MILK PRODUCTION AND FEED INTAKE AT DIFFERENT STOCKING RATES IN AN INTENSIVE GRAZING SYSTEM

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ABSTRACT

The purpose of this research was to determine milk productivity from pasture, using dairy cows of higher performance (>7500 kg for a 305-day lactation) in an intensive grazing system. In both 1993 and 1994 two groups of 3 cows each were grazed from spring to autumn: one group in 1.1 ha (LS) and the other group in 0.65 ha (HS) pasture. A different part of each pasture was cut for hay or silage twice a year. Concentrate and roughage were supplied according to the nutrient requirement of the cows. Milk production from grazed and harvested herbage of the LS pasture in 1993 and 1994 was 10,509 kg/ha and 8,766 kg/ha, respectively, and that of the HS pasture was 9,918 kg/ha and 12,025 kg/ha, respectively, for the same 2 years. The cattle's energy intake from the LS pasture was 80 % of their total intake, and 50-60 % of their total intake from the HS pasture.

KEYWORDS

Dairy cow, intake, Japan, milk production, rotational grazing

INTRODUCTION

In Japan many dairy cows are fed indoors. Recently, however, grazing of dairy cows is being examined as a means of reducing labor, costs, and pollution. There are many problems to overcome in developing a suitable and sustainable grazing system for Japanese farmers, for example the severe climate (hot and humid summers, rainy seasons), small plots of land, and the difficulty of balancing pasture production with the nutrient demands of animals during the grazing season. We have developed an intensive grazing system for raising steers and have achieved high animal production of 1,000 kg body weight gain/ha (Kobayashi et al., 1989). This system is being used for dairy cows, which require higher nutrient intake. This grazing study was conducted to determine potential milk productivity of pasture by maximizing the utilization of pasture at different stocking rates, using higher-production cows.

METHODS

In 1993 and 1994, 2 groups of 3 Holstein cows each were rotationally grazed from spring to autumn in ryegrass(*Lolium perenne* L.)-dominant pasture at the National Grassland Research Institute in the middle of Japan: one group on 1.1 ha (LS:2.7 cow/ha) and the other on 0.65 ha (HS:4.6 cows/ha). The cows all calved between February and April except for one cow in the 1994 LS group which calved in October of 1993. The area of pasture cut for making hay or silage was 55 % in late spring and the other 45 % in early summer in the both pastures. Concentrate (a mixture of 80 % cereal grains and 20 % cotton seeds) and roughage (harvested herbage, alfalfa cubes and beet pulp) were supplied to the cows. The level of supplementary feeding was governed by the availability of the pasture, and was calculated to satisfy the energy requirements of the cows according to NRC (1988) and to make the NDF content of total feed more than 35 %.

RESULTS AND DISCUSSION

Table 1 summarizes the results of 2 years of grazing trials. In 1994 a drought and hot summer resulted in shorter grazing days and lower milk production in comparison to 1993. "Milk production of pasture" means the milk produced from grazed and supplied herbage of the pasture, which was calculated with NEL intake. "Milk production of pasture" for both herds reached 10,000 FCM (4 % fat corrected milk) kg/ha except for the LS pasture in 1994. 600 kg of the total hay harvested from the LS pasture was not fed to the cows because the grazing trial finished earlier than planned in 1994. If cows had been supplied with it, the milk production should have increased.

In 1993 milk production per cow was higher for LS pasture than for HS, while in 1994 the LS rate was lower than HS. One reason for the lowest milk/cow rate for LS in 1994 is that there was a late-lactation cow in the group. It is difficult to directly compare the production per animal of the groups because the calving date of cows varied. Therefore, milk production over a 305-day period was estimated from the lactation stage and the rate of performance. LS showed 6,800 and 6,480 kg/cow, and HS showed 6,400 and 6,640 kg/cow in 1993 and 1994, respectively, and the difference between LS and HS was not distinct. These performance rates were not low but our target had been higher, >7500 kg/cow. This means that the actual availability of pasture was lower than expected. Energy intake from LS pasture was 80 % of total intake in both years, and that of HS was 47 % in 1993 and 59 % in 1994.

The results of this study indicate the high pasture productivity in this intensive grazing system in Japan, but the lactation curve during grazing shows that cows could not achieve the target performance during early lactation or summer. Developing a grazing system for dairy cows needs further investigation.

REFERENCES

Kobayashi, H., K. Ochiai, S. Shioya, Y. Togamura, T. Ami, N. Harashima, K. Sato and M. Nashiki. 1989. New grazing animal production system in Japan. XVI International Grassland Congress in Nice, France: 1139-1140.

National Research Council. 1988. Nutrient Requirements of Dairy Cattle (6th. rev. ed.) National Academy Press, Washington, D.C.

Table 1
Results of grazing trials in 1993 and 1994

		Year	LS	HS
Grazing days	days	1993	205	205
	days	1994	181	181
Milk production	FCM kg/ha	1993	13,285	21,102
	FCM kg/ha	1994	10,677	20,520
Milk production of pasture	FCM kg/ha	1993	10,509	9,918
	FCM kg/ha	1994	8,766	12,025
Milk production of cow	FCM kg/cow	1993	4,871	4,572
	FCM kg/cow	1994	3,915	4,446

FCM:4 % Fat corrected milk