

2023 SOUTH AUSTRALIAN CROP SOWING GUIDE



GRDC
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CORPORATION

SOUTH AUSTRALIA
OCTOBER 2022



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

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Title: 2023 South Australian Crop Sowing Guide

ISSN: 2652-3582 (online)
2652-3574 (print)

Published:
October 2022

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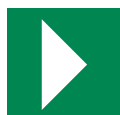
Design and production:
Coretext, www.coretext.com.au

COVER: Vetch at Morchard, SA.
PHOTO: Bridget Penna, SAGIT

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www.grdc.com.au/NVT-south-australian-crop-sowing-guide
Remember to update it each October.

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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) and collaborating researchers.

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 vetch breeding research staff in SA, as well as collaborators around Australia in producing results published in this edition.

Editor: Melissa McCallum, SARDI, Crop Sciences



SA grain growers funding research solutions

The South Australian Grain Industry Trust annually invests more than \$1.8 million in a range of areas crucial to advancing the SA grain industry, including grain growing, farming systems, soil management, harvesting, storage, processing and marketing, and for dissemination of technical information to growers.

In 2022, SAGIT is investing in these new projects:

- Developing a new high value noodle market for South Australian growers, Australian Export Grains Innovation Centre
- Independent benchmarking of harvester weed seed mills, Trengove Consulting
- Lead agriculture teacher for South Australia – growing curriculum and learning, AgCommunicators
- Student Compendium – supporting the next generation 2023-25, Ag Institute Australia
- AgXtra high school and university crop competition, AgXtra
- Agronomy strategies for frost management in pulse crops, University of Adelaide
- Nitrogen strategies for HRZ wheat in waterlogged soils and denitrification, Elders
- Improved resilience of soil function through crop management, CSIRO
- Eyre Peninsula internship in applied grains research 2023, AIR EP
- Reducing wheat yield loss from Barley Yellow Dwarf Virus in the HRZ, MacKillop Farm Management Group
- Realising cereal yield potential using crop physiology and drone technology, University of Adelaide
- Managing crown rot on upper EP – a joint learning experience, AIR EP
- On row sowing benefits on Yorke Peninsula – what are the drivers? Central Ag Solutions
- Revegetation for enhanced biocontrol of pest conical snails, University of Adelaide
- Harvest and use of medic pods on-farm, University of Adelaide
- Sulphur dynamics and budgets in two contrasting soil profiles, Agronomy Solutions
- Ground truthing wheat and barley flowering time in the Mid North and Mallee using the Mesonet, SARDI
- Canola profitability as a break crop in the Upper North? Upper North Farming Systems
- Lower Eyre Peninsula Ag Expo 2022, AIR EP

SAGIT is also supporting these ongoing projects:

- Eyre Peninsula internship in applied grains research, AIR EP
- Regional internship in applied grains research, Hart Field-Site Group
- Taking South Australian canola profitability to the next level, EPAG Research
- MacKillop Farm Management Group annual trial results book, MacKillop Farm Management Group
- SA Crop Variety Sowing Guide, SARDI
- SANTFA Conference 2021-2023, SANTFA
- Comparative effects of agricultural pesticides on SA soil microbial functions, University of South Australia
- Lentil varieties for low rainfall and sandy soil environments, Global Grain Genetics
- Variety selection and weed management options for genetically modified canola, Hart Field-Site Group
- Frost Learning Centre for farmers, advisers and researchers, Mid North High Rainfall Zone Group
- Pasture legume choices, establishment and persistence for the Murray Plains, Murray Plains Farmers
- A practical approach to sub-surface acidity in the Mid North, Precision Agriculture
- Developing criteria for soil and plant aluminium and manganese toxicity in South Australia, PIRSA
- Grower crop root health workshops, SARDI/University of Adelaide
- Measuring and managing yield loss caused by Phoma root in lentil and faba bean, SARDI/University of Adelaide
- Extension support for SA Drought Hub Internship Program, SARDI/University of Adelaide
- Investigating aluminium speciation in wheat roots in alkaline soil, SARDI/University of Adelaide
- Characterising the optimal flowering period for the Murray Plains, SARDI/University of Adelaide
- Eyre Peninsula Farming Systems Summary 2021-2023, SARDI
- Improving crop safety and broadleaf weed control with herbicides in lentil, Trengove Consulting
- Improved management of variable phosphorus requirement and strategies for highly responsive soils, Trengove Consulting
- Understanding and managing fertiliser toxicity in pulses in SA, University of Adelaide
- Developing a DGT methodology to assess bioavailability of herbicide residues, University of South Australia
- 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
- Evaluating super high oleic acid safflower in sodic and saline soils, SARDI/University of Adelaide
- The implications of green hydrogen for SA grain growers, SANTFA
- Improving management of Group A resistant barley grass in current farming systems, SARDI/University of Adelaide

INTRODUCTION

NATIONAL VARIETY TRIALS (NVT)

The variety trial results presented in this book are sourced from the NVT program, SAGIT and AgriFutures Oat Agronomy projects, 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 according to grain yield and to provide grain quality information relevant to delivery standards. NVT are also used by pathologists to determine disease resistance ratings shown in this sowing guide.

Conducted to a set of predetermined protocols, variety trials are sown and managed as close 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 (b). 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 2022-23 are quoted from varietycentral.com.au and are quoted \$/tonne 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 2023-24 harvest will become available early in 2023 on the Variety Central website.

INTRO

WHEAT

BARLEY

OAT

CANOLA

FABA BEAN

LENTIL

FIELD PEA

CHICKPEA

LUPIN

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INTERPRETING LONG-TERM YIELD RESULTS

The long-term yield results presented in the crop sowing guide are an output of NVT Long Term Multi Environment Trial (MET) analysis. NVT run trials in all cropping regions of South Australia (e.g. Lower Eyre Peninsula, Mid North, Murray Mallee etc.) and other states across Australia, and use a five-year rolling results set.

A 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 results for varieties at an individual trial level.

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

Readers can further interrogate the results online to better understand the performance of varieties under a range of situations using the NVT Long Term Yield Reporter tool. The long-term yield results are best viewed at the individual trial/environment level; however, these detailed results sets are too large for printed sowing guides or quick-reference summaries.

Users can choose to view results in year or yield-based groupings and can filter results to region or location selections to suit their own needs. In this sowing guide, we present results in year groups 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.nvt.grdc.com.au/lty/table>.

LEGEND: MEAN VARIETY YIELD PERFORMANCE



LOWEST

HIGHEST

Long-term mean yield illustrated by colour gradient from lowest (red) to highest (green).

DISEASE RATING COLOUR RANGE

VS	SVS	S	MSS	MS	MRMS	MR	RMR	R
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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

Melissa McCallum, Rhiannon Schilling, Courtney Peirce,
Hugh Wallwork and Tara Garrard, SARDI

Since publication of the 2022 sowing guide, BigRed[®], Brumby[®], Kingston[®], LRPB Anvil[®] CL Plus, Reilly[®] and Patron[®] have been released. The sowing guide continues to include the introduction of selected winter and feed wheats.

A summary of the most important selection criteria, grain yield, quality, maturity classification and disease resistance information for each variety is provided in Table 1. While the varieties listed are considered likely to provide the best return within each quality grade, growers need to consider their individual farm and paddock situation and make their selection based on all available information for their region.

USEFUL RESOURCES

An overview of wheat production in Australian can be found on the AEGIC website:
aegic.org.au/australian-grains/wheat

Information about Australian wheat classification can be found on the Wheat Quality Australia website: wheatquality.com.au

Information about the Australian wheat trade and current GTA receival standards can be found on the Grain Trade Australia website: 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. Domestic flour millers purchase a small proportion of South Australian wheat either from marketers or directly from growers. Domestic 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.

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Table 1: Wheat varieties suitable for planting in South Australia, listed by current maximum grade.

Variety	Maturity classification	Suitability and significant features
AH		
Ballista ^{dh}	Q – M	All districts but particularly Mallee environments.
Beckom ^{dh}	M	Low to medium-rainfall districts.
Calibre ^{dh}	Q – M	All districts, widely adapted.
Catapult ^{dh}	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 ^{dh}	VQ – Q	Low to medium-rainfall districts.
Grenade CL Plus ^{dh}	Q – M	All districts, imidazolinone tolerant.
Hammer CL Plus ^{dh}	Q – M	All districts, imidazolinone tolerant.
Kingston ^{dh}	M	Medium to high-rainfall districts.
Illabo ^{dh}	Q (+W)	Mid-winter wheat, very early sowing (pre-20 April) and grazing opportunity in medium to high-rainfall zones.
LRPB Anvil ^{dh} CL Plus	VQ – Q	Low to medium-rainfall districts, imidazolinone tolerant.
LRPB Arrow ^{dh}	M	All districts, similar yields to Mace ^{dh} with shorter plant height, wheat-on-wheat option.
LRPB Cobra ^{dh}	Q – M	Medium to high-rainfall districts.
LRPB Dual ^{dh}	M – S	Awnless spring wheat, long coleoptile.
LRPB Scout ^{dh}	M	All districts, avoid wheat stubbles due to yellow leaf spot susceptibility. Now outclassed.
Reilly ^{dh}	M	Low to medium-rainfall districts.
RockStar ^{dh}	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 ^{dh}	Q – M	All districts broad adaptation, wheat-on-wheat option except that it is susceptible to Septoria tritici blotch and powdery mildew.
Valiant ^{dh} CL Plus	M – S	All districts, imidazolinone tolerant. Slower development pattern suited to late April to early May sowing, but limited evaluation.
Vixen ^{dh}	Q	All districts, fast development, similar yields to Scepter ^{dh} , wheat-on-wheat option except that it is susceptible to Septoria tritici blotch and very susceptible to powdery mildew.
APW		
Ascot ^{dh}	M	Medium to high-rainfall districts.
Brumby ^{dh}	M	All districts, limited evaluation
Chief CL Plus ^{dh}	M	All districts, imidazolinone tolerant, wheat-on-wheat option except that it is very susceptible to powdery mildew.
Cutlass ^{dh}	M – S	All districts and early sowing situations.
Denison ^{dh}	S	Development pattern suited to late April to early May sowing, but limited evaluation in SA from this sowing date.
LRPB Bale ^{dh}	S	Awnless, slow wheat suited to pre-25 April sowing, long coleoptile.
LRPB Nighthawk ^{dh}	VS	Slow spring wheat, suited to pre-20 April emergence. Limited evaluation in NVT.
LRPB Trojan ^{dh}	M – S	Medium to high-rainfall districts.
Sheriff CL Plus ^{dh}	M – S	All districts, imidazolinone tolerant. Development speed similar to LRPB Trojan ^{dh} , suited to wheat-on-wheat except that it is susceptible to Septoria tritici blotch and very susceptible to powdery mildew.
ASW		
DS Bennett ^{dh}	M – S (+W)	Slow winter wheat, very early sowing and grazing opportunity in medium to higher-rainfall zones, awnless hay option.
Longsword ^{dh}	Q (+W)	Fast winter wheat, very early to May sowing and grazing opportunity in all districts.
Razor CL Plus ^{dh}	Q – M	All districts, imidazolinone tolerant.
SOFT		
LRPB Impala ^{dh}	M	Soft-wheat producing districts.
LRPB Orion ^{dh}	M – S	Soft-wheat producing districts. Awnless hay option.
LRPB Oryx ^{dh}	M	Soft-wheat producing districts
UNCLASSIFIED AND FEED		
Anapurna	M – S (+W)	Slow red winter wheat, very early sowing and grazing opportunity in medium to high-rainfall zones.
BigRed ^{dh}	M – S (+W)	Mid-slow red winter wheat. Suited to medium to high-rainfall districts.
Manning ^{dh}	M – 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	M – S (+W)	Slow red winter wheat, very early sowing and grazing opportunity in medium to high-rainfall zones.
RGT Cesario ^{dh}	M – 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. Highly susceptible to stem rust.

Table 1, cont. next page

Table 1: Wheat varieties suitable for planting in South Australia, listed by current maximum grade (continued).

Variety and current maximum grade	Maturity classification	Suitability and significant features
DURUM		
Bitalli ^{db}	Q – M	All durum districts.
DBA-Artemis ^{db}	M – S	All durum districts.
DBA Spes ^{db}	M	All durum districts.
DBA Vittaro ^{db}	Q – M	All durum districts.
DBA-Aurora ^{db}	M	All durum districts.
Saintly ^{db}	Q – M	All durum districts, and potential for hay production (awnless).
Westcourt ^{db}	M	All durum districts.

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

MATURITY CLASSIFICATIONS

Maturity classifications and terminology have been assigned using the industry guidelines provided by Australian Crop Breeders, available at www.australiancropbreeders.com.au. Table 2 shows the maturity description of each variety and associated boundary varieties used as a reference guide.

Varieties differ in their maturity speed from germination to full head emergence. It is important to match variety maturity with sowing time as flowering time is critical for optimising potential wheat yield. Growers need to understand the optimal flowering periods for their environment and therefore associated sowing period for the different maturity speeds. 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. There is an increasing number of varieties in the mid to slow range that may offer potential for late April to early May sowing, with evaluation of these varieties ongoing. Winter varieties are suited for germination from mid-March and April dates and may also provide dual-purpose options at these earlier sowing dates. More information on early sowing winter varieties is available at grdc.com.au/resources-and-publications/all-publications/publications/2020/ten-tips-for-early-sown-wheat.

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

Table 2: Maturity description and quick and slow boundary varieties for Australian wheat varieties assigned by Australian Crop Breeders Ltd.

Maturity description	Quick wheat boundary	Slow wheat boundary
Very quick spring	N/A	Axe ^{db}
Very quick – quick spring	> Axe ^{db}	Vixen ^{db}
Quick spring	> Vixen ^{db}	Corack ^{db} /LRPB Mustang ^{db}
Quick – mid spring	> Corack ^{db} /LRPB Mustang ^{db}	Mace ^{db} /Suntop ^{db}
Mid spring	> Mace ^{db} /Suntop ^{db}	LRPB Reliant ^{db} /Sheriff CL Plus ^{db} /LRPB Trojan ^{db}
Mid – slow spring	> LRPB Reliant ^{db} /Sheriff CL Plus ^{db} /LRPB Trojan ^{db}	Yitpi ^{db} /EGA Gregory ^{db}
Slow spring	> Yitpi ^{db} /EGA Gregory ^{db}	Sunzell
Slow – very slow spring	> Sunzell	Sunmax ^{db}
Very slow spring	> Sunmax ^{db}	N/A
Quick winter	N/A	Illabo ^{db}
Mid winter	> Illabo ^{db}	RGT Accroc
Slow winter	> RGT Accroc	N/A

For further information go to australiancropbreeders.com.au.

DISEASE

Growers should note that 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 3 and durum wheat in Table 14. The full SARDI Cereal Variety Disease Guide should always be consulted when selecting varieties. It can be found at:

pir.sa.gov.au/research/services/reports_and_newsletters/crop_performance.

An updated version with 2022 data will be available from mid-February 2023.

Table 3: Disease responses of selected wheat varieties and reaction to common disorders.

Variety	Rust			Septoria tritici blotch	Yellow leaf spot	Powdery mildew	Black point	CCN	Root lesion nematode		Common root rot	Crown rot
	Stem	Stripe	Leaf						<i>P. neglectus</i>	<i>P. thornei</i>		
Anapurna	MSS	RMR	MS	MRMS	MRMS	RMR	S (P)	MRMS	MS	S (P)	MSS	SVS
Ascot ^{dh}	MRMS	MSS	RMR	S	MRMS	S	MSS	MR	S	S	MS	S
Ballista ^{dh}	MR	MSS	S	SVS	MSS	SVS	MRMS (P)	MRMS	S	MRMS	MS	SVS
Beckom ^{dh}	MRMS	MRMS	MSS	SVS	MSS	S	MRMS	R	S	MSS	MSS	S
BigRed ^{dh}	MRMS (P)	R (P)	MRMS (P)	MRMS (P)	MR (P)	R	–	–	–	–	–	–
Brumby ^{dh}	MR (P)	MS (P)	SVS (P)	MSS (P)	MRMS (P)	R#	–	–	–	–	–	–
Calibre ^{dh}	MR	MS	S	S	MRMS	S	–	MRMS (P)	S (P)	MS	–	S
Catapult ^{dh}	MR	S	S	MSS	MRMS	S	MSS	R	S	MS	MS	MSS
Chief CL Plus ^{dh}	MR	SVS	MR	MSS	MRMS	SVS	MS	MS	MRMS	MSS	MS	MSS
Cutlass ^{dh}	R	MSS	RMR	MSS	MSS	MSS	MS	MR	MSS	MSS	MS	S
Denison ^{dh}	MS	MSS	S	MSS	MRMS	S	MS (P)	MS	S	S	MS	S
DS Bennett ^{dh}	MRMS	S	SVS	MSS	MRMS	R	MSS	S	S	S	S	VS
Emu Rock ^{dh}	MS	SVS	SVS	SVS	MRMS	MSS	MSS	S	MSS	S	MS	MSS
Grenade CL Plus ^{dh}	MR	MRMS	S	S	S	MSS	MSS	R	MSS	S	MS	S
Hammer CL Plus ^{dh}	MR	MS	S	MSS	MRMS	MSS	MRMS (P)	MRMS	MSS	S	MSS	MSS
Illabo ^{dh}	MRMS	MRMS	S	MSS	MS	R	MRMS	MRMS	MSS	MSS	MSS	S
Kiora ^{dh}	MR	RMR	MR/S	MSS	MSS	MS	MS	MSS	S	MRMS	MS	S
Kingston ^{dh}	S	MSS	S	S	MSS	SVS	S (P)	MRMS	S	MRMS	–	S
Kord CL Plus ^{dh}	MR	MR	S	S	MSS	MS	MRMS	MR	MSS	MSS	MRMS	S
LG Cobalt ^{dh}	S	RMR	MSS	S	MSS	MSS	MRMS	MSS	S	S	MSS	S
LRPB Anvil ^{dh} CL Plus	MR	MSS	SVS	VS	MSS	VS	–	MS (P)	MSS	S	–	MSS
LRPB Arrow ^{dh}	S	SVS	SVS	S	MRMS	SVS	MRMS	MS	MRMS	MS	MS	MSS
LRPB Cobra ^{dh}	MR	MSS	MR#	MSS	MRMS	MSS	MSS	MS	MSS	MSS	MS	S
LRPB Impala ^{dh}	MR	MRMS	SVS	VS	MSS	R	MS	MSS	SVS	S	MSS	MSS
LRPB Nighthawk ^{dh}	RMR	MRMS	MSS	MS	MRMS	SVS	MS	MS	MSS	MS	MSS	MSS
LRPB Orion ^{dh}	MR	MS	R	MSS	MSS	SVS	S	MS	MS	MSS	MSS	MSS
LRPB Trojan ^{dh}	MRMS	SVS	MR#	MSS	MSS	S	MS	MS	MSS	MSS	MS	MS
Longsword ^{dh}	MR	R/S	MR#	MSS	MRMS	MSS	MS	MRMS	MRMS	MRMS	MS	MSS
Mace ^{dh}	MRMS	SVS	S	SVS	MRMS	MSS	MRMS	MRMS	MS	MS	MS	S
Manning ^{dh}	MR	RMR	MSS	MRMS	MRMS	MS	S	S	MSS	S	SVS	VS
Razor CL Plus ^{dh}	MR	MS	S	SVS	MSS	MSS	MS	MR	S	MS	MSS	S
RGT Accroc	MS	RMR	SVS	MRMS	MRMS	MSS	MRMS	S	S	MSS	S	SVS
RGT Calabro	MS	RMR	MSS	MRMS	MR	RMR	MS	S	S	MS	MSS	SVS
RGT Zanzibar	VS	RMR	SVS	S	MS	MRMS	MRMS	MSS	S	MS (P)	S	S
Reilly ^{dh}	MR	MRMS	MSS	S	S	S	MR (P)	MRMS	MRMS	MSS	–	S
RockStar ^{dh}	MR	S	S	S	MRMS	SVS	MSS	MSS	MRMS	MS	MSS	S
Scepter ^{dh}	MRMS	MSS	MSS	S	MRMS	SVS	MS	MRMS	S	MSS	MS	MSS
Scout ^{dh}	MR	MRMS	MSS	S	SVS	MS	S	R	S	MSS	S	S
Sheriff CL Plus ^{dh}	MS	S	SVS	S	MRMS	SVS	MRMS	MS	MRMS	MRMS	MS	S
SQP Revenue ^{dh}	RMR	RMR	VS	MSS	MRMS	R	MS	S	S	S	SVS	S
Valiant ^{dh} CL Plus	RMR	MSS	S	S	MRMS	VS	–	MSS (P)	S	S (P)	–	S
Vixen ^{dh}	MRMS	S	SVS	S	MRMS	SVS	MSS	MSS	MRMS	MS	MS	S
Wyalkatchem ^{dh}	MSS	SVS	S	S	MR	SVS	MS	S	MRMS	MS	MS	S
Yitpi ^{dh}	S	S	S	MSS	SVS	MS	MS	MR	MSS	S	MS	S

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, – = variety yet to be fully evaluated, (P) = provisional ratings and subject to change when additional data becomes available. # May be more susceptible to alternate pathotypes. The second score after / is the response to a rare strain not known to be present in SA. Black point is not a disease but is a physiological response to certain humid conditions. Information on disease reactions (like Table 14) was supplied by the Cereal Pathology Group (SARDI) under the GRDC NVT Pathology investment DAS1905-013SAX. Contact Dr Tara Garrard: tara.garrard@sa.gov.au

WHEAT VARIETY NOTES

Ascot[®]

Ascot[®] is an APW quality, mid-maturing variety suited to medium to high-rainfall zones and irrigated cropping. Ascot[®] is the first wheat variety to be launched by BASF, marketed as having a medium plant height and good harvestability. Released in 2020 (tested as BSWDH10-215) and bred by BASF. Seed is available and marketed by Seednet. EPR \$3.50 ex-GST.

Ballista[®]

Ballista[®] is an AH quality, quick to mid-maturing variety, similar to Mace[®] but slightly quicker than Scepter[®]. Ballista[®] has high and stable yields across a range of environmental conditions, consistent with Scepter[®] and Vixen[®]. Released in 2020 (tested as RAC2598), bred and marketed by AGT. Seed is available from AGT Affiliates and eligible for Seed Sharing™. EPR \$3.50 ex-GST.

NEW – Brumby[®]

Brumby[®] is a mid-maturing APW wheat variety. Development speed of this variety is best suited to early May sowings but evaluation in NVT is limited so far. Brumby[®] offers good disease resistance to stem rust (MR) and powdery mildew (R), but is susceptible to leaf rust (SVS). Released in 2022 (tested as IGW6683), seed is available from local resellers or InterGrain Seedclub members. EPR \$3.50 ex-GST.

Calibre[®]

Calibre[®] is a quick-mid maturing variety similar to Mace[®] with an AH classification. Calibre[®] is largely derived from Scepter[®] with improved coleoptile length and good sprouting tolerance. It has had a high and consistent yield over the two years of NVT evaluation across a range of environments, with yields comparable with Scepter[®] and Vixen[®]. Calibre[®] was released in 2021 (tested as RAC2721), bred and marketed by AGT. Seed is available from AGT Affiliates and eligible for Seed Sharing™. EPR \$3.50 ex-GST.

Catapult[®]

Catapult[®] is an AH wheat with a mid-slow maturity, allowing the variety to take earlier planting opportunities in late April to early May. It is widely adapted and provides competitive yields from a range of sowing dates; however, evaluation from early sowing in SA is limited. Initial data suggests Catapult[®] produces grain with high test weights and low screenings and is suitable for wheat-on-wheat situations, with suitable yellow leaf spot resistance (MRMS). However, it is susceptible to powdery

mildew (S) and Septoria tritici blotch (MSS) and needs to be monitored. Catapult[®] was released in 2019 (tested as RAC2484), bred and marketed by AGT. Seed is available from AGT Affiliates and eligible for Seed Sharing™. EPR \$3.25 ex-GST.

Chief CL Plus[®]

Chief CL Plus[®] is a mid-maturing, imidazolinone-tolerant (Clearfield® Plus) APW wheat. Chief CL Plus[®] is rated as moderately resistant (MR) to leaf and stem rust and MRMS for yellow leaf spot, but is very susceptible to powdery mildew (SVS) and stripe rust (SVS). Chief CL Plus[®] was released in 2016 (tested as IGW6089). Seed is available from local resellers or InterGrain Seedclub members. EPR \$4.25 ex-GST.

Cutlass[®]

Cutlass[®] has an APW classification in SA and is a mid-slow maturing variety. It is photoperiod sensitive and has a similar development pattern to Yitpi[®]. While generally lower yielding from May sowing dates compared with faster-developing varieties, its unique flowering behaviour has applications for earlier sowing and frost management where Yitpi[®] has been successful. Cutlass[®] is rated as moderately resistant to CCN with good levels of resistance to stem and leaf rusts (MSS to stripe rust), but is moderately susceptible to susceptible (MSS) to yellow leaf spot. Cutlass[®] was released in 2015 (tested as RAC2069), bred and marketed by AGT. Seed is available from AGT Affiliates and eligible for Seed Sharing™. EPR \$3.00 ex-GST.

Denison[®]

Denison[®] is an APW quality, slow-maturing variety suited to mid to late April sowing. Denison[®] shows competitive yields from early sowing and is also competitive from May sowing dates; however, early sowing and adaptability of the variety has had limited evaluation. Released in 2020 (tested as WAGT734), bred and marketed by AGT. Seed is available from AGT Affiliates and eligible for Seed Sharing™. EPR \$3.40 ex-GST.

Hammer CL Plus[®]

Hammer CL Plus[®] is an imidazolinone-tolerant (Clearfield®) AH variety with two-gene tolerance to label rates of Intervix® herbicide. It is a quick-mid maturing variety closely related to Mace[®]. Hammer CL Plus[®] has moderate CCN and yellow leaf spot resistance (MRMS). Released 2020 (tested as OAGT0016), bred and marketed by AGT. Seed is available from AGT Affiliates. It is not eligible for AGT Seed Sharing™. EPR \$4.25 ex-GST.

NEW – Kingston[®]

Kingston[®] is mid-maturity AH wheat. It is a compact plant type and with broad adaptability. Kingston[®] is susceptible to all rusts and very susceptible to powdery mildew (SVS); it has moderate resistance to CCN (MRMS). Released in 2022 (tested as BSWDH04-062) by BASF. Seed is available through Seednet. EPR \$3.50 ex-GST.

NEW – LRPB Anvil[®] CL Plus

LRPB Anvil[®] CL Plus is a quick-maturity, two-gene imidazolinone-tolerant AH wheat that can be sprayed by label rates of registered imidazolinone herbicides. Quick to maturity with a similar if not faster development pattern to Vixen[®]. It has good early vigour, providing good weed competition early. LRPB Anvil[®] CL Plus has good final grain size and is well suited to the low-medium rainfall zones, providing a fast-maturing, imidazolinone-tolerant variety choice to growers. It is very susceptible to Septoria tritici blotch and powdery mildew and will need to be monitored. Released in 2022, the variety was originally bred by Grains Innovation Australia with further development by LongReach Plant Breeders. Seed is available through Pacific Seeds. EPR \$4.25 ex-GST.

LRPB Bale[®]

LRPB Bale[®] is an APW quality wheat with a slow maturity. It is an awnless variety with a long coleoptile. It has a LRPB Scout[®] background originating from germplasm produced by CSIRO. Maturing later than Yitpi[®], its awnless qualities and delayed flowering allows it to be delivered as grain or cut for hay. Evaluation in NVT is limited, with evaluation ongoing. Released in 2021 (tested as LPB18-7946) by LongReach Plant Breeders. Seed is available through farmer-to-farmer trade.

LRPB Cobra[®]

LRPB Cobra[®] is an AH quality wheat that has a quick-mid maturity. It is most suited to medium to high-rainfall zones and performs well under irrigation. It has good resistance to stem rust but is rated MSS to stripe rust and some susceptibility to leaf rust has been observed. It is MSS to Septoria tritici blotch and MS to CCN and yellow leaf spot. LRPB Cobra[®] has good grain size and moderate test weight and is moderately susceptible to pre-harvest sprouting. Released in 2011 (tested as LPB07-0956) by LongReach Plant Breeders. Seed is available from Pacific Seeds. EPR \$3.50 ex-GST.

LRPB Dual[®]

LRPB Dual[®] is an AH quality wheat with a mid-slow maturity. It is also an awnless variety with a long coleoptile length. Bred from germplasm produced by CSIRO with a LRPB Scout[®]/Yitpi[®] background, it has a unique maturity pattern, flowering between LRPB Trojan[®] and Yitpi[®]. Its awnless nature lends it to dual-purpose applications as it can be cut for hay or delivered as grain, offering options in frost-prone areas. Evaluation through NVT is limited, with evaluation ongoing. Released in 2021 (tested as LPB18-7982) by LongReach Plant Breeders. Seed available through LongReach seed network. EPR \$3.50 ex-GST.

LRPB Nighthawk[®]

LRPB Nighthawk[®] is an APW quality wheat with a very slow maturity but still a spring wheat. Primarily suited to mid-April germination opportunities within SA. It is suited to early planting or grazing opportunities similar to winter wheats in the higher-rainfall zones. Early sowing agronomy data suggests LRPB Nighthawk[®] has similar or higher yields than winter wheats when established in mid-April. LRPB Nighthawk[®] has good resistance to stem and stripe rust but is MSS to leaf rust and Septoria tritici blotch and SVS to powdery mildew. Released in 2019 (tested as LPB14-0392) by LongReach Plant Breeders. Seed is available from Pacific Seeds. EPR \$4.25 ex-GST.

LRPB Trojan[®]

LRPB Trojan[®] is a mid to slow-maturing APW quality variety. It is well suited to main season sowing in high production zones and slightly earlier sowing in medium-rainfall zones. It is SVS to stripe rust, MRMS to stem rust and MSS for Septoria tritici blotch. LRPB Trojan[®] is rated S for powdery mildew and is MS for CCN. It has large grain size with low screenings, high test weight and good black point resistance. Released in 2013 (tested as LPB08-1799) by LongReach Plant Breeders. Seed is available from Pacific Seeds and is approved for farmer-to-farmer trade. EPR \$4.00 ex-GST.

Mace[®]

Mace[®] is a quick-mid maturity variety with 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[®] provides a solid-yielding and widely adapted variety but has now been outperformed by many of its sister or daughter varieties that also have improved disease packages. Released in 2008 (tested as RAC1372), bred and marketed by AGT. Seed is available from AGT Affiliates and eligible for Seed Sharing™. EPR \$3.00 ex-GST.

Razor CL Plus[Ⓢ]

Razor CL Plus[Ⓢ] is a quick to mid-maturity, imidazolinone-tolerant (Clearfield® Plus) ASW wheat. It has stable yields across a range of environments and provides highly competitive yields within the Clearfield® wheat varieties. Razor CL Plus[Ⓢ] is rated SVS for Septoria tritici blotch, S to leaf rust and MS to stripe rust, but MR to CCN. Released in 2018 (tested as RAC2517), bred and marketed by AGT. Seed is available from AGT Affiliates. It is not eligible for AGT Seed Sharing™. EPR \$3.30 ex-GST.

