

Rabbits (*Oryctolagus cuniculus* L.) in coastal dune grasslands

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Abstract

We describe a field experiment for examining the impact of wild rabbits (*Oryctolagus cuniculus* L.) on the vegetation in two Flemish coastal dune grasslands. When numerous, rabbits had a major impact on the vegetation. This impact can be considered positive in the case of the studied grasslands, as evidenced by a decreasing abundance by dominant grass species and a declining species richness. The decrease of the number of rabbits, due to VHS, may hence negatively affect dune grassland species richness. Introducing large herbivores can be part of the solution for preserving the dune grasslands, and this introduction may even have positive effects on rabbit populations through feeding facilitation.

Keywords: Rabbit; Herbivory; Coastal dune grassland; Grazing management.

Introduction

After the last glacial, the wild rabbit (*Oryctolagus cuniculus* L.) has been restricted to Spain and southern France. After its reintroduction in western Europe during the Middle Ages (Tack *et al.*, 1993), the rabbit became very abundant in coastal sand dunes in Belgium, and is since then the most important “natural” herbivore in this area (Rappé *et al.*, 1996). The impressive impact of this herbivore on the vulnerable coastal dune vegetation has been reported several times (*e.g.* Zeevalking and Fresco, 1977; Wallage-Drees, 1988; Olf and Boersma, 1998). Here, we will describe the results of a field experiment that was constructed to assess the influence of the wild rabbit and large herbivores on vegetation characteristics in two Belgian coastal dune areas.

Field study on the impact of rabbits on vegetation

The study was carried out in two coastal dune grasslands in Belgium (in the IJzermonding in Nieuwpoort and in the Doornpanne in Oostduinkerke). To counteract the increasing dominance of grasses and shrubs in this type of grasslands, large herbivores were introduced in both nature reserves (sheep in the IJzermonding, Shetland

Ponies in the Doornpanne). An experimental approach was used to assess the impact of these large herbivores, of the wild rabbits, and of the interaction between rabbits and large herbivores, using exclosures with three treatments (five exclosures in the IJzermonding and three in the Doornpanne). In one treatment all kinds of herbivores can graze. In the other two treatments large herbivores only and large herbivores and rabbits are excluded respectively. After two years, we examined several characteristics of the vegetation (such as species richness, the presence of particular plant species, the vegetation height and the dominance of grasses). Rabbit pellets in the plots were counted every four weeks, because they can be used as a measure for the abundance of the rabbits in the vegetation.

After two years of monitoring, we were able to conclude that, when the rabbits are abundantly present, grazing by rabbits is a very important factor determining vegetation structure and species composition in these grasslands:

- In the IJzermonding, the grassland was regularly visited by rabbits. Treatments from which they were excluded resulted in a dense and high vegetation, with dominance of only a few grass species, a lot of dead organic material and less annual plant species. This treatment was clearly negative for some species e.g. *Sedum acre*, *Arenaria serpyllifolia*, *Phleum arenarium*. In plots that could be visited by rabbits, they proved to be as effective as the large herbivores in reducing dominant plant species. Furthermore, the digging of the rabbits, created some uncovered soil, resulting in safe sites for germination and seedling establishment for plant species that have no opportunities in a high and dense vegetation.
- In the Doornpanne, the plots were hardly visited by rabbits. The vegetation had grown high and dense in the plots, except for these plots were the ponies were able to graze. Nevertheless, large herbivores were not able to compensate for the lack of digging by rabbits, so there was hardly any uncovered soil in the plots.

Conclusions and consequences for dune management

Based on the results of this experiment, we conclude that the impact of rabbits can be impressive when they are numerous: rabbits play an important role in the ecosystem of a dune grassland. If dune management aims at a mosaic of nutrient-rich and nutrient-poor patches of vegetation (shifting mosaics), rabbits can contribute in this process. Although the rabbit is a non-native species in our region, it has become an important part of the system, and the maintenance of the rabbit population is necessary for the preservation of the high species richness of dune grasslands. The recent decrease in the number of rabbits (Janssen, 2004), especially due to VHS (Viral Haemorrhagic Syndrome), should not be ignored in this context. If the number of rabbits in our dune areas keeps declining, introducing large herbivores will be even more important than before. Furthermore, it is possible that large grazers have a positive influence on the rabbit population through feeding facilitation (Arsenault and Owen-Smith, 2002; Drees, 1989; Williams *et al.*, 1974).

In the nearby future, the Terrestrial Ecology Unit of Ghent University will continue investigating the impact of rabbits on vegetation and on the existence of facilitation.

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References

- Arsenault R. and N. Owen-Smith. 2002. Facilitation versus competition in grazing herbivore assemblages. *Oikos* 97(3):313-318.
- Drees M. 1989. Konijnen als grazers. *Duin* 4:156-158.
- Janssen M. 2004. Op de bres voor het konijn. *Duin* 27(4):3-4.
- Olf H. and S.F. Boersma. 1998. Langoor. lange termijn veranderingen in de konijnenstand van Nederlandse duingebieden. Oorzaken en gevolgen voor de vegetatie. Landbouww universiteit Wageningen, Leerstoelgroep Natuurbeheer en Plantenoecologie. 57p.
- Rappé G., M. Leten, S. Provoost, M. Hoys and M. Hoffmann. 1996. Hoofdstuk 7. Biologie. p.167-372 In: *Ecosysteemvisie voor de Vlaamse kust. Deel I. Ecosysteembeschrijving*. Provoost S. and M. Hoffmann (Ed.). Ministerie van de Vlaamse Gemeenschap, AMINAL Afdeling Natuur, Universiteit Gent, Instituut voor Natuurbehoud.
- Tack G., P. van den Bremt and M. Hermy. 1993. *Bossen van Vlaanderen. Een historische ecologie*. Uitgeverij Davidsfonds, Leuven. 320p.
- Wallage-Drees J.M. 1988. Rabbits in coastal sand dunes; weighed and counted. PhD, Rijksuniversiteit Leiden. 151p.
- Williams O.B., T.C.E. Wells and D.A. Wells. 1974. Grazing management of Woodwalton Fen: seasonal changes in the diet of cattle and rabbits. *Journal of Applied Ecology* 11:499-516.
- Zeevalking H.J. and L.F.M. Fresco. 1977. Rabbit grazing and species diversity in a dune area. *Vegetatio* 35(3):193-196.