

2023 QUEENSLAND WINTER CROP SOWING GUIDE



GRDC
GRAINS RESEARCH
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CORPORATION

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

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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:

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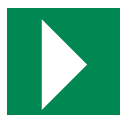
COVER: Harvesting of wheat (early and main), barley and chickpea at the National Variety Trials in Emerald, Queensland in 2021.

PHOTO: QDAF, Emerald

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grdc.com.au/queensland-winter-crop-sowing-guide

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DISEASE RATING COLOUR RANGE

Disease severity scale from very susceptible (VS) to resistant (R)

VS	SVS	S	MSS	MS	MRMS	MR	RMR	R
VI	IVI	I	MII	MI	MTMI	MT	TMT	T

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

VI = very intolerant, IVI = intolerant to very intolerant, I = intolerant, MII = moderately intolerant to intolerant, MI = moderately intolerant, MTMI = moderately tolerant to moderately intolerant, MT = moderately tolerant, TMT = tolerant to moderately intolerant, T = tolerant

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.

INTRODUCTION

The *2023 NVT 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 released varieties that have undergone paddock evaluation in Queensland.

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 that 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 that you are provided with current and reliable information by the vendor.

There are eight new varieties that appear in this guide for the first time for growers to consider – five wheat varieties and three barley varieties. Three wheat varieties are from Australian Grain Technologies named Calibre[®], Catapult[®] and Coota[®], and two wheat varieties are from InterGrain named Jillaroo[®] and Valiant CL[®] Plus. There are three new barley varieties, two from Australian Grain Technologies named Minotaur[®] and TITAN AX[®] and one from InterGrain named Zena[®].

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

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 GRDC, supported by the 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 *2023 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.

CEREAL DISEASES

New stripe rust variant on barley warrants caution

The dedicated team at the Plant Breeding Institute (PBI), Cobbitty, which conducts the essential Cereal Rust Survey, detected a new pathotype of stripe rust with increased virulence on barley in 2021. While stripe rust in barley is not a problem, the new pathotype has increased the importance of growers monitoring their barley crops in case there is a further change in virulence on barley. This form

of *P. striiformis*, first detected in Australia in 1998, is known colloquially as BGYR (barley grass stripe [yellow] rust). BGYR is very common on wild barley grass weed species. Remarkably, late in 2021 PBI found the very first BGYR variant in samples of stripe rust collected from wild barley grass and from several crops of RGT Planet[®] in NSW and, subsequently, in Victoria and Queensland. The new pathotype has been designated BGYR+.

Given there were no reports of serious stripe rust in barley crops in 2021, PBI researchers anticipate that most, if not all, current varieties have adult plant resistance (see section below, 'Stripe rust as an example').

The standard disease resistance rating system is shown in Appendix 1 for rusts and foliar diseases.

'True' barley stripe rust is a major disease of barley in some overseas countries but is not present in Australia. However, barley grass stripe rust and wheat stripe rust can develop to a small extent on some barley varieties, particularly if the diseases are severe on nearby barley grass or wheat. Barley stripe rust poses a significant threat to the Australian barley industry. Report any unusually severe infections of stripe rust on barley to your agronomist and send samples to the Australian Cereal Rust Survey (see page 6).

APPENDIX 1: RUSTS AND FOLIAR DISEASES

A standard disease resistance rating system has been adopted for all crops in all states across Australia. This document helps to explain the values and their implications for growers and advisers.

Standard disease ratings	
Rating	Alpha code
Resistant	R
Resistant to moderately resistant	RMR
Moderately resistant	MR
Moderately resistant to moderately susceptible	MRMS
Moderately susceptible	MS
Moderately susceptible to susceptible	MSS
Susceptible	S
Susceptible to very susceptible	SVS
Very susceptible	VS

Rating	Management option description	For growers: what do I see?	For growers: what do I do?
Resistant (R)	Disease may be found but will be at such a level that no economic management is required, even in instances of high disease pressure.	Trace levels of disease may be found.	No economic management decisions required.
Moderately resistant (MR)	Disease may be observed but no economic management decisions will be required. Preventative sprays are not necessary but disease should be monitored. Management of seed quality may be required.	The disease may be observed at very low levels.	No economic management decisions required. Monitor crops for disease development.
Moderately susceptible (MS)	In the presence of inoculum and in seasons conducive to disease, the disease will be seen more readily when inspecting the crop. If the disease appears early in the season, then an economic management decision (preventative spray) may be appropriate. Later occurrence of the disease may not require any action. Management of seed quality will be required.	In the presence of inoculum, the disease will be seen more readily when inspecting the crop.	Monitor crops for disease development. In the presence of inoculum and in seasons conducive to disease, an economic management decision may be appropriate (e.g. preventative spray). Later occurrence of the disease may not require any action.
Susceptible (S)	The disease will be easily found in the crop. Management decisions will be required to reduce yield loss and will most probably be economic to do so. Management of seed quality will be required.	In the presence of inoculum, the disease will often be easily found in the crop. The disease will be observed readily in the crop.	Management decisions will be required to reduce yield loss and will most probably be economic to do so.

STRIPE RUST AS AN EXAMPLE

Response to stripe rust is determined by the interaction of genes for resistance in a variety and genes for virulence in the pathogen population.

The reaction of a wheat variety to stripe rust depends on two forms of resistance:

1. seedling genes – which are effective from seedling emergence through to maturity, provided the matching virulence gene in the pathogen population is absent; and
2. adult plant resistance (APR) genes – which become effective at various growth stages, ranging from the fourth leaf stage through to full head emergence. APR will also be effective provided that matching virulence is not present in the pathogen.

Both seedling and APR genes, and combinations of both, provide varying levels of crop protection that can be influenced by environment (temperature, crop nutrition, management) and disease pressure.

Growers need to be aware that varieties that predominantly rely on APR for stripe rust protection might be more susceptible to stripe rust infection earlier in the season until the APR provides protection. Wheat varieties with APR can benefit from early stripe rust control by fertiliser, seed or foliar fungicides. If unsure speak to your local agronomist.

Cereal diseases pose a constant, significant threat to the Australian grains industry. In the past, entire crops have been wiped out in Queensland and across Australia. Growers and the wider industry have been the beneficiaries of the combined efforts of breeders and work conducted by the Plant Breeding Institute, University of Sydney (situated in Cobbitty, New South Wales) over the past 100 years.

In any given year there are numerous pathotypes (sometimes referred to as races or strains) of the different diseases that attack our crop varieties. Surveys of the rust populations have been carried out each year since 1921 by the Plant Breeding Institute. This information is crucial in assessing current makeup and levels of the rusts and thereby preempting potential threats to the industry. The Plant Breeding Institute also rates the rust responses of tens of thousands of potential new cereal varieties each year, undertakes innovative genetic investigations to find new sources of rust resistance and crossing for breeding companies, as well as training students in plant breeding and pathology.

The best protection for varieties is to have genetic resistance to the diseases present in the production environment. Protection is afforded by resistance in the plant host to the invading pathogen. The ratings to the three rusts that appear in Table 1 (page 13) are based on the most prevalent strains (race, pathotype) identified by the surveys conducted by the Plant Breeding Institute in the years prior to publishing the guide.

Over time, a variety's rating to a particular rust disease may change. This is due to random changes that occur within the makeup of the pathogen, which enable it to overcome the genetic resistance of a variety. This is not due to any changes in the variety itself.

In this guide, the variety ratings for a specific disease relate to the most prevalent rust strain occurring in Queensland at the time of printing. For example, the ratings for stripe rust refer to (2021 east coast) resistance, which in the case of stripe rust are specifically for the two dominant stripe rust pathotypes 198 E16 A+ J+ T+ 17+ and 239 E237 A- 17+ 33+. The former pathotype was first detected in Australia in 2018 and originated from either Europe or South America; the latter originated from Europe and was first detected in 2017. Determining the origins of such exotic incursions is another example of the critical work that is undertaken by the Plant Breeding Institute. The response of some of these varieties may differ should another pathotype of stripe rust build up and become common. Further, more specific information is available in reports that can be downloaded on the Plant Breeding Institute Rust Laboratory website (www.sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/cereal-rust-research.html); Cereal Rust Report volume 17 issue 3 and volume 19 issue 1).

Growers should monitor all crops and any suspicious lesions should be collected. Keep samples dry, do not wrap in plastic and contact your local Department of Primary Industries representative or your agronomist.

