common Name(s): English - Swollen-thighed Blood Bee ; French – *Sphécode à gros points* ; Dutch – *Brede Dwergbloedbij* ; German - *Dichtpunktierte Blutbiene.*

Figure 247. *Sphecodes crassus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (5 – 7 mm.). Males have depressed gonocoxites and sparse punctuation on the scutum. Females can be separated from *S. miniatus* and *S. marginatus* by the length of antennal articles 3 - 5 and from *S. geofrellus* by the diagnostic punctuation of the antennal scape, hind femora have a diagnostic shape and colour. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European distribution, EOO = 6,054,010 km², AOO = 1,220 km² ; National scale: everywhere in Belgium, EOO = 11,400 km², AOO = 116 km².

Population. Continental scale: one of the most abundant *Sphecodes* species in western and central Europe, relatively rare in southernmost parts of Europe (Bogusch and Straka 2012), the trend can be considered as stable (Bogusch & Straka 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly increasing, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: ubiquitous ; Hosts: *Lasioglossum pauxillum* (Stoeckhert 1933, Sick *et al.*, 1994), *L. punctatissimum* (Westrich 1989, Vegter, 1993). In England *L. nitidiusculum* and *L. parvulum* (Falk, 2015).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is listed in the National Red List of Ireland (Data Deficient; Fitzpatrick *et al.*2006). Future: no future conservation actions have to be taken at the national scale.

Sphecodes ephippius (L., 1767)

Common Name(s): English - Bare-saddled Blood Bee ; French – *Sphécode commun* ; Dutch – *Bosbloedbij* ; German - *Gewöhnliche Blutbiene*.

Figure 248. *Sphecodes ephippius*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. medium-sized species (6 – 9 mm.). Males have non-depressed gonocoxites and gonostyli have a diagnostic shape. Females have an unpunctuated coarse vertex and can be separated from all the species (except *S. rubicundus*) by the diagnostic shape and pubescence of tergite 1, they can be separated from *S. rubicundus* by the black cuticle of tergite 4 and by the diagnostic punctuation of tergite 2. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 9,767,011 km², AOO = 2,064 km² ; National scale: everywhere in Belgium, EOO = 15,000 km², AOO = 216 km².

Population. Continental scale: dominant species in central Europe but it is not quite as common in south Europe probably because of competition with other species of the genus (*Sphecodes gibbus, S. nomioidis*) (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly increasing, Pauly (2019) assessed the species as the most common *Sphecodes* species of Belgium ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: ubiquitous but mostly on schist or calcareous banks ; Hosts: *Seladonia tumulorum, Lasioglossum laticeps, L. leucozonium, L. malachurum, L. pauxillum* and *L. quadrinotatulum* (Bogusch *et al.* 2006), *Seladonia tumulorum, L. leucozonium et L. lativentre* (Falk, 2015).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of the Netherlands as Vulnerable (Peeters and Reemer

2003). Future: no future conservation actions have to be taken at the national scale.

Sphecodes ferruginatus Hagens, 1882

Common Name(s): English - Dull-headed Blood Bee ; French – *Sphécode ferrugineux* ; Dutch – *Roestbruine Bloedbij* ; German - *Rostfarbene Blutbiene*.

Figure 249. *Sphecodes ferruginatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small to medium-sized species (6 – 9 mm.), fine and dense punctuation of the scutum. Males have depressed gonocoxites, the metasoma has a diagnostic shape. Females can be separated from *S. hyalinatus* by the coarse underside of thorax. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 7,962,016 km² , AOO = 1,792 km² ; National scale: mostly the Mosan basin, EOO = 9,900 km², AOO = 80 km².

Population. Continental scale: widespread but rare and uncommon in its localities (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common ; Current population trend: stable

Habitat and Ecology. Flying period: April to September ; Habitat: calcareous banks and grasslands ; Hosts: *Lasioglossum laticeps, L. fulvicorne* and possibly *L. pauxillum, L. fratellum, L. rufitarse* (Stoeckhert 1933, Westrich 1989, Bogusch and Straka 2012, Falk 2015).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Finland (Near Threatened; Rassi *et al.* 2010), Ireland (Vulnerable; Fitzpatrick *et al*. 2006) and the Netherlands (Vulnerable; Peeters and

Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Sphecodes geoffrellus **(Kirby, 1802)**

Common Name(s): English - Geoffroy's Blood Bee ; French – *Sphécode luisant* ; Dutch – *Glanzende Dwergbloedbij* ; German - *Glänzende Zwerg-Blutbiene*.

Figure 250. *Sphecodes geoffrellus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (4 – 6 mm). Males have depressed gonocoxites, sparse punctuation on the scutum and diagnostic colour spots on antennae. Females can be separated from *S. crassus* by their smaller size, the punctuated antennal scape, the diagnostic shape of hind femora, the brownish colour of the legs and from *S. miniatus* and *S. marginatus* by the antennal articles 3 – 5 that are as long as wide, the punctuation of the scutum is also finer and sparser. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species that is more common in the south of Europe, EOO = 7,847,547 km², AOO = 2,088 km² ; National scale: everywhere in Belgium, EOO = 11,900 km², AOO = 122 km².

Population. Continental scale: very common species in southern Europe, scarcer in central Europe, probably due to the spread of similar species such as *Sphecodes miniatus* and *Sphecodes nomioides* (Bogusch and Straka 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly increasing, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: ubiquitous, depending on the one its hosts ; Hosts: *Lasioglossum morio, L. nitidulum, L. leucopus, L. nitidusculum, L. pauxillum* (Westrich 1989) and possibly *L. fratellum* (Field 1996), *L. rufitarse* (Neumeyer & Orbist 2000), *L. sexstrigatum* (Vegter 1993), *L. parvulum* (Falk 2015), *L. marginellum* (Westrich 2006).

Threats. No major threats to this species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Sphecodes gibbus **(Linnaeus, 1758)**

Common Name(s): English - Dark-winged Blood Bee ; French – *Sphécode gibbeux* ; Dutch – *Pantserbloedbij* ; German - *Buckel-Blutbiene*.

Figure 251. *Sphecodes gibbus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. large species (7 – 13 mm.). Males can easily be separated by the forked shape of their gonostyli. Females have a distinctly punctuated vertex and a strong and spare punctuation on the scutum. They can be separated from *S. monilicornis* by the wider head and from *S. reticulatus* by the diagnostic punctuation of the vertex and tergite 2. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 10,011,759 km², AOO = 2,220 km² ; National scale: everywhere in Belgium, EOO = 13,600 km², AOO = 117 km².

Population. Continental scale: one of the most numerous *Sphecodes* species in southern and central Europe, the population trend is considered as stable (Bogusch and Straka 2012, 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as very common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: ubiquitous ; Hosts: *Halictus rubicundus, H. quadricinctus, H. sexcinctus, H. simplex, Lasioglossum malachurum* (Westrich 1989, Bogusch 2003, Falk 2015).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Ireland (Critically Endangered; Fitzpatrick *et al*. 2006) and the Netherlands (Near Threatened; Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

***Sphecodes hyalinatus* Hagens, 1882**

Common Name(s): English - Furry-bellied Blood Bee ; French – *Sphécode transparent* ; Dutch – *Lichte Bloedbij* ; German - *Durchscheinende Blutbiene*.

Figure 252. *Sphecodes hyalinatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (5 – 7 mm.). Males with depressed gonocoxites, fine and dense punctuation on the scutum. They can be separated from *S. ferruginatus* by the larger colour spots on the antennae, the lighter colour of the tarsi. Females can be separated from *S. ferruginatus* by the smaller size, the diagnostic punctuation of frons and clypeus and the underside of the thorax which is coarse with a dense and short pubescence. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 6,066,061 km², AOO = 1,248 km² ; National scale: everywhere in Belgium, EOO = 4,200 km², AOO = 36 km².

Population. Continental scale: in central Europe the species is locally rare, while it is rare in southern Europe (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: same as *L. fulvicorne* ; Hosts: *Lasioglossum fulvicorne* (Stoeckhert 1933, Falk 2015), *L. fratellum* (Heide 1992, Field 1996).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Ireland as Vulnerable (Fitzpatrick *et al*. 2006). Future: no future conservation actions have to be taken at the national scale.

***Sphecodes longulus* Hagens, 1882**

Common Name(s): English - Little Sickle-jawed Blood Bee ; French – *Sphécode allongé* ; Dutch – *Kleine Spitstandbloedbij* ; German - *Längliche Blutbiene*.

Figure 253. *Sphecodes longulus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. the smallest *Sphecodes* species in Belgium (3.5 – 5 mm.). **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 8,813,596 km², AOO = 1,808 km² ; National scale: sandy areas of Low and Middle Belgium, EOO = 6,500 km², AOO = 64 km².

Population. Continental scale: rare species of sandy sites (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: sandy areas of low and middle Belgium ; Hosts: *Lasioglossum minutissimum* (Alfken 1912, Falk 2015), *L. lucidulum, L. sexstrigatum* (Vegter 1993), *L. morio* (Westrich 1989, Falk 2015), *L. punctatissimum, L. semilucens* (Bogusch & Straka 2012), *L. tarsatum* (Van Der Vecht 1928).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Czech Republic (Vulnerable; Farkac *et al.* 2005) and Sweden (Data Deficient; Gärdenfors 2010). Future: no future conservation actions have to be taken at the national scale.

***Sphecodes majalis* Pérez, 1903**

Common Name(s): French – *Sphécode de mai* ; Dutch – *Kortsnuitbloedbij* ; German - *Mai-Blutbiene.*

Figure 254. *Sphecodes majalis*. Female specimen (Photo: A. Pauly).

Diagnosis. medium-sized species (6 – 8 mm.). Males have non-depressed gonocoxites and spines on hind tibia. Females have a very wide and laterally denticulate clypeus. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: DD ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: only one record for Belgium ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: warm localities of Europe, EOO = 5,283,270 km², AOO = 304 km² ; National scale: one record in Bassenge (1999), EOO = 100 km², AOO = 1 km².

Population. Continental scale: very rare species, the population of both host and parasite is decreasing and both are very rare (Herrmann *et al.* 2003, Bogusch *et al.* 2007) ; National scale: Pauly (2019) assessed the species as very rare and localized ; Current population trend: unknown.

Habitat and Ecology. Flying period: Spring species ; Habitat: unknown for Belgium, in whole Europe it occurs in steppes, sunny sites, both temperate and sub-tropical grassland and shrubland, and also pasture land ; Hosts: *Lasioglossum pallens* (Herrmann *et al.* 2003).

Threats. Unknown for Belgium. In whole Europe, their habitats are in decline and are threatened by afforestation and vegetational succession.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of the Czech Republic (Regionally Extinct; Farkac *et al.* 2005) and Switzerland (Near Threatened; Amiet 1994). Future: no conservation actions have to be taken at the national scale, in whole Europe the conservation of its habitat should be promoted.

Research Needed. Monitoring of the population size and trend at the national scale.

***Sphecodes marginatus* Hagens, 1882**

Common Name(s): English - Bare-saddled Blood Bee ; French – *Sphécode commun* ; Dutch – *Bosbloedbij* ; German - *Gewöhnliche Blutbiene*.

Figure 255. *Sphecodes marginatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. very small species (3.5 – 5 mm.). Males with depressed gonocoxites, sparse punctuation on the scutum, large colour spots on antennae. They can be separated from *S. geoffrellus* by the diagnostic punctuation of T1 – T3, from *S. miniatus* by the diagnostic shape of the gonostyli and the stronger punctuation of tergites. Females can be separated from *S. crassus* and *S. geoffrellus* by the very short antennal articles 3 – 5. They are very hard to separate from *S. miniatus*. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO), this reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: atlanto-Mediterranean species, EOO = 3,504,159 km², AOO = 400 km² ; National scale: on sandy heaths of Campine and Gaume, EOO = 2,000 km², AOO = 16 km².

Population. Continental scale: very common species in much of western Europe while in central Europe it is very local and rather rare (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as rare ; Current population trend: unknown.

Habitat and Ecology. Flying period: May to September ; Habitat: sandy heaths ; Hosts: unknown but probably *Lasioglossum lucidulum*, *L. semilucens*, *L.*

sexstrigatum (Bogusch & Straka 2012), *L. punctatissimum* (Falk 2015), *L. brevicorne, L. semilucens* (Blüthgen 1934).

Threats. The threats to this species are unknown.

Conservation Actions. Present: the species is listed in the National Red List of the Czech Republic (Critically Endangered; Farkac *et al.* 2005). Future: no future conservation actions can be taken given the lack of knowledge about the ecology and threats to the species.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the life history and ecology of the species ; determine the threats to the species.

Sphecodes miniatus **Hagens, 1882**

Common Name(s): English - False Margined Blood Bee ; French – *Sphécode nain* ; Dutch – *Gewone Dwergbloedbij* ; German - *Gewöhnliche Zwerg-Blutbiene*.

Figure 256. *Sphecodes miniatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (4 – 6 mm.). Males have depressed gonocoxites, sparse punctuation on the scutum, colour spots on the antennal articles. They can be separated from *S. geoffrellus* by the diagnostic shape of the genitalia and the diagnostic punctuation of the frons and para-ocular space. Females differs from *S. crassus* and *S. geoffrellus* by the antennal articles 3 – 5 being shorter than the following ones and the stronger and denser punctuation of the scutum. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 4,723,854 km², AOO = 956 km² ; National scale: sandy areas of Low and Middle Belgium, sandpits of the natural region of Gaume, EOO = 9,600 km², AOO = 87 km².

Population. Continental scale: common species, especially in warmer and sandy sites in central Europe (Bogusch and Straka 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to September ; Habitat: sandy areas of Low and Middle Belgium, sandpits of the natural region of Gaume ; Hosts: *Lasioglossum sexstrigatum* (Vegter 1993), *Lasioglossum nitidiusculum* (Westrich 1989) and probably *L. morio* (Westrich 1989, Falk 2015), *L. politum* (Bogusch 2003), *L. pauxillum* and *L. punctatissimum* (Bogusch & Straka 2012).

Threats. Very common on sandy sites, no major threats to this species.

Conservation Actions. Present: the species is listed in the National Red List and Red Data Book of Finland (Near Threatened; Rassi *et al.* 2010), Sweden (Vulnerable; Gärdenfors 2010) and Slovenia (Vulnerable; Anonymous 2002). Future: no future conservation actions have to be taken at the national scale.

Sphecodes monilicornis **(Kirby, 1802)**

Common Name(s): English - Box-headed Blood Bee ; French – *Sphécode à grosse tête* ; Dutch – *Dikkopbloedbij* ; German – *Dickkopf-Blutbiene*.

Figure 257. *Sphecodes monilicornis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. large species (7 – 10 mm). Males have a rounded head, gonocoxites are not depressed, gonostyli have a diagnostic shape. Females can be separated by the diagnostic shape of their head. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 10,826,046 km², AOO = 2,596 km² ; National scale: everywhere in Belgium, EOO = 15,600 km², AOO = 177 km².

Population. Continental scale: common species, especially in warm habitats (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly increasing, Pauly (2019) assessed the species as very common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to October ; Habitat: ubiquitous ; Hosts: Generalist species, confirmed hosts are *Halictus rubicundus, Lasioglossum albipes, L. calceatum, L. leucozonium, L. quadrinotatulum, L. zonulum et L. malachurum* (Bogusch *et al.* 2006, Bogusch & Straka 2012), potential other hosts are *Halictus maculatus, S. tumulorum, Lasioglossum laticeps, L. pauxillum, L. villosulum* and *Andrena flavipes* (Bogusch 2003).

Threats. No major threats to this species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Sphecodes niger **Hagens, 1874**

Common Name(s): English - Dark Blood Bee ; French – *Sphécode noir* ; Dutch – *Zwarte Bloedbij* ; German - *Schwarze Blutbiene*.

Figure 258. *Sphecodes niger*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (4.5 – 5.5 mm). Males have a characteristic black-coloured metasoma. Females have a subapical tooth on mandibles. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: VU (B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO), this reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 3,336,957 km², AOO = 964 km²; National scale: Middle Belgium, EOO = 1,400 km², AOO = 10 km².

Population. Continental scale: can be common in warm biotopes, although it is usually not a very common species despite the fact it is widespread (P. Bogusch pers. obs. 2000-2013). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite rare ; Current population trend: unknown.

Habitat and Ecology. Flying period: April to September ; Habitat: clayey banks where its host can be found, according to Bogusch & Straka (2014) the species can be found on temperate grasslands and shrublands, pasture lands, rural gardens, and rocky areas ; Hosts: *Lasioglossum morio* (Bogusch & Straka 2012).

Threats. The threats to this species are unknown, the host is one of the most species in Belgium.

Conservation Actions. Present: the species is listed in National Red List or Red Data Book of Great Britain (Vulnerable; Shirt 1987), the Netherlands (Vulnerable; Peeters and Reemer 2003), and Sweden (Vulnerable; Gärdenfors 2010). Future: No future conservation actions can be taken given the lack of knowledge about **Threats.**

Research Needed. Monitoring of the population size and trend at the national scale ; determine the threats to the species.

Sphecodes pellucidus **Smith, 1845**

Common Name(s): English - Sandpit Blood Bee ; French – *Sphécode des sables* ; Dutch – *Schoffelbloedbij* ; German - *Sand-Blutbiene*.

Figure 259. *Sphecodes pellucidus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. medium to large-sized species (7 – 11 mm). Males without depressed gonocoxites, gonostyli have a diagnostic shape and well-spread colour spots on antennal articles. Females have a coarse and unpunctuated vertex, the scutum is dense and strong. They can be separated from *S. ephippius* by the diagnostic shape and pubescence of tergite 1 and from *S. reticulatus* by the sparsely punctuated tergite 2. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 9,282,863 km², AOO = 1,512 km² ; National scale: Low and Middle Belgium, EOO = 10,700 km², AOO = 116 km².

Population. Continental scale: locally common (Bogusch and Straka 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly increasing, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: April to August ; Habitat: sandy sites, sand dunes and semi-desert biotopes ; Hosts: *Andrena barbilabris* (Alfken 1912, Witt 1992), *Andrena nycthemera* (Schönitzer & Klinksik 1990), *Lasioglossum leucozonium* (Sick *et al.* 1994) and possibly *Andrena argentata, A. bicolor, A. humilis, A. ventralis, A. wilkella* (Bogusch & Straka 2012).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011), Ireland (Vulnerable; Fitzpatrick *et al.* 2006) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

***Sphecodes puncticeps* Thomson, 1870**

Common Name(s): English - Sickle-jawed Blood Bee ; French – *Sphécode ponctué* ; Dutch – *Grote Spitstandbloedbij* ; German - *Punktierte Blutbiene*.

Figure 260. *Sphecodes puncticeps*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. small species (5 – 7 mm). Males with non-depressed elongated gonocoxites, diagnostic shape of the gonostyli, similar to *S. longulus.* Females can be separated from *S. longulus* by the stronger punctuation of tergite 2, the head which is considerably wider and the greater size. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 10,534,254 km², AOO = 8,768 km² ; National scale: Low and Middle Belgium as well as the natural region of Gaume, EOO = 6,900 km², AOO = 56 km².

Population. Continental scale: in southern Europe the species is quite common and in central Europe it is usually abundant in sandy localities (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: May to October ; Habitat: everywhere hosts nests can be found, freshly tilled clayey soil or in bare soil close from mammals burrows which are located close from Asteraraceae Cichorioideae; Hosts: *Lasioglossum villosulum* (Alfken 1912), probably *L. brevicorne* (Bischoff 1927), possibly *L. politum, L. monstrificum (*Bogusch & Straka 2012), in Great-Britain, the main hosts are *L. lativentre* and *L. quadrinotatum* (Perkins pers. comm. in Blüthgen 1934, Falk 2015).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of Finland (Vulnerable; Rassi *et al.* 2010), Norway (Endangered; Kålås *et al.* 2010) and Sweden (Near Threatened; Gärdenfors 2010). Future: no future conservation actions have to be taken at the national scale.

Sphecodes reticulatus **Thomson, 1870**

Common Name(s): English - Reticulate Blood Bee ; French – *Sphécode réticulé* ; Dutch – *Rimpelkruinbloedbij* ; German - *Netz-Blutbiene*.

Figure 261. *Sphecodes reticulatus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. medium to large-sized species (7 – 10 mm). Males with non-depressed gonocoxites, elongated and diagnostic gonostyli, very small colour spots on antennal articles. Females can be separated from *S. gibbus* and *S. pellucidus* by the diagnostic punctuation of vertex and tergite 2, from *S. ephippius* by the diagnostic pubescence of tergite 1. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 7,357,494 km², AOO = 1,448 km² ; National scale: Low and Middle Belgium as well as in the natural region of Gaume, EOO = 4,000 km², AOO = 42 km².

Population. Continental scale: rare within much of its distribution area (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, Pauly (2019) assessed the species as quite common ; Current population trend: stable.

Habitat and Ecology. Flying period: May to early October ; Habitat: sandpits where *Andrena barbilabris* can be found ; Hosts: *Andrena barbilabris* (Stoeckhert 1933, Blüthgen 1934, Falk 2015) and probably *Andrena argentata, A. wilkella, Lasioglossum prasinum* (Bogusch & Straka 2012).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Finland (Near Threatened; Rassi *et al.* 2010), Great Britain (Vulnerable; Shirt 1987), Sweden (Near Threatened; Gärdenfors 2010) and Switzerland (Vulnerable; Amiet

1994). Future: no future conservation actions have to be taken at the national scale.

Sphecodes rubicundus **Hagens, 1875**

Common Name(s): English - Reticulate Blood Bee ; French – *Sphécode réticulé* ; Dutch – *Rimpelkruinbloedbij* ; German - *Netz-Blutbiene*.

Figure 262. *Sphecodes rubicundus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. medium to large-sized species (8 – 12 mm). Males with non-depressed gonocoxites, diagnostic gonostyli and diagnostic punctuation on tergite 2. Females have a coarse unpunctuated vertex and diagnostic pubescence of tergite 1. They can be separated from *S. ephippius* by the red cuticle of tergite 4, the diagnostic punctuation of tergite 2, the more densely punctuated face and scutum and the slightly greater size. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO), this reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of observations Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 6,692,652 km², AOO = 1,276 km² ; National scale: Low and Middle Belgium, EOO = Not Evaluated, AOO = Not Evaluated.

Population. Continental scale: the species has always been rare but in recent years a large decline of its population has been observed (Bogusch and Straka

2012) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as quite rare and probably in danger of extinction ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to July. Habitat: in whole Europe the species inhabits sandy sites, sand dunes, coastal grasslands, Mediterranean and temperate shrubland, pasture land and steppes. Recently, the species has been found at quarries, sandpits and mining areas. Hosts: *Andrena labialis* (Sowa & Mostowska 1978, Blüthgen 1934), probably *A. nigroaenea* (Blüthgen 1934), *A. agilissima* (Torka 1925) and occasionally *A. flavipes* (Falk 2015).

Threats. Decline of host: *Andrena labialis* (NT). Decline of habitats: quarries, sandpits and mining areas are susceptible to vegetational succession, scrub encroachment, afforestation or urbanization once they are no longer in use by humans (Heneberg *et al.* 2013, P. Bogusch pers. obs. 2013) ; in Belgium, coastal habitats are threatened by urbanization and development of tourism infrastructure.

The host species are not often found in the same habitats as *Sphecodes rubicundus.*

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Critically Endangered/Endangered; Peeters and Reemer 2003) and Switzerland (Regionally Extinct; Amiet 1994). Future: promotion of the conservation and rehabilitation of coastal natural habitats as well as old industrial sites.

Research Needed. Monitoring of the population size and trend at the national scale ; better understanding of the ecology and threats to this species.

Sphecodes rufiventris **(Panzer, 1798)**

Common Name(s): French – *Sphécode strié* ; Dutch – *Gestreepte Bloedbij* ; German - *Geriefte Blutbiene*.

Figure 263. *Sphecodes rufiventris*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. medium-sized species (6.5 – 8 mm). Males with non-depressed gonocoxites, diagnostic shape of gonostyli, large colour spots on antennal articles. Similar to *S. monilicornis* but smaller and with a different shape of vertex and mesosoma. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 6,330,729 km², AOO = 2,496 km² ; National scale: very localized, EOO = 100 km², AOO = 1 km².

