
FLEXI
GRAIN
HAY
Dual Purpose Wheat
A Hay EPR has been added to the LongReach seed licence for the 2024 season to support Awnless Wheat variety development
2024
AgroPack
Awnless AH Mid-Slow Spring Wheat
LongReach
PLANT BREEDERS
LongReach
DUAL
PBR

LRPB Dual – Slow Spring Awnless Wheat powered by CSIRO

Vixen (LHS) and LRPB Dual (RHS) Bordertown Late May Sown LongReach trial (1st October 2021)

- LRPB Dual was developed from pre-breeding germplasm produced by CSIRO and distributed by Dr Greg Rebetzke as Sct/Yit_72-6-2-10a
- CSIRO aimed to combine novel traits in a Scout/Yitpi background to deliver growers real options for managing frost risk zones by ensuring different harvest strategies could be implemented in Spring as required
- LongReach trailed LRPB Dual as LPB18-7982
- LRPB Dual has Mid-Slow Spring maturity between Trojan and Yitpi
- LRPB Dual is awnless making it flexible for hay or grain production and has a Mid-Long coleoptile like Yitpi

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LRPB Dual - Evaluation and Development

Dual purpose wheats need adequate grain yield and quality, suitable hay yield and quality and to be awnless to be accepted by many hay markets.

A number of groups have taken an interest in testing this novel CSIRO Awnless Germplasm

- LongReach has concentrated on the suitability of the variety for grain quality and disease screening for commercialisation;
  - It has been widely sown in Main Season LongReach trials across SA/Vic since 2018 as well at targeted Awnless trials and a LongReach time of seeding studies.
  - The objective has been to generate grain samples to quality test LRPB Dual at existing breeding sites with other groups having a better read on the yield performance and varietal traits when sown early.
  - **LRPB Dual has a Southern Zone (SA/Vic) AH classification for the 2021/22 harvest**.
- The Mid North High Rainfall Zone research effort led by Agrilink's Mick Faulkner has played a leading role in identifying the most promising selections for dual purpose Hay/Grain development from these novel Awnless wheats since 2017.
- SARDI and Hart Field Site groups have included the lines in time of seeding and biomass studies in 2020-21.
- LRPB Dual was entered NVT Main Season trials in SA and Vic in 2021.

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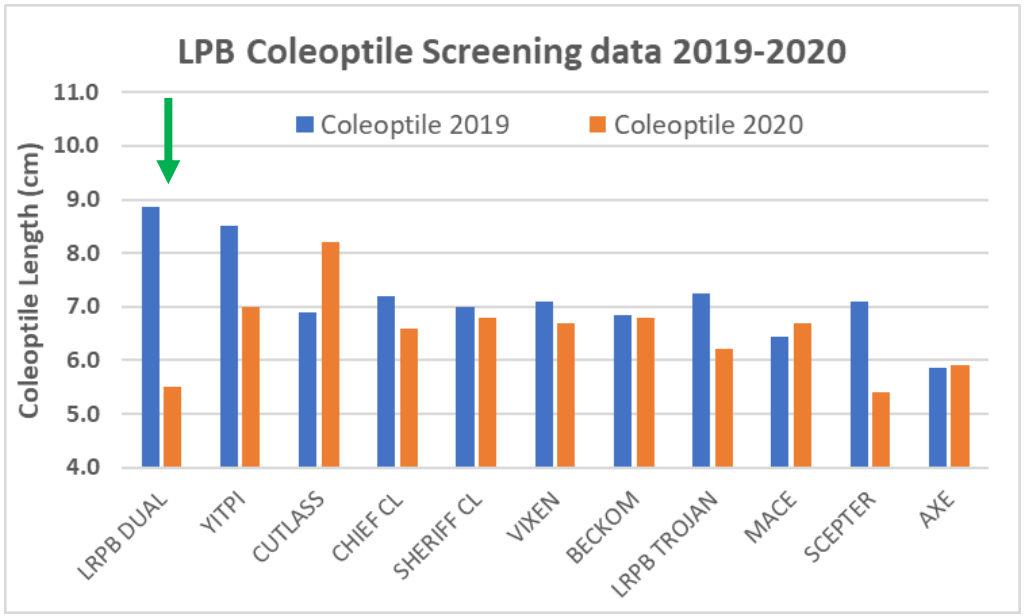
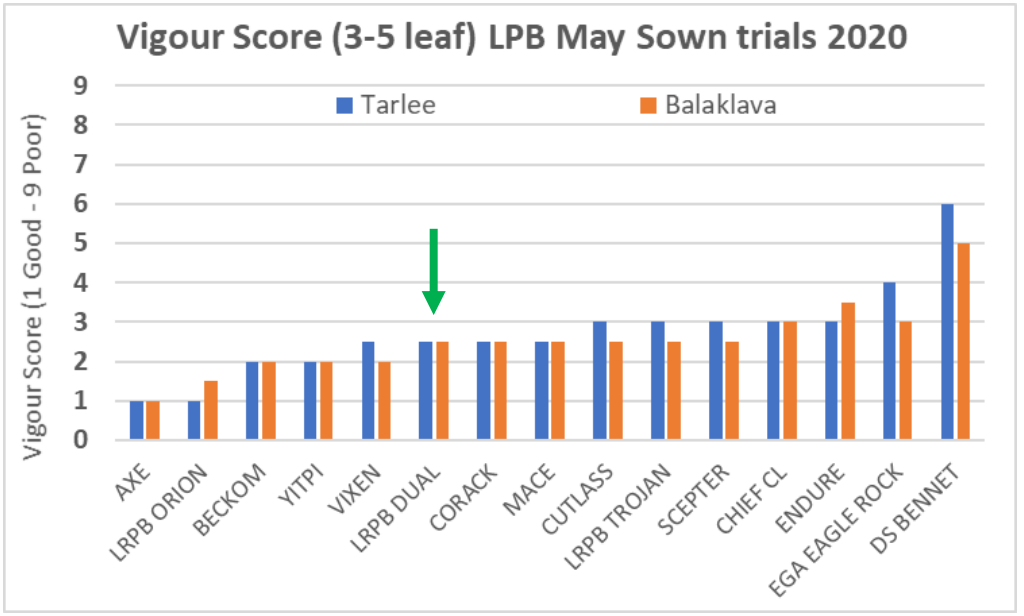
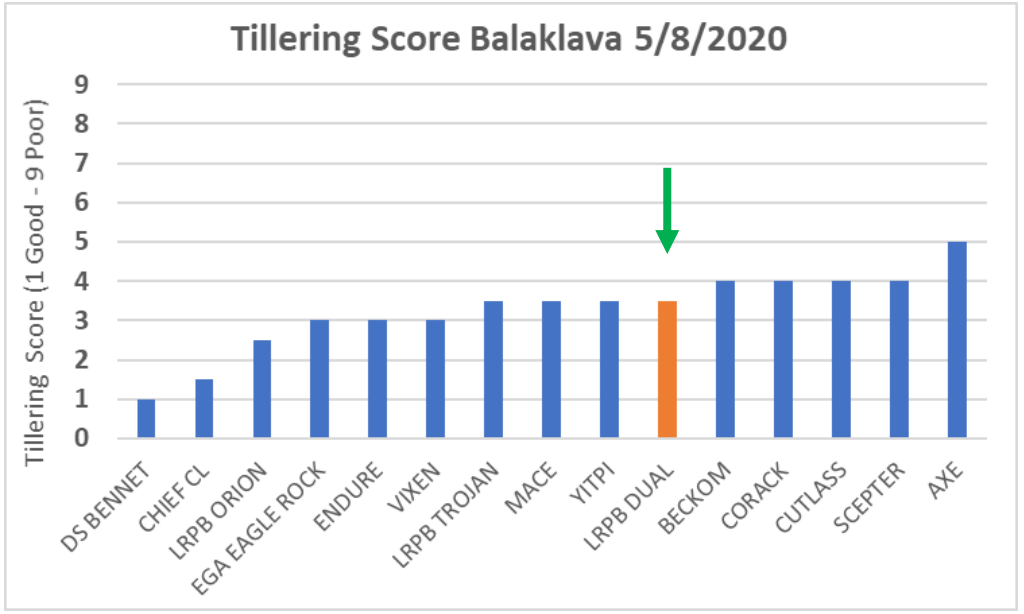
LRPB Dual - Establishment



