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2026

Western Australian Crop Sowing Guide



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2026 Western Australian Crop Sowing Guide

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Remember to update it each October.

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Interpreting resistance classifications

Below is an explanation of the resistance ratings used in this guide for foliar diseases, nematodes and crown rot and how they should be interpreted. These classifications are only a guide and yield losses will depend on environmental and seasonal conditions. Regional and national differences in disease resistance may also occur for different pathotypes.

Cereal resistance classifications (foliar diseases)

- R Resistant:** the disease will not multiply or cause any damage.
- MR Moderately resistant:** the disease may be visible and will multiply slightly but will not cause significant yield loss.
- MS Moderately susceptible:** the disease may cause yield losses up to 15% or more in very severe cases.
- S Susceptible:** the disease can be severe and yield losses of 15 to 50% can occur.
- VS Very susceptible:** the variety should not be grown in areas where a disease is likely to be a problem. Yield losses higher than 50% are possible and the build-up of inoculum will create problems for other growers.

Pulse resistance classifications (foliar diseases)

No pulse varieties are immune to disease and fungicide application may therefore be required under severe disease pressure.

- R Resistant:** no symptoms visible, no fungicides are required.
- MR Moderately resistant:** the disease may be visible but will not cause significant plant damage or loss. However, under high disease pressure or highly favourable environmental conditions fungicide applications may be required e.g. to prevent seed staining.
- MS Moderately susceptible:** disease symptoms are moderate to severe and will cause significant yield and seed quality loss (but not complete crop loss) in conducive seasons in the absence of fungicides.
- S Susceptible:** the disease symptoms are severe and in conducive conditions will cause significant yield and seed quality loss, including complete crop loss in the absence of fungicides.
- VS Very susceptible:** growing very susceptible varieties in areas where a disease is likely to be present is very high risk. Without control significant yield and seed quality losses, including complete crop loss, can be expected and the increase in inoculum may create problems for other growers.

Nematode resistance classifications

PLEASE NOTE: Resistance ratings for *Pratylenchus neglectus* for all pulses (except chickpeas) and wheat varieties released since 2018 have not been tested in WA and should be used as a guide only. Chickpea resistance ratings to *P. neglectus* are from trials conducted in WA. Resistance ratings for *P. quasitereoides* are also from trials conducted in WA.

- R Resistant:** nematode numbers will decrease when resistant varieties are grown.
- MR Moderately resistant:** nematode numbers are expected to decrease slightly in most seasons when moderately resistant varieties are grown.
- MS Moderately susceptible:** nematode numbers are expected to increase slightly in most seasons when moderately susceptible varieties are grown.
- S Susceptible:** nematode numbers will increase when susceptible varieties are grown.
- VS Very susceptible:** a large increase in nematode numbers can occur when very susceptible varieties are grown.

Colour range

VS	SVS	S	MSS	MS	MRMS	MR	RMR	R
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Introduction

Welcome to the 2026 edition of the Western Australian Crop Sowing Guide, which introduces 24 new variety releases: 6 canola, 3 lentils, 2 vetches, 2 feed barley, 3 barley varieties undergoing malt accreditation and 8 wheat varieties.

The 2026 Western Australian Crop Sowing Guide has been compiled by officers in the Department of Primary Industries and Regional Development. It provides information to support variety decisions for each of the major crops for the upcoming season.

Seasonal conditions between 2024 and 2023 were very different, more so in some regions than others, hence it is important to recognize how this may influence a variety/crop's performance. It is critical to view variety performance over multiple years to better understand how a variety might perform across variable seasons.

Variety release with limited or no NVT data has been common with new canola varieties in the past and is now occurring with wheat and barley varieties. Many aspects of variety performance, as well as disease and agronomic traits should be reviewed prior to increasing the scale of such varieties.

Marketing of a commodity or a particular variety can influence the decision to change a variety, particularly for barley. To help with barley decisions, market feedback from GIWA can be found on page 79 of this guide. Before making a barley variety choice, it is important to consider market demand, pricing signals, location of segregation sites and the risk associated of not meeting the specifications for malt-grade barley.

In the past, **CL Plus wheat varieties** were not free to trade due to the Clearfield® licence agreements. This has recently changed, allowing grower-to-grower sales of seed. Various breeding companies

may have specific conditions for grower-to-grower sales and it is recommended to check the conditions for your variety.

Incidence of smut diseases has been increasing over the last few seasons in both barley (loose smut) and wheat (flag smut); due to conducive seasons, inadequate seed coverage of fungicide seed dressing, insufficient uptake of fungicide seed dressings due to the dry conditions at seeding, use of untreated seed and less varietal resistance. There is increasing evidence that many of the newly released barley and wheat varieties are more susceptible, which has prompted a new DPIRD/GRDC project to update smut ratings on newer varieties. The main management option for these diseases is to use effective seed dressings and to also be aware of the risk of self-sown susceptible varieties which are likely to carry the infection and prolong the soil-inoculum.

In many instances, varietal resistance to a particular disease can play a vital role in its management, thus resistance ratings are listed in the guide for the various crop types. Varietal disease resistance ratings vary over time due to seasonal changes in disease pressure, regional disease spread, climatic conditions, stubble retention and the development of new pathotypes/races. As a result, resistance ratings of a particular variety can vary between sowing guides. Fungicides are increasingly the main 'go-to' option for disease management. To ensure their continued effectiveness, fungicide resistance

should be managed to reduce future resistance development by rotating fungicide groups or using fungicide mixtures containing different modes of action. For more detailed information on fungicide resistance (incidence and management) and other, non-chemical, options for minimising disease potential, see the Australian Fungicide Resistance Network's website (afren.com.au/).

Frost can have a devastating effect on crop yield, and matching variety maturity with sowing time remains the most reliable way of reducing yield losses. The relative maturities of wheat, barley and oat varieties are provided in their respective sections of this guide to help match sowing opportunities with the best variety. Flower Power is also a useful tool to match the predicted flowering times of wheat, barley and oats with sowing date in your area (<https://fp.dpiird.app>).

No wheat or barley variety is tolerant to frost, and other crops vary in their susceptibility. Strategies for managing frost are available on the GRDC and DPIRD websites.

Additional information to support crop variety decisions is listed in each section. Advisers can provide locally relevant information and growers are encouraged to use this publication as a guide to support discussions with consultants, agronomists and marketing agents.

It is important for growers and consultants to review disease resistance ratings in autumn 2026 to confirm variety resistance ratings for new varieties and any changes to existing varieties. The latest NVT data will be available early in 2026 via the NVT website and the Long Term MET Yield Reporter tool.



Wheat

Introduction

**Brenda Shackley and Dion Nicol
(DPIRD)**

The 2024 season ended up with the third largest tonnage on record with an estimated wheat production of 12.4 million tonnes. WA's wheat production of 7.6 million tonnes in 2023 was nearly 55% lower than the state's largest ever wheat crop of 13.9 million tonnes in 2022 (source: GIWA crop estimates). For many growers the total rainfall received in 2024 was well down or well above previous years; however, improvements in varieties, sowing strategies and timing in current production systems are providing a buffer in the poorer seasons and push grain yields beyond

records in the good seasons. For much of the state's wheat production areas in 2023 and 2024, there were limited early germination opportunities. This means that bias can exist in the data from trial series such as the National Variety Trials (NVT) because most of the data is from an end-of-May germination. Consideration of maturity types, intended use and sowing dates are therefore required when reviewing the NVT data and making your variety choices.

With the continued influx of recently released wheat varieties from the major Australian wheat breeding companies, information presented in this section is designed to assist growers in determining what wheat varieties to grow.



Scepter accounted for roughly 35% of the area sown to wheat in 2025, making it still the most popular variety grown in WA. As such, it is used as the comparison variety for yield (in the variety snapshots) and days to flowering data (Table 14). The reasons for diversifying from Scepter are yield advantages and different types of maturities to accommodate a wider range of sowing opportunities. Other reasons for variety change include agronomic traits, disease resistances, weed control options (primarily tolerance to imidazolinone (IMI)) and the potential for premium prices for alternate quality types such as noodle wheats.

Environmental conditions are a major driver of crop performance, making it important to review variety performance over multiple years to better understand how a variety might perform across variable seasons in a specific location. For example; the wetter season and soft/late finish experienced in 2022 saw the improved relative performance of the slower maturing varieties. The later germination with a dry finish to the season in 2023 was the opposite, with improved performance of the quick maturing varieties and poorer relative performance of the slower maturing varieties. The 2024 season was generally a lower decile rainfall year, however the

northern part of the grainbelt had a late start but finished with 7+ decile rainfall. Varietal differences can also be used to mitigate the risk of frost or terminal drought by matching the maturity rating of a variety with its optimum sowing time (and likely germination). Finally, it is important to be aware of whether a variety can access specific quality segregations and what the value of the segregation may be for the season.

A new variety should provide:

- an improvement in yield, grain quality and/or disease traits
- diversity or risk mitigation within a farming system
- suitable characteristics for current markets.

The WA wheat industry is supported by significant private and public R&D that underpins decisions on variety selection and management. The wheat section of the guide summarises the yield performance, disease ratings and best practice agronomy of varieties in the GRDC NVT and DPIRD agronomy research. Variety snapshots for 26 of the most common and recently released wheat varieties can be found at the back of the guide.



New varieties for 2026

AGT-Carnac

AGT-Carnac (WAGT1170) is an Australian Noodle Wheat (ANW) released by AGT in 2025. AGT-Carnac has only been included in the 2024 NVT, yielding more than Ninja and Zen, similar to Scepter and slightly less than the highest yielding ANW variety Rottneest which AGT released in 2024. Maturity scores from NVT indicate that AGT-Carnac and Rottneest may have similar maturity in between Ninja and Zen. AGT-Carnac has a provisionally more robust disease package than Ninja or Zen with a moderately resistant moderately susceptible (MRMSp) for stem rust and yellow spot, resistant to moderately resistant (RMRp) for stripe rust, moderately susceptible to susceptible (MSSp) for leaf rust and susceptible (Sp) to powdery mildew.

AGT-Colt

AGT-Colt (RAC3254) is a slow maturity, Australian Hard (AH) variety released by AGT in 2025. Early season NVT in 2024 suggests that AGT-Colt is slightly lower yielding than Denison, an APW with a potentially similar maturity. AGT-Colt has strong resistance ratings to foliar diseases with resistant (R) to stripe rust and moderately resistant (MRp) to stem and leaf rust, powdery mildew and flag smut. Yellow spot is MRMSp.

AGT-Hamelin

AGT-Hamelin (WAGT1159) is a slow spring wheat with an AH classification release by AGT in 2025. It has only been included in the main and early season NVT since 2024, where it has yielded similar to RockStar or slightly higher in the earlier sowing NVT. AGT-Hamelin potentially has a maturity between Catapult and Denison. Provisionally, AGT-Hamelin has a more robust disease package than RockStar, Catapult and Denison, with a higher leaf rust rating of MRp and MSSp to powdery mildew. Other ratings are MRMSp for stem rust and yellow spot, and RMR for stripe rust. Data from 2024 NVT show high hectolitre weights and below average screenings.

Dale

Dale (IGW6993) is an AH released by InterGrain in 2025, suggested to be similar maturity to Scepter.

Dale has only been included in the WA NVT for the first time in 2025, so information is limited to that provided by InterGrain at the time of publication. Disease ratings are to be confirmed by GRDC and DPIRD later in 2025 or early 2026.

Kestrel

Kestrel (IGW6821) is a potentially quick maturity, AH released by InterGrain in 2025. Kestrel has only been included in the WA NVT for the first time in 2025, so information is limited to that provided by InterGrain at the time of publication. Disease ratings are to be confirmed by GRDC and DPIRD later in 2025 or early 2026.

LRPB Sonic

LRPB Sonic (LPB20-10855) was released by LongReach in 2025. It is an AH with a LRPB Cobra background. It is suggested to be a quick-mid maturity, only slightly quicker than Scepter. LRPB Sonic has only been included in the 2024 NVT where it was one of the leading varieties for yield, particularly in high yield potential sites. Disease ratings are moderately susceptible (MSp) for leaf rust, MRp for stripe rust and MRMSp for stem rust and yellow spot and MSSp for powdery mildew.

RGT Marsh

RGT Marsh (H16Q3x0336.SCI-097D) is a new potential AH released by RAGT Australia in 2025. Final classification is still pending. RGT Marsh is potentially similar to Scepter and Calibre in yield and maturity. It is MRMS for stem rust, RMR for stripe rust, MSS for leaf rust, Sp for powdery mildew and MSS for yellow spot. It has an MRp rating for flag smut as well as MRMSp for nodorum blotch (leaf and glume).

Wallaroo

Wallaroo (SWW21.001) is a quick winter wheat with an Australian Premium White (APW) classification now available from Trigall Australia and The SeedGroup. It has been included in the early season NVT since 2022, where it has yielded higher than the current benchmark quick winter variety, Illabo. Wallaroo has a robust rust package with all 3 rusts rated as RMR. Powdery mildew is rated as MSS and yellow spot is MRMS.

Variety classification

Source: Grains Australia

Removal of varieties

Grains Australia maintains the Wheat Variety Master List with annual reviews of varieties that are more than 10 years old and which have accounted for less than 0.25% of deliveries over previous 5 seasons for the hard classes and less than 5.0% of smaller classes (ANW, ADR and ASFT) in a classification zone. The soft-wheat variety Bullaring was removed from the list in 2025, due to decreasing production thresholds. Varieties planned for removal in 2026 include Espada, Fortune and Gladius, and Harper in 2027. Varieties removed from the master list can still be delivered as feed.

Australian Premium White Noodle (APWN)

APWN is a quality class created to allow varietal control of the hard wheat component of export blends with ANW, and to optimise end-use quality for the premium Japanese udon noodle market. APWN classification has been determined for the following AH and APW varieties: Brumby, Chief CL Plus, Cutlass, Devil, Dozer CL Plus, EGA Bonnie Rock, Hammer CL Plus, King Rock, LRPB Avenger, LRPB Havoc, LRPB Trojan, LRPB Scout, Mace, RockStar, Vixen, Westonia and Wyalkatchem. Specifications are similar to APW1 but selected varieties also need to be within a grain protein range of 10.0% to 11.5% instead of a minimum of 10.5%.

Please see the CBH Harvest Guide and website for up-to-date delivery details.



Recent trends in WA wheat

The challenge with the rapid release of varieties is that specific weaknesses and strengths may not be identified by the time growers are looking to adopt these varieties at scale. Seasonal issues such as low falling number, terminal drought or other stresses impacting physical grain quality and disease pressures will influence the retention of varieties and their impact on ease of cultivation and risk will vary across farming systems and regionally.

Since 2019, Scepter has been the dominant variety for WA. It has generally maintained the best or equivalent yields in all regions and had an excellent overall agronomic package in terms of grain receival standards, disease and maintaining a good falling number. Scepter's dominance peaked at 53% of the crop in 2020 and did not reach nor maintain the dominance of its predecessor Mace (70%), due to a more competitive suite of varieties that have demonstrated niches of value to growers regionally or across sowing windows. However, a number of the Scepter replacements are already starting to decline as seasonal conditions may show various weaknesses as well as improved alternatives. For example, Calibre, Rockstar and Vixen are already seeing declining planting areas since their peak areas in 2023 or 2024 (Table 1). Promising new varieties like Tomahawk CL Plus and LRPB Vortex are already increasing in planting areas.

Clearfield® (particularly two-gene CL Plus) varieties as a subset have seen the greatest gains in yield. Despite the traits reputed to have no yield impact, it has taken time for breeding programs to close the yield gap. The total overall proportion of varieties that are IMI tolerant has remained at around 10% but this may change with Tomahawk CL Plus already at 4.4% in 2025, as it remains one of the current overall highest yielding wheat varieties in NVT data. Other CL Plus wheats are likely to continue to diminish, given the yield difference to Tomahawk CL Plus.

ANW have ranged from 8.5 to 16% of the WA wheat crop in the past 5 years but with relative stability for the major varieties. Zen has remained relatively stable due to its physical grain quality and ease of achieving specification even in stressful conditions, Kinsei for earlier sowing and Ninja as the higher yielding main season ANW. AGT have now entered the ANW variety market with Rottneest and AGT-Carnac as well as the release of Firefly and Splendid from InterGrain.

Table 1: Proportion (%) of total area sown to individual wheat varieties in WA (2021–25)

Variety	2021	2022	2023	2024	2025
Scepter	51.3	50.1	44.4	37.5	34.8
Vixen	3.4	9.1	13.2	15.5	13.6
Calibre	–	0.3	8.3	13.5	12.4
Tomahawk CL Plus	–	–	–	0.1	4.4
Zen	4.6	4.0	3.2	3.6	4.2
Devil	4.5	5.0	4.2	4.1	3.9
Ninja	4.5	4.4	3.2	3.5	3.5
RockStar	1.7	4.4	4.4	3.8	3.4
Brumby	–	–	0.5	1.7	3.0
LRPB Havoc	4.5	3.4	2.4	1.8	2.2
LRPB Anvil CL Plus	–	–	0.3	1.2	2.2
Chief CL Plus	9.0	6.5	3.5	3.2	1.6
Machete	0.4	0.3	0.5	0.7	1.3
Kinsei	0.7	1.0	1.1	1.3	1.3
Hammer CL Plus	0.1	2.2	2.4	2.1	1.2
Mace	7.1	3.8	2.5	1.6	1.1
Catapult	0.3	0.6	1.1	0.8	0.7
Denison	0.0	0.3	0.5	0.6	0.6
Yitpi	0.9	0.6	0.3	0.2	0.6
Valiant CL Plus	–	0.2	0.8	0.6	0.4
Firefly	–	–	–	–	0.4
Mowhawk	–	–	–	0.2	0.3
LRPB Avenger	–	–	0.2	0.2	0.3
LRPB Vortex	–	–	–	0.0	0.3
Westonia	0.5	0.1	0.1	0.3	0.2
Arrino	0.1	0.1	0.1	0.2	0.2
Cutlass	0.5	0.5	0.4	0.3	0.2
Magenta	0.8	0.6	0.3	0.2	0.2
Thumper	–	–	–	–	0.2

Source: Grower estimates provided to CBH for the respective years. Varieties with less than 0.2% of total crop area in the 2025 season are not included.

Varieties that were released prior to 2015 (including Mace) now total less than 4% of the WA wheat crop. With the rapid release of new varieties, it is anticipated that uptake will be swift, but if yield data and the overall agronomic package of a new variety does not demonstrate sustained improvements, it will disappear just as fast. Many aspects of variety performance, as well as disease and agronomic traits, are not available when varieties are released, so this will need reviewing before increased scale of planting of these varieties.

What variety should I grow?

There are a large number of wheat varieties available to growers with diverse yield performance, quality attributes, agronomic characteristics, and disease resistance profiles. When selecting wheat varieties for your farm, it is important to consider:

- yield performance in a specific environment over multiple seasons
- how variety maturity will match to a targeted sowing time (refer to suggested sowing window – Table 14)
- varietal herbicide tolerance and weed control options
- varietal disease resistance ratings, particularly for prevalent diseases.

Please note that due to the incursion of new strains and mutations of pathogens already present in WA, it is essential to review disease ratings of existing varieties each year as these can change (Table 17)

- risk of downgrades due to physical quality (i.e. screenings and hectolitre weight)
- susceptibility to pre-harvest sprouting (presented as falling number index ratings) and black point, particularly if sowing into April or early May where the risk is higher (Table 21).

While farming operations may also seek to limit the number of varieties on farm, there are benefits to diversification of varieties to increase production and/or reduce risk. For example:

- selecting varieties of slower or quicker maturity to optimise yield potential across a range of sowing time/germination opportunities and frost risk profiles
- selecting varieties with improved disease resistance ratings to reduce disease risk and in-season management challenges when diseases may increase in prevalence
- growing varieties of multiple quality grades to respond to different pricing signals.

Tables 2 to 6 provide a clear visual comparison of key traits among different maturity and classification niches. In Tables 2 to 6, the statewide multi environment trial (MET) yield (presented as a percentage of site mean) is combined across the 6 Agzones, and a 5-year weighted average has been calculated from the MET data. Caution should be exercised when examining the weighted average as it can mask important variety-by-environment interactions (i.e. how variety performance changes under different seasonal conditions). Refer to Tables 7 to 12 for a more precise estimate of variety performance in specific regions for NVT main season sowings.



