

2018 VICTORIAN WINTER CROP SUMMARY



VICTORIA



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

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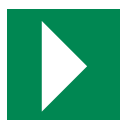
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www.grdc.com.au/NVT-Victorian-Winter-Crop-Summary
Remember to update it each March

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THE WINTER CROP SUMMARY

This publication summarises information on current varieties of the major winter crops grown in Victoria. Sources of additional information are listed in each chapter. Local advisers are also a key resource for information relevant to individual localities.

This publication aims to prompt growers to ask themselves, 'Am I growing the best variety for my situation?' Use it as a guide for discussion with consultants, advisers and marketing agents.

Thank you to the Grains Research and Development Corporation (GRDC) for its support in making this guide available to Victoria.

National Variety Trials (NVT)

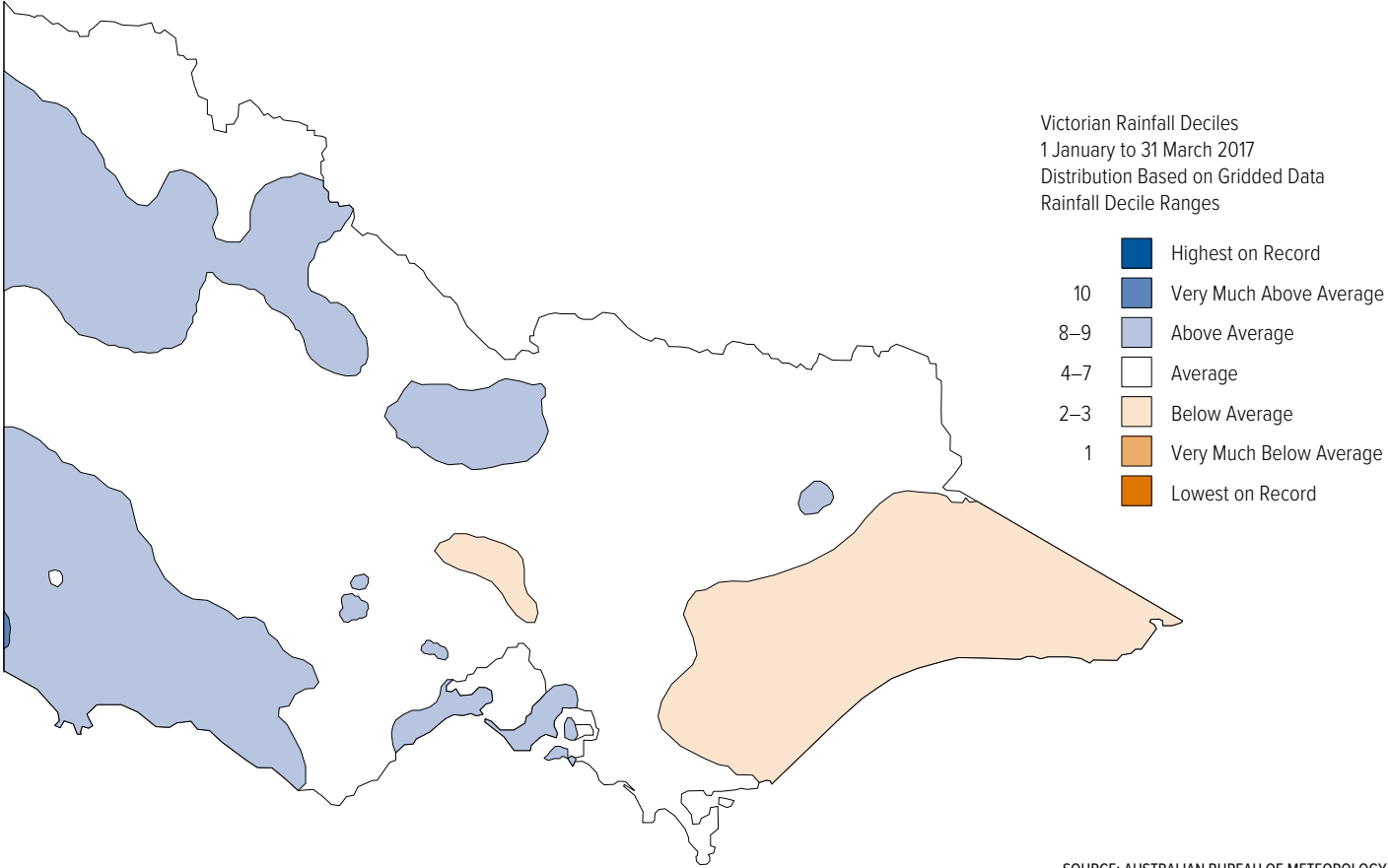
The majority of variety trials presented in this book are sourced from the NVT program. NVT also provide data from some breeding trials to add to the information available. In Victoria, NVTs are fully funded by the GRDC and in 2017 were contracted to three Service Providers: Eurofins, Birchip Cropping 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.

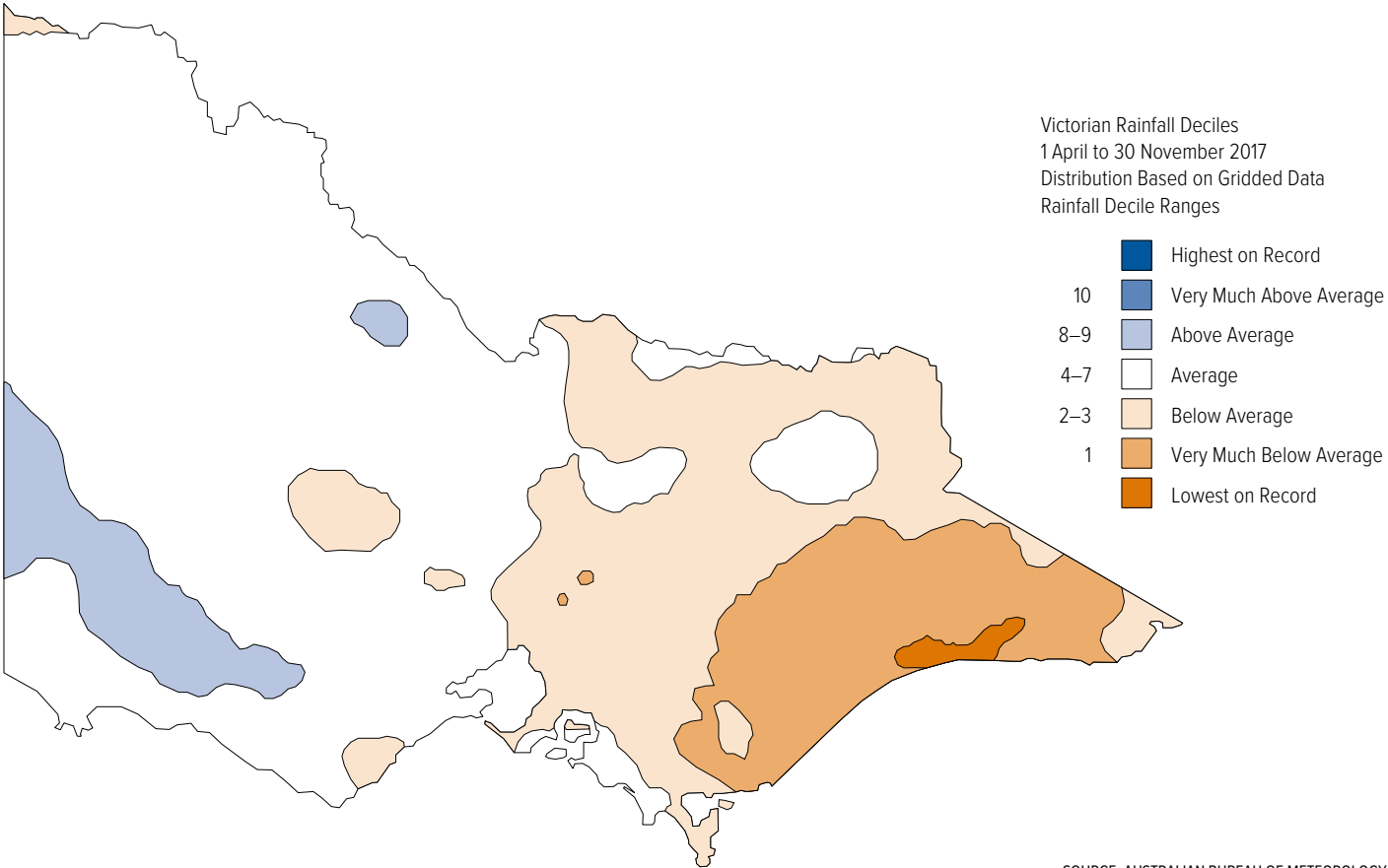
It is acknowledged that an ongoing project of this type would not be possible without the cooperation of farmers prepared to contribute sites, and who often assist with the management of trials on their property.

FIGURE 1 2017 Victorian rainfall deciles for the pre-season (January to March).



SOURCE: AUSTRALIAN BUREAU OF METEOROLOGY

FIGURE 2 2017 Victorian rainfall deciles for the growing season (April to November).



SOURCE: AUSTRALIAN BUREAU OF METEOROLOGY

INTRODUCTION

THE SEASON

Season 2017

After a wet 2016, much of the state entered 2017 with good soil moisture. Most cropping regions also had average rainfall leading into the growing season, with a large part of the Mallee and the South West receiving above average pre-season rainfall (Figure 1). With such a good lead up some dry sowing occurred in March and a near perfect break at the end of April provided good establishment conditions for crops. Gippsland was the exception last season, with a drier start to the season that continued throughout 2017.

High stubble loads from 2016 proved a challenge at sowing. Accompanied by high mouse numbers during autumn, this saw an increased number of growers burning stubble, particularly in the Wimmera - a departure from common practice. Mouse activity also resulted in widespread baiting across the Wimmera-Mallee. Mouse pressure was variable from paddock to paddock, with higher numbers in paddocks where high levels of residue remained and in barley stubble where heads were lost in 2016. Heavily grazed paddocks generally had lower mouse activity. Mild temperatures meant activity continued into June in the Wimmera with reports of some paddocks being baited up to three times.

Soil moisture and the timely break resulted in good emergence, but frosts slowed growth and limited spraying opportunities. The majority of Victoria was sown by the end of May with the remainder finished by the end of June. The tap turned off in June across the west of the state with some areas experiencing their lowest June rainfall on record. Drier conditions benefited Wimmera and South West growers to complete their cropping programs in a timely fashion.

July brought slightly below average rainfall in many areas, with parts of the Mallee in particular looking for moisture. Despite drier winter conditions, crops which started the season with full moisture profiles were generally able to hang on. This set growers up for average to above average yields dependent on a mild spring and no major stresses. Some crops in the Western District and Wimmera were affected by waterlogging, but generally not as badly as in 2016.

August was wetter, with rainfall ranging between decile 7 to 10 across the Wimmera-Mallee and average rainfall in the North Central region. August also brought the first of the major stresses for crops, starting in the Mallee with the first cereal stem frost damage. Wheat was seemingly more affected than barley, with losses reported of up to 30 per cent in some early sown crops and 5 to 15 per cent in crops sown after May 1. Due to dry seasonal conditions, Gippsland crops entered flowering and grain fill under stress with soil moisture reserves running out.

Winter seemed to hang around with cooler minimum temperatures continuing into spring, potentially a sign of what was to come. For Wimmera growers, frosts in September caused some damage to canola, lentils and barley. Rainfall was low in the north and soil moisture rapidly declined. Mouse activity also increased in September, with higher pressure in paddocks where bait wasn't applied early and next to fallow paddocks. Mice caused very minor damage to most heading crops in the Wimmera-Mallee, some of the worst affected paddocks were baited.

Hay cutting started in late September in the Mallee and by mid October in the Wimmera. Barley harvest got underway in the Mallee around the last week of October, with North Central and Wimmera growers getting the header out in the second week of November.

A very late frost on November 3 had major impacts on Wimmera pulse crops and Western District cereals, particularly between Skipton and Lake Bolac. Late frosts can be very unforgiving of crops at any growth stage and often sowing date can have little effect on the losses.

The first of two major rain events occurred on November 16, halting harvest which had only just begun in the Wimmera, North West and North Central. Falls of between 20 mm and 70 mm were recorded across the major cropping zones of Victoria. Just as headers got cracking again, growers prepared to weather a second major rainfall event with forecasted falls of up to 250 mm in some areas. Rainfall totals were lower than anticipated, ranging from 40mm at Dimboola to 139 mm at Echuca, with totals increasing moving eastward. Generally, a dry soil profile beforehand, and good drying conditions afterwards, meant that harvest could resume again within three to seven days.

Pre-harvest sprouting was a concern after these two rainfall events, and receival sites tested cereals for falling numbers, with downgrades of milling grades to General Purpose grades. Isolated hail storms across northern Victoria were common during November and December resulting in a few insurance claims.

Despite the usual array of stresses throughout the 2017 season, crops yielded well, ranging from average to above average yields for many.

Looking forward to 2018

Late storms which frustrated growers will have bolstered depleted deep soil moisture reserves drawn down in most areas. For many, summer volunteer and weed control started before harvest was finished and will continue right up to sowing. This will help to preserve soil moisture reserves, save nutrients and minimise the green bridge for pests and diseases. The 2017 season really showed the value of a full profile with moisture quickly being drawn down as crops reached stem elongation.

Seed that was rain damaged at harvest may experience germination or vigour problems at sowing. Growers will need to conduct germination and vigour tests on retained seed to identify the best seed to use. Careful attention will need to be paid to pre-emergent herbicides, seed dressings, coleoptile length, vigour and sowing depth, to prevent poor establishment.

The 2017 season threw almost everything at growers and was a reminder that while there is a natural desire to get everything in the ground while the weather is warm and the soil moist, spreading sowing time can be a useful technique to minimise risk. Likewise, growers are encouraged to use varieties and crop types with a range of maturities and frost sensitivities to minimise damage.

Frost susceptibility rankings

Frost susceptibility rankings for wheat and barley varieties are available on the NVT website in the format of relative frost values. Growers can use the interactive tool to select a set of either wheat or barley varieties, adapted relative to their production region, to display graphically using an interactive tool. This enables growers to manage the frost risk of new varieties based on how known varieties of similar ranking are currently managed.

The rankings are not due to difference in phenology/flowering time, and refer to the relative susceptibility of varieties flowering at the same time during a frost event. They do not take into account the frost risk associated with a particular variety flowering on a certain sowing date. Selecting an appropriate maturity for a particular sowing time is still the best option in limiting damage resulting from frost. Hence the reproductive frost ranking needs to be considered in relation to the relative time of sowing and flowering time prediction.

No current wheat or barley varieties are completely frost tolerant. Under severe frost (for example -8°C) or multiple moderate frosts (several nights of -2° to -4°C), all varieties tested to date are equally susceptible, resulting in up to 100 per cent sterility in flowering

heads. As a rule, oats are 4°C and barley 2°C more frost tolerant than wheat.

Growers should continue to select varieties based on the best yield, maturity, agronomic and disease performance information from various sources such as regional agronomy trials and NVT. Once a variety has been adopted, use the preliminary reproductive frost susceptibility rankings to fine tune frost risk management, based on how known varieties are currently managed with a similar ranking.

For example, Wyalkatchem, which is more susceptible to frost than Yitpi, is managed differently in terms of sowing date, position in landscape and the associated frost risk; thereby trying to maximise production while also minimising frost risk. Ensuring that flowering occurs within the optimum flowering window to minimise frost, heat and terminal drought continues to be critical, and the reproductive frost rankings need to be used within this context.

This research has been funded as part of the GRDC's multidisciplinary National Frost Initiative.

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.

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. 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 datasets and make more refined, relevant and robust predictions about the relative performance of each variety across different locations and seasons. Readers can now use this more detailed data to better understand a variety's performance over a number of 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 an online 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. The app 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

REVIEW OF 2017

Season

The area sown to wheat moderately decreased in 2017 compared to 2016, potentially influenced by low prices at sowing. Victorian wheat growers had an excellent start to the season with good soil water reserves and a timely break.

Frequent rainfall throughout the first half of the season and proactive disease control meant many growers were looking forward to above average wheat yields for 2017. A dry June resulted in wheat crops quickly using soil moisture, overall crops were generally well supported by stored moisture, with the exception of the Mallee where crops were looking for moisture by August.

Mallee crops yielded well and achieved average to above average yields despite August frosts impacting yields with reports of between 5 and 30 per cent yield loss.

In the Wimmera, where crops were not impacted by frost growers generally achieved above average yields.

In the South West, November frosts had large impacts on wheat crops, particularly between Skipton, Tatyoon and Lake Bolac with growers reporting losses averaging 40 per cent. Frosts also resulted in quality downgrades due to low test weights and high screenings. South West wheat crops yielded up to 6 t/ha where crops were not frosted, with good quality, making ASW and H2 grades. Where crops were affected by frost, yields were reduced to 2 t/ha and lower in some cases and downgraded to Australian General Purpose due to high screenings.

Two large rainfall events in November resulted in the implementation of falling number tests at receipt sites and downgrades from Australian Hard to General Purpose classifications in affected crops. The Mallee was an exception with a higher percentage of hard grades delivered compared with other regions due to crops being further advanced prior to rainfall and good drying conditions post rainfall events.

Prices increased from sowing to a mid July peak, before dropping off as the season progressed. At harvest quality downgrades put some pressure on feed prices while pricing for higher grades remained firm.

Disease and pest issues

Following the very wet spring of 2016, cereal disease levels started high in 2017, but were generally well controlled through proactive disease management. During 2017, Agriculture Victoria field trials demonstrated yield losses greater than 20 per cent from both root and foliar diseases, highlighting the potential for yield loss when appropriate control is not implemented.

Septoria tritici blotch (STB) continued to increase in importance in Victoria, becoming widespread in both the Wimmera and South West.

Yellow leaf spot was common in Wimmera and Mallee wheat crops, particularly where wheat was planted on wheat stubble. Agriculture Victoria field trials measured yield loss of 15 per cent to yellow leaf spot in susceptible varieties grown in the Wimmera.

Rusts were proactively managed across Victoria which minimised losses, and powdery mildew was widespread in the Wimmera and Mallee, particularly in susceptible varieties (e.g. Scepter).

Cereal cyst nematode (CCN) caused issues in the Mallee, where nematode numbers were allowed to increase. An Agriculture Victoria field trial in the Wimmera showed yield losses of 20 per cent where CCN levels were allowed to increase.

Eyespot was reported in some wheat crops in the high rainfall zone.

Russian wheat aphid (RWA) was well managed by seed treatments and follow up insecticide sprays where required. There was a higher incidence of Barley yellow dwarf virus in wheat crops compared with 2016. Wheat streak mosaic virus was also detected, but at low incidences.

LOOKING FORWARD TO 2018

New varieties

The new wheat varieties added this year are Chief CL Plus, DBA Vittaroi, Longsword, LRPB Havoc, RGT Accroc and RGT Zanzibar.

Quality changes

Wheat Quality Australia (WQA) has upgraded Coolah to AH.

Disease and pest management

Cereal diseases will need proactive management during 2018. Following two favourable seasons there will be higher than usual levels of stubble-borne inoculum and rust will require control if there is a green bridge.

Septoria tritici blotch (STB) is best controlled using an integrated approach that combines variety choice (avoiding susceptible cultivars - see Table 3), paddock selection (avoid infected wheat stubble) and the timely use of fungicides. If a foliar fungicide is needed, it should be applied early in disease development.

Yellow leaf spot (YLS) is best controlled by avoiding sowing susceptible varieties into paddocks with infected stubble present. The pressure from YLS will be greatly reduced if susceptible (S) and very susceptible varieties (VS) are replaced with those rated moderately susceptible (MS) or better. Complete resistance is not needed to achieve sustainable control of this disease.

Root disease levels are likely to have increased with favourable spring conditions during the last two seasons. A PREDICTA® B soil test can be used prior to sowing to identify potential root disease issues before they affect crop yield. Contact your local agronomist to organise testing. Most cereal root and crown diseases (take-all, crown rot, cereal cyst nematode and root lesion nematode) can be controlled with a one or two-year break from susceptible hosts. It is important that break crops are kept free of grass weeds to be effective.

Bunts and smuts should be controlled every year. Annual seed treatments with a fungicide provide cheap and effective control of bunt and smut diseases. Without treatment, bunt and smut can increase rapidly, resulting in unsaleable grain. Good product coverage of seed is essential for control. Note that fertiliser treatments do not control bunt and smuts, so additional seed treatments are required. Clean seed should be sourced if a seed lot is infected.

Frost

Frost susceptibility rankings are available on the NVT website in the format of relative frost values. These rankings are explained in more detail in the Introductory chapter of this book.

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

<http://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:

Ⓛ 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[Ⓛ]

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*. Low screenings and SVS to pre-harvest sprouting. Released 2007. Marketed by AGT. EPR \$2.50.

Bread wheat – BECKOM[Ⓛ]

AH quality. Semi-dwarf awned wheat with mid-season maturity and wide adaptation. 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[Ⓛ]

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.

NEW Bread wheat – CHIEF CL PLUS[Ⓛ]

APW quality. A mid-maturing variety with broad adaptation and low screenings. 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 and marketed by InterGrain. EPR \$4.25.

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. Low screenings and tolerant to acid soils. 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. Similar to EGA Gregory in most traits, but slightly longer maturity and improved straw strength. Stem rust MR, stripe rust RMR, leaf rust MR, yellow leaf spot MSS, septoria MSS and CCN S. Tolerant of acid soils, high test weight and low screenings. Released 2016, tested as V07176-69. Marketed by AGT. EPR \$3.50.

Bread wheat – CORACK[Ⓛ]

APW quality. An early to mid-maturing short semi-dwarf variety with good straw strength and low screenings. 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. Good test weight and MS to screenings. 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. Boron tolerant. 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. Moderately tolerant of boron toxicity and MS to screenings. Released 2007. Marketed by Nuseed. EPR \$2.95.

Bread wheat – DS DARWIN[Ⓛ]

AH quality. Early to mid-season maturity and broadly adapted 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. Wide sowing window with low screenings. 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. Good sprouting and lodging tolerance. 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. Low screenings and MS to lodging. 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.

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. Produces large grain with good test weight and has a low susceptibility to screenings. 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. Has a long coleoptile and flexibility in sowing time similar to Yitpi. Has outperformed Yitpi in dry seasons. 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. Tolerant to boron and acid soils. 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. Fast maturity can allow extra time to manage weeds prior to sowing. SVS to pre-harvest sprouting. Released 2015. Bred and marketed by AGT. EPR \$3.80.

Bread wheat – KIORA

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[Ⓛ]

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. SVS to pre-harvest sprouting. Released 2011. Bred and marketed by AGT. EPR \$3.55.

Bread wheat – LRPB ARROW[Ⓛ]

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. Low screenings. Released 2016, tested as LPB11-1728. Marketed by Pacific Seeds. EPR \$3.

Bread wheat – LRPB COBRA[Ⓛ]

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. Compact plant height, moderately resistant to lodging, but SVS to pre-harvest sprouting. Released 2012. Marketed by Pacific Seeds. EPR \$3.50.

