2019 VICTORIAN WINTER CROP SUMMARY

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

VICTORIA
OCTOBER 2018

GRDC NATIONAL VARIETY TRIALS™

AGRICULTURE VICTORIA

ARE YOU GROWING THE BEST VARIETY FOR YOUR SITUATION?

grdc.com.au

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www.grdc.com.au/NVT-Victorian-Winter-Crop-Summary
Remember to update it each November.

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THE VICTORIAN WINTER CROP SUMMARY

The Winter Crop Summary outlines information on current varieties of the major winter crops grown in Victoria. The publication aims to prompt growers to ask themselves, 'Am I growing the best variety for my situation?'

Sources of additional information are listed in each chapter and local advisers are also a key resource for information relevant to individual localities. Growers are encouraged to use this publication as a guide for discussion with consultants, advisers and marketing agents.

Previously published in March, the Winter Crop Summary has been published in spring for the first time in 2018, a timely release to assist growers in making variety choices for the 2019 season. It will be important for growers and advisers to review disease resistance ratings in March 2019 in the Cereal and Pulse Disease Guides to ensure they know the current resistance ratings of varieties. The latest 2018 National Variety Trials (NVT) data will also be available early in 2019 via the NVT website and Long Term Yield Reporting tool.

The Winter Crop Summary is compiled by Agriculture Victoria with investment from the Grains Research and Development Corporation (GRDC). Thank you to the GRDC and all contributors for making this publication available to Victoria.

INTRODUCTION

National Variety Trials (NVT)

The variety trials presented in this book are sourced from the NVT program. NVT also provide data from some breeding trials to add to the information available. In Victoria, NVTs are fully funded by the GRDC and in 2018 were contracted to three Service Providers: Eurofins, Birchip Cropping Group and Southern Farming Systems.

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

Conducted to a set of predetermined protocols, NVTs 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. NVTs 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 farmers prepared to contribute sites, and who often assist with the management of trials on their property.

Plant Breeding Rights (PBR)

Varieties subject to Plant Breeding Rights at the time of printing are annotated with the symbol (D). 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 Breeders Rights Act 1994* and that any breaching of PBR law is punishable by a maximum $50,000 fine for each offence'.

End Point Royalties (EPRs)

EPRs payable for 2018-19 are quoted from www.varietycentral.com.au and are quoted ex GST. Compliance with EPR systems is vital to ensure the future of the Australian grains industry through the funding of new varieties and long-term productivity gains. EPR's for 2019-20 harvest will become available early in 2019 on the Variety Central website.

INTERPRETING LONG TERM YIELD DATA

The long-term yield data presented in the Winter Crop Summary is an output of NVT Long Term Multi Environment Trial (MET) analysis. NVT run trials in all cropping regions of Victoria and Australia (e.g. Wimmera, Mallee, South West, etc) and use a five-year rolling dataset in the MET analysis.

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

Now, a factor analytic (FA) mixed model approach is used in the MET analysis using expertise from the GRDC supported Statistics for the Australian Grains Industry (SAGI) program. This approach generates long-term MET predictions for varieties at an individual trial level. A prediction is generated for every variety in every trial in the entire dataset, regardless of whether the variety was actually tested at every location. Using the FA model, NVT can provide a yield prediction for every situation. For instance, if the yield of five varieties were ranked in a similar order at multiple trials (sites A, B, C and D), but variety X was not grown at site D – the relative ranking of X against the other varieties can be used to predict the yield of variety X at site D.

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

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

WHEAT

NEW VARIETIES

The new wheat varieties added this year are bread wheats Cobalt, DS Bennett, EG Titanium, Illabo, Razor CL Plus, Sheriff CL Plus and Vixen, and dual-purpose wheat RGT Calabro.

QUALITY CHANGES

Wheat Quality Australia (WQA) has classified DBA Vittaroi as ADR in Southern Zone.

Grain Trade Australia has made some changes to the wording and definition of the Falling Number procedure to reflect current industry practices, being that:

- *"Falling Number testing can occur at any time, even if no visual sprouting is evident; and*
- *Where industry may conduct Falling Number testing where there is no visual evidence of sprouting of the germ, the Falling Number result applies."*

Similar wording changes will occur in the Barley Standards.

NEW STRIPE RUST PATHOTYPE

A new stripe rust pathotype was detected in Victoria during 2017. For most varieties stripe rust resistance ratings will not change however Coolah, Axe, EGA Gregory, Grenade CL Plus and Trojan are likely to become susceptible if this pathotype becomes established. These varieties should be monitored closely for stripe rust. If growers find stripe rust in a crop, samples should be submitted to the Australian Cereal Rust Program. Further details on how to submit samples can be found at www.rustbust.com.au. Growers should also access the latest resistance ratings in the Agriculture Victoria Cereal Disease Guide released in March.

MORE INFORMATION

www.nvtonline.com.au

- Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps

- Crop Disease Au App
- NVT Long Term Yield Reports App

www.grdc.com.au/resources-and-publications/grownotes

- GrowNotes™ Wheat – Southern Region

agriculture.vic.gov.au/agriculture/grains-and-other-crops

- AG1160 Cereal disease guide

VARIETY DESCRIPTIONS

Information about each variety is presented as overview statements, then as comparison tables of yield, crop growth and disease reaction characteristics. Wheat quality is for the Southern Zone.

Abbreviations used are:

(ф)	denotes that Plant Breeder Rights apply
CCN	Cereal Cyst Nematode
BYDV	Barley Yellow Dwarf Virus
RLN	Root Lesion Nematode
APH	Australian Prime Hard (min protein 13%)
AH	Australian Hard (min protein 11.5%)
APW	Australian Premium White (min protein 10%)
ASW	Australian Standard White
ADR	Australian Premium Durum
ASWN	Australian Standard Noodle (Protein 9.2–11%)
APNW	Australian Premium Noodle (Protein 10–11.5%)
ASFT	Australian Soft (Protein 9.5%)
FEED	Australian Feed

* denotes default classification

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Bread wheat – AXE(ф)

AH quality. Semi-dwarf awned wheat with early maturity. Stem rust MS, stripe rust MR, leaf rust SVS, yellow leaf spot S, septoria SVS, powdery mildew MS, CCN S, and S to *P. neglectus*. Released 2007. Marketed by AGT. EPR $2.50.

Bread wheat – BECKOM(ф)

AH quality. Semi-dwarf awned wheat with mid-season maturity. Stem rust MRMS, stripe rust MRMS, leaf rust MSS, yellow leaf spot MSS, septoria SVS, powdery mildew MS and CCN R. Short height, tolerant to acid soils and boron. Released 2015. Marketed by AGT. EPR $3.25.

Bread wheat – BOLAC(ф)

AH quality. Fully awned, mid to late season maturity suited to high rainfall zones. Stem rust MRMS, stripe rust RMR, leaf rust S, yellow leaf spot S, septoria MSS and CCN S. Released 2006. Marketed by Seednet. EPR $2.10.

Bread wheat – CHIEF CL PLUS(ф)

APW quality. A mid-maturing variety with broad adaptation. Two gene tolerance to label rates of Intervix® herbicide. Stem rust RMR, stripe rust S, leaf rust R, yellow leaf spot MRMS, septoria MSS, powdery mildew RMR and CCN MS. Released 2016. Marketed by InterGrain. EPR $4.25.

NEW Bread wheat – COBALT

APW quality. An early-mid maturity variety suited across a wide range of environments. Stem rust SVS, stripe rust, RMR, leaf rust MSS, yellow leaf spot MSS, septoria S, powdery mildew MRMS and CCN MSS. Released 2018 (tested as SMBW11-0324). Marketed by Elders. EPR $3.00

Bread wheat – CONDO

AH quality. A very early maturing variety best suited to North Central and North East regions. Stem rust MR, stripe rust MSS, leaf rust S, yellow leaf spot MS, septoria S and CCN MR. Released 2014. Marketed by AGT. EPR $3.25

Bread wheat – COOLAH

AH quality. Mid to late season maturity suitable for end of April/ early May sowing. Stem rust MR, stripe rust RMR, leaf rust MR, yellow leaf spot MSS, septoria MSS and CCN S. Released 2016. Marketed by AGT. EPR $3.50.

Bread wheat – CORACK

APW quality. An early to mid-maturing short semi-dwarf variety. Stem rust MR, stripe rust MS, leaf rust SVS, yellow leaf spot MR#, septoria SVS, powdery mildew SVS and CCN RMR. Released 2011. Marketed by AGT. EPR $3.

Bread wheat – COSMICK

AH quality. Fully awned with early to mid-season maturity. Stem rust MS, stripe rust MSS, leaf rust SVS, yellow leaf spot MRMS, septoria SVS, powdery mildew MSS and CCN S. Released 2014. Marketed by InterGrain. EPR $3.85.

Bread wheat – CUTLASS

APW quality. Mid-late maturing variety with a flexible sowing time like Yitpi. Stem rust R, stripe rust MS, leaf rust R, yellow leaf spot MSS, septoria MSS, powdery mildew S and CCN MR. Released 2015. Marketed by AGT. EPR $3.

Bread wheat – DERRIMUT

AH quality. Semi-dwarf early to mid-season variety widely adapted in Victoria. Stem rust MR, stripe rust MSS, leaf rust MSS, yellow leaf spot S, septoria SVS and CCN R. Released 2007. Marketed by Nuseed. EPR $2.95.

NEW Bread wheat – DS BENNETT

ASW quality. Tall awnless winter wheat suited to medium to high rainfall zones. Stem rust MRMS, stripe rust R, leaf rust S, yellow leaf spot MRMS, septoria MSS and CCN MSS. Released 2018 (tested as ADV11.9419). Bred by Dow Seeds and marketed by Seednet. EPR $4.25.

Bread wheat – DS DARWIN

AH quality. Early to mid-season maturity and suited to low to high rainfall zones. Stem rust MRMS, stripe rust MR, leaf rust S, yellow leaf spot S, septoria SVS, powdery mildew MRMS and CCN MSS. Released 2015. Bred by Dow Seeds and marketed by Seednet. EPR $4.25.

Bread wheat – DS PASCAL

APW quality. Mid to late season maturity suited to medium to high rainfall zones and irrigation. Stem rust MSS, stripe rust RMR, leaf rust MS, yellow leaf spot MRMS, septoria MSS and CCN S. Released 2015. Bred by Dow Seeds and marketed by Seednet. EPR $4.25.

Bread wheat – EGA GREGORY

APW* quality. Mid to late season variety with medium to slow maturity suited to north eastern Victoria. Stem rust MR, stripe rust MR#, leaf rust MR, yellow leaf spot S, septoria MSS and CCN S. MSS to black point. Released 2004. Marketed by Pacific Seeds. EPR $2.10.

Bread wheat – EGA WEDGETAIL

APW* quality. A mid to long season dual-purpose winter wheat. Developed for early sowing, suited to medium to high rainfall areas. Stem rust MRMS, stripe rust MS, leaf rust MSS, yellow leaf spot MSS, septoria MSS and CCN S. Tolerant of acid soils and suitable for early winter grazing. Registered 2002. Marketed by Seednet. EPR $1.45.

NEW Bread Wheat – EG TITANIUM

AH Quality. A full season variety targeted for early planting in medium to high rainfall zones. Insufficient data to publish independent disease resistance ratings. Estimated MR to stripe rust and leaf rust and R to stem rust (company ratings). Released 2018 (tested as EDGE17-001-10-01). Marketed by Elders. EPR $3.00

Bread wheat – ELMORE CL PLUS

AH quality. Two gene tolerance to label rates of Intervix® herbicide. Mid maturing variety best suited to moderate to high yielding areas. Stem rust MR, stripe rust MRMS, leaf rust RMR, yellow leaf spot S, septoria MSS and CCN S. Released 2011. Bred and marketed by AGT. EPR $3.55.

Bread wheat – EMU ROCK

AH quality. An awned semi-dwarf early season variety that is best suited to low to medium rainfall environments. Stem rust MS, stripe rust MRMS, leaf rust SVS, yellow leaf spot MRMS, septoria SVS, powdery mildew MSS and CCN S. Offers partial crown rot resistance (MS). Released 2011. Bred and marketed by InterGrain. EPR $3.50.

Bread wheat – ESTOC

APW quality. A mid to late season variety, slightly earlier flowering than Yitpi. Stem rust MR, stripe rust MRMS, leaf rust S, yellow leaf spot S, septoria S and CCN MR. Tolerant of boron. Released 2010. Bred and marketed by AGT. EPR $3.

Bread wheat – FORREST

APW quality. Awned semi-dwarf long season variety suited to the high rainfall zones for early April to early May sowing. Stem rust RMR, stripe rust RMR, leaf rust S, yellow leaf spot MRMS, septoria MSS and CCN S. Possesses resistance/tolerance to Wheat Streak Mosaic Virus. Released 2011. Bred by HRZ Wheats and marketed by Seednet. EPR $3.50.

Bread wheat – GRENADE CL PLUS

AH quality. Two gene tolerance to label rates of Intervix® herbicide. Fully awned early-mid season variety. Stem rust MR, stripe rust MRMS, leaf rust S, yellow leaf spot S, septoria S, powdery mildew MS and CCN R. Released 2012. Bred and marketed by AGT. EPR $3.80.

Bread wheat – HATCHET CL PLUS

AH quality. Two gene tolerance to label rates of Intervix® herbicide. Semi-dwarf awned wheat with very early maturity, 1-2 days earlier than Axe. Stem rust MS, stripe rust MRMS, leaf rust SVS, CCN MR, septoria SVS and yellow leaf spot S. Released 2015. Bred and marketed by AGT. EPR $3.80

NEW Bread wheat – ILLABO(ф)

AH quality. A mid to long season dual-purpose winter wheat, 2-3 days quicker to maturity than EGA Wedgetail. Developed for early sowing and winter grazing. Stem rust MRMS, stripe rust RMR, leaf rust S, CCN MS, septoria MSS, yellow leaf spot MS and black point MRMS. Released 2018. Bred and marketed by AGT. EPR $3.50.

Bread wheat – KIORA(ф)

AH quality. Mid to late season maturity best suited to medium to high rainfall areas. Stem rust MR, stripe rust RMR, leaf rust MRMS, yellow leaf spot MSS, septoria MSS, powdery mildew MS, CCN MS and black point MS. Released 2014. Bred and marketed by AGT. EPR $3.25

Bread Wheat – KORD CL PLUS(ф)

AH quality. Two gene tolerance to label rates of Intervix® herbicide. Fully awned semi-dwarf with mid-season maturity. Stem rust MR, stripe rust MRMS, leaf rust MS, yellow leaf spot MSS, septoria MSS, powdery mildew MS and CCN MR. Based on Gladius with very similar adaptation. Released 2011. Bred and marketed by AGT. EPR $3.55.

Bread wheat – LRPB ARROW(ф)

AH quality. Mid maturity, 3-4 days later than Mace with short canopy. Stem rust S, stripe rust S, leaf rust SVS, yellow leaf spot MRMS, septoria S, powdery mildew RMR and CCN MS. Released 2016. Marketed by Pacific Seeds. EPR $3.

Bread wheat – LRPB COBRA(ф)

AH quality. Short semi-dwarf early-mid season variety suited to medium to high yield potential environments on both acid and alkaline soils. Stem rust RMR, stripe rust MSS, leaf rust MR, yellow leaf spot MRMS, septoria MSS, powdery mildew MSS and CCN MS. Released 2012. Marketed by Pacific Seeds. EPR $3.50.

Bread wheat – LRPB HAVOC(ф)

AH quality. Early to mid-season variety with quicker maturity and faster grain filling than its Mace parent. Suited to low to medium rainfall areas. Stem rust S, stripe rust MR, leaf rust S, yellow leaf spot MRMS, septoria S and CCN S. Released 2017. Marketed by Pacific Seeds. EPR $4.

Bread wheat – LRPB KITTYHAWK(ф)

AH quality. Mid to long season dual-purpose winter wheat with similar maturity to EGA Wedgetail. Developed for early sowing, suited to medium to high rainfall areas. Stem rust MRMS, stripe rust RMR, leaf rust MS, yellow leaf spot MRMS, septoria MS and CCN S. Suitable for early winter grazing. Released 2016. Marketed by Pacific Seeds. EPR $4.25.

Bread wheat – LRPB LANCER(ф)

AH quality. Mid-long season variety for early planting. Short semi-dwarf with awns suited to medium to high rainfall areas. Stem rust R, stripe rust MR, leaf rust RMR, yellow leaf spot MS, septoria MSS and CCN S. Released 2013. Marketed by Pacific Seeds. EPR $4.25.

Bread wheat – LRPB PHANTOM(ф)

AH quality. A mid to late season variety tolerant of boron and acid soils. Stem rust MSS, stripe rust MR, leaf rust S, yellow leaf spot SVS, septoria SVS, CCN MS and black point MRMS. Released 2012. Marketed by Pacific Seeds. EPR $3.80.

Bread wheat – LRPB SCOUT(ф)

AH quality. An awned white chaff variety with mid-season maturity with wide adaptation. Stem rust MRMS, stripe rust MS, leaf rust MS, yellow leaf spot SVS, septoria S, powdery mildew MRMS, CCN R and black point S. Adapted to alkaline soils. Released 2009. Marketed by Pacific Seeds. EPR $2.80.

Bread wheat – LRPB TROJAN(ф)

APW quality. Mid-long season variety suited to medium to high rainfall areas. Stem rust MRMS, stripe rust MR, leaf rust MR, yellow leaf spot MSS, septoria MSS, powdery mildew S and CCN MS. Released 2013. Marketed by Pacific Seeds. EPR $4.

Bread wheat – MACE(ф)

AH quality. An awned variety of medium height. Stem rust MRMS, stripe rust SVS, leaf rust MSS, yellow leaf spot MRMS, septoria SVS, powdery mildew MSS and CCN MRMS. A comprehensive fungicide strategy is required to control stripe rust. Tolerant of boron. Released 2008. Bred and marketed by AGT. EPR $3.

NEW Bread wheat – RAZOR CL PLUS(ф)

ASW quality. Early maturing variety, derived from Mace. Two gene tolerance to label rates of Intervix® herbicide. Stem rust MRMS, stripe rust MS, leaf rust S, yellow leaf spot MS, septoria SVS, powdery mildew MSS and CCN MR. Released 2018 (tested as RAC2517). Bred and marketed by AGT. EPR $3.30.

Bread wheat – SCEPTER(ф)

AH quality. Mid-season maturity of medium height. Intended to replace Mace, flowering two days later. Stem rust MRMS, stripe rust MSS, leaf rust MSS, yellow leaf spot MRMS, septoria S, powdery mildew SVS and CCN MRMS. It has improved resistance to stripe rust however growers will need to manage accordingly. Released 2015. Bred and marketed by AGT. EPR $3.25.

NEW Bread wheat – SHERIFF CL PLUS(ф)

APW quality. Mid-late maturing variety registered for label rates of Intervix® herbicide. Stem rust MSS, stripe rust MSS, leaf rust SVS, yellow leaf spot MRMS, septoria S, powdery mildew S and CCN MS. Released 2018 (tested as IGW6155). Bred and marketed by InterGrain. EPR $4.25.

Bread wheat – SHIELD(ф)

AH quality. A white fully awned early-mid season variety. Stem rust RMR, stripe rust MR, leaf rust R, yellow leaf spot MSS, septoria SVS, powdery mildew MR and CCN MRMS. Short to medium plant height. Moderate tolerance to acid soils. Released 2012. Bred and marketed by AGT. EPR $3.25.

Bread wheat – SUNLAMB(ф)

ASW quality. A white grained long season spring variety suited for dual purpose applications. It is best sown early to mid-April. Stem rust R, stripe rust MRMS, leaf rust MS, yellow leaf spot MRMS, septoria MRMS and CCN MR. Released 2015. Bred and marketed by AGT. EPR $2.75.

Bread wheat – SUNTOP(ф)

AH quality. A white fully awned variety suited to North Central and North East Victoria. Medium plant height. Stem rust MRMS, stripe rust MRMS, leaf rust MRMS, yellow leaf spot MSS and septoria MSS. Released 2012. Bred and marketed by AGT. EPR $3.25.

NEW Bread wheat – VIXEN(ϕ)

AH quality. Early-mid maturing suited to mid-May sowing with moderate plant height. Stem rust MRMS, stripe rust MRMS, leaf rust SVS, yellow leaf spot MRMS and septoria S. Released 2018 (tested as IGW4279). Bred and marketed by InterGrain. EPR $3.50.

Bread wheat – WALLUP(ϕ)

AH quality. Mid season maturity fully awned variety suited to medium rainfall areas. Stem rust MRMS, stripe rust MRMS, leaf rust SVS, yellow leaf spot MSS, septoria MSS, and CCN MR. Released 2011. Bred and marketed by AGT. EPR $3.

Bread wheat – YITPI(ϕ)

AH quality. White fully awned semi-dwarf suited to low to medium rainfall areas. Stem rust S, stripe rust MRMS, leaf rust S, yellow leaf spot SVS, septoria MSS, powdery mildew MRMS and CCN MR. Boron tolerant. Released 2000. Marketed by Seednet. EPR $1.

Biscuit wheat – LRPB IMPALA(ϕ)

ASFT quality. Early-mid season variety suited to medium rainfall zones in Victoria. Stem rust MR, stripe rust MR, leaf rust SVS, yellow leaf spot MSS, septoria SVS, powdery mildew R and CCN MSS. Released 2012. Marketed by Pacific Seeds. EPR $3.50.

Durum – DBA AURORA(ϕ)

ADR quality. A mid-season variety with good early vigour and weed competitiveness. Stem rust RMR, stripe rust RMR, leaf rust RMR, yellow leaf spot MRMS, septoria MRMS and powdery mildew MR. Released 2014. Bred by Durum Breeding Australia and marketed by AGT. EPR $3.

Durum – DBA VITTAROI(ϕ)

ADR quality. An early-mid maturing variety suited to irrigation zones and dryland cultivation. Stem rust MR, stripe rust MR, leaf rust MR, yellow leaf spot MRMS, and septoria MRMS. Released 2017. Bred by Durum Breeding Australia and marketed by Seednet. EPR $ 3.50.

Durum – WID802(ϕ)

ADR quality. A mid-season variety. Stem rust RMR, stripe rust MR, leaf rust RMR, CCN MS and yellow leaf spot MRMS. WID802 may have low protein if nitrogen is limiting. Likely to produce high screenings in short finishes. Released 2012. Marketed by SA Durum Growers Association. EPR $3.

Feed – BEAUFORT(ϕ)

FEED quality. An awnless red grained mid to long season variety suited to high rainfall zones of southern Australia. Stem rust SVS, stripe rust RMR, leaf rust MSS, yellow leaf spot MRMS, septoria MSS and CCN S. A comprehensive fungicide strategy is required to control stem rust. Released 2008. Marketed by GrainSearch. EPR $3.

Feed – LONGSWORD(ϕ)

FEED quality. Fast mid-late maturing winter wheat suited to low to medium rainfall areas. Suits April sowing and offers grazing potential. Stem rust MR, stripe rust RMR, leaf rust MSS, yellow leaf spot MRMS, septoria MSS, CCN MRMS. Released 2017, tested as RAC2341. Bred and marketed by AGT. EPR $2.75.

Feed/Dual purpose – MANNING(ϕ)

FEED quality. Dual purpose white grain wheat suited to longer growing season zones and irrigation. Stem rust RMR, stripe rust RMR, leaf rust MS, yellow leaf spot MRMS, septoria MR, powdery mildew MS and CCN S. Released 2013. Bred by CSIRO and GRDC and marketed by GrainSearch. EPR $3.50.

Feed/Dual purpose – NAPAROO(ϕ)

FEED quality. A white grained awnless long season winter wheat suited to hay production or grazing. Stem rust RMR, stripe rust R, leaf rust S, yellow leaf spot MS and septoria MS. Released 2007. Marketed by AGT. EPR $2.50.

Feed/Dual purpose – RGT ACCROC

FEED quality. An awned red grained winter wheat. It is a mid to long season variety for high rainfall zones and irrigation. Suitable for dual purpose applications when early sowing is possible. Stem rust MR, stripe rust R, leaf rust S, yellow leaf spot MRMS, septoria MRMS and CCN S. Released 2017 (tested as SFR86-054). Bred by RAGT Semences and marketed by Seed Force. EPR $4.

NEW Feed/Dual purpose – RGT CALABRO

FEED quality. An awned red grain winter wheat with mid to late maturity suited to the high rainfall zone. Stem rust MRMS, stripe rust R, leaf rust MS, yellow leaf spot MRMS, septoria MRMS and CCN MS. Released 2018 (tested as SFR86-055). Bred by RAGT Semences and marketed by Seed Force. EPR $4.00.

Feed/Dual purpose – RGT ZANZIBAR

FEED quality. Fully awned variety suited to North Central, North East and South West. Stem rust VS, stripe rust R, leaf rust SVS, yellow leaf spot MS and septoria S and CCN MSS. A comprehensive fungicide strategy is required to control stem rust. Released 2017 (tested as SFR86-055). Bred by RAGT Semences and marketed by Seed Force. EPR $4.

Feed/Dual purpose – SF ADAGIO

FEED quality. An awned red grained winter wheat. It is a mid to long season variety for high rainfall zones and irrigation, suitable for dual purpose applications when early sowing is possible. Stem rust SVS, stripe rust RMR, leaf rust S, yellow leaf spot MRMS, septoria MRMS and CCN S. A comprehensive fungicide strategy is required to control stem rust. Released 2014. Marketed by AGF Seeds.

Feed/Dual purpose – SF SCENARIO

FEED quality. Long season awnless red grained winter wheat. Stem rust MSS, stripe rust R, leaf rust S, yellow leaf spot MS, septoria MRMS and CCN S. Released 2013. Bred by AGT and marketed by AGF Seeds.

Feed/Dual purpose – SQP REVENUE(ϕ)

FEED quality. A red grained awnless winter wheat suited to longer growing season zones and irrigation. Stem rust RMR, stripe rust R, leaf rust VS, yellow leaf spot MS, septoria MSS, powdery mildew R and CCN S. Released 2009. Bred by AusGrainz and CSIRO and marketed by GrainSearch. EPR $3.50.

Feed – TENFOUR(ϕ)

FEED quality. TenFour is an early-maturing wheat for the South West, North East and irrigation zones. Stem rust SVS, stripe rust SVS, leaf rust S, yellow leaf spot MRMS, septoria SVS, powdery mildew MS and CCN MS. Released 2016. Marketed by Elders. EPR $3.

TABLE 1 Suggested minimum levels of wheat disease resistance for the southern region.

Annual rainfall	Rust			Yellow leaf spot	*Septoria tritici*
	Stem	Stripe	Leaf		
Low < 350 mm	MSS	MS	MS	MSS	S
Medium 300-500 mm	MS	MRMS	MS	MSS	MS
High > 500 mm*	MR	MR	MR	MSS	MS

*unless a suitable program of disease control by fungicide applications can be planned and carried out.

TABLE 2 Wheat variety agronomic guide.

The agronomic characteristics in this table are provided as a guide only and have been compiled from observations of the breeder, National Variety Trials, agronomic research projects and seed companies.

