Comparison of barley varieties

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Key findings

- Drought conditions at Hart in 2024 contributed to low barley yield and high variability across the site. This should be considered when interpreting results.
- The trial average for all barley varieties was 0.69 t/ha with most varieties performing similarly.
- All varieties exceeded the maximum protein threshold of 12% for Malt 1 receival standards, with an average of 16.93%. Most varieties performed well for grain quality parameters including screenings, retention and test weight.
- Long-term yield data shows that Combat, Minotaur, Compass and Beast continue to perform well across a number of seasons at Hart.

Aim

This trial was conducted to compare the performance of new barley varieties alongside current industry standards.

Methodology

A trial was established at the Hart field site in 2024 to evaluate the performance of new and existing barley varieties. The trial was designed as a randomised complete block design with three replicates and included a total of 20 barley varieties (Table 2). New lines trialed at Hart include Australian Grain Technologies (AGT) PegasusAX (AGTB0667) and Bigfoot CL (AGTB0669), RAGT coded lines RP14033 and RP15034, InterGrain Granite CL (IGB21092T) and coded line 19Y027S-003 from Seednet.

This trial was managed with the application of pesticides to ensure a weed, insect and disease-free canopy. All varieties were assessed for grain yield (t/ha), protein (%) screenings (%) and retention (%). Severe water stress in 2024 resulted in a strong edge row effect. Edge rows were therefore removed prior to harvest to accurately reflect grain yield results achieved in the region. Due to unforeseen issues on site, one of three replicates could not be harvested. Drought conditions experienced at Hart contributed to variability across trial data, so the interpretation of results presented should consider this. All data was analysed using ANOVA in Genstat 24th Edition.

Table 1. Trial details for 2024 barley variety comparison at Hart, SA.

Plot size	0.92 m x 10.0 m	**Fertiliser**	Seeding: DAP Zn 1% + Flutriafol @ 80 kg/ha July 10: Urea (46:0) @ 30 kg/ha August 15: Urea (46:0) @ 30 kg/ha)
Seeding date	May 17, 2024		
Location	Hart, SA		
Harvest date	October 29, 2024		
Previous crop	Kingbale oaten hay		
Growing season rainfall	Decile 2 (176 mm)		

Results and Discussion

Grain yield

The 2024 season at Hart, and more broadly across the Mid North region, experienced dry conditions with rainfall well below average. Hart received 176 mm growing season rainfall (GSR) from April–October (300 mm GSR average) with almost 50 mm of this rainfall received mid-October. Barley grain yields achieved in this trial were below the long-term district average, with only one variety exceeding grain yields of 1 t/ha. This yield outcome has not been observed at the Hart field site since 2008 (204 mm GSR).

The average grain yield achieved for all barley varieties at Hart in 2024 was 0.69 t/ha compared to 4.66 t/ha achieved in 2023 (236 mm GSR). Similarly to wheat varieties at Hart in 2024, yield potential was reduced due to low stored soil moisture and Decile 2 conditions. High variability across the site was observed due to dry conditions, providing little to no difference between barley grain yield results for varieties (Table 2). Long-term yield data shows that Combat, Minotaur, Compass and pending malt accreditation variety Beast, have performed well across a number of seasons at Hart (Table 3).

Grain quality

All barley varieties at Hart achieved protein above the maximum receival standard threshold of 12% (Malt grade 1). This was likely due to low rainfall and low yield increasing protein concentration in grain. All barley varieties had good test weight above 65 kg/hL and 62.5 kg/hL for feed grade barley. Almost all varieties were within their receival standard threshold for screenings and retention, where small differences between varieties are observed.

Photo: Barley variety trial at the Hart field site on October 16, 2024.

Table 2. Barley grain yield (t/ha) and quality results at Hart in 2024.