NEW Bread wheat – LRPB HAVOC[Ⓛ]

AH quality. Early to mid-season with quicker maturity and faster grain filling than its Mace parent and suited to low to medium rainfall areas of Victoria. Stem rust S, stripe rust MR, leaf rust S, yellow leaf spot MRMS, septoria S and CCN S. Compact plant height and good lodging tolerance. Released 2017. Marketed by Pacific Seeds. EPR \$4.

Dual purpose wheat – LRPB KITTYHAWK[Ⓛ]

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. Improved test weight over EGA Wedgetail. Released 2016, tested as LPB11-0140. Marketed by Pacific Seeds. EPR \$4.25.

Bread wheat – LRPB LANCER[Ⓛ]

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. Compact plant height and moderate lodging resistance. Released 2013. Marketed by Pacific Seeds. EPR \$4.25.

Bread wheat – LRPB PHANTOM[Ⓛ]

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. MS to lodging. Released 2012. Marketed by Pacific Seeds. EPR \$3.80.

Bread wheat – LRPB SCOUT[Ⓛ]

AH quality. An awned white chaff variety with mid-season maturity and has wide adaptation across Victoria. 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[Ⓛ]

APW quality. Mid-long season variety. Broadly adapted 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. MR to lodging and MT to boron. Released 2013. Marketed by Pacific Seeds. EPR \$4.

Bread wheat – MACE[Ⓛ]

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.

Bread wheat – SCEPTER[Ⓛ]

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

Bread wheat – SHIELD[Ⓛ]

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 with a short coleoptile. Moderate tolerance to acid soils. Released 2012. Bred and marketed by AGT. EPR \$3.25.

Bread wheat – SUNLAMB[Ⓛ]

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[Ⓛ]

AH quality. A white fully awned variety suited to North Central and North East Victoria. Stem rust MRMS, stripe rust MRMS, leaf rust MRMS, yellow leaf spot MSS and septoria MSS. Medium plant height. Tolerance to acid soils, but SVS to pre-harvest sprouting and MS to screenings. Released 2012. Bred and marketed by AGT. EPR \$3.25.

Bread wheat – WALLUP[Ⓛ]

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

Bread wheat – YITPI[Ⓛ]

AH quality. White fully awned semi-dwarf suited to low to medium rainfall areas due to its high flexibility of sowing time, adaptation to stress and good physical grain quality. Stem rust S, stripe rust MRMS, leaf rust S, yellow leaf spot SVS, septoria MSS, powdery mildew MRMS and CCN MR. Boron tolerant, large grain and low screenings. Released 2000. Marketed by Seednet. EPR \$1.

Biscuit wheat – LRPB IMPALA[Ⓛ]

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[Ⓛ]

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.

NEW Durum – DBA Vittaro[Ⓛ]

ADR quality in northern zone (awaiting southern classification). An early-mid maturing variety suited to irrigation zones and dryland cultivation. Low screenings with good tolerance to lodging. 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 – TJILKURI[Ⓛ]

ADR quality. A mid-season fully-awned variety. Stem rust MR, stripe rust MR, leaf rust RMR and yellow leaf spot MRMS. Tolerant to Boron. Released 2010. Marketed by AGT. EPR \$3.

Durum – WID802[Ⓛ]

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 AGT. EPR \$3.

Feed – BEAUFORT[Ⓛ]

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. Strong straw suited to early-mid season sowing with aluminium tolerance. Released 2008. Marketed by GrainSearch. EPR \$3.

NEW Feed – LONGSWORD[Ⓛ]

FEED* quality. Longsword is a widely adapted quick 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 with acid soil tolerance. Released 2017, tested as RAC2341. Bred and marketed by AGT. EPR (rate TBA at time of writing).

Feed/Dual purpose – MANNING[Ⓛ]

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[Ⓛ]

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 – PRESTON

FEED quality with white grain. An awned semi-dwarf mid to late season variety suited to the high rainfall zone. Stem rust SVS, stripe rust RMR, leaf rust SVS, yellow leaf spot MSS, septoria MSS and CCN S. A comprehensive fungicide strategy is required to control stem rust. Released 2009. Marketed by Seednet.

NEW Feed – RGT ACCROC

FEED quality. An awned red grained winter wheat. It is a mid to long season variety for high rainfall zones and irrigation. RGT Accroc is 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 – 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 OVALO

FEED quality. Awnless red grained winter wheat. It is a long season variety for high rainfall zones and irrigation. Ovalo is suitable for dual purpose applications when early sowing is possible. Stem rust SVS, stripe rust R, leaf rust MSS, yellow leaf spot MR, septoria MR and CCN S. Released 2014. Bred by AGT and marketed by Seedforce. EPR \$4.

Feed/Dual purpose – SF SCENARIO

FEED quality. Awnless red grained winter wheat. It is a long season variety with similar maturity to Frelon and a direct replacement for Frelon and Amarok. 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[Ⓛ]

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. Has good early vigour and stands well with good head retention. Released 2009. Bred by AusGrainz and CSIRO and marketed by GrainSearch. EPR \$3.50.

Feed – TENFOUR

FEED quality. TenFour is a widely adapted 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, tested as SMBW12-086. 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

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														
Axe	AH	✓			MR	E	M-S	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	-	-
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-SVSp	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 Darwin	AH	✓	✓	✓	MR	E-M	M	S	MR	SVSp	W	A	-	-
DS Pascal	APW		✓	✓	MR	M-L	M	S	MR	MRp	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
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	S-M	-	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
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
Scepter	AH	✓	✓		MR	E-M	M	MS	MR	MSS	W	A	MT	MT-T
Shield	AH	✓	✓		MR	E-M	M	S	-	S	W	A	I	MT-T
Sunlamb	ASW		✓	✓	MR	L	M	M	MR	MSp	W	AL	I	MI
Suntop	AH	✓	✓	✓	MS	M	MT	M	MR	SVS	W	A	I	MT
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 Vittaroi	ADR^				R	EM	S	-	-	-	-	-	-	-
Tjilkuri	ADR				MS	M	M	ML	-	S	W/B	A	MT	-
WID802	ADR				MS	M	-	ML	-	MR	-	-	-	-

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
		FEED WHEAT												
Beaufort	Feed		✓	✓	-	M-L	M	-	MRMS	MR	R	AL	-	MT
Longsword	Feed*	✓	✓	✓	MR	M-L (+W)	M	-	MR	-	W	A	MTp	MTp
Manning	Feed			✓	-	L (+W)	-	-	-	MSSp	W	AL	-	-
Naparoo	Feed			✓	-	L (+W)	-	-	-	Sp	W	AL	-	-
Preston	Feed			✓	-	L	S	-	MR	Sp	W	A	-	-
RGT Accroc	Feed			✓	-	M-L(+W)	-	-	-	-	R	A	-	-
RGT Zanzibar	Feed	✓	✓	✓	-	M	MT	-	-	-	-	A	-	-
SF Adagio	Feed		✓	✓	-	M-L (+W)	-	-	-	Rp	R	A	-	-
SF Ovalo	Feed			✓	-	L (+W)	-	-	-	Rp	R	AL	-	-
SF Scenario	Feed			✓	-	L (+W)	-	-	-	Rp	R	AL	-	-
SQP Revenue	Feed			✓	-	L (+W)	S	-	-	Rp	R	AL	-	-
Tenfour	Feed	✓	✓	✓	MR	E	M	M	R	Sp	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	MSp	MS	S	MS	MS	SVS
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 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
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
Scepter	MRMS	MSS	MSS	MRMS	S	SVS	MRMS	S	MSS	S	MS	MS	MSS
Shield	RMR	MR	R	MSS	SVS	MR	MRMS	MSS	MSS	S	MRMS	MSS	S
Sunlamb	R	MRMS	MS	MRMS	MRMS	-	MR	MSS	MS	MSSp	MS	MS	S
Suntop	MRMS	MRMS	MRMS	MSS	MSS	-	S	S	MRMS	MSS	MS	MS	R
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 Vittaroi	MR	MR	MR	MRMS	MRMS	-	MSS	MS	MRMS	-	-	-	R
Tjilkuri	MR	MR	RMR	MRMS	MRMS	S	MS	MRMS	MR	VS	MS	MSS	R
WID802	RMR	MR	RMR	MRMS	MRMS	-	MS	MRMS	MS	VS	MS	MS	R

TABLE 2, 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
Preston	SVS	RMR	SVS	MSS	MSS	-	S	S	S	S	MS	MRMS	S
RGT Accroc	MR	R	S	MRMS	MRMS	-	S	S	MSS	SVS	S	MRMS	SVS
RGT Zanzibar	VS	R	SVS	MS	S	-	MSS	MSS	MSp	-	-	RMR	S
SF Adagio	SVS	RMR	S	MRMS	MRMS	-	S	MS	MSS	SVS	MS	MR	MS#
SF Ovalo	SVS	R	MSS	MR	MR	-	S	S	MSS	SVS	MS	MR	MRMS
SF Scenario	MSS	R	S	MS	MRMS	-	S	S	S	SVSp	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 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			
Longsword												
Cutlass, Estoc, LRPB Phantom, LRPB Trojan, Yitpi												
Beckom, Chief CL Plus, 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												
WIMMERA	April				May				June			
LRPB Kittyhawk												
Longsword												
Bolac Coolah, Cutlass, Estoc, Kiora, LRPB Phantom, LRPB Trojan, Yitpi, Durum varieties												
Beckom, Chief CL Plus, 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												
NORTH CENTRAL	April				May				June			
LRPB Kittyhawk												
Longsword												
Bolac, Coolah, Cutlass, Cosmick, EGA Gregory, Estoc, Kiora, LRPB Lancer, LRPB Phantom, LRPB Trojan, Yitpi												
Beckom, Chief CL Plus, 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												
NORTH EAST	April				May				June			
Manning (Mar-Apr), RGT Accroc, SQP Revenue, Sunlamb												
EGA Wedgetail, Forrest, LRPB Kittyhawk												
Longsword												
Bolac, Coolah, Cutlass, DS Darwin, DS Pascal, EGA Gregory, Estoc, Kiora, LRPB Lancer, LRPB Phantom, LRPB Trojan, Yitpi												
Beckom, Chief CL Plus, 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												
SOUTH WEST	April				May				June			
Manning (Mar-Apr), Naparoo, RGT Accroc, SQP Revenue, Sunlamb (early April)												
EGA Wedgetail, Forrest, LRPB Kittyhawk												
Longsword												
Beaufort, Bolac, Coolah, DS Pascal, Kiora, Preston												
Beckom, Chief CL Plus, Derrimut, LRPB Arrow, LRPB Phantom, LRPB Trojan, RGT Zanzibar, Tenfour												

Yellow = earlier than ideal.

Green = optimum sowing time.

Red = later than ideal but acceptable.

TABLE 5 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 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.	
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.	
Scepter	AH	AH	2	1	Suit domestic application. Acceptable AH quality.	
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.	
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 6 Wheat diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
FOLIAR					
Leaf rust	<i>Puccinia triticina</i>	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	<i>Puccinia graminis</i> f. sp. <i>tritici</i>	Red-brown, powdery, oblong pustules with tattered torn edges on leaf and stem.	Can develop from mid spring into summer. Favoured by warm (15–30°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	<i>Puccinia striiformis</i> f. sp. <i>tritici</i>	Yellow powdery pustules often in stripes on leaves.	Can develop throughout the growing season. Favoured by cool (8–15°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)	<i>Stagonospora nodorum</i>	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	<i>Zymoseptoria tritici</i>	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	<i>Pyrenophora tritici-repentis</i>	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	<i>Tilletia laevis</i> <i>T. tritici</i>	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	<i>Urocystis agropyri</i>	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	<i>Ustilago tritici</i>	Black powdery heads on diseased plants.	Region wide.	Infected seed is the predominant source.	Seed-applied fungicide.
ROOT/CROWN					
Common root rot	<i>Bipolaris sorokiniana</i>	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	<i>Fusarium pseudograminearum</i> , <i>F. culmorum</i>	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)	<i>Heterodera avenae</i>	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	<i>Rhizoctonia solani</i> (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	<i>Pratylenchus thornei</i> , <i>P. neglectus</i>	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	<i>Gaeumannomyces graminis</i> var. <i>tritici</i>	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 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)		1.73	2.38	1.6	3.87	3.46		3.58	2.81	1.29	6.69	4.82
	No. trials	8	8	5	5	6	No. trials	4	1	3	5	5
AGT Katana	8	-	103	-	-	-	-	-	-	-	-	-
Axe	32	98	97	104	91	95	18	92	93	108	92	96
Barham	-	-	-	-	-	-	13	86	93	92	93	-
Beckom	32	108	112	110	111	107	18	106	112	114	107	105
Bremer	8	-	102	-	-	-	1	-	100	-	-	-
Buchanan	5	-	-	87	-	-	3	-	-	76	-	-
Chara	-	-	-	-	-	-	1	100	-	-	-	-
Chief CL Plus	13	-	99	-	90	-	11	-	111	-	94	102
Condo	8	96	-	-	-	-	4	96	-	-	-	-
Corack	32	110	104	109	91	108	18	110	109	123	100	110
Correll	21	97	103	-	104	-	13	91	94	99	97	-
Cosmick	32	105	109	108	112	104	18	104	107	107	107	103
Cutlass	16	-	-	101	109	103	13	-	-	103	103	102
Derrimut	26	98	103	100	106	-	18	96	99	98	101	97
DS Darwin	11	-	-	-	97	95	13	-	-	86	99	97
Elmore CL Plus	24	-	101	97	106	95	18	89	93	92	97	92
Emu Rock	32	103	103	111	102	100	18	99	103	113	101	99
Estoc	32	100	103	98	102	100	18	98	97	99	99	101
Gascoigne	-	-	-	-	-	-	8	90	96	92	-	-
Gladius	32	98	100	101	100	97	18	95	94	99	98	98
Grenade CL Plus	32	97	100	103	99	96	18	93	94	102	96	96
Harper	26	99	106	99	106	-	13	94	98	100	99	-
Hatchet CL Plus	32	96	95	103	95	94	18	92	92	100	95	94
Hydra	8	109	-	-	-	-	4	108	-	-	-	-
Impress CL Plus	5	-	-	-	71	-	5	-	-	-	83	-
Jade	-	-	-	-	-	-	8	-	-	75	97	-
Justica CL Plus	26	96	102	100	106	-	13	91	95	96	98	-
Kord CL Plus	32	99	102	102	96	98	18	92	94	106	93	98
LRPB Arrow	16	-	-	104	102	105	13	-	-	106	105	104
LRPB Catalina	8	91	-	-	-	-	4	92	-	-	-	-
LRPB Cobra	32	96	90	93	104	98	18	108	100	78	109	100
LRPB Dart	8	94	-	-	-	-	5	96	91	-	-	-
LRPB Flanker	-	-	-	-	-	-	8	-	-	79	89	-
LRPB Gauntlet	-	-	-	-	-	-	4	87	-	-	-	-
LRPB Havoc	11	-	-	-	90	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	32	93	98	92	105	95	18	94	89	82	100	96
LRPB Reliant	-	-	-	-	-	-	4	-	101	105	-	-
LRPB Scout	32	98	101	101	112	98	18	101	96	89	109	100
LRPB Trojan	32	106	108	100	110	106	18	110	103	98	110	110
LRPB Viking	-	-	-	-	-	-	9	-	85	76	96	-
Mace	32	108	105	108	96	106	18	107	109	119	101	107
Magenta	13	-	106	-	110	-	13	93	97	95	100	-
RGT Zanzibar	-	-	-	-	-	-	10	-	-	-	108	95
Scepter	16	-	-	120	107	114	13	-	-	138	107	114
Shield	32	101	107	109	107	100	18	93	104	113	98	95
Tenfour	-	-	-	-	-	-	13	-	-	110	110	108
Wallup	-	-	-	-	-	-	18	100	98	92	97	98
Wyalkatchem	26	102	99	101	97	-	13	103	106	104	100	-
Yitpi	32	95	101	94	102	97	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)		2.88	3.65	1.44	7.32	3.51		4.21	5.78	3.73	6.80	4.80
	No. trials	3	2	2	2	2	No. trials	3	3	4	4	4
AGT Katana	-	-	-	-	-	-	1	-	-	100	-	-
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
Bolac	-	-	-	-	-	-	1	-	98	-	-	-
Buchanan	2	-	-	89	-	-	4	-	-	100	-	-
Chara	3	95	-	-	-	-	5	96	102	98	-	-
Chief CL Plus	2	-	104	-	-	-	2	-	105	-	-	-
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 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
EGA Gregory	10	95	103	88	95	100	17	100	105	94	100	97
EGA Wedgetail	-	-	-	-	-	-	2	-	97	100	-	-
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	-
Espada	2	102	-	-	-	-	3	103	-	-	-	-
Estoc	11	101	95	102	102	100	16	97	98	102	99	103
Forrest	-	-	-	-	-	-	1	-	-	98	-	-
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	-
Kiora	-	-	-	-	-	-	1	-	-	102	-	-
Kord CL Plus	11	99	95	108	96	101	16	97	93	99	93	101
Livingston	-	-	-	-	-	-	2	-	93	96	-	-
LRPB Arrow	6	-	-	108	101	102	12	-	-	104	97	105
LRPB Beaufort	2	-	-	-	-	99	5	-	112	102	-	100
LRPB Cobra	11	104	105	97	106	101	18	106	107	107	106	103
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	92	-	-
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	88
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 Phantom	11	101	100	97	104	99	16	101	103	100	104	100

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)		2.88	3.65	1.44	7.32	3.51		4.21	5.78	3.73	6.80	4.80
	No. trials	3	2	2	2	2	No. trials	3	3	4	4	4
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
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	-
Manning	-	-	-	-	-	-	1	-	-	103	-	-
Mitch	-	-	-	-	-	-	1	-	-	101	-	-
QAL2000	8	97	101	93	104	-	10	94	103	96	107	-
RGT Accroc	-	-	-	-	-	-	1	-	-	88	-	-
RGT Calabro	-	-	-	-	-	-	3	-	-	98	106	95
RGT Zanzibar	4	-	-	-	109	98	8	-	-	-	117	99
Scepter	6	-	-	123	109	116	12	-	-	113	106	115
SF Adagio	-	-	-	-	-	-	2	-	100	102	-	-
SF Scenario	-	-	-	-	-	-	2	-	92	97	-	-
Shield	1	101	-	-	-	-	1	-	100	-	-	-
SQP Revenue	-	-	-	-	-	-	1	-	-	100	-	-
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	-	-	-	-	-	-
Wallup	11	96	96	94	97	97	18	100	98	100	96	100
Wedin	-	-	-	-	-	-	1	-	-	101	-	-
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	5.29	4.28	7.20	5.99
	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
Coolah	2	-	104	107	10	-	102	107	103	104
Cutlass	2	-	108	107	7	-	-	114	105	107
DS Darwin	3	87	94	98	6	90	99	-	-	-
DS Newton	2	86	97	-	9	92	100	107	-	-
DS Pascal	3	106	108	99	13	111	105	114	101	104
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	-	-
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 Sentinel 3R	1	110	-	-	3	106	-	-	-	-
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
Sunlamb	2	-	96	95	-	-	-	-	-	-
Sunmax	1	-	100	-	3	-	-	96	-	-
Suntop	2	-	103	103	-	-	-	-	-	-
Tenfour	-	-	-	-	3	94	-	-	-	-
Wallup	-	-	-	-	1	101	-	-	-	-

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)		5.05	5.77	3.81	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 Darwin	2	83	-	-	-	-
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
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 Sentinel 3R	2	103	-	-	-	-
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	-

TABLE 11 2017 Mallee and Wimmera wheat (main season) yield. Yield expressed as a percentage of site mean yield.

	Mallee						Wimmera				
	Birchip	Hopetoun	Merrinee	Quambatook	Ultima	Walpeup	Brim	Corack	Horsham	Kaniva	Minyip
Sowing date	5/5/17	9/5/17	11/5/17	2/5/17	9/5/17	12/5/17	10/5/17	9/5/17	25/5/17	12/5/17	15/5/17
Axe	94	89	107	98	94	95	98	101	95	92	100
Beckom	106	106	103	110	109	104	107	107	104	105	98
Chief CL Plus	-	-	-	-	-	-	102	105	104	110	102
Corack	108	102	105	109	111	110	110	109	108	109	104
Cosmick	102	97	105	84	94	99	103	102	97	104	96
Cutlass	102	107	103	104	100	104	103	102	99	99	101
Derrimut	-	-	-	-	-	-	99	98	94	99	99
DS Darwin	93	99	94	100	96	95	95	105	95	100	95
Elmore CL Plus	96	90	94	88	84	90	93	98	92	89	97
Emu Rock	99	96	111	100	98	103	96	101	96	96	91
Estoc	97	101	102	99	101	95	102	100	97	101	102
Gladius	92	93	94	96	94	94	100	95	97	93	99
Grenade CL Plus	93	89	99	93	99	93	98	95	94	96	90
Hatchet CL Plus	81	81	101	87	91	95	92	95	98	93	99
Kord CL Plus	93	93	90	98	94	92	97	99	94	95	94
LRPB Arrow	105	101	96	105	103	102	98	99	108	110	106
LRPB Cobra	102	101	90	101	96	100	95	105	102	102	98
LRPB Havoc	93	102	101	98	106	107	96	98	113	106	94
LRPB Impala	-	-	-	-	-	-	98	95	94	94	101
LRPB Lincoln	-	-	-	-	-	-	92	97	95	91	96
LRPB Mustang	-	-	-	-	-	-	93	103	97	95	96
LRPB Phantom	101	95	96	93	88	92	99	89	97	98	105
LRPB Scout	98	90	91	88	100	90	103	99	95	99	104
LRPB Trojan	111	104	99	107	104	99	112	111	104	112	101
Mace	99	104	102	105	103	105	106	104	113	103	110
RGT Zanzibar	-	-	-	-	-	-	91	96	92	104	99
Scepter	109	113	110	115	117	111	117	113	115	111	118
Shield	98	101	103	100	94	95	95	92	97	93	100
Tenfour	-	-	-	-	-	-	103	113	104	105	103
Wallup	-	-	-	-	-	-	95	93	101	104	99
Yitpi	94	102	96	97	101	95	94	83	89	96	92
Site Mean (t/ha)	4.68	4.32	1.23	4.77	2.58	3.31	3.77	4.91	5.04	6.05	4.11
CV (%)	2	3	7	3	3	2	2	6	3	3	4
LSD (%)	4	5	12	6	6	3	4	11	5	6	7

Interpret results with caution. All trials were affected by heat and frost.

TABLE 12 2017 Mallee and Wimmera wheat (main season) protein (%).

