

Effect of forest grazing in summer on grazing behaviour, heart beat and heat production of beef cows

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Introduction In Japan summer is very hot and humid, particularly in daytime, therefore the supply of shade to animals is important. At the same time, a lot of forest and partial forest area is under-utilised in most of the mountain areas. Introduction of animals to forest areas might result in not only less labour demanding animal management, but also in the efficient weeding in the forest (Sugimoto *et al.*, 1999). We compared the grazing behaviour, heart beat and heat production of beef cows in partial forest with those in the normal grazing place outside the forest.

Materials and Methods The experiment was undertaken in summer. One study site was normal hill side (reference place (RP), mean temperature 24°C) with artificial shading of a feeding shed and some trees and the other was a partial forest range (forest place (FP), mean temperature 25°C). The animals were 2 mature/2 old and 2 mature/1 old cow in RP and FP, respectively. The grazing behaviour was observed and the heart beat measured. Expired gas samples were taken with a change of heart beat and analysed by mass-spectrometry and wet gas meter. Heat production was estimated by Brower's equation (1963). The data were analysed by 4 ways of analysis of variance.

Results There were 3 peaks of eating behaviour in RP. However it was distributed throughout the day in FP. The animal spent ca. 4 hr in the shade in RP and on and of in FP. The grazing behaviour under trees was distributed throughout the day (Fig.1 and 2). The ratio of rumination time to eating time tended to be lower in FP than in RP. The mean heart beat of animals in FP was much lower than that in RP ($P<0.05$). The regression equation of heat production vs. heart beat was also different between the RP and FP groups ($P<0.05$). Heat production per metabolic body weight tended to be lower in FP than in RP, reflecting the lower heart beat of FP. Heat production was also affected by place, grazing behaviour and age of the animal ($P<0.05-0.01$).

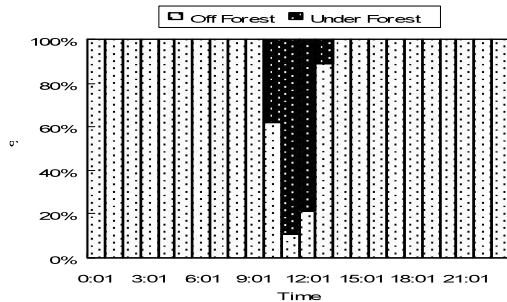


Figure 1 Behaviour in reference place

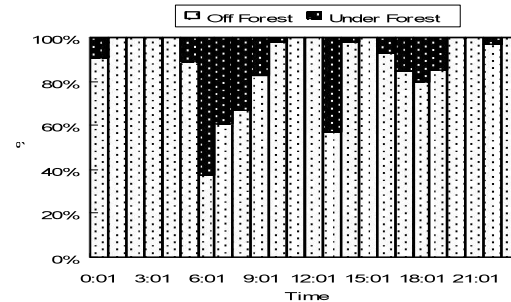


Figure 2 Behaviour in forest place

Conclusions The grazing behaviour, heart beat and heat production of animals in Forest Place was greatly different from those of normal grazing (in Reference Place). This suggests the favourable effect of forest on animal grazing in a hot summer.

References

- Sugimoto, Y., Y. Nakanishi K., Hirata & H. Tobioka, (1999). Forest-pastoral system in the mountainous area of Kyushu, Japan. *Proceeding of the International Workshop on Conservation and Utilization of Land Resources in Less Favored Areas with Special Emphasis on the Roles of Livestock and Technology*, Matsue City, Japan, 92-93.
- Brower, E. (1965). Reports on sub-committee on constants and factors, In: K.L Blaxter, (Ed.) *Energy Metabolism*. Academic Press, London, 441-443