NEW – Reilly[Ⓢ]

Reilly[Ⓢ] is a mid-maturity AH wheat. Best suited to the low to medium-rainfall zone, it has a medium plant height. Reilly[Ⓢ] has moderate resistance to stem (MR), stripe rust (MRMS) and CCN (MRMS), but is susceptible to Septoria tritici blotch, yellow leaf spot and powdery mildew. Released in 2022 (tested as BH120020S-11) by BASF. Seed is available through Seednet. EPR \$3.50 ex-GST.

RockStar[Ⓢ]

RockStar[Ⓢ] is an AH quality wheat with a mid-slow maturity. It was released in 2019 by InterGrain. RockStar[Ⓢ] has been shown to have wide adaptability to a range of environments and sowing dates. Yield performance in both early and main-season NVT show that its mid-slow maturity is suited to late April to early May sowing, but it still performs well from most May sowing dates. RockStar[Ⓢ] is rated MR to stem rust, MRMS to yellow leaf spot, SVS to powdery mildew, and S to leaf and stripe rust and Septoria. Released in 2019 (tested as IGW4341). Seed is available from local resellers and InterGrain Seedclub members. EPR \$3.50 ex-GST.

Scepter[Ⓢ]

Scepter[Ⓢ] is a quick-mid maturing AH wheat largely derived from Mace[Ⓢ]. It is a very widely adapted variety that is suited to most May sowing dates. It continues to be a high-yielding, competitive variety across a range of environments. Scepter[Ⓢ] is rated MRMS to stem rust, MSS to leaf and stripe rust, and MRMS to CCN and yellow leaf spot. Scepter[Ⓢ] 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. Released in 2015 (tested as RAC2182), bred and marketed by AGT. Seed is available from AGT Affiliates, retailers or through Seed Sharing™. EPR \$3.25 ex-GST.

Sheriff CL Plus[Ⓢ]

Sheriff CL Plus[Ⓢ] is an imidazolinone-tolerant (Clearfield® Plus) APW wheat. It is mid-slow maturing and is similar to LRPB Trojan[Ⓢ] in developmental speed and can therefore be sown slightly earlier than the other Clearfield® Plus varieties. Sheriff CL Plus[Ⓢ] has yielded competitively across a range of environments and sowing dates in both the early and main season NVT across SA. It provides competitive and high yields within the Clearfield® Plus varieties. Sheriff CL Plus[Ⓢ] is rated SVS to leaf rust and powdery mildew, MS to stem rust, S to stripe rust, S to Septoria tritici blotch, MRMS to yellow leaf spot, and MS to CCN. Released in 2016 (tested as IGW6155). Seed is available from local resellers or InterGrain Seedclub members. EPR \$4.25 ex-GST.

Valiant[Ⓢ] CL Plus

Valiant[Ⓢ] CL Plus[Ⓢ] is an imidazolinone-tolerant (Clearfield® Plus) AH wheat. It is slow maturing, providing the phenology fit for sowing in April. Valiant[Ⓢ] CL Plus has shown in NVT that it is very susceptible to powdery mildew – worse than similar varieties. Released in 2021 (tested as IGW4502). Seed is available from local resellers or InterGrain Seedclub members. EPR \$4.35 ex-GST.

Vixen[Ⓢ]

Vixen[Ⓢ] is a quick-maturity variety with an AH quality in SA. Vixen[Ⓢ] has wide adaptability across a range of environments within SA and is consistently high yielding from May sowing dates. Vixen[Ⓢ] is rated SVS to powdery mildew and leaf rust, MRMS to stem rust, S to stripe rust and Septoria tritici blotch, MRMS to yellow leaf spot, and MSS to CCN. Released in 2018 (tested as IGW4279). Seed is available through local resellers or InterGrain Seedclub members. EPR \$3.50 ex-GST.

INTRO

WHEAT

BARLEY

OAT

CANOLA

FABA BEAN

LENTIL

FIELD PEA

CHICKPEA

LUPIN

VETCH

SOFT WHEATS

LRPB Impala^{db}

LRPB Impala^{db} 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. LRPB Impala^{db} produces large grain with low screening losses and is MRMS to black point. Released in 2011 (tested as C51021) by LongReach Plant Breeders. Seed is available from Pacific Seeds. EPR \$3.50 ex-GST.

LRPB Orion^{db}

LRPB Orion^{db} is a mid-slow maturing soft biscuit (ASF1) wheat targeted to eastern Australia. It is an awnless variety with a long coleoptile. LRPB Orion^{db} is moderately susceptible to CCN (MS) and yellow

leaf spot (MSS) but has good stem and leaf rust resistance and is MS to stripe rust. LRPB Orion^{db} is S to black point and susceptible to sprouting. Released in 2009 (tested as LPB04-2039) by LongReach Plant Breeders. Seed is available from Pacific Seeds and is approved for farmer-to-farmer trade. EPR \$3.00 ex-GST.

LRPB Oryx^{db}

LRPB Oryx^{db} is a mid-maturing soft biscuit (ASF1) wheat targeted to eastern Australia. It is a variety with large seed size and low screenings. It also has low protein accumulation, meeting the quality requirements for Allied Mills and Arnotts. Released in 2018 (tested as LPB12-0152) by LongReach Plant Breeders. Seed is available from Pacific Seeds. EPR \$3.75 ex-GST.

Table 4: Upper Eyre Peninsula main season wheat yield performance. NVT data 2017–21.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	1.12	1.31	1.30	1.47	2.30
		No. trials	6	6	7	6	6
MILLING WHEATS							
Ballista ^{db}	AH	19	–	–	117	113	112
Beckom ^{db}	AH	19	104	103	104	–	–
Brumby ^{db}	APW	12	–	–	–	109	107
Calibre ^{db}	AH	12	–	–	–	116	116
Catapult ^{db}	AH	25	–	107	104	109	108
Corack ^{db}	APW	25	100	109	94	95	–
Cutlass ^{db}	APW	31	99	103	87	100	95
Emu Rock ^{db}	AH	31	98	98	108	97	103
LRPB Arrow ^{db}	AH	19	101	102	100	–	–
LRPB Cobra ^{db}	AH	12	94	97	–	–	–
LRPB Dual ^{db}	AH	6	–	–	–	–	97
LRPB Scout ^{db}	AH	25	101	93	112	105	–
LRPB Trojan ^{db}	APW	31	102	102	94	102	97
Mace ^{db}	AH	31	104	107	99	100	111
RockStar ^{db}	AH	25	–	108	109	113	110
Scepter ^{db}	AH	31	110	111	106	110	116
Vixen ^{db}	AH	31	107	109	120	110	116
Wyalkatchem ^{db}	APW	25	102	99	98	98	–
Yitpi ^{db}	AH	31	95	97	87	94	92
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus ^{db}	APW	31	100	105	86	95	101
Grenade CL Plus ^{db}	AH	31	97	94	99	95	97
Hammer CL Plus ^{db}	AH	19	–	–	101	99	103
Kord CL Plus ^{db}	AH	31	96	98	92	94	98
LRPB Anvil ^{db} CL Plus	AH	12	–	–	–	100	111
Razor CL Plus ^{db}	ASW	31	104	104	110	103	111
Sheriff CL Plus ^{db}	APW	31	104	103	100	103	103
Valiant ^{db} CL Plus	AH	6	–	–	–	–	96

– denotes no data available.

FEED AND UNCLASSIFIED WHEATS

RGT Zanzibar

RGT Zanzibar is a very slow-maturing red spring wheat of feed grain quality, suited to the medium-high rainfall zone. It has good standability, however it is very susceptible to stem rust, making it a high-risk variety should stem rust occur so should be grown with caution. Released in 2017 (tested as SFR86-055) by RAGT Seeds. Seed is available through Seed Force. EPR \$4.00 ex-GST.

YIELD PERFORMANCE EXPERIMENTS FROM 2017–21

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 2017–21 inclusive, along with some observations in adjacent columns. Further results can be found on the NVT website (nvt.grdc.com.au).

Table 5: Lower Eyre Peninsula main season wheat yield performance. NVT data 2017–21.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	2.92	3.65	5.82	3.93	3.89
		No. trials	3	3	1	3	2
MILLING WHEATS							
Ascot ^{db}	APW	6	–	–	108	101	94
Ballista ^{db}	AH	6	–	–	111	113	108
Beckom ^{db}	AH	7	106	105	107	–	–
Brumby ^{db}	APW	2	–	–	–	–	110
Calibre ^{db}	AH	5	–	–	–	104	112
Catapult ^{db}	AH	9	–	108	98	108	109
Cutlass ^{db}	APW	12	101	102	88	96	101
Denison ^{db}	APW	2	–	–	–	–	111
Emu Rock ^{db}	AH	12	97	97	107	97	99
Kingston ^{db}	AH	5	–	–	–	114	96
LRPB Arrow ^{db}	AH	9	103	103	109	–	102
LRPB Cobra ^{db}	AH	12	94	99	111	105	93
LRPB Dual ^{db}	AH	2	–	–	–	–	96
LRPB Scout ^{db}	AH	10	96	96	104	98	–
LRPB Trojan ^{db}	APW	12	103	103	98	106	101
Mace ^{db}	AH	12	107	104	100	104	110
Reilly ^{db}	AH	5	–	–	–	98	94
RockStar ^{db}	AH	7	–	–	111	108	112
Scepter ^{db}	AH	9	–	111	103	112	110
Vixen ^{db}	AH	12	113	112	120	115	111
Wyalkatchem ^{db}	APW	10	101	100	105	108	–
Yitpi ^{db}	AH	12	93	94	87	89	95
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus ^{db}	APW	12	104	103	97	105	106
Grenade CL Plus ^{db}	AH	12	93	92	94	89	95
Hammer CL Plus ^{db}	AH	5	–	–	–	94	101
Kord CL Plus ^{db}	AH	12	94	93	86	84	98
LRPB Anvil ^{db} CL Plus	AH	2	–	–	–	–	106
Razor CL Plus ^{db}	ASW	12	106	104	107	105	107
Sheriff CL Plus ^{db}	APW	9	106	–	105	104	107
Valiant ^{db} CL Plus	AH	5	–	–	–	98	98

– denotes no data available.

Table 6: Yorke Peninsula main season wheat yield performance. NVT data 2017–21.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	4.48	4.03	3.18	3.50	4.16
		No. trials	3	3	4	3	4
MILLING WHEATS							
Ascot ^{db}	APW	11	–	–	102	102	100
Ballista ^{db}	AH	11	–	–	114	110	110
Brumby ^{db}	APW	4	–	–	–	–	109
Calibre ^{db}	AH	7	–	–	–	107	110
Catapult ^{db}	AH	14	–	105	107	106	105
Cutlass ^{db}	APW	17	101	100	95	99	96
Denison ^{db}	APW	7	–	–	–	106	106
Emu Rock ^{db}	AH	17	96	98	100	97	101
Kingston ^{db}	AH	7	–	–	–	109	106
LRPB Arrow ^{db}	AH	10	103	102	102	–	–
LRPB Cobra ^{db}	AH	13	97	103	96	102	–
LRPB Dual ^{db}	AH	4	–	–	–	–	95
LRPB Scout ^{db}	AH	13	98	102	106	101	–
LRPB Trojan ^{db}	APW	17	104	102	101	104	100
Mace ^{db}	AH	17	104	98	101	100	104
Reilly ^{db}	AH	7	–	–	–	102	100
RockStar ^{db}	AH	13	–	109	112	110	109
Scepter ^{db}	AH	17	110	105	109	107	109
Vixen ^{db}	AH	17	106	110	113	110	115
Wyalkatchem ^{db}	APW	13	103	98	101	102	–
Yitpi ^{db}	AH	17	96	95	91	93	92
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus ^{db}	APW	17	103	98	95	101	101
Grenade CL Plus ^{db}	AH	17	95	93	95	92	94
Hammer CL Plus ^{db}	AH	7	–	–	–	96	98
LRPB Anvil ^{db} CL Plus	AH	7	–	–	–	94	102
Kord CL Plus ^{db}	AH	16	90	95	93	92	91
Razor CL Plus ^{db}	ASW	17	103	102	105	102	106
Sheriff CL Plus ^{db}	APW	14	–	103	104	106	104
Valiant ^{db} CL Plus	AH	7	–	–	–	100	97

– denotes no data available.

Table 7: Mid North main season wheat yield performance. NVT data 2017–21.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	3.33	2.77	2.90	5.11	4.56
		No. trials	3	2	4	4	4
MILLING WHEATS							
Ascot ^{db}	APW	12	–	–	99	103	100
Ballista ^{db}	AH	12	–	–	112	110	109
Brumby ^{db}	APW	4	–	–	–	–	109
Calibre ^{db}	AH	8	–	–	–	110	111
Catapult ^{db}	AH	14	–	106	106	104	106
Corack ^{db}	APW	13	107	108	107	100	–
Cutlass ^{db}	APW	17	96	95	95	98	102
Denison ^{db}	APW	8	–	–	–	105	109
Emu Rock ^{db}	AH	17	100	102	103	100	97
Kingston ^{db}	AH	8	–	–	–	109	105
LRPB Arrow ^{db}	AH	13	105	104	103	–	100
LRPB Cobra ^{db}	AH	16	104	100	95	97	105
LRPB Dual ^{db}	AH	4	–	–	–	–	97
LRPB Impala ^{db}	ASFT	7	92	92	92	94	95
LRPB Orion ^{db}	ASFT	4	86	89	85	89	–
LRPB Scout ^{db}	AH	13	97	98	99	103	–
LRPB Trojan ^{db}	APW	17	101	99	99	101	103
Mace ^{db}	AH	17	107	107	106	98	99
Reilly ^{db}	AH	8	–	–	–	106	103
RockStar ^{db}	AH	14	–	109	110	108	110
Scepter ^{db}	AH	17	111	112	112	104	106
Vixen ^{db}	AH	17	112	116	117	112	109
Wyalkatchem ^{db}	APW	13	104	101	100	99	–
Yitpi ^{db}	AH	17	93	92	91	93	96
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus ^{db}	APW	17	104	101	100	97	99
Grenade CL Plus ^{db}	AH	17	96	96	95	94	93
Hammer CL Plus ^{db}	AH	8	–	–	–	97	97
Kord CL Plus ^{db}	AH	17	94	95	94	91	93
LRPB Anvil ^{db} CL Plus	AH	4	–	–	–	–	98
Razor CL Plus ^{db}	ASW	17	106	109	109	103	101
Sheriff CL Plus ^{db}	APW	14	–	103	103	103	102
Valiant ^{db} CL Plus	AH	8	–	–	–	99	101
FEED WHEATS							
RGT Zanzibar	FEED	17	91	86	86	99	98

– denotes no data available.

Table 8: Murray Mallee main season wheat yield performance. NVT data 2017–21.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	3.40	1.49	1.36	3.04	1.46
		No. trials	1	5	6	6	4
MILLING WHEATS							
Ballista ^{db}	AH	16	–	–	112	112	111
Beckom ^{db}	AH	12	107	102	104	–	–
Brumby ^{db}	APW	4	–	–	–	–	108
Calibre ^{db}	AH	10	–	–	–	114	116
Catapult ^{db}	AH	21	–	108	112	109	105
Cutlass ^{db}	APW	22	104	100	105	100	96
Emu Rock ^{db}	AH	22	93	100	93	97	103
LRPB Arrow ^{db}	AH	16	104	99	96	–	97
LRPB Dual ^{db}	AH	4	–	–	–	–	101
LRPB Scout ^{db}	AH	22	95	100	104	104	106
LRPB Trojan ^{db}	APW	22	107	99	105	103	97
Mace ^{db}	AH	22	105	104	99	100	101
RockStar ^{db}	AH	21	–	111	115	112	108
Scepter ^{db}	AH	22	114	111	111	109	106
Vixen ^{db}	AH	22	107	112	104	109	111
Wyalkatchem ^{db}	APW	18	103	96	97	99	–
Yitpi ^{db}	AH	22	95	95	97	94	94
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus ^{db}	APW	22	107	98	97	97	92
Grenade CL Plus ^{db}	AH	22	91	96	95	95	99
Hammer CL Plus ^{db}	AH	16	–	–	99	98	102
Kord CL Plus ^{db}	AH	22	92	97	96	93	98
LRPB Anvil ^{db} CL Plus	AH	4	–	–	–	–	107
Razor CL Plus ^{db}	ASW	22	102	106	100	103	106
Sheriff CL Plus ^{db}	APW	21	–	101	103	104	99
Valiant ^{db} CL Plus	AH	4	–	–	–	–	98

– denotes no data available.

Table 9: South East main season wheat yield performance. NVT data 2017–21. Data for 2021 not available.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	4.18	5.02	6.63	5.06	0.00
		No. trials	1	3	2	1	0
MILLING WHEATS							
Ascot ^{db}	APW	2	–	–	104	–	Not available
Ballista ^{db}	AH	3	–	–	111	109	
Beckom ^{db}	AH	7	106	106	107	105	
Calibre ^{db}	AH	1	–	–	–	107	
Catapult ^{db}	AH	6	–	106	106	105	
Cutlass ^{db}	APW	7	95	100	100	100	
Denison ^{db}	APW	1	–	–	–	106	
Emu Rock ^{db}	AH	7	102	96	95	98	
LRPB Arrow ^{db}	AH	6	108	104	104	–	
LRPB Cobra ^{db}	AH	7	103	103	105	104	
LRPB Scout ^{db}	AH	7	95	101	104	100	
LRPB Trojan ^{db}	APW	7	101	104	106	103	
Mace ^{db}	AH	7	107	100	96	100	
RockStar ^{db}	AH	6	–	109	110	109	
Scepter ^{db}	AH	7	110	106	105	106	
Vixen ^{db}	AH	6	–	108	108	110	
Wyalkatchem ^{db}	APW	7	106	102	102	101	
Yitpi ^{db}	AH	7	92	94	93	94	
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus ^{db}	APW	7	106	101	99	101	Not available
Grenade CL Plus ^{db}	AH	7	95	93	91	92	
Hammer CL Plus ^{db}	AH	1	–	–	–	96	
Kord CL Plus ^{db}	AH	7	92	90	87	90	
Razor CL Plus ^{db}	ASW	7	107	101	100	102	
Sheriff CL Plus ^{db}	APW	6	–	105	106	105	
Valiant ^{db} CL Plus	AH	1	–	–	–	100	
FEED WHEATS							
LRPB Beaufort ^{db}	FEED	6	–	102	106	102	Not available
RGT Zanzibar	FEED	7	93	103	110	101	

– denotes no data available.

GRAIN QUALITY FROM 2017–21

Grain quality for individual varieties varies between years. However, the trends across sites for a single year tend to be more consistent for a variety. Long-term results highlight trends in variety performance and consistency across seasons. Tables 10 and 17 summarise the variation in test weight for bread wheat and durum wheat varieties, respectively. Test weight is expressed as the mean test weight from NVT data 2017 to 2021 inclusive, along with

some observations in adjacent columns. Table 18 summarises the variation in screening percentages in durum wheat varieties. Screenings are expressed as the mean percentage of grain less than two millimetres in size from NVT data 2017 to 2021 inclusive, along with some observations in adjacent columns. Further results can be found on the NVT website (nvt.grdc.com.au).

Table 10: South Australian wheat test weight performance. NVT data 2017–21.

Variety	Classification		Test weight (kg/hectolitre)				
		Year	2017	2018	2019	2020	2021
		No. trials	17	19	23	23	20
MILLING WHEATS							
Ascot [Ⓓ]	APW	31	—	—	82.88	81.17	79.37
Ballista [Ⓓ]	AH	65	—	—	81.58	80.90	79.43
Brumby [Ⓓ]	APW	20	—	—	—	—	80.54
Calibre [Ⓓ]	AH	43	—	—	—	80.22	79.44
Catapult [Ⓓ]	AH	84	—	81.12	82.72	82.18	81.67
Cutlass [Ⓓ]	APW	101	79.91	81.39	82.42	82.06	81.12
Denison [Ⓓ]	APW	18	—	—	—	82.01	82.23
LRPB Bale [Ⓓ]	APW	4	—	—	—	—	85.47
LRPB Scout [Ⓓ]	AH	85	81.44	82.23	83.39	82.96	84.00
LRPB Trojan [Ⓓ]	APW	101	80.74	81.39	83.30	82.78	81.59
Mace [Ⓓ]	AH	101	79.32	80.98	82.08	81.36	80.76
RockStar [Ⓓ]	AH	83	—	80.00	81.74	81.81	80.18
Scepter [Ⓓ]	AH	101	79.70	80.86	82.97	82.01	81.17
Vixen [Ⓓ]	AH	100	78.60	78.91	81.31	80.49	79.11
Yitpi [Ⓓ]	AH	101	79.99	81.31	82.26	81.10	81.78
IMIDAZOLINONE-TOLERANT WHEATS							
Chief CL Plus [Ⓓ]	APW	101	78.61	80.10	81.16	81.51	80.16
Grenade CL Plus [Ⓓ]	AH	100	79.71	79.93	82.16	80.92	80.45
Hammer CL Plus [Ⓓ]	AH	54	—	—	81.53	81.28	81.00
LRPB Anvil [Ⓓ] CL Plus	AH	12	—	—	—	—	81.42
Razor CL Plus [Ⓓ]	ASW	101	80.02	80.78	82.87	81.98	81.12
Sheriff CL Plus [Ⓓ]	APW	90	79.53	80.77	81.96	81.86	80.72
Valiant [Ⓓ] CL Plus	AH	31	—	—	—	82.34	82.14

– denotes no data available.

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, new varieties and breeding lines continue to be trialled in early-sown NVT and agronomy trials funded by GRDC. Further information on variety performance and agronomy can be found as part of GRDC's Management of Early Sown Wheat and Hyper Yielding Cereal projects.

MILLING WHEATS

DS Bennett[Ⓢ]

DS Bennett[Ⓢ] is a mid-slow white winter wheat with an ASW classification. It has a slow growth pattern and is suited to early sowing (from mid-March) in longer growing season environments. Its awnless characteristic and winter growth type means it can be used as a dual-purpose crop for grazing and grain, as well as being suited for hay. DS Bennett[Ⓢ] is rated SVS to leaf rust and S to stripe rust, MRMS to stem rust, MSS to Septoria and S to CCN. It may also be a higher risk for black point. Released in 2018 (tested as ADV11.9419). Seed is available from Seednet partners. EPR \$4.25 ex-GST.

Illabo[Ⓢ]

Illabo[Ⓢ] is an AH white wheat with a quick winter maturity. It was released in 2018 by AGT and has an AH classification in SA. It can be sown early due to its vernalisation requirement, with its slower maturity lending it to grazing opportunities. Primarily suited to medium-high rainfall zones with a mid-long growing season. Illabo[Ⓢ] is a uniquely placed variety as it is the only AH winter wheat available in SA. It is rated S to leaf rust, MRMS to stem and stripe rust, MSS to Septoria and MRMS to CCN. Released in 2018 (tested as V09150-01), bred and marketed by AGT. Seed is available from AGT Affiliates, retailers or through Seed Sharing[™]. EPR \$3.50 ex-GST.

FEED WINTER WHEATS

Anapurna

Anapurna is red feed wheat with a mid-slow maturity. It is an imported European variety introduced by AGT in collaboration with Field Applied Research (FAR) Australia as part of the Hyper Yielding Cereal project. Anapurna is most suited to a long growing season in the high-rainfall zones of SA. It is best suited to early planting and provides grazing opportunities from early sowing in high-rainfall environments. Anapurna has long vegetative growth phases and similar maturity to RGT Accroc. It was released in 2020. Seed is available from AGT Affiliates, retailers or through Seed Sharing[™]. EPR \$3.20 ex-GST.

NEW – BigRed[Ⓢ]

BigRed[Ⓢ] is a mid-slow maturing red feed winter wheat. Suited for the medium to high-rainfall zones and also performs well under irrigation. It can be used as a dual-purpose variety when early sowing is achieved. BigRed[Ⓢ] offers a disease package with resistance to powdery mildew and stripe rust, as well as MRMS to other folia pathogens. Released in 2022 (tested as AGFWH004718). Seed is available from AGF Seeds and through participating resellers. EPR \$3.65 ex-GST.

Longsword[Ⓢ]

Longsword[Ⓢ] is a quick winter-maturity variety and classified as a white feed wheat. Its quick winter development means that once its vernalisation requirement is met it is very fast to flower. It is most suited to April sowing dates but evaluation within NVT is limited. Agronomic trials suggest it is the highest-yielding winter wheat suited to low-rainfall environments. Longsword[Ⓢ] is rated MR to stem and leaf rust, MSS to Septoria and MRMS to CCN. Released in 2017 (tested as RAC2341), bred and marketed by AGT. Seed is available from AGT Affiliates, retailers or through Seed Sharing[™]. EPR \$2.75 ex-GST.

Manning[Ⓢ]

Manning[Ⓢ] is a mid-slow maturing winter wheat, classified as a white feed wheat in SA. It is an awnless type and its slow growth pattern enable dual-purpose uses, including grazing, while still maintaining high yield potential. Best suited to high-rainfall environments with a long growing season, Manning[Ⓢ] provides competitive high yields within those environments. Good resistance to stem rust but is susceptible to CCN. Released in 2013 (CS9274). Seed is available from GrainSearch affiliates or contact GrainSearch for more details. EPR \$3.50 ex-GST.

INTRO

WHEAT

BARLEY

OAT

CANOLA

FABA BEAN

LENTIL

FIELD PEA

CHICKPEA

LUPIN

VETCH

RGT Accroc

RGT Accroc is a mid-slow maturity red winter wheat, feed grain quality. It is suited to the high-rainfall zone and for sowing late February to early April for early grazing. Very high-yielding variety with good options for grazing and grain production. RGT Accroc is rated SVS to leaf rust, MS to stem rust and RMR to stripe rust, MRMS to yellow leaf spot and S to CCN. Released in 2016 (tested as SFR86-054). Seed is available via Seed Force Broadacre Commercial Partners. EPR \$4.00 ex-GST.

RGT Calabro

RGT Calabro is a mid-slow maturing, red feed grain, awned winter wheat. Well suited to the long growing seasons of the high-rainfall zone. It has a very high yield potential and performs well from sowing in late February to March with potential for early grazing. RGT Calabro has good resistance to stripe rust, yellow leaf spot, Septoria tritici blotch and powdery mildew. Released in 2017 (tested as SFR86-036). Seed is available via Seed Force Broadacre Commercial Partners. EPR \$4.00 ex-GST.

RGT Cesario^{db}

RGT Cesario^{db} is a mid-slow maturing red winter wheat. It is an awnless variety that has very high yield potential in high-rainfall zones of SA with a long growing season. Well suited to early grazing combined with the high yield make it a variety well suited to dual-purpose uses. Released in 2021 (tested as SFR86-090). Seed is available via Seed Force Broadacre Commercial Partners. EPR \$4.00 ex-GST.

Table 11: South East long season wheat yield performance. NVT data 2020.

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

Variety	Classification	Year	2020
		Mean yield (t/ha)	6.03
		No. trials	1
MILLING WHEATS			
Denison ^{db}	APW	1	99
DS Bennett ^{db}	ASW	1	105
Illabo ^{db}	AH	1	101
LRPB Nighthawk ^{db}	APW	1	95
Longsword ^{db}	AWW	1	98
FEED WHEATS			
Anapurna	FEED	1	110
Brennan	FEED	1	86
Einstein	FEED	1	101
Naparoo ^{db}	FEED	1	71
LRPB Beaufort ^{db}	FEED	1	122
Manning ^{db}	FEED	1	107
RGT Accroc	FEED	1	118
RGT Calabro	FEED	1	120
RGT Zanzibar	FEED	1	114
SQP Revenue ^{db}	FEED	1	111

Table 12: South East early season wheat yield performance. NVT data 2017–21. Data for 2021 not available.

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

Variety	Classification	Year	2017	2018	2019	2020	2021
		Mean yield (t/ha)	5.76	7.46	7.97	6.23	0.00
		No. trials	1	1	1	1	0
MILLING WHEATS							
Ascot ^{db}	APW	1	–	–	–	104	Not available
Beckom ^{db}	AH	4	101	93	94	107	
Catapult ^{db}	AH	3	–	97	97	102	
Cutlass ^{db}	APW	4	102	101	92	98	
Denison ^{db}	APW	2	–	–	96	100	
DS Bennett ^{db}	ASW	4	109	112	109	107	
DS Pascal ^{db}	APW	4	101	100	108	106	
Illabo ^{db}	AH	4	106	103	107	107	
LRPB Nighthawk ^{db}	APW	3	–	104	103	101	
LRPB Trojan ^{db}	APW	4	98	94	96	104	
Longsword ^{db}	AWW	4	109	101	100	109	
RockStar ^{db}	AH	2	–	–	108	114	
Yitpi ^{db}	AH	3	–	86	81	82	
IMIDAZOLINONE-TOLERANT WHEATS							
Elmore CL Plus ^{db}	AH	4	93	94	91	91	Not available
Sheriff CL Plus ^{db}	APW	2	–	–	97	104	
Valiant ^{db} CL Plus	AH	1	–	–	–	109	
FEED WHEATS							
LRPB Beaufort ^{db}	FEED	4	107	112	115	113	Not available
Manning ^{db}	FEED	4	105	111	113	99	
RGT Accroc	FEED	4	114	117	117	111	
RGT Calabro	FEED	4	114	114	117	112	
RGT Cesario ^{db}	FEED	1	–	–	–	114	
RGT Zanzibar	FEED	4	117	111	113	120	

– denotes no data available.

Table 13: Upper Eyre Peninsula and Murray Mallee early season wheat yield performance. NVT data 2017 and 2020–2021.

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

Variety	Classification	Upper Eyre Peninsula				Murray Mallee	
		Year	2017	2020	2021	Year	2020
		Mean yield (t/ha)	1.62	1.96	3.77	Mean yield (t/ha)	3.35
		No. trials	1	1	1	No. trials	1
MILLING WHEATS							
Catapult ^{db}	AH	2	–	98	104	1	120
Cutlass ^{db}	APW	3	105	101	109	1	116
Denison ^{db}	APW	2	–	106	113	1	130
DS Bennett ^{db}	ASW	3	116	113	96	1	131
DS Pascal ^{db}	APW	3	104	104	106	1	109
Illabo ^{db}	AH	3	113	107	103	1	121
LRPB Nighthawk ^{db}	APW	2	–	104	103	1	100
LRPB Trojan ^{db}	APW	2	100	98	–	1	109
Longsword ^{db}	AWW	3	117	107	103	1	100
RockStar ^{db}	AH	2	–	99	110	1	135
Sheriff CL Plus ^{db}	APW	2	–	93	95	1	106
Valiant ^{db} CL Plus	AH	1	–	–	109	0	–
Yitpi ^{db}	AH	3	92	96	96	1	92

– denotes no data available.