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:

Jo-Ann Geist
ACRCP research hub coordinator
The University of Sydney
Faculty of Science, School of Life and Environmental Sciences
Plant Breeding Institute
107 Cobbitty Road
Cobbitty, NSW 2570
Phone: +61 2 9351 8864 or +61 2 9351 8875
Fax: +61 400 813740
jo-ann.geist@sydney.edu.au | sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/cereal-rust-research.html

For pulse disease sample testing contact:

Lisa Kelly, QDAF, Queensland
Phone: +61 477 747 040 or email lisa.kelly@daf.qld.gov.au for sample dispatch details.

For cereal disease sample testing contact:

Lisle Snyman, QDAF, Queensland.
Phone: +61 428 324 932 or email lisle.snyman@daf.qld.gov.au for sample dispatch details.

The disease ratings in the report are current at the time of publication. Regularly visit nvt.grdc.com.au/nvt-disease-ratings to find the latest NVT disease ratings.

End point royalties (EPR)

End point royalties (EPRs) are an essential income source for Australia's breeding programs. The collection of these royalties is evolving and now 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: Australian Crop Breeders Ltd, varietycentral.com.au/end-point-royalties

PLANT BREEDER'S RIGHTS (PBR)

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 or set of rights. It is a protection that allows the breeder or owner of the variety to place restrictions on what growers and others can do with it.

Throughout this guide, varieties protected under PBR legislation are signified by the symbol (b). Plant

Breeder's Rights are exclusive commercial rights to a registered variety. In relation to propagating material of the registered variety, the breeder has exclusive rights to:

- produce or reproduce the material;
- condition the material for the purpose of propagation (conditioning includes cleaning, coating, sorting, packaging and grading);
- offer the material for sale;
- sell the material;
- import the material;
- export the material; and
- stock the material for any of the purposes described in the previous dot points.

In most instances the breeder will license these rights to a selected seed company (the licensee). Exceptions to PBR are the rights of growers to save seed for sowing future commercial crops. However, harvested material derived from farm-saved seed will be subject to the end point royalty (EPR) applying to that variety.

Where EPRs apply, growers will be required to enter arrangements with the breeder or licensee whereby royalties are paid on delivery of the grain. Some varieties may have a seed royalty (SR) paid on purchase of seed rather than an EPR. Royalties collected are used to support ongoing research and the breeding of new and improved varieties.

SEED VARIETY LICENCES

The Seed Variety Licence is a legally binding contract between the PBR owner of the EPR variety or the licensed commercialisation party and the grower. The Licence contains the terms and conditions that a grower needs to abide by when using a new variety.

INTRICACIES OF SEED SHARING™

Seed Sharing™ (first introduced as AGT Seed Sharing™, and now a generic term used by growers) provides a way to explore the potential that a new variety may offer to your overall farming system. Despite becoming more popular recently, there are key features to be aware of:

- Breeding companies may have slightly different restrictions on seed sharing, so it is important to read the licensing agreement for each variety.
- Clearfield® varieties are not able to be purchased through a seed sharing arrangement.

- Seed Sharing™ is an agreement between a licensed grower of a variety and another grower that has agreed to use the seed for the sole purpose of producing another generation of that variety.
- End point royalties are not required to be paid on any seed that is sold through a Seed Sharing™ agreement. Since another generation is being created it is not an end point, in contrast to going to a feed lot, a domestic mill or for export.
- Retail agronomy businesses can facilitate a seed sharing transaction between two farming businesses but cannot enter into one. The restricting clause identifies that the purchasing party agrees to be liable for the EPRs that are due following the harvest of the subsequent crop.

TIMING IS ESSENTIAL FOR SUCCESS

Growers face numerous 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 and 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; and
3. Not second-guessing 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. They 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 that their preferred variety for sowing is good quality, taking into account purity, germination and vigour. This is particularly relevant for growers looking to use retained seed. Aim for an even establishment across the paddock, more than simply trying to achieve a given sowing rate. Aim for an even established plant density of 100 to 200 plants per square metre for wheat and barley and 20 to 30 plants/m² for chickpeas, rather than relying on a set planting rate based on kilograms per hectare. 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 that the variety selected has the correct maturity to correspond with planting time to minimise the risk of crop damage from both frost and heat.

Be mindful of a variety's coleoptile length. Varieties' coleoptile length is shorter in Central Queensland due to the higher temperatures usually experienced around sowing. Chickpeas 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 this wheat variety maturity description (Appendix 2) 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 has access to a clear and sufficiently detailed method of describing relative maturity in Australia's field crops.

For further information, or to discuss this document, please feel free to contact ACB at enquiries@australiancropbreeders.com.au, or contact Haydn Kuchel (0428 817 402).

APPENDIX 2: WHEAT VARIETY MATURITY DESCRIPTION

Northern region		
Maturity ^a description	Quick wheat boundary	Slow wheat boundary
Very quick spring	N/A	–
Very quick – quick spring	–	–
Quick spring	–	Sunprime ^{db}
Quick – mid spring	Sunprime ^{db}	Suntop ^{db}
Mid spring	Suntop ^{db}	LRPB Reliant ^{db}
Mid – slow spring	LRPB Reliant ^{db}	Coota ^{db}
Slow spring	Coota ^{db}	Sunzell
Slow – very slow spring	Sunzell	Sunmax ^{db}
Very slow spring	Sunmax ^{db}	N/A

^aMaturity 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



PHOTO: GRDC

WHEAT

KEY POINTS

Newly released varieties available for sowing

- Calibre[®], Catapult[®] and Coota[®], released by Australian Grain Technologies
- Jillaroo[®] and Valiant[®] CL Plus, released by InterGrain

Varieties planned for removal in August 2023

Refer to www.wheatquality.com.au

DISEASE CHARACTERISTICS

Yellow spot

Seedling disease alone rarely results in significant grain yield losses. For grain yield losses to occur, a wet spring will be needed for the disease to develop on adult plants and affect the top three leaves, which are the leaves that 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 appear in Table 1.

False black chaff

This physiological disorder can readily occur in susceptible varieties. It causes 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 the 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. Variety crown rot ratings appear in Table 1.

Stripe rust

Historically, the spread of stripe rust occurs in spring. With night-time temperatures increasing above 20°C, the epidemic usually slows down from late October to early November in Queensland.

Stripe rust has been common and widespread throughout eastern Australia in recent seasons. The sole reason for this uptick in the disease was two incursions of exotic stripe rust pathotypes, which were first detected in 2017 (pathotype 198E16 A+ J+ T+ 17+, or '198') and in 2018 (pathotype 239 E237 A- 17+ 33, or '239'). Pathotype 198 was first detected in Europe and somehow made its way to South America, where it caused severe stripe rust epidemics on over three million hectares of wheat in Argentina in the 2016-17 and 2017-18 cropping seasons. Many growers there applied fungicides but were unable to control the disease and suffered significant economic losses. Yield losses of between 53 and 70 per cent were recorded in the seven most susceptible varieties being grown. Pathotype 239 was first detected by staff at the University of Sydney in 2018 and likely originated from Europe.

These two incursions now mean that Australia has experienced four wheat stripe rust incursions, with the two most recent being the first time that two genetically different isolates of a cereal rust attacking pathogen have been introduced into Australia in quick succession.

The two new pathotypes pose an increased disease threat to a number of wheat (durum and common bread) and triticale varieties.

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. Variety stripe rust ratings appear in Table 1.

Reply-paid sample envelopes can be obtained by contacting:

Jo-Ann Geist, ACRCP research hub coordinator
The University of Sydney
Faculty of Science, School of Life and Environmental Sciences
Plant Breeding Institute
107 Cobbitty Road
Cobbitty, NSW 2570
Phone: +61 2 9351 8864
Email: jo-ann.geist@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. Variety ratings for leaf and stem rust appear in Table 1.

Root lesion nematode (RLN)

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 that the absence of a winter cereal crop in recent seasons does not mean that there are low levels of nematodes in the soil. A soil test should be considered prior to planting if you do not know which species or levels are on your farm. If wheat is to be sown in nematode-infested soil, the tolerant varieties (listed as T, TMT or MT in 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 to be grown. The reaction of a wheat variety may differ to the two species of RLN, *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. Variety black point ratings appear in Table 1.

Russian wheat aphid

Russian wheat aphid (RWA) was initially found in SA and Victoria in 2016 and has subsequently been found in NSW and Tasmania. Grain growers and agronomists across Queensland are urged to regularly monitor cereal paddocks for signs of RWA.

