Livestock Production and Land Use in Hills and Uplands
Occasional Publication No. 18 — British Society of Animal Production 1994
edited by T. L. J. Lawrence, D. S. Parker and P. Rowlinson

The effect of grazing by cattle on animal performance and floristic composition in *Nardus*-dominant swards

T. G. Common, I. A. Wright and S. A. Grant

Macaulay Land Use Research Institute, Craigiebuckler, Aberdeen AB9 2QJ

Introduction

Nardus stricta (White bent) is currently estimated to dominate over 20% of native grasslands in the United Kingdom and this area is generally accepted to be increasing. The increase in *Nardus* may be due to a decrease in the ratio of cattle to sheep grazing native grasslands since sheep are more able to select the preferred between-tussock grasses (Grant, Suckling, Smith, Torvell, Forbes and Hodgson, 1985). Research using non-lactating cows has indicated that semi-natural plant communities dominated by *Nardus stricta* tussocks can be manipulated by grazing with cattle (Grant, Torvell, Armstrong and Beattie, 1987; Hodgson, Forbes, Armstrong, Beattie and Hunter, 1991). A management regime was identified in which dry cows gained weight and the proportion of *Nardus* in the sward declined with time. There is no equivalent information on the relationship between the levels of *Nardus* utilization and the levels of performance that can be sustained by lactating beef cows and their calves. A long-term large-scale experiment was set up in 1988 to provide this information.

Material and methods

Treatments

An area of 25 ha of *Nardus*-dominant grassland was divided into four plots to provide two replicated treatments. Each plot was grazed by six experimental Blue-Grey lactating beef cows and their spring-born Charolais-cross calves. Additional cows and calves were added or removed to maintain the preferred between-tussock grasses at heights of either 4 to 5 or 6 to 7 cm. Grazing began when target sward heights were reached in spring (usually mid to late May) and continued until only two cows remained on each plot (usually early September).

Measurements

Records were kept of stocking density. Cows and calves were weighed every 2 weeks and whenever they were moved on or off plots. Milk yields were measured using an oxytocin and machine milking technique during each intake measurement period.

The floristic composition and structure of the sward were recorded in May each year using an inclined point quadrat at pre-determined positions in each plot. The proportion of *Nardus* leaves showing signs of grazing and the grazed leaf lengths were measured in July and at the end of grazing.

Results and discussion

Preliminary results are available for the first 4 years of the experiment. In the 1st year the proportion of *Nardus* tillers grazed (Table 1) on the 4 to 5 cm treatment was twice that on the 6 to 7 cm treatment (71 *v.* 36%). During the following 3 years the proportion of grazed *Nardus* tillers on the 6 to 7 cm treatment increased to over 65%. The *Nardus* leaves were also more closely grazed on the 4 to 5 cm than on the 6 to 7 cm treatment (64 *v.* 105 cm).

However, the 4 to 5 cm treatment resulted in a significant reduction in individual cow live-weight change (–0·04 *v.* 0·36 kg/day).

Calves also gained less live weight on the 4 to 5 cm treatment, although the difference was less during

Table 1 Nardus *utilization*

	1988	1989	1990	1991
Percentage of *Nardus* tillers grazed				
4 to 5 cm treatment	71·2	82·0	86·8	86·2
6 to 7 cm treatment	36·0	40·2	67·6	61·2
Grazed leaf length (mm)				
4 to 5 cm treatment	80·9	59·6	59·3	55·5
6 to 7 cm treatment	113·2	110·8	98·6	97·0

Table 2 *Cow live-weight gain (kg/day)*

	1988	1989	1990	1991
4 to 5 cm treatment	–0·03	0·07	–0·19	0·00
6 to 7 cm treatment	0·31	0·47	0·32	0·35

https://doi.org/10.1017/S0263967X00001622 Published online by Cambridge University Press

the first 5 to 6 weeks of grazing (0·77 *v.* 0·88 kg/day) than later in the season (0·46 *v.* 0·81 kg/day). This was mainly a consequence of reduced milk production of cows on the 4 to 5 cm treatment, since milk yields were proportionately about 0·13 higher on the 6 to 7 cm treatment during early June but 0·32 higher by the end of July although milk yields declined with time on both treatments.

Conclusions

It is concluded that high levels of *Nardus* utilization are incompatible with high levels of individual animal performance in lactating cows although short periods of high utilization may give acceptable performance. Lower levels of utilization such as achieved on the 6 to 7 cm treatment results in moderate levels of animal performance and appear to control *Nardus* over a longer period of time.

References

Grant, S. A., Suckling, D. E., Smith, H. K., Torvell, L., Forbes, T. D. A. and Hodgson, J. 1985. Comparative studies of diet selection by sheep and cattle: the hill grasslands. *Journal of Ecology* **73:** 987-1004.

Grant, S. A., Torvell, L., Armstrong, R. H. and Beattie, M. M. 1987. The manipulation of mat-grass pasture by grazing management. In *Agriculture and conservation in the hills and uplands* (ed. M. Bell and R. G. M. Bunce). Institute of Terrestrial Ecology, Marled.

Hodgson, J., Forbes, T. D. A., Armstrong, R. H., Beattie, M. M. and Hunter, E. A. 1991. Comparative studies of the ingestive behaviour and herbage intake of sheep and cattle grazing indigenous hill plant communities. *Journal of Applied Ecology* **28:** 205-227.

https://doi.org/10.1017/S0263967X00001622 Published online by Cambridge University Press