







2023 HBS WHEAT & BARLEY VARIETY TRIALS Beelbangera & Hillston

INDEPENDENT AGRONOMY ADVICE + CUTTING EDGE RESEARCH

Evaluating wheat & barley varieties under local conditions

KEY POINTS

- The 2023 season was generally dry, with a hot and dry finish bringing crops in early. Frost events in September impacted on varieties that were heading and flowering. Conditions in 2023 were generally unfavourable for the longer season maturing varieties.
- At Beelbangera barley topped the trial, with Neo yielding over 5t/ha. Barley varieties Beast, Cyclops, Laperouse and Spinnaker also performed well. The long season dual purpose winter barley variety Newton was the lowest yielder in the trial, along with longer season winter wheats RGT Accroc, RGT Cesario and RGT Waugh.
- Whilst lower yielding in the Beelbangera trial, the longer season barley and wheat varieties had the highest proteins, with the average protein of the trial 13.76%.
- The barley variety Neo was also the highest yielding variety at Hillston, yielding 10.18 t/ha, with the trial averaging 8.86 t/ha. Calibre (9.95 t/ha) was the highest yielding wheat variety at Hillston.
- At Hillston frost impacted the longer season winter wheats, with RGT Accroc (6.79 t/ha) the lowest yielding variety in the trial. These longer season varieties also had the highest screenings in the trial.



BACKGROUND

Growers are looking for profitable wheat varieties to grow that are suited to local farming systems. The dryland and irrigated wheat and barley variety trials that we collaborate with Hart Bros Seeds (HBS), aim to provide local research for growers by evaluating currently grown varieties alongside potential numbered lines and newly released varieties in our own backyard.

These trials are set up to compliment the nearest National Variety Trials (NVT) in the area, with varieties chosen based on their relevance and suitability to our local dryland and irrigation areas. The main focus of the trials is on yield and quality, with varietal acid soil tolerance on dryland and lodging tolerance on irrigation also a focus. Along with NVT data, these trials have provided valuable information when choosing the most profitable varieties to grow.

It is important when making decisions on which variety to grow, to not rely solely on data from a single trial in a single year. As such the data from these wheat and barley variety trials should be used in conjunction with the data from long term MET analysis through NVT, which uses 5 years of data across sites.

In 2023 there were 54 entries in the Beelbangera dryland trial and 52 entries in the Hillston irrigated trial, table 1. This included 37 wheat varieties, consisting of 2 numbered lines and 6 new releases; 13 barley varieties including 1 numbered line and 1 new release; 1 triticale variety in the dryland trial only and 4 durum wheat varieties.

Newly released varieties included in the trials in 2023 were:

- Genie, a mid-slow maturing potential AH spring wheat from InterGrain;
- Leverage (mid-slow maturing APH wheat), Sundancer (Lancer maturity, APH currently in the northern region with south eastern quality classification pending) and Tomahawk CL Plus (Scepter type with Clearfield tolerance, APW wheat) from AGT;
- LRPB Major (Mid-slow maturing AH spring wheat with strong yield performance in both acidic and sodic soil trials) and LRPB Tracer (Mid spring maturing APH wheat variety) from LongReach Plant Breeders; and
- Neo a mid-spring maturing Imidazolinone (IMI) barley from AGT.

Table 1: HBS Trial variety list for 2023.

