Impact of renovation on production of irrigated pasture in northern Victoria

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Abstract

The impacts of the renovation of irrigated perennial pastures in northern Victoria are being quantified in a field experiment. Oversowing increased pasture accumulation over a 3 year period by 1.2 to 5.8 t DM/ha while resowing reduced pasture accumulation in year 1 by 3.2 to 4.1 t DM/ha, but increased it in years 2 and 3, compared to the existing pasture. Both oversowing and resowing increased the ryegrass content and in vitro DM digestibility (DMD) of the pasture on offer, with the increase in DMD in the resown treatments in year 1 being up to 6% units. Quantification of these responses to pasture renovation will help dairy farmers make informed decisions about the various pasture renovation options.

Keywords

Pasture renovation, pasture accumulation, oversowing, resowing

Introduction

Perennial pastures that are used for dairy production in the irrigated region of northern Victoria are based upon perennial ryegrass and white clover, but are invaded and often dominated by paspalum (1). A high perennial ryegrass content in a pasture is crucial to optimising pasture growth during autumn, winter and spring (2). An experiment was set up to determine the effects of pasture renovation on the dry matter production, ryegrass content and nutritive value of these pastures.

Methods

The experiment commenced in March 1999 with a 15 year old pasture with a paspalum content of up to 40% in summer. The experiment was a split-plot design with 3 replicates, with the renovation treatments as the main-plots and the species and nitrogen treatments as the sub-plots. The pasture renovation treatments imposed were:

- Control - existing pasture
- Oversown - the existing pasture was grazed, the residual mown to a height of 3 cm, and direct drilled in mid April
- Resown - the existing pasture was sprayed, cultivated and a new pasture sown in mid April.

The grass genotypes used were perennial ryegrass (an equal mix of cvv. Vedette, Banks and Yatsyn 1), Italian ryegrass (cv. Concord) and tall fescue (cv. Grasslands Advance) at seeding rates of 20, 20 and 25 kg/ha, respectively, in the oversown treatments and at 15, 15 and 20 kg/ha in the resown treatments. The Italian ryegrass plots were oversown again in years 2 and 3. White clover (an equal mix of cvv. Irrigation and Kopu) was included at a rate of 5kg/ha when resowing.

Two nitrogen levels were applied across the experiment, nil or 200-250 kg N/ha.year applied at a rate of 25 kg N/ha after every grazing, except in mid and late spring.

Current best management practices were used for pasture renovation, irrigation, grazing and fertiliser usage. Plots were grazed by dairy cows, with 10 to 12 grazings each year. Pasture accumulation was calculated as pre-grazing less post-grazing pasture mass (3).

Genstat was used for the statistical analysis.

Results

Oversowing with either perennial or Italian ryegrass increased pasture accumulation in each of the 3 years, irrespective of the nitrogen level applied (Table 1). Pasture accumulation from the resown pastures was lower in year 1, similar in year 2 and higher in year 3, than from the existing pasture, irrespective of the nitrogen level applied (Table 1).

Table 1. Effect of pasture renovation on pasture accumulation (t DM/ha)

Renovation treatment	Year 1	Year 2	Year 3	Total
Control				
No nitrogen	8.8	8.7	8.5	26.0
Plus nitrogen	10.8	11.6	11.1	33.5
Oversow				
Perennial ryegrass – no nitrogen	10.7	9.9	11.3	31.8
Perennial ryegrass – plus nitrogen	11.8	12.5	12.4	36.7
Italian ryegrass – plus nitrogen	12.2	13.4	12.5	38.2
Tall fescue – plus nitrogen	10.7	12.6	11.9	34.7
Resow				
Perennial ryegrass – no nitrogen	5.6	10.5	11.6	27.7
Perennial ryegrass – plus nitrogen	6.9	11.6	13.0	31.5
Italian ryegrass – plus nitrogen	7.3	13.2	12.5	33.0
Tall Fescue – plus nitrogen	7.3	14.0	13.5	34.7
l.s.d. (*P*=0.05)				
Renovation		1.39	1.79	

Species or nitrogen		1.20	1.41
Renovation x (Species or nitrogen)			
Between renovations	1.89		
Within renovations	0.98		

The ryegrass content of the pasture on offer was increased by up to 20% units in late winter as a result of oversowing and by up to 20% units in summer as a result of resowing. The DMD of the pasture on offer in year 1 increased by up to 2% units with oversowing and by up to 6% units with resowing. The increase in DMD of the oversown and resown pastures in years 2 and 3 was smaller than in year 1.

Conclusion

Oversowing can increase the quantity of pasture accumulated and its DMD irrespective of the level of nitrogen fertiliser being used. While the response to oversowing is larger for short-lived ryegrass than for perennial ryegrass, there is the additional expense of oversowing each autumn. Dairy farmers need to effectively utilise the extra pasture grown in order to maximise the benefits from oversowing.

Resowing can reduce pasture accumulation in the first year. Consequently, resowing is unlikely to be justifiable unless it can be accompanied by increased pasture accumulation in the second and subsequent years. Achieving this increase will depend on the species sown and the productivity of the existing pasture to be renovation.

Acknowledgments

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References

(1) Doyle, P.T., Stockdale, C.R., Lawson, A.R., and Cohen, D.C. (2000). 'Pastures for Dairy Production In Victoria.' 2 edn. (Agriculture Victoria: Kyabram, Australia.)

(2) Stockdale, C.R. (1983). Aust. J. Exp. Agric. An. Husb. 23:131-9.

(3) Earle, D.F., and McGowan, A.A. (1979). Aust. J. Exp. Agric. An. Husb. 19:337-43.