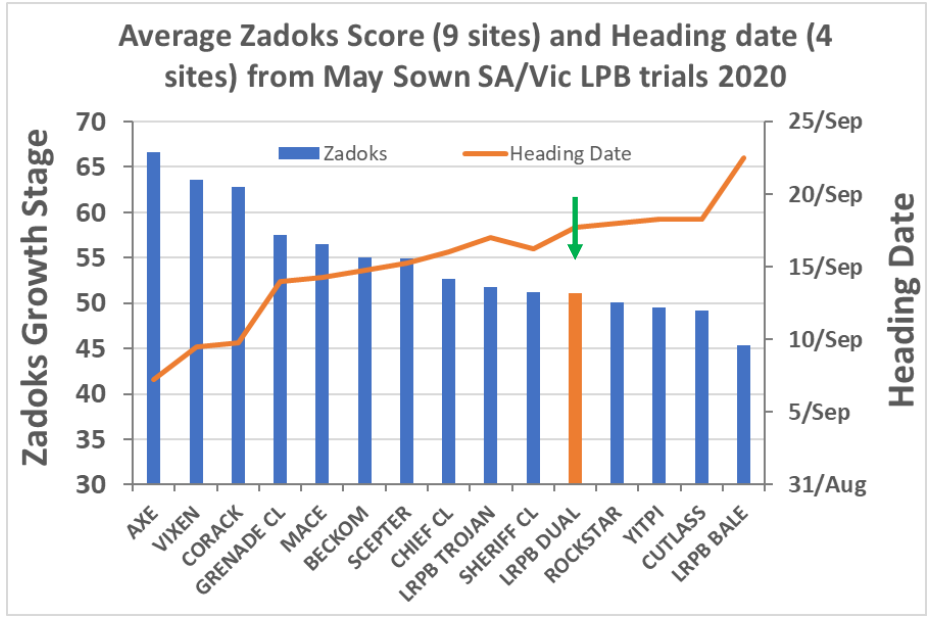


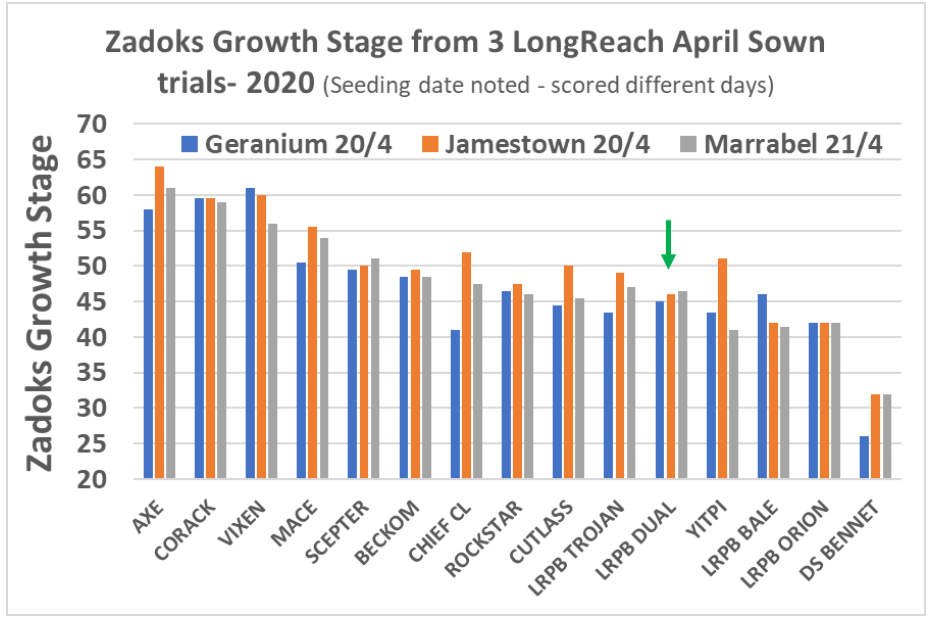
Comments LRPB Dual

- Has shown a variable coleoptile data but both parents have good coleoptile length so this is expected to be longer than Scepter
- Good early vigour then steady build of ground cover which is typical of Mid-Slow varieties with the upper canopy persisting well in spring
- Has average tillering and erect growth habit and is leafy like Yitpi in the vegetative period



