

Early sown winter and awnless wheats

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Key Findings

- Catapult, Denison and Scepter were the highest performing varieties, yielding 2.28, 2.24, and 2.23 t/ha, respectively.
- Early sowing did not provide yield gains at Hart in 2021 due to dry seasonal conditions between time of sowing (TOS) 1 and 2.

Why do the trial?

Early sown winter wheats

The use of winter wheats can allow growers to sow earlier and utilise early April rainfall. Winter wheats are suited for earlier sowing times as they have a vernalisation requirement, meaning flowering will not occur until a cold requirement is met. Spring maturing varieties will flower too early when sown in early April and be at risk of frost damage in early spring.

Awnless wheats

The use of awnless wheat varieties provides a management technique for frost prone environments. Awnless wheats are dual purpose as they can be grazed or cut for hay after frost events, producing a safer hay option for stock due to no awns.

LRPB Orion has been the most commonly grown awnless variety in the Mid-North and was released 12 years ago (Noack et al 2021). LongReach Plant Breeding have released two new lines of awnless wheat, LRPB Dual, AH classification, and LRPB Bale, APW classification. This gives growers new variety options with improved grain quality for frost prone environments.

The aim of this trial is to compare the performance of longer season spring and winter wheats to Scepter wheat sown at its optimal timing and evaluate newly released awnless varieties for hay and grain yield.

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	TOS 1 – April 19 TOS 2 – May 3		June 12: Easy N (42.5:0) @ 70 L/ha August 20: Easy N (42.5:0) @ 70 L/ha
Location	Hart, SA		
Harvest date	November 29, 2021		

The trial was a split plot design with three replicates, two TOS and nine 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 (%).

Awnless varieties were also assessed for hay production (t/ha) by sampling 4 x 1 m sections of row at watery ripe (GS71) for each variety. Samples were oven dried at 60°C for 48 hours and weighed to measure hay production (t/ha). Trialed varieties are listed in Table 1.

Table 1. Summary of wheat varieties, including development and quality (Schilling et al 2021).

Variety	Release year	Company	Development	Quality	Awnless
Scepter	2015	AGT	Mid spring	AH	N
DS Bennett	2018	Seednet	Mid – slow winter	ASW	Y
Nighthawk	2019	LRPB	Very slow spring	APW	N
LPRB Orion	2010	LRPB	Mid – slow spring	SFE1	Y
LPRB Bale	2021	LRPB	Slow spring	APW	Y
LPRB Dual	2021	LRPB	Mid – slow spring	AH	Y
Illabo	2018	AGT	Quick – mid winter	AH	N
Catapult	2019	AGT	Mid – slow spring	AH	N
Denison	2020	AGT	Slow – very slow spring	APW	N

Results and discussion

Catapult, Denison and Scepter were the highest performing varieties with wheat grain yields of 2.28, 2.24, and 2.23 t/ha, respectively (Figure 1 and Table 2). These results are similar to those recorded at Hart in 2020, with Scepter and Catapult also high yielding. In 2021, the earlier sowing date of April 19 did not increase wheat grain yields due to below average rainfall received between TOS 1 and TOS 2. This resulted in all wheat germinating on May 31 after a significant rain event at the end of May (19 mm).

LRPB Bale, LRPB Dual and Bennett performed similarly for awnless wheat grain yield in 2021, with yields ranging from 1.81 – 1.96 t/ha (Figure 1). LRPB Dual also performed well in 2020, yielding similarly to Scepter and Catapult (Table 2).

