

Comparison of barley varieties

Kaidy Morgan and Rebekah Allen
Hart Field-Site Group

Key findings

- The average barley yield was 4.66 t/ha at Hart in 2023.
- Combat, Neo, Minotaur and Beast were the highest yielding barley varieties with yields ranging from 4.89 – 5.11 t/ha.
- Protein (%) for all varieties averaged 13.1%, exceeding Malt 1 receival standards. As a result of high protein (%), no varieties met Malt 1 receival standards in 2023.
- Most varieties performed well across screenings (%), retention (%) and test weight (kg/hL), averaging 4%, 81.2% and 67.3 kg/hL, respectively.

Aim

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

Methodology

A trial was established at Hart, SA to evaluate barley variety performance (Table 1). It was a randomised block design with three replicates and included 16 barley varieties. The 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 REML spatial model (Regular Grid) in Genstat 23rd edition.

New varieties trialed at Hart in 2023 included Neo (IGB22102T) from InterGrain and Spinnaker (SCA21-Y003), commercially available through Seednet in 2025. Neo has been released for the 2024 growing season.

Table 1. Trial details for 2023 barley variety comparison at Hart, SA.

Plot size	1.75 m x 10.0 m	Fertiliser	Seeding: DAP Zn 1% + Flutriafol @ 80 kg/ha
Seeding date	May 12, 2023		
Location	Hart, SA		July 19: Urea (46:0) @ 142 kg/ha
Harvest date	October 23, 2023		
Previous crop	Mulgara oaten hay		A second application was top dressed in error on August 16 (Urea @ 80kg/ha)
Growing season rainfall	Decile 4 (236 mm)		

Results and discussion

Grain yield

The average grain yield (t/ha) for all barley varieties at Hart in 2023 was 4.66 t/ha (Table 2).

Feed variety Combat was the highest yielding barley, achieving 5.11 t/ha. Newer varieties Neo, Minotaur and Beast (pending malt accreditation) performed similarly to Combat, yielding 5.03, 4.96 and 4.89 t/ha, respectively (Table 2).

Combat and Minotaur have continued to achieve high yields across the past two seasons at Hart (Table 3) (Anderson, 2023). Alongside Neo, these varieties were ranked within the top five highest yielding varieties at Spalding and Salter Springs this year (GRDC National Variety Trials sites 2023). Minotaur, RGT Planet and Rosalind have also performed well at Hart across numerous seasons.

Grain quality

Grain protein (%) for all varieties exceeded the maximum protein accepted (12%) for Malt 1 and ranged from 12.7 – 13.7% (Table 2). High nitrogen application and below average rainfall leading into grain fill were contributing factors to high protein in 2023.

Excluding Neo (IGB22102T) and RGT Planet, all other malt or pending malt varieties met maximum grade for test weight (> 65 kg/hL), with a trial average of 67.3 kg/hL. Spartacus had the highest test weight at 71.0 kg/hL, with Neo recording the lowest weight of 61.8 kg/hL despite high yields.

Barley screenings for all varieties was low, with a trial average of 4%.

Zena CL (pending malt accreditation) had the highest screenings at 6.5%, however remained within receival requirements (7%) for Malt 1. Malting varieties Compass, Leabrook and Maximus performed best with Beast, Commodus, Laperouse and Titan AX (all pending malt accreditation) also performing well with low screenings between 1.3 and 2.3%.

Despite achieving superior yields, Combat, in addition to Zena CL had poor retention with an average of 68.3%. With the exception of RGT Planet, all malt varieties had high retention ranging from 85 – 92%, exceeding minimum Malt 1 receival standards.

As a result of high protein, no varieties met Malt 1 specifications despite several varieties meeting all other quality standards.



Photo: Barley variety trial at the Hart field site in 2023.

