

An enclosure experiment to assess the impact of ungulates on plant diversity in Belgium

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Context

The erosion of biodiversity is caused by many factors. Large ungulates, which occupy a large part of the Walloon forests, can also influence the distribution and dynamics of plant species. Therefore, they impact the biodiversity of our temperate forests.

Objectives

The aim of the present study is to identify changes in forest understory vegetation due to the pressure exerted by wild ungulates thanks to an enclosure-exclosure experiment.

Results

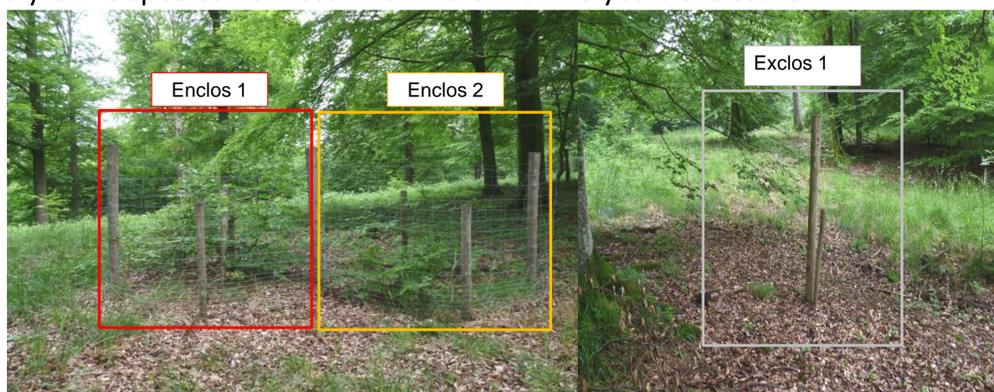
Method

Study site

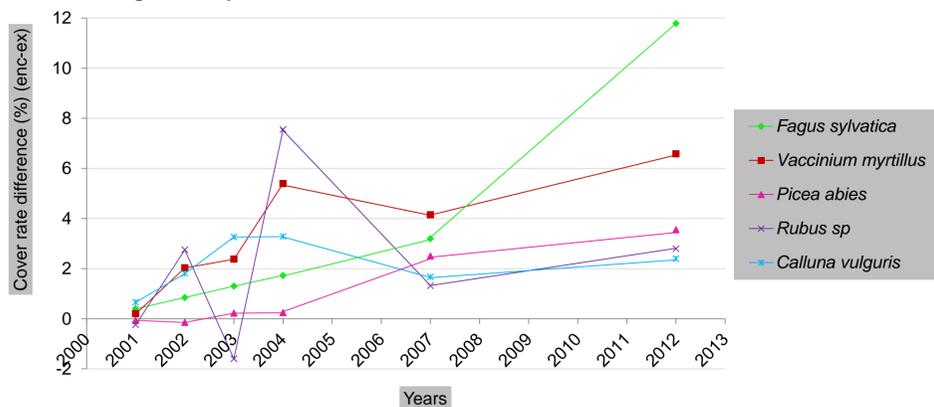
This study was conducted on a high plateau of the Ardenne, in the forest of St Michel Freyr (South Belgium). The forested area is dominated by beech and spruce where red deer, wild boar and roe deer are living in sympatry.

Sampling design

150 sampling plots were established in 2000. Each plot consisted of two closed enclosures of 4 m² each and one exclosure of 4 m² as control under pressure of ungulates. Sampling was carried out systematically by a 500m-square mesh. The cover rate and height of some easily identifiable species were measured regularly since 2000 (2001, 2002, 2003, 2004, 2007, 2011-2012). In addition, we identified each herbaceous species in 2011-2012 to analyze the species richness after more than 10 years enclosure.

