Managing high yield potential barley crops

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Irrigated barley crops have the potential to reliably produce low protein grain as required for malting. However, the role of barley in irrigated cropping has been limited to date by the poor straw strength of the available cultivars and the general intolerance of barley to waterlogging. A programme to develop acceptable agronomic practices for growing high yielding barley crops under irrigation was commenced at the Leeton Field Station in 1985.

Methods

In 1985, three cultivars differing in growth habit were grown with four rates of nitrogen (N) up to 180 kg/ha, applied as single or up to three split applications. The growth regulator ethephon was also applied to the high N plots.

In 1986, cv. Triumph was used in two experiments. Triumph, a late maturing European cultivar, will be available for commercial sowing in 1987. In the first experiment two seeding rates (100 and 200 kg/ha) were used and N was applied in single or split application up to 120 kg/ha-1,

N was topdressed at the three leaf stage, late tillering or heading. A second experiment compared convential "on the flat" sowing with "raised beds". Ethephon and paclobutrazol were applied to both layouts. An additional treatment prevented lodging by using welded mesh to support the plants.

Results and Discussion

1985. Despite the attempts to reduce lodging all plots lodged completely during grain filling. Some plots lodged after 37mm of rain at heading. Grain yield was reduced where dry matter at heading exceeded 9-10 t/ha. The highest yield of 5.5 t/ ha -1 was achieved from a later maturing line

that received 60 kg/ha of **N** at the three leaf stage. The highest ear number at 600/m2 compared unfavourably with the 900 achieved by Mendham in Tasmania (1). Grain protein increased from an average of 12.5% with no N to 15% with 180 kg/ha.

1986. The increased seeding rate had no effect on grain yield. Lodging only reduced yield on the treatment receiving 120 kg/ha of N at the three leaf stage. The highest yield of 6.8 t/ha was achieved with 60 kg/ha of N applied at late tillering. Dry matter at heading was 12 t/ha and head numbers exceeded 800/m *2 .* The use of raised beds delayed but did not prevent lodging at yield levels of over 6 t/ha (the yield on the actual bed surface was 730g/m2). The growth regulators reduced plant height by 5-10cm but did not increase grain yield.

The performance of the growth regulators used in this work has been disappointing. Delayed application of nitrogen fertilizer has shown promise and the potential of the raised beds will be further examined.

39. Mendham, N.J. and Russell, *J.* 1985. Proc. 3rd Agronomy Conf., p.271.