

Comparison of barley varieties

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Key Findings

- The average barley yield at Hart was 5.99 t/ha, with RGT Planet and Zena CL performing the best with yields of 7.13 t/ha and 7.02 t/ha, respectively.
- Spartacus CL and Maximus CL met Malt 1 specifications in the 2022 season.
- Beast, Commodus CL, Cyclops, and Laperouse (all pending malt accreditation) met Malt 1 standards for protein (%), screenings (%), retention (%) and test weight (kg/hL).
- Screenings, retention and test weight met the equivalent to Malt 1 receival standards for all varieties.

Introduction

To compare the performance of new barley varieties alongside current industry standards.

Methodology

Plot size	1.75 m x 10.0 m	Fertiliser	Seeding: DAP (18:20) Zn 1% + Impact @ 80 kg/ha
Seeding date	May 5, 2022		
Location	Hart, SA		July 22: Easy N (42.5:0) @ 70 L/ha
Harvest date	November 17, 2022		August 17: Easy N (42.5:0) @ 60 L/ha
Crop history	Mulgara Oaten Hay		

The trial was a randomised block design with three replicates and 15 barley varieties. This trial was managed with the application of pesticides to ensure a weed, insect and disease-free canopy. All plots were assessed for grain yield (t/ha), protein (%), test weight (kg/hL), screenings (2.2 mm screen) and retention (2.5 mm screen). Data was analysed using a one-way ANOVA model in Genstat 22nd edition.

New varieties trialed at Hart in 2022 include Combat (IGB1944) and Zena CL (IGB20125T) by InterGrain, as well as Titan AX (AGTB0325) by AGT. All varieties have been released for the 2023 growing season.

Results and discussion

Grain yield

Barley at Hart yielded an average of 5.99 t/ha in 2022 (Table 1). The longer season barley varieties were better suited to the seasonal conditions as they were able to utilise late season rains and cool conditions to maximise yield. RGT Planet and Zena CL (mid maturing varieties) were the highest yielding of 7.13 and 7.02 t/ha, respectively (Table 1). Combat (mid maturity) and Minotaur (mid-slow maturity) were also high yielding varieties of 6.71 and 6.4 t/ha, respectively.

Quick maturing varieties Laperouse, Compass, Maximus CL and Spartacus CL were lower yielding at Hart, ranging from 5.2 – 5.47 t/ha. Fast maturing varieties did not suit the conditions experienced in 2022. Spartacus CL was also low yielding in 2021.



The highest yielding malt variety was RGT Planet (7.13 t/ha), followed by Leabrook (5.74 t/ha). Malt varieties of Compass, Maximus CL and Spartacus yielded similarly. A number of varieties currently undergoing malt accreditation also showed excellent yield potential at Hart; newly released variety Zena CL was the highest yielding variety at 7.02 t/ha, followed by Cyclops (6.4 t/ha), and Minotaur of 6.07 t/ha (Table 1).

The newly released variety Combat was the highest yielding feed barley at Hart in 2022. Rosalind and Fathom were also high yielding. Historic data shows that both Rosalind and Fathom consistently perform well at Hart (Table 2).

RGT Planet, Zena CL, Combat and Minotaur were also ranked in the top ten varieties at Spalding, Turretfield, and Salter Springs (GRDC National Variety Trials sites 2022).

Grain quality

Test weights were high for all varieties trialed at Hart in 2022, with all above 65 kg/hL, meeting BAR 1 and Malt 1 receival standards. Laperouse, although lower yielding, recorded the highest test weight of 70.1 kg/hL (Table 1).

Screenings were very low in 2022 with a trial average of 0.86%. This is significantly lower than in 2021, where screenings ranged from 3.8 – 15.7% with the dry finish at Hart (Allen 2022). A cool and wet finish experienced at Hart, allowed varieties to increase yield potential by maximising grain fill, however this likely attributed to reduced protein % levels. All varieties trialed met receival specifications.

Grain retention (%) in 2022 was high, averaging 96%. Many varieties performed well, including Laperouse, Compass, Titan AX, Leabrook, Minotaur, Beast and Combat.

The average barley protein (%) level at Hart averaged 9%. Maximus CL (10%), Spartacus CL (10%) and Beast (9.8%) performed well. Compass, Leabrook, RGT Planet and Zena CL (IGB20125T) did not meet Malt 1 receival standards for grain protein. Lower protein levels observed across the trial are likely a cause of limiting nitrogen levels in addition to above average rainfall leading into grain fill.