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

- **Find** – look for aphids, especially where leaf rolling and other characteristic plant symptoms of infection, including leaf streaking, are observed 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.

grdc.com.au/resources-and-publications/resources/russian-wheat-aphid

Wheat Quality Australia

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. This foundation, along with Wheat Standards – which are designed to ensure defects and contamination are absent – 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 to meet the requirements of 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 Wheat Quality Australia (WQA) Wheat 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.

The WQA Wheat Variety Master List is available from the WQA website at www.wheatquality.com.au. It is also published in the Grain Trade Australia Wheat Standards at www.graintrade.org.au.

WHEAT VARIETY DISEASE AND AGRONOMY RATINGS

Table 1 contains varietal ratings for the predominant diseases of wheat in Queensland.

are listed in alphabetical order and disease ratings are colour-coded to match resistance and susceptibility ratings.

Varieties of most relevance to Queensland growers

Variety	Leaf rust resistance**	Stem rust resistance	Stripe rust (2022 east coast) resistance	Black point resistance	Crown rot resistance	Pratylenchus neglectus		Pratylenchus thornei		Yellow leaf spot resistance
						Resistance ⁿ	Tolerance*	Resistance ⁿ	Tolerance*	
BREAD WHEATS										
Borlaug 100 ^{db}	MR	MR	SVS	MSS	MSS	S	T	MS	T	MRMS
Calibre ^{db}	S	MR	MS		S	S (P)		MS	MT	MRMS
Catapult ^{db}	S	MR	S	MSS	MSS	S	MI	MS	MT	MRMS
Coolah ^{db}	RMR	MR	MRMS	S	MSS	S	MT	MS	MT	MSS
Jiilaroo ^{db}	S (P)	MS (P)	MS (P)							MRMS (P)
LRPB Flanker ^{db}	RMR#	RMR	MR	MS	MSS	S	MT	MSS	MT	MS
LRPB Hellfire ^{db}	MSS	MR	MR	MSS	MSS	MSS	TMT	MSS	MII	MSS
LRPB Lancer ^{db}	RMR#	R	RMR	MRMS	MSS	S	MTMI	MS	TMT	MRMS
LRPB Mustang ^{db}	MSS	MRMS	RMR	MS	MSS	S	MI	MSS	MTMI	MSS
LRPB Raider ^{db}	R#	R	RMR		S	MS		MS	MT	MSS
LRPB Reliant ^{db}	RMR	R	MR	MS	MS	SVS	MTMI	MSS	TMT	S
LRPB Spitfire ^{db}	S	MR	MR	MSS	MS	MSS	MI	MS	MTMI	MSS
LRPB Stealth ^{db}	RMR#	R	RMR	RMR (P)	S	MSS	MI	S	MTMI	MS
Mitch ^{db}	MSS	MRMS	MRMS	MRMS	MS	S	MT	S	MT	MSS
RockStar ^{db}	S	MR	S	MSS	S	MRMS	MII	MS	MI	MRMS
SEA Condamine	RMR#	MRMS	MS	MRMS	MSS	S	MT	MS	MT	MSS
Sunblade CL Plus ^{db}	MSS	MS	MRMS	MR (P)	S	MSS	MTMI	MRMS	TMT	MSS
Suncentral ^{db}	RMR	MRMS	MS	RMR (P)	MSS	MRMS	MI	MRMS	MT	MSS
Sunchaser ^{db}	R	MR	RMR	MRMS	MSS	MSS	MTMI	MSS	MT	MS
Sunflex ^{db}	RMR/S (P)	MR		MSS	MSS (P)	S	MTMI	MSS	MI	MS
Sunlamb ^{db}	MRMS	RMR	MR	MS	S	MSS	I	MSS	MI	MRMS
Sunmaster ^{db}	RMR#	MS	MRMS	RMR (P)	MSS	MRMS	MTMI	MS	TMT	MSS
Sunmax ^{db}	MS	MRMS	RMR	MRMS	MSS	S	MTMI	MS	MI	MS
Sunprime ^{db}	MR#	MRMS	RMR	MSS	S	S	MTMI	S	MT	MSS
Suntime ^{db}	MS	MS	MR	MS	MSS	MSS	MTMI	MRMS	MT	S
Suntop ^{db}	MR	MRMS	MRMS	MSS	MSS	S	MT	MRMS	TMT	MSS
Valiant ^{db} CL Plus	S	MR	MSS		S	S		S (P)	VI	MRMS
Vixen ^{db}	SVS	MRMS	S	MSS	S	MRMS	MT	MS	MII	MRMS

INTRO

WHEAT

BARLEY

CHICKPEA

NOTES

Table 1: Bread and durum wheats – disease and agronomy ratings (continued).

Variety	Leaf rust resistance**	Stem rust resistance	Stripe rust (2022 east coast) resistance	Black point resistance	Crown rot resistance	Pratylenchus neglectus		Pratylenchus thornei		Yellow leaf spot resistance
						Resistance [™]	Tolerance*	Resistance [™]	Tolerance*	
DURUM WHEATS										
DBA Bindaroi ^{db}	MR	MRMS	MS	MRMS	SVS	MRMS	MI	MR	MTMI	MRMS
DBA Lillaro ^{db}	RMR	RMR	MS	MS	SVS	MRMS	MI	RMR	MT	MRMS
DBA Mataroi ^{db}	MR	MR	MR	MRMS	SVS	MS	MT	RMR	MII	MRMS
DBA Vittaro ^{db}	RMR	MR	MS	MSS	SVS	MS	I	MR	MI	MRMS
Westcourt ^{db}	RMR	RMR	MR	MSS	VS	MS	MI	MR	MTMI	MRMS

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

(P) = provisional rating

/ = pathotype differences

Blank cell = rating not available

*RLN tolerance – the root lesion nematode (*P. thornei* and *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.

^aRLN 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.

#May be more susceptible to alternate pathotypes (warning)

DISEASE RATING COLOUR RANGE

VS	SVS	S	MSS	MS	MRMS	MR	RMR	R
VI	IVI	I	MII	MI	MTMI	MT	TMT	T

Table 2: Bread and durum wheats – varietal details.