Population. Continental scale: in central Europe it is quite rare but more abundant in xerothermic habitats (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly decreasing, Pauly (2019) assessed the species as very rare and threatened in Belgium ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to August ; Habitat: in whole Europe it inhabits warm, open or shrubby habitats (forest steppes) and also grasslands, pastureland, plantations and rural gardens ; Hosts: *Halictus maculatus* (Stoeckhert 1933, Blüthgen 1934).

Threats. Decline of host: *Halictus maculatus* (VU).

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic as Vulnerable (Farkac *et al.* 2005). Future: anything likely to benefit its host.

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; specify the ecology and life history of the species at the national scale

Sphecodes scabricollis Wesmael, 1835

Common Name(s): English - Rough-backed Blood Bee ; French – *Sphécode anguleux* ; Dutch – *Wafelbloedbij* ; German - *Leistenkopf-Blutbiene*.

Figure 264. *Sphecodes scabricollis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. medium to large sized species (8 – 11 mm). Males with non-depressed gonocoxites, diagnostic shape of gonostyli. Females have a coarse vertex. Both sex have a strongly and densely punctuated scutum and carinated genae. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: EN (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: found throughout Europe, EOO = 5,751,664 km², AOO = 1,060 km² ; National scale: mostly in the natural region of Campine, EOO = 1,000 km², AOO = 10 km².

Population. Continental scale: very rare species and in most countries it is endangered or extinct (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as quite rare, localized and probably threatened ; Current population trend: decrease.

Habitat and Ecology. Flying period: from the beginning of Spring to the beginning of Autumn ; Habitat: in whole Europe it occurs in sandy wetlands ; Visited flowers: this species is known for collecting nectar on *Pulicaria dysenterica* (Leclercq & Enckels 1944) ; Hosts: *Lasioglosum zonulum* and possibly *Halictus compressus, H. quadricinctus* and *Lasioglossum prasinum* (Blüthgen 1934, Bogusch & Straka 2012).

Threats. Reduction of suitable habitats: drainage of wetlands in agricultural or forestry purposes ; overgrazing of wetlands causes soil compaction and removal of vegetation.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Regionally Extinct; Farkac *et al.* 2005), Germany (Threatened but level unknown; Westrich *et al.* 2011), Great Britain (Vulnerable; Shirt 1987), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Switzerland (Near Threatened ; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC3) could benefit to the species Future: promotion of the conservation of wetlands, ; promotion of extensive grazing practices on wetlands.

Research Needed. Monitoring of the population trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; specify the ecology and life history of the species at the national scale in order to determine potential other threats.

***Sphecodes spinulosus* Hagens, 1875**

Common Name(s): English - Spined Blood Bee ; French – *Sphécode à épines rouges* ; Dutch – *Kraagbloedbij* ; German - *Rotdornige Blutbiene*.

Figure 265. *Sphecodes spinulosus*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. large species (8 – 11 mm). Males with non-depressed gonocoxites, diagnostic gonostyli and spines on hind tibia. Females have long antennal articles and dense punctuation on the scutum. **Taxonomic Source(s).** Pauly A. 2019. Abeilles de Belgique et des régions limitrophes (Insecta: Hymenoptera: Apoidea). Famille Halictidae. Institut royal des Sciences naturelles de Belgique.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-11 ; Assessor(s): Denis Michez, Maxime Drossart, Ella Zambra, Jens d'Haeseleer, Pierre Rasmont, Alain Pauly ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2014 – Near Threatened (NT) (Europe) in Bogusch & Straka, 2014.

Geographic Range. Continental scale: European species, EOO = 5,165,201 km², AOO = 824 km² ; National scale: very localized in Middle Belgium, where its host nests, EOO = 200 km², AOO = 2 km².

Population. Continental scale: a rare species of warm biotopes (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (2019) assessed the species as rare and threatened ; Current population trend: decrease.

Habitat and Ecology. Flying period: May to early July ; Habitat: in whole Europe it can be found in warm biotopes, usually steppes but also Mediterranean

shrubland and grassland, semi-desert, pasture land and rural gardens; Hosts: *Lasioglossum xanthopus* (Stoeckhert 1933, Blüthgen 1934).

Threats. Decline of host: *Lasioglossum xanthopus* (EN) ; Reduction of suitable habitats: destruction of diversified xerothermic grasslands for agricultural, forestry or urbanization purposes ; intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of grasslands ; loss of xerothermic grassland due to the succession from grassland to shrubland.

Conservation Actions. Present: this species is listed in the National Red List or Red Data Book of the Czech Republic (Critically Endangered; Farkac *et al*. 2005), the Netherlands (Critically Endangered; Peeters and Reemer 2003), Sweden (Endangered; Gärdenfors 2010) and Switzerland (Near Threatened; Amiet 1994). Future: promotion of the conservation and restauration of grasslands ; promotion of extensive grazing and mowing practices ; promotion of hay production instead of silage ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizers).

Research Needed. Monitoring of the population size and trend at the national scale ; conduct sampling expeditions to determine the potential existence of other populations ; specify the ecology and life history of the species at the national scale.

Family Megachilidae Latreille, 1802

Genus *Aglaoapis* Cameron, 1901

Aglaoapis tridentata (Nylander, 1848)

Common Name(s): French – *Dioxe tridenté* ; German - *Dunkle Zweizahnbiene*.

Figure 266. *Aglaoapis tridentata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: Palearctic species, estimated AOO = 2100 km² ; National scale: last records in Torgny (1950, 1954), EOO = 0 km², AOO = 0 km².

Population. Continental scale: rare species, no further information available for the population size and trend (Ortiz Sánchez & Ornosa 2014). National scale: extinct. Current population trend : extinct.

Habitat and Ecology. Flying period: in Germany, males flies from mid-May to July and females from June to August ; Habitat: in Germany it occurs in various rocky xerothermic areas (Wiesbauer 2017), in whole Europe it can be found within boreal and temperate forest, boreal and temperate shrubland, subarctic and temperate grassland, semi-desert, arable land and pasture land (Ortiz Sánchez & Ornosa 2014) ; Hosts: *Trachusa byssina, Hoplitis adunca, Osmia andrenoides, Hoplitis anthocopoides, Hoplitis ravouxi* (Petit 1986, Westrich 1989).

Threats. The potential threats and the causes of extinction of the species are not known. Several of its hosts are nationally threatened : *Osmia andrenoides* (CR), *Hoplitis anthocopoides* (CR), *Hoplitis ravouxi* (CR).

Conservation Actions. Present: this species is listed in the National Red Lists or Red Data Books of Finland (Endangered; Rassi 2010), Germany (Endangered; Westrich *et al.* 2008, 2011), Sweden (Vulnerable; Gärdenfors 2010) and Czech

Republic as *Dioxys tridentata* (Endangered; Farkac *et al*. 2005). Future: no conservation actions can be taken at the national scale.

Research Needed. Conduct sampling expeditions in order to confirm / infirm the national extinction ; specify the ecology of the species ; specify the national threats that may occur on the species habitat ; better understanding of the causes of extinction.

Genus *Anthidiellum* Cockerell, 1904

Anthidiellum strigatum (Panzer, 1805)

Common Name(s): French – *Anthidie naine* ; Dutch – *Kleine Harsbij* ; German – *Zwergharzbiene*.

Figure 267. *Anthidiellum strigatum*. A, female specimen; B, male specimen (Photos: A. Pauly); C, resting (Han-sur-Lesse, Photo: J.Y. Baugnée).

Diagnosis. Females: the posterior end of the scutellum is smooth and rounded, the head (excl. the clypeus) is partly yellow-coloured, pulvillus between the leg claws. Males: smooth and rounded posterior end of the scutellum, tergite 7 ending in a single tip, pulvillus between the leg claws. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ornosa & Sánchez 2014.

Geographic Range. Continental scale: Palearctic species, estimated AOO = at least 8,000 km² ; National scale: everywhere in Belgium, EOO = 14,600 km², AOO = 229 km².

Population. Continental scale: seems to be quite abundant and the population across Europe is presumed to be large (Ornosa & Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm.) assessed the species as never really abundant but widespread ; Current population trend : increase.

Habitat and Ecology. Flying period: Summer species ; Habitat: ubiquitous species but always near a pinewood (A. Pauly pers. comm. 2015, Peeters *et al.* 2012) ; Visited flowers: in Netherland the species is considered as a polylectic species which is mostly found on *Lotus corniculatus* and *Lotus uliginosus* (Peeters *et al.* 1999), in whole Europe the species is considered as polylectic with a preference for Fabaceae (Müller 1996a), there are records on *Hypericum prolificum, Onobrychis sp., Lotus corniculatus, Centaurea solstitialis* and *Melilotus officinalis* (Grace 2010) ; Nesting habits: nests in rocks or in tree stump, nests are built with pine resin (Peeters *et al.* 1999, Bellmann 1977, 1981) ; Parasites: *Stelis signata* (Dusmet 1908).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: listed in the National Red Lists or Red Data Books of Austria, the Czech Republic (Farkac *et al*. 2005), Slovakia (Belakova 1996), Switzerland (Amiet 1994, Amiet *et al*. 2004) as Least Concern, in Germany as Vulnerable (Westrich *et al.* 2008, 2011) and in Finland as Near Threatened (Rassi *et al.* 2010). Future: no future conservation actions have to be taken at the national scale.

Genus *Anthidium* Fabricius, 1805

Anthidium manicatum (L., 1758)

Common Name(s): English - Wool Carder Bee ; French – *Anthidie à manique* ; Dutch – *Grote Wolbij* ; German - *Garten-Wollbiene*.

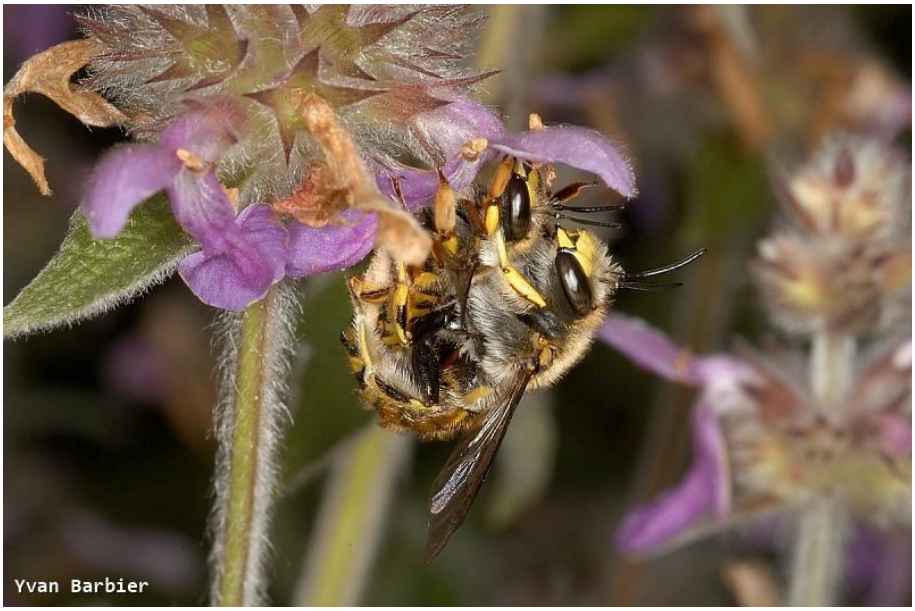

Figure 268. *Anthidium manicatum*. Specimens *in copula* (Gembloux, Photo: Y. Barbier).

Diagnosis. Females: the posterior end of the scutellum is smooth and rounded, the head (incl. the clypeus) is partly yellow-coloured. Males: large size (10 – 16 mm), smooth and rounded posterior end of the scutellum, strongly tridentate tergite 7. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Taxonomic Notes: there is only one subspecies in Europe, the nominal *Anthidium manicatum manicatum* (Linnaeus, 1758).

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ornosa & Sánchez 2014.

Geographic Range. Continental scale: found throughout Europe (except at the highest latitudes), EOO and AOO not evaluated ; National scale: everywhere in Belgium, EOO = 27,600 km², AOO = 514 km².

Population. Continental scale: widely represented species within its range (Ornosa & Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm.) assessed the species as perhaps expanding ; Current population trend : unknown.

Habitat and Ecology. Flying period: Summer species ; Habitat: ubiquitous species that is often found in garden with Lamiaceae flowers ; Visited flowers: Fabaceae, Lamiaceae, Scrophulariaceae, often found on *Stachys byzantina, Ballota nigra, Leonurus cardiaca* ; Records on cultivated plants: in Great-Britain on *Rubus idaeus, Thymus sp., Rosmarinus officinale* (Else & Edwards 2018) ; Nesting habits:

nests in existing cavities, it uses the silks of plants such as *Stachys byzantina, Ballota nigra, Echium vulgare, Hieracium pilosella, Lychnis coronaria* to build its nest ; Parasites: *Stelis punctulatissima*.

Threats. No major threats to the species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Anthidium oblongatum **(Illiger, 1806)**

Common Name(s): French – *Anthidie à deux épines* ; Dutch – *Tweelobbige Wolbij* ; German - *Felsspalten-Wollbiene*.

Figure 269. *Anthidium oblongatum*. A, female specimen; B, male specimen (Photos: A. Pauly).

Diagnosis. Females: the posterior end of the scutellum is rounded and has two small teeth, the head is partly yellow-coloured. Males: the posterior end of the scutellum is rounded and has two small teeth, bi-lobed tergite 7. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ornosa & Sánchez 2014.

Geographic Range. Continental scale: Holarctic species, EOO and AOO not evaluated ; National scale: more abundant in the southern Sambre-Meuse line and around Antwerpen, EOO = 4,400 km², AOO = 45 km².

Population. Continental scale: no information available for the population size and trend of this species, although it is presumed to have a large overall population in Europe (Ornosa & Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm.) assessed that the population is expected to increase due to global warming ; Current population trend : unknown.

Habitat and Ecology. Flying period: May to October ; Habitat: in whole Europe the species occurs in temperate forests, temperate and Mediterranean shrubland, temperate grassland, semi-desert, arable land and pasture land (Ornosa & Sánchez 2014) ; Visited flowers: in whole Europe the species appears to be polylectic with a preference for the families Asteraceae, Crassulaceae, Fabaceae, Lamiaceae, and Boraginaceae (Banaszak and Romasenko 2001, Amiet *et al.* 2004), in the Netherland the species mostly forages on *Lotus corniculatus* (Peeters *et al.* 1999) ; Nesting habits: nests in existing cavities, the nest is built with plants silks ; Parasites: *Stelis punctulatissima* (Amiet *et al.* 2004).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species was listed as in the National Red Lists or Red Data Books of the Germany as Vulnerable (Westrich *et al.* 2008, 2011). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale as this species should benefit from global warming.

***Anthidium punctatum* Latreille, 1809**

Common Name(s): French – *Anthidie à points blancs* ; Dutch – *Kleine Wolbij* ; German - *Weissfleckige Wollbiene*

Figure 270. *Anthidium punctatum*. A, female specimen; B, male specimen (Photos: A. Pauly); C, Resting (Vezin, Photo: J.Y. Baugnée).

Diagnosis. Females: the cuticle of the face is entirely black-coloured. Males: small-sized (8.5 – 10 mm), the posterior end of the scutellum is rounded and has two small teeth, tridentate tergite 7. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ornosa & Ortiz Sánchez 2014.

Geographic Range. Continental scale: Palearctic species distributed throughout most of Europe, it is also introduced in Ecuador, EOO and AOO not evaluated at the continental scale ; National scale: rare, localized and restricted to open

xerothermic habitats in Flanders, more abundant in Wallonia, especially in middle Belgium, EOO = 6,200 km², AOO = 53 km².

Population. Continental scale: no information available for the population size and trend of this species (Ornosa & Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing ; Current population trend : unknown.

Habitat and Ecology. Flying period: May to July ; Habitat: in Belgium it occurs in xerothermic meadows, along railways, warm valleys, calcareous grasslands (A. Pauly pers. comm.), in whole Europe it occurs in on boreal and temperate forest, boreal, temperate and Mediterranean shrubland, temperate grassland, temperate desert, arable land and pasture land (Ornosa & Ortiz Sánchez 2014) ; Visited flowers: in the Netherland it has been observed on *Lotus corniculatus, Echium vulgare* (Peeters *et al.* 1999), in whole Europe the species appears to be polylectic with a preference for the families Asteraceae, Crassulaceae, Dipsacaceae, Fabaceae and Lamiaceae (Ornosa & Ortiz Sánchez 2014) ; Nesting habits: nests between stones, the nest is built with plants silks, in Belgium it has been observed collecting silks of *Verbascum thapsus* ; Parasites: unknown.

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: it is listed in the National Red List or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2008, 2011), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale as this species should benefit from global warming.

Genus *Chelostoma* Latreille, 1809

Chelostoma campanularum (Kirby, 1802)

Common Name(s): English - Small Scissor Bee ; French – *Chélostome peigné des campanules* ; Dutch – *Kleine Klokjesbij*; German - *Kurzfransige Scherenbiene*.

Figure 271. *Chelostoma campanularum*. Specimen resting on *Campanula sp.* (Photo: A. Pauly).

Diagnosis. Females: small species (5 -7 mm), no apical fringe of hairs on tergites, the propodeal area is slightly longer than the metanotum. Males: small species (4.5 – 6 mm), inflated and non-carinated sternite 2, last tergite ending with two sharpened lobes, apex of sternite 5 fringed with a short pubescence. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Taxonomic Notes: in many older publications the record of *Chelostoma florisomne* auct. [not (Linnaeus, 1758)] actually refers to *Chelostoma campanularum* (Kirby, 1802).

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: whole Europe but seems to be absent from Wales, Scotland and Ireland in western Europe, EOO and AOO not evaluated at the continental scale ; National scale: everywhere in Belgium, EOO = 17,700 km², AOO = 274 km².

Population. Continental scale: no information available for the population size and trend of this species, considered as common in cities (Lhomme 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable ; Current population trend : increase.

Habitat and Ecology. Flying period: early June to mid-August ; Habitat: ubiquitous species (Lhomme 2014) ; Visited flowers: in Belgium the species is considered as oligolectic on *Campanula spp., Jasione montana* and ornamental *Walhenbergia* species (A. Pauly pers. comm.) ; Nesting habits: nests in pre-existing cavities like insect burrows in dead wood or hollow stems (*e.g. Phragmites*) (Ferton 1895, Benoist 1929, Westrich 1989, Banaszak and Romasenko 2001) and in thatch roofs (A. Pauly pers. comm.) ; Parasites: unknown.

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of the Netherlands (Vulnerable; Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Chelostoma distinctum (Stoeckhert, 1929)

Common Name(s): French – *Chélostome frangé des campanules* ; Dutch – *Zuidelijke Klokjesbij* ; German - *Langfransige Scherenbiene*.

Diagnosis. Females: small species (5 -7 mm), no apical fringe of hairs on tergites, the propodeal area is as long as the metanotum. Males: small species (4.5 – 6 mm), inflated and non-carinated sternite 2, last tergite ending with two sharpened lobes, apex of sternite 5 fringed with a long pubescence. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: VU (A2c; B1ab(ii,iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (1,500 < EOO < 3,000 km²), severely fragmented distribution and continuing decline in the AOO and quality of habitats ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: known from south, eastern and central Europe until the Caucasus, EOO and AOO not evaluated at the continental scale ; National scale: in nutrient-poor areas of Fagne-Famenne, EOO = 2,800 km², AOO = 32 km².

Population. Continental scale: no information available for the population size and trend (Lhomme 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species a very rare and restricted to specialized habitats ; Current population trend : stable.

Habitat and Ecology. Flying period: early June to mid-August ; Habitat: in Belgium the species in restricted to nutrient-poor, warm calcareous grasslands (A. Pauly pers. comm.) ; Visited flowers: in Belgium as well as in whole Europe the species is considered as oligolectic on *Campanula spp.* (A. Pauly pers. comm., Lhomme 2014) ; Nesting habits: nests in pre-existing cavities like insect burrows and drilled bore holes in dead wood, hollow stems or old galls of *Diplolepis mayri* on *Rosa* species (Stöckhert 1929, Westrich 1989, Banaszak and Romasenko 2001) ; Parasites: unknown.

Threats. Reduction of suitable habitats: destruction of nutrient-poor grasslands in agricultural, forestry or urbanization purposes ; eutrophication of nutrient-poor grasslands due to agricultural intensification; intensification in the uses of grasslands (intensive grazing practices, silage).

Conservation Actions. Present: the species is listed in the National Red List of the Netherlands (Vulnerable; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species. Future: promotion of extensive agricultural (*i.e.* excluding intensive use

of pesticides and nitrogen fertilizer) and grazing practices ; promotion of late mowing practices ; establish a legal protection status for the areas where the species still occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on food ressources ; impact of pesticides on behaviour ; monitoring of the population size and trend at the national scale ; specify the ecology and life history of the species.

Chelostoma florisomne (L., 1758)

Common Name(s): English - Largel Scissor Bee ; French – *Chélostome des renoncules* ; Dutch - *Ranonkelbij* ; German - *Hahnenfuss-Schrenbiene*.

Figure 272. *Chelostoma florisomne*. Specimen foraging on *Ranunculus repens* (Woluwe-St-Lambert, Photo: A. Pauly).

Diagnosis. Females: large species (7 - 11 mm), apical fringes of hairs on tergites, clypeus with a lamella, long mandibles. Males: large species (7 – 11 mm), carinated sternite 2, the apical end of last tergite is fork-shaped. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Taxonomic Notes: in many older publications the record of *Chelostoma florisomne* auct. [not (Linnaeus, 1758)] actually refers to *Chelostoma campanularum* (Kirby, 1802) ; in old collections the species was identified as *C. maxillosum* (A. Pauly pers. comm.).

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: known from most of the European countries but it is also present in southwestern Asia and northern Africa, EOO and AOO not evaluated at the continental scale ; National scale: everywhere in Belgium, EOO = 16,100 km², AOO = 235 km².

Population. Continental scale: no information available for the population size and trend of this species ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm.) assessed the species as quite common when adequate nesting sites can be found ; Current population trend : decrease.

Habitat and Ecology. Flying period: mid-April to mid-July ; Habitat: the habitat has not been described but it is probably ubiquitous as long as there are proper nesting sites and *Ranunculus spp.* ; Visited flowers: in Belgium the species is considered as oligolectic on *Ranunculus spp.* (A. Pauly pers. comm.) ; Nesting habits: nests in pre-existing cavities like hollow stems and bore holes in dead wood, the species is common in insect hotels ; Parasites: unknown.

Threats. No major threats to this species at the national scale. The limiting factor is certainly the availability in nesting sites.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Netherlands (Vulnerable; Peeters and Reemer 2003) and Norway (Near Threatened; Kålås *et al.* 2010). Future: no future conservation actions have to be taken at the national scale.

Chelostoma rapunculi **(Lepeletier, 1841)**

Common Name(s): French – *Chélostome commun des campanules* ; Dutch – *Grote Klokjesbij* ; German - *Glockenblumen-Scherenbiene*.

Figure 273. *Chelostoma rapunculi*. Specimen foraging on *Geranium sp.* (Photo: A. Pauly).

Diagnosis. Females: large species (8 - 9 mm), apical fringes of hairs on tergites, clypeus without any lamella, mandibles are shorter than the ones of *C. florisomne*. Males: large species (8 – 10 mm), carinated sternite 2, last tergite ending in three truncated lobes. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Taxonomic Notes: in old collection the species was identified as *C. nigricornis* or *C. fuliginosum* (A. Pauly pers. comm.).

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widespread throughout Europe, this species is also present in northern Africa, northern and southwestern Asia and has been introduced in northern America, EOO and AOO not evaluated at the continental scale ; National scale: everywhere in Belgium, EOO = 21,500 km², AOO = 351 km².

Population. Continental scale: no information available for the population size and trend of this species ; National scale: Rasmont *et al.* (1993) assessed the

species as very highly significantly increasing, Pauly (pers. comm.) assessed the species as very common ; Current population trend : stable.