		BEELBANGERA	HILLSTON	
VARIETY/LINE	SPECIES	Dryland site	Irrigated site	
Anapurna	Wheat	\checkmark	\checkmark	
Beckom	Wheat	\checkmark	\checkmark	
Boree	Wheat	\checkmark	\checkmark	
Brumby	Wheat	\checkmark	√	
Calibre	Wheat	√	√	
Coota	Wheat	√	√	
DS Pascal	Wheat	√	√	
Genie	Wheat	√	√	
Illabo	Wheat	√	√	
Kingston	Wheat	√	√	
Leverage	Wheat	√	√	
Longsword	Wheat	√	√	
LPB19-14344	Wheat	√	√	
LPB19-3527	Wheat	√	√	
LRPB Cobra	Wheat	Х	√	
LRPB Hellfire	Wheat	√	√	
LRPB Lancer	Wheat	√	√	
LRPB Major	Wheat	√	√	
LRPB Mustang	Wheat	√	√	
LRPB Nighthawk	Wheat	\checkmark	√	
LRPB Raider	Wheat	√	√	
LRPB Scotch	Wheat	1	1	
LRPB Stealth	Wheat	1	√ 	
LRPB Tracer	Wheat	1	 √	
Reilly	Wheat	1	X	
RGT Cesario	Wheat	1	<u> </u>	
RGT Accroc	Wheat	1	√	
RGT Waugh	Wheat	<u> </u>	<u> </u>	
Rockstar	Wheat	1	<u>ا</u>	
Scepter	Wheat	1	ا	
Stockade	Wheat	1	ا	
Sunblade CL Plus	Wheat	1	ا	
Sundancer	Wheat	1	<u> </u>	
Sunflex	Wheat	1	<u>ا</u>	
Sunmaster	Wheat		<u> </u>	
Tomahawk CL Plus	Wheat			
Valiant CL Plus	Wheat			
Vixen	Wheat			
Kokoda	Triticale		X	
Bitalli	Durum		<u> </u>	
DBA Mataroi	Durum			
DBA_Wittaroi	Durum	¥ X		
Westcourt	Durum			
Reast	Barley		<u> </u>	
Cyclons	Barlov	v ./	/	
IGB21130	Barlov	• •/		
	Barlov	v ./		
Maximus Cl	Barley	• ./		
Minotaur	Barley	• ./		
Neo	Barlov	• •/		
Newton	Barloy			
RGT Planot	Barloy			
Spartacus Cl	Barloy			
Spartacus CL	Darley	/	/	
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	Darley	/	<u> </u>	
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TRIAL DETAILS

In 2023 the dryland wheat and barley variety trial was established at the Ag Grow Agronomy research farm "Ridgetop" Beelbangera (approximately 16km NE of Griffith) and the irrigated wheat and barley variety trial was established at Graeme Horneman's "Wilga Glen" Hillston (approximately 125 km NW of Griffith).

Both trials were statistically designed and fully replicated three times. They were sown with a Morris Contour Drill plot seeder, with 25cm row spacings. Plot sizes were 12m by 1.75m (21m²).

Dryland Trial - Beelbangera:

The trial was sown on 4^{th} May 2023 at 30 kg/ha and with 80 kg/ha DAP. It was sown following canola in 2022.

Soil tests before sowing showed the site had a pH (CaCl₂) 5.7, Total N (0-60cm) 88 kg N/ha and Colwell P 69ppm. 100 kg/ha urea was spread late March, with an additional 100 kg/ha Gran-Am topdressed early July.

Weeds, pests and disease were adequately controlled, with 2 timely fungicides applied for stripe rust. The trial was harvested 14th November 2023.

Irrigated Trial - Hillston:

The trial was sown shallow on 16th May 2023, and watered up. It was sown at 100 kg/ha with 150 kg/ha DAP, following canola in 2022.

Soil tests before sowing showed the site had a pH (CaCl_.) 7.9, Total N (0-60cm) 172 kg N/ha and

Colwell P 32ppm. 250 kg/ha urea was pre-drilled and a further 300 kg/ha urea was topdressed in August.

It received 2 spring irrigations, a total of 4 ML/ha including watering up. Weeds, pests and disease were adequately controlled, with 2 timely fungicides applied for stripe rust. The trial was harvested 7th December 2023.

2023 Seasonal Conditions:

The 2022 season was generally wet, so coming into the 2023 season there was a full profile of moisture. Whilst the Beelbangera trial was sown into moisture, there was little rain the second half of April and most of May drying out the top profile, table 3. Due to the conditions at sowing the Hillston trial was sown dry and watered up.

Good conditions in June and early July allowed crops to get away and tap into subsoil moisture reserves. Dry and frosty conditions persisted in August and early September.

Consecutive frost events occurred on 9th and 10th September, with an in crop air temperature logger at Beelbangera (set at 1.2m above the ground) measuring a low of -1°c on 9th September and temperatures below 2°c for 7 hours.

Rain early October was timely, following the warm weather in late September, as conditions were starting to dry. The season finished with hot dry conditions bringing crops in early.