DURUM WHEAT VARIETY NOTES

There are no released durum varieties suited for earlier planting. The development speed of durum varieties was compared with Scepter[®] and LRPB Trojan[®] in time-of-sowing trials across a range of dates in May at 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-mid or mid-maturing within the range of Scepter[®] and LRPB Trojan[®] and therefore suited to early-mid May sowing in SA.

Bitalli[®]

Bitalli[®] is a quick-mid maturity wheat, slightly slower than Saintly[®], which is eligible for ADR 1 in SA. Bitalli[®] is widely adapted and well suited to durum growing regions across the Mid North and Yorke Peninsula. Bitalli[®] offers good physical grain characteristics including low screenings and good test weights. It is RMR to stem rust, MR to leaf rust and MRMS to stripe rust, while also being MRMS to both yellow leaf spot and Septoria tritici blotch. Released in 2019 (tested as AGTD088), bred and marketed by AGT. Seed is available through AGT Affiliates, retailers or through Seed Sharing[™]. EPR \$3.50 ex-GST.

DBA-Artemis[®]

DBA-Artemis[®] is a mid-slow maturity variety that is eligible for ADR in SA. It is RMR to leaf rust and MR to stem and stripe rust. It is also MRMS to both yellow leaf spot and Septoria tritici blotch. It is one of the slowest maturing durum varieties available. Released in 2019 (tested as UAD1154197) by Durum Breeding Australia's Southern Node (University of Adelaide). Seed is available through farmer-to-farmer trade. EPR \$3.00 ex-GST.

DBA Spes[®]

DBA Spes[®] is a mid-maturity variety that is eligible for ADR in SA. It is R to stem and leaf rust and MS to stripe rust. It is also MRMS to yellow leaf spot and MS to Septoria tritici blotch. Released in 2018 (tested as UAD1154192) by the Durum Breeding Australia's Southern Node (University of Adelaide). Seed is available through farmer-to-farmer trade. EPR \$3.00 ex-GST.

DBA Vittaroi[®]

DBA Vittaroi[®] is a quick-mid maturity variety that is eligible for ADR in SA. It is MR to stem rust, RMR to leaf rust, MS to stripe rust and MRMS to yellow leaf spot. DBA Vittaroi[®] has good grain size and consistently low screenings. It is shorter in stature than DBA-Aurora[®] with good straw strength and tolerance to lodging. Released in 2017 (tested as TD280913) by Durum Breeding Australia's Northern Node (Tamworth, NSW DPI). Seed is available from Seednet. EPR \$3.30 ex-GST.

DBA-Aurora[®]

DBA-Aurora[®] is a mid-maturity variety that is eligible for ADR in SA. It is RMR to stem rust and R to leaf rust, MR to stripe rust and MRMS to yellow leaf spot. DBA-Aurora[®] has grain size and screening levels consistent with other varieties available. Released in 2014 (tested as UAD0951096) from the Durum Breeding Australia's Southern Node (University of Adelaide). Seed is available through farmer-to-farmer trade. EPR \$3.00 ex-GST.

NEW – Patron[®]

Patron[®] is eligible for ADR in SA. It is a high-yielding variety that has good grain quality characteristics. Patron[®] has good disease resistance to all of the rusts, Septoria tritici blotch and is MRMS to yellow leaf spot and MSS to powdery mildew. It is best suited to the medium-high yield potential environments of SA. Released in 2022 (tested as AGTD109), bred and marketed by AGT. Seed is available through AGT Affiliates, retailers or through Seed Sharing[™]. EPR \$4.00 ex-GST.

Saintly[®]

Saintly[®] is an awnless, quick-mid maturing variety that is eligible for ADR in SA. It has performed very well in dry finishing conditions in SA but many varieties now outperform Saintly[®]. It is the fastest maturing variety with a similar development time to Scepter[®] and its awnless nature allows it to be cut for hay. Saintly[®] is MR to stem rust, MRMS to leaf rust and MS to stripe rust. Released in 2008 (tested as WID22279), bred and marketed by AGT. Seed is available through farmer-to-farmer trade. EPR \$3.00 ex-GST.

Westcourt[®]

Westcourt[®] is a mid-maturing wheat eligible for ADR in SA. It is RMR to stem and leaf rust, MR to stripe rust, MRMS to yellow leaf spot and MS to Septoria tritici blotch. It has good physical grain quality characteristics with low screenings. Released in 2019 (tested as AGTD090), bred and marketed by AGT. Seed is available through AGT Affiliates, retailers or through Seed Sharing[™]. EPR \$3.50 ex-GST.

Table 14: Disease responses of durum wheat varieties and reaction to common disorders.

Variety	Rust			Septoria tritici blotch	Yellow leaf spot	Powdery mildew	Black point	CCN	Crown rot
	Stem	Stripe	Leaf						
Bitalli ^{db}	RMR	MRMS	MR	MRMS	MRMS	S	MS	MSS	SVS
DBA-Artemis ^{db}	MR	MR	RMR	MRMS	MRMS	S	MS	MS	VS
DBA-Aurora ^{db}	RMR	MR	R	MR/S	MRMS	MSS	MS	MSS	VS
DBA Spes ^{db}	R	MS	R	MS	MRMS	MSS	MS	MS	VS
DBA Vittaroi ^{db}	MR	MS	RMR	MSS	MRMS	MRMS	MSS	S	SVS
Patron ^{db}	R (P)	MRMS (P)	MR (P)	MR (P)	MRMS (P)	MSS	–	–	–
Saintly ^{db}	MR	MS	MRMS	S	MRMS	MSS	MS	MS	VS
Westcourt ^{db}	RMR	MR	RMR	MS	MRMS	S	MSS	MSS	VS

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

Ratings separated by / denotes different responses to different pathotypes.

(P) = provisional ratings – treat with caution.

Black point is not a disease but is a physiological response to certain humid conditions.

Information on disease reactions was supplied by the Cereal Pathology Group (SARDI). Contact Dr Tara Garrard: tara.garrard@sa.gov.au

Table 15: Mid North durum wheat yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.59	1.85	3.01	4.95	4.93
	No. trials	2	2	3	3	3
Bitalli ^{db}	13	107	114	109	107	105
DBA-Artemis ^{db}	13	99	96	100	105	107
DBA Spes ^{db}	13	103	106	98	107	106
DBA Vittaroi ^{db}	13	106	113	101	107	105
DBA-Aurora ^{db}	13	106	112	101	110	108
Patron ^{db}	3	–	–	–	–	113
Saintly ^{db}	13	104	108	102	101	99
Westcourt ^{db}	11	–	96	107	98	100

– denotes no data available.

Table 16: Yorke Peninsula durum wheat yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.71	4.37	2.64	3.66	3.04
	No. trials	3	2	3	2	3
Bitalli ^{db}	13	106	109	113	106	110
DBA-Artemis ^{db}	13	102	101	98	106	100
DBA Spes ^{db}	13	101	101	99	104	104
DBA Vittaroi ^{db}	13	101	103	104	102	107
DBA-Aurora ^{db}	13	103	104	103	105	107
Patron ^{db}	3	–	–	–	–	111
Saintly ^{db}	13	100	102	104	98	103
Westcourt ^{db}	10	–	104	106	103	100

– denotes no data available.

Table 17: South Australian durum wheat test weight performance. NVT data 2017–21.

Variety		Test weight (kg/hectolitre)				
	Year	2017	2018	2019	2020	2021
	No. trials	5	4	6	5	6
Bitalli ^{db}	20	78.7	78.7	82.0	82.8	81.7
DBA-Artemis ^{db}	25	76.7	77.5	81.2	81.0	81.5
DBA Spes ^{db}	25	76.5	77.1	80.4	80.8	80.1
DBA Vittaroi ^{db}	20	77.9	77.7	81.4	82.8	81.3
DBA-Aurora ^{db}	25	77.0	77.2	81.0	81.2	81.0
Saintly ^{db}	25	78.8	77.6	82.3	81.7	81.7
Patron ^{db}	6	–	–	–	–	81.9
Westcourt ^{db}	15	–	79.1	82.6	82.6	83.0

– denotes no data available.

Table 18: South Australian durum wheat screenings performance. NVT data 2017–21.

Variety		Screenings (% <2.0mm)				
	Year	2017	2018	2019	2020	2021
	No. trials	5	4	6	5	6
Bitalli ^{db}	20	2.57	3.90	2.82	0.93	2.05
DBA-Artemis ^{db}	25	4.31	4.54	2.94	1.91	2.07
DBA Spes ^{db}	25	3.90	5.01	3.41	1.29	2.77
DBA Vittaroj ^{db}	20	2.39	3.84	1.67	0.67	1.26
DBA-Aurora ^{db}	25	4.13	3.06	2.97	1.51	1.98
Saintly ^{db}	25	1.95	5.33	2.03	1.44	1.94
Patron ^{db}	6	–	–	–	–	1.36
Westcourt ^{db}	15	–	4.24	1.00	0.51	0.81

– denotes no data available.

ACKNOWLEDGEMENTS

Thanks to Kenton Porker and Hugh Wallwork for input into previous versions of this sowing guide.

BARLEY

By Rhiannon Schilling, Melissa McCallum,
Courtney Peirce and Tara Garrard, SARDI

This sowing guide provides data and guidance on the most suitable barley varieties for sowing in South Australia in 2023. Since publication of the 2022 guide the new varieties Combat[®], TITAN AX[®] and Zena[®] CL have been released, with a suite of potential varieties undergoing malt accreditation.

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

- market demand and malting varietal storage segregations in bulk storage facilities;
- the difference in payments between malting and feed grades compared with 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 (2022-23) quality classification grade, in alphabetical order within classification.

Variety	Maximum grade	Maturity classification	Suitability and significant features
Commander [®]	Malting	Q – M	All areas, except areas prone to net form net blotch. Risk of lodging in high-yielding environments.
Compass [®]	Malting	VQ	All areas, at risk with some strains of leaf rust and lodging in high-yielding environments.
La Trobe [®]	Malting	VQ	All areas, note modest early vigour and weed competitiveness especially in light soils.
Leabrook [®]	Malting	VQ	All areas, similar plant characteristics as Compass [®] , at risk with some strains of leaf rust and lodging in high-yielding environments.
LG Alestar [®]	Malting	Q – M	Targeted for medium to high-rainfall zones.
Maximus [®] CL	Malting	VQ	All areas, imidazolinone tolerant.
RGT Planet [®]	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 of net blotch.
Schooner	Malting	Q	All areas except leaf rust-prone areas. Now agronomically outclassed with declining industry demand. However, has renewed interest in the craft market.
Scope CL [®]	Malting	Q	All areas except where leaf rust and CCN are a problem. Imidazolinone tolerant.
Spartacus CL [®]	Malting	VQ	All areas, imidazolinone tolerant. Similar competitive characteristics as Hindmarsh [®] .
Beast [®]	Feed	Q	Targeted for lower-rainfall zones, Mallee environments, being evaluated for malt accreditation.
Buff [®]	Feed	Q	Broadly adapted and suited to acid soils.
Combat [®]	Feed	Q	High-yielding feed variety with competitive growth habit.
Commodus [®] CL	Feed	Q	Imidazolinone tolerant. Similar plant characteristics as Compass [®] . Being evaluated for malt accreditation.
Cyclops [®]	Feed	Q	Broadly adapted. Being evaluated for malt accreditation.
Fathom [®]	Feed	Q	All areas, noting susceptibility to net form net blotch.
Laperouse [®]	Feed	Q	Being evaluated for malt accreditation.
Minotaur [®]	Feed	Q	Medium to high-rainfall areas. Being evaluated for malt accreditation.
Oxford	Feed	M	Medium to high-rainfall areas (>400mm). Early sowing.
Rosalind [®]	Feed	VQ	All areas, broadly adapted.
TITAN AX [®]	Feed	Q	Group 1/A resistant variety with wide adaptability.
Zena [®] CL	Feed	Q	Imidazolinone tolerant. Being evaluated for malt accreditation.

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

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, as well as agronomic performance, to maximise profitability. Newer food and malt varieties are now offering good yield potential. Varieties accredited and varieties 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 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 accreditation of a new variety does not mean the variety will be a preferred variety. Preferred varieties are listed once 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 (MBIBTC) in conjunction with Pilot Brewing Australia and Barley Australia, including the anticipated timeline for accreditation. Accreditation is only granted if the variety satisfies the selection criteria set by MBIBTC and Barley Australia (see barleyaustralia.com.au).

IMI (imidazolinone herbicide) tolerant barley varieties (Commodus^{db} CL, Spartacus CL^{db}, Scope CL^{db}, Maximus^{db} CL, Zena^{db} CL) may incur market access restrictions in some important export destinations. Information will be updated regularly at:

■ barleyaustralia.com.au/ba-industry-updates

■ barleyaustralia.com.au

Information includes:

■ list of preferred malting barley varieties, barleyaustralia.com.au/varieties/preferred-malting-varieties

■ updated status of malting barley evaluation, barleyaustralia.com.au/varieties/varieties-under-malting-evaluation

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

Variety	Year 0	Stage 1	Stage 2	Target decision date
Beast ^{db}	2020 (accepted)	2021 (passed)	2023	2024
Buff ^{db}	2018 (accepted)	2019 (passed)	2021/2022	2023
Commodus ^{db} CL	2021 (accepted)	2021 (passed)	2022	2023
Cyclops ^{db}	2021 (accepted)	2021 (passed)	2023	2024
Laperouse ^{db}	2019 (accepted)	2020/2021 (passed)	2021/2023	2023
Minotaur ^{db}	2021 (accepted)	2021/2022	2023	2024
Yeti ^{db}	2020 (accepted)	2020/2022	2023	2024
Zena ^{db} CL	2022 (accepted)	2022	–	–

– denotes no data available.

Source: Barley Australia

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 that have activity on powdery mildew should be applied to all susceptible varieties. Spartacus CL^{db} and Rosalind^{db} 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.

Table 3: Disease reactions of selected barley varieties.

Variety	Cereal cyst nematode resistance	Leaf rust	Net form net blotch	Spot form net blotch	Leaf scald	Powdery mildew	Black point	Root lesion nematode		Crown rot
								<i>P. neglectus</i>	<i>P. thornei</i>	
Beast ^{db}	MR	MS-S	MR-S	MS	SVS	MSS	MSS	MRMS	MRMS	S
Buff ^{db}	–	S-SVS	MR-MS	MSS	MS-VS	S	MRMS	MRMS	MS	S
Combat ^{db}	–	MR-S	MR-MSS	MR	SVS	MS	–	–	–	–
Commander ^{db}	R	MS-S	S-VS	MSS	MSS-VS	MS	MSS	MRMS	MRMS	S
Commodus ^{db} CL	R	MRMS-SVS	MR-MSS	MSS	MSS-SVS	MS	MSS	MRMS	S (P)	MSS (P)
Compass ^{db}	R	SVS	MRMS-S	MS	MSS-SVS	MS	MSS	MRMS	MR	S
Cyclops ^{db}	S	SVS-VS	MR-MS	MS-S	R-S	MSS	MS	S (P)	MRMS	S (P)
Fathom ^{db}	R	MRMS-S	MSS-VS	RMR	R-S	MRMS	MSS	MRMS	MR	S
Laperouse ^{db}	S	MS-SVS	MR-MSS	MRMS	MSS-VS	MS	MSS	MR	MR	S
La Trobe ^{db}	R	MRMS-S	MS-S	MSS	R-SVS	MSS	MSS	MRMS	MRMS	S
Leabrook ^{db}	R	S-VS	MR-MS	MS	R-SVS	MS	MSS	MRMS	RMR	S
LG Alestar ^{db}	R [^] (P)	MR-MS	MR-S	S	MS-S	MR	MRMS	MR	MR	MSS
Maximus ^{db} CL	R	MS-S	R-MS	MS	R-SVS	MS	MSS	MRMS	MR	S
Minotaur ^{db}	R	S-VS	R-MS	S	VS	S	MS	MRMS	MR	MS (P)
Oxford	S	MR-MS	MR-VS	S	MS-SVS	RMR	MR	MR	MR	S
RGT Planet ^{db}	R (P)	MRMS-S	MR-SVS	SVS	R-S	R	MRMS	MRMS	MR	MSS
Rosalind ^{db}	R	MR-MS	R-MRMS	MSS	MR-S	MSS	MSS	MRMS	MR	MSS
Schooner	VS	S-SVS	R-MS	MS	MS-S	SVS	MS	MS	MRMS	S
Scope CL ^{db}	S	MS-SVS	R-MR	MS-S	MRMS-SVS	RMR	MS	MRMS	MRMS	S
Spartacus CL ^{db}	R	MR-S	S-VS	S	R-SVS	MSS	MSS	MRMS	MRMS	S
TITAN AX ^{db}	–	SVS-VS	MRMS	MS	S	MRMS	–	–	–	–
Westminster ^{db}	–	MR-MRMS	R-S	S	R-S	RMR	MRMS	MRMS	MS	S
Zena ^{db} CL	–	R-MS	MR-MSS	S	R	R	–	–	–	–

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, – variety yet to be fully evaluated, (P) = provisional ratings and subject to change when additional data becomes available, [^] line contains a few susceptible off types.

Ratings provided are primarily from 2021 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 the Cereal Pathology Group (SARDI). Contact Dr Tara Garrard: tara.garrard@sa.gov.au.

BARLEY VARIETY NOTES

Beast[®]

Beast[®] is a very quick-maturing variety that is undergoing malt evaluation with Barley Australia, with a decision expected in 2024. It is suited to medium to low-rainfall environments and performs well in stressed growing conditions. It is similar in plant type to Compass[®], offering useful early vigour and weed competitiveness, but care should be taken in lodging-susceptible conditions. It was released in 2020 (tested as AGTB0113) and is bred and marketed by AGT. Seed is available through AGT Affiliates and is eligible for AGT Seed Sharing™. EPR \$4.00 ex-GST.

Buff[®]

Buff[®] is a quick-maturing variety that is undergoing malt evaluation with Barley Australia, with a decision expected by 2023. Buff[®] has an erect plant type and produces good early vigour even in acid soils with high aluminium. It was released in 2018 (tested as IGB1506) and is bred and marketed by InterGrain. Seed is available through InterGrain Seedclub members. EPR \$3.50 ex-GST.

NEW – Combat[®]

Combat[®] is a quick-mid maturing feed barley. It has a semi-prostrate growth habit that will provide improved weed competition over the erect growth habit of Rosalind[®] and similar varieties. While evaluation of Combat[®] in SA's NVT is so far limited, 2021 yields were promising, achieving comparable yields to Rosalind[®] with good grain size. Combat[®] has good resistance to net form net blotch and moderate resistance to both spot form net blotch and leaf rust. It was released in 2022 (tested as IGB1944), and is bred by InterGrain. Seed is available from local resellers or InterGrain Seedclub members. EPR \$3.50 ex-GST.

Commander[®]

Commander[®] is a quick to mid-maturing variety with malt accreditation. It has shown wide adaptability across regions and seasons, but it may have been outclassed by new varieties with Commander[®] as a parent. Commander[®] is resistant to CCN but is moderately susceptible to most foliar diseases including net form net blotch. Commander[®] is prone to lodging under higher-yielding environments and wet spring conditions. It was released in 2008 (tested as WI3416-1572) and bred by the University of Adelaide. Seed is available through Seednet. EPR \$3.80 ex-GST.

Commodus[®] CL

Commodus[®] CL is an imidazolinone-tolerant barley with quick maturity that is undergoing malt evaluation with Barley Australia, with a decision expected in 2023. Commodus[®] CL is closely related to Compass[®] and performs similar agronomically with the addition of imidazolinone tolerance. It is suited to the low-medium rainfall environments with a similar risk of head loss and lodging as Compass[®]. It was released in 2021 (tested as IGB1908) and bred by Grains Innovation Australia and InterGrain. Seed is available through InterGrain Seedclub members. EPR \$4.25 ex-GST.

Compass[®]

Compass[®] is a quick-maturing, malt-accredited variety. It is closely related to Commander[®] with a similar growth pattern but earlier flowering. It is prone to lodging and head loss in high-yielding environments. Compass[®] is susceptible (SVS) to leaf rust in SA. It has shown good physical grain quality with high retention and low screenings and low-moderate test weight. It was released in 2015 (tested as WI4593) and bred by University of Adelaide. Seed is available from Seednet. EPR \$3.80 ex-GST.

Cyclops[®]

Cyclops[®] is a quick-maturing variety that is undergoing malt evaluation with Barley Australia, with a decision expected in 2024. It has an erect plant type like Hindmarsh[®] and Spartacus CL[®] with a similar maturity pattern to Spartacus CL[®]. It was released in 2021 (tested as AGTB0200) and is bred and marketed by AGT. Seed is available through AGT Affiliates. EPR \$4.00 ex-GST.

Fathom[®]

Fathom[®] is a quick-maturing feed quality variety. It has a semi-prostrate growth habit with good early vigour and weed competitiveness. Fathom[®] produces good yields particularly in lower-yielding environments. It has good levels of resistance to CCN, powdery mildew and spot form net blotch. Fathom[®] has shown susceptibility to net form net blotch, scald and leaf rust. It was released in 2014 (tested as WI4483) and bred by the University of Adelaide. Seed is available from Seednet. EPR \$2.00 ex-GST.

Laperouse[Ⓢ]

Laperouse[Ⓢ] is a quick-maturing variety undergoing malt evaluation with Barley Australia, with a decision expected in 2023. It has a medium plant height with a growth pattern similar to Compass[Ⓢ] but a slightly longer time to heading. Laperouse[Ⓢ] is susceptible to CCN, MR-MRMS to net form net blotch and MS-SVS to leaf rust. It was released in 2020 (tested as WI4952) and bred by the University of Adelaide and SECOBRA Recherchers. Seed is available and marketed by Seednet. EPR \$3.80 ex-GST.

La Trobe[Ⓢ]

La Trobe[Ⓢ] is a very quick-maturing, malting-accredited variety. It has an erect plant growth habit with plant architecture very similar to Hindmarsh[Ⓢ]. It produces competitive yields compared with other varieties with the same growth habit, with the advantage of malt accreditation. It was released in 2013 (tested as IGB1101) and bred by InterGrain. Seed is available through InterGrain Seedclub members and farmer-to-farmer trade. EPR \$4.00 ex-GST.

Leabrook[Ⓢ]

Leabrook[Ⓢ] is a very quick-maturing variety with malt accreditation. It is closely related to Compass[Ⓢ], achieving high yields across a range of environments but susceptible to lodging and head loss in higher-yielding environments. Leabrook[Ⓢ] is S-VS to leaf rust in SA. It has shown good physical grain quality with high retention and low screenings and low-moderate test weight. It was released in 2019 (tested as WI4896) and bred by the University of Adelaide. Seed is available from Seednet. EPR \$3.80 ex-GST.

LG Alestar[Ⓢ]

LG Alestar[Ⓢ] is a quick to mid-maturing variety that achieved malt accreditation in 2021. It is primarily targeted for the medium to high-rainfall regions of SA. LG Alestar[Ⓢ] has demonstrated a yield improvement compared with Westminster[Ⓢ]. It was released in 2014 (tested as SMBA11-2341) and bred by Elders. Seed is available through Elders and selected seed partners. EPR \$3.00 ex-GST.

Maximus[Ⓢ] CL

Maximus[Ⓢ] CL is a very quick-maturing, imidazolinone-tolerant barley that has malt accreditation. It is resistant to CCN, R-MS to net form net blotch and has improved grain size compared with Spartacus CL[Ⓢ]. It has a short coleoptile length and it is recommended that sowing depth be considered carefully. It was released in 2020 (tested as IGB1705T) and bred by InterGrain. Seed is available through InterGrain Seedclub members. EPR \$4.25 ex-GST.

Minotaur[Ⓢ]

Minotaur[Ⓢ] is quick-mid maturing variety that is undergoing malt evaluation with Barley Australia, with a decision expected in 2024. It is an RGT Planet[Ⓢ] type variety reaching awn peep a day or two later. Best suited to medium to high-rainfall environments, with limited NVT evaluation showing yields that are competitive with RGT Planet[Ⓢ]. It was released in 2021 (tested as AGTB0213) and is bred and marketed by AGT. Seed is available through AGT Affiliates. EPR \$4.00 ex-GST.

RGT Planet[Ⓢ]

RGT Planet[Ⓢ] is a quick-mid maturing variety with malt accreditation. It has performed well in medium to high-rainfall zones, producing some of the highest yields particularly compared with other malt varieties. It sets a high number of grains per head and therefore is prone to lower test weights and small grain size and screenings under suboptimal grain fill conditions. It has good head retention and straw strength, reducing yield loss due to lodging and head loss. RGT Planet[Ⓢ] is susceptible to spot and net form net blotch. It was released in 2017 (tested as SFR85-014) and bred by RAGT Seeds. Seed is available via Seed Force broadacre commercial partners. EPR \$4.00 ex-GST.

Rosalind[Ⓢ]

Rosalind[Ⓢ] is a very quick-maturing feed quality variety. It has a Hindmarsh[Ⓢ] style plant growth pattern with excellent straw strength and standability. Rosalind[Ⓢ] has consistently yielded highly in NVT across all regions and in multiple years, demonstrating its broad adaptability. It has resistance to CCN, moderate resistance to net form net blotch and leaf rust, and variable resistance to leaf scald, but susceptibility to spot form net blotch and moderate susceptibility to powdery mildew. It was released in 2015 (tested as IGB1302) and bred by InterGrain. Seed is approved for farmer-to-farmer trading as well as through InterGrain Seedclub members. EPR \$3.50 ex-GST.

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Scope CL[Ⓢ]

Scope CL[Ⓢ] is a quick-maturing, imidazolinone-tolerant variety with malt accreditation. It is a tall variety that has now been outclassed in most environments. Scope CL[Ⓢ] has registration for use with an appropriate BASF Clearfield® herbicide; this herbicide tolerance makes Scope CL[Ⓢ] 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[Ⓢ]

Spartacus CL[Ⓢ] is a quick-maturing, imidazolinone-tolerant barley with malt accreditation. It is very quick-maturing with a similar plant type and flowering behaviour to Hindmarsh[Ⓢ] and La Trobe[Ⓢ]. It has good head retention and straw strength but is susceptible to brackling in some seasonal conditions prior to harvest. It is susceptible to both net and spot form net blotch. It was released in 2016 (tested as IGB1334) and bred by InterGrain. Seed is available from local resellers and InterGrain Seedclub members. EPR \$4.25 ex-GST.

NEW – TITAN AX[Ⓢ]

TITAN AX[Ⓢ] is a quick-maturing variety with tolerance to Sipcam Aggressor® (Group 1) herbicides. It is the world's first CoAXium® barley variety bred out of a partnership between AGT, Sipcam Australia and Albaugh (a US-based crop protection company). It is derived from Compass[Ⓢ] and provides similar agronomic characteristics with the added benefit of being tolerant to Group 1 herbicides. It was released in 2022 (tested as AGTB0325) and is bred and marketed by AGT. Seed is available through AGT Affiliates. EPR \$4.55 ex-GST.

NEW – Zena[Ⓢ] CL

Zena[Ⓢ] CL is a quick to mid-maturing, imidazolinone-tolerant variety that is undergoing malt evaluation with Barley Australia, with a decision expected by 2024. Closely related to RGT Planet[Ⓢ], it performs well in medium to high-rainfall zones. However, evaluation in NVT is limited. Zena[Ⓢ] has good levels of resistance to powdery mildew and scald but both net form and spot form net blotch levels will need to be monitored. It was released in 2022 (tested as IGB20125T) and is bred by InterGrain. Seed is available through InterGrain Seedclub members. EPR \$3.50 ex-GST.

YIELD PERFORMANCE EXPERIMENTS FROM 2017 TO 2021

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 2017 to 2021 inclusive, along with some observations in adjacent columns. Further results can be found on the NVT website (nvt.grdc.com.au).

Table 4: Upper Eyre Peninsula barley yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.16	2.07	2.45	2.03	3.15
	No. trials	2	4	4	3	4
MALTING						
Commander ^{db}	17	104	106	99	95	100
Compass ^{db}	17	113	117	117	118	115
La Trobe ^{db}	17	112	113	110	105	105
Leabrook ^{db}	17	112	115	118	120	116
LG Alestar ^{db}	17	87	84	87	90	90
Maximus ^{db} CL	15	–	112	113	115	115
RGT Planet ^{db}	17	92	93	98	98	96
Scope CL ^{db}	17	99	99	94	90	93
Spartacus CL ^{db}	17	113	111	111	110	110
FEED						
Fathom ^{db}	17	111	114	114	112	108
Rosalind ^{db}	17	109	110	113	114	111
TITAN AX ^{db}	4	–	–	–	–	116
PENDING MALT ACCREDITATION						
Beast ^{db}	11	–	–	122	122	119
Buff ^{db}	15	–	110	105	99	100
Commodus ^{db} CL	7	–	–	–	116	113
Cyclops ^{db}	7	–	–	–	114	116
Laperouse ^{db}	15	–	113	111	113	115
Minotaur ^{db}	7	–	–	–	110	111
Yeti ^{db}	11	–	–	116	119	118

– denotes no data available.

Table 5: Lower Eyre Peninsula barley yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.41	5.95	1.08	3.21	5.32
	No. trials	3	2	1	3	2
MALTING						
Commander ^{db}	11	102	97	86	94	98
Compass ^{db}	11	105	99	151	87	99
La Trobe ^{db}	11	104	102	129	102	107
Leabrook ^{db}	11	108	103	143	95	101
LG Alestar ^{db}	11	91	97	80	98	96
Maximus ^{db} CL	8	–	104	131	118	105
RGT Planet ^{db}	11	102	108	79	110	105
Spartacus CL ^{db}	11	105	101	132	111	105
FEED						
Combat ^{db}	2	–	–	–	–	111
Fathom ^{db}	12	103	101	142	93	104
Rosalind ^{db}	11	109	108	126	115	108
PENDING MALT ACCREDITATION						
Beast ^{db}	6	–	–	155	99	104
Buff ^{db}	8	–	100	114	90	104
Commodus ^{db} CL	5	–	–	–	86	98
Cyclops ^{db}	5	–	–	–	119	109
Laperouse ^{db}	8	–	104	109	117	102
Minotaur ^{db}	5	–	–	–	124	106
Yeti ^{db}	6	–	–	135	114	102
Zena ^{db} CL	2	–	–	–	–	105

– denotes no data available.

Table 6: Yorke Peninsula barley yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	4.80	5.16	3.76	3.83	4.80
	No. trials	5	3	3	4	4
MALTING						
Commander ^{db}	19	98	96	96	100	106
Compass ^{db}	19	100	101	105	96	108
La Trobe ^{db}	19	100	103	105	96	102
Leabrook ^{db}	19	103	103	107	102	110
LG Alestar ^{db}	19	98	97	95	98	91
Maximus ^{db} CL	14	–	101	102	102	102
RGT Planet ^{db}	19	109	109	106	110	100
Spartacus CL ^{db}	19	96	100	102	97	100
FEED						
Combat ^{db}	4	–	–	–	–	115
Fandaga ^{db}	4	–	–	–	–	104
Fathom ^{db}	19	102	104	107	96	104
Rosalind ^{db}	19	104	107	108	105	103
PENDING MALT ACCREDITATION						
Beast ^{db}	11	–	–	107	99	110
Buff ^{db}	14	–	103	104	96	104
Commodus ^{db} CL	8	–	–	–	95	107
Cyclops ^{db}	8	–	–	–	111	114
Laperouse ^{db}	14	–	99	100	107	108
Minotaur ^{db}	4	–	–	–	114	108
Yeti ^{db}	11	–	–	102	103	105
Zena ^{db} CL	4	–	–	–	–	102

– denotes no data available.