Habitat and Ecology. Flying period: mid-May to mid-July ; Habitat: the habitat has not been described but it is probably ubiquitous as long as there are *Campanula spp.* ; Visited flowers: in Belgium the species is considered as oligolectic on *Campanula spp.* (A. Pauly pers. comm.) ; Nesting habits: nests in pre-existing cavities like hollow stems and bore holes in dead wood ; Parasites: unknown.

Threats. No major threats to this species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Genus *Coelioxys* Latreille, 1809

Coelioxys afra Lepeletier, 1841

Common Name(s): English - Short Sharp-tail Bee ; French – *Célioxe à échelons* ; Dutch - *Schubhaarkegelbij* ; German - *Shuppenhaarige Kegelbiene*.

Figure 274. *Coelioxys afra*. A, female specimen; B, male specimen (Photos: A. Pauly) ; C, resting (Lavaux-Ste-Anne, Photos: Y. Barbier).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s):

Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of observations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: west-Palearctic species, EOO and AOO not evaluated at the continental scale ; National scale: heaps of the Belgian Limburg, EOO = 200 km², AOO = 3 km².

Population. Continental scale: the population is relatively small at the local level due to its kleptoparasitic behaviour, the population trend is considered stable (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as extremely rare and restricted to heaps of Limburg ; Current population trend : decrease.

Habitat and Ecology. Flying period: from June to August ; Habitat: in Belgium the species is restricted to heaps (A. Pauly pers. comm.), in whole Europe it occurs in open and sandy ground, cultivated areas, temperate and Mediterranean shrubland, temperate forest, grassland and semi-deserts (Ortiz Sánchez 2014) ; Hosts: *Megachile leachella, M. pilidens* (Westrich 1989).

Threats. Decline of hosts: *Megachile leachella* (VU), *M. pilidens* (CR). Reduction of suitable habitats: afforestation, scrub encroachment or urbanization of heaps may cause a decline in the number of open areas on old industrial sites ; destruction of grasslands in agricultural, forestry or urbanization purposes ; eutrophication of grasslands due to agricultural intensification; intensification in the uses of grasslands (intensive grazing practices, silage) ; intensification of forestry practices (deletion of edges and clearings, reduction in the diversity of timber species).

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (Vulernable; Westrich *et al.* 2011), Great Britain (Regionally Extinct; Shirt 1987), and Switzerland (Vulnerable; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species ; the species is legally protected (LCN 1973, Annexe IIb). Future: anything likely to benefit its hosts ; promotion of extensive agricultural (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer) and grazing practices ; promotion of late mowing practices, hay production instead of silage ; establish a legal protection status for the areas where the species still occurs ; preserve open areas on heaps where the species occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources and habitats ; monitoring of the population size and trend at the national scale.

Coelioxys alata **Förster, 1853**

Common Name(s): French – *Célioxe ailé* ; Dutch - *Kielstaartkegelbij* ; German - *Geflügelte Kegelbiene*.

Figure 275. *Coelioxys alata*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp. Taxonomic Notes: *Coelioxys alata* belongs to the subgenus *Boreocoelioxys* Mitchell, 1973, which is mainly holarctic (Michener 2007).

Assessment Information. Red List Category & Criteria: VU (B1ab(iii) + 2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the quality of habitats ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: amphipalearctic species, EOO and AOO not evaluated at the continental scale ; National scale: Meuse and Scheldt valley, EOO = 1,800 km², AOO = 17 km².

Population. Continental scale: rare and infrequent species that inhabits a wide area, no further information available for the population size and trend (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as significantly decreasing, Pauly (pers. comm. 2018) assessed the species as very rare and localized, restricted to specific habitats ; Current population trend : stable.

Habitat and Ecology. Flying period: from July to August ; Habitat: in Belgium the species occurs in wetlands, riparian forests and floodplains (A. Pauly pers. comm., Devalez 2010) ; Hosts: the most probable hosts are *Megachile lapponica* and *M. ligniseca, Anthophora furcata* (Westrich 1989, Scheuchl 2006, Devalez 2010).

Threats. Reduction / alteration of suitable habitats: destruction of habitats by drainage due to the agricultural, forestry or urbanization intensification ; intensive grazing practices in wet grasslands ; agricultural intensification causes uses of chemicals (such as fertilisers and pesticides) in the wetland's catchment.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Critically Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2011) and the Netherlands (Regionally Extinct; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the species ; the species is legally protected (LCN 1973, Annexe IIb). Future: promotion of extensive grazing practices on wetlands ; promotion of the conservation of wetlands ; promotion of extensive agricultural practices on wetland's catchment (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers).

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on habitats ; monitoring of the population size and trend at the national scale ; specify the life history and ecology of the species, especially the confirmation of hosts.

***Coelioxys aurolimbata* Förster, 1853**

Common Name(s): French – *Célioxe à frange dorée* ; Dutch - *Gouden Kegelbij* ; German - *Goldsaum Kegelbiene*.

Figure 276. *Coelioxys aurolimbata*. A, female specimen; B, male specimen (Photos : A. Pauly); C, Foraging on Asteraceae(Gembloux, Photo: Y. Barbier).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: widely distributed throughout Europe, EOO and AOO not evaluated at the continental scale ; National scale: wide but scattered distribution throughout Belgium, EOO = 6,800 km², AOO = 47 km².

Population. Continental scale: population is large and continuous throughout its geographic range, the population trend is stable (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the species as common within its host range and expected to increase due to the recent increase of its host ; Current population trend: stable.

Habitat and Ecology. Flying period: from early June to mid-August ; Habitat: various open habitats including well-flowered gardens with insect hotels (Ortiz Sánchez 2014) ; Hosts: the main host is *Megachile ericetorum* (A. Pauly pers. comm).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Finland (Critically Endangered; Rassi *et al.* 2010), Germany (Vulnerable; Westrich *et al.* 2011), and the Netherlands (Critically Endangered; Peeters and Reemer 2003). Future: no future conservation actions are required at the national scale. The promotion of indigenous well-flowered gardens with insect hotels could benefit to both hosts and parasites.

Coelioxys conoidea **(Illiger, 1806)**

Common Name(s): English - Large Sharp-tail Bee ; French – *Célioxe conique* ; Dutch - *Grote Kegelbij* ; German - *Sandrasen Kegelbiene*.

Figure 277. *Coelioxys conoidea*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1(i,ii,iii,iv,v)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²) and continuing decline in the AOO, EOO, quality of habitats, number of observations and number of mature individuals ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: found throughout Europe, EOO and AOO not evaluated at the continental scale ; National scale: last observation in 2017 in Westhoek, the host can still be found in coastal habitats, EOO = 200 km², AOO = 2 km².

Population. Continental scale: the overall population of this species is presumed to be large, taking into account its wide distribution, no further information on the size and trend (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the species as declining in terms of population and distribution ; Current population trend : decrease.

Habitat and Ecology. Flying period: from early June to early September ; Habitat: in Belgium the species is restricted to costal habitats such as coastal sand dunes (A. Pauly pers. comm.), in whole Europe it seems ubiquitous, it occurs in in several different environments such as boreal and temperate forests, boreal, temperate and Mediterranean shrubland, coastal sand dunes, arable land, plantations and semi-deserts (Ortiz Sánchez 2014) ; Hosts: the only confirmed host for Belgium is *Megachile maritima* (A. Pauly pers. comm.), in whole Europe the hosts are *Megachile lagopoda, M. maritima, M. (Chalicodoma) ericetorum, Anthophora plagiata* (Warncke 1992, Proshchalykin 2006, C. Praz pers. comm. 2014).

Threats. Decline of hosts: most hosts are threatened at the national scale (*Megachile maritima* (CR), *M. lagopoda* (CR), *Anthophora plagiata* (RE)) ; Reduction of suitable habitats: coastal habitats are threatened by urbanization and development of tourism infrastructures.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al*. 2005), Finland (Critically Endangered; Rassi *et al.* 2010), Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Critically Endangered; Peeters and Reemer 2003), Sweden (Critically Endangered; Gardenfors 2010) and Switzerland (Vulnerable; Amiet 1994) ; the species is legally protected (LCN 1973, Annexe IIb). Future: anything likely to benefit its hosts ; establish a legal protection status for the areas where the species still occurs ; promotion of the conservation of coastal habitats.

Research Needed. Monitoring of the population size and trend at the national scale.

Coelioxys elongata **Lepeletier, 1841**

Common Name(s): English - Dull-vented Sharp-tail Bee ; French – *Célioxe allongé* ; Dutch - *Slanke Kegelbij* ; German - *Langschwanz-Kegelbiene*.

Figure 278. *Coelioxys elongata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: VU (A2bc; B1ab(iii) + 2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the quality of habitats ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: from the Iberian Peninsula east towards Poland, Ukraine, and Greece and as far north as Scandinavia, outside of Europe it is found in Turkey and Iran, EOO and AOO not evaluated at the continental scale ; National scale: wide but scattered distribution, EOO = 1,200 km², AOO = 13 km².

Population. Continental scale: not commonly found in the field, no further information on the size and trend (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable ; Current population trend : decrease.

Habitat and Ecology. Flying period: from late May to late August ; Habitat: in whole Europe it occurs mainly on sandy soils and coastal dunes (Burn 2012), it is also found on temperate forest, grassland, and shrubland, arable land and pasture land (Ortiz Sánchez 2014) ; Hosts: *Megachile centuncularis, M. circumcincta, M. leachella, M. ligniseca, M. pyrenaea* and *M. willughbiella* (Warncke 1992, Amiet *et al.* 2004, Proshchalykin 2006).

Threats. The threats to this species are not known but may come from the decline of some hosts (*M. circumcincta* (EN), *M. leachella* (VU)) and a decrease of the habitats caused the anthropogenic activities in coastal habitats (urbanization, development of tourism infrastructures).

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Finland (Endangered; Rassi *et al.* 2010), Ireland (Endangered; Fitzpatrick 2006), and the Netherlands (Endangered; Peeters and Reemer 2003). Future: anything likely to benefit its hosts ; promotion of the conservation of coastal habitats.

Research Needed. Monitoring of the population size and trend at the national scale.

Coelioxys emarginata Förster, 1853

Common Name(s): French – *Célioxe bordé* ; German - *Ausgerandete Kegelbiene*.

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: south European species, EOO and AOO not evaluated at the continental scale ; National scale: extinct from two warm localities (Torgny, Belvaux).

Population. Continental scale: presumed to have a large overall population, no further information for the population size and trend (Ortiz Sánchez 2014) ; National scale: extinct ; Current population trend : extinct.

Habitat and Ecology. Flying period: unknown ; Habitat: in whole Europe it occurs in temperate forest, grassland and shrubland, semi-desert, shrub dominated wetlands, coastal sand dunes and arable land (Ortiz Sánchez 2014) ; Hosts: *Megachile leucomalla* (Stoeckhert 1933).

Threats. The threats to this species are not known at the national scale. Belgium is the northern edge of its distribution, it is thus likely to increase at the national scale due to global warming. The host has never been recorded at the national scale. Drought of wetlands, intensification in the uses of grasslands and forestry practices may have played a role in its extinction.

Conservation Actions. Present: the species is listed in the National Red Lists of the Czech Republic (Critically Endangered; Farkac *et al.* 2005) and Switzerland (Regionally Extinct; Amiet 1994) ; this species is legally protected (LCN 1973, Annexe IIb). Future: no specific conservation actions have to be taken at the national scale.

Research Needed. Conduct sampling expeditions in order to monitor the population evolution at the national scale ; specify the threats that are likely to affect this species at the national scale.

Coelioxys inermis **(Kirby, 1802)**

Common Name(s): English - Shiny-vented Sharp-tail Bee ; French – *Célioxe inerme* ; Dutch - *Gewone Kegelbij* ; German - *Ubewahrte Kegelbiene*.

Figure 279. *Coelioxys inermis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: west-Palearctic species, EOO and AOO not evaluated at the continental scale ; National scale: everywhere in Belgium, principally found in north of the country, EOO = 5,500 km², AOO = 58 km².

Population. Continental scale: rare at the local level, but widely distributed in Europe, no further information on the population size or trend (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as the most frequently observed *Coelioxys* specie ; Current population trend : stable.

Habitat and Ecology. Flying period: from early May to mid-September ; Habitat: in whole Europe it is considered as an ubiquitous species living in a wide variety of habitats (Ortiz Sánchez 2014) ; Hosts: in Belgium *Megachile centuncularis, M. versicolor, M. alpicola* (A. Pauly pers. comm. 2018), in whole Europe *Megachile alpicola, M. bombycina, M. centuncularis, M. leachella, M. ligniseca* (not confirmed), *M. maritima, M. versicolor, Hoplitis papaveris* (Westrich 1989, Warncke 1992, Amiet *et al*. 2004, Proshchalykin 2006, Collins 2008) and *Megachile lapponica* (C. Praz pers. comm. 2014).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Finland (Near Threatened; Rassi *et al.* 2010), Ireland (Data Deficient; Fitzpatrick *et al.* 2006), the Netherlands (Endangered; Peeters and Reemer 2003), Norway (Near Threatened; Kalas 2010) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

***Coelioxys mandibularis* Nylander, 1848**

Common Name(s): English - Square-jawed Sharp-tail Bee ; French – *Célioxe mandibulé* ; Dutch - *Duinkegelbij* ; German - *Mandibel-Kegelbiene*.

Figure 280. *Coelioxys mandibularis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: VU (A2c; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: throughout Europe, EOO and AOO not evaluated at the continental scale ; National scale: coastal habitats, scarcer in inland regions, EOO = 2,100 km², AOO = 17 km².

Population. Continental scale: the overall population is presumed to be large and the trend is considered to be stable (Ortiz Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018)

assessed the species as regressing in the inlands habitats ; Current population trend : stable.

Habitat and Ecology. Flying period: from mid-May to early September ; Habitat: in Belgium the species is becoming restricted to coastal dunes (A. Pauly pers. comm. 2018), in whole Europe it is widely ubiquitous (Ortiz Sánchez 2014) ; Hosts: in Belgian dunes it is able to parasitize *Megachile leachella* and probably *M. maritima* (A. Pauly pers. comm. 2018), in whole Europe it parasitizes *Megachile circumcincta, M. centuncularis, M. leachella, M. versicolor, M. pyrenaea, Hoplitis leucomelana, Hoplitis papaveris* and *Hoplitis villosa* (Scheuchl 1996, Banaszak and Romasenko 2001, Amiet *et al.* 2004).

Threats. The decrease of the species in the inland areas is still poorly understood. The decrease may have been caused by the intensification of agricultural practices affecting both hosts and parasite. In coastal habitats the species is likely to be threatened by the residential and commercial development.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Great Britain (Vulnerable; Shirt 1987) and the Netherlands (Vulnerable; Peeters and Reemer 2003), the species is legally protected (LCN 1973, Annexe IIb), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to the return of the species in the inland areas. Future: promotion of the conservation of coastal dunes ; restriction of the urbanization of coastal dunes ; promotion of extensive agricultural practices (*i.e.* excluding intensive use of pesticides and nitrogen fertilizer), grazing practices and mowing practices (*i.e.* late mowing, hay production instead of silage).

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on both hosts and parasite food ressources and habitats ; monitoring of the population size and trend at the national scale.

Coelioxys quadridentata (L., 1758)

Common Name(s): English - Grooved Sharp-tail Bee ; French – *Célioxe quatre dents* ; Dutch – *Heidekegelbij* ; German - *Vierzähnige Kegelbiene*.

Figure 281. *Coelioxys quadridentata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab (i,ii,iv) +2ab (i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: Euro-Anatolian species, EOO and AOO not evaluated at the continental scale ; National scale: very scarcely distributed in Fagne-Famenne and Ardenne, only one occurrence dated from after 1990, 13 occurrences dated from after 1970 in Belvaux, EOO = 800 km², AOO = 10 km².

Population. Continental scale: rare species with a wide distribution, no further information on the population size and trend (Ortiz Sánchez 2014) ; National

scale: Rasmont *et al.* (1993) assessed the species as stable ; Current population trend : decrease.

Habitat and Ecology. Flying period: in whole Europe it occurs from May to September ; Habitat: the species seems ubiquitous at the European scale (Ortiz Sánchez 2014) ; Hosts: in Belgium the species parasitizes *Anthophora furcata, Megachile circumcincta, M. willughbiella, Trachusa byssina* (A. Pauly pers. comm. 2018), in whole Europe *Trachusa byssina, Megachile centuncularis, M. circumcincta, M. leachella, M. willughbiella, Anthophora bimaculata, A. furcata, A. parietina, A. plagiata* and probably *A. quadrimaculata* (Warncke 1992, Amiet *et al.* 2004, Proshchalykin 2006, Baldock 2008).

Threats. Decline of hosts: *Megachile circumcincta* (EN). Further research is needed into the habitat of the species at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011), Great Britain (Vulnerable; Shirt 1987), and the Netherlands (Critically Endangered; Peeters and Reemer 2003) ; the species is legally protected (LCN 1973, Annexe IIb). Future: anything likely to benefit its hosts.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and life history ; specify the threats occurring to this species.

Coelioxys rufescens **Lepeletier & Audinet-Serville, 1825**

Common Name(s): English - Rufescent Sharp-tail Bee ; French – *Célioxe roussi* ; Dutch - *Rosse Kegelbij*; German - *Rötliche Kegelbiene*.

Figure 282. *Coelioxys rufescens*. A, female specimen; B, male specimen (Photos: A. Pauly); C, Foraging on *Borrago officinalis* (Héron, Photo: P. Moniotte).

Taxonomic Source(s). Pauly A. 2015. Clé pour identifier les espèces du genre *Coelioxys* Latreille 1809 de Belgique. Document de travail du projet BELBEES (unpublished document). Rocha-Filho L.C. & Packer L. 2016. Phylogeny of the cleptoparasitic Megachilini genera *Coelioxys* and *Radoszkowskiana*, with the description of six new subgenera in *Coelioxys* (Hymenoptera: Megachilidae). Zoological Journal of the Linnean Society, 2016, 60pp.

Assessment Information. Red List Category & Criteria: NT (A2bc; B1ab(i,ii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as

Near Threatened due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of population (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 20% and 30% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (3,000 km² < EOO < 5,000 km²), severely fragmented EOO and continuing decline in the AOO and EOO ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez 2014.

Geographic Range. Continental scale: Palearctic species, EOO and AOO not evaluated at the continental scale ; National scale: mostly in Flanders, EOO = 2,800 km², AOO = 28 km².

Population. Continental scale: rare throughout its range (Ortiz Sánchez 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed that numerous populations have disappeared from Wallonia, that might be due to the lack of population monitoring. In Flanders the species is frequently observed in gardens. Current population trend : decrease.

Habitat and Ecology. Flying period: from mid-May to late August ; Habitat: in Belgium the species is frequently observed in gardens (incl. those located in cities) (A. Pauly pers. comm. 2018), in whole Europe it seems to be ubiquitous (Ortiz Sánchez 2014) ; Hosts: *Anthophora plagiata, A. bimaculata, A. borealis, A. furcata, A. quadrimaculata* (A. Pauly pers. comm. 2018).

Threats. Decline of hosts: *Anthophora plagiata* (RE), *A. bimaculata* (CR), *A. borealis* (RE).

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Endangered; Peeters and Reemer 2003), Norway (Vulnerable; Kålås *et al.* 2010), and Switzerland (Vulnerable; Amiet 1994). Future: anything likely to benefit its hosts.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and life history ; specify the threats occurring to this species.

Genus *Heriades* Spinola, 1808

Heriades truncorum (L., 1758)

Common Name(s): English - Large-headed Resin Bee ; French – *Hériade des troncs* ; Dutch – *Tronkenbij*; German - *Gewöhnliche Löcherbiene*.

Figure 283. *Heriades truncorum*. Specimen foraging on *Pulicaria dysenterica* (Photo: A. Pauly).

Diagnosis. Tergite 1 interrupted by a strong carina. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: very widespread throughout Europe, EOO and AOO not evaluated ; National scale: everywhere in Belgium, EOO = 24,800 km², AOO = 701 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Ornosa & Sánchez 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as highly significantly increasing, Pauly (pers. comm.) assessed the species as one of the most common Megachilid bees, very abundant on insect hotels ; Current population trend : increase.

Habitat and Ecology. Flying period: from late May to early September ; Habitat: ubiquitous but can easily be found in open areas containing dead wood and abundant supply of yellow Asteraceae (Else & Edwards 2018) ; Visited flowers:

oligolectic on Asteraceae Cichorioideae and Carduoideae (A. Pauly pers. comm. 2015, Westrich 1989) ; Nesting habits: hollow stems, old beetle nests in dead wood, any other pre-existing cavities in dead wood (Grandi 1934, Maciel de A. Correia 1976, 1980, 1981a, 1981b, A. Pauly pers. comm. 2015) ; Parasites: *Stelis breviuscula, Sapygina decemguttata, Chrysis ignita, C. angustula, Melittobia sp., Anthrax sp., Trichodes sp.* (Brechtel 1986, Correia 1976, Grandi 1934, Le Goff 2003, Maciel de A. Correia 1976, 1980, 1981a, 1981b, Westrich 1983).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Great Britain as Vulnerable (Shirt 1987). Future: no future conservation actions have to be taken at the national scale.

Genus *Hoplitis* Klug, 1807

Hoplitis adunca (Panzer, 1798)

Common Name(s): French – *Osmie épineuse de la Vipérine* ; Dutch – *Slangenkruidbij* ; German - *Gewöhnliche Natternkopfbiene*.

Figure 284. *Hoplitis adunca*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: largely distributed across Europe, except in Great Britain and northern Europe, EOO and AOO not evaluated at the continental scale ; National scale: mostly in Fagne-Famenne, EOO = 8,700 km², AOO = 107 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the species as more abundant in Wallonia. Current population trend : stable.

Habitat and Ecology. Flying period: from late May to late August ; Habitat: in Belgium the species is frequently observed in sandy areas or along railways (A. Pauly pers. comm. 2018), in whole Europe it occurs in temperate grasslands, forests and forest borders (Lhomme 2014) ; Visited flowers: oligolectic on the genus *Echium* (A. Pauly pers. comm. 2018, Westrich 1989, Gogala 1999, Banaszak and Romasenko 2001, Amiet *et al*. 2004, Sedivy *et al*. 2013) ; Nesting habits: nests in pre-existing cavities such as stems, wood, clay, chalk, between stones, empty snail shell (A. Pauly pers. comm. 2018) ; Parasites: in the Netherland *Stelis punctulatissima* (Bouwman 1922), *Chrysis ignita*, *Chrysura austriaca* (Van der Zanden 1982), *Leucopsis dorsigera* (Peeters & Kuper 2006).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of the Netherlands (Endangered; Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Hoplitis anthocopoides **(Schenck, 1853)**

Common Name(s): French – *Osmie matte de la Vipérine* ; Dutch – *Zwaluwbij*.

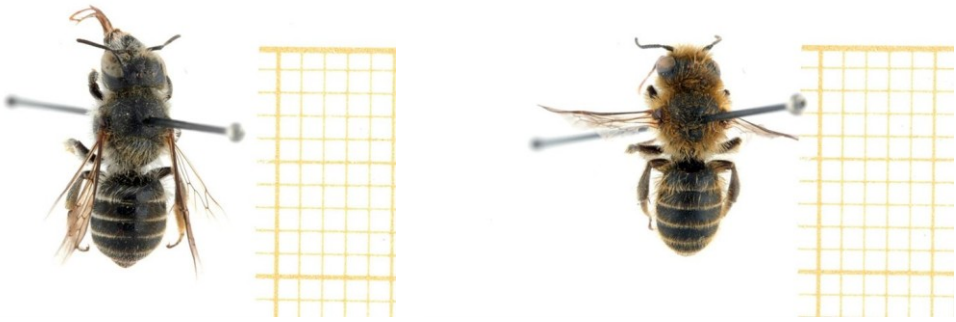

Figure 285. *Hoplitis anthocopoides*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: largely distributed across Europe, except in Great Britain and northern Europe, EOO and AOO not evaluated at the continental scale ; National scale: Middle Belgium, EOO = 400 km², AOO = 4 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the species as drastically declining. Current population trend : decrease.