Variety	Varietal information					Comments (as supplied by breeding companies)	Maturity grouping	WQA maximum quality classification*		
	Pedigree	End point royalty (EPR)	Grower- to-grower sales permitted	Licensee ◊	Released by ◊					
									EPR rate \$/ tonne (GST exclusive)	Year of release
BREAD WHEATS										
Borlaug 100 ^{ab}		✓	Yes	Rebel	Rebel	\$4.55	2018	A mid-season variety, released for its high long-term average yield in the northern NSW and Queensland regions, where livestock markets erode APH premiums. Proven to outyield in both dry conditions and exceed in irrigation. Very strong straw strength, low screening and <i>P.thornei</i> -tolerant. While stripe rust presents in wetter years, it is easily controlled with low-cost fungicide applications.	Quick – mid spring	Feed
Calibre ^{ab}	Scepter ^{ab} derivative	✓	Yes	AGT	AGT	\$3.50	2021	Calibre ^{ab} established itself as an extremely high-yielding variety after one season in the Queensland NVT. Calibre ^{ab} has a moderately long coleoptile and suitable disease resistance and tolerances for the northern region. Calibre ^{ab} matches other feed varieties for yield but has the potential to make the APH classification grade.	Quick – mid spring	Feed
Catapult ^{ab}	Mace ^{ab} derivative	✓	Yes	AGT	AGT	\$3.25	2019	An elite yielding variety from AGT's southern breeding centre. It has a useful disease resistance profile for the northern region and very high yield potential throughout Queensland. It is an adaptable variety with a flexible sowing window and great top-end yield.	Mid – slow spring	AH
Coolah ^{ab}	EGA Gregory ^{ab} /VQ279// EGA Gregory ^{ab}	✓	Yes	AGT	AGT	\$3.50	2016	Coolah ^{ab} has been an outstanding performer in the slow spring maturity group. As a replacement for EGA Gregory ^{ab} it is slightly shorter in stature and has better lodging resistance. Combined with good foliar disease resistance, Coolah ^{ab} is a clear choice for late April/early May planting opportunities throughout Queensland and NSW.	Slow spring	APH
Coota ^{ab}		✓	Yes	AGT	AGT	\$3.60	2020	An elite yielding variety for early sowing options in NSW and Queensland. An alternative to LRPB Lancer ^{ab} and EGA Gregory ^{ab} types, it has a short plant height and large seed size. Coota ^{ab} has a good disease profile accentuated by its ability to maintain yield in the presence of crown rot. Coota ^{ab} has a flexible maturity and performs well in high and low-yield potential situations.	Mid – slow spring	APH
Jillaroo ^{ab}		✓	Yes	InterGrain	InterGrain	\$3.50	2022	A high-yielding quick – mid maturing spring wheat with AH classification (potential APH in 2023). Jillaroo ^{ab} features a moderate plant height with semi-erect growth habit and good disease package to yellow leaf spot, <i>P.thornei</i> resistance and crown rot resistance.	Quick – mid spring	AH
LRPB Flanker ^{ab}	EGA Gregory ^{ab} /EGA Gregory ^{ab} /Lang ^{ab}	✓	Yes	Pacific Seeds	LRPB	\$4.25	2015	APH variety well suited to Queensland with sound diseases resistance.	Mid – slow spring	APH
LRPB Gauntlet ^{ab}	Kukri/Sunvale	✓	No	Seednet	LRPB	\$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.	Mid – slow spring	APH
LRPB Hellfire ^{ab}	EGA Gregory ^{ab} / 2*LPB05-2148	✓	Yes	Pacific Seeds	LRPB	\$4.25	2019	Mid – quick maturing, high-yielding main season APH variety with protein accumulation similar to LRPB Spitfire ^{ab} . Good early vigour and RLN tolerance. Demonstrated yield performance under crown rot pressure.	Quick – mid spring	APH
LRPB Lancer ^{ab}	VII84/Chara// Chara/3/Lang	✓	Yes	Pacific Seeds	LRPB	\$4.25	2013	Slower-maturing APH spring wheat with a compact canopy, solid grain quality and rust packages.	Mid – slow spring	APH
LRPB Mustang ^{ab}	EGA Gregory ^{ab} /LPB117	✓	Yes	Pacific Seeds	LRPB	\$4.25	2017	Quick-maturing APH variety with compact canopy and reliable grain package. Good foliar and soil disease package with highly competitive yield.	Quick spring	APH
LRPB Raider ^{ab}	LRPB Lancer ^{ab} / LPB10-2506	✓	No	Pacific Seeds	LRPB	\$4.25	2021	A short, higher-tillering LRPB Reliant ^{ab} plant type that showed relatively high and stable yield performance across early and main season NVT in 2020-21. Slow spring maturity best suited to mid-April to early May sowing times across a range of growing environments. Robust disease profile based on LRPB Lancer ^{ab} genetics with APH classification.	Slow spring	APH

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

Variety	Varietal information						Comments (as supplied by breeding companies)	Maturity grouping	WQA maximum quality classification*	
	Pedigree	End point royalty (EPR)	Grower- to-grower sales permitted	Licensee [◇]	Released by [◇]	EPR rate \$/ tonne (GST exclusive)				Year of release
BREAD WHEATS										
LRPB Reliant [◇]	LRPB Crusader [◇] /EGA Gregory [◇]	P	Yes	Pacific Seeds	LRPB	\$4.25	2016	A high-yielding APH variety with excellent early vigour and robust grain package, well suited to main season planting windows throughout the Queensland cropping zone.	Mid – slow spring	APH
LRPB Spitfire [◇]	Drysdale/Kukri	✓	Yes	Pacific Seeds	LRPB	\$3.50	2010	APH variety well suited to Queensland conditions. Provides a good grain package and solid disease resistance.	Quick – mid spring	APH
LRPB Stealth [◇]	LRPB Lancer [◇] /Sunguard [◇]	✓	No	Pacific Seeds	LRPB	\$4.25	2020	A mid – slow spring-maturing APH variety demonstrating excellent crown rot resistance and the ability to maintain yield in tight finishes, along with a solid disease package. Moderate to long coleoptile with excellent black point resistance. Well suited to all Queensland production environments.	Mid – slow spring	APH
Mitch [◇]	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 crown rot tolerance belies its resistance rating and performs well in tough environments.	Mid – slow spring	AH
RockStar [◇]	Mace [◇] /IGW3119	✓	Yes	InterGrain	InterGrain	\$3.50	2020	RockStar [◇] is a high yielding mid – slow flowering variety, with a slightly quicker time to flowering than LRPB Lancer [◇] . It has excellent yield stability across its sowing window and very good lodging tolerance. RockStar [◇] has good grain size, good test weight and has a moderate plant height, reducing stubble loads in high-yielding environments.	Mid – slow spring	APH
SEA Condamine	UQ01800	✓	No	Seed Exchange Australia	UQ	\$3.00	2018	A tall, main season maturity, high-yielding variety in Central Queensland, it has a short grain-filling period, large kernal size, low screenings and stiff straw.	Quick – mid spring	FEED
Sunblade CL Plus [◇]	RAC1664/2*Suntop	✓	No	AGT	AGT	\$4.35	2020	The first Clearfield [®] Intervix [®] tolerant variety granted an APH classification. Sunblade CL Plus [◇] is a mid spring variety that demonstrates exceptional yield performance and is suitable for the entire northern region. A replacement for Elmore CL Plus [◇] .	Mid spring	APH
Suncentral [◇]	RAC1629/2*Suntop [◇]	✓	Yes	AGT	AGT	\$3.60	2020	Exceptional yield performance from an APH-classified variety. Suncentral's [◇] quick – mid spring maturity makes it uniquely suited to central and south-west Queensland. Suncentral [◇] shares a lot of characteristics with Suntop [◇] but is a quicker-maturing variety and has a better physical grain package. Suncentral [◇] has outyielded Suntop [◇] in AGT crown rot trials.	Quick – mid spring	APH
Sunchaser [◇]	SUN6268/B1289F	✓	Yes	AGT	AGT	\$3.50	2019	An alternative for the popular variety Suntop [◇] . Sunchaser [◇] has a similar fit in terms of maturity and yield performance with improved characteristics of note. Good grain size and low screenings, moderately long coleoptile, improved crown rot resistance and similar tolerance.	Quick – mid spring	APH
Sunflex [◇]	QT13334/SUN574A	✓	Yes	AGT	AGT	\$3.60	2020	As a slow spring variety, Sunflex [◇] is at the very slow end and is a high-yielding option for early sowing situations throughout Queensland and NSW, with particular adaptation to high yield situations. Sunflex [◇] has a shorter plant type, consistently large seed size and low screenings, as well as a moderately long coleoptile.	Slow spring	APH
Sunlamb [◇]	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.	Very slow spring	ASW