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Table 7: Mid North barley yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	4.95	2.55	3.65	5.13	5.21
	No. trials	3	2	3	4	3
MALTING						
Commander ^{db}	15	98	101	94	98	102
Compass ^{db}	15	103	119	114	94	103
La Trobe ^{db}	15	96	103	115	113	97
Leabrook ^{db}	15	106	118	115	100	107
LG Alestar ^{db}	15	95	84	88	99	94
Maximus ^{db} CL	12	–	116	115	98	103
RGT Planet ^{db}	15	106	96	101	113	104
Spartacus CL ^{db}	15	101	114	113	95	100
FEED						
Combat ^{db}	3	–	–	–	–	110
Fandaga ^{db}	3	–	–	–	–	105
Fathom ^{db}	15	104	117	115	97	102
Rosalind ^{db}	15	107	115	117	105	105
PENDING MALT ACCREDITATION						
Beast ^{db}	10	–	–	121	96	106
Buff ^{db}	12	–	109	106	99	100
Commodus ^{db} CL	7	–	–	–	94	102
Cyclops ^{db}	7	–	–	–	108	112
Laperouse ^{db}	15	104	113	108	101	108
Minotaur ^{db}	7	–	–	–	109	110
Yeti ^{db}	10	–	–	115	97	105
Zena ^{db} CL	3	–	–	–	–	105

– denotes no data available.

Table 8: Murray Mallee barley yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.65	2.01	2.64	3.64	2.09
	No. trials	2	2	2	4	4
MALTING						
Commander ^{db}	14	101	101	92	95	108
Compass ^{db}	14	104	110	121	109	119
La Trobe ^{db}	14	99	101	105	102	103
Leabrook ^{db}	14	108	112	122	113	121
LG Alestar ^{db}	8	–	–	–	93	84
Maximus ^{db} CL	12	–	101	109	105	103
RGT Planet ^{db}	14	104	103	101	109	100
Scope CL ^{db}	14	93	95	90	90	95
Spartacus CL ^{db}	14	101	99	106	101	99
FEED						
Combat ^{db}	4	–	–	–	–	119
Fathom ^{db}	14	101	107	115	108	111
Rosalind ^{db}	14	106	106	113	111	106
TITAN AX ^{db}	4	–	–	–	–	124
PENDING MALT ACCREDITATION						
Beast ^{db}	10	–	–	122	112	120
Buff ^{db}	12	–	104	103	101	108
Commodus ^{db} CL	8	–	–	–	107	117
Cyclops ^{db}	8	–	–	–	112	120
Laperouse ^{db}	12	–	104	104	105	111
Minotaur ^{db}	8	–	–	–	109	110
Yeti ^{db}	10	–	–	113	107	109

– denotes no data available.

Table 9: South East barley yield performance. NVT data 2017–21. Data for 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	5.34	5.35	5.57	6.37	0.00
	No. trials	2	2	2	1	0
MALTING						
Commander [Ⓛ]	7	96	101	94	98	Not available
Compass [Ⓛ]	7	100	102	101	97	
La Trobe [Ⓛ]	7	96	99	107	99	
Leabrook [Ⓛ]	7	105	105	104	101	
LG Alestar [Ⓛ]	5	–	96	96	98	
Maximus [Ⓛ] CL	5	–	102	109	97	
RGT Planet [Ⓛ]	7	109	106	108	112	
Scope CL [Ⓛ]	6	91	94	93	–	
Spartacus CL [Ⓛ]	7	97	99	107	96	
Westminster [Ⓛ]	7	95	93	90	92	
FEED						
Explorer	6	98	100	99	–	Not available
Fathom [Ⓛ]	7	99	100	105	100	
Oxford	6	105	100	95	–	
Rosalind [Ⓛ]	7	106	105	112	105	
PENDING MALT ACCREDITATION						
Beast [Ⓛ]	3	–	–	107	99	Not available
Buff [Ⓛ]	5	–	99	101	101	
Commodus [Ⓛ] CL	1	–	–	–	96	
Cyclops [Ⓛ]	1	–	–	–	107	
Laperouse [Ⓛ]	5	–	106	104	99	
Minotaur [Ⓛ]	1	–	–	–	107	
Yeti [Ⓛ]	3	–	–	107	97	

– denotes no data available.

GRAIN QUALITY FROM 2017 TO 2021

Grain quality for individual varieties varies between years. However, the trends across sites for a single year tend to be more consistent for a variety. Long-term results highlight trends in variety performance and consistency. Table 10 highlights the variation in test weight. Test weight is expressed as the mean test weight from NVT data 2017 to 2021 inclusive. This table shows that the varieties La Trobe[®], Maximus[®] CL, Scope CL[®], Spartacus CL[®] and Laperouse[®] have consistently high test weights across multiple growing seasons.

Table 11 highlights the variation in retention percentages. Retention is expressed as the mean percentage of grain greater than 2.5mm in size from NVT data 2017 to 2021 inclusive. There are a few varieties that have consistently high retention percentage across multiple growing seasons: Compass[®], Leabrook[®], Yeti[®] and Beast[®]. Further results can be found on the NVT website (nvt.grdc.com.au).

Table 10: South Australian barley test weight performance. NVT data 2017–21.

Variety	Year	Test weight (kg/hectolitre)				
		2017	2018	2019	2020	2021
	No. trials	16	16	15	19	17
MALTING						
Commander [®]	83	67.1	67.2	69.7	68.5	70.4
Compass [®]	83	66.4	67.1	69.8	68.1	69.6
La Trobe [®]	83	69.0	68.8	71.2	69.1	71.2
Leabrook [®]	83	66.0	67.0	69.5	68.3	70.2
Maximus [®] CL	67	–	70.0	72.0	70.5	72.2
RGT Planet [®]	83	65.2	66.9	68.9	68.7	70.0
Scope CL [®]	62	67.9	68.5	70.1	70.1	70.8
Spartacus CL [®]	83	69.2	69.1	71.5	69.3	71.6
FEED						
Combat [®]	13	–	–	–	–	71.3
Fandaga [®]	9	–	–	–	–	69.2
Fathom [®]	83	67.1	66.9	68.9	68.6	69.2
Rosalind [®]	83	67.4	67.6	70.6	69.1	70.9
TITAN AX [®]	8	–	–	–	–	69.7
PENDING MALT ACCREDITATION						
Beast [®]	51	–	–	70.5	68.8	70.2
Buff [®]	67	–	67.2	70.0	67.8	69.8
Cyclops [®]	36	–	–	–	69.3	70.8
Commodus [®] CL	36	–	–	–	68.6	70.0
Laperouse [®]	70	70.0	68.2	71.0	69.7	71.5
Minotaur [®]	36	–	–	–	70.2	71.4
Yeti [®]	51	–	–	70.6	68.7	70.7
Zena [®] CL	9	–	–	–	–	70.0

– denotes no data available.

Table 11: South Australian barley retention performance. NVT data 2017–21.

Variety	Year	Retention >2.5mm (%)				
		2017	2018	2019	2020	2021
	No. trials	16	16	15	19	17
MALTING						
Commander ^{db}	83	83.3	83.8	76.7	88.2	91.1
Compass ^{db}	83	88.0	86.2	85.2	89.6	91.9
La Trobe ^{db}	83	73.6	72.3	71.0	74.0	91.7
Leabrook ^{db}	83	89.6	88.8	87.5	92.3	93.4
Maximus ^{db} CL	67	–	84.9	80.7	86.8	93.8
RGT Planet ^{db}	83	72.1	72.0	63.8	81.9	84.8
Scope CL ^{db}	62	72.9	72.2	64.6	69.5	80.2
Spartacus CL ^{db}	83	80.5	79.3	77.1	78.3	89.0
FEED						
Combat ^{db}	13	–	–	–	–	93.1
Fandaga ^{db}	9	–	–	–	–	83.2
Fathom ^{db}	83	86.0	83.1	83.1	87.3	92.5
Rosalind ^{db}	83	77.3	74.5	74.5	80.9	85.4
TITAN AX ^{db}	8	–	–	–	–	92.8
PENDING MALT ACCREDITATION						
Beast ^{db}	51	–	–	91.4	92.0	95.2
Buff ^{db}	67	–	79.0	74.6	82.1	87.7
Commodus ^{db} CL	36	–	–	–	88.3	92.0
Cyclops ^{db}	36	–	–	–	86.1	89.9
Laperouse ^{db}	70	84.7	85.1	83.0	88.3	85.5
Minotaur ^{db}	36	–	–	–	84.0	87.2
Yeti ^{db}	51	–	–	87.2	90.9	94.4
Zena ^{db} CL	9	–	–	–	–	86.7

– denotes no data available.

ACKNOWLEDGEMENTS

Thanks to Kenton Porker and Hugh Wallwork for input into previous versions of this sowing guide.

OAT

By Courtney Peirce and Tara Garrard, SARDI

This sowing guide provides data and guidance on the most suitable oat varieties for sowing in South Australia in 2023.

In 2021, with investment from GRDC and AgriFutures Australia, the National Oat Breeding Program led by SARDI began transitioning to a commercial model led by InterGrain. The authors would like to acknowledge the immense contribution the SARDI oat breeding team, led by Pamela Zwer, has made to the industry and for writing the previous versions of this guide.

Since publication of the 2022 sowing guide, four new oat varieties have been released: Archer[®], Koala[®], Kultarr[®] and Wallaby[®]. The oat variety descriptions in this publication serve as a guide to select varieties for specific end-uses (milling or feed grain and oaten hay) with disease resistance, key agronomic traits, and hay and grain yield potential described where independent data was available.

KEY DISEASE CONSIDERATIONS

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 effects of CCN and SN on varietal performance, soil testing is recommended to assess whether either of these nematodes will be a significant problem. Table 1 provides the resistance and tolerance ratings for current varieties. If CCN or SN are present in a paddock, varieties that offer resistance and tolerance should be sown to limit yield penalties.

Foliar diseases can be a problem for oat crops grown for hay or grain end-uses. Resistance to leaf diseases is important in most environments but particularly in the mid to high-rainfall zones. Monitoring disease levels is essential, and application of fungicide may be required depending on the disease risk and seasonal conditions.

Table 1 indicates the current disease ratings for oat varieties. The pathogens for barley yellow dwarf virus (BYDV) and stem and leaf rust are very variable so a range of possible reactions can occur. Other diseases of concern include red leather leaf (RLL), bacterial blight and Septoria avenae blotch. These three diseases can be spread by rain-splash from infected oat stubble.

Growers should avoid sowing into oat stubbles for this reason as there is no foliar treatment option for bacterial blight. Recent research as part of the National Hay Agronomy Project funded by AgriFutures Australia has shown effective suppression of RLL infection with a foliar fungicide application at tillering and stem elongation.

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[®], Mitika[®], Bilby[®], Kowari[®], Bannister[®] and Durack[®] will reach the classification criteria for milling grade more often than other varieties. Some other varieties 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.

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.

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Table 1: Oat variety agronomy and disease reactions.

Variety	Plant height	Maturity	Probability of reaching milling grade	Rust		Barley yellow dwarf virus ¹	CCN		Stem nematode		Septoria	Bacterial blight	Red leather leaf ¹
				Stem ¹	Leaf ¹		Resistance	Tolerance	Resistance	Tolerance			
MILLING OATS													
Bannister ^{db}	TD	Q	H	S	MSS	MS	MR	I	MRMS	MT (P)	MRMS	S	MS-SVS
Bilby ^{db}	D	Q	H	S	MS	S	VS	–	S	MI (P)	S	SVS	MR-S
Durack ^{db}	MT	VQ	H	S	MR/S	MSS	MRMS	MI-MT	S	MI (P)	S	S	SVS
Koala ^{db}	TD	QM	MH-H	S	MSS	S	R	–	S	MT (P)	MSS	MSS	MSS-SVS
Kowari ^{db}	D	Q	H	S	S	MSS	S	–	S	I (P)	MRMS-S	MSS	MR-S
Mitika ^{db}	D	Q	H	S	S	SVS	VS	I	S	MT (P)	MR-S	MSS	R-SVS
Williams ^{db}	ST	Q	MH	S	MRMS	MSS	VS	I	S	MT (P)	MSS	MSS	MR-MS
Yallara ^{db}	MT	Q	VH	S	S	MSS	R	I	MS	MI (P)	MSS	MS	VS
HAY/FEED OATS													
Brusher ^{db}	T	Q	–	SVS	MS/ MRMS/ RMR	SVS (P)	MR	MI	S	MT (P)	MSS	S	MR-SVS
Forester ^{db}	MT	VS	–	R-S	MR-MS	MR-S	MS	MI	S	–	S	MS-S	MR
Kingbale ^{db}	T	M	–	S	MRMS	MS	R	–	MR	MT (P)	MSS	MSS	MRMS-S
Koorabup ^{db}	MT	QM	–	S	MSS	MS	MRMS	–	S	I (P)	MRMS-SVS	S	MS-SVS
Mulgara ^{db}	T	Q	–	S	MR/MS	MSS (P)	R	MT	R	MT (P)	SVS	MSS (P)	MS-SVS
Tungoo ^{db}	MT	MS	–	S	MR	MS	R	MT	R	–	MR-S	MR-MSS	RMR-MSS
Wintaroo ^{db}	T	M	–	S	S	MSS	R	MT	MR	MI (P)	MSS	S	MR-S

Colour key: Green is a good choice, yellow use caution and brown shades either do not use or develop a management package if this disease is yield limiting in your environment.

Plant height: D = dwarf, TD = tall dwarf, T = tall, ST = short tall, MT = moderate tall. Maturity: VQ = very quick, Q = quick, QM = quick-mid, M = mid, MS = mid slow, S = slow, VS = very slow.

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

Disease ratings: VS = very susceptible, S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant,

VI = very intolerant, I = intolerant, MI = moderately intolerant, MT = moderately tolerant, T = tolerant, VT = very tolerant.

¹ Pathogens are very variable so a range of possible reactions may be observed. – indicates the range of observed scores depending on different pathogen strains.

/ indicates reaction to less common strains. (P) = provisional ratings and subject to change when additional data becomes available.

– denotes no data available.

Information sourced from Cereal Pathology Group (SARDI).

OATS FOR GRAZING

This guide has 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.

NOTES ON VARIETIES

Fact sheets or pamphlets describing all varieties released by the former National Oat Breeding Program are available from the relevant commercial partner for the variety. Yield and quality information for grain varieties is available in this guide and on the NVT website (nvtonline.com.au). Varieties are displayed in alphabetical order and do not represent a preference of variety by the authors.

In the absence of breeding trial data, combined hay and grain yield data for selected varieties is from trials funded by both SAGIT (S319 Improving productivity of oats) and AgriFutures Australia (National Hay Agronomy Project PRJ-011029).

Table 2: Mid North (Hart) oat hay and grain yield performance.

Yield expressed as a percentage of site mean yield.

Variety		Hay yield (t/ha)			Grain yield (t/ha)		
	Year	2019	2020	2021	2019	2020	2021
	Mean yield (t/ha)	2.90	3.10	4.20	1.30	2.50	1.70
	No. trials	1	1	1	1	1	1
Brusher ^{db}	3	107	113	101	102	84	93
Durack ^{db}	3	105	102	102	121	90	114
Koorabup ^{db}	3	105	97	94	113	114	102
Mulgara ^{db}	3	114	98	102	126	96	102
Williams ^{db}	3	91	96	100	102	113	119
Wintaroo ^{db}	3	111	104	108	97	85	92
Yallara ^{db}	3	112	105	114	124	110	107

Data 2019–21 from AgriFutures project PRJ-011029 National Hay Agronomy.

Table 3: Mid North (Tarlee) oat hay and grain yield performance.

Yield expressed as a percentage of site mean yield.

Variety		Hay yield (t/ha)			Grain yield (t/ha)		
	Year	2019	2020	2021	2019	2020	2021
	Mean yield (t/ha)	9.60	9.30	10.40	3.30	4.20	4.30
	No. trials	1	1	1	1	1	1
MILLING OATS							
Bannister ^{db}	3	102	101	102	145	133	123
Bilby ^{db}	2	–	93	84	–	109	107
Durack ^{db}	3	88	86	89	110	83	78
Kowari ^{db}	3	98	92	89	135	110	96
Mitika ^{db}	3	93	83	86	115	100	93
Williams ^{db}	3	97	93	98	126	121	117
Yallara ^{db}	3	109	105	108	90	84	88
HAY/FEED OATS							
Brusher ^{db}	2	96	98	–	73	79	–
Kingbale ^{db}	3	107	114	126	96	88	95
Koorabup ^{db}	3	98	101	98	90	95	86
Mulgara ^{db}	2	116	108	–	82	81	–
Wintaroo ^{db}	2	104	111	–	92	91	–

– denotes no data available.

Data 2019–21 from SAGIT project S319 Improving productivity of oats.

Table 4: Murray Mallee oat hay and grain yield performance.

Yield expressed as a percentage of site mean yield.

Variety		Hay yield (t/ha)			Grain yield (t/ha)		
	Year	2019	2020	2021	2019	2020	2021
	Mean yield (t/ha)	5.80	7.40	5.80	2.20	3.30	3.30
	No. trials	1	1	1	1	1	1
MILLING OATS							
Bannister ^{db}	3	103	103	107	137	129	124
Bilby ^{db}	2	–	93	91	–	122	103
Durack ^{db}	3	114	90	90	100	89	84
Kowari ^{db}	3	100	89	87	132	113	109
Mitika ^{db}	3	94	81	84	113	95	85
Williams ^{db}	3	94	98	95	130	104	117
Yallara ^{db}	3	111	106	107	110	96	86
HAY/FEED OATS							
Brusher ^{db}	2	106	105	–	92	83	–
Kingbale ^{db}	3	95	98	120	81	93	93
Koorabup ^{db}	3	96	94	94	88	88	86
Mulgara ^{db}	2	108	112	–	103	91	–
Wintaroo ^{db}	2	105	109	–	88	90	–

– denotes no data available.

Data 2019–21 from SAGIT project S319 Improving productivity of oats.

OAT VARIETY NOTES

MILLING VARIETIES

Bilby[®]

Bilby[®], developed by SARDI and commercialised by Barenbrug in 2019, is a dwarf, quick-maturing milling oat. It has excellent grain yield comparable with Williams[®] and Bannister[®] in SA, but with improved grain quality due to lower screenings and a higher groat percentage. Bilby[®] has high β -glucan and lower oil than other dwarf varieties with bright grain. It is a cross between two breeder's lines and was tested as 06204-16. Seed is available through Barenbrug Broadacre Agents. EPR \$2.50 ex-GST.

NEW – Koala[®]

Koala[®], developed by SARDI and commercialised by Seednet in 2022, is a tall dwarf potential milling line. It has good early vigour similar to Bannister[®], which is one of its parents, and is a mid-quick maturing variety that can be up to seven days later to head compared with Bannister[®] and Williams[®]. Grain yield potential is similar to Bannister[®] and Williams[®] and grain quality comparable with Bannister[®]. It was tested as 09143-35. Contact Seednet for seed availability. EPR \$2.50 ex-GST.

Kowari[®]

Kowari[®], developed by SARDI and commercialised by Barenbrug in 2017, is a dwarf, quick-maturing milling oat variety measuring slightly taller than Mitika[®] in height with similar maturity and grain yield. Grain quality is good with low screenings and an improved β -glucan content compared with older milling varieties. Kowari[®] has high protein and slightly higher groat percentage compared with Mitika[®]. Seed is available through Barenbrug Broadacre Agents. EPR \$2.50 ex-GST.

Mitika[®]

Mitika[®], developed by SARDI and commercialised by Barenbrug in 2005, is a quick-maturing dwarf milling oat with high hectolitre and grain weight, low screenings and moderately high groat percentage. 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 is not a problem. Seed is available through Barenbrug Broadacre Agents. EPR \$2.00 ex-GST.

DUAL-PURPOSE VARIETIES

The following varieties have shown promise in agronomy and breeding trials for both grain and hay end-uses.

Bannister[®]

Bannister[®] is a quick-maturing milling oat released by the National Oat Breeding Program in 2012 in Western Australia, but also suited to eastern Australia because of its improved disease resistance profile. Bannister[®] is a tall dwarf, 13 centimetres taller than Mitika[®], and is high yielding for grain. It has shown potential for hay production, although may flower in the boot in harsh finishing seasons. Bannister[®] has slightly lower hectolitre weight, slightly higher screenings and slightly lower groat percentage compared with Mitika[®]. Seed is available through Seednet and Seednet partners. EPR \$2.30 ex-GST for grain and \$2.00 ex-GST for hay.

Durack[®]

Durack[®] was released in 2016 and is a very quick-maturing, moderate-tall variety, similar in height to Yallara[®]. This variety is a minimum of one week earlier to flower and cut for hay than any other variety released from the National Oat Breeding Program. It is widely adapted to the low to medium-rainfall zones and late sowing in the high-rainfall regions, although due to its fast development speed it does not have the hay yield potential of other hay varieties. Grain yield is similar to Yallara[®], and an improvement compared with tall varieties bred for hay. Monitoring the crop will be the key to achieving the highest hay quality through cutting at the correct growth stage. Seed is available through Barenbrug Broadacre Agents. EPR \$2.30 ex-GST for grain and \$2.00 ex-GST for hay.

Williams[®]

Williams[®] is a short tall milling variety released by the National Oat Breeding Program in 2013 in Western Australia. It is also suited to eastern Australia because of its improved disease resistance profile. Williams[®] is a high yielding quick variety with similar maturity to Yallara[®] and 15cm shorter. Williams[®] has similar grain yield to Bannister[®] with slightly inferior grain quality. Screenings can be high, especially in low-rainfall regions or sharp finishes. Williams[®] averages slightly lower hay yield compared with other hay varieties. Hay quality is similar to Wintaroo[®] with slightly lower water-soluble carbohydrates and slightly higher crude protein. Seed is available through Barenbrug Broadacre Agents. EPR \$2.30 ex-GST for grain and \$2.00 ex-GST for hay.

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Yallara[®]

Yallara[®] is a moderate-tall milling oat variety developed by SARDI and released in 2009. Yallara[®] is a premium quality oat with the flexibility to cut for hay with fine stems and good hay quality. It performed consistently well for hay yield and quality across the National Hay Agronomy trial program in three challenging seasons at the Hart Field Site and generally above the site average at low-rainfall sites. Yallara[®] has bright grain and high grain digestibility, making it suitable for the horse racing industry. Seed is available through Seednet and Seednet partners. EPR \$2.00 ex-GST for grain and hay.

HAY VARIETIES**NEW – Archer[®]**

Archer[®] is a single gene imidazolinone-tolerant oaten hay with quick maturity, medium plant height, good early vigour and hay colour retention. Improved tolerance to soil-residual imidazolinone herbicides, ideal for use where there are residue concerns. Sentry[®] herbicide is registered for incorporation by sowing for hay, forage, seed and grain (domestic feed market only). Excess grain, seed and screenings produced from single gene imidazolinone-tolerant oaten hay varieties (Kingbale[®] and Archer[®]) can be used for the domestic oaten grain feed markets and/or consumed on-farm. Grain of these varieties cannot be delivered into bulk handling systems. Released 2022 (tested as GIA1803-040). Bred by GIA and marketed by InterGrain with seed available from local resellers and InterGrain Seedclub members. EPR \$3.65 ex-GST for hay and grain.

Brusher[®]

Brusher[®] is a quick-maturing tall oat developed by SARDI and commercialised by AEXCO Pty Ltd in 2003. It is earlier to head than Wintaroo[®] with good panicle emergence, which makes it well suited to low-rainfall areas. Grain yield and grain quality are similar to Wintaroo[®], with higher grain protein. Brusher[®] is moderately low in grain lignin. Seed is available through AEXCO-appointed seed distributors. EPR \$2.00 ex-GST for hay.

Forester[®]

Forester[®] is a very slow-maturing hay variety adapted to high-rainfall and irrigated cropping regions. It was bred by SARDI and commercialised by AEXCO Pty Ltd in 2012. It is three weeks later to head compared with Wintaroo[®]. Forester[®] 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[®] has excellent hay quality. Seed is available through the authorised AEXCO seed distributor AGF Seeds. EPR \$2.00 ex-GST for hay.

Kingbale[®]

Kingbale[®] is a single gene imidazolinone-tolerant oaten hay with mid-maturity, tall plant height and similar disease and agronomic profile to Wintaroo[®]. Kingbale[®] has improved tolerance to soil-residual imidazolinone herbicides. Registered with Sentry[®] herbicide for hay and seed production only. Sentry[®] is registered for incorporation by sowing for hay, forage, seed and grain (domestic feed market only). Excess grain, seed and screenings produced from single gene imidazolinone-tolerant oaten hay varieties (Kingbale[®] and Archer[®]) can be used for the domestic oaten grain feed markets and/or consumed on-farm. Grain of these varieties cannot be delivered into bulk handling systems. Bred by GIA and marketed by InterGrain with seed available from local resellers and InterGrain Seedclub members. EPR \$3.65 ex-GST for hay and grain.

Koorabup[®]

Koorabup[®] is a moderate-tall hay variety with mid-quick maturity, bred by SARDI and developed for the WA market. This line is a cross between two advanced WA breeding lines and was commercialised by AEXCO Pty Ltd. It is similar in height, two to four days later in maturity and has similar grain yield and stem diameter compared with Yallara[®] but with lower hay yield. It has improved grain quality compared with other current hay varieties and improved resistance to some strains of Septoria. It has excellent hay colour and hay quality, although slightly lower water-soluble carbohydrates than other hay varieties across the National Hay Agronomy trial program. Grain quality is similar to Yallara[®] but with a lower groat percentage. It has low oil and bright grain. Seed is available through AEXCO-appointed seed distributors. EPR \$2.00 ex-GST for export hay.

NEW – Kultarr[®]

Kultarr[®] is a quick-maturing oaten hay with a tall plant height, similar to Swan. Kultarr[®] is higher yielding than Brusher[®] and Mulgara[®] and slightly later to flower than Brusher[®], like Mulgara[®]. Preliminary hay quality data indicates the variety has a suitable quality profile. Preliminary disease data indicates an adequate resistance to common diseases including good barley yellow dwarf virus resistance (MRMS (P)), CCN (MS (P)) and Septoria (MS (P)) and is MS (P) to leaf rust. Seed is available for planting in 2023 from local resellers or InterGrain Seedclub members. EPR \$3.00 ex-GST for hay and grain.

Mulgara[®]

Mulgara[®] is a tall, quick-maturing hay oat bred by SARDI and commercialised by AEXCO Pty Ltd in 2009. Hay quality is similar to Wintaroo[®]. Grain yield and quality is similar to Wintaroo[®] with lower screenings, higher protein and groat percentage. Mulgara[®] has high grain hull lignin. It is recommended to replace Wintaroo[®] in areas with stem nematode due to its higher level of resistance. Mulgara[®] seed size is larger than other hay varieties described in this sowing guide. Care should be taken to sow this variety at the correct seed density. Seed is available through AEXCO-appointed seed distributors. EPR \$2.00 ex-GST for hay.

Tammar[®]

Tammar[®] is a tall, mid-slow hay oat variety, later in cutting time than Tungoo[®] but not as late as Forester[®]. It was bred by SARDI and commercialised by AEXCO. Tammar[®] has excellent hay colour and resists brown leaf at hay cutting. Hay yields are slightly lower than Wintaroo[®] and similar to Tungoo[®] with comparable hay quality. Tammar[®] has an excellent foliar disease resistance profile and is an improvement compared with Tungoo[®] for stem rust resistance. Tammar[®] is recommended for medium and high-rainfall zones and gives a slightly later option for cutting time than Tungoo[®]. Seed is available through AEXCO-appointed seed distributors. EPR \$2.00 ex-GST for hay.

Tungoo[®]

Tungoo[®] is a moderate-tall, mid to late season hay variety bred by SARDI and commercialised by AEXCO in 2012. Tungoo[®] 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. It has moderately low hull lignin. Seed is available through AEXCO-appointed seed distributors. EPR \$2.00 ex-GST for hay.

NEW – Wallaby[®]

Wallaby[®] is a mid-maturing oaten hay variety with similar hay yields to Mulgara[®] and Brusher[®]. Wallaby[®] has high quality attributes, including good digestibility, high water-soluble carbohydrate levels and low neutral detergent fibres (NDF). Wallaby[®] has a medium to tall plant height and likely suited to medium and high-rainfall zones. Wallaby[®] is resistant to CCN and provisional ratings suggest it has good barley yellow dwarf virus (R (P)), stem rust (MS (P)) and Septoria (MSS (P)) resistance and is MS (P) to leaf rust. Seed is available for planting in 2023 from local resellers or InterGrain Seedclub members. EPR \$3.00 ex-GST for hay and grain.

YIELD PERFORMANCE EXPERIMENTS FROM 2017–21

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 2017–21 inclusive. Further results can be found on the NVT website (nvt.grdc.com.au).

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Table 5: Upper Eyre Peninsula oat yield performance. NVT data 2017–21. Data for 2017, 2018, 2019 and 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	0.00	0.00	1.07	0.00
	No. trials	0	0	0	1	0
Bannister ^{db}	1	Not available	Not available	Not available	100	Not available
Bilby ^{db}	1				99	
Durack ^{db}	1				99	
Koala ^{db}	1				101	
Koorabup ^{db}	1				99	
Kowari ^{db}	1				100	
Mitika ^{db}	1				100	
Williams ^{db}	1				101	
Yallara ^{db}	1				99	

Table 6: Yorke Peninsula oat yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.66	3.10	2.18	0.83	1.60
	No. trials	1	1	1	1	1
Bannister ^{db}	5	106	108	105	110	100
Bilby ^{db}	5	103	110	110	110	113
Durack ^{db}	5	95	88	97	86	111
Koala ^{db}	5	98	101	78	95	62
Koorabup ^{db}	5	95	77	76	69	88
Kowari ^{db}	5	99	103	108	104	112
Mitika ^{db}	5	97	95	101	95	107
Williams ^{db}	5	106	97	110	105	106
Yallara ^{db}	5	97	84	82	76	99

Table 7: Mid North oat yield performance. NVT data 2017–21. Data for 2018 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.03	0.00	2.09	3.46	3.36
	No. trials	1	0	1	1	1
Bannister ^{db}	4	107	Not available	99	111	109
Bilby ^{db}	4	116		115	106	103
Durack ^{db}	4	82		105	86	91
Koala ^{db}	4	105		75	112	111
Koorabup ^{db}	4	62		80	90	99
Kowari ^{db}	4	108		113	96	95
Mitika ^{db}	4	94		105	91	93
Williams ^{db}	4	85		91	101	102
Yallara ^{db}	4	72		92	95	102

Table 8: Murray Mallee oat yield performance. NVT data 2017–21. Data for 2018 and 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.59	0.00	0.63	2.73	0.00
	No. trials	1	0	1	1	0
Bannister ^{db}	3	105	Not available	95	108	Not available
Bilby ^{db}	3	108		116	102	
Durack ^{db}	3	92		109	93	
Koala ^{db}	3	95		92	109	
Koorabup ^{db}	3	77		99	102	
Kowari ^{db}	3	105		110	95	
Mitika ^{db}	3	98		103	94	
Williams ^{db}	3	100		70	103	
Yallara ^{db}	3	82		113	104	

Table 9: South East oat yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	5.31	2.73	5.04	5.04	4.81
	No. trials	2	2	2	2	2
Bannister ^{db}	10	109	114	106	113	111
Bilby ^{db}	10	101	97	101	101	103
Durack ^{db}	10	87	81	91	79	86
Koala ^{db}	10	105	115	104	114	109
Koorabup ^{db}	10	84	91	89	79	88
Kowari ^{db}	10	98	90	98	95	96
Mitika ^{db}	10	94	89	96	90	92
Williams ^{db}	10	110	120	108	113	108
Yallara ^{db}	10	84	88	89	79	90

ACKNOWLEDGEMENTS

Thanks to Sue Hoppo and Pamela Zwer from the SARDI oat breeding team for input into previous versions of this sowing guide.