	Maximum Quality Southern Zone	Rainfall			Screenings	Maturity	Height	Coleoptile length	Lodging	Sprouting	Head type		Soil tolerance	
		Low <400mm	Med 4-500mm	High >500mm							Colour	Awn	Boron	Acid
BREAD WHEAT														
Axe	AH	✓			MR	E	MS	S	MR	SVS	W	A	I	I
Beckom	AH	✓	✓	✓	MRMS	M	S	M	MRMS	MSS	W	A	MT	MT-T
Bolac	AH		✓	✓	S	M-L	M	M	MR	S	W	A	I	I
Chief CL Plus	APW	✓	✓	✓	MR	M	M	M	MR	S	W	A	-	-
Cobalt	APW	✓	✓	✓	MR	E-M	M	M	MR	MR	W	A	-	MT
Condo	AH	✓	✓		R	E	MT	M	MS	S	W	A	I	MT-T
Coolah	AH		✓	✓	MR	M-L	MT	M	MRMS	S	W	A	I	MT
Corack	APW	✓	✓		R	E-M	S	MS	MR	S	W	A	I	MT-T
Cosmick	AH	✓	✓		MS	E-M	M	L	MRMS	S-SVS*p*	W	A	-	-
Cutlass	APW	✓	✓		MRMS	M-L	MT	ML	MRMS	S	W	A	MT	MT-T
Derrimut	AH	✓	✓		MS	E-M	MS	MS	MRMS	S	W	A	MT	-
DS Bennett	ASW		✓	✓	-	L (+W)	T	-	-	-	W	AL	-	-
DS Darwin	AH	✓	✓	✓	MR	E-M	M	S	MR	SVS*p*	W	A	-	-
DS Pascal	APW		✓	✓	MR	M-L	M	S	MR	MR*p*	W	A	-	-
EGA Gregory	APW*		✓	✓	MR	M-L	T	M	MS	S	W	A	-	MT
EGA Wedgetail	APW*			✓	MR	M-L (+W)	M	MS	MR	S	W	A	I	MT-T
EG Titanium	AH		✓	✓	R	M-L	S	M	R	MR	W	A	-	MT-T
Elmore CL Plus	AH		✓		MS	M	M	M	MRMS	S	W	A	I	I
Emu Rock	AH	✓	✓		R	E	S	M	R	S	W	A	-	-
Estoc	APW	✓	✓		-	M-L	M	ML	MR	MRMS	W	A	MT	MT-T
Forrest	APW		✓	✓	MR	L	M	SM	-	S	W	A		-
Grenade CL Plus	AH		✓		MR	E-M	M	ML	-	S	W	A	MT	MT-T
Hatchet CL Plus	AH	✓			MR	E	S	S	-	SVS	W	A	MI	MT
Illabo	AH	✓	✓	✓	MRp	M-L (+W)	S*p*	-	MR*p*	S*p*	W	A	Ip	MT*p*
Kiora	AH		✓	✓	MS	M-L	M	M	MR	S	W	A	MI	MI
Kord CL Plus		✓	✓		MR	M	M	S	-	SVS	W	A	MT	MT
LRPB Arrow	AH	✓	✓	✓	MR	M	S	M	MR	S	W	A	I	MT-MI
LRPB Cobra	AH	✓	✓	✓	MRMS	E-M	S	M	MR	SVS	W	A	I	MT
LRPB Havoc	AH	✓	✓		MR	E-M	S	M	MR	S	W	A	I	MT-MI
LRPB Kittyhawk	AH		✓	✓	MR	M-L (+W)	M	MS	MR	S	W	A	I	MT-MI
LRPB Lancer	AH		✓	✓	MR	M-L	S	M	MR	S	W	A	I	MI-I
LRPB Phantom	AH		✓	✓	MR	M-L	MT	MS	MS	MSS	W	A	MT	MT
LRPB Scout	AH	✓	✓	✓	MR	M	M	ML	MRMS	MS	W	A	MI	MT-T
LRPB Trojan	APW		✓	✓	MR	M-L	M	M	MR	MSS	W	A	MT	MT-MI
Mace	AH	✓	✓		MR	E	M	MS	MR	MSS	W	A	MT	MT-T
Razor CL Plus	ASW	✓	✓		MR	E	M	-	MR	MSS*p*	W	A	MT	MT-T
Scepter	AH	✓	✓		MR	E-M	M	MS	MR	MSS	W	A	MT	MT-T
Sheriff CL Plus	APW		✓	✓	MR	M-L	M	M	MR	-	W	A	-	-
Shield	AH	✓	✓		MR	E-M	M	S	-	S	W	A	I	MT-T
Sunlamb	ASW		✓	✓	MR	L	M	M	MR	MS*p*	W	AL	I	MI

TABLE 2, cont. next page

(CONTINUED) TABLE 2 Wheat variety agronomic guide.

	Maximum Quality Southern Zone	Rainfall			Screenings	Maturity	Height	Coleoptile length	Lodging	Sprouting	Head type		Soil tolerance	
		Low <400mm	Med 4-500mm	High >500mm							Colour	Awn	Boron	Acid
BREAD WHEAT														
Suntop	AH	✓	✓	✓	MS	M	MT	M	MR	SVS	W	A	I	MT
Vixen	AH	✓	✓	✓	MR	E-M	M	M	MR	-	W	A	-	-
Wallup	AH		✓		MR	M	M	MS	MR	S	W	A	I	I
Yitpi	AH	✓	✓		MR	M	T	ML	MS	MS	W	A	MT	MT-T
BISCUIT WHEAT														
LRPB Impala	ASFT		✓		MR	E-M	ML	M	MS	MSS	W	A	I	MT
DURUM WHEAT														
DBA Aurora	ADR		✓	✓	R	M	M	ML	MR	MR	W	A	MT	-
DBA Bindaroi	FEED	✓	✓	✓	R	EM	S		R		W	A		
DBA Vittaroi	ADR	✓	✓	✓	R	EM	S	-	-	-	W	A	-	-
WID802	ADR				MS	M	-	ML	-	MR	-	-	-	-
FEED WHEAT														
Beaufort	Feed		✓	✓	-	M-L	M	-	MRMS	MR	R	AL	-	MT
Longsword	Feed	✓	✓	✓	MR	M-L (+W)	M	-	MR	-	W	A	MT*p*	MT*p*
Manning	Feed			✓	-	L (+W)	-	-	-	MS*p*	W	AL	-	-
Naparoo	Feed			✓	-	L (+W)	-	-	-	S*p*	W	AL	-	-
RGT Accroc	Feed			✓	-	M-L (+W)	-	-	-	-	R	A	-	-
RGT Calabro	Feed			✓	-	M-L (+W)	-	-	-	-	R	A		
RGT Zanzibar	Feed	✓	✓	✓	-	M	MT	-	-	-	R	A	-	-
SF Adagio	Feed		✓	✓	-	M-L (+W)	-	-	-	R*p*	R	A	-	-
SF Scenario	Feed			✓	-	L (+W)	-	-	-	R*p*	R	AL	-	-
SQP Revenue	Feed			✓	-	L (+W)	S	-	-	R*p*	R	AL	-	-
Tenfour	Feed	✓	✓	✓	MR	E	M	M	R	S*p*	W	A	-	MT

Maturity: E = early, M = mid, L = late (+W) = Winter wheat

Height; S = short, M = medium, T = tall

Coleoptile length; S = short, M = medium, L = long

Soil tolerance; I = intolerant, T = tolerant

Head Colour; W = white, B = black, R = red

Head type; A = awned, AL = awnless

Screening, lodging & sprouting resistance - see key used in Table 3

TABLE 3 Wheat variety disease rating guide.

	Rust			Yellow Leaf Spot	*Septoria tritici*	Powdery mildew	CCN Res	Pratylenchus		Crown Rot	Common Root rot	Black Tip (black point)	Flag Smut
	Stem	Stripe	Leaf					*P. neglectus* resistance	*P. thornei* resistance				
BREAD WHEAT													
Axe	MS	MR	SVS	S	SVS	MS	S	S	MS	S	MSS	S	S
Beckom	MRMS	MRMS	MSS	MSS	SVS	MS	R	S	MSS	S	MSS	MRMS	MRMS
Bolac	MRMS	RMR	S	S	MSS	-	S	MSS	MRMS	S	MS	MSS	RMR
Chief CL Plus	RMR	S	R	MRMS	MSS	RMR	MS	MS*p*	MS	S	MS	MS	SVS
Cobalt	SVS	RMR	MSS	MSS	S	MRMS	MSS	S	S	S	MSS	MRMS	RMR
Condo	MR	MSS	S	MS	S	-	MR	S	MS	S	MSS	MS	MSS
Coolah	MR	RMR	MR	MSS	MSS	-	S	MSS	MRMS	MSS	S	S	R
Corack	MR	MS	SVS	MR#	SVS	SVS	RMR	MSS	MSS	S	MS	S	S
Cosmick	MS	MSS	SVS	MRMS	SVS	MSS	S	MSS	MSS	S	MSS	MRMS	SVS
Cutlass	R	MS	R	MSS	MSS	S	MR	MSS	MSS	S	MS	MR	MS
Derrimut	MR	MSS	MSS	S	SVS	-	R	S	MSS	MSS	S	MSS	MRMS
DS Bennett	MRMS	R	S	MRMS	MSS	R	MSS	S	MSS	VS*p*	S	S	VS
DS Darwin	MRMS	MR	S	S	SVS	MRMS	MSS	S	S	S	MSS	MS	MR
DS Pascal	MSS	RMR	MS	MRMS	MSS	-	S	S	S	S	MS	MS	S
EGA Gregory	MR	MR#	MR	S	MSS	-	S	S	MSS	S	MSS	MSS	MSS#
EGA Wedgetail	MRMS	MS	MSS	MSS	MSS	-	S	S	VS	S	-	MS	-
Elmore CL Plus	MR	MRMS	RMR	S	MSS	-	S	S	MSS	S	S	MS	MSS
Emu Rock	MS	MRMS	SVS	MRMS	SVS	MSS	S	MSS	S	MS	MSS	MS	MS
Estoc	MR	MRMS	S	S	S	-	MR	S	S	MSS	MRMS	MS	MRMS
Forrest	RMR	RMR	S	MRMS	MSS	MS	S	VS	SVS	SVS	MS	MR	MR
Grenade CL Plus	MR	MRMS	S	S	S	MS	R	MSS	S	S	MRMS	MSS	MR
Hatchet CL Plus	MS	MRMS	SVS	S	SVS	MRMS	MR	MSS	MSS	S	MS	S	RMR
Illabo	MRMS	RMR	S	MS	MSS	MR	MS	S	MSS	MS*Sp*	MSS	MRMS	R
Kiora	MR	RMR	MRMS	MSS	MSS	MS	MS	S	MRMS	S	MS	MS	MRMS
Kord CL Plus	MR	MRMS	MS	MSS	MSS	MS	MR	MSS	MSS	S	MRMS	MRMS	MR
LRPB Arrow	S	S	SVS	MRMS	S	RMR	MS	MRMS	MRMS	S	MS	MRMS	MS
LRPB Cobra	RMR	MSS	MR	MRMS	MSS	MSS	MS	MSS	MSS	S	MSS	MSS	S
LRPB Havoc	S	MR	S	MRMS	S	-	S	S	MSS	S	MS	MS	MS
LRPB Kittyhawk	MRMS	RMR	MS	MRMS	MS	-	S	MSS	S	S	S	MS	RMR
LRPB Lancer	R	MR	RMR	MS	MSS	-	S	S	MS	MSS	S	MS	MSS
LRPB Phantom	MSS	MR	S	SVS	SVS	-	MS	S	S	MSS	MSS	MRMS	MRMS
LRPB Scout	MRMS	MS	MS	SVS	S	MRMS	R	S	MSS	MSS	S	S	MR
LRPB Trojan	MRMS	MR	MR	MSS	MSS	S	MS	MSS	MSS	MS	MS	MRMS	SVS
Mace	MRMS	SVS	MSS	MRMS	SVS	MSS	MRMS	MS	MS	S	MS	MRMS	S
Razor CL Plus	MRMS	MS	S	S	SVS	MSS	MR	S	MRMS	S*p*	MS	MS	R
Scepter	MRMS	MSS	MSS	MRMS	S	SVS	MRMS	S	MSS	S	MS	MS	MSS
Sheriff CL Plus	MSS	MSS	SVS	MRMS	S	S	MS	MS	MRMS	SVS*p*	MSS	MRMS	S
Shield	RMR	MR	R	MSS	SVS	MR	MRMS	MSS	MSS	S	MRMS	MSS	S
Sunlamb	R	MRMS	MS	MRMS	MRMS	-	MR	MSS	MS	MSS*p*	MS	MS	S
Suntop	MRMS	MRMS	MRMS	MSS	MSS	-	S	S	MRMS	MSS	MS	MS	R
Vixen	MRMS	MRMS	SVS	MRMS	S	S	MSS	MS	MS	S*p*	MRMS	MS	S
Wallup	MRMS	MRMS	SVS	MSS	MSS	-	MR	MRMS	MRMS	S	MS	MSS	SVS
Yitpi	S	MRMS	S	SVS	MSS	MRMS	MR	MSS	S	S	MS	MS	MR
BISCUIT WHEAT													
Impala	MR	MR	SVS	MSS	SVS	R	MSS	SVS	S	S	MSS	MS	S
DURUM WHEAT													
DBA Aurora	RMR	RMR	R	MRMS	MRMS	MR	MSS	MRMS	RMR	VS	MRMS	MSS	R
DBA Bindaroi	MRMS	RMR	MR	MRMS	MSS	MR	MS	MRMS	MR	SVS	MS	MRMS	R
DBA Vittaroi	MR	MR	MR	MRMS	MRMS	-	MSS	MS	MRMS	-	-	-	R
WID802	RMR	MR	RMR	MRMS	MRMS	-	MS	MRMS	MS	VS	MS	MS	R

TABLE 3, cont. next page

(CONTINUED) TABLE 3 Wheat variety disease rating guide.

	Rust			Yellow Leaf Spot	*Septoria tritici*	Powdery mildew	CCN Res	Pratylenchus		Crown Rot	Common Root rot	Black Tip (black point)	Flag Smut
	Stem	Stripe	Leaf					*P. neglectus* resistance	*P. thornei* resistance				
FEED WHEAT													
Beaufort	SVS	RMR	MSS	MRMS	MSS	-	S	MS	MS	S	MSS	MRMS	R
Longsword	MR	RMR	MSS	MRMS	MSS	-	MRMS	MRMS	MR	S	MRMS	MRMS	MRMS#
Manning	RMR	RMR	MS	MRMS	MR	MS	S	MSS	S	VS	SVS	SVS	R
Naparoo	RMR	R	S	MS	MS	-	-	SVS	S	S	S	-	VS
RGT Accroc	MR	R	S	MRMS	MRMS	-	S	S	MSS	SVS	S	MRMS	SVS
RGT Calabro	MRMS	R	MSS	MRMS	MRMS	R	MSS	S	MS*p*	SVS	MSS	MS	RMR
RGT Zanzibar	VS	R	SVS	MS	S	-	MSS	MSS	MS*p*	-	-	RMR	S
SF Adagio	SVS	RMR	S	MRMS	MRMS	-	S	MS	MSS	SVS	MS	MR	MS#
SF Scenario	MSS	R	S	MS	MRMS	-	S	S	S	SVS*p*	MS	MRMS	RMR
SQP Revenue	RMR	R	VS	MS	MSS	R	S	S	S	S	SVS	MS	S
TenFour	SVS	SVS	S	MRMS	SVS	MS	MS	S	S	S	MS	MS	MR

Varieties marked may be more susceptible if alternative strains are present.

Resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.

p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible , V = very.

TABLE 4 Wheat diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
FOLIAR					
Leaf rust	*Puccinia triticinia*	Small orange-brown powdery pustules on leaf.	Develops in spring. Favoured by mild (15°C–22°C) moist weather.	Airborne spores from living wheat plants.	Resistant varieties, control volunteer summer-autumn wheat. Seed dressings and foliar fungicides.
Stem rust	*Puccinia graminis f. sp. tritici*	Red-brown, powdery, oblong pustules with tattered torn edges on leaf and stem.	Can develop from mid spring into summer. Favoured by warm (15°C–30°C) humid conditions.	Airborne spores from living plants (wheat, barley, durum and triticale).	Resistant varieties, control volunteer summer-autumn wheat and barley. Foliar fungicides.
Stripe rust	*Puccinia striiformis f. sp. tritici*	Yellow powdery pustules often in stripes on leaves.	Can develop throughout the growing season. Favoured by cool (8°C–15°C), moist weather.	Airborne spores from living wheat and barley grass plants.	Resistant varieties, fungicides (seed, fertiliser and foliar), control volunteer summer-autumn wheat.
Septoria nodorum blotch (Glume blotch)	*Stagonospora nodorum*	Leaf lesions with minute black spots, leaf death. Can infect the head.	More common in early sown crops and in wet springs	Initially airborne spores released from stubble, and then spread by rain splashed spores within crop.	Resistant varieties, foliar fungicides, seed treatments, stubble removal.
Septoria tritici blotch	*Zymoseptoria tritici*	Leaf lesions with minute black spots, leaf death.	More common in early sown crops and in wet springs.	Initially airborne spores released from stubble, and then spread by rain splashed spores within crop.	Resistant varieties, foliar fungicides, seed treatments, stubble removal.
Yellow spot	*Pyrenophora tritici-repentis*	Leaf lesions often with yellow border, leaf death.	More severe in close rotations, when wheat is sown into wheat stubble.	Ascospores from stubble infect plants. Then secondary spread is by airborne spores in spring.	Stubble removal, crop rotation, foliar fungicides, resistant varieties.
BYDV	Barley yellow dwarf virus	Yellowing, dwarfing of infected plants, interveinal chlorosis, reduced seed set.	Most common in perennial grass pastures and in early sown crops.	A virus transmitted by aphids from infected grasses and cereals.	Resistant varieties, seed treatments and/or insecticide treatments to control aphids.
GRAIN					
Bunt	*Tilletia laevis, T. tritici*	Seed contains a black, foul smelling mass of spores. Affected grain is not accepted at silos.	Potentially region wide.	Spores on seed coat infect seedling before it emerges.	Seed applied fungicide.
Flag smut	*Urocystis agropyri*	Stunted plants with black, powdery streaks in leaves.	Most likely in crops sown early in warm soils.	Soil and seedborne spores.	Resistant varieties, seed-applied fungicide.
Loose smut	*Ustilago tritici*	Black powdery heads on diseased plants.	Region wide.	Infected seed is the predominant source.	Seed-applied fungicide.
ROOT/CROWN					
Common root rot	*Bipolaris sorokiniana*	Browning of the roots, sub-crown internode and the stem base. Brown spots on leaves. White heads and pinched grain.	Scattered through crop.	Soil borne on grass and cereal residues. Also as spores in the soil.	Crop rotation, one year free from hosts.
Crown rot	*Fusarium pseudogram-inearum, F. culmorum*	Browning of stem bases, crown and sometimes roots. White heads and pinched grain.	More severe following a wet winter and dry spring, especially on heavy soils which are poorly drained	Soil borne on grass and cereal residues.	Crop rotation. Avoid highly susceptible varieties, especially durum wheat.
Cereal cyst nematode (CCN)	*Heterodera avenae*	Yellow, stunted plants with knotted roots, often in patches.	Light soils and well-structured clays where cereals are common.	Present in most soils in the southern region of Australia.	Resistant varieties, two year break from susceptible cereals and grasses, in particular wild oats.
Rhizoctonia bare patch	*Rhizoctonia solani* (AG 8)	Patches of stunted plants with yellow-red erect leaves. Spear tipped roots.	Associated with reduced tillage and poor weed control in autumn. Discouraged by soils with high organic matter.	Fungus carries over in organic matter in the soil. Wide host range.	Pre-cropping weed control, chemical fallow, cultivation, modified sowing equipment. Group B herbicides may increase severity on some soil types. Read the label.
Root lesion nematode	*Pratylenchus thornei, P. neglectus*	Reduced tillering, ill thrift; a lack of root branching and lesions on roots.	Favoured by wheat in rotation with chickpea, medic and vetch.	Survive as dormant nematodes in the soil.	Crop rotation using resistant crops and resistant varieties.
Take-all	*Gaeuman-nomyces graminis* var. *tritici*	Blackening of roots, stem bases and crown. Plant stunting with white heads and pinched grain.	Favoured by a wet spring with a dry finish.	Soil borne on grass hosts and cereal residues.	Crop rotation, at least one year free of hosts (cereals and grasses, especially barley grass). Fungicide applied to seed or fertiliser.

This table has been developed from information in the publications Wallwork H (2000) (Ed) Cereal Root and Crown Diseases (Grains Research and Development Corporation, SARDI) and Wallwork H (2000) (Ed) Cereal Leaf and Stem Diseases (Grains Research and Development Corporation, SARDI).

TABLE 5 Wheat time of sowing guide.

This table is a guide only and has been compiled from observations of departmental agronomists and plant breeders.

MALLEE	April				May				June			
Illabo, Longsword												
Cutlass, EG Titanium, Estoc, LRPB Phantom, LRPB Trojan, Sheriff CL Plus, Yitpi												
Beckom, Chief CL Plus, Cobalt, Corack, Cosmick, Derrimut, DS Darwin, Elmore CL Plus, Grenade CL Plus, Kord CL Plus, LRPB Arrow, LRPB Scout, Mace, Scepter, Shield, Suntop												
Axe, Condo, Emu Rock, Hatchet CL Plus, LRPB Havoc, Tenfour, Vixen												
WIMMERA	**April**				**May**				**June**			
DS Bennett, Illabo, LRPB Kittyhawk												
Longsword												
Bolac Coolah, Cutlass, DS Pascal, Estoc, Kiora, LRPB Phantom, LRPB Trojan, EG Titanium, Sheriff CL Plus, Yitpi, Durum varieties												
Beckom, Chief CL Plus, Cobalt, Corack, Cosmick, Derrimut, DS Darwin, Elmore CL Plus, Grenade CL Plus, Kord CL Plus, LRPB Arrow, LRPB Cobra, LRPB Impala, LRPB Scout, Mace, Scepter, Shield, Suntop, Wallup												
Axe, Condo, Emu Rock, Hatchet CL Plus, LRPB Havoc, Tenfour, Vixen												
NORTH CENTRAL	**April**				**May**				**June**			
DS Bennett, Illabo, LRPB Kittyhawk												
Longsword												
Bolac, Coolah, Cutlass, Cosmick, DS Pascal, EGA Gregory, EG Titanium, Estoc, Kiora, LRPB Lancer, LRPB Phantom, LRPB Trojan, Sheriff CL Plus, Yitpi												
Beckom, Chief CL Plus, Cobalt, Corack, Derrimut, DS Darwin, Elmore CL Plus, Grenade CL Plus, Kord CL Plus, LRPB Cobra, LRPB Impala, LRPB Arrow, LRPB Scout, Mace, RGT Zanzibar, Scepter, Shield, Suntop, Wallup												
Axe, Condo, Emu Rock, Hatchet CL Plus, LRPB Havoc, Tenfour, Vixen												
NORTH EAST	**April**				**May**				**June**			
DS Bennett, Manning (Mar-Apr), RGT Accroc, SQP Revenue, Sunlamb												
Illabo, EGA Wedgetail, Forrest, Illabo, LRPB Kittyhawk												
Longsword												
Bolac, Coolah, Cutlass, DS Darwin, DS Pascal, EGA Gregory, EG Titanium, Estoc, Kiora, LRPB Lancer LRPB Phantom, LRPB Trojan, Sheriff CL Plus, Yitpi												
Beckom, Chief CL Plus, Cobalt, Corack, Cosmick, Elmore CL Plus, Grenade CL Plus, LRPB Arrow, LRPB Cobra, LRPB Impala, LRPB Scout, Mace, Scepter, Shield, Suntop												
Condo, Emu Rock, Hatchet CL Plus, LRPB Havoc, Tenfour, Vixen												
SOUTH WEST	**April**				**May**				**June**			
DS Bennett, Manning (Mar-Apr), Naparoo, RGT Accroc, SQP Revenue, Sunlamb (early April)												
Illabo, EGA Wedgetail, Forrest, Illabo, LRPB Kittyhawk												
Longsword												
Beaufort, Bolac, Coolah, DS Pascal, EG Titanium, Kiora, Preston, Sheriff CL Plus												
Beckom, Chief CL Plus, Cobalt, Derrimut, LRPB Arrow, LRPB Phantom, LRPB Trojan, RGT Zanzibar, Tenfour, Vixen												

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 6 Victorian wheat varieties - Domestic Flours Millers Assessment.

Interpretation provided by David Hogan, Quality Operations Manager for Laucke Flour Mills.

HARD WHEAT	Preferred grade	Max class grade	End product category		Comment
			Plant bakery	Artisan breads	
Axe	AH	AH	1	1	Very poor water absorption, strong dough characteristics and long mix time.
Beckom	AH	AH	2	2	Some interest. Marginal long mix time & tough dough.
Bolac	AH	AH	2	2	Marginal AH - strong dough characteristics.
Chief CL Plus	APW	APW	2	1	Acceptable APW. Low water absorption, short mix time. Acceptable rapid bake performance.
Condo	AH	AH	1	2	Marginal strong dough & mix time. Possible specialist application.
Coolah	APW	AH	2	2	Acceptable for domestic mills. Acceptable water absorption, marginal long mix requirement & strong dough resistance, acceptable bake performance.
Corack	APW	APW	2	1	Acceptable APW quality. Suit domestic mills.
Cosmick	AH	AH	3	2	Acceptable AH for domestic market.
Cutlass	APW	APW	3	1	Suit domestic application. Good WA & acceptable bake.
Derrimut	AH	AH	3	1	Appears acceptable as AH quality to suit plant bakery.
DS Bennett	ASW	ASW	2	1	Acceptable ASW. Low water absorption & dough strength, acceptable mix time & marginal bake performance.
DS Darwin	AH	AH	2	1	Limited data available. High water absorption may suit domestic mills as blend.
DS Pascal	APW	APW	2	1	Limited data available. Potentially limited domestic interest.
EGA Gregory	APW*	APW*	2	1	Limited data but indicate suitable for domestic APW.
EGA Wedgetail	APW*	APW*	1	2	Over strong APW. Long mix requirement. Appears to suit specialist segregation.
Elmore CL Plus	AH	AH	3	1	Good water absorption & acceptable bake performance. Acceptable AH quality.
Emu rock	AH	AH	3	2	Acceptable AH. Marginal long mix requirement.
Estoc	APW	APW	2	1	Marginal APW quality. Some interest from domestic mills.
Forrest	APW	APW	2	1	Acceptable APW quality for domestic market.
Grenade CL Plus	AH	AH	2	2	Marginal strong. Limited domestic interest.
Hatchet CL Plus	AH	AH	2	2	Some domestic interest. Marginal strong dough.
Illabo	AH	AH	1	2	Strong dough characteristics. Long Mix requirement in bakery. Suit specialist bakery application only.
Kiora	AH	AH	2	2	Marginally strong dough. Some interest from Domestic market.
Kord CL Plus	AH	AH	3	1	Appears suitable for domestic mills.
LRPB Arrow	AH	AH		2	Acceptable for domestic mills. Low water absorption and marginal extensibility. Good (short) mix time, good bake performance.
LRPB Cobra	AH	AH	3	1	Appears acceptable. Some concerns over low viscosity and high yellow pigment.
LRPB Havoc	AH	AH	3	1	Acceptable AH. Suit Plant Bakery.
LRPB Kittyhawk	AH	AH	2	2	Acceptable for domestic Mills. Good water absorption and strong doughs. Acceptable bake performance.
LRPB Lancer	AH	AH	2	1	Acceptable APW. Good water absorption & bake volume, but marginal long mix time.
LRPB Phantom	AH	AH	3	1	Appears to suit domestic mills.
LRPB Scout	AH	AH	2	1	Suitable AH, marginal long mix time.
LRPB Trojan	APW	APW	2	1	Some interest from domestic mills. Marginal water absorption, long mix time but good bake volume.
Mace	AH	AH	3	1	Suitable as domestic AH.
Razor CL Plus	ASW	ASW	2	1	Acceptable ASW. Good water absorption, short mix time, short dough extensibility and low dough strength.
Scepter	AH	AH	2	1	Suit domestic application. Acceptable AH quality.
Sheriff CL Plus	APW	APW	1	1	Suit domestic mills. Acceptable APW. Marginal water absorption and extraction. Short mix time, marginal extensibility and acceptable bake performance.
Shield	AH	AH	3	1	Marginal strong. Expect some domestic interest.
Sunlamb	ASW	ASW	2	1	Limited interest. Poor extraction but acceptable rapid bake.
Suntop	AH	AH	2	2	Strong AH. Good water absorption, but marginally long mix time.
Vixen	AH	AH	3	2	Suit domestic mills. Acceptable AH. Good extraction, good water absorption & balanced dough. Acceptable bake performance.
Wallup	AH	AH	1	2	Long mix requirement. Appears to suit specialist segregation. Limited interest from domestic millers.
Yitpi	AH	AH	3	2	Acceptable AH quality.

SOFT OR NOODLE WHEAT	Preferred grade	Max class grade	End product category			
			Biscuit	Cake	Hot plate goods	
LRPB Impala	Soft	SF1	3	2	1	Acceptable biscuit quality.

On the quality scale, a rating of 3 is preferred for a particular varietal end-use, 3 preferred, 2 suitable, 1 not suitable.

TABLE 7 Mallee and Wimmera wheat (main season). Long term predicted yield expressed as a percentage of mean yield.

