

Comparison of wheat and durum wheat varieties

Rebekah Allen and Declan Anderson
Hart Field-Site Group

Key Findings

- Australian Premium Durum variety Patron was the highest yielding at Hart of 5.41 t/ha.
- Ballista, Catapult and Rockstar were the highest yielding Australian Hard varieties, ranging from 4.58 – 4.72 t/ha. Australian Prime Hard variety Sunblade CL Plus also performed well, yielding 4.85 t/ha.
- Scepter continues to perform well across multiple seasons at Hart.
- Brumby, Denison and LRPB Trojan were the highest yielding Australian Premium White varieties, yielding 4.54, 4.80 and 4.59 t/ha, respectively. Brumby also performed well in National Variety Trials across the Mid-North Region.
- Screenings (%) were very low, due to an excellent spring finish supporting wheat grain fill, however protein levels across all varieties trialed were low (>10.5%).

Introduction

To compare the performance of new wheat varieties alongside current commercial 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		July 22: Easy N (42.5:0) @ 70 L/ha
Location	Hart, SA		August 17: Easy N (42.5:0) @ 60 L/ha
Harvest date	December 1, 2022		
Previous Crop	Oaten hay		

The trial was a randomised block design with three replicates and 24 wheat varieties comprising of both bread wheat and durum. 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) and screenings (%). The in-season nitrogen (N) applied targeted an average wheat grain yield of ~3.0 t/ha, however, wet spring conditions from August increased yield potential and the crop became N-limited. Available N at Hart pre-seeding (0-90 cm) was 74 kg/ha, following oaten hay in 2021.

New wheat lines trialed at Hart in 2022 were Reilly (BH120020S-11) and Patron (AGT109). Reilly is a new wheat released by BASF in 2022, available through Seednet for the 2023 growing season. Patron is a new durum wheat, also released in 2022 by AGT. Newer wheat varieties tested at Hart in 2021 include; Sunblade CL Plus (SUN968G) Anvil CL Plus (LPB17-6157), Calibre (RAC2721), Kingston (BSWDH04-062), Valiant CL Plus (IGW4502) and Brumby (IGW6683).

Results and discussion

Grain yield

The average wheat yield was 4.42 t/ha at Hart in 2022, with varieties ranging from 3.54 – 5.14 t/ha. Australian Premium Durum (ADR) variety Patron was the highest yielding at Hart of 5.41 t/ha. Bitalli and DBA-Aurora were also high yielding achieving 4.61 and 4.75 t/ha, respectively. Long-term yield data for durum at Hart also shows these two varieties have performed well in years trialed (Table 1 & Table 2).

Australian Prime Hard (APH) variety Sunblade CL Plus performed well, yielding 4.85 t/ha alongside Australian Hard varieties Ballista, Catapult and Rockstar, ranging from 4.58 – 4.72 t/ha. Sunblade CL Plus, Ballista and Rockstar were also ranked in the top ten yielding varieties at Turretfield, Spalding and Mintaro in National Variety Trials (GRDC National Variety Trials 2022). Long-term yield data at Hart shows that Scepter continues to perform well across multiple seasons, yielding similarly or above the annual trial average (Table 3). Newer varieties Sunblade CL Plus, Calibre and Brumby have also performed well across two seasons at Hart.

Brumby, Denison and LRPB Trojan were the highest yielding Australian Premium White (APW) varieties, yielding 4.54, 4.80 and 4.59 t/ha, respectively. Brumby performed well across the Mid-North in 2022 National Variety Trials at Turretfield, Spalding and Mintaro (GRDC National Variety Trials 2022). Long-term yield data for APW varieties still remains variable at Hart, however LRPB Trojan has performed well, yielding above the trial average in three out of five seasons.

Grain quality

Excellent spring rainfall was received at Hart in 2022, increasing crop yield potential, however the crop was N-limited, resulting in low protein (%) levels. Anvil CL Plus, Calibre, Grenade CL Plus, Hammer CL Plus, Scepter, Chief CL Plus and Razor CL Plus achieved the highest protein levels, however these were still low, ranging between 9.3 – 9.8%, meeting ASW1 receival standards (no minimum protein % level).