	Mallee						Wimmera				
	Birchip	Hopetoun	Merrinee	Quambatook	Ultima	Walpeup	Brim	Corack	Horsham	Kaniva	Minyip
Axe	12.3	14.3	13.4	13.0	15.9	12.5	13.1	12.7	12.8	11.6	11.8
Beckom	11.4	12.3	13.1	11.8	15.3	10.9	12.3	11.4	11.7	10.4	10.6
Chief CL Plus	-	-	-	-	-	-	13.2	11.4	12.2	10.6	11.0
Corack	10.9	12.7	12.9	11.3	14.3	11.5	13.1	12.3	12.1	10.3	10.7
Cosmick	11.3	12.4	13.9	12.8	15.3	11.9	13.9	12.0	12.2	9.9	11.0
Cutlass	10.8	11.9	14.6	12.9	15.7	11.7	12.4	11.9	11.9	10.5	11.0
Derrimut	-	-	-	-	-	-	13.8	12.0	12.1	10.3	11.5
DS Darwin	11.4	11.4	13.5	11.8	14.6	11.7	14.2	11.4	11.5	10.9	10.5
Elmore CL Plus	11.5	13.9	14.5	13.5	16.7	13.0	12.9	12.3	13.0	11.9	11.5
Emu Rock	12.0	13.6	13.5	12.5	14.8	11.7	13.6	12.0	12.9	11.0	11.6
Estoc	12.2	14.3	14.4	13.2	15.9	12.9	13.0	12.7	12.8	11.5	11.3
Gladius	12.3	14.2	14.8	14.3	16.4	13.0	13.3	12.6	12.1	11.7	12.1
Grenade CL Plus	12.0	12.4	13.0	13.1	15.1	12.1	13.3	12.0	12.7	10.9	11.4
Hatchet CL Plus	13.6	15.4	14.7	14.6	15.9	13.2	11.7	13.0	12.5	11.1	12.0
Kord CL Plus	12.5	13.5	14.8	13.4	16.4	12.9	14.0	13.3	13.5	11.2	12.0
LRPB Arrow	11.3	12.1	13.4	12.1	15.0	12.1	14.3	12.4	11.7	10.3	10.7
LRPB Cobra	11.6	13.3	14.4	12.8	15.5	12.1	12.9	11.9	12.3	10.8	12.1
LRPB Havoc	11.8	12.7	13.3	12.0	14.9	11.1	13.0	11.5	11.6	10.6	11.1
LRPB Impala	-	-	-	-	-	-	13.2	11.9	12.2	10.5	10.7
LRPB Lincoln	-	-	-	-	-	-	12.6	11.4	12.0	11.0	10.8
LRPB Mustang	-	-	-	-	-	-	12.2	10.8	11.5	10.1	10.2
LRPB Phantom	11.7	12.5	14.1	12.9	15.3	11.9	13.9	12.2	11.9	9.9	10.4
LRPB Scout	11.6	13.2	14.4	12.7	15.6	11.8	12.4	12.4	12.3	10.2	10.9
LRPB Trojan	11.4	12.5	15.1	11.9	15.8	12.8	13.5	11.1	11.7	9.9	10.9
Mace	11.6	12.6	12.5	12.1	14.8	11.4	12.9	11.6	11.3	10.1	10.7
RGT Zanzibar	-	-	-	-	-	-	12.8	11.9	12.6	11.3	11.5
Scepter	11.0	11.2	12.8	11.3	13.6	11.4	12.7	11.5	11.0	9.9	9.9
Shield	11.3	12.9	13.5	12.5	15.8	12.0	14.4	12.6	11.7	10.4	11.2
Tenfour	-	-	-	-	-	-	12.2	12.0	11.7	10.5	10.9
Wallup	-	-	-	-	-	-	13.9	12.8	12.7	11.2	11.7
Yitpi	12.2	12.9	15.0	13.2	15.5	12.0	14.1	12.5	11.7	11.3	11.7

TABLE 13 2017 Mallee and Wimmera wheat (main season) screenings.
Screenings expressed as % of grain below a 2 mm sieve.

	Mallee						Wimmera				
	Birchip	Hopetoun	Merrinee	Quambatook	Ultima	Walpeup	Brim	Corack	Horsham	Kaniva	Minyip
Axe	2.4	1.7	3.3	1.4	3.2	2.5	5.5	2.7	2.5	1.8	4.7
Beckom	1.7	2.4	3.6	2.2	6.0	2.7	4.0	4.0	3.4	3.7	4.6
Chief CL Plus	-	-	-	-	-	-	2.1	4.3	3.5	1.6	3.4
Corack	2.0	1.6	3.3	1.1	4.1	2.0	5.5	6.9	3.4	1.5	3.9
Cosmick	2.5	3.5	10.5	2.4	15.5	5.0	6.3	12.5	5.9	3.1	5.0
Cutlass	1.8	2.5	3.2	1.6	3.4	3.0	1.8	4.6	3.7	1.8	2.8
Derrimut	-	-	-	-	-	-	4.5	5.6	5.2	2.6	5.9
DS Darwin	3.2	2.3	3.3	2.0	4.1	3.6	2.0	6.4	2.6	2.0	4.6
Elmore CL Plus	2.1	3.7	3.7	2.0	9.7	2.8	2.4	4.7	4.9	3.3	3.5
Emu Rock	2.7	2.1	5.7	2.5	5.0	3.7	4.9	5.3	6.2	3.1	4.9
Estoc	2.1	4.1	2.7	1.9	5.1	3.3	1.2	4.5	3.7	2.8	3.3
Gladius	2.1	2.3	4.9	1.8	4.9	2.7	6.5	5.2	3.5	1.6	4.2
Grenade CL Plus	2.2	1.9	3.6	1.7	3.4	2.5	3.1	5.5	3.5	2.0	3.7
Hatchet CL Plus	2.2	1.6	3.9	1.3	3.1	2.3	4.1	4.1	2.9	1.0	3.6
Kord CL Plus	3.9	2.6	5.4	2.5	5.7	3.2	3.1	5.7	4.0	2.1	6.5
LRPB Arrow	1.3	2.0	2.2	1.1	3.0	1.6	5.5	10.8	2.6	1.8	2.6
LRPB Cobra	2.4	2.3	4.0	1.5	4.9	2.5	4.9	3.3	4.6	1.8	4.7
LRPB Havoc	2.6	2.2	2.9	2.2	4.1	3.2	7.5	4.3	4.2	2.1	6.9
LRPB Impala	-	-	-	-	-	-	4.0	2.8	3.3	1.3	1.8
LRPB Lincoln	-	-	-	-	-	-	3.6	5.8	4.0	2.9	4.0
LRPB Mustang	-	-	-	-	-	-	4.8	5.5	4.8	2.5	5.6
LRPB Phantom	2.1	3.1	2.4	2.2	4.5	2.9	1.6	7.2	3.5	1.5	4.4
LRPB Scout	1.7	3.9	3.7	1.9	7.9	3.2	4.0	6.6	4.3	2.3	4.8
LRPB Trojan	1.8	1.8	2.5	1.4	6.4	3.1	3.6	2.7	2.8	2.0	4.9
Mace	1.9	2.1	4.3	1.5	3.4	2.3	4.1	5.2	3.7	2.6	3.6
RGT Zanzibar	-	-	-	-	-	-	3.3	4.2	8.0	2.8	6.9
Scepter	2.8	2.6	4.2	1.9	3.8	2.8	3.9	5.8	4.1	2.3	5.1
Shield	2.9	3.1	5.5	2.4	8.9	4.8	3.9	7.0	5.4	3.4	5.8
Tenfour	-	-	-	-	-	-	5.7	3.8	3.8	1.6	3.7
Wallup	-	-	-	-	-	-	3.5	4.1	2.1	1.8	2.3
Yitpi	2.5	2.6	3.1	1.9	3.0	3.1	2.1	1.0	3.2	2.0	4.4

TABLE 14 2017 North Central and North East wheat (main season) yield. Yield expressed as a percentage of site mean yield.

	North Central		North East			
	Diggora	Mitiamo	Dookie	Numurkah	Wunghnu	Yarrowonga
Sowing Date	9/5/17	9/5/17	17/5/17	8/5/17	8/5/17	24/5/17
Axe	97	120	100	90	99	106
Beckom	105	117	109	111	105	100
Cobalt	109	92	106	106	107	97
Condo	89	108	102	96	102	104
Coolah	109	100	97	100	99	101
Corack	105	114	105	109	111	109
Cosmick	105	90	104	102	100	105
Cutlass	104	100	105	110	107	99
Derrimut	92	93	96	97	97	95
DS Darwin	93	79	95	101	95	97
DS Faraday	101	87	97	93	98	100
DS Pascal	86	78	83	92	89	94
EGA Gregory	104	90	93	99	94	95
Elmore CL Plus	93	102	93	93	92	100
Estoc	97	107	105	108	102	94
Gladius	92	101	94	96	98	94
Grenade CL Plus	91	98	95	98	96	94
Hatchet CL Plus	87	108	-	-	-	-
Kord CL Plus	91	101	98	98	98	93
LRPB Arrow	96	105	111	103	98	99
LRPB Beaufort	109	93	99	-	104	102
LRPB Cobra	101	97	101	102	102	109
LRPB Flanker	105	95	91	-	100	104
LRPB Havoc	93	110	111	100	107	102
LRPB Impala	98	87	92	-	98	100
LRPB Kittyhawk	-	-	-	83	-	-
LRPB Lancer	-	-	96	94	90	87
LRPB Lincoln	88	77	90	93	95	99
LRPB Mustang	94	115	102	99	103	99
LRPB Phantom	109	98	105	-	98	100
LRPB Reliant	101	105	96	-	99	103
LRPB Scout	106	100	101	101	105	103
LRPB Spitfire	98	101	97	97	97	94
LRPB Trojan	110	110	107	105	112	104
Mace	99	115	104	103	109	104
RGT Calabro	-	-	-	92	-	-
RGT Zanzibar	104	82	106	105	86	95
Scepter	111	140	115	114	117	111
Sunmate	-	-	-	91	-	-
Suntop	103	110	100	106	107	96
Tenfour	100	109	-	-	-	-
Wallup	99	100	104	102	99	98
Yitpi	93	94	99	103	99	95
Site Mean (t/ha)	4.45	2.57	4.04	7.30	4.27	3.57
CV (%)	4	10	5	3	4	4
LSD (%)	6	17	8	5	7	7

Interpret results with caution. All trials were affected by heat and frost.

TABLE 15 2017 North Central and North East wheat (main season) protein (%) and screenings.
Screenings expressed as % of grain below a 2 mm sieve.

	Protein (%)						Screenings (%)					
	North Central		North East				North Central		North East			
	Diggora	Mitiamo	Dookie	Numurkah	Wunghnu	Yarrowonga	Diggora	Mitiamo	Dookie	Numurkah	Wunghnu	Yarrowonga
Axe	8.9	10.9	-	13.6	11.5	10.5	1.3	-	-	6.8	3.0	-
Beckom	8.1	10.7	11.6	12.3	10.3	10.2	1.3	6.6	3.2	3.4	1.3	4.4
Cobalt	7.7	10.5	11.5	13.6	10.6	9.7	2.1	7.2	2.6	4.2	2.1	2.3
Condo	8.8	10.9	12.2	13.2	11.1	10.4	2.3	4.9	3.5	2.9	4.5	6.6
Coolah	7.6	10.6	11.3	12.3	10.4	9.9	1.6	13.1	1.3	3.3	1.3	2.8
Corack	8.0	9.9	11.6	12.9	10.6	9.7	1.3	6.3	1.6	4.2	1.8	4.1
Cosmick	7.9	10.5	12.1	13.3	10.7	9.9	1.6	5.2	4.4	2.7	2.9	5.7
Cutlass	7.9	10.4	11.5	12.5	10.3	9.7	2.6	3.9	27.9	2.1	2.6	2.0
Derrimut	8.2	10.4	12.4	12.9	10.3	10.3	1.5	-	3.4	4.9	1.6	-
DS Darwin	7.7	10.6	11.8	13.3	11.6	10.3	1.6	5.4	1.6	3.1	1.6	8.2
DS Faraday	7.8	10.4	12.3	13.5	11.0	10.5	1.3	6.9	2.1	2.1	1.0	4.7
DS Pascal	8.1	10.2	12.9	13.3	10.5	10.5	1.6	5.0	2.2	3.2	3.1	5.3
EGA Gregory	7.9	10.6	12.3	14.0	10.9	10.5	1.3	-	2.1	9.2	1.5	-
Elmore CL Plus	7.9	11.2	13.1	13.7	11.2	10.4	1.0	5.4	3.1	2.4	1.8	5.5
Estoc	8.3	11.0	12.8	13.9	11.5	10.6	1.8	-	3.7	4.4	3.9	-
Gladius	8.4	11.1	12.0	12.5	11.3	10.7	2.6	-	1.1	7.6	1.9	-
Grenade CL Plus	8.2	11.0	12.2	13.0	11.3	10.7	1.3	4.0	2.9	2.6	2.1	7.0
Hatchet CL Plus	9.1	12.0	-	-	-	-	0.8	6.6	-	-	-	-
Kord CL Plus	7.1	11.0	12.0	13.2	10.9	10.5	2.1	6.1	1.9	3.1	2.9	5.0
LRPB Arrow	7.9	10.2	11.7	13.1	10.6	10.1	1.0	4.4	1.6	5.7	1.8	4.1
LRPB Beaufort	8.1	11.2	13.3	-	11.2	9.9	4.0	-	2.4	-	5.3	-
LRPB Cobra	8.3	11.1	12.3	12.8	11.4	9.7	1.6	4.2	2.2	3.7	1.9	-
LRPB Flanker	7.8	10.6	12.5	-	11.3	9.6	1.3	2.0	2.4	-	1.0	9.1
LRPB Havoc	8.0	10.8	11.6	12.8	10.7	10.0	1.8	5.8	1.6	5.5	3.9	5.5
LRPB Impala	7.9	10.4	11.6	-	11.2	9.7	1.1	-	3.2	-	2.1	-
LRPB Kittyhawk	-	-	-	14.1	-	-	-	-	-	3.8	-	-
LRPB Lancer	-	-	12.9	12.9	12.2	12.1	-	-	1.6	4.3	1.3	9.5
LRPB Lincoln	8.0	11.1	12.2	14.4	10.5	10.4	2.9	-	3.5	8.4	3.4	-
LRPB Mustang	8.5	10.6	-	13.2	11.5	9.7	1.0	7.7	-	2.9	2.3	6.5
LRPB Phantom	8.0	11.1	11.6	-	10.6	9.9	0.8	4.5	2.7	-	1.9	-
LRPB Reliant	8.1	11.0	11.4	-	10.6	9.6	1.8	5.0	3.4	-	1.8	4.7
LRPB Scout	7.8	10.5	11.8	13.5	10.8	10.3	1.8	-	3.1	3.2	2.8	-
LRPB Spitfire	8.7	11.1	13.1	12.4	12.1	11.1	2.3	-	4.0	5.8	2.8	-
LRPB Trojan	7.6	10.3	11.7	13.1	10.6	9.9	1.3	12.3	1.9	5.3	1.6	6.6
Mace	8.1	10.2	-	13.1	10.3	9.4	1.3	-	-	3.4	2.1	-
RGT Calabro	-	-	-	12.7	-	-	-	-	-	3.2	-	-
RGT Zanzibar	11.2	10.9	10.9	12.6	11.3	10.1	1.3	8.0	2.1	2.9	5.0	3.8
Scepter	7.4	10.0	12.1	12.8	10.0	9.1	3.4	5.1	1.6	3.5	2.4	4.6
Sunmate	-	-	-	14.0	-	-	-	-	-	3.0	-	-
Suntop	8.3	10.9	11.8	13.0	11.2	11.0	1.5	6.5	2.9	4.5	2.1	4.9
Tenfour	8.2	10.6	-	-	-	-	2.4	3.9	-	-	-	-
Wallup	8.3	10.6	12.2	12.9	11.2	10.8	1.3	2.7	1.6	2.8	1.6	10.1
Yitpi	8.1	11.0	-	14.0	11.3	10.3	1.5	-	-	8.5	3.1	-

TABLE 16 2017 early season wheat yield. Yield expressed as a percentage of site mean yield.

	Mallee	North Central	North East	South West	
	Hopetoun	Charlton	Rutherglen	Hamilton*	Inverleigh*
Sowing Date	27/4/17	27/4/17	1/5/17	11/5/17	12/5/17
Beckom	-	-	111	109	108
Bolac	100	100	97	94	99
Chara	-	-	104	98	95
Coolah	111	117	111	71	104
Cutlass	115	112	97	114	103
DS Darwin	78	98	95	-	-
DS Faraday	-	-	101	-	-
DS Pascal	101	100	103	101	108
EGA Gregory	-	-	101	-	-
EGA Wedgetail	97	96	98	96	95
Elmore CL Plus	-	-	99	95	98
Estoc	88	106	-	-	-
Forrest	91	66	87	90	88
Kiora	99	109	95	83	95
Longsword	85	85	100	100	98
LRPB Beaufort	113	105	126	103	107
LRPB Flanker	-	-	103	-	-
LRPB Kittyhawk	93	84	93	91	90
LRPB Lancer	-	-	82	-	-
LRPB Phantom	-	-	123	96	105
LRPB Scout	-	-	-	98	101
LRPB Trojan	114	121	94	102	119
Magenta	110	106	-	-	-
Manning	74	49	99	114	86
RGT Accroc	-	-	105	114	109
RGT Calabro	-	-	98	113	104
RGT Zanzibar	-	-	105	114	107
SF Adagio	-	-	91	107	100
SQP Revenue	82	76	-	104	85
Sunlamb	84	90	85	-	-
Suntop	-	-	98	-	-
Yitpi	108	108	-	-	-
Site Mean (t/ha)	4.04	4.78	5.78	5.04	6.94
CV (%)	4	5	7	5	5
LSD (%)	7	8	11	7	7

Interpret results with caution. All trials were affected by heat and frost.
At the South West sites all seed was treated with Raxil.

TABLE 17 2017 early season wheat protein (%) and screenings.
Screenings expressed as a percentage of grain below a 2 mm sieve.

	Protein (%)					Screenings (%)				
	Mallee	North Central	North East	South West		Mallee	North Central	North East	South West	
	Hopetoun	Charlton	Rutherglen	Hamilton	Inverleigh	Hopetoun	Charlton	Rutherglen	Hamilton	Inverleigh
Beckom	-	-	9.6	12.3	11.4	-	-	1.1	2.0	1.6
Bolac	14.0	11.7	9.6	12.7	12.4	4.8	6.8	2.3	2.2	3.5
Chara	-	-	9.7	13.0	12.4	-	-	0.8	1.0	0.9
Coolah	12.2	10.3	9.2	13.4	11.3	2.7	4.9	1.3	1.5	1.6
Cutlass	12.9	10.7	9.6	12.3	11.9	2.4	6.2	1.3	1.4	1.8
DS Darwin	13.6	11.3	9.7	-	-	3.2	8.7	1.6	-	-
DS Faraday	-	-	9.2	-	-	-	-	1.0	-	-
DS Pascal	13.3	10.9	9.8	12.0	11.8	2.6	5.2	1.3	1.5	1.8
EGA Gregory	-	-	9.3	-	-	-	-	1.3	-	-
EGA Wedgetail	13.8	12.1	9.5	12.5	13.0	2.0	5.2	0.4	1.4	1.9
Elmore CL Plus	-	-	9.5	12.1	12.7	-	-	1.8	3.1	2.2
Estoc	14.4	11.9	-	-	-	3.1	4.7	-	-	-
Forrest	13.5	12.3	9.5	11.9	12.9	3.6	21.4	2.1	2.5	2.8
Kiora	13.2	11.3	9.2	12.3	12.1	4.6	4.2	2.0	4.6	1.9
Longsword	15.0	14.0	10.3	13.6	13.2	1.0	2.6	0.8	0.6	1.5
LRPB Beaufort	12.7	12.0	8.9	11.6	11.9	3.2	5.7	2.2	2.5	3.1
LRPB Flanker	-	-	9.1	-	-	-	-	1.3	-	-
LRPB Kittyhawk	13.4	11.4	9.6	12.4	12.6	2.1	6.2	1.3	2.4	2.0
LRPB Lancer	-	-	10.6	-	-	-	-	1.0	-	-
LRPB Phantom	-	-	9.3	12.0	11.4	-	-	0.8	2.2	1.8
LRPB Scout	-	-	-	12.6	11.6	-	-	-	1.3	1.7
LRPB Trojan	12.9	10.9	9.3	12.8	11.4	2.9	4.0	1.3	2.5	1.9
Magenta	13.6	11.9	-	-	-	2.7	5.8	-	-	-
Manning	12.8	11.5	8.8	10.9	11.9	2.8	15.1	2.5	1.9	3.5
RGT Accroc	-	-	8.9	10.9	11.9	-	-	1.3	1.2	1.4
RGT Calabro	-	-	9.5	11.0	12.4	-	-	1.9	3.3	2.2
RGT Zanzibar	-	-	8.8	11.9	11.8	-	-	1.8	2.2	5.4
SF Adagio	-	-	9.2	11.3	12.3	-	-	1.6	2.1	2.6
SQP Revenue	12.8	11.8	-	10.9	11.6	4.8	9.0	-	3.7	4.0
Sunlamb	14.0	13.0	10.2	-	-	3.2	7.2	1.8	-	-
Suntop	-	-	9.5	-	-	-	-	1.6	-	-
Yitpi	13.5	11.5	-	-	-	3.3	8.0	-	-	-

TABLE 18 2017 long season wheat yield, protein (%) and screenings. Yield expressed as a percentage of site mean yield. Screenings expressed as a percentage of grain below a 2 mm sieve.

	Hamilton, South West		
	Yield (%)	Protein (%)	Screenings (%)
Sowing Date	24/5/17		
Brennan	89	12.7	2.4
Cutlass	104	12.4	1.5
DS Pascal	100	12.0	1.2
EGA Wedgetail	98	12.3	1.6
Einstein	87	11.6	2.3
Forrest	91	11.7	1.6
Longsword	87	15.3	0.6
LRPB Beaufort	104	11.3	2.7
LRPB Kittyhawk	93	12.5	2.6
LRPB Trojan	101	13.0	0.9
Manning	113	10.6	1.7
Naparoo	100	11.2	2.6
RGT Accroc	122	11.6	1.4
RGT Calabro	112	11.1	2.1
RGT Zanzibar	111	11.6	2.4
SF Adagio	107	11.5	2.1
SF Ovalo	94	11.9	2.7
SQP Revenue	101	11.2	2.3
Sunlamb	104	12.8	2.4
Sunmax	95	12.3	2.8
Site Mean (t/ha)	5.04		
CV (%)	5		
LSD (%)	8		

TABLE 19 2017 Durum wheat yield, protein (%), screenings and long term predicted yield. Yield expressed as a percentage of site mean yield. Screenings (percentage of grain below a 2 mm sieve)*.