	Mallee						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		1.64	2.48	1.58	4.05	3.24		3.55	2.81	1.30	6.74	4.83
	No. trials	9	9	6	6	7	No. trials	4	1	3	5	5
Axe	37	98	94	106	90	96	18	92	93	108	92	96
Barham	-	-	-	-	-	-	13	86	93	92	93	-
Beckom	37	108	111	111	111	107	18	106	112	114	107	105
Borlaug 100	-	-	-	-	-	-	5	-	-	-	-	96
Bremer	9	-	102	-	-	-	1	-	100	-	-	-
Buchanan	6	-	-	89	-	-	3	-	-	76	-	-
Chief CL Plus	15	-	99	-	91	-	11	-	111	-	94	102
Condo	9	96	-	-	-	-	4	96	-	-	-	-
Corack	37	110	104	110	93	107	18	110	109	123	100	110
Correll	24	98	104	-	103	-	13	91	94	99	97	-
Cosmick	37	105	108	107	111	103	18	104	107	107	107	103
Cutlass	19	-	-	102	109	104	13	-	-	103	103	102
Derrimut	30	98	102	100	105	-	18	96	99	98	101	97
DS Darwin	13	-	-	-	96	96	13	-	-	86	99	97
Elmore CL Plus	28	-	101	97	105	95	18	89	93	92	97	92
Emu Rock	37	103	101	110	101	100	18	99	103	113	101	99
Estoc	37	100	102	99	102	101	18	98	97	99	99	101
Gascoigne	-	-	-	-	-	-	8	90	96	92	-	-
Gladius	37	98	100	98	99	97	18	95	94	99	98	98
Grenade CL Plus	37	98	100	101	98	96	18	93	94	102	96	96
Harper	30	99	105	100	106	-	13	94	98	100	99	-
Hatchet CL Plus	37	96	90	99	96	93	18	92	92	100	95	94
Hydra	9	109	-	-	-	-	4	108	-	-	-	-
Impress CL Plus	6	-	-	-	71	-	5	-	-	-	83	-
Jade	-	-	-	-	-	-	8	-	-	75	97	-
Justica CL Plus	30	96	101	98	104	-	13	91	95	96	98	-
Kord CL Plus	37	99	102	102	95	98	18	92	94	106	93	98
LRPB Arrow	19	-	-	103	102	104	13	-	-	106	105	104
LRPB Catalina	9	92	-	-	-	-	4	92	-	-	-	-
LRPB Cobra	37	96	91	93	106	98	18	108	100	78	109	100
LRPB Dart	9	94	-	-	-	-	5	96	91	-	-	-
LRPB Flanker	-	-	-	-	-	-	8	-	-	79	89	-
LRPB Havoc	13	-	-	-	91	104	10	-	-	-	100	105
LRPB Impala	-	-	-	-	-	-	18	92	91	93	97	97
LRPB Lincoln	-	-	-	-	-	-	17	94	-	76	96	93
LRPB Mustang	-	-	-	-	-	-	10	-	-	-	95	96
LRPB Phantom	37	94	97	93	106	96	18	94	89	82	100	96
LRPB Reliant	-	-	-	-	-	-	4	-	101	105	-	-
LRPB Scout	37	98	101	101	112	98	18	101	96	89	109	100
LRPB Trojan	37	105	108	101	110	106	18	110	103	98	110	110
LRPB Viking	-	-	-	-	-	-	9	-	85	76	96	-
Mace	37	108	105	108	96	106	18	107	109	119	101	107
Magenta	15	-	105	-	110	-	13	93	97	95	100	-
Razor CL Plus	7	-	-	-	-	105	5	-	-	-	-	107
RGT Zanzibar	-	-	-	-	-	-	10	-	-	-	108	95
Scepter	19	-	-	119	107	113	13	-	-	138	107	114
Sheriff CL Plus	6	-	-	-	103	-	5	-	-	-	105	-
Shield	37	101	107	108	105	100	18	93	104	113	98	95
Tenfour	-	-	-	-	-	-	13	-	-	110	110	108
Vixen	13	-	-	-	115	111	10	-	-	-	113	113
Wallup	-	-	-	-	-	-	18	100	98	92	97	98
Wyalkatchem	30	102	98	100	96	-	13	103	106	104	100	-
Yitpi	37	96	100	96	102	98	18	92	92	92	96	96

TABLE 8 North Central and North East wheat (main season). Long term predicted yield expressed as a percentage of mean yield.

	North Central						North East					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.89	3.61	1.44	7.31	3.48		4.17	5.83	3.67	6.84	4.81
	No. trials	3	2	2	2	2	No. trials	3	3	4	4	4
Axe	11	97	97	111	89	101	16	103	89	96	85	99
Barham	9	93	96	94	97	-	12	89	96	90	100	-
Beckom	11	110	107	105	107	110	18	108	110	110	107	110
Chara	3	95	-	-	-	-	5	96	102	98	-	-
Cobalt	6	-	-	100	107	109	12	-	-	108	109	109
Condo	11	102	102	104	98	102	18	109	99	103	95	103
Coolah	4	-	-	-	100	105	9	-	-	101	105	101
Corack	11	108	100	116	102	109	18	104	98	108	97	109
Correll	9	101	99	107	99	-	12	98	96	98	98	-
Cosmick	11	106	104	105	105	104	17	105	104	105	104	104
Cutlass	6	-	-	101	107	105	12	-	-	106	107	106
Derrimut	11	98	96	101	100	98	18	96	96	97	98	99
DS Bennett	2	-	-	-	-	95	8	-	-	-	113	96
DS Darwin	8	-	96	101	99	99	18	97	96	100	97	100
DS Faraday	2	-	-	-	-	100	7	-	-	-	99	97
DS Newton	4	-	92	96	-	-	10	93	94	95	-	-
DS Pascal	6	-	92	-	102	85	18	92	94	93	101	90
DS Tull	2	-	-	-	-	95	8	-	-	-	102	94
EGA Gregory	10	95	103	88	95	100	17	100	105	94	100	97
Elmore CL Plus	11	96	99	95	99	97	17	98	100	96	100	96
Emu Rock	9	101	95	109	98	-	12	101	93	103	93	-
Estoc	11	101	95	102	102	100	16	97	98	102	99	103
Gascoigne	7	99	100	99	-	-	9	98	100	101	-	-
Gladius	11	96	93	101	97	95	17	96	91	100	94	98
Grenade CL Plus	11	96	93	105	95	97	16	94	89	96	92	97
Harper	9	100	95	104	102	-	12	96	97	98	100	-
Hatchet CL Plus	11	97	92	111	93	94	3	-	84	-	-	-
Hydra	3	111	-	-	-	-	3	107	-	-	-	-
Jade	4	-	-	89	97	-						
Justica CL Plus	9	97	94	106	98	-	12	96	90	98	94	-
Kord CL Plus	11	99	95	108	96	101	16	97	93	99	93	101
LRPB Arrow	6	-	-	108	101	102	12	-	-	104	97	105
LRPB Beaufort	2	-	-	-	-	99	5	-	112	102	-	100
LRPB Catalina	3	99	-	-	-	-						
LRPB Cobra	11	104	105	97	106	101	18	106	107	107	106	103
LRPB Dart	3	92	-	-	-	-	3	93	-	-	-	-
LRPB Flanker	8	-	105	90	101	100	12	-	109	97	105	98
LRPB Gauntlet	9	95	99	96	93	-	13	99	97	96	94	-
LRPB Gazelle	3	91	-	-	-	-	5	94	99	94	-	-
LRPB Havoc	4	-	-	-	97	105	7	-	-	-	96	105
LRPB Impala	11	100	99	100	101	101	16	97	100	99	101	101
LRPB Kittyhawk	-	-	-	-	-	-	2	-	-	-	93	85
LRPB Lancer	-	-	-	-	-	-	14	-	99	91	97	93
LRPB Lincoln	11	97	94	103	100	93	16	99	92	98	96	96
LRPB Merlin	8	96	92	103	93	-	12	93	90	97	91	-
LRPB Mustang	4	-	-	-	99	103	8	-	-	-	98	102
LRPB Orion	3	90	-	-	-	-	3	92	-	-	-	-
LRPB Phantom	11	101	100	97	104	99	16	101	103	100	104	100
LRPB Reliant	8	-	104	100	92	104	12	-	101	94	95	98
LRPB Scout	11	103	103	99	105	102	18	103	106	103	105	103
LRPB Spitfire	10	94	92	101	94	95	17	95	89	97	91	97
LRPB Trojan	11	107	105	103	107	105	18	105	107	107	106	106

TABLE 8, cont. next page

(CONTINUED) TABLE 8 North Central and North East wheat (main season). Long term predicted yield expressed as a percentage of mean yield.

	North Central						North East					
Year		**2013**	**2014**	**2015**	**2016**	**2017**		**2013**	**2014**	**2015**	**2016**	**2017**
Mean yield (t/ha)		**2.89**	**3.61**	**1.44**	**7.31**	**3.48**		**4.17**	**5.83**	**3.67**	**6.84**	**4.81**
	No. trials	**3**	**2**	**2**	**2**	**2**	**No. trials**	**3**	**3**	**4**	**4**	**4**
LRPB Viking	6	-	105	88	101	-	11	-	108	96	105	-
Mace	11	106	101	112	99	106	18	104	98	106	96	106
Magenta	9	102	99	107	103	-	13	100	97	100	101	-
QAL2000	8	97	101	93	104	-	10	94	103	96	107	-
Razor CL Plus	2	-	-	-	-	108	4	-	-	-	-	107
RGT Calabro	-	-	-	-	-	-	2	-	-	-	106	93
RGT Zanzibar	4	-	-	-	109	98	8	-	-	-	117	99
Scepter	6	-	-	123	109	116	12	-	-	113	106	115
SEA Condamine	2	-	-	-	-	99	4	-	-	-	-	101
Steel	4	-	-	105	89	-	8	-	-	100	87	-
Sunmate	4	98	-	104	-	-	8	99	-	99	-	97
Suntop	10	101	104	100	96	105	18	100	103	102	99	102
Tenfour	6	-	-	115	105	111						
Vixen	2	-	-	-	-	110	4	-	-	-	-	113
Wallup	11	96	96	94	97	97	18	100	98	100	96	100
Yitpi	11	97	93	101	99	98	16	94	95	94	97	99

TABLE 9 North East and South West wheat (early season). Long term predicted yield expressed as a percentage of mean yield.

	North East				South West					
Year		2013	2015	2016		2013	2014	2015	2016	2017
Mean yield (t/ha)		6.31	6.20	5.37		4.84	5.32	4.29	7.21	5.90
	No. trials	1	1	1	No. trials	3	3	3	2	2
Beckom	2	-	108	107	7	-	-	118	105	109
Bolac	3	101	102	98	13	102	100	104	99	100
Chara	3	98	102	101	13	101	103	106	99	102
Cobalt	-	-	-	-	3	108	-	-	-	-
Coolah	2	-	104	107	10	-	102	107	103	104
Cutlass	2	-	108	107	7	-	-	114	105	107
DS Bennett	1	-	-	107	4	-	-	-	114	107
DS Darwin	3	87	94	98	6	90	99	-	-	-
DS Faraday	1	-	-	100						
DS Newton	2	86	97	-	9	92	100	107	-	-
DS Pascal	3	106	108	99	13	111	105	114	101	104
DS Tull	1	-	-	99	-	-	-	-	-	-
EGA Gregory	3	97	91	100	6	89	91	-	-	-
EGA Wedgetail	3	107	100	97	13	103	96	92	102	97
Elmore CL Plus	3	101	99	99	13	100	98	100	98	98
Estoc	1	99	-	-	3	98	-	-	-	-
Forrest	3	109	101	96	13	105	94	98	97	96
Gascoigne	2	93	97	-	9	94	100	101	-	-
Illabo	1	-	-	101	4	-	-	-	110	108
Kellalac	2	97	96	-	9	94	96	95	-	-
Kiora	3	104	106	101	13	108	104	111	101	104
Longsword	1	-	-	97	4	-	-	-	107	106
LRPB Beaufort	1	117	-	-	13	117	111	109	116	112
LRPB Flanker	2	-	97	105	-	-	-	-	-	-
LRPB Gauntlet	3	84	94	96	-	-	-	-	-	-
LRPB Gazelle	3	110	104	99	11	108	98	108	97	-
LRPB Kittyhawk	2	-	99	94	7	-	-	94	100	97
LRPB Lancer	3	91	100	99	3	97	-	-	-	-
LRPB Phantom	3	106	101	106	13	102	100	106	99	102
LRPB Scout	1	99	-	-	13	102	104	108	101	104
LRPB Trojan	3	108	108	110	13	109	108	114	107	110
LRPB Viking	3	102	97	103	11	97	97	97	98	-
Manning	3	109	106	95	13	112	103	88	115	102
Mansfield	2	84	88	-	6	85	-	72	-	-
Naparoo	-	-	-	-	3	92	-	-	-	-
Preston	3	108	108	104	11	111	107	110	107	-
QAL2000	3	114	106	104	11	110	101	111	101	-
RGT Accroc	2	-	118	109	10	-	111	108	122	113
RGT Calabro	2	-	114	105	7	-	-	100	123	112
RGT Zanzibar	1	-	-	111	4	-	-	-	119	116
SF Adagio	2	-	112	102	13	120	108	102	116	108
SF Ovalo	2	-	98	101	5	102	93	-	-	-
SF Scenario	2	-	101	89	11	103	100	87	106	-
SQP Revenue	3	113	106	99	13	112	102	90	113	102
Steel	-	-	-	-	3	82	-	-	-	-
Sunlamb	2	-	96	95						
Suntop	2	-	103	103	3	94	-	-	-	-

TABLE 10 South West wheat (long season). Long term predicted yield expressed as a percentage of mean yield.

Year		2013	2014	2015	2016	2017
Mean yield (t/ha)		5.06	5.76	3.69	7.45	5.05
	No. trials	2	2	2	2	1
Bolac	6	103	99	106	-	-
Brennan	7	-	98	89	99	97
Cutlass	1	-	-	-	-	105
DS Bennett	3	-	-	-	123	112
DS Pascal	9	100	103	119	103	101
EGA Wedgetail	9	104	100	98	95	101
Einstein	7	-	103	70	111	100
Forrest	9	111	98	106	90	97
Illabo	3	-	-	-	102	100
Longsword	3	-	-	-	90	88
LRPB Beaufort	5	-	-	124	124	107
LRPB Gazelle	4	112	99	-	-	-
LRPB Kittyhawk	7	-	99	104	93	97
LRPB Lancer	4	87	93	-	-	-
LRPB Trojan	7	-	103	127	112	107
LRPB Viking	4	99	94	-	-	-
Mackellar	8	106	106	101	108	-
Manning	9	117	112	95	123	110
Mansfield	4	92	-	70	-	-
Naparoo	9	99	82	68	64	98
RGT Accroc	5	-	-	116	127	123
RGT Calabro	5	-	-	102	124	114
RGT Zanzibar	3	-	-	-	118	109
Rudd	8	114	101	91	101	-
SF Adagio	5	-	-	109	116	114
SF Ovalo	5	-	-	82	112	97
SF Scenario	4	-	-	91	108	-
SQP Revenue	9	128	110	111	121	104
Steel	4	-	-	71	48	-
Sunlamb	7	-	93	76	91	97
Sunmax	5	-	-	93	85	104
Suntime	4	85	89	-	-	-
Sunzell	8	85	85	75	72	-
Tennant	8	98	94	62	98	-
Wylah	8	116	98	101	87	-

BARLEY

NEW VARIETIES

Banks is a longer season, potential malting variety developed by InterGrain suited to late April through to early May sowings in the Wimmera. It is currently undergoing Stage 2 of the Barley Australia malt evaluation process.

Bottler is a mid-maturing feed variety suited to medium to high rainfall zones. GrainSearch will apply to Barley Australia to have Bottler enter the malt evaluation process in 2019. Limited commercial release in 2019.

MALT EVALUATION

In 2018 Spartacus CL and Compass received Barley Australia classification as malting quality varieties. Newly accredited malting varieties still need to gain market acceptance and growers are advised to consult with their marketer regarding the availability of segregation and pricing.

At the time of publication, Alestar was undergoing Stage 1 of evaluation. Banks and RGT Planet advanced to Stage 2 of evaluation in 2018 with a decision expected in March 2019. The outcome of malt evaluation of these varieties will be updated on www.barleyaustralia.com.au in March 2019.

Barley Australia lists malting varieties that are preferred by its member marketing companies. These varieties are highlighted in the variety listings as “Malting barley (Preferred variety)”. The level of demand for domestic and export markets in Victoria is shown in Table 2.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.
- Australian Field Crop Disease Guide App
- NVT Long Term Yield Reports App

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- AG1160 Cereal disease guide

www.barleyaustralia.com.au
Information includes:
- List of preferred malting barley varieties
- Update status of malting barley evaluation each March

www.grdc.com.au
- GRDC GrowNotes™ Barley Southern Region

VARIETY DESCRIPTIONS

Varieties have been listed according to quality classification grade and in alphabetical order and not in order of preference. The agronomic characteristics in these descriptions are provided as a guide only and have been compiled from observations of the breeder, NVT, agronomic research projects or seed companies.

Abbreviations used are:

(ɒ	Denotes that Plant Breeder Rights apply
CCN	Cereal Cyst Nematode
BYDV	Barley Yellow Dwarf Virus
RLN	Root Lesion Nematode
NFNB	Net Form of Net Blotch
SFNB	Spot Form of Net Blotch

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Malting barley (Preferred variety) – COMMANDER(ɒ)

A mid maturing variety best suited to 375-500 mm rainfall districts, particularly the Wimmera Mallee. It is broadly adapted and is high yielding under favourable spring conditions. Commander is inherently lower in grain protein content like Scope. It has moderately weak straw and can lodge under either high yield environments or if unfavourable conditions occur between grain fill and harvest. Grain size is generally excellent compared to other varieties, but it is prone to low test weights in some seasons. Scald SVS, SFNB MSS and NFNB MSS, powdery mildew MRMS# and leaf rust S. Commander is suitable for domestic, Chinese, and SE Asian brewing markets. Growers should consult their grain marketers regarding markets and availability of segregation. Released 2008. Seed available from Seednet. EPR $3.80.

Malting barley (Preferred variety) – COMPASS(ɒ)

Compass is an early to mid-season maturing variety. It is closely related to Commander but is significantly higher yielding and earlier flowering with typical May sowing. Compass has relatively weak straw strength and is prone to lodging in high yielding environments. Compass has excellent physical grain quality with high retention, low screenings and moderate test weight. Scald S, SFNB MSS, NFNB MRMS, powdery mildew MRMS# and leaf rust VS. Bred by Adelaide University. Released 2013. Seed available from Seednet. EPR $3.80.

Malting barley – FAIRVIEW(ϕ)

A moderately late maturing variety best suited to 400-600 mm rainfall districts. Yields are similar to Gairdner and Commander in these districts. The grain plumpness of Fairview is superior to Gairdner. Scald SVS, SFNB S, NFNB VS, powdery mildew R and leaf rust SVS. Limited seed is available under contract with Malteurop. Fairview has an export malt quality profile and is marketed via closed loop supply chain through Malteurop. Released 2008. EPR $3.

Malting barley (Preferred variety) – GAIRDNER

A moderately late maturing variety best suited to 400-600 mm rainfall districts. In lower rainfall districts Gairdner can yield well in seasons with favourable spring finishes, however not necessarily within malting specifications. Gairdner is known for high screenings in a dry spring, with levels of grain plumpness generally being inferior to all other malting varieties. Scald VS, SFNB S, NFNB MRMS, powdery mildew S and leaf rust MS. Gairdner is accepted by both domestic and export brewing markets. Released 1998. Free to trade. No EPR.

Malting barley – GRANGER(ϕ)

A mid to late maturing variety. Scald SVS, SFNB SVS, NFNB MR#, powdery mildew R and leaf rust S. Accredited as malting barley in 2013, export markets are yet to be established and growers are advised to consult with their grain marketer about segregation and pricing. Released 2013. Licenced by Nickerson's, seed available from Heritage Seeds. EPR $2.95.

Malting barley (Preferred variety) – LA TROBE(ϕ)

An early maturing variety for low to medium rainfall environments. A semi-dwarf plant type providing good lodging resistance and good head retention. The variety has a short coleoptile and sowing depth should be considered to maximise early growth and vigour. Good sprouting tolerance, excellent test weights and good grain plumpness. Scald SVS, SFNB S, NFNB MR, powdery mildew MRMS# and leaf rust MSS. Accredited as a malting variety in 2015, La Trobe is now Australia's most widely grown malting variety with well-established international markets. It is a "Preferred" malting variety for Graincrop in the Graincorp areas of the North East, Central, Swan Hill, southern Mallee and Wimmera in Victoria. Developed by InterGrain. Released 2014. Free to trade. EPR $4.

Malting barley (Preferred variety) – SCOPE CL(ϕ)

A tall, early to mid-season maturing barley with moderate to high yield potential across a range of medium rainfall environments. Scope CL can be prone to head loss and lodging under certain environmental conditions. Scope CL has moderate grain size and inherently low grain protein. It is registered for the use of an appropriate imidazolinone herbicide. Scald S, SFNB MSS, NFNB MR, powdery mildew MR and leaf rust S. Accredited as malting barley in 2013, export market demand is increasing, and growers are advised to consult with their grain marketer about segregation and pricing. Scope CL is accepted into those markets previously accepting Buloke. Released 2010. Seed is available from Seednet exclusively through re-sellers that have a current imidazolinone accreditation. EPR $3.50.

Malting barley (Preferred variety) – SPARTACUS CL(ϕ)

Spartacus CL is an early maturing, CCN resistant, Clearfield® barley. It is a semi-dwarf and is ideally suited to the low to medium rainfall regions. It is agronomically similar to La Trobe but has slightly improved straw strength and lodging resistance with good head retention and sprouting tolerance. Compared to Scope CL, it is much less itchy. It is registered for the use of an appropriate imidazolinone herbicide. Scald SVS, SFNB S, NFNB MRMS, powdery mildew MRMS# and leaf rust S. Accredited as a malting barley in 2018, export market demand is developing. Growers are advised to consult with their grain marketer about segregation and pricing. Seed available from InterGrain Seedclub Members. EPR $4.25

Malting barley (Preferred variety) – WESTMINSTER(ϕ)

A mid to late maturing variety with medium to tall, stiff straw and good head retention. This variety continues to have strong market demand in Victoria and is an ideal fit into the higher rainfall areas in southern Victoria. Scald MRMS, SFNB S, NFNB MR, powdery mildew R and leaf rust MRMS. Accredited as malting barley in 2013 with high domestic and export demand. Bred by Nickerson's. Released 2009. Seed available from GrainSearch. EPR $3.

NEW Feed Barley – BOTTLER(ϕ)

A mid maturing variety suited to medium to high rainfall environments. Bottler is an export malt type grain which has currently not yet entered the Barley Australia malt accreditation process. Scald S, SFNB S, NFNB MS and leaf rust S. Bred by Sejet. Released 2018 (tested as HV16). Seed available from GrainSearch. EPR $4.

Feed barley – FATHOM(ϕ)

An early maturing variety with broad adaption. It has low screenings, similar to Maritime. Fathom has a long coleoptile and excellent early vigour, giving weed competitiveness and tolerance to deep planting and especially on sandy soils. Fathom is well suited to wider row spacings and is an alternative to Hindmarsh, particularly where more reliable establishment and improved early vigour are sought. Fathom is moderately tall, possesses good head loss tolerance but is prone to lodging in high yield environments. Scald MS, SFNB MR, NFNB MRMS, powdery mildew MRMS and leaf rust MS. Developed by Adelaide University. Released 2011. Seed available from Seednet. EPR $2.

Feed / Food barley – HINDMARSH(ϕ)

An early maturing semi-dwarf variety recommended for the 325-450 mm rainfall regions. Hindmarsh has a relatively short coleoptile and deep sowing should be avoided to maximise crop establishment and yield potential. Hindmarsh is free threshing with good resistance to head loss and high test weight among feed varieties. Scald SVS, SFNB VS, NFNB MR, powdery mildew MRMS# and leaf rust MSS. It has a high demand as a Food Barley and is still sought after by the export malting markets at a price discount to other malting varieties. Released 2006. Seed available from Seednet. EPR $1.50.

Feed barley – OXFORD

A feed variety best suited to medium to high rainfall regions (350-600 mm) and should not be planted after mid-June. Scald MS, SFNB S, NFNB S, powdery mildew R and leaf rust MS. Bred by Nickerson's, released 2009. Seed available from Heritage Seeds. EPR $2.50.

Feed barley – ROSALIND(ф)

A very broadly adapted mid maturing semi-dwarf, feed quality variety with good yield stability. Maturity is later than La Trobe, but earlier than Buloke. Rosalind has a similar time to flowering as La Trobe but a much longer time to maturity. Good straw strength and head retention. Scald MRMS, SFNB S, NFNB MR, powdery mildew MR# and leaf rust MR. Bred by InterGrain. Released 2015. Seed available from InterGrain Seedclub members. EPR $3.50.

VARIETIES CURRENTLY UNDERGOING MALT EVALUATION

Barley under evaluation – ALESTAR(ф)

Alestar is a mid-maturing variety, with maturity similar to Commander, suited to the medium to high rainfall regions. It is undergoing Barley Australia malt accreditation with a decision expected in March 2020. Elders suggest good straw strength, head retention, and test weight. Scald S, SFNB S, NFNB MRMS#, powdery mildew R and leaf rust MS. Bred by Elders. Released 2017. Seed available from Elders. EPR $3.

NEW Barley under evaluation – BANKS(ф)

Banks is a mid-late maturing variety ideally suited to medium to high rainfall environments. Banks is suited to late April to early May sowings. It is undergoing Barley Australia malt accreditation with a decision expected in March 2019. Scald MS, SFNB MSS, NFNB RMR and leaf rust S. Released 2018 (tested as IGB1305). Bred and marketed by InterGrain. EPR $4.00.

Barley under evaluation – RGT PLANET(ф)

RGT Planet is a mid-flowering, early-late maturing variety, with elastic maturity making it suited from low to high rainfall regions. It is undergoing Barley Australia malt accreditation with a decision expected in 2019. Scald MS, SFNB S, NFNB SVS, powdery mildew R and leaf rust MRMS. Bred by RAGT Semences. Released 2017. Seed available from Seed Force. EPR $4.

TABLE 1 Barley time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.

MALLEE	April				May				June				July			
Finders, Gairdner, GrangeR, Oxford																
Alestar, Commander, Fathom, Scope CL, RGT Planet, Rosalind																
Compass, Hindmarsh, La Trobe, Spartacus CL																
WIMMERA	**April**				**May**				**June**				**July**			
Banks, Gairdner GrangeR, Oxford																
Alestar, Bottler, Commander, Fathom, Scope CL, Rosalind, RGT Planet																
Hindmarsh, La Trobe, Spartacus CL, Compass																
NORTH CENTRAL	**April**				**May**				**June**				**July**			
Banks, Gairdner, GrangeR, Oxford																
Alestar, Bottler, Commander, Fathom, Scope CL, Rosalind, RGT Planet																
Compass, Hindmarsh, La Trobe, Spartacus CL																
NORTH EAST	**April**				**May**				**June**				**July**			
Banks, Gairdner, GrangeR, Oxford																
Alestar, Bottler, Commander, Scope CL, Fathom, Rosalind, RGT Planet																
Hindmarsh, La Trobe, Spartacus CL, Compass																
SOUTH WEST	**April**				**May**				**June**				**July**			
Banks, Gairdner, GrangeR, Oxford, Westminster																
Alestar, Commander, Bottler, Rosalind																

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 2 Barley variety demand[1] for preferred malting varieties and agronomic guide.

Variety	Domestic brewing industries[2]	Export brewing industries	Height	Maturity	Head loss	Plump grain rating	Lodging
MALTING BARLEY							
Commander	medium	low	M	ME	M	8	M
Compass	developing	developing	MT	ME	M	9	M
Fairview*			MS	ML	MR	-	R
Gairdner	low	medium	M	ML	MR	5	R
GrangeR			M	ML	MR	-	R
La Trobe		high	S-MS	E	MR	7	R-MR
Scope		low	MT	ME	MS	6	M
Spartacus CL		developing	MS	E	R	8	R
Westminster	high	high	M	ML	R	-	R
FEED BARLEY							
Bottler			-	M	-	-	-
Fathom			MT	VE	MR	9	MR
Hindmarsh			S-MS	VE	MR	6	R-MR
Oxford			S-MS	L	R	6	R
Rosalind			MS	M	R	6-7	R
BARLEY UNDER MALT EVALUATION							
Variety	**Target accreditation date**		**Height**	**Maturity**	**Head loss**	**Plump grain rating**	**Lodging**
Alestar	2020		M	M	R	8	R
Banks	2019		MS	ML	-	6	-
RGT Planet	2019		M	EML	R	6	R

1 Demand in Victoria is determined by marketing companies who are members of Barley Australia. 2 Domestic demand by Australian malting companies: malt produced may be used by the domestic brewing industry or exported. * Closed loop variety.

Height; T = tall, MT = moderately tall, M = medium, MS = moderately short, S = short

Maturity; VE = very early, E = early, ME = moderately early, M = mid season, L = late

Head loss and lodging: see Table 3 for key.

Plump grain: relative scale: 1=small or unreliable grain size; 9=large or reliable grain size

TABLE 3 Barley variety disease reactions.

Variety	Leaf scald	Spot form Net Blotch	Net form Net Blotch	Powdery mildew	Leaf rust	CCN resistance	Root lesion nematode	
							P. neglectus resistance	*P. thornei* resistance
MALTING BARLEY								
Commander	SVS	MSS	MSS	MRMS#	S	R	MRMS	MRMS
Compass	S	MSS	MRMS	MRMS#	VS	R	MRMS	MR
Fairview	SVS	S	VS	R	SVS	-	MRMS	MR
Gairdner	SVS	S	MRMS	S	S	S	MRMS	MSS
GrangeR	S	S	MR	R	S	R	MRMS	MRMS
La Trobe	SVS	S	MR	MRMS#	MSS	R	MRMS	MRMS
Scope	S	MSS	MR	MR	S	S	MRMS	MRMS
Spartacus CL	SVS	S	MRMS	MRMS#	S	R	MRMS	MRMS
Westminster	MRMS	S	MR	R	MRMS	-	MRMS	MS
FEED BARLEY								
Bottler	S	S	MS	-	S	-	MRMS	R
Fathom	MS	MR	MRMS	MRMS	MS	R	MRMS	MR
Hindmarsh	SVS	VS	MR	MRMS#	MSS	R	MRMS	MRMS
Oxford	MS	S	S	R	MS	S	MR	MR
Rosalind	MRMS	S	MR	MR#	MR	R	MRMS	MR
BARLEY UNDER MALT EVALUATION								
Alestar	S	MSS	MRMS#	R	MS	R	MR	MR
Banks	MS	MSS	RMR	-	S	S	MR	MR
RGT Planet	MS	S	SVS	R	MRMS	Rp	MRMS	RMR

Varieties marked may be more susceptible if alternative strains are present.

Resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.

p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible, V = very.