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

Variety		Varietal information					Comments (as supplied by breeding companies)	Maturity grouping	WQA maximum quality classification*		
		Pedigree	End point royalty (EPR)	Grower- to-grower sales permitted	Licensee	Released by				EPR rate \$/ tonne (GST exclusive)	Year of release
BREAD WHEATS											
Sunmaster ^{db}	RAC1629/2*Suntop	✓	Yes	AGT	AGT	AGT	\$3.60	2020	A mid spring variety with greatly improved yield performance compared with its major parent Suntop ^{db} . Sunmaster ^{db} has a similar adaptation pattern but in a shorter plant type. A genuine replacement for Suntop ^{db} . Sunmaster ^{db} has outyielded Suntop ^{db} in AGT crown rot trials.	Mid spring	APH
Sunmax ^{db}	CRW142.16/2*Sunzeil ^{db}	✓	Yes	AGT	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.	Very slow spring	APH
Sunprime ^{db}	SUN445/EGA Gregory ^{db}	✓	Yes	AGT	AGT	AGT	\$3.50	2018	A quicker-maturing APH variety with higher, stable grain yield and good <i>Pithome</i> tolerance.	Quick spring	APH
Suntime ^{db}	SUN457A/SUN405B	✓	Yes	AGT	AGT	AGT	\$3.50	2015	An APH disease-resistant variety for sowing early in the season.	Slow spring	APH
Suntop ^{db}	Sunco/2*Pastor//SUN436E	✓	Yes	AGT	AGT	AGT	\$3.25	2012	A consistently high-yielding APH variety, possessing a solid disease resistance package including an elevated level of tolerance to crown rot infection.	Mid spring	APH
Valiant ^{db} CL Plus		✓	No	InterGrain	InterGrain	InterGrain	\$4.35	2021	A high-yielding, slow maturity, Clearfield®-tolerant spring wheat with a similar maturity to LRPB Stealth ^{db} . Check current herbicide registrations for registered product rates and adhere to recommended plant growth stages for application timing. Moderate plant height and a long coleoptile. Bred and marketed by InterGrain.	Slow spring	Feed
Vixer ^{db}	Mace ^{db} /IGW3119	✓	Yes	InterGrain	InterGrain	InterGrain	\$3.50	2018	A mid – quick variety, similar in maturity to LRPB Spitfire ^{db} . Suited to sowing from mid-May onward. High yield potential, with very good lodging resistance and strong physical grain characteristics. It has good grain size and produces low screenings. Vixer ^{db} has a short–moderate plant height, providing reduced stubble loads in high-yielding environments.	Quick – mid spring	AH
DURUM WHEATS											
DBA-Aurora ^{db}	Tamaroi*2/Kalka// RH920318/Kalka// Kalka*2/Tamaroi	✓	No	SADGA	University of Adelaide	University of Adelaide	\$3.00	2014	A high-yielding variety, particularly in the south-eastern Queensland zone, which possesses good semolina and colour stability attributes.	Quick – mid spring	ADR
DBA Bindaroi ^{db}	Caparoi ^{db} /261102.	✓	To be advised	Seednet	NSW DPI	NSW DPI	\$3.50	2017	Higher yielding with lower screenings and good protein achievement. Better grain quality than Caparoi ^{db} , with higher semolina yellow colour compared with DBA Lillaro ^{db} . Best performance compared with all released durum varieties in DBA yield loss trials.	Quick spring	ADR
DBA Lillaro ^{db}	960273/980596	✓	To be advised	Seednet	NSW DPI	NSW DPI	\$3.30	2015	This variety is preferred by millers; highest semolina yield, high yellow pigment, highest 1000 grain weight, lowest screenings compared with other released varieties. Medium early variety, around two to three days later than Jandaroi ^{db} . Excellent yield performance in Queensland NVT and is suited to dry seasons, including double cropping, with excellent protein achievement	Quick spring	ADR

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

Variety	Varietal information					Comments (as supplied by breeding companies)	Maturity grouping	WQA maximum quality classification*		
	Pedigree	End point royalty (EPR)	Grower- to-grower sales permitted	Licensor	Released by				EPR rate \$/ tonne (GST exclusive)	Year of release
DURUM WHEATS										
DBA Mataroi ^(b)	234194/YAWA	✓	To be advised	Seednet	NSW DPI	\$3.50	2021	DBA Mataroi ^(b) is a high-yielding, quick-maturing durum wheat, adapted to the dryland durum producing areas of NSW (including western NSW) and Queensland. DBA Mataroi ^(b) has erect plant growth and medium stature and straw strength similar to Caparoi ^(b) . It has demonstrated grain, semolina and pasta-making quality comparable with Caparoi ^(b) as well as low screenings. DBA Mataroi ^(b) has a useful disease package, including rated MR for the 2021 east coast stripe rust race and is rated MRMS for black point.	Quick spring	ADR
DBA Vittaroi ^(b)	200856/980990	✓	To be advised	Seednet	NSW DPI	\$3.30	2017	Recommended for irrigated cropping. Short stature and high tolerance to lodging. High yield combined with excellent grain protein achievement and grain and semolina quality under irrigated conditions relative to EGA Bellaroi ^(b) . Higher semolina yellow colour compared with DBA Lillaro ^(b) . Achieves lower screenings.	Quick – mid spring	ADR
Westcourt ^(b)	WID22209/WID22301	✓	Yes	AGT	AGT	\$3.50	2019	Westcourt ^(b) is a durum variety specifically bred to perform in the northern durum growing region. Displaying exceptional yield and offering a dominant package of disease resistance, moderately long coleoptile and grain quality, including very low screenings and milling qualities similar to DBA Lillaro ^(b) .	Quick – mid spring	ADR

† AGT – Australian Grain Technologies, DAF – Queensland Department of Agriculture and Fisheries, EGA – Enterprise Grains Australia, LRPB – LongReach Plant Breeders, NSW DPI – 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, UniQuest

^{†b} 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 Quality Australia (WQA), www.wheatquality.com.au maximum classifications describe suitability for export markets and do not always reflect the varietal preference of domestic millers.

Note: APH = Australian Prime Hard, AH = Australian Hard, ASW = Australian Standard White, ADR = Australian Premium Durum, Feed = Australian Feed.

WHEAT VARIETY YIELD PERFORMANCE

Tables 3A to 3H contain wheat grain 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 2017–21.

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

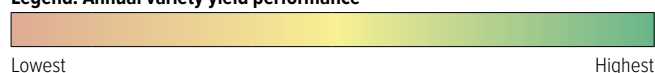
Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	2.33	2.29	2.62	2.86	3.05
	No. trials	5	3	5	5	5
Catapult ^{db}	5					109
LRPB Raider ^{db}	10				114	108
Coolah ^{db}	23	122	116	127	115	109
Sunflex ^{db}	13		116	118	120	
RockStar ^{db}	5					107
Mitch ^{db}	13		116	124	110	
LRPB Flanker ^{db}	23	113	118	125	113	107
LRPB Stealth ^{db}	15			124	111	107
LRPB Reliant ^{db}	15			124	108	105
LRPB Lancer ^{db}	23	108	114	110	100	103
Suntime ^{db}	13	103	100	103		
LRPB Gauntlet ^{db}	13	98	100	101		
Sunmax ^{db}	18	94	64	85	76	
Valiant ^{db} CL Plus	5					94

Table 3B: NVT Central Queensland – wheat main season 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	2.53	2.29	3.29	3.13	3.14
	No. trials	4	2	5	5	5
SEA Condamine	21	117	111	111	109	108
Calibre ^{db}	5					111
Sunmaster ^{db}	15			107	105	108
Sunblade CL Plus ^{db}	15			107	106	107
Borlaug 100 ^{db}	5	112				106
Suncentral ^{db}	15			104	101	105
LRPB Hellfire ^{db}	17		107	104	102	104
Jillaroo ^{db}	5					103
Sunchaser ^{db}	17		105	102	99	102
Sunprime ^{db}	21	99	112	99	97	103
Suntop ^{db}	21	103	99	100	99	101
LRPB Mustang ^{db}	21	95	111	94	92	100
LRPB Spitfire ^{db}	21	92	97	96	96	97

Legend: Annual variety yield performance



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

Table 3C: NVT South-East Queensland – wheat early season 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	2.11	2.14	2.83	3.63	
	No. trials	2	1	2	1	
LRPB Raider ^{db}	1				112	No trial
Coolah ^{db}	6	112	105	113	111	
Sunflex ^{db}	4		118	105	106	
Mitch ^{db}	6	107	103	112	109	
LRPB Stealth ^{db}	3			112	109	
Sunmax ^{db}	6	113	116	107	94	
LRPB Reliant ^{db}	3			110	111	
Suntime ^{db}	5	99	98	105		
LRPB Lancer ^{db}	6	96	95	105	104	
LRPB Flanker ^{db}	6	95	77	108	111	
LRPB Gauntlet ^{db}	5	87	79	104		
Sunlamb ^{db}	2	89				

Table 3D: NVT South-East Queensland – wheat main season 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	2.02	2.61	1.77	3.85	
	No. trials	1	1	2	2	
Borlaug 100 ^{db}	6	115	94	105	114	No trial
Sunmaster ^{db}	4			110	104	
Suncentral ^{db}	4			105	108	
Sunblade CL Plus ^{db}	4			109	102	
SEA Condamine	6	110	99	103	110	
LRPB Mustang ^{db}	6	102	93	109	108	
Sunchaser ^{db}	5		97	102	107	
Sunprime ^{db}	6	101	95	108	107	
Suntop ^{db}	6	115	102	101	102	
LRPB Hellfire ^{db}	5		98	104	104	
LRPB Spitfire ^{db}	6	97	94	96	98	

Table 3E: NVT South-East Queensland – wheat (durum) 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha		3.19	0.75	3.99	
	No. trials		1	1	1	
Westcourt ^{db}	3	No trial	104	105	99	No trial
DBA Mataroi ^{db}	3		100	105	102	
DBA-Aurora ^{db}	3		107	101	97	
DBA Bindaroi ^{db}	3		100	101	100	
DBA Lillaroi ^{db}	3		95	97	103	
DBA Vittaroi ^{db}	3		93	100	100	