Spartacus CL and Maximus CL met all specifications for Malt 1 receival standards at Hart in 2022.

Table 1. Grain yield (t/ha), protein (%), test weight (kg/hL) and screenings (%) and retention for barley varieties at Hart in 2022. Shaded values within each column show the highest performing varieties.

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	Fathom	6.05 ^d	101	9.6	107	67.5 ^{bcd}	99	0.65 ^{ab}	76	95.6	100
	Rosalind	6.03 ^d	101	9.2	102	69.0 ^g	102	0.74 ^{bc}	87	96.0	100
	Combat (IGB1944)	6.71 ^f	112	8.5	94	66.4 ^a	98	0.48 ^a	56	96.8	101
	Titan AX (AGTB0325)	5.77 ^c	96	9.0	100	68.4 ^{ef}	101	0.85 ^c	99	97.3	101
Bar 1 Receival Standards											
Malt	Compass	5.41 ^{ab}	90	8.7	97	67.6 ^{cd}	99	0.63 ^{ab}	74	97.5	102
	Leabrook	5.74 ^c	96	8.9	99	67.3 ^{bcd}	99	0.65 ^{ab}	76	97.2	101
	Maximus CL	5.44 ^{ab}	91	10.0	111	69.5 ^g	102	1.29 ^{de}	151	94.7	99
	RGT Planet	7.13 ^g	119	7.6	84	67.9 ^{de}	100	0.76 ^{bc}	89	95.6	100
	Spartacus CL	5.47 ^{ab}	91	10.0	111	68.9 ^{fg}	101	1.38 ^{de}	161	91.9	96
Malt 1 Receival Standards											
Pending malt accreditation	Beast	5.75 ^c	96	9.8	109	67.7 ^d	100	0.72 ^{bc}	84	97.0	101
	Commodus CL	5.67 ^{bc}	95	9.2	102	67.0 ^{ab}	99	1.22 ^d	143	95.6	100
	Cyclops	6.07 ^d	101	9.0	100	67.7 ^d	100	1.42 ^e	166	93.8	98
	Laperouse	5.24 ^a	87	9.0	100	70.1 ^h	103	0.48 ^a	56	97.9	102
	Minotaur	6.40 ^e	107	8.6	96	67.0 ^{abc}	99	0.84 ^c	98	97.1	101
	Zena CL (IGB20125T)	7.02 ^g	117	7.9	88	67.5 ^{bcd}	99	0.77 ^{bc}	90	95.9	100
Site Average		5.99	100	9.00	100	67.97	100	0.86	100	96.0	100
LSD (P≤0.005)		0.26		0.30		0.62		0.19		1.19	

Values with the same letter are not significantly different.

Table 2. Long term barley variety performance at Hart for 2018-2022 (expressed as % trial average).

		% Trial average					Grain yield (t/ha)
Quality	Variety	2018	2019	2020	2021	2022	2022
Feed	Fathom	109	104	112	107	101	6.05
	Hindmarsh	100	103				
	Rosalind	102	107	100	105	101	6.03
	Combat (IGB1944)					112	6.71
	Titan AX (AGTB0325)					96	5.77
Malt	Commander	104	93	95			
	Compass	105	106	99	112	90	5.41
	La Trobe	99	107	94			
	Leabrook			107	107	96	5.74
	Maximus CL		102	95	96	91	5.44
	RGT Planet	97	101	111	86	119	7.13
	Spartacus CL	98	100	89	83	91	5.47
Pending malt accreditation	Beast			99	111	96	5.75
	Commodus CL				100	95	5.67
	Cyclops				103	101	6.07
	Laperouse			105	112	87	5.24
	Minotaur				101	107	6.40
	Zena CL (IGB20125T)					117	7.02
Average yield (t/ha)		2.86	2.25	3.18	2.61	5.99	
Sowing date		May 14	May 15	May 16	May 3	May 5	
April - Oct (mm)		160	162	355	232	355	
Annual rainfall (mm)		224	189	503	401	519	

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References

Allen R 2022, 'Comparison of barley varieties'

<https://www.hartfieldsite.org.au/pages/resources/trials-results/2021-trial-results.php>

The National Variety Trials program (2022)

<https://nvt.grdc.com.au>