GRDC

TABLE 4 Barley diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
FOLIAR					
Scald	*Rhynchosporium secalis*	Water soaked areas on leaves. Lesions appear grey/green then bleached with brown margins.	Years with frequent rain, and early sown crops.	Residues of barley and barley grass. Can be seed borne. Spores spread by rain splash.	Resistant varieties, clean seed, manage barley and barley grass debris. Seed and foliar fungicides.
Net blotch spot form	*Pyrenophora teres* f. *maculata*	Dark brown spots to 10 mm, with yellow margins.	Infection from stubble especially in wet autumn conditions.	Barley and barley grass stubble, also airborne spores from infected crops.	Control barley grass and manage barley stubble. Avoid very susceptible varieties. Foliar fungicides.
Net blotch net form	*Pyrenophora teres* f. *teres*	Small brown spots that develop into dark brown streaks on leaf blades that have net like appearance.	Spores can be produced for over 2 years on stubble. Moist conditions, temperatures in the 15-25°C range.	Survives on infected barley and barley grass residues. Wind borne spores.	Resistant varieties, crop rotation and stubble management.
Powdery mildew	*Blumeria graminis* f.sp. *hordei*	White powdery spores on upper leaf surfaces, underside of leaves turn yellow to brown.	Favoured by high humidity and temperature of 15-22°C. Worse in high fertility paddocks and early sown crops.	Volunteer barley, barley grass and crop residue. Airborne spores.	Resistant varieties. Seed and foliar fungicides.
Leaf rust	*Puccinia hordei*	Small circular orange pustules on upper leaf surface.	Moist conditions with temperatures in the range 15-22°C.	Living plant hosts including barley, barley grass and Star of Bethlehem.	Use resistant varieties and control volunteer barley and barley grass over summer/autumn.
Stem rust	*Puccinia graminis*	Large red-brown pustules. Rupture of leaf and stem surface.	Infection requires temperatures in the 15-30°C range and moist conditions.	Living plant hosts including volunteer cereals (wheat, barley, triticale and rye).	Use resistant varieties and control volunteer wheat, triticale and barley over summer/autumn.
BGSR (Barley grass stripe rust)	*Puccinia striiformis*	Yellow powdery pustules in stripes on the leaves	Can develop throughout the growing season.	Barley grass and susceptible barley varieties.	Avoid susceptible varieties.
BYDV (Barley yellow dwarf virus)	Barley yellow dwarf virus	Yellow stripes between leaf veins, some leaves red. Sterile heads and dwarfing plants.	Virus is transmitted by aphids.	Hosts include all cereals and many grasses.	Resistant varieties. Chemical control of aphids may be suitable for high value crops.
Wirrega blotch	*Drechslera wirreganensis*	Brown blotches often with hole in centre.	Minor occurrence.	Range of grass weeds and cereal stubble.	Crop rotation. Avoid growing susceptible varieties, control grass weeds.
Ringspot	*Drechslera campanulata*	Small brown rimmed spots on leaves.	Common and widespread in southern Australia.	Wide range of cereals and grass weeds. Barley seed in crop residue infected with fungus.	Crop rotation and weed control.
Halo spot	*Pseudoseptoria stomaticola*	Small white-brown lesions.	Cool, moist conditions.	Residues of barley and grasses. Rain splash.	Disease is not of economic importance.
GRAIN					
Covered smut	*Ustilago segetum* var. *hordei*	Dark, compacted heads, grain replaced by smut balls.	Spores germinate in infected grain when temperatures are between 14-25°C.	Infected seed.	Use disease free seed, resistant varieties, seed treatments.
Loose smut	*Ustilago tritici*	Dark brown powdery spores replace grain.	Moist conditions at flowering and when temperatures are between 16-22°C.	Infected seed	Use disease free seed and seed treatments. Avoid susceptible varieties.
ROOT/CROWN					
Crown rot	*Fusarium pseudo-graminearum, F. culmorum*	'Whiteheads' or deadheads most obvious after flowering, pink discolouration under leaf sheaths.	Most common on heavy or poorly drained soils Favoured by moist, humid conditions with temperatures between 15-30°C.	Survives in infected stubble residue for up to 2 years. Hosts include wheat, barley, triticale and some grasses.	Crop rotation, stubble removal, cultivation.
Pythium root rot (Damping off)	*Pythium spp.*	Stunted seedlings, reduced tillering, pale stunted or stubby roots with light brown tips.	Favoured by wet conditions. Increased risk where high rainfall occurs after sowing.	Spores survive in soil or plant debris for up to 5 years.	Avoid deep sowing into cold wet soils, especially when direct drilling. Ensure good nutrient levels.
Common root rot	*Bipolaris sorokiniana*	Brown discolouration of roots, sub-crown internode and crown. Plant stunting, brown spots on leaves and reduced tillers.	Scattered through crop.	Wheat, barley, triticale and rye.	Crop rotation.
Cereal cyst nematode (CCN)	*Heterodera avenae*	Yellow, stunted plants. Knotted roots.	Light soils and well structured clays where cereals are commonly grown.	Present in most soils in the southern region.	Resistant varieties, break from susceptible cereals and grasses, particularly wild oat.
Root lesion nematode	*Pratylenchus thornei, P. neglectus*	Reduced tillering, ill thrift; lesions on roots, lack of branching of root system.	Favoured by cereals in rotation with chickpea, medic and vetch.	Survives as dormant nematodes in the soil.	Crop rotation using resistant crops and resistant varieties.
Take-all	*Gaeuman-nomyces graminis* var. *tritici* (Ggt)	Stunted or yellowing plants, 'whiteheads' at heading.	Fungus thrives under warm, damp conditions.	Fungus survives over summer in crowns and roots of wheat, barley and grass plants.	Crop rotations, at least one year free of hosts (cereals and grasses, especially barley grass). Fungicide applied to seed or fertiliser.

This table has been developed from information in the publications Wallwork H (2000) (Ed) *Cereal Root and Crown Diseases* (Grains Research and Development Corporation, SARDI) and Wallwork H (2000) (Ed) *Cereal Leaf and Stem Diseases* (Grains Research and Development Corporation, SARDI).

TABLE 5 Mallee and Wimmera barley (main season). Long term predicted yield expressed as a percentage of mean yield.

	Mallee						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.30	2.40	2.01	4.73	3.96		4.18	2.10	1.70	6.87	5.13
	No. trials	6	7	7	6	3	No. trials	4	4	3	3	4
MALTING BARLEY												
Bass	29	101	96	95	97	98	17	96	131	102	109	97
Baudin	-	-	-	-	-	-	18	97	105	88	104	97
Buloke	26	99	98	99	96	-	14	98	104	104	96	-
Charger	-	-	-	-	-	-	18	101	123	117	98	101
Commander	29	99	93	93	101	101	18	104	76	98	98	101
Fairview	-	-	-	-	-	-	14	93	90	61	106	98
Flagship	19	97	-	101	89	-	11	93	104	113	-	-
Flinders	26	96	97	96	97	-	18	94	107	90	98	96
Gairdner	29	93	95	91	93	89	18	90	106	91	89	90
Granger	29	96	94	94	101	100	18	98	91	84	103	101
La Trobe	29	109	114	121	96	104	18	103	121	133	96	103
Macquarie	-	-	-	-	-	-	9	93	99	79	-	-
Navigator	-	-	-	-	-	-	12	100	64	67	104	-
Schooner	29	95	93	96	83	87	11	90	111	113	-	-
Scope	29	99	99	99	96	97	18	97	104	104	95	97
Westminster	-	-	-	-	-	-	14	93	72	54	101	-
Wimmera	3	93	-	-	-	-	11	95	102	71	-	-
FEED BARLEY												
Bottler	-	-	-	-	-	-	7	-	-	-	110	104
Explorer	-	-	-	-	-	-	7	-	-	-	105	106
Fathom	29	113	113	113	100	105	18	105	143	135	109	101
Fleet	29	105	102	101	100	101	18	104	105	119	100	100
Hindmarsh	29	110	116	124	95	103	18	102	125	137	93	101
Keel	20	111	116	118	-	-	-	-	-	-	-	-
Oxford	29	90	81	75	108	100	18	99	71	54	113	102
Rosalind	23	-	120	126	105	112	14	-	124	131	108	109
SY Rattler	26	93	96	99	96	-	14	94	85	85	90	-
Topstart	14	-	83	76	-	-	14	-	70	57	113	103
BARLEY UNDER MALT EVALUATION												
Alestar	-	-	-	-	-	-	18	99	88	79	104	102
Banks	16	-	-	114	106	107	10	-	-	119	105	105
Biere	16	-	-	109	83	90	10	-	-	131	89	89
Compass	29	115	124	131	97	106	18	107	126	154	91	102
Maltstar	-	-	-	-	-	-	18	101	95	79	111	103
RGT Planet	9	-	-	-	118	115	7	-	-	-	121	114
Spartacus CL	23	-	115	124	95	105	14	-	125	140	95	103

TABLE 6 North Central and North East barley (main season). Long term predicted yield expressed as a percentage of mean yield.

	North Central						North East				
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016
Mean yield (t/ha)		3.21	4.26	2.47	6.07	4.64		3.77	5.54	2.43	7.28
	No. trials	2	2	1	2	2	No. trials	1	1	1	1
MALTING BARLEY											
Bass	9	94	89	91	103	104	4	98	95	99	100
Baudin	9	95	100	94	98	99	4	98	98	92	100
Buloke	7	99	95	99	100	-	4	98	97	100	98
Charger	9	100	110	106	90	99	4	109	109	113	101
Commander	9	100	105	104	105	98	4	95	99	96	100
Fairview	2	99	-	-	-	-	4	102	100	84	101
Flagship	5	94	97	100	-	-	3	95	94	98	-
Flinders	9	99	94	93	93	97	4	101	97	96	98
Gairdner	9	91	101	93	86	86	4	96	95	88	93
Granger	5	103	98	96	-	-	4	101	100	95	101
La Trobe	9	106	90	107	105	105	4	104	100	120	100
Macquarie	-	-	-	-	-	-	3	94	97	81	-
Navigator	7	96	110	96	100	-	3	-	99	79	101
Schooner	5	93	88	96	-	-	3	92	89	96	-
Scope	9	98	97	99	97	96	4	98	97	99	97
Westminster	7	100	100	88	92	-	4	98	97	78	99
Wimmera	5	94	99	88	-	-	1	97	-	-	-
FEED BARLEY											
Bottler	4	-	-	-	98	105	1	-	-	-	105
Explorer	4	-	-	-	98	105	1	-	-	-	105
Fathom	9	92	100	105	110	106	4	99	100	113	102
Fleet	-	-	-	-	-	-	-	-	-	-	-
Hindmarsh	9	106	89	107	103	103	4	104	100	122	98
Keel	-	-	-	-	-	-	0	-	-	-	-
Oxford	9	100	105	90	100	104	4	99	100	80	104
Rosalind	7	-	95	109	111	115	3	-	106	125	106
SY Rattler	7	108	92	95	90	-	4	103	98	98	97
Topstart	7	-	107	92	101	104	4	99	101	81	105
BARLEY UNDER MALT EVALUATION											
Alestar	9	103	104	97	95	101	4	103	103	94	102
Banks	5	-	-	109	104	104	2	-	-	110	104
Biere	5	-	-	93	94	93	2	-	-	109	91
Compass	9	102	100	116	105	100	4	102	103	126	99
Maltstar	9	97	114	98	97	103	4	103	106	92	105
RGT Planet	4	-	-	-	103	118	1	-	-	-	112
Spartacus CL	7	-	88	108	107	105	3	-	100	123	99

Note the 2017 North East predicted yields were not published because of high variability.

TABLE 7 South West barley (long season). Long term predicted yield expressed as a percentage of mean yield.

Year		2012	2013	2014	2015	2016	2017
Mean yield (t/ha)		4.75	4.71	6.67	5.28	7.29	5.04
	No. trials	2	3	3	3	3	3
MALTING BARLEY							
Bass	17	92	92	103	106	96	92
Charger	17	104	103	96	97	97	105
Commander	17	99	98	97	100	93	100
Fairview	17	104	102	101	102	103	98
Flinders	17	93	92	100	101	94	95
Gairdner	17	93	92	92	93	85	96
Granger	17	90	94	99	100	96	108
Macquarie	7	95	93	-	96	-	-
Navigator	12	-	-	97	94	96	94
Vlamingh	8	102	99	94	-	-	-
Westminster	17	102	102	93	85	98	95
Wimmera	11	97	98	97	93	-	-
FEED BARLEY							
Bottler	6	-	-	-	-	109	109
Capstan	14	103	-	104	101	110	104
Explorer	12	-	-	102	103	103	97
Maritime	8	98	95	88	-	-	-
Oxford	17	108	109	103	98	111	104
Rosalind	12	-	-	105	111	105	110
SY Rattler	14	96	95	91	84	90	-
Topstart	17	106	109	104	100	114	108
Urambie	17	93	92	101	101	95	90
BARLEY UNDER MALT EVALUATION							
Alestar	17	101	101	101	101	103	102
Compass	17	106	100	91	97	88	103
Maltstar	17	106	107	103	101	109	103
RGT Planet	6	-	-	-	-	115	110
Spartacus CL	9	-	-	-	108	94	100

ACKNOWLEDGEMENTS

Joshua Fanning Agriculture Victoria, Horsham

Mark McLean Agriculture Victoria, Horsham

OAT

NEW VARIETIES

There are no new oat varieties available for sowing in 2019.

The National Oat Breeding Program has delayed the release of two new varieties until spring 2019 for sowing in 2020. The potential milling variety (tested as 06204-19) is a dwarf, early-mid season variety, similar to Possum. The potential hay variety (tested as 05096-32) is a mid-tall variety with improved disease resistance and grain quality attributes when compared with current releases.

QUALITY

Variety selection should be based on agronomic traits, potential grain quality and marketing or end-use options. Grain quality traits for the milling industry include high groat per cent, high β-glucan, low screenings, and high hectolitre weight. Grain quality traits for improved animal feed include low hull lignin, high groat percentage, and high oil content, resulting in high grain digestibility. Important hay quality traits are high digestibility, high water-soluble carbohydrates, low fibre and high protein.

The option of oats for hay is increasing in popularity where growers have identified them as profitable and as a tool to manage herbicide resistance and to spread risk. Variety performance for hay yield and quality is available in the Oat Newsletter at aexco.com.au released in November.

ROYALTIES

Where applicable, growers selling oat seed or export hay will pay an End Point Royalty (EPR). An export hay EPR of $2/tonne (ex GST) applies on all oat varieties bred by the National Oat Breeding Program. Refer to aexco.com.au for further information on hay, grain and seed royalties.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps
- Crop Disease Au App
- NVT Long Term Yield Reports app

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- AG1160 Cereal disease guide

www.aexco.com.au
- Producing Quality Oat Hay booklet
- SARDI Oat Breeding Newsletter

VARIETY DESCRIPTIONS

(Þ) denotes Plant Breeders Rights apply.

End Point Royalty (EPR) for grain and hay and seed royalty for 2018-19 season quoted $/tonne ex-GST.

Milling oat – BANNISTER(Þ)

A dwarf milling variety with wide adaption. Compared to Mitika it is about 13cm taller and flowers 3-4 days later. Similar to Mitika for groat percentage. R to leaf rust. Very susceptible and intolerant to CCN. Released 2013. Bred by the National Oat Breeding Program and marketed by Seednet. EPR $2.30.

Potential milling oat – DURACK(Þ)

Early maturing variety widely adaptable to low-medium rainfall zones and late planting in high rainfall regions. Good early vigour and good lodging resistance with low screenings. Resistant to CCN, S to septoria and S to bacterial blight. Released 2016. Bred by SARDI and marketed by Heritage Seeds. EPR $2.30.

Milling oat – KOWARI(Þ)

An early maturing dwarf potential milling variety, slightly taller than Mitika and suited to medium to high rainfall zones. It has good grain quality, improved β-glucan content and low screenings. S to stem rust, R to leaf rust, S to septoria and MR to bacterial blight, and very susceptible to CCN. Released 2017. Bred by the National Oat Breeding Program, tested as 03198-18 and marketed by Heritage Seeds. EPR $2.50.

Milling oat – MITIKA(Þ)

An early maturing dwarf variety with some resistance to common rusts. Suited to high rainfall areas, it has around 73 per cent groat yield and provides excellent feed value. It is not suited to areas where CCN is a problem. Released 2005. Marketed by Heritage Seeds. EPR $2.

Milling Oat – WILLIAMS(ϕ)

A tall milling oat suited to medium to high rainfall zones. It is 15cm taller than Mitika, 5cm taller than Bannister and 15cm shorter than Yallara. A higher yielding variety, similar to Bannister but with slightly inferior grain quality. Produces high screenings when grown in low rainfall areas. S to stem rust, but R to leaf rust and susceptible and intolerant to CCN. MS to Septoria. Released 2015. Bred by the National Oat Breeding Program and marketed by Heritage Seeds. EPR $2.30.

Milling Oat – WOMBAT(ϕ)

A dwarf mid-season variety that flowers about six days later than Mitika. It is the first dwarf milling variety with CCN resistance and tolerance. Intended to replace Mitika and Possum where CCN and stem nematode are limiting yield but may have higher screenings. Released 2011. Bred by SARDI and marketed by Seednet.

Milling oat – YALLARA(ϕ)

Medium to tall, early to mid-season variety. S to stem rust, MS to leaf rust and MS to septoria. Resistant but intolerant to CCN. Suited to drier areas. Released 2009. Bred by SARDI and marketed by Seednet. EPR $2.

Hay/feed oat – MULGARA(ϕ)

Early to mid-season tall oat. Has excellent hay colour with quality similar to Wintaroo and good grain yield and quality. MS to stem rust, MS to leaf rust and MS to septoria. Resistant and moderately tolerant to CCN. Released 2009. Bred by SARDI and marketed by AEXCO. EPR $2.

Hay/feed oat – TAMMAR(ϕ)

Late season tall hay oat variety for medium and high rainfall zones which provides a slightly later cutting time than Tungoo and Kangaroo. S to stem rust, MS to leaf rust, and moderately resistant and moderately tolerant to CCN. Released 2010. Bred by SARDI and marketed by AEXCO. EPR $2.

Hay/grazing/feed oat – BRUSHER(ϕ)

Early to mid-season tall oat, well suited to low and medium rainfall areas. S to stem and leaf rust. Resistant but moderately intolerant to CCN. Released 2002. Bred by SARDI and marketed by AEXCO. EPR $2.

Hay/grazing/feed oat – WINTAROO(ϕ)

Tall, mid-season variety for all rainfall zones. S to leaf and stem rust. Resistant and moderately tolerant to CCN. Released 2001. Bred by SARDI and marketed by AEXCO. EPR $2.

Hay oat – FORESTER(ϕ)

A medium height late hay variety adapted to high rainfall and irrigated cropping regions. It has excellent lodging and shattering resistance. Susceptible to stem rust and MS to leaf rust and is moderately susceptible and intolerant to CCN. Released 2011. Bred by SARDI and marketed by AEXCO. EPR $2.

Hay oat – GLIDER

A late maturating variety suited to high rainfall regions. S to stem and leaf rust. Moderately susceptible and intolerant to CCN. Released 1999. Bred by SARDI.

Hay oat – TUNGOO(ϕ)

A medium to tall variety. Susceptible to stem rust and MS to leaf rust. Resistant and moderately tolerant to CCN. Hay yield similar to Kangaroo but grain yield poor. Released 2008. Bred by SARDI and marketed by AEXCO. EPR $2.

TABLE 1 Oat time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.

	April				May				June				July			
MALLEE																
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Quoll																
Hay: Kangaroo, Mulgara, Wintaroo, Forester																
Grazing: Wintaroo																
WIMMERA																
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Mulgara, Quoll																
Hay: Brusher, Glider, Kangaroo, Mulgara, Wintaroo, Forester																
Grazing: Wintaroo																
NORTH CENTRAL																
Milling: Bannister, Durack, Echidna, Mitika, Yallara, Wombat																
Feed: Mulgara, Quoll																
Hay: Glider, Kangaroo, Mulgara, Wintaroo, Forester																
NORTH EAST																
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Mulgara, Quoll, Tammar																
Hay: Glider, Mulgara, Tammar, Tungo, Wintaroo, Forester																
Grazing: Tungoo																
SOUTH WEST																
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Quoll, Tammar																
Hay: Glider, Tammar, Tungoo, Forester																

Varietal choice determines time to grazing or cutting for hay

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 2 Oat diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
FOLIAR					
Leaf rust	*Puccinia coronata f.sp. avenae*	Small circular orange pustules on upper leaf surface.	More severe during moist conditions with temperatures between 15-22°C.	Volunteer oats and wild oats.	Resistant varieties. Control volunteer and wild oats over the summer.
Stem rust	*Puccinia graminis f.sp. avenae*	Large red-brown pustules, rupture in leaf surface.	Infection requires warm (15-30°C) moist conditions.	Volunteer oats and wild oats.	Resistant varieties. Control volunteer and wild oats over summer.
Septoria blotch	*Phaeosphaeria avenaria*	Dark brown purple spots on leaves, sheaths and stems. Head and grain may become infected.	Prefers cool, rainy weather, especially coastal districts.	Spores spread in autumn by raindrop splashes from oat residues.	Resistant varieties. Crop rotation, bury or graze infected stubble. Avoid early sowing in high rainfall areas.
BYDV	Barley yellow dwarf virus	Leaf tip and margins turn red with interveinal chlorosis, mottling and stunting.	Transmitted by aphids.	Hosts include all cereals and grasses, including pastures.	Resistant varieties. Chemical control of insects may be suitable for high value crops.
Halo blight	*Pseudomonas syringae pv. coronafaciens*	Light green, yellow or brown halo spot on leaves and sheaths. Leaves may wither and die.	Moist weather provides ideal conditions.	Bacteria on seed and crop debris are spread by rain splash, direct leaf contact, or aphids.	Avoid susceptible varieties, use clean seed in clean paddocks. Destroy infected oat stubble.
Stripe blight	*Pseudomonas syringae pv. striafaciens*	Spots on leaves lengthen to form brown stripes on leaves & sheaths. Leaves may wither & die.	Moist weather provides ideal conditions.	Bacteria on seed and crop debris are spread by rain splash, direct leaf contact, or aphids.	Avoid susceptible varieties, use clean seed in clean paddocks, and destroy infected oat stubble.
Powdery mildew	*Blumeria graminis f.sp avenae*	White powdery spores on upper leaf surfaces. Underside of leaves turn yellow to brown.	Favoured by high humidity and temperatures between 15-22°C.	Volunteer oats, oat stubble, windborne spores.	Avoid very susceptible varieties.
Red leather leaf	*Spermospora avenae*	Long reddish lesions with buff centres. Leaves may look and feel leathery.	High rainfall provides ideal conditions.	Stubble and rain splash.	Avoid susceptible varieties and rotate crops. Remove infected oat stubble.
GRAIN					
Smut	*Ustilage segetum var. hordei. and Ustilage avenae*	Grain replaced with dark brown-black powdery spores.	Moist conditions at flowering and temperatures between 15-25°C.	Air borne spores lodge in hulls, glumes or seed coats.	Clean seed and use seed treatment. Avoid susceptible varieties.
ROOT/CROWN					
Cereal cyst nematode (CCN)	*Heterodera avenae*	Yellow or pale green patches in crop. Stunted, weak plants with knotted root systems.	Can survive in soil between susceptible cereal crops for up to 2 years.	Cereals and some grasses, especially wild oats.	Resistant or tolerant varieties, crop rotation, weed control.
Stem nematode	*Ditylenchus dipsaci*	Swollen base of plant, stunted & numerous tillers.	Encouraged by moist conditions & can reproduce 4-5 times per season.	Wide host range including peas, beans, wild oats and many weeds. Nematode spread in infected hay.	Crop rotation and weed control. Avoid susceptible varieties.
Root lesion nematode	*Pratylenchus thornei, P. neglectus*	Reduced tillering, ill thrift; lack of branching of root system, lesions on roots.	Favoured by wheat in rotation with wheat, chickpea, medic and vetch.	Survives as dormant nematodes in the soil.	Crop rotation using resistant crops.

This table has been developed from information in the publications Wallwork H (2000) (Ed) Cereal Root and Crown Diseases (Grains Research and Development Corporation, SARDI) and Wallwork H (2000) (Ed) Cereal Leaf and Stem Diseases (Grains Research and Development Corporation, SARDI).

TABLE 3 Oat variety agronomic guide and disease reactions.

	End use	Height	Maturity	Hectolitre weight	Stem Rust	Leaf Rust	CCN		BYDV	*Septoria avenae*	Bacterial blight	Red Leather Leaf
							Res	Tol				
MILLING OATS												
Bannister	M	TD	M	H	S	R	VS	I	MS	S	S	MS
Durack	M	MT	E	H	S	S	R	MIMT	S	S	S	MS
Kowari	M	D	E	H	S	R	VS	-	S	S	MR	MS
Mitika	M	D	E	H	S	S	VS	I	S	S	MR	S
Williams	M	T	E	H	S	R	S	I	MS	MS	R	MS
Wombat	M	D	M	H	S	MS	R	T	MR	MS	MS	MS
Yallara	M	MT	EM	H	S	MS	R	I	MS	MS	MS	MS
HAY/GRAZING/FEED OATS												
Brusher	H/G/F	T	EM	M	S	S	R	MI	MS	MS	MS	MS
Forester	H	MT	VL	L	S	MS	MS	MI	S	MR	S	MR
Glider	H	MT	L	ML	S	S	MS	I	S	MR	R	MR
Kangaroo	H	MT	ML	M	S	S	R	MT	S	MS	MS	MS
Mulgara	H/F	T	EM	M	MS	MS	R	MT	MS	MS	MR	S
Tammar	H/F	MT	L	L	S	MS	MR	MT	MS	MR	MR	MS
Tungoo	H	MT	ML	L	S	MS	R	MT	MS	MR	MR	MR
Wintaroo	H/G	T	M	M	S	S	R	MT	MS	MS	MS	MS

End use: M = milling, F = feed grain, G = grazing, H = hay Hectolitre weight: H = heavy, M = medium, L = light

Plant height: D = dwarf, TD = tall dwarf, T = tall, ST = short tall, MT = moderate tall

Maturity: E = early, EM = early mid, M = mid season, ML = mid late season, LM = late mid season, L = late, VL=very late

Disease resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.

p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible, V = very.

TABLE 4 North Central and North East oat. Long term predicted yield expressed as a percentage of mean yield.

	North Central						North East					
Year		**2013**	**2014**	**2015**	**2016**	**2017**		**2013**	**2014**	**2015**	**2016**	**2017**
Mean yield (t/ha)		**3.32**	**4.17**	**0.75**	**5.91**	**3.76**		**4.06**	**3.73**	**2.37**	**6.34**	**4.05**
	No. trials	**2**	**2**	**2**	**2**	**2**	**No. trials**	**3**	**2**	**2**	**1**	**1**
Bannister	10	120	114	111	139	120	9	122	113	95	135	109
Dunnart	8	113	110	101	130	-	8	118	105	88	125	-
Durack	10	99	98	113	89	100	9	94	95	107	90	102
Echidna	10	105	105	77	129	101	8	117	107	85	121	95
Kojonup	-	-	-	-	-	-	1	114	-	-	-	-
Kowari	10	107	107	117	111	105	9	99	99	110	110	105
Mitika	10	102	103	106	107	97	9	98	98	107	104	100
Numbat	2	67	-	-	-	-	2	74	-	-	-	-
Possum	10	110	103	117	118	104	9	108	100	108	109	103
Potoroo	4	-	-	100	128	-	4	116	-	90	126	-
Quoll	2	106	-	-	-	-	2	105	-	-	-	-
Wandering	-	-	-	-	-	-	1	116	-	-	-	-
Williams	10	118	109	117	128	120	9	120	116	98	127	109
Wombat	10	111	103	100	131	104	9	120	107	96	119	99
Yallara	10	101	99	98	98	109	9	105	97	90	96	103

TABLE 5 South West oat. Long term predicted yield expressed as a percentage of mean yield.

Year		2013	2014	2015	2016	2017
Mean yield (t/ha)		1.08	5.60	3.41	6.24	3.11
	No. trials	1	2	2	1	2
Bannister	8	114	121	113	138	102
Dunnart	6	107	112	103	129	-
Durack	8	108	94	97	91	96
Echidna	8	92	112	104	122	106
Kojonup	-	-	-	-	-	-
Kowari	8	113	112	108	110	102
Mitika	8	106	108	105	104	104
Numbat	1	59	-	-	-	-
Possum	8	119	107	105	112	100
Potoroo	3	-	-	106	127	-
Quoll	1	88	-	-	-	-
Wandering	-	-	-	-	-	-
Williams	8	115	113	112	129	101
Wombat	8	111	110	106	122	104
Yallara	8	101	90	90	101	89

ACKNOWLEDGEMENTS

Frank Henry Agriculture Victoria, Hamilton

Grant Hollaway Agriculture Victoria, Horsham

Pamela Zwer South Australian Research and Development Institute

TRITICALE

Triticale is no longer evaluated as part of the GRDC National Variety Trials (NVT) program. Variety descriptions, agronomic information and disease reactions will continue to be presented in this publication.

