

2021 QUEENSLAND WINTER CROP SOWING GUIDE



GRDC

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CORPORATION

QUEENSLAND
OCTOBER 2020



**ARE YOU GROWING THE BEST
VARIETY FOR YOUR SITUATION?**

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**Title:**

2021 Queensland Winter Crop Sowing Guide

ISSN:

2652-3590 (print)

2652-3604 (online)

Published:

October 2020

Acknowledgements:

Sincere thanks to the following contributors, without whose help through their time and industry knowledge this publication would not have been possible:

NSW Department of Primary Industries:

Kevin Moore

Queensland Department of Agriculture and Fisheries:

Merrill Ryan, William Martin

University of Southern Queensland:

Cassy Percy, Jason Sheedy

University of Sydney: Robert Park, Harbans Bariana, Davinder Singh, Bethany Clark, Will Cuddy.

In addition, GRDC would like to thank the numerous breeding companies and their representatives for their contributions.

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GRDC contact details:

Ms Maureen Cribb
Integrated Publications Manager
PO Box 5367
KINGSTON ACT 2604

Email:

Maureen.Cribb@grdc.com.au

Design and production:

Coretext, www.coretext.com.au

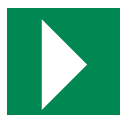
COVER: NVT site at Kilcummin, QLD.

PHOTO: QDAF

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<https://grdc.com.au/queensland-winter-crop-sowing-guide>
Remember to download a new one each November.

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INTRODUCTION

INTRODUCTION

The *2021 Queensland Winter Crop Sowing Guide* contains the latest information for wheat, barley and chickpea varieties. This guide draws on the advice, knowledge and experience of numerous individuals in the cropping industry. Its aim is to provide growers with relevant information that will allow them to make informed choices when deciding on what varieties of wheat, barley or chickpea to sow in their paddocks.

The guide covers new and recently released varieties, as well as those varieties that growers know and which have become established in Queensland.

There are five new wheat varieties (LRPB Stealth[®], Sunblade CL Plus[®], Suncentral[®], Sunflex[®], Sunmaster[®]); three new barley varieties (Beast[®], Laperouse[®], Maximus CL[®]) and one new chickpea variety (CBA Captain[®]) for growers to consider.

National Variety Trials (NVT) seek to collect the most relevant varieties for each region and test them alongside elite lines from the breeding programs. For all the information on the released wheat, barley and chickpea varieties in the trials conducted in Queensland, visit the website www.nvtonline.com.au

Only varieties deemed suitable for conditions experienced in Queensland have been included in this guide. If a variety is not mentioned, there is either no commercial seed available or there is concern it may not carry robust disease resistances and may compromise the industry. However, if seed of varieties not mentioned in this guide is obtained, please ensure you are provided with current and reliable information by the vendor.

Conducted to a set of predetermined protocols, trials are sown and managed to reflect local best practice such as sowing time, fertiliser application,

weed management, pest/disease control and fungicide application. The NVT is not designed to grow varieties to their maximum yield potential.

GRDC acknowledges that an ongoing project of this type would not be possible without the cooperation of growers prepared to contribute sites and who often assist with the management of trials on their property.

INTERPRETING LONG-TERM YIELD DATA

A factor analytic (FA) mixed model approach is used in the multi-environment trial (MET) analysis conducted by the GRDC-supported Statistics for the Australian Grains Industry (SAGI) program. This approach generates long-term MET values for varieties at an individual trial level.

This format provides more detailed data to better understand a variety's performance over several years at the individual trial/environment level, rather than just a single averaged value.

In this *2021 Queensland Winter Crop Sowing Guide*, results are presented for yield and quality in year groupings as designated. Further detailed interrogation of the NVT Online dataset using the NVT Long Term Yield Reporting Tool will provide more specific performance data on all varieties of each crop species in each NVT location.

DISEASES

Cereal diseases pose a significant threat to the Australian grains industry. Growers should monitor all crops and any suspicious lesions should be collected, samples kept dry and packaged in paper (not plastic). Contact your local Department of Primary Industries representative or your agronomist for further instructions.

Send rust samples to:

University of Sydney
Australian Rust Survey,
Reply Paid 88076
Narellan NSW 2567

Reply Paid sample envelopes can be obtained by contacting:

Bethany Clark
University of Sydney Plant Breeding Institute
Cereal Rust Laboratory
107 Cobbitty Road
Cobbitty NSW 2570

Phone: +61 2 9351 8849
Email: bethany.clark@sydney.edu.au

For pulse disease sample testing contact:

Lisa Kelly, Queensland Department of Agriculture and Fisheries, for sample dispatch details.

Phone: +61 477 747 040
Email: lisa.kelly@daf.qld.gov.au

For cereal disease sample testing contact:

Lisle Snyman, Queensland Department of Agriculture and Fisheries, for sample dispatch details.

Phone: +61 428 324 932
Email: lisle.snyman@daf.qld.gov.au

END POINT ROYALTIES

End point royalties (EPRs) are an essential income source for Australia's breeding programs. The collection of these royalties is evolving and there are two main systems:

- automatic deduction of EPRs by grain traders buying from a grower; or
- royalty managers directly invoicing growers for EPRs.

More information: *GRDC End Point Royalties Fact Sheet*, www.grdc.com.au/GRDC-FS-EndPointRoyalty

PLANT BREEDER'S RIGHTS

The Plant Breeder's Rights Act 1994 gives variety owners the exclusive right to sell their varieties, including the right to collect royalties for commercial use. Plant Breeder's Rights (PBR) is a type of intellectual property right/set of rights. It is a protection of a variety that allows the breeder/owner of the variety to place restrictions on what growers and others can do with it.

TIMING IS ESSENTIAL FOR SUCCESS

Growers face many decisions before sowing; getting each decision correct is important and will ultimately affect final grain yield and farm profitability. Put simply: know your paddock, know your varieties and get your timing right. Concentrate on the aspects of your farming operation that you can control and try not to worry about the rest.

Relevant information on individual wheat, barley and chickpea varieties is summarised in this guide. The information is a collation of data from the NVT program conducted across the region. The guide benchmarks the yield performance of regionally important varieties together with individual disease and agronomic ratings.

Timing of each element associated with grain production is critical and can be the difference between success and failure.

Crucial elements include:

- 1) Selecting a crop and then a variety that will fit in with your paddock rotation plan.
- 2) Knowing as much as possible about each individual paddock. This includes the overall nutritional status, different disease inoculum loads and weeds, both current and possibly in the seedbank. However, it does require a steely resolve to stick to a farm rotation plan in the face of varying commodity prices.
- 3) Do not second-guess any aspect. If in doubt, get the relevant tests done. Variety selection is part of the overall plan and decisions need to be made not just for the current season, but long term. Soil tests should be taken well before sowing to estimate nutrient levels and are extremely beneficial when used in conjunction with existing records of grain production and grain protein to determine a nutritional program for the crop.

Growers need to ensure their preferred variety for sowing is good quality, considering purity, germination and vigour. This is particularly relevant for growers looking to use retained seed. Aim for an even establishment across the paddock, rather than simply trying to achieve a given sowing rate. Aim for an even established plant density of between 100–200 plants/m² for wheat and barley, and 20–30 plants/m² for chickpea, rather than just relying on a set planting rate based on kg/ha. Ensure there is good seed-to-soil contact by sowing into moisture and firming with the use of press wheels.

Another important consideration for growers is to ensure the variety selected has the correct maturity to correspond with planting time to minimise the risk of crop damage from frost and heat.

Be mindful of a variety's coleoptile length. Varieties' coleoptile lengths are shorter in central Queensland due to the higher temperatures usually experienced around sowing. Chickpea can tolerate a greater sowing depth if chasing moisture.

AN INDUSTRY GUIDE FOR WHEAT VARIETY MATURITY DESCRIPTION

The wheat breeding members of Australian Crop Breeders (ACB) have worked together to develop a consistent approach to describing wheat variety maturity. It is their intent to use this system on company fact sheets and they encourage the rest of the industry to adopt this system in their publications to provide growers with consistency and transparency. It is hoped to develop a similar approach for the other crops that are represented by Australian Crop Breeders.

The purpose of the wheat variety maturity description (Appendix 1) is to provide growers, agronomists, extension officers, plant breeders and others with a consistent approach to wheat variety maturity (relative heading date) description. As a core component of adaptability and variety management, it is important that the industry have access to a clear and sufficiently detailed method of describing relative maturity in Australia's field crops.

For further information or to discuss this table, contact ACB at enquiries@australiancropbreeders.com.au or Haydn Kuchel (0428 817 402), who is chair of the NVT subcommittee of ACB.

APPENDIX 1. WHEAT VARIETY MATURITY DESCRIPTION

Northern region		
Maturity* description	Quick wheat boundary	Slow wheat boundary
Very quick spring	N/A	-
Very quick – quick spring	-	-
Quick spring	-	LongReach Mustang [®]
Quick – mid spring	LongReach Mustang [®]	Suntop [®]
Mid spring	Suntop [®]	LongReach Reliant [®]
Mid – slow spring	LongReach Reliant [®]	EGA Gregory [®]
Slow spring	EGA Gregory [®]	Sunzell
Slow – very slow spring	Sunzell	Sunmax [®]
Very slow spring	Sunmax [®]	N/A

*Maturity is defined as the time taken from seedling emergence until 50 per cent of tillers have heads that are 50 per cent visible (GS55) above the flag leaf auricle.