Habitat and Ecology. Flying period: from May to July ; Habitat: in whole Europe it occurs in temperate grasslands, forests and forest borders (Lhomme 2014) ;

Visited flowers: oligolectic on the genus *Echium* (A. Pauly pers. comm. 2018, Eickwort 1973, Westrich 1989, Gogala 1999, Banaszak and Romasenko 2001, Amiet *et al.* 2004, Sedivy *et al.* 2013a) ; Nesting habits: nests are built with clay in rock or wall cracks (A. Pauly pers. comm. 2018) ; Parasites: *Stelis phaeoptera, Dioxys tridentata* (Rasmont *et al.* 1993), *Chrysis ignita, C. ruddii* and *Chrysura austriaca* (Amiet *et al.* 2004, Banaszak & Romasenko 2001, Bischoff 1927).

Threats. The threats to this species are not known. However, the species may suffer from a decrease of nesting sites due to the restauration or destruction of old walls. Intensification in the uses of grasslands and forestry practices may also have played a role in the decline of the species. Further research is needed into the habitats of the species at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011) and Switzerland (Vulnerable; Amiet 1994), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of the conservation of old walls (especially old farm walls located near meadows of high interest) ; establish a legal protection status of the areas where the species still occurs ; establish a legal protection status for this species.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and life history of the species ; specify the threats occurring to this species.

Hoplitis claviventris **(Thomson, 1872)**

Common Name(s): English - Welted Mason Bee ; French – *Osmie à épines jaunes* ; Dutch - *Geelgespoorde Houtmetselbij* ; German - *Gelbspornige Stängelbiene*.

Figure 286. *Hoplitis claviventris*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: VU (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widespread all across Europe, EOO and AOO not evaluated at the continental scale ; National scale: rare but widespread species, EOO = 6,900 km², AOO = 70 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as rare. Current population trend : decrease.

Habitat and Ecology. Flying period: from mid-May to mid-August ; Habitat: in Belgium it is found on calcareous grasslands (A. Pauly pers. comm. 2018), in whole Europe it occurs in temperate grasslands, forests and forest borders (Lhomme 2014) ; Visited flowers: polylectic species with a preference for *Trifolium spp., Lotus corniculatus, Hippocrepis comosa* (A. Pauly pers. comm. 2018) ; Nesting habits: nests in stems of brambles and thistles (A. Pauly pers. comm. 2018) ; Parasites: *Stelis minuta, S. ornatula* (Le Goff 2001, Westrich 1989).

Threats. Reduction of suitable habitats: intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of nutrient-poor grasslands

due to the agricultural intensification ; destruction of grasslands in agricultural, forestry or urbanization purposes.

Conservation Actions. Present: the species is not listed in any National Red Lists or Red Data Books ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands, especially nutrient-poor grasslands.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; Monitoring of the population size and trend at the national scale.

Hoplitis leucomelana **(Kirby, 1802)**

Common Name(s): English - Kirby's Mason Bee ; French – *Osmie à épines noires* ; Dutch – *Zwartgespoorde Houtmetselbij* ; German - *Schwarzspornige Stängelbiene*.

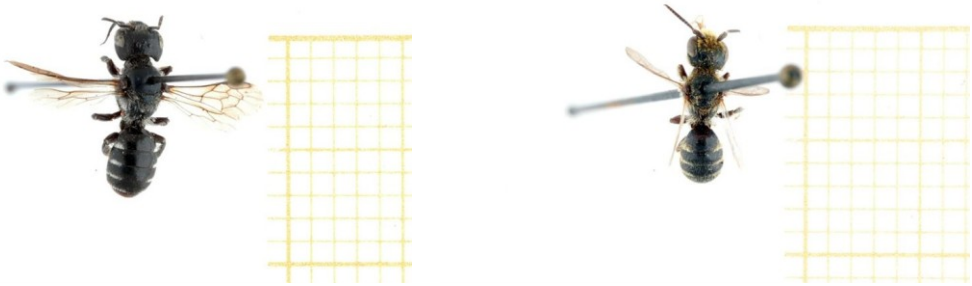

Figure 287. *Hoplitis leucomelana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widespread across Europe, EOO and AOO not evaluated at the continental scale ; National scale: widespread species, EOO = 4,300 km², AOO = 44 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from May to August ; Habitat: in Belgium it is found on flower-rich meadows and verges (A. Pauly pers. comm. 2018) ; Visited flowers: polylectic species with a preference for *Lotus corniculatus* (A. Pauly pers. comm. 2018) ; Records on cultivated plants: *Medicago sp., Trifolium sp., Thymus sp., Salvia sp.*) ; Nesting habits: nests in dry stems of atemisia, brambles, roses and reeds (A. Pauly pers. comm. 2018) ; Parasites: *Stelis ornatulata, S. breviuscula, S. minuta, Coelioxys mandibularis, Sapyga quinquepunctata* (Banaszak & Romasenko 2001, Benno 1957, Westrich 1989, van der Zanden 1982).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Norway (Vulnerable; Kålås *et al.* 2010) and Great Britain (Regionally Extinct; Shirt 1987). Future: no future conservation actions have to be taken at the national scale. However, more conformation to the "bord de route" convention and development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species.

Hoplitis mitis **(Nylander, 1852)**

Common Name(s): French – *Osmie brune des campanules* ; German - *Glockenblumen-Felsenbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Not Evaluated due to a lack of data to judge the status of the species ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widely distributed across Europe, EOO and AOO not evaluated at the continental scale ; National scale: extremely rare species, EOO and AOO not evaluated at the national scale.

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : not evaluated.

Habitat and Ecology. Flying period: June to August ; Habitat: in whole Europe it occurs in temperate grasslands, forests and forest borders (Lhomme 2014) ; Visited flowers: oligolectic on Campanulaceae flowers (A. Pauly pers. comm. 2018, Westrich 1989, Amiet *et al.* 2004) ; Nesting habits: nests below stones, in rock crevices, in grass tussocks, between dried leaves or in old cells of other bees (Lhomme 2014) ; Parasites: unknown.

Threats. The threats to this species are not known at the national scale.

Conservation Actions. Present: listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al*. 2011) and Sweden (Near Threatened; Gärdenfors 2010). Future: no future conservation actions can be taken at the national scale.

Hoplitis papaveris **(Latreille, 1799)**

Common Name(s): English - Welted Mason Bee ; French – *Osmie du Coquelicot* ; Dutch – *Papaverbij* ; German – *Mohnbiene*.

Figure 288. *Hoplitis papaveris*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widespread in Europe except in Great Britain and in Scandinavia, EOO and AOO not evaluated at the continental scale; National scale: extinct, last occurrence in Meer (1978), EOO = 0 km², AOO = 0 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing. Current population trend : extinct.

Habitat and Ecology. Flying period: late May to early July ; Habitat: in whole Europe it is likely to occur in temperate grasslands (Lhomme 2014) ; Visited flowers: polylectic species with a preference for *Centaurea cyanus* (A. Pauly pers. comm. 2018, Weber 2007), pollen records on Asteraceae, Campanulaceae, Caryophyllaceae, Cistaceae, Convolvulaceae, *Papaver* (Papaveraceae), *Echium* (Boraginaceae) and *Melilotus* (Fabaceae) (Benoist 1931, Pashina 1948, Westrich 1989, Banaszak and Romasenko 2001, Amiet *et al.* 2004), in Germany the species is known to forage on *Centaurea cyanus, Echium vulgare, Knautia arvensis, Papaver Rhoeas, Centaurea jacea, Centaurea scabiosa, Cichorium intybus, Picris hieracioides, Hieracium pilosella, Campanula rotundifolia, Helianthemum nummularium, Convolvulus arvensis* (Weber 2007) ; Nesting habits: nests in the loess or sandy soils, line its nests with petals of *Papaver rhoeas* (Günter 1997) ; Parasites: *Coelioxys inermis, C. elongata, C.*

mandibularis and *Stelis phaeoptera* (Banaszak & Romasenko 2001, van der Zanden 1982).

Threats. Reduction of nesting ressources: drastic decrease in the abundancy of *Papaver rhoeas* ; Reduction of suitable habitats / food ressources: agricultural intensification (intensive uses of herbicides, reduction of the size of crop borders), intensification in the uses of grasslands (intensive grazing practices, silage).

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2011), the Netherlands (Regionally Extinct; Peeters and Reemer 2003), and Switzerland (Regionally Extinct; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species ; more conformation to the "bord de route" convention could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat, food and nesting ressources; Monitoring of the population size and trend at the national scale.

Hoplitis ravouxi **(Pérez, 1902)**

Common Name(s): French – *Osmie maçonne* ; Dutch - *Klavermetselbij* ; German - *Französische Felsenbiene*.

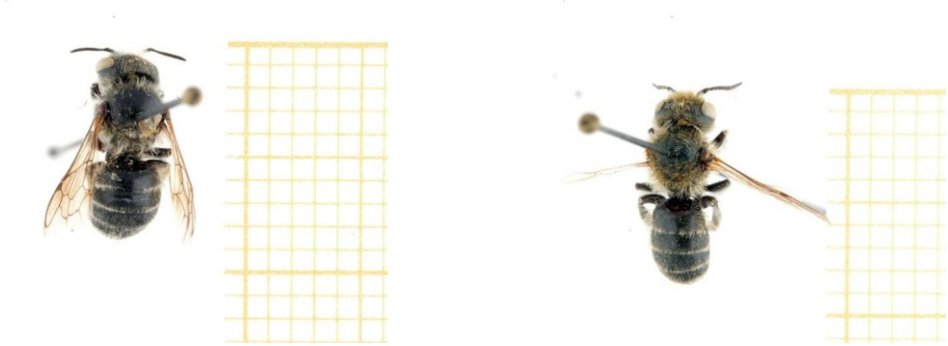

Figure 289. *Hoplitis ravouxi*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: CR (A2c; B1ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), severely fragmented EOO and continuing decline in the AOO, EOO and number of locations or subpopulations) ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: largely distributed across Europe, EOO and AOO not evaluated at the continental scale ; National scale: southern Sambre-Meuse line, last occurrence in 1991, EOO = 900 km², AOO = 18 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as declining. Current population trend : decrease.

Habitat and Ecology. Flying period: from May to July ; Habitat: in Belgium it occurs exclusively on xerothermic habitats (A. Pauly pers. comm. 2015), in whole Europe it occurs in temperate grasslands and in Mediterranean-type shrublands (Lhomme 2014) ; Visited flowers: oligolectic on Fabaceae, showing a strong preference for *Lotus corniculatus* (A. Pauly pers. comm. 2015) ; Nesting habits: nests are built with clay in rock or wall cracks (A. Pauly pers. comm. 2015) ;

Parasites: *Dioxys tridentata,* (Amiet *et al.* 2004, Westrich 1989), *Chrysis ruddii, Chrysura hybrida* (van der Zanden 1982), *Coelioxys mandibularis* (Petit 1970, Westrich (1989) queried this observation).

Threats. The reduction of potential nesting sites (restauration of old walls) combined with the scarcity of xerothermic habitats at the national scale may have played a role in the decline of this species. Belgium is the northern edge of its distribution.

Conservation Actions. Present: the species is listed in the National Red List of Germany (Endangered; Westrich *et al.*2011), development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: : promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of the conservation of old walls (especially old farm walls located near meadows of high interest) ; establish a legal protection status of the areas where the species still occurs ; establish a legal protection status for this species.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; monitoring of the population size and trend at the national scale.

Hoplitis tridentata (Dufour & Perris, 1840)

Common Name(s): French – *Osmie à trois dents* ; Dutch – *Driedoornige Metselbij* ; German - *Dreizahn-Stängelbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: largely distributed across Europe, except in Great Britain and northern Europe, EOO and AOO not evaluated at the continental scale ; National scale: wide and scattered distribution in Belgium, first observation in 1993, EOO = 1,500 km², AOO = 17 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Pauly (pers. comm. 2018) assessed the species as expanding. Current population trend : not evaluated (new species for Belgium).

Habitat and Ecology. Flying period: from June to August ; Habitat: occurs in xerothermic habitats (A. Pauly pers. comm. 2015) ; Visited flowers: oligolectic on Fabaceae species (A. Pauly pers. comm. 2015, Westrich 1989, Banaszak and Romasenko 2001, Amiet *et al*. 2004) ; Nesting habits: nests are built in dry stems (A. Pauly pers. comm. 2015) ; Parasites: *Stelis ornatula, S. minuta, S. minima, Sapyga quinquepunctata, Chrysis fasciata, Aritranis signatorius, A. confecor, Miltogramma murinum, Digomochaeta setipennis* (Banaszak & Romasenko 2001).

Threats. The potential threats to this species are not known at the national.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al*. 2011) and Switzerland as (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale (expanding species).

Research Needed. Specify the ecology and life history of the species at the national scale ; monitoring of the population size and trend at the national scale; specify potential threats that could occur to this species or its habitat.

Hoplitis villosa **(Schenck, 1853)**

Common Name(s): French – *Osmie velue* ; Dutch - *Rotsmetselbij* ; German - *Zottige Felsenbiene*.

Figure 290. *Hoplitis villosa*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES. Ungricht S., Müller A. & Dorn S. 2008. A taxonomic catalogue of the Palaearctic bees of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). Zootaxa 1865: 1-253.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widely distributed across Europe except in Great Britain, EOO and AOO not evaluated at the continental scale ; National scale: extinct, formerly widely distributed on middle and high Belgium, the three last records in Gembloux and Han sur Lesse in 1972 and 1974, EOO = 0 km², AOO = 0 km².

Population. Continental scale: presumed to have a large population, no further information on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the species as drastically declining and probably extinct. Current population trend : extinct.

Habitat and Ecology. Flying period: from May to July ; Habitat: the species habitat is linked to its nesting behaviour, it can thus be found on rock walls, rocky slopes, stone quarry, railway verges and areas with old walls (Petit 1977, Westrich 1989) ; Visited flowers: oligolectic on Asteraceae with a preference for Cichorioideae (A. Pauly pers. comm. 2015, Westrich 1989, Banaszak and Romasenko 2001, Amiet *et al.* 2004) ; Nesting habits: nests are built in rock and wall cracks or under bark with mud and petals of *Geranium spp.* (Friese 1923, Benoist 1931, Stoeckhert 1933, Petit 1970, Westrich 1989, Müller *et al.* 1997, Banaszak and Romasenko 2001) ; Parasites: *Coelioxys mandibularis, Pseudospinolia neglecta, Chrysura hirsuta, C. hybrida* (Westrich 1989, Amiet *et al.* 2004, Banaszak and Romasenko 2001).

Threats. The threats to this species are not known.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Critically Endangered; Farkac *et al.* 2005) and Germany (Endangered; Westrich *et al.* 2011) Future: no future conservation actions can be taken.

Research Needed. Determine the causes of extinction at the national scale.

Genus *Megachile* Latreille, 1802

Megachile alpicola Alfken, 1924

Common Name(s): French – *Mégachile alpine* ; Dutch - *Bergbehangersbij* ; German - *Kleine Blattschneiderbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: VU (A2c; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of locations or subpopulations ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: found across Europe, EOO and AOO not evaluated at the continental scale ; National scale: mostly found in Middle Belgium, EOO = 2,700 km², AOO = 22 km².

Population. Continental scale: no information available for the population size and trend of this species. National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as progressively declining. Current population trend : decrease.

Habitat and Ecology. Flying period: from mid-May to mid-September ; Habitat: woodlands and clearings, can be observed in urban areas (Brechtel 1986, Dorn 1988, Westrich 1989) ; Visited flowers: polylectic species (Westrich 1989, Amiet *et al.* 2004) ; Nesting habits: nests in existing burrows or cavities in dead wood (Peeters *et al.* 1999) ; Parasites: *Coelioxys inermis* (Westrich 1989).

Threats. Reduction of suitable habitats and nesting sites: intensification of forestry practices (*i.e.* clear cutting, evacuation of dead wood).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Norway (Near Threatened; Kålås *et al*. 2010). Future: promotion of extensive forestry practices (*i.e.* including dead trees and clearings).

Research Needed. Specify the ecology and life history of the species at the national scale ; monitoring of the population size and trend at the national scale ; determine potential other threats to this species.

Megachile analis **Nylander, 1852**

Common Name(s): French – *Mégachile des bouleaux* ; Dutch – *Ericabij* ; German - *Birken-Blattschneiderbiene*.

Figure 291. *Megachile analis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the EOO ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: Palearctic species, from Spain to Mongolia, possibly also in Siberia, EOO and AOO not evaluated at the continental scale ; National scale: found north of Antwerpen and probably in the Belgian Limburg, EOO = 400 km², AOO = 4 km².

Population. Continental scale: no information available for the population size and trend of this species. National scale: Rasmont *et al.* (1993) assessed the species as significantly decreasing, Pauly (pers. comm. 2018) assessed the population as very fragmented. Current population trend : decrease.

Habitat and Ecology. Flying period: from late May to early September ; Habitat: in Belgium the species inhabits wet heaths with *Erica tetralix* (A. Pauly pers.

comm. 2018), in northern Europe the species is known to inhabit heathlands and sandy coastal areas (Westrich 1989), in central and southern Europe the species is known to inhabit alpine grasslands and forest clearings (Dewulf & Praz 2014) ; Visited flowers: polylectic, shows a preference for Fabaceae, Campanulaceae and Ericaceae (*Erica tetralix*) (Westrich 1989, Amiet *et al.* 2004, Peeters *et al.* 1999, Müller *et al.* 1997 ; Nesting habits: nests in sandy soils or under rocks (Amiet *et al.* 2004) ; Parasites: not known for Belgium.

Threats. Reduction of suitable habitats and food resources: destruction / drainage of wetlands in forestry, agricultural or urbanization purposes ; intensive grazing practices on wetlands.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Czech Republic (Endangered; Farkac *et al.* 2005) and Germany (Endangered; Westrich *et al*. 2011) ; this species occurs in protected areas. Future: promotion of the conservation of wet heaths ; establish a legal protection status for this species.

Research Needed. Specify the habitat of the species at the national scale ; monitoring of the population size and trend at the national scale.

Megachile centuncularis **(L., 1758)**

Common Name(s): English - Patchwork Leafcutter Bee ; French – *Mégachile coupe-rose* ; Dutch – *Tuinbladsnijder* ; German - *Rosen-Blattschneiderbiene*.

Figure 292. *Megachile centuncularis*. A, female specimen; B, male specimen; C, foraging on *Scabiosa columbaria* (Gembloux, Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: distributed in the east Palearctic and Nearctic regions, and through north Africa ; National scale: everywhere in Belgium, EOO = 23,900 km², AOO = 366 km².

Population. Continental scale: presumed to have a large overall population, no further information available for the population size and trend of this species. National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as one of the most common species in Belgium. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-May to mid-September ; Habitat: in Belgium the species is ubiquitous and known to occur in insect hotels in private and public gardens (A. Pauly pers. comm. 2018), in whole Europe the species is known to inhabit forest edges, forest clearings, open areas and fallow lands (Dewulf & Praz 2014) ; Visited flowers: polylectic species (Peeters *et al.* 1999, Westrich 1989, Amiet *et al.* 2004); Nesting habits: nests in existing cavities or in hollow stems (Holm & Skou 1972) ; Parasites: in the Palearctic regions the species is parasitized by *Sapyga quiquepunctata, Coelioxys elongata, C. inermis, C. rufescens, C. mandibularis*, *Melittobia acasta, Melittobia chalybii, Monodontomerus laticornis, Monodontomerus montivagus* (Banaszak & Romasenko 1998, Doroshina 1989, Zerova & Stolbov 1986 Holm & Skou 1972, Richards 1950).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Finland (Critically Endangered; Rassi *et al.* 2010), Germany (Near Threatened; Westrich *et al.* 2011), Ireland (Near Threatened; Fitzpatrick *et al*. 2006) and Netherlands (Vulnerable; Peeter and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Megachile circumcincta **(Kirby, 1802)**

Common Name(s): English - Black-headed Leafcutter Bee ; French – *Mégachile de la Vesce* ; Dutch – *Ruige Behangersbij* ; German - *Gebänderte Blattschneiderbiene*.

Figure 293. *Megachile circumcincta*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: EN (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: present throughout the Holarctic, from western Canada through subarctic areas, it is widely distributed in Europe ; National scale: formerly found almost everywhere in Belgium, last records on calcareous grasslands in Wallonia, EOO = 2,000 km², AOO = 22 km².

Population. Continental scale: considered to have an overall large population, no further information on the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the population as highly decreasing. Current population trend : decrease.

Habitat and Ecology. Flying period: from late May to late August ; Habitat: in Belgium the species inhabits calcareous grasslands and large heathland areas (A. Pauly pers. comm. 2018), in whole Europe the species is known to inhabit coastal dunes and inland heaths (Erlandsson 1955) ; Visited flowers: polylectic species showing a preference for Campanulaceae, Lamiaceae, Boraginaceae and Fabaceae ; Nesting habits: nests in existing cavities or excavates burrows in the

soil and in wood (Erlandsson 1955) ; Parasites: *Coelioxys conica, C. mandibularis* and probably *C. elongata* and *C. rufescens* (Edwards and Roy 2009).

Threats. Reduction of suitable habitats: intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of nutrient-poor grasslands due to the agricultural intensification ; destruction of grasslands and heathlands in agricultural, forestry or urbanization purposes ; urbanization and development of tourism infrastructures in coastal areas.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Finland (Near Threatened; Rassi *et al.* 2010), Germany (Near Threatened; Westrich *et al.* 2011), Ireland (Data Deficient; Fitzpatrick *et al*. 2006) and Netherlands (Endangered; Peeters and Reemer 2003) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands and heathlands ; establish a legal protection status for the areas where the species still occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; Monitoring of the population size and trend at the national scale.

Megachile ericetorum **Lepeletier, 1841**

Common Name(s): English - Banded Mud Bee ; French – *Mégachile de la Gesse* ; Dutch – *Lathyrusbij* ; German - *Platterbsen-Mörtelbiene*.

Figure 294. *Megachile ericetorum*. A, female specimen; B, male specimen (Photos: A. Pauly); C, Foraging on *Salvia sp.* (Gembloux, Photos: Y. Barbier).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: western Palearctic species, EOO and AOO not evaluated at the continental scale ; National scale: everywhere in Belgium, EOO = 21,400 km², AOO = 372 km².

Population. Continental scale: it presumably has an overall large population, no information on the population trend (Dewulf & Praz 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : decrease.

Habitat and Ecology. Flying period: from June to late August ; Habitat: in Belgium the species inhabits gardens and meadows (A. Pauly pers. comm. 2018), in whole Europe the species occurs in habitats with suitable host plants (Dewulf & Praz 2014) ; Visited flowers: Fabaceae with large flowers (Dewulf & Praz 2014); Nesting habits: nests in pre-existing cavities (Westrich 1989, Peeters *et al.* 1999, Amiet *et al.* 2004) ; Parasites: *Coelioxys aurolimbata* (C. Praz pers. comm. 2014).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Finland (Critically Endangered; Rassi *et al.* 2010), Great Britain (Regionally Extinct; Shirt 1987) and the Netherlands (Vulnerable; Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Megachile genalis Morawitz, 1880

Common Name(s): French – *Mégachile des composées*; Dutch – *Dikbekbehangersbij* ; German - *Stängel-Blattschneiderbiene*.

Figure 295. *Megachile genalis*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the EOO ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dewulf *et al.* 2014.

Geographic Range. Continental scale: very localized west Palearctic species, EOO and AOO not evaluated at the continental scale ; National scale: last observation in Scheldt valley (2017), EOO = 200 km², AOO = 2 km².

Population. Continental scale: very rare and localized species, no further information on the population trend (Dewulf *et al.* 2014). National scale: Pauly (pers. comm. 2018) assessed the population as very rare and localized. Current population trend : decrease.