Triticale, a cross between wheat and cereal rye, has a niche on farms across Victoria due to several attributes. It has a reputation for tolerance to harsh soil conditions such as acid and alkaline soils and soils of low trace element availability. It is a tall crop bred for greater straw strength which can be useful in rocky paddocks or circumstances where crops have been known to lodge.

NEW VARIETIES

Wonambi is a later-maturing spring or facultative type, with good disease resistance profile and drought hardiness bred by Cooper and Elleway. Wonambi is a tall, tip-awned variety producing dense, smooth, 'red' grain and is suitable for grazing, forage conservation and grain production. Minimal public data is available for this variety due to triticale no longer being included in the NVT program.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results up to 2015 and links to variety information.

www.nvtonline.com.au/apps
- Australian Field Crop Disease Guide App
- NVT Long Term Yield Reports App

www.agriculture.vic.gov.au/agriculture/grains-and-other-crops
- AG0497 Growing triticale
- AG1160 Cereal disease guide

VARIETY DESCRIPTIONS

(Þ denotes Plant Breeders Rights apply

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

ASTUTE(Þ)

A mid-season fully-awned variety suited to medium to high yielding environments. An alternative to Hawkeye. Stem rust RMR, stripe rust RMR and leaf rust RMR. Released 2015. Bred and marketed by AGT. EPR $2.75.

BISON(Þ)

An early to mid-season reduced awn variety best suited to low to medium yielding environments. Stem rust RMR, stripe rust R, leaf rust RMR and resistant to CCN. Released 2014. Bred and marketed by AGT. EPR $2.75.

FUSION

A mid-season, fully awned grain only triticale variety. A moderately tall variety that yields well in dry or sudden finishes. Stem rust R, stripe rust RMR, leaf rust R and resistant to CCN. Effectively reduces *Pratylenchus neglectus* (root lesion nematode sp.) in the soil. Released 2012. Marketed by AGT. EPR $3.

GOANNA

An early to mid-season, fully awned grain only triticale. Stem rust R, stripe rust RMR, leaf rust RMR and resistant to CCN. Released in 2011 by Cooper & Elleway.

KM10

A fast growing early to mid-season variety with good early production of forage. Tends to smaller grain and is ideally suited to short season environments. Stem rust R, stripe rust RMR, leaf rust MRMS but susceptible to CCN. Released 2014 by Cooper & Elleway.

NEW WONAMBI

A later maturing spring or facultative type variety suitable for grazing, forage conservation and grain production. Stem rust R, stripe rust RMR, leaf rust R and MS to CCN. Released 2018 by Cooper & Elleway and marketed by Naracoorte Seeds.

TABLE 1 Triticale time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.

	April				May				June				July			
MALLEE																
Bison, Fusion, KM10, Goanna, Yowie																
WIMMERA																
Astute, Bison, Fusion, Goanna, Yowie																
KM10																
NORTH CENTRAL																
Astute, Bison, Fusion, Goanna, Yowie																
KM10																
NORTH EAST																
Astute, Bison, Fusion, Goanna, Yowie																
SOUTH WEST																
Astute, Bison, Fusion																

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 2 Triticale variety agronomic guide and disease reaction.

Variety	Maturity	Height	Head colour	Stem rust	Stripe rust	Leaf rust	Yellow leaf spot	*Septoria tritici*	CCN resistance	*Pratylenchus neglectus*	*Pratylenchus thornei*
Astute	M	M-T	W	RMR	RMR	RMR	MRMS	MR	R	R	MS
Bison	E-M	T	W	RMR	R	RMR	MR	MR	R	R	RMR
Fusion	M	M-T	W	R	RMR	R	MRMS	MR	R	RMR	MSS
Goanna	E-M	T	W	R	RMR	RMR	MR	MR	R	MRMS	SVS
KM10	E-M	-	W	R	RMR	MRMS	MR	MR	S	RMR	MRMS
Wonambi	L	T	W	R	RMR	R	MR	RMR	MS	MR	MS

Maturity: E = early, M = mid season, L = late, VL = very late Height: M = medium, T = tall Colour: W = white, Br = brown
Disease resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.
p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible, V = very.
# Varieties marked may be more susceptible if alternative strains are present.

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CANOLA

NEW VARIETIES

Several new canola varieties have been released and marketing companies have indicated there will be seed commercially available for sowing in 2019. It is important to note for both new and older varieties where seed remains available, that not all varieties have been tested in recent years. Hence NVT tested years are provided in the variety descriptions.

The new listings for 2019 are:

- Clearfield tolerant hybrids – Pioneer® 45Y93 (CL)
- Triazine tolerant hybrids – Hyola® 550TT, InVigor® T 3510, Pioneer® 45T03 TT, SF Spark TT
- Roundup Ready hybrids – InVigor® R 5520P, Pioneer® 43Y29 (RR), Pioneer® 45Y28 (RR)
- Dual herbicide tolerant – Hyola® 580 CT

Varieties removed this year are:

- Conventional – SF Brazzil
- Triazine tolerant – DG 560TT, Pioneer 45T01
- Roundup Ready – DG 460RR

DUAL PURPOSE CANOLA

Research trials have shown that long season 'dual purpose' winter hybrid canola for grazing and grain production have performed well in the high rainfall zone. In autumn, established plants were more able to weather attacks from slugs and waterlogging. While in a dry spring, the more robust root system was better able to access subsoil moisture. These dual purpose hybrid varieties are sown in late spring or early-mid summer and grazed until autumn, or sown in autumn or early winter. Winter type canola varieties are currently not evaluated through the NVT program. Consult the GRDC factsheet: Spring sown winter canola.

SPECIALTY CANOLA (HOLL)

Specialty canola hybrids have a particular trait that produces a high stability oil profile (High Oleic, Low Linoleic or 'HOLL') which offers customers extended frying life and improved shelf stability. Specialty canola may be grown under contract with a premium paid to growers when the grain meets specifications. Specialty canola typically requires additional attention to quality but, agronomically, it is grown similarly to commodity canola.

MORE INFORMATION

www.nvtonline.com.au

- Detailed NVT trial results and links to variety information.
- Blackleg monitoring summaries.

www.nvtonline.com.au/apps

- Australian Field Crop Disease Guide App
- NVT Long Term Yield Reports App

agriculture.vic.gov.au/agriculture/grains-and-other-crops

- AG0750 Growing canola
- AG1352 Blackleg of canola
- AG1354 Canola diseases

www.grdc.com.au

- GrowNotes™ Canola Southern Region
- FACTSHEET: Blackleg Management Guide updated in March and September
- Tip & Tactics: Better Mouse Management

BlacklegCM App

- Decision support tool for profitable management of blackleg available on iPad and Android tablets

VARIETY DESCRIPTIONS

(Þ denotes Plant Breeders Rights apply

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

OP = Open pollinated.
Blackleg ratings: R = resistant, MR = moderately resistant, S = susceptible, p = provisional ratings - treat with caution.
est = estimate by marketing company (yet to be rated)

Resistance order from highest to lowest:
R > R-MR > MR > MR-MS > MS > MSS > S

CONVENTIONAL VARIETIES

OP Conventional – AV-GARNET(ф)

Mid maturing variety of medium height. Blackleg rating MS. NVT tested 2006-18. Bred by Agriculture Victoria. Marketed by Nuseed.

Hybrid Conventional – NUSEED DIAMOND

Early maturing hybrid of medium height suited to medium rainfall zones. Blackleg rating MR. NVT tested 2012-18. Marketed by Nuseed.

Hybrid Conventional – NUSEED QUARTZ

Mid maturing hybrid variety of medium height bred to replace AV-Garnet. Suited to medium to high rainfall zones. Blackleg rating R. NVT tested 2016-2018. Released 2017. Marketed by Nuseed.

CONVENTIONAL SPECIALTY HYBRID VARIETIES

Hybrid Specialty Oil – VICTORY® V3002

Early-mid maturing conventional specialty hybrid. Blackleg rating MR. NVT tested 2011-18. Bred by Cargill. Marketed by AWB under contract.

CLEARFIELD HYBRID VARIETIES

Hybrid Clearfield – BANKER CL

Mid maturing hybrid, later than Carbine and earlier than Archer, suited to medium rainfall areas or later sowing in high rainfall zones. Blackleg rating MR-MS. NVT tested 2014-18. Marketed by Heritage Seeds.

Hybrid Clearfield – HYOLA® 575CL

Mid to mid-early hybrid. Adapted for low to very high rainfall zones. Medium to tall height. Blackleg rating R. NVT tested 2010-18. Bred and marketed by Advanta Seeds.

Hybrid Clearfield - HYOLA® 970CL

Long season winter dual purpose hybrid with tall height. Adapted to high to very high rainfall zones (>500 mm). Blackleg rating R. Marketed by Advanta Seeds.

Hybrid Clearfield – PIONEER® 43Y92 (CL)

Early maturing hybrid variety suited to low to medium rainfall zones. Blackleg rating R-MR. NVT tested 2016-2018 as PHI-1603. Released 2017. Marketed by Pioneer Seeds.

Hybrid Clearfield – PIONEER® 44Y90 (CL)

Early-mid maturing hybrid. Suited to low to medium rainfall zones. Blackleg rating R-MR. NVT tested 2015-18. Marketed by Pioneer Seeds.

Hybrid Clearfield – PIONEER® 45Y91 (CL)

Mid maturing hybrid variety. Suited to medium to high rainfall zones. Unique phenology allows for early planting and grazing potential. Blackleg rating MR. NVT tested 2014-18. Marketed by Pioneer Seeds.

NEW Hybrid Clearfield – PIONEER® 45Y93 (CL)

Early flowering mid maturing hybrid variety. Suited to medium to high rainfall and irrigation zones. Blackleg rating of R-MR. Medium-tall height. NVT tested as PHI1706. Released 2018. Marketed by Pioneer Seeds.

Hybrid Clearfield – SAINTLY CL

Mid to mid-early maturing hybrid. Medium plant height. Blackleg rating MR. NVT tested 2016-18 as HSHC1503CL. Released 2018. Marketed by Heritage Seeds.

Hybrid Clearfield – SF EDIMAX CL

Late maturing winter dual purpose hybrid. Adapted to high to very high rainfall zones (<500mm) and suited to early sowing and spring sowing in high rainfall areas. Blackleg rating R-MR. Marketed by Seed Force.

CLEARFIELD SPECIALTY HYBRID

Victory® Specialty Oil – VICTORY® V7001CL

Late maturing specialty (high oleic, low linoleic oil) hybrid. Blackleg rating MR. NVT tested 2016-17. Released 2017. Bred by Cargill. Marketed by AWB under contract.

Victory® Specialty Oil – VICTORY® V7002CL

Early-mid maturing specialty (high oleic, low linoleic oil) hybrid. Blackleg rating MR. NVT tested 2017-18. Bred by Cargill. Marketed by AWB under contract.

TRIAZINE TOLERANT VARIETIES

OP Triazine Tolerant – ATR-BONITO(ф)

Early mid maturing variety for low to medium rainfall zones. Short to medium height. Alternative to ATR Stingray or ATR Gem. Blackleg rating MS. NVT tested 2012 18. Marketed by Nuseed. EPR $5.

OP Triazine Tolerant – ATR-MAKO(ф)

Early-mid maturing variety for low to medium rainfall zones. Alternative to ATR Gem, ATR Stingray or Crusher TT. Blackleg rating MR. NVT tested 2014-18. Bred and marketed by Nuseed. EPR $5.

OP Triazine Tolerant – ATR-STINGRAY(ф)

An early maturing variety. Short to medium height. Blackleg rating MR. NVT tested 2010-18. Bred by AgSeed Research and Agriculture Victoria. Marketed by Nuseed.

OP Triazine Tolerant – ATR-WAHOO(ф)

Mid maturing variety for medium to high rainfall zones and irrigation. Medium height. Alternative to Crusher TT or Thumper TT. Blackleg rating MS. NVT tested 2013-18. Marketed by Nuseed. EPR $5

Hybrid Triazine Tolerant – DG 670TT

Mid-late maturing hybrid variety suited to high rainfall zones. Medium to tall height. Blackleg rating MR. NVT tested 2015-2018 as SFR65-013TT. Released 2017. Marketed by Landmark and Seednet.

Hybrid Triazine Tolerant – HYOLA® 350TT

Early maturing hybrid variety suited to low through to high rainfall zones. Short to medium plant height. Blackleg rating R. NVT tested 2016-2018 as T48481. Released 2017. Bred and marketed by Advanta Seeds.

NEW Hybrid Triazine Tolerant – HYOLA® 550TT

Early-mid maturing hybrid variety suited to low through to high rainfall zones. Short-medium height. Anticipated blackleg rating of R (company rating). NVT tested as T68001. Released 2018. Bred and marketed by Advanta Seeds.

Hybrid Triazine Tolerant – HYOLA® 559TT

Mid maturing hybrid. Suited to low through to high rainfall zones including irrigation. Blackleg rating R-MR. NVT tested 2011-18. Bred and marketed by Advanta Seeds.

Hybrid Triazine Tolerant – HYOLA® 650TT

Mid to late hybrid. Suited to high to very high rainfall zones including irrigation. Blackleg rating R. NVT tested 2013-18. Bred and marketed by Advanta Seeds.

Hybrid Triazine Tolerant – HYTTEC® TROPHY

Early to early-mid maturing hybrid variety. Medium tall plant height. Blackleg rating R-MR. NVT tested 2017-18 as NCH15T085. Released 2017. Marketed by Nuseed. EPR $10.

NEW Hybrid Triazine Tolerant – INVIGOR® T 3510

Early to early mid maturity hybrid. Particularly suited to early season areas. Estimated blackleg rating of MR with Jockey (company rating). NVT tested 2018 as CHYB2124TT. Limited seed for 2019. Marketed by BASF.

Hybrid Triazine Tolerant – INVIGOR T 4510

Early-mid maturing hybrid variety. Medium-tall plant height. Blackleg rating MR-MS. NVT tested 2016-18. Marketed by BASF.

Hybrid Triazine Tolerant – PIONEER® 44T02 TT

Early-mid maturing hybrid suited to low to medium rainfall areas. Blackleg rating R-MR. NVT tested 2015-17. Marketed by Pioneer Seeds.

NEW Hybrid Triazine Tolerant – PIONEER® 45T03 TT

Mid maturing hybrid variety. Suited to high rainfall and irrigation zones. Estimated blackleg rating of R (company rating). Medium-tall height. Released 2018. Marketed by Pioneer Seeds.

Hybrid Triazine Tolerant – SF IGNITE TT

Mid maturing hybrid. Suited to medium to high rainfall zones. Medium height. Blackleg rating MR. NVT tested 2016-18. Bred by NPZ Australia. Marketed by Seed Force.

NEW Hybrid Triazine Tolerant – SF SPARK TT

Early maturing hybrid. Suited to low–medium rainfall areas. Medium plant height. Blackleg rating R. NVT tested 2018 as SFR65-023TT. Released 2018. Marketed by Seed Force.

Hybrid Triazine Tolerant – SF TURBINE TT

Early-mid maturing hybrid. Suited to medium rainfall zones. Medium height. Blackleg rating MR-MS. NVT tested 2015-18. Bred by NPZ Australia. Marketed by Seed Force.

TRIAZINE TOLERANT SPECIALTY VARIETIES

OP Specialty Oil – MONOLA® 416TT

Early-mid maturity for low to medium rainfall zones. Blackleg rating MR. NVT tested 2014-18. Marketed under closed loop contract through Nuseed.

OP Specialty Oil – MONOLA® 515TT

Mid maturity for medium to high rainfall zones. Medium height. Blackleg rating MR. NVT tested 2014-18. Marketed under closed loop contract through Nuseed.

ROUNDUP READY HYBRID VARIETIES

Hybrid Roundup Ready – DG 408RR

Early to mid maturing hybrid variety suited to low to medium rainfall zones. Medium plant height with good adaptability. Blackleg rating MS. NVT tested 2016-2018 as 11H4054. Released 2017. Marketed by Landmark and Seednet.

Hybrid Roundup Ready – NUSEED GT-41

Early maturing variety. Blackleg rating MR. NVT tested 2012-17. Marketed by Nuseed.

Hybrid Roundup Ready – NUSEED GT-42

Early-mid maturing variety. Medium height. Blackleg rating R. NVT tested 2014-18. Marketed by Nuseed.

Hybrid Roundup Ready – NUSEED GT-53

Mid maturing hybrid variety. Medium-tall height. Blackleg rating R. NVT tested 2014-18. Nuseed.

Hybrid Roundup Ready – HYOLA® 404RR

Early to early-mid season hybrid. Suited to medium to high rainfall zones including irrigation. Medium height. Blackleg rating R-MR. NVT tested 2010-18. Bred and marketed by Advanta Seeds.

Hybrid Roundup Ready – HYOLA® 506RR

Mid maturing hybrid variety. Medium to tall plant height. Blackleg rating R. NVT tested 2013, 2016-18 as M95168. Released 2017. Advanta Seeds.

Hybrid Roundup Ready – IH51 RR

Mid maturing variety. Suited to low to medium rainfall zones. PodGuard™ technology makes it suitable for flexible windrow timing or direct heading with reduced harvest losses. Blackleg rating MR-MS. NVT tested 2014-17. Bred and marketed by BASF.

Hybrid Roundup Ready – INVIGOR R 3520

Early maturing hybrid variety. Suited to early season areas or later planting. Medium plant height. Blackleg rating MR. NVT tested 2016-18 as AN15R5537. Released 2017. Bred and marketed by BASF.

NEW Hybrid Roundup Ready – INVIGOR R 4020P

Early mid maturing hybrid suited to medium rainfall zones. Approximately five days earlier flowering than IH51 RR. PodGuard® technology makes it suited to later windrowing timings or direct harvest. Estimated blackleg rating of R with Jockey (company rating). NVT tested 2018 as AN16R9438. Bred and marketed by BASF.

Hybrid Roundup Ready – INVIGOR R 5520P

Mid maturing hybrid variety suited to medium to high rainfall areas. PodGuard™ technology makes it suitable for flexible windrow timing or direct heading with reduced harvest losses. Medium height. Blackleg rating MR. NVT tested 2015-18. Bred and marketed by BASF.

Hybrid Roundup Ready – PIONEER® 43Y23 (RR)

Early maturing hybrid best suited to Mallee and Wimmera districts. Blackleg rating MR. NVT tested 2011 18. Bred and marketed by Pioneer Seeds.

NEW Hybrid Roundup Ready – PIONEER® 43Y29 (RR)

Early maturing hybrid variety. Suited to low-medium rainfall zones. Blackleg rating of R. Medium height. NVT tested PHR1703. Released 2018. Marketed by Pioneer Seeds.

Hybrid Roundup Ready – PIONEER® 44Y27 (RR)

Early-mid season hybrid variety, ideally suited to low to medium rainfall zones. Blackleg rating R-MR. NVT tested 2016-18. Marketed by Pioneer Seeds.

Hybrid Roundup Ready – PIONEER® 45Y25 (RR)

Mid maturing variety. Suited to medium to high rainfall zones and irrigation. Medium-tall plant height. Blackleg rating MR. NVT tested 2012 18. Bred and marketed by Pioneer Seeds.

NEW Hybrid Roundup Ready – PIONEER® 45Y28 (RR)

Mid maturing hybrid variety. Blackleg rating of MR. Medium-tall height. NVT tested PHR1702. Released 2018. Marketed by Pioneer Seeds.

ROUNDUP READY HIGH STABILITY VARIETIES

Hybrid Roundup Ready Speciality Oil – MONOLA® G11

Early to early-mid maturing hybrid Monola. Medium-tall plant height. Blackleg rating R-MR. NVT tested 2013-18. Marketed under closed loop contract through Nuseed.

Hybrid Roundup Ready Specialty Oil – VICTORY® V5003RR

Mid maturing specialty (high oleic, low linoleic oil) hybrid variety. Blackleg rating MR. NVT tested 2013-2018. Bred by Cargill. Marketed by AWB under contract.

DUAL-HERBICIDE TOLERANT VARIETIES

Hybrid Roundup Triazine Tolerant – BASF 3000 TR

Early maturing hybrid suited to low-medium rainfall zones. Blackleg rating MS-S. NVT tested 2015-18. Marketed by BASF.

NEW Hybrid Clearfield Triazine Tolerant – HYOLA® 580CT

Early-mid hybrid variety suited to medium to high rainfall zones. Medium-short height. Blackleg rating R-MR. NVT tested as T61001. Released 2018. Bred and marketed by Advanta Seeds.

TABLE 1 Canola time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.
Note, early season varieties are not recommended to be sown in the Wimmera, North Central and North East, but in a late sowing when soils are very wet they may be an option.

	April				May				June				July			
MALLEE																
Early Season																
WIMMERA																
Early Season																
Early-Mid Season																
Mid Season																
NORTH CENTRAL																
Early Season																
Early-Mid Season																
Mid Season																
NORTH EAST																
Early Season																
Early-Mid Season																
Mid Season																
SOUTH WEST																
Early Season																
Early-Mid Season																
Mid Season																
Mid-Late Season																
NORTHERN IRRIGATION																
Early Season																
Early-Mid Season																
Mid Season																

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.
Blue = only an acceptable option if very good subsoil moisture is available at sowing

TABLE 2 Canola diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
Blackleg	*Leptosphaeria maculans*	Leaf lesions, which may develop into canker on stem at or near ground level, plant death.	Spores from canola stubble are released in autumn to infect leaves of the new crop.	Canola stubble.	Resistant cultivars. Avoid sowing next to last year's canola stubble. Fungicides can be used.
Sclerotinia stem rot	*Sclerotinia* spp.	White fluffy growth on the stem, causing plant parts above this point to die. Affected area greyish white, sclerotia form on and inside the stems.	Favoured by damp humid spring weather during flowering.	Survives as sclerotia in the soil.	Fungicides applied during early bloom.
Damping off	*"Rhizoctonia* spp., *Pythium* spp. and *Fusarium* spp.	Pre-emergence rot and seedlings fail to emerge. Post emergent plants collapse at ground level with leaves turning orange/purple.	In soils that have not been cultivated post opening rains. During cold wet periods.	Hyphal growth in the soil.	Seed dressings. Cultivation after the break of the season.
Alternaria leaf spot and black spot	*Alternaria brassicae*	Dark target like round spots which initially appear on leaves. Can spread to stems and pods and cause pod shattering.	Infection spreads with wet humid weather during spring.	Canola stubble.	Use clean seed. Use seed dressings if seed is infected.

TABLE 3 Canola variety blackleg ratings (GRDC Blackleg Management Guide, Spring 2018). Ratings will be updated in March 2019.

Variety	Maturity	Year of release	Blackleg resistance rating bare seed	Blackleg resistance rating + Jockey®	Blackleg resistance group	Open pollinated or hybrid	Marketer
CONVENTIONAL CANOLA							
AV-Garnet	mid	2007	MS	MR	A	open	Nuseed
Nuseed Diamond	early	2013	MR	R	A, B, F	hybrid	Nuseed
Nuseed Quartz	early-mid	2017	R	R	A,B, D	hybrid	Nuseed
CONVENTIONAL SPECIALTY CANOLA							
Victory® V3002	early-mid	2011	MR	R	A, B, F	hybrid	AWB
CLEARFIELD TOLERANT CANOLA							
Banker CL	mid	2015	MR-MS	R	A	hybrid	Heritage Seeds
Hyola® 575CL	mid	2010	R		B, F	hybrid	Advanta Seeds
Hyola® 970CL	late	2014	R		H	hybrid	Advanta Seeds
Pioneer® 43Y92 (CL)	early-mid	2017	R-MR	R	B	hybrid	Pioneer Seeds
Pioneer® 44Y90(CL)	early-mid	2016	R-MR	R	B	hybrid	Pioneer Seeds
Pioneer® 45Y91(CL)	mid	2016	MR	R	B	hybrid	Pioneer Seeds
Pioneer® 45Y93 (CL)	mid	2018	R-MR		B, C	hybrid	Pioneer Seeds
Saintly CL	mid-early	2018	MR	R	B	hybrid	Heritage Seeds
SF Edimax CL	late	2014	R-MR		C	hybrid	Seed Force
CLEARFIELD SPECIALTY HYBRID CANOLA							
Victory® V7001CL	late	2016	MR	R	A, B, F	hybrid	AWB
Victory® V7002CL	late	2017	MR	R	A,B, F	hybrid	AWB
TRIAZINE TOLERANT CANOLA							
ATR-Bonito	early-mid	2013	MS	MR	A	open	Nuseed
ATR-Mako	early-mid	2015	MR	R	A	open	Nuseed
ATR-Stingray	early	2011	MR	R	C	open	Nuseed
ATR-Wahoo	mid	2013	MS	R-MR	A	open	Nuseed
DG 670TT	mid-late	2017	MR	R	B, F	hybrid	Landmark
Hyola® 350TT	early	2017	R		A, B, D, F	hybrid	Advanta Seeds
Hyola® 550TT	early-mid	2018	R (est)		A, B, D (tbc)	hybrid	Advanta Seeds
Hyola® 559TT	mid	2012	MR		A, B, D	hybrid	Advanta Seeds
Hyola® 650TT	mid-late	2013	R		A, B, D	hybrid	Advanta Seeds
HyTTec® Trophy	early-mid	2017	R-MR	R	A, B, D	hybrid	Nuseed
InVigor T 3510	early	2019	-	MR (est)	B, F (tbc)	hybrid	BASF
InVigor T 4510	early-mid	2016	MR-MS	R	B, F	hybrid	BASF
Pioneer® 44T02 TT	early-mid	2016	R-MR	R	A, B, D	hybrid	Pioneer Seeds
Pioneer® 45T03 TT	mid	2018	R (est)		tbc	hybrid	Pioneer Seeds
SF Ignite TT	mid	2016	MR	R	B, F	hybrid	Seed Force
SF Spark TT	early	2018	R		A, B, D, F	hybrid	Seed Force
SF Turbine TT	early	2015	MR-MS	R-MR	B, F	hybrid	Seed Force
TRIAZINE TOLERANT SPECIALTY CANOLA							
Monola 416TT	early-mid	2015	MR	R	B	open	Nuseed
Monola 515TT	mid	2015	MR	R	unknown	open	Nuseed
ROUNDUP READY CANOLA							
DG 408RR	early-mid	2017	MS	R-MR	A, C	hybrid	Landmark
GT-41	early	2012	MR	R	A, B, F	hybrid	Nuseed
GT-42	early-mid	2015	R	R	A, B, D, F	hybrid	Nuseed
GT-53	mid	2016	R	R	A, B, D, F	hybrid	Nuseed
Hyola® 404RR	early-mid	2010	R-MR		A, B, D	hybrid	Advanta Seeds
Hyola® 506RR	mid	2017	R		A, B, D	hybrid	Advanta Seeds
IH51 RR	mid	2014	MR-MS	R-MR	A	hybrid	BASF
InVigor R 3520	early	2017	MR	R	unknown	hybrid	BASF
InVigor R 4020P	early-mid	2019	-	R (est)	A, B, C (tbc)	hybrid	BASF
InVigor R 5520P	mid late	2016	MR	R	A, C	hybrid	BASF
Pioneer® 43Y23 RR	early	2012	MR	R	B	hybrid	Pioneer Seeds
Pioneer® 43Y29 RR	early	2018	MR		B, C	hybrid	Pioneer Seeds
Pioneer® 44Y27 RR	early-mid	2017	R-MR	R	B	hybrid	Pioneer Seeds
Pioneer® 45Y25 RR	mid	2014	MR	R	B, C	hybrid	Pioneer Seeds
Pioneer® 45Y28 RR	mid	2018	MR		B, C	hybrid	Pioneer Seeds

TABLE 3, cont. next page

(CONTINUED) TABLE 3 Canola variety blackleg ratings (GRDC Blackleg Management Guide, Spring 2018). Ratings will be updated in March 2019.

Variety	Maturity	Year of release	Blackleg resistance rating bare seed	Blackleg resistance rating + Jockey®	Blackleg resistance group	Open pollinated or hybrid	Marketer
ROUNDUP READY SPECIALTY CANOLA							
Monola G11	early-mid	2015	R-MR	R	A, B, S	hybrid	Nuseed
VICTORY V5003RR	mid	2016	MR	R	A	hybrid	AWB
DUAL-HERBICIDE TOLERANT CANOLA							
BASF 3000 TR	early	2015	MS-S	MR	B	hybrid	BASF
Hyola® 580 CT	early-mid	2018	R-MR		B, C	hybrid	Advanta Seeds

Resistance order from highest to lowest: R > R-MR > MR > MR-MS > MS > MSS > S R = resistant, M = moderately, S = susceptible, p = provisional ratings - treat with caution. est = estimate by marketing company (yet to be rated)

TABLE 4 Mallee canola (early season). Long term predicted yield expressed as a percentage of mean yield.

N.B. These trials were not structured to allow comparisons between different chemistry types.

