

Yield of perennial grasses under different drought and grazing intensities during spring and summer

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Current research at CSIRO, Pastoral Research Laboratory, Armidale, is investigating the persistence of six perennial grasses under different intensities of drought and defoliation, over different seasons. This paper discusses the yield data collected during the first sequence of treatments over the spring-summer season.

Methods

The experiment is being carried out in 1m² plots which are separated vertically by strong plastic to a depth of 1m. The grasses include four important introduced species: perennial ryegrass cv. Victorian; phalaris cv. Sirosa; cocksfoot cv. Porto and tall fescue cv. Demeter, and two native species: *Microlaena stipoides* cv. Shannon (general purpose cultivar) and *Danthonia richardsonii* cv. Taranna. The plots are cut regularly using a lawn mower to simulate grazing at two intensities; moderate and severe. Three moisture regimes are applied ranging from non-limiting to severe. The drought treatments were determined from climatological records and the "rain" applied using a hand-held hose. An automatic "rain-out" shelter has been constructed to exclude all natural rainfall from the trial area. The spring-summer sequence began 1 September 1994 and finished 28 February 1995. The total yield data are presented in this paper.

Results and Discussion

The non-limiting moisture treatment yielding 5.5 t/ha was significantly greater than the two drought treatments. The 40% and 10% droughts yielded 3.6 and 3.2 t/ha respectively. The only significant interaction ($P < 0.001$) was between the species and defoliation levels (Figure 1).

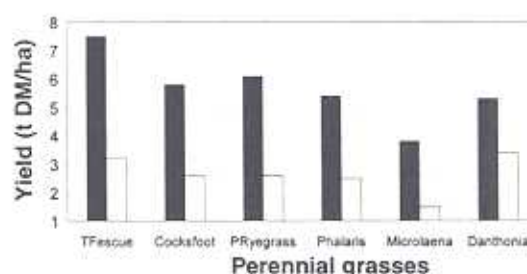


Figure 1. Yield of six perennial grasses under severe (black boxes) and moderate (white boxes) defoliation averaged over a range of drought conditions.

All of the grasses had greater yields under severe defoliation than the moderate defoliation treatment. Under severe defoliation tall fescue had the highest yield. Perennial ryegrass, cocksfoot, phalaris and *Danthonia* had significantly greater yields than *Microlaena*, but were not significantly different from one another. When defoliated at the moderate level, *Danthonia* and the four introduced species produced yields which were not significantly different from one another, but significantly greater than *Microlaena*. All of the grasses were ranked similarly in each of the defoliation treatments with the exception of *Danthonia*. *Danthonia* responded to the moderate defoliation treatment to yield the same as tall fescue, compared with a ranking of fifth under the severe defoliation treatment.

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