Habitat and Ecology. Flying period: from June to August ; Habitat: dry grasslands (Dorn & Weber 1988), in woodland on the verges of rivers and in ruderal areas (Schweitzer 2002, Westrich 1989) ; Visited flowers: probably oligolectic on Asteraceae, especially Cardueae, (Ruhnke 1998, Celary &

Wisniowski 2002) ; Nesting habits: usually nests in onion flower stems (Dudich 1884, Tarbinskiy 1962, Marikovskaya 1972, Kadamshoyev and Edgorshoyev 1981) some nests have also been found in stems of *Cirsium palustre, Echinops sphaerocephalus* and *Allium cepa* (Ruhnke 1998, 2000) ; Parasites: possibly *Coelioxys inermis, C. mandibularis* (Ruhnke 1998).

Threats. Reduction of suitable habitats: intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of nutrient-poor grasslands due to the agricultural intensification ; destruction of grasslands and in agricultural, forestry or urbanization purposes ; diminution of flower-diversified ruderal landscapes due to agricultural intensification (intensive uses of herbicides and nitrogen fertilizers, homogenization of landscape and cultures).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Czech Republic (Regionally Extinct; Farkac *et al.* 2005), Germany (Endangered; Westrich *et al.* 2011) and Switzerland (Regionally Extinct; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands ; establish a legal protection status for this species and for the areas where it still occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on habitats and food ressources ; monitoring of the population size and trend at the national scale ; specify the ecology and life history of the species.

Megachile lagopoda **(L., 1761)**

Common Name(s): French – *Mégachile à pattes laineuses* ; Dutch – *Grote Behangersbij* ; German - *Wollfüssige-Blattschneiderbiene*.

Figure 296. *Megachile lagopoda*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of locations or subpopulations ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: widespread throughout Europe ; National scale: last observations in Mons (2002) and in quarries of Wagnes – Agimont (2010), EOO = 300 km², AOO = 3 km².

Population. Continental scale: in southern Europe, this species is quite common, no information on the population trend. National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the population as highly fragmented. Current population trend : decrease.

Habitat and Ecology. Flying period: from mid-May to early September ; Habitat: in northern Europe it inhabits xerothermic open habitats such as dry grasslands (Westrich 1989) ; Visited flowers: polylectic species showing a preference for Asteraceae Cardueae and *Centaurea jacea* (Banaszak & Romasenko 2001) ; Nesting

habits: nests in the soil in existing burrows or cavities (Westrich 1989, Gogala 2013) ; Parasites: *Coelioxys conoidea* (Banaszak & Romasenko 2001, Westrich 1989).

Threats. Reduction of suitable habitats: intensification in the uses of grasslands (intensive grazing practices, silage) ; eutrophication of nutrient-poor grasslands due to the agricultural intensification ; destruction of grasslands in agricultural, forestry or urbanization purposes. Reduction of food resources: national regulation of Cardueae.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Finland (Near Threatened; Rassi *et al.* 2010), Germany (Endangered; Westrich *et al.* 2011), Norway (Critically Endangered; Kålås *et al*. 2010), Sweden (Vulnerable; Gärdenfors 2010) and Switzerland (Critically Endangered; Amiet 1994) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands ; establish a legal protection status for the areas where the species still occurs.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; monitoring of the population size and trend at the national scale.

Megachile lapponica **Thomson, 1872**

Common Name(s): English - Willowherb Leafcutter Bee ; French – *Mégachile de l'Epilobe* ; Dutch – *Lapse Behangersbij* ; German - *Weidenröschen-Blattschneiderbiene.*

Figure 297. *Megachile lapponica*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: present through the west Palearctic ; National scale: mostly in the southern Sambre-Meuse line, EOO = 2,500 km², AOO = 21 km².

Population. Continental scale: no information available for the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as significantly increasing, Pauly (pers. comm. 2018) assessed the population as widely distributed, large amount of new occurrences Current population trend : stable.

Habitat and Ecology. Flying period: from mid-May to late August ; Habitat: in whole Europe the species inhabits forest edges and clearings (Dewulf & Praz 2014) ; Visited flowers: oligolectic on *Epilobium spp.* (Petit 2002) ; Nesting habits: nests are built in soil or wood cavities (Peeters *et al.* 1999) ; Parasites: *Coelioxys inermis* (Lefeber 1979).

Threats. The threats to this species are not known.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005) and Great Britain (Regionally Extinct; Shirt 1987). Future: no future conservation actions have to be taken at the national scale.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; specify the population size and trend at the national scale ; determine potential threats that could occur to the species.

Megachile leachella **Curtis, 1828**

Common Name(s): English - Silvery Leafcutter Bee ; French – *Mégachile des dunes* ; Dutch – *Zilveren Fluitje* ; German - *Dünen-Blattschneiderbiene*.

Figure 298. *Megachile leachella*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: VU (A2bc; B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (1,500 km² < EOO < 3,000 km²), a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented EOO and AOO and continuing decline in the EOO ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: widely distributed from Spain to Central Asia, including central and northern Europe, UK and Scandinavia ; National scale: found in coastal habitats, EOO = 1,600 km², AOO = 20 km².

Population. Continental scale: the species is widespread and populations are presumed to be quite large overall, no further informations on the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : decrease.

Habitat and Ecology. Flying period: from early June to late August ; Habitat: in northern Europe, *M. leachella* is mainly found on coastal sand dunes (Westrich 1989, Else 2012) ; Visited flowers: polylectic, often found on *Lotus corniculatus* (Peeters *et al.* 1999) ; Nesting habits: nests in the soil and sometimes in wood (Westrich 1989, Amiet *et al.* 2004) ; Parasites: *Coelioxys mandibularis, C. rufescens, C.*

elongata, C. inermis, C. afra (Baldock 2008, Banaszak & Romasenko 1998, Westrich 1989), *Monodontomerus obsoletus, Melittobia acasta* (Zerova & Stolbov 1986).

Threats. This species is threatened by the urbanization and the development of tourism infrastructures in coastal areas.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2011), Netherlands (Vulnerable; Peeters and Reemer 2003), Sweden (Near Threatened; Gärdenfors 2010) and Switzerland (Regionally Extinct, Amiet 1994). Future: promotion of the conservation of coastal habitats.

Research Needed. Monitoring of the population size and trend at the national scale.

Megachile ligniseca **(Kirby, 1802)**

Common Name(s): English - Wood-carving Leafcutter Bee ; French – *Mégachile des chardons* ; Dutch – *Distelbehangersbij* ; German - *Holz-Blattschneiderbiene*.

Figure 299. *Megachile ligniseca*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: west Palearctic species ; National scale: widely distributed in Belgium, EOO = 9,600 km², AOO = 116 km².

Population. Continental scale: no information available for the population size and trend of this species. National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing. Current population trend : stable.

Habitat and Ecology. Flying period: from late May to early September ; Habitat: in whole Europe the species is known to inhabit forest edges and clearings (Baldock 2008, Romasenko 1983) ; Visited flowers: polylectic species ; Nesting habits: nests in existing cavities in dead wood (Peeters *et al.* 1999) ; Parasites: *Coelioxys alata*, and possibly *C. elongata* (Amiet *et al.* 2004).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Czech Republic (Vulnerable; Farkac *et al*. 2005), Germany (Vulnerable; Westrich *et al*. 2011), Ireland (Data Deficient; Fitzpatrick *et al*. 2006), Netherlands (Endangered; Peeters and Reemer 2003), Norway (Regionally Extinct; Kålås *et al*. 2010) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

Megachile maritima **(Kirby, 1802)**

Common Name(s): English - Coast Leafcutter Bee ; French – *Mégachile maritime* ; Dutch – *Kustbehangersbij* ; German - *Sand-Blattschneiderbiene*.

Figure 300. *Megachile maritima*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: CR (A2bc; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (more than 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (more than 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (more than 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of locations or subpopulations ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: west Palearctic species ; National scale: coastal species, EOO = 500 km², AOO = 4 km².

Population. Continental scale: no information available for the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing. Current population trend : decrease.

Habitat and Ecology. Flying period: from early June to late August ; Habitat: in whole Europe it is mainly found on the coast, especially where there is light and sandy soil, other populations occur on lowland heaths and sometimes on chalk grasslands (Else 2012), in Belgium it is found on coastal habitats and sometimes on heaps (A. Pauly pers. comm. 2018) ; Visited flowers: polylectic species (Westrich 1989), in Belgium it can be found on *Lathyrus tuberosus* (A. Pauly pers. comm.) ; Nesting habits: nest burrows are dug in the soil (Else 2012) ; Parasites:

Coelioxys conoidea, C. elongata, C. mandibularis (Banaszak & Romasenko 1998, Edwards & Telfer 2001).

Threats. This species is threatened by the urbanization and the development of tourism infrastructures in coastal areas.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Germany (Vulnerable; Westrich *et al.* 2011), Ireland (Near Threatened; Fitzpatrick *et al*. 2006), Netherlands (Endangered; Peeters and Reemer 2003) and Switzerland (Vulnerable; Amiet 1994). Future: promotion of the conservation of coastal habitats.

There are no conservation actions in place for this species, and it is unknown whether its distribution overlaps with any protected areas throughout its range. Further research should be conducted to determine the population size, trends and threats to the species.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology, life history and threats.

Megachile octosignata Nylander, 1852

Common Name(s): French – *Mégachile huit-points* ; German - *Achtfleck-Blattschneiderbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: west Palearctic species ; National scale: only one record in Boitforts (1940).

Population. Continental scale: no information available for the population size and trend. National scale: extinct.

Habitat and Ecology. Flying period: from June to September ; Habitat: in Germany it occurs on xerothermic and ruderal habitats (Wiesbauer 2017) ; Visited flowers: probably polylectic with a preference for Asteraceae species (Müller & Bansac 2004) ; Nesting habits: nests in existing or self-excavated cavities (Wiesbauer 2017) ; Parasites: unknown.

Threats. Reduction of suitable habitats: destruction of xerothermic areas in urbanization, agricultural, forestry purposes, intensification of grazing practices may also have played a role in the species extinction ; reduction in the surface and floral-diversity of ruderal habitats due to agricultural intensification (intensification in the uses of herbicides and nitrogen fertilizers, optimization and homogenization of cultivated surfaces).

Conservation Actions. Present: this species is included in the National Red List or Red Data Book of Czech Republic (Critically Endangered; Farkac *et al.* 2005) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands.

Research Needed. Specify the habitats and ecology of the species ; conduct ad hoc sampling expeditions in order to confirm / infirm the extinction of the species at the national scale.

Megachile pilidens **Alfken, 1924**

Common Name(s): French – *Mégachile à dent velue* ; Dutch – *Rotsbehangersbij* ; German - *Filzzahn-Blattschneiderbiene*.

Figure 301. *Megachile pilidens*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: CR (B2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a geographic range reduction in the form of the area of occupancy (AOO). This reduction is inferred from a reduced area of occupancy (AOO < 15 km²), severely fragmented AOO and continuing decline in the quality of habitats ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: from western Europe in Spain eastwards to Russia, the species is also found in Morocco and Central Asia, EOO and AOO not evaluated at the continental scale ; National scale: in the surroundings of Dinant, Han-sur-Lesse and Andennes, also found on heaps in the Belgian Limburg, EOO = 400 km², AOO = 4 km².

Population. Continental scale: abundant in southern Europe, probably expanding in northern and central Europe, the overall trend may be stable (Dewulf & Praz 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from June to August ; Habitat: in Belgium the species is restricted to quarries with rocky screes (A. Pauly pers. comm. 2018), in northern Europe it inhabits dry and warm habitats (dry grasslands, fallow areas), in southern Europe it is ubiquitous (Dewulf & Praz 2014) ; Visited flowers: polylectic species showing a preference for Fabaceae, Lamiaceae, Dipsacaceae and Asteraceae (Gogala 2013) ; Nesting habits: nests in pre-existing cavities like crevices between stones (Gogala 2013) ; Parasites: *Coelioxys afra* (Westrich 1989).

Threats. The threats to this species are not known, the habitats of this species is highly specific in Belgium.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Germany (Vulnerable; Westrich *et al*. 2011) and Switzerland (Vulnerable; Amiet 1994). Future: establish a legal protection status for this species and the areas where it occurs.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology, life history and threats to the species.

***Megachile pyrenaea* Pérez, 1890**

Common Name(s): French – *Mégachile des Pyrénées* ; Dutch – *Pyreneese Behangersbij* ; German - *Pyrenäen-Blattschneiderbiene*.

Figure 302. *Megachile pyrenaea*. A, female specimen; B, male specimen (Photos : A. Pauly); C, foraging on Asteraceae (Vézin, Photo: J.Y. Baugnée).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: across the west Palearctic, it also occurs in Turkey ; National scale: middle Belgium species, EOO = 150 km², AOO = 17 km².

Population. Continental scale: no information available for the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) as stable within the scattered places it can be encountered. Current population trend : stable.

Habitat and Ecology. Flying period: from July to September ; Habitat: in northern and central Europe it inhabits xerothermic habitats (Westrich 1989); in southern Europe it is ubiquitous ; Visited flowers: in Belgium it is often found on Fabaceae (A. Pauly pers. comm. 2018), polylectic species (Peeters *et al.* 1999, Gogala 2013) ; Nesting habits: nests in the soil under stones or in the ground (Westrich 1989, Amiet *et al.* 2004, Gogala 2013) ; Parasites: *Coelioxys elongata, C. mandibularis* (Amiet *et al.* 2004).

Threats. The threats to this species are not known.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following European countries: Czech Republic (Critically Endangered; Farkac *et al*. 2005), Finland (Vulnerable; Rassi *et al.* 2010), Germany (threatened but category unknown; Westrich *et al.* 2011), Norway (Regionally Extinct; Kålås *et al.* 2010) and Sweden (Vulnerable; Gärdenfors 2010). Future: no conservation actions can be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale ; determine it there are any threats to this species at the national scale.

Megachile rotundata **(Fabricius, 1793)**

Common Name(s): French – *Mégachile de la Luzerne* ; Dutch – *Luzernebehangersbij* ; German - *Luzerne-Blattschneiderbiene*.

Figure 303. *Megachile rotundata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: from Spain northeastwards to Finland and eastwards to Central Asia, the species has been introduced to various regions of the globe for the pollination of *Medicago sativa* ; National scale: several occurrences in 2016 in high Belgium, EOO = 900 km², AOO = 13 km².

Population. Continental scale: very common in the places where it has been introduced, less common in Europe, no information available for the population trend. National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from June to August ; Habitat: in whole Europe it occurs in temperate grasslands (Dewulf & Praz 2014) ; Visited flowers: polylectic species showing a preference for Fabaceae, exported as a pollinator of *Medicago sativa* (Pitts-Singer and Cane 2011) ; Nesting habits: nests in pre-existing cavities ; Parasites: *Coelioxys echinata* (Amiet *et al.* 2004).

Threats. The threats to this species are not known.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Moldova (Endangered; Anonymous 2002) and Switzerland (Vulnerable; Amiet 1994). Future: no future conservation actions can be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and threats to the species.

Megachile versicolor **Smith, 1844**

Common Name(s): English - Brown-footed Leafcutter Bee ; French – *Mégachile versicolore* ; Dutch – *Gewone Behangersbij* ; German - *Bunte Blattschneiderbiene*.

Figure 304. *Megachile versicolor*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Data Deficient (DD) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: widespread through Europe and Russia ; National scale: everywhere in Belgium, EOO = 14,400 km², AOO = 135 km².

Population. Continental scale: no information available for the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the population as very abundant. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-May to early September ; Habitat: ubiquitous ; Visited flowers: polylectic species (Peeters *et al.* 2012) ; Nesting habits: nests in a variety of cavities ; Parasites: *Coelioxys mandibularis, C. inermis* (Baldock 2008).

Threats. No major threats to this species.

Conservation Actions. No conservation actions have to be taken at the national scale.

Megachile willughbiella **(Kirby, 1802)**

Common Name(s): English - Willughby's Leafcutter Bee ; French – *Mégachile des jardins* ; Dutch – *Grote Bladsnijder* ; German - *Garten-Blattschneiderbiene*.

Figure 305. *Megachile willughbiella*. A, female specimen; B, male specimen; C, resting on leaf (Gembloux, Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Dewulf & Praz 2014.

Geographic Range. Continental scale: widespread through the east Palearctic region including Japan ; National scale: everywhere in Belgium, EOO = 21,400 km², AOO = 390 km².

Population. Continental scale: seems to be abundant through its European distribution, no information on the population trend (Dewulf & Praz 2014).

National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as the most common *Megachile* species of Belgium. Current population trend : increase.

Habitat and Ecology. Flying period: from mid-May to late August ; Habitat: ubiquitous (Dewulf & Praz 2014) ; Visited flowers: polylectic species (Gogala 2013) ; Nesting habits: nests in burrows excavated in decaying wood, or in pre-existing cavities, nests are often built in sunny, sheltered locations in crevices on dead wood or on the ground (Gogala 2013, Else 2013) ; Parasites: *Coelioxys conica, C. elongata, C. rufescens* (Baldock 2008).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of Ireland (Near Threatened; Fitzpatrick *et al*. 2006). Future: no future conservation actions have to be taken at the national scale.

Genus *Osmia* Panzer, 1806

Osmia andrenoides Spinola, 1808

Common Name(s): French – *Osmie rouge des caricoles* ; German - *Rote Schneckenhausbiene.*

Figure 306. *Osmia andrenoides*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: CR (B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Critically Endangered due to a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (EOO < 500 km²), a reduced area of occupancy (AOO < 5 km²), severely fragmented EOO and AOO and continuing decline in the EOO ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widespread in most of the European countries, this species also occurs in southwestern Asia ; National scale: Han-sur-Lesse, Champalle, EOO = 300 km², AOO = 3 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as very localized but stable within its range. Current population trend : stable.

Habitat and Ecology. Flying period: from May to August ; Habitat: in Belgium it is a thermophilous species that only occurs in several calcareous grasslands (A. Pauly pers. comm. 2015), in whole Europe it occurs in temperate grasslands, forests (or forest edges) and in Mediterranean-type shrublands (Lhomme 2014) ; Visited flowers: in Belgium there are records on *Globularia bisnagarica, Stachys recta, Stachys officinalis, Lamium purpureum, Hippocrepis comosa, Centaurea sp., Sedum acre,* in *Austria* there are records on *Medicago falcata, Ballota nigra, Thymus sp., Stachys recta, Veronica sp., Globularia sp., Teucrium scorodonia* (Pittioni pers. comm.), in whole Europe it is considered as polylectic with a preference for

Lamiaceae (e.g. *Acinos, Ajuga, Stachys, Teucrium*) and Fabaceae (Müller 1996b, Müller *et al*. 1997, Westrich 1989, Amiet *et al*. 2004) ; Nesting habits: empty snail shells of small to medium size (e.g. *Cepaea, Cernuella, Helicella, Helix, Pomatias, Theba*) which are hidden under stones ; Parasites: unknown.

Threats. This species is highly threatened by the its scarce habitat and nesting resources (empty snail shells combined with xerothermic habitat).

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al*. 2005) and Germany (Vulnerable; Westrich *et al*. 2011), this species exclusively occurs in natural reserves. Future: establish a legal protection status for the species ; promotion of the conservation of xerothermic calcareous grasslands.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology and threats to the species ; impact of pesticides and nitrogen fertilizers on habitat and food resources.

Osmia aurulenta **(Panzer, 1799)**

Common Name(s): English - Gold-fringed Mason Bee ; French – *Osmie dorée des caricoles* ; Dutch – *Gouden Slakkenhuisbij* ; German - *Goldene Schneckenhausbiene*.

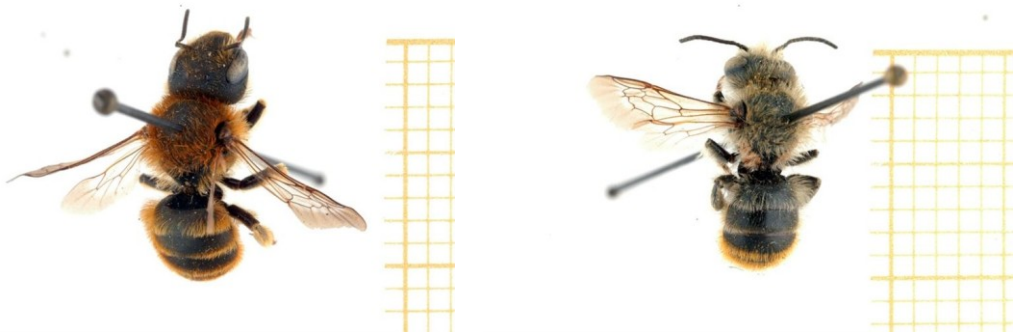

Figure 307. *Osmia aurulenta*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NT (A2c) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) as well as in the quality of habitats (between 20% and 30% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: widely distributed throughout Europe and it is also present in southwestern Asia ; National scale: in middle Belgium and coastal dunes, EOO = 5,200 km², AOO = 74 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing. Current population trend : stable.

Habitat and Ecology. Flying period: males from April to May, females from May to July ; Habitat: in Belgium it occurs on calcareous grasslands and coastal dunes (A. Pauly pers. comm. 2015), in whole Europe it possibly occurs in temperate grasslands, forests (or forest edges) and in Mediterranean-type shrublands (Lhomme 2014) ; Visited flowers: in Belgium as well as in whole Europe the species is considered as polylectic with a preference for Fabaceae, Lamiaceae and Boraginaceae (A. Pauly pers. comm. 2015, Westrich 1989, Müller 1996) ; Records on cultivated plants: *Crataegus sp., Onobrychis viciifolia, Vicia sativa, Medicago sativa, Trifolium repens, Origanum vulgare* ; Nesting habits: empty snail shells (*Helix pomatia, H. nemoralis*) (Maréchal 1926) ; Parasites: *Sapyga quinquepunctata* (Maréchal 1926), *Pteromalus apum, Theroscopus hemipterus* (G.R. Else pers. comm.), *Melittobia acasta* (Maréchal 1926), *Cacoxenus indigator, Villa modesta* (Stubbs &

Chandler 1978), *Chaetodactylus osmiae, Chrysura cuprea, C. trimaculata* (Fain *et al.* 1992, Peeters *et al.* 2012).

Threats. Reduction of suitable habitats: intensification in the uses of grasslands (intensive grazing practices, intensive mowing practices, fertilization) ; eutrophication of nutrient-poor grasslands due to agricultural intensification ; destruction of grasslands in acculturation, afforestation or urbanization purposes. Reduction of food resources: silage instead of hay production has led to a drastic decrease of leguminous crops.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Ireland (Near Threatened; Fitzpatrick *et al.* 2006), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Norway (Endangered; Kålås *et al.* 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production instead of silage) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; monitoring of the population size and trend at the national scale.

Osmia bicolor **(Schrank, 1781)**

Common Name(s): English - Red-tailed Mason Bee ; French – *Osmie bicolore des caricoles* ; Dutch – *Tweekleurige Slakkenhuisbij* ; German - *Zweifarbige Schneckenhausbiene.*

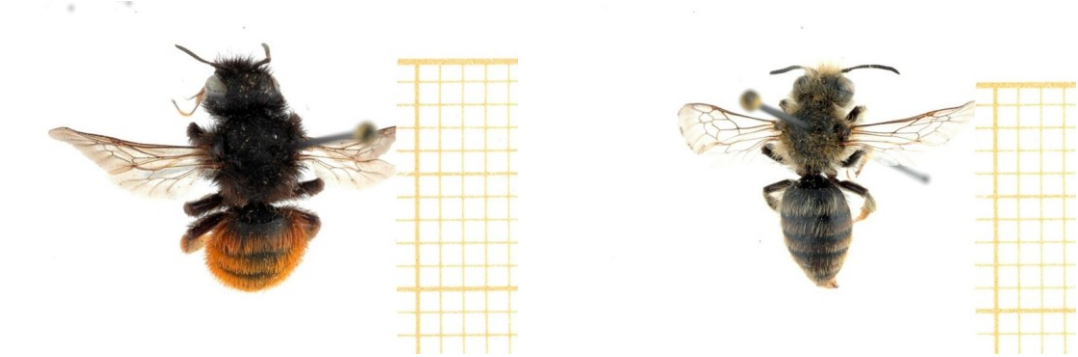

Figure 308. *Osmia bicolor*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: very widespread all across Europe and is also present in northern Asia ; National scale: in the natural region of Fagne-Famenne au Gaume, EOO = 4,100 km², AOO = 58 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable Pauly (pers. comm. 2018) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from March to May ; Habitat: same as *Osmia aurulenta* (A. Pauly pers. comm. 2015, Lhomme 2014) ; Visited flowers: in Belgium it is considered as polylectic, on calcareous grasslands it is often found on *Hippocrepis comosa* and *Lotus corniculatus* (A. Pauly pers. comm. 2015), in whole Europe the species is considered as polylectic (A. Pauly pers. comm. 2015, Westrich 1989, Müller 1996); Records on cultivated plants: *Crataegus sp., Prunus spinosa, Malus sylvestris, Onobrychis viciifolia* ; Nesting habits: empty snail shells (principally *Helix nemoralis*) (A. Pauly pers. comm. 2015) ; Parasites: *Chrysura cuprea, C. trimaculata, Tortonia dogaressa* (Fain *et al.* 1992).