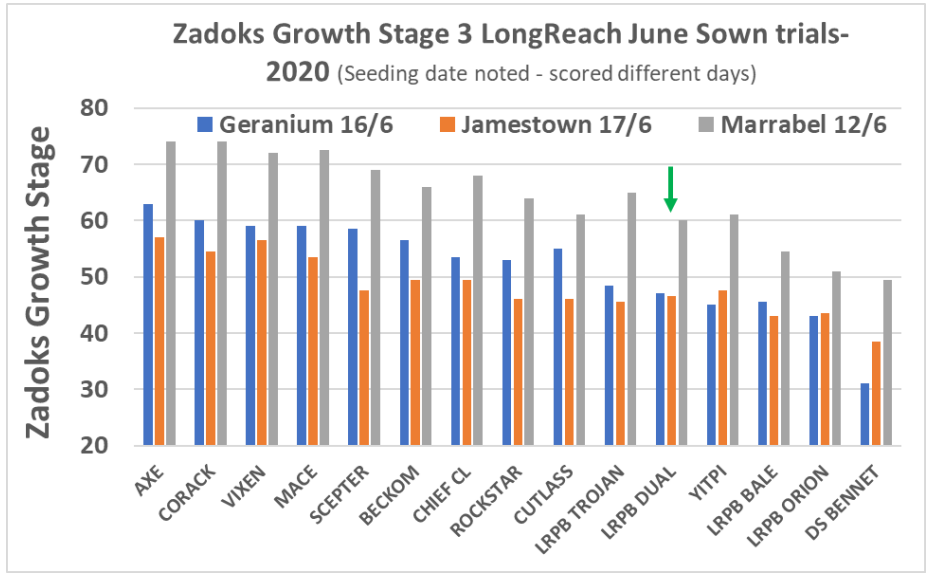
LRPB Dual - Maturity



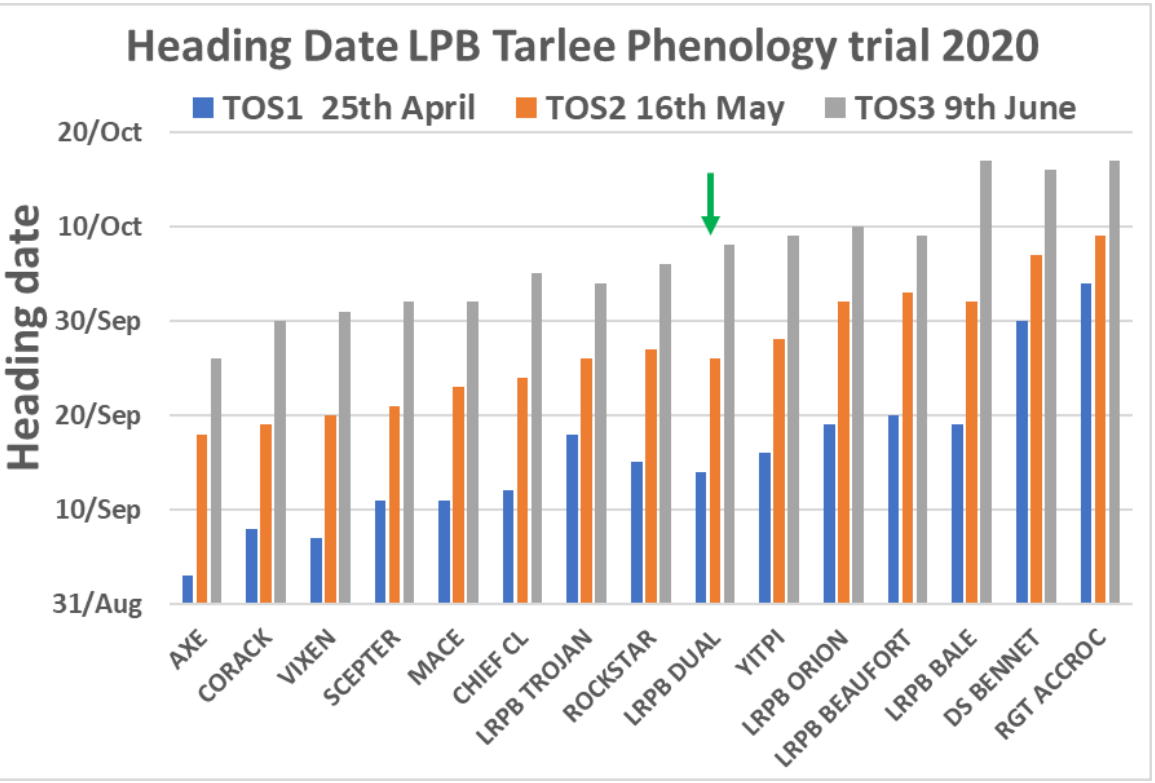


Comments LRPB Dual

- **Mid-Slow Spring maturity between Trojan and Yitpi** in heading time that suits main season planting in MRF areas and late April sowing in LRF areas when early seeding opportunities arise
- Maturity triggers indicate moderate strength photoperiod controls to make the line reasonably stable in different seasons



LRPB Dual – Maturity compared to LRPB Bale



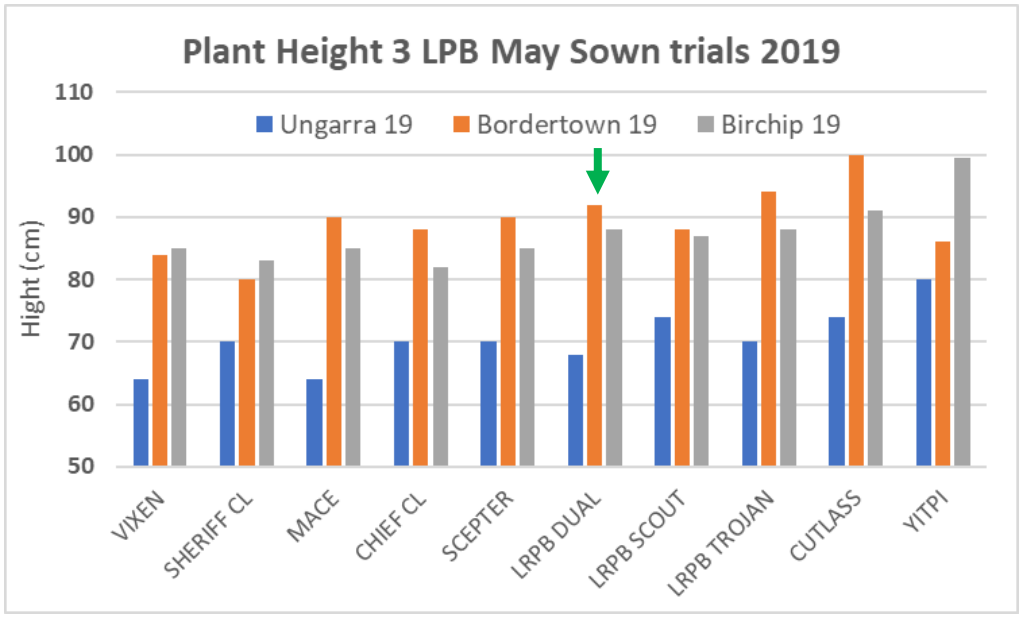
Comments LRPB Dual

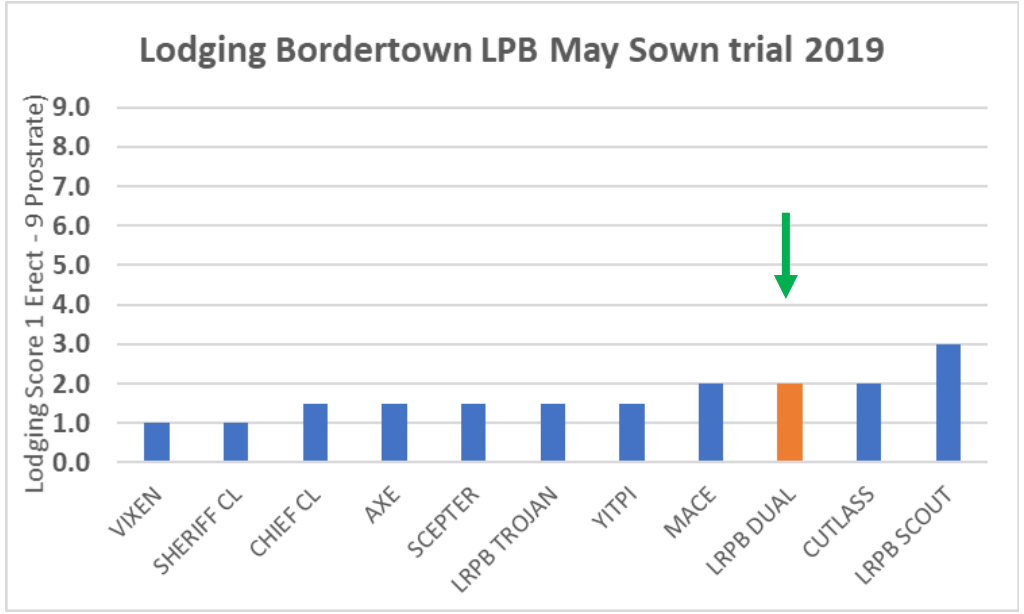
- Compared to other varieties in 2020 LPB phenology trials:
  - 3 to 6 days later than Mid Spring varieties like Scepter
  - Slightly later than Mid-Slow Spring wheat LRPB Trojan
  - 1 to 2 days quicker than Yitpi, 2-6 days quicker than Orion and **5-9 days quicker than LRPB Bale**
- **Overall LRPB Dual has a Mid-Slow maturity between Trojan and Yitpi**

