

# 2021 SOUTH AUSTRALIAN CROP SOWING GUIDE



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GRAINS RESEARCH  
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CORPORATION

**SOUTH AUSTRALIA**  
NOVEMBER 2020



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

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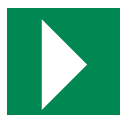
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[www.grdc.com.au/NVT-south-australian-crop-sowing-guide](http://www.grdc.com.au/NVT-south-australian-crop-sowing-guide)  
Remember to update it each November.

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## THE SOUTH AUSTRALIAN CROP SOWING GUIDE

The *South Australian Crop Sowing Guide* outlines information on current varieties of the major winter crops suitable to be grown in South Australia to assist growers in making decisions on variety selection for the upcoming season.

This edition of the *SA Crop Sowing Guide* has been compiled by officers within the South Australian Research and Development Institute (SARDI).

It is proudly sponsored by the South Australian Grain Industry Trust in association with the Department of Primary Industries and Regions and the Grains Research and Development Corporation.

The SARDI Crop Sciences Division officers acknowledge the sponsorship of this guide by the SA Grain Industry Trust (SAGIT) and the Grains Research and Development Corporation (GRDC), the contributions of agronomy and oat breeding and vetch breeding research staff in SA, as well as collaborators around Australia in producing results published in this edition.

Editor: Phil Davies, SARDI, Crop Sciences



# SA grain growers funding research solutions

**The South Australian Grain Industry Trust annually invests more than \$1.5 million to research and development projects across the industry, from growing, farming systems, soil management, nutrition, harvesting, storage, processing and marketing and extension of information to growers.**

## **In 2020, SAGIT is investing in these new projects:**

- 2020 National Controlled Traffic Farming Conference, Adelaide, Australian Controlled Traffic Farming
- Development of a dual-purpose common vetch variety for arid South Australia, University of Adelaide
- Enhancing grain production and quality traits for bread wheat, University of Adelaide
- Evaluation of dual purpose awnless wheat varieties for frost management, LongReach Plant Breeders
- Eyre Peninsula internship in applied grains research, AIR EP
- MacKillop Farm Management Group annual trial results book, MacKillop Farm Management Group
- Maximising performance of pre-emergent herbicide workshops, EPARF
- Management of fungicide resistant wheat powdery mildew, Trengove Consulting
- Novel bulk grain modelling for contamination sorting and separation using computer simulation, University of South Australia
- Pre-emptive flame retardant as a new tool for SA grain growers, SANTFA
- Publication of the 2021 Farm Gross Margin Guide for SA, PIRSA/ Rural Solutions
- Revealing invertebrate species and conditions causing seedling damage in field settings, Maarten van Helden
- Regional internship in applied grains research, Hart Field Site Group
- SA Crop Variety Sowing Guide, SARDI
- SANTFA Conference 2021-2023, SANTFA
- Taking South Australian canola profitability to the next level, AIR EP
- WA frost/low rainfall speaker for SA spring field days, Mallee Sustainable Farming

## **SAGIT is also supporting these ongoing projects:**

- A genetic, environmental and functional; investigation of late maturity alpha-amylase (LMA) and its implications for wheat breeding, University of Adelaide
- Agronomic and quality analysis of high protein malt barley in SA, SARDI
- Comparative effects of agricultural pesticides on SA soil microbial functions, University of South Australia
- Deep ripping to enhance production on Mallee sandy soils, Mallee Sustainable Farming
- Grower crop root health workshops, SARDI
- Improved phosphorus prescription maps - beyond replacement P, Trengove Consulting
- Improved soil water decisions across the S.E. cropping region, MacKillop Farm Management Group Inc
- Improving productivity of oats, SARDI
- Improving the early management of dry sown cereal crops, SARDI
- Increasing reliability of lentil production on sandy soils, Trengove Consulting
- Increasing the knowledge and understanding of micronutrient deficiency in the Upper North, Upper North Farming Systems
- Investigating frost susceptibility in Clearfield varieties treated with imidazolinone herbicide, Mallee Sustainable Farming
- Long-term cropping systems trial, Hart Field- Site Group
- Optimising P nutrition in pulses to maximise N fixation and yield, Agronomy Solutions
- Profitable pulses for the Murray Plains, Murray Plains Farmers
- Promoting secondary and tertiary student engagement in crop production, AgXtra
- Rapid development of innovative lentils for low rainfall regions, Global Grain Genetics
- Regional internship in applied grains research, Hart Field-Site Group
- Revealing the basis for head-loss in barley, University of Adelaide
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- Saline field evaluation of a wheat population identifying novel salinity tolerance, University of Adelaide
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- Strategies to enhance the value of on-farm grain storage in South Australia, CSIRO
- Supporting premier PA events: Precision Ag EXPOS and Symposiums, SPAA
- Uniform seed distribution along the row to increase yields and reduce seed costs, Northern Sustainable Soils
- Upper North Barley time of sowing; frost / heat stress effects, Upper North Farming Systems



# INTRODUCTION

## NATIONAL VARIETY TRIALS (NVT)

The variety trial results presented in this book are sourced from the NVT program, the National Oat Breeding Program and the National Vetch Breeding Program.

NVT provide independent information on varieties for growers. The aim of each NVT is to document a ranking of new and widely adopted varieties in terms of grain yield and to provide grain quality information relevant to delivery standards. NVT are also used by pathologists to determine disease resistance ratings used in the sowing guide.

Conducted to a set of predetermined protocols, variety trials are sown and managed as closely as possible to local best practice, such as sowing time, fertiliser application, weed management, and pest and disease control, including fungicide application. NVT are not designed to grow varieties to their maximum yield potential.

It is acknowledged 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.

## PLANT BREEDER'S RIGHTS (PBR)

Varieties subject to Plant Breeder's Rights at the time of printing are annotated with the symbol <sup>®</sup>. It should be noted that unauthorised commercial propagation or any sale, conditioning, export, import or stocking of propagation material of these varieties is an infringement under the *Plant Breeder's Rights Act 1994*. Intentional infringement of a PBR attracts a penalty of \$85,000 for individuals. The penalty for corporations is up to five times greater.

## END POINT ROYALTIES (EPRS)

EPRs payable for 2020-21 are quoted from [www.varietycentral.com.au](http://www.varietycentral.com.au) and are quoted ex-GST. Compliance with EPR systems is vital to ensure the future of the Australian grains industry through the funding of new varieties and long-term productivity gains. EPRs for 2021-22 harvest will become available early in 2021 on the Variety Central website.

## INTERPRETING LONG-TERM YIELD DATA

The long-term yield data presented in this sowing guide is an output of NVT Long Term Multi Environment Trial (MET) analysis. NVT run trials in all cropping regions of Australia (for example, Lower Eyre Peninsula, Mid North, Murray Mallee) and use a five-year rolling dataset in the MET analysis.

Historically, NVT used a variance component analysis model to produce long-term yield predictions on a regional 'mean' basis. In Australia, this model has been found to be inadequate in modelling variety by environment interaction (GxE) (genotype), and reporting at a regional level often masked important GxE interactions. This meant that good and bad years were 'averaged' together, making it difficult to understand the strengths and weaknesses of each variety when trialled in different environments.

Now, a factor analytic (FA) mixed model approach is used in the MET analysis, using expertise from the GRDC-supported Statistics for the Australian Grains Industry (SAGI) program. This approach generates long-term MET predictions for varieties at an individual trial level. A prediction is generated for every variety in every trial in the entire dataset, regardless of whether the variety was actually tested at every location. Using the FA model, NVT can provide a yield prediction for every situation.

For instance, if the yields of five varieties were ranked in a similar order at multiple trials (sites A, B, C and D), but variety X was not grown at site D, the relative ranking of X against the other varieties can be used to predict the yield of variety X at site D.

The output used in this sowing guide presents the MET data on a region-by-year basis across the five years used in the MET dataset. The analysis, and subsequent reporting systems, have allowed NVT to bring together very large datasets and make more refined, relevant and robust predictions about the relative performance of each variety across different locations and seasons. Readers can now use this more detailed data to better understand a variety's performance over several years – rather than just a single averaged value.

Readers can further interrogate the data online to better understand the performance of varieties under a range of situations using the NVT Long Term Yield Reporting Tool. The FA method is a very powerful and accurate predictor of performance, and the yield predictions are best viewed at the individual trial/environment level. However, these detailed datasets are too large for printed sowing guides or quick reference summaries. NVT have developed a system for viewing the complex dataset based on individual user preferences. Users can choose to view data in year or yield-based groupings and can tailor site or region selections to their own needs, for instance by viewing METs only for sites where varieties were present in the trials (default option). In the *SA Crop Sowing Guide*, we present results in year groupings and only for varieties present in trials. The NVT Long Term Yield Reporter tool is designed to run on all web-browsing platforms on computers, tablets and phones, and is available online at <https://app.nvtonline.com.au>.

## 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.

## DISEASE RATING COLOUR RANGE

R	RMR	MR	MRMS	MS	MSS	S	SVS	VS
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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.



# WHEAT

By Kenton Porker, Melissa McCallum, Courtney Peirce,  
Hugh Wallwork and Tara Garrard, SARDI

Since publication of the 2020 sowing guide, there have been several new releases, including milling wheats BASF Ascot<sup>®</sup>, Ballista<sup>®</sup> and Denison<sup>®</sup>, the Clearfield<sup>®</sup> variety Hammer CL Plus<sup>®</sup> and feed wheat Anapurna. The sowing guide continues to include the introduction of selected winter wheats and feed wheats.

Information on the most important selection criteria, grain yield, quality, maturity classification and disease resistance for each variety can be found in this guide, with a summary in Table 1. While the varieties listed are considered likely to provide the best return within each quality grade, farmers need to consider their individual farm and paddock situation and make their selection based on all available information.

## USEFUL RESOURCES

For an overview of wheat production in Australia, go to the Australian Export Grains Innovation Centre (AEGIC) website: [www.aegic.org.au/publications/australian-grains/wheat](http://www.aegic.org.au/publications/australian-grains/wheat).

Information about Australian wheat classification can be found on the Wheat Quality Australia website: [wheatquality.com.au](http://wheatquality.com.au).

Information about the Australian wheat trade and current GTA receival standards can be found on the Grain Trade Australia website: [www.graintrade.org.au](http://www.graintrade.org.au).

## DOMESTIC FLOUR MILLERS' WHEAT VARIETY PREFERENCES

Most of South Australia's wheat is exported to the Middle East for flat and pan bread production, and to a lesser extent noodle production. The domestic flour millers purchase a small proportion of South Australian wheat, either from marketers or directly from growers.

The domestic flour millers may have different quality requirements to export markets due to different end products and processes employed. For further information, contact Laucke Flour Mills on 03 5431 5201.

## MATURITY CLASSIFICATIONS

Maturity classifications and terminology have been assigned using the industry guidelines provided by Australian Crop Breeders Ltd and will be different to previous editions.

Varieties differ in development speed. It is important to match variety development with sowing time as flowering time is critical for wheat yield. Growers need to understand the optimal flowering periods for their environment. The optimal flowering period is a compromise between frost risk, moisture stress and heat stress events, and differs from region to region.

The majority of widely adapted, quick to mid-developing wheat varieties are suited to early-May to mid-May sowing. A growing number of varieties in the mid to slow range that may offer potential for late-April to early-May sowing are currently being evaluated; however, these need wider evaluation at those sowing times.

The majority of long-term data generated from NVT results presented in this publication are derived from commercially relevant May sowing dates. Winter varieties are suited for dual-purpose use from mid-March and April germination dates, and are suited for grain only at sowing dates before 20 April.

More information on early sowing winter varieties is available at: [grdc.com.au/ten-tips-for-early-sown-wheat](http://grdc.com.au/ten-tips-for-early-sown-wheat).

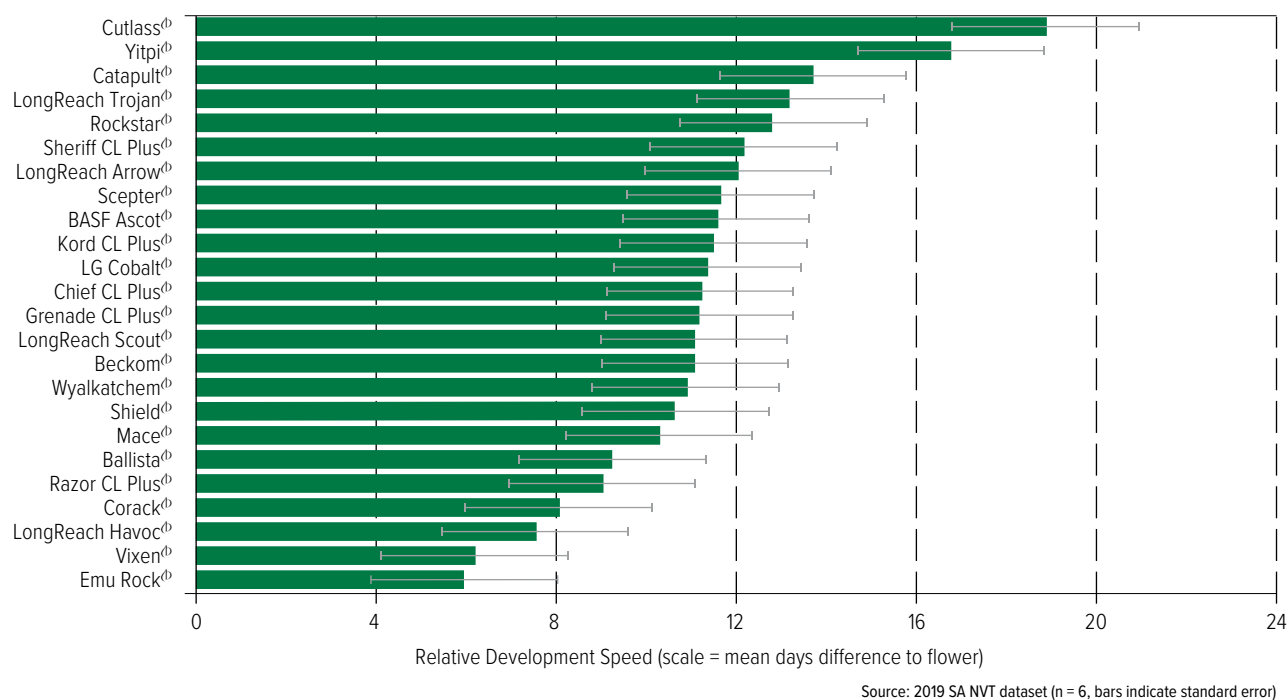
Extensive state-wide evaluation within NVT over coming seasons will provide more confidence in varieties that may have specific adaptation requirements.

**Table 1: Suitable wheat varieties for planting in South Australia.**

Variety and current maximum grade	Maturity classification	Suitability and significant features
<b>AUSTRALIAN HARD (AH)</b>		
Ballista <sup>db</sup>	Q – M	All districts but particularly Mallee environments.
Beckom <sup>db</sup>	M	Medium-rainfall districts.
Catapult <sup>db</sup>	M – S	All districts broad adaptation, wheat-on-wheat option, development pattern suited to late April to early May sowing, but limited evaluation in SA from this sowing date.
Emu Rock <sup>db</sup>	VQ – Q	Low to medium-rainfall districts.
Grenade CL Plus <sup>db</sup>	Q – M	All districts, imidazolinone tolerant.
Hammer CL Plus <sup>db</sup>	Q – M	All districts, imidazolinone tolerant.
Illabo <sup>db</sup>	Q (+W)	Mid-winter wheat, very early sowing (pre-April 20) and grazing opportunity in medium to high-rainfall zones.
LongReach Arrow <sup>db</sup>	M	All districts, similar yields to Mace <sup>db</sup> with shorter plant height, wheat-on-wheat option.
LongReach Cobra <sup>db</sup>	Q – M	Medium to high-rainfall districts.
LongReach Havoc <sup>db</sup>	Q – M	All districts, suited to wheat-on-wheat except that it is susceptible to Septoria tritici blotch.
LongReach Kittyhawk <sup>db</sup>	M (+W)	Mid-winter wheat, very early sowing and grazing opportunity in medium to high-rainfall zones.
LongReach Scout <sup>db</sup>	M	All districts, avoid wheat stubbles due to Yellow leaf spot susceptibility. Now outclassed.
RockStar <sup>db</sup>	M – S	All districts broad adaptation, wheat-on-wheat option, maturity suited to late April to early May sowing, but limited evaluation in SA from this sowing date.
Scepter <sup>db</sup>	M	All districts broad adaptation, wheat-on-wheat option except that it is susceptible to Septoria tritici blotch and Powdery mildew.
Vixen <sup>db</sup>	Q	All districts, fast development, similar yields to Scepter <sup>db</sup> , wheat-on-wheat option except that it is susceptible to Septoria tritici blotch and very susceptible to Powdery mildew.
<b>AUSTRALIAN PREMIUM WHITE (APW)</b>		
BASF Ascot <sup>db</sup>	M	Medium to high rainfall districts.
Chief CL Plus <sup>db</sup>	M	All districts, imidazolinone tolerant, wheat-on-wheat option except that it is very susceptible to Powdery mildew.
Cutlass <sup>db</sup>	M – S	All districts and early sowing situations.
LG Cobalt <sup>db</sup>	M	All districts, yields similar to Mace <sup>db</sup> symbol.
LongReach Nighthawk <sup>db</sup>	VS	Slow spring wheat, suited to pre-April 20 emergence. Limited evaluation in NVT.
LongReach Trojan <sup>db</sup>	M – S	Medium to high-rainfall districts.
Sheriff CL Plus <sup>db</sup>	M – S	All districts, imidazolinone tolerant. Development speed similar to LongReach Trojan <sup>db</sup> , suited to wheat-on-wheat except that it is susceptible to Septoria tritici blotch and very susceptible to Powdery mildew.
<b>AUSTRALIAN STANDARD WHITE (ASW)</b>		
DS Bennett <sup>db</sup>	M (+W)	Slow winter wheat, very early sowing and grazing opportunity in medium to higher rainfall zones, awnless hay option.
Razor CL Plus <sup>db</sup>	Q – M	All districts, imidazolinone tolerant, slightly higher yielding than Mace <sup>db</sup> .
<b>SOFT</b>		
LongReach Impala <sup>db</sup>	M	Soft wheat-producing districts
LongReach Orion <sup>db</sup>		Soft wheat-producing districts. Awnless hay option
<b>UNCLASSIFIED AND FEED</b>		
Anapurna	M – S (+W)	Slow red winter wheat, very early sowing and grazing opportunity in medium to high-rainfall zones.
Denison <sup>db</sup>	S	Development pattern suited to late April to early May sowing, but limited evaluation in SA from this sowing date.
Longsword <sup>db</sup>	Q (+W)	Fast winter wheat, very early to May sowing and grazing opportunity in all districts.
Manning <sup>db</sup>	S (+W)	High-rainfall, winter wheat suited to long-season districts especially the South East region.
RGT Accroc	M – S (+W)	Slow red winter wheat, very early sowing and grazing opportunity in medium to high-rainfall zones.
RGT Calabro	S (+W)	Slow red winter wheat, very early sowing and grazing opportunity in medium to high-rainfall zones.
RGT Zanzibar	VS	Medium to high-rainfall districts, more evaluation needed. Highly susceptible to Stem rust.
TenFour <sup>db</sup>	VQ – Q	All districts.
<b>DURUM</b>		
Bitalli <sup>db</sup>	Q – M	All durum districts.
DBA Artemis <sup>db</sup>	M – S	All durum districts.
DBA Spes <sup>db</sup>	M	All durum districts.
DBA Vittaroi <sup>db</sup>	Q – M	All durum districts.
DBA-Aurora <sup>db</sup>	M	All durum districts.
Saintly <sup>db</sup>	Q – M	All durum districts, and potential for hay production (awnless).
Westcourt <sup>db</sup>	M	All durum districts.

Maturity: VQ = very quick, Q = quick, M = mid, S = slow, VS = very slow, (+W) = winter wheat.





**FIGURE 1** Relative speed of development of selected wheat varieties sown during May to June across SA. Varieties are ranked according to time to flower.

## DISEASE

Growers should note a number of the newer varieties listed in this guide are below acceptable industry standards for rust resistance, but offer other important or useful attributes. If grown, these varieties should be accompanied by suitable rust-preventative strategies. Where varieties do not meet minimum disease-resistance standards for rust, as set by industry, they are listed with a cautioning note.

The current status of selected wheat varieties is shown in Table 2. The full SARDI Cereal Variety Disease Guide should always be consulted when selecting varieties and can be found at:

[pir.sa.gov.au/research/services/reports\\_and\\_newsletters/crop\\_performance](http://pir.sa.gov.au/research/services/reports_and_newsletters/crop_performance).

An updated version, with 2020 data, will be available from mid-February 2021.

## WHEAT VARIETY NOTES

### MILLING WHEATS (ASW APW AH)

#### NEW – BASF ASCOT<sup>®</sup>

BASF Ascot<sup>®</sup> is an APW quality, mid-maturing variety suited to medium to high-rainfall zones. BASF Ascot<sup>®</sup> is the first wheat variety to be launched by BASF. Released in 2020 (tested as BSWDH10-215) and bred by BASF, seed is available and marketed by Seednet. EPR \$3.85 ex-GST.

#### NEW – BALLISTA<sup>®</sup>

Ballista<sup>®</sup> is an AH quality, quick to mid-maturing variety, slightly quicker than Mace<sup>®</sup>. Ballista<sup>®</sup> has high and stable yield across a range of environmental conditions and has CCN resistance similar to Scepter<sup>®</sup> and Mace<sup>®</sup>. Released in 2020 (tested as RAC2598), bred and marketed by AGT, Ballista<sup>®</sup> is eligible for AGT Seed Sharing™. EPR \$3.50 ex-GST.

#### BECKOM<sup>®</sup>

Beckom<sup>®</sup> is a mid-maturing AH wheat suited to the medium to high yield potential environments of SA. Beckom<sup>®</sup> is resistant to cereal cyst nematode (CCN) and shows moderate resistance (MRMS) to Stripe rust, but is susceptible to Leaf rust, Septoria tritici blotch and Powdery mildew. Beckom<sup>®</sup> has a tendency for small grain size, especially in tight finishing seasons. Seed is available from AGT affiliates and Seed Sharing™. EPR \$3.25 ex-GST.

#### CATAPULT<sup>®</sup>

Catapult<sup>®</sup> was released in 2019 by AGT as a variety for late-April/early-May sowing. Catapult<sup>®</sup> offers wide adaptation and has a mid to slow maturity suited for earlier planting opportunities in late April to early May. Yield evaluation of Catapult<sup>®</sup> from earlier sowing is limited in SA and more evaluation is required. Initial data suggests Catapult<sup>®</sup> produces grain with high test weights and low screenings,

and is suitable for wheat-on-wheat situations, with suitable Yellow leaf spot resistance. Seed is available from AGT affiliates, retailers, or through Seed Sharing™. EPR \$3.25 ex-GST.

### CHIEF CL PLUS<sup>Ⓢ</sup>

Chief CL Plus<sup>Ⓢ</sup> is a mid-maturing imidazolinone herbicide-tolerant (Clearfield®) APW wheat, derived from Wyalkatchem<sup>Ⓢ</sup> and released in 2016 by InterGrain. Chief CL Plus<sup>Ⓢ</sup> is rated as moderately resistant (MR) to Leaf rust, RMR for Stem rust and MRMS for Yellow leaf spot, but is very susceptible to Powdery mildew (SVS) and Stripe rust (MSS). The long-term results show grain yields similar to Wyalkatchem<sup>Ⓢ</sup> in many districts. Seed is available for 2020 planting from local resellers or InterGrain Seedclub members. EPR \$4.25 ex-GST.

### CUTLASS<sup>Ⓢ</sup>

Cutlass<sup>Ⓢ</sup> has an APW classification in SA and was released by AGT in 2015. Cutlass<sup>Ⓢ</sup> is a mid to slow-maturing variety like Yitpi<sup>Ⓢ</sup>. Cutlass<sup>Ⓢ</sup> is rated as moderately resistant to CCN with good levels of resistance to all rusts (MS to Stripe rust) but moderately susceptible to susceptible (MSS) to Yellow leaf spot. Cutlass<sup>Ⓢ</sup> is lower yielding than fast to mid-developing cultivars from May sowing dates. Cutlass<sup>Ⓢ</sup> has a unique flowering behaviour, and commercial and agronomy data suggest it has an application for early sowing and frost risk management where Yitpi<sup>Ⓢ</sup> has been successful. Seed is available from AGT affiliates, retailers, or through Seed Sharing™. EPR \$3.00 ex-GST.

### NEW – DENISON<sup>Ⓢ</sup>

Denison<sup>Ⓢ</sup> is an APW quality, slow-maturing variety suited to mid to late-April sowing. It has short stature with good lodging resistance. Released in 2020 (tested as WAGT734). It was bred and marketed by AGT and is eligible for AGT Seed Sharing™. EPR \$3.40 ex-GST.

### EMU ROCK<sup>Ⓢ</sup>

Emu Rock<sup>Ⓢ</sup> is a very quick to quick-maturing AH quality variety for mid to late sowings in a broad range of environments across southern Australia. Emu Rock<sup>Ⓢ</sup> is susceptible to CCN, Septoria tritici blotch (SVS), Leaf rust and Powdery mildew, but has moderate resistance (MRMS) to s\Stripe rust and Yellow leaf spot. Across NVT in SA, Emu Rock<sup>Ⓢ</sup> has shown yields aligned with Wyalkatchem<sup>Ⓢ</sup>. Seed is available from InterGrain and is approved for farmer-to-farmer trade. EPR \$3.50 ex-GST.

### GRENADE CL PLUS<sup>Ⓢ</sup>

Grenade CL Plus<sup>Ⓢ</sup> is an imidazolinone herbicide-tolerant (Clearfield®) AH variety. It is quick to mid-maturing with moderate resistance to CCN, Stem rust (MR) and Stripe rust (MRMS). It is, however, susceptible to Leaf rust and Yellow leaf spot. Seed is available from AGT Affiliates. EPR \$3.80 ex-GST.

### HAMMER CL PLUS<sup>Ⓢ</sup>

Hammer CL Plus<sup>Ⓢ</sup> is an imidazolinone herbicide-tolerant (Clearfield®) AH variety with two-gene tolerance to label rates of Intervix® herbicide. It is closely related to Mace<sup>Ⓢ</sup> with similar quick to mid maturity and adaptability. Hammer CL Plus<sup>Ⓢ</sup> has CCN and Yellow leaf spot resistance. Released 2020 (tested as OAGT0016) Hammer CL Plus<sup>Ⓢ</sup> was bred and is marketed by AGT and it is not eligible for AGT Seed Sharing™. EPR \$4.25 ex-GST.

### KORD CL PLUS<sup>Ⓢ</sup>

Kord CL Plus<sup>Ⓢ</sup> carries two genes for Clearfield® resistance and is derived from Gladius<sup>Ⓢ</sup> with mid maturity and susceptibility to pre-harvest sprouting, but is MR to CCN. Kord CL Plus<sup>Ⓢ</sup> has an AH classification and has yielded similar to Gladius<sup>Ⓢ</sup> in all districts. Seed is available from AGT affiliates. EPR \$3.55 ex-GST.

### LG COBALT<sup>Ⓢ</sup>

LG Cobalt<sup>Ⓢ</sup> is a mid-maturing cultivar with an APW grain quality classification in SA. Long-term yield performance of LG Cobalt<sup>Ⓢ</sup> suggests it is similar to Mace<sup>Ⓢ</sup> in most SA districts. LG Cobalt<sup>Ⓢ</sup> is rated MSS to CCN, RMR to Stripe rust, MSS to Leaf rust, Powdery mildew and Yellow leaf spot. LG Cobalt<sup>Ⓢ</sup> is available through Elders and selected seed partners.

### LONGREACH ARROW<sup>Ⓢ</sup>

LongReach Arrow<sup>Ⓢ</sup> is an AH quality wheat from LongReach Plant Breeders, released in 2016. LongReach Arrow<sup>Ⓢ</sup> is a mid-maturity wheat and develops at a similar speed to Scepter<sup>Ⓢ</sup>. For SA NVT, LongReach Arrow<sup>Ⓢ</sup> yields were similar to Mace<sup>Ⓢ</sup> in the lower to medium-yielding environments and had a small improvement over Mace<sup>Ⓢ</sup> in the higher yielding environments. LongReach Arrow<sup>Ⓢ</sup> is susceptible to Septoria tritici blotch, CCN, stripe, stem and leaf rusts, but is moderately resistant to Yellow leaf spot. LongReach Arrow<sup>Ⓢ</sup> has good physical grain quality with good Black point resistance (MRMS) and relatively short plant height suited to stubble-retained systems. Seed is available from Pacific Seeds. EPR \$3.00 ex-GST.



**LONGREACH COBRA<sup>®</sup>**

LongReach Cobra<sup>®</sup> was released as a quick to mid-maturing Westonia derivative with AH quality and high yield potential, particularly in the medium to higher rainfall districts of SA. LongReach Cobra<sup>®</sup> has good resistance to Stem rust but is rated MSS to Stripe rust, and some susceptibility to Leaf rust has been observed. It is S to Septoria tritici blotch and MS to CCN and Yellow leaf spot. LongReach Cobra<sup>®</sup> has good grain size and moderate test weight and is moderately susceptible to pre-harvest sprouting. Seed is available from Pacific Seeds. EPR \$3.50 ex-GST.

**LONGREACH HAVOC<sup>®</sup>**

LongReach Havoc<sup>®</sup> is a quick to mid-maturing Mace<sup>®</sup> derivative with AH quality. LongReach Havoc<sup>®</sup> has a shorter canopy than Mace<sup>®</sup>. It is susceptible to Leaf and Stem rusts and very susceptible to Septoria tritici blotch, but moderately resistant to Stripe rust. Long-term yield performance is similar or slightly below Mace<sup>®</sup> in most environments. Seed is available from Pacific Seeds. EPR \$4.00 ex-GST.

**LONGREACH NIGHTHAWK<sup>®</sup>**

LongReach Nighthawk<sup>®</sup> has APW classification in SA, and is a very slow-maturity spring wheat developed for early germination opportunities prior to 25 April. It is suited to early planting or grazing opportunities similar to winter wheat in the higher rainfall zones. Early sowing agronomy data suggests LongReach Nighthawk<sup>®</sup> has similar or higher yields than winter wheats when established in mid-April. LongReach Nighthawk<sup>®</sup> has good resistance to Stem and Stripe rusts but is MSS to Leaf rust and Septoria tritici blotch and S to Powdery mildew. More evaluation is needed. Seed is available from Pacific Seeds. EPR \$4.25 ex-GST.

**LONGREACH TROJAN<sup>®</sup>**

LongReach Trojan<sup>®</sup> is a mid to slow-maturing APW quality variety with high yield potential, particularly in medium to high-rainfall districts. LongReach Trojan<sup>®</sup> is well suited to main season sowing in high-production zones and slightly earlier sowing in medium-rainfall zones. It is MSS to Stripe rust, MRMS to Stem and Leaf rusts and MS for Septoria tritici blotch. LongReach Trojan<sup>®</sup> is rated S for Powdery mildew and is MS for CCN. LongReach Trojan<sup>®</sup> has large grain size with low screenings, high test weight and good Black point resistance. Seed is available from Pacific Seeds. EPR \$4.00 ex-GST.

**MACE<sup>®</sup>**

Mace<sup>®</sup> has quick to mid maturity and an AH classification. It is SVS to Stripe rust and S to Septoria tritici blotch, but is better (MSS) to Powdery mildew than similar varieties. Mace<sup>®</sup> has been widely tested since 2009 in NVT in SA and shows wide adaptation, coupled with high yield potential and wheat-on-wheat application. Seed is available from AGT affiliates and Seed Sharing™. EPR \$3.00 ex-GST.

**RAZOR CL PLUS<sup>®</sup>**

Razor CL Plus<sup>®</sup> is a quick to mid-maturity, imidazolinone herbicide-tolerant (Clearfield®) ASW wheat released by AGT. The long-term performance of Razor CL Plus<sup>®</sup> suggests it is the highest yielding Clearfield® variety and on average is three per cent higher than Mace<sup>®</sup>. Razor CL Plus<sup>®</sup> is rated SVS for Septoria tritici blotch, S to Leaf rust, and MS to Stripe rust, but MR to CCN. Seed is available from AGT affiliates. EPR \$3.30 ex-GST.

**ROCKSTAR<sup>®</sup>**

RockStar<sup>®</sup> was released in 2019 by InterGrain. RockStar<sup>®</sup> offers wide adaptation but has a mid to slow maturity which may be suited for earlier planting opportunities in late April to early May. Yield performance similar to or slightly higher than Scepter<sup>®</sup> using May to June sowing dates in the long term NVT data. Yield evaluation of RockStar<sup>®</sup> from earlier sowing is limited in SA and more evaluation is required. RockStar<sup>®</sup> is rated MRMS to Stripe rust and Yellow leaf spot, SVS to Powdery mildew, S to Leaf rust, and MSS to Septoria. RockStar<sup>®</sup> is available for planting in 2020 from local resellers and Seedclub members. EPR \$3.50 ex-GST

**SCEPTER<sup>®</sup>**

Scepter<sup>®</sup> is a mid-maturing AH wheat in SA, was released by AGT in 2015 and is now the most widely grown wheat variety in SA. Scepter<sup>®</sup> is largely derived from Mace<sup>®</sup> with many similar characteristics although it has improved grain yield and Stripe rust resistance and is more susceptible to Powdery mildew. Scepter<sup>®</sup> is rated MRMS to Stem rust, MSS to Leaf rust and is rated MRMS to CCN and Yellow leaf spot. Scepter<sup>®</sup> shows wide adaptation and is suitable for wheat-on-wheat application, except where Septoria tritici blotch and Powdery mildew are likely to be a problem. Seed is available from AGT affiliates, retailers, or through Seed Sharing™. EPR \$3.25 ex-GST.

**SHERIFF CL PLUS<sup>®</sup>**

Sheriff CL Plus<sup>®</sup> is an imidazolinone herbicide-tolerant (Clearfield<sup>®</sup>) APW wheat released by InterGrain in 2018. Sheriff CL Plus<sup>®</sup> is a mid to slow-maturing wheat and is similar to LongReach Trojan<sup>®</sup> in developmental speed and can be sown slightly earlier than the other Clearfield<sup>®</sup> wheat varieties. The long-term NVT performance of Sheriff CL Plus<sup>®</sup> suggests it yields similar to Mace<sup>®</sup> and has stable yields across most regions. Sheriff CL Plus<sup>®</sup> is rated SVS to Leaf rust and Powdery mildew, MSS to Stem and Stripe rusts, S to Septoria tritici blotch, MRMS to Yellow leaf spot, and MS to CCN. Seed is available from local resellers or InterGrain Seedclub members. EPR \$4.25 ex-GST.

**VIXEN<sup>®</sup>**

Vixen<sup>®</sup> is a quick-maturity variety and develops slightly quicker than Mace<sup>®</sup>. Vixen<sup>®</sup> was released by InterGrain in 2018 and has an AH classification in SA. Long-term data suggests performance is slightly above Scepter<sup>®</sup>. The variety's development speed is suited to mid-May to later sowings. Vixen<sup>®</sup> is rated SVS to Leaf rust, MRMS to Stem and Stripe rusts, S to Septoria tritici blotch, MRMS to Yellow leaf spot, and S to CCN. Vixen<sup>®</sup> seed is approved for grower-to-grower trading, and seed is available through local resellers or InterGrain Seedclub members. EPR \$3.50 ex-GST.

**SOFT WHEATS****LONGREACH IMPALA<sup>®</sup>**

LongReach Impala<sup>®</sup> is a mid-maturity soft biscuit (ASF1) wheat targeted to eastern Australia. It is susceptible to CCN, has good Stem and Stripe rust resistance, but is very susceptible to Septoria tritici blotch and Leaf rust. LongReach Impala<sup>®</sup> produces large grain with low screening losses and is MRMS to Black point. Seed is available from Pacific Seeds. EPR \$3.50 ex-GST.

**LONGREACH ORION<sup>®</sup>**

LongReach Orion<sup>®</sup> is a mid to slow-maturing soft biscuit (ASF1) wheat targeted to eastern Australia. LongReach Orion<sup>®</sup> is susceptible to CCN and Yellow leaf spot but has good Stem and Leaf rust resistance and is MSS to Stripe rust. LongReach Orion<sup>®</sup> is S to Black point and susceptible to sprouting. Seed is available from Pacific Seeds. EPR \$3.00 ex-GST.

**FEED AND UNCLASSIFIED WHEATS****RGT ZANZIBAR**

RGT Zanzibar is a very slow-maturing red spring wheat with feed grain quality, suited to the medium to high-rainfall zone. RGT Zanzibar has good standability. It is, however, very susceptible to Stem rust, making this variety a high risk should Stem rust occur and so should be grown with caution. Seed is available from Seed Force broadacre commercial partners. EPR \$4.00 ex-GST.

**TENFOUR<sup>®</sup>**

TenFour<sup>®</sup> is a very quick to quick, white-grained feed wheat released in 2015, that has shown high yield potential in SA NVT trials across a wide range of environments. TenFour<sup>®</sup> is available through Elders and selected seed partners. EPR \$3.00 ex-GST.



Table 2: Disease responses of selected wheat varieties and reaction to common disorders.

Variety	Rust			Septoria tritici blotch	Yellow leaf spot	Powdery mildew	Black point	CCN
	Stem	Stripe	Leaf					
Anapurna	MSS	R	MS	MRMS	MRMS	MR	–	–
BASF Ascot <sup>db</sup>	MRMS	MSS	RMR	S	MRMS	S	MS	MR
Ballista <sup>db</sup>	RMR	S	S	S	MSS	SVS	–	MRMS
Beckom <sup>db</sup>	MRMS	MRMS	MSS	S	MSS	MSS	MRMS	R
Bolac <sup>db</sup>	MRMS	RMR	MRMS	MSS	MSS	MRMS	MS	S
Catapult <sup>db</sup>	MR	MRMS	S	MSS	MRMS	SVS	MSS	R
Chief CL Plus <sup>db</sup>	RMR	MSS	MR	MSS	MRMS	SVS	MS	MS
Cutlass <sup>db</sup>	R	MS	R	MSS	MSS	MSS	MS	MR
Denison <sup>db</sup>	MR/S	MS	S	MS	MRMS	S	–	–
DS Bennett <sup>db</sup>	MRMS	S	S	MSS	MRMS	R	S	MSS
EGA Wedgetail <sup>db</sup>	RMR	R	SVS	MS	MS	MR	MS	MSS
Emu Rock <sup>db</sup>	MS	MRMS	SVS	SVS	MRMS	MSS	MS	S
Grenade CL Plus <sup>db</sup>	MR	MRMS	S	S	S	MS	MSS	MR
Hammer CL Plus <sup>db</sup>	MR	MRMS	MSS	MSS	MRMS	SVS	–	–
Illabo <sup>db</sup>	MS	RMR	S	MSS	MS	MRMS	MS	MS
LongReach Impala <sup>db</sup>	MR	MR	SVS	VS	MSS	R	MS	MSS
Kiora <sup>db</sup>	MR	RMR	MRMS	MS	MSS	MS	MS	MSS
Kord CL Plus <sup>db</sup>	MR	MRMS	MS	MS	MSS	MS	MRMS	MR
LG Cobalt <sup>db</sup>	S	RMR	MSS	S	MSS	MSS	MRMS	MSS
LongReach Arrow <sup>db</sup>	S	S	SVS	S	MRMS	SVS	MRMS	MS
LongReach Cobra <sup>db</sup>	RMR	MSS	MR/S*	S	MS	MSS	MSS	MS
LongReach Havoc <sup>db</sup>	S	MR	S	MSS	MRMS	S	MS	S
LongReach Kittyhawk <sup>db</sup>	MRMS/S*	RMR	MS	MRMS	MRMS	MS	MS	S
LongReach Nighthawk <sup>db</sup>	RMR	RMR	MSS	MSS	MS	SVS	MS	MS
LongReach Trojan <sup>db</sup>	MRMS	MSS	MRMS*	MS	MSS	SVS	MS	MS
Longsword <sup>db</sup>	MR	RMR	MSS	MSS	MRMS	MS	MRMS	MRMS
Mace <sup>db</sup>	MRMS	SVS	MSS	S	MRMS	MSS	MRMS	MRMS
Manning <sup>db</sup>	MR	RMR	MS	MR	MRMS	MS	SVS	S
LongReach Orion <sup>db</sup>	MR	MSS	R	MRMS	MSS	SVS	S	MS
Razor CL Plus <sup>db</sup>	MRMS	MS	S	SVS	MSS	MSS	MS	MR
RGT Accroc	MS	R	S	MS	MRMS	MRMS	MRMS	S
RGT Calabro	MS	RMR	MSS	MRMS	MRMS	MR	MS	S
RGT Zanzibar	VS	R	SVS	S	MS	MRMS	MRMS	MSS
RockStar <sup>db</sup>	MR	MRMS	S	MSS	MRMS	SVS	MS	MSS
Scepter <sup>db</sup>	MRMS	MSS	MSS	S	MRMS	SVS	MS	MRMS
LongReach Scout <sup>db</sup>	MR	MS	MS	S	SVS	MS	S	R
Sheriff CL Plus <sup>db</sup>	MS	MSS	SVS	S	MRMS	SVS	MRMS	MS
SQP Revenue <sup>db</sup>	RMR	R	VS	S	MS	R	MS	S
TenFour <sup>db</sup>	S	SVS	MS	SVS	MRMS	S	MRMS	MS
Vixen <sup>db</sup>	MRMS	MRMS	SVS	S	MRMS	SVS	MS	MSS
Wyalkatchem <sup>db</sup>	MSS	S	S	S	MR	SVS	MS	S
Yitpi <sup>db</sup>	S	MRMS	S	MSS	SVS	MS	MS	MR

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, – variety yet to be fully evaluated.