	Kaniva, Wimmera							
	2017 trial results			Long term predicted yield (%)				
	Yield (%)	Protein (%)	Screenings (%)	Year	2013	2014	2016	2017
	12/5/17			Mean yield (t/ha)	4.43	2.43	6.90	5.73
Sowing Date				No. trials	1	1	1	1
Caparoi	99	12.8	1.5	4	96	71	76	100
DBA-Aurora	102	11.6	2.6	4	99	94	95	107
DBA Lillaroi	-	-	-	1	-	-	87	-
EGA Bellaroi	88	11.8	3.1	4	96	76	83	94
Hyperno	100	11.5	3.4	4	98	67	88	105
Saintly	99	12.0	2.9	4	99	116	91	101
Tjilkuri	97	12.5	2.0	4	97	64	87	100
WID802	105	12.0	3.3	4	100	78	110	108
Yawa	-	-	-	3	103	118	117	-
Site Mean (t/ha)	5.73							
CV (%)	3							
LSD (%)	5							

* There was insufficient data to predict long term yields for 2015. Interpret results with caution. Trial affected by heat and frost.

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BARLEY

REVIEW OF 2017

Season

The area planted to barley in 2017 decreased slightly compared to 2016. A good soil moisture profile and opening break set barley crops up well for 2017. Soil moisture reserves were needed to maintain crops through a dry June, particularly in the Mallee. Some barley crops were impacted by frost, but not to the same extent as wheat crops.

Some barley crops suffered from lodging after late rain events, reducing harvestability. Weather damage was also evident in barley, including pre-harvest sprouting, black tip and downgrading to feed quality, particularly where growers prioritised harvest of higher value crops. Barley was also more affected by low falling numbers than wheat.

Harvest began in mid-late October in the Mallee. Rain at the beginning of harvest delayed Wimmera and North Central growers, but good drying conditions kept most on track with good yields achieved. Mallee yields were up to 4 t/ha in some cases while barley yields in other regions reached between 5 and 7 t/ha, with some higher yields in the high rainfall zones and where crops had good nutrition. Good quantities of malt barley were delivered to receival sites resulting in an average to above average year for barley growers.

Disease and pest issues

The high levels of infected stubble present in most paddocks, widespread green bridge and the early break meant there was potential for very high disease pressure in 2017. However, several factors contributed to a relatively quiet year for barley diseases compared to 2016. Foliar diseases were kept at low levels by drier conditions during June and September as well as proactive fungicide application.

Spot form of net blotch (SFNB), net form of net blotch (NFNB) and scald were common in most barley crops but generally at low levels.

Barley leaf rust was observed late in the season in the Wimmera, but was not a problem due to widespread in season foliar fungicide application. Loose smut was also detected at low levels in some Hindmarsh, La Trobe and Spartacus crops.

Russian wheat aphid (RWA) was well managed by insecticide seed treatments and follow up sprays were required.

Barley yellow dwarf virus was detected in barley crops at a higher incidence in 2017 than in 2015 and 2016.

LOOKING FORWARD TO 2018

New varieties

There are no new barley varieties available for sowing in 2018.

IGB1305 is a longer season, potential malting variety developed by InterGrain and planned for release in 2018, suited to late April to early May sowings in the Wimmera. InterGrain indicate strong NFNB and powdery mildew resistance and relatively stable yield over a range of environmental conditions. IGB1305 has been accepted into the Barley Australia malt evaluation process, with a decision expected in March 2019.

Malt evaluation

In 2017 SY Rattler was withdrawn from malt evaluation and ceased production. At the time of publication, applications to the Barley Australia malt evaluation process had been accepted for Alestar and RGT Planet. Compass and Spartacus advanced to Stage 2 of evaluation in 2017. The outcome of malt evaluation of these varieties will be updated on www.barleyaustralia.com.au in March 2018. 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.

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.

Disease and pest management

Diseases have the potential to cause significant issues during 2018 if not managed. Avoiding sowing susceptible varieties into infected stubble, controlling the green bridge and applying fungicides and insecticides proactively are all important management considerations.

Stubble-borne diseases will need to be managed due to the carryover of inoculum on stubble from 2016 and 2017 crops. There will be a significant level of SFNB and scald inoculum in many paddocks. NFNB is also becoming a problem due to the cultivation of susceptible varieties such as RGT Planet and Fairview.

Hindmarsh, La Trobe and Spartacus are very susceptible to loose smut. Growers should be cautious using infected seed for sowing in 2018. If retaining seed for sowing, growers need to use an effective seed treatment with good coverage.

If there is potential for root disease issues, it is advisable to conduct a PREDICTA® B soil test prior to planting to avoid sowing cereals into high risk paddocks.

Russian wheat aphid (RWA)

Controlling the green bridge will be key to controlling RWA in 2018. Monitor aphid populations and consider numbers before spraying. While economic thresholds are yet to be confirmed under Australian conditions, the current international economic threshold for spraying is when ≥ 20 per cent of plants are infested up to the start of tillering, or ≥ 10 per cent of plants are infested thereafter. Where the risk of early RWA damage is high (early sowing, presence of volunteers, warmer environments, aphids present pre-planting) growers may consider use of permitted insecticide seed treatments to provide early control.

It is important to encourage the build-up of beneficial populations that naturally predate on the pest. Prophylactic spraying of insecticides is strongly discouraged and growers should reconsider the need to spray where aphids are present in very low numbers.

For further information on RWA management consult the GRDC publication *Russian Wheat Aphid: Tactics for future control*.

Frost

Frost susceptibility rankings are available on the NVT website in the format of relative frost values. These rankings are explained in more detail in the introductory chapter.

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

<http://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
- Russian Wheat Aphid: Tactics for Future Control

VARIETY DESCRIPTIONS

Varieties have been listed according to quality classification grade and in alphabetical order and not in order of preference.

Abbreviations used are:

(¹) 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) – BAUDIN⁽¹⁾

A mid maturing variety, Baudin is an alternative malting variety to Gairdner in 375-500 mm rainfall districts, but should not be grown in areas with greater than 500 mm due to leaf disease susceptibility. Compared to Gairdner, Baudin has superior grain plumpness in years with hot, dry spring conditions. The variety is a shorter plant type than Gairdner, less likely to lodge and has excellent head retention. Scald SVS, SFNB MSS, NFNB MSS, powdery mildew VS and leaf rust VS. Now outclassed by newer varieties due to disease susceptibility, Baudin's delivery options are limited. Released 2004. Free trade to WA. Seed available from Seednet outside WA. EPR \$3 malt, \$1 feed.

Malting barley (Preferred variety) – COMMANDER⁽¹⁾

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 – FAIRVIEW⁽¹⁾

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 – FLINDERS⁽¹⁾

A moderately late maturing variety it is moderately short with stiff, strong straw and good head retention. It has high levels of grain plumpness and good test weights. While not as high yielding as the earlier maturing La Trobe or Compass when sown during May, the later maturity of Flinders provides growers with a higher yielding alternative to Baudin and Gairdner for earlier sowing opportunities or in the higher rainfall or irrigated environments. Scald SVS, SFNB MSS, NFNB MR, powdery mildew R and leaf rust MS. Limited segregation options are available but opportunities exist for contract production. Growers should contact domestic malting companies that have interest in this variety. Developed by InterGrain. Released 2012. Free to trade. EPR \$3.80.

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[Ⓛ]

A mid to late maturing variety with strong straw, and good kernel plumpness and low screenings. 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[Ⓛ]

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 Graincorp 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[Ⓛ]

A tall, early to mid-season maturing barley with moderate to high yield potential across a range of medium rainfall environments. Scope can be prone to head loss and lodging under certain environmental conditions. Scope has moderate grain size and inherently low grain protein. Scope is the only malting barley variety 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 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) – WESTMINSTER[Ⓛ]

A mid to late maturing variety with medium to tall, stiff straw and good head retention. This variety continues to have the highest market demand of all malting barleys grown 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 export markets are quickly being established. Bred by Nickerson's. Released 2009. Seed available from GrainSearch. EPR \$3.

Feed barley – FATHOM[Ⓛ]

An early maturing variety with broad adaption and consistently high yields in lower rainfall environments. It has very low screenings, similar to Maritime and a higher test weight than Fleet. 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[Ⓛ]

An early maturing semi-dwarf variety with exceptional yield potential, especially in drier years. It is 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. Under favourable spring conditions Oxford has very high yield potential. 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[Ⓛ]

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 has 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 Syngenta. EPR \$3.50.

VARIETIES CURRENTLY UNDERGOING MALT EVALUATION

Barley under evaluation – ALESTAR[Ⓛ]

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 2019. Elders suggest good straw strength, head retention, and test weight. Scald S, SFNB S, NFNB MRMS#, powdery mildew R and leaf rust MS. Released 2017, bred by Elders and tested as FMBA11-2341. Seed available from Elders. EPR \$3.

Barley under evaluation – COMPASS[Ⓛ]

Compass is an early to mid-season maturing variety, undergoing Barley Australia malt accreditation with a decision expected in March 2018. 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.

Barley under evaluation – RGT PLANET[Ⓛ]

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. Seed Force suggest RGT Planet is high yielding with good straw strength, head retention, test weight and low screenings. Scald MS, SFNB S, NFNB SVS, powdery mildew R and leaf rust MRMS. Bred by RAGT Semences and tested as SFR85-014. Released 2017. Seed available from Seed Force. EPR \$4.

Barley under evaluation – SPARTACUS CL[Ⓛ]

Spartacus is an early maturing, CCN resistant, IMI tolerant, semi-dwarf variety suited to the low to medium rainfall regions. It is undergoing Barley Australia malt accreditation with a decision expected in March 2018. 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, 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. Seed available from Syngenta. EPR \$4.25

TABLE 1 Barley time of sowing guide.

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

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

Yellow = earlier than ideal.

Green = optimum sowing time.

Red = later than ideal but acceptable.

TABLE 2 Barley variety demand¹ 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							
Baudin		medium	S	M	MR	7	R
Commander	medium	low	M	ME	M	8	M
Fairview*			MS	ML	MR	-	R
Flinders			MS	ML	R	7	R
Gairdner	low	medium	M	ML	MR	5	R
GrangeR			M	ML	MR	-	R
La Trobe		high	S-MS	E	MR	6	R-MR
Scope		medium	MT	ME	MS	6	M
Westminster	high	high	M	ML	R	-	R
FEED BARLEY							
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
Compass	2018		MT	ME	M	9	M
RGT Planet	2019		M	EML	R	7	R
Spartacus CL	2018		MS	E	R	6-7	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	
							<i>P. neglectus</i> resistance	<i>P. thornei</i> resistance
MALTING BARLEY								
Baudin	SVS	MSS	MSS	VS	VS	S	MSS	MSS
Commander	SVS	MSS	MSS	MRMS#	S	R	MRMS	MRMS
Fairview	SVS	S	VS	R	SVS	-	MRMS	MR
Flinders	SVS	MSS	MR	R	MS	S	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
Westminster	MRMS	S	MR	R	MRMS	-	MRMS	MS
FEED BARLEY								
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
Compass	S	MSS	MRMS	MRMS#	VS	R	MRMS	MR
RGT Planet	MS	S	SVS	R	MRMS	Rp	MRMS	RMR
Spartacus CL	SVS	S	MRMS	MRMS#	S	R	MRMS	MRMS

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 Barley diseases.

Disease	Organism	Symptoms	Occurrence	Inoculum source	Control
FOLIAR					
Scald	<i>Rhynchosporium secalis</i>	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	<i>Pyrenophora teres</i> f. <i>maculata</i>	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	<i>Pyrenophora teres</i> f. <i>teres</i>	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	<i>Blumeria graminis</i> f.sp. <i>hordei</i>	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	<i>Puccinia hordei</i>	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	<i>Puccinia graminis</i>	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)	<i>Puccinia striiformis</i>	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	<i>Drechslera wirreganensis</i>	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	<i>Drechslera campanulata</i>	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	<i>Pseudoseptoria stomaticola</i>	Small white-brown lesions.	Cool, moist conditions.	Residues of barley and grasses. Rain splash.	Disease is not of economic importance.
GRAIN					
Covered smut	<i>Ustilago segetum</i> var. <i>hordei</i>	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	<i>Ustilago tritici</i>	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	<i>Fusarium pseudo-graminearum</i> , <i>F. culmorum</i>	'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)	<i>Pythium</i> 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	<i>Bipolaris sorokiniana</i>	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)	<i>Heterodera avenae</i>	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	<i>Pratylenchus thornei</i> , <i>P. neglectus</i>	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	<i>Gaeumannomyces graminis</i> var. <i>tritici</i> (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.

Year	Mallee						Wimmera					
		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
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.

Year	North Central						North East				
		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
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

TABLE 8 2017 Mallee (main season) barley yield and protein (%). Yield as a percentage of site mean yield.

	Yield (%)				Protein (%)			
	Birchip	Rainbow	Ultima	Walpeup	Birchip	Rainbow	Ultima	Walpeup
Sowing date	5/5/17	10/5/17	9/5/17	12/5/17				
MALTING BARLEY								
Bass	103	100	113	97	13.6	11.5	14.6	12.9
Commander	103	101	91	91	12.6	10.3	15.8	13.4
Gairdner	90	77	91	88	13.1	11.5	16.4	12.7
Granger	101	95	108	96	13.2	11.3	16.1	12.4
La Trobe	108	103	99	110	12.1	11.0	15.1	11.7
Schooner	87	88	94	92	14.0	12.3	16.6	13.3
Scope	94	98	92	95	13.1	10.8	14.3	11.7
FEED BARLEY								
Fathom	101	105	110	105	12.7	11.1	15.5	12.3
Fleet	103	108	102	102	12.4	10.2	15.8	12.0
Hindmarsh	105	100	104	106	11.6	11.1	16.3	11.6
Oxford	97	94	68	93	13.3	10.7	17.0	12.0
Rosalind	105	114	101	107	12.6	10.5	14.7	11.6
BARLEY UNDER MALT EVALUATION								
Biere	86	75	79	85	14.0	12.7	16.7	13.6
Compass	96	103	89	110	12.4	10.5	15.2	11.8
RGT Planet	117	122	115	106	11.5	9.5	14.7	12.1
Spartacus CL	102	92	101	107	13.6	11.7	15.8	12.4
Site Mean (t/ha)	5.18	3.11	2.61	3.57				
CV (%)	3	4	5	2				
LSD (%)	4	7	9	4				

Interpret results with caution. All trials were affected by heat and frost.

TABLE 9 2017 Mallee (main season) barley plump grain and screenings. Plump grain as the percentage above a 2.5 mm sieve. Screenings as the percentage below a 2 mm sieve.

	Plump Grain (%)				Screenings (%)			
	Birchip	Rainbow	Ultima	Walpeup	Birchip	Rainbow	Ultima	Walpeup
MALTING BARLEY								
Bass	95	91	33	74	0.5	1.1	11.0	4.6
Commander	88	82	52	63	2.9	3.1	9.2	7.5
Gairdner	55	63	6	39	4.5	3.4	50.6	21.8
Granger	86	79	26	79	1.4	1.8	15.7	2.7
La Trobe	86	89	32	60	1.9	1.7	13.0	6.8
Schooner	76	78	15	73	2.1	1.4	13.2	2.7
Scope	79	87	38	76	2.0	1.3	9.0	4.0
FEED BARLEY								
Fathom	67	93	59	67	1.6	1.8	7.5	7.5
Fleet	85	79	30	76	1.9	1.8	16.5	4.0
Hindmarsh	89	90	40	71	1.7	1.7	10.7	4.6
Oxford	77	64	13	60	1.6	2.1	20.7	4.1
Rosalind	84	90	43	62	2.1	1.1	10.9	9.4
BARLEY UNDER MALT EVALUATION								
Biere	81	88	27	58	2.8	2.1	17.4	7.7
Compass	94	93	74	71	1.5	1.8	4.4	5.2
RGT Planet	87	71	31	57	1.6	3.5	15.6	9.4
Spartacus CL	84	90	48	65	1.9	1.2	7.3	6.4

Interpret results with caution. All trials were affected by heat and frost.

TABLE 10 2017 North Central, North East and Wimmera (main season) barley yield and protein (%). Yield as a percentage of site mean yield.

Location & Sowing date	Yield (%)							Protein (%)						
	North Central		North East	Wimmera				North Central		North East	Wimmera			
	Charlton 9/5/17	Colbinabbin 17/5/17	Wunghnu 16/5/17	Brim 10/5/17	Horsham 25/5/17	Kaniva 12/5/17	Minyip 15/5/17	Charlton	Colbinabbin	Wunghnu	Brim	Horsham	Kaniva	Minyip
MALT BARLEY														
Bass	100	97	95	104	93	101	95	14.2	6.8	11.4	13.0	12.5	11.6	11.9
Baudin	86	83	92	98	95	94	93	13.3	7.3	11.3	12.8	11.9	11.1	11.6
Charger	101	86	93	105	99	95	102	12.4	6.7	10.6	12.1	12.6	10.3	11.0
Commander	98	86	111	107	99	95	97	12.2	6.5	10.5	11.9	11.9	11.3	10.6
Fairview	-	-	99	102	109	93	94	-	-	10.2	12.5	11.4	11.5	11.4
Flinders	100	98	104	101	94	101	95	13.3	7.5	10.5	12.4	12.5	11.7	11.4
Gairdner	86	87	89	89	79	97	94	13.1	7.1	11.2	12.9	12.4	12.0	10.8
Granger	-	-	105	89	108	103	101	-	-	10.9	13.1	11.8	10.6	11.3
La Trobe	100	107	96	108	100	95	99	12.5	7.0	10.6	12.0	11.4	11.0	11.3
Scope	87	96	100	94	80	95	90	12.5	6.7	10.3	12.3	11.1	11.0	11.4
Westminster	-	-	94	-	-	-	-	-	-	11.0	-	-	-	-
FEED BARLEY														
Bottler	99	100	94	97	98	104	109	12.3	6.1	11.1	12.4	11.7	10.7	10.0
Explorer	104	102	91	98	94	101	111	11.6	6.6	10.5	12.0	11.6	10.6	10.4
Fathom	101	119	97	109	101	102	103	13.0	7.5	10.7	12.1	12.7	11.0	12.1
Fleet	-	-	-	108	92	79	107	-	-	-	12.6	12.1	11.1	11.2
Hindmarsh	100	104	106	105	104	91	103	13.1	7.8	10.2	11.9	11.7	11.0	11.5
Oxford	96	102	95	94	91	105	108	12.0	6.1	11.9	12.6	12.3	10.6	10.5
Rosalind	107	122	108	102	121	111	104	11.9	7.4	10.6	11.4	11.1	10.4	11.4
Topstart	96	107	98	87	104	102	95	11.9	6.4	11.0	12.0	11.1	10.7	10.3
BARLEY UNDER MALT EVALUATION														
Alestar	96	100	93	100	108	99	100	12.2	6.6	11.2	11.8	11.7	10.7	11.2
Biere	83	98	-	71	96	87	79	12.9	7.3	-	12.7	11.6	11.6	11.9
Compass	101	95	110	105	98	103	96	12.1	6.1	10.5	11.4	11.8	10.7	10.6
Maltstar	95	88	107	104	102	107	106	12.4	7.6	10.6	11.6	11.0	10.1	10.5
RGT Planet	111	124	100	114	109	119	115	11.8	5.5	9.7	11.6	10.9	10.4	9.5
Spartacus CL	99	93	107	102	98	93	92	13.1	7.2	10.5	12.2	11.9	11.2	11.9
Site Mean (t/ha)	5.71	3.63	4.96	4.27	5.16	5.88	5.21							
CV (%)	4	8	5	5	8	3	5							
LSD (%)	8	15	9	8	13	5	8							

Interpret results with caution. All trials were affected by heat and frost.

TABLE 11 2017 North Central, North East and Wimmera (main season) barley plump grain and screenings. Plump grain as the percentage above a 2.5 mm sieve. Screenings as the percentage below a 2 mm sieve.

	Plump grain (%)							Screenings (%)						
	North Central		North East	Wimmera				North Central		North East	Wimmera			
	Charlton	Colbinabbin	Wunghnu	Brim	Horsham	Kaniva	Minyip	Charlton	Colbinabbin	Wunghnu	Brim	Horsham	Kaniva	Minyip
MALTING BARLEY														
Bass	57	96	82	85	93	95	92	9.8	0.9	1.5	1.2	1.4	0.9	0.6
Baudin	50	91	44	56	79	64	75	11.3	2.1	14.8	6.6	3.0	6.9	2.6
Charger	74	80	56	72	65	84	83	6.3	4.0	13.2	5.1	9.5	4.0	3.5
Commander	84	93	79	81	86	84	91	4.5	2.6	3.4	3.8	4.5	4.0	2.9
Fairview	-	-	77	52	80	81	77	-	-	2.6	3.9	3.2	2.4	2.0
Flinders	71	91	78	75	81	87	88	4.6	2.1	2.1	1.8	1.8	2.1	1.4
Gairdner	24	81	40	44	57	57	67	24.9	3.1	20.9	8.4	6.5	9.6	4.4
Granger	-	-	72	64	81	92	89	-	-	5.4	4.1	3.0	1.8	1.7
La Trobe	65	94	49	70	74	76	78	6.6	1.5	9.6	2.7	6.5	6.3	3.5
Scope	78	94	82	74	88	82	83	3.5	1.8	1.8	2.1	2.0	2.1	2.3
FEED BARLEY														
Bottler	76	80	46	62	70	83	86	4.5	3.2	12.9	3.4	4.8	3.4	2.0
Explorer	74	87	51	82	69	84	86	6.4	2.2	13.0	2.7	6.3	3.2	2.7
Fathom	89	95	76	92	94	92	93	2.4	1.5	4.5	1.5	2.1	2.1	1.8
Fleet	-	-	-	72	90	89	92	-	-	-	2.9	1.8	2.2	1.2
Hindmarsh	63	93	70	78	75	82	84	6.2	1.8	4.7	2.4	8.0	5.1	2.6
Oxford	53	70	51	53	75	82	77	8.9	3.7	9.1	4.0	5.0	3.3	2.6
Rosalind	84	94	58	87	85	88	76	2.8	1.2	9.3	1.2	2.4	2.1	3.5
Topstart	45	58	43	44	64	56	69	11.7	5.0	14.6	6.0	5.1	9.7	3.8
BARLEY UNDER MALT EVALUATION														
Alestar	75	85	58	71	84	85	82	4.5	2.5	10.3	4.0	2.7	3.1	2.6
Biere	79	94	-	69	80	91	84	3.5	1.5	-	3.5	3.0	1.8	2.6
Compass	90	94	75	95	88	94	93	2.1	1.9	4.2	0.9	3.3	1.5	2.4
Maltstar	40	68	42	41	71	69	61	19.9	4.9	19.7	8.8	4.2	6.3	5.8
RGT Planet	69	79	45	65	66	82	86	6.8	2.6	16.7	4.7	5.5	3.8	2.1
Spartacus CL	82	95	71	78	74	78	81	3.1	0.9	4.1	1.8	6.2	6.3	3.2

Interpret results with caution. All trials were affected by heat and frost.

