IRRIGATION FREQUENCY IS THE KEY TO IMPROVED PASTURES

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INTRODUCTION

There are around 22,000 ha of irrigated perennial pastures in the Murray Valley (NSW), used mainly for dairying. A mixture of ryegrass, paspalum and white clover is grown on lasered, bordercheck bays. The near levee soils on which most of these pastures are grown are red brown earths with dense clay subsoils of low hydraulic conductivity. Plant-available water (often <60 mm) is a limiting factor. Frequent irrigations are needed to prevent substantial yield losses due to droughting (Blaikie and Martin, 1987). White clover is the most sensitive species. Pasture production is also influenced by waterlogging. Cumulative yield reductions of 20% have been measured from white clover ponded for 6 hours at each irrigation (Blaikie and Martin, 1987). Therefore, unless rapid surface drainage is in place to prevent surface waterlogging and the development of perched watertables, production gains from frequent irrigations could be outweighed by losses due to waterlogging. The duration of waterlogging is greatly influenced by slope and surface roughness. Smooth slopes steeper than 1 in 750 are recommended, but not always achieved.

AIM: To investigate interactions between irrigation frequency and surface ponding on pasture production and composition, as part of a larger experiment.

THE EXPERIMENT

Thirty-six plots (87 m^2) of ryegrass/white clover were sown in May, 1989. There are 9 treatments, consisting of combinations of 3 irrigation frequencies (50, 80 and 120 mm ETc [potential crop evapotranspiration]) and 3 ponding times (4, 12 and 24 h), each replicated 4 times. Irrigation treatments began on 29th November. The plots were harvested 5 times, up to the 23rd April, 1990. Test wells were installed to measure watertables at the site and water-use figures were measured using a neutron moisture meter.

PASTURE PRODUCTION

In these soils, where the watertable depth ranged from 1.6 to 2.5 m, pastures exploited moisture to a depth of about 40 cm. Cumulative pasture production ranged from 853 to 4744 kg/ha. Those plots watered every 50 mm ETc, produced more dry matter. In comparison irrigating every 80 or 120 mm ETc, reduced yields by 25% and 48% respectively ($P < 0.05$). Ponding treatments had no significant effect on cumulative yields, and there were no significant ineractions between irrigation frequency and ponding time.

WHITE CLOVER GROWTH

The proportion of white clover increased from an average of 9% in January to an average of 25% in April. At harvest 5 (14th March to 23 April) clover content was highest (35%) in the most frequently watered plots. It was reduced to 25% and 15% by lengthening irrigations to 80 and 120 mm ETc respectively ($P < 0.05$). Again ponding alone had no significant effect on clover percentage, probably due to the relatively low clover component in the pasture. There were significant interactions between irrigation frequency and ponding time, which reinforce the necessity to combine frequent irrigations with rapid surface drainage. Plots watered every 50 mm ETc, contained more clover when drained after 4 h or 12 h, than after 24 h ($P < 0.05$).

REFERENCES

Blaikie, S.J. and Martin, F.M. (1987). Limits to the productivity of irrigated pastures in south-east Australia. In: J.L. Wheeler, C.J. Pearson and G.E. Robards (eds), Temperate Pastures, their production, use and management. Australian Wool Corporation Technical Publication, CSIRO, Australia. pp. 119-122.