(S) Indicates a variety was scored as a susceptible reaction in some experiments. / Ratings separated by "/" denotes different responses to different pathotypes.

\* Provisional rating based on limited NVT data. Ratings provided are primarily from 2018 and earlier with limited updates based on 2019 data. Cereal cyst nematode (CCN) resistance refers to the ability of the variety to reduce CCN carryover. Black point is not a disease but is a physiological response to certain humid conditions.

Information on disease reactions was supplied by Cereal Pathology (SARDI). Contact Dr Hugh Wallwork: [hugh.wallwork@sa.gov.au](mailto:hugh.wallwork@sa.gov.au) or Dr Tara Garrard: [tara.garrard@sa.gov.au](mailto:tara.garrard@sa.gov.au).

## YIELD PERFORMANCE EXPERIMENTS FROM 2015 TO 2019

The yield results presented are multi environment trial (MET) data shown on a yearly regional group mean and an overall performance mean for the region. All yields are expressed as a percentage of mean yield from NVT data 2015–2019 inclusive, along with a number of observations in adjacent columns. Further results can be found on the NVT website: [www.nvtonline.com.au](http://www.nvtonline.com.au).

**Table 3: Mid North wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	2.88	5.61	3.39	2.71	2.9
Variety	Classification	No. trials	4	3	3	2	4
<b>MILLING WHEATS</b>							
BASF Ascot <sup>db</sup>	APW	4	–	–	–	–	101
Ballista <sup>db</sup>	AH	4	–	–	–	–	114
Beckom <sup>db</sup>	AH	16	104	108	104	105	105
Catapult <sup>db</sup>	AH	6	–	–	–	108	108
LG Cobalt <sup>db</sup>	APW	16	99	99	103	105	104
Corack <sup>db</sup>	APW	16	114	97	109	108	107
Cutlass <sup>db</sup>	APW	16	93	103	97	96	96
Emu Rock <sup>db</sup>	AH	16	106	98	102	105	105
LongReach Arrow <sup>db</sup>	AH	16	107	103	105	104	105
LongReach Cobra <sup>db</sup>	AH	16	104	105	99	96	97
LongReach Havoc <sup>db</sup>	AH	12	–	97	108	107	107
LongReach Impala <sup>db</sup>	ASFT	12	91	96	94	95	95
LongReach Orion <sup>db</sup>	ASFT	3	–	–	86	86	86
LongReach Scout <sup>db</sup>	AH	16	98	105	98	100	100
LongReach Trojan <sup>db</sup>	APW	16	99	109	101	99	100
Mace <sup>db</sup>	AH	16	110	99	107	108	107
RockStar <sup>db</sup>	AH	6	–	–	–	109	110
Scepter <sup>db</sup>	AH	16	111	107	111	113	113
Vixen <sup>db</sup>	AH	9	–	–	113	117	118
Wyalkatchem <sup>db</sup>	APW	16	103	98	103	102	102
Yitpi <sup>db</sup>	AH	16	88	97	93	92	92
<b>CLEARFIELD PLUS®</b>							
Chief CL Plus <sup>db</sup>	APW	12	–	95	103	101	101
Grenade CL Plus <sup>db</sup>	AH	16	97	95	97	97	97
Kord CL Plus <sup>db</sup>	AH	16	95	92	96	97	96
Razor CL Plus <sup>db</sup>	ASW	9	–	–	107	109	109
Sheriff CL Plus <sup>db</sup>	APW	9	–	104	–	105	105
<b>FEED WHEATS</b>							
RGT Zanzibar	FEED	12	–	106	91	89	89
TenFour <sup>db</sup>	FEED	10	115	107	108	–	–



**Table 4: Yorke Peninsula wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	3.08	6.11	4.47	3.99	3.18
Variety	Classification	No. trials	3	3	3	3	4
<b>MILLING WHEATS</b>							
BASF Ascot <sup>db</sup>	APW	4	–	–	–	–	104
Ballista <sup>db</sup>	AH	4	–	–	–	–	116
Beckom <sup>db</sup>	AH	16	104	108	105	107	108
Catapult <sup>db</sup>	AH	7	–	–	–	106	110
Cutlass <sup>db</sup>	APW	16	95	103	101	102	99
Emu Rock <sup>db</sup>	AH	16	103	99	98	100	103
LG Cobalt <sup>db</sup>	APW	7	–	–	–	99	103
LongReach Arrow <sup>db</sup>	AH	16	107	103	104	103	104
LongReach Cobra <sup>db</sup>	AH	16	104	112	100	105	99
LongReach Havoc <sup>db</sup>	AH	13	–	97	103	99	99
LongReach Scout <sup>db</sup>	AH	16	96	107	98	104	105
LongReach Trojan <sup>db</sup>	APW	16	102	110	105	107	104
Mace <sup>db</sup>	AH	16	109	97	104	100	103
RockStar <sup>db</sup>	AH	6	–	–	–	110	115
Scepter <sup>db</sup>	AH	16	112	103	110	106	111
Vixen <sup>db</sup>	AH	13	–	109	109	110	118
Wyalkatchem <sup>db</sup>	APW	16	103	97	102	99	100
Yitpi <sup>db</sup>	AH	16	89	97	96	96	94
<b>CLEARFIELD PLUS®</b>							
Chief CL Plus <sup>db</sup>	APW	13	–	92	102	96	95
Grenade CL Plus <sup>db</sup>	AH	16	95	94	95	95	96
Kord CL Plus <sup>db</sup>	AH	16	94	90	95	93	93
Razor CL Plus <sup>db</sup>	ASW	10	–	–	104	104	108
Sheriff CL Plus <sup>db</sup>	APW	10	–	104	–	104	105
<b>FEED WHEATS</b>							
RGT Zanzibar	FEED	3	–	112	–	–	–

**Table 5: Murray Mallee wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	1.6	4.12	3.43	1.73	1.3
Variety	Classification	No. trials	3	6	1	4	6
<b>MILLING WHEATS</b>							
Ballista <sup>db</sup>	AH	6	–	–	–	–	116
Beckom <sup>db</sup>	AH	20	108	108	106	106	108
Catapult <sup>db</sup>	AH	10	–	–	–	108	111
Cutlass <sup>db</sup>	APW	20	105	103	105	100	107
Emu Rock <sup>db</sup>	AH	20	96	98	94	101	94
LG Cobalt <sup>db</sup>	APW	10	–	–	–	105	112
LongReach Arrow <sup>db</sup>	AH	20	104	104	105	103	101
LongReach Cobra <sup>db</sup>	AH	14	94	103	96	97	–
LongReach Havoc <sup>db</sup>	AH	17	–	98	102	100	88
LongReach Scout <sup>db</sup>	AH	20	100	103	95	102	102
LongReach Trojan <sup>db</sup>	APW	20	107	108	107	103	107
Mace <sup>db</sup>	AH	20	103	101	106	104	100
RockStar <sup>db</sup>	AH	10	–	–	–	111	117
Scepter <sup>db</sup>	AH	20	114	109	114	110	111
Vixen <sup>db</sup>	AH	17	–	111	108	113	107
Wyalkatchem <sup>db</sup>	APW	20	101	99	103	101	100
Yitpi <sup>db</sup>	AH	20	99	97	97	96	103
<b>CLEARFIELD PLUS®</b>							
Chief CL Plus <sup>db</sup>	APW	17	–	97	106	99	99
Grenade CL Plus <sup>db</sup>	AH	20	94	94	93	97	95
Hammer CL Plus <sup>db</sup>	AH	6	–	–	–	–	104
Kord CL Plus <sup>db</sup>	AH	20	95	92	95	96	96
Razor CL Plus <sup>db</sup>	ASW	11	–	–	103	106	100
Sheriff CL Plus <sup>db</sup>	APW	16	–	105	–	105	105
<b>FEED WHEATS</b>							
RGT Zanzibar	FEED	6	–	104	–	–	–
TenFour <sup>db</sup>	FEED	10	99	106	104	–	–

**Table 6: Lower Eyre Peninsula wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	3.65	4.85	2.95	3.63	5.96
Variety	Classification	No. trials	4	2	3	3	1
<b>MILLING WHEATS</b>							
BASF Ascot <sup>db</sup>	APW	1	–	–	–	–	108
Ballista <sup>db</sup>	AH	1	–	–	–	–	108
Beckom <sup>db</sup>	AH	13	106	110	107	106	107
Catapult <sup>db</sup>	AH	4	–	–	–	109	104
Cutlass <sup>db</sup>	APW	13	95	99	101	101	92
Emu Rock <sup>db</sup>	AH	13	103	102	99	98	110
LG Cobalt <sup>db</sup>	APW	4	–	–	–	106	88
LongReach Arrow <sup>db</sup>	AH	13	108	106	106	105	106
LongReach Cobra <sup>db</sup>	AH	13	106	106	96	99	114
LongReach Havoc <sup>db</sup>	AH	9	–	103	105	103	111
LongReach Scout	AH	13	97	105	97	99	108
LongReach Trojan <sup>db</sup>	APW	13	103	107	104	105	102
Mace <sup>db</sup>	AH	13	109	103	107	105	103
RockStar <sup>db</sup>	AH	4	–	–	–	111	107
Scepter <sup>db</sup>	AH	13	113	111	115	112	106
Vixen <sup>db</sup>	AH	7	–	–	114	112	121
Wyalkatchem <sup>db</sup>	APW	13	103	99	103	102	99
Yitpi <sup>db</sup>	AH	13	88	92	94	95	87
<b>CLEARFIELD PLUS<sup>®</sup></b>							
Chief CL Plus <sup>db</sup>	APW	9	–	95	104	102	91
Grenade CL Plus <sup>db</sup>	AH	13	94	94	94	94	97
Kord CL Plus <sup>db</sup>	AH	13	92	90	95	94	90
Razor CL Plus <sup>db</sup>	ASW	7	–	–	107	105	112
Sheriff CL Plus <sup>db</sup>	APW	6	–	106	–	106	104



**Table 7: Upper Eyre Peninsula wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	1.84	2.44	1.22	1.53	1.3
Variety	Classification	No. trials	7	6	5	5	7
<b>MILLING WHEATS</b>							
Ballista <sup>db</sup>	AH	7	–	–	–	–	119
Beckom <sup>db</sup>	AH	30	104	107	105	104	107
Catapult <sup>db</sup>	AH	12	–	–	–	107	108
Corack <sup>db</sup>	APW	30	111	97	102	106	97
Cutlass <sup>db</sup>	APW	30	98	100	102	103	92
Emu Rock <sup>db</sup>	AH	30	100	103	98	96	113
LG Cobalt <sup>db</sup>	APW	30	104	102	107	106	100
LongReach Arrow <sup>db</sup>	AH	30	106	102	103	104	101
LongReach Cobra <sup>db</sup>	AH	23	100	99	95	99	–
LongReach Havoc <sup>db</sup>	AH	23	–	96	99	104	97
LongReach Scout <sup>db</sup>	AH	30	96	106	99	95	112
LongReach Trojan <sup>db</sup>	APW	30	103	103	103	105	96
Mace <sup>db</sup>	AH	30	108	101	104	105	102
RockStar <sup>db</sup>	AH	12	–	–	–	107	115
Scepter <sup>db</sup>	AH	30	113	108	110	110	109
Vixen <sup>db</sup>	AH	17	–	–	109	106	125
Wyalkatchem <sup>db</sup>	APW	30	103	99	101	102	98
Yitpi <sup>db</sup>	AH	30	92	96	98	97	92
<b>CLEARFIELD PLUS®</b>							
Chief CL Plus <sup>db</sup>	APW	23	–	94	102	106	88
Grenade CL Plus <sup>db</sup>	AH	30	95	97	96	94	102
Hammer CL Plus <sup>db</sup>	AH	7	–	–	–	–	104
Kord CL Plus <sup>db</sup>	AH	30	95	94	97	96	96
Razor CL Plus <sup>db</sup>	ASW	23	–	106	103	102	112
Sheriff CL Plus <sup>db</sup>	APW	23	–	104	105	105	103

**Table 8: South East main season wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	3.99	5.62	4.17	3.98	6.66
Variety	Classification	No. trials	2	3	1	2	2
<b>MILLING WHEATS</b>							
BASF Ascot <sup>db</sup>	APW	2	–	–	–	–	106
Ballista <sup>db</sup>	AH	2	–	–	–	–	110
Beckom <sup>db</sup>	AH	10	109	108	104	108	109
Catapult <sup>db</sup>	AH	4	–	–	–	109	108
Cutlass <sup>db</sup>	APW	10	100	103	94	99	104
Emu Rock <sup>db</sup>	AH	10	100	97	105	101	96
LG Cobalt <sup>db</sup>	APW	4	–	–	–	101	98
LongReach Arrow <sup>db</sup>	AH	10	108	104	107	105	105
LongReach Cobra <sup>db</sup>	AH	10	105	110	107	104	109
LongReach Havoc <sup>db</sup>	AH	8	–	101	115	105	99
LongReach Scout <sup>db</sup>	AH	10	100	103	98	102	104
LongReach Trojan <sup>db</sup>	APW	10	108	110	101	106	112
Mace <sup>db</sup>	AH	10	107	100	108	104	100
RockStar <sup>db</sup>	AH	4	–	–	–	112	113
Scepter <sup>db</sup>	AH	10	115	106	110	111	108
Vixen <sup>db</sup>	AH	7	–	109	–	115	110
Wyalkatchem <sup>db</sup>	APW	10	102	99	103	101	99
Yitpi <sup>db</sup>	AH	10	90	96	89	93	96
<b>CLEARFIELD PLUS<sup>®</sup></b>							
Chief CL Plus <sup>db</sup>	APW	8	–	97	102	98	96
Grenade CL Plus <sup>db</sup>	AH	10	92	93	96	94	92
Kord CL Plus <sup>db</sup>	AH	10	90	90	94	92	90
Razor CL Plus <sup>db</sup>	ASW	5	–	–	110	107	104
Sheriff CL Plus <sup>db</sup>	APW	7	–	105	–	106	106
<b>FEED WHEATS</b>							
LongReach Beaufort <sup>db</sup>	FEED	4	–	–	–	102	108
RGT Zanzibar	FEED	8	–	108	92	99	108

## WINTER WHEAT VARIETY NOTES

Winter wheats may facilitate early germination opportunities prior to 20 April in frost-prone environments. Winter wheats have an obligate requirement for cold (vernalisation) in order to flower. While limited yield data is provided in this guide, the winter cultivars Longsword<sup>®</sup>, Illabo<sup>®</sup>, LongReach Kittyhawk<sup>®</sup>, RGT Accroc, DS Bennett<sup>®</sup>, RGT Calabro and Anapurna are all commercially available and are being trialled in a limited number of early-sown NVT trials.

### DS BENNETT<sup>®</sup>

DS Bennett<sup>®</sup> was released in 2018 and has an ASW classification in SA. DS Bennett<sup>®</sup> is a mid to slow-maturity winter wheat that has been developed for longer season and higher rainfall growing areas. It is suited to early planting or grazing opportunities and will be later to flower than EGA Wedgetail<sup>®</sup>. DS Bennett<sup>®</sup> is rated S to Leaf rust, MRMS to Stem and S to Stripe rust, and MSS to Septoria tritici blotch and CCN. DS Bennett<sup>®</sup> may also be a higher risk for Black point. Seed is available from Seednet partners. EPR \$4.25 ex-GST.

### ILLABO<sup>®</sup>

Illabo<sup>®</sup> was released in 2018 by AGT and has an AH classification in SA. Illabo<sup>®</sup> is a quick to mid-maturity winter wheat that has been developed for mid to long-season growing areas. It is suited to early planting or grazing opportunities similar to EGA Wedgetail<sup>®</sup> in the medium to high-rainfall zones. Illabo<sup>®</sup> has shown a yield improvement compared to EGA Wedgetail<sup>®</sup> and LongReach Kittyhawk<sup>®</sup>. Illabo<sup>®</sup> is rated S to Leaf rust, MS to Stem rust and RMR to Stripe rust, MSS to Septoria tritici blotch, and MS to CCN. Seed is available from AGT affiliates, retailers, or through Seed Sharing™. EPR \$3.50 ex-GST.

### LONGREACH KITTYHAWK<sup>®</sup>

LongReach Kittyhawk<sup>®</sup> is an AH mid-winter wheat and has been developed for long-season growing areas. It is suited to early planting or grazing opportunities similar to EGA Wedgetail<sup>®</sup> in the higher rainfall zones. LongReach Kittyhawk<sup>®</sup> has an improved disease and grain quality package compared to EGA Wedgetail<sup>®</sup>, particularly for Septoria tritici blotch (MRMS) and Leaf rust (MS). More evaluation is needed. Seed is available from Pacific Seeds. EPR \$4.25 ex-GST.

## FEED WINTER WHEATS

### ANAPURNA

Anapurna is a mid to slow-maturity, imported European variety introduced by AGT, suited to long-growing-season, high-rainfall areas. Best suited to early planting or grazing opportunities in high-rainfall environments, Anapurna has a long vegetative growth phase and similar maturity to RGT Accroc. Anapurna is a dual-purpose winter wheat suited for grazing and grain production. EPR \$3.20 ex-GST.

### LONGSWORD<sup>®</sup>

Longsword<sup>®</sup> is classified as a feed wheat in SA. Longsword<sup>®</sup> is a quick winter wheat, meaning once its vernalisation requirement is met it is relatively fast to flower, and is quicker to flower than EGA Wedgetail<sup>®</sup>. Longsword<sup>®</sup> has a broad sowing window but will be most suited to April plantings. Longsword<sup>®</sup> has not been widely tested in early sowing NVT, however data from agronomic trials have shown it is the highest yielding winter wheat in the low-rainfall zones. Longsword<sup>®</sup> has a good disease package and is rated MSS to Leaf rust, MR to Stem and MR to Stripe rust, MSS to Septoria, and MRMS to CCN. Seed is available from AGT affiliates, retailers, or through Seed Sharing™. EPR \$2.75 ex-GST.

### MANNING<sup>®</sup>

Manning<sup>®</sup> was released in 2013 as a very late-flowering, white-grained feed wheat for high-rainfall zones in SE Australia. It is a slow-maturity, dual-purpose, grazing/grain yield winter wheat with high yield potential and Barley yellow dwarf virus (BYDV) resistance, coupled with good resistance to Stem and Stripe rusts and other foliar diseases. Seed is available from GrainSearch affiliates or contact GrainSearch for more details. EPR \$3.50 ex-GST.

### RGT ACCROC

RGT Accroc is a mid to slow-maturity, red winter wheat of feed grain quality. It is suited to the high-rainfall zone and is suitable for sowing late February to early April for early grazing. Maturity is three to five days earlier than SF Adagio. RGT Accroc is rated S to Leaf rust, MS to Stem and R to Stripe rust, MRMS to Yellow leaf spot, and S to CCN. Seed is available via Seed Force broadacre commercial partners. EPR \$4.00 ex-GST.

### RGT CALABRO

RGT Calabro is a slow-maturing, red feed grain quality, awned winter wheat with potential for high yields and suited to high-rainfall zones. Suitable for sowing late February to early March for early grazing. Contact Seed Force for agent. EPR \$4.00 ex-GST.



**Table 9: South East early season wheat yield performance. NVT data 2015–19.**

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

		Year	2015	2016	2017	2018	2019
		Mean yield t/ha	5.90	5.60	5.85	7.58	8.05
Variety	Classification	No. trials	1	1	1	1	1
<b>MILLING WHEATS</b>							
Beckom <sup>Ⓛ</sup>	AH	5	108	101	107	99	104
Catapult <sup>Ⓛ</sup>	AH	2	–	–	–	103	101
Cutlass <sup>Ⓛ</sup>	APW	5	97	104	103	105	98
Denison <sup>Ⓛ</sup>	APW	1	–	–	–	–	101
DS Bennett <sup>Ⓛ</sup>	ASW	4	–	116	109	115	112
DS Pascal <sup>Ⓛ</sup>	APW	5	108	98	101	99	107
EGA Wedgetail <sup>Ⓛ</sup>	APW	5	97	101	97	103	100
Forrest <sup>Ⓛ</sup>	APW	5	96	101	97	104	100
Illabo <sup>Ⓛ</sup>	AH	4	–	103	104	103	110
LongReach Kittyhawk <sup>Ⓛ</sup>	AH	4	99	98	97	99	–
LongReach Nighthawk <sup>Ⓛ</sup>	APW	2	–	–	–	104	107
LongReach Scout <sup>Ⓛ</sup>	AH	1	–	96	–	–	–
LongReach Trojan <sup>Ⓛ</sup>	APW	5	109	102	108	98	105
RockStar <sup>Ⓛ</sup>	AH	1	–	–	–	–	110
Scepter <sup>Ⓛ</sup>	AH	2	–	–	–	103	101
Sheriff CL Plus <sup>Ⓛ</sup>	APW	1	–	–	–	–	104
Yitpi <sup>Ⓛ</sup>	AH	2	–	–	–	93	90
<b>FEED WHEATS</b>							
LongReach Beaufort <sup>Ⓛ</sup>	FEED	5	107	120	115	116	117
Longsword <sup>Ⓛ</sup>	FEED	4	–	100	101	100	99
Manning <sup>Ⓛ</sup>	FEED	5	98	123	109	117	120
RGT Accroc	FEED	5	109	124	115	123	126
RGT Calabro	FEED	5	107	128	117	121	129
RGT Zanzibar	FEED	4	–	112	110	114	116
SF Adagio	FEED	5	109	118	111	114	123
SQP Revenue <sup>Ⓛ</sup>	FEED	3	103	121	110	–	–

Please note these data are generated only from the Conmurra site in the South East.

**Table 10: Lower Eyre Peninsula early break wheat yield performance. NVT data 2017.**

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

		Year	2017
		Mean yield t/ha	1.4
Variety	Classification	No. trials	1
<b>MILLING WHEATS</b>			
Bolac <sup>®</sup>	AH	1	105
Cutlass <sup>®</sup>	APW	1	108
DS Bennett <sup>®</sup>	ASW	1	114
DS Darwin <sup>®</sup>	AH	1	86
DS Pascal <sup>®</sup>	APW	1	105
EGA Wedgetail <sup>®</sup>	AH	1	106
Estoc <sup>®</sup>	APW	1	93
Illabo <sup>®</sup>	AH	1	117
Kiora <sup>®</sup>	AH	1	104
LongReach Kittyhawk <sup>®</sup>	APW	1	98
LongReach Trojan <sup>®</sup>	APW	1	99
Yitpi <sup>®</sup>	AH	1	92
<b>FEED WHEATS</b>			
Longsword <sup>®</sup>	FEED	1	121

Note: Murray Mallee 2017 trial not released.

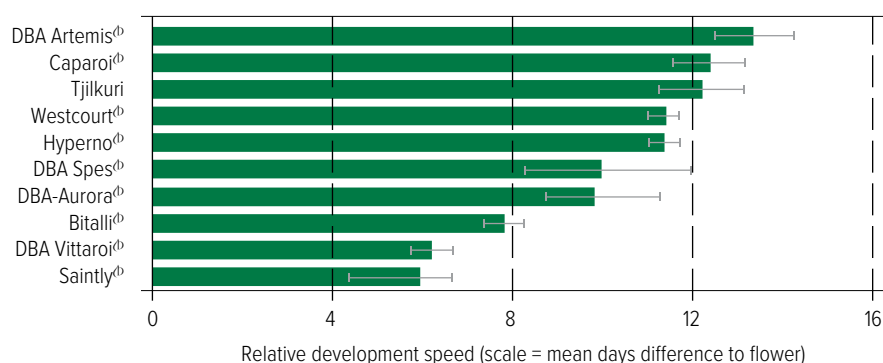
In 2018 both Upper EP and Mallee trials not sown due to lack of early break opportunity.

## DURUM WHEAT VARIETY NOTES

The development speed of different durum varieties was compared to Scepter<sup>®</sup> and LongReach Trojan<sup>®</sup> in time-of-sowing trials across a range of dates in May, at two locations, Loxton and Tarlee in South Australia, in the 2018 season (SAGIT-funded project S518). From these trials, most of the durum varieties were characterised as quick to mid, or mid-developing speed within the range of Scepter<sup>®</sup> and LongReach Trojan<sup>®</sup>, and therefore suited to early to mid-May sowing in SA. Currently, there are no released durum varieties suited for earlier planting.

Figure 2 illustrates the range of development speeds of durum varieties sown during the period from May to June across SA NVT trials in 2019.

**FIGURE 2** Relative speed of development of selected durum varieties sown during May to June across SA. Varieties are ranked according to time to flower.



## BITALLI<sup>®</sup>

Bitalli<sup>®</sup> is a quick to mid-maturity wheat, slightly slower than Saintly<sup>®</sup>. Bitalli<sup>®</sup> is widely adapted and yielded higher than DBA-Aurora<sup>®</sup> in the Mid North and Yorke Peninsula. Bitalli<sup>®</sup> offers good physical grain characteristics including low screenings and high test weight. It is MR to Stem and Leaf rust and RMR to Stripe rust, while also being MRMS to both Yellow leaf spot and Septoria tritici blotch. Bitalli<sup>®</sup> is eligible for ADR in SA and was released by AGT in 2019, with seed available through AGT affiliates, retailers, or through Seed Sharing<sup>™</sup>. EPR \$3.50 ex-GST.

## DBA ARTEMIS<sup>®</sup>

DBA Artemis<sup>®</sup> is mid to slow maturity, slightly slower than DBA-Aurora<sup>®</sup> with a similar disease profile. It is RMR to both Leaf and Stripe rust and MR to Stem rust. It is also MRMS to both Yellow leaf spot and Septoria tritici blotch. Grain size and screenings are comparable to DBA-Aurora<sup>®</sup> and DBA Spes<sup>®</sup>. DBA Artemis<sup>®</sup> is eligible for Australian Durum (ADR) grade in SA and was released by Durum Breeding Australia's Southern Node (University of Adelaide) in 2019, with seed available from Southern Australia Durum Growers Association. EPR \$3.00 ex-GST.

## DBA SPES<sup>®</sup>

DBA Spes<sup>®</sup> is mid maturity and has a good disease package, being RMR to Stem and Stripe rust and R to Leaf rust. It is also MRMS to both Yellow leaf spot and Septoria tritici blotch. It has good grain size and lower screenings consistent with other durum varieties available. DBA Spes<sup>®</sup> is eligible for ADR grade in SA and was released by Durum Breeding Australia's Southern Node (University of Adelaide) in 2018, with seed available from Southern Australia Durum Growers Association. EPR \$3.00 ex-GST.

## DBA VITTAROI<sup>®</sup>

DBA Vittaroi<sup>®</sup> is quick to mid maturity, developing at a similar speed to Saintly<sup>®</sup>. It is MR to Leaf, Stem and Stripe rusts and MRMS to Yellow leaf spot. DBA Vittaroi<sup>®</sup> has good grain size and low screening

levels consistent with other durum varieties. It is shorter in stature than DBA-Aurora<sup>®</sup> with good straw strength and tolerance to lodging. DBA Vittaroi<sup>®</sup> is eligible for ADR grade in SA and was released by Durum Breeding Australia's Northern Node (Tamworth, NSW DPI) in 2017, with seed available from Seednet. EPR \$3.63 ex-GST.

### DBA-AURORA<sup>®</sup>

DBA-Aurora<sup>®</sup> is mid maturing. It is RMR to Stem and Stripe rusts and R to Leaf rust. It is also MRMS to Yellow leaf spot and MS to Septoria tritici blotch. DBA-Aurora<sup>®</sup> has grain size and screenings levels similar to other varieties available. DBA-Aurora<sup>®</sup> has also shown good early vigour and grass weed competitiveness. Released in 2014 by Durum Breeding Australia's Southern Node (University of Adelaide) and eligible for ADR grade in SA. Seed is available from Southern Australia Durum Growers Association. EPR \$3.00 ex-GST.

### SAINTLY<sup>®</sup>

Saintly<sup>®</sup> is awnless, quick to mid maturing and has performed very well in dry finishing conditions in SA. Saintly<sup>®</sup> has slightly less Stem and Leaf rust resistance than Hyperno<sup>®</sup>. Saintly<sup>®</sup> is eligible for ADR grade in SA. EPR \$3.00 ex-GST.

### WESTCOURT<sup>®</sup>

Westcourt<sup>®</sup> is a mid-maturing wheat. It is RMR to Stem, Stripe and Leaf rusts and MRMS to both Yellow leaf spot and Septoria tritici blotch. It has good physical grain quality characteristics with low screenings. Westcourt<sup>®</sup> is eligible for ADR in SA and was released by AGT in 2019, with seed available through AGT affiliates, retailers or through Seed Sharing™. EPR \$3.50 ex-GST.

**Table 11: Disease responses of durum wheat varieties and reaction to common disorders.**

Variety	Rust			Septoria tritici blotch	Yellow leaf spot	Powdery mildew	Black point	CCN
	Stem	Stripe	Leaf					
Bitalli <sup>®</sup>	MR	MS	MR	MRMS	MRMS	S	MRMS	MS
DBA Artemis <sup>®</sup>	MR	MS	RMR	MRMS	MRMS	MSS	MS	MS
DBA-Aurora <sup>®</sup>	RMR	MRMS	R	MRMS	MRMS	MSS	MSS	MSS
DBA Spes <sup>®</sup>	RMR	MRMS/SVS	R	MRMS	MRMS	MS	MS	MRMS
DBA Vittaroi <sup>®</sup>	MR	MS	MR	MS	MRMS	MR	MSS	S
Saintly <sup>®</sup>	MR	MR	MRMS	S	MRMS	MSS	MS	MS
Westcourt <sup>®</sup>	RMR	MR	RMR	MS	MRMS	MSS	–	MSS

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, – variety yet to be fully evaluated.

/ Ratings separated by "/" denotes different responses to different pathotypes.

Ratings provided are primarily from 2018 and earlier data, with limited updates based on 2019 data. Cereal cyst nematode (CCN) resistance refers to the ability of the variety to reduce CCN carryover. Black point is not a disease but is a physiological response to certain humid conditions.

Information on disease reactions was supplied by Cereal Pathology (SARDI). Contact Dr Hugh Wallwork: [hugh.wallwork@sa.gov.au](mailto:hugh.wallwork@sa.gov.au) or Dr Tara Garrard: [tara.garrard@sa.gov.au](mailto:tara.garrard@sa.gov.au).

**Table 12: Mid North durum wheat yield performance. NVT data 2015–19.**

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

	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.32	5.71	3.59	1.83	2.72
Variety	No. trials	3	2	2	2	2
Bitalli <sup>®</sup>	6	–	–	105	113	112
DBA Artemis <sup>®</sup>	8	–	104	98	99	100
DBA Spes <sup>®</sup>	8	–	102	99	99	100
DBA Vittaroi <sup>®</sup>	6	–	–	106	108	103
DBA-Aurora <sup>®</sup>	11	107	102	101	104	105
Saintly <sup>®</sup>	11	116	91	107	108	104
Westcourt <sup>®</sup>	4	–	–	–	97	106



**Table 13: Yorke Peninsula durum wheat yield performance. NVT data 2015–19.**

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

	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.08	5.83	3.71	4.34	2.68
Variety	No. trials	3	3	3	2	3
Bitalli <sup>db</sup>	8	–	–	107	109	113
DBA Artemis <sup>db</sup>	11	–	105	101	101	100
DBA Spes <sup>db</sup>	11	–	104	101	101	101
DBA Vittaroi <sup>db</sup>	8	–	–	100	103	102
DBA-Aurora <sup>db</sup>	14	109	104	103	103	106
Saintly <sup>db</sup>	14	116	88	99	101	104
Westcourt <sup>db</sup>	5	–	–	–	102	107

## ACKNOWLEDGEMENTS

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# BARLEY

By Kenton Porker, Courtney Peirce, Tara Garrard and Hugh Wallwork, SARDI

This sowing guide provides data and guidance on the most suitable barley varieties for sowing in South Australia in 2021.

Since publication of the 2020 sowing guide, Beast<sup>®</sup>, Laperouse<sup>®</sup> and Maximus CL<sup>®</sup> have been released, with a suite of potential varieties undergoing malt accreditation.

The decision to grow either a malting, food or feed variety may depend on one or more factors, including:

- market demand and malting varietal storage segregations in bulk storage facilities;
- the difference in payments between malting and feed grades compared to yield differences;
- the likelihood of producing a malting grade barley within malt receival specifications; and
- disease resistance and agronomic considerations.

**Table 1: Suitable barley varieties for planting in South Australia.**

Listed according to current (2020-21) quality classification grade, in alphabetical order within classification.

Variety	Max. grade	Maturity classification	Suitability and significant features
Commander <sup>®</sup>	Malting	Q – M	All areas, except areas prone to Net form net blotch, risk of lodging in high-yielding environments.
Compass <sup>®</sup>	Malting	VQ	All areas, at risk with some strains of Leaf rust and lodging in high-yielding environments.
Granger <sup>®</sup>	Malting	Q – M	Medium to high-rainfall areas. Note limited malting marketing and segregation opportunities in SA.
La Trobe <sup>®</sup>	Malting	VQ	All areas. Note modest early vigour and weed competitiveness, especially in light soils.
RGT Planet <sup>®</sup>	Malting	Q	All areas. Note lower test weights and higher small grain screenings under hot, dry finishes and susceptibility to Spot form and Net form net blotch.
Schooner	Malting	Q	All areas except Leaf rust-prone areas, now agronomically outclassed, declining industry demand, however has renewed interest in the craft market.
Scope CL <sup>®</sup>	Malting	Q	All areas except where Leaf rust and Cereal cyst nematode (CNN) are problems. Imidazolinone tolerant.
Spartacus CL <sup>®</sup>	Malting	VQ	All areas, imidazolinone tolerant. Similar competitive characteristics to Hindmarsh <sup>®</sup> .
Westminster <sup>®</sup>	Malting	Q – M	Higher rainfall and longer season areas, segregations available in South East region.
LG Alestar <sup>®</sup>	Feed	Q	Targeted for medium to high-rainfall zones, being evaluated for malt accreditation.
Beast <sup>®</sup>	Feed	Q	Targeted for lower rainfall zones, Mallee environments.
Buff <sup>®</sup>	Feed	Q	Broadly adapted and suited to acid soils.
Fathom <sup>®</sup>	Feed	Q	All areas, noting susceptibility to Net form net blotch.
Fleet Australia <sup>®</sup>	Feed		All areas, particularly for districts with lower rainfall and light soils, noting high Net form net blotch risk.
Keel	Feed	VQ	All areas except deep sandy soils of lower fertility and avoid areas prone to Leaf rust. Earliest maturing feed variety.
Laperouse <sup>®</sup>	Feed	Q	Being evaluated for malt accreditation.
Leabrook <sup>®</sup>	Feed	VQ	All areas, similar plant characteristics to Compass <sup>®</sup> , at risk with some strains of Leaf rust and lodging in high-yielding environments. Being evaluated for malt accreditation.
Maximus CL <sup>®</sup>	Feed	VQ	Being evaluated for malt accreditation.
Oxford	Feed	M	Medium to high-rainfall areas (>400mm). Early sowing.
Rosalind <sup>®</sup>	Feed	VQ	All areas, broadly adapted.

Maturity: VQ = very quick, Q = quick, M = mid, S = slow, VS = very slow.

**Table 2: Released varieties undergoing malt evaluation and expected timeline (Barley Australia).**

Variety	Year 0	Stage 1	Stage 2	Target decision date
LG Alestar <sup>®</sup>	2017 (accepted)	2018 (passed)	2020	2021
Beast <sup>®</sup>	2020 (accepted)	2021		2023
Buff <sup>®</sup>	2018 (accepted)	2019 (passed)	2021	2022
Laperouse <sup>®</sup>	2019 (accepted)	2020		2022
Leabrook <sup>®</sup>	2017 (accepted)	2018 (passed)	2019	2021
Maximus CL <sup>®</sup>	2018 (accepted)	2018 (passed)	2020	2021

## MARKETING

Growers need to consider which varietal option will lead to the greatest profitability. The difference in the price premium paid for malt relative to feed may counteract the yield difference between malt and feed or food varieties. Other scenarios may favour high-yielding feed or food varieties where there is a low probability of achieving malt and a desire for lower input costs.

Among malt and food varieties, differential pricing will be a continuing trend and growers need to consider market premiums and discounts in addition to agronomic performance to maximise profitability. Newer food and malt varieties are now offering good yield potential. Varieties accredited and varieties currently undergoing malt evaluation now have similar yield potential as feed varieties, making it worthwhile for growers to consider including some malting varieties in their cropping program.

It is important that growers contact their grain marketers to discuss market demand prior to sowing a malting variety. Malting barley is grown, stored and sold on a variety-specific basis and it is important to ascertain if the variety chosen is able to be stored and marketed in your area. The Barley Australia preferred list is updated annually as a guide to industry on the market-preferred varieties and can be found online at [www.barleyaustralia.com.au](http://www.barleyaustralia.com.au). The preferred list is determined by marketing companies and reflects their opinion on which malting varieties will be sought by purchasers of Australian malting barley. In many cases a new variety accreditation does not mean the variety will be a preferred variety until market demand is established.

Table 2 lists some of the current varieties under malt barley evaluation by the Malting and Brewing Industry Barley Technical Committee (MBITC) in conjunction with Pilot Brewing Australia (PBA) and Barley Australia, including the anticipated timeline for accreditation. Accreditation is only granted if the variety satisfies the selection criteria set by MBITC and Barley Australia (see [www.barleyaustralia.com.au](http://www.barleyaustralia.com.au)). Westminster<sup>®</sup>, while not yet segregated

for malt in SA, has some limited direct marketing opportunities in the South East and into Port Adelaide. Imidazolinone herbicide-tolerant barley varieties (Spartacus CL<sup>®</sup>, Scope CL<sup>®</sup> and Maximus CL<sup>®</sup>) may incur market access restrictions in some important export destinations. Information will be updated regularly at:

- [barleyaustralia.com.au/ba-industry-updates](http://barleyaustralia.com.au/ba-industry-updates); and
- [barleyaustralia.com.au](http://barleyaustralia.com.au).

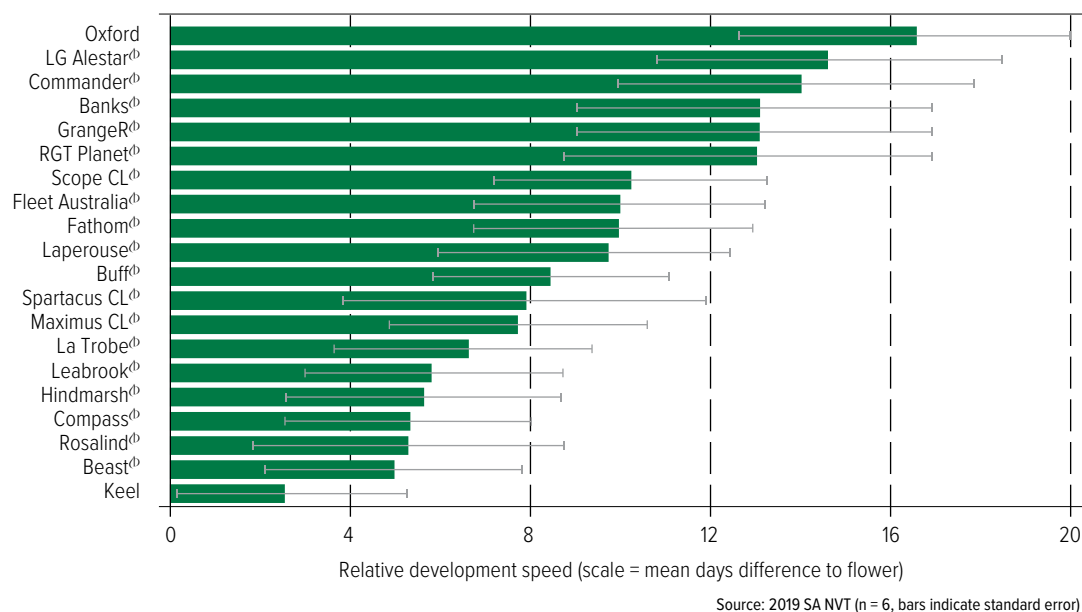
Information includes:

- list of preferred malting barley varieties; and
- updated status of malting barley evaluation.