Table 3F: NVT South-West Queensland – wheat early season 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	1.78	2.95	1.11	2.98	3.86
	No. trials	8	3	3	5	8
Catapult ^{db}	8					115
LRPB Raider ^{db}	13				118	111
RockStar ^{db}	8					112
Coolah ^{db}	27	125	103	111	112	109
LRPB Stealth ^{db}	16			110	109	106
Sunflex ^{db}	11		100	111	107	
Mitch ^{db}	19	122	102	113	106	
LRPB Flanker ^{db}	27	116	102	103	113	103
LRPB Reliant ^{db}	16			104	111	101
Sunmax ^{db}	27	105	106	85	102	100
LRPB Lancer ^{db}	27	108	99	113	95	98
Suntime ^{db}	14	106	101	104		
LRPB Gauntlet ^{db}	14	103	100	102		
Valiant ^{db} CL Plus	8					91
Sunlamb ^{db}	8	44				

Table 3G: NVT South-West Queensland – wheat main season 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	1.95	2.05	1.17	2.80	3.76
	No. trials	8	3	3	6	8
Sunmaster ^{db}	17			112	107	112
Borlaug 100 ^{db}	28	110	114	113	108	109
Sunblade CL Plus ^{db}	17			111	106	111
Suncentral ^{db}	17			111	107	110
Jillaroo ^{db}	8					110
Calibre ^{db}	8					108
SEA Condamine	28	108	115	111	106	106
Suntop ^{db}	28	102	101	105	102	105
LRPB Mustang ^{db}	28	106	96	108	104	102
Sunchaser ^{db}	20		105	105	103	104
Sunprime ^{db}	28	102	97	107	103	102
LRPB Hellfire ^{db}	20		101	103	102	103
LRPB Spitfire ^{db}	28	81	88	95	94	95

Table 3H: NVT South-West Queensland – wheat (durum) 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	2.58	1.74			2.63
	No. trials	1	1			1
DBA Vittaroi ^{db}	3	101	97	Trial failed	Trial failed	109
DBA Mataroi ^{db}	3	102	100			104
Westcourt ^{db}	2		104			103
DBA Bindaroi ^{db}	3	100	100			102
DBA Lillaro ^{db}	3	105	95			96
DBA-Aurora ^{db}	3	95	105			98

BARLEY

KEY POINTS

Recently released varieties available for sowing

- Minotaur[®], released by Australian Grain Technologies
- TITAN AX[®], released by Australian Grain Technologies
- Zena[®], released by InterGrain

Varieties under malting evaluation:

- Laperouse[®], Yeti[®], Beast[®], Commodus CL[®] and Cyclops[®] (see Table 4A).

Marketing barley

Large, plump, bright-coloured grain with high hectolitre 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?

Grain Trade Australia (GTA) has changed the name of feed barley grades from 'Feed 1 Barley' to 'Barley 1'. GTA took this action to recognise the fact that feed barley is often also used for human consumption in some export markets.

There are no changes in the specifications of the grade; it is simply a name change and has not had any impact on segregation.

Malting barley

In Queensland, domestic brewing demand is rated as medium for Commander[®], low for Compass[®] and market developing for Maximus[®] CL, while export brewing demand is rated as medium for Commander[®] and low for Compass[®]. Malt is made from premium-quality barley and provides the

characteristic flavours, aromas and colours that beer drinkers are familiar with, and it also contributes to the whole brewing process (along with water, hops and yeast).

Table 4A (last updated March 2022) and www.barleyaustralia.com.au list the varieties under malt barley evaluation by the Malting and Brewing Industry Barley Technical Committee (MBBTC) in conjunction with PBA and Barley Australia.

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. Variety ratings for powdery mildew appear in Table 4.

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. Variety ratings for leaf rust appear in Table 4.

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 elongate 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. Variety ratings for net blotch appear in Table 4.

Head and root diseases

Head blight

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

Loose smut

Barley varieties with 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 heavily discounted. 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. Variety ratings for black point appear in Table 4.

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 the 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. Variety ratings for crown rot appear in Table 4.

Root lesion nematode (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 that the absence of a winter cereal crop in recent seasons does not mean that 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 prior to 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 to be planted. The response of a barley variety may differ between the two species of RLN, *Pratylenchus thornei* and *Pratylenchus neglectus*. Refer to 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.

BARLEY VARIETY DISEASE RATINGS

Table 4 contains varietal ratings for the predominant diseases of barley in Queensland. Varieties of most relevance to Queensland growers are listed in alphabetical order and disease ratings are colour-coded to match resistance and susceptibility ratings.

Table 4: Barley disease and agronomy ratings.

Variety	Black point resistance	Crown rot resistance	Leaf rust resistance	Net blotch		Powdery mildew resistance	<i>P. neglectus</i>		<i>P. thornei</i>	
				Net form resistance**	Spot form resistance		Resistance*	Tolerance*	Resistance*	Tolerance*
Beast ^{db}	MSS	S	S	MRMS-S	MS	MSS	MRMS	MI	MRMS	T
Commander ^{db}	MSS	S	S	MS-S	MSS	MS	MRMS	MTMI	MRMS	MT
Commodus ^{db} CL	MSS	MSS (P)	S	MRMS	MRMS	MS	MRMS	TMT	S (P)	MTMI
Compass ^{db}	MSS	S	VS	MS	MS	MS	MRMS	TMT	MR	TMT
Fathom ^{db}	MSS	S	MRMS	MS	RMR	MRMS	MRMS	T	MR	TMT
La Trobe ^{db}	MSS	S	MSS	MS	S	MSS	MRMS	MT	MRMS	MT
Laperouse ^{db}	MSS	S	SVS	MRMS	MR	MS	MR	MI	MR	MTMI
Leabrook ^{db}	MSS	S	SVS	MS	MS	MS	MRMS	MT	RMR	TMT
LG Alestar ^{db}	MRMS	MSS	MS	MR-MSS	S	MR	MR	I	MR	MTMI
Maximus ^{db} CL	MSS	S	S	MRMS	MRMS	MS	MRMS	MT	MR	MTMI
Minotaur ^{db}	MS	MS (P)	SVS	MRMS	MSS	S	MRMS	MTMI	MR	TMT
RGT Planet ^{db}	MRMS	MSS	MRMS	MRMS-S	S	R	MRMS	MT	MR	MI
Rosalind ^{db}	MSS	MSS	MR	MRMS	MS	MSS	MRMS	MT	MR	TMT
Spartacus CL ^{db}	MSS	S	MSS	MS-S	S	MSS	MRMS	MII	MRMS	MI
TITAN AX ^{db}			S (P)	MR-MSS (P)	MRMS	MRMS				
Yeti ^{db}	MSS	S (P)	SVS	MS	MR	MSS	MRMS	TMT	MR	MT
Zena ^{db}			MS (P)	MRMS-S (P)	S	R				

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

(P) = provisional rating

/ = pathotype differences

Blank cell = rating not available

* RLN tolerance – the root lesion nematode (*P. thornei* and *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.

** Ratings separated by '-' denotes responses to different pathotypes.

DISEASE RATING COLOUR RANGE

VS	SVS	S	MSS	MS	MRMS	MR	RMR	R
VI	IVI	I	MII	MI	MTMI	MT	TMT	T

Table 4A: Barley varieties under malting evaluation.

This table, last updated March 2022 (www.barleyaustralia.com.au), lists the varieties currently under malt barley evaluation by the Malting and Brewing Industry Barley Technical Committee (MBITC) in conjunction with PBA and Barley Australia, including new varieties accepted into the evaluation program. Accreditation is granted providing the variety satisfies the selection criteria set by MBITC and Barley Australia.

Variety	Stage 0	Stage 1	Stage 2	Target decision/ date	Comment
Laperouse ^{db}	2019 (accepted)	2020-2021 (passed)	2021-2022	2022	Insufficient grain available to complete stage 2 evaluation in 2021, will continue stage 2 evaluation in 2022
Yeti ^{db}	2020 (accepted)	2020–2022	–	2024	Carried over to 2022 for further evaluation
Beast ^{db}	2020 (accepted)	2021 (passed)	2023	2024	Insufficient grain available to commence stage 2 evaluation in 2022
Commodus ^{db} CL	2021 (accepted)	2021 (passed)	2022	2023	Sufficient grain available to commence stage 2 evaluation in 2022
Cyclops ^{db}	2021 (accepted)	2021 (passed)	2023	2024	Insufficient grain available to commence stage 2 evaluation in 2022

Table 5: Barley varietal details.