Scepter vs LRPB Dual, Keith - 1st Oct 2021

Comparative maturity of LRPB Dual and LRPB Bale

LRPB Dual - Agronomy

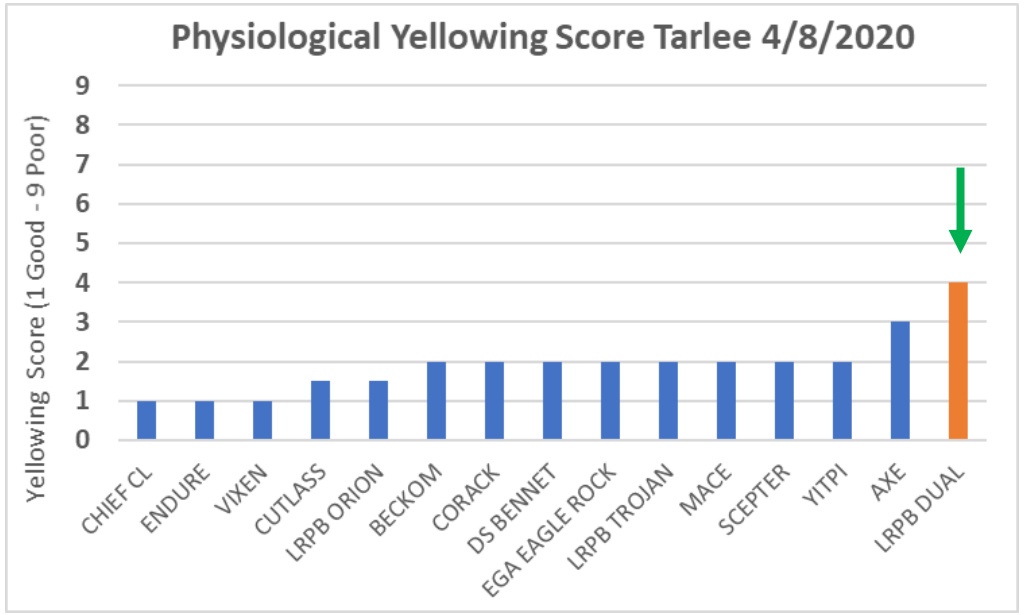




Comments LRPB Dual

- Early growth typical of Scout and Yitpi background
- **Medium-Tall height similar to Scepter and Scout**
- **Height is controlled by a unique combination of dwarfing genes Rht2 and Rht18** with preliminary work showing minimal lodging when bulk has been high in windy situations with good stem strength

LRPB Dual - Physiological Yellowing



Comments LRPB Dual

- **Regularly shown physiological yellowing and leaf tip necrosis in colder winter period** which is varietal not disease related and should be expected as part of growing LRPB Dual
- **Like Scout/Yitpi it is very susceptible to Yellow Spot so both types of yellowing occur and LRPB Dual is not suited** to wheat on wheat paddocks
- **Later in Spring the upper canopy has shown it holds good leaf greenness** with some lower leaf necrosis typical of Scout/Yitpi

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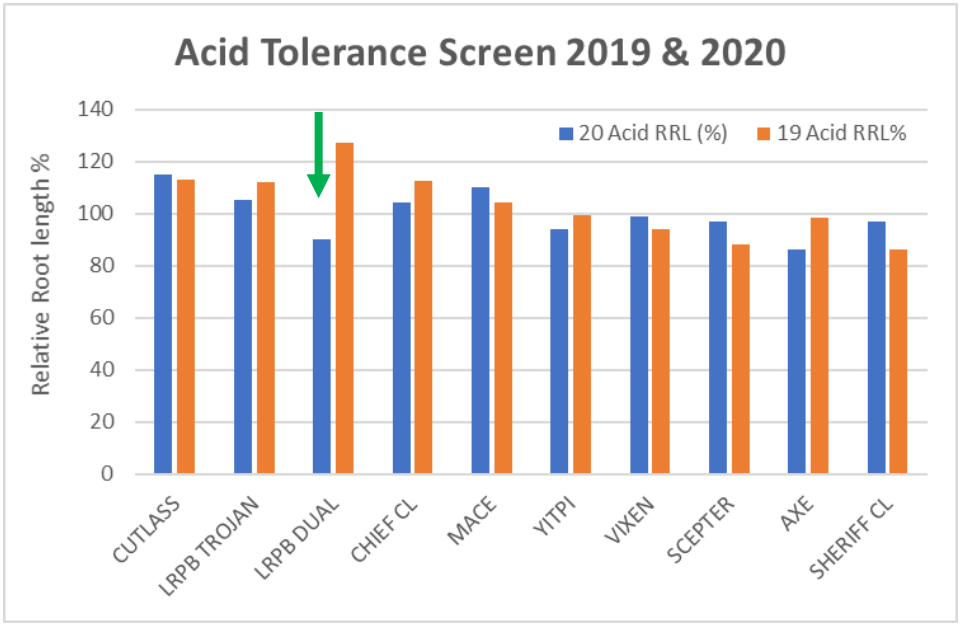
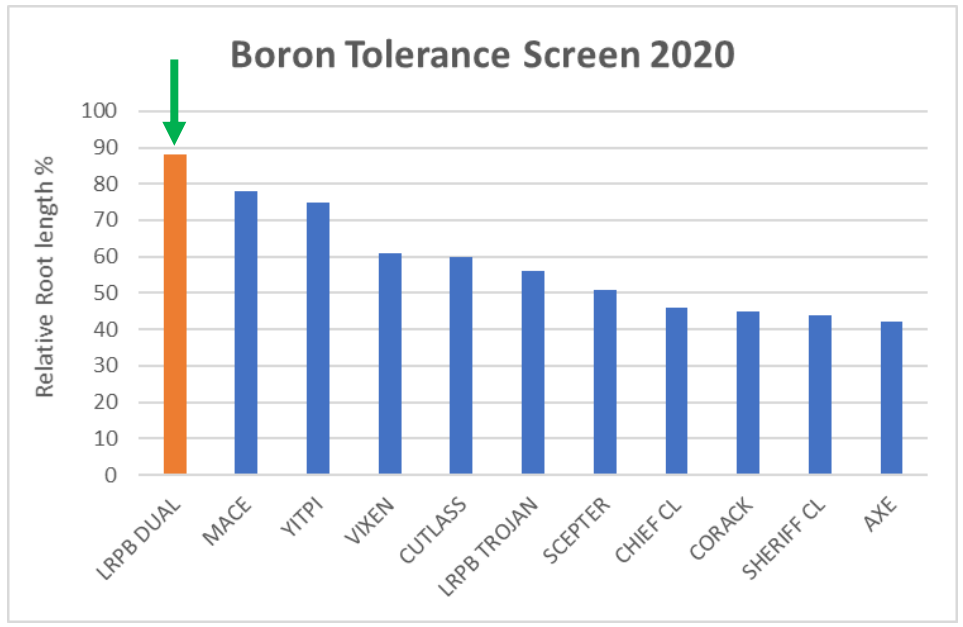
LRPB Dual - Additional Screening data





Shown restricted growth with waterlogging and lower biomass production than Trojan/LRPB Bale at a wet Conmurra SE SA site in 2021

Comments LRPB Dual

- Boron screens show good tolerance to high Boron levels and markers show the presence of a Boron tolerance gene
- Acid tolerance screens suggest reasonable level of tolerance