## MATURITY CLASSIFICATIONS

Barley varieties differ in development speed (Figure 1). Maturity classifications and terminology have been assigned using the industry guidelines provided by Australian Crop Breeders Ltd and will be different to previous editions. The barley data has been sourced from the GRDC National Phenology Initiative and NVT trials and adjusted to be in line with wheat classifications.

Most commonly grown varieties fall in the very quick to quick maturity range and are best suited for planting dates after May 1. In regions of minimal frost risk, varieties can be sown in late April, particularly in shorter season districts defined by terminal moisture and heat stress events during grain fill. Barley is slightly more frost tolerant than wheat, however there are limited varieties with a suitable flowering behaviour for sowing before 25 April. Urambie<sup>®</sup> is the only current winter barley. It may be better suited for dual-purpose graze and grain from early April planting, but has not been included for evaluation in NVT in SA.



**FIGURE 1** Relative speed of development of selected barley varieties sown during May to June across SA. Varieties are ranked according to time to flower.

## DISEASE

Net form net blotch remains a significant disease threat to barley production across South Australia and growers should refrain from growing barley on barley or planting highly susceptible varieties unless a vigilant fungicide strategy is planned.

Seed dressings which have activity on Powdery mildew should be applied to all susceptible varieties. Spartacus CL<sup>db</sup> and Rosalind<sup>db</sup> are more susceptible to Loose smut than other varieties and an appropriate seed smuticide, in addition to foliar control of Powdery mildew, should be considered.

## VARIETY NOTES

### LG ALESTAR<sup>db</sup>

LG Alestar<sup>db</sup> is currently undergoing malt accreditation. Quick to mid maturity similar to Commander<sup>db</sup>, targeted for the medium to high-rainfall regions of SA. LG Alestar<sup>db</sup> has demonstrated a yield improvement compared to Westminster<sup>db</sup>. More evaluation is required for its adaptation to SA. Seed is available through Elders and through selected seed partners. EPR \$3.00 ex-GST.

### NEW – BEAST<sup>db</sup>

Beast<sup>db</sup> is a very quick-maturing variety suited to medium to low-rainfall environments and performs well in stressed growing conditions. Similar plant type to Compass<sup>db</sup> offering useful levels of early vigour and weed competitiveness, but care should be taken in lodging-susceptible conditions. Released 2020 (tested as AGTB0113) and

marketed by Australian Grain Technologies. Seed available through AGT affiliates and is eligible for AGT Seed Sharing™. EPR \$4.00 ex-GST.

### BUFF<sup>db</sup>

Buff<sup>db</sup> is a quick-maturing variety suited to acid soils, with good early vigour and an erect plant type. It is undergoing Barley Australia malt accreditation, passing stage 1 evaluation in 2019. Insufficient grain was available to continue evaluation in 2020, with the earliest possible accreditation decision expected in 2022. Available in 2021 as a feed variety. Released 2018 (tested as IGB 1506). Bred and marketed by InterGrain. For more information on availability contact InterGrain. EPR \$3.50 ex-GST.

### COMMANDER<sup>db</sup>

Commander<sup>db</sup> is a malting quality variety released by the University of Adelaide in 2008 and suitable for domestic, Chinese and SE Asian export brewing markets. Commander<sup>db</sup> has quick to mid-season maturity and, across many seasons, demonstrates wide adaptation and very high yield relative to other malting varieties, particularly in seasons with favourable spring finishes. Commander<sup>db</sup> has excellent grain plumpness, but generally has lower test weight relative to La Trobe<sup>db</sup>. Commander<sup>db</sup> is resistant to Cereal cyst nematode (CNN) but is moderately susceptible to most foliar diseases including Net form net blotch. Compared to La Trobe<sup>db</sup>, Commander<sup>db</sup> has poor straw strength and is prone to lodging in high-yielding environments and wet spring conditions. Seed is available through Seednet. EPR \$3.80 ex-GST.



**COMPASS<sup>®</sup>**

Compass<sup>®</sup> has been developed by the University of Adelaide as a very quick-maturing accredited malting quality variety. It is closely related to Commander<sup>®</sup> but is higher yielding. It has a similar growth habit to Commander<sup>®</sup> but is earlier flowering with typical May sowing and improved Net form net blotch resistance. Compass<sup>®</sup> has similar straw strength to Commander<sup>®</sup> and will be prone to lodging in high-yielding environments. Compass<sup>®</sup> is now susceptible (SVS) to a new strain of Leaf rust in SA. Compass<sup>®</sup> has shown good physical grain quality with high retention and low screenings and low to moderate test weight. Seed is available from Seednet. EPR \$3.80 ex-GST.

**FATHOM<sup>®</sup>**

Fathom<sup>®</sup> is a quick-maturing feed quality variety developed using wild barley to improve stress tolerance and water use efficiency. Fathom<sup>®</sup> has averaged very high yields similar to Hindmarsh<sup>®</sup> based on NVT data since 2010, and shows good early vigour and weed competitiveness.

Fathom<sup>®</sup> typically flowers three to four days later than Hindmarsh<sup>®</sup> with early May sowing and flowers similar to Hindmarsh<sup>®</sup> with later sowings. Fathom<sup>®</sup> has good levels of resistance to CCN, Powdery mildew and Spot form net blotch. Fathom<sup>®</sup> has shown susceptibility to Net form net blotch, Leaf scald and Leaf rust. Seed is available from Seednet. EPR \$2.00 ex-GST.

**GRANGER<sup>®</sup>**

GrangeR<sup>®</sup> is a high-yielding variety accredited for malting in 2013. It is quick to mid-maturing and targeted for areas with more than 400 millimetres rainfall. GrangeR<sup>®</sup> has good levels of resistance to Powdery mildew and is rated MR to MSS for Net form net blotch. It has variable resistance to Leaf rust and Leaf scald and susceptibility to Spot form net blotch. Segregation and marketing opportunities for malting are currently limited in SA. Seed is available from Heritage Seeds. EPR \$2.95 ex-GST.

**Table 3: Disease reactions of selected barley varieties.**

Variety	CCN resistance	CCN tolerance	Leaf rust	NFNB	SFNB	Leaf scald	Powdery mildew	Black point
LG Alestar <sup>®</sup>	–	T	R/MS	MR/S	MSS	MSS/VS	RMR	MRMS
Beast <sup>®</sup>	–	T	MR/S	MRMS	MRMS	MS/SVS	–	MSS
Buff <sup>®</sup>	–	T	SVS	MRMS	S	R/SVS	S	MRMS
Commander <sup>®</sup>	R	T	MSS	MSS/SVS	MSS	S/SVS	MRMS	MSS
Compass <sup>®</sup>	R	T	SVS	MR/MSS	MR/MSS	MS/SVS	MRMS	MS
Fathom <sup>®</sup>	R	T	MRMS/S	MS/VS	RMR	R/MS	MRMS	MSS
Fleet Australia <sup>®</sup>	R	T	MRMS/S	SVS	MR	MR/SVS	MRMS	MS
Flinders <sup>®</sup>	S	T	MRMS/S	SVS	S	S	RMR	MRMS
GrangeR <sup>®</sup>	S	T	MRMS	MR/MSS	S	MS/SVS	R	MS
Keel	R	T	VS	MS	MR	MS/SVS	S	SVS
Laperouse <sup>®</sup>	S	T	MS/SVS	MR/MRMS	MRMS	R/VS	R/MS	MSS
La Trobe <sup>®</sup>	R	T	MRMS/S	MR/MSS	MSS	R/VS	M/S	MSS
Leabrook <sup>®</sup>	R	T	MS/SVS	MRMS	MRMS	MS/SVS	MRMS	MSS
Maritime <sup>®</sup>	R	T	MRMS/S	R/VS	MRMS	MSS	SVS	MS
Maximus CL <sup>®</sup>	R	T	MSS	MR/MRMS	MRMS/MS	R/MRMS	MR/S	MSS
Nitro	–	T	MRMS	RMR	S	R/S	R	MSS
Oxford	S	T	R/MS	MR/SVS	S	MR/SVS	R	MRMS
RGT Planet <sup>®</sup>	R	T	MRMS	MR/SVS	SVS	R/SVS	R	MRMS
Rosalind <sup>®</sup>	R	T	MR	MR	MSS	MR/SVS	RMR/S	MSS
Schooner	VS	T	SVS	MR	MS	MSS	SVS	MS
Scope CL <sup>®</sup>	S	T	MS/SVS	MR	MSS	MSS	RMR	MS
Spartacus CL <sup>®</sup>	R	T	MR/S	MSS/SVS	S	R/VS	MR/S	MSS
Westminster <sup>®</sup>	–	T	R/MRMS	R/S	S	R/S	R	MRMS

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, – variety yet to be fully evaluated.

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

Ratings provided are primarily from 2019 and have not been updated with new data.

A range of reactions is provided where different strains of the pathogen exist and where the variety may respond differently to them. Cereal cyst nematode (CCN) tolerance indicates the ability of the variety to grow and yield in the presence of CCN. Resistance refers to the ability of the variety to reduce CCN carryover.

Information on disease reaction was supplied by Cereal Pathology (SARDI). Contact Dr Tara Garrard on 0459 899 321.

**NEW – LAPEROUSE<sup>Ⓢ</sup>**

Laperouse<sup>Ⓢ</sup> is a quick-maturing variety with a medium plant height. Accepted into Barley Australia malt accreditation in 2019, with an earliest possible decision expected in 2022. Laperouse<sup>Ⓢ</sup> is susceptible to CCN, MR-MRMS to Net form net blotch, and MS-SVS to Leaf rust. Released 2020 (tested as WI4952). Bred by University of Adelaide and SECOBRA Recherches, marketed by Seednet. EPR \$3.80 ex-GST.

**LA TROBE<sup>Ⓢ</sup>**

La Trobe<sup>Ⓢ</sup> is a malting-accredited variety released from InterGrain in 2014 with very quick maturity and semi-dwarf growth habit and plant architecture very similar to Hindmarsh<sup>Ⓢ</sup>. Its yield and agronomic performance in SA NVT since 2013 have also been very similar to Hindmarsh<sup>Ⓢ</sup> with slightly higher yield. La Trobe<sup>Ⓢ</sup> is resistant to CCN, but susceptible to Spot form net blotch and rated moderately resistant to moderately susceptible to Net form net blotch. It shows variable resistance to Leaf rust and Leaf scald. La Trobe<sup>Ⓢ</sup> seed is approved for grower-to-grower trading and seed is available through InterGrain Seedclub members. EPR \$4.00 ex-GST.

**LEABROOK<sup>Ⓢ</sup>**

Leabrook<sup>Ⓢ</sup> is a new variety released in 2019 and has been developed by the University of Adelaide as a very quick maturity variety. It is currently undergoing evaluation for malt accreditation. It is closely related to Compass<sup>Ⓢ</sup> but NVT results suggest it is higher yielding. It has a similar growth habit to Compass<sup>Ⓢ</sup> and similar flowering behaviour with typical May sowing. Leabrook<sup>Ⓢ</sup> has similar straw strength to Compass<sup>Ⓢ</sup> and will be prone to lodging in high-yielding environments. Leabrook<sup>Ⓢ</sup> is MS-SVS to leaf rust in SA. Leabrook<sup>Ⓢ</sup> has shown good physical grain quality with high retention and low screenings and low to moderate test weight. Seed is available from Seednet. EPR \$3.80 ex-GST.

**NEW – MAXIMUS CL<sup>Ⓢ</sup>**

Maximus CL<sup>Ⓢ</sup> is a very quick-maturing imidazolinone (IMI)-tolerant barley. Maximus CL<sup>Ⓢ</sup> is resistant to CCN, MR-MRMS to Net form net blotch and has improved grain size compared to Spartacus CL<sup>Ⓢ</sup>. It has a short coleoptile length and it is recommended that sowing depth be considered carefully. Maximus CL<sup>Ⓢ</sup> is currently undergoing Barley Australia malt accreditation with a decision expected in 2021. Released 2020 (tested as IGB1705T). Bred and marketed by InterGrain. EPR \$4.25 ex-GST.

**OXFORD**

Oxford is a feed quality variety which has shown very high yield potential in seasons with high spring rainfall. Oxford can be sown in mid to late April scenarios. Oxford has medium maturity, good straw strength and low shattering. While Oxford is susceptible to CCN, Leaf scald and Spot form net blotch, it has good resistance to Leaf rust and Powdery mildew. It is also now very susceptible to some strains of Net form net blotch, which is hard to manage. Seed is available through Heritage Seeds. EPR \$2.50 ex-GST.

**RGT PLANET<sup>Ⓢ</sup>**

RGT Planet<sup>Ⓢ</sup> is an accredited malt variety in Australia. RGT Planet<sup>Ⓢ</sup> is a quick-maturing variety which has shown the highest potential yield compared to other currently available barley varieties, particularly in the medium to high-rainfall zones. RGT Planet<sup>Ⓢ</sup> is susceptible to Spot and Net form net blotch. Quality data suggests RGT Planet<sup>Ⓢ</sup> has a lower test weight than Commander<sup>Ⓢ</sup> and a greater tendency for small grain screening under sub-optimal grain fill conditions. Seed is available via Seed Force broadacre commercial partners. EPR \$4.00 ex-GST.

**ROSALIND<sup>Ⓢ</sup>**

Rosalind<sup>Ⓢ</sup> is a very quick-maturing feed quality variety released by InterGrain in 2015. It has been evaluated in SA NVT since 2014 and has demonstrated broad adaptation to low-yielding environments and very high relative yields in high-rainfall environments. Rosalind<sup>Ⓢ</sup> has a Hindmarsh<sup>Ⓢ</sup> plant type and is slightly faster to develop than Hindmarsh<sup>Ⓢ</sup> when sown in May. Rosalind<sup>Ⓢ</sup> has excellent straw strength and standability. Rosalind<sup>Ⓢ</sup> has resistance to CCN, Net form net blotch and Leaf rust, variable resistance to Powdery mildew and Leaf scald, but susceptibility to Spot form net blotch. Rosalind<sup>Ⓢ</sup> seed is approved for grower-to-grower trading and seed is available through InterGrain Seedclub members. EPR \$3.50 ex-GST.

**SCOPE CL<sup>Ⓢ</sup>**

Scope CL<sup>Ⓢ</sup> is a tall, malting quality, quick-maturing, imidazolinone-tolerant barley with moderate to high-yield potential across a range of medium-rainfall environments. Its disease resistance profile is very similar to Buloke<sup>Ⓢ</sup> with susceptibility to some strains of Leaf rust but good resistance to Net form net blotch and Powdery mildew. Scope CL<sup>Ⓢ</sup> has registration for use with an appropriate BASF Clearfield® herbicide, and this herbicide tolerance makes Scope CL<sup>Ⓢ</sup> an attractive option for brome and other grass control, particularly in Mallee-type soils. Seed is available through Seednet. EPR \$3.50 ex-GST.

**SPARTACUS CL<sup>®</sup>**

Spartacus CL<sup>®</sup> is a malting-accredited, imidazolinone-tolerant barley developed by InterGrain and released in 2016. Spartacus<sup>®</sup> is very quick maturing with a similar plant type and flowering behaviour to Hindmarsh<sup>®</sup> and La Trobe<sup>®</sup>. Spartacus CL<sup>®</sup> has also exhibited agronomic performance for grain yield and disease resistance profile similar to Hindmarsh<sup>®</sup> and La Trobe<sup>®</sup>, including resistance to CCN and susceptibility to Loose smut. It has shown increased susceptibility to Net form net blotch in 2019. Yields have averaged similar to Compass<sup>®</sup> across most districts and slightly higher in higher-yielding districts. Spartacus CL<sup>®</sup> has consistently averaged more than 15 per cent above the widely grown imidazolinone-tolerant Scope CL<sup>®</sup> and has improved grain size. Seed is available from local resellers and InterGrain Seedclub members.  
EPR \$4.25 ex-GST.

**WESTMINSTER<sup>®</sup>**

Westminster<sup>®</sup> is a quick to mid-maturing variety with medium to tall, stiff straw. Malting accreditation was completed in March 2013. Westminster<sup>®</sup> now shows variable resistance to Net form net blotch and Leaf scald, has good resistance to Black point, but is susceptible to Spot form net blotch. Westminster<sup>®</sup> is well suited to the south-east of SA and higher rainfall environments. Contact GrainSearch for details on obtaining seed for 2020.  
EPR \$3.00 ex-GST.

**YIELD PERFORMANCE EXPERIMENTS FROM 2015 TO 2019**

The yield results presented are multi-environment trial (MET) data shown on a yearly regional group mean and a weighted regional mean. All yields are expressed as a percentage of mean yield from NVT data 2015 to 2019 inclusive, along with a number of observations in adjacent columns. Further results can be found on the NVT website: [www.nvtonline.com.au](http://www.nvtonline.com.au).

**Table 4: Lower Eyre Peninsula barley yield performance. NVT data 2015–19.**

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

Variety	Group	2015	2016	2017	2018	2019
	Mean yield t/ha	4.02	5	3.25	5.98	1.17
	No. trials	3	3	3	2	1
<b>MALTING</b>						
Commander <sup>®</sup>	12	99	100	103	98	94
Compass <sup>®</sup>	12	113	101	111	102	148
Gairdner	11	87	86	86	89	–
GrangeR <sup>®</sup>	12	100	97	99	101	80
La Trobe <sup>®</sup>	12	110	97	105	102	131
RGT Planet <sup>®</sup>	9	–	112	110	110	89
Scope CL <sup>®</sup>	12	97	93	96	96	115
Spartacus CL <sup>®</sup>	12	114	98	103	103	134
Westminster <sup>®</sup>	9	87	92	92	–	–
<b>FEED</b>						
Beast <sup>®</sup>	1	–	–	–	–	152
Fathom <sup>®</sup>	12	106	106	106	102	136
Fleet Australia <sup>®</sup>	12	98	99	101	96	112
Keel	12	105	95	93	97	130
Oxford	12	89	102	96	99	53
Rosalind <sup>®</sup>	12	117	107	112	111	125
<b>PENDING MALT ACCREDITATION</b>						
LG Alestar <sup>®</sup>	12	96	98	96	100	80
Buff <sup>®</sup>	3	–	–	–	104	122
Laperouse <sup>®</sup>	3	–	–	–	105	122
Leabrook <sup>®</sup>	12	113	107	113	105	133
Maximus CL <sup>®</sup>	3	–	–	–	104	138

**Table 5: Upper Eyre Peninsula barley yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.49	3.99	2.13	2.18	2.55
	No. trials	4	4	2	4	4
MALTING						
Commander <sup>db</sup>	18	97	100	105	108	102
Compass <sup>db</sup>	18	114	100	119	118	119
La Trobe <sup>db</sup>	18	115	100	114	115	112
RGT Planet <sup>db</sup>	14	–	110	97	96	101
Scope CL <sup>db</sup>	18	96	95	103	99	97
Spartacus CL <sup>db</sup>	18	117	100	113	115	115
FEED						
Beast <sup>db</sup>	4	–	–	–	–	125
Fathom <sup>db</sup>	18	113	110	110	116	117
Fleet Australia <sup>db</sup>	18	103	105	109	117	107
Keel	18	111	102	107	113	111
Rosalind <sup>db</sup>	18	123	106	111	113	117
PENDING MALT ACCREDITATION						
LG Alestar <sup>db</sup>	18	94	96	93	90	90
Buff <sup>db</sup>	8	–	–	–	114	107
Laperouse <sup>db</sup>	8	–	–	–	117	115
Leabrook <sup>db</sup>	18	115	106	114	117	120
Maximus CL <sup>db</sup>	8	–	–	–	114	115

**Table 6: Mid North barley yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.34	6.69	4.91	2.53	3.68
	No. trials	3	3	3	2	3
MALTING						
Commander <sup>db</sup>	14	100	95	101	103	98
Compass <sup>db</sup>	14	112	91	105	124	119
Flinders <sup>db</sup>	14	91	95	96	92	95
Gairdner	11	83	88	90	89	–
Grange <sup>db</sup>	14	97	100	98	88	92
La Trobe <sup>db</sup>	14	111	97	104	118	115
RGT Planet <sup>db</sup>	11	–	119	107	99	103
Scope CL <sup>db</sup>	14	94	93	97	100	98
Spartacus CL <sup>db</sup>	14	117	96	104	119	118
Westminster <sup>db</sup>	9	81	97	92	–	–
FEED						
Beast <sup>db</sup>	3	–	–	–	–	122
Explorer <sup>db</sup>	14	103	107	102	93	95
Fathom <sup>db</sup>	14	110	101	106	124	118
Fleet Australia <sup>db</sup>	14	103	97	102	116	106
Keel	14	112	95	100	118	114
Oxford	11	86	–	96	74	80
Rosalind <sup>db</sup>	14	118	107	109	118	120
PENDING MALT ACCREDITATION						
LG Alestar <sup>db</sup>	14	94	103	97	87	91
Buff <sup>db</sup>	5	–	–	–	112	107
Laperouse <sup>db</sup>	8	–	–	107	115	111
Leabrook <sup>db</sup>	14	114	98	108	122	118
Maximus CL <sup>db</sup>	5	–	–	–	119	118



**Table 7: Yorke Peninsula barley yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	3.25	6.36	4.7	5.04	3.78
	No. trials	5	5	5	3	3
<b>MALTING</b>						
Commander <sup>db</sup>	21	105	98	100	98	98
Compass <sup>db</sup>	21	114	95	100	101	106
Gairdner	18	83	90	93	92	–
GrangeR <sup>db</sup>	21	95	98	98	97	94
La Trobe <sup>db</sup>	21	110	98	101	104	105
RGT Planet <sup>db</sup>	16	–	114	111	110	108
Scope CL <sup>db</sup>	21	94	95	98	97	99
Spartacus CL <sup>db</sup>	21	115	97	99	103	105
Westminster <sup>db</sup>	15	80	96	96	–	–
<b>FEED</b>						
Beast <sup>db</sup>	3	–	–	–	–	109
Explorer <sup>db</sup>	18	102	104	103	103	–
Fathom <sup>db</sup>	21	112	104	105	107	111
Fleet Australia <sup>db</sup>	21	108	101	103	103	105
Keel	21	112	97	97	102	105
Oxford	16	86	–	99	95	92
Rosalind <sup>db</sup>	21	115	105	106	109	109
<b>PENDING MALT ACCREDITATION</b>						
LG Alestar <sup>db</sup>	21	92	100	99	98	96
Buff <sup>db</sup>	6	–	–	–	103	104
Laperouse <sup>db</sup>	6	–	–	–	100	102
Leabrook <sup>db</sup>	21	116	100	103	104	108
Maximus CL <sup>db</sup>	6	–	–	–	103	105

**Table 8: Murray Mallee barley yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.58	5.54	3.65	1.92	2.77
	No. trials	2	2	2	2	2
MALTING						
Commander <sup>db</sup>	10	95	99	102	102	97
Compass <sup>db</sup>	10	120	99	104	113	119
GrangeR <sup>db</sup>	4	92	–	–	–	90
La Trobe <sup>db</sup>	10	115	101	99	103	109
RGT Planet <sup>db</sup>	8	–	117	105	107	106
Schooner	6	97	84	88	–	–
Scope CL <sup>db</sup>	10	99	94	92	102	99
Spartacus CL <sup>db</sup>	10	120	99	102	101	112
FEED						
Beast <sup>db</sup>	2	–	–	–	–	122
Fathom <sup>db</sup>	10	117	101	103	112	119
Fleet Australia <sup>db</sup>	10	102	98	97	104	102
Keel	10	116	91	96	96	108
Oxford	10	78	102	101	94	84
Rosalind <sup>db</sup>	10	122	111	108	106	117
PENDING MALT ACCREDITATION						
Buff <sup>db</sup>	4	–	–	–	113	104
Laperouse <sup>db</sup>	4	–	–	–	110	110
Leabrook <sup>db</sup>	10	119	104	109	112	120
Maximus CL <sup>db</sup>	4	–	–	–	103	113

**Table 9: South East barley yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.62	6.13	5.34	5.32	5.54
	No. trials	2	2	2	2	2
MALTING						
Commander <sup>Ⓛ</sup>	10	98	93	96	101	97
Compass <sup>Ⓛ</sup>	10	141	92	103	103	105
Gairdner	6	83	90	89	–	–
GrangeR <sup>Ⓛ</sup>	10	95	98	102	99	99
La Trobe <sup>Ⓛ</sup>	10	126	93	98	100	107
Navigator	8	65	96	94	97	–
RGT Planet <sup>Ⓛ</sup>	8	–	117	111	106	109
Scope CL <sup>Ⓛ</sup>	10	100	93	95	95	97
Spartacus CL <sup>Ⓛ</sup>	10	133	94	100	101	108
Westminster <sup>Ⓛ</sup>	10	71	97	97	94	91
FEED						
Beast <sup>Ⓛ</sup>	2	–	–	–	–	106
Capstan	10	78	114	100	99	95
Explorer <sup>Ⓛ</sup>	10	91	99	100	102	105
Fathom <sup>Ⓛ</sup>	10	119	104	100	103	105
Fleet Australia <sup>Ⓛ</sup>	9	98	93	89	99	99
Keel	8	115	–	91	96	103
Oxford	10	68	106	103	100	93
Rosalind <sup>Ⓛ</sup>	10	134	106	110	107	114
PENDING MALT ACCREDITATION						
LG Alestar <sup>Ⓛ</sup>	4	–	–	–	98	99
Buff <sup>Ⓛ</sup>	4	–	–	–	101	105
Laperouse <sup>Ⓛ</sup>	4	–	–	–	106	105
Leabrook <sup>Ⓛ</sup>	10	135	100	106	107	106
Maximus CL <sup>Ⓛ</sup>	4	–	–	–	101	109

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# OAT

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The oat variety descriptions in this publication serve as a guide to select oat varieties for specific end-uses with disease resistance, agronomic traits and yield potential suited to diverse south-eastern Australian farming systems.

## HOW TO USE THE OAT VARIETY SOWING GUIDE

Varieties adapted to low, medium and high-rainfall regions, and categorised by grain and hay end-use, are shown in Table 1. Select the group of varieties suited to your rainfall region and end-use. Consult Tables 2 to 7 to refine the list to one or two varieties. Consult Tables 2 and 3 for hay and grain production comparisons, Table 4 for agronomic features, Table 5 for disease resistance, Table 6 for grain quality and Table 7 for hay quality. Certain varieties are preferred for particular end-uses, so check with hay processors and millers prior to variety selection.

## IS CEREAL CYST OR STEM NEMATODE A PRODUCTION CONSTRAINT?

Cereal cyst nematode (CCN) and Stem nematode (SN) are major soil-borne diseases limiting the yield of oats in certain areas of southern Australia. Due to the significant effect of CCN and SN on varietal performance, soil testing is recommended to assess whether either of these nematodes will be a significant problem. The PreDicta® B testing service provides a diagnostic test to assess the levels of both nematodes prior to sowing. This is available through your local accredited agronomist.

Varieties in Table 1 provide options for different end-uses. Table 5 should then be used in conjunction with Table 1 to determine whether the variety of choice has resistance and/or tolerance to CCN and SN, if these nematodes are problematic. Varieties grown where CCN or SN are present should be resistant to the particular nematode which is a

problem, so multiplication of the nematode is limited. The variety should also be tolerant so that it yields well in the presence of the nematode. Yield penalties of up to 80% can occur if an intolerant variety is sown in a paddock where CCN or SN is present.

Eight varieties resistant or moderately resistant to CCN are listed in Table 5 and four of these are also tolerant. Tammar<sup>®</sup>, Mulgara<sup>®</sup>, Tungoo<sup>®</sup> and Wintaroo<sup>®</sup> are all varieties with both CCN resistance and tolerance. The remaining four resistant varieties, Yallara<sup>®</sup>, Brusher<sup>®</sup>, Durack<sup>®</sup> and Bannister<sup>®</sup>, are intolerant of CCN. There are four varieties tolerant to stem nematode. These are Tammar<sup>®</sup>, Mulgara<sup>®</sup>, Tungoo<sup>®</sup> and Wintaroo<sup>®</sup>. All of these are rated as resistant or moderately resistant to SN. Bannister<sup>®</sup> is intermediate in tolerance to SN and in cold, wet seasonal conditions may suffer greater yield loss than in warmer, drier winter conditions.

## IS LEAF DISEASE A PRODUCTION CONSTRAINT?

Resistance to leaf diseases is important in most environments. However, even though varieties are listed as resistant to Stem or Leaf rust, changes in rust pathotypes can occur. Recently a Stem rust pathotype was found in the southern region of South Australia causing all Stem rust resistance to be ineffective in its presence. Table 5 indicates a range of resistance reactions for Stem rust depending on whether or not the new pathotype is present. Monitoring disease levels is essential and application of fungicide may be required depending on seasonal conditions. Table 1 should be used to determine the variety options available for a particular end-use. Next, Table 5 should be used to further refine your choice. For example, if an oaten hay variety is required in a high-rainfall environment, Tammar<sup>®</sup>, Tungoo<sup>®</sup>, Brusher<sup>®</sup>, Mulgara<sup>®</sup> and Wintaroo<sup>®</sup> are suitable (Table 1). Table 3 indicates that Wintaroo<sup>®</sup> is the highest yielding hay variety in this environment. However, Table 5 indicates that all

other varieties have better resistance to both Stem and Leaf rust. These varieties also vary in their level of resistance to Septoria, Barley yellow dwarf virus (BYDV), Bacterial blight and Red leather leaf, which may also be important. Table 4 should then be used to determine if the variety selected matures at the time required.

## IS MILLING QUALITY REQUIRED?

The probability of a variety meeting the classification criteria for milling grade is an important consideration when selecting a variety for milling end-use. This is greatly influenced by seasonal conditions. Premium milling varieties such as Yallara<sup>®</sup>, Mitika<sup>®</sup>, Bilby<sup>®</sup>, Kowari<sup>®</sup>, Bannister<sup>®</sup> and Durack<sup>®</sup> will reach the classification criteria for milling grade more often than other varieties (Table 6). Although some other varieties are not considered milling class, they may reach milling grade criteria, but would not be accepted for milling. It is imperative that you check with your miller about the quality standards and varieties that are accepted for milling before you sow a grain crop for this end-use.

To select a variety for milling grain in medium to high-rainfall zones, you have the choice of Bilby<sup>®</sup>, Kowari<sup>®</sup>, Mitika<sup>®</sup>, Yallara<sup>®</sup>, Bannister<sup>®</sup>, Williams<sup>®</sup> or Durack<sup>®</sup> (Table 1). Table 2 shows the relative yield and Table 6 the relative grain quality for each of these varieties. Using this information, choose a variety that suits your end-use, based on whether yield or quality is a priority. Table 4 should also be used to determine whether the variety selected matures at the time required and Table 5 should be used to determine if the variety selected has the desired disease resistance.

## IS EXPORT HAY QUALITY REQUIRED?

Hay quality is essential to meet export hay standards and is greatly influenced by seasonal and nutritional conditions. However, some varieties are more likely to produce higher-quality hay than others. It is imperative that you check with your hay processor about the quality standards required to make export-grade-quality hay before you sow a hay crop. Use Table 7 to refine your choice after first ensuring that the criteria in Tables 1, 4 and 5 are met for your situation.

## OATS FOR GRAZING

This guide contains no guidelines for oats suited to grazing or feed grain production and repeated grazing from early sowing. A more comprehensive guide for grazing varieties is contained in the *Winter*

*Crop Variety Sowing Guide* produced annually by NSW DPI. Please contact the National Oat Breeding Program for information about how to obtain a copy of this publication.

## NOTES ON RECENTLY RELEASED VARIETIES

Fact sheets or pamphlets describing all varieties released by the South Australian-based National Oat Breeding Program are available from the Department of Primary Industries and Regions website ([www.pir.sa.gov.au/research](http://www.pir.sa.gov.au/research)) or from the relevant commercial partner for the variety. The herbicide tolerance of different oat varieties, as well as yield and quality information for grain varieties, is available on the NVT website [www.nvtonline.com.au](http://www.nvtonline.com.au).

## MILLING VARIETIES

### BILBY<sup>®</sup>

Bilby<sup>®</sup>, released in September 2019 by SARDI, is a dwarf, early-mid season potential milling oat. Its height is similar to Mitika<sup>®</sup> and it is three days later to head. Bilby<sup>®</sup> has excellent grain yield and is similar to Williams<sup>®</sup> and Bannister<sup>®</sup> in SA, but with improved grain quality compared to these two varieties. Bilby<sup>®</sup> has lower screenings, higher groat per cent and higher protein content compared to Williams<sup>®</sup> and Bannister<sup>®</sup>. It has lower hectolitre weight and slightly higher screenings compared to Mitika<sup>®</sup> and Kowari<sup>®</sup>. Protein is similar to Mitika<sup>®</sup> and Kowari<sup>®</sup> and grain size is similar to Mitika<sup>®</sup> and bigger than Kowari<sup>®</sup>, Bannister<sup>®</sup> or Williams<sup>®</sup>. Bilby<sup>®</sup> has high  $\beta$ -glucan and lower oil than other dwarf varieties with bright grain. Bilby<sup>®</sup> has improved Barley yellow dwarf virus resistance compared to other dwarf varieties. It is a cross between two breeder's lines and was tested as 06204-16. Heritage is the commercial partner.

### KOWARI<sup>®</sup>

Kowari<sup>®</sup> is a dwarf, early-maturing milling oat variety released by SARDI and measuring slightly taller than Mitika<sup>®</sup> in height. It has a maturity similar to Mitika<sup>®</sup>. Kowari<sup>®</sup> is a cross between Mitika<sup>®</sup> and WAOAT2099 and has similar grain yield to Mitika<sup>®</sup>, but lower than Bannister<sup>®</sup> and Williams<sup>®</sup>. The grain quality is excellent. Kowari<sup>®</sup> has slightly lower hectolitre weight and grain weight when compared to Mitika<sup>®</sup>. It combines high  $\beta$ -glucan with low screenings. Kowari<sup>®</sup> has high protein and slightly higher groat per cent compared to Mitika<sup>®</sup>. The trait of interest for this variety is improved  $\beta$ -glucan content. Heritage is the commercial partner.



## DURACK<sup>Ⓢ</sup>

Durack<sup>Ⓢ</sup> is an extremely early, moderately tall variety, similar in height to Carrolup and Yallara<sup>Ⓢ</sup>. This variety is a minimum of one week earlier than any other variety released from the program. Durack<sup>Ⓢ</sup> has good lodging and shattering resistance and good early vigour. It is susceptible to Stem rust in SA and Victoria so a fungicide application will be mandatory if grown in areas where Stem rust is a problem. Durack<sup>Ⓢ</sup> is rated resistant to susceptible for Leaf rust depending on which pathotype of the rust is present. Again, a fungicide may be required in Leaf rust-prone areas. Grain yield for this variety is similar to the tall varieties, Carrolup and Yallara<sup>Ⓢ</sup>, and an improvement compared to tall varieties bred for hay. Grain quality is excellent with high protein levels. Hay yield averaged over low, medium, and high-rainfall sites is lower than other longer-season varieties, and care will need to be taken to cut this very early maturing variety at the correct growth stage. Monitoring the crop will be the key to achieving the highest hay quality.

## WILLIAMS<sup>Ⓢ</sup>

Williams<sup>Ⓢ</sup> is a tall milling variety commercialised by Heritage and released in Western Australia. It is also suited to eastern Australia because of its improved disease-resistance profile. Williams<sup>Ⓢ</sup> is a high-yielding early to mid-season variety with similar maturity compared to Yallara<sup>Ⓢ</sup> and 15 centimetres shorter. It is three to seven days later maturing than Mitika<sup>Ⓢ</sup> and 15cm taller. Williams<sup>Ⓢ</sup> has the highest level of Septoria resistance compared to all other current milling oat varieties. It has similar grain yield to Bannister<sup>Ⓢ</sup> with slightly inferior grain quality. Screenings can be high, especially in low-rainfall regions. Williams<sup>Ⓢ</sup> has high  $\beta$ -glucan levels. Williams<sup>Ⓢ</sup> averages slightly lower hay yield compared to other hay varieties. Hay quality is similar to Wintaroo<sup>Ⓢ</sup> with slightly lower water-soluble carbohydrates and slightly higher crude protein.

## BANNISTER<sup>Ⓢ</sup>

Bannister<sup>Ⓢ</sup> is a dwarf milling variety commercialised by Seednet and released in Western Australia, but also suited to eastern Australia because of its improved disease resistance profile. Bannister<sup>Ⓢ</sup> is high yielding and 13cm taller than Mitika<sup>Ⓢ</sup>, heading about three to four days later than this variety. Bannister<sup>Ⓢ</sup> has slightly lower hectolitre weight, slightly higher screenings and slightly lower groat per cent compared to Mitika<sup>Ⓢ</sup>.

## MITIKA<sup>Ⓢ</sup>

Mitika<sup>Ⓢ</sup> is an early-maturing dwarf milling oat developed by SARDI and commercialised by Heritage Seeds. Mitika is a milling quality oat with high hectolitre and grain weight, low screenings per cent and moderately high groat per cent. It is also a high feed value oat with low hull lignin and high grain digestibility and is recommended for all rainfall zones where CCN or Stem nematode are not a problem.

## YALLARA<sup>Ⓢ</sup>

Yallara<sup>Ⓢ</sup> is a medium-tall milling oat variety developed by SARDI and commercialised by Seednet. Yallara<sup>Ⓢ</sup> is a backcross line using Euro as the recurrent parent and a North Dakota line as the source of rust resistance. It is moderately resistant to Stem rust and resistant to Leaf rust. Yallara<sup>Ⓢ</sup> is a premium quality oat with the flexibility to cut for hay, with fine stems and good hay quality. In addition, Yallara<sup>Ⓢ</sup> has bright grain and high grain digestibility, making it suitable for the horse racing industry. Based on herbicide-tolerance trials conducted by the SARDI Agronomy Group, Yallara<sup>Ⓢ</sup> is particularly sensitive to applications of BanveIM<sup>®</sup>. For more information about the herbicide tolerance of Yallara<sup>Ⓢ</sup> go to [www.nvtonline.com.au](http://www.nvtonline.com.au).

## HAY VARIETIES

### KOORABUP<sup>Ⓢ</sup>

Koorabup<sup>Ⓢ</sup> is a mid-tall hay variety with early-mid to mid-season maturity, developed for the WA market. It is similar in height, two to four days later in maturity, and has similar grain yield and stem diameter compared to Yallara<sup>Ⓢ</sup>. Hay yield is slightly higher than Carrolup, but lower than Yallara<sup>Ⓢ</sup> and Brusher<sup>Ⓢ</sup>. It has improved disease and grain quality compared to other current hay varieties and combines improved Septoria resistance with good rust and Bacterial blight resistances. It has excellent hay colour and hay quality, and is similar to Wintaroo<sup>Ⓢ</sup> across all traits except water-soluble carbohydrates, which average slightly lower in Victoria and WA. Grain quality is similar to Yallara<sup>Ⓢ</sup> but with a lower groat per cent. It has low oil and bright grain. This line is a cross between two WA advanced breeding lines and is commercialised by AEXCO Pty Ltd.