Source: Australian Crop Breeders Ltd

PREDICTA[®] B TESTING SERVICE

Growers are faced with many decisions before sowing and knowing the disease status of a paddock helps to determine which crop and which variety to sow. Guessing a paddock's disease status is dangerous and whenever possible growers should avail themselves of the PREDICTA[®] B testing service. The service quantifies the level of inoculum of several soil diseases that are common to paddocks in the northern region and can be accessed at http://pir.sa.gov.au/research/services/molecular_diagnostics/predicta_b

DISEASE RATING COLOUR RANGE

R	RMR	MR	MRMS	MS	MSS	S	SVS	VS
---	-----	----	------	----	-----	---	-----	----

R = resistant, RMR = resistant to moderately resistant, MR = moderately resistant, MRMS = moderately resistant to moderately susceptible, MS = moderately susceptible, MSS = moderately susceptible to susceptible, S = susceptible, SVS = susceptible to very susceptible, VS = very susceptible.

COLOUR GRADIENT LEGEND: MEAN VARIETY YIELD PERFORMANCE



LOW

HIGH

Long-term mean yield illustrated by colour gradient from lowest (red) to highest (green), comparable on an annual basis.

KEY POINTS

New and recently released varieties available for sowing

- NEW - LongReach Stealth[®], a slow spring-maturing APH bread wheat variety from LongReach Plant Breeders
- NEW - Sunblade CL Plus[®], a mid spring-maturing APH Clearfield[®] bread wheat variety from Australian Grain Technologies
- NEW - Suncentral[®], a quick – mid spring-maturing APH bread wheat variety from Australian Grain Technologies
- NEW - Sunflex[®], a slow spring-maturing APH bread wheat variety from Australian Grain Technologies
- NEW - Sunmaster[®], a mid spring-maturing APH bread wheat variety from Australian Grain Technologies
- LongReach Hellfire[®], a quick – mid spring-maturing APH bread wheat variety from LongReach Plant Breeders
- Sunchaser[®], a quick – mid spring-maturing APH bread wheat variety from Australian Grain Technologies
- LG Gold[®], a quick – mid spring-maturing AH bread wheat variety from Elders
- RGT Zanzibar, a mid – slow spring grain feed wheat from Seed Force
- RockStar[®], a mid – slow spring season AH bread wheat variety from InterGrain
- Westcourt[®], a quick – mid spring-maturing ADR durum wheat variety from Australian Grain Technologies

Planned for removal in 2020

Refer to www.wheatquality.com.au

- EGA Bounty, EGA Eaglehawk, EGA Stampede, EGA Wills, LongReach Dakota[®], Merinda[®], Naparoo[®], SW Flamenco

Planned for removal in 2021

Refer to www.wheatquality.com.au

- Clearfield JNZ, Zulu, Zebu, LongReach Bullet

DISEASE CHARACTERISTICS

Yellow spot

Seedling disease alone rarely results in significant grain yield losses. For grain yield losses to occur, a wet spring is needed for the disease to develop on adult plants and affect the top three leaves, which drive yield. Previous advice on spraying is still valid: delay decisions on fungicide spraying for Yellow spot control until plants are close to heading and most of the yield-determining leaves have emerged. Variety Yellow spot ratings are shown in Table 1.

False black chaff

This disorder can readily occur in susceptible varieties. It is a physiological disorder causing brown-black, slight to extensive striations on the glume and, in extreme cases, along the tillers. It is associated with the Stem rust resistance gene Sr2, which is common in Australian cultivars.

Crown rot

Crown rot survives for several seasons on decaying stubble from host cereal crops and from grass weeds in non-host crops. Infection of the stem bases of a young crop is high with a wet autumn/winter, but above-ground symptoms are normally only seen when the plant undergoes water stress at the end of the season.

Stripe rust

Historically, the spread of Stripe rust occurs in spring. With night-time temperatures increasing above 20°C the epidemic usually slows from late October to early November in Queensland. A new pathotype, 198 E16 A+ J+ T+ 17+, poses an increased disease threat to several wheat varieties and growers should monitor their paddocks for any infestation and send rust samples to University of Sydney, Australian Rust Survey, Reply Paid 88076, Narellan NSW 2567.

Reply paid sample envelopes can be obtained by contacting:

Bethany Clark

University of Sydney Plant Breeding Institute

Cereal Rust Laboratory

107 Cobbitty Road

Cobbitty NSW 2570

Phone: +61 2 9351 8849

Email: bethany.clark@sydney.edu.au

Leaf rust and Stem rust

From seedling stage onward, regular scouting of crops should be made to determine if rust spores have infected plant leaves and are developing in crops. If the cultivar has less than an MR level of resistance, fungicide application should be considered.

Root lesion nematodes

These nematodes are widespread in the northern grain region and can significantly reduce wheat yields. RLN is also hosted by many non-cereal crops, so the absence of a winter cereal crop in recent seasons does not mean there are low levels of nematodes in the soil. A soil test should be considered before planting if you do not know the species or levels on your farm.

If wheat is to be sown in nematode-infested soil, the tolerant varieties (listed as T, TMT or MT and highlighted in green, Table 1) should be considered for best yield. Choose a variety that has a higher resistance rating to maximise yield and leave fewer nematodes in the soil to attack the next crop. The reaction of a wheat variety may differ to the two species, *Pratylenchus thornei* and *Pratylenchus neglectus*. This should be checked for individual varieties in Table 1.

Bunt

To avoid bunt, wheat seed should be treated with a fungicidal dressing if it has been saved from a crop grown from untreated seed.

Black point

Black point is a brown-black discolouration at the germ end of wheat and barley caryopsis. In wheat, the discolouration occurs in the outer pericarp and inner seed coat tissue. Black point is a physiological response to a certain set of environmental conditions such as heavy morning dews, rainfall and high humidity.

Russian wheat aphid

Russian wheat aphid (RWA) was initially found in South Australia and Victoria in 2016 and has subsequently been found in NSW and Tasmania.

In 2019, RWA was observed as far north as Coonamble, Coonabarabran and the Liverpool Plains. Grain growers and agronomists across Queensland are urged to regularly monitor cereal paddocks for signs of RWA.

GRDC continues to promote the FITE strategy (find, identify, threshold approach and enact), which has been developed to provide a simple guide to RWA management. It involves:

- **Find** – look for aphids, especially where leaf rolling is observed. The characteristic plant symptoms of infection including leaf streaking or leaf rolling on cereal crops and grasses.
- **Identify** – positively identify RWA by consulting with an industry specialist.
- **Threshold approach** – before deciding on your plan of attack, consider thresholds for control, the presence of natural aphid enemies in the crop, crop growth stage and potential yield losses.
- **Enact** – take appropriate action. Manage your next steps, including encouraging beneficial insects and protecting honeybees, before implementing control options.

<https://grdc.com.au/resources-and-publications/resources/russian-wheat-aphid>

Wheat Quality Australia

Wheat Quality Australia (WQA) is responsible for maintaining and enhancing the reputation of Australian wheat as a high-quality product by using its accountable, transparent and sustainable wheat classification system.

Classification identifies varieties with the proven capability to deliver the requirements of each class, creating a solid foundation for consistent processing and end-product performance. Along with Wheat Standards, which are designed to ensure defects and contamination are absent, this foundation gives customers an assurance that Australian wheat is of the highest quality. The objective of the system is to classify wheat varieties to meet distinct quality attributes for processors and end-users.

Wheat quality refers to the performance of grain in meeting the requirements for its use in flour milling, breads, noodles, cereals, pasta or animal feed. Quality is determined by the genetic attributes of the variety grown and the environmental conditions during crop growth. The wheat classification process involves assessing the inherent quality characteristics of a new variety, focusing on processing and end-use performance.

The WQA Variety Classification Panel assesses new wheat varieties to determine their processing and end-product suitability (for qualities such as milling extraction, dough balance, baking performance and noodle colour and texture) to meet key market requirements.

The WQA Panel meets regularly to consider applications for classification. To find out more about the WQA classification process go to www.wheatquality.com.au.

Table 1: Bread and Durum wheats – disease and agronomy ratings.