Variety	Varietal information						Comments (as supplied by breeding companies)
	End point royalty (EPR)	Grower-to- grower sales permitted	Variety owner [◇]	Year of release	Royalty manager, EPR collector	EPR rate \$/ tonne (GST exclusive)	
Beast [Ⓢ]	✓	Yes	AGT	2020	AGT	\$4.00	A very-high-yielding 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, early vigour and high biomass production. Beast [Ⓢ] is being evaluated for potential malt accreditation by Barley Australia.
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 net blotch.
Commodus [Ⓢ] CL	✓	No	InterGrain	2021	InterGrain	\$4.25	High-yielding, quick-maturity, imidazoline-tolerant variety suited to lighter soils and medium to low-rainfall environments. Agronomically similar to Compass [Ⓢ] . Similar lodging tolerance and head loss risk to Compass [Ⓢ] , which may require in-season agronomic management. Excellent grain size with high retention levels and low screening. Moderate hectolitre weight.
Compass [Ⓢ]	✓	No	University of Adelaide	2015	Seednet	\$3.80	Malt-accredited variety suited to domestic and export markets. Earlier flowering compared with Commander [Ⓢ] , high yielding 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	2014	Seednet	\$2.00	A variety with large grain size and long coleoptile length. Good resistance to spot form net blotch. Rated susceptible to net 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, disease resistance package, particularly improvements in net blotches, and very good straw strength.
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 to early maturing, medium-tall variety. A very-high-yielding variety with similar large grain size and lower screenings compared with Compass [Ⓢ] . Good resistance and tolerance to root lesion nematode.
LG Alestar [Ⓢ]	✓	No	Limagrain	2014	Elders	\$3.00	LG Alestar [Ⓢ] is a domestic malt profile barley with medium maturity, five days earlier than Gairdner. Maturity is very similar to Commander [Ⓢ] and Compass [Ⓢ] . LG Alestar [Ⓢ] has high test weight, low screenings and a bright grain colour.
Maximus [Ⓢ] CL	✓	No	InterGrain	2020	Seednet	\$4.25	A mid to quick maturity, imidazoline-tolerant, high-yielding barley. Maximus [Ⓢ] CL is similar to Spartacus CL [Ⓢ] with an erect plant type, strong lodging tolerance and low-medium head loss risk. Maximus [Ⓢ] CL has a short coleoptile and it is recommended that sowing depth be adjusted accordingly. The variety also has a good physical grain package, slightly improved over Spartacus CL [Ⓢ] .
Minotaur [Ⓢ]	✓	Yes	AGT	2021	AGT	\$4.00	Minotaur [Ⓢ] is a lower-risk alternative to RGT Planet [Ⓢ] with a similar top-end yield potential but more suited to medium to high-rainfall environments. Minotaur [Ⓢ] has a broader adaptation pattern than RGT Planet [Ⓢ] , delivering more stable yields across a wider range of environmental conditions. Mid to slow maturity, with improved test weight compared with RGT Planet [Ⓢ] . Minotaur [Ⓢ] is being evaluated for potential malt accreditation by Barley Australia.
RGT Planet [Ⓢ]	✓	No	RAGT	2017	Seed Force Semences	\$4.00	Malt-accredited variety. Yielded well in the NVT series. Susceptible to spot and net form of net blotch.
Rosalind [Ⓢ]	✓	No	InterGrain	2015	Syngenta	\$3.50	Avoid deep sowing due to shorter coleoptile length. Rated VS to powdery mildew.
Shepherd [Ⓢ]	✓	No	QDAF	2008	Seednet	\$2.30	A tall variety with long coleoptile. Susceptible to powdery mildew and SVS to both forms of net blotch.

Table 5: Barley varietal details (continued).

Variety	Varietal information						Comments (as supplied by breeding companies)
	End point royalty (EPR)	Grower-to- grower sales permitted	Variety owner [◇]	Year of release	Royalty manager, EPR collector	EPR rate \$/ tonne (GST exclusive)	
Spartacus CL [◇]	✓	No	InterGrain	2016	Syngenta	\$4.25	Malt-accredited variety. A semi-dwarf, Clearfield [®] -tolerant variety. Avoid deep sowing due to shorter coleoptile length. Susceptible to spot form of net blotch and powdery mildew.
TITAN AX [◇]	✓	Yes	AGT	2022	AGT	\$4.55	TITAN AX [◇] is the first CoAXium [®] barley variety to be released, as such it is tolerant to Sipcam's Aggressor AX [®] (Group 1) herbicide. TITAN AX [◇] is a Compass [◇] type with similar agronomic attributes, grain package, coleoptile length and early vigour. TITAN AX [◇] will initially be deliverable as feed, with assessment of potential as a malting variety to occur in coming seasons.
Yeti [◇]	✓	Yes	AGT	2021	AGT	\$4.00	Yeti [◇] has established itself as the highest-yielding barley variety in the northern region. While it has a Compass [◇] plant type and similar growth habit and early vigour, Yeti [◇] is shorter in stature and demonstrates better standability. Yeti [◇] also has large grain size and high retentions. Yeti [◇] is being evaluated for potential malt accreditation by Barley Australia.
Zena [◇]	✓	No	InterGrain	2022	Syngenta	\$4.25	Zena [◇] is an imidazolinone-tolerant barley released in 2022 by InterGrain (tested as IGB20125T). It is closely related to RGT Planet [◇] and is similar agronomically, with the addition of the herbicide tolerance. Suited to the medium to high-rainfall environments. The variety has good levels of resistance to powdery mildew and leaf rust. Net form and spot form net blotch will need to be monitored. Zena [◇] has been accepted into the Barley Australia malt accreditation program, with stage 1 commencing in 2022 – this means the earliest possible time for an accreditation decision is Feb 2024. Seed is available through InterGrain Seedclub Members.

Table 6A: NVT Central Queensland – barley 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	1.52	2.4	3.34	3.44	3.3
	No. trials	2	2	2	2	1
Leabrook [◇]	9	119	113	124	108	119
Yeti [◇]	5			125	111	119
Beast [◇]	5			121	103	115
RGT Planet [◇]	9	117	110	112	104	115
Compass [◇]	9	110	108	124	98	111
Commodus [◇] CL	3				101	109
Commander [◇]	9	108	104	110	99	104
Laperouse [◇]	7		96	107	105	104
Zena [◇]	1					103
Rosalind [◇]	9	93	98	104	100	101
Shepherd [◇]	6	104	102	81		
LG Alestar [◇]	5	98	97			96
Fathom [◇]	8	93	98	94	101	
La Trobe [◇]	9	97	99	97	92	92
Minotaur [◇]	1					95
Maximus [◇] CL	5			88	103	87
Spartacus CL [◇]	9	80	90	87	89	83

Legend: Annual variety yield performance

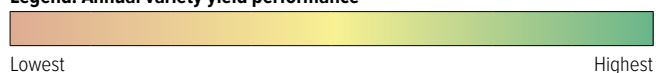


Table 6B: NVT South-East Queensland – barley 2017-21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	2.60	2.45	1.96	4.19	
	No. trials	1	1	2	2	
Yeti ^{db}	4			121	115	No trial
Beast ^{db}	4			121	106	
Leabrook ^{db}	6	108	109	116	104	
Maximus ^{db} CL	4			115	111	
Compass ^{db}	6	104	102	116	106	
Fathom ^{db}	6	89	97	131	105	
Laperouse ^{db}	5		104	111	108	
Commodus ^{db} CL	2				100	
Rosalind ^{db}	6	99	97	107	106	
La Trobe ^{db}	6	90	86	116	104	
Commander ^{db}	6	104	115	103	96	
Spartacus CL ^{db}	6	86	80	113	107	
RGT Planet ^{db}	6	109	97	93	100	
LG Alestar ^{db}	6	103	108	85	96	
Shepherd ^{db}	4	99	90	88		

Table 6C: NVT South-West Queensland – barley 2017-21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	1.35	3.19	2.19	3.38	3.87
	No. trials	2	1	1	2	2
Yeti ^{db}	5			122	112	110
Beast ^{db}	5			117	115	98
Leabrook ^{db}	8	115	111	110	114	101
Compass ^{db}	8	119	106	116	110	95
Laperouse ^{db}	6		106	107	103	108
Fathom ^{db}	8	110	100	109	110	98
RGT Planet ^{db}	8	108	105	106	103	101
Maximus ^{db} CL	5			104	97	112
Rosalind ^{db}	8	107	102	109	102	102
Commodus ^{db} CL	4				108	98
Minotaur ^{db}	2					108
La Trobe ^{db}	8	114	96	115	105	91
Spartacus CL ^{db}	8	111	93	117	98	95
Shepherd ^{db}	4	92	99	92		
Commander ^{db}	8	97	102	92	103	96
Zena ^{db}	2					100
LG Alestar ^{db}	8	91	96	91	92	96

CHICKPEA

KEY POINTS

Variety selection

- Choose varieties that best suit your environment

Seed source

- Only sow seed from a reputable source

Paddock history

- Aim for a break of at least three years between chickpea crops

INTRODUCTION

There are two groups of chickpea, 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 Indian communities in other parts of the world such as Britain and western Canada. Buyers in India and Pakistan prefer larger, light-coloured desi chickpea 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 in chickpea require an average daily temperature of 15°C; 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 prior to 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

Chickpea can be infected by *Ascochyta* blight (AB) 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 that 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 to 14 days after each rain event and, if *Ascochyta* is detected, consult your agronomist.