**MULGARA<sup>®</sup>**

Mulgara<sup>®</sup> is a tall mid-season hay oat similar in heading time and height to Wintaroo<sup>®</sup>. It is available to growers through AEXCO Pty Ltd. Mulgara<sup>®</sup> is an improvement compared to Wintaroo<sup>®</sup> for resistance to Stem rust and Bacterial blight. It is also an improvement compared to Wintaroo<sup>®</sup> for lodging and shattering resistance and early vigour. Hay yield is an improvement compared to Brusher<sup>®</sup> but is slightly lower than Wintaroo<sup>®</sup>. Hay quality is similar to Wintaroo<sup>®</sup>. Mulgara<sup>®</sup> has excellent hay colour and resists brown leaf at hay cutting. Grain yield and quality is similar to Wintaroo<sup>®</sup> with lower screenings, and higher protein and groat per cent. Mulgara<sup>®</sup> has high grain hull lignin. Mulgara<sup>®</sup> is recommended to replace Wintaroo<sup>®</sup> in areas with Stem nematode due to its higher level of resistance. It is also recommended to replace Wintaroo<sup>®</sup> where improved lodging resistance, and Stem rust or Bacterial blight resistance is required. The seed size of Mulgara<sup>®</sup> is larger than other hay varieties described in this sowing guide. Care should be taken to sow this variety at the correct seed density.

**FORESTER<sup>®</sup>**

Forester<sup>®</sup> is a very late hay variety adapted to high-rainfall and irrigated cropping regions. It is three weeks later to head compared to Wintaroo<sup>®</sup>. Forester<sup>®</sup> has excellent early vigour and lodging and shattering resistance. Forester<sup>®</sup> has an excellent foliar disease resistance spectrum with good hay colour, but like all late hay varieties may not resist hot dry winds as well as earlier varieties. Forester<sup>®</sup> has excellent hay quality and seed is available from AGF Seeds.

**TAMMAR<sup>®</sup>**

Tammar<sup>®</sup> is a late tall hay oat variety later in cutting time than Kangaroo and Tungoo<sup>®</sup> but not as late as Forester<sup>®</sup>. It is available to growers through AEXCO Pty Ltd. Tammar<sup>®</sup> has excellent hay colour and resists brown leaf at hay cutting. Hay yields are slightly lower than Wintaroo<sup>®</sup> and similar to Tungoo<sup>®</sup> and Kangaroo. Grain yield is better than Kangaroo and Tungoo<sup>®</sup>. Hay quality is better than Kangaroo and similar to Tungoo<sup>®</sup> and Wintaroo<sup>®</sup>. Tammar<sup>®</sup> has an excellent foliar disease resistance profile and is an improvement compared to Tungoo<sup>®</sup> for Stem rust resistance. Tammar<sup>®</sup> is similar in height to Kangaroo, Tungoo<sup>®</sup> and Wintaroo<sup>®</sup> and has better lodging resistance than Tungoo<sup>®</sup> and Wintaroo<sup>®</sup> and better early vigour than Tungoo<sup>®</sup>. Tammar<sup>®</sup> has grain quality similar to Tungoo<sup>®</sup> and Kangaroo with slightly smaller grain weight and slightly more screenings. Tammar<sup>®</sup> is recommended for medium and high-rainfall zones and gives a slightly later option for cutting time than Tungoo<sup>®</sup> and Kangaroo.

**TUNGOO<sup>®</sup>**

Tungoo<sup>®</sup> is a medium-tall, mid to late-season hay variety similar in heading date to Kangaroo. Seed of this line is available to growers through AEXCO Pty Ltd. Tungoo<sup>®</sup> has an excellent disease resistance profile and resists leaf browning from hot dry winds. It combines resistance and moderate tolerance to CCN and Stem nematode. Hay yield is similar to Kangaroo with lower grain yield and quality. Hay digestibility is similar to Wintaroo<sup>®</sup> (better than Kangaroo), although it tends to be higher in neutral detergent fibre (NDF) and lower in water soluble carbohydrates (WSC) than Wintaroo<sup>®</sup> but an improvement compared to Kangaroo. Early vigour is not as good as Kangaroo. It has moderately low hull lignin.

**BRUSHER<sup>®</sup>**

Brusher<sup>®</sup> is an early-mid season tall oat developed by SARDI and commercialised by AEXCO Pty Ltd. It is two to four days earlier to head than Wintaroo<sup>®</sup> and this makes it well suited to low-rainfall areas. Although Brusher<sup>®</sup> has inferior hay yield when compared to Wintaroo<sup>®</sup>, it is recommended to replace this variety where improved resistance to Stem and Leaf rusts or improved hay quality is desired. Grain yield and grain quality is similar to Wintaroo<sup>®</sup>, Wallaroo<sup>®</sup> and Kangaroo with higher grain protein. Brusher<sup>®</sup> is moderately low in grain lignin.

**KINGBALE<sup>®</sup>**

KingBale<sup>®</sup> is a mid-flowering imidazolinone (IMI)-tolerant oaten hay variety with improved tolerance to soil residual IMI herbicides. It is an ideal variety for use where there are IMI residue concerns from previous crops. KingBale<sup>®</sup> is a tall variety with good early vigour and is suitable for planting in the major hay-growing regions of Australia. Preliminary data shows that KingBale<sup>®</sup> has a similar disease and agronomic profile to Wintaroo<sup>®</sup> and indicates that it is resistant to CCN although rust (likely susceptible) will require proactive management. Yield information is currently limited. KingBale<sup>®</sup> is a single-gene IMI-tolerant variety. The original breeding work was undertaken by Grains Innovation Australia (GIA) and the line is being commercialised by InterGrain. Commercial seed of KingBale<sup>®</sup> will be available in 2021 subject to field testing results and APVMA herbicide registration.

**Table 1: Oat varieties listed according to annual rainfall.**

Use Tables 2, 3, 4, 5, 6 and 7 to further refine your choice within each category.

Rainfall zone (average annual rainfall)		
Low < 375mm	Medium 375–500mm	High > 500mm
END-USE – MILLING GRAIN		
Bilby <sup>db</sup>	Bilby <sup>db</sup>	Bilby <sup>db</sup>
Kowari <sup>db</sup>	Kowari <sup>db</sup>	Kowari <sup>db</sup>
Mitika <sup>db</sup>	Mitika <sup>db</sup>	Mitika <sup>db</sup>
Yallara <sup>db</sup>	Yallara <sup>db</sup>	Yallara <sup>db</sup>
Bannister <sup>db</sup>	Bannister <sup>db</sup>	Bannister <sup>db</sup>
Durack <sup>db</sup>	Williams <sup>db</sup>	Williams <sup>db</sup>
	Durack <sup>db</sup>	
END-USE – FEED GRAIN – SHEEP, CATTLE		
Kowari <sup>db</sup>	Kowari <sup>db</sup>	Kowari <sup>db</sup>
Mitika <sup>db</sup>	Mitika <sup>db</sup>	Mitika <sup>db</sup>
Yallara <sup>db</sup>	Yallara <sup>db</sup>	Yallara <sup>db</sup>
Wintaroo <sup>db</sup>	Wintaroo <sup>db</sup>	Wintaroo <sup>db</sup>
Mulgara <sup>db</sup>	Mulgara <sup>db</sup>	Mulgara <sup>db</sup>
Wallaroo		
END-USE – FEED GRAIN – PIGS, POULTRY		
-	Numbat	Numbat
END USE – OAT HAY		
Koorabup <sup>db</sup>	Koorabup <sup>db</sup>	Forester <sup>db</sup>
Brusher <sup>db</sup>	Wintaroo <sup>db</sup>	Tammar <sup>db</sup>
Mulgara <sup>db</sup>	Mulgara <sup>db</sup>	Tungoo <sup>db</sup>
Wintaroo <sup>db</sup>	Tammar <sup>db</sup>	Koorabup <sup>db</sup>
Durack <sup>db</sup>	Tungoo <sup>db</sup>	Brusher <sup>db</sup>
Yallara <sup>db</sup>	Brusher <sup>db</sup>	Mulgara <sup>db</sup>
	Durack <sup>db</sup>	Wintaroo <sup>db</sup>
END-USE – HAY AND LEGUME MIXES		
Brusher <sup>db</sup>	Wintaroo <sup>db</sup>	Forester <sup>db</sup>
Koorabup <sup>db</sup>	Mulgara <sup>db</sup>	Tammar <sup>db</sup>
Mulgara <sup>db</sup>	Tungoo <sup>db</sup>	Tungoo <sup>db</sup>
Yallara <sup>db</sup>	Brusher <sup>db</sup>	Williams <sup>db</sup>
Durack <sup>db</sup>	Koorabup <sup>db</sup>	

**Table 2: Five-year (2015–19) average grain yield (t/ha) of oat varieties tested in grain trials.**

Variety	Yorke Peninsula	Mid North	South East	Murray Mallee	Average for all regions
SEMI-DWARF (HUSKED)					
Bannister <sup>db</sup>	3.7	4.0	4.5	1.6	3.8
Bilby <sup>db</sup>	3.6	3.8	4.4	1.6	3.6
Kowari <sup>db</sup>	3.4	3.6	4.1	1.5	3.4
Mitika <sup>db</sup>	3.3	3.6	4.0	1.5	3.3
SEMI-DWARF (NAKED)					
Numbat <sup>1</sup>	NA	NA	NA	NA	NA
TALL (HUSKED)					
Durack <sup>db</sup>	3.0	3.2	3.7	1.5	3.1
Koorabup <sup>db</sup>	2.6	2.9	3.4	1.4	3.0
Williams <sup>db</sup>	3.5	3.8	4.4	1.6	3.6
Yallara <sup>db</sup>	2.5	3.0	3.5	1.3	3.0
<b>No. trials</b>	<b>5</b>	<b>18</b>	<b>14</b>	<b>4</b>	<b>164</b>

<sup>1</sup> Not grown in trials.

**Table 3: Six-year (2014–2019) average hay and grain production of oat varieties tested in hay trials.**

Variety	Hay yield (t/ha)			Grain yield (t/ha)		
	Rainfall zone			Rainfall zone		
	Low < 375mm	Medium 375–500mm	High > 500mm	Low < 375mm	Medium 375–500mm	High > 500mm
<b>SEMI-DWARF (HUSKED)</b>						
Bannister <sup>db</sup>	6.5	8.8	11.0	2.8	3.3	4.3
<b>TALL (HUSKED) – EARLY TO MID-SEASON MATURITY</b>						
Brusher <sup>db</sup>	6.9	9.1	11.3	2.0	2.3	2.6
Durack <sup>db</sup>	6.3	8.6	10.8	2.4	2.9	3.3
Koorabup <sup>db</sup>	6.3	8.9	11.0	2.3	2.6	3.4
Mulgara <sup>db</sup>	6.7	9.0	11.2	2.1	2.3	3.1
Williams <sup>db</sup>	6.1	8.9	10.9	2.8	3.2	4.4
Wintaroo <sup>db</sup>	6.9	9.4	11.5	2.1	2.3	3.2
Yallara <sup>db</sup>	6.8	9.1	11.4	2.4	2.8	3.5
<b>TALL (HUSKED) – MID LATE TO VERY LATE MATURITY</b>						
Forester <sup>db</sup>	NA <sup>1</sup>	9.1	11.0	NA <sup>2</sup>	NA <sup>2</sup>	NA <sup>2</sup>
Tammar <sup>db</sup>	NA <sup>1</sup>	8.7	10.8	1.9	2.1	3.1
Tungoo <sup>db</sup>	NA <sup>1</sup>	9.1	11.2	1.8	2.0	2.9
<b>No. trials</b>	<b>11</b>	<b>21</b>	<b>10</b>	<b>26</b>	<b>31</b>	<b>21</b>

<sup>1</sup> Not recommended for low-rainfall areas.<sup>2</sup> Data not available.**Table 4: Agronomic features of varieties.**

Variety	Early vigour	Plant height	Heading	Maturity	Shattering resistance	Standing ability
<b>SEMI-DWARF (HUSKED)</b>						
Bannister <sup>db</sup>	G	D	EM	EM	R	R
Bilby <sup>db</sup>	G	D	EM	EM	R	R
Kowari <sup>db</sup>	G	D	E	E	R	R
Mitika <sup>db</sup>	G	D	E	E	R	R
<b>SEMI-DWARF (NAKED)</b>						
Numbat	MG	D	EM	EM	MR	R
<b>TALL (HUSKED)</b>						
Brusher <sup>db</sup>	G	T	E	EM	MS	MS
Durack <sup>db</sup>	G	MT	VE	VE	MS	MR
Forester <sup>db</sup>	VG	MT	VL	VL	R	R
Kangaroo	MG	MT	ML	ML	MS	R
Koorabup <sup>db</sup>	M	MT	E-EM	EM	MS	MR
Mulgara <sup>db</sup>	G	T	EM	EM	MS	MR
Tammar <sup>db</sup>	M	T	LM	LM	MS	R
Tungoo <sup>db</sup>	MP	MT	ML	ML	MS	MS
Williams <sup>db</sup>	G	MT	EM	EM	R	R
Wintaroo <sup>db</sup>	MG	T	M	EM	MS	MS
Yallara <sup>db</sup>	VG	MT	EM	EM	MR	R

**Early vigour:** VG = very good, G = good, MG = moderately good, M = moderate, P = poor, MP = moderately poor.**Plant height:** D = dwarf, TD = tall dwarf, ST = short tall, MT = moderate tall, T = tall.**Heading and maturity:** VE = very early, E = early, EM = early mid, M = mid season, ML = mid late season, LM = late mid season, L = late, VL = very late.**Shattering and standing ability:** R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

Table 5: Disease resistance of oat varieties – field reactions.

Variety	Rust		Barley yellow dwarf virus <sup>2</sup>	CCN		Stem nematode		Septoria	Bacterial blight	Red leather leaf <sup>1</sup>
	Stem <sup>1</sup>	Leaf		Resistance	Tolerance	Resistance	Tolerance			
SEMI-DWARF (HUSKED)										
Bannister <sup>db</sup>	MR-S	R	MS	R	MI	–	MI	S	MR-S	MS-VS
Bilby <sup>db</sup>	S	R	MRMS	S	–	–	–	S	MS	RMR
Kowari <sup>db</sup>	MR-S	R	MS	S	–	–	I	S	MR	MR-VS
Mitika <sup>db</sup>	MR-S	MS	S	VS	I	S	I	S	MR	R-MS
SEMI-DWARF (NAKED)										
Numbat	MR-S	R	S	S	I	S	I	MR	S	R
TALL (HUSKED)										
Brusher <sup>db</sup>	MSS	MRMS	MS	R	MI	MS	I	MS	MRMS	R-S
Durack <sup>db</sup>	SVS	R-S	MS	R	MI-MT	–	I	MS	MR-S	MS-VS
Forester <sup>db</sup>	R-S	MRMS	MR-S	MS	MI	S	I	MR	MSS	R-MS
Koorabup <sup>db</sup>	R-S	MSS	MSS	S	–	–	MI	MR	MR	MS-VS
Mulgara <sup>db</sup>	MSS	MR	MS	R	MT	R	MT	MS	MR	MS-VS
Tammar <sup>db</sup>	MR-S	MR	MS	MR	MT	R	MT	MR	MR	MR-VS
Tungoo <sup>db</sup>	MSS	MR	MRMS	R	MT	R	MT	MR	MR	R-MS
Williams <sup>db</sup>	MR-S	R	MRMS	S	I	–	I	MRMS	R	MR-VS
Wintaroo <sup>db</sup>	S	MS	MSS	R	MT	MR	MT	MRMS	MR	MR-VS
Yallara <sup>db</sup>	MR-S	R	MS	R	I	S	I	MS	MRMS	MS-VS

<sup>1</sup> Disease reactions to Stem rust and Red leather leaf will vary with pathotype.<sup>2</sup> Disease reactions to BYDV may vary with the strain of the virus.

**Key to symbols used:** VS = very susceptible, S = susceptible, MR = moderately resistant, R = resistant, VI = very intolerant, I = intolerant, MI = moderately intolerant, MT = moderately tolerant, T = tolerant, VT = very tolerant.

Table 6: Grain quality comparisons.

Variety	Hectolitre weight (kg/hL)	Screenings <2mm	1000 grain weight (g)	Kernel (%)	Probability of reaching milling grade	Protein (%)	Oil (fat) (%)	Hull lignin content
SEMI-DWARF (HUSKED)								
Bannister <sup>db</sup>	MH	ML	MH	MH	H	M	MH	H
Bilby <sup>db</sup>	MH	ML	H	H	H	MH	ML	H
Kowari <sup>db</sup>	MH	L	H	H	H	MH	M	L
Mitika <sup>db</sup>	H	L	H	MH	H	MH	M	L
SEMI-DWARF (NAKED)								
Numbat	VH	H	L	–	–	H	VH	–
TALL (HUSKED)								
Brusher <sup>db</sup>	M	M	MH	M	–	MH	M	L
Durack <sup>db</sup>	H	L	H	MH	H	MH	MH	H
Forester <sup>db</sup>	L	M	L	L	–	M	M	H
Koorabup <sup>db</sup>	H	L	H	ML	–	MH	L	H
Mulgara <sup>db</sup>	M	M	MH	MH	–	MH	M	H
Tammar <sup>db</sup>	L	H	L	ML	–	MH	M	SEG
Tungoo <sup>db</sup>	L	H	L	ML	–	MH	M	L
Williams <sup>db</sup>	MH	M	M	M	MH	M	M	MH
Wintaroo <sup>db</sup>	M	M	MH	MH	–	M	M	L
Yallara <sup>db</sup>	H	L	H	H	VH	MH	L	H

**Value for trait:** L = low, ML = moderately low, M = medium, MH = moderately high, H = high, VH = very high, – = not applicable.



**Table 7: Hay quality comparisons.**

Variety	Digestible dry matter (%dm)	Crude protein (%dm basis)	Neutral detergent fibre (%dm basis)	Water-soluble carbohydrate (%dm basis)	Stem diameter
SEMI-DWARF (HUSKED)					
Bannister <sup>db</sup>	H	H	ML	MH	M
TALL (HUSKED)					
Brusher <sup>db</sup>	MH	M	M	MH	M
Durack <sup>db</sup>	M	M	M	M	M
Forester <sup>db</sup>	MH	M	L	MH	MH
Koorabup <sup>db</sup>	MH	M	M	M	M
Mulgara <sup>db</sup>	M	M	M	M	M
Tammar <sup>db</sup>	M	MH	M	M	ML
Tungoo <sup>db</sup>	M	MH	M-MH	M	M
Williams <sup>db</sup>	M	H	M	M	MH
Wintaroo <sup>db</sup>	M	M	M	M	M
Yallara <sup>db</sup>	MH	M	ML	H	ML

**Value for trait:** L = low, ML = moderately low, M = medium, MH = moderately high, H = high.

# CANOLA

By Andrew Ware, EPAG Research

Since the publication of the *2020 Canola Variety Sowing Guide*, several new canola varieties will be available for production in 2021. These include SF Dynatron TT, Hyola® Blazer TT, Hyola® Enforcer CT, HyTTec® Trifecta, InVigor® T 6010 and Pioneer® 44Y94CL. Further to this, 2021 will bring the first year that South Australian growers will be able to grow genetically modified canola (glyphosate-tolerant canola). There may be further variety releases in the months to follow, with seed possibly being available for planting in 2021, but these can't be confirmed at this time.

It should be noted that the marketing company responsible for each of the varieties listed in this document has advised they are planning to have seed available for each of these varieties for planting in 2021; however, not all varieties that are still marketed have been tested in NVT trials in 2020. Some older varieties have not been evaluated in NVT trials for several years, but seed remains available. Several new varieties are only being evaluated in NVT trials for the first time in 2020 and no NVT yield data for these varieties is currently available. No glyphosate-tolerant NVT trials were conducted in SA in 2020, so South Australian yield data does not currently exist.

There are two groups of NVT canola trials conducted in SA: mid-maturity and early-maturity series. Both sets of trials have similar sowing and harvest times and have a similar complement of varieties, although there may be several early-maturity varieties in the early series that are not tested in the mid series, and vice versa. The main difference between the series is that the trials are located in areas suited to their maturity, with the majority of the early series in the lower rainfall zone and the mid-season in the medium to high-rainfall zones.

All NVT canola trials are treated with flutriafol in-furrow fungicide placed on fertiliser at sowing for the control of Blackleg disease, and have foliar fungicides applied where Blackleg pressure is high.

## GLYPHOSATE-TOLERANT – ROUNDUP READY® AND TRUFLEX® CANOLA

In order to grow Roundup Ready® or TruFlex® canola, growers should be aware that an additional technology fee will be charged at a per kilogram rate on top of normal hybrid seed costs. Growers will need to undertake a stewardship program prior to planting the crop and understand that the number of applications and formulation of glyphosate applied to the crop is restricted. Further information can be found at [www.roundupreadycanola.com.au](http://www.roundupreadycanola.com.au).

Both Roundup Ready® and TruFlex® varieties are tolerant to applications of Roundup® herbicide. The difference in the varieties relates to the amount and timing of herbicide that the crop is able to tolerate. Roundup Ready® varieties must not be sprayed after the crop has reached the six-true-leaf stage, whereas the TruFlex® varieties are able to be sprayed up until the first flower stage.

## SPECIALTY TYPES

A number of specialty oil canola varieties are available for production in SA. These include the VICTORY® varieties (marketed by AWB/Cargill) and Monola® varieties (marketed by Nuseed Pty Ltd). These varieties have a different oil profile to commodity canola that is more suitable for use in the food industry. Agronomically, specialty canola is the same as commodity canola. Specialty canola is being offered to growers in closed-loop marketing systems, attracting a significant price premium. Production contracts for these varieties are available in the South East and Mid North regions.

## WINTER TYPE/GRAIN 'N GRAZE CANOLA

A number of winter type canola varieties are currently available. These varieties have a high vernalisation (or cold) requirement which means

they are capable of producing high quantities of biomass before they commence flowering and are able to make use of extended growing seasons. This enables them to be grazed over a relatively large window, with often little damage to grain yield. These varieties are not evaluated in NVT trials; however, they are suited to some environments that have a long growing season, such as the lower South East and Kangaroo Island, or in situations where growers are looking to utilise either spring, summer or early autumn rainfall events. They include Hyola® 970CL, SF Edimax CL and Phoenix CL – all Clearfield®-tolerant types.

## STACKED HERBICIDE TOLERANCE

There are a number of varieties with herbicide tolerance to two modes of action. These may be useful in situations where growers are concerned with herbicide soil residue levels, or require two modes of action to control a spectrum of weeds, or to help manage herbicide-resistant weed populations. There are currently varieties with tolerance to both the imidazolinone and triazine groups; tolerance to the triazine and glyphosate technologies; and tolerance to the imidazolinone and glyphosate herbicide groups.

## VARIETAL SELECTION

The selection of the most suitable canola variety for a particular situation needs consideration of maturity, herbicide tolerance, Blackleg resistance, relative yield, oil content and early vigour.

- The expected weed species may dictate the need for a herbicide-tolerant production system (for example, triazine, imidazolinone or glyphosate-tolerant). It should be noted that a triazine-tolerant variety will incur a yield and oil penalty when grown in situations where they are not warranted.
- Blackleg has the potential to be a very destructive disease in canola and its management through varietal selection, fungicides and cultural practices is important to maximise yield potential. Varietal Blackleg resistance and/or fungicide use should be considered, particularly when rotations are close.
- Recent research has found that early-seeding canola has the potential to maximise water use efficiency. If canola is planted earlier than the traditional window of late April to early May, it is important to consider matching the variety's flowering time with the early seeding date, so that biomass is maximised, and frost and heat risk are minimised. To do this, planting fast-flowering varieties in the medium and high-rainfall areas in early to mid-April should be avoided.

## TRIAZINE-TOLERANT VARIETIES

### ATR BONITO<sup>Ⓛ</sup>

Early to mid-season maturing open-pollinated variety. Short to medium height. Suited to low-medium rainfall areas. Blackleg resistance rating of MS (resistance group A). Tested in NVT trials 2012–18. Marketed by Nuseed Pty Ltd. EPR \$5.00/t ex-GST.

### ATR MAKO<sup>Ⓛ</sup>

Early to mid-maturity triazine-tolerant open-pollinated variety. Medium plant height. Suited to medium-high rainfall areas. Blackleg resistance rating of MR (resistance group A). Tested in NVT trials 2013–18. Marketed by Nuseed Pty Ltd. EPR \$5.00/t ex-GST.

### ATR STINGRAY<sup>Ⓛ</sup>

Early maturing open-pollinated variety. Fast to flowering. Short height. Blackleg resistance rating of MR (resistance group C). Tested in NVT trials 2011–18. Bred by Nuseed Pty Ltd and DPI Victoria. Marketed by Nuseed Pty Ltd.

### ATR WAHOO<sup>Ⓛ</sup>

Mid-maturity open-pollinated variety. Medium plant height. Blackleg rating of MS (resistance group A). Suited to medium-high rainfall areas. Tested in NVT trials 2012–17. Marketed by Nuseed Pty Ltd. EPR \$5.00/t ex-GST.

### DG 670TT

A mid to late-maturity triazine-tolerant hybrid. Medium to tall plant height. Suited to medium-high rainfall areas. Blackleg resistance of MR (resistance group BF). Tested in NVT in 2016–20. Marketed by Nutrien Ag Solutions and Seednet.

### HYOLA® 350TT

Early maturing TT hybrid. Medium to medium-short plant height. Suited to low-medium rainfall zones. Blackleg resistance rating of R (resistance groups ABDF). Tested in NVT trials in 2016–20. Bred and marketed by Pacific Seeds.

### HYOLA® 559TT

Mid to early maturing TT hybrid. Medium plant height. Suited to medium-low through to medium-high rainfall areas. Blackleg resistance rating of R (resistance groups ABD). Tested in NVT trials in 2012–19. Bred and marketed by Pacific Seeds.

**NEW – HYOLA® BLAZER TT**

Mid to early-maturing TT hybrid. Medium-short plant height. Blackleg resistance rating R (resistance groups to be determined). Suited to medium-low to high rainfall zones. Replacement for Hyola® 550TT, 559TT and 650TT. Tested in NVT trials 2019-20. Bred and marketed by Pacific Seeds.

**HYTTEC® TRIDENT**

An early-maturity hybrid canola. Medium-tall plant height. Blackleg rating of R (resistance group AD). Tested in NVT trials 2017–20. HyTTec® Trident is marketed with an EPR of \$10/t ex-GST, but a reduced seed price compared to other hybrid varieties. Bred and marketed by Nuseed Pty Ltd.

**NEW – HYTTEC® TRIFECTA**

A mid-maturity hybrid canola. Medium-tall plant height. Provisional Blackleg resistance rating of R (resistance group ABD). Tested in NVT trials 2019-2020. HyTTec® Trifecta is marketed with an EPR of \$10/tonne, but a reduced seed price compared to other hybrid varieties. Bred and marketed by Nuseed Pty Ltd.

**HYTTEC® TROPHY**

An early to mid-maturity hybrid canola. Medium-tall plant height. Blackleg rating of R (resistance group AD). In NVT 2017–20. HyTTec® Trophy is marketed with an EPR of \$10/t ex-GST, but a reduced seed price compared to other hybrid varieties. Bred and marketed by Nuseed Pty Ltd.

**INVIGOR® T 3510**

Early-maturing hybrid. Blackleg resistance rating of MS (resistance group BF). Tested in NVT trials 2018-19. Marketed by BASF.

**INVIGOR® T 4510**

Mid-season hybrid variety. Medium plant height. Suited to medium-rainfall areas. Blackleg resistance rating of MR-MS (resistance group BF). Tested in NVT trials 2016–19. Marketed by BASF.

**NEW – INVIGOR® T 6010**

Mid to late-season hybrid variety. Suited to higher rainfall areas. BASF suggest a Blackleg resistance rating of R (resistance group BC). Tested in NVT trials 2019-20. Marketed by BASF.

**NEW – MONOLA® 420TT**

A new open-pollinated early-maturing Monola® variety. Provisional Blackleg rating of R (resistance group AD). Medium plant height. Tested in NVT trials 2019-20. A premium payment will apply to Monola® 420TT. Closed-loop market and must be delivered to Glencore Grain at Owen and Coomandook.

**NEW – MONOLA® H421TT**

A new early-maturing hybrid Monola® variety. Provisional Blackleg rating of R (resistance group BC). Medium plant height. Tested in NVT trials 2019-20. A premium payment will apply to Monola® H421TT. Closed loop market and must be delivered to Glencore Grain at Owen and Coomandook.

**PIONEER® 44T02 TT**

An early to mid-maturing hybrid variety. Medium plant height. Suited to low-medium rainfall areas. Blackleg resistance rating of R (resistance group ABD). Tested in NVT trials in 2015–18. Marketed by Pioneer Brand Seeds.

**PIONEER® 45T03 TT**

A mid-maturing triazine-tolerant hybrid. Medium plant height. Suited to medium-high rainfall areas. Blackleg resistance rating of R (resistance group ABD). Tested in NVT trials 2018–20. Marketed by Pioneer Brand Seeds.

**NEW – SF DYNATRON TT**

Mid-maturing hybrid canola. Suited to medium to high-rainfall areas. Medium-tall height with a high oil content. Blackleg rating of MR-MS (resistance group BC). NVT tested 2019-20 as SFR65-061TT. Released 2020. Marketed by Seed Force. EPR \$10.00 ex-GST.

**SF IGNITE TT**

Mid-maturing hybrid. Suited to medium to high-rainfall zones. Medium plant height. Blackleg resistance rating MR (resistance group BF). Tested in NVT 2016–20. Marketed by Seed Force.

**SF SPARK TT**

Early-maturing hybrid. Suited to low-medium rainfall areas. Medium plant height. Blackleg rating R (resistance group ABDS). Tested in NVT trials 2018–20. Marketed by Seed Force.

**SF TURBINE TT**

Early to mid-maturing hybrid. Excellent early vigour with a moderate height. Moderate oil content. Suited to medium-rainfall areas. Blackleg resistance rating MR-MS (resistance group BF). Tested in NVT 2015–20. Marketed by Seed Force.

INTRO

WHEAT

BARLEY

OAT

CANOLA

FABA BEAN

LENTIL

FIELD PEA

CHICKPEA

LUPIN

VETCH

NOTES

## DUAL TRIAZINE AND IMIDAZOLINONE-TOLERANT VARIETIES

### HYOLA® 580CT

Dual-herbicide tolerant, Hyola® 580CT carries tolerance to both triazine and imidazolinone herbicide chemistries. It is a mid-maturing hybrid. Hyola® 580CT is thermal responsive and, when sown in early-mid April, will commence flowering at a similar time to other varieties with mid-fast phenology. Medium plant height. Suited to medium-high through to high-rainfall areas. Blackleg resistance rating R (resistance groups BC). Tested in NVT trials in 2017–20. Bred and marketed by Pacific Seeds.

### NEW – HYOLA® ENFORCER CT

Dual-herbicide tolerant, Hyola® Enforcer CT carries tolerance to both triazine and imidazolinone herbicide chemistries. Mid-early maturity. Medium plant height. Suited to medium-low through to high-rainfall areas. Blackleg resistance rating R (resistance groups to be determined). Tested in NVT trials in 2019-20. Bred and marketed by Pacific Seeds.

## IMIDAZOLINONE-TOLERANT VARIETIES

### BANKER CL

Mid-maturing hybrid. Medium plant height. Suited to medium-rainfall areas. Blackleg resistance rating MR (resistance group A). Tested in NVT trials 2014–18. Marketed by Barenbrug.

### HYOLA® 970CL

Long-season, winter graze and grain, dual-purpose hybrid. Pacific Seeds indicate high to very high biomass, good grain yield and oil content. Suited to sowing in autumn (February to April) and spring (early to late October) in medium-high through to very high rainfall zones. Blackleg resistance rating of R (resistance group H). Not tested in NVT trials. Marketed by Pacific Seeds.

### PHOENIX CL

A winter graze and grain, dual-purpose and grain-only hybrid variety. AGF Seeds indicate high biomass with excellent yield and oil content. Suited to early sowing in high-rainfall areas. Blackleg resistance rating of R (resistance group B). Not tested in NVT trials. Marketed by AGF Seeds.

### PIONEER® 43Y92 CL

Early-maturing hybrid. Medium plant height. Blackleg resistance rating of R (resistance group B). Suited to low-medium rainfall areas and short season growing zones. Tested in NVT trials 2016–20. Marketed by Pioneer Brand Seeds.

### PIONEER® 44Y90 CL

An early to mid-maturing hybrid. Medium plant height. Suited to low-medium rainfall areas. Blackleg resistance rating of R (resistance group B). Tested in NVT trials in 2015–20. Marketed by Pioneer Brand Seeds.

### NEW – PIONEER® 44Y94 CL

An early to mid-maturing hybrid. Blackleg resistance rating of R (resistance group BC). Tested in NVT trials in 2019-20. Marketed by Pioneer Brand Seeds.

### PIONEER® 45Y91 CL

A mid-maturing hybrid variety. Medium-tall plant height. Suited to medium to high-rainfall areas. A Blackleg rating of R-MR (resistance group B). Tested in NVT trials in 2015–20. Marketed by Pioneer Brand Seeds.

### PIONEER® 45Y93 CL

An early-flowering, mid-maturing hybrid variety. Medium-tall plant height. A Blackleg rating of R (resistance group BC). Tested in NVT trials in 2017–20. Marketed by Pioneer Brand Seeds.

### SAINTLY CL

Mid-maturity hybrid, slightly earlier than Banker CL. High oil content, medium plant height. Blackleg rating MR (resistance group B). Tested in NVT 2016–20. Marketed by Barenbrug.

### SF EDIMAX CL

Late-maturing, dual-purpose, winter graze and grain hybrid. Seed Force indicate very high biomass with excellent yield and oil content. Suited to early sowing and spring sowing in high-rainfall areas. Blackleg resistance R-MR (resistance group C). Not tested in NVT trials. Marketed by Seed Force.

### VICTORY® V7001CL

Late-maturing specialty (high oleic, low linoleic oil) hybrid. Blackleg resistance rating of R-MR (resistance group ABF). Tested in NVT trials in 2016–2019. Bred by Cargill. Marketed by AWB under contract.



**VICTORY® V7002CL**

Early to mid-maturing specialty (high oleic, low linoleic oil) hybrid. Low-medium plant height. Blackleg resistance rating of R-MR (resistance group ABF). Tested in NVT trials from 2017–20. Bred by Cargill. Marketed by AWB under contract.

**VICTORY® V75-03CL**

Mid-maturing specialty (high oleic, low linoleic oil) hybrid. Medium plant height. Blackleg rating R-MR (resistance group AB). Tested in NVT trials from 2017–20. Bred by Cargill. Marketed by AWB under contract.

**CONVENTIONAL VARIETIES****AV-GARNET<sup>Ⓛ</sup>**

Mid-maturing open-pollinated variety. Medium height. Widely adapted. Blackleg resistance rating of MS (resistance group A). Tested in NVT trials 2006–2019. Bred by DPI Victoria. Marketed by Nuseed Pty Ltd.

**NUSEED® DIAMOND**

Early-maturing hybrid. Very fast to flower. Medium plant height. Suited to low to medium-rainfall areas. Blackleg resistance rating of MR (resistance group ABF). Tested in NVT trials in 2012–20. Bred and marketed by Nuseed Pty Ltd.

**NUSEED® QUARTZ**

Mid-maturing conventional hybrid. Replacement for AV-Garnet. Medium height. Blackleg resistance rating of R (resistance group ABD). Tested in NVT trials 2016–20. Bred and marketed by Nuseed Pty Ltd.

**GLYPHOSATE-TOLERANT HYBRID VARIETIES****DG 408RR**

Early to mid-maturing Roundup Ready® hybrid variety suited to low-medium rainfall zones. Medium plant height with good adaptability. Blackleg rating MR-MS (resistance group AC). NVT tested 2016–18. Released 2017. Marketed by Nutrien Ag Solutions and Seednet.

**HYOLA® 404RR**

Early, Roundup Ready® hybrid canola. Medium to medium-tall plant height. Suited to low-medium rainfall zones. Blackleg resistance rating of R-MR (resistance groups ABD). NVT tested 2010–20. Bred and marketed by Pacific Seeds.

**HYOLA® 410XX**

Mid to early, TruFlex® hybrid canola. Medium to medium-tall plant height. Suited to low-medium-high rainfall zones. Blackleg resistance rating of R-MR (resistance groups ABD). NVT tested 2018–20. Bred and marketed by Pacific Seeds.

**HYOLA® 506RR**

Mid-maturing hybrid variety. Medium plant height. Suited to medium-high rainfall zones. Blackleg rating R (resistance group ABD). NVT tested 2013, 2016–19. Released 2017. Bred and marketed by Pacific Seeds.

**INVIGOR® R 3520**

Early-maturing Roundup Ready® hybrid variety. Suited to early season areas or later planting. Medium plant height. Blackleg rating R-MR (resistance group unknown). NVT tested 2016–20. Released 2017. Bred and marketed by BASF.

**INVIGOR® R 4022P**

Early to mid-maturing TruFlex® hybrid suited to medium-rainfall zones. PodGuard® technology makes it suited to later windrowing timings or direct harvest. BASF indicate a Blackleg rating of MR (resistance group ABC). NVT tested 2019–20. Bred and marketed by BASF.

**INVIGOR® R 5520P**

Mid-maturing Roundup Ready® hybrid variety suited to medium-high rainfall areas. PodGuard® technology makes it suitable for flexible windrow timing or direct heading with reduced harvest losses. Medium height. Blackleg rating MR (resistance group ABC). NVT tested 2015–20. Bred and marketed by BASF.

**NUSEED® GT-42**

Early to mid-maturing Roundup Ready® variety. Medium height. Blackleg rating R (resistance group ABDF). NVT tested 2014–18. Marketed by Nuseed Pty Ltd.

**NUSEED® GT-53**

Mid-maturing Roundup Ready® hybrid variety. Medium-tall height. Blackleg rating R (resistance group ABDF). NVT tested 2014–18. Marketed by Nuseed Pty Ltd.

**PIONEER® 43Y23 RR**

Early-maturing Roundup Ready® hybrid best suited to low-medium rainfall districts. Blackleg rating R-MR (resistance group BC). NVT tested 2011–18. Marketed by Pioneer Brand Seeds.

**PIONEER® 43Y29 RR**

Early-mid maturing Roundup Ready® hybrid variety. Suited to early sowing in wide range of rainfall zones. Blackleg rating of R-MR (resistance group BC). Medium height. NVT tested 2017–20. Released 2018. Marketed by Pioneer Brand Seeds.

**PIONEER® 44Y27 RR**

Early to early-mid season Roundup Ready® hybrid variety, ideally suited to low-medium rainfall zones. Blackleg rating R-MR (resistance group B). NVT tested 2016–19. Marketed by Pioneer Brand Seeds.

**PIONEER® 45Y28 RR**

Mid-maturing Roundup Ready® hybrid variety. Suited to medium-high rainfall zones and irrigation. Blackleg rating unknown (resistance group BC). Medium-tall height. NVT tested in 2018-19. Released 2018. Marketed by Pioneer Brand Seeds.

**XSEED™ RAPTOR**

Early to mid-maturing TruFlex® hybrid. Blackleg rating MR (resistance group AD). Medium height. NVT tested 2018–20. Marketed by Nuseed Pty Ltd.

**NEW – XSEED™ CONDOR**

Mid-maturing TruFlex® hybrid. Provisional blackleg rating R (Nuseed) (resistance group ABD). Tall height. NVT tested 2019-20. Marketed by Nuseed Pty Ltd.

**VICTORY® V5003RR**

Mid-maturing Roundup Ready® specialty (high oleic, low linoleic oil) hybrid variety. Medium height. Blackleg rating R-MR (resistance group AB). NVT tested 2013–20. Bred by Cargill. Marketed by AWB under contract.

**DUAL ROUNDUP READY® AND TRIAZINE-TOLERANT VARIETY****BASF 3000 TR**

Early-maturing Roundup Ready® and triazine-tolerant hybrid suited to low-medium rainfall zones. Blackleg rating MS-S (resistance group B). NVT tested 2015–19. Marketed by BASF.

**HYOLA® 530XT**

Dual-herbicide tolerant, mid TruFlex® + Triazine hybrid canola. Suited to the medium-high to high-rainfall zones. Blackleg rating MR (resistance groups ABD). NVT tested 2019–20. Marketed by Pacific Seeds.

**DUAL ROUNDUP READY® AND IMIDAZOLINONE-TOLERANT VARIETIES****HYOLA® 540XC**

Dual-herbicide tolerant, early to mid TruFlex® + imidazolinone hybrid canola. Suited to the medium-high to high-rainfall zones. Hyola® 540XC is thermal responsive and, when sown in early to mid-April, will commence flowering at a similar time to other varieties with mid-fast phenology. Blackleg rating R (resistance groups to be determined). NVT tested 2019–20. Marketed by Pacific Seeds.