Hay and grain yield data from Tables 2 to 4 is derived from SAGIT-funded project S319, 'Improving productivity of oats' and the 'National Hay Agronomy Project' (PRJ-011029), funded by AgriFutures Australia as part of the AgriFutures Export Fodder Program.

CANOLA

By Andrew Ware, EPAG Research

Since the publication of the 2022 sowing guide 14 new canola varieties have become available for production in 2023. These include Outlaw[®], Bandit TT[®], HyTTec[®] Velocity, InVigor[®] T 4511, DG Torrens TT[®], DG Hotham TF, Nuseed[®] Eagle TF, Nuseed[®] Hunter TF, Pioneer[®] PY520TC, Renegade TT[®], RGT Baseline TT, Hyola[®] Regiment XC, Hyola[®] Solstice CL and RGT Clavier[™] CL.

There may be further variety releases in the months to follow, with seed possibly being available for planting in 2023, but these cannot be confirmed at this time.

It should be noted that the marketing company responsible for each of the varieties listed in this section has advised that they are planning to have seed available for planting in 2023. However, not all varieties that are still marketed have been tested in NVT in 2022. Some older varieties have not been evaluated in NVT for several years, but seed remains available.

Specialty-type canola varieties such as those marketed under the VICTORY[®] or Monola[®] brands have been removed from the sowing guide as there are no delivery points for these varieties in South Australia.

VARIETAL SELECTION

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

The weed species expected may dictate the need for a herbicide-tolerant production system (for example, triazine tolerant or imidazolinone tolerant or glyphosate tolerant). It should be noted that any variety with triazine tolerance 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 in maximising yield potential. Varietal blackleg resistance and/or fungicide use should be considered, particularly when rotations are close.

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CANOLA VARIETY NOTES

CONVENTIONAL VARIETIES

Conventional varieties (varieties with no herbicide tolerance) are no longer evaluated in NVT in South Australia. No yield data will be reported here for conventional varieties.

NUSEED® DIAMOND

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

NUSEED® QUARTZ

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

NEW – OUTLAW[Ⓛ]

An early-maturing open pollinated variety. Provisional blackleg resistance rating of MRMS (provisional resistance group A). Bred and marketed by AGT. EPR \$10.00 ex-GST.

TRIAZINE TOLERANT VARIETIES

AFP CUTUBURY[Ⓛ]

An early-mid maturing open pollinated variety. AFP Cutubury[Ⓛ] has tolerance to Group 2 (Group B) herbicide that allows it to be planted into soil residues of Group 2 herbicide. Medium plant height. Suited to low to medium-rainfall areas. Blackleg resistance rating of MRMS (resistance group AB). Tested in NVT in 2020–22. Bred by Agronomy for Profit Seeds. EPR \$4.00 ex-GST.

ATR-BLUEFIN[Ⓛ]

An early-maturity open pollinated triazine-tolerant variety. Blackleg resistance rating (provisional) RMR, (resistance group AB). Medium height. Improved early vigour on ATR-Stingray[Ⓛ]. For low to medium-rainfall areas. Tested in NVT in 2020–22. Bred and marketed by Nuseed. EPR \$5.00 ex-GST.

ATR-BONITO[Ⓛ]

Early-mid season maturing open pollinated variety. Short-medium height. Suited to low to medium-rainfall areas. Blackleg resistance rating of MS (resistance group A). Tested in NVT in 2012–22. Marketed by Nuseed. EPR \$5.00 ex-GST.

ATR-STINGRAY[Ⓛ]

Early-maturing open pollinated variety. Fast to flowering. Short height. Blackleg resistance rating of MRMS (resistance group C). Tested in NVT in 2011–22. Bred by Nuseed and DPI Victoria. Marketed by Nuseed.

ATR-WAHOO[Ⓛ]

Mid-maturing open pollinated variety. Medium plant height. Blackleg rating of MRMS (resistance group A). Suited to medium to high-rainfall areas. Tested in NVT in 2012–22. Marketed by Nuseed. EPR \$5.00 ex-GST.

NEW – BANDIT TT[Ⓛ]

An early-maturing open pollinated variety. Blackleg rating of MS (resistance group A). Suited to low to medium-rainfall areas. Tested in NVT in 2021–22. Marketed by AGT. EPR \$10.00 ex-GST.

DG BIDGEE TT[Ⓛ]

An early-mid maturity, open pollinated triazine-tolerant variety. Suited to low to medium-rainfall areas. Blackleg resistance of R (resistance group H). Tested in NVT in 2021–22. Marketed by Nutrien Ag Solutions and Seednet. EPR \$5.00 ex-GST.

DG MURRAY TT[Ⓛ]

A mid-late maturity, open pollinated triazine-tolerant variety. Suited to medium to high-rainfall areas. Blackleg resistance of R (resistance group H). Tested in NVT in 2020–22. Marketed by Nutrien Ag Solutions and Seednet. EPR \$5.00 ex-GST.

NEW – DG TORRENS TT[Ⓛ]

An early-mid maturity, open pollinated triazine-tolerant variety. Suited to low to medium-rainfall areas. Blackleg resistance of RMR (resistance group H). Tested in NVT in 2021–22. Marketed by Nutrien Ag Solutions and Seednet. EPR \$5.00 ex-GST.

HYOLA® BLAZER TT

Mid-early maturing TT hybrid. Medium-short plant height. Blackleg resistance rating R (resistance group ADF). Suited to medium to very high-rainfall zones. Tested in NVT in 2019–22. Bred and marketed by Pacific Seeds.

HYTTEC® TRIDENT

An early-maturity hybrid canola. Medium-tall plant height. Blackleg rating of R (resistance group AD). Suited to the low-rainfall areas. Tested in NVT 2017–22. Bred and marketed by Nuseed. EPR \$5.00 ex-GST.

HYTTEC® TRIFECTA

A mid-maturity hybrid canola. Medium-tall plant height. Provisional blackleg resistance rating of R (resistance group ABD). Suited to the medium to high-rainfall areas. Tested in NVT in 2019–22. Bred and marketed by Nuseed. EPR \$5.00 ex-GST.

HYTTEC® TROPHY

An early-mid maturity hybrid canola. Medium-tall plant height. Blackleg rating of R (resistance group AD). Suited to the low to medium-rainfall areas. Tested in NVT in 2017–22. Bred and marketed by Nuseed. EPR \$5.00 ex-GST.

NEW – HYTTEC® VELOCITY

An early-maturity hybrid canola. Medium-tall plant height. Blackleg rating of MRMS (resistance group AB). Suited to the low to medium-rainfall areas. Tested in NVT in 2020–22. Bred and marketed by Nuseed. EPR \$5.00 ex-GST.

INVIGOR® T 4510

Early-mid season triazine-tolerant hybrid variety. Medium plant height. Suited to early/medium rainfall areas. Blackleg resistance rating of MR (resistance group BF). Tested in NVT in 2016–22. Marketed by BASF.

NEW – INVIGOR® T 4511

Early-mid season triazine-tolerant hybrid variety. Blackleg resistance rating R (resistance group to be determined). Tested in NVT in 2021–22. Marketed by BASF.

INVIGOR® T 6010

Mid-late season triazine-tolerant hybrid variety. Medium plant height. Suited to medium to high-rainfall areas. Blackleg resistance rating of MRMS (resistance group BC). Tested in NVT in 2019–22. Marketed by BASF.

NEW – RENEGADE TT[Ⓛ]

An early-mid maturing open pollinated variety. Blackleg rating of MRMS (resistance group A). Tested in NVT in 2021–22. Marketed by AGT. EPR \$10.00 ex-GST.

NEW – RGT BASELINE TT

Mid-maturing hybrid with similar maturity to SF Ignite TT. Suited to medium-rainfall areas. Medium plant height. Blackleg resistance rating MRMS (resistance group B). Tested in NVT in 2021–22. Marketed by Seed Force. EPR \$10.00 ex-GST.

RGT CAPACITY™ TT

An early-mid maturing hybrid, similar flowering to SF Turbine TT. Suited to low to medium-rainfall areas. Medium plant height. Blackleg resistance rating MRMS (resistance group B). Tested in NVT in 2019–22. Marketed by Seed Force. EPR \$10.00 ex-GST.

SF DYNATRON TT™

Mid-maturing hybrid, triazine-tolerant canola. Suited to the medium to high-rainfall areas. Medium-tall height with a high oil content. Blackleg rating of MRMS (resistance group BC). Tested in NVT in 2019–22. Marketed by Seed Force, exclusively to Nutrien. EPR \$10.00 ex-GST.

SF SPARK TT

Early-maturing hybrid. Suited to low to medium-rainfall areas. Medium plant height. Blackleg rating MR (resistance group ABDS). Tested in NVT in 2018–22. Marketed by Seed Force. EPR \$10.00 ex-GST.

Discontinued TT varieties:

ATR-Mako[Ⓛ], DG 670TT, Pioneer® 45T03, SF Ignite, SF Turbine.

DUAL TRIAZINE AND LIBERTYLINK® TOLERANT**INVIGOR® LT 4530P**

Early-mid maturing triazine tolerant and LibertyLink® hybrid variety. Blackleg resistance RMR (resistance group BF). Suited to medium to high-rainfall areas. PodGuard® technology makes it suited to later windrowing timings or direct harvest. Blackleg resistance rating to be confirmed (resistance group BF). Tested in NVT 2020–22. NVT yields in triazine-tolerant tables. Bred and marketed by BASF.

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DUAL TRIAZINE AND IMIDAZOLINONE TOLERANT

HYOLA® ENFORCER CT

Dual herbicide tolerant, Hyola® Enforcer CT carries tolerance to both triazine and Clearfield® herbicide chemistries. Mid-early maturity. Medium plant height. Blackleg resistance rating R (resistance group ADF). Also designed for imidazolinone soil carryover situations. Tested in NVT in 2019–22. NVT yields in triazine-tolerant tables. Bred and marketed by Pacific Seeds.

NEW – PIONEER® PY520TC

Mid-maturing variety that carries tolerance to both triazine and Clearfield® herbicide chemistries. Suited to medium to high-rainfall zones. Blackleg rating MR (resistance group BC). Tested in NVT in 2021-22. Marketed by Pioneer Brand Seeds.

GLYPHOSATE-TOLERANT HYBRID VARIETIES

The first year of evaluation of glyphosate-tolerant varieties in NVT in South Australia was 2021, so one year of NVT yield results are reported here.

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.

DG BINDO TF

Early-mid maturing TruFlex® hybrid. Suited to low to medium-rainfall zones. Blackleg rating of MRMS (resistance group AB). Tested in NVT in 2021-22. Marketed by Nutrien Ag Solutions and Seednet.

DG LOFTY TF

Early-mid maturing TruFlex® hybrid. Suited to low to medium-rainfall zones. Blackleg rating of R (resistance group ABH). Tested in NVT in 2021-22. Marketed by Nutrien Ag Solutions and Seednet.

NEW – DG HOTHAM TF

Mid-maturing TruFlex® hybrid. Suited to medium to high-rainfall zones. Blackleg rating of R (resistance group ABH). Tested in NVT in 2022. Marketed by Nutrien Ag Solutions and Seednet.

HYOLA® 410XX

Mid-early TruFlex® hybrid canola. Medium to medium-tall plant height. Suited to low to medium-rainfall zones. Blackleg resistance rating of MR (resistance group ABD). Tested in NVT in 2018–22. Bred and marketed by Pacific Seeds.

INVIGOR® R 4022P

Early-mid maturing TruFlex® hybrid suited to medium-rainfall zones. PodGuard® technology makes it suited to later windrowing timings or direct harvest. Blackleg rating of MR (resistance group ABC). Tested in NVT in 2019–22. Bred and marketed by BASF.

INVIGOR® R 4520P

Early-mid maturing TruFlex® hybrid variety (slightly later than InVigor® R 4022P). PodGuard® technology makes it suited to later windrowing timings or direct harvest. Blackleg rating of MRMS (resistance group B). Tested in NVT in 2019–22. Bred and marketed by BASF.

NUSEED® GT-53

Mid-maturing Roundup Ready® hybrid variety. Medium-tall height. Blackleg rating R (resistance group ABDF). Tested in NVT in 2014–21. Marketed by Nuseed.

NUSEED® CONDOR TF

Mid-maturing TruFlex® hybrid. Blackleg rating R (resistance group ABD). Tall height. Tested in NVT in 2019–22. Bred and Marketed by Nuseed.

NEW – NUSEED® EAGLE TF

Mid-maturing TruFlex® hybrid. Nuseed suggests higher yields than Condor TF and Raptor TF. Suited to medium to high-rainfall areas. Blackleg rating R (resistance group ABD). Tall height. Tested in NVT in 2022. Bred and marketed by Nuseed.

NUSEED® EMU TF

Early-maturing TruFlex® hybrid. Suited to low to medium-rainfall areas. Medium plant height. Blackleg rating MR (resistance group AB). Tested in NVT in 2019–22. Bred and marketed by Nuseed.

NEW – NUSEED® HUNTER TF

Early-mid maturing TruFlex® hybrid. Suited to low to medium-rainfall areas. Medium plant height. Blackleg rating RMR (resistance group AB). Tested in NVT in 2021-22. Bred and marketed by Nuseed.

NUSEED® RAPTOR TF

Early-mid maturing TruFlex® hybrid. Blackleg rating R (resistance group AD). Medium height. Tested in NVT in 2018–22. Bred and marketed by Nuseed.

PIONEER® 44Y27 RR

Early to early-mid season Roundup Ready® hybrid variety, ideally suited to low to medium-rainfall zones. Blackleg rating RMR (resistance group B). Tested in NVT in 2016–22. Marketed by Pioneer Brand Seeds.

PIONEER® 44Y30 RR

Early-mid season Roundup Ready® hybrid variety, with a wide area of adaptation. Blackleg rating MR (resistance group AB). Tested in NVT in 2020–22. Marketed by Pioneer Brand Seeds.

PIONEER® 45Y28 RR

Mid-maturing Roundup Ready® hybrid variety. Suited to medium to high-rainfall zones and irrigation. Blackleg rating RMR (resistance group BC). Medium-tall height. Tested in NVT in 2018–22. Marketed by Pioneer Brand Seeds.

Discontinued glyphosate varieties:

BASF 3000 TR, InVigor® R 3520, InVigor® R 5520P, Nuseed® GT-42.

DUAL IMIDAZOLINONE AND GLYPHOSATE TOLERANT**HYOLA® BATTALION XC**

Dual herbicide tolerant, early-mid maturity, TruFlex® plus Clearfield® (imidazolinone) hybrid canola. Medium plant height. Suited to low to medium-rainfall zones. Blackleg resistance rating R (resistance group ADF). Also designed for imidazolinone herbicide residue situations. Tested in NVT in 2020–22. NVT yields in glyphosate-tolerant tables. Bred and marketed by Pacific Seeds.

HYOLA® GARRISON XC

Dual herbicide tolerant, mid-maturity, TruFlex® plus Clearfield® (imidazolinone) hybrid canola. Medium to medium-tall plant height. Suited to medium to high-rainfall zones. Blackleg resistance rating R (resistance group ADF). Also designed for imidazolinone herbicide residue situations. Tested in NVT in 2019–22. NVT yields in glyphosate-tolerant tables. Bred and marketed by Pacific Seeds.

NEW – HYOLA® REGIMENT XC

Dual herbicide tolerant, mid-maturity, TruFlex® plus Clearfield® (imidazolinone) hybrid canola. Blackleg resistance rating R (resistance group ADFH). Also designed for imidazolinone herbicide residue situations. Tested in NVT in 2021–22. NVT yields in glyphosate-tolerant tables. Bred and marketed by Pacific Seeds.

IMIDAZOLINONE TOLERANT**HYOLA® EQUINOX CL**

Mid-maturing CL hybrid. Suited to medium to high-rainfall zones. Blackleg resistance rating R (resistance group ADF). Tested in NVT in 2020–22. Bred and marketed by Pacific Seeds.

NEW – HYOLA® SOLSTICE CL

Mid-maturing CL hybrid. Suited to medium to high-rainfall zones. Blackleg resistance rating RMR (resistance group ADFH). Tested in NVT in 2021–22. Bred and marketed by Pacific Seeds.

PIONEER® 43Y92 CL

Early-maturing hybrid. Medium plant height. Suited to low to medium-rainfall areas and short season growing zones. Blackleg resistance rating of RMR (resistance group B). Tested in NVT in 2016–22. Marketed by Pioneer Brand Seeds.

PIONEER® 44Y94 CL

An early to mid-maturing hybrid. Blackleg resistance rating of RMR (resistance group BC). Tested in NVT in 2019–22. Marketed by Pioneer Brand Seeds.

PIONEER® 45Y93 CL

A mid-maturing hybrid suited to early planting and high to medium-rainfall zones. Medium-tall plant height. A blackleg rating of R (resistance group BC). Tested in NVT in 2017–22. Marketed by Pioneer Brand Seeds.

PIONEER® 45Y95 CL

A mid-maturing hybrid variety, best suited to medium to high-rainfall zones and irrigation. Medium-tall plant height. Blackleg rating of RMR (resistance group C). Tested in NVT in 2020–22. Marketed by Pioneer Brand Seeds.

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WINTER-TYPE IMIDAZOLINONE TOLERANT

Several winter-type canola varieties are available. These varieties have a high vernalisation (or cold) requirement, which means they are capable of producing high quantities of biomass before they start 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; 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.

HYOLA® 970CL

Long season, winter graze-and-grain, dual-purpose Clearfield® hybrid. Pacific Seeds indicates high to very high biomass dry matter (DM) production, 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 R (resistance group H). Not tested in NVT. Marketed by Pacific Seeds.

Table 1: Agronomic and disease information for current canola varieties.

Variety	Herbicide tolerance	Type	Harvest maturity†	Blackleg rating			Blackleg group	EPR (\$/t)	Release	Seed access
				Bare seed	ILeVO®	Saltro®				
Nuseed® Diamond	Conv	Hybrid	3	RMR	R	R	ABF	—	2013	Nuseed
Nuseed® Quartz	Conv	Hybrid	5	R	—	—	ABD	—	2017	Nuseed
Outlaw ^{db}	Conv	OP	3	MRMS (P)	—	R (P)	A (P)	10	2022	AGT
AFP Cutubury ^{db}	TT**	OP	4	MRMS	R	R	AB	4	2020	Agronomy for Profit
ATR-Bluefin ^{db}	TT	OP	3	RMR	—	—	AB	5	2021	Nuseed
ATR-Bonito ^{db}	TT	OP	4	MS	RMR	R	A	5	2013	Nuseed
ATR-Stingray ^{db}	TT	OP	3	MRMS	R	R	C	—	2011	Nuseed
ATR-Wahoo ^{db}	TT	OP	6	MRMS	—	—	A	5	2013	Nuseed
Bandit TT ^{db}	TT	OP	3	MS	R	R	A	10	2022	AGT
DG BIDGEE TT ^{db}	TT	OP	4	R	R	R	H	5	2021	Nutrien
DG MURRAY TT ^{db}	TT	OP	6	R	R	R	H	5	2021	Nutrien
DG Torrens TT ^{db}	TT	OP	4	RMR	—	—	H	5	2022	Nutrien
Hyola® Blazer TT	TT	Hybrid	4	R	—	R	ADF	—	2020	Pacific Seeds
HyTTec® Trident	TT	Hybrid	3	R	—	R	AD	5	2019	Nuseed
HyTTec® Trifecta	TT	Hybrid	5	R	—	R	ABD	5	2020	Nuseed
HyTTec® Trophy	TT	Hybrid	4	R	R	R	AD	5	2017	Nuseed
HyTTec® Velocity	TT	Hybrid	3	MRMS	—	—	AB	5	2022	Nuseed
InVigor® T 4510	TT	Hybrid	4	MR	R	R	BF	—	2016	BASF
InVigor® T 4511	TT	Hybrid	4	R	R	—	tbd	—	2022	BASF
InVigor® T 6010	TT	Hybrid	6	MRMS	R	R	BC	—	2020	BASF
Renegade TT ^{db}	TT	OP	4	MRMS	R	R	A	10	2022	AGT
RGT Baseline TT	TT	Hybrid	5	MRMS	R	R	B	10	2022	Seed Force
RGT Capacity™ TT	TT	Hybrid	4	MRMS	R	R	B	10	2021	Seed Force
SF Dynatron TT™	TT	Hybrid	5	MRMS	R	R	BC	10	2020	Nutrien & CRT
SF Spark TT	TT	Hybrid	3	MR	R	R	ABDS	10	2018	Seed Force
InVigor® LT 4530P	TT + LL	Hybrid	4	RMR	R	R	BF	—	2021	BASF
Hyola® Enforcer CT	TT + CL	Hybrid	5	R	—	R	ADF	—	2020	Pacific Seeds
Pioneer® PY520TC	TT + CL	Hybrid	5	MR	R	R	BC	—	2022	Pioneer
DG Bindo TF	GT (TF)	Hybrid	4	MRMS	R	R	AB	—	2021	Nutrien
DG Lofty TF	GT (TF)	Hybrid	4	R	—	—	ABH	—	2021	Nutrien

Table 1, cont. next page

HYOLA® FEAST CL

Long season, winter graze-and-grain, dual-purpose Clearfield® hybrid. Pacific Seeds indicates high to very high biomass DM production, good grain yield and oil content. Will mature seven days earlier than Hyola® 970CL. 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 R (resistance group H). Not tested in NVT. Marketed by Pacific Seeds.

PHOENIX CL

A winter graze-and-grain, dual-purpose hybrid variety. AGF Seeds indicates 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. Marketed by AGF Seeds.

NEW – RGT CLAVIER™ CL

A winter graze-and-grain, dual-purpose hybrid variety. Suited to early sowing in high-rainfall areas. Blackleg resistance rating of R (resistance group to be determined). Not tested in NVT. Marketed by Seed Force. EPR \$12.00 ex-GST.

RGT NIZZA™ CL

Early winter dual-purpose grazing hybrid. Approximately 7 to 10 days earlier to flower than Hyola® 970CL. Seed Force indicates very high biomass with excellent yield and oil content. Suited to early sowing and spring sowing in high-rainfall areas. Blackleg resistance rating R (resistance group B). Not tested in NVT. Marketed by Seed Force. EPR \$12.00 ex-GST.

Table 1: Agronomic and disease information for current canola varieties (continued).

Variety	Herbicide tolerance	Type	Harvest maturity†	Blackleg rating			Blackleg group	EPR (\$/t)	Release	Seed access
				Bare seed	ILeVO®	Saltro®				
DG Hotham TF	GT (TF)	Hybrid	5	R	–	–	ABH	–	2022	Nutrien
Hyola® 410XX	GT (TF)	Hybrid	4	MR	R	R	ABD	–	2018	Pacific Seeds
InVigor® R 4022P	GT (TF)	Hybrid	4	MR	R	R	ABC	–	2019	BASF
InVigor® R 4520P	GT (TF)	Hybrid	4	MRMS	R	R	B	–	2020	BASF
Nuseed® GT-53	GT (RR)	Hybrid	5	R	–	–	ABDF	–	2016	Nuseed
Nuseed® Condor TF	GT (TF)	Hybrid	5	R	–	R	ABD	–	2020	Nuseed
Nuseed® Eagle TF	GT (TF)	Hybrid	5	R	–	–	ABD	–	2022	Nuseed
Nuseed® Emu TF	GT (TF)	Hybrid	3	MR	–	R	AB	–	2021	Nuseed
Nuseed® Hunter TF	GT (TF)	Hybrid	4	RMR	–	–	AB	–	2022	Nuseed
Nuseed® Raptor TF	GT (TF)	Hybrid	4	R	–	–	AD	–	2019	Nuseed
Pioneer® 44Y27 RR	GT (RR)	Hybrid	4	RMR	R	R	B	–	2017	Pioneer
Pioneer® 44Y30 RR	GT (RR)	Hybrid	4	MR	R	R	AB	–	2021	Pioneer
Pioneer® 45Y28 RR	GT (RR)	Hybrid	5	RMR	R	R	BC	–	2018	Pioneer
Hyola® Battalion XC	GT (TF) + CL	Hybrid	4	R	–	R	ADF	–	2021	Pacific Seeds
Hyola® Garrison XC	GT (TF) + CL	Hybrid	5	R	–	R	ADF	–	2020	Pacific Seeds
Hyola® Regiment XC	GT (TF) + CL	Hybrid	5	R	–	–	ADFH	–	2022	Pacific Seeds
Hyola® Equinox CL	CL	Hybrid	5	R	–	R	ADF	–	2021	Pacific Seeds
Hyola® Solstice CL	CL	Hybrid	5	RMR	–	–	ADFH	–	2022	Pacific Seeds
Pioneer® 43Y92 CL	CL	Hybrid	3	RMR	R	R	B	–	2017	Pioneer
Pioneer® 44Y94 CL	CL	Hybrid	4	RMR	R	R	BC	–	2020	Pioneer
Pioneer® 45Y93 CL	CL	Hybrid	5	R	R	R	BC	–	2018	Pioneer
Pioneer® 45Y95 CL	CL	Hybrid	5	RMR	–	R	C	–	2021	Pioneer
Hyola® 970CL	CL	Hybrid	Winter	R	R	R	H	–	2018	Pacific Seeds
Hyola® Feast CL	CL	Hybrid	Winter	R	–	R	H	–	2020	Pacific Seeds
Phoenix CL	CL	Hybrid	Winter	R	–	–	B	–	2018	AGF Seeds
RGT Clavier™ CL	CL	Hybrid	Winter	R	R	R	tbd	12	2022	Seed Force
RGT Nizza™ CL	CL	Hybrid	Winter	R	R	R	B	12	2020	AGF Seeds

TT = triazine tolerant, GT = glyphosate tolerant, TF = TruFlex®, RR = Roundup Ready®, LL = LibertyLink® (glufosinate tolerant), CL = Clearfield® (imidazolinone tolerant), (P) = provisional ratings and subject to change when additional data becomes available, ** = tolerant to Group B (Group 2) herbicide residue, † information provided by seed companies, winter = late. Blackleg resistance rating key: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible.

