



Saisonale Nährstoffdynamik und Veränderung der Futterqualität auf einem Kalkmagerrasen

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Abstract

In the nature reserve Osterklee, situated in the northwestern part of Germany, a management conflict for calcareous grassland arises from different objectives of nature conservation. The calcareous grasslands of the nature reserve are maintained by traditional sheep pasture. Grazing especially in spring and early summer, however, seriously endangers a population of protected orchids (*Orchis mascula*). Against this background, this study aims at determining the seasonal dynamics of soil and plant biomass nutrients and the development of forage quality in the course of a growing season on this site. Additionally, the impact of pasture on nutrient dynamics will be considered.

In order to determine the concentration of nitrogen, phosphorus and potassium in soil and biomass, samples were taken monthly from May to August. The samples were also analyzed for fiber contents (NDF, ADF and ADL) and the resulting nutritional feeding value (MJ ME and MJ NEL). The nutrient availability on the site was low and little variation occurred during the growing season. The plant nutrient content, on the other hand, was more dynamic. The mineral nutrient content declined from May to July due to plant growth and senescence and increased again in August according to the typical growth rhythm in grasslands. Due to dilution during the time of highest plant growth rates (May to June), the plant nutrient concentration particularly declined on sites with a comparatively better nutrient availability. The fiber concentration increased according to the physiological ageing of the vegetation and increasing cell wall fractions. Simultaneously, the feeding value declined. The highest increase of fiber content and thus loss in feeding value corresponded with the major growth of grasses. At the end of the study period, the feeding value was high by comparison, presumably due to large amounts of leafy herbs and short grasses in vegetation. The grazing of sheep caused a regeneration of the vegetation and hence increased the forage quality especially at the end of the growing season. Merely the ADL content of the vegetation was not influenced by the graze.

This study proves that the decline of nutritional feeding value with the maturation of the vegetation is a feature that can also be found in calcareous grasslands. Additionally, it stresses the relevance of seasonal growth patterns, which are subject to weather condition, and its impact on nutrient dynamics on the nutrient-poor and dry calcareous grasslands in the Osterklee. The results also emphasize that the occurring management conflict might not be solved by shifting grazing, for example, to August. Sheep pasture at this time of the growing season might not impede natural succession due to a declining forage quality and an increasing lignification of grasses. For further management it is important to give priority to one of the objectives of nature conservation in Osterklee.