Variety	Maturity grouping	WQA maximum quality classification*	Disease ratings (www.nvtonline.com.au)**										Black point†
			Yellow spot	Crown rot	Common root rot	Root lesion nematode				Rust			
						<i>P. thornei</i>		<i>P. neglectus</i>					
						resistance†	tolerance*	resistance†	tolerance*	Stem	Leaf	Stripe	
BREAD WHEATS													
Borlaug 100 ^{db}	Quick– mid spring	Not classified	MRMS	MSS	MS	MS	T	S	–	MR	MR	MSS	MSS
Coolah ^{db}	Slow spring	APH	MSS	MSS	S	MS	MT	S	TMT _p	MR	RMR/MS	RMR	S
DS Faraday ^{db}	Slow spring	APH	MSS	MSS	S	MSS	MT	S	MTMI	MR	R/MS	RMR	MSS
EGA Gregory ^{db}	Slow spring	APH	S	S	MSS	MSS	MT	S	MT	MR	RMR/MS	MR	MSS
Elmore CL Plus ^{db}	Quick–mid spring	AH	S	S	S	S	MI–I	S	TMT	MR	RMR	MRMS	MS
LG Gold ^{db} !	Quick–mid spring	AH	–	–	–	MS	–	MSS	–	–	–	–	–
LongReach Flanker ^{db}	Mid–slow spring	APH	MSS	MSS	MSS	MSS	MT	S	MT	MR	RMR/MSS	RMR	MS
LongReach Gauntlet ^{db}	Mid–slow spring	APH	MS	MSS	MSS	MR	MT	S	MTMI	RMR	MSS	MRMS	MRMS
LongReach Hellfire ^{db}	Quick–mid spring	APH	MS	MSS _p	MSS	MSS	MI	S	–	MR	MSS	MR	MS
LongReach Lancer ^{db}	Mid–slow spring	APH	MRMS	MSS	MS	MSS	TMT	S	MI	MRMS	MSS	MR	MRMS
LongReach Mustang ^{db}	Quick spring	APH	MSS	MSS _p	MSS	MS	MTMI	S	–	RMR	MSS	RMR	MS
LongReach Reliant ^{db}	Mid–slow spring	APH	S	MS	MSS	MS	TMT	SVS	MTMI	MR	MSS	MR	MS
LongReach Spitfire ^{db}	Quick–mid spring	APH	MSS	MS	MS	MSS	MTMI	MSS	MT	MRMS	MRMS	MR	MSS
LongReach Stealth ^{db}	Slow spring	APH	MS _p	–	–	–	–	–	–	R _p	RMR/SVSp	RMR _p	–
Mitch ^{db}	Mid–slow spring	AH	MSS	S	S	MS	MT	S	MT	SVS	S	MR	–
RGT Zanzibar ^{db}	Mid–slow spring	FEED	MS	S	S	MS _p	–	S	–	VS	SVS	R	–
RockStar ^{db} !	Mid–slow spring	AH	MRMS	S _p	MS	MRMS	MI	MRMS	–	MR	S	MRMS	MS
SEA Condamine	Quick–mid spring	FEED	MSS	MSS	MSS	MS	–	S	TMT	MRMS	MR	MRMS	MRMS
Sunblade CL Plus ^{db}	Mid spring	APH	MSS _p	–	–	–	–	–	–	MS _p	MRMS _p	MR _p	–
Suncentral ^{db}	Quick–mid spring	APH	MS _p	–	–	–	–	–	–	MRMS _p	MR	MR _p	–
Sunchaser ^{db}	Quick–mid spring	APH	MS	MSS _p	MSS	MSS	TMT	S	–	MR	R	MR	MS
Sunflex ^{db}	Slow spring	APH	MS	MSS _p	S	MSS	MII _p	S	–	MR	RMR/S	RMR	MRMS
Sunlamb ^{db}	Very slow spring	ASW	MRMS	S	MS	MSS	MI	MSS	I	RMR	MS	MRMS	MS
Sunmaster ^{db}	Mid spring	APH	MSS _p	–	–	–	–	–	–	MS _p	MR _p	MR _p	–
Sunmate ^{db}	Quick–mid spring	APH	MSS	MSS	MS	MRMS	TMT	S	MTMI	MRMS	MRMS	MRMS	MS
Sunmax ^{db}	Very slow spring	APH	MS	MSS	MSS	MS	MI	S	TMT	MR	MS	RMR	MRMS
Sunprime ^{db}	Quick spring	APH	MSS	S _p	MSS	S	MTMI	S	–	MRMS	MR/S	RMR	MSS
Suntime ^{db}	Slow spring	APH	S	MSS	S	MRMS	MT	S	MTMI	MRMS	MS	RMR	MS
Suntop ^{db}	Mid spring	APH	MSS	MSS	MS	MRMS	TMT	S	MT	MRMS	MR	MRMS	MSS
Vixen ^{db} !	Quick–mid spring	AH	MRMS	S	MS	MS	I	MRMS	MT	MRMS	SVS	MRMS	MSS
DURUM WHEATS													
DBA Aurora ^{db}	Quick–mid spring	ADR	MRMS	VS	MSS	RMR	MT	MRMS	IVI	RMR	R	MRMS	MS
DBA Bindaroi ^{db}	Quick spring	ADR	MRMS	SVS	MSS	MR	MTMI	MRMS	MI	MRMS	MR	MS	MRMS
DBA Lillaro ^{db}	Quick spring	ADR	MRMS	SVS	MSS	RMR	MT	MRMS	MII	RMR	RMR	MS	MS
DBA Vittaro ^{db}	Quick–mid spring	ADR	MRMS	SVS	MSS	MR	MI	MS	MII	MR	MR	MS	MSS
Westcourt ^{db}	Quick–mid spring	ADR	MRMS	SVS _p	MS	MR	MT	MS	–	RMR	RMR	MR	MS

R (Resistant) RMR (Resistant – Moderately Resistant) MR (Moderately Resistant) MRMS (Moderately Resistant – Moderately Susceptible) MS (Moderately Susceptible) MSS (Moderately Susceptible – Susceptible) S (Susceptible) SVS (Susceptible – Very Susceptible) VS (Very Susceptible) – indicates that a rating is not available T (Tolerant) TMT (Tolerant – Moderately Tolerant) MT (Moderately Tolerant) MTMI (Moderately Tolerant – Moderately Intolerant) MI (Moderately Intolerant) MII (Moderately Intolerant – Intolerant) I (Intolerant) IVI (Intolerant – Very Intolerant) VI (Very Intolerant)

*Wheat Quality Australia (WQA), www.wheatquality.com.au maximum classifications describe suitability for export markets and not always reflect the varietal preference of domestic millers. (Note: APH – Australian Prime Hard, AH – Australian Hard). Please refer to Grain Trade Australia, 2018/19 Grain Trading Standards, www.graintrade.org.au for more information.

* RLN tolerance – The root-lesion nematode (*P. thornei* & *P. neglectus*) tolerance ratings that appear in this sowing guide are based on field data collected in the northern grain region rather than national consensus ratings.

* RLN resistance – The Root lesion nematode (*P. thornei* and *P. neglectus*) resistance ratings that appear in this sowing guide are national consensus ratings based on glasshouse and field data collected from all Australian grain regions.

Black point will not cause a reduction in yield but may result in grain receiving a different classification. ! Information supplied by breeding company.

** Ratings separated by “/” denotes different responses to different pathotypes.

(S) Indicates a variety was scored as a susceptible reaction in some experiments.

p Provisional information. Disease and agronomic scores based on one year of data. RLN data relating to these varieties is based on less than four years of testing.

Table 2: Bread and durum wheats – varietal details.

Variety	Varietal information						Comments (as supplied by breeding companies)	
	Pedigree	End Point Royalties (EPR)	Grower to grower sales permitted	Licensee	Released by	EPR rate \$/tonne (GST exclusive)		Year of release
BREAD WHEATS								
Borlaug 100 ^{db}		✓	Yes	Rebel	Rebel	\$4.55	2018	Robust mid-season variety good with sodicity, nematodes, Yellow spot and lodging resistance.
Coolah ^{db}	EGA Gregory ^{db} /VQ2791/EGA Gregory ^{db}	✓	Yes	AGT	AGT	\$3.50	2016	Coolah ^{db} is regarded as a yield benchmark in the slow spring maturity group. As a replacement for EGA Gregory ^{db} it is slightly shorter in stature and has better lodging resistance. Combined with good foliar disease resistance Coolah ^{db} is a clear choice for late April/early May planting opportunities throughout Queensland and NSW.
DS Faraday ^{db}	EGA Gregory ^{db} /UQ01484/3*EGA Gregory ^{db}	✓	No	Seednet	Dow Seeds	\$4.25	2017	A good early season APH wheat with enhanced pre-harvest sprouting tolerances and a solid rust package.
EGA Gregory ^{db}	Pelsart/2*Batavia DH	✓	Yes	Pacific Seeds	EGA	\$2.10	2004	A good early season variety for paddocks with a history of root lesion nematodes.
Elmore CL Plus ^{db}	Janz*2/Wilg4/11A//Annuello	✓	No	AGT	AGT	\$3.55	2012	A mid spring variety, Elmore CL Plus ^{db} was the first Clearfield® Intervix® tolerant variety suitable for the northern region.
LG Gold ^{db}	Farak/Surco//05SW19	✓	No	Elders	Elders	\$3.00	2018	LG Gold ^{db} is an AH classification wheat variety best suited to the inner Darling Downs as well as northern and central NSW. It is well suited to late planting and has demonstrated superior yield maturity to Suntop ^{db} , LRPB Spitfire ^{db} and EGA Gregory ^{db} with an added maturity advantage. It has an excellent disease package and shows consistently high protein and test weight along with very low screenings.
LongReach Flanker ^{db}	EGA Gregory ^{db} //EGA Gregory ^{db} /Lang	✓	Yes	Pacific Seeds	LPB	\$4.25	2015	APH variety is well suited to Queensland with sound disease resistance.
LongReach Gauntlet ^{db}	Kukri/Sunvale	✓	No	Seednet	LPB	\$3.00	2012	Early to main season APH variety similar in maturity to Sunvale. Has good Yellow spot and RLN (<i>P. thornei</i>) resistance and a solid grain receivals package.
Longreach Hellfire ^{db}	EGA Gregory ^{db} /2*LPB05-2148	✓	No	Pacific Seeds	LPB	\$4.25	2019	Mid to quick-maturing main season APH variety with protein accumulation similar to LRPB Spitfire ^{db} . Good early vigour and RLN tolerance. Demonstrated performance under Crown rot pressure.
LongReach Lancer ^{db}	V184/Chara ^{db} /Chara ^{db} /3/Lang	✓	Yes	Pacific Seeds	LPB	\$4.25	2013	Slower-maturing APH spring wheat with a compact canopy, solid grain quality and rust packages.
LongReach Mustang ^{db}	EGA Gregory ^{db} /LPB1117	✓	Yes	Pacific Seeds	LPB	\$4.25	2017	Quick maturing APH variety with compact canopy and reliable grain quality. Good foliar and soil disease resistance combination with highly competitive yield.
LongReach Reliant ^{db}	LRPB Crusader ^{db} /EGA Gregory ^{db}	✓	Yes	Pacific Seeds	LPB	\$4.25	2016	An APH variety with excellent early vigour and low screenings and high test weight, well suited to main season planting windows throughout the Queensland cropping zone.
LongReach Spitfire ^{db}	Drysdale/Kukri	✓	Yes	Pacific Seeds	LPB	\$3.50	2011	APH variety well suited to Queensland conditions. Provides low screenings and high test weight and solid disease resistance.
LongReach Stealth ^{db}	LRPB Lancer ^{db} /Sunguard ^{db}	✓	No	Pacific Seeds	LPB	\$4.25	2020	A slow-spring maturing APH variety demonstrating excellent Crown rot resistance and the ability to maintain yield in tight finishes. Well suited to all Queensland production environments.
Mitch ^{db}	QT10422/ Giles	✓	Yes	AGT	AGT	\$3.25	2014	A mid – slow spring wheat with distinct adaptation to central and south-west Queensland regions. Mitch's ^{db} Crown rot tolerance belies its resistance rating and performs well in tough environments.
RGT Zanzibar (under licence		✓	No	Seed Force	RAGT Semences	\$4.00	2017	Red feed wheat, mid – slow spring maturity, suited to early planting and performs well in high-yielding environments. Has good Stripe rust resistance.
RockStar ^{db}	Mace ^{db} /IGW3119	✓	Yes	InterGrain	InterGrain	\$3.50	2019	Mid – slow spring AH variety. Good disease resistance including good RLN resistance with low screenings and high test weight.
SEA Condamine	UQ01800	✓	No	Seed Exchange Australia	UQ	\$3.00	2018	A tall, main season maturity variety in central Queensland, it has a short grain-filling period, large kernel size, low screenings and stiff straw.
Sunblade CL Plus ^{db}	RAC1664/2*Suntop ^{db}	✓	No	AGT	AGT	\$4.35	2020	The first Clearfield® Intervix® tolerant variety granted an APH classification. Sunblade CL Plus ^{db} is a mid spring variety that is suitable for the entire northern region. A replacement for Elmore CL Plus ^{db} .