Botrytis grey mould

Botrytis grey mould (BGM) 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 BGM in spring as temperatures and humidity rise. Apply a fungicide containing either carbendazim or mancozeb once BGM has been identified within the crop. Variety BGM ratings appear in Table 7.

Root diseases

Phytophthora root rot

Phytophthora root rot (PRR) 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 waterlogged. A soil test should be carried out on all paddocks prior to sowing to ascertain the range and levels of disease present. Variety ratings for PRR appear in Table 7.

Root lesion nematode (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 that the absence of a winter cereal crop in recent seasons does not mean that there are low levels of nematodes in the soil. A soil test should be considered prior to planting if you do not know the species or 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 to be planted. The reaction of a chickpea variety may differ to the two species of RLN, *Pratylenchus thornei* and *Pratylenchus neglectus*. Refer to Table 7 for variety ratings.

CHICKPEA: INTEGRATED DISEASE MANAGEMENT

Summary of strategies

- **Variety selection is critical.** Choose varieties that best address your paddock disease status, especially regarding 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 to 85 percent 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 pulseaus.com.au

CHICKPEA VARIETY DISEASE RATINGS – QUEENSLAND

Table 7 contains varietal ratings for the predominant diseases of chickpeas in Queensland. Varieties

of most relevance to Queensland growers are listed in alphabetical order and disease ratings are colour-coded to match resistance and susceptibility ratings.

Table 7: Chickpea disease ratings.

Variety	Ascochyta blight (Pathogen Group 2 – North) resistance (1)	Phytophthora root rot resistance	Root lesion nematode			
			<i>P. neglectus</i>		<i>P. thornei</i>	
			Resistance ^m	Tolerance*	Resistance ^m	Tolerance*
CBA Captain ^{db}	MS	S	MR	TMT	MS	MT
Kyabra ^{db}	VS	SVS	MRMS	MT	MSS	TMT
PBA Boundary ^{db}	S	VS	RMR	MII	MRMS	TMT
PBA Drummond ^{db}	VS	VS	MR	T	MRMS	MTMI
PBA HatTrick ^{db}	S	S	MRMS	MT	MRMS	MT
PBA Pistol ^{db}	VS		RMR		MS	I
PBA Seamer ^{db}	MS	S	MRMS	MII	MRMS	MT

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

Blank cell = (no information available)

(1) Ascochyta ratings are for northern Australia only

* RLN tolerance – the root lesion nematode (*P. thornei* and *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.

^m 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.

DISEASE RATING COLOUR RANGE

VS	SVS	S	MSS	MS	MRMS	MR	RMR	R
VI	IVI	I	MII	MI	MTMI	MT	TMT	T

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 ^{db}	✓	No	NSW DPI/ GRDC	NSW DPI	\$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.
Kyabra ^{db}			QDAF/ NSW DPI	Heritage Seeds	Nil	2005	Tall, erect, high-yielding variety with large seed size and susceptible to all three diseases (Ascochyta blight, Phytophthora root rot, Botrytis grey mould). Lodging-resistant, bred for Southern Queensland but performs well in Central Queensland as well. Amethyst/Norwin/Barwon cross. Seed royalty applies. No EPR.
PBA Boundary ^{db}	✓	No	PBA	Seednet	\$4.00	2011	Moderately susceptible to Ascochyta blight but susceptible to Phytophthora root rot. Tall, erect with high yield. Lodging resistant and bred for Southern Queensland. Jimbour cross.
PBA Drummond ^{db}	✓	No	PBA	Seednet	\$4.50	2018	Tall, erect, high-yielding variety evaluated and released in Central Queensland with limited Ascochyta blight resistance. Lodging-resistant. PBA HatTrick ^{db} x PBA Pistol ^{db} cross.
PBA HatTrick ^{db}	✓	No	PBA	Seednet	\$4.00	2009	Moderate susceptibility to Ascochyta blight and moderate resistance to Phytophthora root rot. High yields in and bred for Southern Queensland. A cross involving Jimbour.
PBA Pistol ^{db}	✓	No	PBA	Seednet	\$4.00	2010	PBA Pistol ^{db} was released as a Moti replacement. It is taller, more resistant to lodging and offers improved harvestability, high yield with large seed size. PBA Pistol ^{db} 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 (Ascochyta blight, Phytophthora root rot, Botrytis grey mould). Lodging-resistant. A Moti cross.
PBA Seamer ^{db}	✓	No	PBA	Seednet	\$4.00	2016	Most resistant variety to all three diseases (Ascochyta blight, Phytophthora root rot, Botrytis grey mould). Semi-erect plant type with high yield. Lodging-resistant with improved seed quality. PBA HatTrick ^{db} cross, bred for Southern Queensland conditions.

[◇] DAWA – Department of Agriculture, Western Australia. GRDC – Grains Research and Development Corporation. NSW DPI – New South Wales Department of Primary Industries. CBA – Chickpea Breeding Australia. PBA – Pulse Breeding Australia. QDAF – Queensland Department of Agriculture and Fisheries

^{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.

CHICKPEA VARIETY YIELD PERFORMANCE – QUEENSLAND

Tables 9A to 9C contain chickpea grain 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 9A: NVT Central Queensland – chickpea desi 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	1.91	1.73	1.99	2.39	2.33
	No. trials	2	2	2	3	3
PBA Drummond ^{db}	12	102	114	106	104	107
PBA Seamer ^{db}	12	104	100	106	102	103
CBA Captain ^{db}	12	99	102	99	101	101
PBA Pistol ^{db}	12	99	90	104	103	100
Kyabra ^{db}	12	93	90	97	100	97
PBA HatTrick ^{db}	12	97	92	94	96	94

Table 9B: NVT South-East Queensland – chickpea desi 2017–21.

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

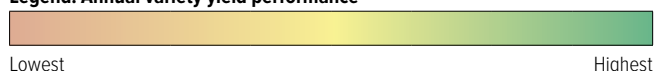
Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	1.55		0.49	1.39	
	No. trials	1		1	1	
CBA Captain ^{db}	3	108	No trial	114	103	No trial
PBA Boundary ^{db}	3	103		126	100	
PBA Drummond ^{db}	2			81	106	
Kyabra ^{db}	3	106		76	107	
PBA HatTrick ^{db}	3	94		98	97	
PBA Seamer ^{db}	3	89		80	96	

Table 9C: NVT South-West Queensland – chickpea desi 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield t/ha	0.79	2.13	0.54	1.25	1.86
	No. trials	1	1	2	1	2
PBA Drummond ^{db}	6		102	97	110	116
CBA Captain ^{db}	7	111	103	110	109	100
Kyabra ^{db}	7	104	101	75	106	100
PBA Seamer ^{db}	7	92	95	94	87	104
PBA Boundary ^{db}	7	102	104	99	105	85
PBA HatTrick ^{db}	7	94	99	87	94	90

Legend: Annual variety yield performance



NOTES

NOTES

Useful NVT tools



Visit the NVT website @ nvt.grdc.com.au

◀ Harvest Reports

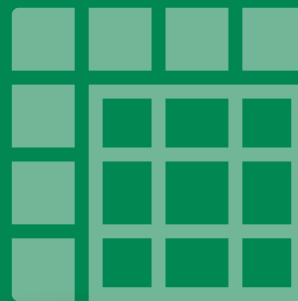
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◀
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results**



◀
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