

Row spacing x wheat variety at Berriwillock

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Key messages:

- Narrower row spacings resulted in some increased yields in a low rainfall zone (this work will be continued in 2016).
- There was no interaction between variety selection and row spacing.
- Sowing density impacted on the final yield of Mace in a low rainfall season.

Row spacing is a tool that is considered potentially useful for managing yield and sowing operations. Wider row spacing can increase grain yield in some low yielding situations (Blackwell et al. 2006; Jones and O'Halloran 2006). This is due to perceived water conservation effects where it is thought that it takes time for the roots to grow and access the reserves in the inter-row area, meaning water is 'rationed' to crops at wider row spacings.

The counter argument is that a narrower row spacing produces a crop that covers the ground surface more rapidly, reducing the potential for evaporative losses. In light of this, the differences in early vigour that are inherent in different wheat varieties may also influence the importance of row spacing for water conservation in stubble retained cropping systems.

Method

Aim: To determine how seeding density interacts with row spacing in the Mallee (9, 12 and 15 inch) to affect the yield of Mace and Trojan wheat and to ascertain the performance of new and existing varieties in the Mallee on nine and 15 inch row spacing.

Table 1: Methodology

Soil type	Sandy clay
Annual rainfall	241mm
GSR (Apr-Oct)	141mm
Varieties	Corack [®] , Cosmick [®] , Cutlass [®] , Emu Rock [®] , Hatchet CL Plus [®] , Kord CL Plus [®] , LPB11-1728*, Mace [®] , LongReach Phantom [®] , LongReach Scout [®] , Scepter [®] , Trojan [®] , Yitpi [®]
Sowing date	15 May
Seeding equipment	Knife point, press wheels on 23cm, 30cm & 38cm row spacing
Target plant density	150 plants/m ²
Harvest date	11 November
Fertiliser	Granulock Supreme®Z + Impact® @ 50kg/ha at sowing
Trial average yield	1.3t/ha

*LPB11-1728 is a variety predicted to be released soon; it is of Australian Hard quality and with moderately resistant/moderately susceptible yellow leaf spot characteristics.

At the Berriwillock site, using a split-plot design, two wheat varieties were compared on different row spacings and plant densities. Mace and Trojan, which are two similar yielding varieties with different maturities, were sown on three different row spacings 23cm (9 inch), 30.5cm (12 inch) and 38cm (15 inch) and at two plant densities (100 plants/m² and 200 plants/m²).

Adjacent to the trial, 13 wheat varieties were also sown on 23cm and 38cm row spacings. The trial was dry-sown into a vetch hay stubble. Emergence occurred 15 days after sowing following 13mm of rain which occurred five days after the trial was sown. The trial had good even emergence.

Grain yield was measured and quality (protein, moisture, test weight and screenings) analysis was performed according to grain receival site standards. Statistical analysis was completed using a one-way and/or a two-way ANOVA in Genstat, depending on the trial design.

Results

Mace and Trojan were compared at three different row spacings and two plant densities. The data showed a trend that suggested that narrower row spacing yielded more than wider row spacings, but this was not significant ($P=0.061$, CV 6.7%) (data not presented).

Reflecting the dry season, the lower plant density in Mace yielded greater than higher plant density, but the same did not occur for Trojan (Figure 2). This could be attributed to the fact that Trojan is a longer season variety and hence seeding density did not make a difference.

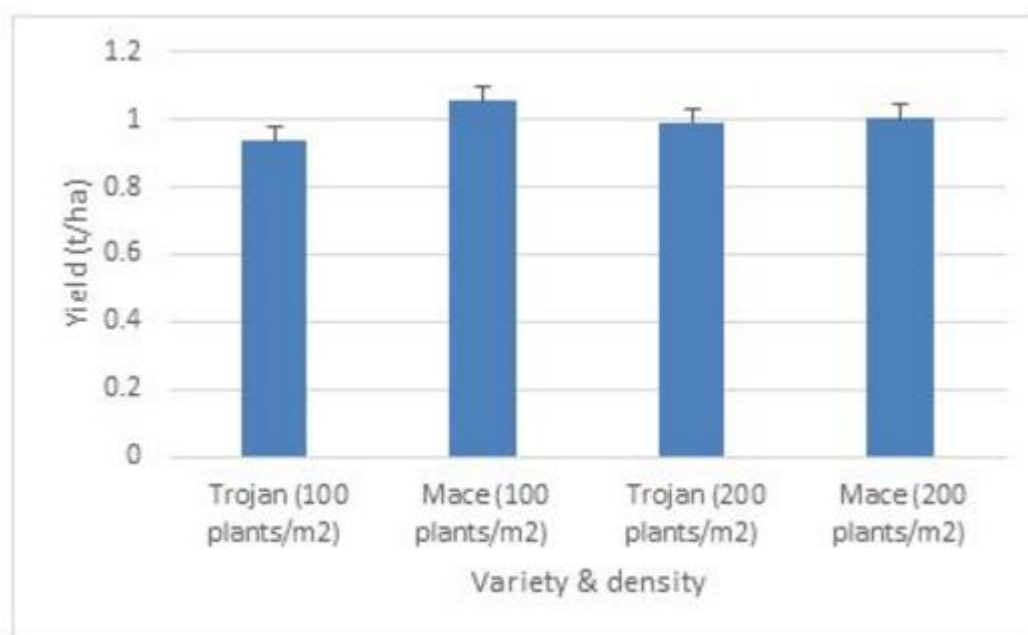


Figure 1. Average grain yield (t/ha) of Mace and Trojan at two sowing densities at Berriwillock, 2015.

