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Response of barley to row spacing – Moree, Walgett and Bellata 2011

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Introduction

There has been a trend to wider row spacing's in recent years. Likely benefits include:

- an ability to sow into higher levels of retained stubble
- a reduction in fuel costs during sowing and/or increased sowing speed
- ability to inter-row sow subsequent crops
- reduced soil disturbance, and
- lower cost of sowing equipment.

However, potential costs from wider spacing's include:

- lower yields with wider row spacing, particularly under higher yielding conditions, and
- reduced weed competition.
- Unlike wheat varieties there can be large differences in plant type between barley varieties. For example Hindmarsh(ф) is a short erect type that does not produce large amounts of biomass compared to Commander(ф), which is more competitive with a more prostrate growth habit and production of large quantities of biomass early in the season. It is hypothesised that these differences in plant types may allow some barley varieties to perform better at wider row spacing's in comparison to others.

Site details

Location:	"Boggy Creek", Bellata,	"Oodnadatta", Moree,	"Sefton Park", Walgett
Co-operator:	Brian Lowe	Hugh Ball	Dave Denyer
Sown:	7th June 2011	19th May 2011	8th June 2011

Treatments

There were three row spacing trials conducted in 2011 at Bellata, Moree and Walgett. In the trials there were three barley varieties, Commander(ф), Hindmarsh(ф) and Shepherd(ф) which were planted at three target populations 40, 80 and 120 plants/m^2. The Hindmarsh(ф) treatments at Walgett received severe preferential damage from mice during grain fill and could not be harvested. Mice damage for Commander(ф) and Shepherd(ф) was surprisingly negligible. These differences were due to different maturities of the varieties with Hindmarsh(ф) being the quickest maturing variety. Three row spacing's were used; 300, 400 and 500 mm, and for Commander(ф) twin rows on 500 mm spacing's (500T) were also included.

Results

- At Walgett the 400 and 500 mm row spacing's reduced the establishment by approximately 20 plants/m^2 or 25% compared to the 300 mm row spacing. The 500T (twin row) treatment established similar plant numbers for Commander(ф) as the 300 mm row spacing.
- At Moree plant establishment was very poor being 25 to 65% lower compared to Walgett. A rainfall event immediately following planting caused significant crusting of the soil surface, which may explain the low establishment across the site. The establishment was much lower than anticipated. The 500T treatment still had 39% greater establishment than the 400 and 500 mm row spacing's.

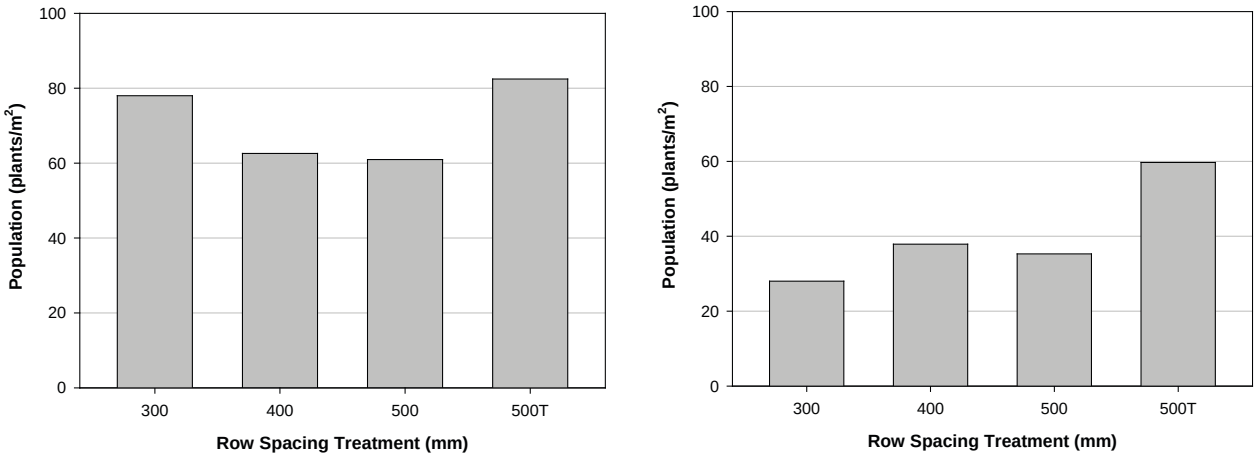

Figure 1. Effect of row spacing treatment on plant establishment at Walgett (a) and Moree (b) in 2011

- There was no significant effect of row spacing on grain yield at Bellata in 2011.
- Similar to Bellata, there was no significant effect of row spacing treatments on the grain yield of Shepherd(ϕ) at Walgett. The 500 mm row spacing for Commander(ϕ) yielded significantly lower than the 300 mm row spacing at Walgett.
- The 500T treatment at Walgett yielded similar to the 300 mm row spacing.