Threats. This species might be threatened by the intensification in the uses of grasslands (intensive grazing and mowing practices, fertilization), the eutrophication of nutrient-poor grasslands due to agricultural intensification and the destruction of grasslands in acculturation, afforestation or urbanization purposes.

Conservation Actions. No conservation actions have to be taken at the national scale given the stable trend of the **Population.** However the development of

agro-environmental measures ("MAE" like MC4-8 and MC10) and the promotion of the conservation of grasslands could benefit to this species.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on the habitat and food ressources ; monitoring of the population size and trend at the national scale.

Osmia bicornis (L., 1758)

Common Name(s): English - Red Mason Bee ; French – *Osmie rousse commune* ; Dutch – *Rosse Metselbij* ; German - *Rote Mauerbiene*.

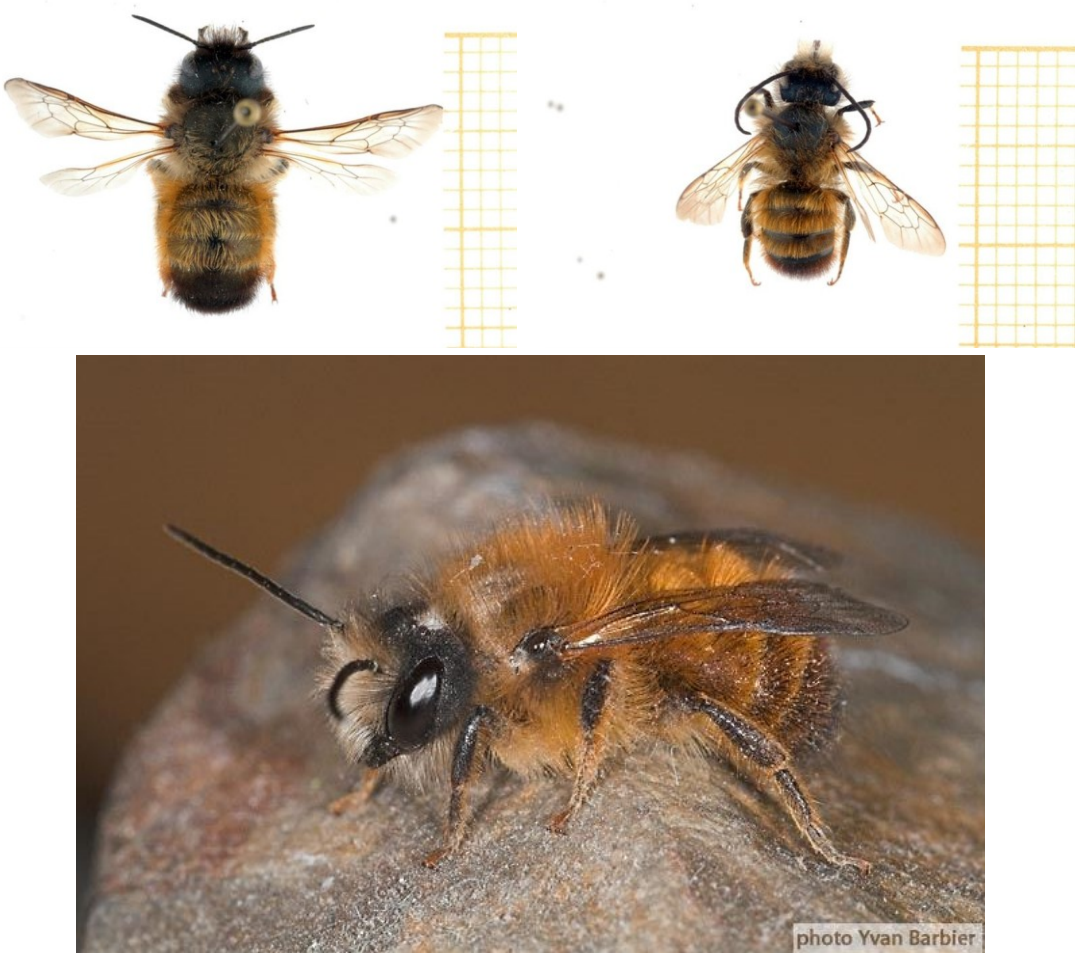

Figure 309. *Osmia bicornis*. A, female specimen; B, male specimen (Photos : A. Pauly; C, resting (Gembloux, Photo: Y. Barbier).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: very widespread all across Europe and also occurs in northern Africa and northern and southwestern Asia ; National scale: everywhere in Belgium, EOO = 34,200 km², AOO = 1622 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Pauly (pers. comm. 2018) assessed the species as very abundant in insect hotels. Current population trend : increase.

Habitat and Ecology. Flying period: from March to June ; Habitat: ubiquitous ; Visited flowers: polylectic species, found on willows catkins as well as on other Spring species ; Nesting habits: nests in pre-existing cavities in wood or in vertical sandy-clay banks, abundant in insect hotels (Tasei 1973, A. Pauly pers. comm. 2015, 2018) ; Parasites: *Stelis phaeoptera, Megatoma undata, Thyrophagus sp., Chaetodactylus osmiae, Chrysis ignita, Melittobia Acasta, Monodontomerus obsoletus, M. dentipes, M. obscurus* (Malyshev 1937, Raw 1972, De Groot 1974, Vicens *et al.* 1993).

Threats. No major threats to this species at the national scale.

Conservation Actions. No conservation actions have to be taken at the national scale.

Osmia brevicornis **(Fabricius, 1798)**

Common Name(s): French – *Osmie du Vélar* ; German - *Schöterich-Mauerbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Not Evaluated because there was only one observation for Belgium, it occurs in some bordering countries (Luxembourg, Germany) ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: present in most of the southern and central European countries and is also found in northern Africa and northern to southwestern Asia ; National scale: only one doubtful observation in Louette-Saint-Pierre (Belgium 1869), Bonnevoie (Luxembourg 1996), Remerschen (Luxembourg 1998) ; EOO = NE ; AOO = NE.

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: NE.

Habitat and Ecology. Flying period: in Germany it occurs from May to July ; Habitat: in Germany it is reported as a xerothermic species (Wiesbauer 2017), in whole Europe it possibly occurs in temperate grasslands, forests (or forest edges) and in Mediterranean-type shrublands (Lhomme 2014) ; Visited flowers: oligolectic on Brassicaceae (Westrich 1989, Müller *et al.* 1997, Amiet *et al.* 2004) ; Nesting habits: nests in insect burrows in dead wood and bore holes in wooden blocks; hollow stems and bore holes in pithy stems; and holes and cavities in walls (Radchenko 1978, Brechtel 1986, Westrich 1989, Bosch *et al.* 1993, Müller *et al.* 1997, Banaszak and Romasenko 2001) ; Parasites: probably *Stelis punctulatissima* (Wiesbauer 2017).

Threats. The threats to this species are not known, Belgium would be the extreme northern edge of its distribution.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (threatened but category unknown; Westrich *et al*. 2011) and Switzerland (Vulnerable; Amiet 1994). Future: no conservation actions can be taken for this species a the national scale.

Research Needed. Conduct sampling expeditions in order to confirm / infirm the presence of the species at the national scale ; specify the threats to the species.

Osmia caerulescens **(L., 1758)**

Common Name(s): English - Blue Mason Bee ; French – *Osmie bleue* ; Dutch – *Blauwe Metselbij* ; German - *Blaue Mauerbiene*.

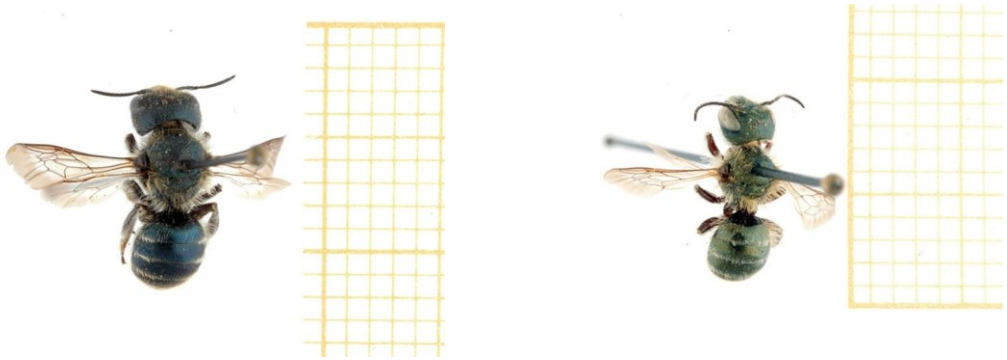

Figure 310. *Osmia caerulescens*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: very common and widespread throughout most of Europe, also occurs in northern Africa, southwestern to northern Asia and has an extra-limital distribution in India and in the Nearctic; National scale: everywhere in Belgium, EOO = 17,100 km², AOO = 191 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as not so abundant but common. Current population trend : stable.

Habitat and Ecology. Flying period: partly bivoltine from late March to late August ; Habitat: ubiquitous ; Visited flowers: in Belgium the species is considered as polylectic with a preference for Fabaceae and Lamiaceae (A. Pauly pers. comm. 2015), frequently observed on *Lotus spp., Taraxacum spp., Ballota spp., Stachys spp.* (Benoist 1929), in whole Europe it is also considered as polylectic and collecting pollen nearly exclusively on Fabaceae, Lamiaceae, Boraginaceae and Antirrhineae (Raw 1974, Tasei 1976, Westrich 1989, Müller 1996) ; Records on cultivated plants: *Trifolium repens, T. pratense, Medicago sativa* ; Nesting habits: nests in various types of pre-existing cavities (Benoist 1931, Bonelli 1968, Tasei 1972, Olifir 1980, Romasenko 1980, Brechtel 1986, Westrich 1989, Vicens *et al.* 1993, Müller *et al.* 1997, Banaszak and Romasenko 2001) ; Parasites: *Stelis ornatula* (Westrich 1989), *Sapyga quinquepunctata, S. clavicornis* (Brechtel 1986), *Melittobia acasta, Ptinus sexpunctatus* (Tscharntke *et al.* 1998).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List of the Netherlands as Vulnerable (Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Osmia cornuta **(Latreille, 1805)**

Common Name(s): French – *Osmie cornue* ; Dutch – *Gehoornde Metselbij*; German - *Gehörnte Mauerbiene*.

Figure 311. *Osmia cornuta*. A, female specimen; B, male specimen; C, *In copulla* (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: very widespread species that occurs in most of central and southern European countries, also present in northern Africa and from southwestern to northern Asia ; National scale: everywhere in Belgium, EOO = 32,800 km², AOO = 1703 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly increasing, Pauly (pers. comm. 2018) assessed the species as very abundant in insect hotels. Current population trend : increase.

Habitat and Ecology. Flying period: from late February to early May ; Habitat: ubiquitous, common in garden and cities ; Visited flowers: polylectic species ; Records on cultivated plants: *Malus domestica, Malus sylvestris, Prunus avium, Prunus cerasifera, Pyrus communis, Ribes uva-crispa, Ribes nigrum* (Pauly pers. comm. 2015) ; Nesting habits: nests in various types of pre-existing cavities, very abundant in insect hotels (Benoist 1931, Mavromoustakis 1948, Tasei 1973, Olifir 1980, Brechtel 1986, Westrich 1989, Vicens *et al.* 1993, Müller *et al.* 1997, Gogala 1999) ; Parasites: cuckoo-bees parasites are not known, *Cacoxenus indagator, Chaetodactylus osmiae, Anthrax anthrax* (Krunic *et al.* 2005).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: The species is listed in the National Red List of the Netherlands (Vulnerable; Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Osmia inermis (Zetterstedt, 1838)

Common Name(s): English - Mountain Mason Bee ; French – *Osmie des montagnes* ; German - *Felsheiden-Mauerbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: only one observation in Waha (1931) ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: boreo-alpine distribution ; National scale: only one observation in Waha (1931), EOO = NE, AOO = NE.

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: NE.

Habitat and Ecology. Flying period: in Great-Britain it flies from late May to late July ; Habitat: in Great-Britain it occurs on exposed mountain grasslands on flower-rich basic soils (Else & Edwards 2018) ; Visited flowers: in Great-Britain it occurs on *Lotus corniculatus, Geum sp., Astragalus sp., Hieracium sp.* (Banaszak & Romasenko 1998, Else & Edwards 2018), in whole Europe it is considered as polylectic with a preference for Fabaceae (Westrich 1989, Amiet *et al*. 2004) ; Nesting habits: nests in pre-existing cavities in rocks (Grandi 1962, Westrich 1989, Müller *et al*. 1997) ; Parasites: *Chrysura hirsuta* (Else & Edwards 1996).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List of the Netherlands as Vulnerable (Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Osmia leaiana **(Kirby, 1802)**

Common Name(s): English - Orange-vented Mason Bee ; French – *Osmie à deux angles* ; Dutch – *Kauwende Metselbij* ; German - *Zweihöckerige Mauerbiene*.

Figure 312. *Osmia leaiana*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: very widespread species present in most of Europe but also in northern Africa and from southwestern to northern Asia ; National scale: everywhere in Belgium, EOO = 4,800 km², AOO = 47 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm. 2018) assessed the species as widespread but not so abundant. Current population trend : stable.

Habitat and Ecology. Flying period: partly bivoltine from late April to late August ; Habitat: ubiquitous ; Visited flowers: in Belgium it is oligolectic on Asteraceae, especially *Cirsium* and *Onopordon* (A. Pauly pers. comm. 2015) ; Nesting habits: nests in various types of pre-existing cavities, can be found in insect hotels (Benoist 1931, Romasenko 1980, Westrich 1989, Müller *et al.* 1997, Banaszak and Romasenko 2001, A. Pauly pers. comm. 2015) ; Parasites: *Stelis phaeoptera, S. punctulatissima, Monosapyga clavicornis, Sapyga quinquepunctata, Chrysura radians* (van der Zanden 1982, Morgan 1984, Kunz 1994).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is included in the National Red List or Red Data Book of Finland (Vulnerable; Rassi *et al*. 2010), Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Endangered; Peeters and Reemer 2003), and Switzerland as *Osmia fulviventris*(Vulnerable; Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

Osmia mustelina **Gerstäcker, 1869**

Common Name(s): French – *Osmie belette* ; German - *Östliche Felsen-Mauerbiene*.

Figure 313. *Osmia mustelina*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: present in several central and southern European countries, this species also occurs in southwestern Asia ; National scale: two occurrences in Torgny and Saint Mard (1931), EOO = NE, AOO = NE.

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: NE

Habitat and Ecology. Flying period: from May to July ; Habitat: in whole Europe it probably occurs in temperate grasslands, forests (or forest edges) and in Mediterranean-type shrublands (Lhomme 2014) ; Visited flowers: in Belgium and Luxemburg the species has been observed on *Lotus corniculatus*, *Hippocrepis comosa* and *Ajuga reptans*, in whole Europe the species is considered as polylectic (Westrich 1989, Amiet *et al.* 2004) ; Nesting habits: nests in rocky pre-existing cavities (Westrich 1989, Grandi 1961, Bonelli 1967, Müller *et al.* 1997, Banaszak and Romasenko 2001) ; Parasites: in Germany the species is parasitized by *Stelis franconica* (Wiesbauer 2017).

Threats. The threats to this species are not known at the national scale. Belgium is the northern edge of its distribution.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005) and Germany (Endangered; Westrich *et al.* 2011). Future: no future conservation actions can be taken at the national scale.

Research Needed. Better understanding of the ecology and threats at the northern edge of the distribution ; conduct sampling expeditions in order to confirm / infirm the settlement of the species at the national scale.

Osmia niveata **(Fabricius, 1804)**

Common Name(s): English - Jersey Mason Bee ; French – *Osmie à un angle* ; Dutch – *Zwartbronzen Houtmetselbij* ; German - *Einhöckerige Mauerbiene*.

Figure 314. *Osmia niveata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: present in most of Europe and also occurs in northern Africa and from southwestern to northern Asia ; National scale: everywhere in Belgium, EOO = 6,800 km², AOO = 63 km².

Population. Continental scale: no information on the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : increase.

Habitat and Ecology. Flying period: from early May to late August ; Habitat: everywhere the host plants can be found (A. Müller pers. comm.) ; Visited flowers: in Belgium as well as in whole Europe the species is considered as oligolectic on Asteraceae Cardueae (Westrich 1989, Amiet *et al*. 2004, A. Pauly pers. comm. 2015), records on *Hesperis, Taraxacum, Carduus* (Benoist 1929) ; Nesting habits: nests in pre-existing cavities in wood, hollow stems, banks, bore holes in walls and empty snail shells (Benoist 1931) ; Parasites: *Stelis phaeoptera, S. punctulatissima, Sapyga clavicornis, S. quinquepunctata* (Banaszak & Romasenko 2001, van der Zanden 1982).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005) and Germany (Vulnerable; Westrich *et al.* 2011). Future: no future conservation actions have to be taken at the national scale.

Osmia parietina Curtis, 1828

Common Name(s): English - Wall Mason Bee ; French – *Osmie des murailles* ; Dutch *Boommetselbij* ; German - *Warldrand-Mauerbiene*.

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: EN (A2c; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (500 km² < EOO < 1,500 km²), a reduced area of occupancy (5km² < AOO < 15 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: known from most of Europe, also occurs in northern Africa and southwestern Asia; National scale: southern Sambre-Meuse line, Fagne-Famenne natural region, EOO = 600 km², AOO = 7 km².

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend. National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : decrease.

Habitat and Ecology. Flying period: from April to July ; Habitat: sunny open and reflective areas (*e.g.* limestone) sheltered by surrounding scrub (Westrich 1989) ; Visited flowers: in Belgium as well as in whole Europe the species is considered as polylectic with a preference for Fabaceae (Westrich 1989, Amiet *et al.* 2004, A. Pauly pers. comm. 2015) ; Nesting habits: various types pre-existing cavities in rock or in wood (Benoist 1931, Westrich 1989, Banaszak and Romasenko 2001) ; Parasites: *Sapyga similis, Chrysura austriaca, C. hirsuta* (Westrich 2002, Banaszak & Romasenko 2001, van der Zanden 1982).

Threats. At the national scale the species is threatened by the scarcity of its habitat and human alterations that may occur on it such as afforestation, acculturation or urbanization. Intensification of forestry practices has led to less heterogeneity and floral biodiversity of wooded areas.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Vulnerable; Westrich *et al.* 2011) and Great Britain (Vulnerable; Shirt 1987). Future: establish a legal protection status for the areas where the species still occurs ; promotion of extensive forestry practices (*e.g.* selection cutting instead of even-aged woodlands).

Research Needed. Monitoring of the population size and trend at the national scale ; specify the habitats of the species at the national scale and conservation practices that should be associated to them ;

Osmia pilicornis **Smith, 1846**

Common Name(s): English - Fringe-horned Mason Bee ; French – *Osmie de la Pulmonaire* ; German - *Lungenkraut-Mauerbiene*.

Figure 315. *Osmia pilicornis*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: endemic to Europe, mainly occurs in central and northern Europe ; National scale: last observation in Ciergnon (1972), EOO = 0 km², AOO = 0 km².

Population. Continental scale: presumed to have a large population, no further informations on the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, Pauly (pers. comm. 2018) assessed the species has drastically decreased and is now extinct. Current population trend : extinct.

Habitat and Ecology. Flying period: males from late March to April, females from April to May ; Habitat: in Belgium it occurred in warm localities of the Meuse basin (Pauly pers. comm. 2015), in the south of Great-Britain it occurs in clearings of deciduous woods on calcareous soils (Earwaker 2012, 2014, Prosi *et al.* 2016) ; Visited flowers: in Belgium as well as in whole Europe it is considered as polylectic, associated with undergrowth flowers such as *Ajuga reptans, Pulmonaria officinalis* and *Pulsatilla* vulgaris, in Belgium and its surrounding borders it has been observed on *Lathyrus montanus, Vicia orobus, Cytisus scoparius, Hippocrepis comosa, Pulmonaria officinalis, Geum rivale, Pulsatilla vulgaris, Viola spp., Pulmonaria sp., Polygonatum verticillatum, Taraxacum officinal, Glechoma hederacea, Salix spp., Symphytum sp., Prunella vulgaris* (A. Pauly pers. comm. 2015, Benoist 1929, Feitz pers. comm., Else 2012) ; Nesting habits: nests in pre-existing cavities in dead wood (Chambers 1949) ; Parasites: *Chrysura hirsuta, Hoplocryptus confector* (Wiesbauer 2017).

Threats. Reduction of suitable habitats, food resources and potential nesting sites: intensification of forestry practices has led to a reduction in the number of dead or senescent trees as well as a reduction in the floral offer and diversity.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Finland (Near Threatened; Rassi *et al.* 2010), Germany (threatened but level unknown; Westrich *et al.* 2011), Great Britain (Vulnerable; Shirt 1987) and Switzerland (Vulnerable; Amiet 1994). Future: promotion of extensive forestry practices (*e.g.* selection cutting instead of even-aged woodlands).

Research Needed. Conduct sampling expeditions in order to confirm / infirm the national extinction of the species ; better understanding of the national extinction.

Osmia rufohirta **Latreille, 1811**

Common Name(s): French – *Osmie rousse des caricoles* ; German - *Rothaarige Schneckenhausbiene*

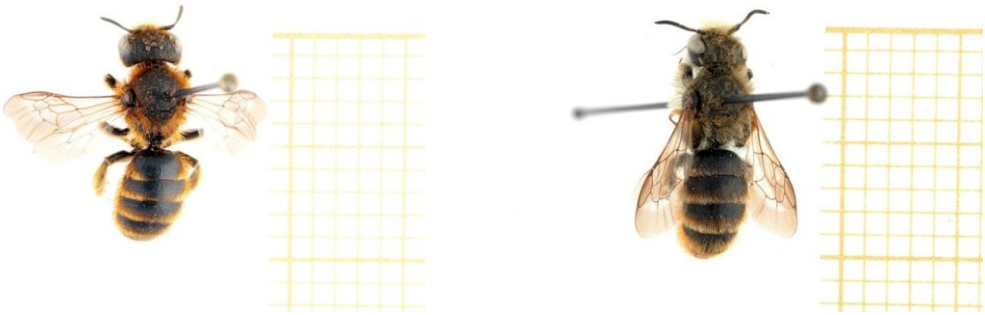

Figure 316. *Osmia rufohirta*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: EN (A2bc; B1ab(i,ii,iii,iv) +2ab(i,ii,iii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (500 km² < EOO < 1,500 km²), a reduced area of occupancy (5 km² < AOO < 15 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO, quality of habitats and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: present in most of central and southern Europe, also occurs in northern Africa and from southwestern to northern Asia ; National scale: middle Belgium species, EOO = 300 km², AOO = 8 km².

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, A. Pauly (pers. comm.) assessed the species as drastically declining. Current population trend : decrease.

Habitat and Ecology. Flying period: males from late April to June, females from May to July ; Habitat: calcareous grasslands of the Meuse basin ; Visited flowers: in Belgium it has mostly been observed on *Hippocrepis comosa* and *Lotus corniculatus* but also on *Helianthemum nummularium, Knautia arvensis, Onobrychis viciifolia, Potentilla verna, Ranunculus bulbosus, Scabiosa columbaria, Sedum sp. Viola*

sp. (A. Pauly pers. comm. 2015) ; Nesting habits: empty snail shells (principally *Helicella*) (Bellmann 1995) ; Parasites: *Chrysura trimaculata, C. cuprea* and *C. dichroa* (Wiesbauer 2017).