TABLE 12 2017 South West (long season) barley yield, protein (%), plump grain and screenings. Yield as a percentage of site mean yield. Plump grain as the percentage above a 2.5 mm sieve. Screenings as the percentage below a 2 mm sieve.

	Yield (%)		Protein (%)		Plump grain (%)		Screenings (%)	
	Hamilton	Inverleigh	Hamilton	Inverleigh	Hamilton	Inverleigh	Hamilton	Inverleigh
Sowing date	11/4/17	15/5/17						
MALTING BARLEY								
Bass	88	90	13.3	13.5	91	96	2.0	1.2
Charger	109	103	12.7	11.7	92	89	2.3	2.8
Commander	94	101	11.1	11.2	89	93	3.4	2.0
Fairview	81	100	11.9	12.3	79	89	4.1	1.8
Flinders	103	95	13.3	12.8	87	94	3.1	1.5
Gairdner	102	89	12.8	13.0	94	90	1.1	1.9
Granger	129	97	12.5	12.1	94	94	1.3	1.6
Navigator	97	90	12.4	12.1	93	96	2.2	1.2
Westminster	107	94	12.4	12.2	86	92	2.9	1.5
FEED BARLEY								
Bottler	109	111	11.7	11.2	89	89	3.0	2.8
Capstan	91	109	13.0	12.6	68	86	10.1	4.3
Explorer	79	97	12.0	12.3	85	88	4.1	3.0
Oxford	109	101	11.9	11.5	82	87	4.8	3.1
Rosalind	111	105	11.8	11.6	90	91	2.1	1.7
Topstart	104	105	11.5	11.7	79	84	5.2	3.3
Urambie	86	97	12.9	12.0	97	97	0.4	0.4
BARLEY UNDER MALT EVALUATION								
Alestar	111	99	11.5	11.4	90	92	2.0	1.6
Compass	101	104	11.7	12.6	91	93	2.5	1.9
Maltstar	94	107	11.7	10.9	85	89	3.7	2.7
RGT Planet	116	112	12.3	10.9	84	89	3.5	2.5
Spartacus CL	104	96	13.5	12.6	80	90	5.7	2.4
Site Mean (t/ha)	4.76	6.00						
CV (%)	9	8						
LSD (%)	15	13						

Interpret results with caution. All trials were affected by heat and frost.
All seed was treated with Systiva.

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OAT

REVIEW OF 2017

Season

Oat plantings increased again in 2017, reflecting strong prices at the end of 2016 and an increasing number of growers producing oaten hay for export markets. As with other cereals the solid break gave crops a good start to the season.

Oats are more tolerant to frost than other cereals and therefore were less impacted by the late season frosts than other cereals. Growers in the southern Mallee were able to get hay making underway in a timely fashion and excellent conditions resulted in good yields of quality export oaten hay. Grain yields were also good with many achieving average to above average yields.

Disease

Red leather leaf and bacterial blight were observed across western Victoria, with septoria also seen in the South West. These diseases were observed early on in trials and in crops where infected stubble was present. These diseases generally didn't progress to have a major impact on yields.

LOOKING FORWARD TO 2018

New varieties

Kowari (tested as 03198-18) is a new dwarf potential milling variety with similar maturity and grain yield to Mikita. Bred by the National Oat Breeding Program, Kowari offers excellent grain quality, improved β -glucan content, low screenings and a reasonable disease package.

The National Oat Breeding Program aims to release two new varieties for 2019. 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.

Disease

Red leather leaf, bacterial blight and septoria (in the high rainfall zone) have become common and will be the diseases to watch for again in 2018. Inoculum will be present from 2016 and 2017 stubble, and growers should avoid back to back oat plantings as these pathogens survive on stubble. Managing the green bridge after summer rain events will also be important to control pests and diseases for the coming season.

Quality

Variety selection should be based on agronomic traits, potential grain quality and marketing or end use options. Oats are grown for human consumption or animal feed as grain or hay. 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 it 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.

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

<http://agriculture.vic.gov.au/agriculture/grains-and-other-crops>

- AG1160 Cereal disease guide

www.aexco.com.au

- Producing quality oat hay booklet

VARIETY DESCRIPTIONS

Ⓓ 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[Ⓓ]

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.

Milling oat – DURACK[Ⓓ]

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.

NEW Potential milling oat – KOWARI[Ⓓ]

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, VS to CCN, S to septoria and MR to bacterial blight. Released 2017. Bred by the National Oat Breeding Program, tested as 03198-18 and marketed by Heritage Seeds. EPR \$2.50.

Milling oat – MITIKA[Ⓓ]

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[Ⓓ]

A tall milling oat suited to medium to high rainfall zones. It is 15 cm 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[Ⓓ]

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[Ⓓ]

Medium to tall, early to mid-season variety intended to replace Euro. 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[Ⓓ]

Early to mid-season tall oat targeted as a replacement for Wintaroo but with better resistance to leaf rust and lodging. Has excellent hay colour with quality similar to Wintaroo and good grain yield and quality. Released 2009. Bred by SARDI and marketed by AEXCO. EPR \$2.

Hay/feed oat – TAMMAR[Ⓓ]

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[Ⓓ]

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[Ⓓ]

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[Ⓓ]

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

Hay oat – GLIDER

A late maturing 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 – KANGAROO[Ⓓ]

A mid to late season moderately tall oat. A later flowering time makes it less suited to low rainfall environments. S to rusts. Resistant and moderately tolerant to CCN. Released 2003. Bred by SARDI and marketed by AEXCO. EPR \$2.

Hay oat – TUNGOO[Ⓓ]

A medium to tall variety. S 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 local departmental agronomists.

MALLEE	April				May				June				July			
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Quoll																
Hay: Kangaroo, Mulgara, Wintaroo, Forester																
Grazing: Wintaroo																
WIMMERA	April				May				June				July			
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Mulgara, Quoll																
Hay: Brusher, Glider, Kangaroo, Mulgara, Wintaroo, Forester																
Grazing: Wintaroo																
NORTH CENTRAL	April				May				June				July			
Milling: Bannister, Durack, Echidna, Mitika, Yallara, Wombat																
Feed: Mulgara, Quoll																
Hay: Glider, Kangaroo, Mulgara, Wintaroo, Forester																
Grazing: Tungoo																
NORTH EAST	April				May				June				July			
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Feed: Mulgara, Quoll, Tammar																
Hay: Glider, Mulgara, Tammar, Tungoo, Wintaroo, Forester																
Grazing: Tungoo																
SOUTH WEST	April				May				June				July			
Milling: Bannister, Durack, Echidna, Kowari, Mitika, Yallara, Wombat																
Possum																
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	<i>Puccinia coronata</i> f.sp. <i>avenae</i>	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	<i>Puccinia graminis</i> f.sp. <i>avenae</i>	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	<i>Phaeosphaeria avenaria</i>	Dark brown purple spots on leaves, sheaths & 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	<i>Pseudomonas syringae</i> pv. <i>coronafaciens</i>	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	<i>Pseudomonas syringae</i> pv. <i>striafaciens</i>	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	<i>Blumeria graminis</i> f.sp. <i>avenae</i>	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	<i>Spermospora avenae</i>	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	<i>Ustilage segetum</i> var. <i>hordei</i> . and <i>Ustilage avenae</i>	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)	<i>Heterodera avenae</i>	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	<i>Ditylenchus dipsaci</i>	Swollen base of plant, stunted and 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	<i>Pratylenchus thornei</i> , <i>P. neglectus</i>	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.

Year	North Central						North East					
		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
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	-	-	-	-
Williams	8	115	113	112	129	101
Wombat	8	111	110	106	122	104
Yallara	8	101	90	90	101	89

TABLE 6 2017 oat yield and protein (%). Yield as a percentage of the site mean yield. Screenings as a percentage of grain below a 2mm sieve and test weight (kg/hectolitre).

	Yield (%)			Protein (%)			Screenings (%)			Test weight (kg/hectolitre)		
	North Central		North East	North Central		North East	North Central		North East	North Central		North East
	Diggora	Eastville	Dookie	Diggora	Eastville	Dookie	Diggora	Eastville	Dookie	Diggora	Eastville	Dookie
Sowing date	17/5/17	31/5/17	17/5/17									
Bannister	111	116	101	9.8	13.9	12.5	2.6	13.1	11.3	54.6	51.8	51.2
Durack	89	90	95	9.8	12.7	12.2	4.0	8.6	7.3	54.6	53.6	52.4
Echidna	100	80	88	11.2	14.2	12.6	6.3	17.7	9.1	54.2	50.8	52.6
Kowari	94	102	99	10.0	13.9	12.7	9.0	9.8	10.5	51.0	50.8	51.6
Mitika	94	86	96	10.5	13.4	12.8	14.0	17.2	17.4	50.0	51.2	49.4
Possum	99	93	100	8.8	12.9	12.0	4.5	15.1	13.6	53.0	47.6	52.8
Williams	111	110	110	10.1	14.3	12.8	5.0	7.2	6.4	52.2	52.6	53.0
Wombat	99	96	92	8.9	12.1	11.7	2.9	6.8	10.0	54.8	50.4	52.0
Yallara	97	100	93	10.6	14.4	12.8	5.0	9.8	9.3	52.0	51.0	51.6
Site Mean (t/ha)	4.98	2.54	4.06									
CV (%)	2	8	4									
LSD (%)	3	13	6									

Interpret results with caution. All trials were affected by heat and frost

ACKNOWLEDGEMENTS

Frank Henry Agriculture Victoria, Hamilton

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Luise Sigel 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 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 fertility. 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.

REVIEW OF 2017

Season

The area sown to triticale has declined substantially in recent years as growers favour wheat and barley. Continuing this trend, the production area remained low in 2017. Warmer than average autumn temperatures in 2017 meant varieties without vernalisation requirements matured significantly earlier than other years. Thus, varieties sown outside their optimal sowing windows were more at risk of frost damage.

Disease

There were no reports of disease issues in this crop for 2017. Triticales are noted for their resistance to a range of diseases and therefore provide a good rotational option. However, growers should still have a disease management plan when growing triticale.

LOOKING FORWARD TO 2018

New varieties

There are no new triticale varieties for 2018.

Disease

When selecting varieties up to date rust resistance ratings should be consulted as previous ratings may have changed due to new rust strains becoming established. The important diseases to consider are stripe rust and CCN.

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

<http://agriculture.vic.gov.au/agriculture/grains-and-other-crops>

- AG0497 Growing triticale
- AG1160 Cereal disease guide

VARIETY DESCRIPTIONS

([†]) denotes Plant Breeders Rights apply

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

ASTUTE^(†)

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

BISON^(†)

An early to mid-season reduced awn variety best suited to low-medium yielding environments. Intended as a replacement for Rufus. 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 variety, fully awned grain only triticale. 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. 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 in 2014 by Cooper & Elleway.

TABLE 1 Triticale time of sowing guide.

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

MALLEE	April				May				June				July			
Bison, Fusion, KM10, Goanna, Yowie																
WIMMERA	April				May				June				July			
Astute, Bison, Fusion, Goanna, Yowie																
KM10																
NORTH CENTRAL	April				May				June				July			
Astute, Bison, Fusion, Goanna, Yowie																
KM10																
NORTH EAST	April				May				June				July			
Astute, Bison, Fusion, Goanna, Yowie																
SOUTH WEST	April				May				June				July			
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	<i>Septoria tritici</i>	CCN resistance	<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
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

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.

ACKNOWLEDGEMENTS

Joshua Fanning Agriculture Victoria, Horsham

Grant Hollaway Agriculture Victoria, Horsham

Britt Kalmeier AGT

CANOLA

REVIEW OF 2017

Season

Solid subsoil moisture reserves after a wet 2016 and a favourable autumn break across much of the state meant that canola planting area increased in 2017. This increase was despite some commercial seed shortages which meant a number of growers planted stored seed instead of hybrid seed.

A few growers experienced emergence issues due to mice activity and waterlogging. Considerable baiting minimised the issues caused by high mouse activity, however there were some reports of mice eating flower buds, but not enough to cause significant impact.

Canola growers experienced near perfect conditions throughout the season, with the exception of a dry June. Unfortunately, late hail impacted growers with isolated storms in the Wimmera, North Central and South West causing losses of up to 100 per cent in the worst cases.

Harvest in the Mallee and Wimmera resulted in good yields for many with minimal quality issues. Some crops were impacted by frost damage resulting in yield and oil penalties. In general, canola growers achieved average to above average yields across canola growing regions. Mild conditions also resulted in high oil content for all canola types across Victoria.

Disease and pest issues

Favourable conditions early in the season saw an increased incidence of White leaf spot which caused concern for some however, the disease was not severe enough to cause yield loss, as is normally the case.

Seasonal conditions were not conducive to the development of the blackleg fungus, with drier spells between rainfall events during June and July. Growers were advised to monitor the severity of blackleg infection prior to making decisions to apply foliar fungicides. Significantly less fungicide was applied in 2017 compared with 2016.

Research has confirmed that the emergence of upper canopy blackleg infections has resulted from the move towards early sowing. This means crops are elongating and flowering in later winter allowing infection to directly affect branches rather than the leaves, as occurs in later developing crops. Preliminary research suggests that later flowering is effective at reducing damage from upper canopy infection. Fungicides are also effective in reducing upper canopy infection, but the best timing for fungicide application is still being investigated.

Conditions did not favour the development of Alternaria in 2017.

Turnip yellows virus (TuYV, previously known as Beet western yellows virus) was detected in several canola crops and with higher incidence in 2017 than 2016. Note that TuYV is not seed borne.

LOOKING FORWARD TO 2018

New varieties

The new listings for 2018 are:

- Conventional hybrid – Nuseed Quartz
- Clearfield tolerant hybrids – Pioneer® 43Y92 (CL), Sainly CL™
- Clearfield specialty hybrids – Victory® V7002CL
- Triazine tolerant hybrids – DG 670TT, Hyola® 350 TT, HyTTec® Trophy
- Roundup Ready hybrids – DG 408RR, Hyola® 506RR, InVigor R 3520, Pioneer® 44Y27 (RR)

Varieties removed this year are:

- Conventional – SF Sensation
- Clearfield – Pioneer® 44Y89 (CL)
- Triazine tolerant OP – ATR Gem
- Roundup Ready – IH30 RR, Nuseed GT-50, Pioneer® 44Y24 RR, Pioneer® 44Y26 RR
- Specialty Oil – Monola 314TT, Monola 513 GT
- Dual herbicide tolerant – Hyola® 525RT

Disease and pest management

Despite low levels of disease in 2017 growers should still consult the GRDC Blackleg Management Guide to minimise the impact of blackleg. Specifically, growers should ensure that they are sowing this year's canola crop at least 500 metres from last year's stubble. Sow according to the normal flowering window to avoid blackleg infection during flowering and rotate blackleg resistance groups if high levels of internal canker disease were detected in 2017. Growers should monitor infection levels throughout the season to ensure timely fungicide application and also do paddock cuts each year to determine whether internal infection is changing over time in varieties being grown on farm or nearby.

Do not retain seed from crops that had high levels of blackleg or alternaria pod infection in 2017. If retaining seed, grade it for larger seeds which are less likely to be infected with blackleg and ensure an even and adequate treatment with an appropriate fungicide to control seedling blight.

Sclerotinia is a very sporadic disease. In regions where sclerotinia has occurred in the past it is likely to occur when rainfall coincides with flowering. Sclerotinia is also likely to be more severe in regions with a higher proportion of broad leaved crops. The only control for sclerotinia is foliar fungicide application, fungicides

should be applied early during flowering to protect the main stem. Later infections on the branches normally result in less significant damage.

While we haven't seen a Turnip yellows virus (TuYV) outbreak since 2014 it is always important to prevent aphid build up. Growers should manage weeds over summer particularly after summer rain and sow into standing stubble to reduce aphid landings. Use seed dressings that are suitable for aphid control to provide protection for the first 4-5 weeks and monitor aphid numbers throughout the season.

Mice

Mice were an issue throughout the Wimmera Mallee at sowing and also in spring for some due to heavy stubbles and food availability allowing mice to survive the 2017 winter. High populations were present during spring 2017 in the Wimmera Mallee, but effective baiting meant mice only caused minor damage. Results from the spring 2017 survey indicate that there is a moderate likelihood of an outbreak in autumn 2018 and seasonal conditions over spring and summer have set up the potential for increased numbers at sowing, particularly in the Mallee.

Monitoring for the presence of mice is key for canola sown into cereal stubble. Growers should assess the mouse situation in each paddock and manage accordingly. Moderate to high populations can have a significant impact on crop establishment and baiting should be considered if mice are present pre-sowing. Consult the *GRDC Tips & Tactics: Better Mouse Management* for more information.

Slugs

Slugs can be a major problem in the high rainfall zone where stubble is retained. Canola is one of the more susceptible crops to slugs particularly at the seedling stage. Summer rain and weed growth mean it is important to implement an integrated management plan.

Retaining seed

Research in South Australia has shown that newly purchased commercial hybrid seed yields 7 to 17 per cent better than sowing retained hybrid seed (which is no longer hybrid seed). Oil content is also significantly better for newly purchased hybrid seed. Any seed that was subject to weather damage during the 2017 harvest should not be retained for sowing.

Dual purpose canola

Southern Farming Systems 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. 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 is grown agronomically similarly to commodity canola.

MORE INFORMATION

www.nvtonline.com.au

Detailed NVT trial results and links to variety information.

www.nvtonline.com.au/apps

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

<http://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.
- FACTSHEET: Resistance management strategy for the green peach aphid in Australian grains
- Tip & Tactics: Better Mouse Management
- GRDC factsheet: Spring sown winter canola

www.extensionaus.com.au/field-crop-diseases

- Blackleg monitoring summaries

VARIETY DESCRIPTIONS

(b) 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^(b)

Mid maturing variety of medium height. Nuseed indicate very high oil content. Blackleg rating MS. NVT tested 2006-17. 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 2012-17. Marketed by Nuseed.

NEW 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 2016-2017 as NCH14C047. Released 2017. Marketed by Nuseed.

OP Conventional – SF BRAZZIL

Late maturing winter dual purpose open-pollinated variety suited to early sowing and winter grazing in very high rainfall zones. Blackleg rating R-MR. Marketed by Seed Force. EPR \$7.

CONVENTIONAL SPECIALTY HYBRID VARIETIES

Hybrid Specialty Oil – VICTORY® V3002

Early-mid maturing conventional specialty hybrid. Cargill indicate high yield potential and oil content. Blackleg rating MR. NVT tested 2011-17. 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 2014-17. 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 with good vigour and excellent flowering uniformity and standability. Blackleg rating R. NVT tested 2010-17. Bred and marketed by Advanta Seeds.

Hybrid Clearfield – HYOLA® 970CL

Long season winter dual purpose hybrid, adapted to high to very high rainfall zones (>500 mm). Advanta Seeds indicate tall with excellent early biomass and excellent flowering uniformity. High yield and oil content. Blackleg rating R. Marketed by Advanta Seeds.

NEW Hybrid Clearfield – PIONEER® 43Y92 (CL)

Early maturing hybrid variety suited to low to medium rainfall zones. Blackleg rating R-MR. NVT tested 2016-2017 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. Pioneer indicate exceptional adaptability and yield for maturity. Blackleg rating R-MR. NVT tested 2015-16 as PHI-1502. Released 2016. 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 2014-17. Released 2016. Marketed by Pioneer Seeds.

NEW Hybrid Clearfield – Saintry CL™

Mid to mid-early maturing hybrid. Heritage Seeds indicate high yield and oil content. Medium plant height with excellent standability. Blackleg rating MR (company rating). NVT tested 2016-17 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. Seed Force indicate very high biomass with excellent yield and oil content. 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. High yield potential and oil content. Blackleg rating R Jockey. NVT tested 2016-17. Released 2017. Bred by Cargill. Marketed by AWB under contract.

NEW Victory® Specialty Oil – VICTORY® V7002CL

Early-mid maturing specialty (high oleic, low linoleic oil) hybrid. High yield potential and oil content. Provisional blackleg rating R Jockey (company rating). NVT tested 2017. Limited release 2018. Bred by Cargill. Marketed by AWB under contract.

TRIAZINE TOLERANT VARIETIES

OP Triazine Tolerant – ATR-BONITO[Ⓛ]

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 2012-17. Marketed by Nuseed. EPR \$5.

OP Triazine Tolerant – ATR-MAKO[Ⓛ]

Early-mid maturing variety for low to medium rainfall zones. Alternative to ATR Gem, ATR Stingray or Crusher TT. Blackleg rating MR. NVT tested 2014-17. Bred and marketed by Nuseed. EPR \$5.

OP Triazine Tolerant – ATR-STINGRAY[Ⓛ]

An early maturing variety. Moderate vigour with uniform short to medium height and compact pod set. Blackleg rating MR. NVT tested 2010-17. Bred by AgSeed Research and Agriculture Victoria. Marketed by Nuseed.

OP Triazine Tolerant – ATR-WAHOO[Ⓛ]

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 2013-17. Marketed by Nuseed. EPR \$5

Hybrid Triazine Tolerant – DG 560TT

Mid maturing hybrid. Suited to medium rainfall zones. Medium height and moderate oil content. Blackleg rating MR. NVT tested 2015-17. Marketed by Landmark and Seednet..

NEW Hybrid Triazine Tolerant – DG 670TT

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

NEW 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 2016-2017 as T48481. Released 2017. Advanta Seeds.

Hybrid Triazine Tolerant – HYOLA® 559TT

Mid maturing hybrid. Suited to low through to high rainfall zones including irrigation. Good seedling vigour, medium height and excellent flowering uniformity and shatter tolerance. Very high oil content. Blackleg rating R-MR. NVT tested 2011-17. 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. Good seedling vigour, medium plant height and excellent flowering and height uniformity. High oil content. Blackleg rating R. NVT tested 2013-17. Bred and marketed by Advanta Seeds.

NEW Hybrid Triazine Tolerant – HyTTec® Trophy

Early to early-mid maturing hybrid variety suited to a wide range of environments. Medium tall plant height. Blackleg rating unknown. NVT tested 2017 as NCH15T085. Released 2017. Marketed by Nuseed. EPR \$10.

Hybrid Triazine Tolerant – InVigor T 4510

Early-mid maturing hybrid variety. Bayer indicate highly adaptable and high yielding. Blackleg rating MR-MS. Medium-tall plant height. NVT tested 2016-17 as PJTT3. Released 2016. Marketed by Bayer.

Hybrid Triazine Tolerant – PIONEER® 44T02 TT

Early-mid maturing hybrid suited to low to medium rainfall areas. Pioneer indicate exceptional adaptability and yield for maturity and excellent early vigour. Blackleg rating R-MR. NVT tested 2015-17 as PHT-1504. Released 2016. Marketed by Pioneer Seeds.

Hybrid Triazine Tolerant – PIONEER® 45T01 TT

Mid maturing hybrid suited to medium to high rainfall zones. Pioneer indicate excellent early vigour, medium to tall height and high oil content. Blackleg rating MS. NVT tested 2013-16. Marketed by Pioneer Seeds.