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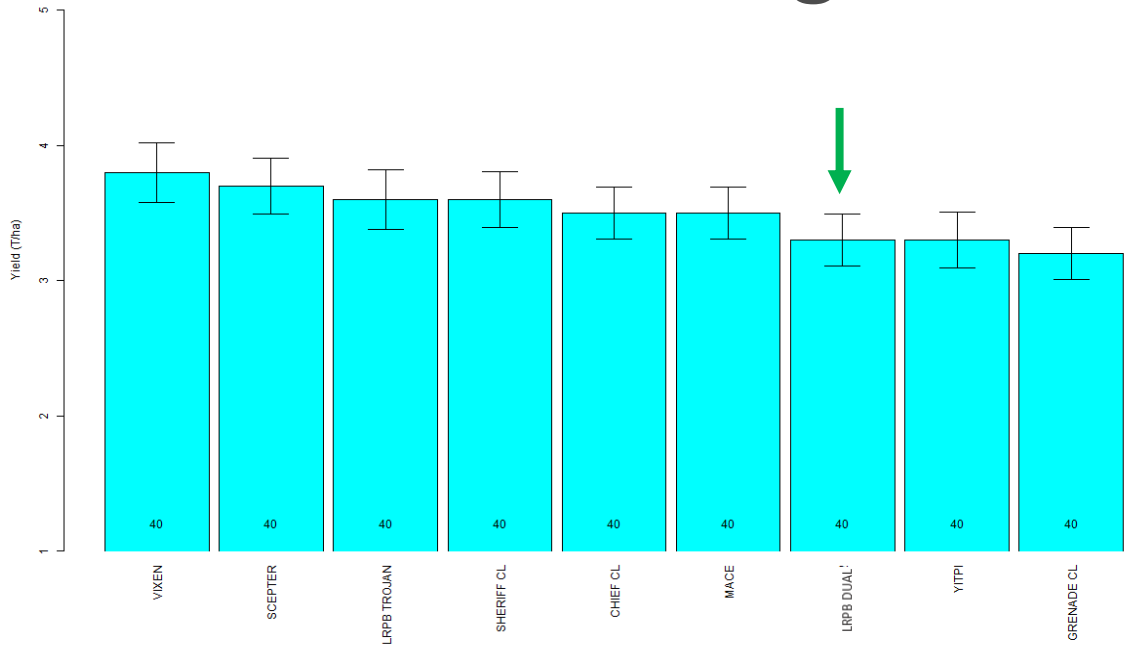
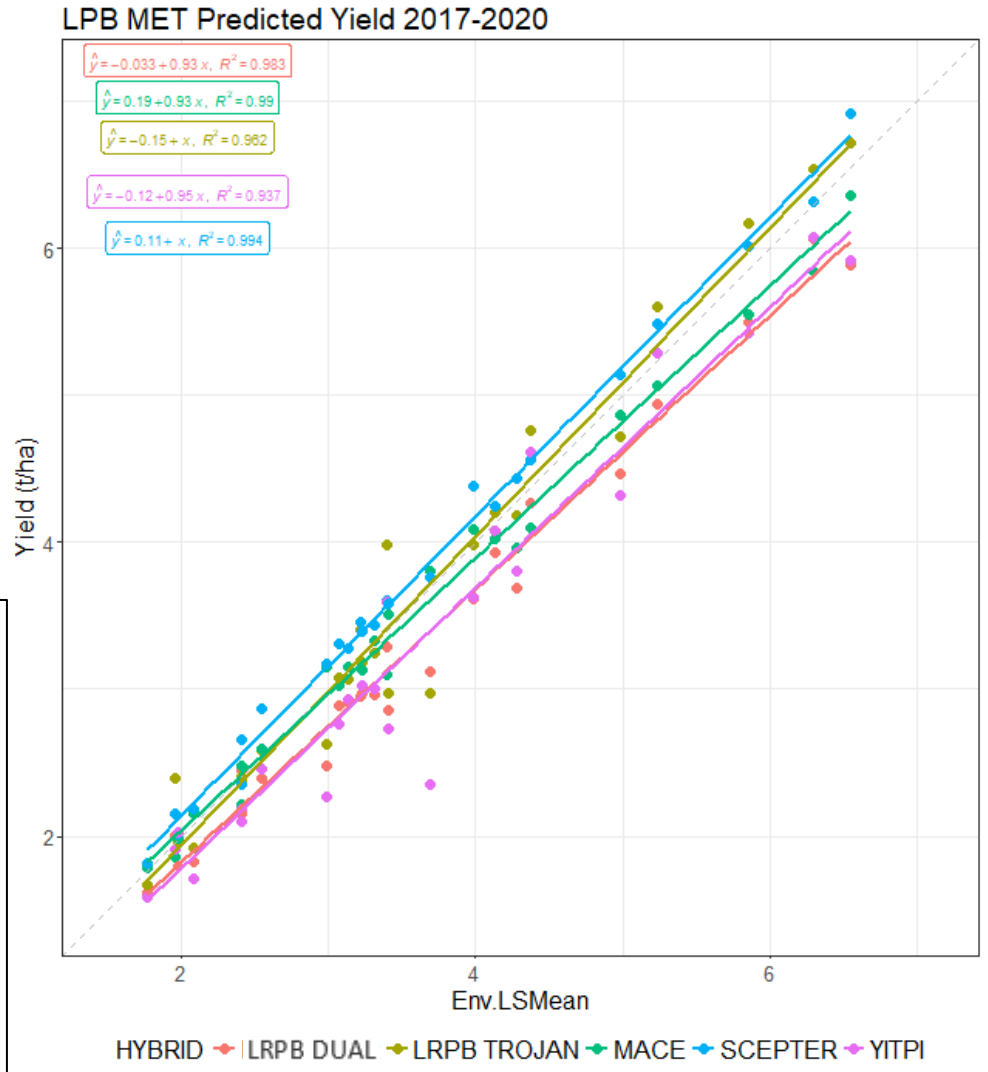
LRPB Dual – Agronomy and Hay studies

LRPB Dual agronomy studies

- The **Mid North High Rainfall Zone research effort led by Agrilink's Mick Faulkner** has identified the most promising selections for dual purpose Hay/Grain development from these novel Awnless wheats since 2017.
- This has included agronomy studies to identify management required on farm for grain and hay production with Agrilink being contracted by **AgriFutures Export Fodder Program (PRJ-011946)** to assess the yield and quality of dual-purpose wheat varieties (including LRPB Dual) for suitability to the export fodder industry.
- **LongReach acknowledges Agrilink and AgriFutures Export Fodder Program's contribution to the assessment of these varieties.**

LRPB Dual Yield – LongReach Predicted MET (2017-2020)





Comments LRPB Dual

- LRPB Dual was <u>included in LongReach trials in 2019 and 2020</u> with this data being MET predicted yield across SA and Vic Main Season areas for a 4 year trial period
- Yield performance of LRPB Dual shows it was similar to Yitpi when sown in a main season window
- The Mid-Slow maturity of LRPB Dual had lower yield than widely grown varieties like Scepter and LRPB Trojan
- The initial awnless dual purpose releases are expected to be lower yielding than the best wheat varieties to meet the rigorous quality requirements for both hay and grain markets

