5.3 Row Spacing and Nitrogen Placement Demonstration in barley

Location: Inverleigh Research Site, 2006 Flats

Funding: This demonstration was funded by SFS.

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Rainfall (mm) April – November : 233mm GSR.

Summary of Findings: Results from this demonstration suggested that in the dry season of 2006, there were yield benefits from wider row cropping. Whilst the results showed no significant differences between the nil nitrogen by row spacing treatments for yield (see Table 1. shaded plots), correct placement of nitrogen during the season for wider row spacings showed a yield advantage.

Background to the trial: This demonstrations was conducted for two significant reasons.

1. To assess the potential yield losses when increasing the seed row width for the benefits of subsequent inter-row (no-till) cropping;
2. To determine if nitrogen application efficiency can be increased in wider row spacing by applying product in a linear manner.

Trial Inputs:

Seeding Date: 21/6/06, 90kg/ha Gairdner, 100kg MAP/ha,
Chemical Regime: 21/6/06; Sprayseed @ 2L/ha + 1.2L/ha Triflur X, IBS
5/8/06; Tigrex @ 750mls/ha, GS23
7/9/06; Tilt @ 250mls/ha, GS30
Nitrogen: 18/9/06; Urea @ 80kg/ha applied in either a linear or blanket manner.
Harvest: 13/12/06; outside rows harvested separately from internal plot to minimise edge affect.

Trial Design:

This demonstration gained momentum and interest as the season progressed. From what originally was only to be a comparison of three row spacings, it became an interaction with nitrogen placement. Each plot was sown to a two metre width (using the new SFS stubble seeder) with a plot length of 12 metres. Table 1 shows the final design of the demonstration. Blanket urea application was undertaken in a way typical of how nitrogen would be spread from a farmer spreader. Linear application followed the row line, to represent more precise application, as may occur with use of liquids and GPS.

Table 1. Row Spacing Width x Nitrogen Application Method.

	Range 1	Range 2	Range 3	Range 4
200mm Spacing	Blanket	Nil	Blanket	Nil
300mm Spacing	Blanket	Linear	Nil	Blanket
400mm Spacing	Linear	Blanket	Nil	Linear
200mm Spacing	Nil	Blanket	Nil	Blanket
300mm Spacing	Linear	Nil	Blanket	Linear
400mm Spacing	Blanket	Nil	Linear	Blanket

Trial Results: Monitoring throughout the season took observations of tiller and head counts per square metre for each row spacing treatment. Early observations suggested that there were more than adequate tiller numbers (>600) in each of the row spacing plots (no statistical data), see Figure 1.

Although there appeared to be more tillers per square metre within the 200mm (8") row spacing plots, when this was matched with the nil nitrogen applied at GS30/31 (control), the overall head number count (conducted 8th November) appeared far less than the blanket nitrogen application. Similarly, the 300mm/12" and 400mm/16" row spacings had far higher head counts compared with the control (-N) treatment. The linear placement of nitrogen in this demonstration did not appear to show any apparent variance to the conventional broadcast method, when assessing head counts.

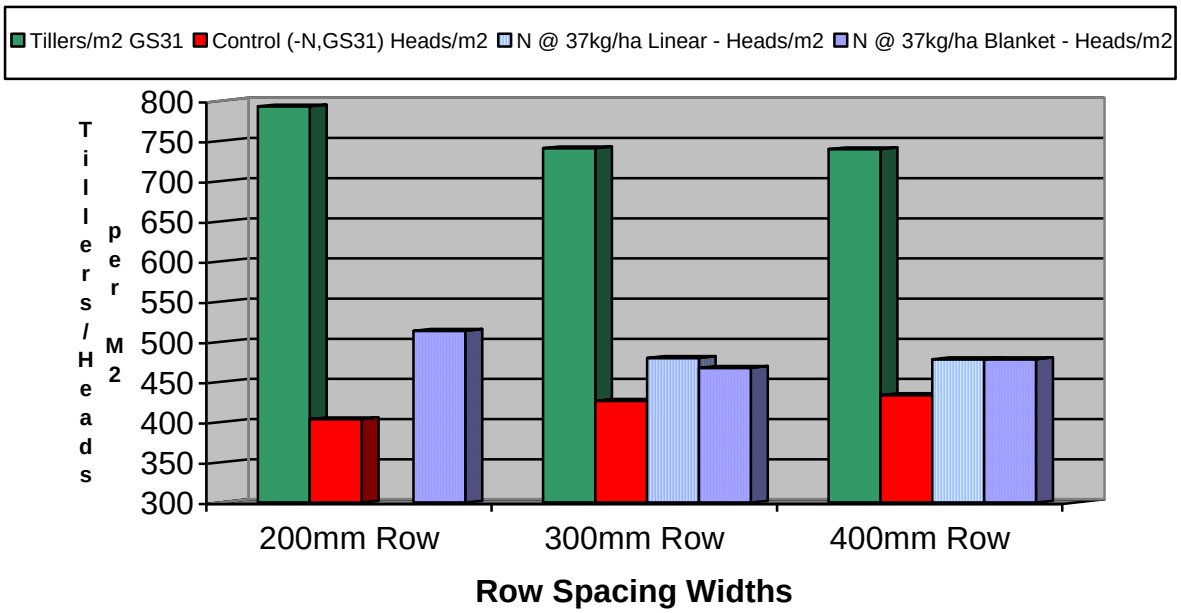

Figure 1. Tiller and Head Counts for each of the Row Spacing and Nitrogen Treatment.

