

Optimizing the establishment of inland brackish marshlands: first results of a large-scale experiment and a survey on the invertebrate community

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Brackish marshlands are exceptional habitats confined to places where brackish groundwater surfaces. The area of brackish marshland has shrunken dramatically and a considerable amount of the remaining area is under threat by continuing harbour expansions. Currently, the loss of brackish marshlands within the NATURA 2000 network needs to be compensated following EU legislation. The Institute for Nature and Forest Research (INBO) was asked to compare different scenarios for establishing successful compensation.

In a large outdoor experiment on four locations (Kieldrecht (2), Oudenburg, Zeebrugge), we compare the establishment of brackish marshland vegetation on bare soil between twelve combinations (700 plots) of translocation treatments (transfer of sods, seeds of focal species only, hay, no transfer) fully crossed with three management treatments (mowing, grazing by cows, no management) over three growing seasons. The experimental units are 1 m² square plots in which we monitor plant cover, plant reproduction and plant height (average and maximum). Evaluation of successful ecosystem compensation is preferentially based on more than vegetation alone. Invertebrates are a prime component of biodiversity hence very suitable for evaluating compensation success, yet very little is known on invertebrate communities of brackish marshland. We choose to build a basis dataset of current biodiversity of invertebrates in brackish marshlands in Flanders for later evaluation assessment. We therefore designed a survey applying a set of standardized sampling devices targeting different components of the invertebrate community: pitfall traps (ground-dwelling species), Malaise traps (flying species) and coloured pan traps (mainly flying species). At present, four brackish marshland areas have been sampled: Putten Weiden (Kieldrecht, 2012), Monnikenwerve (Lissewege, 2012), 't Pompje (Oudenburg, 2012), Uitkerkse polder (Uitkerke, 2013).

We here present the first results of the experimental study and the invertebrate survey. Results of the experimental study are particularly premature, after just one growing season. All three true translocation methods increase the colonization of plots by typical saltmarsh plant species. Note that colonization not necessarily implies establishment: with the closing of vegetation, focal plant species will experience increasing competition with the many other species that colonized the plots. The invertebrate survey samples are currently processed. Preliminary analyses suggest large differentiation among sites, even within one area. Typical brackish marshland species appear largely confined to sites where a constant supply of brackish water to the topsoil is available. Future analyses will dig deeper into the relationship with local soil salinity (measured by rhizons) and into the question whereas the invertebrate community of inland brackish marshlands is fully nested in that of tidal saltmarshes, or whether inland brackish marshlands harbor a unique component of total brackish marshland biodiversity.