Yield performance from April sowing (early season NVT) are provided in Tables 6 and 13.

The content of the Tables 2 to 6 has changed in this edition due to the general improvement of resistance to a number of diseases such as stem and stripe rust and a shifting of disease resistances and changing regional incidence. Given the prevalence of yellow spot resistant cultivars, growers are encouraged to check suspected infection as it may be physiological yellowing, herbicide damage, nutrition or other similar foliar diseases like nodorum or septoria tritici blotch.

Generally, the priority disease for many WA wheat growers is powdery mildew given the recent prevalence of susceptible varieties. Leaf rust remains important in some regions and growers should note the considerable differences in resistance to new leaf rust strains between the varieties. Flag smut has been incorporated in Tables 2 to 6 due to the increase in prevalence in some regions and there are significant differences in susceptibility among wheat varieties. While the majority of registered seed dressings continue to prevent yield loss, the repeated cultivation of very susceptible varieties has meant that some growers may need to consider incorporating resistant varieties into their program as the disease continues to proliferate, possibly due to susceptible volunteer wheat and/or poor coverage of seed dressings.

Interpretation of resistance classifications for cereal foliar diseases is provided on page 4, however the classifications are only a guide. Varieties with minimum ratings of MS for powdery mildew and leaf rust are recommended; this doesn't mean the disease won't impact yield, but it will be less often and the improved resistance allows for more time to manage the disease if present.

Falling number index ratings are not available for newly released varieties. The ratings are still presented for existing varieties as some high-risk varieties have increased in popularity. Black point ratings from NVT are also presented. Both black point and falling number risk increase with wet spring conditions and with earlier sowing/germination.

Physical grain quality (screenings and hectolitre weight), while largely environmentally driven, differs significantly between varieties. The average screenings (% grain < 2mm) across all sites is presented for the 2024 NVT data. For hectolitre weight, the relative trend across all sites was



compared against the mean of all varieties and used to predict the varieties performance at a site mean of 74 kg/hl. For more details, please see page 39.

AH and APW quick-mid season varieties

LRPB Vortex, Tomahawk CL Plus and LRPB Sonic (2024 NVT only) currently are the highest average yielding wheat varieties across all Agzones (Table 2). Comparing these varieties, Tomahawk CL Plus generally had superior performance across NVT sites with a site mean yield below 3.5 t/ha, while LRPB Vortex had superior performance across NVT sites with a site mean yield above 3.5 t/ha. Other varieties that exceed Scepter for average yield in NVT include Shotgun, Vixen, Calibre, Thumper, RGT Marsh and Brumby. With the exception of RGT Marsh (pending classification at the time of publication), the quality classifications of these varieties are presented in Table 2.

Powdery mildew has been relatively prevalent in recent years, particularly given the large planting areas of Scepter (rated S). Brumby has the highest resistance rating of these varieties (R). Compared to Scepter, LRPB Vortex has a useful improvement in resistance (rated MS), while Calibre (MSS), LRPB Sonic (MSSp) and Shotgun (MSSp) are also expected to show a reduced rate of infection. Based on their resistance ratings, Tomahawk CL Plus (S), RGT Marsh (Sp) and Thumper (Sp) are expected to show a similar susceptibility as Scepter.

The majority of high yielding varieties released in recent years have a yellow spot rating of MRMS. RGT Marsh is rated MSS which is similar to LRPB Anvil CL Plus and Cutlass as a reference (Table 17). There is a large range of ratings for leaf rust with LRPB Sonic an MRMSp, while LRPB Vortex, Vixen and Brumby are rated SVS and Tomahawk CL Plus is rated S.

Table 2 shows that for flag smut, the majority of leading wheat varieties in the quick to mid maturity group are susceptible. The other benefits of these susceptible varieties mean growers should manage flag smut through seed dressings rather than compromising yield potential through alternative, lower-yielding variety choices. RGT

Marsh is the notable exception as a high yielding variety with a flag smut rating of MRp, although it has an MSS yellow spot rating and is pending quality classification at the time of publication.

Falling no. index ratings are not available for recent releases. Generally, the risk of low falling number is greater when early germination and variety maturity leads to maturation occurring earlier in spring and under wetter and cooler conditions. Varieties targeting April and early May germination are at a higher risk of pre-harvest sprouting and black point and growers should be particularly mindful of their varietal resistance for these scenarios. The current high yielding varieties are rated mostly S for black point, though LRPB Vortex and Shotgun did have higher black point incidence in two DPIRD time of sowing trials (similar to Thumper – SVSp). It would be recommended to avoid early sowing of these varieties in black point prone environments.

Screenings comparison of 2024 NVT data show that Thumper had the highest risk of excess small grains in the leading quick to mid maturity varieties. Scepter, LRPB Sonic, Vixen and RGT Marsh were all better than average for screenings. Hectolitre weights indicate higher risks for Shotgun, Calibre, Thumper and Brumby.

Table 2: Relative performance of top-yielding quick, quick-mid and mid maturity wheat varieties compared to Scepter

	Scepter	LRPB Vortex	Tomahawk CL Plus	LRPB Sonic	Shotgun	Vixen	Calibre	Thumper	RGT Marsh	Brumby
Statewide MET yield (% site mean) ¹	107%	111%	111%	110%^	109%	108%	108%	108%	108%	108%
Maturity	Quick-mid	Midp	Quick-mid	Quick-mid	Quick-mid	Quick	Quick-mid	Quick-mid	Quick-mid	Midp
Classification	AH	APW	APW	AH	AH	AH (N)	AH	AH	Pending	APW (N)
Powdery mildew	S	MS	S	MSSp	MSSp	SVS	MSS	Sp	Sp	R*
Yellow spot	MRMS	MRMS	MRMS	MRMSp	MRMS	MRMS	MRMS	MRMS	MSS	MRMS
Leaf rust	MSS	SVS	S	MRMSp	MSS	SVS	S	MSS	MSS	SVS
Flag smut	MSS	SVSp	SVSp	–	SVSp	SVS	Sp	Sp	MRp	SVSp
Falling no. index	5	–	–	–	–	3	6p	–	–	6p
Black point	MS	S	S	Sp	Sp	MSS	MSS	SVSp	MSp	MSS
Screenings	5.5	6.6	6.0	5.7	6.1	5.2	5.9	8.2	4.3	6.3
Hectolitre weight	74.1	74.7	73.8	75.3	71.8	73.5	72.7	71.7	75.1	73.1

¹Regional differences in yield are masked when using a state-wide average of the WA wheat NVT MET data (2020–24). Readers are directed to Tables 6–11 for a more precise estimate of variety performance in their region.

(N) = supplementary classification of APWN, p = provisional rating, * = Some races in eastern Australia can attack these varieties, ^ = single year of NVT data in 2024, Falling no. index please refer to page 41. Screenings (average of 2024 NVT) and Hectolitre weight (relative to site mean of 74 kg/hl) – see page 39 for more information. Refer to page 4 for interpreting resistance classification.

Clearfield® wheat

In the past, CL Plus varieties were not free to trade due to the Clearfield® licence agreements. This has recently changed allowing grower-to-grower sales of seed. Various breeding companies may have specific conditions for grower-to-grower and it is recommended to check the conditions for your variety.

The yield gap between Tomahawk CL Plus and all other CL Plus wheat varieties is around 10%. With the exception of Tomahawk CL Plus, most of the other leading CL Plus varieties have achieved around 99–102% of the NVT site mean, which is a considerable reduction compared to the leading non-Clearfield® wheats (Table 3). However, the differences in yield at environments with a yield potential below 2.5 t/ha have been less significant, representing scenarios where some of these alternative CL Plus wheats may have a fit.

Powdery mildew resistance is low among CL Plus options, so proactive monitoring and management are advised. As with most current varieties, yellow spot is typically MRMS except for MSS ratings for both LRPB Anvil CL Plus and Razor CL Plus. Leaf rust ratings in this category are generally susceptible except Chief CL Plus (MR). Flag smut ratings show some resistant options in Razor CL Plus and Hammer CL Plus.

Most CL Plus varieties were moderate risk for falling numbers with ratings of 4, representing a risk in high pressure environments. LRPB Anvil CL Plus and Valiant CL Plus have higher susceptibility for exhibiting low falling number. However, this is expected to be more significant for Valiant CL Plus which will be targeting earlier sowing which increases environmental risk, compared to LRPB Anvil CL Plus which will typically be used in later sowing and lower rainfall environments. Black point is weaker in Tomahawk CL Plus and LRPB Anvil CL Plus than Scepter, so avoiding early sowing in high-risk environments is recommended.

Small grain screenings were better than average in all CL Plus varieties except Dozer CL Plus and Hammer CL Plus. Hectolitre weights were generally better than average except for Dozer CL Plus which was well below average. Tomahawk CL Plus at 73.8 kg/hl, is not statistically significant from the mean of 74.0 kg/hl or from Scepter at 74.1 kg/hl.

Note: There are NOW grower-to-grower sales permitted for Clearfield® varieties upon completion of a License Agreement but check with a variety's seed distributor for clarification.

Table 3: Relative performance of Clearfield® wheat varieties compared to Scepter

	Scepter	Tomahawk CL Plus	LRPB Anvil CL Plus	Razor CL Plus	Dozer CL Plus	Hammer CL Plus	Chief CL Plus	Valiant CL Plus
Statewide MET yield (% site mean) ¹	107%	111%	101%	102%	101%	100%	99%	95%
Maturity	Quick-mid	Quick-mid	Quick	Quick-mid	Quick-mid	Quick-mid	Mid	Slow
Classification	AH	APW	AH	ASW	APW (N)	AH (N)	APW (N)	AH
Powdery mildew	S	S	S	MSS	S	S	S	SVS
Yellow spot	MRMS	MRMS	MSS	MSS	MRMS	MRMS	MRMS	MRMS
Leaf rust	MSS	S	SVS	S	S	S	MR*	S
Flag smut	MSS	SVSp	–	RMR	SVSp	RMR	SVS	Sp
Falling no. index	5	–	2/3p	4	–	4	4	2/3p
Black point	MS	S	S	MS	MRMS	MRMS	MS	MRMS
Screenings	5.5	6.0	3.8	–	7.6	6.8	4.9	4.2
Hectolitre weight	74.1	73.8	75.7	–	72.3	75.3	75.4	75.9

¹Regional differences in yield are masked when using a state-wide average of the WA wheat NVT MET data (2020–24). Readers are directed to Tables 6–11 for a more precise estimate of variety performance in their region.

(N) = supplementary classification of APWN, p = provisional rating, * = Some races in eastern Australia can attack these varieties,

[^] = single year of NVT data in 2024, Falling no. index please refer to page 41. Screenings (average of 2024 NVT) and Hectolitre weight (relative to site mean of 74 kg/hl) – see page 39 for more information. Refer to page 4 for interpreting resistance classification.

Australian Noodle Wheat (ANW)

Rottnest is the leading ANW variety for yield across the NVT datasets. In NVT yielding below 3.5 t/ha, AGT-Carnac and Rottnest yield similarly to Scepter and above other ANW varieties. At NVT sites yielding above 3.5 t/ha, Rottnest yields generally exceed AGT-Carnac and Scepter. Splendid yields competitively with AGT-Carnac in these environments (data not shown, refer to yield groups in NVT yield reporter). As Rottnest, AGT-Carnac and Splendid have only been tested in NVT for one season (2024), it is prudent to exercise some caution in interpreting their yield data and adopting these varieties until their performance has been proven in multiple seasons.

There are limited options for powdery mildew resistance in the ANW varieties. Firefly with a provisional MSS rating, is marginally better than the other varieties. Generally, proactive monitoring and management of powdery mildew will be required for ANW varieties. Yellow spot ratings (provisional for Rottnest, AGT-Carnac and Splendid) are MRMS for all varieties except Kinsei (MS). Leaf rust susceptibility ranges from VSp for Rottnest to MS for Kinsei, but AGT-Carnac, Splendid and Firefly are all equivalent to Scepter with an MSS rating.

ANW wheats are generally resistant to flag smut with Zen rated as MS and all other varieties rated MR or better which provides useful resistance. AGT-Carnac has yet to be rated for flag smut resistance.

The falling number index ratings for the ANW varieties were generally moderate. Zen was assessed to be a higher risk of low falling number, particularly with early sowing. There are no ratings for the newer ANW varieties. Firefly and Kinsei have weak ratings for black point compared to Ninja and Zen. As Rottnest, AGT-Carnac and Splendid were all included in the NVT for the first time in 2024, no black point ratings are available.

Zen has been the gold standard for physical grain quality in NVT data since its release with very low screenings and high hectolitre weights. AGT-Carnac has the closest physical grain quality to Zen with low screenings and better than average test weight in 2024. Rottnest, Splendid and Firefly have screenings similar to or above Kinsei, while the hectolitre weight data show Firefly to have a much greater risk of low hectolitre weight.

ANW growers have competitive yield options in Rottnest (and AGT-Carnac for environments yielding below 3.5 t/ha). The recent yield improvements mean that compared to Zen, the protein concentration of Rottnest was 0.6% lower and AGT-Carnac was 0.4% lower on average in main-season NVT data. Therefore, additional protein management may be required.

Table 4: Relative performance of noodle wheat varieties compared to Scepter

	Scepter	Rottnest	AGT-Carnac	Splendid	Firefly	Ninja	Kinsei	Zen
Statewide MET yield (% site mean) ¹	107%	109% [^]	107% [^]	106% [^]	105%	104%	102%	101%
Maturity	Quick-mid	Midp	Midp	Midp	Mid-slow	Mid	Mid-slow	Mid-slow
Classification	AH	ANW	ANW	ANW	ANW	ANW	ANW	ANW
Powdery mildew	S	SVSp	Sp	SVSp	MSSp	S	S	S
Yellow spot	MRMS	MRMSp	MRMSp	MRMSp	MRMS	MRMS	MS	MRMS
Leaf rust	MSS	VSp	MSSp	MSSp	MSS	S	MS	S
Flag smut	MSS	MRp	–	RMRp	MRp	MR	RMR	MS
Falling no. index	5	–	–	–	–	4	4	3
Black point	MS	–	–	–	S	MRMS	S	MRMS
Screenings	5.5	7.7	4.4	7.4	7.2	6.6	7.0	3.6
Hectolitre weight	74.1	73.5	74.4	73.0	71.4	74.1	73.6	75.7

¹Regional differences in yield are masked when using a state-wide average of the WA wheat NVT MET data (2020–24). Readers are directed to Tables 6–11 for a more precise estimate of variety performance in their region.

(N) = supplementary classification of APWN, p = provisional rating, * = Some races in eastern Australia can attack these varieties, [^] = single year of NVT data in 2024, Falling no. index please refer to page 41. Screenings (average of 2024 NVT) and Hectolitre weight (relative to site mean of 74 kg/hl) – see page 39 for more information. Refer to page 4 for interpreting resistance classification.

Mid-slow and slow maturity varieties in main and early season NVT

This section covers wheat varieties that exhibit a range of maturities from the mid maturity Brumby to the slower varieties such as Denison and Valiant CL Plus. Within the main season NVT, slower maturity wheats are often penalised in trials with later germination. However, some of the mid-slow maturity wheats remain competitive in the main season NVT and in these cases present useful options for reducing/managing frost risk without a predictable yield gap in unfrosted scenarios. Most of the varieties shown in this category have AH classification except for Brumby (APW), Denison (APW) and Kinsei (ANW). Brumby and Rockstar are the only varieties with APWN classification.

Powdery mildew resistance varies with Brumby rated as R, AGT-Colt as MR_p and Rockstar and AGT-Hamelin as MSS or MSS_p. The remainder of the group have a rating of S or lower. Yellow spot ratings are MRMS (including provisional ratings) with Kinsei rated MS. Improved leaf rust resistance is available for early sowing options in AGT-Hamelin and AGT-Colt, both rated MR_p. Kinsei is rated MS for leaf rust while the remaining mid-slow or slow varieties are S, with Brumby SVS. Flag smut resistance ratings range considerably from VS in RockStar and SVS_p in Brumby and AGT-Hamelin, however Catapult, Kinsei, Denison, Genie and AGT-Colt are MR or better.

Falling number and black point ratings are generally more important for early sowing/germination scenarios as the crop is likely to flower and fill grain in wetter and cooler conditions, increasing the risk of sprouting and black point. Brumby, Catapult and Denison have higher falling number index ratings, while Rockstar and Valiant CL Plus are lower, representing a greater risk of downgrades due to low falling numbers. Black point ratings are not available for AGT-Hamelin and AGT-Colt. Catapult and Kinsei are rated S and care should be taken for early sowing in higher black point risk environments.

Despite later flowering and grain development increasing exposure to terminal drought often causing smaller grains, AGT-Hamelin and Valiant CL Plus have well below average screenings across the main-season NVT data for 2024. Genie at the other extreme averaged 12% screenings,



Wheat

well above all other varieties. Kinsei, Denison and AGT-Colt are above average for screenings but with earlier germination, this risk is typically lower. Hectolitre weights vary greatly among these varieties. AGT-Hamelin, Denison and Valiant CL Plus were all well above average, while Brumby and Rockstar were below average.

Although only having one season of data, AGT-Hamelin has so far demonstrated strong yield performance, overall good disease risk profile and has excellent physical grain quality. AGT-Colt appears similar to Cutlass in maturity and yield patterns and physical grain quality but with much strong disease resistances. It will be important to investigate the falling number performance of these varieties given the suitability of these varieties for early sowing opportunities.

Table 5: Relative performance of mid to slow maturity wheat varieties compared to Scepter in main and early season NVT (refer to Table 13 for Early season NVT)

	Scepter	Brumby	RockStar	AGT-Hamelin	Catapult	Kinsei	Denison	Genie	AGT-Colt	Valiant CL Plus
Main – Statewide MET yield (% site mean) ¹	107%	108%	107%	107% [^]	102%	102%	101%	97%	95% [^]	95%
Early – Statewide MET yield (% site mean) ¹	–	104%	107%	110% [^]	105%	106%	111%	111%	108% [^]	107%
Maturity	Quick-mid	Midp	Mid-slow	Slowp	Mid-slow	Mid-slow	Slow	Mid-slow	Slowp	Slow
Classification	AH	APW (N)	AH (N)	AH	AH	ANW	APW	AH	AH	AH
Powdery mildew	S	R*	MSS	MSSp	S	S	S	Sp	MRp	SVS
Yellow spot	MRMS	MRMS	MRMS	MRMSp	MRMS	MS	MRMS	MRMSp	MRMSp	MRMS
Leaf rust	MSS	SVS	S	MRp	S	MS	S	S	MRp	S
Flag smut	MSS	SVSp	VS	SVSp	RMR	RMR	MRp	RMRp	MRp	Sp
Falling no. index	5	6p	2	–	6	4	5	–	–	2/3p
Black point	MS	MSS	MSS	–	S	S	MS	MS	–	MRMS
Screenings	5.5	6.3	5.5	4.3	6.4	7.0	7.4	12.1	7.0	4.2
Hectolitre weight	74.1	73.1	72.7	76.9	74.2	73.6	75.4	74.2	73.7	75.9

¹Regional differences in yield are masked when using a state-wide average of the WA wheat NVT MET data (2020–24). Readers are directed to Tables 6–11 for a more precise estimate of variety performance in their region.

(N) = supplementary classification of APWN, p =provisional rating, * = Some races in eastern Australia can attack these varieties,

[^] = single year of NVT data in 2024, Falling no. index please refer to page 41. Screenings (average of 2024 NVT) and Hectolitre weight (relative to site mean of 74 kg/hl) – see page 39 for more information. Refer to page 4 for interpreting resistance classification.



Winter and slow season spring wheats in early season NVT

In WA since 2017 an early season wheat NVT series has evaluated the performance of slower maturing varieties when sown at an earlier sowing date (Table 6).

Between 2020 and 2024 the early season series was generally sown in late April. A timing favourable to varieties with a mid–slow maturity but potentially not early enough for the very slow spring or winter varieties. Due to this reason and the smaller number of sites evaluated, hectolitre weight and screenings comparison have not been shown.