Hybrid Triazine Tolerant – SF IGNITE TT

Mid maturing hybrid. Excellent early vigour. Suited to medium to high rainfall zones. Medium height and moderate oil content. Blackleg rating MR. NVT tested 2016-17 as SFR65-014TT. Bred by NPZ Australia. Marketed by Seed Force.

Hybrid Triazine Tolerant – SF TURBINE TT

Early-mid maturing hybrid. Excellent early vigour. Suited to medium rainfall zones. Medium height and moderate oil content. Blackleg rating MR-MS. NVT tested 2015-17. 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 2014-17. 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 2014-17. Marketed under closed loop contract through Nuseed.

ROUNDUP READY HYBRID VARIETIES**NEW 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 2016-2017 as 11H4054. Released 2017. Marketed by Landmark and Seednet.

Hybrid Roundup Ready – DG 460RR

Mid maturing hybrid. Medium plant height with good standing ability. High oil content. Blackleg rating of MR. NVT tested 2014-17. Released 2016. Bred and marketed by Landmark and Seednet.

Hybrid Roundup Ready – NUSEED GT-41

Early maturing variety. Nuseed indicate high yielding with good early vigour and high oil content. Blackleg rating R-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 2014-17. Marketed by Nuseed.

Hybrid Roundup Ready – NUSEED GT-53

Mid maturing hybrid variety. Medium-tall height. High yields and high oil content. Blackleg rating R. NVT tested 2014-16 as NCH13G046. Released 2016. Nuseed.

Hybrid Roundup Ready – HYOLA® 404RR

Early to early-mid season hybrid. Suited to medium to high rainfall zones including irrigation. Medium height, excellent early vigour, flowering uniformity and oil content. Blackleg rating R-MR. NVT tested 2010-17. Bred and marketed by Advanta Seeds.

NEW Hybrid Roundup Ready – HYOLA® 506RR

Mid maturing hybrid variety. Medium to tall plant height and high oil content. Blackleg rating R. NVT tested 2013, 2016-17 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 Bayer.

NEW 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 2016-17 as AN15R5537. Released 2017. Bred and marketed by Bayer.

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 2015-17 as AN14R9012. Released 2016. Bred and marketed by Bayer.

Hybrid Roundup Ready – PIONEER® 43Y23 (RR)

Early maturing hybrid. Wide adaptation, but best suited to Mallee and Wimmera districts. Excellent vigour, high yield potential and excellent shatter tolerance. Blackleg rating MR. NVT tested 2011-17. Bred and marketed by Pioneer Seeds.

NEW Hybrid Roundup Ready – PIONEER® 44Y27 (RR)

A early-mid season hybrid variety with good adaptability, ideally suited to low to medium rainfall zones. Blackleg rating MR. NVT tested 2016-17 as PHR-1605. 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 with high oil content. Blackleg rating MR. NVT tested 2012-17. Bred and 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 2013-17. Marketed under closed loop contract through Nuseed.

Hybrid Roundup Ready Specialty Oil – VICTORY® V5003RR

Mid maturing specialty (high oleic, low linoleic oil) hybrid variety. Cargill indicate high yield potential and oil content. Blackleg rating R - Jockey. NVT tested 2013-2017. Released 2016. Bred by Cargill. Marketed by AWB under contract.

DUAL-HERBICIDE TOLERANT VARIETIES

Hybrid Roundup Triazine Tolerant – 3000 TR

Early maturing hybrid suited to low-medium rainfall zones. Blackleg rating MS-S. NVT tested 2015-17. Marketed by Bayer.

TABLE 1 Canola time of sowing guide.

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

MALLEE	April				May				June				July			
Early Season																
WIMMERA	April				May				June				July			
Early Season																
Early-Mid Season																
Mid Season																
NORTH CENTRAL	April				May				June				July			
Early Season																
Early-Mid Season																
Mid Season																
NORTH EAST	April				May				June				July			
Early Season																
Early-Mid Season																
Mid Season																
SOUTH WEST	April				May				June				July			
Early Season																
Early-Mid Season																
Mid Season																
Mid-Late Season																
NORTHERN IRRIGATION	April				May				June				July			
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	<i>Leptosphaeria maculans</i>	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	<i>Sclerotinia</i> 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
Damping off	<i>Rhizoctonia</i> spp., <i>Pythium</i> spp. and <i>Fusarium</i> 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	<i>Alternaria brassicae</i>	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 2017). Ratings will be updated in March 2018.

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		A	open	Nuseed
Nuseed Diamond	early	2013	MR		A, B, F	hybrid	Nuseed
Nuseed Quartz	early-mid	2017	R		A,B, D	hybrid	Nuseed
SF Brazzil	late	2013	R-MR		B, C	open	Seed Force
CONVENTIONAL SPECIALTY CANOLA							
Victory® V3002	early-mid	2011	MR	R	A, B, F	hybrid	AWB
CLEARFIELD TOLERANT CANOLA							
Banker CL	mid	2015	MR-MS		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
Saintly CL™	mid-early	2018	MR (est)	R-MR (est)	A (TBC)	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 (est)	R (est)	A,B, F	hybrid	AWB
TRIAZINE TOLERANT CANOLA							
ATR-Bonito	early-mid	2013	MS		A	open	Nuseed
ATR-Mako	early-mid	2015	MR		A	open	Nuseed
ATR-Stingray	early	2011	MR		C	open	Nuseed
ATR-Wahoo	mid	2013	MS		A	open	Nuseed
DG 560TT	mid	2015	MR	R	B, F	hybrid	Landmark
DG 670TT	mid-late	2017	MR	R	B, F	hybrid	Landmark
Hyola® 350TT	early	2017	R		A, B, D, F	hybrid	Advanta Seeds
Hyola® 559TT	mid	2012	R-MR		A, B, D	hybrid	Advanta Seeds
Hyola® 650TT	mid-late	2013	R		A, B, D	hybrid	Advanta Seeds
InVigor T 4510	early-mid	2016	MR-MS	R	B, F	hybrid	Bayer
Pioneer® 44T02 TT	early-mid	2016	R-MR	R	A, B, D	hybrid	Pioneer Seeds
Pioneer® 45T01 TT	mid	2015	MS	R-MR	A, B	hybrid	Pioneer Seeds
SF Ignite TT	mid	2016	MR	R	B, 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		B	open	Nuseed
Monola 515TT	mid	2015	MR		unknown	open	Nuseed
ROUNDUP READY CANOLA							
DG 460RR	mid	2016	MR	R	A	hybrid	Landmark
DG 408RR	early-mid	2017	MS	R-MR	A, C	hybrid	Landmark
GT-41	early	2012	R-MR		A, B, F	hybrid	Nuseed
GT-42	early-mid	2015	R		A, B, D, F	hybrid	Nuseed
GT-53	mid	2016	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	A	hybrid	Bayer
InVigor R 5520P	mid late	2016	MR	R	A, C	hybrid	Bayer
InVigor R 3520	early	2017	MR	R	unknown	hybrid	Bayer
Pioneer® 43Y23 RR	early	2012	MR	R	B	hybrid	Pioneer Seeds
Pioneer® 44Y27 RR	early-mid	2017	MR	R	B	hybrid	Pioneer Seeds
Pioneer® 45Y25 RR	mid	2014	MR	R	B, C	hybrid	Pioneer Seeds
ROUNDUP READY SPECIALTY CANOLA							
Monola G11	early-mid	2015	R-MR		A, B, S	hybrid	Nuseed
VICTORY V5003RR	mid	2016	MR	R	A	hybrid	AWB
ROUNDUP READY AND TRIAZINE TOLERANT CANOLA							
3000 TR	early	2015	MS-S	MR	B	hybrid	Bayer

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	2.72	1.44
	No. trials	2	3	1	3	3
Banker CL	7	-	-	130	118	117
Carbine	2	111	-	-	-	-
Hyola 474CL	8	109	104	89	95	-
Hyola 575CL	10	-	103	82	91	91
Pioneer 43Y85 (CL)	5	75	88	-	-	-
Pioneer 43Y92 (CL)	6	-	-	-	105	108
Pioneer 44Y84 (CL)	2	114	-	-	-	-
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	2.72	1.44
	No. trials	2	3	1	3	3
ATR Bonito	12	84	99	99	94	97
ATR Gem	2	80	-	-	-	-
ATR Stingray	12	95	103	101	97	99
Bayer 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	-
HyITec Trophy	3	-	-	-	-	107
InVigor T 4510	6	-	-	-	111	112
Monola 314TT	2	55	90	-	-	-
Monola 416TT	1	-	-	-	103	-
Monola 515TT	1	-	74	-	-	-
Pioneer 44T02 TT	7	-	-	111	108	108
Pioneer 45T01TT	3	-	92	-	-	-
Pioneer Atomic TT	4	-	94	99	-	-
SF Turbine TT	6	-	-	-	106	102

TABLE 4, cont. next page

(CONTINUED) 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.

ROUNDUP READY CANOLA						
Year		2013	2014	2015	2016	2017
Mean yield (t/ha)		0.66	0.52	0.44	2.72	1.44
	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
Nuseed GT-53	1	-	-	-	105	-
Pioneer 43Y23 (RR)	12	129	120	102	98	101
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												
Year	North Central						North East					
		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	-	-
Hyola 50	2	101	101	-	-	-	3	101	103	-	-	104
Hyola 635CC	2	104	98	-	-	-	1	-	100	-	-	-
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

CLEARFIELD TOLERANT CANOLA												
Year	North Central						North East					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.03	2.91	0.70	3.75	2.64		2.04	2.95	1.71	3.12	1.75
	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
Carbine	2	99	-	-	-	-	2	97	-	-	-	-
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
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

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												
Year	North Central						North East					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.03	2.91	0.70	3.75	2.64		2.04	2.95	1.71	3.12	1.75
	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
Bayer 3000 TR	3	-	-	-	89	99	-	-	-	-	-	-
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 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
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	-	-	-
Pioneer Sturt TT	2	93	-	-	-	-	2	91	-	-	-	-
SF Ignite TT	4	-	-	-	114	107	4	-	-	-	114	106
SF Turbine TT	5	-	-	111	104	105	6	-	-	107	105	106
ROUNDUP READY CANOLA												
Year	North Central						North East					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.03	2.91	0.70	3.75	2.64		2.04	2.95	1.71	3.12	1.75
	No. trials	2	1	1	2	2	No. trials	2	2	2	2	2
CB Frontier RR	2	104	-	-	-	-	2	106	-	-	-	-
CB Status RR	2	93	-	-	-	-	0	-	-	-	-	-
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 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	-
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

TABLE 5, cont. next page

(CONTINUED) TABLE 5 North Central and North East conventional 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.

ROUNDUP READY CANOLA												
Year	North Central						North East					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.03	2.91	0.70	3.75	2.64		2.04	2.95	1.71	3.12	1.75
	No. trials	2	1	1	2	2	No. trials	2	2	2	2	2
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 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
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												
Year	South West						Wimmera					
		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	-	-
Hyola 50	1	103	-	-	-	-	1	-	103	-	-	-
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												
Year	South West						Wimmera					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.47	1.97	1.52	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 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
Rimfire CL	4	101	97	88	-	-	3	-	98	98	-	-
Saintly CL	8	-	-	147	112	112	4	-	-	141	103	107
VICTORY V7002CL	-	-	-	-	-	-	2	-	-	-	-	100

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												
Year	South West						Wimmera					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.47	1.97	1.52	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
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	-	-	-	-
CB Henty HT	2	97	-	-	-	-	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 559TT	12	103	103	105	98	100	8	104	104	109	98	100
Hyola 650TT	11	107	106	79	104	100	4	-	96	89	102	-
Hyola 725RT	6	-	95	77	94	-	-	-	-	-	-	-
HyITec Trophy	3	-	-	-	-	116	2	-	-	-	-	113
InVigor T 4510	3	-	-	-	-	113	4	-	-	-	116	110
Monola 314TT	2	78	-	-	-	-	3	-	91	84	-	-
Monola 416TT	7	-	-	94	98	102	6	-	95	89	92	98
Monola 515TT	6	-	-	56	80	88	5	-	81	61	85	-
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												
Year	South West						Wimmera					
		2013	2014	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		2.47	1.97	1.52	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
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 404RR	5	101	-	129	-	-	9	102	110	128	96	97
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	-
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 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
Victory V5002RR	6	109	107	74	-	-	5	111	95	90	-	-
VICTORY V5003RR	11	105	105	92	101	101	8	-	99	100	97	101

TABLE 7 2017 Mallee canola (early season) yield and oil content (%). Yield expressed as a percentage of the site mean yield.

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

Sowing Date	Yield (%)			Oil (%)		
	Birchip	Hopetoun	Ultima	Birchip	Hopetoun	Ultima
	3/5/17	27/4/17	24/4/17			
CLEARFIELD TOLERANT CANOLA						
Banker CL	115	102	104	43.6	41.3	39.1
Hyola 575CL	88	94	71	43.8	42.5	40.9
Pioneer 43Y92 (CL)	95	104	85	42.2	42.1	39.3
Pioneer 44Y90 (CL)	91	102	116	43.0	41.1	40.8
Saintly CL	97	101	124	43.9	42.0	39.9
VICTORY V7002CL	93	93	72	43.9	41.9	40.5
Site Mean (t/ha)	1.96	1.54	0.71			
CV (%)	8	6	11			
LSD (%)	13	9	17			
TRIAZINE TOLERANT CANOLA						
ATR Bonito	106	93	87	43.1	40.7	41.2
ATR Stingray	106	100	105	43.2	41.8	41.0
Bayer 3000 TR	97	96	80	42.0	40.6	39.5
Hyola 350TT	110	106	122	42.7	40.7	40.1
HyTtec Trophy	102	98	106	42.2	40.0	38.1
InVigor T 4510	110	100	117	41.4	39.2	39.3
Pioneer 44T02 TT	111	100	103	42.6	41.3	39.6
SF Turbine TT	102	94	106	40.5	39.1	37.8
Site Mean (t/ha)	1.85	1.39	0.99			
CV (%)	8	7	8			
LSD (%)	13	10	13			
ROUNDUP READY CANOLA						
DG 408RR	112	99	100	44.9	43.1	42.4
Hyola 404RR	99	90	84	45.8	44.3	42.9
InVigor R 3520	105	116	117	44.2	41.2	40.4
Nuseed GT-42	83	-	-	42.7	-	-
Pioneer 43Y23 (RR)	93	96	86	42.2	40.4	38.9
Pioneer 44Y27 (RR)	105	109	112	42.3	39.7	39.2
Site Mean (t/ha)	1.82	1.54	0.88			
CV (%)	8	6	9			
LSD (%)	13	9	14			

Interpret results with caution. All trials were affected by heat and frost

TABLE 8 2017 North Central, North East, South West and Wimmera canola (mid season) yield. Yield expressed as a percentage of the site mean yield.

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

Sowing Date	North Central		North East		South West			Wimmera	
	Charlton	Diggera	Wunghnu	Yarrowonga	Hamilton	Inverleigh	Streatham*	Kaniva	Minyip
	2/5/17	9/5/17	2/5/17	2/5/17	28/4/17	6/5/17	29-30/4/17	1/5/17	27/4/17
CONVENTIONAL CANOLA									
AV Garnet	-	93	103	-	-	-	103	-	102
Hyola 50	-	-	100	-	-	-	-	-	-
Nuseed Quartz	-	99	109	-	-	-	103	-	109
Victory V3002	-	90	88	-	-	-	93	-	95
Site Mean (t/ha)	-	2.30	1.90	-	-	-	2.73	-	3.70
CV (%)	-	8	5	-	-	-	13	-	4
LSD (%)	-	12	7	-	-	-	18	-	7

Interpret results with caution. All trials were affected by heat and frost except Streatham, which had high variability and was also affected by frost.

TABLE 8, cont. next page

(CONTINUED) TABLE 8 2017 North Central, North East, South West and Wimmera canola (mid season) yield.
Yield expressed as a percentage of the site mean yield.

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

Sowing Date	North Central		North East		South West			Wimmera	Minyip
	Charlton	Diggora	Wunghnu	Yarrowonga	Hamilton	Inverleigh	Streatham*	Kaniva	
	2/5/17	9/5/17	2/5/17	2/5/17	28/4/17	6/5/17	29-30/4/17	1/5/17	
CLEARFIELD TOLERANT CANOLA									
Banker CL	99	104	-	119	102	103	99	-	-
Hyola 575CL	83	91	82	91	82	75	84	91	88
Pioneer 43Y92 (CL)	91	101	113	104	-	-	-	96	100
Pioneer 44Y90 (CL)	97	103	97	106	99	102	112	102	104
Pioneer 45Y91 (CL)	105	99	108	111	105	92	105	100	101
Saintly CL	95	-	110	102	97	116	111	97	-
VICTORY V7002CL	111	91	86	90	-	-	-	91	95
Site Mean (t/ha)	3.02	2.32	2.36	1.50	2.91	3.06	2.74	2.60	3.73
CV (%)	5	8	4	9	8	12	13	4	4
LSD (%)	8	12	6	14	11	19	18	6	7
TRIAZINE TOLERANT CANOLA									
ATR Bonito	91	96	98	91	-	-	-	100	103
ATR Mako	-	77	87	93	-	-	-	95	-
ATR Stingray	97	95	-	-	-	-	-	95	95
ATR Wahoo	-	-	84	101	101	94	-	-	-
Bayer 3000 TR	89	95	-	-	-	-	-	92	93
DG 560TT	97	100	106	96	101	89	-	95	101
DG 670TT	-	-	-	117	101	106	-	101	-
Hyola 350TT	112	103	115	102	-	-	-	104	102
Hyola 559TT	94	98	104	94	94	95	-	98	102
Hyola 650TT	-	-	-	95	101	90	-	-	-
HyTtec Trophy	116	127	117	107	90	114	-	112	119
InVigor T 4510	110	116	114	110	103	122	-	102	104
Monola 416TT	88	103	94	97	-	94	-	96	95
Monola 515TT	-	-	86	-	-	-	-	-	-
Pioneer 44T02 TT	99	98	112	105	-	-	-	96	95
SF Ignite TT	108	123	119	100	107	101	-	107	107
SF Turbine TT	102	106	101	90	-	-	-	97	101
Site Mean (t/ha)	2.93	2.03	1.59	1.45	2.74	3.12	-	2.31	3.56
CV (%)	5	9	6	9	8	12	-	4	4
LSD (%)	9	14	9	14	11	19	-	7	7
ROUNDUP READY CANOLA									
DG 408RR	96	105	103	-	-	-	-	-	112
DG 460RR	89	-	104	94	94	100	-	98	97
Hyola 404RR	93	110	92	92	-	-	-	92	92
Hyola 506RR	-	-	96	89	102	95	-	94	101
IH51 RR	95	103	90	97	95	94	-	103	94
InVigor R 5520P	110	107	108	103	109	100	-	113	103
Monola G11	-	97	99	108	-	-	-	-	-
Nuseed GT-42	-	99	89	97	-	-	-	-	97
Nuseed GT-53	111	89	97	101	112	101	-	95	107
Pioneer 43Y23 (RR)	88	88	-	-	-	-	-	-	-
Pioneer 44Y27 (RR)	106	118	-	109	-	109	-	102	104
Pioneer 45Y25 (RR)	105	97	99	96	113	101	-	100	108
VICTORY V5003RR	96	91	-	90	96	84	-	100	102
Site Mean (t/ha)	3.22	2.30	2.11	1.62	2.73	3.39	-	2.54	3.72
CV (%)	5	8	4	8	8	11	-	4	4
LSD (%)	8	12	7	13	12	15	-	6	7

Interpret results with caution. All trials were affected by heat and frost except Streatham, which had high variability and was also affected by frost.

TABLE 9 2017 North Central, North East, South West and Wimmera canola (mid season) oil content (%).

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

Location	North Central		North East		South West			Wimmera	Minyip
	Charlton	Diggora	Wunghnu	Yarrawonga	Hamilton	Inverleigh	Streatham*	Kaniva	
CONVENTIONAL CANOLA									
AV Garnet	-	42.6	-	-	-	-	46.6	-	44.6
Hyola 50	-	-	-	-	-	-	-	-	-
Nuseed Quartz	-	42.2	-	-	-	-	46.0	-	44.7
Victory V3002	-	42.2	44.5	-	-	-	45.7	-	44.4
CLEARFIELD TOLERANT CANOLA									
Banker CL	41.5	41.5	-	46.3	46.4	43.0	47.3	-	-
Hyola 575CL	41.2	41.3	44.9	45.9	45.5	43.4	46.0	46.3	44.1
Pioneer 43Y92 (CL)	41.7	41.8	44.2	48.1	-	-	-	47.4	44.2
Pioneer 44Y90 (CL)	42.5	42.2	44.8	48.5	47.6	43.7	47.7	47.4	44.9
Pioneer 45Y91 (CL)	41.2	41.3	45.0	48.2	45.9	43.2	47.5	47.9	45.3
Saintly CL	42.9	-	44.9	48.4	47.1	44.3	47.7	48.7	-
VICTORY V7002CL	43.2	43.0	44.2	47.3	-	-	-	49.2	46.1
TRIAZINE TOLERANT CANOLA									
ATR Bonito	42.4	41.9	44.4	48.2	-	-	-	48.1	46.0
ATR Mako	-	39.1	40.8	44.3	-	-	-	43.5	-
ATR Stingray	41.7	41.6	-	-	-	-	-	46.6	43.5
ATR Wahoo	-	-	43.6	46.8	46.6	43.8	-	-	-
Bayer 3000 TR	41.7	40.3	-	-	-	-	-	45.7	42.7
DG 560TT	38.1	39.9	42.3	45.8	44.3	41.5	-	43.9	41.6
DG 670TT	-	-	-	46.3	44.7	43.2	-	44.7	-
Hyola 350TT	41.5	40.0	42.7	47.0	-	-	-	44.6	41.5
Hyola 559TT	42.0	40.8	44.9	48.2	47.1	43.8	-	46.3	43.5
Hyola 650TT	-	-	-	47.3	45.0	44.0	-	-	-
HyTtec Trophy	40.7	40.8	42.2	45.0	44.7	43.0	-	45.0	41.9
InVigor T 4510	39.1	40.6	42.1	45.8	45.0	43.2	-	45.3	42.5
Monola 416TT	42.3	40.8	43.7	47.0	-	45.1	-	47.6	44.8
Monola 515TT	-	-	43.7	-	-	-	-	-	-
Pioneer 44T02 TT	41.2	40.7	42.3	45.6	-	-	-	48.8	44.3
SF Ignite TT	40.4	38.7	42.8	45.3	45.6	41.8	-	46.6	43.1
SF Turbine TT	38.7	40.1	41.4	45.3	-	-	-	44.5	42.9
ROUNDUP READY CANOLA									
DG 408RR	43.7	44.0	46.5	-	-	-	-	-	47.8
DG 460RR	42.3	-	45.4	48.3	47.9	44.3	-	47.5	46.4
Hyola 404RR	43.9	43.7	45.0	49.4	-	-	-	47.5	46.2
Hyola 506RR	-	-	44.5	47.8	47.2	44.2	-	46.2	45.0
IH51 RR	39.7	38.9	42.8	47.1	44.6	43.3	-	44.0	42.0
InVigor R 5520P	42.2	41.0	44.4	49.0	47.5	44.2	-	46.3	44.9
Monola G11	-	44.1	46.1	49.5	-	-	-	-	-
Nuseed GT-42	-	40.3	43.3	45.6	-	-	-	-	43.6
Nuseed GT-53	41.7	41.0	42.6	46.4	45.3	43.4	-	45.7	44.0
Pioneer 43Y23 (RR)	39.7	40.5	-	-	-	-	-	-	-
Pioneer 44Y27 (RR)	41.5	42.1	-	48.3	-	44.3	-	45.8	44.6
Pioneer 45Y25 (RR)	43.4	42.3	44.2	47.6	47.7	44.6	-	47.9	46.2
VICTORY V5003RR	43.3	43.6	43.8	47.7	46.5	45.3	-	47.4	45.6

Interpret results with caution. All trials were affected by heat and frost except Streatham, which had high variability and was also affected by frost.

