

Ecosystem sensitivity to invasive species

DURATION OF THE PROJECT
01/03/2009 – 28/02/2011

BUDGET
179.778€

CONTEXT

The introduction of invasive species is a major problem to marine ecosystems. The American jack knife clam *Ensis directus* represents a well-investigated and -documented example of such invasion in North-West European coastal waters. Given its high densities and habitat preferences, a major impact onto the *Abra alba* community, the biologically highest valued macrobenthic community along the Belgian coast, was hypothesized. The high densities in combination with its fast growth are expected to impact on the foraging behaviour of larger predators at sea (e.g. sea birds) and further feed the discussion on a possible future commercial exploitation of the species. However, before being able to tackle both issues, still many ecological baseline questions remain unanswered.

PROJECT DESCRIPTION

Objectives

Several ecological aspects, regarding *E. directus* in the Belgian part of the North Sea (BPNS), are considered highly important both from an ecological and socio-economic perspective, but reliable data on these aspects is currently lacking. This study aims at filling this gap in knowledge, focusing on three overarching objectives:

1. To describe the ecological features of *E. directus* in Belgian waters
2. To evaluate the ecological impacts of *E. directus*' introduction into Belgian waters
3. To assess the impact of possible *E. directus*' fisheries in Belgian waters

Within each of these main objectives, several more specific issues are targeted.

Methodology

As no reliable data on *Ensis spp.* populations are available from the BPNS, a first necessary step is to collect baseline field information on *E. directus*, using the most appropriate and reliable sampling techniques. This newly collected data on *E. directus*' distribution as well as population size and structure, in relation to habitat features and accompanying macrobenthic fauna, will then feed the ecological features issue: its habitat and spatial distribution will be directly characterized or assessed as well as mapped through habitat suitability modeling and its accompanying macrobenthic species assemblage will be qualified and quantified. Based on this knowledge the impact of *E. directus* on the spatial distribution of wintering seaducks (common scoter *Melanitta nigra*) in the BPNS will be assessed. The potential impact of *E. directus* on the indigenous macrobenthic fauna will be evaluated through a comparison of existing macrobenthic data obtained prior to and after its introduction in 1987. We will finally address the impact of a possible future targeted fishery on its accompanying macrofauna (habitat suitability modeling, biological trait analysis) and on its population structure and dynamics.



INTERACTION BETWEEN THE DIFFERENT PARTNERS

Given the need for a wide expertise regarding *E. directus* and, by extension, macrobenthos and its habitat in general, a research team with a diverse expertise was set up. Each partner brings in a specific expertise, needed to comply with the objectives of this project. Having a rich background in (1) invasive species' field biology and macrobenthos research in general, (2) the provision of (full-coverage) environmental information on the BPNS, and (3) the application of acoustic techniques in the marine environment, the RBINS-MUMM team is selected as project coordinator. This macrobenthos expertise is completed with the macrobenthos expertise from UGENT-MBS, more specifically its experiences with habitat suitability modeling and grain size analysis, and from IMARES, our foreign partner (the Netherlands) with a unique expertise in *Ensis* spp. stock assessment. The ILVO-Fisheries brings its data on the spatial distribution of *E. directus* in the BPNS. Supplementary expertise for seaducks was retrieved from INBO.

EXPECTED RESULTS AND/OR PRODUCTS

1. Newly collected data, partim *E. directus* sampling, delivered to BMDC-IDOD database.
2. Newly collected data, partim acoustic habitat characterization, delivered to BMDC-IDOD database.
3. Habitat suitability model for *E. directus* established.
4. *Ensis directus* distribution maps for the BPNS available.
5. Trophic relationship between common scoter *M. nigra* and *E. directus* assessed.
6. Effect of *E. directus* invasion on indigenous macrobenthos quantified.
7. Feasibility of *E. directus* fisheries in Belgian waters evaluated: ecological and sustainability implications

PARTNERS

Activities

RBINS/MUMM

General project coordination, field data acquisition and sample processing, integration of partners activities: population structure, predation, impact on local macrobenthic communities, habitat preferences, spatial distribution, potential for exploitation.

UGENT-MBS

Development of habitat suitability models and maps for *E. directus*, macrobenthos database "MacroDat" put at disposal of the project, distribution maps, impact of *E. directus* on indigenous macrobenthos.

IMARES

Expertise and equipment for benthic data acquisition and processing put at disposal of the project, data acquisition in Dutch waters, database to merge Dutch and newly acquired Belgian data, evaluation of potential impacts by *Ensis* targeted fisheries.

INBO

Quantification of the relationship between *E. directus* and the common scoter *Melanitta nigra*.

ILVO

Data on spatial distribution of *E. directus* put at disposal of project

CONTACT INFORMATION

Coordinators

**Steven Degraer, Jean-Sébastien Houziaux
Francis Kerckhof, Vera Van Lancker**

RBINS-MUMM

Royal Belgian Institute of Natural Sciences,
Management Unit of the North Sea

Mathematical Models

Gulledelle 100

B-1200 Brussels

Tel: +32 (0)2 773 21 03

Fax: +32 (0)2 773 21 12

S.Degraer@mumm.ac.be

Promotors

Magda Vincx / Bea Merckx

UGENT-MBS

Ghent University

Biology Department

Marine Biology Section

Krijgslaan 281 – S8,

B-9000 Gent

Tel: +32 (0)9 264 85 29

Fax +32 (0)9 264 85 98

Magda.Vincx@UGent.be

Eric Stienen / Wouter Courtens

INBO

Research Institute for Nature and Forest

Kliniekstraat 25

B-1070 Brussels

Tel: +32 (0)2 558 18 28

Fax +32 (0)2 558 18 05

Eric.Stienen@inbo.be

Johan Craeymeersch

Wageningen IMARES

Institute for Marine Resources and

Ecosystem Studies

P.O Box 77, 4400 AB Yerseke

The Netherlands

visitor's address:

Korringaweg 5, Yerseke

The Netherlands

Tel: +31 317 487075

Fax: +31 317 487359

Johan.Craeymeersch@wur.nl

Kris Hostens / Gert Van Hoey

ILVO - Fisheries

Ankerstraat 1

B-8400 Oostende

Tel. + 32 (0) 59 56 98 38

Fax. + 32 (0) 59 33 06 29

Kris.Hostens@ilvo.vlaanderen.be

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>