Several new releases have generally improved the yield and agronomic traits in quick-winter types, with the latest of these being Wallaroo, an APW winter release in 2025 for WA. It is a quick winter with a robust disease package (Table 6). Wallaroo has been in the early season NVT since 2022 where overall it's yields are similar to Mammoth (a very slow spring APW released in 2024) and competitive with the mid–slow and slow varieties. Table 13 shows the overall summary of the early season NVT's from 2020 to 2024 where it can be seen that the longer season in 2022 benefitted Wallaroo compared to 2023 and 2024.

Mammoth is a very slow spring variety, with a similar potential fit for very early sowing (late March to early April) to quick winter wheats, but it does not have the same vernalisation requirement (responding to an accumulation of cold temperatures). DPIRD data shows that flowering is quicker than Illabo at Mullewa and Merredin but can be similar at Katanning and Grass Patch. Despite its slower maturity, Mammoth has been competitive in yield with mid–slow varieties sown at the end of April in the early sown NVTs, outside Mammoth's ideal sowing time.

The suitability of winter wheats and slower spring varieties continues to be assessed; in general, they are more competitive when sown in early to mid-April in southern, longer season environments and/or at frost-prone locations.

Winter wheats can provide options for farming system benefits from the extended vegetative phase which can allow more time for herbicide application and/or grazing which can provide an increase in profitability. Growers in higher rainfall areas have benefited from targeting paddocks at risk of poor trafficability in wetter seasons. The total impact on profit requires a farming system context, given other environmental considerations.

Table 6: Relative performance of slower maturity wheat varieties in early season NVT

	Denison	Wallaroo	AGT-Hamelin	Mammoth	AGT-Colt	Valiant CL Plus	Catapult	Cutlass	Mowhawk	Brighton	Illabo
Statewide MET yield (% site mean) ¹	111%	110%	110%^	109%	108%^	107%	105%	106%	102%	100%	92%
Maturity	Slow	Quick winter	Slowp	Very slow	Slowp	Slow	Mid–slow	Slow	Quick winter	Quick winter	Quick winter
Classification	APW	APW	AH	APW	AH	AH	AH	APW(N)	AH	AH	AH
Powdery mildew	S	MSS	MSSp	S	MRp	SVS	S	S	RMRp	MSS	R
Yellow spot	MRMS	MRMS	MRMSp	MRMS	MRMSp	MRMS	MRMS	MSS	MRMSp	MRMS	MS
Leaf rust	S	RMR	MRp	MRMS	MRp	S	S	RMR*	MRp	S	S
Flag smut	MRp	RMRp	SVSp	SVSp	MRp	Sp	RMR	MSS	MRp	–	R
Falling no. index	5	–	–	–	–	2/3p	6	4	5	–	5
Black point	MS	MS	–	MS	–	MRMS	S	MS	–	MS	MRMS

¹Regional differences in yield are masked when using a state-wide average of the WA wheat NVT MET data (2020–24). Readers are directed to Table 13 for a more precise estimate of variety performance in their region.

(N) = supplementary classification of APWN, p = provisional rating, * = Some races in eastern Australia can attack these varieties,

^ = single year of NVT data in 2024, Falling no. index please refer to page 41. Refer to page 4 for interpreting resistance classification.

Grain yield

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The GRDC National Variety Trials (NVT) provide an independent assessment of crop variety performance in WA. NVT results can be viewed as individual site reports or as multi environment (MET) long-term summaries that provide insight into variety yield performance across environments and seasons. Tables 7 to 12 are outputs extracted from nvt.grdc.com.au and provide the MET data for the 6 Agzones in WA between 2020 and 2024. Table 12 represent a summary of the early season NVT. Where there is more than one year of data, or 4 or more observations, a 5-year weighted average has been calculated from the MET data, including the predicted yields for varieties that were absent at a site or in a season. Caution should be exercised when examining the weighted average as it can mask important variety-by-environment interactions (i.e. how a variety's performance changes under different environmental conditions).

Port-zone based summaries are now available online; they are not included in this guide.

The overall performance of a variety within an Agzone/port zone does not necessarily capture the variation in relative yield performance of varieties in response to those environments. Major drivers in the relative performance of a variety include its maturity and germination timing, the amount and timing of rainfall and the occurrence of abiotic stressors such as drought, heat and frost damage. Growers are encouraged to consider the predominant environmental conditions experienced in any given season in their region when interpreting relative varietal performance in local NVTs.

Visit app.nvt.grdc.com.au to access the NVT Yield Reporter.



Table 7: Grain yield of wheat varieties in AGZONE 1 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year			2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)			3.68	4.03	4.69	2.04	4.32	3.81
Variety	Maturity	(No. trials)	(4)	(5)	(4)	(4)	(6)	(23)
Australian Hard								
Kestrel	Quickp	(–)	–	–	–	–	–	–
LRPB Anvil CL Plus	Quick	(19)	–	107	89	101	102	100
Sting	Quick	(23)	103	106	101	106	104	104
Vixen (N)	Quick	(23)	103	110	100	108	107	106
Calibre	Quick–mid	(23)	106	104	106	108	104	105
Dale	Quick–mid	(–)	–	–	–	–	–	–
Devil (N)	Quick–mid	(23)	106	106	108	108	106	107
Hammer CL Plus (N)	Quick–mid	(23)	100	99	97	101	99	99
LRPB Havoc (N)	Quick–mid	(23)	100	110	97	105	105	104
LRPB Sonic	Quick–mid	(6)	–	–	–	–	112	111
RGT Marsh*	Quick–mid	(10)	–	–	–	109	105	106
Scepter	Quick–mid	(23)	105	107	105	107	106	106
Shotgun	Quick–mid	(6)	–	–	–	–	105	107
Thumper	Quick–mid	(10)	–	–	–	107	105	106
Catapult	Mid–slow	(23)	103	98	106	101	100	101
Genie	Mid–slow	(–)	–	–	–	–	–	–
RockStar (N)	Mid–slow	(23)	106	106	112	106	106	107
AGT-Hamelin	Slowp	(6)	–	–	–	–	107	107
AGT-Colt	Slowp	(–)	–	–	–	–	–	–
Valiant CL Plus	Slow	(19)	–	96	105	92	99	98
Australian Premium White								
LRPB Avenger (N)	Quick	(18)	97	–	94	103	106	103
Dozer CL Plus (N)	Quick–mid	(15)	–	97	–	102	98	100
Tomahawk CL Plus	Quick–mid	(14)	–	–	107	111	108	109
Chief CL Plus (N)	Mid	(23)	99	103	99	101	101	101
LRPB Vortex	Midp	(14)	–	–	113	109	112	111
Brumby (N)	Midp	(19)	–	106	110	108	106	107
Denison	Slow	(23)	100	102	109	98	103	102
Australian Noodle Wheat								
AGT-Carnac	Midp	(6)	–	–	–	–	105	107
Ninja	Mid	(23)	105	102	107	105	103	104
Rottnest	Midp	(6)	–	–	–	–	106	108
Splendid	Midp	(6)	–	–	–	–	103	105
Firefly	Mid–slow	(15)	–	100	–	104	102	104
Kinsei	Mid–slow	(23)	103	101	109	101	102	103
Zen	Mid–slow	(23)	101	105	102	103	103	103

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, * = classification pending, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Table 8: Grain yield of wheat varieties in AGZONE 2 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year			2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)			2.80	4.52	5.01	2.51	4.01	3.80
Variety	Maturity	(No. trials)	(14)	(15)	(16)	(15)	(14)	(74)
Australian Hard								
Kestrel	Quickp	(–)	–	–	–	–	–	–
LRPB Anvil CL Plus	Quick	(74)	104	103	92	107	98	101
Sting	Quick	(74)	108	107	103	111	104	107
Vixen (N)	Quick	(74)	110	110	103	114	105	108
Calibre	Quick–mid	(74)	109	106	108	112	106	108
Dale	Quick–mid	(–)	–	–	–	–	–	–
Devil (N)	Quick–mid	(74)	107	107	108	109	107	108
Hammer CL Plus (N)	Quick–mid	(74)	101	99	97	102	100	100
LRPB Havoc (N)	Quick–mid	(74)	105	107	97	107	104	104
LRPB Sonic	Quick–mid	(14)	–	–	–	–	109	110
RGT Marsh*	Quick–mid	(29)	–	–	–	112	107	108
Scepter	Quick–mid	(74)	107	107	105	109	106	107
Shotgun	Quick–mid	(14)	–	–	–	–	108	109
Thumper	Quick–mid	(29)	–	–	–	108	107	108
Catapult	Mid–slow	(74)	101	100	105	100	102	102
Genie	Mid–slow	(29)	–	–	–	94	97	97
RockStar (N)	Mid–slow	(74)	74	104	107	110	104	107
AGT-Hamelin	Slowp	(14)	–	–	–	–	107	107
AGT-Colt	Slowp	(14)	–	–	–	–	94	95
Valiant CL Plus	Slow	(74)	74	90	97	103	87	96
Australian Premium White								
LRPB Avenger (N)	Quick	(59)	105	–	98	109	100	104
Dozer CL Plus (N)	Quick–mid	(30)	–	–	100	–	105	103
Tomahawk CL Plus	Quick–mid	(45)	–	–	108	114	109	111
Chief CL Plus (N)	Mid	(74)	99	100	96	98	102	99
LRPB Vortex	Midp	(45)	–	–	112	110	109	111
Brumby (N)	Midp	(60)	–	108	109	109	108	108
Denison	Slow	(74)	96	103	108	94	101	101
Australian Noodle Wheat								
AGT-Carnac	Midp	(14)	–	–	–	–	108	107
Ninja	Mid	(74)	104	103	105	103	105	104
Rottnest	Midp	(14)	–	–	–	–	109	109
Splendid	Midp	(14)	–	–	–	–	107	106
Firefly	Mid–slow	(44)	–	103	–	104	105	105
Kinsei	Mid–slow	(74)	99	103	108	98	103	102
Zen	Mid–slow	(74)	100	103	98	99	104	101

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, * = classification pending, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Table 9: Grain yield of wheat varieties in AGZONE 3 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year			2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)			3.80	5.13	5.39	4.41	4.98	4.74
Variety	Maturity	(No. trials)	(5)	(4)	(5)	(4)	(5)	(23)
Australian Hard								
Kestrel	Quickp	(–)	–	–	–	–	–	–
LRPB Anvil CL Plus	Quick	(18)	–	97	93	99	96	96
Sting	Quick	(23)	105	105	102	105	104	104
Vixen (N)	Quick	(23)	106	106	104	106	105	105
Calibre	Quick–mid	(23)	107	108	106	107	108	107
Dale	Quick–mid	(–)	–	–	–	–	–	–
Devil (N)	Quick–mid	(23)	108	107	108	107	108	108
Hammer CL Plus (N)	Quick–mid	(23)	99	98	96	99	99	98
LRPB Havoc (N)	Quick–mid	(23)	102	100	99	102	101	101
LRPB Sonic	Quick–mid	(5)	–	–	–	–	109	110
RGT Marsh*	Quick–mid	(9)	–	–	–	106	107	106
Scepter	Quick–mid	(23)	107	105	106	105	106	106
Shotgun	Quick–mid	(9)	–	–	–	108	110	110
Thumper	Quick–mid	(4)	–	–	–	108	109	109
Catapult	Mid–slow	(23)	103	103	104	102	104	103
Genie	Mid–slow	(9)	–	–	–	100	99	101
RockStar (N)	Mid–slow	(23)	109	108	112	107	109	109
AGT-Hamelin	Slowp	(5)	–	–	–	–	109	110
AGT-Colt	Slowp	(5)	–	–	–	–	98	99
Valiant CL Plus	Slow	(23)	99	100	107	98	98	101
Australian Premium White								
LRPB Avenger (N)	Quick	(19)	101	–	100	103	99	101
Dozer CL Plus (N)	Quick–mid	(9)	–	–	–	101	101	101
Tomahawk CL Plus	Quick–mid	(14)	–	–	108	109	110	109
Chief CL Plus (N)	Mid	(23)	99	96	98	98	99	98
LRPB Vortex	Midp	(14)	–	–	117	111	111	113
Brumby (N)	Midp	(18)	–	108	110	107	109	109
Denison	Slow	(23)	104	105	112	103	103	106
Australian Noodle Wheat								
AGT-Carnac	Midp	(5)	–	–	–	–	108	107
Ninja	Mid	(23)	106	104	105	104	106	105
Rottnest	Midp	(5)	–	–	–	–	110	110
Splendid	Midp	(5)	–	–	–	–	107	107
Firefly	Mid–slow	(13)	–	107	–	105	107	107
Kinsei	Mid–slow	(23)	105	105	110	104	105	106
Zen	Mid–slow	(23)	102	98	101	99	101	100

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, * = classification pending, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Table 10: Grain yield of wheat varieties in AGZONE 4 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year			2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)			2.36	4.07	4.37	1.32	2.36	2.84
Variety	Maturity	(No. trials)	(11)	(6)	(11)	(9)	(11)	(48)
Australian Hard								
Kestrel	Quickp	(–)	–	–	–	–	–	–
LRPB Anvil CL Plus	Quick	(48)	110	108	94	112	108	106
Sting	Quick	(48)	110	109	104	115	109	109
Vixen (N)	Quick	(48)	113	112	104	118	112	112
Calibre	Quick–mid	(48)	108	107	107	115	107	109
Dale	Quick–mid	(–)	–	–	–	–	–	–
Devil (N)	Quick–mid	(48)	106	107	108	109	107	107
Hammer CL Plus (N)	Quick–mid	(48)	102	100	98	103	102	101
LRPB Havoc (N)	Quick–mid	(48)	110	110	99	108	111	107
LRPB Sonic	Quick–mid	(11)	–	–	–	–	114	111
RGT Marsh*	Quick–mid	(20)	–	–	–	114	110	110
Scepter	Quick–mid	(48)	108	108	105	109	109	108
Shotgun	Quick–mid	(20)	–	–	–	112	108	109
Thumper	Quick–mid	(20)	–	–	–	107	104	106
Catapult	Mid–slow	(48)	98	98	104	99	98	100
Genie	Mid–slow	(–)	–	–	–	–	–	–
RockStar (N)	Mid–slow	(48)	102	105	109	100	104	104
AGT-Hamelin	Slowp	(11)	–	–	–	–	103	104
AGT-Colt	Slowp	(11)	–	–	–	–	87	91
Valiant CL Plus	Slow	(37)	–	92	100	80	89	90
Australian Premium White								
LRPB Avenger (N)	Quick	(42)	112	–	98	112	110	108
Dozer CL Plus (N)	Quick–mid	(26)	–	99	–	106	100	102
Tomahawk CL Plus	Quick–mid	(31)	–	–	108	116	113	112
Chief CL Plus (N)	Mid	(48)	101	102	97	97	103	100
LRPB Vortex	Midp	(31)	–	–	111	107	111	110
Brumby (N)	Midp	(37)	–	107	109	108	107	107
Denison	Slow	(48)	94	99	105	88	95	96
Australian Noodle Wheat								
AGT-Carnac	Midp	(11)	–	–	–	–	108	107
Ninja	Mid	(46)	100	103	104	107	101	103
Rottnest	Midp	(11)	–	–	–	–	108	108
Splendid	Midp	(11)	–	–	–	–	104	104
Firefly	Mid–slow	(26)	–	101	–	102	101	103
Kinsei	Mid–slow	(48)	96	100	106	94	97	99
Zen	Mid–slow	(48)	102	103	100	96	105	101

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, * = classification pending, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Table 11: Grain yield of wheat varieties in AGZONE 5 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year			2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)			2.16	4.10	3.91	2.71	3.60	3.31
Variety	Maturity	(No. trials)	(6)	(5)	(6)	(5)	(8)	(30)
Australian Hard								
Kestrel	Quickp	(–)	–	–	–	–	–	–
LRPB Anvil CL Plus	Quick	(30)	112	101	98	107	98	103
Sting	Quick	(30)	113	108	106	110	106	108
Vixen (N)	Quick	(30)	117	110	107	112	107	110
Calibre	Quick–mid	(30)	112	110	109	110	109	110
Dale	Quick–mid	(–)	–	–	–	–	–	–
Devil (N)	Quick–mid	(30)	109	109	109	108	108	109
Hammer CL Plus (N)	Quick–mid	(30)	102	98	100	102	100	100
LRPB Havoc (N)	Quick–mid	(30)	111	104	102	107	102	105
LRPB Sonic	Quick–mid	(8)	–	–	–	–	108	111
RGT Marsh*	Quick–mid	(13)	–	–	–	111	108	110
Scepter	Quick–mid	(30)	110	108	108	108	106	108
Shotgun	Quick–mid	(13)	–	–	–	110	110	111
Thumper	Quick–mid	(13)	–	–	–	106	109	108
Catapult	Mid–slow	(30)	98	102	103	100	103	101
Genie	Mid–slow	(–)	–	–	–	–	–	–
RockStar (N)	Mid–slow	(30)	103	108	109	103	107	106
AGT-Hamelin	Slowp	(8)	–	–	–	–	107	106
AGT-Colt	Slowp	(8)	–	–	–	–	97	94
Valiant CL Plus	Slow	(30)	85	97	94	88	95	92
Australian Premium White								
LRPB Avenger (N)	Quick	(25)	114	–	100	108	101	106
Dozer CL Plus (N)	Quick–mid	(13)	–	–	–	103	102	102
Tomahawk CL Plus	Quick–mid	(19)	–	–	112	113	110	112
Chief CL Plus (N)	Mid	(30)	100	97	99	99	98	99
LRPB Vortex	Midp	(19)	–	–	111	108	110	111
Brumby (N)	Midp	(24)	–	110	110	108	109	109
Denison	Slow	(30)	93	104	101	94	101	99
Australian Noodle Wheat								
AGT-Carnac	Midp	(11)	–	–	–	–	108	108
Ninja	Mid	(30)	102	104	106	103	105	104
Rottnest	Midp	(8)	–	–	–	–	110	110
Splendid	Midp	(8)	–	–	–	–	107	106
Firefly	Mid–slow	(18)	–	106	–	102	106	105
Kinsei	Mid–slow	(30)	96	104	103	98	103	101
Zen	Mid–slow	(30)	101	99	101	100	100	100

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, * = classification pending, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Table 12: Grain yield of wheat varieties in AGZONE 6 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year			2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)			3.74	4.31	4.63	3.49	3.63	3.96
Variety	Maturity	(No. trials)	(3)	(2)	(3)	(3)	(2)	(13)
Australian Hard								
Kestrel	Quickp	(–)	–	–	–	–	–	–
LRPB Anvil CL Plus	Quick	(10)	–	98	91	102	97	96
Sting	Quick	(13)	104	103	101	108	106	104
Vixen (N)	Quick	(13)	105	106	101	109	107	105
Calibre	Quick–mid	(13)	107	105	106	109	109	107
Dale	Quick–mid	(–)	–	–	–	–	–	–
Devil (N)	Quick–mid	(13)	110	108	108	108	108	108
Hammer CL Plus (N)	Quick–mid	(13)	99	99	99	100	99	99
LRPB Havoc (N)	Quick–mid	(13)	103	106	99	104	100	102
LRPB Sonic	Quick–mid	(2)	–	–	–	–	110	–
RGT Marsh*	Quick–mid	(5)	–	–	–	109	107	107
Scepter	Quick–mid	(13)	108	107	106	107	106	107
Shotgun	Quick–mid	(5)	–	–	–	109	111	110
Thumper	Quick–mid	(5)	–	–	–	108	110	109
Catapult	Mid–slow	(13)	104	101	105	101	103	103
Genie	Mid–slow	(5)	–	–	–	96	101	98
RockStar (N)	Mid–slow	(13)	112	111	111	106	108	110
AGT-Hamelin	Slowp	(2)	–	–	–	–	108	–
AGT-Colt	Slowp	(2)	–	–	–	–	99	–
Valiant CL Plus	Slow	(13)	99	100	100	93	98	98
Australian Premium White								
LRPB Avenger (N)	Quick	(11)	99	–	93	105	102	100
Dozer CL Plus (N)	Quick–mid	(5)	–	–	–	102	102	101
Tomahawk CL Plus	Quick–mid	(8)	–	–	108	111	110	110
Chief CL Plus (N)	Mid	(13)	102	103	101	99	96	100
LRPB Vortex	Midp	(8)	–	–	110	110	111	112
Brumby (N)	Midp	(10)	–	109	109	108	109	109
Denison	Slow	(13)	105	106	104	99	103	103
Australian Noodle Wheat								
AGT-Carnac	Midp	(2)	–	–	–	–	107	–
Ninja	Mid	(13)	108	106	108	104	105	106
Rottnest	Midp	(2)	–	–	–	–	110	–
Splendid	Midp	(2)	–	–	–	–	106	–
Firefly	Mid–slow	(2)	–	–	–	–	107	–
Kinsei	Mid–slow	(13)	106	106	106	101	105	105
Zen	Mid–slow	(13)	105	107	104	100	98	103

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, * = classification pending, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Table 13: Relative performance of varieties in the EARLY SEASON NVT for AGZONES 1 to 6 combined (2020–24), expressed as a percentage of site mean yield and the weighted average over the 5-year period (where there is more than one year of data or 4 or more observations)

Year				2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)				3.15	4.88	4.59	2.99	3.64	3.88
Variety (order of maturity)	Classification	Maturity	(No. trials)	(5)	(8)	(10)	(10)	(10)	(43)
RockStar	AH (N)	Mid–slow	(43)	111	110	94	114	107	107
Kinsei	ANW	Mid–slow	(43)	109	109	97	112	106	106
Catapult	AH	Mid–slow	(43)	107	107	94	111	107	105
Genie	AH	Mid–slow	(8)	–	–	–	119	111	111
AGT-Hamelin	AH	Slowp	(10)	–	–	–	–	112	110
AGT-Colt	AH	Slowp	(10)	–	–	–	–	106	108
Denison	APW	Slow	(43)	113	110	106	116	111	111
Valiant CL Plus	AH	Slow	(38)	–	106	104	111	107	107
Yitpi	AH	Slow	(43)	96	98	93	98	99	97
Cutlass	APW (N)	Slow	(43)	106	104	105	108	106	106
Mammoth	APW	Very slow	(20)	–	–	–	109	102	109
Brighton	AH	Quick winter	(20)	–	–	–	94	97	100
Illabo	AH	Quick winter	(43)	90	92	102	86	91	92
Longsword	AWW	Quick winter	(43)	96	96	108	95	99	99
Mowhawk	AH	Quick winter	(20)	–	–	114	–	99	102
Wallaroo	APW	Quick winter	(26)	–	–	118	109	105	110

Source: based on MET analysis from NVT, nvt.grdc.com.au

(N) = supplementary classification of APWN, p = provisional rating.