CLEARFIELD TOLERANT CANOLA						
Year		**2013**	**2014**	**2015**	**2016**	**2017**
Mean yield (t/ha)		**0.66**	**0.52**	**0.44**	**2.71**	**1.46**
	No. trials	**2**	**3**	**1**	**3**	**3**
Banker CL	7	-	-	130	118	117
Hyola 474CL	8	109	104	89	95	-
Hyola 575CL	10	-	103	82	91	91
Pioneer 43Y92 (CL)	6	-	-	-	105	108
Pioneer 44Y87 (CL)	6	102	94	84	-	-
Pioneer 44Y89 (CL)	8	118	111	97	97	-
Pioneer 44Y90 (CL)	7	-	-	114	108	110
Rimfire CL	4	-	95	98	-	-
Saintly CL	4	-	-	119	-	111
VICTORY V7002CL	3	-	-	-	-	98
TRIAZINE TOLERANT CANOLA						
Year		**2013**	**2014**	**2015**	**2016**	**2017**
Mean yield (t/ha)		**0.66**	**0.52**	**0.44**	**2.70**	**1.47**
	No. trials	**2**	**3**	**1**	**3**	**3**
ATR Bonito	12	84	99	99	94	97
ATR Stingray	12	95	103	101	97	99
BASF 3000 TR	7	-	-	96	85	94
Hyola 350TT	3	-	-	-	-	104
Hyola 450TT	9	110	95	75	94	-
Hyola 525RT	7	-	93	86	95	-
Hyola 559TT	9	121	104	95	103	-
HyTTec Trophy	3	-	-	-	-	107
InVigor T 4510	6	-	-	-	111	112
Monola 416TT	1	-	-	-	103	-
Pioneer 44T02 TT	7	-	-	111	108	108
SF Turbine TT	6	-	-	-	106	102
ROUNDUP READY CANOLA						
Year		**2013**	**2014**	**2015**	**2016**	**2017**
Mean yield (t/ha)		**0.66**	**0.52**	**0.44**	**2.71**	**1.45**
	No. trials	**2**	**3**	**1**	**3**	**3**
DG 408RR	6	-	-	-	102	105
Hyola 400RR	5	118	110	-	-	-
Hyola 404RR	12	123	113	91	95	96
IH30 RR	9	126	120	91	91	-
InVigor R 3520	6	-	-	-	103	109
Nuseed GT-41	5	109	120	111	-	-
Nuseed GT-42	5	-	-	96	101	99
Pioneer 43Y23 (RR)	12	129	120	102	98	101
Pioneer 43Y29 RR	2	-	-	-	-	113
Pioneer 44Y24 (RR)	9	136	113	106	107	-
Pioneer 44Y27 (RR)	6	-	-	-	114	114

TABLE 5 North Central and North East canola (mid season). Long term predicted yield expressed as a percentage of mean yield.

N.B. These trials were not structured to allow comparisons between different chemistry types.

CONVENTIONAL CANOLA												
	North Central						North East					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.51	2.91	0.70	3.67	2.22		1.62	2.97	1.19	3.07	1.97
	No. trials	1	1	1	1	1	No. trials	1	1	1	1	1
AV Garnet	5	91	99	74	103	92	5	91	93	78	102	93
AV Zircon	3	92	98	77	-	-	3	94	94	79	-	-
Nuseed Diamond	4	104	101	126	98	-	4	104	104	123	99	-
Nuseed Quartz	2	-	-	-	111	102	2	-	-	-	111	106
Victory V3002	4	96	99	84	-	88	4	94	92	87	-	88
Nuseed Quartz	2	-	-	-	111	102	2	-	-	-	111	106
CLEARFIELD TOLERANT CANOLA												
	North Central						North East					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.05	2.91	0.70	3.75	2.64		2.04	2.95	1.71	3.13	1.74
	No. trials	2	1	1	2	2	No. trials	2	2	2	2	2
Archer	4	99	100	91	-	-	6	103	102	95	-	-
Banker CL	6	-	103	113	111	108	6	-	109	111	113	109
Hyola 474CL	5	101	99	92	96	-	7	101	98	94	96	-
Hyola 575CL	8	101	99	89	94	91	10	101	97	91	94	92
Hyola 577CL	4	97	100	86	-	-	7	100	100	93	104	-
Pioneer 43Y92 (CL)	4	-	-	-	105	108	4	-	-	-	108	111
Pioneer 44Y87 (CL)	2	-	99	101	-	-	4	-	100	98	-	-
Pioneer 44Y89 (CL)	5	107	100	115	95	-	4	-	101	107	-	-
Pioneer 44Y90 (CL)	5	-	-	122	112	110	4	-	-	117	-	111
Pioneer 45Y86 (CL)	4	103	99	103	-	-	6	103	99	99	-	-
Pioneer 45Y88 (CL)	6	100	101	97	106	-	8	101	103	100	106	-
Pioneer 45Y91 (CL)	5	-	102	-	107	107	5	-	108	-	109	108
Pioneer 45Y93 CL	2	-	-	-	-	111	2	-	-	-	-	109
Rimfire CL	3	102	99	98	-	-	5	103	99	96	-	-
Saintly CL	4	-	-	130	106	110	6	-	-	121	107	109
VICTORY V7002CL	2	-	-	-	-	101	2	-	-	-	-	93
TRIAZINE TOLERANT CANOLA												
	North Central						North East					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.04	2.91	0.70	3.75	2.66		2.03	2.95	1.73	3.12	1.74
	No. trials	2	1	1	2	2	No. trials	2	2	2	2	2
ATR Bonito	8	95	99	95	99	100	10	92	94	99	95	95
ATR Gem	6	92	99	85	98	-	8	91	92	93	94	-
ATR Mako	5	-	99	92	97	96	8	-	95	97	94	91
ATR Stingray	8	94	99	101	97	103	2	93	-	-	-	-
ATR Wahoo	4	89	100	75	-	-	10	91	93	89	100	92
BASF 3000 TR	3	-	-	-	89	99	2	97	-	-	-	-
DG 560TT	5	-	-	105	96	99	6	-	-	102	96	99
DG 670TT	2	-	-	-	115	-	3	-	-	-	114	105
Hyola 350TT	2	-	-	-	-	107	3	-	-	-	105	106
Hyola 450TT	6	100	99	98	93	-	4	100	97	-	-	-
Hyola 525RT	6	98	98	99	93	-	8	98	95	97	93	-
Hyola 559TT	8	104	100	106	100	100	10	103	102	103	100	101
Hyola 580CT	1	-	-	-	-	96	2	-	-	-	-	96
Hyola 650TT	3	100	101	92	-	-	8	102	102	96	105	99
Hyola 725RT	-	-	-	-	-	-	5	-	96	92	96	-
HyTTec Trophy	2	-	-	-	-	111	2	-	-	-	-	111
InVigor T 4510	4	-	-	-	113	110	4	-	-	-	113	109
Monola 314TT	4	89	95	87	-	-	6	85	82	89	-	-
Monola 416TT	6	-	99	91	97	98	8	-	92	95	93	93
Monola 515TT	4	-	95	70	87	-	7	-	85	79	84	85

TABLE 5, cont. next page

(CONTINUED) TABLE 5 North Central and North East canola (mid season). Long term predicted yield expressed as a percentage of mean yield.

N.B. These trials were not structured to allow comparisons between different chemistry types.

TRIAZINE TOLERANT CANOLA												
	North Central						North East					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.04	2.91	0.70	3.75	2.66		2.03	2.95	1.73	3.12	1.74
	No. trials	2	1	1	2	2	No. trials	2	2	2	2	2
Pioneer 44T02 TT	5	-	-	117	95	100	4	-	-	106	-	106
Pioneer 45T01TT	4	98	100	102	99	-	7	96	97	102	97	-
Pioneer Atomic TT	3	97	98	-	-	-	4	99	96	-	-	-
SF Ignite TT	4	-	-	-	114	107	4	-	-	-	114	106
SF Turbine TT	5	-	-	111	104	105	6	-	-	107	105	106
ROUNDUP READY CANOLA												
	North Central						North East					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.04	2.91	0.70	3.75	2.65		2.04	2.95	1.73	3.12	1.75
	No. trials	2	1	1	2	2	No. trials	2	2	2	2	2
DG 408RR	4	-	-	-	108	109	1	-	-	-	-	106
DG 460RR	4	-	-	101	106	102	6	-	-	102	108	104
DG 550RR	3	100	100	94	-	-	5	105	104	95	-	-
Hyola 400RR	3	107	101	-	-	-	4	106	105	-	-	-
Hyola 404RR	8	108	100	121	95	102	10	105	104	110	97	104
Hyola 500RR	3	108	101	-	-	-	4	110	108	-	-	-
Hyola 504RR	1	-	-	102	-	-	4	-	109	99	-	-
Hyola 505RR	1	102	-	-	-	-	1	103	-	-	-	-
Hyola 506RR	1	107	-	-	-	-	3	-	-	-	111	109
Hyola 600RR	1	-	102	-	-	-	5	-	106	101	107	-
IH30 RR	6	106	99	126	91	-	3	-	101	112	94	-
IH50 RR	3	105	101	-	-	-	4	102	103	-	-	-
IH51 RR	6	-	100	116	98	106	8	-	99	109	97	103
IH52 RR	5	103	101	100	104	-	7	105	104	100	105	-
InVigor R 3520	2	-	-	-	92	-	2	-	-	-	96	-
InVigor R 5520P	4	-	-	-	110	113	6	-	-	113	110	112
Monola 513GT	4	99	99	104	-	-	6	96	95	101	-	-
Monola G11	5	111	99	128	87	100	9	105	101	111	90	103
Nuseed GT-41	4	104	100	119	-	-	2	101	-	-	-	-
Nuseed GT-42	5	-	102	110	102	102	4	-	-	-	102	100
Nuseed GT-50	6	109	104	121	110	-	8	104	109	117	110	-
Nuseed GT-53	6	-	104	120	109	105	6	-	-	116	110	104
Pioneer 43Y23 (RR)	6	112	102	-	101	104	2	111	-	-	-	-
Pioneer 43Y29 RR	2	-	-	-	-	115	2	-	-	-	-	111
Pioneer 44Y24 (RR)	6	109	103	119	110	-	8	106	110	115	111	-
Pioneer 44Y26 (RR)	2	-	102	109	-	-	4	-	104	108	-	-
Pioneer 44Y27 (RR)	4	-	-	-	110	112	3	-	-	-	113	115
Pioneer 45Y22 (RR)	2	102	-	-	-	-	2	107	-	-	-	-
Pioneer 45Y25 (RR)	8	108	105	104	116	105	9	109	112	108	117	105
Pioneer 45Y28 RR	2	-	-	-	-	110	2	-	-	-	-	117
Victory V5002RR	4	102	101	91	-	-	6	104	103	96	-	-
VICTORY V5003RR	7	103	101	99	102	99	9	102	102	101	102	98

TABLE 6 South West and Wimmera canola (mid season). Long term predicted yield expressed as a percentage of mean yield.

N.B. These trials were not structured to allow comparisons between different chemistry types.

CONVENTIONAL CANOLA												
	South West						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.51	-	-	2.62	2.46		-	1.10	0.66	4.38	3.66
	No. trials	1	-	-	1	1	No. trials	-	1	1	1	1
AV Garnet	3	94	-	-	108	101	4	-	88	65	99	99
AV Zircon	1	88	-	-	-	-	2	-	89	68	-	-
Nuseed Diamond	2	102	-	-	99	-	3	-	113	135	103	-
Nuseed Quartz	2	-	-	-	115	101	2	-	-	-	108	110
Victory V3002	3	99	-	-	93	97	3	-	91	80	-	97
CLEARFIELD TOLERANT CANOLA												
	South West						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.47	1.97	1.56	2.76	2.83		2.76	1.12	0.66	3.57	3.06
	No. trials	3	1	2	3	3	No. trials	1	2	1	2	2
Archer	6	104	104	83	-	-	4	104	95	87	-	-
Banker CL	8	-	-	120	118	110	4	-	109	117	113	-
Hyola 474CL	5	102	-	77	-	-	6	105	96	91	91	-
Hyola 575CL	12	102	97	69	84	90	8	106	94	87	87	94
Hyola 577CL	9	103	103	75	104	-	4	104	93	81	-	-
Pioneer 43Y92 (CL)	3	-	-	-	108	-	4	-	-	-	106	105
Pioneer 44Y87 (CL)	1	-	98	-	-	-	3	-	100	101	-	-
Pioneer 44Y89 (CL)	1	-	100	-	-	-	5	-	108	121	91	-
Pioneer 44Y90 (CL)	5	-	-	132	-	112	5	-	-	128	112	109
Pioneer 45Y86 (CL)	4	100	97	-	-	-	4	102	101	104	-	-
Pioneer 45Y88 (CL)	9	104	106	94	109	-	6	104	99	95	106	-
Pioneer 45Y91 (CL)	6	-	-	-	113	108	5	-	110	-	109	106
Pioneer 45Y93 CL	3	-	-	-	-	115	2	-	-	-	-	112
Rimfire CL	4	101	97	88	-	-	3	-	98	98	-	-
Saintly CL	8	-	-	147	112	112	4	-	-	141	103	107
VICTORY V7002CL	-	-	-	-	-	-	2	-	-	-	-	100
TRIAZINE TOLERANT CANOLA												
	South West						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.46	1.97	1.56	2.76	2.86		2.76	1.12	0.66	3.62	3.10
	No. trials	3	1	2	3	3	No. trials	1	2	1	2	2
ATR Bonito	9	93	93	101	102	-	8	92	98	94	94	100
ATR Gem	9	93	92	85	100	-	6	93	92	81	93	-
ATR Mako	7	-	95	86	96	101	6	-	97	91	86	98
ATR Stingray	3	88	-	-	-	-	8	85	99	100	101	99
ATR Wahoo	12	96	96	68	109	105	1	95	-	-	-	-
BASF 3000 TR	-	-	-	-	-	-	4	-	-	118	85	94
DG 560TT	6	-	-	-	95	99	5	-	-	108	94	98
DG 670TT	6	-	-	-	124	111	3	-	-	-	117	110
Hyola 350TT	1	-	-	-	110	-	2	-	-	-	-	104
Hyola 450TT	3	98	-	-	-	-	6	100	98	98	91	-
Hyola 525RT	9	94	91	101	90	-	6	94	98	99	95	-
Hyola 555TT	3	102	-	-	-	-	1	102	-	-	-	-
Hyola 559TT	12	103	103	105	98	100	8	104	104	109	98	100
Hyola 580CT	3	-	-	-	-	97	2	-	-	-	-	99
Hyola 650TT	11	107	106	79	104	100	4	-	96	89	102	-
Hyola 656TT	3	102	-	-	-	-	1	102	-	-	-	-
Hyola 725RT	6	-	95	77	94	-	-	-	-	-	-	-
HyTTec Trophy	3	-	-	-	-	116	2	-	-	-	-	113

TABLE 6, cont. next page

(CONTINUED) TABLE 6 South West and Wimmera canola (mid season). Long term predicted yield expressed as a percentage of mean yield.

N.B. These trials were not structured to allow comparisons between different chemistry types.

TRIAZINE TOLERANT CANOLA												
	South West						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.46	1.97	1.56	2.76	2.86		2.76	1.12	0.66	3.62	3.10
	No. trials	3	1	2	3	3	No. trials	1	2	1	2	2
InVigor T 4510	3	-	-	-	-	113	4	-	-	-	116	110
Monola 314TT	2	78	-	-	-	-	3	-	91	84	-	-
Monola 413TT	3	79	-	-	-	-	1	77	-	-	-	-
Monola 416TT	7	-	-	94	98	102	6	-	95	89	92	98
Monola 515TT	6	-	-	56	80	88	5	-	81	61	85	-
Monola 605TT	2	78	-	-	-	-	1	77	-	-	-	-
Pioneer 44T02 TT	2	-	-	121	-	-	5	-	-	123	102	97
Pioneer 45T01TT	6	95	-	110	101	-	5	-	101	103	97	-
Pioneer Atomic TT	1	92	-	-	-	-	4	92	98	99	-	-
SF Ignite TT	6	-	-	-	124	112	4	-	-	-	117	110
SF Turbine TT	-	-	-	-	-	-	5	-	-	113	107	103
ROUNDUP READY CANOLA												
	South West						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.46	1.97	1.54	2.77	2.88		2.76	1.28	0.66	3.64	3.09
	No. trials	3	1	2	3	3	No. trials	1	3	1	2	2
DG 408RR	-	-	-	-	-	-	3	-	-	-	100	108
DG 460RR	8	-	-	96	108	102	5	-	-	100	109	104
DG 550RR	5	105	105	86	-	-	3	-	100	91	-	-
Hyola 400RR	2	107	-	-	-	-	4	109	104	-	-	-
Hyola 404RR	5	101	-	129	-	-	9	102	110	128	96	97
Hyola 500RR	4	108	108	-	-	-	4	108	109	-	-	-
Hyola 504RR	3	-	112	89	-	-	1	-	-	102	-	-
Hyola 506RR	6	110	-	-	111	104	2	-	-	-	-	106
Hyola 600RR	6	-	110	87	103	-	4	-	100	100	-	-
IH30 RR	-	-	-	-	-	-	7	93	113	135	98	-
IH50 RR	4	101	103	-	-	-	4	101	106	-	-	-
IH51 RR	9	-	97	135	102	105	8	-	107	121	99	100
IH52 RR	8	107	107	94	103	-	6	-	101	100	105	-
InVigor R 3520	-	-	-	-	-	-	2	-	-	-	96	-
InVigor R 5520P	8	-	-	142	123	114	4	-	-	-	118	109
Monola G11	5	98	-	-	79	92	0	-	-	-	-	-
Nuseed GT-41	1	96	-	-	-	-	5	95	109	125	-	-
Nuseed GT-42	3	-	-	-	103	105	3	-	-	116	94	103
Nuseed GT-50	9	109	115	131	117	-	7	109	109	128	104	-
Nuseed GT-53	8	-	-	115	110	109	5	-	-	129	98	108
Pioneer 43Y23 (RR)	3	109	-	-	-	-	7	110	112	131	104	-
Pioneer 43Y29 RR	2	-	-	-	-	118	2	-	-	-	-	111
Pioneer 44Y24 (RR)	9	110	115	127	116	-	7	109	109	125	107	-
Pioneer 44Y26 (RR)	6	-	107	115	109	-	3	-	104	-	-	-
Pioneer 44Y27 (RR)	4	-	-	-	117	110	4	-	-	-	116	109
Pioneer 45Y25 (RR)	11	119	123	93	120	110	8	-	103	106	110	111
Pioneer 45Y28 RR	2	-	-	-	-	110	2	-	-	-	-	114
Victory V5002RR	6	109	107	74	-	-	5	111	95	90	-	-
VICTORY V5003RR	11	105	105	92	101	101	8	-	99	100	97	101

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Steve Marcroft Marcroft Grains Pathology

FIELD PEA

If dry conditions continue in parts of the state residual herbicides are likely to persist into 2019. Growers will need to take this into consideration when selecting paddocks and varieties for 2019.

NEW VARIETIES

There are no new field pea varieties available for sowing in 2019.

KEY DISEASE CONSIDERATIONS

Bacterial blight was enhanced in field pea crops in 2018 due to numerous frosts. As this is a bacterial disease there is no in season treatment. To prevent infection of 2019 field pea crops with bacterial blight using uninfected seed is the main control measure and a two-year break between pea crops should be implemented to allow stubble breakdown. Do not keep seeds from infected crops for sowing.

As infected stubble is a major source of inoculum destroying stubble by burying, burning or baling is advised, and the next year's pea crop should be planted some distance from the previous year's stubble. Early sown peas are more vulnerable to frost injury and sowing into cereal stubble in frost prone paddocks also increases the risk of infection. Variety choice is important in frost prone areas with MR (PBA Hayman, PBA Percy) or MRMS (PBA Butler, PBA Oura) rated field pea varieties a good option.

Blackspot is another key disease field pea growers should consider looking forward to 2019. Further key disease management considerations for the 2019 season will be published in the Agriculture Victoria Pulse Disease Guide in March.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps
- Crop Disease Au App
- NVT Long Term Yield Reports app

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- Growing field pea
- AG1347 Pulse disease guide

www.pulseaus.com.au

Pulse Australia information on growing pulses including;
- Field pea disease management strategy
- Current emergency and minor use chemical permits

VARIETY DESCRIPTIONS

(Þ denotes Plant Breeders Rights apply.

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Semi-dwarf dun seeded – KASPA(Þ)

A late flowering, semi-dwarf field pea which produces spherical dun type grain. Kaspa is the bench mark for field peas with its broad adaption and high yield potential. Kaspa is better suited to longer growing season environments. Kaspa is MR to downy mildew (Parafield strain) but will need to be managed for blackspot, bacterial blight, PSbMV, powdery mildew and downy mildew (Kaspa strain) in disease prone areas. Kaspa has fair lodging resistance at maturity and pods are resistant to shattering. Released 2002. Seednet. EPR $2.

Semi-dwarf dun seeded – PBA BUTLER(Þ)

PBA Butler is a mid to late flowering semi-dwarf, semi-leafless field pea variety. PBA Butler has high yield potential and produces 'Kaspa type' grain adapted to low to medium rainfall regions. It possesses superior bacterial blight and downy mildew resistance to other 'Kaspa type' releases. PBA Butler will need to be managed for blackspot and PSbMV in disease prone areas. Released 2017. Seednet. EPR $2.70.

Semi-dwarf dun seeded – PBA COOGEE

A dual-purpose pea that can be left for grain production or cut early for forage in the case of drought or frost. A mid-late flowering and mid maturing conventional trailing dun pea similar to Parafield, but with increased early growth, more branching and longer vines. A long season variety with high plant biomass by early to mid-spring. It is resistant to powdery mildew, but will need to be managed for blackspot, bacterial blight and downy mildew. It has high tolerance to soil boron and salinity. Released 2013. Seednet. EPR $2.60.

Semi-dwarf dun seeded – PBA GUNYAH(Þ)

An early flowering, semi-dwarf field pea which produces Kaspa type grain. PBA Gunyah is broadly adapted and is better suited to shorter growing season environments. Resistant to downy mildew (Parafield strain) but will need to be managed for blackspot, bacterial blight, PSbMV, BLRV and powdery mildew in disease prone areas. PBA Gunyah has fair lodging resistance at maturity and pods are resistant to shattering. Released 2010. Seednet. EPR $2.50.

Semi-dwarf dun seeded – PBA OURA(ф)

An early to mid-flowering, semi-dwarf, erect growing field pea which produces Australian dun type grain, PBA Oura is broadly adapted. PBA Oura is MRMS to bacterial blight and was released for regions prone to this disease. PBA Oura is MR to downy mildew (Parafield strain) and BLRV, but will need to be managed for blackspot, PSbMV and powdery mildew. PBA Oura has fair lodging resistance at maturity and has moderate non-sugar-pod resistance to shattering. Released 2011. Seednet. EPR $2.60.

Semi-dwarf white seeded - PBA PEARL(ф)

An early to mid-flowering, semi-dwarf field pea. PBA Pearl is broadly adapted and produces medium white grain that can be marketed for human consumption or for stockfeed. PBA Pearl has good resistance to BLRV and downy mildew (Parafield strain). It is MS to bacterial blight and will need to be managed for blackspot, PSbMV, powdery mildew and downy mildew (Kaspa strain) in disease prone areas. PBA Pearl has good lodging resistance at maturity and has moderate non-sugar-pod resistance to shattering. Released 2012. Seednet. EPR $2.70.

Semi-dwarf dun seeded – PBA TWILIGHT(ф)

An early flowering, semi-dwarf field pea which produces 'Kaspa type' grain, better suited to short growing season environments. PBA Twilight is resistant to downy mildew (Parafield strain). It will need to be managed for bacterial blight, blackspot, PSbMV, powdery mildew and downy mildew in disease prone areas. PBA Twilight has fair lodging resistance at maturity and pods are resistant to shattering. Released 2010. Seednet. EPR $2.50.

Semi-dwarf dun seeded – PBA WHARTON(ф)

An early-mid flowering, semi-dwarf field pea which produces 'Kaspa type' grain. PBA Wharton is adapted across short to medium growing season environments and is a suitable variety for crop topping when sowing is delayed. It is resistant to downy mildew (Parafield strain), powdery mildew, PSbMV and BLRV. It will need to be managed for blackspot, bacterial blight and downy mildew (Kaspa strain). PBA Wharton has improved tolerance to soil boron and sugar-pod resistance to shattering. Released 2013. Seednet. EPR $2.60.

Semi-dwarf blue seeded – EXCELL

An early to mid-season flowering, semi-dwarf pea which produces medium sized, spherical, smooth blue seed suitable for premium human consumption markets. Excell has lower grain yield potential compared to new variety releases and is best suited to medium rainfall environments of Victoria and southern NSW. Excell is moderately resistant to downy mildew (Parafield strain). Excell will need to be managed for blackspot, bacterial blight, PSbMV and powdery mildew in disease prone areas. Excell has good lodging resistance. Pods are susceptible to shattering. Released 1998. Can be freely marketed.

Tall field pea – MORGAN(ф)

A tall, late flowering, semi-leafless pea, which produces small Australian dun type grain. Morgan has lower grain yield potential than other varieties but was released for the lower rainfall regions of Central and Western NSW as a dual-purpose pea that could be used for forage in drought years. Morgan is MR to downy mildew (Parafield strain). Morgan will need to be managed for blackspot, bacterial blight, PSbMV, powdery mildew, downy mildew (Kaspa strain) and BLRV in disease prone areas. Has moderate non-sugar-pod resistance to shattering. Grain size is small and less suitable for human consumption markets. Released 1998. Can be freely marketed.

Tall field pea - PBA HAYMAN(ф)

A field pea bred for forage use such as hay or silage production or for manuring. This variety grows vigorously and produces large quantities of dry matter over spring. Total dry matter produced is significantly greater than regular field pea varieties (20 per cent more than Morgan) and comparable to vetch. PBA Hayman produces leafy plants with a high number of basal branches that grow vigorously. Plants have very long vines (can be over 3 m) that remain semi-erect to maturity. PBA Hayman flowers very late in the growing season and is resistant to powdery mildew. It is MS to ascochyta, MR to bacterial blight and RMR to Downy mildew (Parafield strain). It produces small pods and very small seed that will reduce the cost of sowing. The grain is soft seeded and therefore suitable for cropping rotations with other broadleaf crops. Grain yield potential can vary but is generally between 30 to 80 per cent of a normal field pea crop and is suitable for stockfeed. Developed by PBA. Released 2013. Seednet.

Tall field pea– PBA PERCY(ф)

A very early flowering and maturing conventional pea (similar to Parafield) which produces Australian dun type grain. PBA Percy has high yield potential and is broadly adapted. PBA Percy is MR to bacterial blight and was released for regions prone to this disease. It will need to be managed for blackspot, PSbMV, downy and powdery mildew and BLRV. PBA Percy has poor lodging resistance and will require specialised pea pickup fronts for harvesting. Released 2011. Seednet. EPR $2.60.

Tall field pea – STURT

A tall, early to mid-season flowering pea, which produces medium to small, spherical, smooth white seed. Sturt is broadly adapted but is best suited to low rainfall environments and has higher tolerance to frost at podding. Sturt will need to be managed for bacterial blight, blackspot, PSbMV, BLRV, powdery mildew and downy mildew in disease prone areas. Sturt has poor lodging resistance and will require specialised pea pickup fronts for harvesting. Has moderate non-sugar-pod resistance to shattering. Released 2004. Premier Seeds.

TABLE 1 Field pea time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.

MALLEE	April				May				June				July			
PBA Coogee, PBA Hayman																
Kaspa, PBA Butler, PBA Gunyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt																
WIMMERA																
PBA Hayman																
Kaspa, PBA Butler, PBA Coogee, PBA Gunyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt																
NORTH CENTRAL																
PBA Coogee, PBA Hayman																
Kaspa, PBA Butler, PBA Gunyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt.																
NORTH EAST																
PBA Hayman																
Kaspa, PBA Butler, PBA Coogee PBA Gunyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt.																
SOUTH WEST																
Kaspa, PBA Butler, PBA Coogee PBA Gunyah, PBA Hayman, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton																
SOUTH WEST spring sowing	**June**				**July**				**August**				**September**			
Above varieties for spring sowing																

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.
Blue = if conditions allow (e.g. raised beds, dry season, non-waterlogging paddocks)

TABLE 2 Agronomic characteristics of field pea varieties.

Variety	Plant habit	Plant vigour, Early season	Flowering time	Maturity time	Plant lodging resistance at maturity	Pod shattering at maturity	Boron tolerance	Salinity tolerance
YELLOW OR BLUE PEA GRAIN TYPE								
Excell	SD-SL	high	early	early-mid	good	S: NSP	S	S
PBA Hayman	multi-branched	moderate	very late	very late	poor	MR: NSP	MS	MS
PBA Pearl	SD-SL	moderate	early-mid	early-mid	good	MR: NSP	MS	MS
Sturt	C	high	early-mid	mid	poor	MR: NSP	S	MS
KASPA GRAIN TYPE								
Kaspa	SD-SL	moderate	late	mid	fair-good	R: SP	S	S
PBA Butler	SD-SL	high	mid-late	mid	good	R: SP	S	S
PBA Gunyah	SD-SL	high	early-mid	early	fair-good	R: SP	S	SMS
PBA Twilight	SD-SL	high	early	early	fair-good	R: SP	S	S
PBA Wharton	SD-SL	moderate	early-mid	early	fair-good	R: SP	MT	MT
AUSTRALIAN DUN GRAIN TYPE								
Morgan	Tall-SL	high	late	late	poor-fair	MR: NSP	S	S
PBA Coogee	C	high	mid-late	mid	poor	MR: NSP	T	MT
PBA Oura	SD-SL	moderate	early-mid	early	fair-good	MR: NSP	MS	S
PBA Percy	C	high	early	early	poor	MR: NSP	S	MT

SD=semi-dwarf, C=conventional, SL= semi-leafless, S=susceptible, MS=moderately susceptible, MR=moderately resistant, R=resistant, SP=sugar pod type pod, NSP=non sugar pod type, I=intolerant, MI=moderately intolerant

TABLE 3 Disease resistance characteristics of field pea varieties.

