Concepts for nutrient management in nature conservation areas on organic soils

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Introduction

Lowland fen grasslands are important breeding habitats for meadow birds. The extensive agricultural use is supposed to provide a certain habitat structure, since nutrient input via fertilization is forbidden. Nevertheless grasslands exhibit different trophic levels, which have an effect on botanical composition and feed quality for herbivores, but also on the abundance of soil fauna as a feed source for meadow birds.

We intended to identify the main drivers for the different trophic levels of grassland soils and their effects on the biotic and agricultural resources to create a reasonable concept for nutrient management on lowland fens.

Material and methods

In 1999 we started to collect data on the characteristics of grassland use in order to investigate the soil conditions and the situation of flora and avifauna over an 8-year period. This included peat layer thickness and ground water levels. Soil nutrients P and K (double lactate extraction method, DL) were analyzed from representative topsoil samples (0-10 cm). Evaluation of the agricultural suitability of above ground biomass was based on yield recording, weighing livestock and in-vitro-digestibility analyses of hay and silages. To estimate the habitat quality for meadow birds, we characterized the sward structure and determined invertebrate-biomass of the topsoil using eclector traps.

Results and discussion

Despite the geogenic determined differences in nutrient status of lowland fen soil, the trophic level and the sustainability of it can be controlled, at least partly, by choosing the management and utilisation of grasslands either as grazed or cut or a mixture of both.

The K flux can be seen as a important control variable on fens as K is closely related to the biomass yield and parameters of biotop/habitat quality, and is influenced in the short-term. Providing a good potential feed source for meadow birds while maintaining a good agronomical field utilisation are not necessarily conflicting aims. This finding offers perspectives for an efficient management of meadow bird protection in extensive grassland, which are used by farmers.