Effects of renovation on irrigated dairy pastures in northern Victoria

AR Lawson and KB Kelly

Agriculture Victoria, Kyabram Dairy Centre, 120 Cooma Road, Kyabram, Victoria.

Abstract

A field experiment was established in northern Victoria in the autumn of 1999 to quantify the effects of pasture renovation practices on a 15 year old, irrigated perennial pasture, with a high paspalum content in summer. The treatments were: Control – the existing pasture, Oversown – the existing pasture grazed, topped and direct drilled, and Resown - the existing pasture sprayed, cultivated and a new pasture sown. The genotypes used were perennial ryegrass, short-lived ryegrass or tall fescue. The plots were grazed by dairy cows. Data from the first year only are presented. Oversowing with ryegrass increased pasture consumption by 1.0 to 1.4 t DM/ha, ryegrass content by 5-10% units, *in vitro* DM digestibility (DMD) by 2-3% units and ryegrass tiller density in January by 50%. Resowing reduced pasture consumption by 3.5 to 4.1 t DM/ha compared to the control, although DMD and crude protein were increased.

KEYWORDS

Establishment, oversowing, resowing, ryegrass, clover, production.

INTRODUCTION

Perennial pastures that are used for dairy production in the irrigated region of northern Victoria are based on perennial ryegrass and white clover, but are invaded, and often dominated, by paspalum and summer active weeds. The perennial ryegrass tiller density of these pastures halves in the 2.5 years after sowing (2) and this reduces their productivity through the cooler months. Improving the production and nutritive characteristics of these pastures may require increasing the ryegrass content through regular renovation. A field experiment was established to quantify the effects of pasture renovation practices.

MATERIALS AND METHODS

Pasture renovation treatments imposed in the autumn of 1999 on a pasture with a paspalum content of >40 % DM in summer were: Control – the existing pasture, Oversown – the existing pasture grazed, topped and direct drilled using a coulter and Baker boot, and Resown - the existing pasture sprayed, cultivated to 25 mm with a Rotera? and a new pasture sown. The genotypes used were perennial ryegrass (cv. Verdette, Banks and Yatsyn 1), short-lived ryegrass (cv. Concord) and tall fescue (cv. Grasslands Advance). White clover (cv. Irrigation and Kopu) was also sown in the resown treatments. The experiment was of a split-plot design with 3 replicates; the renovation treatments were the main plots and the genotype treatments were the subplots.

Plots were grazed when the ryegrass had 2.5 to 3.0 fully opened leaves, and grazed to a residual height of 4 cm. Pasture removal was calculated as pre-grazing less post-grazing pasture mass. Botanical composition and nutritive value samples were taken to ground level using hand shears. Sward structure was determined by taking ten 150 x 75 mm cores, sorting into species, and counting tillers and growing points. The site was irrigated every 50 mm evaporation less rainfall.

RESULTS

Oversowing with perennial or short-lived ryegrass increased pasture consumption by 1.0 - 1.4 t DM/ha compared with the control (Table 1). This extra pasture was consumed in autumn, winter and spring. Pasture consumption during summer was reduced in the oversown short-lived ryegrass plots compared with the control. Pasture consumption from the resown pastures was 3.5 - 4.1 t DM/ha lower than that of the control due to fewer grazings in winter and to lower pasture consumption in spring and summer.

The ryegrass content in the oversown plots was similar to the control plots until September, 5-10% units higher from October until February, and not different in March or April. The paspalum content was 5 % units lower in the oversown, than in the control plots, in late spring, but not different to them at other times. For the resown plots, the short-lived ryegrass was quickest to establish, exceeding 40% of the DM on offer from July until December, and the tall fescue the slowest, taking until mid November to exceed 30% of the DM on offer. The resown perennial ryegrass was intermediate in its rate of establishment.

The *in vitro* DM digestibility (DMD) of the oversown treatments was 2% units higher than that of the control from early spring onwards. Similarly, the DMD of the resown treatments was 5% units higher than that of the control from late spring onwards. The resown tall fescue treatment had a crude protein content that was up to 3% units higher than any other treatments throughout spring and summer, probably due to its higher clover content.

Table 1. Effect of pasture renovation and genotype on pasture consumption (t DM/ha) in year 1

Renovation	Genotype	Autumn	Winter	Spring	Summer	Total
Control		1.2	1.0	3.5	5.1	10.8
Oversown	Perennial ryegrass	1.5	1.2	4.0	5.0	11.8
	Short-lived ryegrass	1.5	1.4	4.8	4.6	12.2
	Tall fescue	1.5	1.0	3.7	4.5	10.7
Resown	Perennial ryegrass	0.0	0.9	2.8	2.9	6.7
	Short-lived ryegrass	0.0	1.0	3.9	2.4	7.3
	Tall fescue	0.0	0.8	2.5	4.0	7.3
	l.s.d (P=0.05)					
Renovation (R)		0.30		0.89		
Genotype (G)				0.49		
	R x G Between renovations				1.35	2.67
	R x G Within renovations				0.57	0.95

The perennial ryegrass tiller density in January was 50% higher in the oversown than in the control plots, but was not different to them at other times. In the resown ryegrass plots, the tiller densities took until January to reach a level comparable to the control plots.

DISCUSSION

The increased pasture consumption and digestibility of the pastures oversown with perennial ryegrass suggests that it may be possible to either increase the stocking rate, or reduce the level of supplements fed to the cows grazing them, while maintaining per cow production.

While oversowing with short-lived ryegrass increased pasture consumption and DMD, the change in timing of pasture growth, with pasture consumption up to late spring increasing by 1.9 t DM/ha, and that in summer declining by 0.5 t DM/ha, suggests that it might be difficult to efficiently utilise all of the extra pasture grown. This lower productivity in summer was also evident in the reduced ryegrass content and DMD, and was associated with tiller death from January onwards. This suggests that the benefits of oversowing with short-lived ryegrass might be confined to the first year.

The newly sown pastures were slow to establish, receiving 2 less grazings during autumn and winter than the control and oversown plots. While an earlier sowing date may have reduced the establishment period due to the higher soil temperatures at sowing (1), it would have required the existing pasture to be sprayed earlier, and thus is questionable whether total pasture consumption would have been increased. This 3.5 - 4.0 t DM reduction in pasture consumption, while compensated for to some degree by the increased DMD throughout the year, would add considerably to the cost of resowing pastures.

CONCLUSIONS

While oversowing pastures with ryegrass increased pasture consumption, and resowing reduced pasture consumption, these responses need to be quantified in the second and subsequent years, and viewed in a whole farm content, in order to determine the profitability of these pasture renovation practices.

ACKNOWLEDGEMENTS

Funding is provided by the Department of Natural Resources and Environment, and the Dairy Research and Development Corporation through Murray Dairy.

REFERENCES

1. Charles, G.W., Blair, G.J. and Andrews, A.C. 1991. *Aust. J. Agric. Res*. **42,** 1161-1169.

2. Lawson, A., Kelly, K., Kelly, K., Phyland, G. and Byrne, L. 1998. DAV353 Final Report to DRDC.