Table 2: Bread and durum wheats – varietal details (continued).

Variety	Varietal information						Comments (as supplied by breeding companies)	
	Pedigree	End point royalties (EPR)	Grower to grower sales permitted	Licensee	Released by	EPR rate \$/tonne (GST exclusive)		Year of release
BREAD WHEATS								
Suncentral ^{db}	RAC1629/2*Suntop ^a	✓	Yes	AGT	AGT	\$3.60	2020	APH classified variety. Suncentral's ^{db} quick – mid spring maturity makes it uniquely suited to central and south-west Queensland. Suncentral ^a shares a lot of characteristics with Suntop ^{db} but is a quicker maturing variety and has a better physical grain package.
Sunchaser ^{db}	SUN6268/B1289F	✓	Yes	AGT	AGT	\$3.50	2019	An alternative for the popular variety Suntop ^{db} . Sunchaser ^{db} has a similar fit in terms of maturity and performance with improved characteristics of note. Good grain size and low screenings, moderately long coleoptile, improved Crown rot resistance and similar tolerance.
Sunflex ^{db}	QT13334/SUN574A	✓	Yes	AGT	AGT	\$3.60	2020	As a slow spring variety, Sunflex ^{db} is at the very slow end and is an option for early sowing situations throughout Queensland and NSW. Sunflex ^{db} has a shorter plant type, consistently large seed size and low screenings, as well as a moderately long coleoptile.
Sunlamb ^{db}	2*Baconora/Sunlin	✓	Yes	AGT	AGT	\$2.75	2015	Suitable for early April sowing. It differs from other dual-purpose wheats in that it is a spring wheat and does not have a strong vernalisation requirement. When planted early it has a long grazing period due to its unique combination of photoperiod sensitivity and cold responsiveness.
Sunmaster ^{db}	RAC1629/2*Suntop ^{db}	✓	Yes	AGT	AGT	\$3.60	2020	A mid spring variety with greatly improved performance compared with its major parent Suntop ^{db} . Sunmaster ^{db} has a similar adaptation pattern but is a shorter in stature plant type. A genuine replacement for Suntop ^{db} .
Sunmate ^{db}	Sunco/2*Pastor//SUN436E	✓	Yes	AGT	AGT	\$3.25	2014	Quick APH variety with similar maturity to LRPB Spitfire ^{db} . It has moderate resistance to RLN (<i>P. thornei</i>).
Sunmax ^{db}	CRW142.16/2*Sunzell	✓	Yes	AGT	AGT	\$3.50	2015	As a very slow spring variety, Sunmax ^{db} has shown its ability to maintain its maturity in all early sowing situations. Suited for mid-April sowing in southern Queensland and northern NSW.
Sunprime ^{db}	SUN445//EGA Gregory ^{db}	✓	Yes	AGT	AGT	\$3.50	2018	A quicker-maturing APH variety with higher, stable grain yield and good <i>P.thornei</i> tolerance.
Suntime ^{db}	SUN457A/SUN405B	✓	Yes	AGT	AGT	\$3.50	2015	An APH disease-resistant variety for sowing early in the season.
Suntop ^{db}	Sunco/2*Pastor//SUN436E	✓	Yes	AGT	AGT	\$3.25	2012	An APH variety, possessing a solid disease resistance package including an elevated level of tolerance to Crown rot infection.
Vixen ^{db}	Mace ^{db} /IGW3119	✓	Yes	InterGrain	InterGrain	\$3.50	2018	Quick – mid maturing AH variety with a good disease resistance package. It has a short-moderate plant height with a good grain quality package.
DURUM WHEATS								
DBA Aurora ^{db}	Tamaroi*2/Kalka//RH920318/Kalka//Kalka*2/Tamaroi	✓	No	SADGA	University of Adelaide	\$3.00	2014	A high-performing variety, particularly in south-east Qld zone which possesses good semolina and colour stability attributes.
DBA Bindaroi ^{db}	Caparoi ^{db} /261102	✓	To be advised	Seednet	NSWDPI	\$3.50	2017	Has lower screenings and good protein achievement. Better grain quality than Caparoi ^{db} , with higher semolina yellow colour compared to DBA Lillaro ^{db} . Best performer compared with all released durum varieties in DBA yield loss trials.
DBA Lillaro ^{db}	960273/980596	✓	To be advised	Seednet	NSWDPI	\$3.30	2015	A preferred variety by millers with the highest semolina yield, high yellow pigment, highest 1000 grain weight, lowest screenings compared with other released varieties. Medium early variety, around 2-3 days later than Jandaroi ^{db} . Performed well in Queensland NVT trials and is suited to dry seasons, including double cropping, with excellent protein achievement.
DBA Vittaroi ^{db}	200856/980990	✓	To be advised	Seednet	NSWDPI	\$3.30	2017	Recommended for irrigated cropping. Short stature and high tolerance to lodging combined with excellent grain protein achievement and grain and semolina quality under irrigated conditions relative to EGA Bellaroi. Higher semolina yellow colour compared with DBA Lillaro ^{db} . Achieves lower screenings.
Westcourt ^{db}	WID22209*WID22301	✓	Yes	AGT	AGT	\$3.50	2019	Westcourt ^{db} is a durum variety specifically bred to perform in the Northern durum growing region. It offers a dominant package of disease resistance, moderately long coleoptile and grain quality, including very low screenings and milling qualities similar to DBA Lillaro ^{db} .

AGT – Australian Grain Technologies, CSIRO – Commonwealth Scientific and Industrial Research Organisation, QDAF – Department of Agriculture and Fisheries, Queensland.

EGA – Enterprise Grains Australia, LRPB – LongReach Plant Breeders, NSWDPI – New South Wales Department of Primary Industries, SADGA – South Australian Durum Growers Association, SU – Sydney University Plant Breeding Institute.

UA – University of Adelaide, UQ – University of Queensland.

^{db}Varieties displaying this symbol are protected under the *Plant Breeders Rights Act 1994*. Unauthorised sale of seed of these varieties is an infringement under this Act.

WHEAT VARIETY YIELD PERFORMANCE

The following tables 3A to 3F contain wheat yield results for selected varieties within each NVT region in Queensland for the past five seasons. Data is presented (as a percentage) for each variety relative

to the mean trial yield for the location within each year. Varieties are listed in descending order of average yield over the period.