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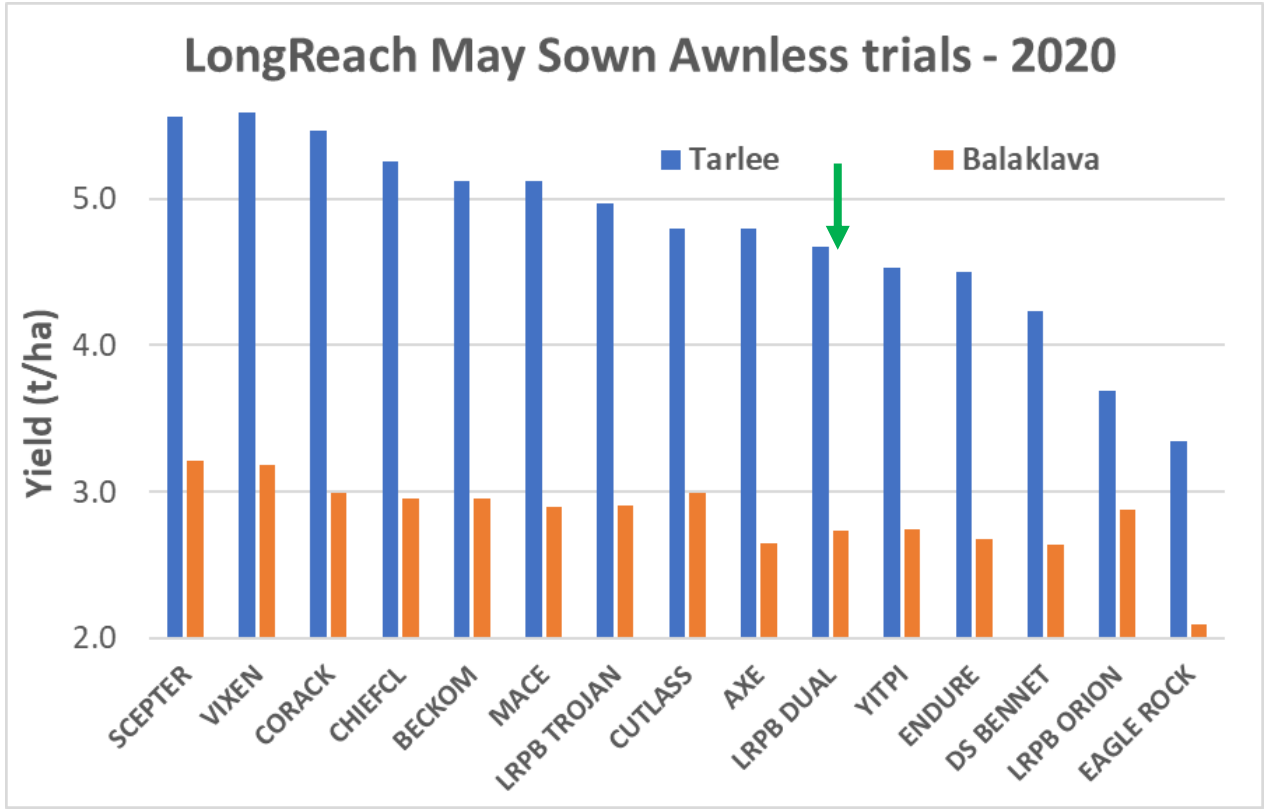
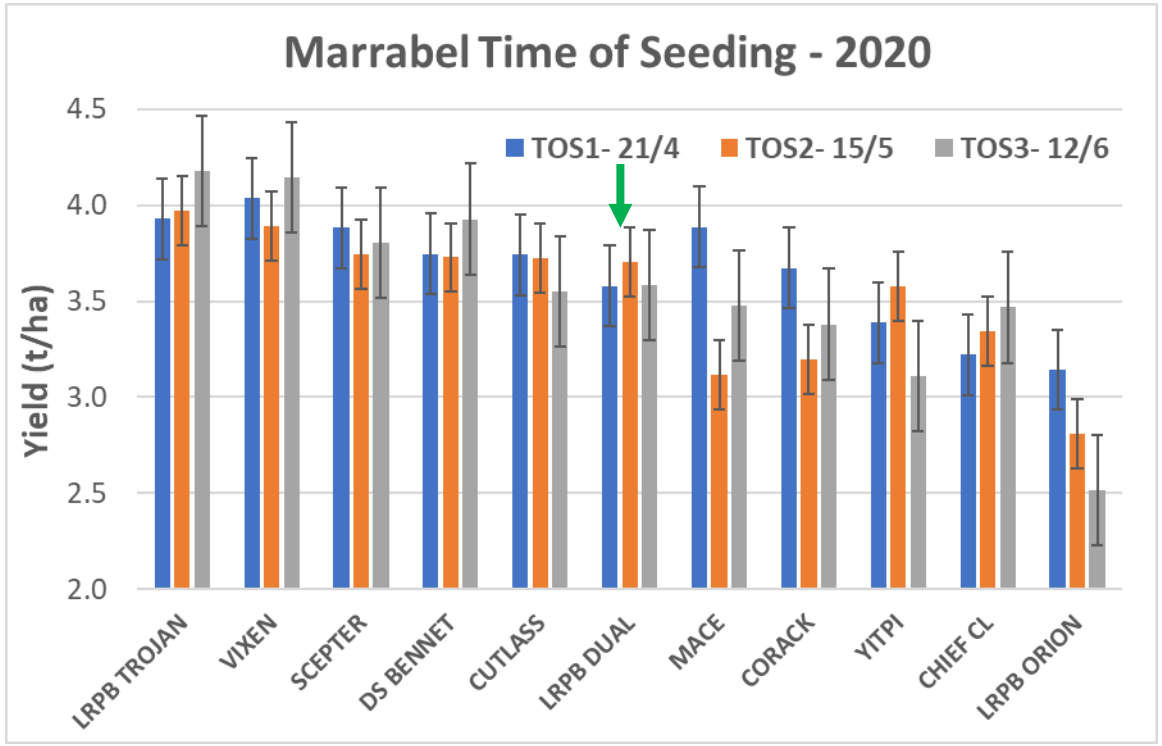
LRPB Dual Yield - LPB Awnless trials 2020



Comments LRPB Dual

- At the high yielding Tarlee site LRPB Dual out yielded Orion by 1.0 t/ha and was 0.3-0.9 t/ha behind widely grown varieties like Scepter and Trojan
- At the lower yielding Balaklava site LRPB Dual out yielded Orion by 0.1t/ha and was 0.2-0.5 t/ha behind widely grown varieties like Scepter and Trojan
- LRPB Dual has acceptable grain yield and should be targeted at red and amber zones of the farm which are known to have some frost risk rather than replacing high yielding wheats on lower-risk green zones

LRPB Dual Yield – LPB Time of Seeding 2020



Yield LRPB Dual The Marrabel TOS trial had an unusual yield pattern with late rains helping DS Bennet deliver the highest yield at the latest sowing time

- This site escaped serious frost damage with similar yield of LRPB Dual at all sowing times that was within 0.2-0.5 t/ha of widely grown main season varieties
- At all seeding times LRPB Dual out yielded the awnless LRPB Orion

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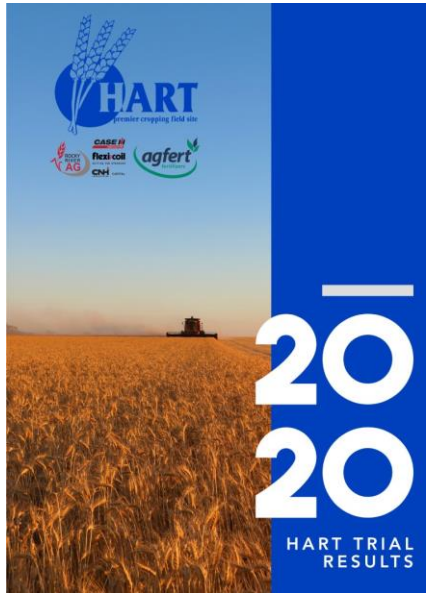
LRPB Dual – Early sown winter and awnless wheats trial
(Hart Field site - 2020)

Table 2. Dry matter (t/ha) and grain yield (t/ha) for wheat varieties trialed at Hart, 2020. Numbers appended by different letters within the grain yield columns are different from each other.