Threats. At the national scale the species is threatened by the scarcity of its habitat and nesting sites. Human activities may have affected their habitats in number through afforestation, acculturation or urbanization. Intensification in the uses of grasslands (tilling, early mowing, fertilization, intensive grazing) may have led to a decrease in the floral diversity of grasslands.

Conservation Actions. Present: The species is included in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al*. 2011), Switzerland (Vulnerable; Amiet 1994) and in the Czech Republic as *Hoplitis rufohirta* (Endangered; Farkac *et al.* 2005) ; occurs in protected areas ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: establish a legal protection status for the unprotected areas where the species still occurs ; promotion of extensive pasture and mowing practices (*e.g.* hay production, late mowing, reduction in the number of livestock per hectare).

Research Needed. Monitoring of the population size and trend at the national scale ; impact of herbicides and nitrogen fertilizers on habitat and food resources.

Osmia spinulosa **(Kirby, 1802)**

Common Name(s): English - Spined Mason Bee ; French – *Osmie épineuse des caricoles* ; Dutch - *Gedoornde Slakkenhuisbij* ; German - *Bedornte Schneckenhausbiene.*

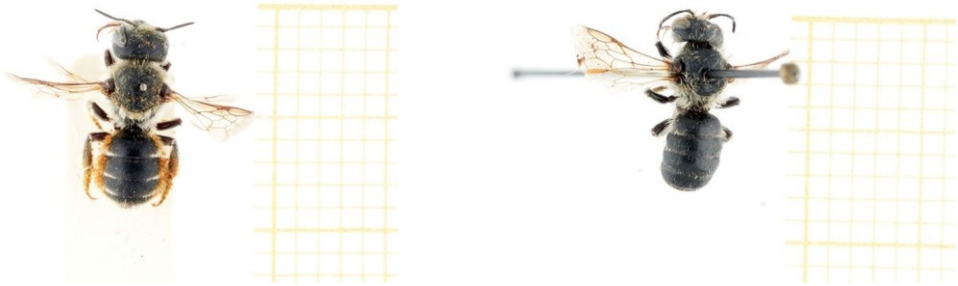

Figure 317. *Osmia spinulosa*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NT (A2bc; B1ab(iii) +2ab(iii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (3,000 km² < EOO < 5,000 km²), a reduced area of occupancy (30 km² < AOO < 50 km²), severely fragmented EOO and AOO and continuing decline in the quality of habitats ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: Mediterranean-centred species that mostly occurs in southern Europe but also in northern Africa and southwestern Asia ; National scale: coastal species, in the inland regions it is very scarcely distributed, EOO = NE, AOO = NE.

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, A. Pauly (pers. comm.) assessed the species as quite abundant in coastal areas but very localized in the inland regions, the trend seems to be stable. Current population trend : NE.

Habitat and Ecology. Flying period: from June to August ; Habitat: in Belgium it is known to occur on coastal dunes and dry calcareous grasslands (A. Pauly pers. comm. 2018) ; Visited flowers: in Belgium it has been observed on *Cichorium intybus* (A. Pauly pers. comm. 2015), in Great-Britain it occurs mostly on Asteraceae Cardueae and *Centaurea spp.* (Else & Edwards 2018) ; Nesting habits:

nests in empty snail shells of small to medium size with mostly two cells per shell (Westrich 1989, Müller *et al.* 1997, Banaszak and Romasenko 2001) ; Parasites: *Stelis odontopyga, Chrysura cuprea, C. trimaculata,* probably *C. dichroa, Pteromalus apum, P. venustus, Melittobia acasta, Anthrax aethiops* (Edwards 2007, Müller 1994, Noskiewicz 1925).

Threats. At the national scale the species is threatened by the scarcity of its habitat and nesting sites. Human activities may have affected their habitats in surface through urbanization, tourism infrastructure development, acculturation or urbanization. Intensification in the uses of grasslands (tilling, early mowing, fertilization, intensive grazing) may have led to a decrease in the floral diversity of dry calcareous grasslands.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Vulnerable; Peeters and Reemer 2003) and Norway (Near Threatened; Kålås *et al* 2010) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of the conservation of coastal habitats ; promotion of extensive pasture and mowing practices (*e.g.* hay production, late mowing, reduction in the number of livestock per hectare).

Research Needed. Monitoring of the population size and trend at the national scale ; impact of herbicides and nitrogen fertilizers on habitat and food resources.

Osmia uncinata **Gerstäcker, 1869**

Common Name(s): English - Pinewood Mason Bee ; French – *Osmie des pinèdes*, *Osmie à crochets* ; Dutch – *Bosmetselbij* ; German - *Rinden-Mauerbiene*.

Figure 318. *Osmia uncinata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: EN (A2bc; B1ab(i,ii,iv) +2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Endangered due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (50% and 80% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 50% and 80% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 50% and 80% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the extent of occurrence (EOO) and the area of occupancy (AOO). This reduction is inferred from a reduced extent of occurrence (500 km² < EOO < 1,500 km²), a reduced area of occupancy (5 km² < AOO < 15 km²), severely fragmented EOO and AOO and continuing decline in the AOO, EOO and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: present in most of Europe but also in northern Asia ; National scale: in the natural regions of Ardenne, Hautes-Fagnes and Campine, EOO = 1,200 km², AOO = 11 km².

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend (Lhomme 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable, A. Pauly (pers. comm.) assessed the species as rare. Current population trend : decrease.

Habitat and Ecology. Flying period: from late March to early July ; Habitat: found in open woodlands, on clearing, along footpaths ; Visited flowers: in Belgium and Netherland it is considered as a polylectic species, it occurs on *Hippocrepis sp., Viola sp., Rubus sp., Glechoma hederaceae, Ajuga reptans, Vaccinium vitis-idaea* (Crèvecoeur 1925, Peeters *et al.* 1999) ; Nesting habits: nests in insect burrows in dead wood or bark and bore holes in wooden blocks, between the

thick bark of pine trees (Westrich 1989, Banaszak and Romasenko 2001, Amiet *et al.* 2004) ; Parasites: *Sapyga similis, Chrysura hybrida* (Banaszak & Romasenko 2001, van der Zanden 1982).

Threats. At the national scale the species is threatened by the scarcity of its habitat and human alterations that may occur on it such as acculturation or urbanization. Intensification of forestry practices has led to a decline of open-wooded areas with dead wood. The difficulty of finding sunny sites containing both the forage species and existing burrows in dead wood probably explains the scarcity of the species.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Germany (threatened but category unknown; Westrich *et al.* 2011), Great Britain (Endangered; Shirt 1987) and Switzerland (Vulnerable; Amiet 1994). Future: establish a legal protection status for the areas where the species still occurs ; promotion of extensive forestry practices (*e.g.* selection cutting instead of even-aged woodlands).

Research Needed. Monitoring of the population size and trend at the national scale.

Osmia xanthomelana (Kirby, 1802)

Common Name(s): English - Cliff Mason Bee, Large Mason Bee ; French – *Osmie des Hippocrepis* ; Dutch – *Grote Metselbij* ; German - *Hufeisenklee-Mauerbiene*.

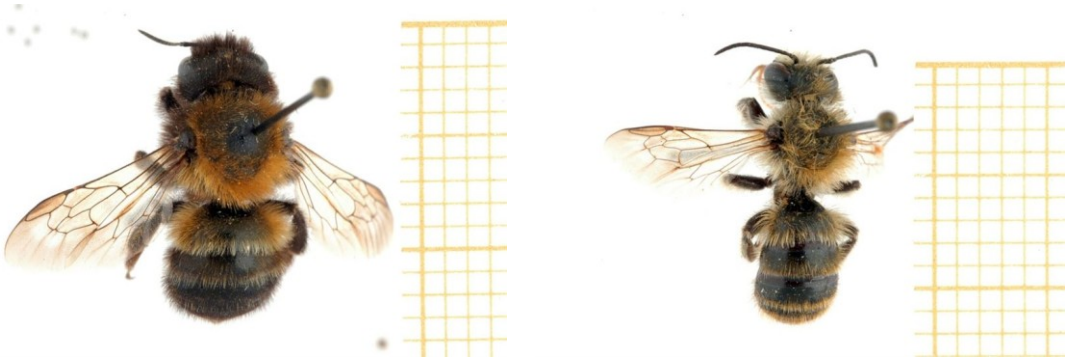

Figure 319. *Osmia xanthomelana*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Lhomme 2014.

Geographic Range. Continental scale: occurs all across Europe and is also present in northern Asia ; National scale: formerly scarcely distributed in Middle Belgium, last record in Belvaux (1956), EOO = 0 km², AOO = 0 km².

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend (Lhomme 2014). National scale: extinct, the species has never been abundant. Current population trend : extinct.

Habitat and Ecology. Flying period: from May to mid-June ; Habitat: strongly thermophilous species, in Belgium it is was found on calcareous grasslands (A. Pauly pers. comm. 2015), the species occurs where both foraging resources and nest building material can be found ; Visited flowers: oligolectic on *Lotus corniculatus* and *Hippocrepis comosa* (Westrich 1989, Feitz *et al.* 2003, Else 2012) ; Nesting habits: nests are built in pre-existing cavities in the soil with mud, small stones, roots and grass blades (A. Pauly pers. comm. 2015, Benoist 1931, Westrich 1989, Müller *et al*. 1997, Banaszak and Romasenko 2001) ; Parasites: *Chrysura hirsuta, Sapyga similis, S. quinquepunctata,* (Else 1997, Enslin 1920, van der Zanden 1982).

Threats. The species scarcity is probably due to difficulties of finding simultaneously xerothermic habitats, appropriate pollen resources and appropriate nesting sites and materials. The species extinction is likely to be due to the reduction of grasslands in number (urbanization, acculturation or urbanization) and quality (tilling, early mowing, fertilization, intensive grazing).

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Germany

(Endangered; Westrich *et al.* 2011), Great Britain (Critically Endangered; Shirt 1987) and the Netherlands (Regionally Extinct; Peeters and Reemer 2003). Future: promotion of extensive pasture and mowing practices (*e.g.* hay production, late mowing, reduction in the number of livestock per hectare).

Research Needed. Conduct sampling expeditions on the habitats where the species is likely to occur ; better understanding of the causes of extinction at the national scale.

Genus *Stelis* Panzer, 1806

Stelis breviuscula Nylander, 1848

Common Name(s): English - Little Dark Bee ; French – *Stélis brève* ; Dutch – *Gewone Tubebij* ; German - *Kurze Düsterbiene*.

Figure 320. *Stelis breviuscula*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: northern Palearctic species, found everywhere except in Japan ; National scale: widely distributed in Belgium, EOO = 8,800 km², AOO = 87 km².

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend (Ortiz Sánchez & Ornosa 2014). National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from late May to late August ; Habitat: ubiquitous but mainly found in open habitats with dead wood in which the hosts are nesting ; Hosts: *Hoplitis leucomelana, Heriades truncorum, H. crenulatus, Chelostoma rapunculi* and *Hoplitis adunca* (Benoist 1929, Banaszak and Romasenko 2001, Amiet *et al.* 2004).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed as Vulnerable in the National Red List of the Netherlands (Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Stelis minima Schenck, 1861

Common Name(s): French – *Stélis minime* ; Dutch – *Minitubebij* ; German - *Winsige Düsterbiene.*

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: widely distributed throughout northern and central Europe, but it is not found in the southern European countries, it is also found in the Asiatic part of Russia ; National scale: last observation in 1969 in Villers-sur-Lesse, EOO = 0 km², AOO = 0 km².

Population. Continental scale: presumed to have a large population, no further informations available for the population size and trend (Ortiz Sánchez & Ornosa 2014). National scale: extinct. Current population trend : extinct.

Habitat and Ecology. Flying period: June and July ; Habitat: sunny open habitats with dead wood ; Hosts: *Hoplitis tridentata, Chelostoma campanularum, C. distinctum* and *Heriades truncorum* (Banaszak & Romasenko 2001, Amiet *et al.* 2004, Grace 2010).

Threats. The threats and causes of extinction are not known at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005) and the Netherlands (Endangered; Peeters and Reemer 2003). Future: no future conservation actions can be taken at the national scale.

Research Needed. The species is very small and is thus likely to be missed during sampling expeditions ; Conduct sampling expeditions on the habitats where the species is likely to occur in order to confirm / infirm the national extinction ; better understanding of the causes of extinction at the national scale.

Stelis minuta **Lepeletier & Audinet-Serville, 1825**

Common Name(s): French – *Stélis naine* ; Dutch – *Kleine Tubebij* ; German - *Zwerg-Düsterbiene.*

Figure 321. *Stelis minuta*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: western Palearctic species found throughout Europe, in the southern part of its range, it is found in montane habitats ; National scale: last record in 1976 in Wonck, EOO = 0 km², AOO = 0 km².

Population. Continental scale: rare species but its population seems to be continuous throughout its range (Ortiz Sánchez & Ornosa 2014). National scale: extinct. Current population trend : extinct.

Habitat and Ecology. Flying period: from May to August ; Habitat: sunny open habitats with dead wood ; Hosts: *Hoplitis leucomelana, C. rapunculi, Hoplitis claviventris, H. tridentata, Heriades truncorum* (Müller 1944, Stöckhert 1933, Banaszak & Romasenko 2001, Enslin 1925, Müller 1944, Pijfers 2003, Westrich 1989).

Threats. The threats and causes of extinction are not known at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Finland (Near Threatened; Rassi *et al.* 2010) and the Netherlands (Critically Endangered; Peeters and Reemer 2003). *Stelis minuta* has not been recorded from Denmark since 1980 (Madsen and Calabuig 2010). Future: no future conservation actions can be taken at the national scale.

Research Needed. The species is very small and is thus likely to be missed during sampling expeditions ; conduct sampling expeditions on the habitats where the species is likely to occur in order to confirm / infirm the national extinction ; better understanding of the causes of extinction at the national scale.

Stelis odontopyga Noskiewicz, 1926

Common Name(s): French – *Stélis des caricoles* ; German - *Schneckenhaus-Düsterbiene.*

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: found in central and southern Europe, outside of Europe it is found within Turkey ; National scale: a single occurrence in Koksijde in 1954, EOO = NE, AOO = NE.

Population. Continental scale: rare throughout its range but the populations are continuous and there are no subspecies or subpopulations (Ortiz Sánchez & Ornosa 2014). National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: May and August ; Habitat: various xerothermic areas (Wiesbauer 2017) ; Hosts: *Osmia spinulosa* (Amiet *et al.* 2004).

Threats. The threats are not known at the national scale. Belgium is the extreme northern edge of the species.

Conservation Actions. Present: The species is listed in the National Red List of Germany (Vulnerable; Westrich *et al*. 2011). Future: no future conservation actions can be taken at the national scale.

Research Needed. The species is very small and is thus likely to be missed during sampling expeditions ; conduct sampling expeditions on the habitats where the species is likely to occur in order to confirm / infirm the presence of the species at the national scale.

Stelis ornatula **(Klug, 1807)**

Common Name(s): English - Spotted Dark Bee ; French – *Stélis rubicole* ; Dutch – *Witgevlekte Tubebij*; German - *Stängel-Düsterbiene*.

Figure 322. *Stelis ornatula*. Female specimen (Photo: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: VU (A2bc; B2ab(i,ii,iv)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Vulnerable due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the area of occupancy (AOO). This reduction is inferred from a reduced area of occupancy (15 km² < AOO < 30 km²), severely fragmented distribution and continuing decline in the AOO, EOO and number of locations or subpopulations ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: distributed throughout the western Palearctic ; National scale: widely but scarcely distributed throughout Belgium, EOO = 1,200 km², AOO = 12 km².

Population. Continental scale: rare but widely distributed throughout its range, the overall population is presumed to be relatively large for a parasitic bee (Ortiz Sánchez & Ornosa 2014). National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, A. Pauly (pers. comm.) assessed the species as rare. Current population trend : decrease.

Habitat and Ecology. Flying period: from May to August ; Habitat: sunny open areas with dead wood or hollow stems ; Hosts: *Hoplitis claviventris, H. leucomelana, H. tridentata, H. parvula, Osmia maritima, O. caerulescens, Ceratina cucurbitina* (Banaszak & Romasenko 2001, Benno 1957, Enslin 1925, 1933, Friese

1888, Haeseler 1982, Höppner 1904, Janzon & Svensson 1984, Le Goff 1997, 2001, Westrich 1989).

Threats. The threats are not known at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of Finland (Endangered; Rassi *et al*. 2010), Great Britain (Vulnerable; Shirt 1987), and the Netherlands (Vulnerable; Peeters and Reemer 2003). Future: no future conservation actions can be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the threats that may occur to the species.

Stelis phaeoptera **(Kirby, 1802)**

Common Name(s): English - Plain Dark Bee ; French – *Stélis à ailes noires* ; Dutch - *Zwarte Tubebij* ; German - *Schwartzflügische Düsterbiene*.

Figure 323. *Stelis phaeoptera*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belg ique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: NT (A2bc; B1ab(i,ii) +2ab(i,ii)) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to (1) a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 20% and 30% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 20% and 30% between 1900-1969 and 1970-2017) (2) a geographic range reduction in the form of the area of occupancy (AOO) and the extent of occurrence. This reduction is inferred from a reduced area of occupancy (30 km² < AOO < 50 km²), a reduced extent of occurrence (3,000 km² < EOO < 5,000 km², severely fragmented distribution and continuing decline in the AOO and EOO ; Previously published Red List assessments: 2013 – Data Deficient (DD) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: western Palearctic species, the nominal subspecies occurs in Europe between 43° and 63° N, Caucasus and Central Asia ; National scale: widespread in Belgium, EOO = 3,200 km², AOO = 28 km².

Population. Continental scale: the whole population size is unknown but it is suspected to be decreasing, additional studies are needed (Ortiz Sánchez & Ornosa 2014). National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly decreasing, A. Pauly (pers. comm. 2018) assessed the species as slightly more common than *S. ornatula*. Current population trend : decrease.

Habitat and Ecology. Flying period: May and August ; Habitat: in Netherland it occurs on forest edges (Reemer *et al.* 1999), in whole Europe it can be found within boreal, temperate and Mediterranean-type shrublands and temperate grasslands (Ortiz Sánchez & Ornosa 2014) ; Hosts: *Osmia emarginata, O. mustelina, O. bicornis, O. leaiana, O. niveata, O. parietina* and probably *Anthidium manicatum,*

Hoplitis papaveris, H. tuberculata, Hoplitis anthocopoides (Alfken 1913, Banaszak & Romasenko 2001, Bischoff 1927, Dusmet 1921, Friese 1888, 1895, Grace 2010, Mavromoustakis 1957, Müller 1931, Rozen & Kamel 2009, Stöckhert 1933, Verhoeff 1892, Warncke 1992a, Westrich 1989).

Threats. The loss of flower-rich grasslands and multistage diversified forest edges may have affected both hosts and parasites.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Endangered; Farkac *et al.* 2005), Finland (Near Threatened; Rassi *et al.* 2010), Germany (Vulnerable; Westrich *et al*. 2011), Great Britain (Vulnerable; Shirt 1987), the Netherlands (Endangered; Peeters and Reemer 2003), Norway (Data Deficient; Kålås *et al.* 2010) and Sweden (Near Threatened; Gärdenfors 2010). Future: promotion of extensive agricultural (*i.e.* excluding intensive uses of herbicides and nitrogen fertilizers), pastry (*i.e.* reduction of the number of head of livestock per hectare), mowing (*i.e.* late mowing, hay production) and forestry (*i.e.* selection cutting, multistage edges and clearings) practices.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology at the national scale.

Stelis punctulatissima **(Kirby, 1802)**

Common Name(s): English - Banded Dark Bee ; French – *Stélis ponctuée* ; Dutch - *Geelgerande Tubebij*; German - *Punktierte Düsterbiene*.

Figure 324. *Stelis punctulatissima*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: spreads from central and southern Europe, through the Mediterranean basin to the Caucasus ; National scale: very widespread in Belgium, EOO = 9,600 km², AOO = 83 km².

Population. Continental scale: widely distributed but never common. However, it can be presumed to have a large overall population (Ortiz Sánchez & Ornosa 2014). National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, A. Pauly (pers. comm. 2018) assessed the species as very widespread with common hosts. Current population trend : increase.

Habitat and Ecology. Flying period: May and late August ; Habitat: in Netherland it occurs mostly in villages and cities around hosts nesting aggregations (Peeters *et al.* 2012), in whole Europe it can be found within temperate forest, shrubland, grassland, Mediterranean-type shrubland, arable land and rocky areas (Ortiz Sánchez & Ornosa 2014) ; Hosts: *Hoplitis adunca, Megachile parietina, Osmia leaiana, O. niveata, O. brevicornis, Anthidium manicatum, A. oblongatum* (Alfken 1913, Baldock 2008, Banaszak & Romasenko 2001, Bischoff 1927, Blüthgen 1916, Brechtel 1986, Enock 1900, Leiniger 1924, Verhoeff 1892, Westrich 1989).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is listed in the National Red List or Red Data Book of Finland (Near Threatened; Rassi *et al.* 2010) and the

Netherlands (Vulnerable; Peeters and Reemer 2003). Future: no future conservation actions have to be taken at the national scale.

Stelis signata **(Latreille, 1809)**

Common Name(s): French – *Stélis à taches jaunes* ; Dutch - *Gele Tubebij* ; German - *Gelbfleckige Düsterbiene*.

Figure 325. *Stelis signata*. A, female specimen; B, male specimen (Photos: A. Pauly).

Taxonomic Source(s). Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belg ique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: VU (A2bc) ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Justification: listed as Near Threatened due to a population reduction where the causes of reduction may not have ceased or may not be understood (A2). This reduction is inferred from a decline in the number of populations (between 30% and 50% between 1900-1969 and 1970-2017), a decline in the area of occupancy (AOO) (between 30% and 50% between 1900-1969 and 1970-2017) and a decline in the extent of occurrence (EOO) (between 30% and 50% between 1900-1969 and 1970-2017) ; Previously published Red List assessments: 2013 – Least Concern (LC) (Europe) in Ortiz Sánchez & Ornosa 2014.

Geographic Range. Continental scale: western Palearctic species ; National scale: scarcely distributed throughout Belgium, EOO = 800 km², AOO = 8 km².

Population. Continental scale: rare species whose populations seem to be continuous along its range (Ortiz Sánchez & Ornosa 2014). National scale: Rasmont *et al.* (1993) assessed the species as highly significantly decreasing, A. Pauly (pers. comm. 2018) assessed the species as uncommon. Current population trend : decrease.

Habitat and Ecology. Flying period: mid-June to late August ; Habitat: in Netherland it occurs on coniferous forest edges (Reemer *et al.* 1999), in whole Europe it can be found within boreal and temperate forest and shrubland, temperate grassland, Mediterranean-type shrubland, tundra, arable land and semi-deserts (Ortiz Sánchez & Ornosa 2014) ; Hosts: *Anthidiellum strigatum* (Bellman 1981, Friese 1923, Madsen and Calabuig 2010, Stöckhert 1933, Westrich 1989).

Threats. The threats to this species are not known at the national scale.

Conservation Actions. Present: the species is listed in the National Red Lists or Red Data Books of the Czech Republic (Vulnerable; Farkac *et al.* 2005), Finland (Vulnerable; Rassi *et al.* 2010), Germany (Vulnerable; Westrich *et al.* 2011), the Netherlands (Critically Endangered; Peeters and Reemer 2003). Future: no conservation actions can be taken at the national scale.

Research Needed. Monitoring of the population size and trend at the national scale ; specify the ecology at the national scale ; specify the potential threats that may occur to the species.

Genus *Trachusa* Panzer, 1804

Trachusa byssina (Panzer, 1798)

Common Name(s): French – *Trachuse commune* ; Dutch – *Grote Harsbij* ; German - *Grosse Harzbiene*.