Table 2. Barley grain yield and quality results from Hart in 2023. Values shaded in blue indicate the best 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	Rosalind ^b	4.73 ^{cde}	101	13.3 ^{def}	102	69.4 ^{hi}	103	3.6 ^{de}	117	77.6 ^{bc}	96
	Combat ^b (IGB1944)	5.11 ^f	109	12.9 ^{abc}	98	67.4 ^{de}	100	4.8 ^{ef}	155	68.3 ^a	84
<i>Bar 1 Reception Standards</i>											
Malt	Compass ^b	4.69 ^{bcd}	100	12.9 ^{abcd}	99	68.7 ^{ghi}	102	2.2 ^{abc}	70	88.0 ^e	108
	Leabrook ^b	4.55 ^{abc}	97	12.8 ^{abc}	98	67.6 ^{ef}	100	1.6 ^{ab}	53	90.2 ^e	111
	Maximus CL ^b	4.33 ^a	93	13.1 ^{abcde}	100	69.6 ⁱ	103	1.4 ^a	46	89.1 ^e	110
	RGT Planet ^b	4.68 ^{bcd}	100	12.7 ^{ab}	97	64.5 ^c	96	5.4 ^{fg}	174	71.2 ^{ab}	88
	Spartacus CL ^b	4.37 ^a	94	13.4 ^{ef}	103	71.0 ^j	105	2.6 ^{bcd}	85	85.1 ^{de}	105
<i>Malt 1 Reception Standards</i>											
Pending malt accreditation	Beast ^b	4.89 ^{def}	105	12.9 ^{abcd}	98	69.2 ^{hi}	103	1.3 ^a	42	91.9 ^e	113
	Commodus CL ^b	4.53 ^{abc}	97	13.1 ^{bcde}	100	68.6 ^{fgh}	102	1.5 ^{ab}	48	91.0 ^e	112
	Cyclops ^b	4.49 ^{ab}	96	13.2 ^{cde}	101	67.8 ^{efg}	101	3.2 ^{cd}	102	78.3 ^{cd}	96
	Laperouse ^b	4.40 ^a	94	13.7 ^f	105	69.0 ^{hi}	103	2.3 ^{abc}	74	86.1 ^e	106
	Minotaur ^b	4.96 ^{ef}	106	13.1 ^{abcde}	100	67.0 ^{de}	100	2.9 ^{cd}	94	77.5 ^{bc}	95
	Neo ^b (IGB22102T)	5.03 ^f	108	12.7 ^a	97	61.8 ^a	92	3.4 ^{cd}	108	77.8 ^{bc}	96
	Spinnaker ^b (SCA21-Y003)	4.55 ^{abc}	97	13.4 ^{ef}	103	65.4 ^c	97	4.8 ^{ef}	154	70.6 ^a	87
	Titan AX ^b	4.73 ^{bcd}	101	13.1 ^{abcde}	100	66.4 ^d	99	2.3 ^{abc}	73	88.1 ^e	109
	Zena CL ^b (IGB20125T)	4.57 ^{abc}	98	13.0 ^{abcde}	99	62.9 ^b	94	6.5 ^g	207	68.3 ^a	84
	Site average	4.66	100	13.1	100	67.3	100	4.0	100	81.2	100

Table 3. Long-term barley variety performance at Hart for 2019-2023 (expressed as % of trial average).

% Trial average							Grain yield (t/ha)
Quality	Variety	2019	2020	2021	2022	2023	2023
Feed	Fathom	104	112	107	101		
	Hindmarsh	103					
	Rosalind	107	100	105	101	102	4.73
	Combat (IGB1944)				112	110	5.11
Malt	Commander	93	95				
	Compass	106	99	112	90	101	4.69
	La Trobe	107	94				
	Leabrook		107	107	96	98	4.55
	Maximus CL	102	95	96	91	93	4.33
	RGT Planet	101	111	86	119	100	4.68
	Spartacus CL	100	89	83	91	94	4.37
Pending malt accreditation	Beast		99	111	96	105	4.89
	Commodus CL			100	95	97	4.53
	Cyclops			103	101	96	4.49
	Laperouse		105	112	87	94	4.40
	Minotaur			101	107	106	4.96
	Neo (IGB22102T)					108	5.03
	Spinnaker (SCA21-Y003)					98	4.55
	Titan AX				96	102	4.73
	Zena CL (IGB20125T)				117	98	4.57
Average yield (t/ha)		2.25	3.18	2.61	5.99	4.66	
Sowing date		May 15	May 16	May 3	May 5	May 12	
April - Oct (mm)		162	355	232	355	236	
Annual rainfall (mm)		189	503	401	519	355	

Acknowledgements

The Hart Field-Site Group would like to acknowledge the generous support of our sponsors who provide funding that allows us to conduct this trial. Proceeds from Hart's ongoing commercial crop also support Hart's research and extension program.

We would like to thank InterGrain, AGT and Seednet for providing seed to conduct this trial.



References

Anderson D., (2023). Comparison of barley varieties, [Hart Trial Results 2022](#)
[The National Variety Trials program \(2023\)](#)