Variety	Blackspot (Ascochyta)	Bacterial blight (Field rating)	Downy mildew (Kaspa strain)	Downy mildew (Parafield strain)	Powdery mildew	PSbMV virus	BLRV virus (Field rating)	*Pratylenchus neglectus*	*Pratylenchus thornei*
YELLOW OR BLUE PEA GRAIN TYPE									
Excell	MS	S	S	MR	S	-	-	-	-
PBA Hayman	MS	MR	-	RMR	R	-	-	-	-
PBA Pearl	MRMS	MS	S	MS	S	S	R	MRMS	MRMS
Sturt	MS	MS	S	MS	S	S	MS	MS*p*	MR
KASPA GRAIN TYPE									
Kaspa	MS	S	S	MR	S	S	S	MRMS	MRMS
PBA Butler	MS	MRMS	MS	S	S	S	S	MRMS	MRMS
PBA Gunyah	MS	S	S	R	S	S	S	MR	MRMS
PBA Twilight	MS	S	S	R	S	S	S	MRMS*p*	MRMS
PBA Wharton	MS	S	S	R	R	R	R	MRMS*p*	MR*p*
AUSTRALIAN DUN GRAIN TYPE									
Morgan	MS	MS	S	MR	S	S	S*p*	RMR*p*	MR*p*
PBA Coogee	MS	MS	-	-	R	-	S*p*	MRMS*p*	MR*p*
PBA Oura	MS	MRMS	MRMS	MR	S	S	MR	MRMS*p*	MRMS*p*
PBA Percy	MS	MR	S	S	S	S	S	MRMS	RMR*p*

PSbMV = pea seed borne mosaic virus, BLRV = bean leaf roll virus

Resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.

p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible, V = very.

TABLE 4 The most suitable field pea varieties for Victorian cropping regions for grain production (Ticked).

	Southern Wimmera	Northern Wimmera	Southern Mallee	Northern Mallee	South West
YELLOW/WHITE OR BLUE PEA GRAIN TYPE					
Excell		✓	✓		
PBA Hayman	✓	✓	✓	✓	✓
PBA Pearl	✓	✓	✓	✓	✓
Sturt	✓	✓	✓	✓	
KASPA GRAIN TYPE					
Kaspa	✓	✓			✓
PBA Butler	✓	✓	✓		
PBA Gunyah	✓	✓	✓		✓
PBA Twilight			✓	✓	
PBA Wharton	✓	✓	✓	✓	✓
AUSTRALIAN DUN GRAIN TYPE					
Morgan			✓	✓	
PBA Coogee	✓	✓	✓	✓	✓
PBA Oura	✓	✓	✓	✓	✓
PBA Percy	✓	✓	✓	✓	

TABLE 5 Field pea diseases.

Disease	Organism	Symptoms	Occurrence	Hosts	Control
Ascochyta blight (Blackspot)	*Mycosphaerella pinodes. Phoma pinodella, Ascochyta pisi*	Most obvious on stems and lower leaves. Purplish-black discolouration of lower stem. Dark brown spotting of pods and leaves. Blackening of stem base and upper tap root.	Common in all pea growing regions; most crops are affected to some extent. Favoured by wet conditions. Most damage in early sown crops.	Peas and most legumes.	Crop rotation. Later sowing. Fungicidal seed dressings. Disease free seed.
Bacterial blight	*Pseudomonas syringae* pv, *pisi, P. syringae* pv *syringae*	Water-soaked spots on leaflets and stipules. Yellowish brown fan-shaped lesion on stipules.	Sporadic in wetter regions. Most severe in early sown crops already damaged by frost or heavy rain.	Peas.	Crop rotation. Late sowing. Disease free seed.
Downy mildew	*Perenospora viciae*	Brown blotches on upper leaf surface. Underside of leaves covered by masses of fluffy 'mouse-grey' spores.	Sporadic in all regions. Damage most severe in wetter districts.	Peas.	Resistant varieties. Fungicidal seed dressings.
Powdery mildew	*Erysiphe polygoni*	Leaves covered by a film of powdery white spores. Infected plants have a blue-white colour.	Can occur in most regions towards the end of the season. Most common in late-sown crops.	Peas.	Resistant varieties. Avoid late sowing. Foliar fungicide application at flowering is an economic option for disease prone areas.
Septoria leaf blotch	*Septoria pisi*	Straw coloured blotches on leaves, stems and tendrils. Pin-head size black spots within lesions.	Present in most pea growing regions. Damage most severe on short, semi-leafless cultivars.	Peas.	Destroy crop residue. Most varieties are moderately susceptible. Crop rotation.
VIRUS DISEASES					
PSbMV	Pea seedborne mosaic virus	Downward curling of leaves, mosaic, stunting.	Present in all pea growing regions.	Host range limited to *Fabaceae*	This virus is highly seed borne in peas. Virus free seed is recommended
BLRV	Bean leaf roll virus	Yellowing and stunting	Present in all pea production areas.	Host range limited to *Fabaceae*	Managing aphids and weeds, resistant varieties.

TABLE 6 Long term predicted field pea yield expressed as a percentage of mean yield.

	Mallee						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		1.78	0.99	0.50	2.71	1.50		3.43	2.30	0.40	2.62	2.62
	No. trials	5	4	5	4	6	No. trials	3	4	2	3	3
Excell	1	-	-	-	52	-	1	-	-	-	78	-
Kaspa	24	102	69	68	97	91	15	95	89	68	102	83
Parafield	12	85	79	98	82	77	8	89	83	79	72	74
PBA Butler	23	112	96	87	132	108	13	108	97	87	113	102
PBA Gunyah	23	97	88	94	99	96	15	97	96	91	95	95
PBA Oura	24	89	120	148	100	102	15	98	98	125	84	101
PBA Pearl	24	100	126	146	122	111	15	105	99	123	98	106
PBA Percy	23	85	107	151	107	97	13	95	89	115	74	92
PBA Twilight	17	89	89	104	84	91	11	92	95	97	85	92
PBA Wharton	24	88	110	113	89	94	15	99	105	115	80	105
Sturt	5	98	112	126	110	-	3	102	94	-	92	-

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LENTIL

If dry conditions continue in parts of the state residual herbicides are likely to persist into 2019. Growers will need to take this into consideration when selecting paddocks and varieties for 2019. Some growers may be tempted to resow lentils into the same paddock after a failed crop. This is not recommended. Lentils benefit considerably from being sown into standing cereal stubble that can provide support and protection.

NEW VARIETIES

PBA Hallmark XT is a new high yielding variety with the same herbicide tolerance as Hurricane XT. It is a medium sized red lentil with greater early vigour and improved BGM resistance compared to Hurricane XT. It is currently in the process of APVMA permit and registration for imazethapyr use.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps
- Crop Disease Au app
- NVT Long Term Yield Reports app

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- Growing lentil
- AG1347 Pulse disease guide

www.pulseaus.com.au
Pulse Australia information on growing pulses including:
- Lentil disease management strategy
- Minor use and emergency permits for chemicals

VARIETY DESCRIPTIONS

(Þ) denotes Plant Breeder Rights apply

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Red lentil – NIPPER(Þ)

Nipper is a mid-season variety with a small seed size and grey seed coat. Nipper is MRMS to foliar ascochyta blight, MR to seed ascochyta and RMR to BGM. Nipper has improved salinity tolerance and is well established in markets, attracting a premium price in some years. Released 2005. Seednet. EPR $5.

Red lentil – NUGGET

Nugget is a mid-season variety with a medium size seed and a grey seed coat. It is MRMS to ascochyta blight and BGM. Nugget is not grown much anymore as it has been superseded by PBA Ace and PBA Bolt. Released 1999. Heritage Seeds. EPR $5.

Red lentil – PBA ACE(Þ)

PBA Ace is a vigorous medium sized, mid-season red lentil with grey seed. PBA Ace is best suited to longer season areas replacing Nugget and PBA Jumbo. RMR to ascochyta and MRMS to BGM. Intolerant to salinity and boron. High milling quality. Released 2012. PB Seeds. EPR $5.

Red lentil – PBA BLITZ(Þ)

PBA Blitz is a medium sized red lentil with a grey seed coat, it is genetically prone to seed coat blotching. PBA Blitz is early flowering and is suited to short growing seasons. It has improved early vigour and an erect growth habit which is suited to no-till and inter-row sowing. PBA Blitz is MR to foliar ascochyta, MRMS to seed ascochyta and MR to BGM. PBA Blitz is intolerant of soil boron and salinity. It has demonstrated similar but generally improved milling characteristics compared to Nugget. Released 2010. PB Seeds. EPR $5.

Red lentil – PBA BOLT(Þ)

PBA Bolt is a medium sized red lentil with grey seed, adapted to the Mallee and northern Wimmera. It's similar to PBA Flash with early-mid maturity and improved boron and salinity tolerance. PBA Bolt is MR to foliar ascochyta blight and RMR to seed ascochyta blight. Its susceptibility to BGM makes it less suited to medium to high rainfall areas in wetter years and with early sowing. Like PBA Flash, PBA Bolt is a good variety for timely crop topping to control weeds. An erect habit and good lodging resistance make it easier to harvest in dry seasons. Released 2012. PB Seeds. EPR $5.

Red lentil – PBA FLASH(Þ)

PBA Flash is an early-mid maturing, red lentil with a medium seed size suited to all current lentil growing areas but particularly shorter season growing areas. It has improved tolerance to boron and salinity compared to Nugget. Like PBA Bolt, PBA Flash is a good variety for timely crop topping to control weeds. It is MS to foliar and seed ascochyta blight, and MRMS to BGM. PBA Flash has improved standing ability at maturity relative to other lentil varieties which may make it more prone to pod drop in windy environments, timely harvest is required. It is well suited to medium red lentil grain markets, particularly for splitting. Released 2009. PB Seeds. EPR $5.

NEW Red lentil – PBA HALLMARK XT(ϕ)

PBA Hallmark XT is a mid-season variety with a medium seed size and grey seed coat. PBA Hallmark XT has greater early vigour and improved ratings to BGM compared to PBA Hurricane XT. It is MR to foliar ascochyta blight, MR to seed ascochyta and RMR to BGM. PBA Hallmark XT is in the process of APVMA permit and registration for imazethapyr use. It has improved tolerance to the herbicide flumetsulam plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues. *It is important to note that growers must adhere to product label rates, plant back periods and all label directions for use.* As a medium red lentil this variety can provide an alternative market class option to the popular small red lentil PBA Hurricane XT. Released 2018. PB Seeds. EPR $5.40.

Red lentil – PBA HURRICANE XT(ϕ)

PBA Hurricane XT is a small red seeded lentil with mid flowering and mid maturity. It has tolerance to imazethapyr, improved tolerance to the herbicide flumetsulam plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues. *It is important to note that growers must adhere to product label rates, plant back periods and all label directions for use.* PBA Hurricane XT is the highest yielding small red lentil available in Australia and has improved yields over Nipper and Nugget, but lower than PBA Ace. It is MR to foliar ascochyta, RMR to seed ascochyta and MRMS to BGM. Released 2013. PB Seeds. EPR $5.

Red lentil – PBA JUMBO(ϕ)

PBA Jumbo is a large seeded red lentil with a grey seed coat. It is mid flowering with a maturity similar to Nugget. Suited to no-till inter-row sowing into standing stubble. It is MRMS to foliar ascochyta blight and S to seed ascochyta and MS to BGM. Tolerance to soil boron is similar to PBA Flash. PBA Jumbo is suited to medium to high rainfall regions where it produces uniform larger seed size for the premium large red split markets but has been outclassed by PBA Jumbo2. Released 2010. PB Seeds. EPR $5.

Red lentil – PBA JUMBO2(ϕ)

PBA Jumbo2 is the highest yielding large seeded red lentil, approximately 20 per cent higher than PBA Jumbo. It is a direct replacement for Jumbo and Aldinga. It has a similar seed size to Jumbo and Aldinga with a grey seed coat. It is mid flowering and has a maturity similar to PBA Jumbo. It is well suited to no-till inter-row sowing into standing stubble. It is R to ascochyta and RMR to BGM. Tolerance to soil boron is similar to PBA Flash. PBA Jumbo2 is suited to medium to high rainfall regions where it produces uniform larger seed size well suited to premium large red split markets. Released 2014. PB Seeds. EPR $5.

Green lentil – BOOMER

Boomer is a large seeded green lentil that is tall, bulky and vigorous but can lodge when growing conditions are favourable. Sowing early can increase lodging and result in smaller seed. Boomer is MR to foliar ascochyta blight and MRMS to seed ascochyta blight and BGM. Early harvest is important to prevent shattering and produce good coloured seed. Boomer has been superseded by PBA Giant. Released 2005. Seednet. EPR $5.

Green lentil – PBA GIANT(ϕ)

The largest seeded green lentil in Australia with an average seed diameter of 5.8 millimetres (about 7 g/100 seeds). PBA Giant is broadly adapted but is best suited to the medium rainfall lentil growing regions. It has similar yield and improved shattering resistance to Boomer, though timely harvest is still required to minimise shattering. It is less susceptible to lodging at maturity than Boomer. It is MR to foliar ascochyta, and MS to seed ascochyta and BGM. Released 2014. PB Seeds. EPR $5.

Green lentil – PBA GREENFIELD(ϕ)

The highest yielding green lentil variety with yields similar to PBA Ace. PBA Greenfield is a medium sized green lentil broadly adapted but best suited to the medium rainfall lentil growing regions. It has improved salinity tolerance and resistance to shattering, although timely harvest is still required. It is MRMS to foliar and seed ascochyta and MR to BGM. Released 2014. PB Seeds. EPR $5.

TABLE 1 Lentil time of sowing guide.

Take variety flowering and maturity status into account when choosing a sowing date. In the Wimmera, the highest yields are from sowing in early May to mid June. However early sowing increases the risk of yield and quality losses from Botrytis grey mould and ascochyta blight. Early sowing also increases the likelihood of crop lodging. This table is a guide only and has been compiled from experimental data and observations of the breeder and departmental agronomists.

MALLEE/Northern WIMMERA	April				May				June			
Boomer, Nugget, PBA Ace, PBA Bolt, PBA Blitz, PBA Flash, PBA Greenfield, PBA Giant, PBA Hurricane XT, PBA Jumbo, PBA Jumbo 2												
WIMMERA												
Boomer, Nipper, Nugget, PBA Ace, PBA Bolt, PBA Blitz, PBA Flash, PBA Greenfield, PBA Giant, PBA Hurricane XT, PBA Jumbo, PBA Jumbo 2												

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 2 Lentil variety agronomic guide (may vary with sowing time and location).

Variety	Grain type	Seed coat	Seed size (%)*	Flowering time	Maturity	Lodging	Shattering	Salinity	Boron
SMALL RED LENTIL									
Nipper	red	grey	75-80	mid/late	mid	MR	MR	MT	I
PBA Hurricane XT	red	grey	85	mid	mid	MR	R	I	I
MEDIUM RED LENTIL									
Nugget	red	grey	100	mid	mid/late	MS	R	I	I
PBA Ace	red	grey	100	mid	mid	MRMS	MRMS	I	I
PBA Blitz	red	grey	115-120	early	early	MR	MR	I	I
PBA Bolt	red	grey	100	early/mid	early/mid	R	R	MI	MI
PBA Flash	red	green	100-110	early/mid	early/mid	MR	MR	MI	MI
PBA Hallmark XT	red	grey	105	mid	mid	MR	R	MI	I
LARGE RED LENTIL									
PBA Jumbo	red	grey	120	mid	mid	MS	MR	I	MI
PBA Jumbo2	red	grey	120	mid	mid	MRMS	R	I	MI
MEDIUM GREEN LENTIL									
PBA Greenfield	yellow	green	130	mid	mid/late	MS	MR	MI	I
LARGE GREEN LENTIL									
Boomer	yellow	green	150	mid	mid/late	S	S	I	MI
PBA Giant	yellow	green	170	mid	mid/late	MS	MRMS	I	MI

R = resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible, VS=very susceptible, I=intolerant, MT= moderately tolerant, MI= moderately intolerant.
* ratings relative to Nugget. Can flower and mature relatively earlier if sown early.

TABLE 3 Disease rating for current lentil varieties.

No variety with a Resistant rating is immune to disease, and fungicide application may be required under severe disease pressure.

Variety	Ascochyta blight Foliar	Ascochyta blight Seed/pod	Botrytis grey mould (BGM)	*Pratylenchus neglectus* (provisional)	*Pratylenchus thornei* (provisional)
SMALL RED LENTIL					
Nipper	MRMS	MR	RMR	R	MR
PBA Hurricane XT	MR	RMR	MRMS	MRMS	MRMS
MEDIUM RED LENTIL					
Nugget	MRMS	MRMS	MRMS	MRMS	MRMS
PBA Ace	RMR	RMR	MRMS	MR	MRMS
PBA Blitz	MR	MRMS	MR	MR	MRMS
PBA Bolt	MR	RMR	S	MR	MR
PBA Flash	MS	MS	MRMS	MR	MRMS
PBA Hallmark XT	MR	MR	RMR	MR	MRMS
LARGE RED LENTIL					
PBA Jumbo	MRMS	S	MS	MR	MRMS
PBA Jumbo2	R	R	RMR	MR	MR
MEDIUM GREEN LENTIL					
PBA Greenfield	MRMS	MRMS	MR	-	-
LARGE GREEN LENTIL					
Boomer	MR	MRMS	MRMS	-	MR*p*
PBA Giant	MR	MS	MS	MR*p*	MR*p*

Resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.

p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible , V = very

TABLE 4 Lentil diseases.

Disease	Organism	Symptoms	Occurrence	Hosts	Control
Ascochyta blight	*Ascochyta lentis*	Leaves: small, round, whitish grey lesions with brown margins. Lesions contain small black fruiting bodies of the fungus. Lesions can also form on stems causing premature death. Pod infection can ultimately result in dark discolourations on seed.	Common in all lentil growing regions in southern Australia. All varieties except Northfield and Nipper are at risk of seed infection by ascochyta blight. Damage is most likely in wet seasons.	Lentils – seed, stubble and self sown plants.	Fungicidal seed dressings. Resistant varieties. Foliar fungicides. Crop rotation. Avoid early sowing.
Botrytis grey mould	*Botrytis cinerea* and *Botrytis fabae*	Leaves: white, round lesions/spots without black fruiting bodies as in ascochyta blight. Stems: Pale brown grey lesions form on stems that are covered with fluffy grey mould. Botrytis grey mould can cause branches to die and cause discoloured and shrivelled seed. In severe cases large brown patches can form in the crop.	Most likely to occur in dense, lodged crops when there is frequent rain late in spring.	Most legumes including chickpeas, faba bean and vetch.	Fungicidal seed dressings. Low plant density. Avoid early sowing. Foliar fungicides. Crop rotation. Resistant varieties.
VIRUS DISEASES					
AMV	Alfalfa mosaic virus	Tip necrosis. Young leaves are pale green, small, twisted and distorted. A faint mosaic pattern may appear.	Prevalent in lentil production regions with high aphid numbers.	Wide host range including most pulses, some horticultural plants and weeds.	Virus free seed, management of weeds, resistant varieties.
CMV	Cucumber mosaic virus	Yellowing, stunting. Young leaves are pale green, small, twisted and distorted. A faint mosaic pattern may appear.	Common in all lentil growing areas with high aphid numbers.	Wide host range including most pulses, some horticultural plants and weeds.	Virus free seed, management of weeds, resistant varieties.
TuYV (previously BWYV)	Turnip yellows virus (previously known as Beet western yellows virus)	Yellowing, stunting. Produces the most severe symptoms of the all the viruses. Patches of crop resemble root disease or herbicide residue damage.	Present in all lentil production areas with high aphid numbers.	Wide host range including most pulses, some horticultural plants and weeds.	Managing weeds and aphids, resistant varieties.

TABLE 5 Long term predicted lentil yield expressed as a percentage of mean yield.

	Mallee						Wimmera					
Year		**2013**	**2014**	**2015**	**2016**	**2017**		**2013**	**2014**	**2015**	**2016**	**2017**
Mean yield (t/ha)		**1.23**	**0.69**	**0.24**	**2.88**	**1.43**		**2.43**	**1.34**	**0.28**	**2.45**	**2.85**
	No. trials	**4**	**3**	**3**	**4**	**5**	**No. trials**	**4**	**2**	**2**	**3**	**2**
Boomer	2	70	-	68	-	-	6	78	73	85	-	-
Nipper	14	71	59	44	85	72	10	89	82	72	91	85
Nugget	19	96	85	75	86	97	13	97	95	85	82	98
PBA Ace	19	110	101	94	95	117	13	100	100	96	99	109
PBA Blitz	14	74	76	105	97	95	10	91	83	106	114	90
PBA Bolt	19	111	125	127	95	103	13	100	107	111	100	101
PBA Flash	19	106	99	103	101	107	13	106	104	99	86	104
PBA Giant	4	84	-	91	77	-	7	84	82	96	110	-
PBA Greenfield	6	95	-	78	100	111	8	97	91	92	110	105
PBA Hallmark XT	16	103	116	109	103	99	11	96	101	107	119	100
PBA Hurricane XT	19	103	111	102	97	93	13	98	103	100	102	97
PBA Jumbo	19	87	68	77	90	105	13	97	87	88	90	100
PBA Jumbo2	19	102	95	106	118	115	13	106	101	107	114	109

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FABA BEAN

NEW VARIETIES

PBA Marne is the highest yielding faba bean variety for short season areas while PBA Bendoc is the first faba bean variety with tolerance to some imidazolinone herbicides to be realeased in Australia.

DISEASE

Ascochyta Pathotype 1 is widespread in Victoria and is best managed by resistant varieties and foliar fungicides. Pathotype 2 has been detected in the Kaniva area and will spread over time. Growers need to monitor crops closely, particularly where faba bean has been grown. If you observe unusual levels of disease on resistant varieties please send lesioned samples to Agriculture Victoria at:

CropSafe
Private Bag 260, Horsham VIC 3401
Ph: 03 5362 2111
Email: Crop.Safe@ecodev.vic.gov.au

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps
- Crop Disease Au App
- NVT Long Term Yield Reports App

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- AG0083 Growing faba bean
- AG1347 Pulse disease guide

www.pulseaus.com.au
Pulse Australia has detailed information on growing pulses and lists all current emergency and minor use chemical permits.

www.communities.grdc.com.au/field-crop-diseases
- Spot the difference – identifying faba bean diseases

VARIETY DESCRIPTIONS

(ℓ) denotes Plant Breeder Rights apply
End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Broad bean – AQUADULCE

Tall late flowering broad bean with some tolerance to waterlogging as well as iron and manganese deficiencies. Best suited to high rainfall districts (>450mm). MS to both ascochyta blight pathotypes, chocolate spot and rust. Released 1982.

NEW Faba bean – PBA BENDOC(ℓ)

PBA Bendoc is the first faba bean line with improved tolerance to some Group B herbicides. *It is important to note that growers must adhere to product label rates, plant back periods and all label directions for use.* It has a small to medium sized seed suited to the Middle East markets. RMR to both ascochyta blight pathotypes, S to chocolate spot and S to cercospora and rust. Developed by PBA. Released 2018 (tested as AF15369). Seednet. EPR $3.90.

Broad bean – PBA KAREEMA

PBA Kareema is a direct replacement for Aquadulce. It requires a long growing season similar to Aquadulce and rainfall greater than 450 mm. It is MR to ascochyta blight (P1 and P2), MS to chocolate spot and MRMS to rust. PBA Kareema is only recommended for the South West region. Released 2009.

Faba bean – FARAH(ℓ)

Farah is similar to Fiesta in seed quality and adaptation and performs best in medium rainfall environments. It is RMR to ascochyta blight P1, but susceptible to P2 and S to chocolate spot. Released 2004. Heritage Seeds. EPR $3.

Faba bean – FIESTA VF

A medium sized bean, Fiesta has good yields and wide adaptation throughout southern Australia. It is medium height with good seedling vigour. Fiesta is MS to ascochyta blight (P1 and P2) and S to chocolate spot. Released 1998.

NEW Faba bean – PBA MARNE(ℓ)

PBA Marne is suited to low to medium rainfall zones. Medium plant height with a medium sized seed suitable to Middle Eastern markets. It is RMR to ascochyta blight pathotype 1, MRMS to pathotype 2, S to chocolate spot, S to cercospora, MR to rust and MR to PSbMV seed staining. Developed by PBA. Released 2018 (tested as AF09169). Seednet. EPR $3.50.

Faba bean – NURA(ф)

Nura is shorter than Fiesta and Farah and less likely to lodge, however the bottom pods are closer to the ground. Nura is RMR to both pathotypes of ascochyta blight, MS to chocolate spot and rust. Nura needs to be sown early as it flowers about seven days later than Fiesta, but it matures at a similar time. Released 2005. Seednet. EPR $3.

Faba bean – PBA RANA(ф)

Relatively late flowering and maturing variety suited to higher rainfall, long season regions. Seed is larger than current varieties and is considered high quality by the major Egyptian market. Resistant to ascochyta blight P1, but MRMS to P2 and MS to chocolate spot. Developed by PBA. Released 2013. Seednet. EPR $3.50.

Faba bean – PBA SAMIRA(ф)

A high yielding variety with wide adaptation. Excellent disease resistance and later flowering means it can take advantage of late rainfall in longer season environments. Seed is slightly larger than Farah and is suited to Middle East markets. Resistant (RMR) to both pathotypes of ascochyta blight, MS to chocolate spot and rust. Developed by PBA. Released 2015. Seednet. EPR $3.50.

Faba bean – PBA ZAHRA(ф)

A high yielding, later flowering and maturing variety that has performed very well in longer season environments. Seed is larger than Farah and similar to PBA Rana and suited to Middle East markets. Good overall response to diseases, resistant to ascochyta blight (P1), but MRMS to P2, MS to chocolate spot. Developed by PBA. Released 2016. Seednet. EPR $3.50.

TABLE 1 Faba bean time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists

MALLEE	April				May				June			
Farah, Fiesta, PBA Samira												
WIMMERA												
Aquadulce, PBA Bendoc, Farah, Fiesta, Nura, PBA Marne, PBA Samira, PBA Zahra												
NORTH CENTRAL - 1 week earlier for irrigation												
Aquadulce, PBA Bendoc, Farah, Fiesta, Nura, PBA Marne, PBA Samira, PBA Zahra												
NORTH EAST												
Aquadulce, PBA Bendoc, Farah, Fiesta, Nura, PBA Marne, PBA Samira, PBA Zahra												
SOUTH WEST												
Aquadulce, PBA Bendoc, PBA Kareema, Farah, Fiesta, PBA Rana, PBA Samira, PBA Zahra												

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 2 Faba bean variety agronomic guide.

Variety	Seed size	Seed colour	Plant height	Flowering time	Maturity	Lodging
Aquadulce	large	light buff	tall	late	mid-late	MS
PBA Bendoc	medium	light brown	medium	mid	early-mid	MS
PBA Kareema	large	light brown	tall	late	late	MS
Farah	medium	light brown-brown	medium	early-mid	early-mid	MS
Fiesta VF	medium	light brown-brown	medium	early-mid	early-mid	MS
PBA Marne	medium	light brown	medium	early-mid	early-mid	MR
Nura	small-med	light buff	short	mid	early-mid	MR
PBA Rana	med-large	light brown	med/tall	mid	mid	MR
PBA Samira	medium	light brown	medium	mid	mid	MR
PBA Zahra	med-large	light brown	med/tall	mid	mid-late	MR

Lodging resistance – see key used in Table 3

TABLE 3 Faba bean variety disease guide.

Variety	Ascochyta blight		Chocolate spot	Cercospora	Rust	PSbMV seed staining	*P. thornei*	*P. neglectus*
	Pathotype 1 (P1)	Pathotype 2 (P2)						
Aquadulce	MS	MS	MS	S	MS	S	MS	MR*p*
PBA Bendoc	RMR	RMR	S	S	S	-	MR*p*	MS*p*
PBA Kareema	MR	MR	MS	S	MRMS	S	-	-
Farah	RMR	S	S	S	S	S	MS	MR*p*
Fiesta VF	MS	MS	S	S	S	S	MS	MR*p*
Nura	RMR	RMR	MS	S	MS	VS	MS	MR*p*
PBA Marne	RMR	MRMS	S	S	MR	MR	MR*p*	MR*p*
PBA Rana	R	MRMS	MS	S	MS	MR	MS	MR*p*
PBA Samira	RMR	RMR	MS	S	MS	S	MRMS	MR*p*
PBA Zahra	R	MRMS	MS	S	MS	S	MS	MR*p*

Resistance order from best to worst: R > RMR > MR > MRMS > MS > MSS > S > SVS > VS.

p = provisional ratings - treat with caution. R = resistant, M = moderately, S = susceptible , V = very.

TABLE 4 Faba bean diseases.