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FIELD PEA

REVIEW OF 2017

Season

The area sown to field peas was similar in 2017 to previous seasons. Field pea crops were looking promising across the Wimmera Mallee after a favourable start to the season until the impacts of frost and bacterial blight took their toll on both yield and quality.

Mallee crops were impacted by the August frost event leaving field peas vulnerable to bacterial blight infection, with variable impacts, in some cases resulting in 100 per cent losses. Wimmera crops were affected by the early November frost, which alone had a high impact on yields. Where field peas escaped frost and bacterial blight quality was good, but the majority of crops had some level of yield impact and quality downgrade.

Disease and insects

The major disease issue for field pea growers in 2017 was bacterial blight. Isolated hail storms increased the severity of existing infections or provided the opportunity for bacterial blight infections to establish, while August frosts in the Mallee exacerbated existing bacterial blight infections, resulting in failed crops in a number of cases.

Ascochyta blight, commonly known as blackspot, was not a major issue in 2017. Due to a timely break, Blackspot Manager predicted a low risk for ascochyta blight in mid to late May across most field pea growing regions, allowing for timely sowing.

Timely warning messages of native budworm flights were broadcast to various regions. Low moth activity, and subsequent caterpillar pressure, resulted in minimal damage to field pea crops.

Seed borne viruses were detected in field pea crops in 2017, but not at damage causing levels.

LOOKING FORWARD TO 2018

New varieties

PBA Butler[®] (tested as OZP1101) is a new mid to late flowering semi-dwarf field pea variety. PBA Butler has high yield potential and produces 'Kaspa type' grain. 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.

Disease

Due to the incidence of bacterial blight epidemics in the Mallee it is important to source clean seed for sowing in 2018. There is no treatment for bacterial blight so clean seed is the main control measure and seed from infected paddocks should not be kept. Growers should avoid sowing infected seed, not sow adjacent to last year's stubble and extend crop rotations to two years for infected paddocks.

Growers in bacterial blight prone regions should update to the more resistant varieties PBA Butler, PBA Oura and PBA Percy. When bacterial blight occurs, growers should minimise in crop traffic. Sowing into heavy cereal stubble appears to increase the disease severity and should be avoided in frost prone regions.

To reduce the incidence of blackspot, new crops should not be planted within 500 m of field pea stubble. Growers should use the Blackspot Manager service to ensure they are sowing field peas in a low risk window for blackspot. To subscribe to the Blackspot Manager alert service, text 'blackspot' with your name and location to 0475 959 932. Field pea seed should be treated with a thiram-based fungicide to reduce seedling infection followed by a foliar fungicide application at four to eight nodes. Growers should also maintain a rotation of at least three years between field pea crops.

It is also important to source seed that is tested free of pea seed borne mosaic virus (PSbMV) and test retained seed for seed borne viruses such as CMV. Applying a seed treatment is a cost-effective method for controlling a number of diseases and insect pests. Growers should use caution when using P-Pickle T on poorer quality seed, as it may result in reduced vigour.

Marketing

Field pea grain is exported as whole peas (not split) for human consumption to key markets of India, Bangladesh and Sri Lanka. Although there is capacity, no split peas have been exported for six years. Peas are also sold domestically, split for human consumption or as stockfeed. The market demands for field pea vary according to type where there are four classes – Dun, Dun 'Kaspa', white and blue peas.

Over 90 per cent of Australian production is from dun types (i.e., grain that has a coloured seed coat) of which more than 85 per cent is now 'Kaspa type' (e.g., Kaspa, PBA Gunyah, PBA Twilight and PBA Wharton). 'Kaspa type' grain is preferred for human consumption in southern India and Sri Lanka over other pea grain types and attracts a price premium. Growers of 'Kaspa type' grain for export should avoid sowing seed contaminated with Parafield or other dun types to avoid potential downgrading.

Most field pea markets in India traditionally buy the 'Kaspa type' as it is easier to remove the seed coat from a round seed over a

dimple seed shape (e.g., PBA Aura). There are markets in India and Sri Lanka that will buy the Dun type field pea. White field pea markets are further developing into China and the Indian sub-continent and growers of the high yielding PBA Pearl should ensure they have access to traders of these white peas.

Domestically all field pea 'Dun' and 'Kaspa' varieties are sought after for the splitting market including PBA Twilight, PBA Aura, PBA Wharton, PBA Percy and PBA Gunyah.

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

<http://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

(¹) denotes Plant Breeders Rights apply.

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

Semi-dwarf dun seeded – KASPA⁽¹⁾

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.

NEW Semi-dwarf dun seeded – PBA BUTLER⁽¹⁾

PBA Butler (tested as OZP1101) is a new 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⁽¹⁾

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⁽¹⁾

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⁽¹⁾

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⁽¹⁾

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⁽¹⁾

An early-mid flowering, semi-dwarf field pea which produces 'Kaspa type' grain. PBA Wharton is widely adapted across short to medium growing season environments and is a suitable variety for crop topping when sowing is delayed. PBA Wharton is resistant to downy mildew (Parafield strain), powdery mildew, PSbMV and BLRV. It will need to be managed for blackspot and 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[Ⓛ]

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. Hart Bros Seeds.

Tall field pea – PARAFIELD

A tall, mid-season flowering pea, which produces large Australian dun type grain. Parafield has lower yield potential compared to recent variety releases. PBA Percy is now a superior option for growers wanting to grow a conventional dun field pea. Parafield will need to be managed for all diseases in disease prone areas. Parafield has poor lodging resistance and will require specialised pea pickup fronts for harvesting. Parafield has moderate non-sugar-pod resistance to shattering. Released 1998. Can be freely marketed.

Tall field pea – PBA HAYMAN[Ⓛ]

A new type of 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 broad leaf 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[Ⓛ]

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. PBA Percy 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 local departmental agronomists.

MALLEE	April				May				June				July			
PBA Coogee, PBA Hayman																
Kaspa, Parafield, PBA Butler, PBA Gonyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt																
WIMMERA																
PBA Hayman																
Kaspa, Parafield, PBA Butler, PBA Coogee, PBA Gonyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt																
NORTH CENTRAL																
PBA Coogee, PBA Hayman																
Kaspa, Parafield, PBA Butler, PBA Gonyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt																
NORTH EAST																
PBA Hayman																
Kaspa, Parafield, PBA Butler, PBA Coogee PBA Gonyah, PBA Oura, PBA Percy, PBA Twilight, PBA Wharton, Sturt																
SOUTH WEST																
Kaspa, PBA Butler, PBA Coogee PBA Gonyah, 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 Gonyah	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
Parafield	C	high	mid	mid	poor	MR: NSP	S	MS
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)	<i>Pratylenchus neglectus</i>	<i>Pratylenchus thornei</i>
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	MSp	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 Gonyah	MS	S	S	R	S	S	S	MR	MRMS
PBA Twilight	MS	S	S	R	S	S	S	MRMSp	MRMS
PBA Wharton	MS	S	S	R	R	R	R	MRMSp	MRp
AUSTRALIAN DUN GRAIN TYPE									
Morgan	MS	MS	S	MR	S	S	Sp	RMRp	MRp
Parafield	MS	MS	S	S	S	S	S	MRMS	MRp
PBA Coogee	MS	MS	-	-	R	-	Sp	MRMSp	MRp
PBA Oura	MS	MRMS	MRMS	MR	S	S	MR	MRMSp	MRMSp
PBA Percy	MS	MR	S	S	S	S	S	MRMS	RMRp

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 Gonyah	✓	✓	✓		✓
PBA Twilight			✓	✓	
PBA Wharton	✓	✓	✓	✓	✓
AUSTRALIAN DUN GRAIN TYPE					
Morgan			✓	✓	
Parafield				✓	
PBA Coogee	✓	✓	✓	✓	✓
PBA Oura	✓	✓	✓	✓	✓
PBA Percy	✓	✓	✓	✓	

TABLE 5 Field pea diseases.

Disease	Organism	Symptoms	Occurrence	Hosts	Control
Ascochyta blight (Blackspot)	<i>Mycosphaerella pinodes</i> , <i>Phoma pinodella</i> , <i>Ascochyta pisi</i>	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	<i>Pseudomonas syringae</i> pv. <i>pisi</i> , <i>P. syringae</i> pv. <i>syringae</i>	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	<i>Peronospora viciae</i>	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	<i>Erysiphe polygoni</i>	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	<i>Septoria pisi</i>	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 <i>Fabaceae</i>	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 <i>Fabaceae</i>	Managing aphids and weeds, resistant varieties.

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

Year	Mallee						Wimmera					
		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 Gonyah	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	-

TABLE 7 2017 field pea yield in NVT and Victorian breeding (B) trials.
Yield expressed as a percentage of the site mean yield.

	Mallee					Wimmera		
	Beulah (B)	Birchip	Curyo (B)	Rainbow	Ultima	Horsham (B)	Kaniva	Tarranyurk
Sowing Date	26/5/17	8/5/17	11/5/17	10/5/17	9/5/17	8/6/17	1/6/17	24/5/17
Kaspa	93	94	93	87	96	102	95	63
Parafield	-	79	-	84	84	-	68	78
PBA Butler	98	112	105	94	94	102	110	91
PBA Gunyah	75	97	102	83	104	96	94	74
PBA Oura	117	88	100	110	99	101	96	111
PBA Pearl	138	98	99	114	84	99	101	121
PBA Percy	96	90	88	97	97	98	87	100
PBA Twilight	86	-	80	-	-	97	-	-
PBA Wharton	98	88	81	85	97	108	108	113
Site Mean (t/ha)	1.00	2.62	2.06	1.19	1.04	2.54	3.24	2.07
CV (%)	11	6	9	10	12	8	7	6
LSD (%)	26	10	27	16	21	18	11	10

Interpret results with caution. All NVT trials were affected by heat and frost.

TABLE 8 2017 field pea grain weight (g/100 seeds) in NVT trials.

	Mallee			Wimmera	
	Birchip	Rainbow	Ultima	Kaniva	Tarranyurk
Kaspa	20.3	17.0	18.3	21.0	21.5
Parafield	15.8	16.7	16.0	18.1	21.8
PBA Butler	19.1	17.5	17.2	21.3	23.0
PBA Gunyah	21.7	19.2	19.7	22.5	23.7
PBA Oura	21.1	19.5	19.3	23.9	24.2
PBA Pearl	21.0	17.2	16.6	23.2	27.3
PBA Percy	21.8	22.3	21.8	23.8	25.1
PBA Wharton	19.3	18.4	18.5	21.4	25.2

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LENTIL

REVIEW OF 2017

Season

The area of lentils sown increased significantly in 2017 with expansion further north into the Mallee and also into the southern Wimmera and South West. This continued increase is mostly due to strong prices and another successful lentil season in 2016. Sowing got underway on time, but the 2017 season was a mixed bag in the end - tough for some lentil growers and very profitable for others.

Frost was a major stress for many lentil crops in 2017. Soil type, topography and timing of frosts in relation to crop developmental stage played a major role in where and to what extent crops were impacted. Mallee crops were impacted by an August frost event, with PBA Hurricane XT, in particular, badly affected. Those crops in the Mallee which received good growing season rainfall and avoided frosts achieved good yields, but the dry spring, particularly in the northern and central Mallee, resulted in yield penalties. Many Wimmera growers were severely impacted by frost, particularly on grey clay soils and the Kalkee Plains. Most crops experienced significant yield loss and in many cases grain quality was poor resulting in price downgrades.

There is a current oversupply of lentils on global markets and lentils didn't see an improvement in pricing throughout 2017. The announcement of a tariff increase on lentil and chickpea exports to India may also make lentils difficult to shift.

Disease and insects

Disease was not an issue for lentils in 2017 due to the dry spring and an active fungicide management program.

Lentil crops which were surveyed for viruses had higher incidences of CMV, TuYV and BLRV than 2016. However, a number of crops surveyed for viruses were also asymptomatic in 2017 and very few visual virus symptoms were observed in commercial lentil crops.

LOOKING FORWARD TO 2018

New varieties

There are no new lentil varieties for 2018.

Disease

To protect lentil crops from Botrytis grey mould (BGM) a foliar fungicide spray at canopy closure is recommended for all lentil varieties in favourable seasons and disease prone areas. Where there is high risk of BGM, growers using susceptible varieties may also need to apply follow up sprays. Variety choice, delayed

time of sowing (particularly for susceptible varieties) and wider row spacing can also assist in minimising BGM. Growers with significant levels of BGM in 2017 lentil crops are advised to use a thiram-based seed dressing on seed to be planted in 2018 to protect against botrytis seedling rots.

Ascochyta blight can manifest rapidly and depending on the variety sown, should be factored into management plans for 2018. PBA Flash has the highest level of susceptibility among the lentil varieties and is therefore not a recommended variety for the Wimmera region. There has been evidence of the beginning of changes in pathogen virulence in SA, with ascochyta blight found in several paddocks of PBA Hurricane XT. It is not expected that a large change in the susceptibility of these varieties will be seen in Victoria in 2018. Nevertheless, crops of PBA Hurricane XT should be monitored for the presence of foliar ascochyta lesions during the 2018 season. Growers are encouraged to report lesions on resistant varieties to Agriculture Victoria at:

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

To develop a suitable virus management strategy it is important to test seed for Cucumber Mosaic Virus (CMV) and Alfalfa Mosaic Virus (AMV) if symptoms were observed in the seed crop.

Marketing

The majority of Australian lentil production is exported, with India, Sri Lanka and Bangladesh the largest buyers in recent years. Turkey and the Middle East are also important customers. The import tariff on lentils and chickpeas was increased by the Indian government during the 2017 harvest which caused a major slowdown in trade.

Variety purity is critical in lentils with a restriction of one per cent maximum contamination by different varieties. This is of particular concern when growing varieties with different seed coat colour and/or different cotyledon colour. Be aware of the potential for contamination from volunteer lentils in paddocks when changing to new varieties with different seed coat colours i.e. PBA Flash to PBA Bolt.

Some lentil varieties also have normal genetic variation in coat colour. Lentil standards have a one per cent maximum "contrasting seed coat colours" allowance for the varieties PBA Blitz and PBA Hurricane XT that have low levels of genetic variation in their seed coat colours.

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

<http://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

(^Δ) denotes Plant Breeder Rights apply

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

Red lentil – NIPPER^Δ

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 and R to the exotic disease Fusarium wilt. Nipper has improved salinity tolerance and generally lodges less than other varieties 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 now been superseded by PBA Ace and PBA Bolt. Released 1999. Heritage Seeds. EPR \$5.

Red lentil – PBA ACE^Δ

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

Red lentil – PBA BLITZ^Δ

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. AGT/ PB Seeds. EPR \$5.

Red lentil – PBA BOLT^Δ

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 salinity tolerance. PBA Bolt is MR to foliar ascochyta blight and RMR to seed ascochyta blight. It's 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 conditions. Released 2012. AGT/ PB Seeds. EPR \$5.

Red lentil – PBA FLASH^Δ

PBA Flash is an early-mid maturing, high yielding 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. AGT/ PB Seeds. EPR \$5.

Red lentil – PBA HURRICANE XT^Δ

PBA Hurricane XT is a small red seeded lentil with mid flowering and mid-late maturity. It has tolerance to imazethapyr with Genfarm imazethapyr 700WG herbicide registered for pre or post-emergent application. 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. PBA Hurricane XT is the highest yielding small red lentil available in Australia and has improved yields over PBA Herald XT, Nipper and Nugget, but lower than PBA Ace. It is MR to foliar ascochyta, RMR to seed ascochyta and MRMS to BGM. Released 2013. AGT/ PB Seeds. EPR \$5.

Red lentil – PBA JUMBO^Δ

PBA Jumbo is a high yielding 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 will be outclassed by PBA Jumbo2. Released 2010. AGT/ PB Seeds. EPR \$5.

Red lentil – PBA JUMBO2^Δ

PBA Jumbo2 is the highest yielding large seeded red lentil, approximately 10 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. AGT/ 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 is expected to be superseded by PBA Giant. Released 2005. Seednet. EPR \$5.

Green lentil – PBA GIANT[Ⓛ]

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[Ⓛ]

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 lentils growing regions. It has improved tolerance to salinity 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 local 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/late	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
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)	<i>Pratylenchus neglectus</i> (provisional)	<i>Pratylenchus thornei</i> (provisional)
SMALL RED LENTIL					
Nipper	MRMS	MR	RMR	RMRp	MRp
PBA Hurricane XT	MR	RMR	MRMS	MRMSp	MRp
MEDIUM RED LENTIL					
Nugget	MRMS	MRMS	MRMS	MRMSp	MRp
PBA Ace	R	R	MRMS	MRp	MRp
PBA Blitz	MR	MRMS	MR	MRMSp	MRp
PBA Bolt	MR	RMR	S	MRp	MRp
PBA Flash	MS	MS	MRMS	MSp	MRp
LARGE RED LENTIL					
PBA Jumbo	MRMS	S	MS	MRp	MRp
PBA Jumbo2	R	R	RMR	MSp	MRp
MEDIUM GREEN LENTIL					
PBA Greenfield	MRMS	MRMS	MR	-	-
LARGE GREEN LENTIL					
Boomer	MR	MRMS	MRMS	-	MRp
PBA Giant	MR	MS	MS	MRp	MRp

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	<i>Ascochyta lentis</i>	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	<i>Botrytis cinerea</i> and <i>Botrytis fabae</i>	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.
BWV	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.

Year	Mallee						Wimmera					
		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 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

TABLE 6 2017 lentil yield and grain weight in NVT and Victorian breeding (B) trials.
Yield expressed as a percentage of the site mean yield.

	Yield (%)						Grain weight (g/100 seeds)				
	Mallee			Wimmera			Mallee			Wimmera	
	Birchip	Rainbow	Ultima	Horsham (B)	Kaniva	Tarranyurk	Birchip	Rainbow	Ultima	Kaniva	Tarranyurk
Sowing Date	8/5/17	10/5/17	9/5/17	5/6/17	1/6/17	24/5/17					
Nipper	-	-	-	83	-	-	-	-	-	-	-
Nugget	85	85	88	89	94	100	4.0	4.1	3.9	4.3	4.3
PBA Ace	112	122	121	106	118	100	4.9	4.6	4.2	4.9	4.9
PBA Blitz	-	-	-	104	-	-	-	-	-	-	-
PBA Bolt	111	90	93	105	90	108	4.4	4.5	4.3	5.1	4.7
PBA Flash	127	103	105	78	109	86	4.8	5.0	4.6	5.3	5.3
PBA Greenfield	-	-	-	105	-	-	-	-	-	-	-
PBA Hurricane XT	50	95	88	105	103	103	3.4	3.3	3.2	4.1	3.6
PBA Jumbo	87	101	107	90	106	85	5.2	5.0	4.8	5.2	5.5
PBA Jumbo2	111	109	106	114	96	107	4.8	5.2	4.9	5.4	5.7
Site Mean (t/ha)	1.98	1.25	0.68	3.17	2.49	2.03					
CV (%)	11	4	8	8	8	7					
LSD (%)	20	8	14	13	13	10					

Interpret results with caution. All NVT trials were affected by heat and frost.

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FABA BEAN

Faba bean has a range of colours and sizes which meet different market requirements and are identified by different names. Small to medium seeded types (*Vicia faba* var. *minor* and var. *equina*) may be called faba bean or tickbean and are commonly used for human consumption and animal feed. Large seed types (*V. faba* var. *major*) may be called broad bean and are used more commonly as a dry broad bean or as a green bean for human consumption.

REVIEW OF 2017

Season

The excellent break kept most sowing programs on track and faba bean crops were sown on time, achieving good early growth. There was a slight drop in the area sown to faba bean in the Wimmera in 2017.

Waterlogging affected some faba bean crops in the South West due to high soil moisture reserves and early season rainfall.

Faba bean crops were not as badly impacted by frosts as other pulses, although some crops were affected. The majority of faba bean crops yielded well and growers who could shift grain still found faba bean profitable despite low prices. Grain quality was also generally good in 2017.

Disease and insects

Despite frequent rainfall at the beginning of the season, very few cases of chocolate spot and cercospora were observed. Proactive disease management and the dry June and July period limited the impact of disease on yield.

Ascochyta Pathotype 2 has been identified on some faba bean crops, particularly in South Australia since 2013. This new pathotype has been observed in Victoria particularly where faba beans have been grown historically, such as around Kaniva. Pathotype 1 is widely distributed in the Southern Region and most varieties are resistant to Pathotype 1. PBA Samira and Nura are resistant to both pathotypes.

Aphid and virus damage was limited. There were sightings of the bean/vetch aphid *Megoura crassicauda* in Sydney and around northern NSW in 2017. It is a large, dark green aphid and can form mixed colonies with pea and cowpea aphids. Entomologists at CESAR can inspect high quality images and aphid samples to determine whether crops are infested with the new pest.

LOOKING FORWARD TO 2018

New varieties

There are no new faba bean varieties for 2018.

Disease

Low levels of fungal disease were present in 2017, however, the high level of inoculum carryover from 2016 may still impact 2018 faba bean crops. Crop rotation is key to minimising the risk of disease in faba bean crops. Faba bean should be sown at least 500 metres from where faba bean crops were grown in 2017. Growers should source clean seed where possible.

Ascochyta Pathotype 1 is widespread in Victoria and is best managed by resistant varieties and foliar fungicides. As Pathotype 2 spreads, 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

To minimise the risk of yield loss and retain grain quality, growers are encouraged to consider the response of varieties to Pathotype 2 (see Table 3), regularly monitor crops for symptoms and use strategic fungicide applications where necessary.

If 2018 provides good sowing conditions with adequate rainfall during the grain fill period, it is highly recommended that growers spray faba bean crops for disease control. The six-to-eight week and 15-week growth stages are important timing to minimise ascochyta blight, cercospora leaf spot and chocolate spot in order to maximise yield and harvest disease-free seed. All current varieties are susceptible to cercospora leaf spot. Prompt harvest when the crop is initially ripe is also important to retain grain quality.