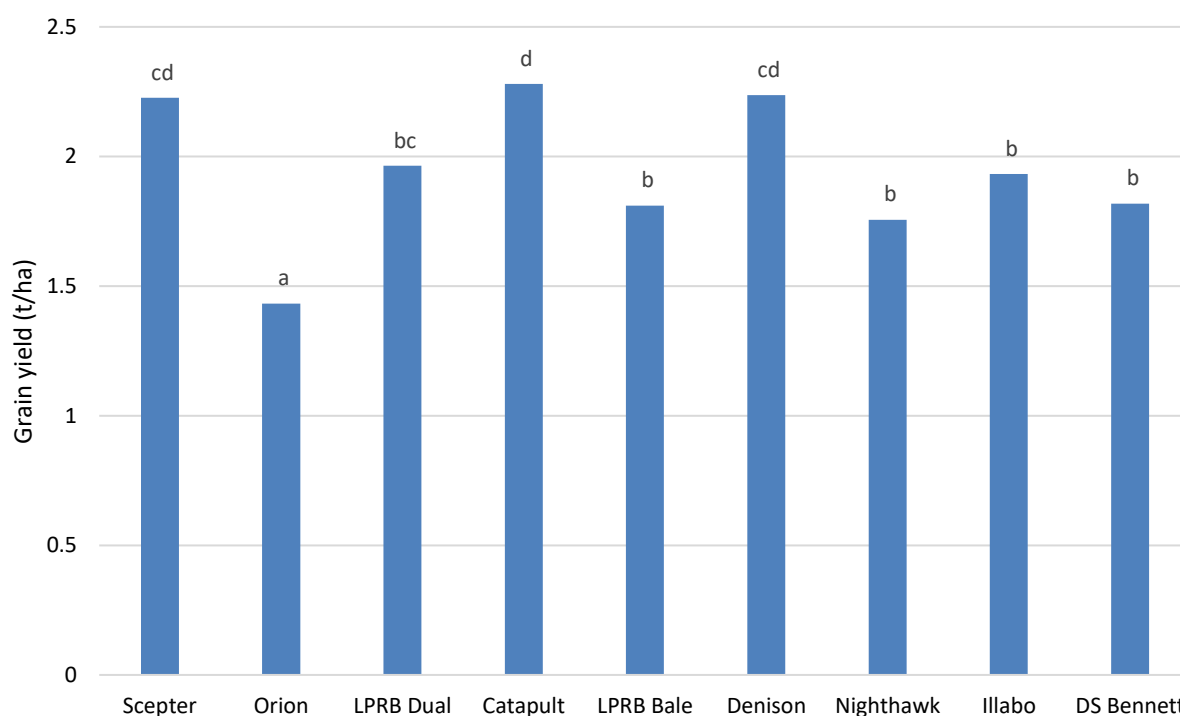


Figure 1. Grain yield of wheat varieties trialed at Hart. Varieties are ordered from quick to slow maturity.

Table 2. Summary of average grain yields for wheat varieties in TOS 1 and TOS 2 at Hart in 2020 – 2021. Shaded values indicate the highest performing treatments.

Variety	2020		2021	
	April 20	May 6	April 19	May 3
	Grain yield (t/ha)		Grain yield (t/ha)	
Catapult	2.13 ^{def}	2.92 ^{ab}	2.34	2.22
Denison	1.91 ^{ef}	2.43 ^{bcd}	2.18	2.3
Illabo	1.65 ^f	2.00 ^{def}	2.05	1.82
Scepter	1.65 ^f	3.03 ^a	2.18	2.28
Nighthawk	2.28 ^{cde}	1.97 ^{def}	1.74	1.77
DS Bennett	2.19 ^{cde}	2.25 ^{cde}	1.94	1.69
LPRB Dual	2.02 ^{def}	2.64 ^{abc}	1.94	1.99
LPRB Bale	1.98 ^{def}	2.04 ^{def}	1.75	1.87
Orion	2.06 ^{de}	2.00 ^{def}	1.41	1.46
Average yield	1.99^a	2.34^b	1.95	1.93
LSD (P≤0.05)	0.17 (0.49 in each TOS)		NS	

Values with the same letters are not significantly different.

Australian Hard (AH) varieties did not meet receival specifications for protein and ranged from 10.8 – 12.6% (Table 3), however, test weights were high (78.4 – 80.7 kg/hL) with screenings below 5%.

All APW 1 varieties met specifications for protein (%), test weight (kg/hL) and screenings (%).

Table 3. Summary of grain quality for all wheat varieties trialed at Hart in 2021. Shaded values show the highest performing varieties.

Quality	Variety	Protein %	Test weight kg/hL	Screenings %
AH	Scepter	10.8 ^a	79.1 ^{bc}	3.1 ^{bc}
	Illabo	12.6 ^{cd}	78.4 ^b	2.4 ^a
	Catapult	10.9 ^a	79.6 ^{cd}	2.4 ^a
	LRPB Dual	12.4 ^{cd}	80.7 ^f	2.2 ^a
<i>H1 receival standard</i>		> 13.0	> 76	< 5.0
APW	Nighthawk	13.0 ^{de}	80.4 ^{ef}	3.8 ^d
	LRPB Bale	12.4 ^{cd}	82.8 ^g	2.1 ^a
	Denison	11.4 ^{ab}	79.9 ^{de}	2.6 ^{ab}
<i>APW1 receival standard</i>		> 10.5	> 76	< 5.0
ASW	DS Bennett	13.5 ^e	81.0 ^f	3.8 ^d
<i>ASW1 receival standard</i>		NA	> 76	< 5.0
SFE1	LRPB Orion	11.8 ^{bc}	71.3 ^a	3.6 ^{cd}
<i>SFW1 receival standard</i>		NA	> 70	< 10
LSD (P≤0.05)		0.85	0.70	0.53

Values with the same letter are not significantly different.