■ = new releases for 2026 season. ■ = 2025 releases.

Maturity

In WA, the flowering of spring wheat varieties is broadly classified into maturity categories of quick, quick–mid, mid, mid–slow and slow. While there are later maturing spring wheats and winter wheats, these are not commonly grown in WA. Most spring wheat varieties grown in WA have a minor vernalisation requirement (responding to an accumulation of cold temperatures) and photoperiod sensitivity (response to daylength), which means their development is mainly driven by temperature (warmer temperatures increase development rate).

The quick–mid spring maturity type is the predominant maturity type in WA. Spring wheat varieties with a higher, albeit still limited, response to vernalisation (such as Magenta) or photoperiod (such as Cutlass) can be sown from late April as their maturity is delayed, and many of these

varieties fall into the mid–slow and slow maturity class. In recent years, very slow spring (such as Mammoth) and quick winter wheats (such as Wallaroo, Mowhawk and Illabo) with greater adaptation to the WA environment have been released, offering unique maturity characteristics for very early sowing.

Sowing spring wheats in April can result in an advanced rate of development (due to warmer temperatures and longer daylengths) and a quicker time to flowering. For this reason, winter wheats are seen as having more appropriate development times for an early April (or even March) sowing in WA, primarily due to their vernalisation requirement, which negates much of the warmer temperatures in April and May.

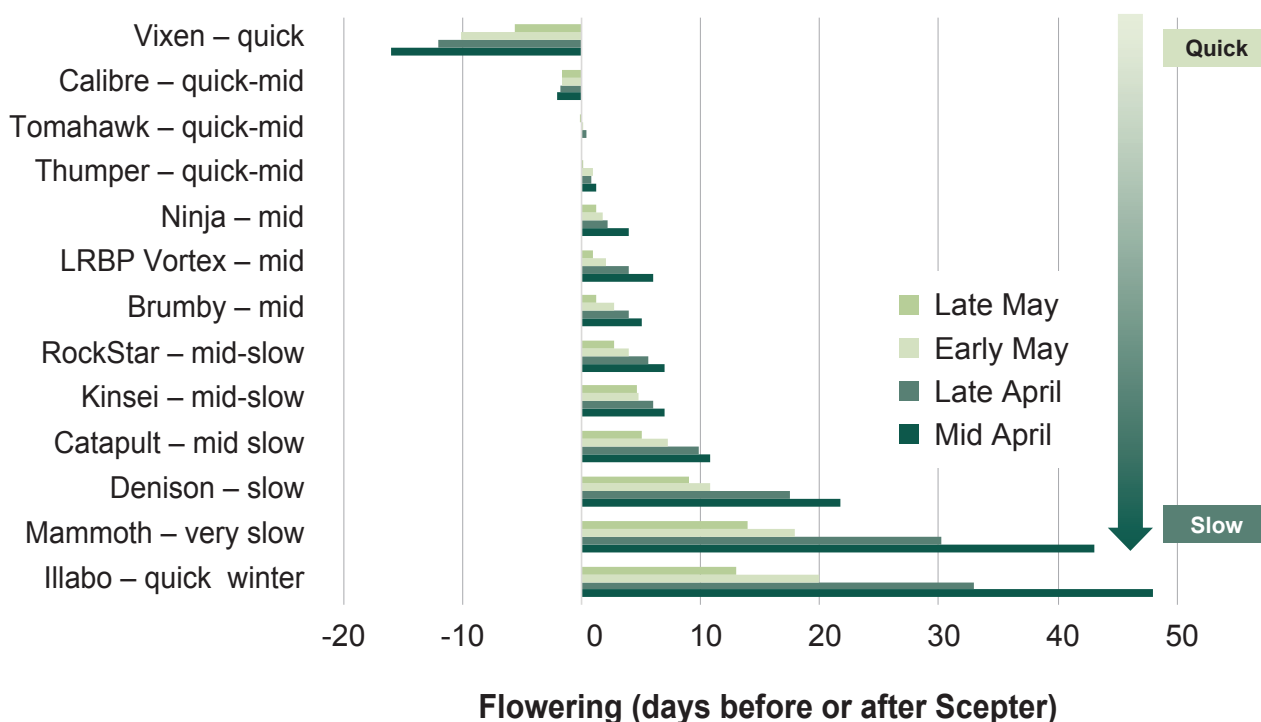


Figure 1: Flowering (days before or after Scepter) response of various maturity types sown on a range of sowing dates (mid-April to late May) average over 4 locations in 2023 and 2024

Source: DPIRD wheat agronomy research

Flowering dates change with sowing date, location (Table 14) and from season to season (not shown), predominantly due to differences in temperatures, although stress can also have an impact (not shown). Figure 1 shows the large difference in flowering compared to Scepter between the quick to slow spring and winter wheats in WA (differences are greatest with an April sowing). Given that the genetic control of flowering is complex and it is driven by environmental conditions that differ from season to season, it is important to consider data from multiple sites and seasons to better understand the maturity type of a variety.

Earlier sowing of mid–slow maturity types still result in an earlier flowering time than mid-May sowing of quick–mid maturity wheats. Risks associated with early flowering wheat, such as frost damage, low falling numbers or pre-harvest sprouting and black point, should be considered with a greater scrutiny if early sowing is planned with these maturity types.

FlowerPower: is an online tool that predicts cereal flowering dates across the WA wheatbelt. FlowerPower enables the user to compare flowering date predictions over a range of sowing dates. Refer to the DPIRD website or <https://fp.dpiird.app>

Scepter is classified as quick–mid maturity and Table 14 outlines how other varieties compared to Scepter when sown mid to late May at the northern and south coast NVT sites and in DPIRD trials in 2024. A more detailed flowering comparison between Scepter and other varieties can be found in the variety snapshots (pages 43–56).

Brumby and LRBP Vortex have the maturity category of provisional mid-season in this bulletin, as the duration of days to flowering has varied between Scepter and RockStar depending on the environment and season (Table 14). AGT-Carnac, Rottneest and Splendid are also midp or AGT-Colt and AGT-Hamelin are slowp with only information from 2024.

Table 14: Days from sowing to flowering (relative to Scepter) at selected NVT and DPIRD trials in 2024.
Statistical errors are generally ± 2 days

Variety	Maturity	Northern NVTs*	Great Southern NVTs*	Mullewa	Merredin	Katanning	Mt Burdett	Average
Sowing date		Av of 31-May	Av of 12-May	15-May	15-May	17-May	19-May	
LRPB Anvil CL Plus	Quick	-6	-10	–	–	–	–	-8
LRPB Avenger	Quick	-5	-9	–	–	–	–	-7
Vixen	Quick	-5	-7	-10	-10	-9	-6	-8
Sting	Quick	-4	-4	–	–	–	–	-4
LRPB Havoc	Quick	-2	-5	–	–	–	–	-4
Calibre	Quick-mid	0	-2	-2	-3	-4	-1	-2
LRPB Sonic	Quick-mid	-1	-2	–	–	–	–	-2
Mace	Quick-mid	0	-1	–	–	–	–	-1
Dozer CL Plus	Quick-mid	1	1	-2	-1	-2	-1	-1
RGT Marsh	Quick-mid	-2	1	–	–	–	–	0
Devil	Quick-mid	-1	0	–	–	–	–	0
Tomahawk CL Plus	Quick-mid	0	1	1	-1	-2	0	0
Scepter	Quick-mid	0	0	0	0	0	0	0
Shotgun	Quick-mid	2	1	-2	-2	-2	0	0
Thumper	Quick-mid	2	3	1	0	0	1	1
LRPB Vortex	Midp	-1	-2	3	1	1	1	1
Hammer CL Plus	Quick-mid	3	1	–	–	–	–	2
Ninja	Mid	3	1	3	3	2	1	2
Rottnest	Midp	4	3	2	1	1	1	2
Chief CL Plus	Mid	3	2	–	–	–	–	3
AGT-Carnac	Midp	4	3	–	–	–	–	3
Splendid	Midp	4	3	–	–	–	–	4
Brumby	Midp	5	4	5	4	2	3	4
Firefly	Mid-slow	6	5	3	2	1	2	3
RockStar	Mid-slow	6	5	5	3	3	2	4
Zen	Mid-slow	6	4	–	–	–	–	5
Kinsei	Mid-slow	9	6	6	4	2	4	5
Magenta	Mid-slow	8	–	–	–	–	–	–
Genie	Mid-slow	-	8	9	7	4	6	7
Catapult	Mid-slow	9	7	11	7	4	4	7
AGT-Hamelin	Slowp	11	8	12	8	3	8	8
Yitpi	Slow	12	10	–	–	–	–	11
Denison	Slow	13	12	15	11	8	10	11
AGT-Colt	Slowp	13	11	–	–	–	–	12
Cutlass	Slow	14	11	–	–	–	–	12
Valiant CL Plus	Slow	14	12	–	–	–	–	13
Scepter's flowering date		Av 5-Sept	Av 11-Sept	21-Aug	02-Sep	17-Sep	07-Sep	

*NVT sites include Mullewa, Eradu, Nabawa, Ogilvie, Yuna, Tarwonga and Kojonup.

■ = new releases for 2026 season. ■ = 2025 releases. p = provisional rating.

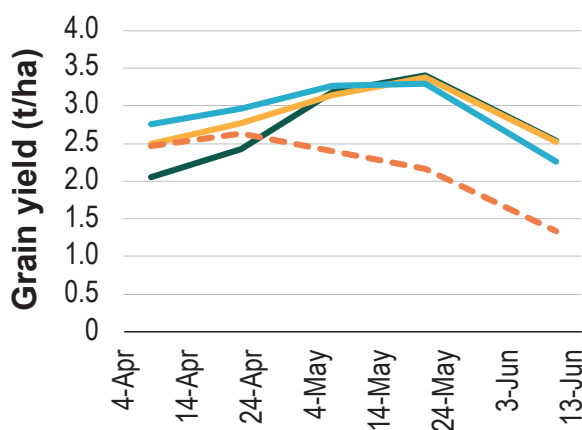
Sowing time response of wheat varieties in WA

Matching varieties to their appropriate sowing date is the key to maximising potential wheat yield in WA. However, as the environmental constraints of each season differ in significance, prevalence and timing, the perfect match of sowing date and variety development is difficult to achieve. For example, many wheat growing areas in WA have had both tight, dry finishes and cool, long finishes over the past few years. These differing conditions alter the developmental timings of wheat crops and result in one maturity type being favoured over another for any given sowing date. Despite this, there are some consistencies that occur over several seasons that can guide appropriate variety choice for any sowing opportunity.

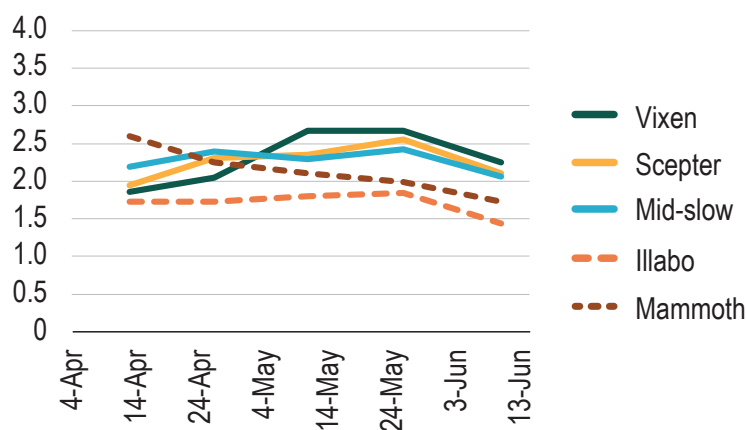
Most of the main season wheat NVTs are germinated from mid-May onwards, a time best suited to the quicker maturity varieties that currently dominate WA's wheat area. DPIRD's research since 2020 has assessed the optimal variety choices for any given sowing date and the best match of variety maturity types to sowing opportunities in specific environments.

Even at the vastly different locations of Mullewa, Merredin, Katanning and Grass Patch/Mt Burdett, peak yields generally occurred from a late April to early May sowing (Figure 2). However, the variety combinations to maximise yield from each sowing date at each site varied and there are opportunities to maintain high yields across the sowing window by matching varieties to a given sowing date. Table 15 provides the suggested sowing times of main season wheat varieties in WA.

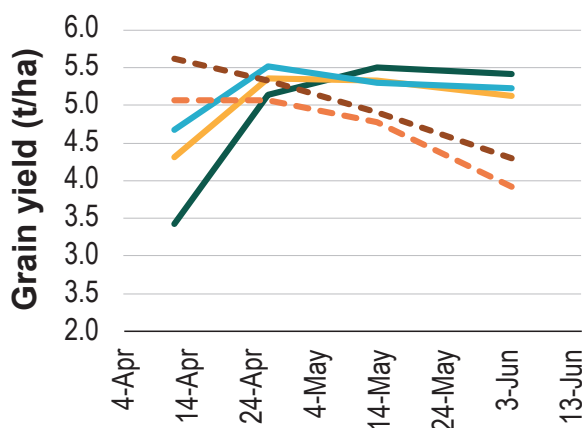
(a) Mullewa (2020–24)



(b) Merredin (2022–24)



(c) Katanning (2022–24)



(d) Grass Patch/Mt Burdett (2022–24)

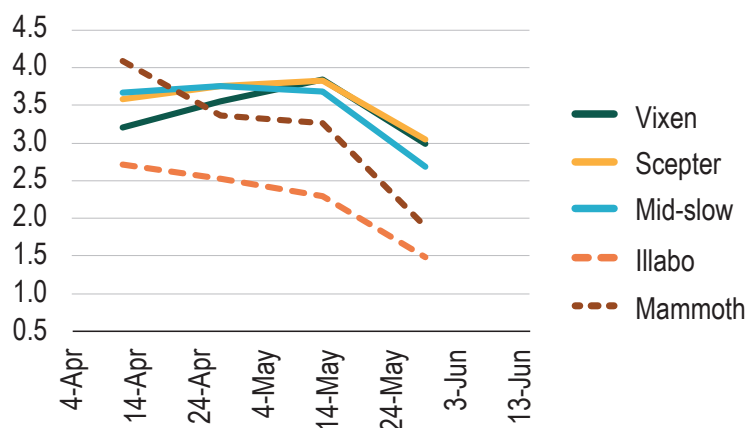


Figure 2: Grain yield (t/ha) response of varieties sown on 4 to 5 sowing dates (early April to mid-June) at a) Mullewa (2020–24), b) Merredin (2022–24), c) Katanning (2022–24) and d) Grass Patch/Mt Burdett (2022–24)

Irrigation was used at the early sowing dates to ensure timely germination. Source: DPIRD wheat agronomy research

Atypical seasons (not included in Figure 2):

In 2021, Merredin experienced an extreme frost event in the optimum flowering times, penalising all varieties. The atypical finish to the season in 2022 and 2024 at Mullewa, showed an improved performance of the mid–slow and even the quick winter varieties at the later sowing dates, while the tight/dry finish and no minor frost events in 2023 at Katanning showed an improved performance of the quick or quick–mid maturing varieties to yield higher than normal in late April.

In addition to frost damage, a key factor in reduced yields of April sown wheat greatly depends on the degree of drought stress and the interaction of higher temperatures in April–May. These trials are irrigated to achieve a germination; in some conditions this may reduce the degree of crops ‘running-up’ from early season stress which results in very poor yield potential with low biomass. Cooler environments are less likely to experience this but are typically much higher risk of frost.

The suitability of winter and very slow spring varieties is continually being assessed by DPIRD; in general, they are more competitive when sown in early to mid-April in southern, longer season environments and/or frost-prone locations.

Suggested sowing times

Suggested sowing times for varieties (Table 15) have been developed to support decisions around preferences and opportunities in sowing times. The proposals are based on knowledge of the varieties and their performance in NVT and DPIRD agronomy trials (see *Sowing time response of wheat varieties in WA* on page 30). The suggested sowing times were developed in consultation with breeding companies and researchers. For varieties not listed in the table, refer to the maturity class of the variety.

Note: spring wheats generally have a lower yield potential if sown before late April in WA.

The number of days to flowering relative to Scepter is provided in the variety snapshots at the end of this guide.

Knowing the maturity length of a variety helps with planting order planning and enables variety development to be aligned with typical seasonal conditions.

Table 15 does not suggest the sowing time of wheat varieties where frost may be an issue. Frost risk is extremely variable within the landscape and across environments. Delaying sowing time and the choice of variety or crop are still the most significant ways of reducing yield losses in frost-prone areas. Key management strategies for frost are available on the GRDC and DPIRD websites.

Table 15: Suggested sowing times of wheat varieties in WA (assumes low frost risk)

AGZONES 1–6	March	April				May				June			
	wk 4	wk 1	wk 2	wk 3	wk 4	wk 1	wk 2	wk 3	wk 4	wk 1	wk 2	wk 3	wk 4
# Winter wheat (quick): Brighton, Illabo, Mowhawk, Wallaroo													
# Very slow: Mammoth													
Slow: AGT-Colt, AGT-Hamelin, Cutlass, Denison, Valiant CL Plus, Yitpi													
Mid–slow: Catapult, Firefly, Genie, Kinsei, RockStar, Zen													
Quick–mid to mid: Bumby, Calibre, Devil, Dozer CL Plus, Hammer CL Plus, LRPB Sonic, LRPB Vortex, Ninja, RGT Marsh, Scepter, Shotgun, Thumper, Tomahawk CL Plus													
Quick: LRPB Anvil CL Plus, Sting, Vixen													

■ = earlier than ideal ■ = optimum sowing time ■ = later than ideal but acceptable

Suggested sowing times have been given for quick winter wheats such as Illabo or Mowhawk; however, this is only applicable in the southern areas of WA where the winter types are more adapted to the longer environments (refer to Figure 2).

Disease and pest resistance

Manisha Shankar, Geoff Thomas, Carla Wilkinson, Sarah Collins and Daniel Huberli (DPIRD)

Key points

- Be aware of a variety's disease package so that pre- and in-season disease management can be planned.
- Do not plant a susceptible variety into a high disease risk paddock.
- Use a diversity of wheat varieties and crop types.

