

Book of Abstracts

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'Soil Science in a Changing World'

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SOIL ECOLOGY AND ECOSYSTEM SERVICES OF DAIRY AND NATURE GRASSLANDS ON PEAT

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Peat wetlands are of major importance for ecosystem services such as carbon storage, water buffering and maintenance of biodiversity. However, drainage for dairy farming may lead to increased CO₂ emission, soil subsidence, societal costs and biodiversity losses. Solutions are sought in reducing drainage, adapting farming to wetter soils, and converting dairy grasslands to nature. We compared the soil ecology and related ecosystem services of twenty dairy and twenty nature grasslands on peat in the Netherlands. Soil abiotic and biotic parameters were measured (0-10 cm depth), with particular focus on the ecosystem services (i) grass production (soil fertility), (ii) mitigation of climate change (CO₂ emission), (iii) water buffering (water infiltration) and (iv) maintenance of biodiversity (soil faunal diversity).

The potential for grass production was higher in dairy than in nature grasslands. This was related to higher nutrient concentrations, pH and root densities. Potential N and C mineralization (CO₂ emission) were similar in dairy and nature grasslands. As the variation in these parameters was partly explained by soil water content, mineralization rates in the top soil appeared to be limited by moisture independent of land use type. Water infiltration rate was higher in dairy grasslands, and correlated with soil porosity. Earthworm abundance was also higher in dairy grasslands, as well as the mean soil faunal taxonomic richness per site. However, the total observed number of taxa per land use type (gamma diversity) was higher in nature grasslands. Our findings show that land use type strongly affects the ecosystem services of grasslands on peat soils.