Table 2: Upper Eyre Peninsula low-medium rainfall zone. NVT data 2017–21.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	1.11	1.17	1.18	1.03
	No. trials	0	2	2	1	1
ATR-Bluefin ^{db}	1	No trial	–	–	–	79
ATR-Bonito ^{db}	5		95	101	83	–
ATR-Stingray ^{db}	6		89	87	75	76
Bandit TT ^{db}	1		–	–	–	102
Hyola® Blazer TT	1		–	–	118	–
Hyola® Enforcer CT	3		–	100	98	–
HyTTec® Trident	5		125	97	130	122
HyTTec® Trophy	6		109	102	118	121
InVigor® T 4510	6		110	106	124	117
InVigor® T 4511	1		–	–	–	114
Renegade TT ^{db}	1		–	–	–	99
SF Dynatron TT™	2		–	114	–	–
SF Spark TT	3		–	98	106	–
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	0.00	1.17	1.19	1.29	1.42
	No. trials	0	2	2	1	1
Pioneer® 43Y92 CL	6	No trial	103	99	102	105
Pioneer® 45Y95 CL	2		111	–	–	–

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

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

Table 3: Lower Eyre Peninsula medium-high rainfall zone. NVT data 2017–21.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	1.24	2.41	1.94	1.99
	No. trials	0	1	1	2	2
AFP Cutubury [Ⓛ]	2	No trial	–	–	–	82
ATR-Bonito [Ⓛ]	1		94	–	–	–
ATR-Wahoo [Ⓛ]	2		98	94	–	–
Bandit TT [Ⓛ]	1		–	–	–	98
DG MURRAY TT [Ⓛ]	4		–	–	78	83
Hyola® Blazer TT	4		–	–	113	112
Hyola® Enforcer CT	5		–	105	102	109
HyITec® Trifecta	6		111	115	114	118
HyITec® Trophy	6		107	110	108	118
InVigor® LT 4530P	1		–	–	–	108
InVigor® T 4510	6		103	106	114	115
InVigor® T 4511	2		–	–	–	120
InVigor® T 6010	5		–	109	116	94
Renegade TT [Ⓛ]	1		–	–	–	99
RGT Capacity™ TT	2		–	–	–	104
SF Spark TT	6		99	98	95	102
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	0.00	1.50	2.66	1.88	1.82
	No. trials	0	1	1	2	2
Hyola® Equinox CL	4	No trial	–	–	107	117
Hyola® Solstice CL	2		–	–	–	120
Pioneer® 44Y94 CL	5		–	110	114	124
Pioneer® 45Y93 CL	4		107	110	109	–
Pioneer® 45Y95 CL	4		107	113	–	122
GLYPHOSATE TOLERANT						
Variety	Mean yield (t/ha)	0.00	0.00	0.00	0.00	1.77
	No. trials	0	0	0	0	1
DG Bindo TF	1	No trial	No trial	No trial	No trial	103
Hyola® 410XX	1					107
Hyola® Battalion XC	1					108
Hyola® Garrison XC	1					108
Hyola® Regiment XC	1					119
InVigor® R 4022P	1					120
InVigor® R 4520P	1					125
Nuseed® Condor TF	1					124
Nuseed® Emu TF	1					133
Nuseed® Raptor TF	1					121
Pioneer® 44Y27 RR	1					128
Pioneer® 44Y30 RR	1					125
Pioneer® 45Y28 RR	1					115

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

Table 4: Yorke Peninsula medium-high rainfall zone. NVT data 2017–21. Data for 2018 not available.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.98	0.00	1.23	1.20	2.27
	No. trials	1	0	1	1	1
AFP Cutubury ^d	1	–	Not available	–	–	85
ATR-Stingray ^d	1	89		–	–	–
Bandit TT ^d	1	–		–	–	97
DG BIDGEE TT	1	–		–	–	91
Hyola® Blazer TT	2	–		–	109	112
Hyola® Enforcer CT	3	–		99	104	105
HyTtec® Trident	3	–		109	124	120
HyTtec® Trifecta	3	–		113	114	115
HyTtec® Trophy	4	109		111	116	114
InVigor® LT 4530P	1	–		–	–	107
InVigor® T 4510	4	105		113	121	112
InVigor® T 4511	1	–		–	–	113
InVigor® T 6010	3	–		106	96	100
Renegade TT ^d	1	–		–	–	99
RGT Baseline TT	1	–		–	–	97
RGT Capacity™ TT	3	–		110	109	105
SF Dynatron TT™	3	–		117	113	109
SF Spark TT	2	–	98	101	–	
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	3.29	0.00	1.22	1.07	2.69
	No. trials	1	0	1	1	1
Hyola® Equinox CL	2	–	Not available	–	116	107
Hyola® Solstice CL	1	–		–	–	110
Pioneer® 43Y92 CL	1	–		–	123	–
Pioneer® 44Y94 CL	3	–		119	127	115
Pioneer® 45Y93 CL	4	108		110	102	105
Pioneer® 45Y95 CL	2	–		123	–	115
GLYPHOSATE TOLERANT						
Variety	Mean yield (t/ha)	0.00	0.00	0.00	0.00	2.71
	No. trials	0	0	0	0	1
DG Bindo TF	1	No trial	No trial	No trial	No trial	103
Hyola® 410XX	1					102
Hyola® Battalion XC	1					102
Hyola® Garrison XC	1					103
Hyola® Regiment XC	1					110
InVigor® R 4022P	1					112
InVigor® R 4520P	1					116
Nuseed® Emu TF	1					112
Nuseed® Hunter TF	1					116
Nuseed® Raptor TF	1					110
Pioneer® 44Y27 RR	1					114
Pioneer® 44Y30 RR	1					115
Pioneer® 45Y28 RR	1					110
VICTORY® V55-04TF	1					101

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

Table 5: Mid North medium-high rainfall zone. NVT data 2017–21.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.25	1.33	1.48	2.53	2.54
	No. trials	3	1	3	2	3
AFP Cutubury [Ⓛ]	3	–	–	–	–	85
ATR-Bonito [Ⓛ]	5	93	92	–	95	–
ATR-Stingray [Ⓛ]	3	87	83	–	–	–
ATR-Wahoo [Ⓛ]	2	89	–	–	92	–
Bandit TT [Ⓛ]	2	–	–	–	–	90
DG BIDGEE TT [Ⓛ]	2	–	–	–	–	107
DG MURRAY TT [Ⓛ]	3	–	–	–	–	102
Hyola® Blazer TT	5	–	–	–	112	115
Hyola® Enforcer CT	8	–	–	104	103	103
HyITec® Trident	10	114	123	110	106	117
HyITec® Trifecta	8	–	115	114	113	116
HyITec® Trophy	12	112	115	111	109	113
InVigor® LT 4530P	1	–	–	–	–	94
InVigor® T 4510	12	109	111	114	109	105
InVigor® T 4511	3	–	–	–	–	108
InVigor® T 6010	8	–	–	107	109	102
Renegade TT [Ⓛ]	2	–	–	–	–	91
RGT Baseline TT	3	–	–	–	–	110
RGT Capacity™ TT	7	–	–	111	109	103
SF Dynatron TT™	8	–	–	112	111	108
SF Spark TT	6	–	–	98	98	100
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	2.43	1.44	1.66	2.57	2.82
	No. trials	3	1	3	2	3
Hyola® Equinox CL	5	–	–	–	105	100
Hyola® Solstice CL	3	–	–	–	–	107
Pioneer® 43Y92 CL	8	106	108	–	106	101
Pioneer® 44Y94 CL	8	–	–	113	112	114
Pioneer® 45Y93 CL	11	108	–	105	108	111
Pioneer® 45Y95 CL	6	–	119	117	–	114
GLYPHOSATE TOLERANT						
Variety	Mean yield (t/ha)	0.00	0.00	0.00	0.00	2.99
	No. trials	0	0	0	0	1
DG Bindo TF	1	No trial	No trial	No trial	No trial	106
DG Lofty TF	1					102
Hyola® 410XX	1					105
Hyola® Battalion XC	1					106
Hyola® Garrison XC	1					110
Hyola® Regiment XC	1					120
InVigor® R 4022P	1					103
InVigor® R 4520P	1					109
Nuseed® Emu TF	1					105
Nuseed® Raptor TF	1					119
Pioneer® 44Y27 RR	1					112
Pioneer® 44Y30 RR	1					108
Pioneer® 45Y28 RR	1					116
VICTORY® V55-04TF	1					102

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

Table 6: Murray Mallee low-medium rainfall zone. NVT data 2017–21. Data for 2021 unavailable.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.32	0.56	0.94	1.03	0.00
	No. trials	1	1	1	1	0
ATR-Bonito ^{db}	4	88	88	95	96	Not available
ATR-Stingray ^{db}	2	–	116	–	89	
Hyola® Blazer TT	1	–	–	–	107	
Hyola® Enforcer CT	2	–	–	92	98	
HyTTec® Trident	3	–	155	103	106	
HyTTec® Trophy	4	116	109	103	105	
InVigor® T 4510	4	108	105	107	109	
RGT Capacity™ TT	1	–	–	–	105	
SF Dynatron TT™	2	–	–	104	110	
SF Spark TT	2	–	–	103	101	
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	1.21	0.31	0.97	1.01	0.00
	No. trials	1	1	1	1	0
Pioneer® 43Y92 CL	4	106	114	99	100	Not available
Pioneer® 45Y95 CL	1	–	86	–	–	

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

Table 7: South East medium-high rainfall zone. NVT data 2017–21.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.21	2.31	2.65	2.95	3.46
	No. trials	2	1	1	1	1
AFP Cutubury ^{db}	1	–	–	–	–	84
ATR-Bonito ^{db}	3	96	95	–	95	–
ATR-Wahoo ^{db}	4	100	91	–	100	93
DG MURRAY TT ^{db}	2	–	–	–	91	99
Hyola® Blazer TT	2	–	–	–	127	116
Hyola® Enforcer CT	3	–	–	103	95	102
HyTTec® Trident	2	–	112	–	102	–
HyTTec® Trifecta	3	–	–	111	122	117
HyTTec® Trophy	6	105	108	108	114	113
InVigor® T 4510	6	103	106	109	110	106
InVigor® T 4511	1	–	–	–	–	108
InVigor® T 6010	3	–	–	105	119	102
Renegade TT ^{db}	1	–	–	–	–	91
RGT Baseline TT	1	–	–	–	–	110
RGT Capacity™ TT	1	–	–	–	115	–
SF Dynatron TT™	2	–	–	–	129	110
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	3.14	2.85	2.91	3.36	3.57
	No. trials	2	1	1	1	1
Hyola® Equinox CL	2	–	–	–	89	99
Hyola® Solstice CL	1	–	–	–	–	107
Pioneer® 44Y94 CL	2	–	–	110	–	116
Pioneer® 45Y93 CL	4	109	–	105	–	112
Pioneer® 45Y95 CL	3	–	109	112	–	117

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

Table 8: South East low-medium rainfall zone. NVT data 2017–21.

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

TRIAZINE TOLERANT						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.66	1.42	2.41	2.79	1.95
	No. trials	1	1	1	1	1
ATR-Bluefin [®]	1	–	–	–	–	91
ATR-Bonito [®]	5	92	88	93	94	98
ATR-Stingray [®]	5	93	86	89	83	90
Bandit TT [®]	1	–	–	–	–	103
Hyola [®] Blazer TT	2	–	–	–	123	113
Hyola [®] Enforcer CT	3	–	–	99	109	105
HyTTec [®] Trident	4	–	132	114	116	107
HyTTec [®] Trophy	5	116	117	107	114	107
HyTTec [®] Velocity	1	–	–	–	112	–
InVigor [®] LT 4530P	1	–	–	–	–	107
InVigor [®] T 4510	5	105	114	111	111	105
InVigor [®] T 4511	1	–	–	–	–	106
Renegade TT [®]	1	–	–	–	–	98
RGT Capacity [™] TT	3	–	–	102	108	104
SF Dynatron TT [™]	3	–	–	107	119	111
SF Spark TT	3	–	–	103	100	99
IMIDAZOLINONE TOLERANT						
Variety	Mean yield (t/ha)	1.87	1.51	3.00	3.04	2.06
	No. trials	1	1	1	1	1
Hyola [®] Solstice CL	1	–	–	–	–	102
Pioneer [®] 43Y92 CL	5	108	106	100	104	102
Pioneer [®] 44Y94 CL	1	–	–	–	–	106
Pioneer [®] 45Y95 CL	1	–	110	–	–	–
GLYPHOSATE TOLERANT						
Variety	Mean yield (t/ha)	0.00	0.00	0.00	0.00	2.00
	No. trials	0	0	0	0	1
DG Lofty TF	1	No trial	No trial	No trial	No trial	96
Hyola [®] 410XX	1					98
Hyola [®] Battalion XC	1					97
Hyola [®] Regiment XC	1					105
InVigor [®] R 3520	1					97
InVigor [®] R 4022P	1					104
InVigor [®] R 4520P	1					108
Nuseed [®] Raptor TF	1					105
Pioneer [®] 44Y27 RR	1					102
Pioneer [®] 44Y30 RR	1					105

NVT are not designed to allow comparison of varieties between herbicide tolerance groups. – denotes no data available.

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FABA BEAN

By Amanda Pearce and Sara Blake, SARDI, and Sam Catt, University of Adelaide

Faba bean variety choice for South Australian growers will be the same in 2023, with no new varieties released for the southern region in 2022.

VARIETIES AND DISEASE MANAGEMENT

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 or dense canopy growth retains moisture levels within the canopy. Chocolate spot typically develops during early spring as temperatures increase; however, it can establish slowly in crops earlier during cooler weather where there is prolonged high humidity, so faba beans should be monitored from late winter. PBA Amberley[®] is rated MRMS to chocolate spot and should have less severe disease compared with all other varieties, which are rated susceptible (S) or moderately susceptible (MS).

There are two pathotypes for Ascochyta blight and pathotype 2, which is aggressive on Farah[®], is predominant and widespread across the southern region. As a result, only the pathotype 2 rating is now reported in the NVT disease ratings. 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[®], Nura[®] and PBA Samira[®] are highly resistant (RMR) to Ascochyta blight while PBA Bendoc[®] has very good resistance (MR). The old varieties, Farah[®] and Fiesta VF, are susceptible (S) to

Ascochyta blight while PBA Rana[®] and PBA Zahra[®] are MRMS. PBA Marne[®] has been provisionally downgraded to moderately susceptible (MS (P)) to Ascochyta blight. Prophylactic fungicides are recommended ahead of a rain front 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; crops need to be monitored to reduce the impact of rust on production. Farah[®], Fiesta VF, PBA Amberley[®], PBA Bendoc[®], PBA Rana[®] and PBA Zahra[®] are very susceptible (VS) to rust and often display more pronounced symptoms than Nura[®] and PBA Samira[®], which are rated S. PBA Marne[®] is MRMS 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 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 rated S, making early preventive control measures best practice.

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The Australian Pulse Bulletin – Faba Bean: Integrated Disease Management, published by Pulse Australia, contains the latest information on disease management in faba beans and can be found at: pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean/idm-strategies.

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.

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 can result in marketing downgrades and should be managed. Budworm needs early monitoring and control, even in seasons with below-average rainfall. To avoid damage, growers should harvest beans when they have a high moisture content (12 to 14 per cent) 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.

FABA BEAN VARIETY NOTES

PBA AMBERLEY[Ⓢ]

PBA Amberley[Ⓢ] is the newest variety, commercially released in 2019. 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[Ⓢ] has very good standing ability and a low incidence of 'necking'. It has an improved level of disease resistance compared with all other faba bean varieties. It is RMR to Ascochyta blight and MRMS to chocolate spot. Despite PBA Amberley[Ⓢ] being less susceptible to chocolate spot than other commercially available cultivars, fungicide sprays may still be required to control the disease, especially in higher-rainfall situations. 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, although it is rated VS to rust. PBA Amberley[Ⓢ] seed is similar in size to PBA Samira[Ⓢ] and PBA Marne[Ⓢ] and should be suitable to co-mingle with these other varieties. PBA Amberley[Ⓢ] is commercialised by Seednet. EPR \$3.50 ex-GST.

PBA BENDOC[Ⓢ]

This variety was developed by the University of Adelaide in collaboration with SARDI. It is the first commercially released variety selected for tolerance to imidazolinone herbicides. This tolerance was developed by conventional mutation breeding techniques in Nura[Ⓢ]. A herbicide-tolerant selection was crossed with PBA Samira[Ⓢ] and PBA Bendoc[Ⓢ] was derived from the progeny of this cross. Imidazolinone-tolerant faba beans are on the Nufarm Intercept[®] herbicide label for post-emergent application. Herbicide application timings, product label rates, plant-back periods and all label directions for use must be followed. Generally, PBA Bendoc[Ⓢ] yields are comparable with conventional varieties and there is no obvious yield penalty associated with herbicide tolerance. PBA Bendoc[Ⓢ] is similar in flowering time and maturity and has very good resistance (MR) to Ascochyta blight. It is rated S to Cercospora leaf spot, rust and chocolate spot, which will need to be managed in higher-rainfall and high-biomass situations. PBA Bendoc[Ⓢ] produces small-medium sized, light-brown seeds that are comparable in size to Nura[Ⓢ]. PBA Bendoc[Ⓢ] seed can be co-mingled with Nura[Ⓢ] for the Middle East market. PBA Bendoc[Ⓢ] is licensed to Seednet. EPR \$3.90 ex-GST.

FARAH[Ⓢ]

Farah[Ⓢ] was selected directly from Fiesta VF and is identical in many respects, with more uniform seed size and colour. Like Fiesta VF, Farah[Ⓢ] is rated S to Ascochyta blight, so a proactive disease management strategy is recommended to achieve clean seed and ensure market standards are met. Farah[Ⓢ] is rated S to chocolate spot and Cercospora leaf spot and VS to rust. Long-term Farah[Ⓢ] yields are similar to Fiesta VF but are generally lower than more recent varieties in most regions of southern Australia. The major advantage of Farah[Ⓢ] over Fiesta VF is the increased likelihood of achieving market standards for freedom from seed staining. Farah[Ⓢ] is licensed to Barenbrug. EPR \$3.00 ex-GST.

FIESTA VF

Fiesta VF has a buff-coloured seed that is larger than Fiord. Fiesta VF has good seedling vigour, is of medium height and is early-mid flowering. It is rated 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.

PBA MARNE[Ⓢ]

PBA Marne[Ⓢ] is the result of a complex cross between four parents of diverse origins. It 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[Ⓢ]. It is medium-short in height. The overall disease resistance profile of PBA Marne[Ⓢ] is improved compared with Fiesta VF and Farah[Ⓢ], being provisionally rated MS to Ascochyta blight and MRMS to rust. It is rated S to chocolate spot and Cercospora leaf spot. PBA Marne[Ⓢ] produces medium-sized seeds that are comparable in size with PBA Samira[Ⓢ]. The overall colour of seed is similar to other major bean varieties. PBA Marne[Ⓢ] seed can be co-mingled with PBA Samira[Ⓢ] for the Middle East market. PBA Marne[Ⓢ] is licensed to Seednet. EPR \$3.50 ex-GST.

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NURA[®]

Nura[®] is a medium-sized faba bean rated RMR to Ascochyta blight. It is rated MS to chocolate spot, S to Cercospora leaf spot and VS to rust. It is generally shorter than Fiesta VF and Farah[®], 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. Nura[®] has good seed appearance, a light buff colour, with minimal seed staining and discolouration. Flowering time is generally around seven days later than Farah[®], although it has similar maturity. Nura[®] is licensed to Seednet. EPR \$3.00 ex-GST.

PBA RANA[®]

PBA Rana[®] is a mid-flowering (similar to Nura[®]) and mid-maturity (later than Nura[®] and Farah[®]) variety with good vigour and stem strength. PBA Rana[®] is well adapted to high-rainfall areas with longer growing seasons. PBA Rana[®] is MRMS to the predominant pathotype of Ascochyta blight. It is rated MS to chocolate spot, S to Cercospora leaf spot and VS to rust. PBA Rana[®] produces large, plump, light-brown seeds and is suited to the Egyptian market requirements for that grade. PBA Rana[®] represents a unique category for faba bean marketing. As PBA Rana[®] is three-quarters Manafest in its breeding, it should establish itself into areas where Manafest was grown before Ascochyta blight caused its demise. PBA Rana[®] is licensed to Seednet. EPR \$3.50 ex-GST.

PBA SAMIRA[®]

PBA Samira[®] is a high-yielding faba bean variety for southern Australia. It is widely adapted and responsive to high-yielding situations. It is mid-flowering, five to 10 days later than Fiesta VF and Farah[®], but matures at the same time as these varieties. PBA Samira[®] is rated RMR to Ascochyta blight. It is rated MS to chocolate spot and S to Cercospora leaf spot and rust. Seeds of PBA Samira[®] are slightly larger than Fiesta VF, Farah[®] and Nura[®], but the overall seed colour is similar for all varieties. PBA Samira[®] can be co-mingled with these other varieties for the Middle East market. PBA Samira[®] is licensed to Seednet. EPR \$3.50 ex-GST.

PBA ZAHRA[®]

This variety is a cross between Farah[®] and an accession 920/3, which originated from Morocco. It has shown wide adaptation throughout southern Australia and is responsive to high-yielding situations. PBA Zahra[®] seed is uniform large size and colour and should be suitable to co-mingle with PBA Rana[®] for a medium-large faba bean category for the Egyptian market. PBA Zahra[®] is mid-flowering, similar to Nura[®], PBA Rana[®] and PBA Samira[®] and with mid-maturity similar to PBA Rana[®]. It is a medium-tall plant similar to PBA Rana[®] and taller than other varieties. It is rated MRMS to Ascochyta blight, MS to chocolate spot, S to rust, and S to Cercospora leaf spot. PBA Zahra[®] is licensed to Seednet. EPR \$3.50 ex-GST.

BROAD BEAN VARIETY NOTES

AQUADULCE

Aquadulce is a tall broad bean variety with late flowering and maturity, suited to areas with at least 500mm average annual rainfall. The large seed size means it is considered a specialty and commands a price premium over faba beans, dependent on grading and seed size.

PBA KAREEMA

Selected from Aquadulce, PBA Kareema has similar plant type and adaptation but larger and more uniform seed and fewer 'evergreens'. It is well adapted to the very high-rainfall broad bean districts in the lower South East of SA. The large seed size means it is considered a specialty and commands a price premium over faba beans, dependent on grading and seed size.

FURTHER INFORMATION

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

Table 1: 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 ⁱⁱ	Rust	PSbMV seed staining ⁱ	<i>Pratylenchus neglectus</i> ⁱⁱ	<i>Pratylenchus thornei</i>
FABA BEAN											
Farah [Ⓛ]	Medium	Early-mid	Early-mid	MS	S	S	S	VS	S	MR	MS
Fiesta VF	Medium	Early-mid	Early-mid	MS	S	S	S	VS	S	RMR (P)	MS
Nura [Ⓛ]	Short	Mid	Early-mid	MR	RMR	MS	S	VS	VS	MR	MS
PBA Amberley [Ⓛ]	Medium	Mid	Mid	MR	RMR	MRMS	S	VS	–	MR	MS
PBA Bendoc [Ⓛ] +	Medium	Mid	Early-mid	MS	MR	S	S	VS	S	RMR (P)	MRMS
PBA Marne [Ⓛ]	Medium-short	Early	Early-mid	MR	MS (P)	S	S	MRMS	MR	MR	MS
PBA Rana [Ⓛ]	Medium-tall	Mid	Mid	MR	MRMS	MS	S	VS	MR	MR	MS
PBA Samira [Ⓛ]	Medium	Mid	Early-mid	MR	RMR	MS	S	S	S	MR	MRMS
PBA Zahra [Ⓛ]	Medium-tall	Mid	Mid	MR	MRMS	MS	S	S	S	MR	MRMS
BROAD BEAN											
Aquadulce	Tall	Mid	Late	MS	MS ⁱ	MS ⁱ	S ⁱ	MS ⁱ	S	–	–
PBA Kareema [Ⓛ]	Tall	Mid	Late	MS	MR ⁱ	MS ⁱ	S ⁱ	MRMS ⁱ	S	–	–

Source: Pulse Breeding Australia trials program 2012–17 and NVT Online (nvt.grdc.com.au)

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

(P) = provisional ratings and subject to change when additional data becomes available.

ⁱ Not tested since 2019 or earlier.

ⁱⁱ Faba bean ratings last reviewed in 2020.

+ Herbicide-tolerant variety.

– denotes no data available.

* 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 (nvt.grdc.com.au).

Table 2: Lower Eyre Peninsula faba bean yield performance. NVT data 2017–21. Data for 2017, 2018 and 2019 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	0.00	0.00	3.81	4.30
	No. trials	0	0	0	1	1
Farah [Ⓛ]	4	Not available	Not available	Not available	102	98
Fiesta VF	3				94	94
Nura [Ⓛ]	4				105	100
PBA Amberley [Ⓛ]	4				97	96
PBA Bendoc [Ⓛ]	4				108	106
PBA Marne [Ⓛ]	4				85	98
PBA Rana [Ⓛ]	3				–	84
PBA Samira [Ⓛ]	4				101	97
PBA Zahra [Ⓛ]	4				98	102

– denotes no data available.

Table 3: Mid North faba bean yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.44	1.81	1.91	4.59	4.26
	No. trials	2	2	2	2	2
Farah [Ⓛ]	12	93	97	96	100	97
Fiesta VF	12	98	99	96	102	96
Nura [Ⓛ]	12	90	96	95	98	97
PBA Amberley [Ⓛ]	12	102	101	99	106	98
PBA Bendoc [Ⓛ]	12	97	98	101	96	103
PBA Marne [Ⓛ]	12	102	106	100	89	99
PBA Rana [Ⓛ]	9	90	86	86	–	85
PBA Samira [Ⓛ]	12	103	98	99	109	98
PBA Zahra [Ⓛ]	12	109	99	102	102	100

– denotes no data available.

Table 4: Yorke Peninsula faba bean yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	4.02	3.01	2.84	5.27	5.13
	No. trials	2	2	2	1	1
Farah [Ⓛ]	8	96	98	97	97	96
Fiesta VF	8	96	96	98	98	94
Nura [Ⓛ]	8	95	97	97	96	96
PBA Amberley [Ⓛ]	8	101	99	100	102	99
PBA Bendoc [Ⓛ]	8	100	102	100	100	103
PBA Marne [Ⓛ]	8	96	94	101	92	93
PBA Rana [Ⓛ]	7	93	95	90	–	94
PBA Samira [Ⓛ]	8	101	100	99	105	102
PBA Zahra [Ⓛ]	8	101	101	101	105	106

– denotes no data available.

Table 5: Murray Mallee faba bean yield performance. NVT data 2017–21. Data for 2018, 2020 and 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.99	0.00	0.94	0.00	0.00
	No. trials	1	0	1	0	0
Farah [Ⓛ]	2	97	Not available	95	Not available	Not available
Fiesta VF	2	101		85		
Nura [Ⓛ]	2	96		98		
PBA Amberley [Ⓛ]	2	100		95		
PBA Bendoc [Ⓛ]	2	98		113		
PBA Marne [Ⓛ]	2	109		77		
PBA Rana [Ⓛ]	2	86		88		
PBA Samira [Ⓛ]	2	98		100		
PBA Zahra [Ⓛ]	2	103		101		

Table 6: South East faba bean yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.40	3.09	2.97	4.15	4.35
	No. trials	2	2	2	2	2
Farah ^{db}	10	96	97	94	106	96
Fiesta VF	10	93	97	94	109	93
Nura ^{db}	10	96	96	94	104	97
PBA Amberley ^{db}	10	98	100	98	107	98
PBA Bendoc ^{db}	10	105	100	103	92	105
PBA Marne ^{db}	10	91	98	98	93	93
PBA Rana ^{db}	8	93	92	82	–	89
PBA Samira ^{db}	10	102	100	99	108	100
PBA Zahra ^{db}	10	106	102	106	94	103

– denotes no data available.

LENTIL

By Sarah Day and Sara Blake, SARDI

Four new lentil varieties – GIA Lightning[®], GIA Thunder[®], GIA Metro[®] and GIA Sire[®] – developed by Grains Innovation Australia (GIA) have been released or are being considered for release for the 2023 season, with seed licensed to PB Seeds.

For herbicide-tolerant varieties it is important to adhere to all product labels, plant-back periods and directions for use, as any off-label usage can result in crop damage.

DISEASE MANAGEMENT

There are two pathotypes of *Ascochyta* blight in the southern region. Pathotype 1 is virulent on Nipper[®] and pathotype 2 is virulent on PBA Hurricane XT[®] and is commonplace on the Yorke Peninsula and throughout the Lower and Mid North regions. Disease ratings have now been updated to reflect this shift in the pathogen population. PBA Highland XT[®] has very good resistance to *Ascochyta* blight and is rated moderately resistant (MR) to both pathotypes. GIA Leader[®] also has very good resistance to both *Ascochyta* blight pathotypes with a provisional MR rating. PBA Hurricane XT[®], PBA Hallmark XT[®] and PBA Kelpie XT[®] are rated MRMS to pathotype 2 for foliar *Ascochyta* blight in South Australia.

Note that fungicide sprays are not required if no disease is visible and if rain is not forecast. However, growers are urged to monitor crops regularly for disease, and podding sprays ahead of a rain front may be required if disease is present during the growing season for PBA Hurricane XT[®], PBA Hallmark XT[®] and PBA Kelpie XT[®] to protect the developing grain. It is important to diversify variety selections within a year and across rotations, alongside agronomic and disease-management practices. This will help to protect resistance present in current cultivars, reduce the risk of fungicide resistance developing and reduce the risk of crop failures.

Botrytis grey mould (BGM) continues to be a major disease limitation to SA lentil production. 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[®] (rated S) and PBA Hurricane XT[®] (rated MS), as well as the new varieties GIA Metro[®], GIA Thunder[®], GIA Lightning[®] and GIA Sire[®], which have provisional BGM ratings. A foliar fungicide spray at canopy closure is also appropriate for varieties with improved resistance to BGM such as PBA Hallmark XT[®] (provisionally rated MR), GIA Leader[®] (provisionally rated MR), and PBA Jumbo2[®] (provisionally rated RMR), although follow-up sprays may not be needed in the latter. Early sowing is not recommended for varieties rated S or MS to BGM in disease-prone areas.

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 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 Table 1. When selecting a variety, growers also need to consider their individual farm and paddock situation, and the access and availability of likely target markets, and make their selection on all available information. NVT yield data is summarised in Tables 2 to 6.

LENTIL VARIETY NOTES

SMALL RED LENTILS

NEW – GIA LIGHTNING[Ⓛ]

GIA Lightning[Ⓛ] (tested as GIA2003L) is an imidazolinone-tolerant small red lentil, derived from a PBA Ace[Ⓛ] and PBA Hurricane XT[Ⓛ] background. GIA Lightning[Ⓛ] has an upright plant type combined with improved yield, making it a more reliable choice on lighter sandy-textured soils. GIA Lightning[Ⓛ] is mid to late flowering with mid-maturity and moderate resistance to pod drop and lodging, and RMR to shattering at maturity. It is provisionally rated R and MRMS to pathotype 1 and pathotype 2 of Ascochyta blight, respectively. GIA Lightning[Ⓛ] is provisionally rated MS to BGM. It is licensed to PB Seeds. EPR \$5.40 ex-GST.

NEW – GIA THUNDER[Ⓛ]

GIA Thunder[Ⓛ] (tested as GIA2002L) is a broadly adapted imidazolinone-tolerant small red lentil, derived from a cross between popular varieties PBA Bolt[Ⓛ] and PBA Hurricane XT[Ⓛ]. GIA Thunder[Ⓛ] is a mid-flowering and mid-maturing variety. It is rated MRMS to lodging at maturity, similar to PBA Kelpie XT[Ⓛ] and PBA Jumbo2[Ⓛ]. GIA Thunder[Ⓛ] is provisionally rated R and MRMS to pathotype 1 and 2 of Ascochyta blight, respectively, and provisionally rated MRMS to BGM. GIA Thunder[Ⓛ] is licensed to PB Seeds. EPR \$5.40 ex-GST.

NIPPER[Ⓛ]

Nipper[Ⓛ] is provisionally rated MR to BGM and MRMS and MR to Ascochyta blight pathotype 1 and 2, respectively. Crops should be monitored for presence of Ascochyta blight and strategic vegetative and podding sprays are recommended in disease-prone areas if infection continues to spread. Nipper[Ⓛ] has a small seed size, poor to moderate early vigour, mid to late-flowering time with mid-maturity. Nipper[Ⓛ] is more sensitive to metribuzin than most other varieties and caution is required to avoid application when conditions are conducive to damage. Nipper[Ⓛ] is licensed to Seednet. EPR \$5.00 ex-GST.

PBA HIGHLAND XT[Ⓛ]

PBA Highland XT[Ⓛ] has 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[Ⓛ] 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, upright plant type, with early flowering and early to mid-maturity. PBA Highland XT[Ⓛ] has a disease rating of MR for Ascochyta blight pathotype 1 and 2. It has a MS rating for BGM, and in disease-prone areas a strategic fungicide program for BGM will be required and early sowing should be avoided. PBA Highland XT[Ⓛ] is licensed to PB Seeds. EPR \$5.40 ex-GST.

PBA HURRICANE XT[Ⓛ]

PBA Hurricane XT[Ⓛ] has 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[Ⓛ]. PBA Hurricane XT[Ⓛ] has a MRMS rating for pathotype 2 of Ascochyta blight. Severe lesions occurred in seedling crops in 2018, 2019 and 2020, so a podding spray may be required to prevent seed and pod infection. PBA Hurricane XT[Ⓛ] has a MS rating for BGM and in disease-prone areas a strategic fungicide program will be required and early sowing should be avoided. Plant height and early vigour are improved over Nipper[Ⓛ], improving weed competition and harvestability. PBA Hurricane XT[Ⓛ] has been found to be more sensitive to Group 5 (previously 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[Ⓛ] is commercialised by PB Seeds. EPR \$5.00 ex-GST.

MEDIUM RED LENTILS

GIA LEADER[®]

GIA Leader[®] is an imidazolinone-tolerant medium seed-sized red lentil developed by GIA from PBA Jumbo2[®] for favourable lentil-growing areas with good soil types in medium to higher-rainfall zones. This variety has similar imidazolinone herbicide tolerance and tolerance to residual levels of sulfonylurea (SU) herbicide from prior crops to current XT lentil varieties (e.g. PBA Hurricane XT[®]). GIA Leader[®] has a very good level of foliar disease resistance and is provisionally rated MR to Ascochyta blight pathotype 1 and 2 and to BGM. GIA Leader[®] has mid to late flowering and maturity, making it well suited to early sowing. It has a uniform grey seed coat and the grain is well suited to the medium-sized Nugget-type red lentil human food market. GIA Leader[®] is licensed to PB Seeds. EPR \$5.40 ex-GST.