When selecting a wheat variety, it is important to consider its yield and potential quality grade along with the disease resistance (Table 17). Higher resistance ratings reduce disease severity and potential yield loss. Avoiding susceptible (S) or very susceptible (VS) varieties significantly reduces the chance of disease outbreaks and the need for in-season management.

For a disease to become damaging in season, there needs to be:

- the presence of inoculum, which is usually carried over from the previous season
- favourable weather conditions for disease proliferation
- a susceptible host crop that becomes infected.

Depending on the disease in question, inoculum can be carried on infested stubble or trash, a green bridge, in seed or in the soil (Table 16).

Choose varieties for each paddock based on disease resistance/susceptibility and the disease risk of the paddock. Disease risk is related to the potential presence of disease inoculum and the favourability of the environment for the disease. For example, it is not advisable to sow Yitpi, which is rated SVS for yellow spot, onto wheat stubble.

Knowing the disease strengths and weaknesses of a variety enables more effective disease management during the season. Varieties that are VS to S to powdery mildew are more likely to get the disease, and the rate of epidemic development will be faster and the impact will be greater in these types. When S varieties such as Vixen make up a high proportion of the crop grown, the disease will be more common and damaging across the grainbelt. Therefore, the need to respond with in-crop fungicide can be greater and the time to respond shorter with these varieties. Use of proactive protection, such as fertiliser applied fungicides, may be more useful for these varieties to delay or slow disease onset in favourable environments.

Using a diverse range of varieties with different disease resistance traits reduces the risk that the whole farm will require disease management at the same time. Diversification also reduces the risk of new pathotypes emerging, which could render a significant proportion of a farm or region susceptible and require region-wide management responses.

Table 16: Examples of wheat diseases carried over from different inoculum sources

Inoculum carryover source	Disease
Infested stubble or trash	Yellow spot, septoria nodorum blotch, powdery mildew and crown rot
Green bridge	Rusts, powdery mildew and viruses
Seed	Loose smut and flag smut
Soilborne	Root lesion nematode, cereal cyst nematodes, rhizoctonia root rot, take-all, flag smut and common bunt

Disease ratings provided in this guide reflect the expected response to the most common or dominant pathotype or strain of a disease in WA. For most diseases, very little variability in response is evident between seasons or regions, but occasionally mutations or incursions of rusts can significantly change variety ratings. For example, leaf rust ratings in Table 17 are for pathotypes that entered WA in 2015 (104–1,3,4,6,7,8,10,12 +Lr37) and 2017 (104–1,3,4,5,7,9,10,12 +Lr37).

Ratings for **powdery mildew** reflect expected resistance to the general mildew population; however, varietal response can differ on rare occasions when a more virulent isolate occurs.

Nodorum blotch causes characteristic necrotic lesions on leaves and can also cause glume blotch, dark brown to black lesions or staining on the heads associated with infection. Varieties can differ in disease expression on foliage and heads, so in this guide variety rankings have been included for both these plant parts (Table 17). Susceptible varieties are more likely to suffer glume blotch in seasons where disease is present in the foliage and when weather favourable to disease occurs after head emergence.

Flag smut is commonly seen in the medium and lower rainfall regions of the WA grainbelt. The incidence within paddocks and severity of infection seen in the 2024 season was significantly greater than normal. In the worst affected paddocks, some yield losses have occurred. The 2024 season will have contributed to increased inoculum for coming years. Varietal resistance and seed dressing application are the main management options for this disease with no in-season management options, however resistance ratings for flag smut in wheat varieties are no longer routinely assessed. In 2025 a DPIRD project with GRDC investment (DAW2506-007RTX _ NGN: Improving Management of Flag Smut in Wheat and Loose Smut in Barley for Western Australia) commenced with trials to update flag smut ratings on newer varieties. Ratings range from Catapult at RMR to RockStar the most susceptible at VS (Table 17). AGT-Hamelin, Brumby, Dale, Devil, LRPB Vortex, Shotgun, Sting, Tomahawk CL Plus and Vixen are SVSp for flag smut, while AGT-Colt, Denison and RGT Marsh are MRp.



Wheat

An example of severe flag smut observed at Merredin in 2024

ANW varieties are generally MS or better for flag smut. Please refer to Table 17 for the full list now available. For 2026:

- apply a fungicide seed dressing registered for smut and bunt control in wheat in all paddocks, particularly to susceptible varieties and those sown over wheat stubbles from 2024. Historical trial results suggest that registered products should effectively reduce infection risk, refer to labels.
- Note that self-sown wheat of susceptible varieties will likely carry the infection and while unlikely to significantly affect yield, will prolong the soil-inoculum.

Soilborne diseases and pests

Soilborne pathogens and nematode pests infect plant roots and impair their ability to take up water and nutrients. Environmental factors such as soil moisture, temperature and nutrient availability will determine the severity of disease development. The most prevalent root diseases or pests of wheat in WA are rhizoctonia bare patch, root lesion nematodes (RLN), fusarium crown rot and take-all. Less widespread are cereal cyst nematodes (CCN), common root rot and pythium root rot.

Soilborne diseases and nematode pests are best managed by (i) identifying the pathogens or pests causing plant decline, (ii) use of crop and variety rotation, and (iii) applying chemical management where available.

Rhizoctonia bare patch is probably the most prevalent and damaging soilborne disease in WA wheat, and there is no varietal resistance. For **fusarium crown rot**, there is limited resistance in varieties grown in WA. Reducing the build-up of infected cereal stubble and weeds is the best approach, through inclusion of broadleaf crops in the rotation and controlling grasses and cereal volunteers.

Pratylenchus neglectus is the dominant RLN species in broadacre growing areas of WA, followed by ***P. quasitereoides*** (formerly *P. teres*). ***P. thornei*** and ***P. penetrans*** are detected less frequently but can also impact yields. The key to managing RLN is identifying paddocks with yield-limiting levels and incorporating more resistant crops and varieties to reduce their populations. Wheat, barley and canola are all susceptible crops. These crops can suffer significant yield loss and can increase ***P. neglectus*** and ***P. quasitereoides*** levels in a paddock over a growing season.

In this guide, ***P. quasitereoides*** nematode resistance scores are from WA glasshouse and field trials. Ratings for ***P. neglectus*** should be treated as indicative only, many varieties have not been tested in WA. Varieties with fewer than 5 observations, or where there has been no field trial verification of the glasshouse rating, receive provisional ratings.

CCN (*Heterodera australis*) is among the most damaging pests in WA soils and can cause significant yield losses in wheat, oats and barley. Canola and other broadleaf crops are not hosts and their yields are not affected by CCN. When the season breaks, CCN eggs hatch and juveniles enter plant roots where they set up a fixed feeding



Plant pathology group (from left to right): Karan Jaura, Manisha Shankar, Dorthe Jorgensen, Donna Foster and Ethan Ryan

site. They damage root tissues as they grow and impair plant function by extracting nutrients and water. These nematodes form into hardened cysts which protect hundreds of eggs over the summer period. CCN is most commonly found around Geraldton, Esperance and the Avon Valley but can occur elsewhere across the WA grainbelt. CCN can be effectively managed by including resistant cereal varieties and ensuring rotations include weed free, non-cereal crops. If levels of CCN are high, then 2 consecutive years of a non-host may be required. No chemical treatments are currently registered to control CCN.

In-crop diagnosis of the disease or pest affecting plant roots is best achieved by sending affected plants to DPIRD Diagnostic and Laboratory Services (DDLs) in South Perth. For more information on sample submission contact 08 9368 3351 or DDLs@dpiird.wa.gov.au. Alternatively, a DNA-based soil-testing service (PREDICTA®B) is also available and growers can contact their agronomist or SARDI for advice on how to submit samples for molecular testing.

Fungicides

Fungicides can help control disease and limit yield impacts but a rapidly developing issue for the Australian grains industry is the development of fungicide resistance in a range of wheat and barley pathogens. Using integrated disease management (IDM), including varietal disease resistance, can help reduce reliance on fungicides for disease management. More information on fungicide resistance is available from the Australian Fungicide Resistance Extension Network (<https://afren.com.au/>)



Wheat

An example of stem rust observed at Carnarvon

For more information:

- Registered seed dressing and in-furrow fungicides for cereals in WA: <https://www.dpiird.wa.gov.au/businesses/pests-weeds-and-diseases/control-methods/chemicals/fungicides/>
- 'Australian Field Crop Disease Guide App', which is available for both Apple and Android
- 'MyCrop App', which is available for both Apple and Android.

Table 17: Disease resistance ratings for wheat varieties grown in WA

Variety	Grade	Yellow spot	Nodorum blotch (leaf)	Nodorum blotch (glume)	Rust			Powdery mildew
					Stem	Stripe	Leaf	
AGT-Carnac	ANW	MRMS _p	–	–	MRMS _p	RMR	MSS _p	Sp
AGT-Colt	AH	MRMS _p	–	–	MR _p	R	MR _p	MR _p
AGT-Hamelin	AH	MRMS _p	–	–	MRMS _p	MR	MR _p	MSS _p
Brighton	AH	MRMS	MR	MR	MRMS	RMR	S	MSS
Brumby	APW (N)	MRMS	MRMS	MS	MR	RMR	SVS	R*
Calibre	AH	MRMS	MS	MSS	MR	RMR	S	MSS
Catapult	AH	MRMS	MRMS	MS	MR	RMR	S	S
Chief CL Plus	APW (N)	MRMS	MS	MRMS	MR	S	MR*	S
Cutlass	APW (N)	MSS	MRMS	MRMS	R	RMR	RMR*	S
Dale	AH	–	–	–	–	–	–	–
Devil	AH (N)	MRMS	MRMS	MS	S	RMR	SVS	SVS
Denison	APW	MRMS	MR	MRMS	MS	MR	S	S
Dozer CL Plus	APW	MRMS	MRMS	MSS	MS	MRMS	S	S
DS Bennett	Feed	MRMS	MR	MR	MS	RMR	SVS	RMR
Firefly	ANW	MRMS	MRMS	MSS	S	MS	MSS	MSS _p
Genie	AH	MRMS _p	MR _p	Sp	MRMS	RMR	S	Sp
Hammer CL Plus	AH (N)	MRMS	MRMS	MRMS	MR	RMR	S	S
Illabo	AH	MS	MR	MR	MR	RMR	S	R
Kestrel	AH	–	–	–	–	–	–	–
Kinsei	ANW	MS	MRMS	MRMS	MSS	MRMS	MS	S
Longsword	AWW	MRMS	MRMS	MRMS	MR	RMR	MSS	MS
LRPB Anvil CL Plus	AH	MSS	MSS	MSS	MR	RMR	SVS	S
LRPB Avenger	APW (N)	MS	MSS	MS	MS	MR	SVS	S
LRPB Havoc	AH (N)	MRMS	MS	MS	S	MR	S	MSS
LRPB Sonic	AH	MRMS _p	MRMS _p	MS _p	MS _p	MR _p	MRMS _p	MSS _p
LRPB Vortex	APW	MRMS	MRMS	MS	MRMS	RMR	SVS	MS
Mace	AH (N)	MRMS	MS	MS	MRMS	RMR	S	MSS
Magenta	APW	MRMS	MRMS	MSS	MR	MSS	RMR*	MRMS
Mammoth	APW	MRMS	MRMS	MR	MR	MRMS	MRMS	S
Mowhawk	AH	MRMS _p	–	–	RMR _p	–	MR _p	RMR _p
Ninja	ANW	MRMS	MRMS	MS	S	MS	S	S
RGT Marsh	AH (?)	MSS	MRMS _p	MRMS _p	MRMS	RMR	MSS	Sp
RockStar	AH (N)	MRMS	MRMS	MRMS	MRMS	RMR	S	MSS
Rottnest	ANW	MRMS _p	–	–	Sp	MRMS	VSp	SVSp
Scepter	AH	MRMS	MRMS	MSS	MRMS	RMR	MSS	S
Shotgun	AH	MRMS	MRMS _p	MSS _p	MRMS	RMR	MSS	MSS _p
Splendid	ANW	MRMS _p	–	–	MR _p	RMR _p	MSS _p	SVSp
Sting	AH	MRMS	MS	MS	MRMS	MR	SVS	MSS
Thumper	AH	MRMS	MRMS _p	Sp	MS	RMR	MSS	Sp
Tomahawk CL Plus	APW	MRMS	MRMS	S	MR	RMR	S	S
Valiant CL Plus	AH	MRMS	MR	MRMS	MRMS	RMR	S	SVS
Vixen	AH (N)	MRMS	MS	MSS	MRMS	MR	SVS	SVS
Wallaroo	APW	MRMS	MR	MR	RMR	RMR	RMR	MSS
Westonia	APW (N)	MSS	S	MSS	SVS	VS	S	SVS
Yitpi	AH	SVS	MS	MRMS	S	MRMS	MSS	MS
Zen	ANW	MRMS	MS	MRMS	S	MR	S	S

(N) = supplementary classification of APWN, (?) = classification pending. ■ = new releases for 2026 season. ■ = 2025 releases.

VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant. Refer to page 4 for interpreting resistance classification.

No score '–' = no rating is currently available, p = provisional assessment, () = different response over east.

* Some races in eastern Australia can attack these varieties, including races with Yr17 virulence for stripe rust, races with Lr24 virulence for leaf rust, and a virulent pathotype for powdery mildew at Bute, SA affecting Brumby and Shenton Park, WA affecting DS Bennett.

[Table 17. continued on following page]

Table 17: Disease resistance ratings for wheat varieties grown in WA (cont'd)

Variety	Grade	Septoria tritici blotch	Flag smut	Common bunt	Root lesion nematode [#]		Cereal cyst nematode [†]	Crown rot [§]
					<i>P. neglectus</i>	<i>P. quasitereoides</i>		
AGT-Carnac	ANW	—	—	—	—	—	—	—
AGT-Colt	AH	—	MRp [^]	—	—	—	—	—
AGT-Hamelin	AH	—	SVSp [^]	—	—	—	—	—
Brighton	AH	MRMSp	—	—	S	—	R	S
Brumby	APW (N)	MSSp	SVSp [^]	—	MRMS	MSp	MRMS	S
Calibre	AH	S	Sp	—	S	MRMSp	MRMS	S
Catapult	AH	MSS	RMR	MRMS	S	MRMS	R	MSS
Chief CL Plus	APW (N)	MSS	SVS	MR	MRMS	MRMS	MS	MSS
Cutlass	APW (N)	MSS	MSS	S	MSS	MS	MR	S
Dale	AH	—	SVSp [^]	—	—	—	—	—
Devil	AH (N)	SVS	SVS	MR	MSS	MRMS	MSS	MSS
Denison	APW	MS	MRp [^]	MRp	S	MRMSp	MS	MSS
Dozer CL Plus	APW	MSSp	SVSp [^]	—	MRMS	MSSp	MS	S
DS Bennett	Feed	MR	SVS	RMR	S	—	S	VS
Firefly	ANW	MSSp	MRp [^]	—	MS	MSSp	MSSp	S
Genie	AH	—	RMRp [^]	—	MSp	Rp	MSSp	MSp
Hammer CL Plus	AH (N)	MSS	RMR	RMR	MSS	MS	MRMS	MSS
Illabo	AH	MR	R	MS	MSS	RMR	MRMS	S
Kestrel	AH	—	—	—	—	—	—	—
Kinsei	ANW	MS	RMR	MR	S	S	MSS	MSS
Longsword	AWW	MRMS	MRMS	RMR	MRMS	—	MRMS	MSS
LRPB Anvil CL Plus	AH	SVS	—	—	MSS	MSSp	MS	MSS
LRPB Avenger	APW (N)	S	S	S	MSS	MSp	MRMS	S
LRPB Havoc	AH (N)	MRMS	MS	R	S	MRMS	S	MSS
LRPB Sonic	AH	—	—	—	—	—	—	MSp
LRPB Vortex	APW	MSSp	SVSp [^]	—	S	—	MSS	MSS
Mace	AH (N)	S	S	MRMS	MSS	MRMS	MRMS	S
Magenta	APW	MS	MSS	SVS	MSS	MSS	S	MSS
Mammoth	APW	MRMS	SVSp [^]	—	MSS	—	MSS	S
Mowhawk	AH	—	MRp [^]	—	—	—	—	—
Ninja	ANW	MSS	MR	RMR	S	S	MS	S
RGT Marsh	AH (?)	—	MRp [^]	—	—	—	—	MSSp
RockStar	AH (N)	S	VS	MR	MRMS	MS	MSS	S
Rottnest	ANW	—	MRp [^]	—	—	—	—	—
Scepter	AH	S	MSS	MSS	S	MS	MRMS	MSS
Shotgun	AH	—	SVSp [^]	—	MSp	—	Rp	MSp
Splendid	ANW	—	RMRp [^]	—	—	—	—	—
Sting	AH	S	SVS	S	MS	MSS	MS	MSS
Thumper	AH	—	Sp [^]	—	S	MSSp	MSp	MSp
Tomahawk CL Plus	APW	MSSp	SVSp [^]	—	S	MSp	MRMS	MSS
Valiant CL Plus	AH	MRMS	Sp [^]	—	S	MSS	MSSp	S
Vixen	AH (N)	MSS	SVS	RMR	MRMS	MSS	MSS	S
Wallaroo	APW	MRMSp	RMRp [^]	—	—	—	—	MSS
Westonia	APW (N)	S	SVS	S	SVS	S	S	S
Yitpi	AH	MS	MR	S	MSS	MS	MR	S
Zen	ANW	S	MS	MR	MRMS	MRMS	S	S

(N) = supplementary classification of APWN, (?) = classification pending. ■ = new releases for 2026 season. ■ = 2025 releases.

VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant. Refer to page 4 for interpreting resistance classification.

No score '—' = no rating is currently available, p = provisional assessment, () = different response over east.

Use *P. neglectus* ratings as a guide only as not all varieties have been tested in WA. *P. quasitereoides* ratings are from DPIRD WA glasshouse and field trials.

† Cereal cyst nematode data from nvt.grdc.com.au

§ Crown rot ratings from SARDI, USQ and DPI NSW data.

[^] New flag smut ratings from DPIRD/GRDC - DAW2506-007RTX _ NGN: Improving Management of Flag Smut in Wheat and Loose Smut in Barley for Western Australian Growers.

Variety traits

**Brenda Shackley, Dion Nicol and
Jeremy Curry (DPIRD)**

Coleoptile length and seeding depth

Seeding into moisture at a seeding depth of 2–4 cm is the preferred option in WA to ensure quick establishment and maintain yield potential. However, with expanding seeding programs and increased variability in the timing and amount of autumn rainfall, dry seeding has dramatically increased in WA.

Avoid sowing deeper than 5 cm as this has the potential to delay and reduce emergence, causing weaker seedlings and an overall reduction in yield, even in varieties with a longer coleoptile (Table 18).

Longer coleoptiles can increase establishment rate if seeding depth increases (Table 18). The ability to establish wheat crops from seed placed deeper in the soil can be useful in situations where the soil surface is dry, but the subsurface is moist. Coleoptile length is influenced by factors other than variety, including seed size and source, temperature, soil water, certain seed dressings, and the type of coleoptile length assessment, as shown in Table 18. Generally, there is more scope to adjust seeding equipment for deep sowing that can impact establishment to a greater degree than the often-minor differences in coleoptile length in the mainstream varieties.

Varieties have inherently different coleoptile lengths. Table 21 provides a guide to the coleoptile group. Coleoptile groups are collectively identified as short (S), medium (M), long (L) or very long (VL).

- Very long coleoptile wheats similar to Halberd are now in various breeding programs.
- Varieties with long coleoptile lengths include Calibre, Cutlass, Magenta and Yitpi. Denison and Sting have a slightly shorter coleoptile, hence they are rated as M/L.
- The impact of deep sowing on grain yield depends on growing season conditions and whether lower plant density and vigour can be compensated for through increases in other yield components such as tiller number, grains per ear and grain weight.
- Increasing seeding rates can help partially reduce the yield penalty caused by reduced establishment with deeper sowing.
- Not all seeding systems are equal for deep sowing, so ensure depth is monitored as conditions change.

Physical grain quality

While low hectolitre weights (kg/hl) and high small grain screenings are largely environmentally driven and are typically within industry limits for WA, there are considerable differences in the risk profiles of individual varieties. In 2024 a higher proportion of trials and varieties in the WA NVT had hectolitre weights below 74kg/hl or screenings above 5 or 10% and summaries are presented in Tables 19 and 20.

