

# ALIEN IMPACT

## Biodiversity impacts of highly invasive alien plants: mechanisms, enhancing factors and risk assessment

### DURATION OF THE PROJECT

Phase 1: 15/12/2006 – 14/12/2007  
Phase 2: 15/12/2007 – 31/01/2011

### BUDGET

1.131.945 €

### KEYWORDS

Alien invasive species, biodiversity, impacts, climate change, competitive displacement, plant-animal interactions

### CONTEXT

The introduction and spread of non-native species has become a global ecological crisis, as invasive organisms are increasingly altering terrestrial and aquatic ecosystems worldwide. Assessing the extent and variety of effects of invasive nonindigenous species on native species and communities, as well as on their physical environment, is consequently one of the world's most serious conservation issues. The desire to respond effectively has prompted governments to call for improved strategies for reducing nonindigenous species' impacts at national, regional and local levels. To achieve this goal, the scientific basis for decision-making on biological invasions needs to be improved, in line with the priorities of international research agendas. Understanding and quantifying impacts of biological invasions also fit in several priority fields of international conventions to which Belgium is committed (e.g. Convention on Biological Diversity).

tangle the coupling of response mechanisms at different ecological levels, whereas general trends can only be derived from assessments with simple measures over a large scale (many sites). The aim of the current proposal is to reconcile these conflicting prerequisites in a single study.

### Methodology and interaction between the different partners

Partners will work with a common set of species for terrestrial plants, and organize the field work in the same landscape/sites when relevant. For most studies, an aquatic counterpart is planned to allow comparison with terrestrial invaders. Partner 1 will study direct mechanisms of impact on native terrestrial plants via competition and how climate warming will modify this. Partner 2 will investigate indirect mechanisms of impact on native plants via soil modification, impact on soil fauna, and how soil eutrophication will influence impact (all terrestrial). Partner 3 will focus on impact on aquatic plant communities and associated other trophic levels, and on how eutrophication of water will modify impact. Partner 4 will study patterns of impact on native terrestrial plant communities at larger scale (up to landscape) and, together with partner 5, indirect mechanisms of impact on terrestrial plants via pollination. Experimental protocols are shared among partners when possible. Data from different experiments will be combined in additional, integrated analysis.

### PROJECT DESCRIPTION

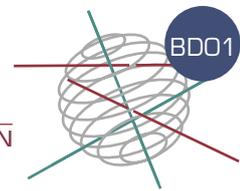
#### Objectives

The proposal aims to provide a first integrated study of patterns and mechanisms of impact by alien invasive species in Belgium. It will consider different spatial scales and multiple levels of ecological organisation. The project will consider both terrestrial and fresh water ecosystems, though resolution is expected to be greater for terrestrial systems. The central aim is impact on biodiversity. We will focus on impact on native autotrophs, but also on soil and water fauna, as well as how eutrophication (soil and water) and climate warming (only terrestrial) modify impact. Both direct (via competition) and indirect (via pollination, soil modification, allelopathy) mechanisms of impact will be studied. The project will concentrate on highly invasive plant species (HIPS) in Belgium. Forecasting the impact of Belgian alien invasive plants, faces the challenge that detailed studies (by necessity limited to few species/sites) are needed to disen-

### LINK WITH INTERNATIONAL PROGRAMMES

Several EU-funded projects such as DAISIE and ALARM and several networks such as NOBANIS, ERNAIS and EPPO deliver data, inventories and information on biological invasions on which policy and stakeholders can base their decisions. The quantitative assessments of ecosystem impacts that ALIEN IMPACT will deliver, will be made available for integration into such databases, in order to supply users with more informative estimates of the ecological risks of invading species.





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## EXPECTED RESULTS AND/OR PRODUCTS

The results of the project are expected to create spinoffs useful for ecosystem management and restoration. Sensitive species might be identified that could serve as bio-indicators for impact. Knowledge on carry-over effects of HIPS, mediated by modification of soil properties, can be used to estimate the probability of successful restoration of infested sites. Regional administrations for environment and agriculture can take into account estimates of aggravation of invasion impact by eutrophication, for decisions on the sustainability of agricultural practise. Comparison of impact between ter-

restrial and aquatic systems could aid policy makers in prioritisation of means. The knowledge on HIPS impact acquired in the project will also be used to adjust the Black List and Watch List of exotic species of the Belgian Biodiversity Platform. The results of the project will be actively disseminated to the stakeholders, including the broader public via the ALIEN IMPACT website and via specific activities to raise awareness. These include demonstrations in existing experimental gardens, a brochure on aquatic invasion impact, and guided field tours to in situ experience impact of HIPS on native biodiversity. The results will also be submitted for publication to leading journals in ecology.

## PARTNERS

The research group of partner 1 focuses on global changes and their impact on plants, vegetation, and landscapes. Research in the laboratory of partner 2 is focused on evolutionary and functional aspects of plant-soil relationships, with a special interest for man-disturbed environments. Partner 3 focuses on the ecology of macrophyte-dominated ecosystems and on the genetic di-

versity of plant populations. Partner 4 is developing fundamental and applied research in the domain of plant biodiversity management. The lab is recognized as a centre of expertise for management of invasive species in the Walloon region. Research in the group of partner 5 is focused on the reproductive ecology of several insect-pollinated plant species.

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### Follow-up Committee

For the complete and most up-to-date composition of the Follow-up Committee, please consult our Federal Research Actions Database (FEDRA) by visiting <http://www.belspo.be/fedra> or <http://www.belspo.be/ssd>