Original expectations where that narrow row spacings would far out yield wider rows, based on overseas higher rainfall experience. These results give confidence to many producers who have found it difficult to grapple with high volume stubble loads, seeded by narrow row spacings. In this one demonstration (in a very dry year), yield outcomes showed that wider rows in general, out yielded the narrow rows. The greatest yield outcome for both the plus and minus nitrogen occurred in the 400mm row spacing treatments (Figure 2).

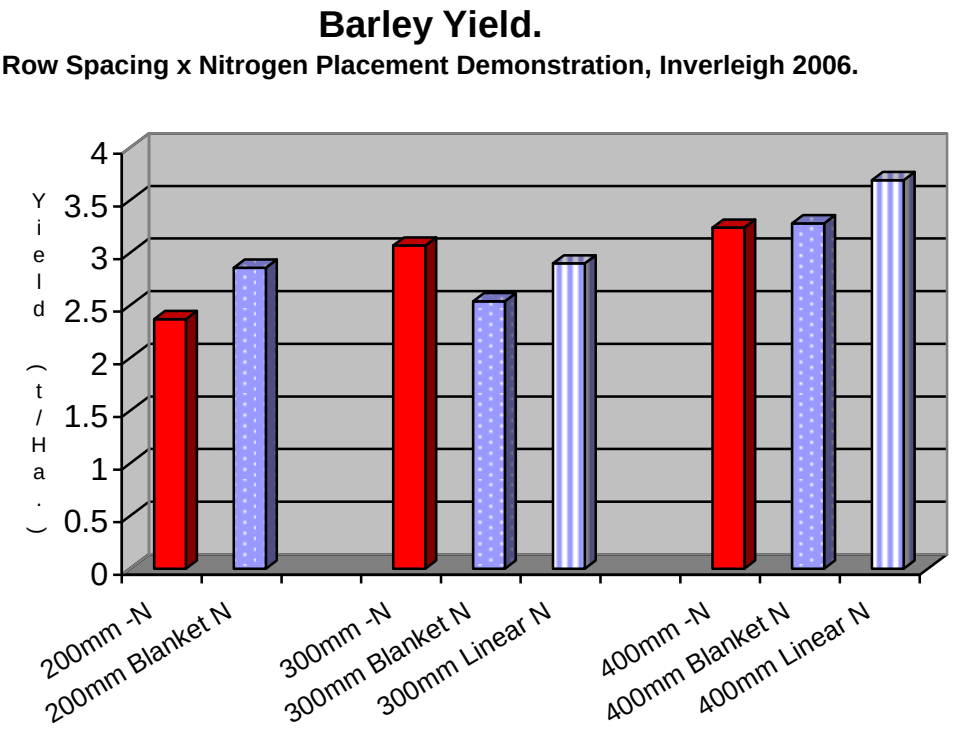

Figure 2. Raw Yield Results, Barley 2006, Nil nitrogen, Blanket and Linear Application across 200mm, 300mm & 400mm Row Spacings.

When comparing the available data for statistical analysis, it was shown that there appeared to be no significant difference between treatments for yield (Table 2). The reason for this inability to create any significant outcomes is through lack of data sets for analysis. The data that was used did also have a high Coefficient of Variation that does not give strong confidence to the data set.

Table 2. Statistic Analysis for Row Spacing affects on Yield and Quality

	Yield T/ha	Protein %	Screenings %	Test Weight kg/hl	TGW g/1000 seeds
200mm Rows	2.847	11.53	5.9	72.15	33.17
300mm Rows	2.768	12.85	7.5	72.4	32.72
400mm Rows	2.915	11.95	6.7	71.35	34.2
LSD 5%	977kg	1.32%	4.59%	1.86kg	1.82g
Sig Diff 5%	No	Yes	No	No	No

From the limited statistic analaysis, it is difficult to determine economic outcomes. Machinery changeover for wider row spacings, effective linear placement of nitrogen and reliance on GPS are critical, although, if wider rows are used, there is some suggestion that wider implements can be pulled without the need for additional horsepower. In

general, up to a one tonne grain benefit in a drought due to wider row spacings could be viewed as highly economic, but again, this is one location in a dry year with a limited data set.

Trial Observations: This demonstration was sown into canola stubble without a high residue load. Ryegrass did not prove to be an issue with these plots; as it was hoped to assess the row width interaction with weed competition. Whilst disease pressure was low, there was evidence that greatest levels were present the narrow row spacing. It did also appear that the narrow row spacing suffered more from poor grain set due to the dry conditions.

This demonstration will now be constructed into a larger trial for 2007, building greater capacity to also analyze both nitrogen timing and a varietal response (a similar demonstration conducted at Yalla-Y-Poora in 2006).

Photographs: the below photos show two timings of each of the three row spacing treatments with nitrogen applied.

Row Spacing: 200mm/8” 300mm/12” 400mm/16”

25th September 2006.

8th November 2006.