**NEW – HYOLA® GARRISON XC**

Dual-herbicide tolerant, mid to early TruFlex® + imidazolinone hybrid canola. Medium to medium-tall plant height. Suited to medium-low to high-rainfall zones. Blackleg resistance rating R (resistance groups to be determined). NVT tested 2019–20. Bred and marketed by Pacific Seeds.

**Table 1: Agronomic and disease information of selected canola: triazine-tolerant, imidazolinone-tolerant and conventional varieties.**

Variety	Licensee	Release year	Type^	Phenology**	Maturity	Blackleg resistance				
						(bare)	(Jockey)	(ILeVo)	(Saltro)	group
TRIAZINE TOLERANT										
ATR Bonito <sup>ⓓ</sup>	Nuseed	2013	OP	Mid-fast	E-EM	MS	RMR	R	R	A
ATR Mako <sup>ⓓ</sup>	Nuseed	2015	OP	Mid-fast	EM	MR	RMR	R	R	A
ATR-Stingray <sup>ⓓ</sup>	Nuseed	2011	OP	Fast	E	MR	R	R	R	C
ATR Wahoo <sup>ⓓ</sup>	Nuseed	2013	OP	Mid-slow	ML	MS	—	—	—	A
DG 670TT	Seednet	2017	Hybrid	Mid	ML	MR	—	R	R	BF
Hyola® 350TT	Pacific Seeds	2017	Hybrid	Fast	E	R	R	R	R	ABDF
Hyola® 559TT	Pacific Seeds	2012	Hybrid	Mid	M	R	R	—	R	ABD
Hyola® Blazer TT	Pacific Seeds	2020	Hybrid		M	R*	—	—	—	TBD
HyTtec® Trident	Nuseed	2019	Hybrid	Mid-fast	E	R	—	—	—	AD
HyTtec® Trophy	Nuseed	2017	Hybrid	Mid	E-EM	R	—	—	—	AD
HyTtec® Trifecta	Nuseed	2020	Hybrid	n.d.	M	R	—	—	—	ABD
InVigor® T 3510	BASF	2018	Hybrid	Fast	E	MRMS	MR	R	—	BF
InVigor® T 4510	BASF	2016	Hybrid	Mid-fast	EM	MR	R	R	R	BF
InVigor® T 6010	BASF	2020	Hybrid		M-ML	MS	—	—	—	BC
Monola® 420TT	Nuseed	2020	Spec. oil	n.d.	E	R	R	—	—	AD
Monola® H421TT	Nuseed	2020	Spec. oil	n.d.	E	R	—	—	—	BC
Pioneer® 44T02 TT	Pioneer Brand	2016	Hybrid	Mid-fast	EM	R	—	R	—	ABD
Pioneer® 45T03 TT	Pioneer Brand	2018	Hybrid	Mid-fast	M	R	—	R	—	ABD
SF Dynatron TT	Seed Force	2020	Hybrid			MRMS	—	—	—	BC
SF Ignite TT	Seed Force	2017	Hybrid	Mid-slow	M-ML	MR	R	R	R	BF
SF Spark TT	Seed Force	2018	Hybrid	Fast	E	R	R	R	R	ABDS
SF Turbine TT	Seed Force	2016	Hybrid	Mid	EM	MRMS	R	R	R	BF
TRIAZINE TOLERANT AND IMIDAZOLINONE TOLERANT										
Hyola® 580CT	Pacific Seeds	2018	Hybrid	Fast	EM	R	R	R	R	BC
Hyola® Enforcer CT	Pacific Seeds	2020	Hybrid	Fast	EM	R*	—	—	—	TBD
IMIDAZOLINONE TOLERANT										
Banker CL	Barenbrug	2012	Hybrid	Mid-fast	M	MR	R	—	R	A
Hyola® 575CL	Pacific Seeds	2010	Hybrid	—	M	R	R	R	R	BF
Hyola® 970CL	Pacific Seeds		Hybrid	Winter	Winter	R	R	R	R	H
Phoenix CL	AGF Seeds	2018	Hybrid	Winter	Winter	R	—	—	—	B
Pioneer® 43Y92 CL	Pioneer Brand	2017	Hybrid	Mid-fast	E	R	—	R	—	B
Pioneer® 44Y90 CL	Pioneer Brand	2016	Hybrid	Mid-fast	EM	R	R	R	R	B
Pioneer® 44Y94 CL	Pioneer Brand	2020	Hybrid		EM	R	—	R	R	BC
Pioneer® 45Y91 CL	Pioneer Brand	2016	Hybrid	Mid	M	RMR	R	R	R	B
Pioneer® 45Y93 CL	Pioneer Brand	2018	Hybrid	—	M	R	—	R	R	BC
Saintly CL	Barenbrug	2017	Hybrid	—	M	MR	R	—	R	B
SF Edimax CL	Seed Force		Hybrid	Winter	Winter	RMR	—	—	—	C
VICTORY® V7001CL	Cargill/AWB	2016	Spec. oil	Slow	L	RMR	R	R	R	ABF
VICTORY® V7002CL	Cargill/AWB	2018	Spec. oil	—	EM	RMR	R	R	R	ABF
VICTORY® V75-03CL	Cargill/AWB	2019	Spec. oil	—	M	RMR	R	R	R	AB
CONVENTIONAL										
AV-Garnet <sup>ⓓ</sup>	Nuseed	2007	OP	Mid	M	MS	—	—	—	A
Nuseed® Diamond	Nuseed	2013	Hybrid	Fast	E	MR	R	R	R	ABF
Nuseed® Quartz	Nuseed	2017	Hybrid	Mid	M	R	—	—	—	ABD

<sup>^</sup>Type: OP = open pollinated, Spec. oil = high-stability specialty oil.<sup>\*\*</sup> Phenology = time to start of flowering in crops established early (before 20 April). Source: GRDC Optimised Canola Profitability Project.

Maturity: E = early, M = mid, L = late. Source: canola breeding companies.

Blackleg rating key: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible. Source: GRDC Blackleg Management Guide.

Blackleg resistance group refers to the combinations of Blackleg resistance genes carried by each variety. Source: GRDC Blackleg Management Guide.

\* Provisional rating.

Table 2: Agronomic and disease information of selected canola: Roundup Ready® and TruFlex® varieties.

Variety	Licensee	Release year	Type^	Phenology**	Maturity	Blackleg resistance				
						(bare)	(Jockey)	(ILeVo)	(Saltro)	group
ROUNDUP READY®										
DG 408RR	Seednet	2017	Hybrid		Early-mid	MR-MS	MR	R	R	AC
Hyola® 404RR	Pacific Seeds	2010	Hybrid		Early-mid	R-MR	–	–	R	ABD
InVigor® R 3520	BASF	2017	Hybrid		Early	R-MR	R	R	–	TBD
InVigor® R 5520P	BASF	2019	Hybrid	Mid-slow	Mid	MR	R	–	–	ABC
Nuseed® GT-42	Nuseed	2015	Hybrid		Early-mid	R	–	–	–	ABDF
Nuseed® GT-53	Nuseed	2016	Hybrid	Mid	Mid	R	–	–	–	ABDF
Pioneer® 43Y23 RR	Pioneer Brand	2012	Hybrid		Early	R-MR	–	–	–	B
Pioneer® 43Y29 RR	Pioneer Brand	2018	Hybrid	Mid-fast	Early	R-MR	–	R	R	BC
Pioneer® 44Y27 RR	Pioneer Brand	2017	Hybrid	Mid-fast	Early-mid	R-MR	–	R	–	B
Pioneer® 45Y28 RR	Pioneer Brand	2018	Hybrid		Mid	–	–	–	–	BC
VICTORY® V5003RR	Cargill	2016	Hybrid		Mid	R-MR	R	R	R	AB
TRUFLEX®										
Hyola® 410XX	Pacific Seeds	2018	Hybrid	Mid-fast	Mid-early	R-MR	–	–	R	ABD
InVigor® R 4022P	BASF	2019	Hybrid	Mid-fast	Mid-early	MR	–	R	–	ABC
Xseed™ Raptor	Nuseed	2019	Hybrid	Mid-fast	Mid-early	R	–	–	–	AD
Xseed™ Condor	Nuseed	2020	Hybrid	n.d.	Mid	R*	–	–	–	ABD
DUAL-HERBICIDE TOLERANCE										
BASF 3000 TR	BASF	2015	Hybrid		Early	MS-S	MR	R	R	B
Hyola® 530XT	Pacific Seeds	2020	Hybrid		Mid	MR	–	–	–	ABD
Hyola® 540XC	Pacific Seeds	2019	Hybrid		Mid	R	–	–	–	TBD
Hyola® Garrison XC	Pacific Seeds	2020	Hybrid		Mid-early	R	–	–	–	TBD

<sup>^</sup>Type: OP = open pollinated, Spec. oil = high stability specialty oil.

<sup>\*\*</sup> Phenology = time to start of flowering in crops established early (before 20 April). Source: GRDC Optimised Canola Profitability Project.

Maturity: E = early, M = mid, L = late. Source: canola breeding companies.

Blackleg rating key: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible. Source: GRDC Blackleg Management Guide.

Blackleg resistance group refers to the combinations of Blackleg resistance genes carried by each variety. TBD indicates to be determined. Source: GRDC Blackleg Management Guide.

\* Provisional ratings.

Dual-herbicide tolerance category includes varieties that are tolerant to two modes of herbicide activity. Please check variety description for specific details.

Table 3: Lower Eyre Peninsula mid-season canola.

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.87	2.64			2.57
	No. trials	2	1			1
ATR Bonito <sup>Ⓢ</sup>	3	97	96	Not sown	Trial failed	–
ATR Mako <sup>Ⓢ</sup>	3	95	93			–
ATR Wahoo <sup>Ⓢ</sup>	4	104	101			99
DG 670TT	1	–	–			111
Hyola® 350TT	1	–	108			–
Hyola® 559TT	4	102	104			102
Hyola® 580CT	1	–	–			100
Hyola® 650TT	3	108	108			–
Hyola® Enforcer CT	1	–	–			107
HyTTec® Trifecta	1	–	–			121
HyTTec® Trophy	1	–	–			115
InVigor® T 4510	1	–	–			114
InVigor® T 6010	1	–	–			118
Pioneer® 44T02 TT	2	102	–			–
Pioneer® 45T03 TT	1	–	–			102
SF Ignite TT	1	–	–			112
SF Spark TT	1	–	–			102
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	2.07	2.64			2.57
	No. trials	2	1			1
Banker CL	3	109	114	Not sown	Trial failed	–
Hyola® 575CL	4	93	88			92
Pioneer® 43Y92 CL	1	–	109			–
Pioneer® 44Y90 CL	4	109	115			110
Pioneer® 44Y94 CL	1	–	–			115
Pioneer® 45Y91 CL	1	–	108			–
Pioneer® 45Y93 CL	1	–	–			112
Saintly CL	4	102	109			108
VICTORY® V7002CL	1	–	–			96
VICTORY® V75-03CL	1	–	–			97
CONVENTIONAL						
Variety	Mean yield t/ha	2.06	2.64			2.57
	No. trials	2	1			1
AV Garnet <sup>Ⓢ</sup>	4	96	90	Not sown	Trial failed	93
Nuseed® Diamond	4	94	99			102
Nuseed® Quartz	2	–	115			110

Source: SARDI/GRDC, NVT 2015–19 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT are not designed to allow comparison of varieties between herbicide-tolerance groups. Unseasonal conditions in 2017 resulted in no NVT canola trials being planted on LEP.



Table 4: Mid North mid-season canola.

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.76	2.79	2.34	1.34	1.56
	No. trials	3	3	3	1	3
ATR Bonito <sup>®</sup>	9	96	97	96	93	–
ATR Mako <sup>®</sup>	9	95	95	96	95	–
ATR-Stingray <sup>®</sup>	7	97	96	93	87	–
ATR Wahoo <sup>®</sup>	5	88	97	96	–	–
DG 670TT	9	–	112	108	103	108
Hyola <sup>®</sup> 350TT	6	–	109	107	111	111
Hyola <sup>®</sup> 559TT	13	105	103	106	113	104
Hyola <sup>®</sup> 580CT	5	–	–	100	99	96
Hyola <sup>®</sup> 650TT	8	97	102	104	106	–
Hyola <sup>®</sup> Enforcer CT	3	–	–	–	–	113
HyTTec <sup>®</sup> Trident	5	–	–	119	128	116
HyTTec <sup>®</sup> Trifecta	3	–	–	–	120	122
HyTTec <sup>®</sup> Trophy	7	–	–	115	118	115
InVigor <sup>®</sup> T 4510	10	–	117	113	113	117
InVigor <sup>®</sup> T 6010	3	–	–	–	–	116
Pioneer <sup>®</sup> 44T02 TT	7	108	103	106	113	–
Pioneer <sup>®</sup> 45T03 TT	4	–	–	–	97	102
SF Dynatron TT	3	–	–	–	–	116
SF Ignite TT	9	–	112	108	101	105
SF Spark TT	3	–	–	–	–	103
SF Turbine TT	13	110	108	106	108	108
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	1.76	2.8	2.34	1.34	1.56
	No. trials	3	3	3	1	3
Banker CL	9	110	111	105	100	–
Hyola <sup>®</sup> 575CL	6	90	91	92	91	92
Pioneer <sup>®</sup> 43Y92 CL	3	–	111	108	111	–
Pioneer <sup>®</sup> 44Y90 CL	10	114	112	108	107	111
Pioneer <sup>®</sup> 44Y94 CL	–	–	–	–	–	116
Pioneer <sup>®</sup> 45Y91 CL	–	–	106	103	–	104
Pioneer <sup>®</sup> 45Y93 CL	12	–	–	109	–	110
Saintly CL	8	120	112	107	–	115
VICTORY <sup>®</sup> V7002CL	13	–	–	96	–	95
VICTORY <sup>®</sup> V75-03CL	2	–	–	–	–	94
CONVENTIONAL						
Variety	Mean yield t/ha	1.80	2.92	1.97		1.59
	No. trials	1	1	1		1
AV-Garnet <sup>®</sup>	4	86	87	86	No result	87
Nuseed <sup>®</sup> Diamond	4	108	107	106		111
Nuseed <sup>®</sup> Quartz	3	–	114	116		112

Source: SARDI/GRDC, NVT 2015–19 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.

Table 5: Yorke Peninsula mid-season canola.

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.42	2.75	3.1		1.22
	No. trials	1	1	1		1
ATR Bonito <sup>Ⓛ</sup>	2	97	94	–	Trial failed	–
ATR Mako <sup>Ⓛ</sup>	3	97	94	97		–
ATR Stingray <sup>Ⓛ</sup>	3	95	90	94		–
DG 670TT	3	–	109	106		109
Hyola® 350TT	2	–	–	104		111
Hyola® 559TT	3	104	109	104		–
Hyola® 580CT	2	–	–	101		97
Hyola® 650TT	3	103	105	106		–
Hyola® Enforcer CT	1	–	–	–		112
HyTtec® Trident	1	–	–	–		119
HyTtec® Trifecta	1	–	–	–		123
HyTtec® Trophy	2	–	–	112		117
InVigor® T 4510	3	–	119	108		117
InVigor® T 6010	1	–	–	–		118
Pioneer® 44T02 TT	3	104	110	103		–
Pioneer® 45T03 TT	1	–	–	–		101
SF Dynatron TT	1	–	–	–		117
SF Ignite TT	2	–	108	108		–
SF Spark TT	1	–	–	–		103
SF Turbine TT	4	105	109	104		108
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	2.42	2.75	3.10		1.22
	No. trials	1	1	1		1
Banker CL	3	105	107	104	Trial failed	–
Hyola® 575CL	4	94	89	94		91
Pioneer® 43Y92 CL	1	–	114	–		–
Pioneer® 44Y90 CL	3	107	–	106		111
Pioneer® 44Y94 CL	1	–	–	–		118
Pioneer® 45Y91 CL	3	–	103	102		104
Pioneer® 45Y93 CL	2	–	–	107		111
Saintly CL	4	107	112	102		113
VICTORY® V7002CL	2	–	–	97		95
VICTORY® V75-03CL	1	–	–	–		95
CONVENTIONAL						
Variety	Mean yield t/ha	2.42	2.75	3.10		1.22
	No. trials	1	1	1		1
AV-Garnet <sup>Ⓛ</sup>	4	93	86	95	Trial failed	89
Nuseed® Diamond	4	103	107	98		108
Nuseed® Quartz	3	–	115	108		111

Source: SARDI/GRDC, NVT 2015–19 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.

Table 6: South East mid-season canola.

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	0.98	2.70	3.45	2.56	2.81
	No. trials	3	1	1	1	1
ATR Bonito <sup>db</sup>	6	93	98	101	97	–
ATR Mako <sup>db</sup>	6	95	96	98	97	–
ATR Wahoo <sup>db</sup>	5	82	95	–	95	–
DG 560TT	4	105	99	96	102	–
DG 670TT	4	–	112	111	103	107
Hyola® 350TT	3	–	110	–	105	108
Hyola® 559TT	6	110	101	95	106	–
Hyola® 580CT	2	–	–	99	100	–
Hyola® 650TT	6	96	98	99	103	–
Hyola® Enforcer CT	1	–	–	–	–	109
HyTTec® Trident	1	–	–	–	114	–
HyTTec® Trifecta	1	–	–	–	–	116
HyTTec® Trophy	3	–	–	107	110	111
InVigor® T 3510	1	–	–	–	104	–
InVigor® T 4510	4	–	118	109	108	113
InVigor® T 6010	1	–	–	–	–	112
Monola® 515TT	4	69	79	–	–	–
Pioneer® 44T02 TT	6	114	102	95	106	–
Pioneer® 45T03 TT	2	–	–	–	99	101
SF Ignite TT	4	–	110	112	102	104
SF Turbine TT	4	112	108	103	104	–
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	0.97	2.70	3.45	2.56	2.81
	No. trials	3	1	1	1	1
Banker CL	6	108	112	111	101	–
Hyola® 575CL	7	88	91	96	95	94
Pioneer® 43Y92 CL	4	–	115	104	105	112
Pioneer® 44Y90 CL	7	115	113	108	104	109
Pioneer® 44Y94 CL	1	–	–	–	–	112
Pioneer® 45Y91 CL	2	–	–	107	101	–
Pioneer® 45Y93 CL	2	–	–	112	–	108
Saintly CL	7	124	116	106	104	112
VICTORY® V7002CL	3	–	–	99	97	96
VICTORY® V75-03CL	1	–	–	–	–	95
CONVENTIONAL						
Variety	Mean yield t/ha	1.01	2.70	3.45	2.56	2.81
	No. trials	3	1	1	1	1
AV-Garnet <sup>db</sup>	7	80	89	98	94	91
Nuseed® Diamond	7	121	109	100	103	108
Nuseed® Quartz	4	–	109	103	107	107

Source: SARDI/GRDC, NVT 2015–19 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.

Table 7: Upper Eyre Peninsula early-season canola.

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.55	1.37		1.16	1.11
	No. trials	2	2		2	1
ATR Bonito <sup>Ⓢ</sup>	7	102	93	Not sown	92	99
ATR Stingray <sup>Ⓢ</sup>	7	95	95		89	94
Hyola® 350TT	3	–	–		114	106
Hyola® 559TT	6	105	106		109	–
Hyola® Enforcer CT	1	–	–		–	108
HyTTec® Trident	2	–	–		123	–
HyTTec® Trophy	3	–	–		109	109
InVigor® T 3510	3	–	–		107	107
InVigor® T 4510	5	–	109		110	110
Pioneer® 44T02 TT	7	105	105		110	105
SF Dynatron TT	1	–	–		–	110
SF Spark TT	1	–	–		–	102
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	1.55	1.35		1.16	1.11
	No. trials	2	2		2	1
Hyola® 575CL	7	102	90	Not sown	90	96
Pioneer® 43Y92 CL	5	–	100		103	109
Pioneer® 44Y90 CL	7	106	104		105	107
Saintly CL	3	105	–		–	108
VICTORY® V7002CL	3	–	–		103	100
CONVENTIONAL						
Variety	Mean yield t/ha	1.49	1.68		1.37	
	No. trials	1	1		1	
AV-Garnet <sup>Ⓢ</sup>	3	82	97	Not sown	86	Trial failed
Nuseed® Diamond	3	112	106		118	
Nuseed® Quartz	2	–	106		110	

Source: SARDI/GRDC, NVT 2015–19 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.

Unseasonal conditions in 2017 resulted in no NVT canola trials being planted on UEP.

**Table 8: Yorke Peninsula early-season canola.**

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.68	2.69	2.75	1.34	1.78
	No. trials	1	1	1	1	1
ATR Bonito <sup>db</sup>	5	101	86	99	98	95
ATR Mako <sup>db</sup>	1	102	–	–	–	–
ATR Stingray <sup>db</sup>	5	93	90	96	90	93
DG 670TT	1	–	–	–	102	–
Hyola® 350TT	3	–	–	104	112	108
Hyola® 559TT	3	111	106	–	111	–
Hyola® Enforcer CT	1	–	–	–	–	105
HyTTec® Trident	2	–	–	–	124	112
HyTTec® Trophy	3	–	–	108	113	106
InVigor® T 3510	2	–	–	–	110	104
InVigor® T 4510	4	–	107	109	115	106
Pioneer® 44T02 TT	5	107	109	104	109	106
Pioneer® 45T03 TT	1	–	–	–	96	–
SF Dynatron TT	1	–	–	–	–	103
SF Spark TT	1	–	–	–	–	102
SF Turbine TT	4	104	107	103	103	–
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	1.68	2.69	2.75	1.34	1.78
	No. trials	1	1	1	1	1
Banker CL	3	106	104	103	–	–
Hyola® 575CL	5	96	84	97	94	93
Pioneer® 43Y92 CL	4	–	93	107	114	102
Pioneer® 44Y90 CL	5	113	100	106	111	103
Saintly CL	2	116	–	107	–	–
VICTORY® V7002CL	3	–	–	98	102	100

Source: SARDI/GRDC, NVT 2015–19 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.

Table 9: Mallee early-season canola.

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	0.48	1.44	1.31	0.52	0.97
	No. trials	1	1	1	1	1
ATR Bonito <sup>db</sup>	5	100	93	101	107	97
ATR Stingray <sup>db</sup>	3	86	100	–	85	–
Hyola® 350TT	3	–	–	99	124	103
Hyola® 559TT	3	118	107	–	111	–
Hyola® Enforcer CT	1	–	–	–	–	100
HyTtec® Trident	2	–	–	–	160	103
HyTtec® Trophy	3	–	–	113	108	108
InVigor® T 3510	2	–	–	–	100	107
InVigor® T 4510	4	–	115	115	107	109
Pioneer® 44T02 TT	5	113	101	102	112	104
SF Dynatron TT	1	–	–	–	–	111
SF Spark TT	1	–	–	–	–	100
SF Turbine TT	2	–	–	108	88	–
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	0.48	1.44	1.31	0.52	0.97
	No. trials	1	1	1	1	1
	No. trials	1	1	1	1	1
Banker CL	3	98	135	119	–	–
Hyola® 575CL	5	93	86	95	108	94
Pioneer® 43Y92 CL	4	–	100	112	125	105
Pioneer® 44Y90 CL	5	119	106	111	113	106
Saintly CL	4	121	–	116	110	107
VICTORY® V7002CL	1	–	–	–	138	–

Source: SARDI/GRDC, NVT 2015–2019 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.  
 NVT canola trials were not conducted in the SA Mallee region prior to 2015.



**Table 10: South East early season canola**

TRIAZINE TOLERANT						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha		2.38	1.73	1.50	2.64
	No. trials		1	1	1	1
ATR Bonito <sup>®</sup>	4	–	105	101	92	90
ATR Stingray <sup>®</sup>	4	–	99	97	88	92
DG 670TT	1	–	–	–	102	–
Hyola <sup>®</sup> 350TT	3	–	–	102	116	108
Hyola <sup>®</sup> 559TT	2	–	112	–	109	–
Hyola <sup>®</sup> Enforcer CT	1	–	–	–	–	100
HyTTec <sup>®</sup> Trident	2	–	–	–	126	108
HyTTec <sup>®</sup> Trophy	3	–	–	109	109	108
InVigor <sup>®</sup> T 3510	2	–	–	–	106	108
InVigor <sup>®</sup> T 4510	4	–	120	110	110	109
Pioneer <sup>®</sup> 44T02 TT	4	–	102	103	111	107
Pioneer <sup>®</sup> 45T03 TT	1	–	–	–	100	–
SF Dynatron TT	1	–	–	–	–	106
SF Spark TT	1	–	–	–	–	102
SF Turbine TT	3	–	108	103	102	–
IMIDAZOLINONE TOLERANT						
Variety	Mean yield t/ha	0.66	2.38	1.73	1.5	2.64
	No. trials	1	1	1	1	1
Banker CL	3	83	121	107	–	–
Hyola <sup>®</sup> 575CL	5	74	97	97	91	88
Pioneer <sup>®</sup> 43Y92 CL	4	–	120	110	105	99
Pioneer <sup>®</sup> 44Y90 CL	5	130	116	108	106	103
Saintly CL	2	124	–	111	–	–
VICTORY <sup>®</sup> V7002CL	3	–	–	96	106	93
CONVENTIONAL						
Variety	Mean yield t/ha		2.38	1.73	1.50	2.64
	No. trials		1	1	1	1
AV-Garnet <sup>®</sup>	5	–	87	90	82	94
Nuseed <sup>®</sup> Diamond	5	–	99	103	119	114
Nuseed <sup>®</sup> Quartz	3	–	112	107	111	108

Source: SARDI/GRDC, NVT 2015–2019 MET data analysis by statistics for the Australian Grains Industry (SAGI)

NVT Trials are not designed to allow comparison of varieties between herbicide-tolerance groups.

# FABA BEAN

By Amanda Pearce and Sara Blake, SARDI, and Melissa Garcia, University of Adelaide

Faba bean variety choice for South Australian growers will remain the same in 2021, with no new varieties released for the southern region.

PBA Amberley<sup>®</sup>, was released in the spring of 2019 and was available for growers in 2020.

PBA Amberley<sup>®</sup> is a later flowering variety that has yielded well in districts with a longer growing season. It has a very good overall level of disease resistance, being highly resistant (rated RMR) to the predominant pathotype of Ascochyta blight and having a higher level of resistance to Chocolate spot (provisionally rated MR) than all other varieties. However higher than expected levels of chocolate spot on PBA Amberley<sup>®</sup> in field observations in Victoria in 2020 indicated that this cultivar needs fungicide sprays to control the disease. Plants have very good standing ability with a low incidence of 'necking'. Seed is medium in size and suitable for co-mingling with other medium-sized varieties. Seed is available from the commercial partner Seednet.

Two faba bean varieties were released in the spring of 2018: PBA Bendoc<sup>®</sup> and PBA Marne<sup>®</sup>.

PBA Bendoc<sup>®</sup> is the first faba bean variety with a high level of tolerance to some Group B herbicides. The Group B herbicide tolerance will not only increase the options for control of broad leaf weeds within crop, but will also enable the variety to be grown where residues persist from applications to a previous crop. Note that permits, product label rates, plant-back periods and all label directions for use must be adhered to. PBA Bendoc<sup>®</sup> has similar yield compared to the other major faba bean varieties grown in southern Australia and is highly resistant (MR) to the predominant pathotype of Ascochyta blight. Seed is small to medium in size and suited to the Middle East markets. Seed is available from the commercial partner Seednet.

PBA Marne<sup>®</sup> is an early-flowering, high-yielding faba bean that has shown adaptation to the lower rainfall and short season areas in southern Australia where

yield is generally greater than current cultivars. PBA Marne<sup>®</sup> offers potential to expand faba bean production into areas currently considered marginal and to improve reliability in established areas during below-average rainfall seasons. Seed is light brown and medium in size and suitable for co-mingling with the current faba bean varieties for export to the major food markets in the Middle East. Seed is available from the commercial partner Seednet.

Faba beans are cross-pollinated by bees. Seed crops should be isolated from other varieties by at least 200 metres to minimise the risk of cross-pollination and maintain genetic purity of the variety. This is particularly important for specific traits such as disease resistance, seed quality, and herbicide tolerance.

## VARIETIES AND MARKET PREFERENCES

Australian faba beans are preferred by the Middle East human consumption market, although competition for market share from France, the United Kingdom and, more recently, the Baltic states occurs. To access the export human food markets, Australian beans must be of a high quality and free from mechanical damage, weathering, disease staining and storage problems. Faba beans darken over time while in storage and seed can become unsuitable for the export market after about nine months.

Farah<sup>®</sup>, Nura<sup>®</sup> and Fiesta VF varieties are well accepted in the Middle East. Seed of PBA Samira<sup>®</sup>, PBA Bendoc<sup>®</sup>, PBA Marne<sup>®</sup> and PBA Amberley<sup>®</sup> are of similar size, and acceptance is expected by the same markets.

Market signals indicate that small-seeded faba bean varieties, such as the old Fiord and Ascot VF varieties, are no longer desired in the Middle East. Mixing smaller seeded varieties into the accepted larger 'Fiesta grade' will downgrade the overall quality of the product.

The medium seed size 'Fiesta grade' is expected to remain the dominant quality type as it is currently well accepted in the Middle East market and is easier to manage for on-farm operations.

PBA Rana<sup>®</sup> seed is larger than other varieties and considered to be of high quality by the major Egyptian market, representing a different grain category for faba bean production and marketing in Australia. PBA Zahra<sup>®</sup> should be suitable to co-mingle with PBA Rana<sup>®</sup> for a medium-large bean category for export to the major food markets in the Middle East.

Product that does not meet export standards or is surplus to demand is consumed domestically in stockfeed rations, often at lower prices. Faba beans are also finding a place in many integrated cropping and grazing enterprises as a means of finishing lambs on farm. Strong demand by graziers for feed beans can occur in dry conditions.

## VARIETIES AND DISEASE MANAGEMENT

Check for updated variety disease categories in the Pulse Variety Disease Guide for South Australia, due out in February 2021. In growing regions or seasonal conditions that favour Chocolate spot development, all varieties require a protective fungicide spray before canopy closure, and often when the crop is at the early flowering stage. Additional applications will be required if wet conditions favour epidemics, particularly when early disease symptoms are evident, soil moisture is high and dense canopy growth retains moisture levels within the canopy. Chocolate spot typically develops during early spring as temperatures increase; however, it can establish in crops earlier where there is prolonged high humidity, so faba beans should be monitored from late winter. PBA Amberley<sup>®</sup> is provisionally rated moderately resistant (MR) to Chocolate spot and should require fewer fungicide applications to control the disease compared to all other varieties which are rated susceptible (S) or moderately susceptible (MS).

A shift in virulence for *Ascochyta* blight has seen the disease rating for *Ascochyta* blight separated into two pathotypes; however, the more recent pathotype 2 which is aggressive on Farah<sup>®</sup> is now predominant and widespread across the southern region. Resistant varieties allow growers to be more reactive to *Ascochyta* blight than with susceptible varieties, and disease management strategies can be based on monitoring levels in high-risk situations.

PBA Amberley<sup>®</sup>, Nura<sup>®</sup>, and PBA Samira<sup>®</sup> are highly resistant (RMR) while PBA Bendoc<sup>®</sup> has very good resistance (MR) to the predominant *Ascochyta* blight pathotype. The old varieties, Farah<sup>®</sup> and Fiesta VF are susceptible (S) to *Ascochyta* blight while PBA Marne<sup>®</sup>, PBA Rana<sup>®</sup> and PBA Zahra<sup>®</sup> are MRMS to this disease. Prophylactic fungicides are recommended in S, MS and MRMS varieties during early and vegetative growth to prevent or minimise disease establishment. Additional fungicides will most likely be required, especially in seasons favourable to disease epidemics, particularly during podding, to prevent seed staining.

Rust can be an occasional problem in faba beans in seasons favouring disease outbreaks and can cause significant yield loss. The disease can survive over summer on volunteer bean plants, and crops need to be monitored to reduce the impact of rust on production. Farah<sup>®</sup>, Fiesta VF and PBA Bendoc<sup>®</sup> are susceptible to rust, often displaying more pronounced symptoms than Nura<sup>®</sup>, PBA Rana<sup>®</sup>, PBA Samira<sup>®</sup> and PBA Zahra<sup>®</sup>, which are moderately susceptible. PBA Marne<sup>®</sup> is MR to rust. Early-sown crops are at greater risk, or where beans are sown adjacent to the previous year's bean stubble. Disease control using suitable fungicides may be required before flowering, coinciding with the time Chocolate spot management is also being implemented.

*Cercospora* leaf spot continues to be widely reported in faba beans. The disease is soil-borne and typically occurs in paddocks with a history of faba beans in the rotation, particularly where they have been grown in close rotation (less than four to six years) or within close proximity of these paddocks. Early control (five to eight weeks post sowing) with carbendazim or tebuconazole is most effective in preventing disease establishment and consequent yield loss from *Cercospora* leaf spot. All current faba bean varieties are susceptible (S), thus early preventative control measures are best practice.

*The Australian Pulse Bulletin – Faba Bean Integrated Disease Management*, published by Pulse Australia, contains information on disease management in faba beans, and can be found at: [www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean/idm-strategies](http://www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean/idm-strategies). However, disease resistance categories in the online document are out-dated.

## HARVEST

In high-biomass production situations, lodging can become an issue. Conversely, crops with short canopies can cause problems with low harvest height, particularly in varieties that produce bottom pods close to the ground.

Physical damage of bean seed has resulted in marketing downgrades in recent years, and needs to be managed. Bud worm needs early monitoring and control, even in seasons with below-average rainfall. Growers should harvest beans when they have a high moisture content (12 to 14 per cent) to avoid breakage and handle the beans carefully when shifting them.

Crop-topping of faba beans can make them more vulnerable to seed staining, particularly if rain falls soon after application. Crop-topping too early or using products or rates that cause crops to dry down quickly can exacerbate the issue. Maturity of current faba bean varieties is not as well suited to crop-topping as the industry would like, particularly in better seasons, hence all grain may not be mature when the ryegrass is ready to top.

## NOTES ON FABA BEAN VARIETIES

### PBA AMBERLEY<sup>®</sup>

PBA Amberley<sup>®</sup>, the newest faba bean variety, was commercially released in 2019 and available for commercial production from 2020. It is a later flowering type and has shown good adaptation in higher rainfall and longer growing season environments in the south-east and mid-north of SA and in the western districts of Victoria. PBA Amberley<sup>®</sup> has an improved level of disease resistance compared to all other faba bean varieties. It is RMR to the predominant and widespread *Ascochyta* blight pathotype, and has improved disease resistance compared to other varieties in its response to Chocolate spot, where it is rated MR (provisional). However, higher than expected levels of Chocolate spot on PBA Amberley<sup>®</sup> in field observations in Victoria and south east of SA in 2020 indicated that this cultivar needs fungicide sprays to control the disease. It is rated S to *Cercospora* leaf spot. The improvement in disease resistance should assist in reliability of production in high-yielding situations where foliar diseases are a significant risk. Seed of PBA Amberley<sup>®</sup> is similar in size to PBA Samira<sup>®</sup> and PBA Marne<sup>®</sup> and should be suitable to co-mingle with these other varieties. Plants of PBA Amberley<sup>®</sup> have very good standing ability and a low incidence of 'necking'. PBA Amberley<sup>®</sup> is commercialised by Seednet and an end point royalty applies.

### PBA BENDOC<sup>®</sup>

PBA Bendoc<sup>®</sup> was developed by the University of Adelaide, in collaboration with SARDI. Tolerance to imidazolinone herbicides was developed by conventional mutation breeding techniques in Nura<sup>®</sup>. A herbicide-tolerant selection was crossed with PBA Samira<sup>®</sup>, and PBA Bendoc<sup>®</sup> was derived from the progeny of this cross. It has been selected for tolerance to imidazolinone herbicides applied post-emergence when plants are at the five-node growth stage. Note that permits, product label rates, plant-back periods and all label directions for use must be adhered to. Generally, PBA Bendoc<sup>®</sup> yields comparably to conventional varieties with no obvious yield penalty associated with herbicide tolerance. PBA Bendoc<sup>®</sup> is similar in Nura<sup>®</sup> and PBA Samira<sup>®</sup> flowering time and maturity, and has very good resistance (MR) to the predominant pathotype of *Ascochyta* blight. It is rated S to *Cercospora* leaf spot, and also rated S to Chocolate spot, which will need to be managed in higher rainfall and high biomass situations. PBA Bendoc<sup>®</sup> produces small to medium-sized, light brown seeds that are comparable in size to Nura<sup>®</sup>. PBA Bendoc<sup>®</sup> seed can be co-mingled with these other varieties for the Middle East market. PBA Bendoc<sup>®</sup> is licensed to Seednet and an end point royalty applies.

### PBA MARNE<sup>®</sup>

PBA Marne<sup>®</sup> (evaluated as AF09169) was developed by the PBA Faba bean breeding program led by University of Adelaide. It is the result of a complex cross between four parents of diverse origins. PBA Marne<sup>®</sup> is an early-flowering faba bean variety that is well suited to lower rainfall or short-season environments of southern Australia. It is the earliest flowering variety, with maturity similar to PBA Samira<sup>®</sup>. It is medium to short in height. The overall disease resistance profile of PBA Marne<sup>®</sup> is improved compared to Fiesta VF and Farah<sup>®</sup>, being rated MRMS to *Ascochyta* blight and MR to rust. It is rated S to Chocolate spot and *Cercospora* leaf spot. PBA Marne<sup>®</sup> produces medium-sized seeds that are comparable in size to PBA Samira<sup>®</sup>. The overall colour of seed is similar to other major bean varieties. PBA Marne<sup>®</sup> seed can be co-mingled with these other varieties for the Middle East market. PBA Marne<sup>®</sup> is licensed to Seednet and an end point royalty applies.

**PBA ZAHRA<sup>®</sup>**

PBA Zahra<sup>®</sup> (evaluated as AF05095 and the re-selection AF05095-1) is the result of a cross between Farah<sup>®</sup> and an accession 920/3, which originated from Morocco. It has shown wide adaptation throughout southern Australia and is very responsive to high-yielding situations. PBA Zahra<sup>®</sup> seed is uniform large size and colour and should be suitable to co-mingle with PBA Rana<sup>®</sup> for a medium-large faba bean category for the Egyptian market. PBA Zahra<sup>®</sup> is mid-flowering, similar to Nura<sup>®</sup>, PBA Rana<sup>®</sup> and PBA Samira<sup>®</sup> and mid-maturity similar to PBA Rana<sup>®</sup>. It is a medium to tall plant similar to PBA Rana<sup>®</sup> and taller than other varieties. It is rated MRMS to Ascochyta blight, MS to Chocolate spot and rust, and S to Cercospora leaf spot. PBA Zahra<sup>®</sup> is licensed to Seednet and an end point royalty applies.

**PBA SAMIRA<sup>®</sup>**

PBA Samira<sup>®</sup> (tested as AF05069 and the re-selection AF05069-2) is a high-yielding faba bean variety for southern Australia. It is widely adapted and is responsive to high-yielding situations. It is mid-flowering, five to 10 days later than Fiesta VF and Farah<sup>®</sup>, but matures at the same time as these varieties. PBA Samira<sup>®</sup> is rated RMR to the predominant and widespread pathotype of Ascochyta blight. It is rated MS to Chocolate spot and rust, and S to Cercospora leaf spot. Seed of PBA Samira<sup>®</sup> is slightly larger than Fiesta VF, Farah<sup>®</sup> and Nura<sup>®</sup>, but the overall seed colour is similar for all varieties. PBA Samira<sup>®</sup> can be co-mingled with these other varieties for the Middle East market. PBA Samira<sup>®</sup> is licensed to Seednet and an end point royalty applies.

**PBA RANA<sup>®</sup>**

PBA Rana<sup>®</sup> (tested as AF01006-1 or 974\*(611\*974)/15-1) has good vigour and stem strength. It is mid-flowering (similar to Nura<sup>®</sup>) and mid-maturity (later than Nura<sup>®</sup> and Farah<sup>®</sup>). PBA Rana<sup>®</sup> is well adapted to high-rainfall areas with longer growing seasons. PBA Rana<sup>®</sup> is MRMS to Ascochyta blight. It is rated MS to Chocolate spot and rust, and S to Cercospora leaf spot. PBA Rana<sup>®</sup> produces large, plump, light brown seeds and is suited to meeting Egyptian market requirements for that grade. PBA Rana<sup>®</sup> represents a unique category for faba bean marketing. As PBA Rana<sup>®</sup> is three-quarters Manafest in its breeding, it should establish itself into areas where Manafest was grown before Ascochyta blight saw its demise. PBA Rana<sup>®</sup> is licensed to Seednet and an end point royalty applies.