NEW – GIA METRO[®]

GIA Metro[®] (tested as GIA2004L) is the first lentil to combine imidazolinone and metribuzin herbicide tolerances. This unique combination expands weed control options in lentil, particularly in light-textured soils prone to damage from the application of Group 5 (previously Group C) herbicides. Grain yield of GIA Metro[®] is lower than existing lentil varieties in the absence of weed pressure, or where weeds are controlled effectively without crop damage from Group 5 herbicides. GIA Metro[®] has a medium to large seed size with a grey seed coat. It is provisionally rated MR and RMR to pathotype 1 and pathotype 2 of Ascochyta blight respectively, and provisionally rated MRMS to BGM. GIA Metro[®] is under a small-scale controlled release to determine its crop suitability to lentil-growing areas of southern and western Australia. GIA Metro[®] was bred by GIA using a metribuzin trait from a project funded by GRDC (DAS00113) and SARDI. GIA Metro[®] is licenced to PB Seeds. EPR TBC.

NEW – GIA SIRE[®]

GIA Sire[®] (tested as GIA1703) is the first lentil with improved tolerance to clopyralid soil residues from a prior crop, applied according to product label directions. GIA Sire[®] is an imidazolinone-tolerant, small round red lentil with a grey seed coat. Its tolerance to imidazolinone and sulfonylurea soil residues is similar to existing XT varieties; however, it has improved tolerance to clopyralid soil residues from a prior crop over all lentil varieties. GIA Sire[®] is provisionally rated R and MS to pathotype 1 and pathotype 2 of Ascochyta blight respectively, and is provisionally rated MS to BGM. GIA Sire[®] is slow growing with smaller plant parts, increased basal branching and shorter plant height compared with other lentil varieties. It is best suited to agronomic practices such as early sowing and lentil-growing environments that maximise growth, harvest height and grain yield. Avoid growing this variety in low-fertility sandy soils or low-rainfall, frost-prone environments. GIA Sire[®] seed is under small-scale controlled release with PB Seeds. EPR TBC.

PBA ACE[®]

PBA Ace[®] is a vigorous-growing, mid-flowering and mid-maturing variety with high yield potential and broad adaptation. It has a high level of resistance to both pathotypes of Ascochyta blight, and is rated MS to BGM. PBA Ace[®] 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. PBA Ace[®] is rated MRMS for shattering, and a small level of shattering has been observed under some conditions at maturity but it is unlikely to cause significant yield loss. PBA Ace[®] has a grey seed coat colour and is licensed to PB Seeds. EPR \$5.00 ex-GST.

INTRO

WHEAT

BARLEY

OAT

CANOLA

FABA BEAN

LENTIL

FIELD PEA

CHICKPEA

LUPIN

VETCH

PBA BLITZ[®]

PBA Blitz[®] is suited to all current lentil-growing areas, with particular adaptation to shorter-season areas. It has early flowering, early maturity, moderate disease resistance to BGM (provisionally rating MRMS) and good resistance to Ascochyta blight pathotype 2 (rated MR). PBA Blitz[®] 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 upright plant type. PBA Blitz[®] is a medium-sized red lentil with a grey seed coat. It 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. These 'pale coat Blitz' seeds are classified at receival point as seeds of contrasting colour with a limit of one per cent allowed. PBA Blitz[®] is commercialised by PB Seeds. EPR \$5.00 ex-GST.

PBA BOLT[®]

PBA Bolt[®] is an early-mid flowering and maturing lentil with excellent lodging and shattering resistance at maturity and high yield in drought years and dry areas. It has improved tolerance to boron and salt over most other varieties. PBA Bolt[®] has good resistance (rated MR) to Ascochyta blight pathotype 1 and a MRMS rating for pathotype 2. PBA Bolt[®] is highly susceptible (rated S) to BGM and in disease-prone areas a strategic fungicide program will be required and early sowing should be avoided. It has a grey seed coat colour and is licensed to PB Seeds. EPR \$5.00 ex-GST.

PBA HALLMARK XT[®]

PBA Hallmark XT[®] has 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[®] is a mid-flowering, mid-maturing variety with medium red seed and a grey seed coat. PBA Hallmark XT[®] has a provisional MR rating for BGM and is rated MRMS for Ascochyta blight pathotype 2, and a podding spray to prevent seed and pod infection may be required. Like Nipper[®] and PBA Hurricane XT[®], PBA Hallmark XT[®] has been found to be more sensitive to Group 5 (previously 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 Hallmark XT[®] has moderate to good early crop vigour, a branching plant type and a good level of resistance to shattering and lodging at maturity. PBA Hallmark XT[®] is a high-yielding medium red lentil and is commercialised by PB Seeds. EPR \$5.40 ex-GST.

LARGE RED LENTILS

PBA JUMBO2[Ⓛ]

PBA Jumbo2[Ⓛ] is the highest yielding conventional, non-herbicide tolerant red lentil available for South Australia. It has good early vigour, lodging and pod drop resistance, mid-flowering and mid-maturity. It has a provisional RMR rating for both Ascochyta blight pathotype 2 and for BGM, but disease monitoring and a fungicide application prior to canopy closure are still recommended for the latter. As with other large-seeded varieties, PBA Jumbo2[Ⓛ] is well suited to the post-harvest removal of small broadleaf weed seeds. PBA Jumbo2[Ⓛ] has a large seed size with a grey seed coat and is licensed to PB Seeds. EPR \$5.00 ex-GST.

PBA KELPIE XT[Ⓛ]

PBA Kelpie XT[Ⓛ] is the first large seed sized, herbicide-tolerant red lentil to be released in Australia. This variety provides growers with further market opportunities by combining herbicide tolerance in the large seed market class, complementing previous small and medium red lentil releases. PBA Kelpie XT[Ⓛ] is an early to mid-flowering and maturing variety with a moderate resistance to BGM (provisionally rated MRMS). PBA Kelpie XT[Ⓛ] is rated MRMS to both Ascochyta blight pathotypes. It has moderate to good early vigour, is moderately resistant to pod drop and resistant to seed shattering. PBA Kelpie XT[Ⓛ] is licensed to Seednet. EPR \$5.40 ex-GST.

Table 1: 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 (foliage)		<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
												Foliage pathotype 1 (Nipper ^(b) virulent)	Foliage pathotype 2 (PBA Hurricane XT ^(b) virulent)		
SMALL RED															
GIA Lightning ^{(b)+}	Grey	Red	SRP	Moderate	Medium	Mid/late	Mid	MR	MR	RMR	MS (P)	R (P)	MRMS (P)	R	MR
GIA Sire ^{(b)*}	Grey	Red	SRP	Poor	Short	Mid/late	Mid	MR	MR	RMR	MS (P)	R (P)	MS (P)	MR	MR
GIA Thunder ^{(b)+}	Grey	Red	SRP	Moderate	Medium	Mid	Mid	MRMS	MR	RMR	MRMS (P)	R (P)	MRMS (P)	MR	R
Nipper ^(b)	Grey	Red	SRP	Poor/mod	Short	Mid/late	Mid	MR	MR	MR	MR (P)	MRMS	MR	RMR	MR
PBA Highland XT ^{(b)+}	Grey	Red	MRS	Mod/good	Medium	Early	Early/mid	MR	MR	MR	MS	MR	MR	MR	MRMS
PBA Hurricane XT ^{(b)+}	Grey	Red	SRP	Moderate	Medium	Mid	Mid	MR	MR	R	MS	RMR	MRMS	MRMS	MRMS
MEDIUM RED															
GIA Leader ^{(b)+}	Grey	Red	MRS	Moderate	Medium	Mid/late	Mid/late	MR	MR	MR	MR (P)	MR (P)	MR (P)	R	MR
GIA Metro ^{(b)*}	Grey	Red	MRS/ LRS (P)	Mod/poor	Short/ Med (P)	Late	Mid/late	MR	MR	RMR	MRMS (P)	MR (P)	RMR (P)	MR	MRMS
PBA Ace ^(b)	Grey	Red	MRS	Good	Medium	Mid	Mid	MRMS	R	MRMS	MS	R	RMR (P)	MR	MRMS
PBA Blitz ^(b)	Grey	Red	MRS	Mod/good	Med/tall	Early	Early	MR	MR	MR	MRMS (P)	MRMS	MR	MR	MRMS
PBA Bolt ^(b)	Grey	Red	MRS	Mod/good	Medium	Early/mid	Early/mid	R	R	R	S	MR	MRMS	MR	MR
PBA Hallmark XT ^{(b)+}	Grey	Red	MRS	Mod/good	Medium	Mid	Mid	MR	MR	R	MR (P)	RMR	MRMS	MR	MRMS
LARGE RED															
PBA Jumbo2 ^(b)	Grey	Red	LRS	Mod/good	Med/tall	Mid	Mid	MRMS	MR	R	RMR (P)	R	RMR (P)	MR	MRMS
PBA Kelpie XT ^{(b)+}	Grey	Red	LRS	Mod/good	Medium	Early/mid	Early/mid	MRMS	MR	R	MRMS (P)	MRMS	MRMS	MRMS	MRMS

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

R = resistant, RMR = resistant to moderately resistant, MR = moderately resistant, MRMS = moderately resistant to moderately susceptible, MS = moderately susceptible, S = susceptible.

(P) = provisional rating and subject to change when additional data becomes available. + herbicide-tolerant variety. * dual herbicide-tolerant variety

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

Table 2: Lower Eyre Peninsula lentil yield performance. NVT data 2017–21. Data for 2019 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.16	3.16	0.00	1.86	3.15
	No. trials	1	1	0	1	1
GIA Leader ^{db} +	2	–	–	Not available	106	101
GIA Lightning ^{db} +	2	–	–		117	119
GIA Metro ^{db*}	1	–	–		–	66
GIA Sire ^{db*}	1	–	–		–	89
GIA Thunder ^{db} +	2	–	–		117	118
Nipper ^{db}	3	93	94		95	–
Nugget	2	105	98		–	–
PBA Ace ^{db}	2	–	–		113	96
PBA Blitz ^{db}	3	80	104		104	–
PBA Bolt ^{db}	4	99	99		99	100
PBA Flash ^{db}	2	111	108		–	–
PBA Hallmark XT ^{db} +	4	102	94		89	106
PBA Highland XT ^{db} +	4	101	103		90	108
PBA Hurricane XT ^{db} +	4	98	97		98	105
PBA Jumbo2 ^{db}	4	105	105		110	100
PBA Kelpie XT ^{db} +	4	100	113		84	99

+ herbicide-tolerant variety. * dual herbicide-tolerant variety. – denotes no data available.

Table 3: Yorke Peninsula lentil yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.16	2.24	1.68	2.36	3.45
	No. trials	3	3	3	2	1
GIA Leader ^{db} +	6	–	–	98	108	100
GIA Lightning ^{db} +	3	–	–	–	112	112
GIA Metro ^{db*}	1	–	–	–	–	79
GIA Sire ^{db*}	1	–	–	–	–	95
GIA Thunder ^{db} +	3	–	–	–	110	111
Nipper ^{db}	11	90	87	93	94	–
Nugget	6	97	94	–	–	–
PBA Ace ^{db}	6	–	–	102	111	98
PBA Blitz ^{db}	11	96	95	93	90	–
PBA Bolt ^{db}	12	99	99	99	100	100
PBA Flash ^{db}	6	106	104	–	–	–
PBA Hallmark XT ^{db} +	12	96	96	99	100	103
PBA Highland XT ^{db} +	12	102	101	103	96	104
PBA Hurricane XT ^{db} +	12	98	98	98	101	103
PBA Jumbo2 ^{db}	12	106	107	104	103	100
PBA Kelpie XT ^{db} +	12	106	104	108	85	98

+ herbicide-tolerant variety. * dual herbicide-tolerant variety. – denotes no data available.

Table 4: Mid North lentil yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.51	2.50	1.95	2.51	3.56
	No. trials	1	2	2	2	1
GIA Leader ^{dh+}	5	–	–	92	102	97
GIA Lightning ^{dh+}	3	–	–	–	109	100
GIA Metro ^{dh*}	1	–	–	–	–	82
GIA Sire ^{dh*}	1	–	–	–	–	88
GIA Thunder ^{dh+}	3	–	–	–	115	109
Nipper ^{dh}	7	79	86	86	79	–
Nugget	3	94	93	–	–	–
PBA Ace ^{dh}	5	–	–	96	107	103
PBA Blitz ^{dh}	7	85	85	109	98	–
PBA Bolt ^{dh}	8	98	99	99	99	99
PBA Flash ^{dh}	3	110	98	–	–	–
PBA Hallmark XT ^{dh+}	8	97	98	91	93	91
PBA Highland XT ^{dh+}	8	103	97	104	99	101
PBA Hurricane XT ^{dh+}	8	97	99	96	99	97
PBA Jumbo2 ^{dh}	8	110	108	108	110	100
PBA Kelpie XT ^{dh+}	8	106	89	118	97	107

+ herbicide-tolerant variety. * dual herbicide-tolerant variety. – denotes no data available.

Table 5: Murray Mallee lentil yield performance. NVT data 2017–21. Data for 2017, 2020 and 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	0.78	0.36	0.00	0.00
	No. trials	0	1	1	0	0
GIA Leader ^{dh+}	1	Not available	–	109	Not available	Not available
Nipper ^{dh}	2		67	138		
Nugget	1		79	–		
PBA Ace ^{dh}	1		–	96		
PBA Blitz ^{dh}	2		66	72		
PBA Bolt ^{dh}	2		100	102		
PBA Flash ^{dh}	1		86	–		
PBA Hallmark XT ^{dh+}	2		124	130		
PBA Highland XT ^{dh+}	2		112	104		
PBA Hurricane XT ^{dh+}	2		110	106		
PBA Jumbo2 ^{dh}	2		92	74		
PBA Kelpie XT ^{dh+}	2		84	91		

+ herbicide-tolerant variety. * dual herbicide-tolerant variety. – denotes no data available.

Table 6: South East lentil yield performance. NVT data 2017–21. Data for 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.56	2.18	2.27	2.62	0.00
	No. trials	1	1	1	1	0
GIA Leader ^{db} +	2	–	–	99	99	Not available
GIA Lightning ^{db} +	1	–	–	–	108	
GIA Thunder ^{db} +	1	–	–	–	113	
Nipper ^{db}	4	86	70	98	86	
Nugget	2	88	83	–	–	
PBA Ace ^{db}	2	–	–	104	102	
PBA Blitz ^{db}	4	106	88	94	106	
PBA Bolt ^{db}	4	100	99	99	99	
PBA Flash ^{db}	2	96	98	–	–	
PBA Hallmark XT ^{db} +	4	96	95	97	93	
PBA Highland XT ^{db} +	4	102	101	100	99	
PBA Hurricane XT ^{db} +	4	100	99	97	99	
PBA Jumbo2 ^{db}	4	104	112	105	107	
PBA Kelpie XT ^{db} +	4	104	97	105	101	

+ herbicide-tolerant variety. * dual herbicide-tolerant variety. – denotes no data available.

FIELD PEA

By Sarah Day and Sara Blake, SARDI

Four new field pea varieties have been released and made available to growers in the past few years. Although no new lines are being released for the 2023 season, several new field pea lines are being considered for release in the coming seasons.

For herbicide-tolerant varieties it is important to adhere to all product labels, plant-back periods and directions for use, as any off-label usage can result in crop damage.

DISEASE MANAGEMENT

The disease-forecasting model Blackspot Manager predicted medium to high blackspot risk levels in many regions of South Australia for the 2022 season due to the dry start and then staggered early winter rains. The frequent winter rain would have increased the spread of blackspot. 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 history of low 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® seed dressing combined with two foliar fungicide sprays (four to nine weeks post-sowing and again at early flowering). Blackspot Manager predictions of disease risk are based on spore release times in each field pea growing district and weekly alerts are available for free via email (blackspotmanager@dpird.wa.gov.au) or SMS (0475 959 932). For more information go to agric.wa.gov.au/field-peas/blackspot-field-peas-disease-forecast or contact Sara Blake (sara.blake@sa.gov.au). Note that blackspot disease resistance ratings were last reviewed in 2019 and are no longer assessed within the annual NVT disease ratings review.

SELECTION CRITERIA

Information on the most important agronomic characteristics of the different varieties is shown in Table 1 and grain yield for each variety, where available, can be found in Tables 2 to 7. When selecting a variety, growers need to make their decision based on all the available information, including their individual farm and paddock situation, the access and availability of target markets, and storage and handling facilities.

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

FIELD PEA VARIETY NOTES

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. Kasper[®] seed type grain is also preferred over dimpled grain (such as PBA Percy and PBA Oura[®]) 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 Kasper[®] seed type from the dimpled dun type.

KASPA[®] SEED TYPE

GIA KASTAR[®]

GIA Kastar[®] is the first Kasper[®] seed type field pea with improved tolerance to common in-crop and residual imidazolinone herbicides. It 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[®] to residual sulfonylurea and post-emergent flumetsulam is similar to that of PBA Wharton[®]. It is imperative that growers adhere to product label rates, plant-back periods and all label direction for use. GIA Kastar[®] is a mid-flowering variety with early to mid-maturity suitable for crop topping. It has a semi-leafless plant type, an erect growth habit and is resistant to pod shatter at maturity. GIA Kastar[®] has a disease resistance profile similar to PBA Wharton[®] and is resistant (rated RMR) to powdery mildew, moderately susceptible (provisionally rated MS) to blackspot at the last NVT disease ratings review in 2020, and susceptible (provisionally rated S) to bacterial blight. GIA Kastar[®] was developed by Grains Innovation Australia (GIA) using conventional breeding techniques and commercialised by AG Schilling & Co. EPR \$3.30 ex-GST.

KASPA[®]

Kasper[®] is a semi-leafless, late-flowering variety with resistance to shattering, good early-season vigour and moderate resistance to lodging. It is rated S to powdery mildew and downy mildew, and was last assessed as MS to blackspot in 2020. Kasper[®] seed is distinct from traditional dun types (such as Parafield) as it is red-brown in colour and almost spherical in shape. Kasper[®] 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. Kasper[®] is under contract to Seednet. EPR \$2.00 ex-GST.

PBA BUTLER[®]

PBA Butler[®] is a Kasper[®] type field pea with high yields and improved resistance to bacterial blight over all other Kasper[®] type field pea varieties available. It is mid to late flowering, early to mid-maturing and offers the same agronomic benefits of lodging and shattering resistance as Kasper[®]. PBA Butler[®] has a medium seed size with a yellow split and a uniform tan seed coat colour that is similar to Kasper[®]. It has a semi-leafless plant type with vigorous plant growth. It was last assessed as MS to blackspot in 2020 and is rated S to downy and powdery mildew. PBA Butler[®] 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. EPR \$2.70 ex-GST.

PBA GUNYAH[®]

PBA Gunyah[®] is a Kasper[®] seed type field pea with early to mid-flowering and early maturity, offering high yield in shorter-season environments and drier seasons (yield potential below 2.25t/ha). It is better suited to delayed sowing than Kasper[®] for blackspot disease management due to its early flowering characteristic. Its disease resistance profile is similar to Kasper[®] and therefore not well suited to bacterial blight-prone environments. Despite being susceptible to powdery mildew, it is likely that PBA Gunyah[®] will incur less yield loss from this disease than Kasper[®] due to its earlier maturity. PBA Gunyah[®] is licensed to Seednet. EPR \$2.50 ex-GST.

PBA TAYLOR[®]

PBA Taylor[®] is a Kasper[®] seed type, semi-leafless, semi-dwarf field pea with wide adaptation. It has improved resistance to viruses including pea seed-borne mosaic and bean leaf roll over all other field pea varieties, except for PBA Wharton[®]. Foliar disease resistance in PBA Taylor[®] is similar to that of Kasper[®]. PBA Taylor[®] is rated S to mildew and bacterial blight and last assessed as MS to blackspot in the 2020 NVT ratings review. PBA Taylor[®] outyields other Kasper[®] seed type varieties including PBA Wharton[®] and Kasper[®], except in regions with high boron and salinity constraints. It is a mid-flowering variety with early to mid-maturity. PBA Taylor[®] is licensed to Seednet. EPR \$2.70 ex-GST.

PBA WHARTON[®]

PBA Wharton[®] is a Kaspas[®] seed type dun pea offering improved powdery mildew (rated RMR) and virus resistances (bean leaf roll and pea seed-borne mosaic viruses – although virus ratings were last reviewed in 2018 or earlier). It provides the same agronomic benefits as Kaspas[®] (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[®] is early to mid-flowering and early maturing, making it well suited to crop topping and delayed sowing for blackspot management. Seed is licensed to Seednet. EPR \$2.60 ex-GST.

TRADITIONAL DIMPLED DUN SEED TYPE

GIA OURSTAR[®]

GIA Ourstar[®] is the first dun dimpled type field pea offering improved tolerance to common in-crop and residual Group B herbicides. It 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[®] is an early to mid-flowering variety with early to mid-maturity suitable for 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[®] has a disease resistance profile similar to PBA Oura[®] and is rated S to bacterial blight and was last assessed as MS (provisional) to blackspot in the 2020 NVT ratings review. GIA Ourstar[®] was developed by GIA using conventional breeding techniques and commercialised by AG Schilling & Co. EPR \$3.30 ex-GST.

PBA OURA[®]

PBA Oura[®] is a high-yielding, early-flowering and maturing, semi-dwarf, dun dimpled type variety with higher yields than Kaspas[®], PBA Gunyah[®], PBA Twilight[®] and PBA Wharton[®]. 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[®] was rated S to downy mildew and bacterial blight and MS to blackspot at the last NVT disease ratings review in 2020. It has improved tolerance to metribuzin herbicide over Kaspas[®]. Seed is licensed to Seednet. EPR \$2.60 ex-GST.

PBA PERCY

PBA Percy is an early-flowering, conventional, dun dimpled type variety with improved resistance (MRMS) 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[®]. PBA Percy generally produces yields similar to PBA Oura[®] but in low-rainfall environments can be the highest yielding dun variety in trials. PBA Percy has poor lodging resistance at maturity. Seed is licensed to Seednet. EPR \$2.60 ex-GST.

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

PBA Pearl is a semi-leafless white pea variety that 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[®]. It has good resistance to bean leaf roll virus; however, virus resistance ratings were last reviewed in 2018 or earlier. It is rated MS 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[®] type export markets. EPR \$2.70 ex-GST.

INTRO

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CANOLA

FABA BEAN

LENTIL

FIELD PEA

CHICKPEA

LUPIN

VETCH

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.

PBA NOOSA[Ⓢ]

PBA Noosa[Ⓢ] (tested as OZB1308) is a semi-leafless, semi-dwarf blue field pea with broad adaptation and grain yield exceeding Excell by up to 30 per cent, with similar yield to Kaspas[Ⓢ] seed type varieties. PBA Noosa[Ⓢ] has a good level of resistance to downy mildew (provisionally rated MS), resistance to bean leaf roll virus (last reviewed in 2018 or earlier) and has shatter-resistant pods. It has early to mid-flowering and maturity. PBA Noosa[Ⓢ] is licensed to PB Seeds. EPR \$6.50 ex-GST.

Table 1: 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 ^h strain)	Blackspot ⁱⁱ	Powdery mildew	Bacterial blight (pv. <i>syringae</i>)	Pea seed-borne mosaic virus (PSbMV) ⁱ	Bean leafroll virus (BLRV) ⁱ	<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
GIA Kastar ^{dh+}	Dun (K)	Me	SL	Me-T	Moderate-high	Pi	M	E-M	R: SP	Fair-good	S	MS (P)	RMR	S	R (P)	**	MR	MSS
Kaspa ^h	Dun (K)	Me	SL	Me-T	High	Pi	L	M	R: SP	Fair-good	S	MS	S	S	S	S	RMR	MRMS
PBA Butler ^h	Dun (K)	Me	SL	Me-T	High	Pi	M-L	E-M	R: SP	Fair-good	S	MS	S	MS	S	S	RMR	MRMS
PBA Gunyah ^h	Dun (K)	Me	SL	Me-T	High	Pi	E-M	E	R: SP	Fair-good	S	MS	S	S	S	S	RMR	MRMS
PBA Taylor ^h	Dun (K)	Me	SL	Me-T	High	Pi	M	E-M	R: SP	Fair-good	S	MS	S	S	R	R	RMR	MRMS
PBA Twilight ^h	Dun (K)	Me	SL	Me-T	High	Pi	E	E	R: SP	Fair-good	S	MS	S	S	S	**	MR	MRMS
PBA Wharton ^h	Dun (K)	Me	SL	Me-T	High	Pi	E-M	E	R: SP	Fair-good	S	MS	RMR	S	R	R	MR	MRMS
GIA Ourstar ^{dh+}	Dun	Me	SL	Me-T	Moderate-high	P	E-M	E-M	MR: SP	Fair	S	MS (P)	S	S (P)	S (P)	**	MRMS (P)	MSS
Parafield	Dun	Me-Lg	C	T	High	P	M	M	MR: NSP	Poor	S ⁱⁱ	MS	S ⁱⁱ	MS ⁱⁱ	S	**	**	**
PBA Oura ^h	Dun	Me	SL	Me-T	High	P	E	E	MR: NSP	Fair-good	S	MS	S	MS	S	R	MR	MRMS
PBA Percy	Dun	Me-Lg	C	T	High	P	E	E	MR: NSP	Poor	S	MS	S	MRMS	S	S	RMR	RMR
PBA Pearl	White	Me-Lg	SL	Me-T	High	W	E-M	E	MR: NSP	Good	S	MS	S	MS	S	R	MR	MRMS
PBA Noosa ^h	Blue	Me	SL	Me-T	High	W	E-M	E-M	R: SP	Fair-good	MS	MS	S	S	S	R	MR	MRMS

Source: Pulse Breeding Australia trials program 2012-17 and NVT Online

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

K = kaspa^h 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,

SP = sugar pod, NSP = non-sugar pod.

+ herbicide-tolerant variety.

ⁱNo disease screening since 2018 or earlier and may be a breeder rating. ⁱⁱNo disease screening since 2020.

(P) = provisional rating and subject to change when additional data becomes available. ** not tested.

Table 2: Upper Eyre Peninsula field pea yield performance. NVT data 2017–21. Data for 2017, 2018 and 2019 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	0.00	0.00	1.35	2.14
	No. trials	0	0	0	1	1
GIA Kastar ^{db}	2	Not available	Not available	Not available	76	84
GIA Ourstar ^{db}	2				88	83
Kaspa ^{db}	2				92	105
PBA Butler ^{db}	1				–	109
PBA Gunyah ^{db}	1				–	101
PBA Noosa ^{db}	2				97	95
PBA Oura ^{db}	2				100	96
PBA Pearl	2				106	100
PBA Percy	2				103	100
PBA Taylor ^{db}	2				105	109
PBA Wharton ^{db}	2				102	93

+ herbicide-tolerant variety. – denotes no data available.

Table 3: Lower Eyre Peninsula field pea yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.66	2.30	2.24	2.36	2.99
	No. trials	2	2	2	2	2
GIA Kastar ^{db}	4	–	–	–	80	83
GIA Ourstar ^{db}	4	–	–	–	83	94
Kaspa ^{db}	10	95	96	92	100	94
Parafield	4	80	86	–	–	–
PBA Butler ^{db}	8	101	102	98	–	100
PBA Gunyah ^{db}	8	100	98	97	–	97
PBA Noosa ^{db}	8	–	99	100	99	102
PBA Oura ^{db}	10	99	99	102	97	101
PBA Pearl	10	101	106	108	104	108
PBA Percy	10	98	100	106	98	100
PBA Taylor ^{db}	10	105	104	100	106	100
PBA Wharton ^{db}	10	104	98	99	95	98

+ herbicide-tolerant variety. – denotes no data available.

Table 4: Yorke Peninsula field pea yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.44	2.14	1.90	1.38	3.42
	No. trials	2	2	2	1	2
GIA Kastar ^{db}	3	–	–	–	89	80
GIA Ourstar ^{db}	3	–	–	–	76	74
Kaspa ^{db}	9	99	99	98	107	99
Parafield	4	78	88	–	–	–
PBA Butler ^{db}	8	108	103	104	–	109
PBA Gonyah ^{db}	8	99	100	99	–	98
PBA Noosa ^{db}	7	–	97	98	94	104
PBA Oura ^{db}	9	95	98	99	93	94
PBA Pearl	9	103	101	105	96	106
PBA Percy	9	88	99	102	92	84
PBA Taylor ^{db}	9	109	105	105	112	107
PBA Wharton ^{db}	9	99	100	95	97	96

+ herbicide-tolerant variety. – denotes no data available.

Table 5: Mid North field pea yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	2.21	2.29	1.91	3.25	3.45
	No. trials	2	2	2	2	2
GIA Kastar ^{db}	4	–	–	–	74	82
GIA Ourstar ^{db}	4	–	–	–	72	88
Kaspa ^{db}	10	93	93	92	103	96
Parafield	4	75	81	–	–	–
PBA Butler ^{db}	8	103	101	96	–	103
PBA Gonyah ^{db}	8	97	97	97	–	97
PBA Noosa ^{db}	8	–	102	99	94	103
PBA Oura ^{db}	10	98	99	103	94	99
PBA Pearl	10	106	106	106	101	107
PBA Percy	10	93	93	107	95	95
PBA Taylor ^{db}	10	106	103	100	113	102
PBA Wharton ^{db}	10	102	103	101	95	97

+ herbicide-tolerant variety. – denotes no data available.

Table 6: Murray Mallee field pea yield performance. NVT data 2017–21. Data for 2020 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.09	1.12	0.23	0.00	1.64
	No. trials	1	1	1	0	1
GIA Kastar ^{db}	1	–	–	–	Not available	89
GIA Ourstar ^{db}	1	–	–	–		89
Kaspa ^{db}	4	83	69	76		98
Parafield	2	64	88	–		–
PBA Butler ^{db}	4	101	85	104		102
PBA Gunyah ^{db}	4	92	83	77		101
PBA Noosa ^{db}	3	–	119	141		94
PBA Oura ^{db}	4	100	113	101		98
PBA Pearl	4	117	135	149		99
PBA Percy	4	91	112	72		100
PBA Taylor ^{db}	4	104	84	86		107
PBA Wharton ^{db}	4	101	92	73		104

+ herbicide-tolerant variety. – denotes no data available.

Table 7: South East field pea yield performance. NVT data 2017–21. Data for 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.01	2.82	2.03	3.62	0.00
	No. trials	1	1	1	1	0
GIA Kastar ^{db}	1	–	–	–	72	Not available
GIA Ourstar ^{db}	1	–	–	–	79	
Kaspa ^{db}	4	92	98	91	94	
Parafield	2	75	75	–	–	
PBA Butler ^{db}	3	106	105	110	–	
PBA Gunyah ^{db}	3	95	101	91	–	
PBA Noosa ^{db}	3	–	93	109	102	
PBA Oura ^{db}	4	97	97	97	97	
PBA Pearl	4	112	99	122	109	
PBA Percy	4	91	98	92	93	
PBA Taylor ^{db}	4	106	110	105	105	
PBA Wharton ^{db}	4	96	103	83	96	

+ herbicide-tolerant variety. – denotes no data available.