Table 3A: NVT Central Queensland – wheat early season 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	4.15	3.85	2.41	2.45	3.04
	No. trials	3	1	5	3	5
Mitch ^{db}	8				116	120
Coolah ^{db}	17	107	105	120	111	119
LRPB Flanker ^{db}	17	107	117	113	114	120
LRPB Stealth ^{db}	5					118
LRPB Reliant ^{db}	5					118
Coota ^{db}	5					114
EG Jet ^{db}	8				112	112
EGA Gregory ^{db}	17	104	115	106	110	113
Cutlass ^{db}	8				105	111
Sunflex ^{db}	8				118	113
LRPB Lancer ^{db}	17	97	106	108	113	108
DS Faraday ^{db}	13			101	101	107
LRPB Gauntlet ^{db}	17	97	110	99	106	101
Suntime ^{db}	17	97	97	103	106	101
Sunmax ^{db}	13			95	73	85

Table 3B: NVT Central Queensland – wheat main season 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	4.23	3.72	2.48	2.33	3.29
	No. trials	4	5	3	2	5
SEA Condamine	15		117	121	110	113
Sunblade CL Plus ^{db}	5					109
Suncentral ^{db}	5					106
Sunmaster ^{db}	5					107
Mitch ^{db}	19	106	105	115	94	106
LRPB Flanker ^{db}	19	107	107	112	95	103
LRPB Impala ^{db}	19	105	103	109	104	108
LRPB Reliant ^{db}	19	106	108	107	104	102
LRPB Hellfire ^{db}	7				107	105
Condo ^{db}	19	102	110	97	106	98
Suntop ^{db}	19	103	103	105	101	102
Sunprime ^{db}	10			99	107	100
Sunchaser ^{db}	7				106	100
LRPB Oryx ^{db}	8			93		100
EGA Gregory ^{db}	19	101	98	105	87	99
Scepter ^{db}	7				103	102
LRPB Mustang ^{db}	15		107	88	108	93
Elmore CL Plus ^{db}	19	97	95	99	98	100
LRPB Spitfire ^{db}	19	96	95	94	97	97
EG Jet ^{db}	11	95			87	98
LRPB Gauntlet ^{db}	19	92	91	91	89	92

Legend: Annual variety yield performance

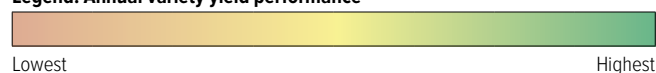


Table 3C: NVT South-East Queensland – wheat early season 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	4.05	5.39	2.05	2.01	3.19
	No. trials	2	2	2	1	2
Coota ^{db}	2					106
LRPB Reliant ^{db}	2					108
Sunflex ^{db}	3				133	110
Coolah ^{db}	9	108	108	108	109	106
Sunmax ^{db}	9	106	112	110	118	94
Mitch ^{db}	9	105	106	108	112	107
RGT Zanzibar	7		116	109	124	76
Cutlass ^{db}	3				109	102
LRPB Stealth ^{db}	2					108
EG Jet ^{db}	5			107	113	104
LRPB Flanker ^{db}	9	109	103	98	88	107
DS Faraday ^{db}	5			95	82	103
EGA Gregory ^{db}	9	106	100	96	85	105
Suntime ^{db}	9	96	98	103	108	101
Suntop ^{db}	9	98	94	97	100	100
LRPB Lancer ^{db}	9	97	93	96	97	101
LRPB Gauntlet ^{db}	9	97	88	87	80	98

Table 3D: NVT South-East Queensland – wheat main season 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.79	5.61	1.99	2.58	2.24
	No. trials	2	2	1	1	1
Sunblade CL Plus ^{db}	1					113
Mitch ^{db}	7	105	111	112	112	99
SEA Condamine	5		112	113	96	101
Borlaug ^{db} 100	3			114	100	103
Suncentral ^{db}	1					119
LRPB Flanker ^{db}	7	111	107	96	104	92
LRPB Reliant ^{db}	7	113	103	106	100	101
Scepter ^{db}	2				106	111
LRPB Hellfire ^{db}	2				102	111
Suntop ^{db}	7	105	103	117	102	102
DS Faraday ^{db}	5	111		92	106	83
Buchanan ^{db}	7	104	109	103	92	98
Sunchaser ^{db}	2				100	109
DS Tull ^{db}	3			114	97	103
Sunmaster ^{db}	1					111
LRPB Impala ^{db}	7	96	106	104	103	109
Sunprime ^{db}	3			105	101	112
EG Jet ^{db}	4	96			114	99
EGA Gregory ^{db}	7	108	103	90	105	83
Condo ^{db}	7	102	100	107	96	104
Coota ^{db}	1					99
LRPB Mustang ^{db}	5		95	100	100	117
Elmore CL Plus ^{db}	7	96	99	98	103	102
LRPB Oryx ^{db}	4		98	92		118
LRPB Gauntlet ^{db}	7	99	95	91	101	88
LRPB Spitfire ^{db}	7	93	96	100	93	89

Table 3E: NVT South-West Queensland – wheat early season 2015–19.

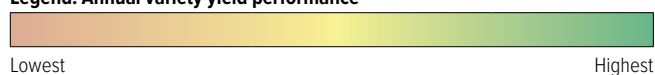
Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.39	4.69	1.87	2.8	1.24
	No. trials	9	5	8	2	3
Coolah ^{db}	27	113	110	118	109	111
Mitch ^{db}	27	110	108	118	106	117
LRPB Flanker ^{db}	27	116	104	116	104	102
Cutlass ^{db}	5				110	110
Coota ^{db}	3					112
LRPB Reliant ^{db}	3					112
EGA Gregory ^{db}	27	110	100	110	99	97
LRPB Stealth ^{db}	3					114
Suntop ^{db}	27	108	101	103	107	119
DS Faraday ^{db}	13			106	103	90
LRPB Lancer ^{db}	27	105	98	103	101	115
Sunmax ^{db}	27	97	109	94	115	88
LRPB Gauntlet ^{db}	27	106	94	95	102	106
Suntime ^{db}	27	96	100	101	97	109
Sunflex ^{db}	5				83	111

Table 3F: NVT South-West Queensland – wheat main season 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.29	4.44	1.93	2.05	1.2
	No. trials	8	8	8	3	3
Borlaug 100 ^{db}	14			114	118	108
Sunblade CL Plus ^{db}	2					112
SEA Condamine	22		112	111	116	106
Suncentral ^{db}	2					117
LRPB Reliant ^{db}	30	109	106	113	118	102
Mitch ^{db}	30	98	116	104	108	101
Suntop ^{db}	30	106	108	107	105	105
Sunchaser ^{db}	6				106	108
Condo ^{db}	30	107	105	106	105	109
LRPB Hellfire ^{db}	6				103	108
LRPB Flanker ^{db}	30	100	109	105	117	93
LRPB Mustang ^{db}	22		101	109	103	114
Sunprime ^{db}	14			107	102	111
Sunmaster ^{db}	2					109
Scepter ^{db}	6				102	104
DS Faraday ^{db}	14			101	116	86
DS Tull ^{db}	14			102	100	105
LRPB Impala ^{db}	30	98	104	99	95	106
EGA Gregory ^{db}	30	95	103	99	112	85
EG Jet ^{db}	14	90			92	99
Coota ^{db}	2					95
Elmore CL Plus ^{db}	30	96	98	96	92	99
LRPB Oryx ^{db}	19		98	95		113
LRPB Spitfire ^{db}	30	98	94	92	92	95
LRPB Gauntlet ^{db}	30	94	95	93	97	90

Legend: Annual variety yield performance

BARLEY

KEY POINTS

New and recently released varieties available for sowing

- NEW - Beast[®], a high-yielding feed barley from AGT
- NEW - Laperouse[®], a mid-season maturing variety available through Seednet
- NEW - Maximus CL[®], an early to mid-season variety from InterGrain available through Seednet
- LG Alestar[®], a medium to long-season variety available through Elders
- Leabrook[®], an earlier-maturing variety from University of Adelaide available through Seednet

Newly accredited varieties

- RGT Planet[®], has been granted malt accreditation by MBIBTC

Varieties under malt evaluation

- LG Alestar[®], undergoing stage 2 malt evaluation in 2020
- Banks[®], failed Stage 2 malt evaluation assessment.
- Leabrook[®], undergoing stage 2 malt evaluation in 2020
- Laperouse[®], undergoing stage 1 malt evaluation.
- Maximus CL[®], undergoing stage 2 malt evaluation in 2020

MARKETING BARLEY

Large, plump, bright-coloured grain with high test weight is preferred for both the malt and livestock industries. Price dockages will be incurred if grain does not meet specifications. Barley trading standards can be accessed at www.graintrade.org.au

WILL YOU BE DELIVERING BARLEY THIS HARVEST?

If you did not deliver barley last harvest, you may not be aware that Grain Trade Australia (GTA) has changed the name of feed barley grades from Feed 1 Barley to Barley 1. GTA took this action in recognition that feed barley is often used for human consumption in some export markets. There are no changes in specifications of the grade; it is simply a name change and has had no impact on segregation or price.

MALTING BARLEY

In Queensland, domestic and export brewing demand is rated as medium for Commander[®], Compass[®] and Westminster[®]. Malt is made from premium-quality barley and provides the characteristic flavours, aromas and colours that beer drinkers are familiar with and also contributes to the whole brewing process (along with water, hops and yeast).

DISEASE CHARACTERISTICS

Leaf diseases

Powdery mildew

Although Powdery mildew is often present in susceptible barley varieties, the disease seldom causes grain yield losses above 10 to 15 per cent.

Leaf rust and Stem rust

Leaf rust and Stem rust can cause significant loss of grain yield in excess of 50 per cent, especially in wetter environments and later sowings. Epidemics of Stem rust have been rare in recent years, but Leaf rust has been a persistent problem. Crops of varieties rated MS or above should be regularly monitored from mid-elongation for the presence of Leaf rust. If present, it is likely to appear on older leaves as small brown pustules or small green dots in senescing leaf tissue. Varieties rated S to VS should be sprayed once the disease is detected. In favourable seasons, fungicide application may be warranted in varieties with levels of resistance less than MR.

Stripe rust

Barley stripe rust ratings have not been included in the disease table as this disease is not currently present in Australia. However, some barley varieties can be infected by Barley grass stripe rust and even Wheat stripe rust. Introduction of true Barley stripe rust poses a serious threat to the industry. Growers should monitor crops and any suspicious lesions should be collected and sent to the Australian Cereal Rust Survey, PBI, Private Bag 4011, Narellan 2567.

