Skipped-row urea application at sowing may improve nitrogen efficiency

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Summary
Nineteen experiments in the Mallee, over four years, have shown that mid-row banding does as well as top-dressing in obtaining yield and protein improvements over more conventional methods of nitrogen application at sowing (eg, broadcast, and incorporated at sowing).

Background

Mid-row banding of urea is a method of applying urea at sowing and getting a similar effect to that of top-dressing urea at stem elongation. Applying urea at sowing in bands between every second row, rather than under each seed row, delays the availability of nitrate to seedling roots. The slower availability of nitrate (delayed for up to six weeks) means a leaner seedling, with few tillers, rather than a lush, many-tillered plant. However, in areas such as the Mallee, where dry springs are frequent and sub-soil constraints may also reduce the availability of sub-soil moisture, a many-tillered crop may hay-off and fail to produce up to potential yield. Providing nitrogen at a later growth stage (by top-dressing or by mid-row banding) may ensure yield, and encourage higher quality in the crop, despite poor moisture resources.

Method

Conversion of conventional, two-box seeding equipment to mid-row banding can be done by blocking off (skipping) every third row for seed, and placing only urea in that row, while placing no urea in the other seed rows. The resulting pattern is S F S S F S S F S , where S = seed and F = fertiliser. This approximation of mid-row banding (skipped-row) was demonstrated in plots at Birchip in 2003.

Six plots of Yitpi wheat (61 kg/ha) were sown in May 2003, with 20 kg/ha grain legume super as basal fertiliser. Three rates of nitrogen were applied as urea (nil, 13 and 26 kg N/ha). For conventional plots, urea was placed under each seed row. For the skipped row plots, urea was placed in every third row, where no seed was sown.

Results

Biomass harvests in September at booting stage, showed nearly twice as much plant growth (kg/ha) with twice as many tillers in the conventional plots as in the skipped row plots (Figure 1).

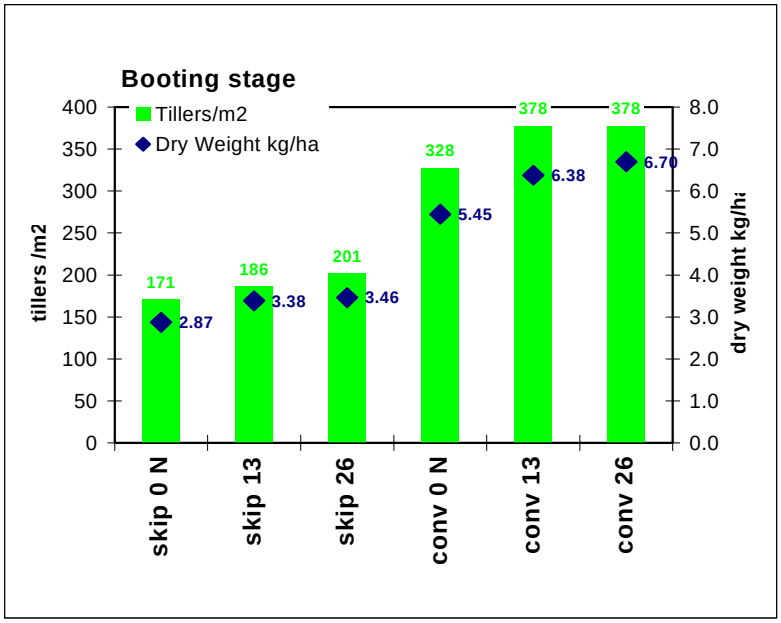

Figure 1. Tiller counts and dry weight of Yitpi wheat when comparing skipped row-plots with conventional plots (applying N at 0, 13 and 26 kg N/ha)

However, grain harvest in December showed the yield in skipped-row was equivalent to that in the conventionally-sown plots (Figure 2). Grain quality data is pending.

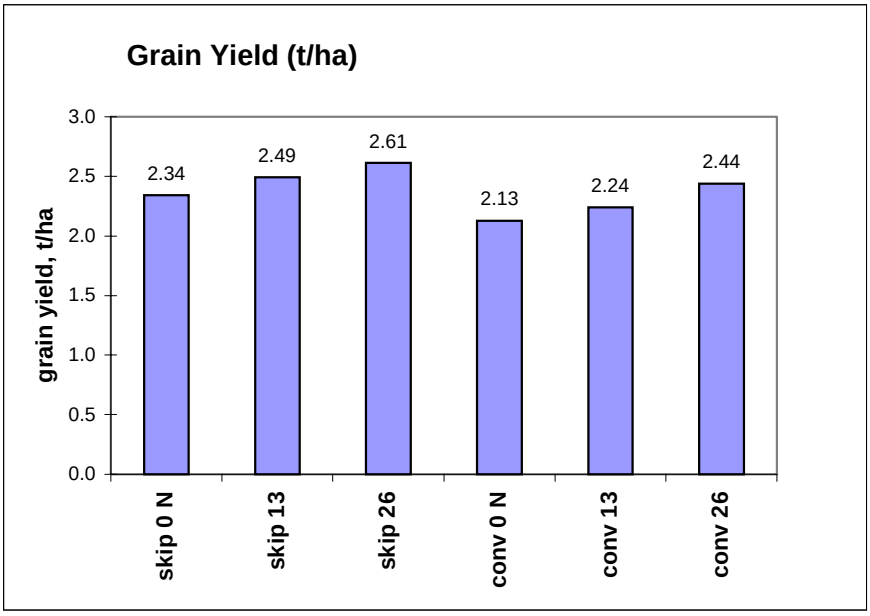

Figure 2. Grain yield of Yitpi when comparing skipped row-plots with conventional plots (applying N at 0, 13 and 26kg N/ha)

These plots were not replicated, but do bear out results from replicated experiments, that mid row banding of urea results in lower tiller numbers but similar or higher grain yields, when compared to conventional applications of urea in which nitrogen is made available to seedlings earlier in the season.

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