Table 2: 2023 Rainfall and Growing Season Rainfall (GSR) for the Beelbangera and Hillston Trial sites.

MONTH	Ridgetop Rainfall 2023	Griffith Airport 2023	Griffith Airport Long Term (1958 to 2023)	Hillston Airport 2023	Hillston Airport Long Term (1881 to 2023)
January	31	39	36	51.8	31.6
February	0	0	28.1	0	27
March	61.5	12.2	35.8	40.6	33.5
April	33	34	29.2	24	27.8
May	9	10.6	35.1	8.2	31.9
June	41.5	38	35.4	50.8	35.4
July	18	24.4	32.6	28.2	30.5
August	10	18	35	17.8	30.8
September	0	2.4	32.9	1.6	28.7
October	25	12.4	40.4	25.6	36.5
November	78	90.6	35.5	72.6	30.3
December					
TOTAL	307	281.6	376	321.2	344
GSR (April - Oct)	136.5	139.8	240.6	156.2	221.6

RESULTS AND DISCUSSION

Establishment, lodging, grain yield and grain quality, were assessed on both trials. Yield and grain quality were statistically analysed using ASReml.

Establishment:

Establishment was assessed at the end of May at Beelbangera when the crop was at the 2-4 leaf stage and mid-June at Hillston when the crop was at the 3-5 leaf, figure 1.

Establishment was assessed using an establishment score, where each plot was scored from 0 to 9 (0 indicating poor establishment and 9 indicating very even establishment).

Both trials established well with scores at Beelbangera averaging 7.9 and 8.3 for Hillston.

Figure 1: Establishment of the trials -Beelbangera (top) and Hillston (bottom).

Lodging:

Lodging was assessed at harvest on both trials, with each plot scored for lodging on a scale of 0 to 9, with 0 indicating no lodging and 9 flat on the ground. Lodging at Beelbangera was assessed on 10th November and 7th December at Hillston, figure 2.

At Beelbangera most varieties had minimal lodging, with an average lodging score of 2.5. Barley varieties generally had the highest degrees of lodging with Spartacus CL, Beast and Titan AX having scores above 5.

At Hillston the average lodging score was 2.8, with lodging ranging from less than 1 for the wheat varieties RGT Waugh and Stockade to over 7 for the barley variety Laperouse. Barley varieties RGT Planet and Spinnaker also had high degrees of lodging.

Figure 2: Lodging of the trials - Beelbangera (top) and Hillston (bottom)..



Grain Yield:

Beelbangera: The trial was harvested on 14th November 2023. The average yield of the Beelbangera trial was 4174 kg/ha. Barley varieties performed well in 2023, with the exception of the the long season dual purpose barley variety Newton, figure 3.

The highest yielding variety in the trial was the barley variety Neo, yielding 5354 kg/ha, significantly higher than all other varieties in the trial. Other varieties to yield well were the barley varieties Beast (4944 kg/ha), Cyclops (4879 kg/ha), Laperouse (4861 kg/ha), Spinnaker (4860 kg/ha) and Minotaur (4809 kg/ha). The highest yielding wheat variety in the trial was Tomahawk CL Plus (4809 kg/ha).

The lowest yielding variety in the trial was the barley variety Newton, yielding 691 kg/ha, significantly lower than all other varieties in the trial. The long season wheat varieties RGT Accroc (2799 kg/ha), RGT Waugh (3203 kg/ha) and RGT Cessario (2873 kg/ha) were the next lowest yielding varieties in the trial.

Hillston: The trial was harvested on 7th December 2023. The average yield of the Hillston trial was 8857 kg/ha. The barley variety Neo was the highest yielding variety in the trial, yielding 10180 kg/ha, statistically similar to 19 other varieties in the trial, including Calibre which was the highest yielding wheat variety in the trial (9950 kg/ha), figure 4.

The long season wheat variety RGT Accroc was the lowest yielding variety in the trial, yielding 6787 kg/ ha. Which was statistically simlar to LRPB Tracer (7194 kg/ha), RGT Cesario (7358 kg/ha), LRPB Major (7630 kg/ha) and Newton (7723 kg/ha).

