

# The Impact of Intensive Grass Cultivation on Biodiversity

## - Review

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### Introduction

Milk production has diverse effects on biodiversity in agricultural ecosystems. Although traditional cattle production based on grazing is often considered beneficial for local biodiversity, intensive grassland production using short-term leys has been criticised for reducing biodiversity (direct and indirect impacts). However, there seems to be lack of scientific knowledge concerning observed effect of intensive cattle production on biodiversity in Finland and other similar regions in Scandinavia.

### The aim of the study

The aim was to review the literature about the effects of intensive grass cultivation on biodiversity in agricultural ecosystems and identify the most important biodiversity indicators for Finnish agriculture. This review will cover different biodiversity aspects, such as **flora, fauna, microbiota, soil and waters, and indirect effects of nutrient leaching and deposition.**

### Flora

There are only few studies focusing on vascular plant diversity in intensive grassland systems in Finland. An increasing proportion of legumes in grass cultivation might increase the botanical value of grassland for silage.

### Fauna

Impacts of intensive grass cultivation on arthropod and other invertebrate abundance and diversity are poorly studied in Finland. However, intensity and type of management in grasslands affect both communities.

Knowledge on Finnish farmland bird populations and diversity changes is based on censuses made since the 1930s. Diversity of bird communities is related to changes of landscape structure and land use. Especially, the decline of dairy farming has caused profound changes which are related to the disappearance of food availability on pastures and around cattle. However, there are no published studies on the impact of intensive grass cultivation on birds.



Picture: Perttu Virkajärvi

### Soil Environment

The activity of decomposers is essential to the well-being of all organisms relying on primary production. Soil microbes, earthworms, nematodes and enchytraeids well represent soil decomposer food webs as they together cover all trophic groups of soil organisms. These groups have been suggested to be suitable bioindicators for soil health and quality. Nevertheless, there were only few scientific papers focusing on below-ground biota in various agriecosystems including intensive pasture and none about the effects of intensive silage cultivation on biodiversity of below-ground soil organisms in Finland.

### Water Environment

Ecological assessment does not take into account intensive grass cultivation separately; with present knowledge, we can only hypothesize its effects on aquatic biodiversity based on our expert opinions and combining the current knowledge of nutrient and/or sediment loading to aquatic biodiversity in general.

### Indirect effects of nutrients

Leaching of nutrients from grasslands to watercourses can cause eutrophication of aquatic ecosystems. Vegetated strips are probably the most common means used for mitigating these harmful effects. Effect of  $\text{NH}_3$  deposition is not measured but N deposition in Finland is low compared to most EU countries.

### Conclusion

There seems to be lack of information in all biodiversity categories – especially in soil organisms. Also, the connection between intensive grass production and biodiversity needs more attention in Finland.

The impacts of intensive grass production on different biodiversity aspects are strongest on soil structure and consequently soil organisms.



Picture: Pauliina Taimisto