THE EFFECT OF SEASONAL DEFERRED GRAZING ON PORTO COCKSFOOT

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ABSTRACT

The objective of this study was to determine whether seasonal deferred grazing regimes could be used to increase the composition of cocksfoot (Dactylis glomerata L) in perennial pastures growing in temperate Australia.

The experiment was conducted over three years at two sites; one in Victoria and the other in Tasmania, Australia.

Relative to the control of continuous grazing, deferred grazing in spring reduced the amount of cocksfoot in the sward. Conversely, deferred grazing in summer increased the amount of cocksfoot present. It is concluded that deferred grazing can be used to change the amount of cocksfoot in a pasture, but the critical length of the deferment and driving mechanisms require further investigation.

KEYWORDS

Deferred grazing, cocksfoot, grazing management

INTRODUCTION

Perennial pastures in temperate Australia have been shown to support less than desirable levels of introduced perennial grasses. (Kemp and Dowling, 1991, Ward and Quigley, 1992, Friend et al., personal communication). As a consequence, animal production from these pastures has declined and there is threat of environmental degradation. Changing botanical composition by introducing seed either following cultivation or by direct drilling is expensive. It is therefore relevant to investigate the use of grazing management to enhance the contribution of a desired species in a pasture mix.

METHODS

A two year old mixed species pasture was selected in Tasmania (42˚ 30 south, 450m asl, 575mm winter maximum rainfall) and in Victoria (36˚ 22 south 325 m asl, 600mm winter maximum rainfall).

When the experiment commenced in September, 1993 the two pastures contained 20% and 38% cocksfoot respectively on a dry weight basis. Subterranean clover was present at both sites with the Tasmanian site also supporting white clover. The main perennial companion grass in Tasmania was ryegrass and phalaris in Victoria. Four treatment replicates were imposed on plots (15m x 20m) and allocated to allow for stratification based on the initial botanical composition of each plot. In an effort to enhance or maintain the cocksfoot component in these pastures the following seven deferred grazing treatments were imposed at each site:

Closure from grazing during spring, summer, autumn and winter. Spring grazing to maintain 1500kg DM/ha, fodder conservation, and mob stocking in autumn and winter. In addition at the Tasmanian site a treatment (Best Bet) involving spring closure until seed set, grazing and then closure to allow seed germination was imposed in order to maximise the chance of increasing the cocksfoot population by seedling recruitment. The control treatment was continuous grazing (set stocking). Treatment plots were individually fenced and included within a 5 ha site such that a communal grazing strategy could be adopted.

Each site was grazed with Merino wethers at a base stocking rate of 7.5 Dry Sheep Equivalent (DSE) /ha. Stocking rate was increased in spring to simulate lambing and reduced in response to drought conditions. Botanical composition was determined by the dry weight rank technique ('t Mannetje and Haydock, 1963) at ten fixed points along a diagonal transect through each plot. Pasture dry matter yield was determined at each of these points using a falling plate pasture meter (Cayley and Bird, 1991). These measurements were undertaken at six weekly intervals.

A cubic smoothing spline was fitted using a mixed linear model (Gilmore personal communication, Veryla et al, personal communication). From the fitted spline a "t" test was derived which was used to test whether individual treatments were significantly ($p<0.05$) different from the continuously grazed treatment.

The project was a component of a large study covering 22 sites in the temperate, high rainfall zone of Australia funded by the Meat Research Corporation.

RESULTS AND DISCUSSION

Despite a stocking rate higher than the district average and below average rainfall, the control treatments maintained the cocksfoot component throughout the experiment.

Deferred grazing in summer significantly ($p<0.05$) increased the yield of cocksfoot at both sites. Fodder conservation had a similar effect in Tasmania but in Victoria the effect, although positive, was not significant. The Tasmanian "best bet" treatment also significantly increased the yield of cocksfoot.

Deferred grazing in spring significantly reduced the yield of cocksfoot. No other treatments had any effect on cocksfoot relative to the control of either site (Table 1).

Knight (1965) concluded that the initial growth of cocksfoot after summer dormancy is from sterile tillers. This is because buds at the base of fertile tillers are slower in producing leaf and thus probably make little contribution to autumn plant yield.

Deferred grazing in spring probably maximises the number of fertile tillers and hence slows up the rate of regeneration in autumn. Consequently such a treatment would, as observed, reduce the yield contribution of cocksfoot relative to a continuously grazed control which would inhibit flowering.

The summer deferred grazing treatment was applied to plots that had been continuously grazed during all the other seasons hence flowering may not have been maximised. No summer grazing coupled with some summer rain (particularly in Tasmania) probably allowed the cocksfoot plants to break dormancy and establish considerable leaf area, making them very competitive relative to companion species.

Removal of reproductive components together with much of the early spring growth by fodder conservation probably allowed the cocksfoot plants to respond to the abundant summer light and some rain. They

therefore were able to increase the leaf area and successfully compete relative to companion species.

The "best bet" treatment, although designed to promote seedling recruitment failed to achieve it. This may have been because the early summer closure promoted considerable growth, thus leaving little room for seedlings to establish.

The results from this experiment support the premise that deferred grazing of cocksfoot during summer could be used to significantly increase this species within a sward. Further work is required to more accurately define the deferment period and to understand the mechanisms driving the observed effect. Such understanding may help define grazing strategies that ensure the maintenance of legume species in cocksfoot pastures.

REFERENCES

Cayley, J.W.D. and P.R. Bird. 1991. Techniques for measuring pastures. Victorian Department of Agriculture Technical report series No. 191.

Kemp, D.R. and P.M. Dowling. 1991. Species distribution within improved pastures over central N.S.W. in relation to rainfall and altitude. Aust. J. Agric. Res. **42**: 647-59.

Knight, R 1964 The relation between yield and the reproductive phase in cocksfoot (Dactylis glomerata L.) in a winter rainfall environment. Aust Journal of Agriculture Res **16**: 505-15.

't Mannetje, E. and K.P. Haydock. 1963. The dry-weight-rank method for the botanical analysis of pastures. Journal of the British Grassland Society **18**: 268-275.

Ward, G.N. and P.E. Quigley. 1992. The Botanical compostion of high rainfall pastures in south western Victoria. Proc. 6th Australian Society of Agronomy Conference.

Table 1
Treatment effects on Cocksfoot, showing "t" values for absolute yield when treatments are compared to the control.

Treatment	Tasmania	Victoria
Spring Deferment	-1.21	-3.15
Summer Deferment	4.30*	1.17
Autumn Deferment	0.17	0.1
Winter Deferment	-0.24	0.01
Close Spring	-1.23	0.14
Fodder Conservation	2.92*	0.84
Mob Stocking	-1.66	-0.87
Best Bet4.58*		

*$p<0.05$ +ve and -ve "t" values indicate a signficant upward and down trend respectively.