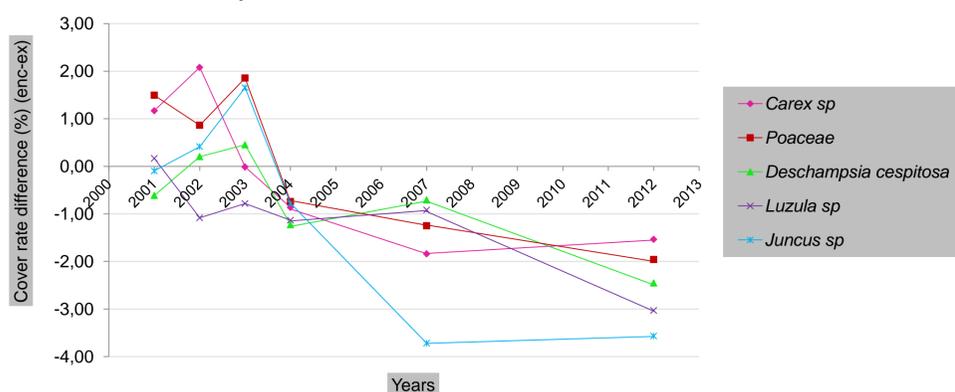


Ligneous species cover rate difference between enclosure and exclosure



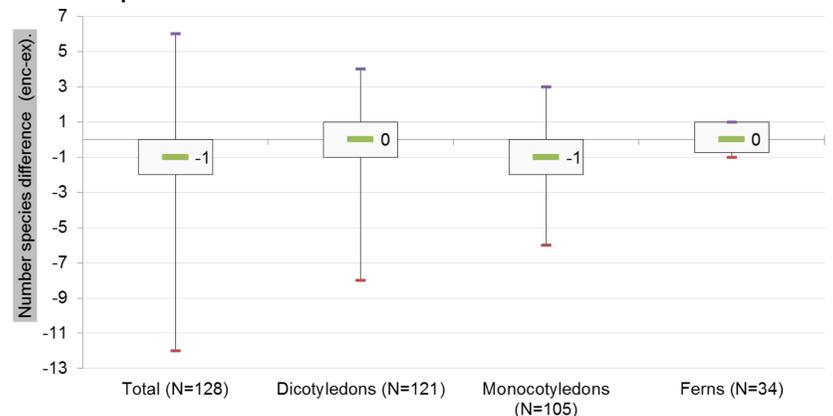
Ligneous species showed an increase of development in the fenced area. These species are more impacted when they are not much represented in the study site.

Herbaceous species cover rate difference between enclosure and exclosure



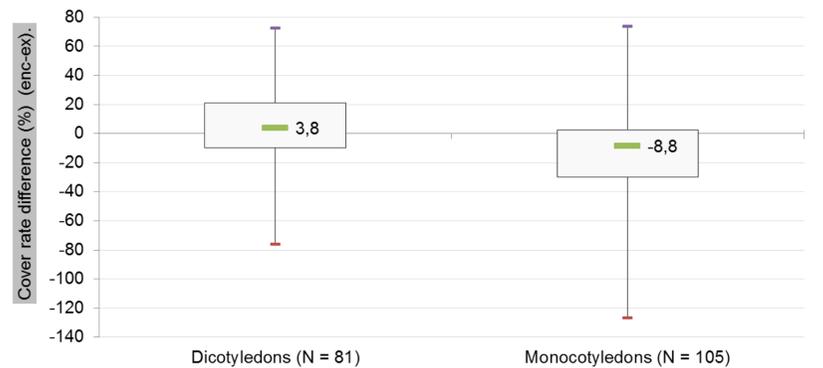
In the same time, herbaceous species have a lower cover rate in the enclosure because of the competitive exclusion induced by shrub and tree seedlings layer.

Species richness difference between enclosure and exclosure



Species richness and diversity are higher in areas impacted by herbivory. Monocotyledons are mainly favored while tree seedlings are unfavored. Browsing on the trees keeps the area free from high vegetation and allows light to reach the ground.

Cover rate difference between enclosure and exclosure



If the apparition of most species is favored by ungulates, they induce a lag of growth on dicotyledons which have a higher palatability than monocotyledons.

Conclusion

Ungulates have the ability to impact the distribution of vegetal species by the modification of the competitive interaction. By their pressure on tree and shrub species, they induce a higher diversity of the ground flora. However, this change in vegetation composition is slow and requires a long-term study, specially in areas of low biomass productivity like the St-Hubert forest.