

A sward based method to estimate herbage selection of grazing dairy cows

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Introduction Diet selection of grazing animals is influenced by sward composition and vertical sward structure. Grazing studies were established in northern Germany (Kiel, Schleswig – Holstein state) to determine if selective grazing behaviour in a mixed sward can be measured by a sward based method. The hypothesis that active selection of different functional groups of forages can be documented by using the selection index (Figure 1, Hodgson, 1990) and regressive approaches vs time was tested.

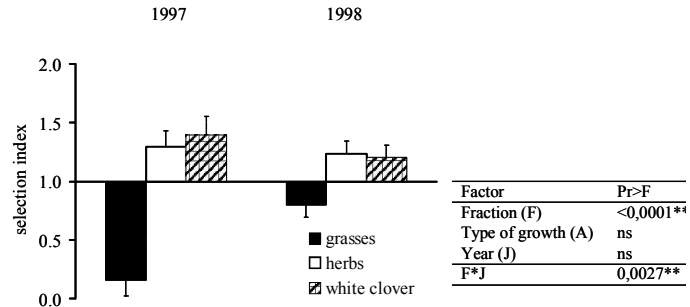


Figure 1 Selection index of dry matter intake (according to Hodgson, 1990) for grasses, herbs and clover (means of growths, 1997 and 1998)

Materials and methods Pastures were a multi-species permanent grassland with grasses (*Lolium perenne* exceeded 80% of the grass fraction), white clover (*Trifolium repens*) and herbs (*Taraxacum officinalis* exclusively). The measurements were conducted in a rotational grazing system during 1997 and 1998. In both years we used three grazing periods each of 5 days of grazing. Clip boards were used to divide the samples into layers of 5 cm each to separate the herbage mass in different plant groups. This procedure was conducted daily during each grazing period (four replicates), starting the day before grazing began. Four non-grazed replicates were used as control. Analysis of variance was performed with the procedure MIXED of SAS software taking into account the factors fraction (grass, clover, herbs), type of growth (spring, summer, autumn) and year (1997, 1998).

Results Selection index of dry matter intake indicates that cows selected herbs and white clover in preference to grasses (Fig.1). However, the selection index gives no indication as to whether a species in a specific layer has been selected actively or not. Depending on the vertical architecture of a species in a mixed sward, stratification effects (passive selection) can overlap with active selection processes.

Data from the different layers of grazed and non-grazed swards indicate, that selection of herbs was an active selection process, while selection of white clover was a passive selection process due to the stratification of the sward by the grazing animal. Selection of herbs and white clover obviously depends on the amount of these species in the offered forage. When the percentage of herbs exceeded 40% in offered forage (Fig. 2 ;1997) a significant selection could be documented, while a smaller percentage of herbs (less than 25%) in the sward did not enhance dry matter disappearance of herbs (1998).

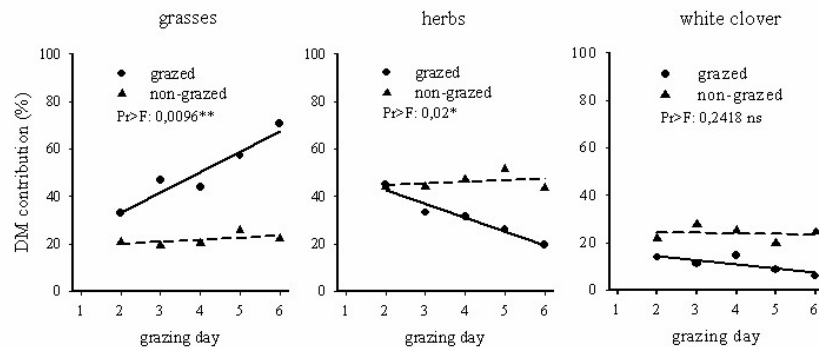


Figure 2 Effects of defoliation (R, grazed, non-grazed) and time (T, grazing day within growth period) on the contribution of grass, herbs and white clover (% of DM) of the grazed and non-grazed swards (1997, mean of growth periods). Shown is the interaction RxT

Conclusions Herbage disappearance and crude protein content of disappeared herbage indicated that by using a sward based method in an accurate way, quantity and quality of consumed forage can be estimated in its dynamic within the grazing period.

Reference

Hodgson, J. (1990) Grazing Management – Science into Practise. Longman Scientific Technical, New York