Variety	April 20	May 6	April 20	May 6
	Dry matter (t/ha)		Grain yield (t/ha)	
Catapult			2.13^{def}	2.92^{ab}
Denison			1.91^{ef}	2.43^{bcd}
Illabo			1.65^{f}	2.00^{def}
Scepter			1.65^{f}	3.03^{a}
Nighthawk			2.28^{cde}	1.97^{def}
DS Bennett	4.23	3.88	2.19^{cde}	2.25^{cde}
LRPB Dual	4.49	4.31	2.02^{def}	2.64^{abc}
LRPB Bale	4.27	4.81	1.98^{def}	2.04^{def}
Orion	4.46	4.03	2.06^{def}	2.00^{def}
	NS		LSD (P≤0.05) 0.50	



https://www.hartfieldsite.org.au/media/2020%20Trial%20Results/2020_Hart_Trial_Results_Early_sown_winter_and_awnless_wheat.pdf

Early sown winter and awnless wheats (LRPB Dual tested as LPB18-7982 in Hart summary)

- Dry matter production at the watery ripe (GS71) cutting stage ranged from 3.88 t/ha to 4.49 t/ha for all awnless varieties. The new awnless varieties did not improve dry matter production compared to DS Bennett and Orion.
- At harvest, LRPB Dual was the highest yielding (2.64 t/ha) awnless variety when sown in early May (Table 2). All other awnless varieties DS Bennett, Orion and LRPB Bale yielded similarly at 2.00 – 2.25 t/ha.

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Dual Purpose Wheat

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LRPB Dual Yield – NVT Long term MET Data

NVT MET Predicted Long Term Yield (2019-23) for SA/Vic Main Season trials as Regions (% Mean Yield)

	State	South Australia						Victoria	
	Region	Upper EP	Lower EP	Yorke Pen	Mid Nth	SA Mallee	Sth East	Vic Mallee	Wimmera
Variety	**Trials**	**32**	**10**	**18**	**19**	**27**	**5**	**37**	**14**
LRPB Matador	70	111	110	110	109	110	108	109	109
Calibre	148	111	108	109	109	113	106	110	111
Ballista	188	111	109	109	109	110	109	110	110
RockStar	187	109	108	109	108	109	109	109	110
Vixen	188	112	112	110	109	107	109	109	106
Scepter	188	106	109	107	105	107	104	106	105
LRPB Trojan	187	100	103	102	101	100	103	101	102
LRPB Scout	131	102	96	99	101	102	102	102	103
LRPB Dual	**108**	**96**	**92**	**95**	**95**	**98**	**93**	**95**	**96**
Yitpi	188	91	92	93	93	94	92	93	94
Mean Yield	**t/ha**	**2.24**	**4.83**	**4.16**	**4.54**	**2.35**	**5.74**	**3.59**	**4.22**

LRPB Dual first included in NVT in 2021 (NVT MET 29th Feb 2024)

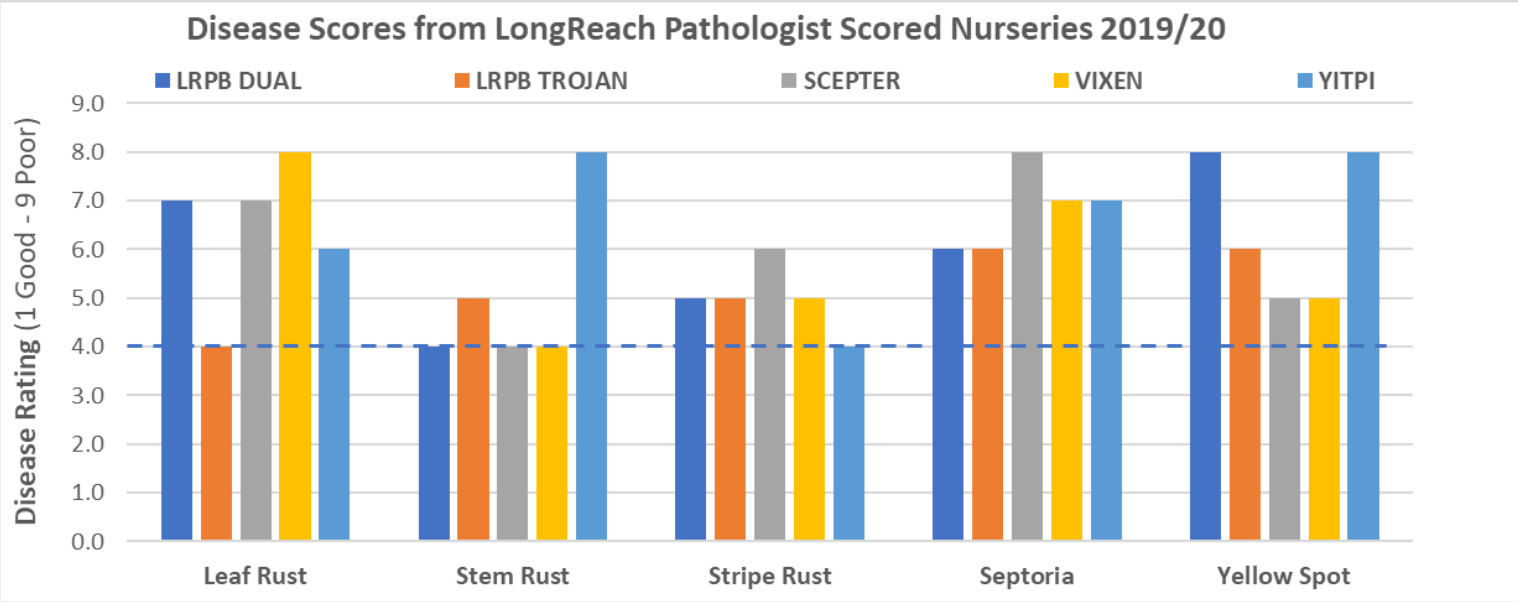
Dual was first included in NVT trials in 2021

- LRPB Dual has shown steady yield between the parent material it was crossed with (Yitpi and scout)
- LRPB Dual has always shown to be back on grain yield and its purpose on farm is to diversify options for intermediate frost risk areas that need to cut paddocks for hay at times

FLEXI GRAIN HAY

Dual Purpose Wheat

Disease – LongReach and NVT data



LongReach Disease Rating LRPB Dual

- Good **Stem rust MRMS** level of resistance
- Acceptable **Stripe Rust MS** level of resistance
- Base level of **Leaf rust MSS** resistances **MSS**
- **MSS to Septoria** with screens indicating it is better than Scepter
- **Weak for Yellow Spot (SVS)** as is the Scout/Yitpi parents and **does not suit being grown on wheat stubbles**
- **Excellent CCN (R) resistance**

Attributes	Rating
Classification	AH (SA/VIC/WA)
Stem Rust	MRMS
Leaf Rust	MSS
Stripe Rust East	MS
Septoria Tritici	MSS
Prat. Thornei - Resistance	MSS
Prat. Thornei - Tolerance	MI
Crown Rot	S
Yellow Spot	SVS
Powdery Mildew	S
Prat. Neglectus - Resistance	MSS
Prat. Neglectus - Tolerance	I
CCN	R
Black Point	S
Boron Tolerance	MT
Acid Soil Tolerance	MT-MI
Coleoptile Length	Long
Farmer to Farmer Trade	Allowed
EPR Rate/MT (ex GST) Grain	$3.50
EPR Rate/MT (ex GST) Hay	$3.50

Longreach disease ratings have been compiled from LongReach Disease Screening data and from NVT Disease Ratings March 2024.

