Comparison of wheat varieties

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Key Findings

- The average wheat grain yield for varieties trialed at Hart in 2021 was 2.03 t/ha.
- Vixen, Scepter and Calibre (tested as RAC2721) were the highest yielding AH varieties.
- The highest yielding APW varieties were Sheriff CL Plus, Chief CL plus and LongReach Trojan, yielding 2.18, 2.08 and 1.75 t/ha, respectively.
- Grain test weights were high, with a trial average of 81.3 kg/hL and screenings were variable, ranging from 1.9 10.3%.

Why do the trial?

To compare the performance of new wheat varieties alongside current commercial standards.

How was it done?

Plot size	1.75 m x 10.0 m	Fertiliser	Seeding: DAP (18:20) Zn 1% + Impact @ 80 kg/ha					
Seeding date	May 3, 2021							
Location	Hart, SA		June 12: Easy N (42.5:0) @ 70 L/ha					
Harvest date	November 9, 2021		August 20: Easy N (42.5:0) @ 70 L/ha					

The trial was a randomised complete block design with three replicates and 21 wheat 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) and screenings (%). The in-season nitrogen (N) budget was managed to target a wheat grain yield of 3.5 t/ha; however, yield potential was water-limited with dry spring conditions following applications of N in August.

Available N at Hart pre-seeding (0 – 60 cm) was 88.5 kg/ha, following oaten hay in 2020.

Wheat varieties emerged on May 26. Due to a poor-quality seed source, Devil had low seedling emergence and crop establishment. Grain yield and quality data was not analysed for this variety.

Results and discussion

Grain yield

Across all varieties trialed, wheat grain yields at Hart ranged from 1.55 – 2.64 t/ha, with a trial average of 2.03 t/ha (Table 1). The highest yielding Australian Hard (AH) varieties were Vixen, Scepter and Calibre (tested as RAC2721), yielding 2.64, 2.29 and 2.27 t/ha, respectively. Vixen, Scepter and Calibre were also ranked in the top ten yielding varieties within the National Variety Trials at Spalding and Turretfield (National Variety Trials, 2021).

Long-term yield data shows that Vixen and Scepter continue to perform well, yielding above the trial average across multiple seasons at Hart (Table 2). New varieties Ballista, Calibre, Hammer CL Plus and Australian Prime Hard (APH) variety Sunblade CL Plus have performed well, but still require further evaluation across a range of seasons.



Sheriff CL Plus, Chief CL plus and LongReach Trojan were the highest performing Australian Premium White (APW) varieties yielding from 1.89 – 2.18 t/ha. Although long-term yield data for APW varieties trialed at Hart remains variable, Sheriff CL Plus and Chief CL plus have performed well over the past two seasons, consistently yielding above the trial average (Table 2).

Cutlass and LongReach Trojan, both later maturing spring wheats, have also performed well in three out of five seasons at Hart.

Grain quality

Grain protein for all wheat varieties was similar, with a trial average of 13%. All APW and ASW varieties met APW1 and ASW1 receival standards (> 10.5%).

All varieties were above 76 kg/hL for test weight, meeting standards for maximum grade, ranging from 78.1 – 83.2 kg/hL, with a trial average of 81.3 kg/hL. Hammer CL Plus, Scepter and Valiant CL Plus (tested as IGW4502) had the highest test weights of 83.2, 82.8 and 82.5 kg/hL respectively.

Wheat screenings were variable for varieties trialed. Australian Hard varieties Ballista, LongReach Scout, Sunblade CL Plus and Vixen had high levels of screenings ranging between 5.9% – 10.3%. APW variety Trojan and test line BSWDH04-062 also had screenings > 5% and did not meet maximum grade.





Table 1. Grain yield (t/ha), protein (%), test weight (kg/hL) and screenings (%) for wheat varieties at Hart in 2021. Shaded values within each column show the highest performing varieties.