Net blotch

There are two forms of Net blotch: the spot form and the net form. As the common names suggest, spot form is seen as dark brown to black round to oval spots, while net form is more likely to occur as brown elongated lesions or stripes. Both forms survive on infested barley stubble, while net form can also be seed borne. Growers need to be aware if grain is infected as this can introduce the disease to clean areas. Seed treatments are available. Leaves can be infected by both forms of the pathogen at the same time.

Head and root diseases

Head blight

Head blight can be caused by several *Fusarium* species or *Eutiarosporella*. Spores are stubble borne and infection usually occurs following wet conditions at and shortly after head emergence.

Loose smut

Barley varieties that have Hindmarsh[®] in their pedigree are more susceptible to Loose smut. Control is achieved by applying a registered seed dressing at sowing.

Covered smut

Covered smut is seed and soil borne. Contaminated grain is not usually accepted by end-users unless at a heavy discount. Control is by using a recommended seed dressing.

Black point

Black point is a brown-black discolouration at the germ end of wheat and barley caryopsis. In barley, Black point appears mainly in the lemma and palea tissue (glume) and in severe cases discolouration can also occur in the testa. Black point is a physiological response to a certain set of environmental conditions such as heavy morning dews, rainfall and high humidity.

Crown rot

Crown rot survives for several seasons on decaying stubble from host cereal crops and from grass weeds in non-host crops. Infection of the stem bases of a young crop is high with a wet autumn/winter, but above-ground symptoms are normally only seen when the plant undergoes water stress at the end of the season. Barley crops do not usually display the typical 'white heads' that are seen in infected wheat crops.

Root lesion nematodes (RLN)

RLN are widespread in the northern grain region and can significantly reduce grain yields. RLN is also hosted by many non-cereal crops; the absence of a winter cereal crop in recent seasons does not mean there are low levels of nematodes in the soil. Barley is considered more tolerant than most wheats, yet significant yield losses can occur in some varieties. A soil test should be considered before planting if you do not know the species or levels on your farm.

If barley is to be sown in nematode-infested soil, the tolerant varieties (listed as T, TMT or MT and highlighted in green) should be considered for best yield. Choose a variety that has a higher resistance rating to maximise yield and leave fewer nematodes in the soil to attack the next crop. The response of a barley variety may differ between the two species of RLN, *Pratylenchus thornei* and *Pratylenchus neglectus* (Table 4).

Insects

Malting barley can only be treated with specific grain protectants for control of insects. Check with all potential end-users to ensure that a particular insecticide is acceptable.

Table 4: Barley disease and agronomy ratings.

Variety	Root lesion nematode				Crown rot	Common root rot	Black point	Leaf rust	Leaf scald	Net blotch		Powdery mildew
	<i>P. thornei</i>		<i>P. neglectus</i>							Net form™	Spot form	
	resistance†	tolerance*	resistance†	tolerance*								
Banks [Ⓓ]	MR	TMT	MRMS	MII	MSS	MSS	MS	S	MSS	MS	MSS	MRMS/S
Beast [Ⓓ]	–	–	–	–	–	S	MSS	MRMS _p	SVSp	MRMS/SVSp	MR	MSS _p
Commander [Ⓓ]	MRMS	MT	MRMS	MT	S	MSS	MSS	S	VS	MSS	MS	MRMS/S
Compass [Ⓓ]	MR	TMT	MRMS	T	S	MS	MSS	VS	SVS	MRMS/MSS	MRMS	MRMS/S
Fathom [Ⓓ]	MR	MT	MRMS	-	S	MSS	MSS	MRMS	S	MRMS/S	RMR	MRMS/S
GrangeR [Ⓓ]	MRMS	MTMI	MRMS	MII	SVS	S	MS	MRMS	VS	MRMS/SVS	SVS	RMR
Laperouse [Ⓓ]	RMR	MII	MR	MI	S	MSS	MSS	SVS	VS	MS/SVS	MR	MRMS/S
La Trobe [Ⓓ]	MRMS	MT	MRMS	MT	SVS	S	MSS	MSS	MRMS/VS	MS	SVS	MRMS/SVS
Leabrook [Ⓓ]	RMR	TMT	MR	MTMI	S	MS	MSS	SVS	VS	MRMS	MRMS	MRMS/S
LG Alestar [Ⓓ]	MR	MTMI	MR	MII	S	MSS	MRMS	MS	SVS	MR/S	MSS	RMR
Maximus CL [Ⓓ]	MRMS	I	MRMS	-	MSS _p	S	MSS	MSS	S	MRMS	MRMS	S
RGT Planet [Ⓓ]	MR	I	MRMS	MT	MSS	MSS	MRMS	MRMS	S	S/MRMS	S	R
Rosalind [Ⓓ]	MR	T	MRMS	MT	MSS	S	MSS	MR	S	MRMS	MS	MRMS/SVS
Shepherd [Ⓓ]	MSS	MI	MRMS	MI	MSS	MSS	MRMS	MRMS	SVS	SVS/MSS	S	S
Spartacus CL [Ⓓ]	MRMS	MI	MRMS	MI	S	MS	MSS	MSS	VS	MS	SVS	MRMS/SVS

Legend

R = Resistant
 RMR = Resistant to moderately resistant
 MR = Moderately resistant
 MRMS = Moderately resistant to moderately susceptible
 MS = Moderately susceptible
 MSS = Moderately susceptible to susceptible
 S = Susceptible
 SVS = Susceptible to very susceptible
 VS = Very susceptible
 T = Tolerant
 TMT = Tolerant to Moderately tolerant
 MT = Moderately tolerant
 MTMI = Moderately tolerant to moderately intolerant
 MI = Moderately intolerant
 MII = Moderately intolerant to intolerant
 I = Intolerant
 IVI = Intolerant to very intolerant
 VI = Very intolerant
 – indicates that a rating is not available.

* RLN tolerance – The Root lesion nematode (*P. thornei* and *P. neglectus*) tolerance ratings that appear in this guide are based on field data collected in the northern grain region rather than national consensus ratings.

† RLN resistance – The Root lesion nematode (*P. thornei* and *P. neglectus*) resistance ratings that appear in this planting guide are national consensus ratings based on glasshouse and field data collected from all Australian grain regions.

** In this column, ratings separated by “/” denotes different responses to different pathotypes.

p RLN data relating to these varieties is based on less than four years of testing and is to be considered provisional information.

Table 5: Barley – varietal details.

Variety	Varietal information						Comments (as supplied by breeding companies)
	End point royalties (EPR)	Grower to grower sales permitted	Variety owner*	Year of release	Royalty manager, EPR collector	EPR Rate \$/tonne (GST exclusive)	
Banks [Ⓛ]	✓	Yes	InterGrain	2019	InterGrain	\$4.00	Variety failed stage 2 evaluation in 2019, not granted malting accreditation.
Beast [Ⓛ]	✓	Yes	AGT	2020	AGT	\$4.00	A feed barley line with particular adaptation to low to moderate rainfall environments. Beast [Ⓛ] demonstrates excellent grain size (low screenings) and high retention rates. A Compass [Ⓛ] plant-type with similar adaptation and biomass production.
Commander [Ⓛ]	✓	No	University of Adelaide	2008	Seednet	\$3.80	Malt variety suited to domestic and export markets [Ⓛ] . Can lodge if sown too early and in high-yielding situations. Rated susceptible to net form of Net blotch.
Compass [Ⓛ]	✓	No	University of Adelaide	2013	Seednet	\$3.80	Malt accredited variety suited to domestic and export markets. Earlier flowering compared with Commander [Ⓛ] with large grain size, low screenings and high retention. Can lodge if sown too early and in high-yielding situations. Rated VS to leaf rust.
Fathom [Ⓛ]	✓	No	University of Adelaide	2012	Seednet	\$2.00	Feed grade variety with large grain size and long coleoptile length. Good resistance to spot form Net blotch. Rated susceptible to net form of Net blotch.
GrangeR [Ⓛ]	✓	Yes, WA only	Nickerson	2013	Barenbrug	\$2.95	Malt accredited variety. Medium to late maturity. Susceptible to Shepherd strain of net form of Net blotch and SVS to spot form Net blotch.
Laperouse [Ⓛ]	✓	To be advised	Secobra	2020	Seednet	\$3.80	Laperouse [Ⓛ] is a mid-season variety and has undergone preliminary trial work that indicates its phenology could be better suited to early sowing times than other spring varieties. It has good yield, grain size with lower screenings and a good disease resistance package, particularly improvements in Net blotches, and very good straw strength. Currently in year 1 of malt barley evaluation.
La Trobe [Ⓛ]	✓	Yes	InterGrain	2013	Syngenta	\$4.00	Malt accredited variety suited to the export trade. A semi-dwarf variety, avoid deep sowing due to shorter coleoptile length. Susceptible to spot form of Net blotch and Powdery mildew.
Leabrook [Ⓛ]	✓	No	University of Adelaide	2019	Seednet	\$3.80	Leabrook [Ⓛ] is a mid-early maturing, medium-tall variety under malting evaluation, with stage 2 evaluation carried over to 2020. A variety with similar large grain size and lower screenings compared with Compass [Ⓛ] . Good resistance and tolerance to root lesion nematodes.
LG Alestar [Ⓛ]	✓	No	Limagrain	2019	Elders	\$3.00	Insufficient grain quantity available to complete malting assessment hence carried over to complete in 2020.
Maximus CL [Ⓛ]	✓	NA	InterGrain	2020	Seednet	\$4.25	Early to mid-flowering, feed and potential malt, imidazoline-tolerant barley. Undergoing stage 2 evaluation in 2020.
RGT Planet [Ⓛ]	✓	No	RAGT Semences	2017	Seed Force Semences	\$4.00	Malt accredited variety. Yielded well in the NVT series. Susceptible to both forms of Net blotch.
Rosalind [Ⓛ]	✓	No	InterGrain	2015	Syngenta	\$3.50	Feed grade variety. Avoid deep sowing due to shorter coleoptile length. Rated VS to Powdery mildew.
Shepherd [Ⓛ]	✓	No	QDAF	2008	Seednet	\$2.30	Feed grade variety, tall, with long coleoptile. Susceptible to Powdery mildew and SVS to both forms of Net blotch.
Spartacus CL [Ⓛ]	✓	No	InterGrain	2016	Syngenta	\$4.25	Malt accredited, semi-dwarf, Clearfield® tolerant variety. Avoid deep sowing due to shorter coleoptile. Susceptible to spot form of Net blotch and Powdery mildew.

