

Barley agronomy – deep sowing barley

Southern Barley Agronomy Project, funded by GRDC
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Key findings

- Barley varieties differ in coleoptile length and their ability to emerge from depth
- Care at sowing should be taken when Triadimenol based dressings are used in conjunction with short coleoptile varieties such as Hindmarsh
- Choosing a long coleoptile variety, or combining higher seeding rates with a Carboxin based dressing may help counteract some of the plant establishment losses from deeper sowing

Why do the trial?

Agronomic combinations of barley variety, seed dressings, and seeding rate can influence plant emergence and early vigour when sown deep. A poor combination can weaken the agronomic system and leave the crop exposed to other factors such as root disease, poor weed competitiveness and can ultimately lead to yield losses. The aim of this trial was to demonstrate best management practices that can give barley the best possible start from deeper sowing.

How was it done?

Plot size: 1.4m x 10m

Fertiliser: 70kg/ha DAP (18:20) + Zn 2%

Seeding date: 1st June 2012

The trial was a randomised complete block design consisting of three replicates, and six combination treatments of variety, sowing depth; seed rate and seed dressings (Table 1). Plant emergence counts, NDVI, and grain yield measurements were recorded from every plot.

Table 1. Treatment combinations of variety, sowing depth, seeding rate, and seed dressing for the demonstration trial at Hart, 2012.

Treatment	Variety	Sowing Depth	Seeding Rate (seeds/m ²)	Seed Dressing (Product active, & rate)
1.	Hindmarsh	Shallow (30mm)	150	Untreated
2.	Hindmarsh	Deep (75mm)	150	150g/L Triadimenol, 4g/L Triflururon (100ml/100kg seed)
3.	Hindmarsh	Deep (75mm)	150	400g/L Carboxin, 3.2g/L Cypermethrin (250mL/100kg seed)
4.	Hindmarsh	Deep (75mm)	200	400g/L Carboxin, 3.2g/L Cypermethrin (250mL/100kg seed)
5.	Fleet	Shallow (30mm)	150	Untreated
6.	Fleet	Deep (75mm)	150	Untreated

Results

Plant emergence

Treatment combination one, of Hindmarsh sown shallow at 150 seeds per square metre with no seed dressing is considered the control treatment and established well at 148 plants per square metre (Figure 1). When Triadimenol treated Hindmarsh was sown deeper at 150 seeds per square metre emergence was reduced by 25% and by 12% when treated with Carboxin. Increasing the seeding rate to 200 seeds per square metre along with Carboxin resulted in similar emergence to the control. Fleet established similar to the Hindmarsh shallow control at both sowing depths.

Early Vigour (NDVI 6 weeks after sowing)

Early vigour growth responses in Hindmarsh were representative of the plant emergence results. At deeper sowing Triadimenol treated Hindmarsh reduced vigour to the greatest extent and vigour was improved with Carboxin and a higher seeding rate. Compared to shallow sown Hindmarsh, Fleet had approximately 40% greater vigour sown shallow, and 25% when sown deep.

Grain Yield

Plant establishment and growth effects from deep sowing and seed dressing did not result in significant yields losses at this site in 2012. The grain yield of untreated Hindmarsh sown shallow was 2.71t/ha similar to all other treatment combinations of Fleet, Hindmarsh, sowing depth and seed dressings.

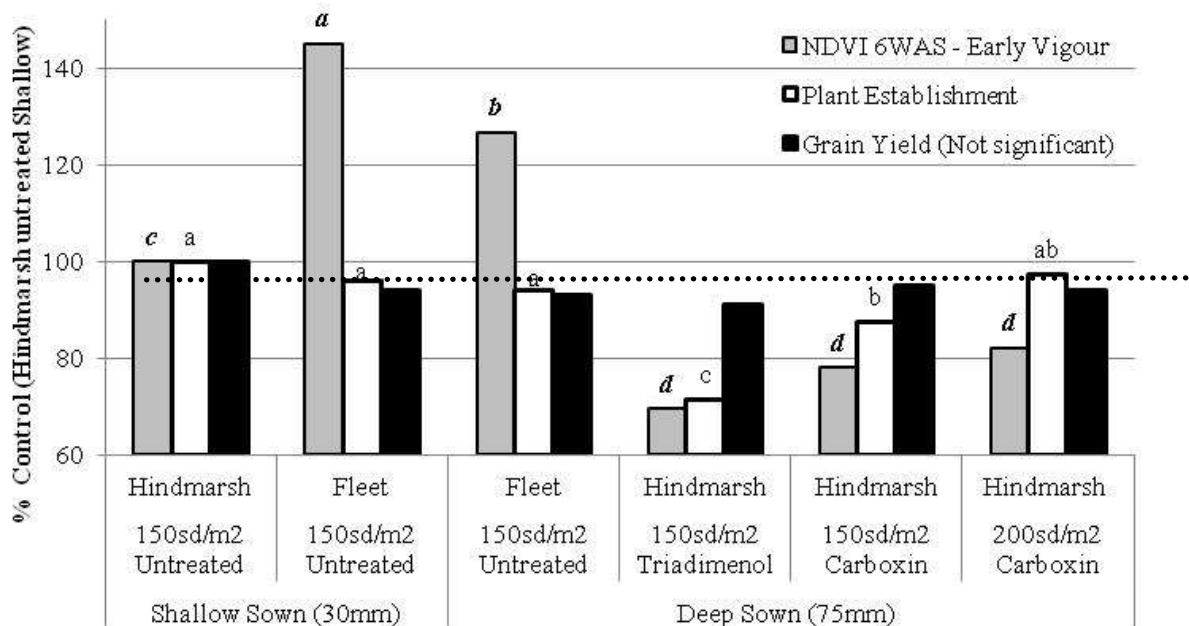


Figure 1: Plant establishment, NDVI (growth) taken 6 weeks after sowing, and grain yield expressed as a percentage of the Hindmarsh shallow sown control (148 plants per square metre, 2.7t/ha) from the combination treatments of variety, seed dressing, seeding rate, and sowing depth at Hart 2012 (treatments with the same letter are not significantly different).

Summary

Growers need to consider the combination of variety, sowing depth, seed dressing and seeding rate. Early vigour and emergence is almost always reduced by deeper sowing, however varieties differ in their tolerance to deeper sowing due to their seed size and coleoptile length. Hindmarsh

is a shorter coleoptile variety, so care should be taken with seeding depth, whereas Fleet has the longest coleoptile (~85mm long) coupled with a large seed size.

Other barley varieties with long coleoptiles include Commander, Maritime and Fathom. Varieties with short to medium coleoptiles include Scope, Buloke, Oxford and Hindmarsh.

In addition Triadimenol seed dressings can shorten the coleoptile and further reduce establishment of shorter coleoptile varieties. A seed dressing containing the active ingredient Carboxin can lengthen the coleoptile by up to 10mm, thereby improving establishment from deeper sowing as demonstrated in this trial. The 2012 trial at Hart highlights that when sowing deep, growers should consider sowing a long coleoptile variety such as Fleet, or apply Carboxin (avoid Triadimenol) along with increased seeding rates if sowing shorter coleoptile varieties such as Hindmarsh. Yield differences between treatments were not established in this trial but any plant establishment and growth setbacks are likely to weaken the agronomic system, which may relate to yield losses depending on seasonal conditions

Acknowledgements:

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Photo: Hindmarsh barley sown at 80mm depth (left hand side) or 25mm depth (right hand side) at Hart 2012.