**NURA<sup>®</sup>**

Nura<sup>®</sup> is a medium-sized faba bean rated RMR to the predominant and widespread pathotype of Ascochyta blight. Nura<sup>®</sup> is rated MS to Chocolate spot, S to Cercospora leaf spot and MS to rust. It is generally shorter than Fiesta VF and Farah<sup>®</sup> meaning it is less likely to lodge. However, since its bottom pods are closer to the ground, harvest can be more difficult in lower rainfall districts or when sown late. In most areas long-term yields of Nura<sup>®</sup> tend to be slightly lower than Farah<sup>®</sup> and more recent varieties. It has good seed appearance, light buff in colour, with minimal seed staining and discolouration. Flowering time of Nura<sup>®</sup> is generally around seven days later than Farah<sup>®</sup>, although it has similar maturity. Nura<sup>®</sup> is licensed to Seednet and an end point royalty applies.

**FARAH<sup>®</sup>**

Farah<sup>®</sup> was selected directly from Fiesta VF and is identical in many respects, except it is rated S to the predominant and widespread pathotype of Ascochyta blight and tends to have more uniform seed size and colour. Farah<sup>®</sup>'s yields are similar to Fiesta VF but generally lower than more recent varieties in most regions of southern Australia. The major advantage of Farah<sup>®</sup> over Fiesta VF is the increased likelihood of achieving market standards for freedom from seed staining. Farah<sup>®</sup> is licensed to Heritage Seeds and an end point royalty applies.

**FIESTA VF**

Fiesta VF seed is buff coloured and larger than Fiord. Fiesta VF has good seedling vigour, is of medium height and is early to mid-flowering. It is classed as S to Chocolate spot, although it is less susceptible than Fiord. Fiesta VF is rated S to Ascochyta blight, so a proactive disease management strategy is recommended to achieve clean seed and ensure market standards are met. Fiesta VF is no longer protected by PBR, and no end point royalty applies.



## BROAD BEAN VARIETIES

### PBA KAREEMA<sup>Ⓛ</sup>

PBA Kareema<sup>Ⓛ</sup> was selected from Aquadulce and has similar plant type and adaptation to this variety, but larger and more uniform seed and no 'evergreens'. It is well adapted to the very high rainfall broad bean districts in the lower south-east of SA. It has significantly improved resistance to Ascochyta blight (MR), better rust resistance (MR) than Aquadulce and is MS to Chocolate spot. Like Aquadulce, PBA Kareema<sup>Ⓛ</sup> is more tolerant of waterlogging than most varieties of faba bean, and is more tolerant of iron and manganese deficiencies. PBA Kareema<sup>Ⓛ</sup> is licensed to PGG Wrightson and an end point royalty applies.

### AQUADULCE

Aquadulce is a tall broad bean variety, with late flowering and maturity, suited to areas with at least 500mm average annual rainfall, such as the lower south-east of SA. It is rated MS for Chocolate spot, but can succumb under high disease pressure and high rainfall situations. Aquadulce is more tolerant of waterlogging than most faba bean varieties and tolerates soils with iron and manganese deficiencies. The large seed size of Aquadulce means it must be considered a specialty bean as it has different marketing opportunities to faba beans. It commands a price premium over faba beans which are dependent on grading and seed size.

## FURTHER INFORMATION

Variety management packages (VMP) for all named varieties (except Aquadulce) are available on the Pulse Australia website: [www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean](http://www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean).

**Table 1: Most-adapted faba bean varieties for each rainfall zone.**

Rainfall zone (average annual rainfall)		
Low <375mm	Medium 375–500mm	High >500mm
PBA Marne <sup>Ⓛ</sup>	PBA Zahra <sup>Ⓛ</sup>	PBA Zahra <sup>Ⓛ</sup>
PBA Bendoc <sup>Ⓛ</sup>	PBA Amberley <sup>Ⓛ</sup>	PBA Amberley <sup>Ⓛ</sup>
Farah <sup>Ⓛ</sup>	PBA Samira <sup>Ⓛ</sup>	PBA Samira <sup>Ⓛ</sup>
Fiesta VF	PBA Marne <sup>Ⓛ</sup>	PBA Rana <sup>Ⓛ</sup>
Nura <sup>Ⓛ</sup>	PBA Bendoc <sup>Ⓛ</sup>	Nura <sup>Ⓛ</sup>
PBA Samira <sup>Ⓛ</sup>	Nura <sup>Ⓛ</sup>	PBA Bendoc <sup>Ⓛ</sup>
PBA Zahra <sup>Ⓛ</sup>	Farah <sup>Ⓛ</sup>	PBA Marne <sup>Ⓛ</sup>
	Fiesta VF	Fiesta VF

**Table 2: Agronomic and disease characteristics of faba and broad bean varieties.**

Variety	Plant height	Flower time	Maturity	Lodging resistance	Ascochyta blight*	Chocolate spot	Cercospora leaf spot	Rust	PSbMV seed staining	Pratylenchus neglectus	Pratylenchus thornei
FABA BEAN											
Farah <sup>Ⓛ</sup>	Medium	Early-mid	Early-mid	MS	S	S	S	S	S	MR	MS
Fiesta VF	Medium	Early-mid	Early-mid	MS	S	S	S	S	S	MR	MS
Nura <sup>Ⓛ</sup>	Short	Mid	Early-mid	MR	RMR	MS	S	MS	VS	MR	MS
PBA Amberley <sup>Ⓛ</sup>	Medium	Mid	Mid	MR	RMR	MR#	S	S	—	MR	MS#
PBA Bendoc <sup>Ⓛ</sup>	Medium	Mid	Early-mid	MS	MR	S	S	S	S	MR	MRMS#
PBA Marne <sup>Ⓛ</sup>	Medium-short	Early	Early-mid	MR	MRMS	S	S	MR	MR	MR	MS#
PBA Rana <sup>Ⓛ</sup>	Medium-tall	Mid	Mid	MR	MRMS	MS	S	MS	MR	MR	MS
PBA Samira <sup>Ⓛ</sup>	Medium	Mid	Early-mid	MR	RMR	MS	S	MS	S	MR	MRMS
PBA Zahra <sup>Ⓛ</sup>	Medium-tall	Mid	Mid	MR	MRMS	MS	S	MS	S	MR	MS
BROAD BEAN											
Aquadulce	Tall	Mid	Late	MS	MS	MS	S	MS	S	—	—
PBA Kareema <sup>Ⓛ</sup>	Tall	Mid	Late	MS	MR	MS	S	MRMS	S	—	—

Source: Pulse Breeding Australia trials program 2012–17 and NVT

**Key:** R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible.

# Provisional rating.

\* Ascochyta blight ratings: Ratings have previously been separated based on the older pathotype 1 and newer pathotype 2 strains. However, as pathotype 2 is now the predominant and widespread strain present in the southern region, ratings now reflect resistance to this strain as determined through the National Variety Trials ([www.nvtonline.com.au](http://www.nvtonline.com.au)). Check for updated variety disease categories in the *Pulse Variety Disease Guide for South Australia*, due out in February 2021.



**Table 3: Mid North faba bean yield performance. NVT data 2015–19.**

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

		2015	2016	2017	2018	2019
	Mean yield t/ha	2.03	4.15	2.48	1.82	1.62
	No. trials	5	5	3	3	5
<b>NVT data 2015–2019.</b>						
Farah <sup>db</sup>	21	95	93	97	95	96
Fiesta VF	20	96	90	95	95	98
Nura <sup>db</sup>	21	92	97	94	95	96
PBA Amberley <sup>db</sup>	21	96	101	101	105	106
PBA Bendoc <sup>db</sup>	16	–	89	97	104	108
PBA Marne <sup>db</sup>	21	106	108	90	103	104
PBA Rana <sup>db</sup>	21	85	90	92	89	87
PBA Samira <sup>db</sup>	21	98	98	104	100	101
PBA Zahra <sup>db</sup>	21	98	104	108	96	100

**Table 4: Yorke Peninsula faba bean yield performance. NVT data 2015–19.**

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

	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	2.39	5.2	3.84	3.05	2.81
	No. trials	2	1	2	2	2
<b>Variety</b>						
Farah <sup>db</sup>	9	96	99	100	99	97
Fiesta VF	9	96	99	101	99	98
Nura <sup>db</sup>	9	90	97	100	95	97
PBA Amberley <sup>db</sup>	9	91	95	104	99	103
PBA Bendoc <sup>db</sup>	7	–	97	103	101	104
PBA Marne <sup>db</sup>	9	106	103	98	93	102
PBA Rana <sup>db</sup>	9	85	96	96	96	91
PBA Samira <sup>db</sup>	9	97	98	102	102	100
PBA Zahra <sup>db</sup>	9	97	97	108	101	99

**Table 5: Lower Eyre Peninsula faba bean yield performance. NVT data 2015, 2016, 2018 and 2019.\***

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

\*Data for 2017 not available due to poor seasonal conditions.

Variety	Year	2015	2016	2018	2019
	Mean yield t/ha	1.82	4.57	3.68	3.58
	No. trials	1	1	1	1
Farah <sup>Ⓛ</sup>	4	106	94	97	95
Fiesta VF	3	112	93	97	–
Nura <sup>Ⓛ</sup>	4	97	95	96	95
PBA Amberley <sup>Ⓛ</sup>	4	100	102	101	102
PBA Bendoc <sup>Ⓛ</sup>	3	–	98	99	102
PBA Marne <sup>Ⓛ</sup>	4	91	104	99	107
PBA Rana <sup>Ⓛ</sup>	4	101	89	94	89
PBA Samira <sup>Ⓛ</sup>	4	104	99	101	98
PBA Zahra <sup>Ⓛ</sup>	4	92	98	100	93

**Table 6: South East faba bean and broad bean yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.61	4.85	3.36	2.89	2.9
	No. trials	4	5	5	4	4
<b>FABA BEAN</b>						
Farah <sup>Ⓛ</sup>	22	98	96	98	99	96
Fiesta VF	20	101	95	98	99	98
Nura <sup>Ⓛ</sup>	22	90	97	93	94	94
PBA Amberley <sup>Ⓛ</sup>	22	98	105	101	97	101
PBA Bendoc <sup>Ⓛ</sup>	18	–	99	103	98	101
PBA Marne <sup>Ⓛ</sup>	22	91	94	92	98	102
PBA Nanu <sup>Ⓛ</sup>	3	–	–	99	98	98
PBA Nasma <sup>Ⓛ</sup>	6	101	93	102	102	98
PBA Rana <sup>Ⓛ</sup>	22	84	93	92	92	84
PBA Samira <sup>Ⓛ</sup>	22	104	103	103	101	101
PBA Zahra <sup>Ⓛ</sup>	22	111	106	102	104	108
<b>BROAD BEAN</b>						
Aquadulce	6	90	91	90	–	104
PBA Kareema <sup>Ⓛ</sup>	6	91	95	96	–	99

**Table 7: Murray Mallee faba bean yield performance. NVT data 2015, 2016, 2017 and 2019.\***

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

\*Data for 2018 not available due to poor seasonal conditions.

Variety	Year	2015	2016	2017	2019
	Mean yield t/ha	0.86	3.68	2.03	0.94
	No. trials	1	1	1	1
Farah <sup>db</sup>	4	91	96	99	94
Fiesta VF	4	94	95	103	92
Nura <sup>db</sup>	4	86	93	92	88
PBA Amberley <sup>db</sup>	4	99	100	94	100
PBA Bendoc <sup>db</sup>	3	–	100	104	100
PBA Marne <sup>db</sup>	4	108	95	104	90
PBA Rana <sup>db</sup>	4	80	90	86	90
PBA Samira <sup>db</sup>	4	98	102	99	104
PBA Zahra <sup>db</sup>	4	73	101	96	93

# LENTIL

By Sarah Day, Jenny Davidson and Sara Blake, SARDI

Two new lentil varieties will be available to growers in 2021. PBA Kelpie XT<sup>®</sup> (tested as CIPAL1721) is a large-seed-sized, herbicide-tolerant red lentil, released in spring 2020 through commercial partner Seednet. PBA Kelpie XT<sup>®</sup> is an early to mid-flowering and maturing variety with a good resistance to Botrytis grey mould (BGM). PBA Kelpie XT<sup>®</sup> has similar herbicide tolerance characteristics to other PBA XT lentil varieties, but offers a larger seed type.

GIA Leader<sup>®</sup> (tested as GIA1701L) is a new imidazolinone-tolerant, medium-seed-sized red lentil developed by Grains Innovation Australia (GIA) for favourable lentil-growing areas with good soil types in medium to higher rainfall zones. This variety has similar IMI herbicide tolerance and tolerance to residual levels of sulfonylurea (SU) herbicide from prior crops to current XT lentil varieties (for example, PBA Hurricane XT<sup>®</sup>). GIA Leader<sup>®</sup> has mid to late flowering and maturity, making it well suited to early sowing. Provisional data indicates a good level of resistance to Ascochyta blight and BGM.

In spring of 2019 PBA Highland XT<sup>®</sup> (tested as CIPAL1621) was released from the PBA breeding program. PBA Highland XT<sup>®</sup> is a medium-seed-sized, herbicide-tolerant red lentil variety. It is early flowering, early to mid-maturing and has performed well in the lower yielding environments of the Victorian Mallee and South Australia. PBA Highland XT<sup>®</sup> has good resistance to Ascochyta blight, maintaining this level of resistance against the increasingly prevalent pathogen isolates which are virulent on either PBA Hurricane XT<sup>®</sup> or Nipper<sup>®</sup>. In 2021 there will be more variety options available to growers wanting to utilise a herbicide-tolerant red lentil. For conventional options, the high-yielding large red lentil PBA Jumbo2<sup>®</sup> is broadly adapted across all lentil production zones.

There are now two pathotypes of Ascochyta blight in the southern region. The older pathotype 1 is virulent on Nipper<sup>®</sup> and the newer pathotype 2 is virulent on

PBA Hurricane XT<sup>®</sup>. Pathotype 2 is commonplace on the Yorke Peninsula and widespread throughout the mid and lower north regions. Disease ratings have now been updated to reflect this shift in the pathogen population. The newly released GIA Leader<sup>®</sup> has a very high level of resistance to both pathotypes, whilst PBA Highland XT<sup>®</sup> is rated moderately resistant (MR) to both pathotypes. PBA Hurricane XT<sup>®</sup>, PBA Hallmark XT<sup>®</sup> and the newly released PBA Kelpie XT<sup>®</sup> (provisional rating) are rated moderately resistant/moderately susceptible (MRMS) to the new pathotype 2 for foliar Ascochyta blight in South Australia. Fungicide sprays are not required if no disease is visible. However, growers are urged to monitor crops regularly for disease, and podding sprays may be required if disease is present during the growing season for PBA Hurricane XT<sup>®</sup>, PBA Hallmark XT<sup>®</sup> and PBA Kelpie XT<sup>®</sup> to protect the developing grain. It is important to diversify variety selections within a year and across rotations, alongside agronomic and disease-management practices to maintain the sustainability of the system and reduce the risk of crop failures.

Botrytis grey mould (BGM) continues to be a major disease limitation to SA lentil production and a foliar fungicide spray at the canopy closure stage in all varieties is recommended in conducive seasons and disease-prone areas. This is particularly important in varieties with low levels of resistance such as PBA Bolt<sup>®</sup> (rated S) and PBA Hurricane XT<sup>®</sup> (rated MRMS), amongst others. A foliar fungicide spray at canopy closure is also appropriate for varieties with improved resistance to BGM such as PBA Kelpie XT<sup>®</sup> (provisionally rated RMR), PBA Highland XT<sup>®</sup> and PBA Hallmark XT<sup>®</sup> (both rated MR) and GIA Leader<sup>®</sup> (provisionally rated MR), and PBA Jumbo2<sup>®</sup> (rated R), although follow-up sprays may not be needed in the latter. Early sowing is not recommended for varieties rated susceptible or moderately susceptible to BGM in disease-prone areas. Check for updated variety disease categories in the *Pulse Variety*

*Disease Guide for South Australia*, due out in February 2021.

Price differences can occur between varieties across seasons; however, growers need to produce high-quality seed in all varieties to secure markets and achieve the highest prices. On-farm storage can assist in attaining the highest price for grain in some seasons and allow lentils with poor quality issues or contaminants to be stored until appropriate cleaning and marketing can occur. Timely harvesting is recommended in lentils to minimise seed discolouration and weather damage, and also to reduce the risk of yield loss from shattering.

## SELECTION CRITERIA

Information on the most important selection criteria, grain yield, disease resistance, maturity, lodging resistance, shattering and seed type for each variety can be found in Tables 1 and 2. When selecting a variety, growers also need to consider their individual farm and paddock situation, and the access and availability of the likely target markets, and make their selection on all available information. National Variety Trials yield data is summarised in Tables 3 to 7.

## NOTES ON SELECTED VARIETIES

### SMALL RED LENTILS

#### PBA HURRICANE XT<sup>®</sup>

PBA Hurricane XT<sup>®</sup> was the second lentil variety to be released with improved tolerance to the herbicides imazethapyr and flumetsulam, plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues. However, it is important to note that product label rates, plant-back periods and directions for use must still be adhered to. It is a mid-flowering, mid-maturing variety with small red seed and a grey seed coat, although the seed size is slightly larger than Nipper<sup>®</sup> and PBA Herald XT<sup>®</sup>. PBA Hurricane XT<sup>®</sup> has an MRMS rating for foliar Ascochyta blight (AB) pathotype 2 (PBA Hurricane XT<sup>®</sup> virulent) in South Australia, and severe lesions have occurred in seedling crops in 2018, so may require a podding spray to prevent seed and pod infection. PBA Hurricane XT<sup>®</sup> has an MRMS rating for BGM, and in disease-prone areas a strategic fungicide program for BGM will be required and early sowing should be avoided. Plant height and early vigour are improved over Nipper<sup>®</sup> and PBA Herald XT<sup>®</sup>, improving weed competition and harvestability. Like PBA Herald XT<sup>®</sup> and Nipper<sup>®</sup>, PBA Hurricane XT<sup>®</sup> has been found to be more sensitive to Group C herbicides such as metribuzin

and simazine than other lentil varieties; however, label rates of these herbicides have been used on most evaluation trials. It is important to be cautious when applying these herbicides on variable soil types, especially if weather conditions conducive to crop damage are forecast. PBA Hurricane XT<sup>®</sup> is the highest yielding small red lentil and is commercialised by PBSeeds.

#### NIPPER<sup>®</sup>

Nipper<sup>®</sup> is rated RMR to BGM, MRMS to AB pathotype 1 and MR to AB pathotype 2. Crops should be monitored for presence of AB and strategic vegetative and podding sprays for AB are recommended in this variety in disease-prone areas if infection continues to spread. Nipper<sup>®</sup> has a small seed size, flowers later than Nugget but often matures earlier. Nipper<sup>®</sup> is more sensitive to metribuzin than most other varieties and caution is required to avoid application when conditions are conducive to damage. Nipper<sup>®</sup> is licensed to Seednet.

### MEDIUM RED LENTILS

#### PBA HIGHLAND XT<sup>®</sup>

PBA Highland XT<sup>®</sup> is the fourth lentil variety released with improved tolerance to the herbicides imazethapyr and flumetsulam, plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues. However, it is important to note that product label rates, plant-back periods and directions for use must still be adhered to. PBA Highland XT<sup>®</sup> offers an improved herbicide-tolerant lentil that is showing adaptation to drier lentil-growing regions of the Victorian Mallee and South Australia. It has medium seed size, high early vigour with early flowering, and early to mid-maturity. PBA Highland XT<sup>®</sup> has a disease rating for AB of moderately resistant (MR) and moderately resistant/moderately susceptible (MRMS) to BGM.

#### NEW – GIA LEADER<sup>®</sup>

GIA Leader<sup>®</sup> (tested as GIA1701L) is a new imidazolinone-tolerant, medium-seed-sized red lentil developed by Grains Innovation Australia (GIA) for favourable lentil growing areas with good soil types in medium to higher rainfall zones. This variety has similar IMI herbicide tolerance and tolerance to residual levels of sulfonylurea (SU) herbicide from prior crops to current XT lentil varieties (for example, PBA Hurricane XT<sup>®</sup>). GIA Leader<sup>®</sup> has mid to late flowering and maturity, making it well suited to early sowing.

## PBA ACE<sup>®</sup>

PBA Ace<sup>®</sup> is a vigorous-growing, mid-flowering and mid-maturing variety with high yield potential and broad adaptation. It provides an alternative to Nugget in all regions. PBA Ace<sup>®</sup> has high resistance to AB and is rated MRMS to BGM. PBA Ace<sup>®</sup> is one of the highest-yielding medium red lentils in long-term trials in all regions of SA and Victoria, but due to its later maturity than PBA Bolt<sup>®</sup>, PBA Blitz<sup>®</sup> and PBA Flash<sup>®</sup>, it is likely to be better suited to areas where mid-maturing varieties are favoured. PBA Ace<sup>®</sup> can be prone to lodging under conditions of high biomass production, often making BGM difficult to control. When grown in favourable environments, particularly when sown early, a small reduction in seeding rate may be beneficial in this variety to reduce biomass and lodging. A small level of shattering has been observed under some conditions in PBA Ace<sup>®</sup> at maturity, but it is unlikely to cause significant yield loss. PBA Ace<sup>®</sup> has a grey seed coat colour and is licensed to PBSeeds.

## PBA BOLT<sup>®</sup>

PBA Bolt<sup>®</sup> is an early to mid-flowering and maturing lentil with excellent lodging resistance at maturity and high yield in drought years and dry areas. It provides an alternative to PBA Flash<sup>®</sup> in all areas, particularly in areas where AB, harvestability and drought tolerance are major issues. Like PBA Flash<sup>®</sup> it has improved tolerance to boron and salt over most other varieties. PBA Bolt<sup>®</sup> has moderate resistance (MR) to AB pathotype 1 and MRMS rating for AB pathotype 2. PBA Bolt<sup>®</sup> is susceptible (S) to BGM and this disease will need to be carefully managed in disease-prone areas. It has a grey seed coat colour and is licensed to PBSeeds.

## PBA BLITZ<sup>®</sup>

PBA Blitz<sup>®</sup> is suited to all current lentil-growing areas, with particular adaptation to shorter season areas, where its combination of early to mid-flowering, early maturity, moderate disease resistance to both AB and BGM, and medium seed size will improve lentil reliability and economics of production. PBA Blitz<sup>®</sup> is the earliest maturing lentil variety and the best option where crop-topping and/or delayed sowing are practised. It has a good level of early vigour and an erect plant type. PBA Blitz<sup>®</sup> is a medium-sized red lentil (larger than PBA Flash<sup>®</sup> and Nugget) with a grey-coloured seed coat. PBA Blitz<sup>®</sup> has a low level of 'pale coat Blitz' seeds that still have red cotyledons and are a natural part of the genetic make-up of the variety. These do not affect the splitting or cooking characteristics of the variety. These 'pale coat Blitz' seeds are classified at receipt point as seeds of contrasting colour with a limit of one per cent allowed. PBA Blitz<sup>®</sup> is commercialised by PBSeeds.

## PBA FLASH<sup>®</sup>

PBA Flash<sup>®</sup> is a red lentil with a green seed coat and medium seed size. It has been well suited to shorter seasons and lower-yielding lentil-growing areas where its earlier maturity improves reliability of yield. It is rated moderately susceptible (MS) to AB and requires strategic foliar fungicide sprays prior to flowering and at podding in disease-prone areas. Earlier maturity makes PBA Flash<sup>®</sup> better suited to crop-topping than PBA Ace<sup>®</sup>, although caution is still required with this practice due to seasonal variation in weed and crop maturity. PBA Flash<sup>®</sup> is rated MRMS to BGM, but has improved tolerance to both boron and salt over all varieties except for PBA Bolt<sup>®</sup>. PBA Flash<sup>®</sup> is commercialised by PBSeeds.

## PBA HALLMARK XT<sup>®</sup>

PBA Hallmark XT<sup>®</sup> was the third lentil variety to be released with improved tolerance to the herbicides imazethapyr and flumetsulam, plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues. However, it is important to note that product label rates, plant-back periods and directions for use must still be adhered to. PBA Hallmark XT<sup>®</sup> builds on PBA Herald XT<sup>®</sup> and PBA Hurricane XT<sup>®</sup>, with higher grain yields and a different size market class. It is a mid-flowering, mid-maturing variety with medium red seed and a grey seed coat. The seed size is slightly larger than PBA Ace<sup>®</sup> and PBA Bolt<sup>®</sup> but less than PBA Flash<sup>®</sup> and PBA Blitz<sup>®</sup>. PBA Hallmark XT<sup>®</sup> has a high resistance rating for BGM (RMR) and is rated MRMS for AB pathotype 2 and RMR for AB pathotype 1 in SA where it may require a podding spray to prevent seed and pod infection. Like Nipper<sup>®</sup> and PBA Hurricane XT<sup>®</sup>, PBA Hallmark XT<sup>®</sup> has been found to be more sensitive to Group C herbicides such as metribuzin and simazine than other lentil varieties; however, label rates of these herbicides have been used on most evaluation trials. It is important to be cautious when applying these herbicides on variable soil types, especially if weather conditions conducive to crop damage are forecast. Vigour and plant height are slightly better than PBA Hurricane XT<sup>®</sup> and equivalent to PBA Bolt<sup>®</sup>. Similar lodging to PBA Hurricane XT<sup>®</sup> and can still lodge under some conditions. PBA Hallmark XT<sup>®</sup> is a high-yielding medium red lentil and is commercialised by PBSeeds.



## LARGE RED LENTILS

### PBA JUMBO2<sup>Ⓢ</sup>

PBA Jumbo2<sup>Ⓢ</sup> is the highest yielding red lentil available for SA. PBA Jumbo2<sup>Ⓢ</sup> was released as a direct replacement for PBA Jumbo<sup>Ⓢ</sup>, although grain size is almost the only similarity. It has improved agronomic characteristics over PBA Jumbo<sup>Ⓢ</sup>, including greater early vigour, improved lodging, shattering and disease resistance. It is rated R for AB and RMR for BGM, but disease monitoring and a fungicide application prior to canopy closure are still recommended for the latter. It has a seed size and shape similar to PBA Jumbo<sup>Ⓢ</sup> but with a grey seed. As with other large-seeded varieties, PBA Jumbo2<sup>Ⓢ</sup> is well suited to the post-harvest removal of small broadleaf weed seeds. PBA Jumbo2<sup>Ⓢ</sup> is licensed to PBSeeds.

### NEW – PBA KELPIE XT<sup>Ⓢ</sup>

PBA Kelpie XT<sup>Ⓢ</sup> (tested as CIPAL1721) is a large-seed-sized, herbicide-tolerant red lentil, released in spring 2020 through the commercial partner Seednet. PBA Kelpie XT<sup>Ⓢ</sup> is an early to mid-flowering and maturing variety with a good resistance to BGM (provisionally rated MR). PBA Kelpie XT<sup>Ⓢ</sup> is rated MRMS to both pathotypes of AB in SA. PBA Kelpie XT<sup>Ⓢ</sup> has similar herbicide tolerance characteristics to other PBA XT lentil varieties but offers a larger seed type.

## MEDIUM AND LARGE GREEN LENTILS

### PBA GIANT<sup>Ⓢ</sup>

PBA Giant<sup>Ⓢ</sup> is the largest-seeded Australian green lentil available. It is a broadly adapted variety with similar yield to Boomer but improved shattering resistance and produces a slightly larger and more consistent seed size. Although shattering resistance is improved over that of Boomer, it is rated MRMS for this trait and timely harvest is important to prevent seed loss. PBA Giant<sup>Ⓢ</sup> has moderate resistance (MR) to AB pathotype 2 but is rated moderately susceptible (MS) to AB pathotype 1 and BGM; therefore, monitoring and timely application of fungicides will be important to ensure the control of disease. As pods are susceptible to AB infection, a strategic fungicide application at podding may also be required to minimise seed staining and maximise seed quality. The large seed size may provide opportunity for removal of small broadleaf weed seeds from the harvested sample. PBA Giant<sup>Ⓢ</sup> is commercialised by PBSeeds.

### PBA GREENFIELD<sup>Ⓢ</sup>

PBA Greenfield<sup>Ⓢ</sup> is the highest yielding Australian green lentil variety. It is a medium-sized green lentil with broad adaptation and good early vigour. It is rated MRMS for AB pathotype 1, and is moderately resistant (MR) to AB pathotype 2 and BGM. PBA Greenfield<sup>Ⓢ</sup> is mid-flowering and like the other green lentils has a mid to late-maturity rating. PBA Greenfield<sup>Ⓢ</sup> has improved shattering resistance over both Boomer and PBA Giant<sup>Ⓢ</sup> with an MR rating, but timely harvest is still important to produce good-coloured seed for ease of marketing. This may also be aided by strategic fungicide applications during podding to minimise seed staining from AB. PBA Greenfield<sup>Ⓢ</sup> is commercialised by PBSeeds.

### BOOMER

Boomer was the first large-seeded green lentil, released as an Australian-adapted variety for all lentil-growing areas. Boomer has good early vigour and can produce large amounts of biomass, making it prone to lodging under favourable growing conditions. It is rated moderately resistant (MR) to foliar AB and MRMS to BGM. Boomer is susceptible to pod infection from AB, so this must be managed with strategic fungicides during podding to avoid disease staining on the seed coat. Boomer is rated susceptible to shattering at maturity, and therefore delayed harvest can result in grain loss and also a reduction of its green seed colour resulting in downgrading in this variety. Boomer is licensed to Seednet.

**Table 1: Most-adapted lentil varieties for each rainfall zone.**

Rainfall zone (average annual rainfall)			
<400mm	400–450mm	450–500mm	>500mm
SMALL RED			
Nipper <sup>db</sup>	Nipper <sup>db</sup>	Nipper <sup>db</sup>	Nipper <sup>db</sup>
PBA Hurricane XT <sup>db+</sup>	PBA Hurricane XT <sup>db+</sup>	PBA Hurricane XT <sup>db+</sup>	PBA Hurricane XT <sup>db+</sup>
MEDIUM RED			
PBA Bolt <sup>db</sup>	PBA Bolt <sup>db</sup>	PBA Blitz <sup>db^</sup>	PBA Ace <sup>db</sup>
PBA Hallmark XT <sup>db+</sup>	PBA Hallmark XT <sup>db+</sup>	PBA Hallmark XT <sup>db+</sup>	PBA Hallmark XT <sup>db+</sup>
PBA Highland XT <sup>db+</sup>	PBA Highland XT <sup>db+</sup>	PBA Highland XT <sup>db+</sup>	PBA Highland XT <sup>db+</sup>
GIA Leader <sup>db+</sup>	GIA Leader <sup>db+</sup>	GIA Leader <sup>db+</sup>	GIA Leader <sup>db+</sup>
PBA Flash <sup>db</sup>	PBA Flash <sup>db</sup>	PBA Flash <sup>db</sup>	PBA Blitz <sup>db^</sup>
PBA Ace <sup>db</sup>	PBA Ace <sup>db</sup>	PBA Ace <sup>db</sup>	PBA Flash <sup>db</sup>
PBA Blitz <sup>db^</sup>	PBA Blitz <sup>db^</sup>	PBA Bolt <sup>db</sup>	PBA Bolt <sup>db</sup>
LARGE RED			
PBA Jumbo2 <sup>db</sup>	PBA Jumbo2 <sup>db</sup>	PBA Jumbo2 <sup>db</sup>	PBA Jumbo2 <sup>db</sup>
PBA Kelpie XT <sup>db+</sup>	PBA Kelpie XT <sup>db+</sup>	PBA Kelpie XT <sup>db+</sup>	PBA Kelpie XT <sup>db+</sup>
MEDIUM & LARGE GREEN			
PBA Greenfield <sup>db</sup>	PBA Greenfield <sup>db</sup>	PBA Greenfield <sup>db</sup>	PBA Greenfield <sup>db</sup>
PBA Giant <sup>db</sup>	PBA Giant <sup>db</sup>	PBA Giant <sup>db</sup>	PBA Giant <sup>db</sup>
Boomer	Boomer	Boomer	Boomer

+ Herbicide-tolerant variety.

# Not well-suited to low-rainfall areas or dry seasonal conditions due to low-biomass type, must be sown early in these situations.

^ Variety best suited to crop-topping.

**Table 2: Agronomic and disease characteristics of lentil varieties.**

Variety	Seed coat colour	Cotyledon colour	Market category	Vigour	Plant height	Flowering time	Maturity time	Lodging resistance	Pod drop	Shattering	Botrytis grey mould	Ascochyta blight <sup>#</sup>			<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
												Foliage pathotype 1 (Nipper <sup>db</sup> virulent)	Foliage pathotype 2 (PBA Hurricane XT <sup>db</sup> virulent)	Seed		
SMALL RED																
Nipper <sup>db</sup>	Grey	Red	SRP	Poor-mod	Short	Mid-late	Mid	MR	MR	MR	RMR	MRMS	MR	MR	RMR	MR
PBA Hurricane XT <sup>db+</sup>	Grey	Red	SRP	Moderate	Medium	Mid	Mid	MR	MR	R	MRMS	RMR	MRMS	MR	MRMS	MRMS
MEDIUM RED																
GIA Leader <sup>db+</sup>	Grey	Red	MRS	Moderate	Medium	Mid-late	Mid-late	MR*	MR*	–	MR*	RMR*	RMR	**	–	–
PBA Ace <sup>db</sup>	Grey	Red	MRS	Good	Medium	Mid	Mid	MRMS	R	MRMS	MRMS	R	R	R	MR	MRMS
PBA Blitz <sup>db</sup>	Grey	Red	MRS	Mod-good	Med-tall	Early	Early	MR	MR	MR	MR	MRMS	MR	MRMS	MR	MRMS
PBA Bolt <sup>db</sup>	Grey	Red	MRS	Mod-good	Medium	Early-mid	Early-mid	R	R	R	S	MR	MRMS	RMR	MR	MR
PBA Hallmark XT <sup>db+</sup>	Grey	Red	MRS	Mod-good	Medium	Mid	Mid	MR	MR	R	RMR	RMR	MRMS	MR	MR	MRMS
PBA Highland XT <sup>db+</sup>	Grey	Red	MRS	Mod-good	Medium	Early	Early-mid	MR	MR	MR	MRMS	MR	MR	MR*	MR	MRMS
PBA Flash <sup>db</sup>	Green	Red	MRS	Moderate	Medium	Early-mid	Early-mid	MR	MR	MR	MRMS	MS	MS	MS	–	–
LARGE RED																
PBA Jumbo2 <sup>db</sup>	Grey	Red	LRS	Mod-good	Med-tall	Mid	Mid	MRMS	MR	R	RMR	R	R	R	MR	MRMS
PBA Kelpie XT <sup>db+</sup>	Grey	Red	LRS	Mod-good	Medium	Early-mid	Early-mid	MRMS	MR	R	RMR	MRMS	MRMS	MR*	–	MRMS
MEDIUM AND LARGE GREEN																
PBA Greenfield <sup>db</sup>	Green	Yellow	LG	Good	Tall	Mid	Mid-late	MS	R	MR	MR	MRMS	MR	MRMS	–	–
PBA Giant <sup>db</sup>	Green	Yellow	LG	Good	Tall	Mid	Mid-late	S	R	MRMS	MS	MS	MR	MS	–	–
Boomer	Green	Yellow	LG	Good	Tall	Mid	Mid-late	S	R	R	MRMS	MR	MR	MRMS	–	–

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

\*\* Untested.

\* Provisional.

+ Herbicide-tolerant variety.

# Sourced from NVT online.

Market category: MRS = medium red split, SRP = small red premium round (football), SR = small red round (football), LRS = large red split, LG = large green.

Check for updated variety disease categories in the *Pulse Variety Disease Guide for South Australia*, due out in February 2021.

**Table 3: Lower Eyre Peninsula lentil yield performance. NVT data for 2015–18.\***

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

\*Data for 2019 not available due to poor seasonal conditions.

Variety	Year	2015	2016	2017	2018
	Mean yield t/ha	1.09	2.29	2.14	3.23
	No. trials	1	1	1	1
Nipper <sup>Ⓛ</sup>	4	91	101	95	101
Nugget	4	92	97	103	96
PBA Ace <sup>Ⓛ</sup>	2	81	87	–	–
PBA Blitz <sup>Ⓛ</sup>	4	99	79	75	102
PBA Bolt <sup>Ⓛ</sup>	4	100	94	100	94
PBA Flash <sup>Ⓛ</sup>	4	107	104	102	100
PBA Hallmark XT <sup>Ⓛ</sup>	4	87	94	102	99
PBA Herald XT <sup>Ⓛ</sup>	1	74	–	–	–
PBA Highland XT <sup>Ⓛ</sup>	3	–	89	93	99
PBA Hurricane XT <sup>Ⓛ</sup>	4	93	99	104	97
PBA Jumbo <sup>Ⓛ</sup>	1	100	–	–	–
PBA Jumbo2 <sup>Ⓛ</sup>	4	100	104	101	109
PBA Kelpie XT <sup>Ⓛ</sup>	2	–	–	93	106

**Table 4: Mid North lentil yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.71	2.51	1.23	1.43	1.73
	No. trials	4	4	3	4	3
Nipper <sup>Ⓛ</sup>	18	81	105	83	84	83
Nugget	16	91	89	98	96	87
PBA Ace <sup>Ⓛ</sup>	15	101	103	108	107	91
PBA Blitz <sup>Ⓛ</sup>	18	99	95	103	90	103
PBA Bolt <sup>Ⓛ</sup>	18	103	86	100	101	102
PBA Flash <sup>Ⓛ</sup>	16	103	91	105	102	103
PBA Giant <sup>Ⓛ</sup>	4	95	90	–	–	–
PBA Greenfield <sup>Ⓛ</sup>	10	97	128	107	108	90
PBA Hallmark XT <sup>Ⓛ</sup>	18	99	114	96	101	95
PBA Herald XT <sup>Ⓛ</sup>	8	76	96	75	–	–
PBA Highland XT <sup>Ⓛ</sup>	16	107	101	102	102	108
PBA Hurricane XT <sup>Ⓛ</sup>	18	96	102	93	99	95
PBA Jumbo <sup>Ⓛ</sup>	10	96	96	106	98	94
PBA Jumbo2 <sup>Ⓛ</sup>	18	107	124	111	106	105
PBA Kelpie XT <sup>Ⓛ</sup>	11	–	113	101	98	105

**Table 5: Yorke Peninsula lentil yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.54	3.48	2.52	1.61	1.45
	No. trials	5	5	5	5	5
Nipper <sup>db</sup>	25	83	104	87	84	87
Northfield	2	87	–	–	–	–
Nugget	22	93	87	97	94	94
PBA Ace <sup>db</sup>	19	102	91	105	99	93
PBA Blitz <sup>db</sup>	25	107	108	99	96	93
PBA Bolt <sup>db</sup>	25	101	87	99	101	102
PBA Flash <sup>db</sup>	22	103	95	104	105	105
PBA Giant <sup>db</sup>	6	98	93	–	–	–
PBA Greenfield <sup>db</sup>	12	97	115	106	102	97
PBA Hallmark XT <sup>db</sup>	25	97	104	97	95	93
PBA Herald XT <sup>db</sup>	9	77	90	80	–	–
PBA Highland XT <sup>db</sup>	22	107	102	101	102	101
PBA Hurricane XT <sup>db</sup>	25	94	96	96	95	97
PBA Jumbo <sup>db</sup>	13	100	99	103	100	99
PBA Jumbo2 <sup>db</sup>	25	109	121	108	106	101
PBA Kelpie XT <sup>db</sup>	17	–	116	101	101	99

**Table 6: Murray Mallee lentil yield performance. NVT data 2015, 2018 and 2019.\***

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

\*Data for 2016 and 2017 not available due to poor seasonal conditions.

Variety	Year	2015	2018	2019
	Mean yield t/ha	0.7	0.73	0.35
	No. trials	1	1	1
Nipper <sup>db</sup>	3	45	76	128
Nugget	2	62	80	–
PBA Ace <sup>db</sup>	2	80	–	114
PBA Blitz <sup>db</sup>	3	105	68	92
PBA Bolt <sup>db</sup>	3	120	114	94
PBA Flash <sup>db</sup>	2	104	90	–
PBA Hallmark XT <sup>db</sup>	3	97	122	138
PBA Herald XT <sup>db</sup>	1	47	–	–
PBA Highland XT <sup>db</sup>	2	–	121	110
PBA Hurricane XT <sup>db</sup>	3	94	115	121
PBA Jumbo <sup>db</sup>	1	66	–	–
PBA Jumbo2 <sup>db</sup>	3	98	93	105
PBA Kelpie XT <sup>db</sup>	2	–	95	108

**Table 7: South East lentil yield performance. NVT data 2015, 2018 and 2019.\***

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

\*Data for 2016 and 2017 not available due to poor seasonal conditions.

