

## Plant species diversity in permanent grassland production systems

Permanent grassland ecosystems account for a large part (34%; 58 Million hectares) of the currently utilised agricultural area (UAA) in the EU-28 plus Switzerland (CH) (Eurostat 2012). Permanent grassland ecosystems provide multi-functional services. Besides feed and food production ('provision' function) (Hopkins & Holz 2006), they are of primary importance for conservation of plant diversity and soil organism diversity ('support' function), and mitigation of climate change through enhanced sequestration of carbon and nutrients ('regulation' function) (FAO & ITPS 2015; Peeters 2009; Minns et al 2001; Tilman et al 2001). The current European Common Agricultural Policy (CAP) and European Habitats Directive for 2014 to 2020 point towards an increased importance of permanent and extensively managed grassland systems (PEGS). The agro-ecological scheme of PEGS primarily aims at reducing fertiliser-input and at the same time enhancing above- and below-ground biodiversity to profit from their support functions, while decreases in food and feed provision are only accepted to a certain extent. PEGS ideally complement intensively managed grasslands, which mainly satisfy the increasing global demand for feed and food (O'Mara 2012; OECD/FAO 2011). PEGS thus may serve as a refuge for biodiversity, a typical feature for this habitat. The practicable ratio of PEGS versus intensively managed grasslands will very much depend on the productivity of PEGS and their effectiveness in promoting biodiversity. Therefore, it is of prime importance to understand the interactions of above- and below-ground biodiversity of PEGS and its ecosystem services.

In the BIOINVENT project (see SLU webpage for more information) we investigate if grassland management is a stronger regulator of soil microbial diversity than agro-ecological distinctions across Europe and if PEGS select for those microbial groups showing a stronger functional adaptation to below-ground resource limitation than more intensively managed grassland systems. However, the management effects on the plant communities are not yet resolved. The plant survey in Sweden was done more extensive than in the other partner countries and allows for a more detailed analysis. The plant species communities were recorded in 2017 at 72 localities in Skåne (southernmost of Sweden) and Västerbotten (north of Sweden). Soil sampling was done simultaneously.

The aim of the thesis is to investigate how the plant communities are controlled by management factors.

The project will include on one hand a detailed analysis of the plant species diversity (the plant inventory has been already done during summer 2018), and on the other hand an analysis of the C and N content of the plant material.

The project is suitable for master thesis in the horticultural programme, landscape architecture, biology, ecology, and agroecology. In case of a Master Thesis in Agroecology, systems thinking, interdisciplinary research and education, and participative and action-oriented strategies are required components which needs to be developed by the student.

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