

Grazing management and soil fertility effects on pasture quality

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There are large economic and environmental benefits to be gained from rotational grazing (Thompson *et al.* 2000, Warn *et al.* 2001). However, there is little information on the effect of grazing management on pasture quality. This research focuses on comparing pasture quality under different grazing systems and soil fertility levels.

A grazing experiment at Broadford, compared pasture quality under three grazing systems; continuous grazing (set stocking), 4-paddock rotation (time based), and 20-paddock rotation (plant recovery based). Crude protein concentrations of the green pasture component as a whole, the green clover component, the green grass component, and the dead pasture component, under a continuous grazing system were each significantly ($P=0.05$) higher throughout the year than under either of the rotation systems (Table 1). However, crude protein levels were in excess of stock requirements in all three grazing systems.

Table 1. Crude protein (%) comparisons between grazing systems

Grazing system	Green pasture				Dead pasture			
	April	July	Oct	Nov	April	July	Oct	Nov
Continuous	26.2 ^a	28.6 ^a	26.5 ^a	18.7 ^a	14.8 ^a	15.0	*	16.8 ^a
4-paddock	24.8 ^a	27.4 ^b	23.9 ^b	15.3 ^b	12.0 ^b	10.2	13.6	14.4 ^b
20-paddock	21.4 ^b	26.8 ^b	22.7 ^b	14.8 ^b	9.5 ^c	8.5	13.7	11.8 ^c

Means with a different superscript within columns are significantly different ($P=0.05$); * Sample size too small to analyse

Digestibility was slightly higher in the continuous grazed system than in either of the rotations, but this was not significant ($P=0.05$). The neutral detergent fibre concentrations of both the green and dead pasture components under a continuous grazed system were each significantly ($P=0.05$) lower throughout the year than under either of the rotations.

The trend of higher crude protein concentration, higher digestibility, and lower neutral detergent fibre concentration of the continuously grazed system indicates that pasture quality was enhanced by continuous grazing. This is due to the high clover content and high utilisation of the pasture in the continuous grazed system.

In addition to the grazing system comparison, pasture quality was also compared between a low (6 kg P/ha) and a high (25 kg P/ha) phosphorus application rate, which had been applied annually since 1994. Comparisons of the quality of the various pasture components revealed that under a high phosphorus rate, both crude protein and digestibility were consistently higher throughout the year than the low phosphorus rate for the green grass component only. There were no significant ($P=0.05$) differences in pasture quality between the phosphorous rates for any other pasture component. However, there was a trend of increased pasture quality under the high phosphorus rate. This supports findings from the Hamilton long-term phosphate experiment (Cayley 1999).

Comparisons of the three grazing systems and two phosphorus rates revealed that, although there was no significant ($P=0.05$) correlation, the combination of continuous grazing and a high phosphorus rate produced pasture of the highest quality.

References

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