Valiant CL Plus had the highest test weight of 85.6 kg/hL. Similar to 2021 results, all varieties trialed were above 76 kg/hL, meeting maximum receival standards (Table 1). Screenings were also low, (<1%) due to an excellent spring finish supporting grain fill.

Table 1. Long term durum wheat variety performance at Hart from 2017 – 2021 (expressed as % trial average).

Variety	% Trial average					Grain yield (t/ha)
	2017	2018	2019	2020	2021	2021
Bitalli ^{db}			99	103	101	1.55
DBA-Aurora ^{db}	100	102	103	106	100	1.53
DBA Artemis ^{db}			95	79	84	1.29
DBA Spes ^{db}		102	105	104	107	1.64
DBA Vittaroi ^{db}		104	96	99		
Hyperno	96	95	95			
Saintly ^{db}	100	90	97			
Westcourt ^{db}			107	110	108	1.65
Trial average yield t/ha	4.08	4.24	2.31	2.63	1.53	
Sowing date	May 10	May 9	May 15	May 15	May 3	
Apr-Oct rain (mm)	356	191	160	162	2.32	
Annual rain (mm)	485	331	224	189	401	

Quality	Variety	Grain yield t/ha	% of site average	Protein %	% of site average	Test Weight kg/hL	% of site average	Screenings %	% of site average
APH	Sunblade CL Plus	4.85	110	8.9	101	81.8	98	0.9	222
	Anvil CL Plus [Ⓛ] (LPB17-6157)	3.54	80	9.8	111	82.4	99	0.5	120
	Ballista [Ⓛ]	4.72	107	8.8	99	83.1	100	0.7	159
	Catapult [Ⓛ]	4.58	104	8.2	93	83.6	101	0.4	90
	Calibre [Ⓛ]	4.32	98	9.3	105	82.6	99	0.4	107
	Devil [Ⓛ]	4.27	97	8.9	100	82.0	99	0.4	105
	Grenade CL Plus [Ⓛ]	4.21	95	9.5	107	82.3	99	0.3	65
	Hammer CL Plus [Ⓛ]	3.87	88	9.7	110	83.9	101	0.4	91
	Kingston [Ⓛ] (BSWDH04-062)	4.16	94	8.8	99	84.2	101	0.2	46
	LRPB Scout [Ⓛ]	4.42	100	9.0	102	84.5	102	0.5	115
AH	Reilly [Ⓛ] (BH120020S-11)	4.47	101	9.2	104	84.5	102	0.5	110
	RockStar [Ⓛ]	4.65	105	8.1	91	82.5	99	0.5	118
	Scepter [Ⓛ]	4.35	98	9.3	105	85.0	102	0.4	102
	Valiant CL Plus [Ⓛ] (IGW4502)	4.37	99	9.1	103	85.6	103	0.2	46
	Vixen [Ⓛ]	4.20	95	9.3	105	81.1	98	0.3	82
	H1 receiver standard								
	Brumby [Ⓛ] (IGW6683)	4.54	103	>13.0	>76	<5.0			
	Chief CL Plus [Ⓛ]	3.69	83	9.5	107	81.13	98	0.5	116
	Denison [Ⓛ]	4.80	109	8.2	93	82.97	100	0.3	84
	Sheriff CL Plus [Ⓛ]	4.19	95	9.0	101	84.1	101	0.5	134
APW	LRPB Trojan [Ⓛ]	4.59	104	8.4	94	84.57	102	0.2	56
	APW1 receiver standard								
	Razor CL Plus [Ⓛ]	4.10	93	>10.5	>76	<5.0			
	ASW1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	9.4	106	83.83	101	0.3	81
	Bitalli [Ⓛ]	4.61	104	NA	>76	<5.0			
	Patron [Ⓛ] (AGTD109)	5.41	122	8.9	101	80.8	97	0.5835	143
	ADR1 receiver standard								
	Bitalli [Ⓛ]	4.61	104	8.7	98	82.1	99	0.3	70
	Patron [Ⓛ] (AGTD109)	5.41	122	7.4	84	79.8	96	0.3	78
ASW	ADR1 receiver standard								
	Razor CL Plus [Ⓛ]	4.10	93	>13	>76	<5.0			
	ASW1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	8.9	101	80.8	97	0.5835	143
	Bitalli [Ⓛ]	4.61	104	8.7	98	82.1	99	0.3	70
	Patron [Ⓛ] (AGTD109)	5.41	122	7.4	84	79.8	96	0.3	78
	ADR1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	8.9	101	80.8	97	0.5835	143
	Bitalli [Ⓛ]	4.61	104	8.7	98	82.1	99	0.3	70
	Patron [Ⓛ] (AGTD109)	5.41	122	7.4	84	79.8	96	0.3	78
ADR	ADR1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	8.9	101	80.8	97	0.5835	143
	Bitalli [Ⓛ]	4.61	104	8.7	98	82.1	99	0.3	70
	Patron [Ⓛ] (AGTD109)	5.41	122	7.4	84	79.8	96	0.3	78
	ADR1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	8.9	101	80.8	97	0.5835	143
	Bitalli [Ⓛ]	4.61	104	8.7	98	82.1	99	0.3	70
	Patron [Ⓛ] (AGTD109)	5.41	122	7.4	84	79.8	96	0.3	78
	ADR1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	8.9	101	80.8	97	0.5835	143
Bitalli [Ⓛ]	4.61	104	8.7	98	82.1	99	0.3	70	
Patron [Ⓛ] (AGTD109)	5.41	122	7.4	84	79.8	96	0.3	78	
APW	APW1 receiver standard								
	Razor CL Plus [Ⓛ]	4.10	93	>10.5	>76	<5.0			
	ASW1 receiver standard								
	DBA-Aurora [Ⓛ]	4.75	107	8.9	101				