Disease	Organism	Symptoms	Occurrence	Hosts	Control
Ascochyta blight	*Ascochyta fabae*	Large, light tan to grey lesions on leaves. Small black fruiting bodies develop within lesions. Centres of lesions may fall out, leaving holes in leaves. Sunken lesions on stem similar in colour to leaf lesions. Brown-black discolouration of grain.	Common in all faba bean growing areas in southern Australia. Most severe in wet seasons. Spores spread by wind and rain. Infected seed.	Faba bean, vetch.	Foliar fungicides. Resistant varieties. Crop rotation. Control volunteer plants. Clean seed.
Chocolate spot	*Botrytis fabae* *Botrytis cinerea*	Passive phase: small chocolate covered spots scattered over leaves. Aggressive phase: tissue around spots turns dark grey and black. Leaves die and blacken.	Occurs in all areas where beans are grown. Disease usually becomes established in late winter and becomes more severe as day temperatures increase during spring. Spores spread by wind and rain. Can destroy unprotected crops in wet seasons.	Faba bean, vetch, lentil, chickpea.	Foliar fungicides. Resistant varieties. Crop rotation. Control volunteer plants.
Cercospora leaf spot	*Cercospora zonata*	Irregular black lesions, with a distinct margin on the leaf. Easily confused with Ascochyta or Chocolate spot but distinguished by the concentric pattern within lesions.	Occurs in all areas where beans are grown.	Faba bean, vetch.	Foliar fungicides.
Rust	*Uromyces viciae-fabae*	Numerous small, orange-brown rust pustules, surrounded by a light yellow halo on the leaves of infected plants.	Most prevalent in northern Australia. Crops usually affected late in the season.	Faba bean, vetch.	Foliar fungicides. Crop rotation. Control volunteer plants.
Sclerotinia stem rot	*Sclerotinia trifoliorum* var. *fabae, Sclerotinia sclerotiorum*	Infection usually begins close to ground level and slimy wet rot extends into stem and down into the roots. Plants easily pulled from soil and have blackened base covered with cottony, white fungus growth. Usually isolated plants that suddenly wilt and collapse. Sclerotia on surface and within stem turn from white to black.	Rapid development of disease in wet, cool conditions. Foliar form of disease spread by air-borne spores. Fungus survives in the soil for many years.	Wide host range.	Crop rotation. Lower seeding rates, wider row spacing and good weed control.
Stem nematode	*Ditylenchus dipsaci*	Patches of malformed and stunted plants with curling leaves and water-soaked spots. Stem may die back, turning reddish-brown colour.	Most severe in wet seasons. Nematode can survive many years in seed, straw or soil.	Faba bean, pea, oat, wild oat. Infected seed straw or soil.	Seed test. Crop rotation.
VIRUS DISEASES					
SCSV	*Subterranean clover stunt virus*	Stunting, tip yellowing, small and thick leaves.	Prevalent in all bean growing areas, symptoms appear early on faba bean.	Sub clover, faba bean, lupin, lentil, chickpea, lucerne, soybean.	Managing aphids and weeds.
BLRV	*Bean leaf roll virus*	Interveinal yellowing, leaf rolling, stunting, leathery leaves.	Occurs in all bean growing areas.	The host range is limited to *Fabaceae*.	Managing aphids through seed dressing and weed control.
PSbMV	Pea seedborne mosaic virus	Can be symptomless or systemic dark and light green leaf mottle, leaf margins upright leaf blade reduced in size. Seeds have brown rings or line patterns on surface.	Occurs in all bean growing areas.	Host range is limited to *Fabaceae*	Virus free seed is recommended. Managing aphids.

TABLE 5 North Central and North East long term predicted faba bean yield expressed as a percentage of mean yield.

	North Central						North East		
Year		2013	2014	2015	2016	2017		2013	2014	2015
Mean yield (t/ha)		6.1	5.3	5.39	6.19	7.39		3.91	2.00	1.59
	No. trials	1	1	1	1	1	No. trials	1	1	1
Farah	5	90	86	101	92	94	3	102	109	94
Fiesta VF	5	92	89	99	97	95	3	101	106	92
Nura	4	96	96	105	81	-	3	91	101	104
PBA Bendoc	1	-	-	-	-	92	-	-	-	-
PBA Marne	5	107	100	100	93	103	3	95	98	112
PBA Rana	-	-	-	-	-	-	3	88	88	87
PBA Samira	5	102	107	105	100	100	3	102	97	102
PBA Zahra	5	100	107	113	95	99	3	105	104	105

TABLE 6 South West and Wimmera long term predicted faba bean yield expressed as a percentage of mean yield.

	South West					Wimmera					
Year		2013	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		3.37	2.95	5.58	4.61		3.62	1.51	0.67	3.25	4.35
	No. trials	1	1	1	1	No. trials	5	5	2	4	5
Farah	4	100	97	92	97	21	94	104	109	94	94
Fiesta VF	3	102	98	94	-	12	94	101	105	94	94
Fiord	-	-	-	-	-	2	-	-	-	90	99
Nura	4	115	100	101	107	21	96	93	104	84	98
PBA Bendoc	2	-	-	83	112	9	-	-	-	78	100
PBA Marne	4	76	96	97	92	19	106	102	104	108	105
PBA Rana	4	110	100	100	103	21	90	86	88	88	93
PBA Samira	4	116	106	98	108	21	102	98	101	93	100
PBA Zahra	4	124	105	109	111	21	104	101	101	95	104

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Jason Brand Agriculture Victoria, Horsham

Josh Fanning Agriculture Victoria, Horsham

Jeffrey Paull University of Adelaide

LUPIN

NEW VARIETIES

There are no new lupin varieties available for sowing in 2019.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps
- Crop Disease Au App
- NVT Long Term Yield Reports App

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- Growing lupin
- AG1347 Pulse disease guide

www.pulseaus.com.au
Pulse Australia has detailed information on growing pulses and lists all current emergency and minor use chemical permits.

VARIETY DESCRIPTIONS

(Þ) denotes Plant Breeder Rights apply
End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Narrow-leaf lupin – JENABILLUP(Þ)

Tall mid-flowering narrow-leaf lupin with early vigour. A high yielding variety that is MR to lodging and more suited to the medium to higher rainfall areas. It has a longer flowering window compared to Mandelup, making it less suitable for crop topping. It is MR to aphid colonisation and has the best tolerance available in narrow-leaf varieties for both brown leaf spot (MRMS), BYMV and black pod syndrome (MR). S to anthracnose, MS to stem phomopsis and R to pod/seed phomopsis. Poor tolerance of foliar Metribuzin. Released 2007. Seednet. EPR $2.30.

Narrow-leaf lupin – MANDELUP(Þ)

A tall, early flowering and maturing variety with high yield suited to low to medium rainfall zones. Suitable for crop topping. Mandelup may lodge in high rainfall zones. Good disease resistance package being MR to anthracnose, R to stem phomopsis, MRMS to pod phomopsis and MS to brown spot and CMV seed transmission. MR to aphids but less tolerant than PBA Jurien or Wonga. Good tolerance to Metribuzin. Pod shatter with delayed harvest and poorer seed germination rate and establishment with rain before harvest have been issues with Mandelup. Released 2004. Heritage Seeds. EPR $2.30.

Narrow-leaf lupin – PBA BARLOCK(Þ)

PBA Barlock is an early variety with slightly later flowering and maturity than Mandelup with a greater yield potential, reduced lodging and good resistance to pod shatter. Resistant to aphids. R to anthracnose and pod phomopsis, MR to stem phomopsis and CMV and MS to brown leaf spot. Similar Metribuzin tolerance to that of Mandelup and better than Wonga. Released 2014. Seednet. EPR $2.50

Narrow-leaf lupin – PBA BATEMAN(Þ)

Tall, early-flowering lupin variety with improved virus resistance. It offers significant yield improvements over current varieties in areas where virus infection from CMV and BYMV can cause significant yield loss to susceptible varieties when seasonal conditions are conducive to high aphid numbers. PBA Bateman has similar harvest grain loss risk and resistance to pod shatter to PBA Barlock. PBA Bateman has similar tolerance to Metribuzin as PBA Jurien. It is MR to anthracnose, MR to phomopsis, MS to brown spot and MR to BYMV, MRMS to CMV. Released 2017. Seednet. EPR $2.60.

Narrow-leaf lupin – PBA JURIEN(Þ)

An early maturing, early flowering variety, flowering slightly earlier than PBA Barlock. Very strong aphid (R) and disease resistance profile being resistant to anthracnose, phomopsis and grey spot and having tolerance of BYMV and black pod syndrome similar to Jenabillup. PBA Jurien is similar in height to Mandelup and is MS to lodging in high rainfall regions. Tolerance to Metribuzin is better than Mandelup. The seed size is similar to Mandelup and the alkaloid content is similar to PBA Gunyidi. Some reduced seed germination has been experienced when rain before harvest has affected seed quality. Developed by PBA. Released 2015. Seednet. EPR $2.50.

Narrow-leaf lupin – WONGA

Very good disease resistance profile, resistant to anthracnose, phomopsis and CMV seed transmission with medium height and lodging resistance. Best suited to medium rainfall districts, particularly when resistance to anthracnose and phomopsis is required. Very poor tolerance of Metribuzin. Released 1997.

Albus lupin – MURRINGO(Þ)

Murringo is a mid-flowering albus lupin suited to medium to high rainfall zones. It has a slightly longer maturity time to Luxor. Murringo is 100 per cent sweet and should not be grown within one kilometre of other albus varieties to avoid bitter contamination. MR to brown leaf spot, VS to anthracnose, MS to stem phomopsis and S to pod phomopsis. Moderate resistance to Pleiochaeta root rot. Released 2017. Seednet. EPR $3.20

TABLE 1 Optimal lupin sowing times for rainfall zones and soil types.

Rainfall zone	Optimum sowing time	
Average mm per year	Sands	Shallow sand over clay, sandy loams, loams
Below 350 mm	mid-April to early May	late April to early May
350 - 450 mm	early to mid-May	mid May
Above 450 mm	mid May	late May

TABLE 2 Lupin time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.

	April				May				June				July			
MALLEE																
Narrow-leaf: Jenabillup, Mandelup, PBA Barlock, PBA Jurien, Wonga																
Albus lupin: Murringo																
WIMMERA																
Narrow-leaf: Jenabillup, Mandelup, PBA Barlock, PBA Jurien, Wonga																
Albus lupin: Murringo																
NORTH CENTRAL																
Narrow-leaf: Jenabillup, Mandelup, PBA Barlock, PBA Jurien, Wonga																
Albus lupin: Murringo																
NORTH EAST																
Narrow-leaf: Jenabillup, PBA Barlock, PBA Jurien, Wonga																
Albus lupin: Murringo																
SOUTH WEST																
Narrow-leaf: Jenabillup, PBA Barlock, PBA Jurien, Wonga																
Albus lupin: Murringo																

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 3 Lupin variety agronomic and disease guide.

	Flowering time	Height	Lodging	Pod shattering	Aphid resist	Brown leaf spot	Pleiochaeta root rot	CMV seed transmit	Anthracnose	Phomopsis	
										Stem	Pod
NARROW-LEAF											
Jenabillup	M	T	MR	MS	MR	MRMS	R	MRMS	S	MS	R
Mandelup	VE	T	MS	MS	MR	MS	R	MS	MR	R	MRMS
PBA Barlock	E	S	MR	R	R	MS	-	MR	R	MR	R
PBA Bateman	VE-E	T	MRMS	MRMS	R	MS	-	MRMS	MR	MR	MR
PBA Jurien	VE	M	MS	MR	R	MS	-	MRMS	R	R	MR
Wonga	E-M	M	MR	R	R	MS	R	R	R	R	R
ALBUS LUPIN											
Murringo	M	M	R	MR	-	MR	MR	Immune	VS	MS	S

Flowering time; VE=very early, E=early, M=mid, L=late

Height; S=short, M=medium, T=tall

Lodging and disease reactions; 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

TABLE 4 Lupin diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
FUNGAL DISEASES					
Brown leaf spot	*Pleiochaeta setosa*	Dark spots on cotyledons leaves and pods, often web like on leaves, infected leaves drop off, lesions may girdle stem.	Very common but losses usually minor in dry areas, yield loss can be significant in cool damp areas.	Spores survive in soil and lupin trash. Rain splash and windblown rain spread the disease.	Fungicide seed dressings, crop rotation, variety selection, early sowing, sow into cereal stubble.
Pleiochaeta root rot	*Pleiochaeta setosa*	Browning and rotting of tap and lateral roots, seedling plant death.	Serious reduction in lupin plant density and vigour.	Spores in soil infecting roots usually at seedling stage.	Minimum 4 year rotation between lupins, sowing 4-5 cm deep to avoid spore layer, fungicide seed dressings.
Rhizoctonia	*Rhizoctonia spp.*	Bare patches in crop, spear tipped root ends or hypocotyl rot and stain.	Root rot can be severe in distinct patches, reduces stand density, favoured by minimum tillage, wet soils and mild conditions.	Soil borne infection with wide host range, survives as fungal fragments in soil and plant debris.	Tillage prior and during sowing below seed depth, rotation has no effect.
Anthracnose	*Colletotrichum lupini*	Dark brown lesions containing pink/orange spore masses on stems, pods and occasionally leaves. Lesions cause bending and twisting of stems and pods and occur in crook of bend.	Severe infections can result in severing of stems or total pod abortion resulting in complete crop failure.	Seed-borne infection. Spread in crop by rain splash and wind.	Clean seed and machinery, resistant varieties, fungicide seed dressings.
Sclerotinia	*Sclerotinia sclerotiorum*	White fungal growth containing black sclerotia in upper stem, branches or colonising pods. Stem death above lesion. Sclerotia contaminating harvested seed.	Most common in higher rainfall or wetter regions, particularly in canola growing regions.	Sclerotia survive in soil and trash for several years. Wide host range in broad leaf crops.	Avoid lupins following broad leaf crops or pasture (particularly canola). No variety resistance.
VIRUS DISEASES					
CMV	Cucumber mosaic virus	Leaves are pale, bunched, and down curled with faint mosaic pattern.	Early widespread infection severely reduces yield. Minor infections prevent use of harvested grain as seed.	Seed borne infection in narrow-leaf lupin, aphid vectored in crop.	Sow clean seed, use a seed test, high sowing rates and cereal barriers around crops reduce aphid transmission.
BYMV Black pod syndrome	Bean yellow mosaic virus	Brown necrotic streaks as plant dies back from growing point of stem, shepherd crook of stem, pods blackened and flat, leaves yellow, plants wilt and die.	Can be severe in higher rainfall areas, usually transmitted from pasture.	Aphid vectored, many hosts (including pasture legumes), seed borne in L. albus.	High plant density, cereal barrier, control weed and volunteer lupins, avoid sowing adjacent to legume pastures.

TABLE 5 Long term predicted lupin yield expressed as a percentage of mean yield.

	Mallee						North Central		
Year		**2013**	**2014**	**2015**	**2016**	**2017**		**2013**	**2014**
Mean yield (t/ha)		**0.41**	**1.04**	**0.91**	**1.69**	**1.06**		**2.53**	**2.33**
	No. trials	**1**	**2**	**2**	**1**	**1**	**No. trials**	**1**	**1**
Coromup	5	-	92	89	103	-	2	90	94
Jenabillup	7	111	91	90	96	113	2	98	103
Jindalee	2	-	-	69	-	-	-	-	-
Mandelup	7	105	115	105	105	96	2	102	93
PBA Barlock	7	88	98	100	94	76	2	101	111
PBA Bateman	3	-	-	105	120	-	-	-	-
PBA Gunyidi	7	113	100	98	103	98	2	107	113
PBA Jurien	7	113	105	106	103	77	2	105	117
Quilinock	7	85	101	94	91	108	-	-	-
Wonga	7	83	92	89	82	78	2	91	94

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CHICKPEA

If dry conditions continue in parts of the state residual herbicides are likely to persist into 2019. Growers will need to take this into consideration when selecting paddocks and varieties for 2019. Some growers may be tempted to resow chickpeas into the same paddock after a failed crop. This is not recommended.

NEW VARIETIES

No new chickpea varieties were released for 2019 sowing in Victoria.

Two new kabuli chickpea lines from the Pulse Breeding Australia Chickpea program are being multiplied for anticipated variety release in spring 2019, for commercial production in 2020. CICA1156 is a medium seeded kabuli with larger seed size than Genesis 090 and higher yield than Genesis 090 in medium rainfall Victorian environments (yield >2 t/ha). It will be commercialised by Seednet. CICA1352 is a large seeded kabuli (larger than Genesis Kalkee) with higher yield than Genesis Kalkee. It will be commercialised by PB Seeds. Both lines are moderately susceptible (MS) to southern ascochyta blight isolates, similar to Genesis 090.

MORE INFORMATION

www.nvtonline.com.au
Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps
- Crop Disease Au app
- NVT Long Term Yield Reports app

agriculture.vic.gov.au/agriculture/grains-and-other-crops
- Growing chickpea
- AG1347 Pulse disease guide

www.pulseaus.com.au
Pulse Australia has detailed information on growing pulses including:
- Chickpea disease management strategy
- Current emergency and minor use chemical permits

VARIETY DESCRIPTIONS

(ϕ) denotes Plant Breeders Rights apply.

End Point Royalty (EPR) 2018-19 quoted $/tonne ex-GST.

Desi type – AMBAR(ϕ)

MS to ascochyta, strategic fungicide applications (3-4 sprays) required throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Ambar is an early flowering and maturing variety suitable for short season environments. Seed is smaller than Howzat and PBA Slasher but has a uniform grain size and tan-brown colour that assists marketing. Released 2012. Heritage Seeds. EPR $4.

Desi type – NEELAM(ϕ)

MS to ascochyta, strategic fungicide applications (3-4 sprays) required throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Mid flowering and mid maturing variety. Seed is smaller than Howzat and PBA Slasher. Released 2012. Heritage Seeds. EPR $4.

Desi type – PBA MAIDEN(ϕ)

S to ascochyta blight, will require regular strategic application of fungicides (every 2-3 weeks) throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Large angular seed size, yellow-tan in colour, is suitable for the whole seed market. Mid flowering and mid maturity. Growers are advised to investigate delivery and marketing options prior to growing this variety due to its unique and favourable seed characteristics. Released 2013. Seednet. EPR $4.

Desi type – PBA SLASHER(ϕ)

MS to ascochyta, strategic fungicide applications (3-4 sprays) required throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. PBA Slasher has mid-flowering and maturity. Seed is medium size tan-brown which has excellent milling quality, suitable for both split and whole seed markets. Released 2009. Seednet. EPR $4.

Desi type – PBA STRIKER(ϕ)

S to ascochyta, will require regular strategic application of fungicides (every 2-3 weeks) throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Excellent adaptation to short season environments due to early flowering and maturity. Medium seed size with excellent milling quality. Released 2012. Seednet. EPR $4.

Kabuli type – ALMAZ

MS to ascochyta, strategic fungicide applications (3-4 sprays) required throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Almaz will require at least three fungicide applications to be successfully grown in Victorian growing conditions. Seed size is similar to PBA Monarch (8-9 mm) but smaller than Genesis™ Kalkee. Yield is lower than PBA Monarch. Best adapted to the traditional kabuli growing areas. Released 2005. Seednet. EPR $6.50.

Kabuli type – GENESIS™ 079

S to ascochyta and will require strategic application of fungicides (every 2-3 weeks) throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. It is a high yielding, small seeded type (6-7mm) with relatively high yields in short season environments. Genesis™ 079 is the earliest flowering and maturing kabuli variety available. Released 2009.

Kabuli type – GENESIS™ 090

MS to ascochyta and will require strategic fungicide applications (3-4 sprays) throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Genesis™ 090 has a small seed (7-8 mm), approximately 1 mm smaller than Almaz or PBA Monarch. It has the potential to be grown as a good alternative to desi chickpeas or as a higher yielding but lower value alternative (smaller seed) to kabulis such as Almaz, PBA Monarch and Genesis™ Kalkee. Released 2005. PB Seeds. EPR $5.

Kabuli type – GENESIS™ KALKEE

MS to ascochyta and will require strategic fungicide applications (3-4 sprays) throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Seed size is larger than Kaniva and Almaz (predominantly 9 mm) with an erect plant habit. Released 2012. PB Seeds. EPR $5.

Kabuli type – PBA MONARCH

S to ascochyta, will require regular strategic application of fungicides (every 2-3 weeks) throughout the growing season. Treat seed with a thiram based fungicide to prevent seed transmission of ascochyta on emerging seedlings. Particularly suited to shorter season environments. Medium seed size (8-9 mm) is larger than Genesis™ 090 and similar to Almaz. Highest yielding medium sized kabuli. A semi-spreading plant similar to PBA Slasher with some susceptibility to lodging particularly when biomass is high. Released 2013. Seednet. EPR $6.50.

TABLE 1 Chickpea time of sowing guide.

This table is a guide only and has been compiled from observations of the breeder and departmental agronomists.

MALLEE	April				May				June				July			
Desi: Ambar, PBA Maiden, PBA Slasher, PBA Striker																
Kabuli: Genesis 079, Genesis 090, PBA Monarch																
WIMMERA	**April**				**May**				**June**				**July**			
Desi: Ambar, PBA Maiden, PBA Slasher, PBA Striker																
Kabuli: Genesis 079, Genesis 090																
Kabuli: Almaz, Genesis Kalkee, PBA Monarch																
NORTH CENTRAL	**April**				**May**				**June**				**July**			
Desi: Ambar, PBA Maiden, PBA Slasher, PBA Striker																
Kabuli: Genesis 079, Genesis 090, PBA Monarch																

Yellow = earlier than ideal.
Green = optimum sowing time.
Red = later than ideal but acceptable.

TABLE 2 Chickpea variety agronomic guide.

Variety	Ave 100 seed wt. (g)	Seed size group	Early growth	Flowering	Maturity	Height	Lodging resistance
DESI CHICKPEA							
Ambar	16	small	poor-mod	early	early	short-mid	MS
Neelam	17	medium	mod	mid	mid	short-mid	MS
PBA Maiden	24	med-large	mod	mid	mid	short-mid	MS
PBA Slasher	18	medium	poor-mod	mid	mid	short-mid	MS
PBA Striker	22	medium	good	early	early	short-mid	MS
KABULI CHICKPEA							
Almaz	38	medium	mod	mid-late	late	mid-tall	MR
Genesis 079	24	small	good	early	early	short	MR
Genesis 090	31	small	good	mid	mid-late	mid	MR
Genesis Kalkee	45	large	good	late	late	tall	R
PBA Monarch	40	medium	poor-mod	early	early	mid	S

Lodging resistance - see key used in Table 3

TABLE 3 Chickpea variety disease guide.

All chickpea varieties are now rated as S or MS to foliar Ascochyta blight infection. All chickpea crops will need to be monitored for ascochyta during the growing season and sprayed if disease is detected to prevent spread to pods.

Variety	Botrytis grey mould	Ascochyta blight Foliage /Stem	Ascochyta blight Pod	*P. thornei*	*P. neglectus*
DESI CHICKPEA					
Ambar	S	MS	S	MS	MRMS
Neelam	S	MS	S	MS	MRMS
PBA Maiden	S	S	S	MRMS	MRMS
PBA Slasher	S	MS	S	MRMS	MRMS
PBA Striker	S	S	S	-	MRMS
KABULI CHICKPEA					
Almaz	S	MS	S	VS	MRMS
Genesis 079	MS	S	S	MS	MRMS
Genesis 090	S	MS	S	MS	MRMS
Genesis Kalkee	S	MS	S	MS	MRMS
PBA Monarch	S	S	S	MSS	MRMS

R = Resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, p = provisional

TABLE 4 Chickpea diseases.

Disease	Organism	Symptoms	Occurrence	Hosts	Control
FUNGAL DISEASES					
Ascochyta blight	*Ascochyta rabiei*	Pale brown lesions on leaves, stems and pods. Lesions may have a grey centre containing small black fruiting bodies. Infected stems wither and break.	Occurs in all regions. Affects both kabuli and desi types. Most severe in spring.	Chickpea.	Fungicide seed dressing, foliar fungicides, rotation, avoid susceptible varieties, avoid early sowing.
Botrytis grey mould	*Botrytis cinerea*	Poor emergence and death of young plants. Soft rot at the base of the stem. Grey mould growth on leaves, stems and pods. Lodging of plants in dense crops. Discolouration of seed with grey mould.	Occurs in all regions. Affects both kabuli and desi types. Most severe in wet seasons. Dense crops are more likely to be affected.	Chickpea, most pulses, including lentil and faba bean.	Fungicide seed dressings, lower plant densities, avoid early sowing.
Sclerotinia	*Sclerotinia sclerotiorum*	Scattered dead plants within a crop. Cottony white fungal growth on the lower stems of dead plants. Soft rot and white mould on stems and pods.	Occurs in all chickpea growing regions. Most severe in wet seasons where chickpea is planted in fields recently cropped to chickpea.	Most pulses, oilseeds and broadleaf weeds.	Crop rotation. (Seed dressings of no benefit.)
Damping-off	*Pythium spp.*	Poor crop establishment under wet conditions. Seed rotting in the ground. Sudden death of young seedlings.	Problem in all regions, particularly in soils that become very wet just after sowing. More severe on kabuli than desi chickpea.	Chickpea, most pulses.	Fungicide seed dressings, avoid poorly drained soils.
Phytophthora	*Phytophthora megasperma*	Plants suddenly wither and die, particularly after waterlogging. Dark brown to black discolouration of the tap root.	Most serious disease in northern Australia. May be a problem in poorly drained soils in southern Australia under wet conditions.	Chickpea, lucerne.	Resistant varieties.
Phoma blight	*Phoma medicaginis var. pinodella*	Blackening of the stem near ground level. Dark, tan coloured lesions on leaves, stems and pods.	Common in most chickpea growing regions. Most severe in wet seasons.	Most legumes.	Crop rotation.
Root lesion nematode	*Pratylenchus thornei, P. neglectus*	Ill-thrift, lack of branching of root system, small dark stripes on roots.	Favoured by wheat in rotation with chickpea, medic and vetch.	Wheat, chickpea, medic, vetch, narbon bean.	Crop rotation (predictive soil test available).
VIRUS DISEASES					
AMV	Alfalfa mosaic virus	Tip necrosis. The leaves and stems of desi varieties become red/brown. The leaves and stems of kabuli varieties turn yellow.	Occurs in all chickpea growing areas. Seasons and districts with major aphid flights.	Wide host range including most pulses, some horticultural plants and weeds.	Virus-free seed. Resistant varieties.
CMV	Cucumber mosaic virus	Yellowing, stunting, offshoots. The leaves and stems of desi varieties become red/brown. The leaves and stems of kabuli varieties turn yellow.	Prevalent in chickpea growing regions. Seasons and districts with major aphid flights.	Very wide host range, including most pulses, pastures, horticultural crops and weeds.	Virus-free seed. Resistant varieties.
TuYV (previously BWYV)	Turnip yellows virus (previously Beet western yellows virus)	Yellowing, stunting, offshoots. The leaves and stems of desi varieties become red/brown. The leaves and stems of kabuli varieties turn yellow.	Occurs in all chickpea growing areas. Seasons and districts with major aphid flights.	Very wide host range, including most pulses, brassicas and weeds.	Managing aphids and weeds, resistant varieties.

TABLE 5 Long term predicted chickpea yield expressed as a percentage of mean yield.

DESI CHICKPEA												
	Mallee						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		1.15	0.71	0.28	1.51	1.82		1.52	0.83	0.56	1.94	1.67
	No. trials	4	4	4	2	3	No. trials	3	3	1	2	2
Ambar	17	104	102	108	116	104	11	106	96	102	110	101
Genesis 079	17	114	121	133	117	98	11	93	104	124	86	90
Genesis 090	17	102	107	111	100	102	11	117	108	107	115	112
Genesis 509	4	94	89	88	-	98	7	125	103	91	118	127
Genesis 836	4	97	93	90	-	95	7	91	97	96	86	98
Howzat	3	101	102	100	-	-	6	82	99	103	82	-
Neelam	17	105	109	118	112	105	11	126	106	109	126	117
PBA Boundary	4	101	94	96	-	94	7	92	95	99	82	100
PBA HatTrick	4	99	95	93	-	95	7	89	98	98	83	96
PBA Maiden	17	99	105	102	98	100	11	97	107	103	98	96
PBA Seamer	3	-	93	93	-	97	5	-	103	96	105	116
PBA Slasher	17	105	108	114	115	104	11	108	102	107	110	101
PBA Striker	17	109	120	125	116	100	11	90	108	120	88	86
KABULI CHICKPEA												
	Mallee						Wimmera					
Year		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		1.09	0.72	0.27	1.51	1.55		1.52	1.07	0.56	1.94	1.67
	No. trials	3	3	3	2	2	No. trials	3	2	1	2	2
Almaz	13	90	78	73	91	98	10	104	89	81	109	108
Genesis 079	13	116	124	135	117	102	10	93	106	124	86	90
Genesis 090	13	100	107	110	100	105	10	117	108	107	115	112
Genesis 114	3	94	-	-	-	-	6	108	91	85	99	-
Genesis 425	-	-	-	-	-	-	6	106	104	103	100	109
Genesis Kalkee	13	100	93	90	75	93	10	103	100	97	92	111
PBA Monarch	13	113	123	127	94	96	10	93	114	122	80	96

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NOTES

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