In the trial testing – the effect of row spacing on 13 different varieties – there was an effect of row spacing with the narrower row spacing (23cm) yielding more than wider (38cm) row spacing (Table 2). This could be attributed to the fact that crops planted at the narrower row spacing covered the ground quicker and consequently reduced evaporation losses (Hunt and Kirkegaard, 2013). Water use efficiency is known to be greater where soil evaporation losses are lower.

Table 2: Grain yield (t/ha) for 23cm and 38cm row spacing.
Sig. diff. $P < 0.01$, LSD ($P < 0.05$) 0.06, CV% 11.9.

Row spacing	Grain yield (t/ha)
23cm (9 inch)	1.30
38cm (15 inch)	1.15

The highest yielding varieties at Berriwillock were Scepter, LPB11-1728, Cosmick, Corack, Emu Rock and Scout (Figure 2). Mace was relatively lower yielding than it was in previous years. While there were differences between varieties and between row spacings, there was no interaction and no variety was better suited to a particular row spacing.

During the season the temperature fell below zero degrees at canopy height on 37 days. However, the majority of these frosts occurred prior to grain filling.

High protein was observed in all varieties due to the site having adequate nitrogen (N) and low yield potential due to the dry season. There were no significant differences between protein per cent in any varieties, which was also the case for test weight (kg/hL).

Screenings were all under 12 per cent in this trial, and a difference between varieties was observed. Mace and Cutlass had the lowest screenings of all varieties ($P=0.04$, LSD 3.6, CV 36 per cent).

The mean quality grade achieved was Australian General Purpose (AGP), largely due to the test weight and in a few cases, screenings which were greater than 10 per cent.

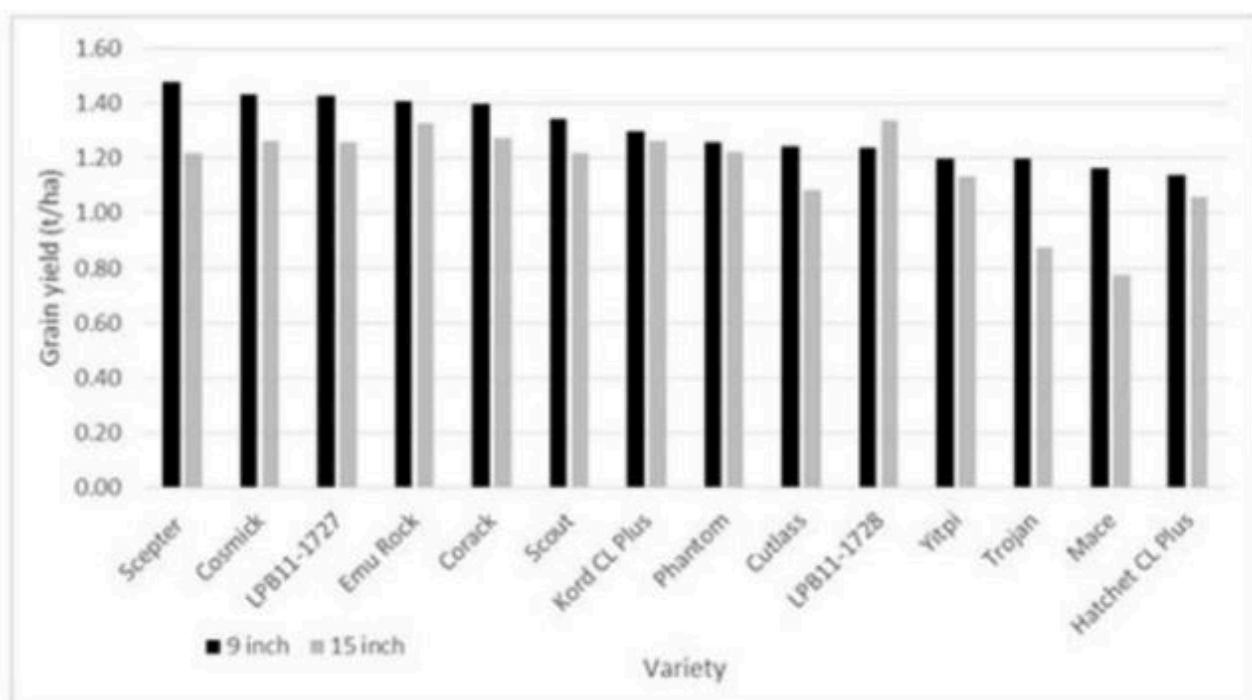


Figure 2: Average grain yield (t/ha) of wheat varieties at Berriwillock on 23cm (9 inch) and 38cm (15 inch) row spacing (variety: $P<0.001$, LSD 0.06t/ha CV 6.7 per cent; variety x row spacing $P=NS$, LSD 0.24t/ha, 11.9 per cent).



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About BCG

Birchip Cropping Group Inc. (BCG) is a not-for-profit agricultural research and extension organisation led by farmers in the Victorian Wimmera and Mallee.

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