

Effect of sward height on the behaviour of grazing dairy cows*E. Paulenz^{1,2}, L. Gygas¹, K. Barth² and E. Hillmann¹**¹Division of Animal Husbandry and Ethology, Faculty of Life Sciences, Humboldt-Universität zu Berlin, Invalidenstraße 42, 10115 Berlin, Germany, ²Institute of Organic Farming, Johann Heinrich von Thünen Institute, Trenthorst 32, 23847 Westerau, Germany; esther.paulenz@hu-berlin.de*

Pasture management affects quantity and quality of the feed provided to grazed animals. Therefore, it has an impact on animal welfare, but is often perceived by the farmer to be labour-intensive and might be challenging due to its complexity and interdisciplinarity. One challenge is estimating the amount of feed available and when to move to the next paddock without causing too many losses or impair animals' welfare. Tools based on behavioural measurements might assist the farmer in this decision process. To investigate this approach, we aimed to determine if the behaviour of dairy cows changes with decreasing sward height during grazing. Forty-four cows (German Holstein) were allocated two areas of different pre-grazing sward height (12.0 and 8.0 cm, respectively). The cows grazed until a sward height of 4.0 cm, which took two to six days. Sward height was measured four times a day using a rising plate meter (Grasshopper®, True North Technologies). Feeding and rumination behaviour was measured by RumiWatch® (ITIN + HOCH GmbH) and lying behaviour by IceTag3D™ (IceRobotics Ltd.). Weather data were obtained from a weather station of the research farm. Based on a principal component analysis, we identified three components that could be associated with different behavioural patterns and explained 70.4% of the variance in the dataset. For each pattern, representative variables were selected. Eating and lying time were chosen for the 'general behaviour' at pasture, number of activity changes and number of lying bouts were representative of the pattern 'activity', and 'ruminating' was represented by rumination bout duration. We found significant effects of compressed sward height on eating time, lying time, and number of activity changes, which, however, only occurred when further effects like the time of the day and the weather were taken into account. The factors that we investigated in this study described only a part of the data variation. Therefore, further aspects need to be considered to develop a reliable decision support tool for practical application on farms.

Detecting feed scarcity on pasture by a drop in milk yield and behavioural changes of grazing cows*L. Hart^{1,2}, U. Dickhoefer¹ and C. Umstaetter²**¹University of Hohenheim, Fruwirthstrasse 31, 70599 Stuttgart, Germany, ²Agroscope, Tänikon 1, 8356 Ettenhausen, Switzerland; leonie.hart@agroscope.admin.ch*

Most of the time, dropping milk yields are the initial alarming sign to recognize a potential problem with feed intake of dairy cows. The present study aimed at determining the changes in milk yield and behavioural patterns of grazing dairy cows that occur as soon as the allocated feed in a plot becomes scarce. A part-time rotational grazing system was set up in 2019 where twenty lactating cows grazed in two plots on permanent grassland for 9-11 h/d over six consecutive days during six experimental periods. The available feed within a plot was 80% of all cow's dry matter feed demand for each 6 d. The same restriction was applied to the feed supply in the barn. To verify changes in daily feed intake on pasture, rumen fill scores were evaluated visually in each cow following the daily time on pasture. Milk yields were recorded by the milking system and chaw movement sensors measured grazing and rumination behaviour of the cows. Both was summarized by day. The next-day's milk yield was considered to correspond to the cow's feed supply on the present day. The first three days of each experimental period were used to create a cow-individual milk yield baseline. As a first result, the mean relative decrease in daily milk yields of cows during days 4 to 7 was -1.6, -7.3, -10.8 and -9.7% from the baseline, respectively. The mean relative decrease in rumen fill scores was more pronounced and gradually increased towards the end of the 6-d-periods, when it was -19.7% lower than the mean rumen fill score on days 1 and 2. The mean standard deviation of the milk yield baselines across all cows and periods was 6.3%. In a next step, we will consider the feed allowance of individual cows as scarce, if their milk yield drops below the 99% confidence interval, and analyse the behavioural patterns that occur in such cases. We hypothesize that behavioural patterns can be used to inform farmers about scarce feed availability on pastures without a one-day delay such as in the response of milk yield, which would support decision-making related to the allocation of new grazing plots to cows in commercial dairy farming.