Grain Quality: Protein, screenings and test weight were all measured and analysed on each trial. For screenings, a 2.0mm screen was used for wheat and a 2.2mm screen was used for barley.

Beelbangera: Quality data for the Beelbangera trial is shown in table 3.

Grain protein: The average grain protein of the trial was 13.76%. The barley variety Newton had the highest grain protein with 18.7%, statistically higher than all other varieties in the trial. RGT Waugh (15.84%), RGT Cessario (15.29%) and LRPB Hellfire (15.23%) had the highest grain proteins out of the wheat varieties in the trial. The wheat variety Scepter had the lowest protein content in the trial with 12.13%, which was statistically similar to 14 other varieties in the trial.

Screenings: The average screenings of the trial was 4.81%. The wheat variety LRPB Tracer had the lowest screenings in the trial with 0.39%, which was statistically similar to three quarters of the remaining wheat varieties in the trial. Barley varieties had the highest screenings in the trial, with the lined variety IGB21130 (24.44%) having the highest screenings, statistically similar to RGT Planet (22.22%) and Spartacus CL (21.47%). The barley varieties Cyclops, Zena CL and Maximus CL also had screenings above 15%.

Test Weight: The average test weight of the trial was 78.57 kg/HL. The barley variety Newton had the lowest test weight in the trial with 58.93 kg/HL, statistically lower than all other varieties. RGT Waugh (74.17 kg/HL) and RGT Cessario (76.97 kg/HL) had the lowest test weights of the wheat varieties in the trial. LRPB Stealth (85.56 kg/HL) had the highest test weight, statistically similar to 10 other varieties in the trial. LPB19-3527, LRPB Major and LRPB Mustang were the only other varieties to have test weights above 85 kg/HL.

Hillston: Quality data for the Hillston trial is shown in table 3.

Grain Protein: Grain protein for the Hillston trial averaged 12.43%. The variety Newton had the highest grain protein with 15.53%, which was statistically higher than all other varieties in the trial. RGT Waugh had the highest grain protein of the wheats with 14.83%. Boree had the lowest protein in the trial with 11.02%, statistically similar to 12 other varieties in the trial. Zena CL had the lowest protein of the barley varieties with 12.14%.

Screenings: Screenings in the trial averaged 1.74%. RGT Accroc had the highest screenings in the trial with 10.50%, statistically higher than all other varieties in the trial. RGT Cesario (9.24%) was the only other variety to have screenings above 5%. The barley variety Zena CL had the lowest screenings in the trial with 0.55%, statistically similar to 20 other varieties in the trial.

Test Weight: The average test weight of the trial was 77.47/ kg/HL. The wheat variety LRPB Hellfire had the highest test weight in the trial (83.48 kg/HL), statistically similar to LPB19-3527 (82.63 kh/HL) and DBA Vittaroi (82.59 kg/HL). The lowest test weight was 60.84 kg/HL for the barley variety Newton, which was significantly lower than all other varieties in the trial. All other barley varieties in the trial had a test weight less than 70 kg/HL. RGT Accroc had the lowest test weights of the wheats with 69.66 kg/HL.



Figure 3: Grain yield of the Beelbangera trial, Lsd (p=0.05) 341.6 kg/ha

Figure 4: Grain yield of the Hillston trial, Lsd (p=0.05) 997.4 kg/ha



Table 3: Quality Data for the Beelbangera and Hillston 2023.