Quality	Variety	Grain yield t/ha	% of site average	Protein %	% of site average	Test weight kg/hL	% of site average	Screenings %	% of site average	Retention %	% of site average
Feed	Bigfoot CL(b) (AGTB0669)	0.73^{ab}	1.0	17.0^{ab}	1.0	74.7^{cd}	1.0	2.6^{a}	0.6	84.0^{bc}	1.0
	Combat(b)	0.96^{ab}	1.3	14.7^{a}	0.8	72.3^{ab}	0.9	2.1^{a}	0.5	80.2^{bc}	1.0
	Granite(b) CL (IGB21092T)	0.89^{ab}	1.2	14.5^{a}	0.8	72.6^{abc}	0.9	3.1^{a}	0.8	74.5^{bc}	0.9
	PegasusAX(b) (AGTB0667)	0.80^{ab}	1.1	17.4^{ab}	1.0	73.8^{abc}	1.0	6.8^{a}	1.7	65.2^{ab}	0.8
Bar 1 Receival Standards				**NA**		**>62.5**		**<15**		**NA**	
Malt	Commodus(b) CL	0.54^{ab}	0.7	16.8^{ab}	1.0	74.5^{bcd}	1.0	3.5^{a}	0.9	83.4^{bc}	1.0
	Compass(b)	0.79^{ab}	1.1	17.9^{ab}	1.0	74.3^{bcd}	1.0	2.7^{a}	0.7	87.0^{bc}	1.1
	Maximus(b) CL	1.30^{b}	1.8	14.5^{a}	0.8	73.8^{abc}	1.0	1.7^{a}	0.4	84.1^{bc}	1.0
	Minotaur(b)	0.90^{ab}	1.2	15.1^{a}	0.8	74.2^{bcd}	1.0	3.6^{a}	0.9	71.1^{abc}	0.9
	RGT Planet(b)	0.56^{ab}	0.8	17.8^{ab}	1.0	74.5^{bcd}	1.0	3.5^{a}	0.9	80.9^{bc}	1.0
	Spartacus CL(b)	0.94^{ab}	1.3	16.8^{ab}	0.9	74.2^{bcd}	1.0	2.7^{a}	0.7	73.3^{bc}	0.9
Malt 1 Receival Standards				**9 - 12%**		**>65**		**<7**		**>70**	
Pending malt accreditation	19Y027S-003	0.44^{a}	0.6	16.1^{ab}	0.9	76.2^{d}	1.0	1.9^{a}	0.5	91.6^{c}	1.1
	Beast(b)	0.89^{ab}	1.2	16.6^{ab}	0.9	73.3^{abc}	0.9	2.7^{a}	0.7	89.5^{c}	1.1
	Cyclops(b)	0.62^{ab}	0.8	17.6^{ab}	1.0	73.3^{abc}	0.9	2.8^{a}	0.7	80.8^{bc}	1.0
	Laperouse(b)	0.71^{ab}	1.0	17.2^{ab}	1.0	74.0^{bcd}	1.0	3.0^{a}	0.8	73.0^{bc}	0.9
	Neo(b)	0.49^{ab}	0.7	17.7^{ab}	1.0	73.4^{abc}	1.0	4.6^{a}	1.2	76.3^{bc}	0.9
	Spinnaker(b)	0.40^{ab}	0.5	20.3^{b}	1.2	71.6^{a}	0.9	13.9^{b}	3.6	48.3^{a}	0.6
	Titan AX(b)	0.57^{ab}	0.8	16.2^{ab}	0.9	74.4^{bcd}	1.0	2.5^{a}	0.6	89.2^{c}	1.1
*Under evaluation	AGTB0532	0.69^{ab}	0.9	16.6^{ab}	0.9	72.9^{abc}	0.9	4.8^{a}	1.2	73.9^{bc}	0.9
	RP14033	0.33^{a}	0.4	18.7^{ab}	1.1	72.7^{abc}	0.9	2.8^{a}	0.7	76.5^{bc}	0.9
	RP15034	0.33^{a}	0.4	18.7^{ab}	1.1	73.7^{abc}	1.0	5.0^{a}	1.3	73.2^{bc}	0.9
	Site average	**0.69**		**16.9**		**73.7**		**3.8**		**77.8**	

Table 3. Long-term barley variety performance at Hart for 2020–2024 seasons (expressed as a % of trial average).

		% Trial average					Grain yield (t/ha)
Quality	**Variety**	**2020**	**2021**	**2022**	**2023**	**2024**	**2024**
Feed	Bigfoot CL(b) (AGTB0669)					108	0.73
	Combat(b)			112	110	142	0.96
	Fathom(b)	112	107	101			
	Granite CL(b) (IGB21092T)					132	0.89
	Hindmarsh(b)						
	PegasusAX(b) (AGTB0667)					118	0.80
	Rosalind(b)	100	105	101	102		
Malt	Commander	95					
	Commodus(b) CL		100	95	97	80	0.54
	Compass(b)	99	112	90	101	116	0.79
	La Trobe(b)	94					
	Leabrook(b)	107	107	96	98		
	Maximus(b) CL	95	96	91	93	193	1.30
	Minotaur(b)		101	107	106	133	0.90
	RGT Planet(b)	111	86	119	100	82	0.56
	Spartacus CL(b)	89	83	91	94	139	0.94
Pending malt accreditation	19Y027S-003					65	0.44
	Beast(b)	99	111	96	105	132	0.89
	Cyclops(b)		103	101	96	92	0.62
	Laperouse(b)	105	112	87	94	105	0.71
	Neo(b)					72	0.49
	Spinnaker(b)				98	59	0.40
	Titan AX(b)			96	102	84	0.57
	Zena CL(b)			117	98		
Under evaluation	AGTB0532					101	0.69
	RP14033					48	0.33
	RP15034					48	0.33
	Trial average yield (t/ha)	**3.18**	**2.61**	**5.99**	**4.66**	**0.68**	
	Sowing date	**May 16**	**May 3**	**May 5**	**May 12**	**May 17**	
	April-October (mm)	355	232	355	236	176	
	Annual rainfall (mm)	503	401	519	355	240.2	

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