Variety	Year	2015	2018	2019
	Mean yield t/ha	0.93	2.15	2.25
	No. trials	1	1	1
Boomer	1	78	–	–
Nipper <sup>Ⓛ</sup>	3	83	87	103
Nugget	2	82	88	–
PBA Ace <sup>Ⓛ</sup>	2	85	–	97
PBA Blitz <sup>Ⓛ</sup>	3	92	89	84
PBA Bolt <sup>Ⓛ</sup>	3	100	102	93
PBA Flash <sup>Ⓛ</sup>	2	101	103	–
PBA Giant <sup>Ⓛ</sup>	1	89	–	–
PBA Greenfield <sup>Ⓛ</sup>	1	95	–	–
PBA Hallmark XT <sup>Ⓛ</sup>	3	98	96	104
PBA Herald XT <sup>Ⓛ</sup>	1	71	–	–
PBA Highland XT <sup>Ⓛ</sup>	2	–	104	95
PBA Hurricane XT <sup>Ⓛ</sup>	3	97	99	102
PBA Jumbo <sup>Ⓛ</sup>	1	89	–	–
PBA Jumbo2 <sup>Ⓛ</sup>	3	107	100	109
PBA Kelpie XT <sup>Ⓛ</sup>	2	–	101	103

# FIELD PEA

By Sarah Day and Jenny Davidson, SARDI

Two new field pea varieties will be available to southern region growers in 2021. GIA Ourstar<sup>®</sup> and GIA Kastar<sup>®</sup> were developed by Grains Innovation Australia (GIA) and are the first field pea varieties to be released with improved herbicide tolerance characteristics. GIA Ourstar<sup>®</sup> is the first 'dun' field pea, offering improved tolerance to common in-crop and residual Group B herbicides, and will provide increased flexibility and robustness in mixed farming systems and improved weed control options over all current field pea varieties. GIA Kastar<sup>®</sup> is the first 'Kaspa<sup>®</sup>' field pea with improved tolerance to common in-crop and residual IMI herbicides and will provide increased weed control options over all current field pea varieties except for GIA Ourstar<sup>®</sup>.

The disease-forecasting model 'Blackspot Manager' predicted medium to low Blackspot risk levels in many regions of SA for the 2020 season due to early spore release with autumn rains. The dry growing conditions in July also kept this disease at a minimum since it relies on rain splash to spread. Irrespective of the seasonal Blackspot risk, field peas should be grown in paddocks with at least four years' break from field peas and with a low history of Blackspot disease infection, and not adjacent to last year's field pea stubble. Blackspot can be reduced in paddocks where a grain yield of at least 1.5 tonnes per hectare is achievable by using a fungicide strategy of P-Pickel T<sup>®</sup> seed dressing combined with two foliar fungicide sprays (four to nine weeks post sowing and again at early flowering). Predictions of Blackspot spore release times in each field pea growing district can be obtained through 'Blackspot Manager' via the internet ([www.agric.wa.gov.au/cropdiseases](http://www.agric.wa.gov.au/cropdiseases)) or a free SMS service (to subscribe email Jenny Davidson: [jenny.davidson@sa.gov.au](mailto:jenny.davidson@sa.gov.au)).

## SELECTION CRITERIA

The list of suggested varieties shown in Table 1 is based on performance within different rainfall zones. Information on the most important agronomic characteristics is shown in Table 2 and grain yield for each variety, where available, can be found in Tables 3 to 8. When selecting a variety, growers need to make their selection on all the available information, including their individual farm and paddock situation, the access and availability of the target markets, and storage and handling facilities.

White and blue peas are not accepted in the bulk dun segregation so growers need also to consider the different seed quality types (Table 1) and where they can be delivered before deciding whether to grow these types.

## NOTES ON SELECTED VARIETIES DUN TYPES

Dun peas are segregated from white and blue peas due to the different market quality specifications. Some pea markets in India and Sri Lanka prefer Australian dun peas due to their distinct 'nutty' taste. 'Kaspa<sup>®</sup> seed type' grain is also preferred over dimpled grain (such as PBA Percy<sup>®</sup> and PBA Oura<sup>®</sup>) in these markets due to its round shape and lack of dimples, allowing easier seed coat removal and greater split returns. It is important to check segregation plans for local delivery points as some will segregate the 'Kaspa<sup>®</sup> seed type' from the dimpled dun type.



## KASPA<sup>®</sup> SEED TYPE

### NEW – GIA KASTAR<sup>®</sup>

GIA Kastar<sup>®</sup> is the first ‘Kaspa<sup>®</sup> seed type’ field pea with improved tolerance to common in-crop and residual IMI herbicides. GIA Kastar<sup>®</sup> has improved tolerance to post-emergent imazamox and imazethapyr applications as well as improved tolerance to commonly used residual Group B imidazolinone herbicides. The response of GIA Kastar<sup>®</sup> to residual sulfonylurea and post-emergent flumetsulam is similar to that of PBA Wharton<sup>®</sup>. It is imperative that growers adhere to product label rates, plant-back periods and all label directions for use. GIA Kastar<sup>®</sup> is a mid-flowering variety with early to mid-maturity suitable for the practice of crop-topping. It has a semi-leafless plant type, an erect growth habit and is resistant to pod shatter at maturity. GIA Kasta<sup>®</sup> has a disease-resistance profile similar to PBA Wharton<sup>®</sup> and is resistant to Powdery mildew, moderately susceptible to Blackspot and susceptible to Bacterial blight. GIA Kastar<sup>®</sup> was developed by Grains Innovation Australia (GIA) using conventional breeding techniques and commercialised by AG Schilling & Co.

### PBA BUTLER<sup>®</sup>

PBA Butler<sup>®</sup> is a ‘Kaspa<sup>®</sup> type’ field pea with high yields and improved resistance to Bacterial blight over Kaspa<sup>®</sup>. It is mid to late flowering, early to mid-maturing and offers the same agronomic benefits of lodging and shattering resistance as Kaspa<sup>®</sup>. PBA Butler<sup>®</sup> has a medium seed size with a yellow split and a uniform tan seed coat colour that is similar to Kaspa<sup>®</sup>. It has a semi-leafless plant type with vigorous plant growth and is rated MS to Blackspot and S to Downy mildew. PBA Butler<sup>®</sup> has wide adaptation across southern Australia and performs particularly well in medium to long growing seasons in SA and may reduce yield losses in regions where Bacterial blight is a significant disease. Seed is available from the commercial partner Seednet.

### PBA WHARTON<sup>®</sup>

PBA Wharton<sup>®</sup> is a ‘Kaspa<sup>®</sup> seed type’ dun pea offering improved Powdery mildew and virus resistances (Bean leaf roll and Pea seed-borne mosaic viruses). It provides the same agronomic benefits as Kaspa<sup>®</sup> (for example, lodging and shattering resistance), has some tolerance to boron toxicity, is moderately tolerant to salinity and will provide a reliable alternative in those areas where Powdery mildew and viruses are regular problems. PBA Wharton<sup>®</sup> is early to mid-flowering and early maturing, making it well suited to the practices of crop-topping and delayed sowing for Blackspot management. Seed is licensed to Seednet.

### PBA GUNYAH<sup>®</sup>

PBA Gunyah<sup>®</sup> is a ‘Kaspa<sup>®</sup> seed type’ field pea with earlier and longer flowering than Kaspa<sup>®</sup> and higher yield in shorter season environments and drier seasons (yield potential below 2.25t/ha) than that variety. It is early to mid-flowering and early maturing, making it more suitable than Kaspa<sup>®</sup> to the practice of crop-topping. It is better suited to delayed sowing than Kaspa<sup>®</sup> for Blackspot disease management. Its disease-resistance profile is similar to Kaspa<sup>®</sup> and therefore not well suited to Bacterial blight-prone environments. Despite being susceptible to Powdery mildew, PBA Gunyah<sup>®</sup> is likely to incur less yield loss from this disease than Kaspa<sup>®</sup> due to its earlier maturity. PBA Gunyah<sup>®</sup> is licensed to Seednet.

### PBA TWILIGHT<sup>®</sup>

PBA Twilight<sup>®</sup> is a ‘Kaspa seed type’ with similar attributes to PBA Gunyah<sup>®</sup>. It has a shorter flowering period and is earlier in maturity than PBA Gunyah<sup>®</sup>, making it well suited to the low rainfall and very short season field pea-growing environments. Widespread evaluation over a number of years shows that it is higher yielding than Kaspa<sup>®</sup> when yield potential is below 1.5t/ha. Its disease-resistance profile is similar to Kaspa<sup>®</sup> and therefore not well suited to Bacterial blight-prone environments. Despite being susceptible to Powdery mildew, PBA Twilight<sup>®</sup> is likely to incur less yield loss from this disease than Kaspa<sup>®</sup> due to its earlier maturity. PBA Twilight<sup>®</sup> is licensed to Seednet.

### KASPA<sup>®</sup>

Kaspa<sup>®</sup> is a semi-leafless, late-flowering variety with resistance to shattering, good early-season vigour and moderate resistance to lodging. Kaspa<sup>®</sup> is susceptible to Powdery mildew and Downy mildew, and is moderately susceptible to Blackspot. The seed of Kaspa<sup>®</sup> is distinct from traditional dun types (such as Parafield) as it is red-brown in colour and almost spherical in shape. Kaspa<sup>®</sup> needs to be considered carefully before use as an option in low-rainfall areas or areas prone to early periods of high temperature and drought stress due to its late and condensed flowering period. Kaspa<sup>®</sup> is under contract to Seednet.

## TRADITIONAL DIMPLED DUN SEED TYPE

### NEW – GIA OURSTAR<sup>®</sup>

GIA Ourstar<sup>®</sup> is the first ‘dun dimpled type’ field pea offering improved tolerance to common in-crop and residual Group B herbicides. GIA Ourstar<sup>®</sup> has improved herbicide tolerance to post-emergent imazamox, imazethapyr and flumetsulam applications as well as improved tolerance to commonly used Group B imidazolinone and sulfonylurea herbicides. It is imperative that growers adhere to product label rates, plant-back periods and all label direction for use. GIA Ourstar<sup>®</sup> is an early to mid-flowering variety with a relatively long flowering window, and early to mid-maturity suitable for the practice of crop-topping. It has a semi-leafless plant type with a semi-erect growth habit and moderate resistance to pod shatter at maturity. GIA Ourstar<sup>®</sup> has a disease resistance profile similar to PBA Oura<sup>®</sup> and is moderately susceptible to Blackspot and susceptible to Bacterial blight. GIA Ourstar<sup>®</sup> was developed by Grains Innovation Australia (GIA) using conventional breeding techniques and commercialised by AG Schilling & Co.

### PBA OURA<sup>®</sup>

PBA Oura<sup>®</sup> is a high-yielding early to mid-flowering semi-dwarf ‘dun dimpled type’ variety with high yields over Kaspas<sup>®</sup>, PBA Gunyah<sup>®</sup>, PBA Twilight<sup>®</sup> and PBA Wharton<sup>®</sup>. This line has broad adaptation and high yield potential in short growing seasons. It produces non sugar-type pods and has fair to good lodging resistance at maturity. PBA Oura<sup>®</sup> seed is dimpled and not a ‘Kaspas<sup>®</sup> seed type’. PBA Oura<sup>®</sup> has improved resistance (MS) to Downy mildew and improved tolerance to metribuzin herbicide over Kaspas<sup>®</sup>. Seed is licensed to Seednet.

### PBA PERCY<sup>®</sup>

PBA Percy<sup>®</sup> is an early-flowering conventional ‘dun dimpled type’ variety with improved resistance (MR/MS) to bacterial blight over all other varieties, making it a preferred option in areas prone to this disease. Its early flowering and early maturity make it well suited to delayed sowing for disease management and the agronomic practice of crop-topping. It is moderately tolerant to salinity and produces non sugar-type pods similar to PBA Oura<sup>®</sup>. PBA Percy<sup>®</sup> seed is dimpled and not a ‘Kaspas<sup>®</sup> seed type’. PBA Percy<sup>®</sup> generally produces yields similar to PBA Oura<sup>®</sup> but in low-rainfall environments can be the highest yielding dun variety in trials. Seed is licensed to Seednet.

## WHITE TYPES

White peas cannot be delivered to bulk export markets with dun peas. Some high-quality specialised white peas may fit into specific premium value markets for split peas. Higher prices may be achieved if supplying specific niche markets, but these markets may be small. Small-seeded white peas are likely to only suit domestic stock feed markets. Growers are advised to secure markets before deciding to grow these pea types.

### PBA PEARL<sup>®</sup>

PBA Pearl<sup>®</sup> is a semi-leafless white pea variety which is broadly adapted and the highest yielding field pea in long-term evaluation trials in all areas of SA. It has an erect growth habit, often with excellent lodging resistance at maturity. It is early to mid-flowering and produces non sugar-type pods similar to PBA Oura<sup>®</sup>. It has a favourable disease-resistance profile, with good resistance to Bean leaf roll virus, and moderate susceptibility to Bacterial blight. Seed is available through Seednet, and growers are advised to secure markets before deciding to grow white peas as they cannot be delivered to bulk dun or Kaspas<sup>®</sup> type export markets.

## BLUE TYPES (GREEN COTYLEDONS)

Some blue pea varieties are for specific premium value markets, which are usually only small. Quality is paramount in these markets where peas are used predominantly for canning and snack food. Important parameters include damage by insects, bleaching of seed coat and consistency of seed colour.

Two blue field pea varieties, Excell and Maki, have been available to growers in the past. Maki is best suited to the north-eastern field pea-growing areas of northern Australia, and limited testing has occurred in southern Australia. Both varieties are outclassed for yield and agronomic adaptation by the newer dun and white pea releases in the southern region of Australia and they have a relatively poor disease-resistance profile.

**Table 1: Most-adapted field pea varieties for each rainfall zone.**

Rainfall zone (average annual rainfall)			
<350mm	350–425mm	425–500mm	>500mm
DUN – ‘KASPA’ TYPE <sup>†</sup>			
PBA Wharton <sup>†</sup>	PBA Butler <sup>†</sup>	PBA Butler <sup>†</sup>	PBA Butler <sup>†</sup>
PBA Twilight <sup>†</sup>	PBA Wharton <sup>†</sup>	PBA Wharton <sup>†</sup>	PBA Wharton <sup>†</sup>
GIA Kastar <sup>†</sup>	GIA Kastar <sup>†</sup>	GIA Kastar <sup>†</sup>	GIA Kastar <sup>†</sup>
PBA Gunyah <sup>†</sup>	PBA Twilight <sup>†</sup>	PBA Gunyah <sup>†</sup>	Kaspa <sup>†</sup>
Kaspa <sup>†</sup>	PBA Gunyah <sup>†</sup>	Kaspa <sup>†</sup>	PBA Gunyah <sup>†</sup>
	Kaspa <sup>†</sup>	PBA Twilight <sup>†</sup>	PBA Twilight <sup>†</sup>
DUN – OTHER			
PBA Oura <sup>†</sup>	PBA Oura <sup>†</sup>	PBA Oura <sup>†</sup>	PBA Oura <sup>†</sup>
GIA Ourstar <sup>†</sup>	GIA Ourstar <sup>†</sup>	GIA Ourstar <sup>†</sup>	GIA Ourstar <sup>†</sup>
PBA Percy <sup>†</sup>	PBA Percy <sup>†</sup>	PBA Percy <sup>†</sup>	PBA Percy <sup>†</sup>
Parafield	Parafield	Parafield	Parafield
WHITE			
PBA Pearl <sup>†</sup>	PBA Pearl <sup>†</sup>	PBA Pearl <sup>†</sup>	PBA Pearl <sup>†</sup>
BLUE			
Excell	Excell	Excell	Excell
Maki	Maki	Maki	Maki

† Herbicide-tolerant variety.

^ Preferred variety where Bacterial blight is a production constraint.

**Table 2: Agronomic and disease characteristics of field pea varieties.**

Variety	Seed type	Seed size	Plant habit	Plant height	Early vigour	Flower colour	Flowering time	Maturity time	Pod shattering, at maturity	Lodging resistance at maturity	Downy mildew (Kaspa <sup>†</sup> strain)	Blackspot	Powdery mildew	Bacterial blight	Pea seedborne mosaic virus (PSBMV)	Bean leaf roll virus (BLRV)	<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
Kaspa <sup>†</sup>	Dun (K)	Me	SL	Me-T	High	Pi	L	M	R: SP	Fair-good	S	MS	S	S	S	S	MR	MRMS
GIA Kastar <sup>†</sup> #	Dun (K)	Me	SL	Me-T	Moderate-high	Pi	M	E-M	R: SP	Fair-good	S*	MS*	R*	S*	R*	–	MR*	MS*
PBA Butler <sup>†</sup>	Dun (K)	Me	SL	Me-T	High	Pi	M-L	E-M	R: SP	Fair-good	S	MS	S	MS	S	S	MR	MRMS
PBA Gunyah <sup>†</sup>	Dun (K)	Me	SL	Me-T	High	Pi	E-M	E	R: SP	Fair-good	S	MS	S	S	S	S	MR	MRMS
PBA Twilight <sup>†</sup>	Dun (K)	Me	SL	Me-T	High	Pi	E	E	R: SP	Fair-good	S	MS	S	S	S	–	MR	MRMS
PBA Wharton <sup>†</sup>	Dun (K)	Me	SL	Me-T	High	Pi	E-M	E	R: SP	Fair-good	S	MS	R	S	R	R	MR	MRMS
Parafield	Dun	Me-Lg	C	T	High	P	M	M	MR: NSP	Poor	S	MS	S	MS	–	–	–	–
PBA Oura <sup>†</sup>	Dun	Me	SL	Me-T	High	P	E	E	MR: NSP	Fair-good	MS	MS	S	MS	S	R	MR	MRMS
PBA Percy <sup>†</sup>	Dun	Me-Lg	C	T	High	P	E	E	MR: NSP	Poor	S	MS	S	MRMS	S	S	MR	RMR
GIA Ourstar <sup>†</sup> #	Dun	Me	SL	Me-T	Moderate-high	P	E-M	E-M	MR: SP	Fair	S*	MS*	S*	S*	S*	–	MRMS*	MR*
PBA Pearl <sup>†</sup>	White	Me-Lg	SL	Me-T	High	W	E-M	E	MR: NSP	Good	S	MS	S	MS	S	R	MR	MRMS

Key: K = Kaspa<sup>†</sup> type, Sm = small, Me = medium, Lg = large, T = tall, Sh = short, C = conventional, SL = semi-leafless, P = purple, Pi = pink, W = white, E = early, M = mid, L = late.

S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant, SP = sugar pod, NSP = non-sugar pod.

# Herbicide-tolerant variety.

\* Provisional data.

Check for updated variety disease categories in the *Pulse Variety Disease Guide for South Australia*, due out in February 2021.

**Table 3: Lower Eyre Peninsula field pea yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.43	2.52	1.68	2.27	2.16
	No. trials	2	2	2	2	2
Kaspa <sup>db</sup>	10	86	81	99	95	93
Parafield	8	77	94	80	84	–
PBA Butler <sup>db</sup>	10	104	100	101	105	100
PBA Gunyah <sup>db</sup>	10	93	90	101	98	97
PBA Oura <sup>db</sup>	10	102	105	100	98	103
PBA Pearl <sup>db</sup>	10	115	109	106	107	107
PBA Percy <sup>db</sup>	10	99	118	96	97	109
PBA Twilight <sup>db</sup>	2	91	–	–	–	–
PBA Wharton <sup>db</sup>	10	98	95	102	96	98

**Table 4: Upper Eyre Peninsula field pea yield performance. NVT data 2015–16.**

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

Variety	Year	2015	2016
	Mean yield t/ha	1.65	2.88
	No. trials	2	1
Kaspa <sup>db</sup>	3	101	91
PBA Butler <sup>db</sup>	2	104	100
PBA Gunyah <sup>db</sup>	2	102	96
PBA Oura <sup>db</sup>	3	95	91
PBA Pearl <sup>db</sup>	3	98	88
PBA Percy <sup>db</sup>	2	96	97
PBA Twilight <sup>db</sup>	2	99	93
PBA Wharton <sup>db</sup>	3	98	100

**Table 5: Mid North field pea yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.43	3.58	1.98	1.82	1.63
	No. trials	4	5	4	3	4
Kaspa <sup>db</sup>	20	89	94	92	90	92
Parafield	8	82	88	79	82	–
PBA Butler <sup>db</sup>	19	102	105	102	102	100
PBA Gunyah <sup>db</sup>	19	95	96	96	95	97
PBA Oura <sup>db</sup>	20	98	98	98	97	103
PBA Pearl <sup>db</sup>	20	107	103	106	103	108
PBA Percy <sup>db</sup>	19	90	104	93	93	104
PBA Twilight <sup>db</sup>	11	94	92	95	93	97
PBA Wharton <sup>db</sup>	20	101	93	101	100	101

**Table 6: Yorke Peninsula field pea yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.26	4.01	3.5	2.15	1.69
	No. trials	4	3	2	2	3
Kaspa <sup>db</sup>	14	96	97	94	99	99
Parafield	9	74	93	76	86	87
PBA Butler <sup>db</sup>	13	106	110	106	103	107
PBA Gunyah <sup>db</sup>	13	98	96	96	100	99
PBA Oura <sup>db</sup>	14	95	98	91	97	96
PBA Pearl <sup>db</sup>	14	104	108	99	101	103
PBA Percy <sup>db</sup>	13	93	106	85	99	102
PBA Twilight <sup>db</sup>	5	94	90	–	–	94
PBA Wharton <sup>db</sup>	14	97	87	97	98	92

**Table 7: Murray Mallee field pea yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.13	2.85	1.08	1.11	0.21
	No. trials	1	1	1	1	1
Kaspa <sup>db</sup>	5	87	98	83	71	71
Parafield	4	75	78	64	101	–
PBA Butler <sup>db</sup>	5	92	113	105	101	136
PBA Gunyah <sup>db</sup>	5	97	98	93	85	78
PBA Oura <sup>db</sup>	5	105	97	101	117	101
PBA Pearl <sup>db</sup>	5	110	113	120	138	159
PBA Percy <sup>db</sup>	5	96	96	90	111	88
PBA Twilight <sup>db</sup>	1	102	–	–	–	–
PBA Wharton <sup>db</sup>	5	113	88	100	97	62

**Table 8: South East field pea yield performance. NVT data 2015–19.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.19	3.99	3.07	2.86	2.08
	No. trials	1	1	1	1	1
Kaspa <sup>db</sup>	5	89	98	91	98	85
Parafield	4	72	71	75	75	–
PBA Butler <sup>db</sup>	5	102	110	114	104	113
PBA Gunyah <sup>db</sup>	5	95	99	94	100	90
PBA Oura <sup>db</sup>	5	98	96	97	94	90
PBA Pearl <sup>db</sup>	5	109	111	119	98	109
PBA Percy <sup>db</sup>	5	89	91	89	93	84
PBA Twilight <sup>db</sup>	1	95	–	–	–	–
PBA Wharton <sup>db</sup>	5	103	93	88	99	90

# CHICKPEA

By Sarah Day, Jenny Davidson and Sara Blake, SARDI

All varieties are rated as either susceptible or moderately susceptible to *Ascochyta* blight (AB) infection. This follows observations of severe AB on previously resistant chickpea varieties in 2015 to 2019 across South Australia and Victoria. Chickpea growers now need to carefully consider their risk of AB infection along with the ability to effectively control the disease prior to choosing to grow this crop in southern Australia. This will be the case in both high and low-rainfall regions, as severe disease outbreaks can still occur in the latter for all current variety options during wet seasons, such as 2016.

It is imperative that all chickpea seed is treated with a thiram-based fungicide to prevent seed transmission of AB onto the emerging seedlings. The disease will also survive on stubble and organic matter for a number of years, so growers must observe a minimum three-year rotation between chickpeas in the same paddock and avoid planting adjacent to last year's chickpea stubble.

All chickpea crops will need to be regularly monitored for AB infection. Moderately susceptible varieties will require three to four strategic fungicide sprays ahead of rain events, offering two to three weeks' protection, starting at six to eight weeks post-sowing. Susceptible varieties will require regular fungicide sprays every two to three weeks throughout the growing season, prior to rainfall events. As the pods of all commercial varieties are susceptible to AB, they will also require fungicide sprays ahead of rain fronts during pod setting to protect the pods from seed staining and seed abortion.

A new desi and a new kabuli chickpea variety will be available to southern region growers in 2021.

CBA Captain<sup>®</sup> is a desi type chickpea with broad adaptation and a medium seed size. It has good grain yields in South Australia, in particular in the Mid North region. CBA Captain<sup>®</sup> has excellent harvestability with improved plant height and

improved height to the lowest pod, compared to all other desi varieties adapted to the southern region. It is a mid-flowering and mid-maturing variety, similar to Genesis<sup>™</sup> 090. CBA Captain<sup>®</sup> has a susceptible rating (S) to AB in the southern region. CBA Captain<sup>®</sup> has superior grain quality to current southern desi varieties based on seed shape, size and colour. CBA Captain<sup>®</sup> meets the requirement of a 'Jimbour type' suitable for the sub-continent market.

PBA Magnus<sup>®</sup> is a large seed-size kabuli chickpea with a significant yield advantage over Genesis<sup>™</sup> Kalkee and a slightly larger seed size. PBA Magnus<sup>®</sup> has a similar plant type to Genesis<sup>™</sup> 090 and similar mid-flowering and mid-maturity. PBA Magnus<sup>®</sup> has a moderately susceptible (MS) rating for foliar AB in the southern region. PBA Magnus<sup>®</sup> has been licensed to PBSeeds.

PBA Royal<sup>®</sup> (tested as CICA1156) is a medium kabuli released in 2019. It is an early to mid-flowering chickpea and has mid-maturity. PBA Royal<sup>®</sup> has a medium seed size, with seed larger than Genesis<sup>™</sup> 090 but smaller than PBA Monarch<sup>®</sup>. PBA Royal is particularly well adapted to the medium-rainfall chickpea-growing regions (greater than 1.5t/ha) of south-eastern Australia. PBA Royal<sup>®</sup> is rated moderately susceptible for foliar AB infection.

## SELECTION CRITERIA

The list of suggested varieties for 2021 is shown in Table 1. A range of chickpea types is now available, offering growers the opportunity to exploit particular management and/or market opportunities, providing AB can be managed effectively. Information on key selection criteria and yield for each variety can be found in Tables 2, 3 and 4. When selecting a chickpea type and variety to grow, growers need to make their decision on the basis of AB resistance, yield, price and marketability. Other agronomic traits such as maturity, cold tolerance, Root lesion nematode susceptibility and lodging resistance also need to be considered.



## CHICKPEA TYPES

### Desi types

Larger seeds are preferred for desi types, regardless of whether they are used for splitting or whole-seed use. There has been an increasing use of large whole-seeded desi types in a range of food preparations in the Indian sub-continent, and a small premium has been available for types fitting this use. Newer desi varieties have improved seed size and colour over older varieties, such as Genesis™ 509 and Tyson, and are suited to whole and splitting markets. They are therefore more likely to achieve the higher prices of the benchmark northern region varieties (such as Jimbour).

### Small kabuli types

Bulk markets for the small kabuli Genesis™ 090 have been developed in recent years and generally have attracted a higher price than the desi types. However, growers need to be aware these bulk markets have previously been oversupplied by a number of overseas countries and they may be required to hold seed from time to time as marketing opportunities are not always available or may be limited in terms of size and price. Seed size is small, 6 to 8mm, so will not attract the higher prices of the larger-seeded kabuli types (such as PBA Monarch<sup>®</sup>, Genesis™ Kalkee). Further premiums may be obtained by grading and selling the seed on size.

### Medium-large kabuli types

PBA Monarch<sup>®</sup>, Almaz<sup>®</sup> and Genesis™ Kalkee produce predominantly 8 to 10mm seed for traditionally larger-seeded kabuli markets where larger seed size is imperative to attract premium prices. Uniformity of seed size is also important in these markets and may be difficult to achieve for the large types like Genesis™ Kalkee due to its relatively poor adaptation to dry finishing conditions. The medium-sized PBA Monarch<sup>®</sup> is likely to produce more uniform-sized seed under these conditions.

## NOTES ON SELECTED DESI CHICKPEA VARIETIES

### NEW – CBA CAPTAIN<sup>®</sup>

CBA Captain<sup>®</sup> is a desi type chickpea with broad adaptation and a medium seed size. It has good grain yields in South Australia, in particular in the Mid North region. CBA Captain<sup>®</sup> has excellent harvestability with improved plant height and height to the lowest pod compared to all other desi varieties adapted to the southern region. It is a mid-flowering and mid-maturing variety, similar to Genesis™ 090. CBA Captain<sup>®</sup> has a susceptible rating (S) to AB in the southern region. CBA Captain<sup>®</sup> has superior grain quality to current southern desi varieties based on seed shape, size and colour. CBA Captain<sup>®</sup> meets the requirement of a 'Jimbour type' suitable for the Indian sub-continent market.

### PBA MAIDEN<sup>®</sup>

PBA Maiden<sup>®</sup> is rated as susceptible to foliar infection by AB and will require regular vegetative and reproductive foliar fungicide sprays every two to three weeks. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB to the emerging seedlings. PBA Maiden<sup>®</sup> is a large-seeded high-quality desi chickpea for the medium to low-rainfall environments of southern Australia. It is broadly adapted to these regions and has shown similar yields to PBA Slasher<sup>®</sup>. PBA Maiden<sup>®</sup> has a semi-spreading plant type and height similar to PBA Slasher<sup>®</sup>. It has a seed size greater than current southern desi varieties (approximately 30 per cent larger than PBA Slasher<sup>®</sup>) with a yellow-tan seed coat. This variety is targeted for whole-seed markets where its large, angular-shaped and bright yellow-tan coloured seed coat are well suited to the specific requirements of these markets. Growers are advised to investigate delivery and marketing options for PBA Maiden<sup>®</sup> prior to growing this variety, due to its unique and favourable seed characteristics. Larger uniform seed size is more likely in medium rainfall regions. Seed is licensed to Seednet.

### PBA STRIKER<sup>®</sup>

PBA Striker<sup>®</sup> is susceptible to AB and will require regular vegetative and reproductive foliar fungicide sprays every two to three weeks. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB on emerging seedlings. PBA Striker<sup>®</sup> is a high-yielding desi chickpea with very good early vigour. It is an early flowering and maturing variety and will provide a

high-yielding alternative to all chickpea varieties in the medium to low-rainfall environments of western and southern Australia, providing AB can be managed. PBA Striker<sup>®</sup> has a similar plant type to PBA Slasher<sup>®</sup> but with larger seed size than all other southern desi varieties. Seed of PBA Striker<sup>®</sup> is also light in colour and has good milling characteristics. Due to its early maturity and AB susceptibility, PBA Striker<sup>®</sup> is not recommended for high-rainfall and long-growing season districts. Seed is licensed to Seednet.

### AMBAR<sup>®</sup>

Ambar<sup>®</sup> is an early-flowering and maturing desi type chickpea. It is rated as susceptible to AB and will require regular strategic fungicide sprays during the season ahead of rain fronts, the sprays offering two to three weeks' protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB to the emerging seedlings. Ambar<sup>®</sup> has had similar, but generally lower, yields than PBA Slasher<sup>®</sup> in southern Australia. It produces a short to medium canopy that can be difficult to harvest in some seasons and it has a seed size smaller than PBA Slasher<sup>®</sup> and PBA Striker<sup>®</sup> but similar light seed colour. Seed is licensed to Heritage Seeds.

### PBA SLASHER<sup>®</sup>

PBA Slasher<sup>®</sup> is rated as susceptible to AB and will require regular strategic fungicide sprays during the season ahead of rain fronts, the sprays offering two to three weeks' protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB to the emerging seedlings. PBA Slasher<sup>®</sup> is high yielding in all chickpea-growing areas of SA, providing AB can be managed. It has a semi-spreading plant type with mid-flowering and mid-maturity. PBA Slasher<sup>®</sup> is suitable for both the split and whole-seed markets as it has improved seed size and colour over varieties like Genesis™ 509 which are only suited to split-seed markets. Seed is licensed to Seednet.

### PBA SEAMER<sup>®</sup>, PBA HATTRICK<sup>®</sup>, PBA PISTOL<sup>®</sup>, PBA BOUNDARY<sup>®</sup> and PBA DRUMMOND<sup>®</sup>

These varieties have been released for northern NSW/southern Queensland (PBA Seamer<sup>®</sup>, PBA HatTrick<sup>®</sup> and PBA Boundary<sup>®</sup>) and Central Queensland (PBA Pistol<sup>®</sup> and PBA Drummond<sup>®</sup>) where they offer specific production advantages. All five have limited suitability to South Australia due to late maturity and low relative yields.

## NOTES ON SELECTED KABULI CHICKPEA VARIETIES

### PBA ROYAL<sup>®</sup>

PBA Royal<sup>®</sup> is a high-yielding, medium-sized kabuli chickpea. It is particularly well adapted to the medium-rainfall chickpea-growing regions of south-eastern Australia. In these regions, it has improved grain yields in mid to high-yielding environments (greater than 1.5t/ha) compared to Genesis™ 090, PBA Monarch<sup>®</sup> and Genesis™ Kalkee. The provisional AB rating for PBA Royal<sup>®</sup> is moderately susceptible, similar to Genesis™ 090, and crops will now require three to four strategic fungicide sprays during the season ahead of rain fronts, the sprays offering two to three weeks' protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB onto the emerging seedlings. PBA Royal<sup>®</sup> has medium plant height with early to mid-flowering and mid-maturity. Seed is licensed to Seednet.

### NEW – PBA MAGNUS<sup>®</sup>

PBA Magnus<sup>®</sup> is a large seed-sized kabuli chickpea with a significant yield advantage over Genesis™ Kalkee and a slightly larger seed size. PBA Magnus<sup>®</sup> has a similar plant type to Genesis™ 090 and similar mid-flowering and mid-maturity. PBA Magnus<sup>®</sup> has a moderately susceptible (MS) rating for AB in the southern region. PBA Magnus<sup>®</sup> has been licensed to PBSeeds.

### PBA MONARCH<sup>®</sup>

PBA Monarch<sup>®</sup> is a high-yielding, medium-sized kabuli chickpea with adaptation to all kabuli-growing areas of Australia. The AB rating for PBA Monarch<sup>®</sup> is susceptible, and crops will require regular vegetative and reproductive foliar fungicide sprays every two to three weeks. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB onto the emerging seedlings. It is particularly well suited to the shorter seasoned, medium-rainfall environments of south-eastern Australia due to improved adaptation through earlier flowering and maturity compared to Genesis™ 090 and Genesis™ Kalkee. It is adapted to the traditional kabuli chickpea-growing regions and has shown a consistent and significant yield advantage over all current medium and large-seeded kabuli varieties, providing AB can be managed. It has similar yields to and larger seed size than Genesis™ 090 although is higher yielding than this variety in low-yielding (<1t/ha) situations. In shorter growing seasons, PBA Monarch<sup>®</sup> may have larger and more consistent seed size than other medium-sized varieties due to its earlier pod filling timing. Seed is licensed to Seednet.

**ALMAZ<sup>®</sup>**

Almaz<sup>®</sup> is a medium to large-seeded kabuli type. It is susceptible to foliar AB and will require regular strategic fungicide sprays during the season prior to rain fronts, the sprays offering two to three weeks' protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB onto the emerging seedlings. Almaz<sup>®</sup> is a mid-flowering and mid to late-maturing variety and is lower yielding than Genesis<sup>™</sup> 090 in southern Australia. Seed is licensed to Seednet.

**GENESIS<sup>™</sup> 090**

Genesis<sup>™</sup> 090 is a small to medium-seeded kabuli (7 to 8mm). The AB rating for Genesis<sup>™</sup> 090 is moderately susceptible, and crops will now require three to four strategic fungicide sprays during the season ahead of rain fronts, the sprays offering two to three weeks' protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB onto the emerging seedlings. Genesis<sup>™</sup> 090 has medium height with erect branches and yields similar to PBA Monarch<sup>®</sup> but lower than PBA Slasher<sup>®</sup> and PBA Striker<sup>®</sup>. For seed distribution contact PBSeeds.

**GENESIS<sup>™</sup> KALKEE**

Genesis<sup>™</sup> Kalkee is a medium to large-seeded kabuli type, mid-late in flowering and large in seed size. It is rated as moderately susceptible to AB and will require three to four strategic fungicide sprays during the season ahead of rain fronts, the sprays offering two to three weeks' protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of AB onto the emerging seedlings. It has the largest seed size of all commercial kabuli types, hence is more able to meet the size requirements of premium high-valued markets. However, yield is inferior to the small kabuli types and PBA Monarch<sup>®</sup> but generally similar to Almaz<sup>®</sup> in SA. For seed distribution contact PBSeeds.

Table 1: Most-adapted chickpea varieties for each rainfall zone.

Rainfall zone (average annual rainfall)			
<400mm	400–450mm	450–500mm	>500mm
DESI			
PBA Striker <sup>db</sup>	PBA Striker <sup>db</sup>	PBA Maiden <sup>db</sup>	PBA Maiden <sup>db*</sup>
PBA Maiden <sup>db</sup>	PBA Maiden <sup>db*</sup>	PBA Striker <sup>db</sup>	CBA Captain <sup>db</sup>
CBA Captain <sup>db</sup>	CBA Captain <sup>db</sup>	CBA Captain <sup>db</sup>	Ambar <sup>db</sup>
Ambar <sup>db</sup>	Ambar <sup>db</sup>	Ambar <sup>db</sup>	
SMALL KABULI			
GenesisTM 090	GenesisTM 090	GenesisTM 090	GenesisTM 090
MEDIUM/LARGE KABULI			
PBA Royal <sup>db</sup>	PBA Royal <sup>db</sup>	PBA Royal <sup>db</sup>	PBA Royal <sup>db</sup>
PBA Monarch <sup>db</sup>	Genesis™ Kalkee	Genesis™ Kalkee	Genesis™ Kalkee
PBA Magnus <sup>db</sup>	PBA Monarch <sup>db</sup>	PBA Monarch <sup>db</sup>	PBA Monarch <sup>db</sup>
	PBA Magnus <sup>db</sup>	PBA Magnus <sup>db</sup>	PBA Magnus <sup>db</sup>
	Almaz <sup>db</sup>	Almaz <sup>db</sup>	Almaz <sup>db</sup>

\* High-quality seed type.

Table 2: Agronomic and disease characteristics of chickpea varieties.

Variety	Seed size (g/100 seeds)	Kabuli main seed size (mm)	Seed colour	Market type suitability	Early vigour	Flowering	Maturity	Plant height	Ascochyta blight**		Lodging resistance maturity	Pratylenchus neglectus Resistance	Pratylenchus thornei Resistance
									Foliage	Seed			
DESI TYPE													
Ambar <sup>db</sup>	16		light brown	split & whole	—	early	early	short-medium	S	S	MR	MRMS	MS
PBA Maiden <sup>db</sup>	21–24		yellow-tan	premium whole	moderate	early-mid	mid	short-medium	S	S	MS	MRMS	MRMS
PBA Slasher <sup>db</sup>	17–19		light brown	split & whole	poor-mod	mid	mid	short-medium	S	S	MS	MRMS	MRMS
PBA Striker <sup>db</sup>	20–22		light brown	split & whole	good	early	early	short-medium	S	S	MS	MRMS	MRMS
CBA Captain <sup>db</sup>	18–20		yellow-brown	split & whole	moderate	mid	mid	medium-tall	S	S	MR	RMR*	MS*
KABULI TYPE													
Almaz <sup>db</sup>	36–42	8–9	cream	8–9mm	poor	mid	mid-late	medium-tall	S	S	MR	MRMS	S
Genesis™ 090	26–35	7–8	cream	6–8mm	good	mid	mid	medium	MS	S	MR	MRMS	MS
Genesis™ Kalkee	40–46	8–9	cream	8–10mm	good	mid-late	late	tall	MS	S	R	MRMS	MS
PBA Monarch <sup>db</sup>	37–43	8–9	cream	8–9mm	poor-mod	early	early	medium	S	S	MS	MRMS	MS
PBA Royal <sup>db</sup>	39	8	cream-beige	8–9mm	moderate	early-mid	mid	medium	MS	S	MR	MR	MS*
PBA Magnus <sup>db</sup>	42–48	9	cream-beige	9–10mm	poor-mod	mid	mid	medium	MS	S	MRMS	MR	MS*

\* Provisional data.