Table 18: Coleoptile length (cm) and plant establishment of a range of varieties germinated on filter paper 'cigars' or sown at 10 cm at Katanning in 2021

Variety (Coleoptile group)	Coleoptile length (cm)		Establishment (m ²) at 10cm deep	Grain yield (t/ha)	
	Filter paper	Sown at 10 cm		at 10 cm deep	at 4 cm deep
DS Pascal (S)	6.3	4.9	27	2.3	4.4
Scepter (S/M)	7.5	5.5	31	2.5	5.0
Calibre (L)	8.5	6.7	48	3.0	4.9
Yitpi (L)	9.4	6.8	58	2.7	4.6
Halberd (VL)	12.3	7.8	100	3.3	4.2
Isd	–	–	30 (m ²)	0.5 (t/ha)	0.5 (t/ha)

Germination cabinet set at 15 °C and average soil temp was 14.7 °C for the 15 days from 'seeding' to measurement. Plant establishment determined at 21 days after sowing; sown on 5 May. Average establishment at 4 cm was 175 plants/m². Variable seed sources and grain weights.

To better summarise the risk of a variety to have a hectolitre weight below the industry standard of 74 kg/hl, the 2024 main season NVT single site data was analysed to identify the trend of a varieties hectolitre weight compared to the site mean and the trend was used to predict a varieties hectolitre weight at a site mean of 74 kg/hl. The standard error is also provided to account for the variation or error when comparing varieties. The average hectolitre weights for the

data analysed is also presented but this is less clear in indicating a varieties risk in conditions when hectolitre weights may be low.

AGT-Hamelin had the highest hectolitre weights but importantly showed much lower risks with a predicted weight of 77 kg/hl, and Firefly, Shotgun, and Thumper were higher risk of poor hectolitre weights in the 2024 season (Table 19).

Table 19: Predicted hectolitre weights at a site mean of 74 kg/hl based on variety trends in 2024 main season NVT. Mean hectolitre weight (kg/hl) of varieties in the 2024 NVT used

Variety	No. sites	Predicted hectolitre weight (kg/hl)	Standard error	Mean hectolitre weight (kg/hl)
AGT-Hamelin	44	76.9	0.2	79.8
Valiant CL Plus	44	75.9	0.4	78.5
Zen	43	75.7	0.2	78.3
LRPB Anvil CL Plus	44	75.7	0.4	78.3
Denison	44	75.4	0.3	78.4
Chief CL Plus	43	75.4	0.2	78.2
Hammer CL Plus	44	75.3	0.2	78.2
LRPB Sonic	43	75.3	0.3	78.5
Yitpi	44	75.2	0.3	77.9
RGT Marsh	44	75.1	0.3	78.1
LRPB Havoc	44	74.9	0.3	78.0
LRPB Vortex	44	74.7	0.2	77.8
Cutlass	44	74.7	0.4	77.3
AGT-Carnac	44	74.4	0.2	77.7
Mace	44	74.4	0.3	77.1
LRPB Avenger	44	74.3	0.3	77.2
Genie	21	74.2	0.4	78.4
Catapult	44	74.2	0.3	77.4
Scepter	44	74.1	0.3	77.6
Ninja	44	74.1	0.2	77.5
Sites mean	44	74.0		77.2
Tomahawk CL Plus	44	73.8	0.2	77.3
AGT-Colt	39	73.7	0.5	76.5
Kinsei	44	73.6	0.3	76.5
Vixen	44	73.5	0.3	76.6
Rottnest	44	73.5	0.3	77.3
Devil	44	73.4	0.3	76.7
Sting	44	73.4	0.3	76.7
Brumby	44	73.1	0.2	76.3
Splendid	44	73.0	0.2	76.7
Calibre	44	72.7	0.3	75.9
RockStar	44	72.7	0.3	76.3
Dozer CL Plus	44	72.3	0.3	75.9
Shotgun	44	71.8	0.3	75.8
Thumper	44	71.7	0.3	75.6
Firefly	43	71.4	0.4	75.3

Source: based on composite sample from single site data from NVT, nvt.grdc.com.au

■ = new releases for 2026 season. ■ = 2025 releases.

Note: Cadoux and Camamah were not included in the analysis. Several outliers were removed as shown in the number of data points for each variety.

In Table 20 the proportion of trials that had screenings under 5% and over 10% were used to determine the risk of an issue in 2024. Note that variations in cracked grain under the 2mm screen was not accounted for across sites or varieties. Varieties ranged from having over 83% of the sites with less than 5% such as LRPB Avenger, to Genie which had only 24% of the sites under 5% and nearly 50% had screenings over 10%. It should be noted that these sites for Genie were confined to Agzones 2, 3 and 6 which

are environment less conducive to screenings. A variety that tends to have a smaller grain size can be at more risk of screenings, but sometimes the trend deviates such as Cutlass, which had a lower average grain weight of 33mg but over 65% of the sites with screenings under 5%. Another example is Zen, the leading variety for low risk of small grain screenings has an average grain weight similar to Ninja which is slightly above average screenings risk.

Table 20: Average screenings (% , <2mm) of varieties in the 2024 NVT, the proportion of trials with less than 5% or greater than 10% and the average grain weight (mg)

Variety	Trial No.	Average screenings (%, <2mm)	% of trials		Grain weight (mg)
			(<5% screenings)	(>10% screenings)	
Genie	21	12.1	24	48	32
Thumper	46	8.2	48	26	35
Rottnest	46	7.7	50	24	36
Dozer CL Plus	46	7.6	50	17	34
Denison	46	7.4	57	28	34
Splendid	46	7.4	46	20	36
Firefly	46	7.2	50	20	36
Kinsei	46	7.0	54	22	34
AGT-Colt	40	7.0	55	25	32
Sting	46	7.0	61	13	36
Hammer CL Plus	46	6.8	54	17	34
LRPB Vortex	46	6.6	57	15	35
Ninja	46	6.6	54	15	36
Catapult	46	6.4	61	17	34
Brumby	46	6.3	59	15	36
Devil	46	6.2	65	15	37
Yitpi	46	6.2	59	20	34
Sites mean	46	5.9	63	11	36
Shotgun	46	6.1	65	13	37
Tomahawk CL Plus	46	6.0	63	13	38
LRPB Havoc	46	5.9	63	11	36
Calibre	46	5.9	61	9	37
LRPB Sonic	45	5.7	69	9	37
Mace	46	5.7	63	17	36
Scepter	46	5.5	67	11	38
RockStar	46	5.5	61	9	37
Cutlass	46	5.4	65	17	33
Vixen	46	5.2	70	11	36
Chief CL Plus	46	4.9	72	13	38
LRPB Avenger	46	4.8	83	11	38
AGT-Carnac	46	4.4	80	9	38
RGT Marsh	46	4.3	76	9	39
AGT-Hamelin	46	4.3	72	9	38
Valiant CL Plus	46	4.2	76	7	36
LRPB Anvil CL Plus	46	3.8	80	7	38
Zen	45	3.6	82	11	36

Source: based on composite sample from single site data from NVT, nvt.grdc.com.au

■ = new releases for 2026 season. ■ = 2025 releases.

Note: No adjustments made for variation in cracked grain below 2mm.

Black point

Black point ratings in Table 21 are sourced from NVT disease ratings. Black point assessments are also routinely conducted in the DPIRD wheat agronomy trials where it has been observed that Shotgun (Sp) and LRPB Vortex (S) had higher incidence of black point in 2024 than Thumper which is rated as SVSp. Incidence of black point is more prevalent with earlier sowing; hence it is recommended to avoid sowing these varieties in April to early May, particularly in area of higher black point incidence.

Falling number index

The falling number index (FNI) is a rating system that reflects the risk of a wheat variety exhibiting a low falling number at harvest (Table 21). The predominant cause of low falling number in wheat in Australia is pre-harvest sprouting, where mature grain begins to germinate in the paddock in response to rainfall. Enzymes produced during the germination process reduce the quality of the wheat for a range of end-uses, and the falling number test measures the activity of these enzymes. The falling number of a variety upon receipt will be influenced by the wheat variety grown, stage of maturity, timing and intensity of seasonal rainfall.

DPIRD has carried out research since 2013 to better understand the susceptibility of wheat varieties to low falling number, in response to both growing conditions and rainfall in the pre- and post-maturation period.

The FNI determines the risk of a variety exhibiting low falling number. On a 1–9 scale, the higher the rating the more likely a variety is to maintain falling number and the lower the risk of downgrade at grain delivery.

The pre-harvest sprouting (PHS) tolerance of Mace and Scepter (FNI of 5) has underpinned their widespread adoption across WA, even into areas of high PHS risk. With an FNI of 7, DS Pascal is considered the variety of lowest risk of PHS. Lower FNI ratings indicate varieties of higher risk of low falling number should harvest rainfall occur, with these varieties recommended for lower risk environments. The ratings were last updated with data from the 2022 season, for varieties including Calibre and Brumby (both rated 6p), Mowhawk (5), Sting (4p), and LRPB Anvil and Valiant CL Plus (both 2/3p).

DPIRD research found crops that mature earlier (such as spring wheats sown in April) have a higher risk of low falling number and black point.

DPIRD's current research is investigating the interactions between genetic resistance, environmental conditions, and maturity stage, to inform pre-harvest sprouting management.

Below: Jeremy Curry checking wheat heads to be tested for falling number



Table 21: Black point ratings, falling number index and coleoptile group of wheat varieties in 2025

Variety	Black point	Falling number index	Coleoptile Group
AGT-Hamelin	–	–	Mp
Brighton	MS	–	–
Brumby	MSS	6p	M
Calibre	MSS	6p	L
Catapult	S	6	M
Chief CL Plus	MS	4	M
Cutlass	MS	4	L
Denison	MS	5	M/L
Devil	MSS	3	M
Dozer CL Plus	MRMS	–	M/Lp
DS Bennett	MSS	–	M
DS Pascal	MS	7	S
Firefly	S	–	Mp
Genie	MS	–	M/Lp
Hammer CL Plus	MRMS	4	M
Illabo	MRMS	5	M
Kinsei	S	4	M
LRPB Anvil CL Plus	S	2/3p	M
LRPB Avenger	MRMS	5p	–
LRPB Havoc	MS	3	–
LRPB Sonic	Sp	–	–
LRPB Vortex	S	–	M
Mace	MRMS	5	M
Magenta	MSS	3	L
Mammoth	MS	–	M
Mowhawk	–	5	M
Ninja	MRMS	4	S
RGT Marsh	MSp	–	–
Rockstar	MSS	2	M
Rottnest	–	–	Mp
Scepter	MS	5	S/M
Shotgun	Sp	–	Mp
Sting	S	4p	M/L
Thumper	SVSp	–	M
Tomahawk CL Plus	S	–	M
Valiant CL Plus	MRMS	2/3p	M
Vixen	MSS	3	M
Wallaroo	MS	–	Lp
Westonia	MS*	2	M
Wyalkatchem	MS*	3	S
Yitpi	MS	5	L
Zen	MRMS	3	S

Black point ratings are sourced from NVT disease ratings, nvt.grdc.com.au

■ = new releases for 2026 season. ■ = 2025 releases.

* = black point ratings not updated.

Coleoptile groups are collectively identified as short (S), medium (M), long (L) or very long (VL). Coleoptile groups are based on filter paper 'cigars' germinated at 15 °C for 15 days. Groups combine information previously supplied as part of an NVT project, and DPIRD research in 2024.

p = provisional rating based upon a single year of data and limited data – results should be treated with caution.

Variety snapshots

Brenda Shackley, Jeremy Curry and Dion Nicol (DPIRD)

Variety snapshots are presented for 26 varieties in order of quality classification.

Each snapshot includes a summary of the essential characteristics of a variety and its key strengths and weaknesses. Grain yields relative to Scepter for each year between 2020 and 2024 for each Agzone are presented (extracted from nvtonline.com.au) and disease ratings are from Table 17. Comments on grain quality are directed to Tables 19 and 20.

Flowering information is sourced from DPIRD experiments in 2020, 2021, 2022, 2023 and 2024, and from NVT sites when other data is not available. All information is presented relative to Scepter.

Variety information including pedigree, seed licensee, seed trading restrictions and end point royalty (EPR) payable is sourced from breeding companies and Variety Central (varietycentral.com.au).

If you are seeking information for any varieties not included in the snapshots, please consult varietycentral.com.au, nvt.grdc.com.au or the respective breeding company.

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AGT-Colt[Ⓛ]

AH

Comments

AGT-Colt, released in 2025, is a potentially slow maturity AH. AGT-Colt has only been included in the main and early season NVT since 2024 where it has yielded approximately 89% of Scepter or 97% of Denison respectively. It has potentially the most robust leaf disease package for the mid-slow and slow maturity groups with an R for stripe rust, MR_p for stem rust, leaf rust and powdery mildew. Yellow spot is MRMS_p. AGT-Colt may display the 'Mace yellows' which is a physiological symptom not a disease. The 2024 NVT grain quality data suggests that AGT-Colt may have a higher risk of screenings, similar to Kinsei but less than Denison.

Yield (% of Scepter)	2024	Yield (% of Denison)	2024
Agzone 1	–	Early sown NVT	–
Agzone 2	89		95
Agzone 3	92		95
Agzone 4	80		89
Agzone 5	92		105
Agzone 6	93		95
Disease resistance	Adult rating		
Yellow spot	MRMS _p		
Nodorum blotch (leaf)	–		
Nodorum blotch (glume)	–		
Septoria tritici blotch	–		
Stem rust	MR _p		
Stripe rust	R		
Leaf rust	MR _p		
Powdery mildew	MR _p		
Flag smut	MR _p		
Common bunt	–		
RLN (<i>P. quasitereoides</i>)	–		
RLN (<i>P. neglectus</i>)	–		
CCN	–		
Crown rot	–		
Flowering	Days after/before Scepter		
2024 NVT			
Northern	+13		
Great Southern	+11		
Agronomic traits			
Coleoptile group	–		
Black point	–		
Falling number index	–		
Maturity	Slow _p		
Variety information			
Pedigree	–		
Breeder/Seed licensee	AGT		
Access to seed	AGT Affiliates, retailers, or Seed Sharing		
EPR (\$/t, excl GST)	\$3.90		

p = provisional rating

Refer to page 4 for interpreting resistance classification.

AGT-Hamelin[Ⓛ]

AH

Comments

AGT-Hamelin, released in 2025, is a potentially slow AH. It has only been included in the main and early season NVT since 2024, where it has yielded similar to RockStar or slightly higher in the earlier sowing NVT respectively. AGT-Hamelin potentially has a maturity between Catapult and Denison. Provisionally, AGT-Hamelin has a more robust disease package than RockStar, Catapult and Denison, with a higher leaf rust rating of MR_p and MSS_p to powdery mildew. Other ratings are MRMS_p for stem rust and yellow spot, and MR for stripe rust. The 2024 NVT grain quality data suggests that AGT-Hamelin has one of the better grain packages similar to Valiant CL Plus.

Yield (% of Scepter)	2024	Yield (% of Denison)			2024
Agzone 1	101	Early sown NVT			–
Agzone 2	101				106
Agzone 3	103				101
Agzone 4	94				109
Agzone 5	101				94
Agzone 6	102				100
Disease resistance	Adult rating				
Yellow spot	MRMS _p				
Nodorum blotch (leaf)	–				
Nodorum blotch (glume)	–				
Septoria tritici blotch	–				
Stem rust	MRMS _p				
Stripe rust	MR				
Leaf rust	MR _p				
Powdery mildew	MSS _p				
Flag smut	SVS _p				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	–				
CCN	–				
Crown rot	–				
Flowering	Days after/before Scepter				
2024 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+31	+27	+15	+10	+8
Merredin	+26	+8	+7	+8	+8
Katanning	+9	+13	+5	+1	–
Mt Burdett	+17	+10	+10	+6	–
Agronomic traits					
Coleoptile group	Medium (<i>p</i>)				
Black point	–				
Falling number index	–				
Maturity	Slow _p				
Variety information					
Pedigree	–				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers, or Seed Sharing				
EPR (\$/t. excl GST)	\$3.90				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Calibre^(b)

AH

Comments

Calibre was the first Scepter cross released by AGT in 2021. It is a quick-mid maturing AH variety with a longer coleoptile than its parent Scepter (similar to Cutlass). Calibre has been included in the NVT since 2020, yielding similarly to or slightly higher than Scepter, and competitive with Vixen, RockStar, Devil and the new releases such as Tomahawk CL Plus, Thumper, LRPB Vortex, RGT Marsh and Shotgun across the various Agzones. Calibre is MSS to powdery mildew, which is higher than Vixen and Devil, while LRPB Vortex is MS and Brumby is R, the highest rating among the quick-mid and mid maturity groups. Preliminary data indicates that Calibre has a slightly higher rating than Scepter for pre-harvest sprouting.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	101	97	101	101	98
Agzone 2	102	99	103	103	100
Agzone 3	100	103	100	102	102
Agzone 4	100	99	102	106	98
Agzone 5	102	102	101	102	103
Agzone 6	99	98	100	102	103
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MS				
Nodorum blotch (glume)	MSS				
Septoria tritici blotch	S				
Stem rust	MR				
Stripe rust	RMR				
Leaf rust	S				
Powdery mildew	MSS				
Flag smut	Sp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	MRMSp				
RLN (<i>P. neglectus</i>)	S				
CCN	MRMS				
Crown rot	S				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	0	+1	-2	-1	-3
Merredin	-2	-1	-2	-2	-1
Katanning	-2	-2	-4	-2	-
Mt Burdett/Grass Patch	-2	-5	-1	-1	-
Agronomic traits					
Coleoptile group	Long				
Black point	MSS				
Falling number index	6p				
Maturity	Quick-mid				
Variety information					
Pedigree	Derived from a Scepter cross				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers, or Seed Sharing				
EPR (\$/t, excl GST)	\$3.50				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Catapult^(b)

AH

Comments

Catapult is a mid-slow maturity AH variety released by AGT in 2019. Catapult yields slightly higher than Denison, but lower than Scepter, RockStar and Brumby in the main season trials. In the early season NVT, Catapult is lower yielding than Denison, but similar to Valiant CL Plus, Cutlass and Kinsei. Catapult is rated S to leaf rust and powdery mildew. With a falling number rating of 6, Catapult has a lower risk of pre-harvest sprouting. In good growing conditions, Catapult can exhibit a speckling on the leaves or what has previously been known as 'Mace yellows'. This is not a disease but a physiological response, which typically has no effect on yield.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	98	92	101	94	94
Agzone 2	94	93	100	92	96
Agzone 3	96	98	98	97	98
Agzone 4	91	91	99	91	90
Agzone 5	89	94	95	93	97
Agzone 6	96	94	99	94	97
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MS				
Septoria tritici blotch	MSS				
Stem rust	MR				
Stripe rust	RMR				
Leaf rust	S				
Powdery mildew	S				
Flag smut	RMR				
Common bunt	MRMS				
RLN (<i>P. quasitereoides</i>)	MRMS				
RLN (<i>P. neglectus</i>)	S				
CCN	R				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	13	+19	+11	+9	6
Merredin	+9	+7	+7	+6	+3
Katanning	+10	+10	+5	3	–
Mt Burdett/Grass Patch	+12	+7	+5	+2	–
Agronomic traits					
Coleoptile group	Medium				
Black point	S				
Falling number index	6				
Maturity	Mid-slow				
Variety information					
Pedigree	Mace/Corack				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers, or Seed Sharing				
EPR (\$/t, excl GST)	\$3.25				

Refer to page 4 for interpreting resistance classification.