% of site average	208	167	86	109	91	54	186	06	68	39	118		76	69	77	77	106		72		107	84	84	100	
Screenings %	10.3 ^e	8.3 ^{de}	4.3 ^{abc}	5.4°	4.5 ^{abc}	2.7 ^{ab}	9.2 ^e	4.5 ^{abc}	3.4 ^{abc}	1.9ª	5.9 ^{cd}	<5.0	3.8 ^{abc}	3.4 ^{abc}	3.8 ^{abc}	3.8 ^{abc}	5.3 ^{bc}	<5.0	3.6 ^{abc}	<5.0	5.3 ^{bc}	4.2 ^{abc}	4.2 ^{abc}	5.0	2.68
% of site average	66	96	100	66	66	102	100	98	102	102	98		100	66	100	101	102		101		101	101	101	100	
Test Weight	ky/IIL 80.5	78.1	81.0	80.3	80.2	83.2	80.9	80.0	82.8	82.5	80.0	>76.0	81.4	80.7	81.5	82.3	82.9	>76.0	82.3	>76.0	82.3	81.9	82.2	81.3	1.99
% of site average	95	100	102	93	105	100	109	104	95	105	92		66	108	105	97	66		93		66	94	94	100	
Protein %	12.3	13.0	13.3	12.1	13.7	13.0	14.2	13.6	12.3	13.7	12.0	>13.0	12.8	14.1	13.7	12.6	12.9	>10.5	12.1	>10.5	12.8	12.2	12.3	13.0	NS
% of site average	105	100	95	112	93	108	86	80	113	93	130		102	76	86	107	93		111		101	115	105	100	
Grain yield t/ha	2.14	2.04	1.94	2.27	1.88	2.19	1.75	1.63	2.29	1.89	2.64		2.08	1.55	1.74	2.18	1.89		2.26		2.06	2.34	2.14	2.03	0.45
Variety	Sunblade CL Plus ^{(b} (SUN968G)	Ballista ^(h) (RAC2598)	Catapult ^(b)	Calibre(RAC2721)	Grenade CL Plus ^(b)	Hammer CL Plus ^(b)	LongReach Scout ⁽⁾	Rockstar ⁽)	Scepter(¹⁾	Valiant CL Plus ^(b) (IGW4502)	Vixen	H1 receival standard	Chief CL Plus ⁽¹⁾	Cutlass ^(b)	Denison ^(b)	Sheriff CL Plus ^(b)	LongReach Trojan ⁽⁾	APW1 receival standard	Razor CL Plus ^(b)	ASW1 receival standard	BSWDH04-062	IGW6683	LPB17-6157	Site Average	LSD (P≤0.05)
Quality	APH						E								APW				ASW		Unclassified				

Hart Trial Results 2021

	% Trial average										
Quality	Variety	2017	2018	2019	2020	2021	2021				
APH	Sunblade CL Plus (SUN968G)					105	2.14				
	Ballista				95	100	2.04				
	Calibre ⁽⁾ (RAC2721)					112	2.27				
	Catapult			97	107	96	1.94				
	Devil			104	109		1.78				
	Emu Rock	98	104	104	111						
AH	Grenade CL Plus	95	110	93	93	93	1.88				
	Hammer CL Plus				106	108	2.19				
	Longreach Scout	107	107	107	106	86	1.75				
	Mace	102	95	95	100						
	Rockstar ^(b)			104	108	80	1.63				
	Scepter	111	113	106	101	113	2.29				
	Valiant CL Plus (IGW4502)			93	1.89						
	Vixen ^(b)			111	109	130	2.64				
	Chief CL Plus		87	85	113	102	2.08				
APW	Cutlass	104	117	98	81	76	1.55				
	Denison() (WAGT734)					86	1.74				
	Longreach Trojan /	113	106	102	94	93	1.89				
	Nighthawk (D				74						
	Sheriff CL Plus			96	100	107	2.18				
ASW	Razor CL Plus	103	104	109	98	111	2.26				
Unclass	BSWDH04-062					101	2.06				
	IGW6683					115	2.34				
	LPB17-6157			98	98	105	2.14				
-	Trial mean yield t/ha	3.83	2.13	1.50	2.50	2.03					
	Sowing date	May 8	May 14	May 15	May 6	May 3					
	Apr-Oct rain (mm)	191	160	162	336	232					
	Annual rain (mm)	331	224	189	503	401					

Table 2. Long term wheat variety performance at Hart (expressed as % trial average).

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References

The National Variety Trials program (2021) https://nvt.grdc.com.au