\*\* AB ratings for southern region only.

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

Check for updated variety disease categories in the *Pulse Variety Disease Guide for South Australia*, due out in February 2021.

**Table 3: Mid North desi and kabuli chickpea yield performance. NVT data 2015–2019.**

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

DESI						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.52	2.31	0.97	0.55	0.71
	No. trials	2	1	1	1	1
Ambar <sup>Ⓢ</sup>	5	93	113	108	77	–
CBA Captain <sup>Ⓢ</sup>	4	–	118	106	103	110
Genesis™ 509	4	91	119	98	88	–
Neelam <sup>Ⓢ</sup>	6	98	119	101	96	105
PBA Maiden <sup>Ⓢ</sup>	6	108	95	97	99	100
PBA Slasher <sup>Ⓢ</sup>	6	104	108	102	104	105
PBA Striker <sup>Ⓢ</sup>	6	106	100	107	97	106
KABULI						
Variety	Mean yield t/ha	2.39	1.38	2.96	2.74	1.81
	No. trials	2	1	1	1	1
Almaz <sup>Ⓢ</sup>	6	98	123	105	102	92
PBA Magnus <sup>Ⓢ</sup>	6	107	112	98	109	104
Genesis™ 079	5	95	83	104	101	–
Genesis™ 090	6	98	111	112	104	101
Genesis™ Kalkee	6	94	99	103	96	91
PBA Monarch <sup>Ⓢ</sup>	6	99	86	96	101	100
PBA Royal <sup>Ⓢ</sup>	6	104	130	105	106	100

NVT are not designed to allow comparisons of varieties between desi and kabuli chickpeas where they are not evaluated in the same trial.

**Table 4: Yorke Peninsula desi and kabuli chickpea yield performance. NVT data 2015–2019.**

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

DESI						
Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.45	2.29	2.23	1.18	0.69
	No. trials	2	2	2	2	2
Ambar <sup>Ⓢ</sup>	9	98	111	103	93	102
CBA Captain <sup>Ⓢ</sup>	7	–	108	106	98	105
Genesis™ 509	4	96	121	105	95	–
Neelam <sup>Ⓢ</sup>	10	103	123	108	100	103
PBA Maiden <sup>Ⓢ</sup>	10	106	104	101	107	104
PBA Slasher <sup>Ⓢ</sup>	10	105	113	104	103	108
PBA Striker <sup>Ⓢ</sup>	10	110	93	102	105	114
KABULI						
Variety	Mean yield t/ha	1.45	2.27	2.21	1.18	0.71
	No. trials	2	2	2	2	2
Almaz <sup>Ⓢ</sup>	10	96	110	100	94	102
PBA Magnus <sup>Ⓢ</sup>	10	106	98	100	103	115
Genesis™ 079	8	110	97	106	105	–
Genesis™ 090	10	105	110	105	98	117
Genesis™ Kalkee	10	89	93	95	90	93
PBA Monarch <sup>Ⓢ</sup>	10	104	88	100	103	100
PBA Royal <sup>Ⓢ</sup>	10	103	120	104	100	110

NVT are not designed to allow comparisons of varieties between desi and kabuli chickpeas where they are not evaluated in the same trial.

# LUPIN

By Amanda Pearce, SARDI, and Matt Aubert, AGT

Lupin variety choice for South Australian growers will be the same in 2021 as in 2020, with no new varieties released for the southern region in 2020.

AGT are managing the lupin breeding program for Australian growers and in September 2019 released their first narrow-leafed lupin variety, Coyote<sup>®</sup>. Seed of Coyote<sup>®</sup> will be available to southern region growers in 2021. Coyote<sup>®</sup> has consistently high yields and is widely adapted through South Australian growing regions. Coyote<sup>®</sup> has metribuzin tolerance similar to Mandelup<sup>®</sup> and is similar in maturity to PBA Jurien<sup>®</sup>, slightly later than Mandelup<sup>®</sup>.

Narrow-leafed lupins (*Lupinus angustifolius*) are well suited to acidic and sandy soils. They continue to be grown in suitable areas as a key component of the farming system.

Recent improvements in grain pricing for lupins and a possible shift away from a heavy reliance on wheat/canola rotations is expected to see the area grown to lupins increase in coming seasons. There is also growing interest in developing the lupin crop for human consumption.

## DOMESTIC MARKETING

Producers wanting to sell lupin grain into Victorian and NSW markets, they must satisfy Anthracnose freedom, market access and transporting protocols. Anthracnose grain tests are the most common means of identifying Anthracnose freedom for marketing. As part of new regulations, two paddock inspections are required prior to exporting to Victoria ([agriculture.vic.gov.au/biosecurity/moving-plants-and-plant-products/plant-quarantine-manual/conditions/condition-27f-lupin-anthrachnose-seed-for-sowing](http://agriculture.vic.gov.au/biosecurity/moving-plants-and-plant-products/plant-quarantine-manual/conditions/condition-27f-lupin-anthrachnose-seed-for-sowing)) and restrictions apply to exporting to NSW ([www.dpi.nsw.gov.au/biosecurity](http://www.dpi.nsw.gov.au/biosecurity)).

## GRAZING OF LUPIN STUBBLES

Lupin stubbles can be a high-value feed source for livestock; however, growers have lost stock to lupinosis. This livestock health problem occurs when toxins are produced by the *Phomopsis* fungus that may develop in the lupin stem as the plant matures. Current varieties have levels of resistance that slow the development of the *Phomopsis* fungus. However, when significant rains occur before and after crop maturity, fungal development can occur regardless of the resistance level of the plant.

Care must be taken in grazing lupin stubbles and it may be advisable not to graze some paddocks at all should wet conditions prevail at, or after, harvest.

Lupin paddocks should be grazed at the first opportunity after harvest and stock should have access to a good-quality water supply. Older animals are less affected by lupinosis than young animals. Producers should note that bulky crops, crop-topping and tight lupin crop rotations aid the development of the fungus and can increase the risk of lupinosis.

## LUPIN AGRONOMY

A common problem reported by SA growers is the poor emergence and establishment of lupin crops, which affects early vigour and also exacerbates any effects of pre-emergent herbicides. Growers are encouraged to seek germination tests on sowing seed so seeding rates can be increased to compensate for poor germination rates, or alternative seed sourced.

Manganese deficiency has been a problem for a number of growers in recent seasons. Lupin plants have a high demand for manganese during seed development and maturity. Manganese deficiency can have a negative influence on seed development and cause seed to split or shrivel in pods. Deficient plants can be slow to ripen, remaining green for longer and causing difficulty at



harvest. Manganese deficiency can be overcome by applying manganese. Timing is important and manganese should be applied at mid-flowering of the first lateral, by which time growth of the first pods on the main stem should be 2 to 2.5cm long.

## NOTES ON CURRENT NARROW-LEAFED LUPIN VARIETIES

### COYOTE<sup>®</sup>

Coyote<sup>®</sup> (tested as WALAN2546) is the first narrow-leaved lupin variety release for AGT. It was released in Western Australia in the spring of 2019. Coyote<sup>®</sup> is very high yielding, setting a new yield benchmark for lupin varieties across South Australia. Coyote<sup>®</sup> has metribuzin tolerance similar to Mandelup<sup>®</sup>, and is similar in maturity to PBA Jurien<sup>®</sup> and slightly later than Mandelup<sup>®</sup>. It is MRMS to Anthracnose, R to Grey leaf spot and MR to Cucumber mosaic virus (CMV). Coyote<sup>®</sup> resistance to Phomopsis stem infection is lower than Mandelup<sup>®</sup>, PBA Bateman<sup>®</sup> and PBA Jurien<sup>®</sup>. Where the risk of Phomopsis stem infection is high, monitor livestock when grazing stubbles or remove grazing livestock completely. Coyote<sup>®</sup> seed may be available through AGT affiliates or your local retailer and an end point royalty applies.

### PBA BARLOCK<sup>®</sup>

PBA Barlock<sup>®</sup> (tested as WALAN2325) was released in WA in spring 2013. It is a high-yielding variety, which can provide yield improvement in regions of SA. PBA Barlock<sup>®</sup> has improved metribuzin tolerance over the varieties Tanjil<sup>®</sup> and Wonga, allowing growers to use metribuzin for weed control. PBA Barlock<sup>®</sup> is MR to lodging in high-rainfall regions, and shows improved pod shatter resistance compared to Mandelup<sup>®</sup>, MRMS. It is R to Anthracnose and MR to Phomopsis stem infection. PBA Barlock<sup>®</sup> seed is available through Seednet and an end point royalty applies.

### PBA BATEMAN<sup>®</sup>

PBA Bateman<sup>®</sup> (tested as WALAN2533) was released in the eastern states in the spring of 2017. It is a high-yielding variety, which can provide a yield improvement in regions of SA. It is MRMS to Anthracnose and MRMS to Cucumber mosaic virus seed transmission. PBA Bateman<sup>®</sup> has similar agronomic features compared to PBA Jurien<sup>®</sup>. PBA Bateman<sup>®</sup> shows tolerance to metribuzin similar to PBA Jurien<sup>®</sup>, PBA Barlock<sup>®</sup> and PBA Gunyidi<sup>®</sup>. Seed is medium in size, similar to Mandelup<sup>®</sup>. Growers should contact Seednet partners for supply of seed and an end point royalty applies.

### PBA GUNYIDI<sup>®</sup>

PBA Gunyidi<sup>®</sup> (tested as WALAN2289) was released in WA in September 2011 as a potential Mandelup<sup>®</sup> replacement with improved resistance to pod shattering. This feature may enable growers to harvest later without incurring significant losses. PBA Gunyidi<sup>®</sup> is MR to Anthracnose and RMR to Phomopsis stem infection. It flowers and matures slightly later than Mandelup<sup>®</sup>. It is R to metribuzin herbicide, but is less tolerant to Eclipse<sup>®</sup> and this herbicide should be used with care. Seednet is the royalty manager for PBA Gunyidi<sup>®</sup> but there is no longer any new seed production and an end point royalty applies.

### JENABILLUP<sup>®</sup>

Jenabillup<sup>®</sup> has been extensively trialled in SA trials, where it typically has an advantage over Mandelup<sup>®</sup> in regions with a longer growing season. In these regions its extended flowering window can assist with increased yield. Jenabillup<sup>®</sup> flowers slightly later and for a longer period than Mandelup<sup>®</sup>, making it less suitable to crop-topping. Jenabillup<sup>®</sup> does not have tolerance to metribuzin herbicide and has an MS Anthracnose rating. Seednet is the royalty manager for Gunyidi<sup>®</sup> but there is no longer any new seed production and an end point royalty applies.

### PBA JURIE<sup>®</sup>

PBA Jurien<sup>®</sup> (tested as WALAN2385) was released in WA in spring 2015. It can provide a yield improvement in regions of SA. It is RMR to Anthracnose and Phomopsis stem infection. Although rated RMR to Anthracnose, seed dressings are still recommended to reduce the risk of soil-borne disease. It is tolerant to metribuzin, superior to PBA Barlock<sup>®</sup>. PBA Jurien<sup>®</sup> has similar agronomic characteristics to PBA Gunyidi<sup>®</sup>, flowering slightly earlier. It is similar to Mandelup<sup>®</sup> in height and is MS to lodging in high-rainfall regions. PBA Jurien<sup>®</sup> has medium to large seed, similar to Mandelup<sup>®</sup>, and the alkaloid content is similar to PBA Gunyidi<sup>®</sup>. Growers should contact Seednet Partners for supply of seed and an end point royalty applies.

## MANDELUP<sup>®</sup>

Mandelup<sup>®</sup> is widely adapted to SA conditions and is established as a leading variety. Mandelup<sup>®</sup> is a tall variety, with good early vigour and very early flowering and maturity, making it well suited to low-medium rainfall districts in SA while still yielding well in higher rainfall areas. Its early maturity makes it suitable for crop-topping, with careful attention to correct timing. Mandelup<sup>®</sup> is MR to Anthracnose. It is RMR to Phomopsis stem infection. It can suffer pod loss/partial pod shattering with delayed harvest, and seed quality can suffer if wet conditions occur during harvest. Mandelup<sup>®</sup> seed is available in SA through Heritage Seeds Pty Ltd and an end point royalty applies.

**Table 1: Most-adapted narrow-leaved lupin varieties for each rainfall zone.**

Rainfall zone (average annual rainfall)		
Low < 375mm	Medium 375–500mm	High > 500mm
Coyote <sup>®</sup>	Coyote <sup>®</sup>	Coyote <sup>®</sup>
PBA Bateman <sup>®</sup>	PBA Bateman <sup>®</sup>	PBA Bateman <sup>®</sup>
PBA Jurien <sup>®</sup>	PBA Jurien <sup>®</sup>	PBA Gunyidi <sup>®</sup>
PBA Gunyidi <sup>®</sup>	PBA Gunyidi <sup>®</sup>	PBA Barlock <sup>®</sup>
Mandelup <sup>®</sup>	PBA Barlock <sup>®</sup>	Jenabillup <sup>®</sup>
PBA Barlock <sup>®</sup>	Mandelup <sup>®</sup>	PBA Jurien <sup>®</sup>

**Table 2: Agronomic characteristics of lupin varieties.**

Variety	Flowering	Height	Lodging	Pod shatter
Coyote <sup>®</sup>	Early	Tall	—	—
Jenabillup <sup>®</sup>	Mid	Tall	MRMS	MS
Mandelup <sup>®</sup>	Very early	Tall	MS	MS
PBA Barlock <sup>®</sup>	Mid	Med	MR	MRMS
PBA Bateman <sup>®</sup>	Early	Tall	MRMS	MRMS
PBA Gunyidi <sup>®</sup>	Early	Med	MR	MR
PBA Jurien <sup>®</sup>	Early	Tall	MS	MRMS

Source: Agriculture and food, DPIRD Western Australia and PBA lupin breeding program, South Perth, WA, 2013–2016 and AGT data

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

**Table 3: Disease-resistance characteristics of lupin varieties.**

Variety	Anthracnose	Brown leaf spot	Grey leaf spot	"Cucumber mosaic virus (CMV) (seed-transmitted)"	Phomopsis stem infection	Phomopsis pod infection	Pleiochaeta root rot
Coyote <sup>®</sup>	MRMS	MS	R	MR	MS	MRMS	MRMS
Jenabillup <sup>®</sup>	MS	MRMS	R	MS	MS	MR	MRMS
Mandelup <sup>®</sup>	MR	MS	R	MS	RMR	MRMS	MRMS
PBA Barlock <sup>®</sup>	RMR	MS	R	MR	MR	MR	MRMS
PBA Bateman <sup>®</sup>	MRMS	MS	R	MRMS	RMR	MS	MRMS
PBA Gunyidi <sup>®</sup>	MR	MS	S	MS	RMR	MRMS	MRMS
PBA Jurien <sup>®</sup>	RMR	MS	R	MS	RMR	MR	MR

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

Source: NVT disease ratings and AGT data

**Table 4: Mid North lupin yield performance. NVT data 2015–2019.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.22	2.83	1.96	1.49	1.47
	No. trials	1	1	1	1	1
Coyote <sup>®</sup>	4	111	117	105	109	—
Jenabillup <sup>®</sup>	5	98	87	94	91	126
Jindalee	4	91	76	87	—	94
Mandelup <sup>®</sup>	4	100	100	98	—	117
PBA Barlock <sup>®</sup>	4	98	98	92	—	119
PBA Bateman <sup>®</sup>	4	109	110	—	103	134
PBA Gunyidi <sup>®</sup>	4	104	103	98	—	122
PBA Jurien <sup>®</sup>	4	103	110	92	—	123
Wonga	5	90	74	93	98	109

**Table 5: Lower Eyre Peninsula lupin yield performance. NVT data 2015–2019.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	1.53	2.32	1.11	2.9	1.26
	No. trials	2	1	1	1	1
Coyote <sup>db</sup>	5	117	121	106	112	–
Jenabillup <sup>db</sup>	6	100	110	96	100	81
Jindalee	5	89	91	86	–	81
Mandelup <sup>db</sup>	5	100	108	99	–	85
PBA Barlock <sup>db</sup>	5	94	108	93	–	69
PBA Bateman <sup>db</sup>	5	116	119	–	112	99
PBA Gunyidi <sup>db</sup>	5	106	111	98	–	90
PBA Jurien <sup>db</sup>	5	99	111	91	–	70
Wonga	6	85	100	95	85	72

**Table 6: South East lupin yield performance. NVT data 2015–2019.**

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

Variety	Year	2015	2016	2017	2018	2019
	Mean yield t/ha	0.72	3.12	1.94	1.42	2.17
	No. trials	2	3	2	1	2
Coyote <sup>db</sup>	8	106	113	112	113	–
Jenabillup <sup>db</sup>	10	87	97	96	86	110
Jindalee	9	77	84	80	–	97
Mandelup <sup>db</sup>	9	97	104	101	–	102
PBA Barlock <sup>db</sup>	9	90	103	94	–	96
PBA Bateman <sup>db</sup>	8	100	109	–	105	113
PBA Gunyidi <sup>db</sup>	9	95	104	100	–	106
PBA Jurien <sup>db</sup>	9	92	108	95	–	94
Wonga	10	87	93	93	85	103

**Table 7: Murray Mallee lupin yield performance. NVT data 2015–2016.**

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

Variety	Year	2015	2016
	Mean yield t/ha	0.91	2.82
	No. trials	1	1
Coyote <sup>db</sup>	2	109	115
Jenabillup <sup>db</sup>	2	94	96
Jindalee	2	86	80
Mandelup <sup>db</sup>	2	97	103
PBA Barlock <sup>db</sup>	2	90	100
PBA Bateman <sup>db</sup>	2	106	110
PBA Gunyidi <sup>db</sup>	2	100	104
PBA Jurien <sup>db</sup>	2	93	106
Wonga	2	86	90

# VETCH

Stuart Nagel, Angus Kennedy and Gregg Kirby, SARDI

Vetch is a multi-purpose species grown mostly as a disease break crop, in rotation with cereals, in a wide range of soil types from light sands to heavier clay soils. The versatility of common vetch varieties (Languedoc, Blanchefleur, Studenica<sup>®</sup>, Morava, Rasina<sup>®</sup>, Volga<sup>®</sup>, Timok<sup>®</sup> and Cummins) allows cropping for grain or hay, early grazing as green pasture, dry grazing or green manure production.

Grain or multi-purpose vetches are grown in the lower to mid-rainfall cereal areas of southern Australia, and their grain yields have been similar to field pea in these areas. Note that common vetch grain is not used for human consumption and can be used up to 20 per cent in pig rations.

Grain from Morava, Studenica<sup>®</sup>, Rasina<sup>®</sup>, Volga<sup>®</sup> and Timok<sup>®</sup> can be used without limit to feed all ruminants and up to 20 per cent in the diet of pigs. These five varieties possess less toxin in grain (<0.65 per cent) compared with Blanchefleur (0.95 per cent) and Languedoc (1.65 per cent).

Forage vetches are used for hay, green manure or mid to late-winter feed for grazing. There is a purple vetch (*Vicia benghalensis*) variety Popany and woolly pod vetch (*V. villosa* subsp.) varieties Namoi, Capello, Haymaker and RM4<sup>®</sup>. Forage vetches can grow successfully in areas of 400 to 650mm of annual rainfall. Grain from woolly pod vetch varieties CANNOT be used to feed any livestock.

Vetch is valued for its benefits to subsequent cereal and oilseed crops in the rotation; these benefits are usually greater than from other pulses, particularly in lower rainfall areas. On sandy soils vetches provide better soil protection than peas and provide better stubble retention in the soil.

Morava, Studenica<sup>®</sup>, Rasina<sup>®</sup>, Volga<sup>®</sup> and Timok<sup>®</sup> are resistant to rust and are the preferred varieties for grain in areas prone to rust infections. Disease management is critical when growing a vetch crop, regardless of the end-use, where possible disease-resistant varieties should be planted as

a preference. Care must be taken when growing rust-susceptible varieties as grazing or feeding hay/silage from rust-infected plants may induce abortions in pregnant livestock.

While it is usually not economically viable to use fungicides for rust on vetch, it may be necessary where rust-susceptible varieties are to be used as feed.

Ascochyta blight occurs in earlier stages of the vetch crop and can reduce grain and dry matter production. This disease is generally less severe than Botrytis grey mould (BGM), which can develop high levels of infestation in cool/wet growing seasons.

There is little difference between vetch varieties in their resistance to BGM; varieties like Morava, which produce greater levels of vegetative growth and denser canopies, will be particularly prone to this disease in higher rainfall areas.

Vetch variety characteristics are summarised in the following tables:

**Table 1** contains adaptation information for vetch varieties grown for grain and hay in different rainfall zones.

**Table 2** contains information for selection of common and woolly pod vetch varieties for hay/silage, grazing and green manuring.

**Table 3** provides varietal information on the most important criteria to consider for vetch grain and hay crops: yield potential, disease resistance, maturity, shattering resistance and hard seed percentage.

**Table 4** displays yield results for grain and dry matter production of common vetches varieties tested at five sites over five years in SA by the Australian National Vetch Breeding Program (ANVBP).

**Table 5** provides dry matter yield results for woolly pod and purple vetch varieties tested from 2010 to 2014 in SA by ANVBP.

**Table 6** provides seeding rate recommendations for production of vetch grain, hay/silage, grazing and green manuring.

When selecting a vetch variety, growers also need to consider their individual farm and paddock situations and, most importantly, the intended end-use for the crop. Selections should be made using all of the available information.

## NOTES ON VARIETIES COMMON VETCH (*VICIA SATIVA*)

### STUDENICA<sup>♢</sup>

Studenica<sup>♢</sup> is a new white-flowering variety of common vetch that will be commercially available for sowing for the first time in 2021. This variety has the earliest flowering and maturity of the common vetches, flowering in approx 85 to 90 days. It is rust resistant but susceptible to Botrytis, like other common vetch varieties. Studenica<sup>♢</sup> has toxin/anti-nutritional (BCN) levels similar to Morava.

The advantage Studenica<sup>♢</sup> has over other varieties is its superior winter growth and vigour combined with good frost tolerance; this enables it to put on more bulk through the cold parts of winter, providing fodder earlier in the season. This variety is particularly well suited to low-rainfall marginal cropping/mixed farming systems looking for early feed to fill the winter feed gap or late planting for spring fodder and hay. It offers a more reliable legume option in mixed enterprises in marginal cropping environments. Studenica<sup>♢</sup> has grain yields comparable with Timok<sup>♢</sup> and Volga<sup>♢</sup> in most environments. Its early growth and vigour sets it apart, particularly in cold environments, as demonstrated in Table 8. (See Tables 7 and 8 for Studenica<sup>♢</sup> production data).

Studenica<sup>♢</sup> is a multi-purpose variety – it can be used for grain, hay/silage, grazing or green/brown manure. It can be successfully grown in many Australian soil types, from non-wetting sand to heavy clay loam with pH 5.8 to 9.4, like other common vetch varieties.

Studenica<sup>♢</sup> was bred, developed and trialled by the SARDI National Vetch Breeding Program in conjunction with GRDC and the SA Grain Industry Trust (SAGIT) and it will be available from Pasture Genetics/ S&W Seeds.

### LANGUEDOC

Languedoc is an early-flowering and maturing variety recommended for low-rainfall areas, although it can lodge severely, making harvest difficult under certain conditions. Languedoc generally exceeds Blanchefleur's grain yield in areas with less than 350mm rainfall. Its hard seed content is generally around five to 10 per cent and it is highly susceptible to rust. Languedoc grains possess 1.0 to 1.6 per cent anti-nutritional compound (BCN).

### BLANCHEFLEUR

Prior to the release of Morava, Blanchefleur was the preferred grain variety in areas above 350mm rainfall in SA. Blanchefleur has mid-maturity, white flowers and reddish brown/mottled seed with orange cotyledons. Blanchefleur is very susceptible to rust.

It is well suited to medium to high-rainfall areas where rust is not a regular problem. Both vetch and lentils are on the prescribed grain list of the Australian Quarantine and Inspection Service (AQIS) due to the vetch–lentil substitution issue. This has meant export markets of orange-cotyledon varieties like Blanchefleur are limited to small-birdseed markets in Europe and seed for grazing and green manure crops. Blanchefleur grains possess 0.9 to 1.6 per cent anti-nutritional BCN.

### CUMMINS

A mid to early-maturing, white-flowering variety selected from Languedoc. It is well adapted to medium to low-rainfall areas where it generally yields higher than Blanchefleur. Cummins is susceptible to rust and moderately susceptible to Ascochyta blight. Cummins possess a similar percentage of BCN to Blanchefleur.

### MORAVA

Morava is a rust-resistant late-flowering vetch variety with 100 per cent soft seeds, developed in 1998 by the Australian National Vetch Breeding Program (ANVBP) at SARDI. Grain yield is superior to other vetches in the high-rainfall areas and to Blanchefleur, Languedoc and Cummins in all other areas in the presence of rust. It is larger seeded and more resistant to shattering than other vetch varieties.

The BCN levels of Morava are 0.65 per cent, which is 50 per cent lower than Blanchefleur and Languedoc. Morava produces higher herbage yields than all other common vetch varieties.

Morava is later flowering and maturing than Blanchefleur and grain yield will be reduced in environments with dry finishes. Morava



is susceptible to *Ascochyta* blight and very susceptible to *Botrytis*, because it produces very high biomass in wet/cool zones.

Morava can be sourced from Barenbrug Australia.

### **RASINA<sup>®</sup>**

Rasina<sup>®</sup> is soft-seeded vetch from the ANVBP, developed in 2006. Rasina<sup>®</sup> replaces Languedoc, Blanchefleur and Cummins in low to medium-rainfall areas for grain production.

Rasina<sup>®</sup> is five to 10 days earlier than Blanchefleur and 10 to 15 days earlier than Morava. A significant advantage over Languedoc, Blanchefleur and Cummins is Rasina<sup>®</sup>'s resistance to rust, and it is slightly more tolerant to *Ascochyta* blight and *Botrytis*.

Rasina<sup>®</sup> is not expected to replace Morava in higher rainfall districts or for hay production. The level of anti-nutritional factors in Rasina<sup>®</sup> is between 0.6 per cent and 0.8 per cent compared to 0.9 per cent to 1.6 per cent in Blanchefleur and Languedoc, respectively. Rasina<sup>®</sup> possesses a distinctive uniform dark-brown speckled seed coat with dark beige cotyledons.

Rasina<sup>®</sup> is a PBR variety and can be sourced from Barenbrug Australia.

### **VOLGA<sup>®</sup>**

Volga<sup>®</sup> was developed in 2012 by the ANVBP at SARDI. It is a high-yielding grain/seed variety for low and mid-rainfall areas. It is particularly suited to shorter season areas where the growing season finishes sharply; dry periods in September and October are common in many low to mid-rainfall areas.

Volga<sup>®</sup> has good initial establishment, is rust-resistant, and earlier flowering and maturing than Blanchefleur and Rasina<sup>®</sup>. It will improve the reliability and economic production of vetch in crop rotations, especially in low and mid rainfall areas of 330 to 380mm per year.

Volga<sup>®</sup> has high grain and herbage yields and is well adapted to all areas where vetch is currently grown. Because of its early flowering and maturity characteristics, Volga<sup>®</sup> is well suited to situations where the season finishes sharply.

It can be successfully grown in many Australian soil types, from non-wetting sand to heavy clay loam with pH 5.8 to 9.4, like other common vetch varieties. Volga<sup>®</sup> is moderately susceptible to *Ascochyta* blight, whereas Morava is susceptible. The early maturity of Volga<sup>®</sup> may limit yield potential

relative to longer growing season varieties, like Morava, in high-rainfall areas.

Toxin levels in the grain are around 0.54 per cent, lower than Morava at 0.65 per cent and Blanchefleur 0.95 per cent. Volga<sup>®</sup> seed size is very similar to Morava (100 seed weight is 7.82 grams).

Volga<sup>®</sup> is a PBR variety and can be sourced from Barenbrug Australia.

### **TIMOK<sup>®</sup>**

Timok<sup>®</sup> was bred to complement Morava in mid to high-rainfall areas for grain/seed and especially for hay/silage production. Timok<sup>®</sup> yielded more grain than Rasina<sup>®</sup>, Morava and Blanchefleur by 9 per cent, 18 per cent and 21 per cent, respectively, over five years at five sites in SA (Table 4).

Timok<sup>®</sup> has better initial establishment than Morava and will improve the reliability and economics of vetch production in crop rotations, especially in mid and high-rainfall areas with 350 to 450mm per year. Morava will remain the preferred variety for hay/silage in rainfall areas with greater than 450mm per year.

Timok<sup>®</sup> is high yielding, highly rust resistant and susceptible to *Ascochyta* blight and *Botrytis*. It has good early establishment and is a soft-seeded variety.

Timok<sup>®</sup> matures between Rasina<sup>®</sup> and Morava (approx. 105 days from seeding to full flowering).

Timok<sup>®</sup> is very well adapted for grain production in rainfall areas greater than 380mm per year, and dry matter production is similar to Morava in high-rainfall regions (greater than 400mm per year). In low to medium-rainfall regions (330 to 380mm/year), dry matter production from Timok<sup>®</sup> is 19 per cent higher than Morava. Timok<sup>®</sup> is a multi-purpose variety – it can be used for grain, hay/silage, grazing or green/brown manure.

Toxin levels in Timok<sup>®</sup> grain are around 0.57 per cent. Seed weight is 6.88g per 100 seeds, similar size to Rasina<sup>®</sup> at 6.92g per 100 seeds.

Timok<sup>®</sup> was developed in 2012 by the ANVBP at SARDI. Timok<sup>®</sup> is a PBR variety and can be sourced from Pasture Genetics.

### **Herbicide tolerance**

There are no differences between common vetch varieties to registered herbicides for control of broadleaf weeds and no differences between varieties to registered herbicides for grass weed control.



## PURPLE VETCH

### POPANY

Popany is a purple vetch (*Vicia benghalensis*) variety. Grain yield is significantly lower than for common vetch. Seeds are smaller than common vetch seed, therefore the seeding rates are lower at approximately 30 to 35 kilograms per hectare.

Grain from this variety can be used as a bird feed in mixtures with other recommended grains. Popany is a late-maturing variety, requiring more than 125 days from seeding to podding. It is a good variety in mid to high-rainfall areas for hay/ silage. Popany possesses five to 10 per cent hard seeds. This variety is resistant to rust but susceptible to Ascochyta and Chocolate spot. It has a black seed coat with distinctive white hilum.

## WOOLLY POD VETCHES

### CAPELLO and HAYMAKER

These woolly pod vetches (*Vicia villosa* subsp. *dasycarpa*) are lower in grain yield compared with common vetches, but are much higher in dry matter production in rainfall areas greater than 450mm per year. Grain from these varieties cannot be used to feed any livestock.

Also, these varieties can only be grazed from the 10-node stage to podding stage. It is not recommended that grazing occur earlier or once plants begin to develop seeds in pods. These two varieties are very good for hay/silage production in areas with higher than 400mm of annual rainfall.

Haymaker and Capello are selected soft-seed varieties from Namoi. In the past few years these two varieties have become prone to setting hard (dormant) seeds. Both varieties are owned by Barenbrug Australia.

### RM4<sup>®</sup>

RM4<sup>®</sup> (*Vicia villosa* subsp. *eriocarpa*) was selected by ANVBP at SARDI.

RM4<sup>®</sup> is a high producer of dry matter, has very good early establishment, is moderately resistant to Ascochyta blight, and is susceptible to Botrytis. It is a soft-seeded variety (greater than 94 per cent), emerges in 15 to 20 days and is earlier in maturity by 10 to 15 days than Haymaker or Capello.

RM4<sup>®</sup> is significantly higher in dry matter production in mid to low-rainfall areas (less than 380mm per year) than Haymaker or Capello. RM4<sup>®</sup> is also suitable for higher rainfall areas (400 to 650 mm per year).

RM4<sup>®</sup> is a multipurpose variety that can be used for hay/silage, grazing, green/brown manure or for seed. RM4<sup>®</sup> can be successfully grown, like other woolly pod varieties, in many Australian soil types. Like other vetches, it is excellent for soil fertility/ structure and nitrogen fixation. It can be grazed from 10 nodes up to the end of flowering and can be used for hay/silage production where cutting in full flowering provides the best balance of feed value. RM4<sup>®</sup> performs better in grain production than other woolly pod varieties when the season finishes sharply.

Herbicide tolerance: RM4<sup>®</sup> was not sensitive to any herbicides registered for use in woolly pod vetch varieties.

Insect pests: RM4<sup>®</sup> is susceptible in early growth stages to Redlegged earth mite and Lucerne flea, like other woolly pod vetch varieties. RM4<sup>®</sup> is also susceptible to Blue-green and Cowpea aphids from early growth through to pod maturity, as well as to Native budworm during pod formation and filling.

Grain from this variety, like other woolly pod vetches, cannot be used to feed any livestock.

RM4<sup>®</sup> is a PBR variety and can be sourced from Barenbrug Australia.

Table 1: Vetch grain variety rainfall zones.

Rainfall zone (average annual rainfall)				
<350mm	350–400mm	400–450mm	450–600mm	>600mm
Rasina <sup>db</sup>	Rasina <sup>db</sup>	Morava	Morava	Morava
Studenica <sup>db</sup>	Blanchefleur	Rasina <sup>db</sup>	Rasina <sup>db</sup>	Timok <sup>db</sup>
Volga <sup>db</sup>	Studenica <sup>db</sup>	Blanchefleur	Timok <sup>db</sup>	
Timok <sup>db</sup>	Morava	Cummins		
	Volga <sup>db</sup>	Volga <sup>db</sup>		
	Timok <sup>db</sup>	Timok <sup>db</sup>		

Table 2: Vetch hay/silage/grazing and green manuring variety rainfall zones.

Rainfall zone (average annual rainfall)				
<350mm	350–400mm	400–450mm	450–600mm	>600mm
Rasina <sup>db</sup>	Rasina <sup>db</sup>	Morava	Morava	Capello
Blanchefleur	Morava	Rasina <sup>db</sup>	Popany	Haymaker
Studenica <sup>db</sup>	Studenica <sup>db</sup>	Popany	Capello	Morava
Morava	Popany	Capello	Haymaker	Popany
Volga <sup>db</sup>	Blanchefleur	Haymaker	Timok <sup>db</sup>	Timok <sup>db</sup>
Timok <sup>db</sup>	Volga <sup>db</sup>	Volga <sup>db</sup>	RM4 <sup>db</sup>	RM4 <sup>db</sup>
RM4 <sup>db</sup>	Timok <sup>db</sup>	Timok <sup>db</sup>		
	RM4 <sup>db</sup>	RM4 <sup>db</sup>		

Table 3: Characteristics of selected vetch varieties.

Variety	Maturity	Yield potential		Flower colour	% of		Disease reaction		
		Grain	Dry matter		Pod shattering	Hard seeds	Rust	Ascochyta	Botrytis
COMMON VETCH VARIETIES ( <i>VICIA SATIVA</i> )									
Blanchefleur	Mid	High	Mod	White	5–10	5–10	VS	MR	S
Studenica <sup>db</sup>	Very early	High	High	White	0–2	0	R	MS	S
Morava	Late	High	High	Purple	0	0	R	MS	VS
Rasina <sup>db</sup>	Early-mid	High	Mod	Purple	0–2	0	R	MR	S
Volga <sup>db</sup>	Early	Very high	High	Purple	0–2	2–5	R	MR	MS
Timok <sup>db</sup>	Mid	High	Very high	Purple	0–2	0–2	R	MR	MS
PURPLE VETCH ( <i>VICIA BENGHALENSIS</i> SUBSP. <i>BENGHALENSIS</i> )									
Popany	Very late	Low	High	Purple	20–30	5–10	R	S	VS
WOOLLY POD VETCHES ( <i>VICIA VILLOSA</i> SUBSP.)									
Haymaker	Late	Low	Very high	Purple	5–10	20–30	R	S	VS
Capello	Late	Low	Very high	Purple	5–10	15–20	R	S	VS
RM4 <sup>db</sup>	Mid	Mod	Very high	Purple	2–5	2–5	R	MS	VS

Table 4: Grain and dry matter yield for common vetch varieties (2014–18).

Five sites over five years in SA.

Variety	Grain yield (t/ha)	% of Blanchefleur	Dry matter yield (t/ha)	% of Morava
Blanchefleur	1.82	100		–
Rasina <sup>db</sup>	2.10	116	4.71	95
Morava	1.84	102	4.94	100
Volga <sup>db</sup>	2.44	134	5.39	109
Timok <sup>db</sup>	2.18	120	5.20	105
Mean yield	2.07		5.06	

**Table 5: Dry matter yield for woolly pod and purple vetch varieties (2010–14).**

Variety	Dry matter (t/ha)	% of Cappello <sup>Ⓓ</sup>
Cappello	6.23	100.0
Haymaker	6.26 (2009–12)	100.4
RM4 <sup>Ⓓ</sup>	6.71	107.7
<b>Mean yield</b>	<b>6.4</b>	
<b>PURPLE VETCH VARIETY</b>		
Popany	5.28 (2009–12)	84.75

**Table 6: Plant density and recommended seeding rates for vetch.**

End-use	Common vetch varieties		Woolly pod vetch varieties		Purple vetch variety	
	Plants density (plants per sq.m.)	Sowing rate (kg/ha)	Plants density (plants per sq.m.)	Sowing rate (kg/ha)	Plants density (plants per sq.m.)	Sowing rate (kg/ha)
Grain	40–60	40–50	40–50	25–40	40–50	25–40
Hay/silage	50–70	50–60	50–60	30–45	50–60	30–45
Grazing	50–70	50–60	50–60	30–45	50–60	30–45
Green manure	60–70	55–65	60–70	45–50	50–60	30–45

**Table 7: Average hay yields of Studenica<sup>Ⓓ</sup> in South Australia compared to current varieties.**

Taken from four low-rainfall sites at Perlubie, Minnipa, Morchard and Loxton, cut mid-September.

Line	2014	2015	2016	3-year average
Studenica <sup>Ⓓ</sup>	2.24	3.09	2.19	2.51
Rasina <sup>Ⓓ</sup>	—	2.86	2.21	—
Timok <sup>Ⓓ</sup>	2.13	3.15	2.08	2.45
Volga <sup>Ⓓ</sup>	2.26	3.06	2.45	2.59

**Table 8: 2018 dry matter yields (t/ha) at low-rainfall Mallee sites in SA and Victoria.**

Cut in August to show early growth.

Line	Waikerie 15 August	Walpeup 25 August
Studenica <sup>Ⓓ</sup>	4.81	3.22
Morava	3.69	1.71
Rasina <sup>Ⓓ</sup>	3.96	
Timok <sup>Ⓓ</sup>	3.75	2.11
Volga <sup>Ⓓ</sup>	4.21	2.19

# NOTES

[illegible]



	INTRO
	WHEAT
	BARLEY
	OAT
	CANOLA
	FABA BEAN
	LENTIL
	FIELD PEA
	CHICKPEA
	LUPIN
	VETCH
	NOTES



# PREDICTA® B

## KNOW BEFORE YOU SOW



**Cereal root diseases cost grain growers in excess of \$200 million annually in lost production.**

PREDICTA® B soil testing service and your accredited agronomist can help you identify the disease risk before sowing the crop and develop a management plan.

Enquire with your local agronomist or visit

[http://pir.sa.gov.au/research/services/molecular\\_diagnostics/predicta\\_b](http://pir.sa.gov.au/research/services/molecular_diagnostics/predicta_b)

### Potential high-risk paddocks:

- Durum crops (crown rot)
- Newly purchased or leased land
- Bare patches, uneven growth, white heads in previous crop
- Paddocks with unexplained poor yield from the previous year
- Cereals on cereals
- Cereal following grassy pastures
- High frequency of root lesion nematode-susceptible crops, such as chickpeas
- Intolerant cereal varieties grown on stored moisture

### There are PREDICTA® B tests for most of the soil-borne diseases of cereals and some pulse crops:

- Crown rot (cereals)
- Rhizoctonia root rot
- Take-all (including oat strain)
- Root lesion nematodes
- Cereal cyst nematode
- Stem nematode
- Blackspot (field peas)
- Yellow leaf spot
- Common root rot
- Pythium clade f
- Charcoal rot
- Ascochyta blight of chickpea
- White grain disorder
- Sclerotinia stem rot