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THE EFFECT OF SEASONAL DEFERRED GRAZING ON PHALARIS (PHALARIS AQUATICA) IN TEMPERATE AUSTRALIA.

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ABSTRACT

The aim of this study was to determine the effects of deferred grazing strategies on phalaris (*Phalaris aquatica*) composition in both new and established pastures in temperate Australia. The experiment was conducted over three years at three sites; two in southern Victoria and one in northern Victoria. Relative to the control of continuous grazing all treatments maintained phalaris composition. At two sites winter deferment of grazing increased phalaris composition. It is concluded that deferred grazing of phalaris over the autumn, winter and spring will increase phalaris composition. The critical length of the grazing deferment and timing requires further investigation.

KEYWORDS

Deferred grazing, grazing management, perennial grass, *phalaris aquatica*

INTRODUCTION

Temperate pastures in south-eastern Australia have been shown to contain insufficient levels of perennial grasses (Kemp and Dowling, 1991; Ward and Quigley, 1992). *Phalaris aquatica* is a desirable perennial grass species for both animal production and environmental protection (Oram, 1993, Ridley et al., 1994). Over the past decade there have been frequent reports from graziers of a lack phalaris persistence, particularly with cultivars Sirosa and Sirolan (Oram, 1990). As a consequence animal production has declined and long term sustainability of these grazing systems is at risk (Anon, 1992). Pasture re-establishment is expensive. In the current economic environment pasture sowing is not a viable option for many meat producers in temperate Australia. Strategic use of grazing tactics has the potential to maintain and improve the composition of established perennial grass based pastures in a cost-effective manner (Kemp, 1993). This research was conducted as part of a larger research program, *The Temperate Pasture Sustainability Key Program*, supported by the Meat Research Corporation of Australia. The aims of this study were to determine if grazing strategies could maintain and improve phalaris composition both new (1-2 years) and old (greater than two years) temperate pastures.

METHODS

Three phalaris based pastures were selected in 1992. The Rutherglen (36°22'S., 146°41E, 600 mm rainfall) and Hamilton (Hamilton-A) (37°32'S., 142°06'E; 650 mm rainfall) sites were newly sown phalaris (cv Sirosa) pasture. A second site at Hamilton (Hamilton-B) (37°17'S., 141°50'E; 600 mm rainfall) was selected to represented a degraded phalaris (cv Australian) pasture. At the commencement of the experiment phalaris compositions were 18, 10.3 and 15.6% respectively on a dry weight basis. Subterranean clover (*Trifolium subterraneum*) was present at the three sites with the main companion grass being cocksfoot (*Dactylis glomerata*) at Rutherglen, perennial ryegrass (*Lolium pernne*) at Hamilton-A and annual grass weeds at Hamilton-B. The experimental design was open-communal. Each experiment consisted of a minimum of 32 experimental plots. Two replicates were commenced in the first year followed by two replicates in the second year. Eight core treatments were allocated on the basis of initial botanical composition. These consisted of continuous grazing, four complete seasonal closures, mob stocking over the autumn-winter period, increased spring utilisation and fodder conservation. Experiments were grazed by Merino wethers at above district average stocking rates (Rutherglen 7 wethers/ha, Hamilton-A and Hamilton-B 12 wethers/ha). Stocking rates were increased in spring to simulate lambing and were strategically reduced in response to drought in the spring-summer of 1994-95. Every six weeks botanical composition by the dry-weight-rank technique ('t Mannetje and Haydock, 1963) and pasture dry matter yield (Cayley and Bird, 1991) was determined at ten fixed points along a diagonal transect of the plot.

