Wheat varieties: Managing yield and grain quality risks through sowing time and seeding rate at Mullewa

Summary

Sowing time has a greater influence on production of all wheat varieties than seeding rate.

Weed competition is one factor which can limit early sowing and increasing crop competition through increasing plant density has been demonstrated as a useful non-chemical tool to reduce weed growth.

The research has demonstrated that increasing plant density did not adversely affect crop yield or grain quality of crops sown close to the break of the season in May, however higher plant densities of varieties sown in June did reduce yield of wheat varieties.

Aim

The objective of this research is to improve crop production by determining the effect of sowing time and sowing rate on crop yield and grain quality risks of new wheat varieties.

Trial Details

Property	Mullewa Research Annexe, Ardingly South Road
Plot size and replication	20 m plot length x 1.54 m width x 3 reps
Soil type	Earth loam
Variety	Wheat: Cobra, Corack, Emu Rock, Envoy, Mace, Magenta
Seeding date	11 May and 7 June 2012
Treatments	6 varieties, replicated 3 times x 2 sowing times x 3 seeding rates
Seeding rate	Targeting 100, 200 and 300 plants/m^2
Fertiliser	TOS 1: 11 May, 80 kg/ha Agras Xtra drilled with seed + 60 kg/ha Urea topdressed. TOS1: 11 May, sprayed 100 mL/ha Dominex +1.5 L/ha Triflur X + 1 L/ha Sprayseed TOS2: 7Jun, 80 kg Agras Xtra + 50 kg/ha Urea TOS1+2: 25 Jun, 0.5 L/ha Hasten + 700 mL/ha Velocity
Growing Season Rainfall (Apr-Oct)	Summer rain Dec – April 49 mm, GSR May to Oct – 100.4 mm

Results and Conclusions

There was no influence of seeding rate on crop production in 2012 at Mullewa when the crop was sown close to the break. However there was a yield penalty with the higher seeding rate when the sowing time was delayed by a month. These results are in contrast to 2011 at Mullewa. Increasing seeding rate increased crop production when sown close to the break and there was no effect on production with increasing seeding rate when seeding was delayed.

Emergence
Emergence was staggered for the first sown treatments only. This is because seeding was on 11 May into a drying seed bed. It had rained in April and early May. The second sowing time was on 7 June. Rainfall in June was 56 mm. The seeding rate treatments targeted 100, 200 and 300 plants/m^2. The actual plant population was 100, 147 and 200 plants/m^2 respectively (averaged across variety and sowing time). The range in ears produced across treatments was not large, however it was significantly different between the highest (145 ears/m^2) and the lowest seeding rate (137 ears/m^2) (averaged across variety and sowing time).

Yield

At Mullewa, there was no interaction between seeding rate, sowing time and variety on crop yield. However, there was an interaction between seeding rate and sowing time on crop production for all varieties. When sown close to the break of the season, changing seeding rates did not affect crops yields significantly. In contrast to the first sowing time, the grain yield (averaged across all varieties) was significantly reduced at the higher actual plant population compared to the middle and lower targeted plant populations of 100 and 147 plants/m^2 (Figure 1). Delaying seeding by a month later, reduced crop production by 500−600 kg/ha. This equates to 20 kg/day/ha. Emu Rock, Mace and Corack were the higher yielding varieties at each sowing time. Emu Rock and Mace are AH varieties, Corack is an APW variety.