	BEELBANGERA			HILLSTON			
	Grain Protein	Screenings	Test Weight	Grain Protein	Screenings	Test Weight	
VARIETY/LINE	(%)	(%)	(kg/HL)	(%)	(%)	(kg/HL)	
Anapurna	14.55	2.35	82.02	13.15	4.02	76.66	
Beast	14.21	5.32	66.98	-	-	-	
Beckom	12.85	1.52	83.94	11.96	0.86	80.88	
Bitalli	12.84	3.35	82.76	11.46	1.34	82.29	
Boree	12.62	1.45	81.58	11.02	1.54	79.98	
Brumby	12.7	2.31	82.88	11.55	1.21	79.32	
Calibre	12.78	1.77	81.78	11.64	1.40	80.39	
Coota	13.5	1.27	83.5	12.21	1.20	81.76	
Cyclops	14.46	19.26	65.68	13.65	1.70	68.05	
DBA_Mataroi	14.57	2.58	81.83	13.27	1.91	82.06	
DBA_Vittaroi	-	-	-	12.91	0.69	82.59	
DS Pascal	13.39	1.33	83.37	11.43	1.06	79.67	
Genie	13.4	6.70	83.41	11.6	1.92	81.70	
IGB21130	16.59	24.44	64.99	12.69	1.27	68.29	
lilado Kia aste a	14.3	0.93	81.83	11.61	2.01	/5.11	
Kingston	13.32	1.02	83.39	11.63	1.02	81.72	
кокода	12.37	1.34	//.59	-	-	-	
Laperouse	14.62	9.94	00.00	14.30	1./1	00.18	
Leverage	14.01	1.01	04./4 93.2F	12.37	0.00	01.00	
LUNESWULU	13 56	0.60	81 15	11 5	1 5/	01.51 81 70	
LPD19-14544	12.30	1.25	04.45 Q5 /l	11.5	1.34	82.63	
LPB19-5527	12.4	1.25	- 05.4	13.55	1.22	70.20	
LRPB Hollfire	15.23	1 13	82.10	14.34	1.10	83.48	
LRPB Lancer	13.77	1 12	84.86	12.89	0.94	80.65	
LRPB Major	12 52	1 43	85.26	11 76	1.07	82.03	
LRPB Mustang	12.82	0.68	85.25	11.70	1.29	81.68	
LRPB Nighthawk	13.58	1.17	83.22	11.9	1.56	80.75	
LRPB Raider	12.38	1.45	82.15	12.08	1.22	80.06	
LRPB Scotch	13.8	1.63	81.6	12.19	1.25	79.16	
LRPB Stealth	12.84	0.91	85.56	11.83	1.20	81.67	
LRPB Tracer	13.53	0.39	84.82	13.48	1.10	80.17	
Maximus CL	14.52	15.77	67.18	14.3	1.38	68.45	
Minotaur	14.34	12.82	68.11	13.9	0.78	69.59	
Neo	13.12	9.88	63.03	12.59	0.77	66.99	
Newton	18.7	7.61	58.93	15.53	2.63	60.84	
Reilly	14.25	2.36	81.79	-	-	-	
RGT Accroc	14.4	1.69	80.71	12.84	10.50	69.66	
RGT Cesario	15.29	2.26	76.97	13.14	9.24	72.21	
RGT Planet	13.95	22.22	64.8	12.63	1.18	68.14	
RGT Waugh	15.84	0.70	74.17	14.83	3.27	72.86	
Rockstar	12.96	2.01	82.23	11.1	1.61	80.46	
Scepter	12.13	1.18	83.17	11.49	1.30	82.32	
Spartacus CL	15.09	21.46	67.1	14.63	2.55	68.72	
Spinnaker	13.61	14.//	65.57	12.83	0.82	68.17	
Stockade	13.61	1.60	84.32	11.37	1.88	80.64	
Sundancer	13.03	3.21	82.12	11.33	1.88	81.48	
Sundancer	12.09	1.95	03.92	11.05	1.20	00.40	
Sunmaster	13.02	7 25	04.1Z 8/1 20	11.42	1 /2	82 U3 91'TQ	
Titan AY	14.24	0.24	64.39	11.65	1.45	82.05	
Tomahawk CL Plue	12 34	1 57	82.64	11 36	1 30	80 99	
Valiant CL Plus	13.92	1 33	84.93	12.27	1.30	81 37	
Vixen	12.43	1.72	81.44	12.26	1.29	79.39	
Westcourt	14.21	0.66	83.67	12.45	0.71	82.03	
Zena CL	14.07	19.01	64.54	12.14	0.55	67.91	
Moor	12 76	A Q1	70 57	12 /2	1 7/	77 /7	
Lsd (p=0.05)	0.762	3.734	1.416	0.5346	0.662	1.249	



THIS TRIAL WAS A COLLABORATION BETWEEN AG GROW AGRONOMY AND RESEARCH AND HBS

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