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Establishment of an intensive grazing system for lactating cows －Focusing on meadow fescue pasture－

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Summary

The purpose of this study was to establish an intensive grazing system for lactating cows in regions of Japan in which temperate grass can grow stably in summer, such as Hokkaido, Tohoku and Chuubu districts. Experiments were carried out to determine the productivity of this grazing system and to quantitatively show how to manage pastures by analysis of coefficients related to pastures and grazing cows under intensive grazing conditions. The main grass species sown in the experimental pastures were meadow fescue (Mf) and perennial ryegrass (Pr), and experiments to determine the optimal method of intensive grazing of an Mf pasture was also carried out. Pr is the best grass species for intensive grazing but can not survive in regions in which soil freezes in winter. Although Mf has potential as a grass species for an intensively managed pasture in an area in which Pr can not survive in winter, the characteristics of Mf under the condition of intensive grazing have not been clarified.

In experiment 1 in this study, an Mf pasture and a Pr pasture were subjected to intensive grazing by lactating cows from May to October each year for a period of 5 years, and milk productivities of cows grazing in the two pastures were compared. Four spring-calved cows were grazed in each of pastures in the daytime and then grazed together in the other same pasture at night. The cows grazed in the Mf pasture and those grazed in the Pr pasture showed no significant differences in 4 % fat corrected milk (FCM) production, quality of milk, body condition score, concentrations of blood constituents, and total digestible nutrient (TDN) supply from grazing. The FCM production from cows grazed in both Mf and Pr pastures reached 8,500 kg / ha, indicating that the milk productivity of cows grazed in an Mf pasture and that of cows grazed in a Pr pasture are the same. On the other hand, over 60% of the TDN demand of the cows was supplied by roughage during the grazing season except for the first year, and this was thought to be due to the effect of intensive grazing.

Experiment 2 was carried out to determine the factors that influence herbage intake of a lactating cow. Herbage intake per herd was estimated by measuring herbage mass before grazing and that after grazing or by the method of Linehan. The average TDN content of herbage was over 68%, and about half of the TDN demand of cows was supplied by grazing between grazing seasons. Mean daily milk yield and herbage intake of cows were 31 kg / head and 1.75 kg / 100 kg of body weight, respectively. Herbage intake was most greatly affected by herbage mass, and herbage intake increased as herbage mass increased and decreased as intake of supplement increased. The grass species in the pasture had only a slight effect on herbage intake, and the TDN content of herbage had almost no effect on herbage intake. Daily milk yield did not influence herbage intake. A positive correlation was found between herbage mass and TDN intake from grazing for cows that were grazed in a one-day rotational grazing pasture in which the herbage mass per 100 kg of body weight was less than 8 dry matter kg.

Experiment 3 was carried out in small pastures to determine the effects of plant height in a pasture being grazed on plant yield, nutritive value and persistency of the pasture. The effect of integration of conservation with grazing on persistency of the Mf pasture was also investigated. When plant height had reached 20 cm and pastures were grazed, yield and nutritive value of the plants in the Mf pasture were the same as those of plants in the Pr pasture, the efficiency of utilization of

the Mf pasture was greater than that of the Pr pasture, and persistency of the Mf pasture was inferior to that of the Pr pasture. When plant height had reached 25 – 30 cm and the Mf pasture was grazed, the plant nutritive value was slightly lower but the plant yield was 33% greater and persistency of the pasture was improved compared with those in the case of grazing at a plant height of 20 cm. There was little improvement in persistency of the Mf pasture by integration of conservation with grazing.

While showing the intensive grazing system of Mf and Pr pasture based on the above result, it came to a conclusion as follows. Pasture productivity and milk productivity of an Mf pasture under intensive grazing conditions are equivalent to those of a Pr pasture. Therefore, the pasture areas required for the two species are about the same. However, for permanent use of an Mf pasture, plant height at the time of grazing of an Mf pasture must be set at a higher level than that of a Pr pasture (i.e., at 25 – 30 cm). Thus, an Mf pasture requires a longer rest period than does a Pr pasture, and more paddocks are therefore required for Mf even if the total pasture area does not change. Moreover, although the nutritive value of an Mf pasture used for grazing when plant height is 25 – 30 cm is slightly lower than that of a Pr pasture used for grazing when plant height is 20 cm, herbage intake and TDN intake from an Mf pasture are not influenced because herbage mass is sufficient.