At Hart in 2021, LRPB Bale produced the highest hay yields of 5.98 t/ha (Figure 2). LRPB Dual and LRPB Bale both had improved yields when compared to DS Bennett due to this variety better suited to longer growing season regions.

Although LRPB Bale has a longer maturity when compared to LRPB Dual, it is best suited for hay production, whereas LRPB Dual is suitable for both grain and hay production, likely leading to a small hay yield penalty, but also providing growers in the low and medium rainfall zones additional flexibility when managing frost.

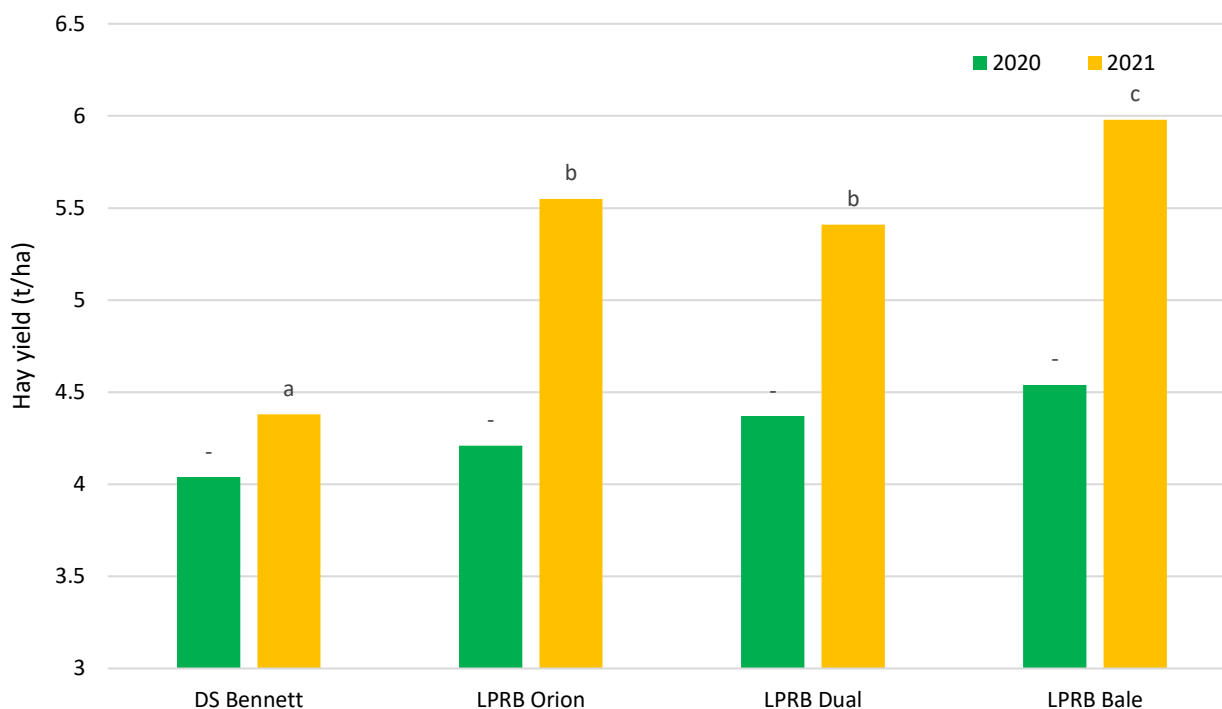


Figure 2. Summary of hay yields of awnless wheats trialed at Hart in 2020 and 2021. 2020 yield data is not significant.

Acknowledgements



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References

- Noack S, Allen R & Guidera B 2021, 'Early sown winter and awnless wheats', *2020 Hart Trial Results*
- Schilling R, McCallum M, Peirce C, Wallwork H & Garrard T 2021, 'Wheat', *2022 South Australian Crop Sowing Guide*