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LRPB Dual - Grain receival quality

Grain Receival quality from 3 LongReach trials 2020

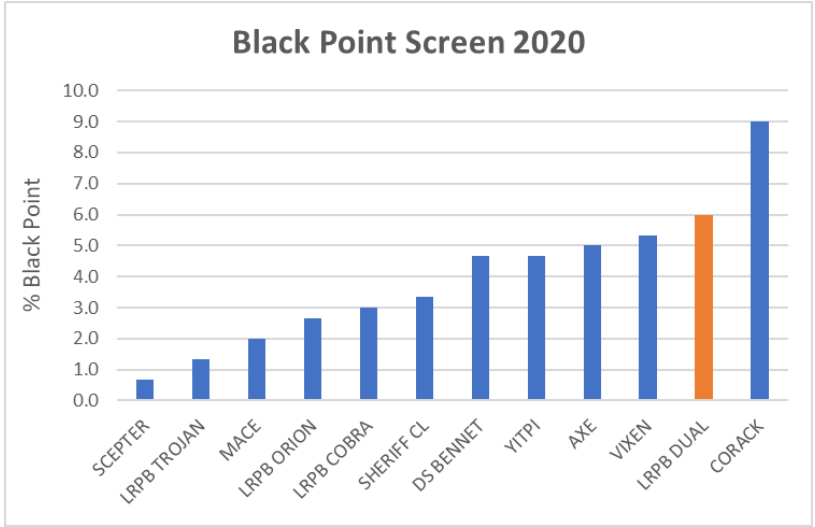
LINCD	Grain Protein (%)			Test Weight (kg/hl)			1000 Grain Weight (g)			Screening (%)			Black Point (%)		
	Minnipa	Tarlee	Rudall	Minnipa	Tarlee	Rudall	Minnipa	Tarlee	Rudall	Minnipa	Tarlee	Rudall	Minnipa	Tarlee	Rudall
AXE	13.3	12.6	14.4	83.3	82.1	85.1	44.8	43.3	40.2	0.5	0.6	0.5	0.3	1.0	1.7
BECKOM	10.9	11.5	13.2	86.7	82.9	86.5	38.4	38.3	34.5	0.5	0.4	1.3	0.3	2.0	0.7
CHIEF CL	10.8	11.8	12.4	85.1	84.7	85.1	46.0	50.5	39.3	0.5	0.2	0.6	0.3	3.0	0.7
CUTLASS	11.4	11.9	13.5	87.0	84.8	86.9	38.6	44.2	38.3	0.6	0.4	0.4	0.7	1.7	3.7
LRPB DUAL	11.0	13.6	12.8	85.7	86.7	86.2	41.7	44.6	38.4	1.1	0.3	0.7	0.3	2.0	3.0
LRPB TROJAN	11.4	12.2	13.3	87.7	85.1	87.5	41.3	48.1	39.2	0.5	0.2	0.4	0.0	1.7	0.7
MACE	11.3	12.1	12.6	87.5	83.8	86.8	44.4	41.5	41.9	0.3	0.3	0.4	0.3	0.0	0.0
SCEPTER	10.9	11.4	12.1	88.1	85.2	87.6	47.1	47.0	44.0	0.4	0.6	1.1	0.3	0.3	0.7
SHERIFF CL	10.7	11.9	12.6	87.0	84.3	86.1	43.1	43.8	37.9	0.4	0.2	0.2	0.0	0.7	0.7
VIXEN	12.0	11.8	12.2	85.0	83.0	85.6	48.2	43.1	40.0	0.3	0.6	0.5	0.3	0.0	0.0
YITPI	11.8	12.3	13.7	86.8	84.8	86.5	38.9	44.7	41.3	1.0	1.0	0.6	0.0	2.3	3.0

FLEXI GRAIN HAY

Dual Purpose Wheat

Comments LRPB Dual

- Grain deliverables from 2020 trials show similar specs to many robust varieties on the market with sound test weight and medium grain size
- Good finishing rains also meant that grain Screenings % were low and all lines and this will need to be tested in a tougher finish
- Black point has been low in recent seasons and limited 2021 data suggests LRPB Dual is Susceptible at the Yitpi/Vixen level in tolerance
- **LRPB Dual has a Southern Zone (SA/Vic) AH classification for the 2021/22 harvest**



LongReach PLANT BREEDERS

LRPB Dual - Grain receival quality 2023 NVT

GRDC NATIONAL VARIETY TRIALS™

NVT Grain Quality - Data summary for 2023 Main Season SA/Vic trials (36 sites)

	kg/hectolitre			Protein %			Screenings %			g/1000 seed		
Variety Name	**Ave**	**Max**	**Min**	**Ave**	**Max**	**Min**	**Ave**	**Max**	**Min**	**Ave**	**Max**	**Min**
Ballista	80.1	85.3	67.7	10.8	13.6	6.7	3.0	8.2	0.5	40.0	51.3	31.5
Calibre	81.0	84.6	77.5	11.2	14.6	7.7	2.5	8.4	0.3	40.9	51.6	28.3
Catapult	82.1	84.7	77.4	11.1	14.1	7.0	2.4	5.4	0.4	38.2	48.1	29.0
LRPB Dual	**82.4**	**86.2**	**75.5**	**12.4**	**15.6**	**9.7**	**2.5**	**9.6**	**0.4**	**38.5**	**51.8**	**31.0**
LRPB Major	82.5	86.2	77.3	11.4	14.4	8.9	3.2	10.5	0.3	38.0	48.6	28.4
LRPB Matador	81.8	86.3	77.6	11.1	13.8	8.1	3.6	13.4	0.7	37.8	46.3	26.1
LRPB Trojan	82.6	86.7	71.3	11.7	14.1	9.1	2.3	8.4	0.4	39.1	48.4	27.9
RockStar	80.8	85.5	69.7	11.2	14.1	6.6	2.8	7.2	0.7	40.7	52.0	31.5
Scepter	82.5	85.0	78.4	11.0	14.8	7.2	2.7	8.9	0.7	40.8	50.0	21.4
Vixen	81.5	85.7	77.0	11.4	14.1	7.2	2.6	11.2	0.5	39.4	51.3	27.1
Yitpi	81.6	85.8	69.0	12.5	15.2	9.7	2.3	5.5	0.4	38.9	48.0	31.3
Site Average	**81.5**	**84.4**	**76.5**	**11.5**	**14.7**	**8.0**	**3.1**	**9.1**	**0.9**	**38.1**	**46.0**	**29.5**

(NVT Online 14th March 2024)

FLEXI GRAIN HAY

Dual Purpose Wheat

Comments LRPB Dual

- Grain deliverables from 2023 NVT trials show similar specs to many robust varieties with Dual perfoming very similarly to Trojan overall

LongReach PLANT BREEDERS

LRPB Dual – Seed distribution and availability

FLEXI GRAIN HAY

Dual Purpose Wheat

- Seed is available for LongReach Dual
  - Contact: Richard Verner, RH Verner & Co Pty Ltd, Mallala, SA 5502.
  - Mobile: 0429 202 182; Fax: (08) 8520 2123; Email: richard@rhverner.com.au
- LongReach Dual is also able to be “farmer to farmer” traded to make it easily available to growers
- EPR of $3.50/MT (GST Exc.) has been set for grain deliveries
- **A Hay EPR of $3.50/MT (GST Exc.) has been implemented for the 2024 season as per the standard LongReach Seed licence:** https://www.longreachpb.com.au/royalties

LongReach PLANT BREEDERS

LongReach DUAL

2024 AgroPack

FLEXI GRAIN HAY

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Awnless AH Mid-Slow Spring Wheat