Devil[Ⓛ]

AH (N)

Comments

Devil is a quick-mid maturity AH (N) variety which was released in 2018. Devil yields similar to Scepter. Devil has been recently downgraded to S for stem rust and remains SVS to the latest leaf rust pathotype and powdery mildew. DPIRD trials suggest that Devil has different maturity triggers to Scepter, resulting in earlier flowering when sown in April or in the northern regions. Devil has a falling number rating of 3, so is not recommended for areas prone to pre-harvest sprouting.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	101	99	103	101	100
Agzone 2	100	100	103	100	101
Agzone 3	101	102	102	102	102
Agzone 4	98	99	103	100	98
Agzone 5	99	101	101	100	102
Agzone 6	102	101	102	101	102
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MS				
Septoria tritici blotch	SVS				
Stem rust	S				
Stripe rust	RMR				
Leaf rust	SVS				
Powdery mildew	SVS				
Flag smut	SVS				
Common bunt	MR				
RLN (<i>P. quasitereoides</i>)	MRMS				
RLN (<i>P. neglectus</i>)	MSS				
CCN	MSS				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2020 & 2021 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	-3	-3	-3	-1	-1
Merredin	+1	-2	-2	+0	-
Katanning	-4	-1	-1	+0	-
South East	-4	-2	-1	-	-1
Agronomic traits					
Coleoptile group	Medium				
Black point	MSS				
Falling number index	3				
Maturity	Quick-mid				
Variety information					
Pedigree	IGW3110/Mace				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST)	\$3.50				

(N) = supplementary classification of APWN

Refer to page 4 for interpreting resistance classification.

Hammer CL Plus[Ⓛ]

AH (N)

Comments

Hammer CL Plus is an AH (N) variety that is tolerant to imidazolinone (IMI) and was released in 2020 by AGT. Hammer CL Plus has been included in the WA NVT since 2020, where it yielded 6–7% lower than Scepter depending on the Agzone. The recently released Tomahawk CL Plus is now the highest yielding IMI-tolerant variety, yielding on average 11% higher than Hammer CL Plus. Both are similar in maturity but Tomahawk CL Plus is an APW. Hammer CL Plus is closely related to Mace, with a similar maturity. A disadvantage with Hammer is that it may be prone to lodging compared to other IMI-tolerant varieties. Hammer CL Plus is rated RMR for stripe rust, MR for stem rust, and S for leaf rust and powdery mildew. It is registered for label rate applications of Intervix® herbicide.

Note: There are now grower-to-grower sales permitted for CL Plus varieties.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	95	93	92	94	93
Agzone 2	94	93	92	94	94
Agzone 3	93	93	91	94	93
Agzone 4	94	93	93	94	94
Agzone 5	93	91	93	94	94
Agzone 6	92	93	93	93	93
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MRMS				
Septoria tritici blotch	MSS				
Stem rust	MR				
Stripe rust	RMR				
Leaf rust	S				
Powdery mildew	S				
Flag smut	RMR				
Common bunt	RMR				
RLN (<i>P. quasitereoides</i>)	MS				
RLN (<i>P. neglectus</i>)	MSS				
CCN	MRMS				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2020 & 2021 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	-	-3	-1	+1	-
Merredin	-1	-2	-3	-2	+0
Katanning	-4	-4	-3	-	+0
Grass Patch	-2	-3	+1	-2	-
Agronomic traits					
Coleoptile group	Medium				
Black point	MRMS				
Falling number index	4				
Maturity	Quick-mid				
Variety information					
Pedigree	Clearfield donor backcrossed to Mace derivative				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates or retailers.				
EPR (\$/t, excl GST)	\$4.25				

(N) = supplementary classification of APWN

Refer to page 4 for interpreting resistance classification.

LRPB Anvil[Ⓛ] CL Plus

AH

Comments

LRPB Anvil CL Plus was released by LongReach in 2022, as a quick maturity AH IMI-tolerant variety. It has been included in the WA NVT since 2020, previously achieving the highest yields of the IMI-tolerant varieties until the latest release of Tomahawk CL Plus in 2023, which yields approximately 10% higher. It is lower yielding than Scepter, particularly in the soft finish of 2022. LRPB Anvil CL Plus appears more suited to the terminal drought conditions in the low to medium rainfall areas of WA. LRPB Anvil CL Plus has a similar stem and stripe rust profile to Tomahawk CL Plus and Hammer CL Plus, but is weaker for leaf rust and yellow spot. LRPB Anvil CL Plus is rated S for black point and has a falling number index rating of 2/3p, so is at risk of grain being downgraded if the conditions are conducive for black point or sprouting. The 2024 NVT grain quality data indicates that LRPB Anvil CL Plus has a low risk of screenings. Registered for label rate applications of Intervix[®] herbicide. *Note: Grower-to-grower sales are permitted for CL Plus varieties, please contact the seed distributor for further information.*

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	100	85	94	96
Agzone 2	97	96	88	98	92
Agzone 3	–	92	88	94	91
Agzone 4	102	100	90	103	99
Agzone 5	102	94	91	99	92
Agzone 6	–	92	86	95	92
Disease resistance	Adult rating				
Yellow spot	MSS				
Nodorum blotch (leaf)	MSS				
Nodorum blotch (glume)	MSS				
Septoria tritici blotch	SVS				
Stem rust	MR				
Stripe rust	RMR				
Leaf rust	SVS				
Powdery mildew	S				
Flag smut	–				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	MSSp				
RLN (<i>P. neglectus</i>)	MSS				
CCN	MS				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2023 & 2022 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	–	-11	-12	-8	–
Merredin	–	-9	-10	-4	-5
Katanning	–	-8	-9	–	-2
Grass Patch	–	-14	-9	-3	–
Agronomic traits					
Coleoptile group	Medium				
Black point	S				
Falling number index	2/3p				
Maturity	Quick				
Variety information					
Pedigree	Mace background				
Breeder/Seed licensee	LongReach Plant Breeders				
Access to seed	Seed associate network.				
EPR (\$/t, excl GST)	\$4.25				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

LRPB Sonic[Ⓛ]

AH

Comments

LRPB Sonic was released by LongReach in 2025 with 2024 the first year in NVT. In 2024 LRPB Sonic has performed similarly to the highest overall yielding varieties LRPB Vortex and Tomahawk CL Plus, but the limited results need to be reviewed with the addition of the 2025 results. LRPB Sonic is potential a quick-mid maturity, slightly quicker than Scepter. It has a slightly weaker resistance to stem rust (MSp) than other varieties in the maturity group however it provisionally has the highest leaf rust resistance (MRMSP) and an improved powdery mildew resistance (MSSp). The 2024 NVT grain quality data indicates that LRPB Sonic has potential better grain quality than LRPB Vortex and Tomahawk CL Plus.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	106
Agzone 2	–	–	–	–	103
Agzone 3	–	–	–	–	103
Agzone 4	–	–	–	–	105
Agzone 5	–	–	–	–	102
Agzone 6	–	–	–	–	104
Disease resistance	Adult rating				
Yellow spot	MRMSP				
Nodorum blotch (leaf)	MRMSP				
Nodorum blotch (glume)	MSp				
Septoria tritici blotch	–				
Stem rust	MSp				
Stripe rust	MRp				
Leaf rust	MRMSP				
Powdery mildew	MSSp				
Flag smut	–				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	–				
CCN	–				
Crown rot	MSp				
Flowering	Days after/before Scepter				
2024 NVT					
Mullewa	-1				
Merredin	-2				
Agronomic traits					
Coleoptile group	–				
Black point	Sp				
Falling number index	–				
Maturity	Quick-mid				
Variety information					
Pedigree	Cobra background				
Breeder/Seed licensee	LongReach Plant Breeders				
Access to seed	Seed associate network.				
EPR (\$/t, excl GST)	\$4.00				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

RGT Marsh^(b)**AH (pending classification)****Comments**

RGT Marsh was released in 2025 by RAGT Australia with its classification as AH pending until 2026. RGT Marsh has been in NVT since 2023 where it has yielded similar to Scepter, Calibre, Devil, Thumper, Brumby and Vixen. RGT Marsh is a potential quick-mid maturity. RGT Marsh has a similar provisional disease package to Scepter, except for a slightly lower yellow spot rating of MSS. New data suggests a provisional rating of MRp for flag smut. The 2024 NVT grain quality data indicates that RGT Marsh has potentially a similar grain quality profile to Scepter.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	102	99
Agzone 2	–	–	–	103	101
Agzone 3	–	–	–	101	101
Agzone 4	–	–	–	105	101
Agzone 5	–	–	–	103	102
Agzone 6	–	–	–	102	101
Disease resistance	Adult rating				
Yellow spot	MSS				
Nodorum blotch (leaf)	MRMSp				
Nodorum blotch (glume)	MRMSp				
Septoria tritici blotch	–				
Stem rust	MRMSp				
Stripe rust	RMR				
Leaf rust	MSS				
Powdery mildew	Sp				
Flag smut	MRp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	–				
CCN	–				
Crown rot	MSSp				
Flowering	Days after/before Scepter				
2024 NVT					
Northern	-2				
Great Southern	+1				
Agronomic traits					
Coleoptile group	–				
Black point	MSSp				
Falling number index	–				
Maturity	Quick-mid				
Variety information					
Pedigree	–				
Breeder/Seed licensee	RAGT Australia				
Access to seed	RAGT Seed partners in WA				
EPR (\$/t, excl GST)	\$4.00				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

RockStar^(b)**AH (N)****Comments**

RockStar is a mid-slow AH (N) variety released in 2019 by InterGrain. It has yielded similar to Scepter and higher than other mid-slow or slow alternatives such as Catapult, Cutlass, Denison, Kinsei and Valiant CL Plus in main season NVT. RockStar yields approximately 4% lower than Denison in the early season NVT. RockStar has different maturity triggers from other mid-slow or slow varieties, such as Denison; caution is recommended if sown in April. RockStar is rated MRMS to *P. neglectus* but S to leaf rust and VS to flag smut. RockStar has a falling number rating of 2, so a higher risk to pre-harvest sprouting, particularly with earlier sowing.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	101	99	107	99	100
Agzone 2	97	100	105	95	101
Agzone 3	102	103	106	102	103
Agzone 4	94	97	104	92	95
Agzone 5	94	100	101	95	101
Agzone 6	104	104	105	99	102
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MRMS				
Septoria tritici blotch	S				
Stem rust	MRMS				
Stripe rust	RMR				
Leaf rust	S				
Powdery mildew	MSS				
Flag smut	VS				
Common bunt	MR				
RLN (<i>P. quasitereoides</i>)	MS				
RLN (<i>P. neglectus</i>)	MRMS				
CCN	MSS				
Crown rot	S				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+10	+8	+5	+5	3
Merredin	+5	+3	+3	+3	+2
Katanning	+7	+6	+4	+1	–
Grass Patch	+5	+5	+5	+1	–
Agronomic traits					
Coleoptile group	Medium				
Black point	MSS				
Falling number index	2				
Maturity	Mid-slow				
Variety information					
Pedigree	IGW3119/Mace/IGW3176				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST)	\$3.50				

(N) = supplementary classification of APWN

Refer to page 4 for interpreting resistance classification.

Scepter^{db}

AH

Comments

Scepter, released in 2015, remains the yield benchmark in WA NVT, although it is similar in yield to Calibre and Devil, and slightly lower in yield than Vixen in Agzones 4 and 5. LRPB Vortex and Tomahawk CL Plus have had 3 years in NVT, where they have averaged 4% higher than Scepter. Scepter is rated MSS to the latest strain of leaf rust, which is an advantage over Tomahawk CL Plus, Calibre, Devil, Vixen, LRPB Vortex and Sting, which are rated S to SVS. Scepter has a similar pre-harvest sprouting resistance to Calibre (5 vs 6p), but its powdery mildew rating is S compared to MSS for Calibre and Shotgun, MS for LRPB Vortex and R for Brumby. Due to a consistent increase in yield, grain protein is on average lower for this variety and additional nitrogen may benefit yield and protein performance.

Yield (% of Tomahawk CL Plus)	2020	2021	2022	2023	2024
Agzone 1	–	–	98	96	98
Agzone 2	–	–	97	96	97
Agzone 3	–	–	98	96	96
Agzone 4	–	–	97	94	96
Agzone 5	–	–	96	96	96
Agzone 6	–	–	98	96	96
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MSS				
Septoria tritici blotch	S				
Stem rust	MRMS				
Stripe rust	RMR				
Leaf rust	MSS				
Powdery mildew	S				
Flag smut	MSS				
Common bunt	MSS				
RLN (<i>P. quasitereoides</i>)	MS				
RLN (<i>P. neglectus</i>)	S				
CCN	MRMS				
Crown rot	MSS				
Flowering	Days after/before Tomahawk CL Plus				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	-1	-3	-1	-1	+1
Merredin	-1	-1	-1	-1	+1
Katanning	+2	+2	+2	+1	–
Gibson	–	+0	-1	+1	–
Agronomic traits					
Coleoptile group	Short/Medium				
Black point	MS				
Falling number index	5				
Maturity	Quick–mid				
Variety information					
Pedigree	RAC1480/2*Mace				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers or Seed Sharing				
EPR (\$/t, excl GST)	\$3.25				

Refer to page 4 for interpreting resistance classification.

Shotgun^{db}

AH

Comments

Shotgun is a quick–mid AH variety released in 2024 by AGT. Shotgun was included in only half of the NVT sites for the first time in 2023 and then all NVT sites in 2024, where overall it is yielding 2% higher than Scepter but 2% lower than LRPB Vortex and Tomahawk CL Plus. Shotgun's disease package is similar to Scepter, with MRMS for stem rust and yellow spot, RMR for stripe rust and MSS for leaf rust. Shotgun is an MSSp for powdery mildew compared to S for Scepter and it has a better resistance to *P. neglectus* and CCN than Scepter. Shotgun is Sp for black point with issues noted in the early sown DPIRD's trials at Mullewa and Katanning. New flag smut rating are a provisional SVSp. The 2024 NVT grain quality data indicates that Shotgun has similar grain quality profile to Calibre, where lower hectolitre weights may be an issue.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	99
Agzone 2	–	–	–	–	102
Agzone 3	–	–	–	103	104
Agzone 4	–	–	–	103	99
Agzone 5	–	–	–	102	104
Agzone 6	–	–	–	102	105
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMSp				
Nodorum blotch (glume)	MSSp				
Septoria tritici blotch	–				
Stem rust	MRMS				
Stripe rust	RMR				
Leaf rust	MSS				
Powdery mildew	MSSp				
Flag smut	SVSp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	MSp				
CCN	Rp				
Crown rot	MSp				
Flowering	Days after/before Scepter				
2024 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	–	+1	-3	-1	-1
Merredin	–	-2	-3	-1	-2
Katanning	–	+0	-1	-2	–
Gibson	–	+0	+0	+0	–
Agronomic traits					
Coleoptile group	Medium (p)				
Black point	Sp				
Falling number index	–				
Maturity	Quick–mid				
Variety information					
Pedigree	–				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers or Seed Sharing				
EPR (\$/t, excl GST)	\$3.90				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Thumper^ϕ

AH

Comments

Thumper is an AH wheat variety released by InterGrain in 2023. It is a quick-mid maturity which was included in the NVT for the first time in 2023 where it has yielded similarly to Scepter depending on the Agzone. Thumper has one of the highest leaf rust rating, MSS, in its maturity group, but only MS for stem rust and MRMS for yellow spot, and Sp for powdery mildew. Stripe rust is RMR but it is rated SVSp for black point so recommended to avoid sowing early and areas prone to black point. Thumper also has a new provisional rating of Sp for flag smut. The 2024 NVT grain quality data indicates that Thumper has a high risk of screenings and achieving lower hectolitre weights.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	100	99
Agzone 2	–	–	–	99	101
Agzone 3	–	–	–	103	103
Agzone 4	–	–	–	98	95
Agzone 5	–	–	–	98	103
Agzone 6	–	–	–	101	104
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMSp				
Nodorum blotch (glume)	Sp				
Septoria tritici blotch	–				
Stem rust	MS				
Stripe rust	RMR				
Leaf rust	MSS				
Powdery mildew	Sp				
Flag smut	Sp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	MSSp				
RLN (<i>P. neglectus</i>)	S				
CCN	MSp				
Crown rot	MSp				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+1	+1	+2	+1	-1
Merredin	+1	+0	+1	+1	-1
Katanning	+0	+0	+0	+0	–
Grass Patch	+1	+2	+2	+0	–
Agronomic traits					
Coleoptile group	Medium				
Black point	SVSp				
Falling number index	–				
Maturity	Quick-mid				
Variety information					
Pedigree	–				
Breeder/Seed licensee	InterGrain				
Access to seed	InterGrain Seed Club members or seed retailers. Free to trade				
EPR (\$/t, excl GST)	\$3.50				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Vixen^ϕ

AH (N)

Comments

Vixen is a quick maturity AH (N) variety released in 2018 by InterGrain. Yields are higher than Scepter in Agzones 4 and 5 and slightly lower in Agzone 6. Despite its quick maturity, Vixen is a very competitive variety; however, it performs better with later sowing and terminal drought compared to the softer finish in 2022. Vixen is rated MRMS to stem and MR to stripe rust but SVS to the latest strain of leaf rust, powdery mildew and flag smut. Vixen has a falling number rating of 3, so it is not recommended for areas prone to pre-harvest sprouting.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	98	103	95	101	101
Agzone 2	103	103	98	105	99
Agzone 3	99	101	98	101	99
Agzone 4	105	104	99	108	103
Agzone 5	106	102	99	104	101
Agzone 6	97	99	95	102	101
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MS				
Nodorum blotch (glume)	MSS				
Septoria tritici blotch	MSS				
Stem rust	MRMS				
Stripe rust	MR				
Leaf rust	SVS				
Powdery mildew	SVS				
Flag smut	SVS				
Common bunt	RMR				
RLN (<i>P. quasitereoides</i>)	MSS				
RLN (<i>P. neglectus</i>)	MRMS				
CCN	MSS				
Crown rot	S				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	–	-16	-12	-7	-7
Merredin	–	-14	-11	-4	-5
Katanning	–	-10	-11	-4	–
Grass Patch	–	-11	-7	-4	–
Agronomic traits					
Coleoptile group	Medium				
Black point	MSS				
Falling number index	3				
Maturity	Quick				
Variety information					
Pedigree	Mace/IGW3119				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST)	\$3.50				

(N) = supplementary classification of APWN

Refer to page 4 for interpreting resistance classification.

Brumby^(b)

APW (N)

Comments

Brumby is an APW (N) variety released by InterGrain in 2022. Brumby was included in the WA NVT for the first time in 2021, where it yields similar to RockStar and Scepter. Brumby's maturity has varied over the years tested, from a mid-slow maturity similar to RockStar to a mid in 2023. A key attribute of Brumby is its powdery mildew resistance of R*, with ratings of RMR for stripe rust, MR for stem rust but SVS for leaf rust. Brumby currently has a provisional rating of 6p for pre-harvest sprouting, similar to Catapult, which has the highest rating for the more recently released wheat varieties grown in WA. Brumby has a new provisional rating of SVSp for flag smut.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	99	105	101	100
Agzone 2	–	101	104	100	102
Agzone 3	–	103	104	102	103
Agzone 4	–	99	104	99	98
Agzone 5	–	102	102	100	103
Agzone 6	–	102	103	101	103
Disease resistance		Adult rating			
Yellow spot		MRMS			
Nodorum blotch (leaf)		MRMS			
Nodorum blotch (glume)		MS			
Septoria tritici blotch		MSSp			
Stem rust		MR			
Stripe rust		RMR			
Leaf rust		SVS			
Powdery mildew		R*			
Flag smut		SVSp			
Common bunt		–			
RLN (<i>P. quasitereoides</i>)		MSp			
RLN (<i>P. neglectus</i>)		MRMS			
CCN		MRMS			
Crown rot		S			
Flowering		Days after/before Scepter			
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+4	+4	+3	+3	+1
Merredin	+3	+1	+3	+3	+2
Katanning	+3	+7	+2	+2	–
Grass Patch	+3	+2	+3	-1	–
Agronomic traits					
Coleoptile group		Medium			
Black point		MSS			
Falling number index		6p			
Maturity		Mid			
Variety information					
Pedigree		–			
Breeder/Seed licensee		InterGrain			
Access to seed		InterGrain Seed Club members or seed retailers. Free to trade			
EPR (\$/t, excl GST)		\$3.50			

(N) = supplementary classification of APWN, p = provisional rating,
 * = some other races can attack these varieties
 Refer to page 4 for interpreting resistance classification.

Denison^(b)

APW

Comments

Denison is a slow maturing APW variety released by AGT in 2020. In the main season NVT, Denison yields about the same to 11% lower than Scepter, depending on the Agzone and season, and slightly lower than mid-slow varieties like Catapult. Overall Denison is the highest yielding varieties in the early season NVT, except in Agzone 4. Denison is rated S to leaf rust and powdery mildew. Denison has a good pre-harvest sprouting rating compared to Cutlass but may be at more risk to screenings so avoid sowing later in May.