◆ QDAF – Queensland Department of Agriculture and Fisheries, AGT – Australian Grain Technologies.

[Ⓛ] www.barleyaustralia.com.au

([Ⓛ]) Varieties displaying this symbol are protected under the *Plant Breeder's Rights Act 1994*. Unauthorised sale of seed of these varieties is an infringement under this Act.

BARLEY VARIETY YIELD PERFORMANCE

Tables 6A to 6C contain barley yield results for selected varieties within each NVT region in Queensland for the past five seasons. Data is presented (as a percentage) for each variety relative to the mean trial yield for the location within each year. Varieties are listed in descending order of average yield over the period.

Table 6A: NVT Central Queensland – barley 2015, 2017, 2018 and 2019.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2017	2018	2019
	Mean yield t/ha	3.92	1.45	2.42	3.49
	No. trials	2	2	2	2
Leabrook ^{db}	8	112	122	115	123
Beast ^{db}	2				123
Compass ^{db}	8	110	111	110	115
Banks ^{db}	8	107	115	110	109
RGT Planet ^{db}	6		108	108	116
Commander ^{db}	8	105	112	103	109
Oxford	8	98	112	105	109
Rosalind ^{db}	8	102	92	99	108
Laperouse ^{db}	4			97	109
GrangeR ^{db}	4	99			104
Fathom ^{db}	8	102	92	98	99
Shepherd ^{db}	8	100	102	99	96
La Trobe ^{db}	8	100	88	98	98
Grout ^{db}	8	100	98	101	90
Hindmarsh ^{db}	8	98	76	92	95
Maximus CL ^{db}	2				92
Scope CL ^{db}	6		88	91	83
Spartacus CL ^{db}	8	96	75	90	88

NB: There is no yield data available for 2016.

Legend: Annual variety yield performance

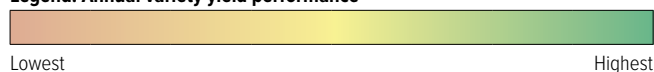


Table 6B: NVT South-East Queensland – barley 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.83	6.66	2.57	2.44	1.91
	No. trials	2	1	1	1	2
Leabrook ^{db}	7	115	104	107	110	121
Beast ^{db}	2					124
Compass ^{db}	7	111	98	101	104	125
RGT Planet ^{db}	5		116	119	98	96
Rosalind ^{db}	7	105	108	103	97	116
Laperouse ^{db}	3				103	115
Commander ^{db}	7	110	98	99	118	100
Banks ^{db}	7	105	98	103	101	112
Bottler ^{db}	3				98	99
Fathom ^{db}	7	102	98	92	95	122
Oxford	7	100	114	117	106	74
GrangeR ^{db}	7	101	105	109	103	89
La Trobe ^{db}	7	98	98	98	87	117
LG Alestar ^{db}	7	99	105	105	102	88
Hindmarsh ^{db}	7	97	97	97	86	115
Maximus CL ^{db}	2					119
Shepherd ^{db}	7	100	96	94	104	100
Spartacus CL ^{db}	7	93	97	91	82	118
Grout ^{db}	7	93	93	91	86	114
Flinders ^{db}	7	92	101	99	93	90
Bass ^{db}	7	92	99	92	94	95
Scope CL ^{db}	7	92	91	85	95	101

Table 6C: NVT South-West Queensland – barley 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	4.26	4.35	1.38	3.18	2.32
	No. trials	1	2	2	1	1
Beast ^{db}	1					118
RGT Planet ^{db}	6		119	108	106	105
Leabrook ^{db}	7	116	102	117	112	112
Rosalind ^{db}	7	113	109	108	105	106
Compass ^{db}	7	117	97	121	110	119
Laperouse ^{db}	2				108	107
Hindmarsh ^{db}	7	112	102	115	101	118
La Trobe ^{db}	7	108	102	116	100	119
Banks ^{db}	7	105	99	115	105	115
Bottler ^{db}	2				102	109
Spartacus CL ^{db}	7	105	102	108	95	114
Fathom ^{db}	7	109	99	107	100	109
GrangeR ^{db}	2	100				97
Oxford	5	90		88	101	84
Maximus CL ^{db}	1					106
Grout ^{db}	7	95	96	109	94	115
LG Alestar ^{db}	7	96	105	92	99	91
Commander ^{db}	7	107	92	94	106	89
Shepherd ^{db}	7	97	94	93	98	94
Bass ^{db}	7	84	99	86	90	91
Scope CL ^{db}	7	92	90	90	92	95

CHICKPEA

KEY POINTS

New and recently released varieties available for sowing

- NEW - CBA Captain[®], a mid-early maturity desi variety with good pod height and low lodging
- PBA Drummond[®], an early to mid maturing, tall, erect variety. NVT trial results now available for south-east Queensland.

INTRODUCTION

There are two groups of chickpeas, desi and kabuli, mainly distinguished by seed size, shape and colour.

The two types have different production requirements, markets and end-uses. Most Australian chickpea (desi type) production is in northern Australia and nearly all the grain is exported. The main market for desi chickpea is India and Pakistan, and to Indian communities in other parts of the world such as Britain and Western Canada. Buyers in India and Pakistan prefer larger, light-coloured desi grain.

Temperature, day length and drought are the three major factors affecting flowering in chickpea. Temperature is generally more important than day length. Flowering and pod set require an average daily temperature of 15°C and cool wet conditions at flowering can adversely affect pod and seed set. Flowering is invariably delayed under low temperatures, but more branching occurs.

INOCULATION

All seed should be treated with Group N chickpea inoculant just before sowing. Inoculation should occur for every chickpea crop, every year, regardless of cropping history or soil type, to ensure nodulation.

DISEASE CHARACTERISTICS

Leaf diseases

Fungal disease control is geared around protection rather than curing. The first fungicide spray must be applied as early as necessary to minimise the spread of the disease. Additional sprays are required if the weather conditions favour the disease. Timing of fungicide sprays is critical. As *Ascochyta* and *Botrytis* can spread rapidly, do not delay spraying. A spray in advance of a rainy period is most desirable.

Ascochyta blight

Chickpeas can be infected by *Ascochyta* blight at several growth stages. *Ascochyta* inoculum can be found as infected chickpea stubble, internally infected seed, externally infected seed (due to contamination by affected residue) and infected volunteer chickpea plants growing over summer. Variety disease ratings for *Ascochyta* blight, which appear in Table 7, are based on northern Australia results. Avoid planting chickpea in the same paddock for at least three years or next to last year's chickpea crop.

In seasons of high *Ascochyta* pressure, a reactive foliar fungicide program is required. Monitor the crop 10–14 days after each rain event and if *Ascochyta* is detected, consult your agronomist.

Botrytis grey mould

Botrytis grey mould is an airborne foliar disease present when temperatures are rising, usually above 15°C, and canopy closure is likely.

A registered fungicide seed dressing is highly recommended for early control of seedling root rots, seed-transmitted *Ascochyta* blight and *Botrytis* seedling disease. Monitor for *Botrytis* grey mould in spring as temperatures and humidity rise. Apply a fungicide containing either carbendazim or mancozeb once *Botrytis* grey mould has been identified within the crop.

Root diseases

Phytophthora root rot

Phytophthora root rot is a soil and water-borne disease that can establish in any paddock regardless of soil type. Monitor paddocks for affected areas and avoid these if possible, as well as avoiding areas that have had pasture legumes (medics and lucerne) and areas that may become water-logged. A soil test should be carried out on all paddocks before sowing to ascertain the range and levels of disease present.

Root lesion nematodes (RLN)

These nematodes are widespread in the northern grain region and can significantly reduce grain yields. RLN is also hosted by many non-cereal crops, so the absence of a winter cereal crop in recent seasons does not mean there are low levels of nematodes in the soil. A soil test should be considered before planting if you do not know the species or its levels on your farm. Choose a variety that has a higher resistance rating to maximise yield and leave fewer nematodes in the soil to attack the next crop. The reaction of a chickpea variety may differ to the two species of RLN, *Pratylenchus thornei* and *Pratylenchus neglectus*. Refer to Table 7.

INTEGRATED DISEASE MANAGEMENT

This is a summary of strategies for integrated disease management of chickpea crops.

- Variety selection is critical. Choose varieties that best address your paddock disease status, especially in regard to Ascochyta.
- Paddock isolation from chickpea stubble is a high priority (greater than 500 metres).
- Paddock history. Aim for a break of at least four years between chickpea crops.
- Seed source. Use seed from a paddock where disease was not detected and check germination and vigour.
- Fungicide seed dressing is effective and should be used, especially in high disease risk situations.
- Sowing date. Do not sow too early, even with an Ascochyta-resistant variety.
- Sowing depth. If using an Ascochyta-susceptible variety, sow deeper than normal.
- Sowing rate. Aim for 35 to 50 plants per square metre, depending on the situation and crop type.

