

Barley variety response to row spacing

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Key findings

- There was no gross margin difference between 225mm (9inch) and 355mm (14inch) row spacings, as it had no impact on grain yield or grain quality.
- Hindmarsh produced the highest grain yields, but Maritime showed the best grain quality.

Why do the trial?

The trial was conducted to determine barley varietal performance across two seeding row spacings. Characteristics measured included differences in early vigor, grain yield and grain quality.

How was it done?

A replicated trial was established at the Hart Field site. The trial assessed four barley varieties, Maritime, Fleet, Hindmarsh and Flagship. These varieties differ in growth rate, habit and height, which were compared across two row spacings, 225mm (9") and 355mm (14").

Seeding rates were adjusted according to grain weight and germination to produce target plant populations of 145 plants per square metre. The trial was sown on the 5th June using chisel points.

Plot size 1.5m x 10m **Fertiliser rate** 70kg DAP @ 70kg/ha

Plant counts were carried out four weeks after sowing to determine crop establishment. All plots were assessed for Normalised Difference Vegetative Index (NDVI) using a Greenseeker to ascertain any differences through the early growth stages.

The trials were harvested on the 12th of November and scores for straw strength, plant height and grain yield measurements were recorded. Grain quality was assessed for retention (%) with a 2.5mm screen, protein (% dry basis), screenings with a 2.2mm screen and test weight (kg/hectolitre).

Results

Comparison of row spacing grain yields at Hart showed no significant difference between 225mm (9") (1.77t/ha) and 355mm (14") (1.81t/ha) (Table 1). Evaluation of the NDVI for 225mm (9") treatment showed a significantly higher NDVI value compared to the 355mm (14"). There was no difference in barley plant counts.

Table 1: Row spacing grain yields and NDVI at Hart in 2008.

Row Spacing	Grain yield (t/ha)		NDVI		Plant density (plants/m ²)	
225mm (9")	1.77	a	0.632	a	150	a
355mm (14")	1.81	a	0.592	b	140	a
LSD (5%)	ns		0.036		ns	

Table 2 displays the barley variety grain yield. Hindmarsh was the highest grain yielding variety, 2.18t/ha, with Fleet yielding 1.83t/ha. The NDVI of Hindmarsh showed a significantly lower index value compared to all other varieties. Flagship and Fleet showed no difference for NDVI.

Table 2. Barley variety grain yield and NDVI at Hart in 2008

Variety	Grain yield (t/ha)		NDVI	
Flagship	1.7	bc	0.6	a
Fleet	1.8	b	0.7	a
Hindmarsh	2.2	a	0.5	c
Maritime	1.5	c	0.6	b
LSD (5%)	0.3		0.1	

There was no difference for all grain quality characteristics across both row spacing treatments (Table 3). Grain protein levels were very high, well above the malt receival standard of 12%. Both treatments showed no significant difference in screenings, retention and test weight with an overall receival grade of Feed 3.

Table 3. Row spacing grain quality characteristics at Hart in 2008.

Row Spacing	Protein (%)		Screenings (%)		Retention (%)		Test weight (kg/hL)		Receival grade
225mm (9")	17.0	a	35.1	a	15.1	a	66.2	a	F3
355mm (14")	17.2	a	37.7	a	14.1	a	65.3	a	F3
LSD (5%)	ns		ns		ns		ns		

Table 4 shows the variety grain quality characteristics. All varieties had high grain protein with no difference between varieties. Maritime had the lowest screenings (7.7%), with Flagship and Hindmarsh the highest. Maritime also had the highest retention levels. All varieties showed good test weights, Flagship and Maritime the highest. Due to low screenings, Maritime was the only variety to achieve Feed 1 classification; all other varieties were Feed 3 quality.

Table 4. Barley variety grain quality characteristics at Hart in 2008.

Variety	Protein (%)		Screenings (%)		Retention (%)		Test weight (kg/hL)		Receival grade
Flagship	17.8	a	54.3	c	2.9	c	67.6	a	F3
Fleet	16.5	a	30.3	b	14.3	b	64.1	b	F3
Hindmarsh	16.4	a	53.3	c	4.6	c	64.8	b	F3
Maritime	17.8	a	7.7	a	36.6	a	66.7	a	F1
LSD (5%)	ns		17.1		8.2		1.8		

Hart field trials 2008

Discussion

Early rainfall enabled good crop establishment at Hart. Rains throughout winter allowed high biomass production with crops setting high grain yield potential. These beneficial conditions were followed with a very dry spring, imposing severe drought effects on the crop.

Plant counts confirm that there was no difference in barley plants per square meter for the two row spacings. There was no grain yield difference between the two spacings, suggesting that the barley plants were able to adapt to these treatments. There was no barley variety by row spacing interaction for grain yield and quality; indicating that all varieties respond alike to this row spacing effect. Previous row spacing research on Eyre Peninsula has indicated that there is a grain yield penalty incurred when row spacings are wider. These results, and results from the same trial in 2007 at Hart, indicate the contrary with no grain yield or quality difference between row spacings. This may be a result of the very dry springs that have been witnessed during the past two seasons.

There was no gross margin difference between row spacings due to the treatment having no impact on grain yield or grain quality. The barley variety Hindmarsh returned the highest gross margin at Hart, this is attributed to producing the highest grain yield. Maritime had the best grain quality, Feed 1, due to low screenings levels and was the second most profitable variety, despite producing the lowest grain yield.

Barley varieties were also found to generate different NDVI readings. Table 2 shows Maritime recorded a NDVI value higher than all other varieties; this is due to the ability of Maritime to tiller and produce large amounts of dry matter compared to other varieties in the trial. Flagship and Fleet were not different from each other due to both varieties having similar tillering and standing ability. Hindmarsh recorded the lowest NDVI value due to this variety having a more erect growth habit compared to all other varieties in the trial. Rankings may vary if the measurement is taken on a different date, or growth stage, due to the growth habit and rate differences of barley varieties, therefore, it is important to compare NDVI readings taken at the same time.

Trials will continue in 2009 to validate 2007 and 2008 results with different seasonal conditions.

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