Seed production of curly Mitchell grass (astrebla lappacea)

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Mitchell grass is recognised as productive and persistent native forage, ideally suited to rehabilitate marginal croplands in north western NSW. Inadequate seed supplies have severely restricted commercial sowings of Mitchell grass. Seed production is limited primarily by the amount of summer rainfall and low soil nitrogen levels (1). However, no quantitative data are available on seed production of Mitchell grass under irrigation. Intensive management by specialist seed producers has dramatically increased yields in exotic species. This paper reports the responses of Mitchell grass to nitrogen fertilizer under irrigation and defines the lower limit of extractable soil water on a grey cracking clay soil.

Methods

Mitchell grass was sown at Trangie (32.0?S, 147.7?E) at 1 kg/ha with 300 kg/ha of superphosphate in December 1986. Ammonium nitrate was applied in November 1987, after defoliation, at rates of 0, 50, 100 and 150 kg N/ha in a randomized block design with five replicates. The stand was flood irrigated until the end of flowering. Soil moisture was measured in the control plots with a neutron probe. The driest measured profile of lucerne on a similar soil is used for comparison.

Results and discussion

The results indicate a marked response of Mitchell grass to irrigation and nitrogen. The main response was due to an increase in inflorescence density (Table 1). Inflorescence densities of 3-10/m^2 have been reported from plants in Astrebla grasslands (1). Nitrogen application significantly increased the number of spikelets per inflorescence. Machine harvested seed yields at 150 kg N/ha were 343% of the control. Biomass production showed a similar increase to applied nitrogen.

Mitchell grass dried the soil to a lower moisture content than lucerne at all depths, particularly in the surface layers. Both species extracted water from depths greater than 1.6 metres.

Table 1. The effect of management on yield and some yield components

Nitrogen rate kg N/ha	Number of inflorescences m^{-2}	Spikelets per inflorescence	Harvested seed yield kg/ha	Straw yield t/ha
Nil (control)	82 a*	16.5 a	14 a	5.0 a
50	112 a	19.3 b	20 ab	5.2 ab
100	160 b	22.9 c	44 bc	6.2 bc
150	180 b	24.5 c	48 c	6.5 c

* Letters refer to SNK Test (P = 0.05)

These yields if achieved on a commercial farm would represent a considerable economic return to the farmer. It is concluded that a domesticated native grass will respond to intensive management, aimed at increasing seed production.

1. Orr, D. M. (1986). Unpublished Ph.D. thesis. University of Queensland, Brisbane. Qld.