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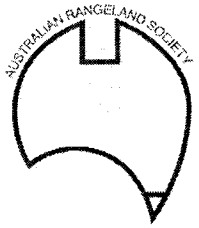

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GRAZING MANAGEMENT TO IMPROVE THE COMPOSITION OF NATIVE GRASSLANDS IN CENTRAL WEST NEW SOUTH WALES

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INTRODUCTION

Native grasslands are the dominant pasture type in the 400-600mm rainfall zone of central west NSW. These pastures are the mainstay for the region's grazing enterprises. This area in NSW is situated in the transition between the summer and winter dominant rainfall zones. Hence native grasslands consist of a mix of C3 and C4 species. The majority of the native perennial grasses are C4 (summer growing species) which are interspersed with many annual grass and forb species, both cool and warm season. This evenly distributed rainfall and large mix of species makes these native grasslands particularly difficult to manage. There are 2 major soil types in the region – the hardsetting red soils tend to dominate in the south, with self-mulching grey clays in the north.

There has been anecdotal evidence from landholders in the region that desirable native perennial grasses are decreasing in their pastures. The burden of annual and perennial weeds is simultaneously increasing. Landholders have a range of options to deal with this problem. The cheapest and least risk option in this environment is to manipulate the pasture with grazing stock.

Methodology

A benchmark survey of pasture condition was carried out in the summer of 1995/1996. From this the major soil/pasture species associations were described. On the hardsetting red soils the dominant desirable native grass species was *Enteropogon acicularis* (Curly windmill grass). *Digitaria* spp., *Panicum* spp., *Paspalidium* spp. and *Danthonia caesiptosa* (wallaby grass) were also found. *Stipa* (spear grasses) and *Eragrostis* spp. (love grasses) were the main less desirable native grasses recorded.

From the paddock survey some significant relationships between the species that were found and the grazing management that had occurred in the last 3 years were also derived. *Enteropogon acicularis* was found to be a species responsive to grazing management. This meant it would be suitable to monitor in any investigation of grazing strategies. Hence we knew the desirable and undesirable species in the region and which grasses were good indicators of management. A management objective had already been set by the landholders: **Increase desirable perennial native grasses and decrease weed species in the paddocks.**

An experiment was established in 1998/99 to investigate grazing management strategies that might achieve that objective. Four sites were selected on landholder properties, all on hardsetting red soil with *Enteropogon acicularis* based pastures. The density of *Enteropogon* ranged from 0-3 (poor condition) to 6-8 (reasonable condition) plants/m2.

Seven grazing management strategies were implemented at each site, four of which are described in this paper:

1. **Permanent exclosure** from March 1999
2. **Set stocked** at the landholders stocking rate
3. **Summer lock-up** (lock-up of the plots from November to March to allow the native perennials to seed down and recruitment to occur)
4. **50% utilisation of *Enteropogon*** by stock (only implemented in the spring/summer months, designed to protect the *Enteropogon* plants from overgrazing. 50% utilisation was the trigger for excluding stock. These areas were opened to grazing when *Enteropogon* plants were back to 70% remaining, compared to an ungrazed plant.) **combined with weed control** (mainly of annual species and usually by spray topping)

RESULTS

The experiment commenced in March 1999. There were good summers in the region in 1999/00 and 2000/01 while the 2001/2002 summer was dry. In the first 2 years stock pressure in the paddocks was not particularly high, because of the seasons, but became greater in the dry 2001/2002 season.

Enteropogon acicularis plant numbers increased particularly well under the 50% utilisation + weed control treatment in a short period of time. Data for one site is shown in Figure 1. However there was concern that because the grazing strategies were designed to benefit one C4 grass (*Enteropogon*), they may also benefit the less desirable C4 *Stipa* species. This was not the case. Stipa actually increased to the greatest extent under the set stocking treatment. *Danthonia*, a palatable C3 species, appeared resilient to a range of grazing strategies and plant number increased significantly in all treatments except permanent exclosure.

Complete lock-up of the plots was not beneficial in the first years of the experiment. In many cases perennial grasses in the locked up areas grew rapidly in the first summer. They then flowered and set seed, but because the old growth was not removed from the plants by grazing they became moribund and all growth ceased. A number of large perennial grass plants, particularly *Stipas*, are now starting to die out in those areas.

CONCLUSION

Grazing to keep perennial grass plants in an active stage of growth for as long as possible has benefits in terms of animal production. However protecting them from overgazing, for example through the implementation of the 50% utilisation treatment, will allow recruitment of new plants given favourable seasons. The key species of perennial grass, *Enteropogon acicularis*, found in these grasslands did not respond to exclusion of stock in terms of increased plant recruitment nor did it respond significantly to an over summer lockup.

Figure 1 Changes in the density of 3 perennial grasses in central west NSW at one site under 4 grazing regimes