RESULTS AND DISCUSSION

At the Rutherglen site all treatments maintained phalaris composition despite being subjected to several months drought. Compared to the continuous grazing control treatment winter deferment of grazing and mob stocking over the autumn-winter period significantly ($P<0.05$) increased the dry matter contribution of phalaris. Changes in phalaris composition over the period from spring 1993 to autumn 1996 for the continuously grazed, winter deferment and mob stocked over the autumn-winter period treatments were 0.43 to 0.90 t DM/h, 13 to 2.1 t DM/ha and 0.20 to 1.86 t DM/ha respectively (Table 1). At the Hamilton-A site there were no significant ($P<0.05$) increases or decreases in phalaris composition. The most favourable treatments were however rotational grazing, spring and winter deferment of grazing. Fodder conservation caused the greatest decline in phalaris composition. Changes in phalaris composition over the period from spring 1993 to autumn 1996 for the continuously grazed, rotational grazing, spring and winter deferment of grazing. and fodder conservation treatments were 0.29 to 0.55 t DM/h, 0.66 to 1.5 t DM/ha, 0.4 to 1.0 t DM/h, 1.1 to 2.5 t DM/h and 0.54 to 0.42 t DM/ha respectively (Table 1). At the degraded site (Hamilton-B) phalaris (cv Australian) composition was significantly ($P<0.05$) increased by the winter deferred and the autumn-winter herbicide (gramoxone and simazine) treatments when compared to the continuous grazing control. Changes in phalaris composition over the period from spring 1993 to autumn 1996 for the continuously grazed, winter deferment of grazing and autumn-winter herbicide treatments were 0.48 to 0.56 t DM/h, 0.61 to 1.1 t DM/ha and 0.67 to 1.3 t DM/ha respectively (Table 1). Two local non-core treatments, 250 kg/ha of superphosphate combined with summer closure and 250 kg/ha of superphosphate with spray-topping in spring generated a decline (non-significant) in phalaris composition. Phalaris composition has been maintained or improved across all grazing treatments despite being subjected to drought and above normal grazing pressure. This would seem to indicate that phalaris, particularly the newer cultivars are less sensitive to grazing in these environments than first thought and this is largely in contrast to observations by graziers. Culvenor (1994) observed a strong relationship of regenerative capacity and persistence with site and season. Plants in these experiments were limited by spring moisture in 1994, but it was unlikely that phalaris root development was restricted by soil acidity. Grazing strategies most beneficial to phalaris involved some spelling from grazing over the autumn-winter period. Results also indicate that forage conservation of winter-active (cv. sirosa) phalaris pastures has the greatest potential to reduce phalaris composition. Swards which are relatively tall in early spring as is the case with paddocks deferred for grazing for forage conservation are likely to be more prone to severe defoliation due to lower rates of tillering, death of smaller tillers and more synchronous stem elongation (Culvenor, 1994). This situation can be avoided when swards are grazed several times over the winter and spring period to encourage tiller density and age range. The results from this study indicate that deferred grazing over the autumn-winter period could be used to increase phalaris composition and support the conclusions of Culvenor (1994) of the benefit of a mob stocking strategy. Winter deferment treatments are likely to be difficult to implement on farm as winter is the period of greatest feed shortage. Further investigations are required to refine the grazing-spelling regime to develop practical grazing strategies and ensure on-farm adoption.

REFERENCES

Anon (1992). Temperate Pasture Sustainability Key Program, A Preparation Report. PDP Australia Pty Ltd.

Cayley, J.W.D. and P.R. Bird (1991). Techniques for measuring pastures. Victorian Department of Agricultural Technical Report Series No. 191.

Culvenor, R.A (1994) The persistence of five cultivars of phalaris after cutting during reproductive development in spring. Australian Journal of Agricultural Research **45**: 945-62.

Kemp, D.R. (1993). Managing pastures by grazing. Proc. 6th Grassland Society of NSW Conference, Orange Australia. p 32-38.

Kemp, D.R. and P.M. Dowling (1991). Species distribution within improved pasture over central N.S.W. in relation to rainfall and altitude.

Oram, R.N. (1990). Register of Australian herbage plant cultivars. CSIRO, Australia 3rd Edition. p 304.

Oram, R.N. (1993). Perennials in the pipeline. Proc. 6th Grassland Society of NSW Conference, Orange Australia. p 59-63.

Ridley, A.M., W.J. Slattery, K.R.Helyar, A. Clowling (1990). Acidification under grazed annual and perennial grass based pastures. Australian Journal of Agricultural Research **30**: 539-544.

't Mannetje, E. and K.P. Haycock (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 composition of high rainfall pastures in south western Victoria. Proc. 6th Australian Society of Agronomy Conference.

Table 1
The effects of Grazing Strategies on Phalaris.
("t" values for absolute yield when treatments are compared to the control)

Grazing Strategy	Rutherglen	Hamilton-A	Hamilton-B
Autumn Deferment	1.53	0.08	1.74
Winter Deferment	5.60*	1.05	2.29*
Spring Deferment	1.19	1.43	1.98
Summer Deferment	0.36	-0.11	0.23
Increased Spring Utilisation	0.31	-0.36	0.91
Fodder Conservation	0.28	-1.07	0.17
Mob Stocking	2.26*	0.46	0.12
Rotational Grazing	-	1.60	-
Autumn-Winter Herbicide	-*	-	2.21

* P<0.05 +ve and -ve "t" values indicate a significant upward and downward trend respectively.