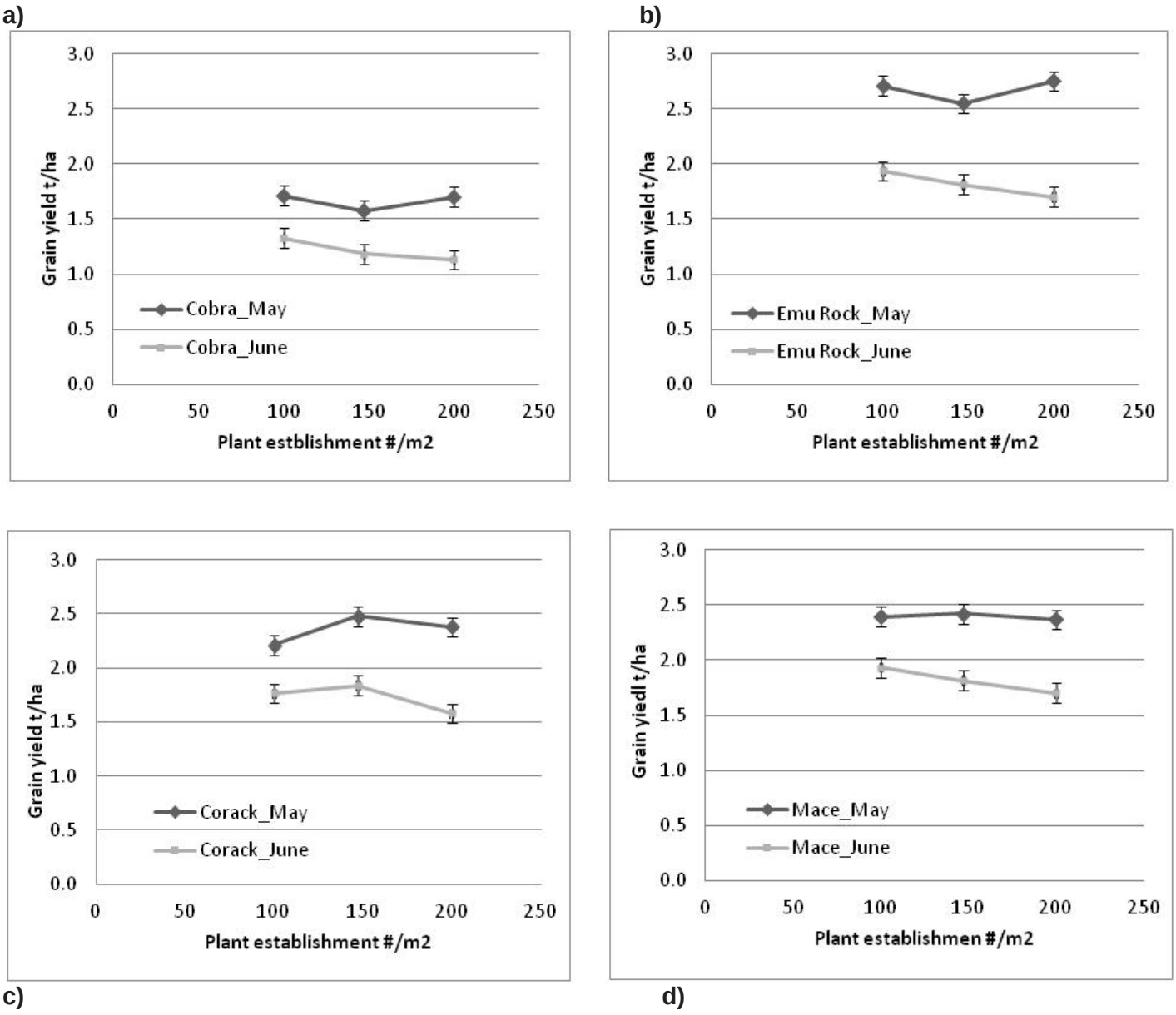

Figure 1(a-d) Effect of increasing plant density on grain yield of wheat varieties sown at two sowing times May 11 and June 7 2012.

Quality

There was no influence of seeding time, plant density or variety on grain protein (P>0.05). Initial assessment of grain screenings includes whole and cracked grain. Except for Emu Rock, screenings of all varieties were lower than five per cent when sown at the first sowing time (P<0.05). Observations of Emu Rock at harvest suggest the screenings are a result of mechanical damage, rather than small grain (further measurements are to be undertaken to assess this).

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Sowing deep to establish a crop under drying conditions

Background

This is a systems demonstration to highlight how deep current varieties can be sown when ‘chasing moisture’.

Soil moisture, sufficient to establish a wheat crop, was present at depth in many of the soils surrounding the Mullewa region in autumn 2012. Often this was beyond the recommended depth of sowing for wheat.

Recommended sowing depth of wheat is from 30−40 mm dependant on variety.

Longer season varieties generally have greater coleoptile length than shorter season varieties and can be sown deeper as a result (growers are aware of this).

A less than perfect start, low rainfall at the break late in the season, dictates that they must push the limits in order to utilise the limited moisture available.

In an effort to establish wheat crops with limited soil moisture farmers are sowing wheat at depths greater than the known coleoptile length.

Aim

Deep sow current varieties, Mace, Magenta, Wyalkatchem, Cobra, Corack, Bonnie Rock, to demonstrate the ability of each variety to emerge from depth.

Trial Details

Property	Mullewa Research Annexe, Ardingly South Road.
Soil type	Heavy red loam
Crop and Varieties	Wheat; Bonnie Rock, Cobra, Corack, Mace, Magenta, Wyalkatchem
Treatments	3 Sowing depths; 40mm, 60mm, 90mm
Replicates	2 replicates
Sowing date	25 May
Seeding rate	40 kg/ha

Figure 1. Horizontal stubble indicating soil surface, depth of sowing approximately 90mm with seed at bottom of hole, screw driver indicating top of moisture line approximately 40mm.