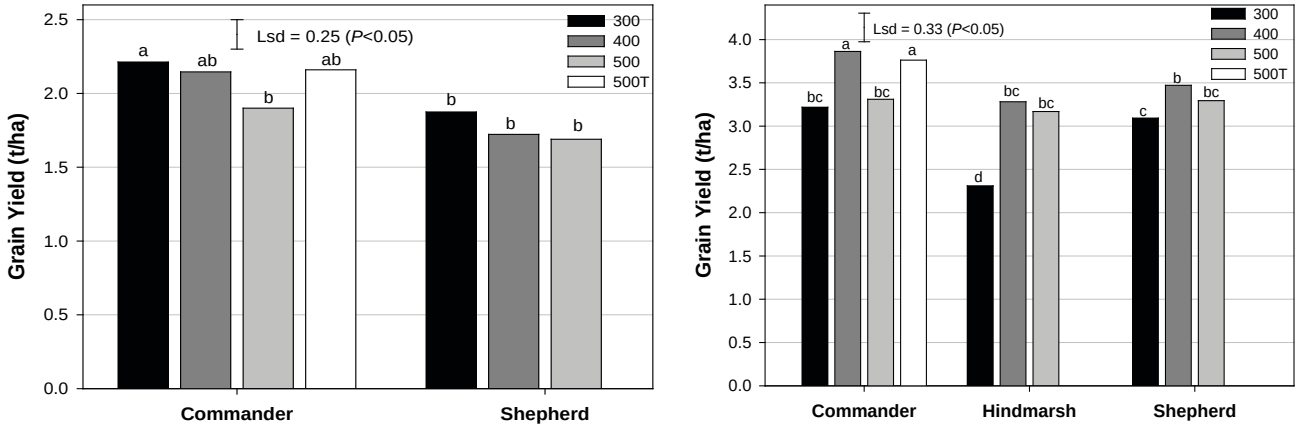

Figure 2. Variety yields at 4 row spacing treatments at Walgett (a) and Moree (b) in 2011.

- The 400 mm and 500T row spacing treatments for Commander(ϕ) had the greatest number of tillers at Moree. All other treatments had similar tiller numbers except for the 300 mm row spacing treatment for Hindmarsh(ϕ), which had the lowest tiller numbers.

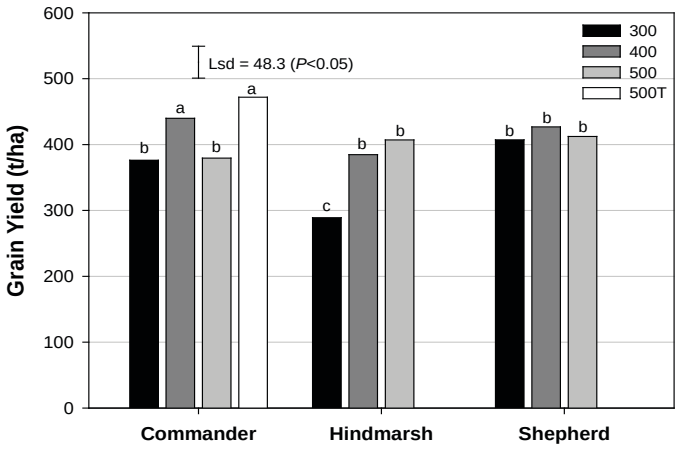

Figure 3. Tiller numbers for Commander(ф), Hindmarsh(ф) and Shepherd(ф) at 4 row spacing treatments at Moree in 2011.

- Plant populations above 80 plants/m^2 had limited effect on the grain yield at Bellata, while increasing from 40 to 80 plants/m^2 increased yield by approximately 0.25 t/ha.

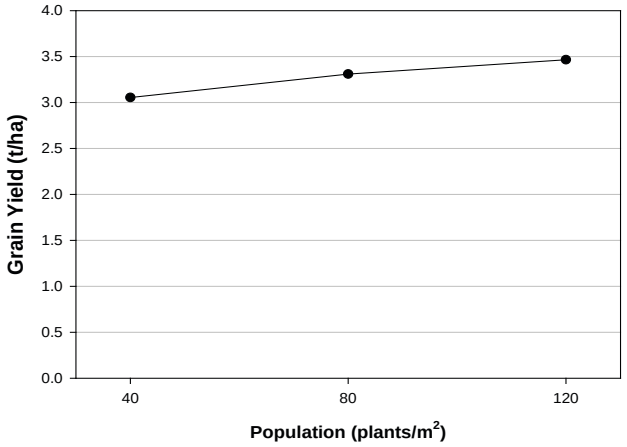

Figure 4. Effect of plant population on grain yield at Bellata in 2011.

Summary

The 500 mm row spacing treatment incurred the greatest yield penalty at Moree and Walgett for Commander(ф). For Shepherd(ф) there was no yield penalty for shifting from 300 to 500 mm row spacing's at Walgett or from 400 to 500 mm row spacing's at Moree. At Moree Hindmarsh(ф) did not have any yield penalty from moving between 400 and 500 mm row spacing's. No yield differences between row spacing treatments were observed at Bellata. The 500T row spacing treatment was shown to be an effective means of improving plant establishment numbers and consequently grain yield at both Walgett and Moree compared to the 500 mm row spacing treatment. The importance of establishment was made evident by the Moree trial where low establishment for the 300 mm row spacing treatment resulted in lower or similar yields to the 500 mm row spacing treatment. The influence of row spacing on grain yield from trials in 2011 does not support results of similar trials in 2010, which showed significant reductions in yield when moving from 330 to 430 mm. It is unclear why significant responses were not observed in 2011 although both trials suffered significant moisture stress up to stem elongation (GS30), but is hoped that when grain quality data becomes available then an explanation may become clear.

Acknowledgements

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