- Foliar fungicides. Ascochyta-resistant varieties still require foliar fungicide at podding. Success is dependent on monitoring, timeliness of spraying and correct fungicide choice. Early detection and correct disease identification are essential.
- Manage aphids and virus. Ground surface cover, healthy plants and crop canopy are important. Control aphids at their source (host) crop.
- Harvest management. Harvest early to minimise disease infection of seed. Crop desiccation enables even earlier harvest.

DESICCATION

Desiccation can occur in chickpea crops when 80–85% of pods have turned from green to yellow-brown and 90 per cent of seed has begun to lighten in colour (indicating physiological maturity).

For more information, consult www.pulseaus.com.au

Table 7: Chickpea – disease ratings.

Variety	Root lesion nematode				Ascochyta blight (1)	Phytophthora root rot (2)	Botrytis grey mould (3)	Virus (4)
	<i>P. thornei</i>		<i>P. neglectus</i>					
	resistance [†]	tolerance [*]	resistance [†]	tolerance [*]				
CBA Captain [Ⓛ]	MS _p	MT	RMR _p	-	MS	MR	-	-
Jimbour	MS _p	MTMI _p	MR _p	-	S	S	S	S
Kyabra [Ⓛ]	MSS _p	TMT _p	MRMS _p	-	VS	S	S	S
Moti [Ⓛ]	MRMS _p	MI _p	RMR _p	-	VS	S	S	S
PBA Boundary [Ⓛ]	MRMS	TMT _p	RMR _p	-	MS	VS	S	S
PBA Drummond [Ⓛ]	MRMS _p	MTMI _p	MR _p	-	S	S	S	MS
PBA HatTrick [Ⓛ]	MRMS	MT _p	MRMS _p	-	MS	MR	S	S
PBA Pistol [Ⓛ]	MS	lp	RMR _p	-	VS	S	S	S
PBA Seamer [Ⓛ]	MRMS	MT _p	MRMS _p	-	MR	MR	S	S

Source: NVT chickpea national disease ratings.

Legend:

R = Resistant
 RMR = Resistant to moderately resistant
 MR = Moderately resistant
 MRMS = Moderately resistant to moderately susceptible
 MS = Moderately susceptible
 MSS = Moderately susceptible to susceptible
 S = Susceptible
 SVS = Susceptible to very susceptible
 VS = Very susceptible
 T = Tolerant
 TMT = Tolerant to moderately tolerant
 MT = Moderately tolerant
 MTMI = Moderately tolerant to moderately intolerant
 MI = Moderately intolerant
 MI_p = Moderately intolerant to Intolerant
 I = Intolerant
 VI = Intolerant to very intolerant
 VI = Very intolerant,
 – indicates that a rating is not available.

* RLN tolerance – The root lesion nematode (*P. thornei* and *P. neglectus*) tolerance ratings that appear in this guide are based on field data collected in the northern grain region rather than national consensus ratings.

† RLN resistance – The root lesion nematode (*P. thornei* and *P. neglectus*) resistance ratings that appear in this guide are national consensus ratings based on glasshouse and field data collected from all Australian grain regions.

_p RLN data relating to these varieties is based on less than four years of testing and is considered to be provisional information.

(1) Ascochyta ratings are for northern Australia only.

(2) Ratings are a compilation of NSW (Tamworth) and Queensland (Warwick) data.

(3) The risk of Botrytis grey mould (BGM) damage can be affected by the spray programs for Ascochyta blight (AB); fungicides used to control Ascochyta can also control Botrytis. Note that if BGM risk is high, then a fungicide with greater efficacy for BGM than for AB might also be needed. BGM screening is conducted in a controlled environment and rating is independent of plant architecture.

(4) Virus ratings could change with different virus species predominating in different areas.

Table 8: Chickpea – varietal details.

Variety	Varietal information						Comments (as supplied by breeding companies)
	End point royalties (EPR)	Grower to grower sales permitted	Variety owner*	Royalty manager, EPR collector	EPR rate \$/tonne (GST exclusive)	Year of release	
CBA Captain [Ⓛ]	✓	No	NSWDPI/GRDC	NSWDPI	\$4.50	2020	An erect, early to mid maturity, medium height variety with broad adaptation. Yellow-brown seed coat and angular seed shape. Good pod height and low lodging.
Jimbour			QDAF/NSWDPI	None	Nil	2001	Older variety susceptible to all three diseases (AB, PRR, BGM). Tall, erect, lodging resistant. No EPR.
Kyabra [Ⓛ]			QDAF/NSWDPI	Heritage Seeds	Nil	2005	Tall, erect variety with large seed size and susceptible to all three diseases (AB, PRR, BGM). Lodging resistant, bred for Southern Queensland but performs well in Central Queensland as well. Amethyst/Norwin/Barwon cross. Seed royalty applies. No EPR.
Moti [Ⓛ]	✓	No	DAFWA	Seednet	\$2.50	2003	WA bred line, tall, erect variety evaluated and released in Central Queensland with no disease resistance. Lodging resistant.
PBA Boundary [Ⓛ]	✓	No	PBA	Seednet	\$4.00	2011	Moderately susceptible to Ascochyta blight but susceptible to Phytophthora root rot. Tall, erect, lodging resistant and bred for Southern Queensland. Jimbour cross.
PBA Drummond [Ⓛ]	✓	No	PBA	Seednet	\$4.50	2018	Tall, erect variety evaluated and released in Central Queensland with limited Ascochyta blight resistance. Lodging resistant. PBA HatTrick [Ⓛ] x PBA Pistol [Ⓛ] cross.
PBA HatTrick [Ⓛ]	✓	No	PBA	Seednet	\$4.00	2009	Moderate susceptibility to Ascochyta blight and moderate resistance to Phytophthora root rot. Bred for southern Queensland. A cross involving Jimbour.
PBA Pistol [Ⓛ]	✓	No	PBA	Seednet	\$4.00	2011	PBA Pistol [Ⓛ] was released as a Moti [Ⓛ] replacement. It is taller, more resistant to lodging offering improved harvestability and large seed size. PBA Pistol [Ⓛ] must not be grown south of Theodore/Rolleston due to its susceptibility to Ascochyta blight. Evaluated and released in Central Queensland and susceptible to all three diseases. Lodging resistant. A Moti [Ⓛ] cross.
PBA Seamer [Ⓛ]	✓	No	PBA	Seednet	\$4.00	2016	Most resistant variety to all three diseases. Semi-erect plant type, lodging resistant with improved seed quality. PBA HatTrick [Ⓛ] cross, bred for Southern Queensland conditions.

♦ DAFWA – Department of Agriculture and Food, Western Australia
 NSWDPI – New South Wales Department of Primary Industries
 PBA – Pulse Breeding Australia
 CBA – Chickpea Breeding Australia
 QDAF – Queensland Department of Agriculture and Fisheries

Ⓛ Varieties displaying this symbol are protected under the *Plant Breeder's Rights Act*. Unauthorised sale of seed of these varieties is an infringement under this Act.

Table 9A: NVT Central Queensland – chickpea desi 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.35	2.62	2.2	1.98	1.93
	No. trials	2	3	4	3	2
PBA Drummond [Ⓢ]	14	111	112	110	116	110
CBA Captain [Ⓢ]	12	107	106	105	108	106
PBA Seamer [Ⓢ]	14	100	101	102	102	102
PBA Pistol [Ⓢ]	14	107	101	101	92	109
Kyabra [Ⓢ]	14	102	98	95	98	97
PBA HatTrick [Ⓢ]	14	98	97	97	96	98

Table 9B: NVT South-East Queensland – chickpea desi 2015–19.

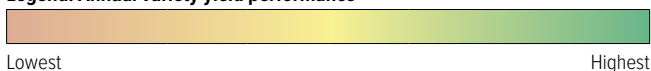
Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.27	3.22	1.95	1.95	1.45
	No. trials	3	2	3	1	3
PBA Drummond [Ⓢ]	4				109	109
CBA Captain [Ⓢ]	12	106	105	109	104	106
PBA Boundary [Ⓢ]	12	102	95	104	98	104
Kyabra [Ⓢ]	12	100	95	106	98	103
PBA Seamer [Ⓢ]	12	100	103	98	101	99
Jimbour	12	99	92	102	96	101
PBA HatTrick [Ⓢ]	12	98	95	98	97	99

Table 9C: NVT South-West Queensland – chickpea desi 2015–19.

Long-term predicted grain yield expressed as a percentage of mean yield.

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.26	3.08	1.25	1.56	0.52
	No. trials	4	2	3	3	1
PBA Drummond [Ⓢ]	4				110	106
CBA Captain [Ⓢ]	13	106	108	111	105	105
PBA Boundary [Ⓢ]	13	102	101	102	101	104
Kyabra [Ⓢ]	13	98	104	107	104	71
PBA Seamer [Ⓢ]	13	102	99	98	99	112
Jimbour	13	98	98	100	100	91
PBA HatTrick [Ⓢ]	13	97	96	95	98	99

Legend: Annual variety yield performance

NOTES

INTRO

WHEAT

BARLEY

CHICKPEA



NVTtools

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Long Term Yield Reporter

New web-based high speed Yield Reporting tool, easy-to-use means of accessing and interpreting the NVT Long Term MET (Multi Environment Trial) results.



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Crop Disease Au App



Access to current disease resistance ratings & disease information.

Long Term Yield App



Easy access to the analysed NVT Multi Environment Trial (MET) data.

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