Resistance ratings for both *Pratylenchus neglectus* and *P. thornei* root lesion nematodes have now been included. All faba bean varieties have provisionally been rated MR to *P. neglectus* and will reduce nematode densities in most seasons. Most faba bean varieties are moderately susceptible to *P. thornei* and will increase nematode densities in most seasons. Susceptible varieties will increase nematode densities or maintain them at levels which will cause yield loss in subsequent intolerant varieties. Resistant varieties will reduce nematode densities or maintain them at low levels.

Marketing

Faba bean grown in Australia is predominately exported to the human consumption market of the Middle East and North Africa. Egypt is the largest single market, taking more than two thirds of Australian exports. These markets demand high visual quality standards to meet market specifications.

Australia competes with the United Kingdom (UK), the European Union (EU), the Baltic States, eastern Europe and North America for the Middle Eastern Market. Ramadan will be relatively early this year (May-June) so this will favour selling 2017 crop into the Middle East, before the UK and EU can supply faba bean. This may give a favourable bounce in demand for Australian product. Indonesia has emerged as a market for Australian split faba bean where it is roasted and used as a snack food.

The relatively small market demand from the Middle East and Northern Africa is consistent and has been for some time. If there is a surplus of product produced globally, expect to see a downward slide in price. There is however growing demand for faba bean as stock feed and in the aquaculture market as it is suitable for grinding for pellet production.

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

<http://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.

VARIETY DESCRIPTIONS

(¹) 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.

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 450mm. 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. PGG Wrightson Seeds.

Faba bean – FARAH⁽¹⁾

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.

Faba bean – NURA⁽¹⁾

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⁽¹⁾

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⁽¹⁾

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⁽¹⁾

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 should be 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 (as AF05095-1). 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 local departmental agronomists

MALLEE	April				May				June			
Farah, Fiesta, PBA Samira												
WIMMERA												
Aquadulce, Farah, Fiesta, Nura, PBA Samira, PBA Zahra												
NORTH CENTRAL - 1 week earlier for irrigation												
Aquadulce, Farah, Fiesta, Nura, PBA Samira, PBA Zahra												
NORTH EAST												
Aquadulce, Farah, Fiesta, Nura, PBA Samira, PBA Zahra												
SOUTH WEST												
Aquadulce, 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 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
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 Pathotype 1 (P1)	Ascochyta blight Pathotype 2 (P2)	Chocolate spot	Cercospora	Rust	PSbMV seed staining	<i>P. thornei</i>	<i>P. neglectus</i>
Aquadulce	MS	MS	MS	S	MS	S	MS	MRp
PBA Kareema	MR	MR	MS	S	MRMS	S	-	-
Farah	RMR	S	S	S	S	S	MS	MRp
Fiesta VF	MS	MS	S	S	S	S	MS	MRp
Nura	RMR	RMR	MS	S	MS	VS	MS	MRp
PBA Rana	R	MRMS	MS	S	MS	MR	MS	MRp
PBA Samira	RMR	RMR	MS	S	MS	S	MRMS	MRp
PBA Zahra	R	MRMS	MS	S	MS	S	MS	MRp

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	<i>Ascochyta fabae</i>	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	<i>Botrytis fabae</i> <i>Botrytis cinerea</i>	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	<i>Cercospora zonata</i>	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	<i>Uromyces viciae-fabae</i>	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	<i>Sclerotinia trifoliorum</i> var. <i>fabae</i> , <i>Sclerotinia sclerotiorum</i>	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	<i>Ditylenchus dipsaci</i>	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	<i>Subterranean clover stunt virus</i>	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	<i>Bean leaf roll virus</i>	Interveinal yellowing, leaf rolling, stunting, leathery leaves.	Occurs in all bean growing areas.	The host range is limited to <i>Fabaceae</i> .	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 <i>Fabaceae</i>	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.

Year	North Central						North East			
		2013	2014	2015	2016	2017		2013	2014	2015
Mean yield (t/ha)		6.10	5.30	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 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.

Year	South West					Wimmera					
		2013	2015	2016	2017		2013	2014	2015	2016	2017
Mean yield (t/ha)		3.37	2.95	5.58	4.61		3.64	1.50	0.67	3.27	4.40
	No. trials	1	1	1	1	No. trials	5	5	2	4	5
Farah	4	100	97	92	97	21	94	104	109	95	104
Fiesta VF	3	102	98	94	-	12	94	101	105	93	100
Fiord	-	-	-	-	-	2	-	-	-	98	-
Nura	4	115	100	101	107	21	96	93	104	94	94
PBA Rana	4	110	100	100	103	21	90	86	88	84	98
PBA Samira	4	116	106	98	108	21	102	98	101	88	93
PBA Zahra	4	124	105	109	111	21	104	101	101	-	-

TABLE 7 2017 faba bean yield and grain weight in NVT and Victorian breeding (B) trials. Yield expressed as a percentage of the site mean yield and grain weight as g/100 seeds.

	Yield (%)							Grain weight (g/100 seeds)	
	North Central	South West	Wimmera					Wimmera	
	Kerang (B)	Lake Bolac (B)	Horsham (B)	Kaniva	Kaniva (B)	Wonwondah	Wonwondah (B)	Kaniva	Wonwondah
Sowing Date	10/5/17	2/5/17	1/5/17	19/4/17	19/4/17	20/4/17	20/4/017		
Farah	91	98	94	93	92	98	94	72.2	71.7
Fiesta VF	90	-	99	93	-	96	-	65.0	72.3
Fiord	-	-	94	-	-	-	-	-	-
Nura	-	104	98	103	97	94	83	66.9	75.9
PBA Rana	-	102	93	90	89	84	88	83.1	78.9
PBA Samira	97	115	101	99	98	93	99	77.6	86.7
PBA Zahra	89	107	111	103	103	95	93	87.2	88.4
Site Mean (t/ha)	7.39	4.61	5.53	3.98	4.62	3.94	4.30		
CV (%)	5	13	5	4	3	8	7		
LSD (%)	8	17	9	6	5	13	12		

Interpret results with caution. All NVT trials were affected by heat and frost

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LUPIN

There are two species of lupin used in broadacre crop production, the more commonly grown narrow-leafed lupins (*Lupinus angustifolius*) and the large seeded broad-leafed types (*Lupinus albus*). Narrow-leafed types have been generally used as a high protein stock feed either for sale or supplementary feeding on-farm, but more recently are being promoted as a human food ingredient. The albus types may fit into human food and aquaculture markets as well as high protein stock feed markets, however are the less preferred lupin for stock feed manufacturing. Albus lupins are also more susceptible to dry conditions than narrow-leaf lupins.

REVIEW OF 2017

Season

The area planted to lupins in 2017 remained similar to previous seasons. Good soil moisture supported emerging lupin crops however a dry June and July particularly in northern lupin growing regions impacted crops. The 2017 season was generally good for lupin growers with average yields achieved. There were also no issues with pod set and grain fill.

Disease

Brown leaf spot was present in lupin crops early in the season however didn't cause great concern for growers. Root rot was found in higher rainfall and irrigation areas, in some instances associated with water logging.

Lupin anthracnose was detected in NSW in 2016. Ongoing surveillance found no sign of the disease in NSW in 2017. Testing of suspect samples from Victoria in 2017 confirmed that Victoria remains free of anthracnose.

Cucumber mosaic virus (CMV) was found at low incidence in 2017.

LOOKING FORWARD TO 2018

New varieties

There are two new lupin varieties with limited quantities available for planting in 2018. Murringo is a high yielding, mid flowering albus variety, while PBA Bateman is a high yielding narrow-leafed lupin variety.

Disease

Lupins are susceptible to a number of pathogens causing root or collar rots. Identification of the disease involved is important for future management of affected paddocks. Lupin growers who identified root rot in lupin crops in 2017 should avoid planting lupins in paddocks prone to waterlogging, rotate lupins with other

non-legume crops to reduce the inoculum in the soil and apply registered seed dressings.

Most narrow-leafed varieties are moderately susceptible to brown leaf spot. Fungicide seed dressings (iprodione or procymidone) and agronomic management are required to reduce the impact of this disease, particularly on, or adjacent to paddocks with lupin history.

Virus diseases remain a potential issue for 2018 and the use of more resistant varieties is recommended where viruses occur regularly. CMV is seed borne in narrow-leafed lupins and seed harvested from infected crops can pose infection risk in the following season. Seed testing is recommended to confirm freedom from CMV, particularly in crops or regions where the disease was seen in crop. Bean yellow mosaic virus (BYMV) is not seed borne in lupin, avoid sowing lupins adjacent to legume crops or pasture (e.g., lucerne, sub clover) to reduce virus risk as these are the major source of BYMV in lupins. PBA Bateman (new in 2018), Jenabilup, Quilnock and PBA Jurien offer the best available resistance to BYMV and black pod syndrome (late expression of BYMV) among currently available narrow-leafed varieties. Monitoring and managing aphids in crop may have limited impact on BYMV and CMV management.

Phomopsis is an important disease in lupin because of the production of a mycotoxin (phomopsin) by the fungus as it grows in mature lupin stems or in seed. The toxin can cause sickness or death (lupinosis) in livestock if grazing of infected stubble is poorly managed. Most current varieties have moderate resistance to phomopsis, slowing development of the fungus and reducing toxin production. However, when significant rainfall occurs on plants as they mature or after harvest, disease development and toxin production can still occur. Care must be taken when grazing lupin stubbles or feeding infected seed to avoid lupinosis.

Victoria remains free of anthracnose. Lupin anthracnose is highly seed transmitted and it is therefore important that seed is obtained from reputable sources to prevent accidental introduction into Victoria. The disease can also be transmitted on clothing or animals moving between paddocks. Thiram seed dressings are recommended to reduce the risk of seed borne anthracnose infections. Most narrow-leafed lupin varieties have reasonable resistance to anthracnose, however Albus lupin varieties are very susceptible to anthracnose and are at greatest risk. Standard hygiene practice should apply when dealing with equipment, material or people from infected states.

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

<http://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

([Ⓛ]) denotes Plant Breeder Rights apply

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

Narrow-leaf lupin – JENABILLUP[Ⓛ]

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). It has poor anthracnose (S) and stem phomopsis (MS) tolerance but has good pod/seed phomopsis resistance (R). Poor tolerance of foliar Metribuzin. Released 2007. Seednet. EPR \$2.30.

Narrow-leaf lupin – JINDALEE

Tall, mid-flowering and late maturing variety suited to early sowing in high rainfall, long season areas. Does not handle a dry finish, and because of its vernalisation requirement can flower too late in warmer areas. Susceptible to anthracnose but resistant to phomopsis. Medium size speckled seed with medium seed alkaloid levels. Developed by NSW DPI. Released 2000.

Narrow-leaf lupin – MANDELUP[Ⓛ]

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. Seednet. EPR \$2.30.

Narrow-leaf lupin – PBA BARLOCK[Ⓛ]

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. Strong disease resistance profile, 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

NEW Narrow-leaf lupin – PBA BATEMAN[Ⓛ]

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 GUNYIDI[Ⓛ]

PBA Gunyidi is a slightly later flowering and maturing variety than Mandelup. PBA Gunyidi has proven widely adapted to a range of environments, and is considered an alternative to Mandelup, but with greater resistance to pod shattering. It is not as tall as Mandelup, and generally considered comparable to it for yield. MR to aphids. Strong disease resistance profile, MR to anthracnose, R to phomopsis and MS to brown leaf spot. It is only available in limited supply in eastern Australia and likely to be adopted only by those who are dissatisfied with Mandelup. Developed by PBA. Released 2011. Seednet. EPR \$2.50.

Narrow-leaf lupin – PBA JURIE[Ⓛ]

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 – LUXOR[Ⓛ]

A newer release to replace Kiev Mutant, but with resistance to Pleiochaeta root rot. Slightly taller than Kiev Mutant and suitable for lower to medium rainfall regions and high rainfall regions where Pleiochaeta root rot is a problem. Very susceptible to anthracnose. Luxor is 100 per cent sweet and should not be grown within two kilometres of other albus varieties to avoid bitter contamination. Released 2008. Seednet. EPR \$2.80.

NEW Albus lupin – MURRINGO[Ⓛ]

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

Bitter, large seeded albus lupin – LUPINI bean

Varieties are Lago Azzurro, Mount Beauty and Murphy. They must be grown in complete isolation from sweet albus varieties due to the high alkaloid content of the seed and the potential to cross or contaminate sweet albus varieties. Disease profiles relatively untested, although likely to be susceptible to anthracnose. *Production is for a niche market.*

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 local departmental agronomists.

MALLEE	April				May				June				July			
Narrow-leaf: Jenabillup, Mandelup, PBA Barlock, PBA Gunyidi, PBA Jurien, Quilnock, Wonga																
Albus lupin: Kiev Mutant, Luxor, Rosetta																
WIMMERA	April				May				June				July			
Narrow-leaf: Jenabillup, Mandelup, PBA Barlock, PBA Gunyidi, PBA Jurien, Quilnock, Wonga																
Albus lupin: Kiev Mutant, Luxor, Rosetta																
NORTH CENTRAL	April				May				June				July			
Narrow-leaf: Jenabillup, Jindalee, Mandelup, PBA Barlock, PBA Gunyidi, PBA Jurien, Quilnock, Wonga																
Albus lupin: Kiev Mutant, Luxor, Rosetta																
NORTH EAST	April				May				June				July			
Narrow-leaf: Jenabillup, Jindalee, PBA Barlock, PBA Gunyidi, PBA Jurien, Quilnock, Wonga																
Albus lupin: Kiev Mutant, Luxor, Rosetta																
SOUTH WEST	April				May				June				July			
Narrow-leaf: Jenabillup, Jindalee, PBA Barlock, PBA Gunyidi, PBA Jurien, Quilnock, Wonga																
Albus lupin: Kiev Mutant, Luxor, Rosetta																

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	Drought tolerance	Aphid resistance	Brown leaf spot	Pleiochaeta root rot	CMV seed transmit	Anthracnose	Phomopsis	
											Stem	Pod
NARROW-LEAF												
Jenabillup	M	T	MR	MS	MR	MR	MRMS	R	MRMS	S	MS	R
Jindalee	M-L	M-T	R	MR	MS	-	MRMS	R	MS	S	R	R
Mandelup	VE	T	MS	MS	MR	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 Gunyidi	VE	M	MR	R	MR	MR	MS	R	MRMS	MR	R	R
PBA Jurien	VE	M	MS	MR	-	R	MS	-	MRMS	R	R	MR
Wonga	E-M	M	MR	R	MS	R	MS	R	R	R	R	R
ALBUS LUPIN												
Luxor	E-M	M-T	R	MR	MS	-	MR	R	Immune	VS	MS	S
Murringong	M	M	R	MR	MS	-	MR	MR	Immune	VS	MS	S
Rosetta	M-L	T	R	MR	MS	-	MR	MR	Immune	VS	MR	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	<i>Pleiochaeta setosa</i>	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	<i>Pleiochaeta setosa</i>	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	<i>Rhizoctonia spp.</i>	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.
Anthrachnose	<i>Colletotrichum lupini</i>	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	<i>Sclerotinia sclerotiorum</i>	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). <u>No</u> 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 <i>L. albus</i> .	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.

Year	Mallee						North Central		
		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
Quilinoock	7	85	101	94	91	108	-	-	-
Wonga	7	83	92	89	82	78	2	91	94

TABLE 6 2017 Mallee lupin yield and grain weight.
Yield expressed as a percentage of the site mean yield and grain weight as g/100 seeds.

	Hopetoun	
	Yield (%)	Grain weight (g/100 seeds)
Sowing Date	9/5/17	
Jenabillup	115	11.8
Mandelup	91	12.4
PBA Barlock	81	12.2
PBA Gunyidi	73	10.8
PBA Jurien	69	12.7
Quilinock	106	12.4
Wonga	63	11.7
Site Mean (t/ha)	0.99	
CV (%)	7	
LSD (%)	12	

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CHICKPEA

REVIEW OF 2017

Season

The area planted to chickpeas increased significantly following high yields and prices in 2016. An early break and stored soil moisture gave chickpea crops an excellent start, with growers sowing chickpea crops on time and achieving good early growth. The wet 2016 season and good management meant that herbicide damage was not an issue for chickpea growers in 2017.

Disease pressure was well managed by preventative fungicide strategies and the dry spring held off any lingering disease. Unfortunately, late frosts in the Wimmera led to many significant losses. However, a wet November and December meant some chickpea crops were able to flower again and recover some grain yield. Isolated hail events also affected some chickpea crops.

The impacts of frost were variable with some crops yielding well and achieving 2 t/ha and H1 quality, with other crops impacted by yield loss and quality downgrades. In the northern areas yields and seed size were good where chickpeas escaped frost. Some northern Mallee growers achieved lower yields, potentially impacted by lower stored moisture to support crops through the drier June and July period.

Chickpea prices generally remained higher than average but were affected by the December announcement of an increased import tariff by the Indian government, Australia's main export market.

Disease and insects

Despite wet conditions early in the season, a drier winter resulted in low disease pressure for chickpea crops in 2017. Preventative fungicide management also assisted in minimising impacts of ascochyta blight (AB), particularly with all varieties now rated susceptible or moderately susceptible to AB.

Virus incidence was low in 2017 chickpea crops.

LOOKING FORWARD TO 2018

New varieties

No new chickpea varieties were released for 2018.

Disease

As a result of a virulence change in the ascochyta blight pathogen in southern Australia in 2016 all current chickpea varieties are now rated susceptible or moderately susceptible to foliar ascochyta blight infection. Chickpea growers need to consider the risk of ascochyta blight and their ability to effectively control the disease.

A proactive fungicide spray should be applied to all varieties six to eight weeks' post sowing. For moderately susceptible (MS) varieties, fungicide sprays will be required ahead of rain events and three to four of these strategic applications may be required to offer ongoing protection. For susceptible (S) varieties, regular fungicide sprays every two to three weeks ahead of rain events will be required throughout the growing season. Regular monitoring of chickpea crops will help to identify early infections of both AB and botrytis grey mould (BGM) and enable timely application of foliar fungicides to reduce the impact of disease on crops.

Management of fungal diseases begins at sowing. Growers should source seed from a paddock where disease was not detected or was well managed and treat properly with a fungicide seed dressing to minimise ascochyta blight and botrytis seedling diseases. Seed testing is a valuable tool to determine the presence of diseases or viruses, and the germination rate and vigour of seed for sowing. Seed testing is highly recommended to ensure seed is healthy and disease-free for sowing in 2018.

Chickpeas should not be sown into chickpea stubble and at least 500 metres away from last year's chickpea crop to reduce the risk of ascochyta. Chickpeas should also be sown at least 500 metres from last year's chickpea and lentil crops to reduce the impact of BGM. All desi varieties grown in Victoria are susceptible to BGM.

Resistance ratings for both *Pratylenchus neglectus* and *P. thornei* root lesion nematodes have now been included. Currently all chickpea varieties are rated MRMS to *P. neglectus* and will maintain nematode densities at low levels. Most chickpea varieties are susceptible to *P. thornei* and will increase nematode densities in most seasons. In the Southern Region, avoiding the most susceptible varieties should reduce nematode multiplication if resistant crops or varieties are used in rotation. Resistant varieties will reduce nematode densities or maintain them at low levels. Susceptible varieties will increase nematode densities or maintain them at levels which will cause yield loss in subsequent intolerant varieties.

Planting within the recommended sowing window (see Table 1) remains an important management technique for chickpeas, although consideration of cold temperatures in spring, frost risk and diligent disease management is required for success.

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

<http://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

^(b) denotes Plant Breeders Rights apply.

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

Desi type – AMBAR^(b)

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^(b)

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^(b)

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. Early-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^(b)

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^(b)

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^(b)

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 kabuli's such as Almaz, PBA Monarch and Genesis™ Kalkee. Released 2005. AGT/ 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. AGT/ PB Seeds. EPR \$5.

Kabuli type – PBA MONARCH^(b)

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 local 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	early-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	<i>P. thornei</i>	<i>P. neglectus</i>
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	<i>Ascochyta rabiei</i>	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	<i>Botrytis cinerea</i>	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	<i>Sclerotinia sclerotiorum</i>	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	<i>Pythium spp.</i>	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	<i>Phytophthora megasperma</i>	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	<i>Phoma medicaginis</i> var. <i>pinodella</i>	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	<i>Pratylenchus thornei</i> , <i>P. neglectus</i>	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

TABLE 6 2017 Chickpea yield and grain weight in NVT and Victorian breeding (B) trials.
Yield expressed as a percentage of the site mean yield and grain weight as g/100 seeds.

	Yield (%)					Grain weight (g/100 seeds)			
	Mallee			Wimmera		Mallee		Wimmera	
	Birchip	Curyo (B)	Rainbow	Kaniva	Tarranyurk	Birchip	Rainbow	Kaniva	Tarranyurk
Sowing date	8/5/17	10/5/17	10/5/17	1/6/17	24/5/17				
DESI CHICKPEA									
Ambar	95	99	97	94	96	14.1	16.0	17.5	19.4
Genesis 079	101	100	100	99	81	20.2	24.0	23.0	26.1
Genesis 090	103	108	95	105	77	27.4	28.2	28.5	32.2
Genesis 509	-	94	-	-	-	-	-	-	-
Genesis 836	-	103	-	-	-	-	-	-	-
Neelam	104	97	102	94	104	13.7	18.4	21.8	21.1
PBA Boundary	-	88	-	-	-	-	-	-	-
PBA HatTrick	-	89	-	-	-	-	-	-	-
PBA Maiden	90	104	98	91	99	17.8	26.0	24.0	27.0
PBA Seamer	-	91	-	-	-	-	-	-	-
PBA Slasher	107	97	100	92	94	15.7	20.0	21.5	23.2
PBA Striker	69	99	102	110	95	16.5	23.0	21.8	29.4
Site Mean (t/ha)	1.49	2.35	1.71	2.43	1.53				
CV (%)	8	9	3	5	8				
LSD (%)	13	19	5	9	13				
KABULI CHICKPEA									
Almaz	87	-	87	103	73	26.3	32.6	35.4	33.4
Genesis 079	94	-	111	100	110	17.4	24.6	35.8	26.0
Genesis 090	97	-	107	99	77	23.8	26.8	28.4	33.9
Genesis Kalkee	94	-	79	93	116	29.4	35.6	37.4	42.9
PBA Monarch	98	-	91	96	116	33.6	35.8	36.9	41.7
Site Mean (t/ha)	1.59	-	1.36	2.43	1.14				
CV (%)	8	-	4	5	11				
LSD (%)	13	-	7	9	18				

Interpret results with caution. All NVT trials were affected by heat and frost

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NVT apps

CANOLA | WHEAT | DURUM | BARLEY | CHICKPEA | FABABEAN | FIELDPEA |
LENTIL | LUPIN | OAT | SORGHUM

Long Term MET Yield Reporter

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



Crop Disease Au App



Access to current disease resistance ratings & disease information.

Long Term Yield App



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