Table 3. Long term wheat variety performance at Hart (expressed as % trial average).

% Trial average							Grain yield (t/ha)
Quality	Variety	2018	2019	2020	2021	2022	2022
APH	Sunblade ^(b) CL Plus				105	111	4.85
AH	LRPB Anvil ^(b) CL Plus				105	81	3.54
	Ballista ^(b)			95	100	108	4.72
	Calibre ^(b)				112	99	4.32
	Catapult ^(b)		97	107	96	105	4.58
	Devil ^(b)		104	109		98	4.27
	Grenade CL Plus ^(b)	110	93	93	93	97	4.21
	Hammer CL Plus ^(b)			106	108	89	3.87
	Kingston ^(b)				101	95	4.16
	LRPB Scout ^(b)	107	107	106	86	101	4.42
	Reilly ^(b)					102	4.47
	RockStar ^(b)		104	108	80	107	4.65
	Scepter ^(b)	113	106	101	113	100	4.35
	Valiant ^(b) CL Plus				93	100	4.37
	Vixen ^(b)		111	109	130	96	4.20
	APW	Brumby ^(b)				115	104
Chief CL Plus		87	85	113	102	85	3.69
Cutlass ^(b)		117	98	81	76		
Denison ^(b)					86	110	4.80
LRPB Trojan ^(b)		106	102	94	93	105	4.59
Sheriff CL Plus ^(b)			96	100	107	96	4.19
ASW	Razor CL Plus ^(b)	104	109	98	111	94	4.10
ADR	DBA-Aurora ^(b)					109	4.75
	Bitalli ^(b)					106	4.61
	Patron ^(b)					124	5.41
	Trial average yield t/ha	2.13	1.50	2.50	2.03	4.40	
	Sowing date	May 14	May 15	May 6	May 3	May 5	
	Apr-Oct rain (mm)	160	162	336	232	355	
	Annual rain (mm)	224	189	503	401	519	

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, LongReach Plant Breeders, BASF and Seednet for providing seed to conduct this trial.



References

The GRDC National Variety Trials program (2022)

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

Useful Resources

2023 South Australian Crop Sowing Guide (2022)

<https://grdc.com.au/resources-and-publications/all-publications/nvt-crop-sowing-guides/sa-crop-sowing-guide>