

Pasture manipulation to improve crop-pasture rotations in Southern Australia

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The control of annual grasses during the ley phases of pasture-crop rotations has been promoted as a means of reducing cereal root diseases and increasing cereal yields. However, on the majority of wheat farms in southern Australia annual grass has an important role in providing feed in autumn and early winter for animal production. The aim of the research reported here was to determine the effects of grass removal in the pasture phase on pasture, livestock and subsequent crop production. Results from the first year of the experiment (1991), which included a control and 2 spray treatments, are described.

Methods

In the experiment reported here, 3 pasture treatments were imposed in 1991 and replicated 4 times. Each plot is 0.6 ha in size. The initial pasture sward consisted of subterranean clover, (*Trifolium subterraneum*) and predominantly annual ryegrass, (*Lolium rigidum*), silver grass, (*Vulpia* spp.) and winter grass, (*Poa annual*). The pasture treatments were: (i) winter cleaning, designed to produce a legume dominant pasture that is optimal for crop production, (paraquat applied at 0.3 kg a.i/ha on 19 August 1991); (ii) spray-topping, which reduces grass seed production but retains grass herbage (paraquat applied at 0.2 kg a.i/ha on 14 November 1991) and (iii) control. The treatments were set stocked with aged merino wethers at 10 D.S.E./ha. Sheep were weighed fortnightly, pasture availability and production were measured on a regular basis.

Results and discussion

The use of non-selective herbicides provides an effective means of grass removal without relying on grass selective herbicides, thereby limiting the risk of herbicide resistance buildup in ryegrass. Early herbage production was restricted in 1991 due to a late autumn break. The winter cleaning treatment was effective in reducing grass population numbers by 40%. Available pasture was reduced on the winter cleaned treatment and at the end of the growing season (December) the winter clean treatment contained < 50% of the available dry matter to the control treatment (Table 1). In summer on the winter cleaned treatment, the clover herbage quickly shattered, significantly reducing available herbage but without resulting in liveweight loss. The spray-top treatments gave a small reduction in available herbage compared to the control, but there was no corresponding reduction in liveweight.

Table 1. Pasture availability, 1991-92

	Aug	Sept	Oct	Nov	Dec	Jan	April
	(kg DM/ha)						
Control	486	1360	3870	3430	3260	2770	1910
Spray-top	486	1360	3870	3430	3070	2490	1800
Winter clean	486	200	1000	2080	1350	760	200

Winter cleaning is becoming more popular for controlling grass weeds prior to cropping. It is likely that when grasses are removed from pasture stocking rates will have to be reduced both at the time of herbicide application and again during summer.