Figure 326. *Trachusa byssina*. A, male specimen (Photo: A. Pauly); B, male specimen resting (Erezée, Photo: B. Lanis).

Diagnosis. Females have a ventral scopa, males often have teeth on tergites 6, 7, both sexes have a black metasoma. **Taxonomic Source(s).** Pauly, A. 2015. Clé illustrée pour l'identification des abeilles de Belgique. II. Megachilidae. Document de travail du projet BELBEES.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-01-12 ; Assessor(s): Pieter Vanormelingen, Ella Zambra, Denis Michez, Alain Pauly, Maxime Drossart ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2014 – Least Concern (LC) (Europe) in Bogusch & Straka 2014.

Geographic Range. Continental scale: occurs in the whole of continental Europe between 42° and 64° latitude, absent from British Isles, EOO and AOO not evaluated ; National scale: widespread in Wallonia, very rare in Flanders, EOO = 5,400 km², AOO = 64 km².

Population. Continental scale: the species is the most abundant *Trachusa* species in northern and central Europe (Warncke 1980) as well as in some southern European countries, it can be locally abundant, no further information on the population trend (Bogusch & Straka 2014) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Pauly (pers. comm.) assessed the species as widespread and locally abundant in Wallonia ; Current population trend : stable.

Habitat and Ecology. Flying period: from early June to mid-August ; Habitat: in Belgium it is considered as a thermophilous species that occurs in calcareous grasslands located near pinewoods (A. Pauly pers. comm. 2015), in the Netherland the species occurs on sunny edges and clearings of pinewoods (Peeters *et al.* 2012) ; Visited flowers: oligolectic on Fabaceae (Müller 1996b, A. Pauly pers. comm. 2015) ; Nesting habits: females build their nesting burrows in the soil, the construction of the nest requires pine resin ; Parasites: possibly *Coelioxys conica* (Amiet *et al.* 2004).

Threats. No major threats to this species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Family Melittidae Michener, 2000

Genus *Dasypoda* Latreille, 1802

Dasypoda argentata Panzer, 1809

Common Name(s): French – *Dasypode argentée des scabieuses* ; German - *Skabiosen-Hosenbiene*

Diagnosis. The genus *Dasypoda* has two submarginal cells, females have dense and long scopal hairs, *D. argentata* is extinct in Belgium. **Taxonomic Source(s).** Michez, D., M. Terzo & P. Rasmont. 2004. Révision des espèces ouest-paléarctiques du genre *Dasypoda* Latreille 1802 (Hymenoptera, Apoidea, Melittidae). Linzer Biologische Beitrage, 36(2): 847-900.

Assessment Information. Red List Category & Criteria: RE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Near Threatened (NT) (Europe) in Nieto & Michez 2012.

Geographic Range. Continental scale: present in Europe and Asia, it is the second most widespread species of the genus, EOO = 5,323,678 km², AOO = 632 km² ; National scale: last record in Mont de l'Enclus (1931), EOO = 0 km², AOO = 0 km².

Population. Continental scale: populations are mainly composed of a small numbers of individuals and are decreasing (Nieto & Michez 2012) ; National scale: extinct ; Current population trend : extinct.

Habitat and Ecology. Flying period: from June to August ; Habitat: in Germany the species occurs in various dry sandy or loess areas where there are large bare areas and large areas covered by its pollen host-plant (Wiesbauer 2017), in whole Europe the species occurs in Mediterranean-type shrubby and grassland temperate vegetation where there are large areas covered by its pollen host-plant (Celary 2002, 2005; Michez *et al*. 2008), the species habitat has disappeared from Belgium (D. Michez pers. comm. 2018) ; Visited flowers: oligolectic on *Cephalaria, Succisa* and *Scabiosa* (Dipsacaceae) ; Nesting habits: nests in sandy or loess soils (Celary 2002, 2005, Wiesbauer 2017) ; Parasites: unknown.

Threats. The species extinction in Belgium is probably due to the loss of potential nesting sites located near pollen ressources. This loss is likely to be due to the reduction of grasslands in number (urbanization, acculturation or urbanization) and quality (tilling, early mowing, fertilization, intensive grazing).

Conservation Actions. Present: this species is included in the National Red Lists or Red Data Books of the following five European countries: Lithuania (Vulnerable; Rašomavičius 2007), Switzerland (Endangered; Amiet 1994), Czech Republic (Endangered; Farkac *et al.* 2005), Germany (Critically Endangered; Westrich *et al.* 2008), Poland (Critically Endangered; Głowaciński and Nowacki 2009), Sweden (Extinct; Gardenfors 2010). Future: at the continental scale, Nieto & Michez (2012) recommend to establish a legal protection on the areas where the species still occurs and to manage the areas where the species still occur in order to prevent the vegetational covering of potential nesting sites.

Research Needed. Conduct expeditions in order to confirm / infirm the national extinction of the species or its habitat.

Dasypoda hirtipes **(Fabricius, 1793)**

Common Name(s): English - Pantaloon Bee ; French – *Dasypode à culottes* ; Dutch – *Pluimvoetbij* ; German - *Dunkelfransige Hosenbiene, Braunbrüstige Hosenbiene*.

Figure 327. *Dasypoda hirtipes*. Specimens at the nest entrance (Sclaigneaux, Photo: Y. Barbier).

Diagnosis. The genus *Dasypoda* has two submarginal cells, females have dense and long scopal hairs. **Taxonomic Source(s).** Michez, D., M. Terzo & P. Rasmont. 2004. Révision des espèces ouest-paléarctiques du genre *Dasypoda* Latreille 1802 (Hymenoptera, Apoidea, Melittidae). Linzer Biologische Beitrage, 36(2): 847-900.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Nieto & Michez 2012.

Geographic Range. Continental scale: the most widespread species of the genus, from British Isles to China and from the 60°N to the Arabic peninsula, EOO = 9,743,065 km², AOO = 2,992 km² ; National scale: widespread in Belgium, EOO = 7,800 km², AOO = 77 km².

Population. Continental scale: although the species is declining in some countries, the species seems stable at the continental scale (Nieto & Michez 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable. Current population trend : stable.

Habitat and Ecology. Flying period: from early June to early September ; Habitat: sunny sandy sites with appropriate pollen resources such as heaths, sandpits and coastal dunes ; Visited flowers: oligolectic on Asteraceae, mainly on *Crepis* and *Hypochoeris* (Michez *et al.* 2008) ; Nesting habits: nests in open areas with sandy soil (Pouvreau and Loublier 1995) ; Parasites: *Miltogramma sp.* (Müller 1884, Gardner 1901, Pape 1987) and possibly *Nomada flavopicta* (Vegter 1977).

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: the species is red listed in five European countries: (i) Near Threatened in Germany and Sweden (Westrich *et al.* 2008, Gärdenfors 2010); (ii) Vulnerable in Switzerland (Amiet 1994); (iii) Endangered in Norway and Slovenia (Anonymous 2002, Kålås *et al.* 2010) ; the species is legally protected (LCN 1973 annexe IIb). Future: no future conservation actions have to be taken at the national scale.

Genus *Macropis* Panzer, 1809

Macropis europaea Warncke, 1973

Common Name(s): English - Yellow-Loosestrife Bee ; French – *Macropède commune* ; Dutch – *Gewone Slobkousbij* ; German - *Auen-Schenkelbiene, Sumpf-Schenkelbiene*.

Figure 328. *Macropis europaea*. Foraging on *Lysimachia vulgaris* (Gembloux, Photo: Y. Barbier).

Diagnosis. The genus *Macropis* has two submarginal cells, males have a yellow clypeus and both sexes have a well-developed pygidial plate. Males have a black labrum (sometimes with a small central yellow spot), females have a densely punctuated tergite 4. **Taxonomic Source(s).** Michez D. & Patiny S. 2005. World revision of the oil-collecting bee genus Macropis Panzer 1809 (Hymenoptera, Apoidea, Melittidae) with a description of a new species from Laos. Annales de la Société entomologique de France, 41 (1): 25pp.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: present in Europe from the United Kingdom to the Moscow region of Russia, and from Finland southwards to Italy, EOO = 7,916,269 km², AOO = 2,004 km² ; National scale: widespread in Belgium, EOO = 6,800 km², AOO = 66 km².

Population. Continental scale: no information available on the population size and trend but it seems to be declining (Michez & Nieto 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2015) assessed the species as widespread but never abundant. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-June to late August ; Habitat: various types of moist habitats where appropriate pollen resources can be found (Pekkarinen *et al.* 2003, Celary 2005) ; Visited flowers: oligolectic on the genus *Lysimachia spp.*, as this genus produces no nectar, it collects nectar in numerous other flower species, generally wetland species ; Nesting habits: nests in self-excavated burrows in banks or slopes, nests are concealed by the vegeation (Celary 2005) ; Parasites: *Epeloides coecutiens* (Stöckhert 1933).

Threats. No major threats to this species at the national scale. However the host-plant habitats are known to be declining in Belgium.

Conservation Actions. Present: *Macropis europaea* is considered as Vulnerable in the United Kingdom (Shirt 1987), development of MAE MC3 could benefit to this species. Future: no future conservation actions have to be taken at the national scale except the promotion of the conservation and restauration of habitats with host-species.

Macropis fulvipes (Fabricius, 1804)

Common Name(s): English - Yellow-Loosestrife Bee ; French – *Macropède à pattes brunes* ; Dutch – *Bruine Slobkousbij* ; German - *Wald-Schenkelbiene, Gelbbeinige Schenkelbiene, Braunbeinige Schenkelbiene.*

Diagnosis. The genus *Macropis* has two submarginal cells, males have a yellow clypeus and both sexes have a well-developed pygidial plate. Males have a yellow labrum, females have a sparsely punctuated tergite 4. **Taxonomic Source(s).** Michez D. & Patiny S. 2005. World revision of the oil-collecting bee genus Macropis Panzer 1809 (Hymenoptera, Apoidea, Melittidae) with a description of a new species from Laos. Annales de la Société entomologique de France, 41 (1): 25pp.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: present in most parts of Europe, except in the United Kingdom, Sweden and Norway, EOO = 556,392.74 km², AOO = 1,128 km² ; National scale: mostly in the southern Sambre-Meuse line, lots of observations around Brussels in gardens, EOO = 2,200 km², AOO = 17 km².

Population. Continental scale: no information available on the population size and trend but it seems to be declining (Michez & Nieto 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2015) assessed the species as rarer than *M. europaea* but expanding in gardens. Current population trend : stable.

Habitat and Ecology. Flying period: from June to September ; Habitat: various types of moist habitats where appropriate pollen resources can be found, including grasslands, shrublands and wetlands (Bassin *et al.* 2011), in Belgium it is expanding in gardens (Michez pers. comm. 2018) ; Visited flowers: oligolectic on the genus *Lysimachia spp.*, as this genus produces no nectar, it collects nectar in numerous other flower species, generally wetland species ; Nesting habits: nests in self-excavated burrows in the ground, sometimes in small aggregations (Malyshev 1929, Vogel 1986) ; Parasites: *Epeloides coecutiens* (Bogusch 2005).

Threats. No major threats to this species at the national scale. However the host-plant habitats are known to be declining in Belgium.

Conservation Actions. Present: *Macropis europaea* is considered as Near Threatened in Germany (Westrich *et al.* 2008) and in the Netherlands (Peeters and Reemer 2003), development of MAE MC3 could benefit to this species. Future: no future conservation actions have to be taken at the national scale except the promotion of the conservation and restauration of habitats with host-species.

Genus *Melitta* Kirby, 1802

Melitta dimidiata Morawitz, 1876

Common Name(s): English - Sainfoin Bee ; French – *Mélitte du Sainfoin* ; German - *Esparsetten-Sägehornbiene*.

Figure 329. *Melitta dimidiata*. A, female specimen; B, male specimen (Photos : D. Michez).

Taxonomic Source(s). Michez D. & Eardley C.D. 2007. Monographic revision of the bee genus *Melitta* Kirby 1802 (Hymenoptera: Apoidea: Melittidae). Annales de la Société entomologique de France (n. s.), 43(4): 379-440.

Assessment Information. Red List Category & Criteria: NE ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: from the United Kingdom (restricted to southern England) eastwards to Afghanistan, EOO = 4,638,438 km², AOO = 344 km² ; National scale: last observation in Uccle (1899), EOO = NE, AOO = NE.

Population. Continental scale: severely fragmented and declining population (Michez & Nieto 2012) ; National scale: NE. Current population trend : NE.

Habitat and Ecology. Flying period: from late June to early August ; Habitat: in northern Europe it is restricted to xerothermic open habitats with an abundance of host species (Else 2012), elsewhere in Europe it occurs in Mediterranean-type shrubby and grassland temperate vegetation (Michez & Nieto 2012) ; Visited flowers: monolectic on *Onobrychis viciifolia* for pollen (D. Michez pers. comm. 2018, Else 2012); Nesting habits: unknown but probably in self-excavated burrows ; Parasites: unknown.

Threats. Reduction of food resources: the host-plant used by *Melitta dimidiata* is declining due to land use change and intensification of agriculture, including the use of nitrogen fertilizers and herbicides. This plant was cultivated in the past as forage crop and as a soil fertilizer, the distribution of *Onobrychis viciifolia* is thus now very fragmented (Rasmont and Meersch 1988).

Conservation Actions. Present: included in the national red lists of five European countries: (i) Endangered in United Kingdom (Shirt 1987)); (ii) Critically Endangered in Germany (Westrich *et al.* 2008); (iii) Extinct in Belgium, Czech Republic and Slovenia (Michez and Eardley 2007, Farkac *et al.* 2005, Anonymous 2002). Future: promotion of the reintroduction of leguminous cropping and extensive agricultural practices (*i.e.* small farms and mixed farming).

Research Needed. Conduct expeditions in order to confirm / infirm the national extinction of the species or its habitat.

Melitta haemorrhoidalis **(Fabricius, 1775)**

Common Name(s): English - Gold-tailed *Melitta* ; French – *Mélitte des campanules* ; Dutch - *Klokjesdikpoot* ; German - *Glockenblumen-Sägehornbiene*.

Taxonomic Source(s). Michez D. & Eardley C.D. 2007. Monographic revision of the bee genus *Melitta* Kirby 1802 (Hymenoptera: Apoidea: Melittidae). Annales de la Société entomologique de France (n. s.), 43(4): 379-440.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: one of the most widespread Melittidae species, EOO = 6,677,247 km², AOO = 2,852 km² ; National scale: scarcely distributed throughout Belgium, EOO = 3,200 km², AOO = 61 km².

Population. Continental scale: no information available on the population size and trend but the species seems to be common (Michez & Nieto 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed that the populations are stable but scattered. Current population trend : stable.

Habitat and Ecology. Flying period: from early June to early September ; Habitat: in whole Europe it occurs within temperate grassland with appropriate pollen resources (Celary 2005, Michez *et al.* 2008) ; Visited flowers: oligolectic on the genus *Campanula* ; Nesting habits: nests in self-excavated burrows in the soil, in Great-Britain it has been observed trying to enter cavities in rotten wood (Baldock 2007) ; Parasites: *Nomada emarginata,* and possibly *N. flavopicta* (Westrich 1989, Wolf 1950, Tengö & Bergtröm 1976)

Threats. No major threats to this species at the national scale.

Conservation Actions. No future conservation actions have to be taken at the national scale.

Research Needed. Monitoring of the population size and trend.

Melitta leporina **(Panzer, 1799)**

Common Name(s): English - Clover *Melitta* ; French – *Mélitte de la Luzerne* ; Dutch – *Klaverdikpoot* ; German - *Luzerne-Sägehornbiene*.

Figure 330. *Melitta leporina*. A, female specimen; B, male specimen (Photos : D. Michez).

Taxonomic Source(s). Michez D. & Eardley C.D. 2007. Monographic revision of the bee genus *Melitta* Kirby 1802 (Hymenoptera: Apoidea: Melittidae). Annales de la Société entomologique de France (n. s.), 43(4): 379-440.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: the most widespread species of the genus, occurs from the United Kingdom eastwards to Vladivostok and from Finland to Spain, EOO = 8,159,367 km², AOO = 3,164 km² ; National scale: widespread in Belgium, EOO = 1,700 km², AOO = 18 km².

Population. Continental scale: the species is very common, the current trend is stable overall except in certain parts of its range where it is declining (Michez & Nieto 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as very highly significantly declining, Michez (pers. comm. 2018) assessed that the species as abundant despite its specialisation on Fabaceae. Current population trend : decrease.

Habitat and Ecology. Flying period: from mid-June to late August ; Habitat: in whole Europe it occurs within temperate grassland with appropriate pollen resources, in Belgium it is mostly observed on *Medicago sativa* crops and *Trifolium spp.* flowerbeds in urban areas (Michez *et al.* 2008, Dellicour and Michez 2010) ; Visited flowers: oligolectic on the genera *Melilotus*, *Trifolium* and mostly *Medicago* (Westrich 1989, Michez *et al.* 2008) ; Nesting habits: gregarious species that nests in self-excavated burrows in the soil (Celary 2005, 2006, Edwards 1998, Malyshev 1923, Tirgari 1968, Rozen & McGinley 1974) ; Parasites: *Nomada flavopicta* (Celary 2005, 2006, Dellicour and Michez 2010, Schmiedeknecht 1930, Tengö & Bergström 1976, Westrich 1989, Yarrow 1941)

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: included in the national red lists of the following five countries: (i) Near Threatened in Finland and Sweden (Rassi *et al.* 2001, Gärdenfors 2010); (ii) Vulnerable in the Netherlands and Norway (Peeters and Reemer 2003, Kålås *et al.* 2010); (iii) Endangered in Slovenia (Anonymous 2002). Future: no future conservation actions have to be taken at the national scale.

Melitta nigricans **Alfken, 1905**

Common Name(s): French – *Mélitte de la Salicaire* ; Dutch - *Kattenstaartdikpoot* ; German - *Blutweiderich-Sägehornbiene*.

Figure 331. *Melitta nigricans*. Flying around *Lythrum salicaria* (Terril d'Hensies, Photo: Y. Barbier).

Taxonomic Source(s). Michez D. & Eardley C.D. 2007. Monographic revision of the bee genus *Melitta* Kirby 1802 (Hymenoptera: Apoidea: Melittidae). Annales de la Société entomologique de France (n. s.), 43(4): 379-440.

Assessment Information. Red List Category & Criteria: LC ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Least Concern (LC) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: distributed across much of Europe but its range does not extend to northernmost parts of the continent, EOO = 4,947,442 km², AOO = 1,092 km² ; National scale: distributed throughout Belgium, EOO = 1,400 km², AOO = 16 km².

Population. Continental scale: common species, stable trend overall but declining in some parts of its distribution (Michez & Nieto 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed that the populations are expanding. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-June to late August ; Habitat: in whole Europe it occurs within moist grasslands and abandoned arable lands with abundant pollen resources (Michez & Nieto 2012) ; Visited flowers: oligolectic on *Lythrum spp.* for pollen (Westrich 1989, Müller *et al.* 1997, Michez *et al.* 2008); Nesting habits: probably self-excavated burrows in the soil (Dellicour & Michez 2010) ; Parasites: *Nomada flavopicta*.

Threats. No major threats to this species at the national scale.

Conservation Actions. Present: *Melitta nigricans* is considered as Vulnerable in the Czech Republic (Farkac *et al.* 2005) and Endangered in Slovenia (Anonymous

2002) and Switzerland (Amiet 1994). Future: no future conservation actions have to be taken at the national scale.

Melitta tricincta **Kirby, 1802**

Common Name(s): English - Red Bartsia Bee ; French – *Mélitte de l' Odontite* ; Dutch - *Ogentroostdikpoot* ; German - *Zahntrost-Sägehornbiene*.

Figure 332. *Melitta tricincta*. A, female specimen; B, male specimen (Photos: D. Michez); C, foraging on *Odontites verna* (Photo: A. Pauly).

Taxonomic Source(s). Michez D. & Eardley C.D. 2007. Monographic revision of the bee genus *Melitta* Kirby 1802 (Hymenoptera: Apoidea: Melittidae). Annales de la Société entomologique de France (n. s.), 43(4): 379-440.

Assessment Information. Red List Category & Criteria: VU (B2ab(i,ii,iii)) ; Year Published: 2019 ; Date Assessed: 2018-06-26 ; Assessor(s): Maxime Drossart, Pieter Vanormelingen, Denis Michez, Pierre Rasmont, Nicolas Vereecken, Ella Zambra ; Facilitator/Compiler(s): Maxime Drossart & Denis Michez ; Previously published Red List assessments: 2012 – Near Threatened (NT) (Europe) in Michez & Nieto 2012.

Geographic Range. Continental scale: widespread in Europe, from the United Kingdom eastwards to Kazakhstan, and from Sweden to southern Italy, EOO = 6,090,311 km², AOO = 1,084 km² ; National scale: scarcely distributed throughout Belgium, EOO = 5,000 km², AOO = 13 km².

Population. Continental scale: rare over much of its range, the habitat supporting strong populations of the host-plant is declining (Michez & Nieto 2012) ; National scale: Rasmont *et al.* (1993) assessed the species as stable, Michez (pers. comm. 2018) assessed that the populations are scattered. Current population trend : stable.

Habitat and Ecology. Flying period: from mid-June to mid-September ; Habitat: in whole Europe it occurs within temperate grassland with appropriate pollen resources, in xerothermic forest edges, verges and abandoned arable lands but in Belgium it occurs mostly on extensive pastures (Banaszak 1982, Celary 2005, Dellicour & Michez 2010, Michez *et al.* 2008, Westrich 1989) ; Visited flowers: oligolectic on *Odontites vernus* and *O. lutea* (Michez *et al.*, 2008, Müller *et al.*1997, Westrich 1989) ; Nesting habits: nests in self-excavated burrows in the soil (Dellicour & Michez 2010) ; Parasites: probably *Nomada flavopicta* (Westrich 1989)

Threats. Reduction of food resources: the loss of pollen resources is likely to be due to the reduction of grasslands in number (urbanization, acculturation or urbanization) and quality (tilling, early mowing, fertilization, intensive grazing).

Conservation Actions. Present: listed as Near Threatened in Germany (Westrich *et al*. 2008), Vulnerable in the Czech Republic (Farkac *et al.* 2005), the Netherlands (Peeters and Reemer 2003), Sweden (Gärdenfors 2010) and Switzerland (Amiet 1994), and Endangered in Slovenia (Anonymous 2002) ; development of agro-environmental measures ("MAE" like MC4-8 and MC10) could benefit to this species. Future: promotion of extensive grazing and mowing practices (*i.e.* late mowing and hay production) ; promotion of extensive agricultural practices (*i.e.* excluding intensive uses of pesticides and nitrogen fertilizers) ; promotion of the conservation of grasslands.

Research Needed. Quantify the impact of herbicides and nitrogen fertilizers on habitat and food ressources ; Monitoring of the population size and trend at the national scale.

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K. Lambaere, M. Drossart, C. Tourbez , P. Rasmont, J. d'Haeseleer, M. Dufrêne, A. Pauly , P. Vanormelingen, N. Vereecken, S. Vray, E. Zambra & D. Michez. 2021. *Species assessement of the Red List of Belgian wild bees.* ed. Université de Mons, Belgium, 780 p.

This document is a development of the "*Belgian red list of bees*" (Drossart *et al*. 2019). These assessments present the conservation status of Belgian species according to the IUCN guidelines for application of the international IUCN Red List criteria at regional and national levels (IUCN 2012a,b). It identifies the extinction threat of species at this level. These results can be used to implement conservation actions to improve the threatstatus of species. Moreover we added the information supporting and justiying the assessments: (i) Taxonomic Source(s), (ii) Assessment Information (i.e. red list category and criteria, date of assessment, assessor(s), Facilitator/Compiler(s), justification, European red list assessment), (iii) Geographic Range, (iv) Population trend, (v) Habitat and Ecology, (vi) Threats (i.e. reduction of resources), (vii) Conservation Actions; (viii) Research needed. Reduction of food ressources. When available, we provided data at national and Europea levels. All bee species recorded in Belgium until the first half of 2017 have been included in this Red List. The geographical scope is nation-wide.

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