Production and Quality of Caucasian and White Clover Pastures after 10 Years on the Monaro

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The Monaro region of NSW is characterised by cold winters, short growing seasons and the frequent occurrence of summer drought. In this environment, the persistence and productivity of the legume component of the pasture is a major issue. Traditional species such as white clover and subterranean clover are limited in their potential contribution by either the short length of season (subclover) or the periodic dry summers (white clover).

One species which can tolerate these conditions and grows actively between spring and autumn is caucasian clover (*Trifolium ambiguum*). When compared with white clover, caucasian clover displays superior drought tolerance and lower phosphate requirement. Being rhizomatous (stems beneath the ground) its growing points are protected from overgrazing, and it is able to colonise gaps in the pasture to form daughter plants. The aim of this work was to demonstrate the persistence and potential productivity of a pasture containing caucasian clover after 10 years under grazing and declining levels of soil phosphate.

Methods

A study commenced in June 1992 on the site of a legume variety trial originally sown in 1981 at Middlingbank, near Cooma (average annual rainfall 710 mm). A number of legume species and varieties were originally sown, but for the purposes of this paper, only caucasian clover (cv. Monaro) and white clover (cv. Haifa) will be referred to. In the spring of 1981, four replicate plots of each species were sown at 2 kg/ha and 200 kg/ha of molybdenised superphosphate applied. After establishment, the site was locked up for one year and subsequently opened to grazing.

No further fertiliser was applied from 1981 to 1992. In June 1992, half of each plot received 280 kg/ha of molybdenised superphosphate ('high P') and the plots were excluded from grazing. Olsen soil phosphorus levels for the low and high P plots in late 1992 were 14 and 21 ppm respectively. Pasture yield and botanical composition were measured every two months from spring 1992. At each harvest, the plots were mown to a height of 1.5cm. *In vitro* digestibility of all pasture components was measured on herbage from the October-November growth period.

Results and Conclusions

Both caucasian clover and white clover had persisted in the plots from 1981 until 1992. Clover yield and digestibility results are shown in Table 1. Under the high P conditions, there was significantly greater production from caucasian clover throughout the sampling period. Under low P conditions, caucasian clover out-produced white clover from October 1992 to January 1993. The presence of caucasian clover in the pasture increased the *in vitro* digestibility significantly, irrespective of phosphate status. The digestibility of the caucasian clover pasture at low P was equal to that of the white clover pasture at high P.

Table 1. Production and quality of caucasian clover and white clover at two different phosphate regimes.

	Clover yield (kg/ha)			
	Aug-Sep 1992	Oct-Nov 1992	Dec-Jan 1993	Feb-Mar 1993
		High P		
Caucasian clover	63	4393 (77)[1]	4392	1315
White clover	18	1515 (71)	1455	714
		Low P		
Caucasian clover	<10	1002 (71)	144	335
White clover	0	26 (65)	30	286

[1] *In vitro* digestibility (%)

All differences statistically significant ($P<0.05$), except for Aug-Sep 1992 and Feb-Mar 1993 under low P.

Caucasian clover (cv. Monaro) was able to persist under a regime characterised by low P input and continual grazing. Its presence in the pasture increased the quality of feed on offer when compared to that of white clover. When phosphate was added, there were dramatic increases in the growth of caucasian clover and the quality of feed on offer, which again compared favourably with white clover. The potential role of this important species needs to be explored over a wider area, especially where persistence of white clover may be a problem.