CHICKPEA

By Sarah Day and Sara Blake, SARDI

No new chickpea varieties will be available to growers in 2023.

All varieties are rated as either susceptible (S) or moderately susceptible (MS) to *Ascochyta* blight infection. This follows observations of severe *Ascochyta* blight on previously resistant chickpea varieties across South Australia and Victoria. Chickpea growers need to carefully consider their risk of 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 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 *Ascochyta* blight on to the emerging seedlings. The disease will also survive on stubble and organic matter for several 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 infection. Moderately susceptible varieties will require three to four strategic fungicide sprays ahead of rain events, offering two to three weeks of 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 *Ascochyta* blight, they will also require fungicide sprays ahead of rain fronts during pod setting to protect the pods from seed staining and seed abortion.

SELECTION CRITERIA

The list of suggested varieties for 2023 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 *Ascochyta* blight can be managed effectively. Information on key selection criteria and yield for each variety can be found in the tables. When selecting a chickpea type and variety to grow, growers need to make their decision on the basis of *Ascochyta* blight resistance, yield, price and marketability. Other agronomic traits such as maturity, cold tolerance, root lesion nematode (*Pratylenchus* spp.) 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 subcontinent, and a small premium has been available for types fitting this use. Newer desi varieties have improved seed size and colour over older varieties 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 that these bulk markets have previously been oversupplied by several 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[®] and Genesis™ Kalkee). Further premiums may be obtained by grading and selling the seed on size.

MEDIUM-LARGE KABULI TYPES

PBA Monarch[®] 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 such as Genesis™ Kalkee due to its relatively poor adaptation to dry finishing conditions. The medium-sized PBA Monarch[®] is likely to produce more uniform-sized seed under these conditions.

CHICKPEA VARIETY NOTES

DESI VARIETIES

CBA CAPTAIN[®]

CBA Captain[®] 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[®] has excellent harvestability with improved plant height and height to the lowest pod compared with all other desi varieties adapted to the southern region. It is a mid-flowering and mid-maturing variety, similar to Genesis™ 090. CBA Captain[®] has a provisional MS rating to Ascochyta blight in the southern region. It has superior grain quality to current southern desi varieties based on seed shape, size and colour. CBA Captain[®] meets the requirement of a Jimbour type suitable for the subcontinent market. Seed can be obtained through CBA Seed Distributors. EPR \$4.50 ex-GST.

PBA MAIDEN[®]

PBA Maiden[®] is rated S to Ascochyta blight 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 Ascochyta blight to the emerging seedlings. PBA Maiden[®] is a large-seeded 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[®]. PBA Maiden[®] has a semi-spreading plant type and height similar to PBA Slasher[®]. It has a seed size greater than current southern desi varieties (approximately 30 per cent larger than PBA Slasher[®]) with a yellow-tan seed coat. PBA Maiden[®] is targeted for whole-seed markets where its large, angular shaped and bright yellow-tan coloured seed coat are well suited to specific requirements. Growers are advised to investigate delivery and marketing options for PBA Maiden[®] 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. EPR \$4.00 ex-GST.

PBA STRIKER[®]

PBA Striker[®] is rated S to Ascochyta blight 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 Ascochyta blight on emerging seedlings. PBA Striker[®] is a high-yielding desi chickpea with 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 Ascochyta blight can be managed. PBA Striker[®] has a similar plant type to PBA Slasher[®] but with larger seed size than all other southern desi varieties. Seed of PBA Striker[®] is also light in colour and has good milling characteristics. Due to its early maturity and Ascochyta blight susceptibility, PBA Striker[®] is not recommended for high-rainfall and long-growing season districts. Seed is licensed to Seednet. EPR \$4.00 ex-GST.

PBA SLASHER[®]

PBA Slasher[®] is rated S to Ascochyta blight and will require regular strategic fungicide sprays during the season ahead of rain fronts, with the sprays offering two to three weeks of protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of Ascochyta blight to the emerging seedlings. PBA Slasher[®] is high yielding in all chickpea-growing areas of SA, providing Ascochyta blight can be managed. It has a semi-spreading plant type with mid-flowering and mid-maturity. PBA Slasher[®] is suitable for the split and whole-seed markets. Seed is licensed to Seednet. EPR \$4.00 ex-GST.

PBA Seamer[®], PBA HatTrick[®], PBA Pistol[®], PBA Boundary[®] and PBA Drummond[®]

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

KABULI CHICKPEA**ALMAZ[®]**

Almaz[®] is a medium seed size kabuli type chickpea. It is rated S to Ascochyta blight and will require regular strategic fungicide sprays during the season prior to rain fronts, with the sprays offering two to three weeks of protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of Ascochyta blight on the emerging seedlings. Almaz[®] is a mid-flowering and mid to late-maturing variety and is lower yielding than Genesis[™] 090 in southern Australia. Seed is licensed to Seednet. EPR \$6.50 ex-GST.

GENESIS[™] 090

Genesis[™] 090 is a small-seeded kabuli type chickpea. Its Ascochyta blight rating is MS and crops will require three to four strategic fungicide sprays during the season ahead of rain fronts, with the sprays offering two to three weeks of protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of Ascochyta blight on the emerging seedlings. Genesis[™] 090 has medium height with erect branches and yields similar to PBA Monarch[®] but lower than PBA Slasher[®] and PBA Striker[®]. For seed distribution contact PB Seeds. EPR \$5.00 ex-GST.

GENESIS[™] KALKEE

Genesis[™] Kalkee is a large-seeded kabuli type, mid-late in flowering and mid-maturity. It is rated S to Ascochyta blight and will require three to four strategic fungicide sprays during the season ahead of rain fronts, with the sprays offering two to three weeks of protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of Ascochyta blight on the emerging seedlings. For seed distribution contact PB Seeds. EPR \$5.00 ex-GST.

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PBA ROYAL[Ⓛ]

PBA Royal[Ⓛ] 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 with Genesis™ 090, PBA Monarch[Ⓛ] and Genesis™ Kalkee. The Ascochyta blight rating for PBA Royal[Ⓛ] is MS and crops will require three to four strategic fungicide sprays during the season ahead of rain fronts, with the sprays offering two to three weeks of protection against infection. All chickpea seed should be treated with a thiram-based fungicide to prevent seed transmission of Ascochyta blight on to the emerging seedlings. PBA Royal[Ⓛ] has medium plant height with early to mid-flowering and mid-maturity. Seed is licensed to Seednet. EPR \$6.50 ex-GST.

PBA MAGNUS[Ⓛ]

PBA Magnus[Ⓛ] is a large seed size kabuli chickpea. It has a significant yield advantage over Genesis™ Kalkee, particularly in short growing environments, due to its earlier flowering and maturity. It is well adapted to the medium-rainfall chickpea growing regions of south-eastern Australia, where the large seed size can be obtained. PBA Magnus[Ⓛ] has a similar plant type to Genesis™ 090 and similar mid-flowering and mid-maturity. PBA Magnus[Ⓛ] is rated S to Ascochyta blight in the southern region. Seed of PBA Magnus[Ⓛ] is larger than Genesis™ Kalkee, with a cream-beige seed coat and good wrinkling

characteristics. It has received favourable feedback on seed quality from domestic and internal traders. PBA Magnus[Ⓛ] is licensed to PB Seeds. EPR \$6.50 ex-GST.

PBA MONARCH[Ⓛ]

PBA Monarch[Ⓛ] is a high-yielding, medium-sized kabuli chickpea with adaptation to all kabuli growing areas of Australia. It is rated S to Ascochyta blight 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 Ascochyta blight on to the emerging seedlings. PBA Monarch[Ⓛ] 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 with Genesis™ 090 and Genesis™ Kalkee. PBA Monarch[Ⓛ] 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 Ascochyta blight can be managed. It has similar yields and larger seed size than Genesis™ 090, although it is higher yielding than this variety in low-yielding (<1t/ha) situations. In shorter growing seasons, PBA Monarch[Ⓛ] may have larger and more consistent seed size than other medium-sized varieties due to its earlier pod fill timing. Seed is licensed to Seednet. EPR \$6.50 ex-GST.

Table 1: 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	Lodging resistance maturity	Ascochyta blight*	<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
DESI TYPE												
CBA Captain [Ⓛ]	18–20		Yellow-brown	Split & whole	Moderate	Mid	Mid	Medium-tall	MR	MS (P)	MR	MS
PBA Maiden [Ⓛ]	21–24		Yellow-tan	Premium whole	Moderate	Early-mid	Mid	Short-med	MS	S	MRMS	MRMS
PBA Slasher [Ⓛ]	17–19		Light brown	Split & whole	Poor/mod	Mid	Mid	Short-med	MS	S	MRMS	MRMS
PBA Striker [Ⓛ]	20–22		Light brown	Split & whole	Good	Early	Early	Short-med	MS	S	MRMS	MRMS
KABULI TYPE												
Almaz [Ⓛ]	36–42	8–9	Cream	8–9mm	Poor	Mid	Mid-late	Medium-tall	MR	S	MRMS	S
Genesis™ 090	26–35	7–8	Cream	6–8mm	Good	Mid	Mid	Medium	MR	MS	MRMS	MSS
Genesis™ Kalkee	40–46	8–9	Cream	8–10mm	Good	Mid-late	Late	Tall	R	S	MRMS	MS
PBA Magnus [Ⓛ]	42–48	9	Cream-beige	9–10mm	Poor/mod	Mid	Mid	Medium	MRMS	S	MR	MSS
PBA Monarch [Ⓛ]	37–43	8–9	Cream	8–9mm	Poor/mod	Early	Early	Medium	MS	S	MRMS	MS
PBA Royal [Ⓛ]	39	8	Cream-beige	8–9mm	Moderate	Early-mid	Mid	Medium	MR	MS	MR	MS

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

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

* Foliar Ascochyta blight ratings for southern region only (pathotype 1). † Not tested since 2019 or earlier.

– denotes data not available at time of publication. (P) = provisional ratings and subject to change when additional data becomes available.

Table 2: Yorke Peninsula desi and kabuli chickpea yield performance. NVT data 2017–21. Data for 2020 not available.

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

DESI						
Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	3.27	1.88	0.80	0.00	0.55
	No. trials	1	1	1	0	1
Ambar ^{db}	3	102	97	109	Not available	–
CBA Captain ^{db}	4	97	102	88		112
PBA Maiden ^{db}	4	103	112	102		80
PBA Slasher ^{db}	4	102	106	105		97
PBA Striker ^{db}	4	103	107	100		106
KABULI						
Variety	Mean yield (t/ha)	2.90	1.88	1.27	0.00	0.52
	No. trials	1	1	1	0	1
Almaz ^{db}	4	96	92	92	Not available	86
Genesis™ 090	4	99	96	109		112
Genesis™ Kalkee	4	92	90	82		78
PBA Magnus ^{db}	4	100	99	86		100
PBA Monarch ^{db}	4	105	102	97		83
PBA Royal ^{db}	4	97	100	103		98

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

– denotes no data available.

Table 3: Mid North desi and kabuli chickpea yield performance. NVT data 2016–20. Data for 2020 not available.

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

DESI						
Variety	Year	2016	2017	2018	2019	2020
	Mean yield (t/ha)	2.38	0.97	0.53	0.71	0.00
	No. trials	1	1	1	1	0
Ambar ^{db}	3	111	109	80	–	Not available
CBA Captain ^{db}	4	113	105	109	100	
PBA Maiden ^{db}	4	99	98	96	102	
PBA Slasher ^{db}	4	106	102	101	102	
PBA Striker ^{db}	4	96	103	99	105	
KABULI						
Variety	Mean yield (t/ha)	1.53	2.90	2.69	1.78	0.00
	No. trials	1	1	1	1	0
Almaz ^{db}	4	118	96	104	96	Not available
Genesis™ 090	4	113	105	104	104	
Genesis™ Kalkee	4	91	97	89	90	
PBA Magnus ^{db}	4	108	95	106	106	
PBA Monarch ^{db}	4	84	94	100	104	
PBA Royal ^{db}	4	122	103	106	102	

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

– denotes no data available.

LUPIN

By Amanda Pearce, SARDI and Matt Aubert, AGT

Lupin variety choice for South Australian growers will increase, with Lawler[®] being released in the spring of 2023.

Narrow-leaved 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 and cropping rotation.

Recent improvements in grain pricing for lupins and a shift towards the inclusion of legumes in cropping rotations may 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 the Victorian and NSW markets must satisfy Anthracnose freedom, market access and transporting protocols. Anthracnose grain tests are the most common means of verifying Anthracnose freedom for marketing. Please refer to the most current information for biosecurity requirements in Victoria (agriculture.vic.gov.au/biosecurity/moving-plants-and-plant-products/plant-quarantine-manual) and the restrictions that apply to exporting to NSW (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 may have levels of resistance that slow the development of *Phomopsis*. 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. This affects early vigour, but it also enhances any effects of pre-emergent herbicides. Growers are encouraged to seek germination tests on sowing seed so that seeding rates can be increased to compensate for poor germination rates or alternative seed sourced.

Manganese deficiency has been a problem for 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.

LUPIN VARIETY NOTES

PBA BARLOCK[®]

With improved metribuzin tolerance over the older varieties, PBA Barlock[®] allows growers to use this herbicide for weed control. PBA Barlock[®] is moderately resistant to lodging in high-rainfall regions and shows improved pod shatter resistance compared with Mandelup[®]. Its Anthracnose resistance is RMR and Phomopsis stem infection resistance is MR. PBA Barlock[®] is licensed to Seednet. EPR \$2.50 ex-GST.

PBA BATEMAN[®]

Released in the eastern states in the spring of 2017, PBA Bateman[®] is MRMS (P) to Anthracnose and MR (P) to cucumber mosaic virus. It has similar agronomic features to PBA Jurien[®]. PBA Bateman[®] shows similar tolerance to metribuzin as PBA Jurien[®], PBA Barlock[®] and PBA Gunyidi[®]. Seed is medium in size similar to Mandelup[®]. PBA Bateman[®] is licensed to Seednet. EPR \$2.60 ex-GST.

COYOTE[®]

Coyote[®] is the first narrow-leaf lupin variety released by AGT, coming out in Western Australia in the spring of 2019. Coyote[®] is a high-yielding variety, setting a new yield benchmark for lupin varieties across SA. Coyote[®] has metribuzin tolerance similar to Mandelup[®]. It has similar maturity to PBA Barlock[®], which is slightly later than PBA Jurien[®]. It has a provisional MR (P) rating for Anthracnose resistance and a provisional MR (P) rating for cucumber mosaic virus. Its resistance rating to Phomopsis stem infection is S (P), which is lower than other varieties available. Where the risk of Phomopsis stem infection is high, monitor livestock when grazing stubbles or remove grazing livestock completely. Coyote[®] is licensed to AGT. EPR \$3.00 ex-GST.

PBA GUNYIDI[®]

PBA Gunyidi[®] was released in WA in September 2011 as a potential Mandelup[®] replacement with improved resistance to pod shattering. This feature may enable growers to harvest later without incurring significant losses. PBA Gunyidi[®] is rated MRMS for Anthracnose and RMR for Phomopsis stem infection. It flowers and matures slightly later than Mandelup[®]. PBA Gunyidi[®] is licensed to Seednet. EPR \$2.50 ex-GST.

JENABILLUP[®]

Extensively evaluated in SA trials, Jenabillup[®] typically has an advantage over Mandelup[®] in regions with a longer growing season. In these regions, its extended flowering window can assist with increased yield. Jenabillup[®] flowers slightly later and for a longer period than Mandelup[®], making it less suitable to crop topping. Jenabillup[®] does not have tolerance to metribuzin herbicide and is rated MS to Anthracnose. Jenabillup[®] is licensed to Seednet. EPR \$2.30 ex-GST.

PBA JURIE[®]

Released in WA in the spring of 2015, PBA Jurien[®] is rated RMR for Anthracnose and RMR for Phomopsis stem infection. Although rated RMR to Anthracnose, seed dressings are still recommended to reduce the risk of soil-borne disease. PBA Jurien[®] is tolerant to metribuzin, better than PBA Barlock[®]. PBA Jurien[®] has similar agronomic characteristics to PBA Gunyidi[®], flowering slightly earlier. It is like Mandelup[®] in height and can be moderately susceptible to lodging in high-rainfall regions. PBA Jurien[®] has medium to large seed, like Mandelup[®], and the alkaloid content is similar to PBA Gunyidi[®]. PBA Jurien[®] is licensed to Seednet. EPR \$2.50 ex-GST.

NEW – LAWLER[®]

Lawler[®] is an elite yielding alternative to Coyote[®] and PBA Jurien[®]. It is the second narrow-leaf lupin variety release for AGT, becoming available in the spring of 2023. Lawler[®] has metribuzin tolerance similar to PBA Jurien[®]. It has similar to slightly quicker maturity to Mandelup[®]. It is rated MR (P) to Anthracnose and MRMS (P) to cucumber mosaic virus. Its MR (P) rating to Phomopsis stem infection is an improvement over Coyote[®] and similar to PBA Barlock[®]. Lawler[®] has reduced risk of seed splitting compared with PBA Jurien[®]. Lawler[®] is licensed to AGT. EPR \$3.00 ex-GST.

MANDELUP[®]

Mandelup[®] is an established variety widely adapted to SA conditions. It is tall with good early vigour and very early flowering and maturity. This makes 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[®] is rated MRMS to Anthracnose and RMR for 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[®] is licensed to Seednet and marketed by Barenbrug. EPR \$2.30 ex-GST.

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Table 1: Disease resistance characteristics of lupin varieties.

Variety	Anthrachnose resistance	Cucumber mosaic virus resistance	Phomopsis (pod infection) resistance	Phomopsis (stem infection) resistance
Coyote ^{db}	MRMS (P)	MR	MRMS	S
Jenabillup ^{db}	MS	MRMS	MR	MS
Lawler ^{db}	MR	MRMS (P)	MS (P)	MR (P)
Mandelup ^{db}	MRMS	MRMS	S	RMR
PBA Barlock ^{db}	RMR	MR	MR	MR
PBA Bateman ^{db}	MRMS	MR	MS	RMR
PBA Gunyidi ^{db}	MRMS	MRMS	MRMS	RMR
PBA Jurien ^{db}	RMR	MS	MR	RMR

Source: NVT Disease Ratings, www.nvt.grdc.com.au

R = resistant, RMR = resistant to moderately resistant, MR = moderately resistant, MRMS = moderately resistant to moderately susceptible, MS = moderately susceptible, S = susceptible, V = very susceptible.

(P) = provisional ratings and subject to change when additional data becomes available.

Table 2: Lower Eyre Peninsula lupin yield performance. NVT data 2017–21. Data from 2021 not available.

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

	Year	2017	2018	2019	2020	2021
Variety	Mean yield (t/ha)	1.12	2.91	1.67	2.10	0.00
	No. trials	1	1	1	1	0
Coyote ^{db}	3	102	120	–	95	Not available
Danja	1	103	–	–	–	
Jenabillup ^{db}	4	98	102	75	100	
Jindalee	3	89	–	75	82	
Mandelup ^{db}	3	96	–	76	91	
PBA Barlock ^{db}	3	94	–	65	89	
PBA Bateman ^{db}	3	–	111	85	99	
PBA Gunyidi ^{db}	3	101	–	84	99	
PBA Jurien ^{db}	3	97	–	65	87	
Wonga	4	91	89	67	95	

– denotes no data available.

Table 3: Mid North lupin yield performance. NVT data 2017–21. Data for 2018 and 2020 not available.

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

	Year	2017	2018	2019	2020	2021
Variety	Mean yield (t/ha)	1.97	0.00	1.43	0.00	1.32
	No. trials	1	0	1	0	1
Coyote ^{db}	2	104	Not available	–	Not available	118
Danja	1	100		–		–
Jenabillup ^{db}	3	96		109		97
Jindalee	3	91		78		98
Mandelup ^{db}	3	98		100		106
Lawler ^{db}	1	–		–		108
PBA Barlock ^{db}	3	95		101		104
PBA Bateman ^{db}	2	–		113		109
PBA Gunyidi ^{db}	3	101		111		106
PBA Jurien ^{db}	3	100		108		116
Wonga	3	89		93		87

– denotes no data available.

Table 4: Murray Mallee lupin yield performance. NVT data 2017–21. Data for 2017, 2018, 2019 and 2021 not available.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	0.00	0.00	0.00	2.20	0.00
	No. trials	0	0	0	1	0
Coyote ^{db}	1	Not available	Not available	Not available	94	Not available
Jenabillup ^{db}	1				101	
Jindalee	1				91	
Mandelup ^{db}	1				94	
Lawler ^{db}	1				97	
PBA Barlock ^{db}	1				94	
PBA Bateman ^{db}	1				98	
PBA Gunyidi ^{db}	1				98	
PBA Jurien ^{db}	1				91	
Wonga	1				100	

– denotes no data available.

Table 5: South East lupin yield performance. NVT data 2017–21.

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

Variety	Year	2017	2018	2019	2020	2021
	Mean yield (t/ha)	1.91	1.57	2.54	2.74	1.36
	No. trials	2	1	2	3	1
Coyote ^{db}	7	109	102	–	110	101
Danja	2	93	–	–	–	–
Jenabillup ^{db}	9	102	90	92	102	109
Jindalee	8	86	–	79	77	86
Mandelup ^{db}	8	99	–	85	95	96
Lawler ^{db}	4	–	–	–	103	98
PBA Barlock ^{db}	8	98	–	80	93	97
PBA Bateman ^{db}	7	–	100	93	107	102
PBA Gunyidi ^{db}	8	105	–	93	105	103
PBA Jurien ^{db}	8	103	–	77	99	95
Wonga	9	93	81	87	88	105

– denotes no data available.

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VETCH

By Stuart Nagel, Angus Kennedy and Gregg Kirby, SARDI

Vetch is a multipurpose 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[®], Morava, Rasina[®], Volga[®], Timok[®] and Cummins) allows cropping for grain or hay, early grazing as green pasture, dry grazing or green manure production.

Grain or multipurpose 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.

Grain from Morava, Studenica[®], Rasina[®], Volga[®] and Timok[®] 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 variety Popany (*Vicia benghalensis*) and woolly pod vetch varieties (*Vicia villosa*) Namoi, Capello, Haymaker and RM4[®]. 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 better stubble retention.

Morava, Studenica[®], Rasina[®], Volga[®] and Timok[®] 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, and 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 a 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 such as Morava, which produce greater levels of vegetative growth and denser canopies, will be more prone to this disease in higher-rainfall areas.

Vetch variety characteristics are summarised in the following tables:

- **Table 1** contains information on adaptation of vetch varieties for grain production in different rainfall zones.
- **Table 2** contains information on selection of common and woolly pod vetch varieties for hay/silage, grazing and green manuring in different rainfall zones.
- **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 vetch 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 in SA by ANVBP.
- **Table 6** provides seeding rate recommendations for production of grain, hay/silage, grazing and green manuring.
- **Table 7** summarises dry matter yields at low-rainfall Mallee sites in SA and Victoria, cut in August to show early growth potential.

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.

VETCH VARIETY NOTES

COMMON VETCH (*VICIA SATIVA*)

STUDENICA[®]

Studenica[®] is a new, white-flowering variety of common vetch that became commercially available for sowing in 2021. It has the earliest flowering and maturity of the common vetches, flowering in approximately 85 to 90 days. It is rust resistant but susceptible to Botrytis, like other common vetch varieties. Studenica[®] has toxin/anti-nutritional (BCN) levels similar to Morava.

The advantage Studenica[®] has over other varieties is its superior winter growth and vigour combined with good frost tolerance, which enables it to put on more bulk through the cold parts of winter and therefore providing fodder earlier in the season. It is particularly well suited to low-rainfall marginal cropping/mixed farming systems requiring 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[®] has grain yields comparable with Timok[®] and Volga[®] in most environments. Its early growth and vigour sets it apart, particularly in cold environments, as demonstrated in Table 7. It is a multipurpose 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[®] was bred, developed and trialled by the SARDI National Vetch Breeding Program in conjunction with GRDC and SAGIT and it is available from S&W Seeds.

LANGUEDOC

Languedoc is an early-flowering and maturing variety recommended for low-rainfall areas; however, 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).

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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. It 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 due to the vetch–lentil substitution issue. This has meant export markets of orange cotyledon varieties such as Blanchefleur are limited to small bird seed 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

Cummins is 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. It 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.

Its BCN levels 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. It 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[®]

Rasina[®] is a soft-seeded vetch developed in 2006 by the ANVBP. Rasina[®] replaces Languedoc, Blanchefleur and Cummins in low to medium-rainfall areas for grain production. Rasina[®] is five to 10 days earlier than Blanchefleur and 10 to 15 days earlier than Morava. Rasina[®] has a significant advantage over Languedoc, Blanchefleur and Cummins in its resistance to rust and it is slightly more tolerant to Ascochyta blight and Botrytis.

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

Rasina[®] can be sourced from Barenbrug Australia.

VOLGA[®]

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

Volga[®] has high grain and herbage yields and is well adapted to all areas where vetch is currently grown. Its early flowering and maturity characteristics make it 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[®] is moderately susceptible to Ascochyta blight, whereas Morava is susceptible. The early maturity of Volga[®] may limit yield potential relative to longer growing season varieties, such as Morava, in high-rainfall areas.

Toxin levels in grain are around 0.54 per cent, lower than Morava at 0.65 per cent and Blanchefleur at 0.95 per cent. Seed size is very similar to Morava (100 seed weight, 7.82g).

Volga[®] can be sourced from Barenbrug Australia.

TIMOK[Ⓛ]

Timok[Ⓛ] was bred to complement Morava in mid to high-rainfall areas for grain/seed and especially for hay/silage production. Timok[Ⓛ] yielded more grain than Rasina[Ⓛ], 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[Ⓛ] 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, 350 to 450mm a year. Morava will remain the preferred variety for hay/silage in rainfall areas with greater than 450mm a year.

Timok[Ⓛ] is high-yielding, highly rust resistant, and susceptible to Ascochyta blight and Botrytis. It has good early establishment and is soft-seeded. Timok[Ⓛ] matures between Rasina[Ⓛ] and Morava (approximately 105 days from seeding to full flowering).

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

Toxin levels in Timok[Ⓛ] grain are around 0.57 per cent. Seed weight is 6.88g per 100 seeds, similar to Rasina[Ⓛ] at 6.92g per 100 seeds. Timok[Ⓛ] was developed in 2012 by the ANVBP at SARDI. It can be sourced from S&W Seeds.

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 a 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[Ⓛ]

RM4[Ⓛ] (*Vicia villosa* subsp. *eriocarpa*) was selected by ANVBP at SARDI. It 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 soft-seeded (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[Ⓛ] is significantly higher in dry matter production in mid to low-rainfall areas (less than 380mm a year) than Haymaker[Ⓛ] or Capello[Ⓛ]. RM4[Ⓛ] is also suitable for higher-rainfall areas (400 to 650mm a year).

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It is a multipurpose variety that can be used for hay/silage, grazing, green/brown manure or for seed. It 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[®] performs better in grain production than other woolly pod varieties when the season finishes sharply.

RM4[®] is not sensitive to any herbicides registered for use in woolly pod vetch varieties. It is susceptible in early growth stages to red-legged earth mite and lucerne flea, like other woolly pod vetch varieties. RM4[®] 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[®] 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 [®]	Rasina [®]	Morava	Morava	Morava
Studenica [®]	Blanchefleur	Rasina [®]	Rasina [®]	Timok [®]
Volga [®]	Studenica [®]	Blanchefleur	Timok [®]	
Timok [®]	Morava	Cummins		
	Volga [®]	Volga [®]		
	Timok [®]	Timok [®]		

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 [®]	Rasina [®]	Morava	Morava	Capello
Blanchefleur	Morava	Rasina [®]	Popany	Haymaker
Studenica [®]	Studenica [®]	Popany	Capello	Morava
Morava	Popany	Capello	Haymaker	Popany
Volga [®]	Blanchefleur	Haymaker	Timok [®]	Timok [®]
Timok [®]	Volga [®]	Volga [®]	RM4 [®]	RM4 [®]
RM4 [®]	Timok [®]	Timok [®]		
	RM4 [®]	RM4 [®]		

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	Moderate	White	5–10	5–10	VS	MR	S
Studenica [Ⓓ]	Very early	High	High	White	0–2	0	R	MS	S
Morava	Late	High	High	Purple	0	0	R	S	VS
Rasina [Ⓓ]	Early–mid	High	Moderate	Purple	0–2	0	R	MS	S
Volga [Ⓓ]	Early	Very high	High	Purple	0–2	2–5	R	MS	S
Timok [Ⓓ]	Mid	High	Very high	Purple	0–2	0–2	R	MS	S
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 [Ⓓ]	Mid	Moderate	Very high	Purple	2–5	2–5	R	MS	VS

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

Table 4: Grain and dry matter yield for common vetch varieties.

Five sites over five years in SA, 2016 to 2020.

Variety	Grain yield (t/ha)	% of Volga [Ⓛ]	Dry matter yield (t/ha)	% of Morava
Studenica [Ⓛ]	1.7	86	4.7	92
Rasina [Ⓛ]	1.8	92	–	–
Morava	1.6	82	5.1	100
Volga [Ⓛ]	1.9	100	4.8	94
Timok [Ⓛ]	1.9	100	4.9	96
Mean yield	1.8		4.9	

– denotes no data available.

Table 5: Woolly pod and purple vetch varieties.

Variety	Dry matter (t/ha)	% of Capello
WOOLLY POD VETCH VARIETY		
Capello	5.7	100
RM4 [Ⓛ]	5.9	104
Mean yield	5.8	
PURPLE VETCH VARIETY		
Popany	5.28 (2009–12)	85

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

End use	Common vetch varieties		Woolly pod vetch varieties		Purple vetch varieties	
	Plant density (plants per sq.m.)	Sowing rate (kg/ha)	Plant density (plants per sq.m.)	Sowing rate (kg/ha)	Plant 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: 2018 dry matter yields (t/ha) at low-rainfall Mallee sites in SA and Victoria, cut in August to show early growth.

Variety	Waikerie 15 August	Walpeup 25 August
Studenica [Ⓛ]	4.81	3.22
Morava	3.69	1.71
Rasina [Ⓛ]	3.96	–
Timok [Ⓛ]	3.75	2.11
Volga [Ⓛ]	4.21	2.19

– denotes no data available.

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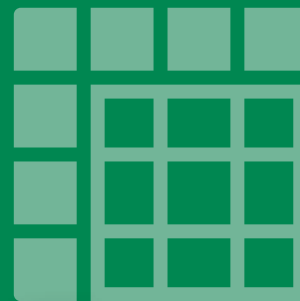
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