Yield (% of Scepter)	Av.	Yield (% of Catapult)		Av.	
Agzone 1	97	Early sown NVT		107	
Agzone 2	94			103	
Agzone 3	100			105	
Agzone 4	89			106	
Agzone 5	92			107	
Agzone 6	97			106	
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MR				
Nodorum blotch (glume)	MRMS				
Septoria tritici blotch	MS				
Stem rust	MS				
Stripe rust	MR				
Leaf rust	S				
Powdery mildew	S				
Flag smut	MR _p				
Common bunt	MR _p				
RLN (<i>P. quasitereoides</i>)	MRMS _p				
RLN (<i>P. neglectus</i>)	S				
CCN	MS				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+13	+19	+11	+9	+6
Merredin	+18	+13	+11	+11	+6
Katanning	+22	+17	+8	+6	–
Grass Patch	+25	+15	+10	+7	–
Agronomic traits					
Coleoptile group	Medium/Long				
Black point	MS				
Falling number index	5				
Maturity	Slow				
Variety information					
Pedigree	Complex cross with Mace and Corack as key parents				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers or Seed Sharing				
EPR (\$/t, excl GST)	\$3.40				

p = provisional rating
 Refer to page 4 for interpreting resistance classification.

Dozer CL Plus^(b)

APW (N)

Comments

Dozer CL Plus was released by InterGrain in 2023 as a quick-mid APW (N) IMI-tolerant variety. It was included in selected NVTs in 2021 and later in the 2023 and 2024 NVT, where it has yielded approximately 5% lower than Scepter and 9% lower than Tomahawk CL Plus. Dozer has a similar leaf rust rating to Tomahawk CL Plus (S) but it has lower ratings for stem rust (MS), stripe rust (MRMS) and powdery mildew (S) than many of the recent IMI-tolerant wheat releases. Dozer is registered for label rate applications of Intervix[®] herbicide.

Note: There are now grower-to-grower sales permitted for CL Plus varieties.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	91	–	95	92
Agzone 2	–	93	–	95	95
Agzone 3	–	–	–	96	95
Agzone 4	–	92	–	97	92
Agzone 5	–	–	–	95	96
Agzone 6	–	–	–	95	96
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MSS				
Septoria tritici blotch	MSSp				
Stem rust	MS				
Stripe rust	MRMS				
Leaf rust	S				
Powdery mildew	S				
Flag smut	SVSp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	MSSp				
RLN (<i>P. neglectus</i>)	MRMS				
CCN	MS				
Crown rot	S				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+4	+1	-1	+0	-3
Merredin	-2	-1	-1	+0	-1
Katanning	-1	-1	+0	-1	–
Grass Patch	+2	-1	-1	-1	–
Agronomic traits					
Coleoptile group	Medium/Long (p)				
Black point	MRMS				
Falling number index	–				
Maturity	Quick-mid				
Variety information					
Pedigree	–				
Breeder/Seed licensee	InterGrain				
Access to seed	InterGrain Seed Club members or seed retailers				
EPR (\$/t, excl GST)	\$3.90				

(N) = supplementary classification of APWN, p = provisional rating
Refer to page 4 for interpreting resistance classification.

LRPB Vortex^(b)

APW

Comments

LRPB Vortex was released by LongReach in 2024. It is an APW with a different genetic background from Scepter. DPIRD data suggests that LRPB Vortex is mid maturity, slightly longer than Scepter, however yield performance does not necessarily support early sowing with best NVT results in later May with high yield potential. LRPB Vortex has been included in the WA NVT since 2022, where it is now the highest yielding alongside Tomahawk CL Plus. LRPB Vortex tends to do better in higher yielding environments than Tomahawk CL Plus. Disease ratings are SVS for leaf rust and flag smut, RMR for stripe rust and MRMS for stem rust and yellow spot and MS for powdery mildew.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	108	102	106
Agzone 2	–	–	107	101	103
Agzone 3	–	–	110	106	105
Agzone 4	–	–	106	98	102
Agzone 5	–	–	103	100	104
Agzone 6	–	–	104	103	105
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MS				
Septoria tritici blotch	MSSp				
Stem rust	MRMS				
Stripe rust	RMR				
Leaf rust	SVS				
Powdery mildew	MS				
Flag smut	SVSp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	S				
CCN	MSS				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+14	+16	+5	+5	+2
Merredin	+8	+2	+4	+2	+2
Katanning	+6	+4	+2	+0	–
Grass Patch	+7	+3	+3	+0	–
Agronomic traits					
Coleoptile group	Medium				
Black point	S				
Falling number index	–				
Maturity	Mid				
Variety information					
Pedigree	–				
Breeder/Seed licensee	Longreach				
Access to seed	Grower-to-grower trading allowed				
EPR (\$/t, excl GST)	\$3.50				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Tomahawk CL Plus[Ⓛ]

APW

Comments

Tomahawk CL Plus is an APW variety released by AGT in 2023. It is closely related to Scepter with a similar maturity, but with the additional benefit of the option to use Clearfield® Intervix® technology in crop or to manage the Imidazolinone herbicide soil residues from previous crops. Tomahawk CL Plus was included in the WA NVT for the first time in 2022 where overall it is the highest yielding variety along side LRPB Vortex. Yield trends suggest that Tomahawk CL Plus out yields LRPB Vortex in environments with the potential of less than 3.5t/ha. Tomahawk CL Plus is rated S for leaf rust, compared to Scepter at MSS, is similar for powdery mildew (S), stripe rust (RMR) and yellow spot (MRMS) but higher for stem rust (MR) and a lower provisional flag smut rating of SVSp.

Note: There are now grower-to-grower sales permitted for CL Plus varieties.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	102	104	102
Agzone 2	–	–	103	105	103
Agzone 3	–	–	102	104	104
Agzone 4	–	–	103	106	104
Agzone 5	–	–	104	105	104
Agzone 6	–	–	102	104	104
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	S				
Septoria tritici blotch	MSSp				
Stem rust	MR				
Stripe rust	RMR				
Leaf rust	S				
Powdery mildew	S				
Flag smut	SVSp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	MSp				
RLN (<i>P. neglectus</i>)	S				
CCN	MRMSp				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+1	+3	+1	+1	-1
Merredin	+1	+1	+1	+1	-1
Katanning	-2	-2	-2	-1	–
Grass Patch	–	+0	+1	-1	–
Agronomic traits					
Coleoptile group	Medium				
Black point	S				
Falling number index	–				
Maturity	Quick–mid				
Variety information					
Pedigree	Scepter type with Clearfield donor				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates or retailers. Grower to grower now available				
EPR (\$/t, excl GST)	\$4.15				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

AGT-Carnac[Ⓛ]

ANW

Comments

AGT-Carnac was released by AGT in 2025, AGT's second ANW variety. AGT-Carnac has only been included in the NVT since 2024, yielding similar to Scepter and slightly less than Rottneest which AGT released in 2024. Flowering scores from NVT indicate that AGT-Carnac and Rottneest may have similar maturity in between Ninja and Zen. AGT-Carnac has a provisionally more robust disease package than Rottneest with MRMSp for stem rust compared to Sp, and MSSp for leaf rust compared to VSp and Sp compared to SVSp for powdery mildew. AGT-Carnac was also found to have less issues with screenings and hectolitre weights in 2024 compared to other ANW varieties (except Zen).

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	99
Agzone 2	–	–	–	–	102
Agzone 3	–	–	–	–	102
Agzone 4	–	–	–	–	99
Agzone 5	–	–	–	–	102
Agzone 6	–	–	–	–	101
Disease resistance	Adult rating				
Yellow spot	MRMSp				
Nodorum blotch (leaf)	–				
Nodorum blotch (glume)	–				
Septoria tritici blotch	–				
Stem rust	MRMSp				
Stripe rust	RMR				
Leaf rust	MSSp				
Powdery mildew	Sp				
Flag smut	–				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	–				
CCN	–				
Crown rot	–				
Flowering	Days after/before Scepter				
2024 NVT					
Northern	+4				
Great Southern	+3				
Agronomic traits					
Coleoptile group	–				
Black point	–				
Falling number index	–				
Maturity	Midp				
Variety information					
Pedigree	–				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers, or Seed Sharing				
EPR (\$/t, excl GST)	\$3.90				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Firefly[Ⓛ]**ANW****Comments**

Firefly was released in 2023, one of InterGrain's latest ANW release since Kinsei in 2018. Firefly was included in the 2021, 2023 and 2024 WA NVT where it has yielded overall similar to Ninja. Firefly has mid-slow maturity, between Zen and Kinsei. Physical grain quality parameters in NVT have shown much greater risk of low hectolitre weights and higher screenings than Zen which has a strong grain quality package.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	93	–	97	96
Agzone 2	–	96	–	95	99
Agzone 3	–	102	–	100	101
Agzone 4	–	94	–	94	93
Agzone 5	–	98	–	94	100
Agzone 6	–	–	–	–	101
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MSS				
Septoria tritici blotch	MSSp				
Stem rust	S				
Stripe rust	MS				
Leaf rust	MSS				
Powdery mildew	MSSp				
Flag smut	MRp				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	MSSp				
RLN (<i>P. neglectus</i>)	MS				
CCN	MSSp				
Crown rot	S				
Flowering	Days after/before Scepter				
2024 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+6	+11	+4	+2	+3
Merredin	+4	+1	+1	+3	+2
Katanning	+3	+7	+1	+0	–
Grass Patch	+5	+2	+3	+1	–
Agronomic traits					
Coleoptile group	–				
Black point	MSSp				
Falling number index	–				
Maturity	Mid-slow				
Variety information					
Pedigree	Complex cross of coded breeding lines				
Breeder/Seed licensee	InterGrain				
Access to seed	Intergrain Seed Club members or seed retailers				
EPR (\$/t, excl GST)	\$4.00				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Kinsei[Ⓛ]**ANW****Comments**

Kinsei is a mid-slow maturity noodle wheat released by InterGrain in 2018. It is well suited to early sowing opportunities and has also performed well in the NVT main season plantings, particularly in Agzone 3. Overall Kinsei yields slightly less than Ninja, and slightly higher than Zen. Kinsei is now outyielded by most of the new ANW releases, particularly Rottnest. Kinsei is rated S for black point, which may be an issue if sowing the variety in April. Kinsei's disease ratings are marginally better than Ninja and Zen.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	98	94	104	94	96
Agzone 2	93	96	103	90	97
Agzone 3	98	100	104	99	99
Agzone 4	89	93	101	86	89
Agzone 5	87	96	95	91	97
Agzone 6	98	99	100	94	99
Disease resistance	Adult rating				
Yellow spot	MS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MRMS				
Septoria tritici blotch	MS				
Stem rust	MSS				
Stripe rust	MRMS				
Leaf rust	MS				
Powdery mildew	S				
Flag smut	RMR				
Common bunt	MR				
RLN (<i>P. quasitereoides</i>)	S				
RLN (<i>P. neglectus</i>)	S				
CCN	MSS				
Crown rot	MSS				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+7	+7	+6	+8	+5
Merredin	+6	+3	+4	+7	+3
Katanning	+5	+7	+3	+3	–
Grass Patch	+6	+2	+5	+5	–
Agronomic traits					
Coleoptile group	Medium				
Black point	S				
Falling number index	4				
Maturity	Mid-slow				
Variety information					
Pedigree	Complex cross				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

Ninja[Ⓛ]

ANW

Comments

Ninja is a noodle wheat variety released by InterGrain in 2016 that has a Calingiri and Wyalkatchem background. Ninja has been the highest yielding ANW variety, but is likely to be replaced in the future with the release of varieties such as Rottnest and AGT-Carnac. Ninja is rated S to stem rust, powdery mildew and the new incursion of leaf rust. It is rated MRMS to black point.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	100	95	102	98	97
Agzone 2	97	96	100	94	99
Agzone 3	99	99	99	99	100
Agzone 4	94	94	101	94	94
Agzone 5	93	96	98	95	99
Agzone 6	100	99	102	97	99
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MRMS				
Nodorum blotch (glume)	MS				
Septoria tritici blotch	MSS				
Stem rust	S				
Stripe rust	MS				
Leaf rust	S				
Powdery mildew	S				
Flag smut	MR				
Common bunt	RMR				
RLN (<i>P. quasitereoides</i>)	S				
RLN (<i>P. neglectus</i>)	S				
CCN	MS				
Crown rot	S				
Flowering	Days after/before Scepter				
2024 & 2023 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+7	+6	+5	+3	+1
Merredin	+2	+1	+2	+4	+1
Katanning	+0	+1	+0	+0	–
Grass Patch	+3	+1	+0	-1	–
Agronomic traits					
Coleoptile group	Medium				
Black point	MRMS				
Falling number index	4				
Maturity	Mid				
Variety information					
Pedigree	Calingiri/Wyalkatchem				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

Rottnest[Ⓛ]

ANW

Comments

Rottnest was released in 2024 and it is AGT's first ANW variety. Rottnest has only been included in NVT since 2024 so the preliminary results need to be treated with caution. In 2024 Rottnest did become the highest yielding ANW variety, outyielding Ninja by 4%. DPIRD data suggests that Rottnest has a maturity similar to Ninja. Rottnest is *Sp* for stem rust, *VSp* for leaf rust and *SVSp* for powdery mildew so will require a more active leaf disease monitoring program than the other ANW varieties. The 2024 NVT grain quality data suggests that Rottnest may have more screenings issues than the other ANW varieties.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	100
Agzone 2	–	–	–	–	103
Agzone 3	–	–	–	–	104
Agzone 4	–	–	–	–	99
Agzone 5	–	–	–	–	104
Agzone 6	–	–	–	–	104
Disease resistance	Adult rating				
Yellow spot	MRMS _p				
Nodorum blotch (leaf)	–				
Nodorum blotch (glume)	–				
Septoria tritici blotch	–				
Stem rust	<i>Sp</i>				
Stripe rust	MRMS				
Leaf rust	<i>VSp</i>				
Powdery mildew	<i>SVSp</i>				
Flag smut	MR _p				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	–				
CCN	–				
Crown rot	–				
Flowering	Days after/before Scepter				
2024 DPIRD trials	Early/ mid April	Late April	Early/ mid May	Late May	Early June
Mullewa	+12	+8	+4	+1	-1
Merredin	+6	+1	+1	+2	-2
Katanning	-2	+1	+0	-1	–
Grass Patch	+4	+2	+1	+1	–
Agronomic traits					
Coleoptile group	Medium (<i>p</i>)				
Black point	–				
Falling number index	–				
Maturity	Mid _p				
Variety information					
Pedigree	–				
Breeder/Seed licensee	AGT				
Access to seed	AGT Affiliates, retailers, or Seed Sharing				
EPR (\$/t, excl GST)	\$3.90				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Splendid[Ⓛ]

ANW

Comments

Splendid was released by InterGrain in 2024, which was its first year in NVT. In 2024 Splendid achieved yields similar to Ninja, Firefly and AGT-Carnac which yielded slightly lower than Rottnest. Splendid, AGT-Carnac and Rottnest tended to have similar flowering in the 2024 NVT, similar to Ninja and slightly earlier than Firefly or Kinsei. Splendid has a similar leaf rust disease resistance as AGT-Carnac, the highest of the ANW varieties, however it is SVSp for powdery mildew. The 2024 NVT grain quality data suggests that Splendid may have a higher risk of screenings than Ninja.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	97
Agzone 2	–	–	–	–	101
Agzone 3	–	–	–	–	101
Agzone 4	–	–	–	–	95
Agzone 5	–	–	–	–	101
Agzone 6	–	–	–	–	100
Disease resistance	Adult rating				
Yellow spot	MRMS _p				
Nodorum blotch (leaf)	–				
Nodorum blotch (glume)	–				
Septoria tritici blotch	–				
Stem rust	MR _p				
Stripe rust	RMR _p				
Leaf rust	MSS _p				
Powdery mildew	SVSp				
Flag smut	RMR _p				
Common bunt	–				
RLN (<i>P. quasitereoides</i>)	–				
RLN (<i>P. neglectus</i>)	–				
CCN	–				
Crown rot	–				
Flowering	Days after/before Scepter				
2024 NVT					
Northern	+4				
Great Southern	+3				
Agronomic traits					
Coleoptile group	–				
Black point	–				
Falling number index	–				
Maturity	Mid _p				
Variety information					
Pedigree	–				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST)	\$4.00				

p = provisional rating

Refer to page 4 for interpreting resistance classification.

Zen[Ⓛ]

ANW

Comments

Zen is a noodle variety with a Calingiri and Wyalkatchem background. On average Zen's yields are similar to Kinsei, however Kinsei does outyield Zen in Agzones 3 and 6 and with earlier May sowings. Zen is rated S to leaf rust, stem rust and powdery mildew. It has a good black point and RLN (*P. neglectus*) rating but has a weaker falling number index rating than Ninja and Kinsei. Zen has excellent grain size and a low risk of small grain screenings but is frequently outyielded in datasets above 3 t/ha.

Yield (% of Scepter)	2020	2021	2022	2023	2024
Agzone 1	96	98	97	96	97
Agzone 2	93	96	93	91	98
Agzone 3	95	93	95	94	95
Agzone 4	94	95	95	88	96
Agzone 5	92	92	94	93	94
Agzone 6	97	100	98	93	92
Disease resistance	Adult rating				
Yellow spot	MRMS				
Nodorum blotch (leaf)	MS				
Nodorum blotch (glume)	MRMS				
Septoria tritici blotch	S				
Stem rust	S				
Stripe rust	MR				
Leaf rust	S				
Powdery mildew	S				
Flag smut	MS				
Common bunt	MR				
RLN (<i>P. quasitereoides</i>)	MRMS				
RLN (<i>P. neglectus</i>)	MRMS				
CCN	S				
Crown rot	S				
Flowering	Days after/before Scepter				
2018 & 2019 DPIRD trials	10-Apr	24-Apr	08-May	22-May	20-Jun
Northern	+9	+4	+5	+6	+4
Eastern	+7	+8	+5	+2	+0
Katanning	+6	+4	+0	+0	+0
Gibson	–	–	–	–	–
Agronomic traits					
Coleoptile group	Short				
Black point	MRMS				
Falling number index	3				
Maturity	Mid–slow				
Variety information					
Pedigree	Calingiri/Wyalkatchem				
Breeder/Seed licensee	InterGrain				
Access to seed	Free to Trade				
EPR (\$/t, excl GST)	\$3.85				

Refer to page 4 for interpreting resistance classification.

Barley

Introduction

Blakely Paynter (DPIRD)

This guide supports barley variety selection for Western Australian (WA) growers by providing market insights, grain yield and quality comparisons, disease resistance ratings, and agronomic profiles. It covers malt barley varieties currently segregated in WA, those in Stage 2 of malt accreditation with Grains Australia, and selected feed varieties deliverable to the WA bulk handling system (Tables 1–16 and Figures 1–8).

Australia remains a key player in the global malt barley trade, supplying 30–40% of total exports, with China as its largest customer. However, declining beer consumption in mature markets and rising competition from Chinese malt exports, often made from WA Fair Average Quality (FAQ) barley, are compressing malt premiums and challenging profitability.

Demand for premium, single-variety malt barley is growing in Africa and Latin America. Countries such as Mexico, Peru, and Ecuador exclusively purchase MALT1-grade barley, avoiding FAQ- and feed-grade barley. Chile and Brazil have expressed interest in WA malt barley. However, trade constraints currently limit grain exports, prompting Brazilian brewers to import processed Australian malt instead. These markets help sustain the malt–feed price spread, supporting the profitability of WA growers.

Premium beer producers in Southeast Asia and Japan are seeking barley suitable for malting without the use of processing aids. This demand presents opportunities for WA malt processors, though varietal limitations, particularly the dominance of Maximus CL, restrict market access. Expanding varietal options is essential to meet quality requirements in these regions.

Despite beer premiumisation trends, malt premiums remain low due to declining beer consumption in mature markets. In China, overall beer production is declining, while demand for premium beer is increasing. Chinese malt exports are increasing, driven by lower domestic consumption and reduced production costs, challenging Australian malt competitiveness. Much of this malt is produced from WA-sourced FAQ barley, including out-of-spec Maximus CL (barley that failed to meet MALT1 specifications).

In 2024, WA growers delivered 32 barley varieties, however, only Maximus CL was planted across all 4 port zones, representing two-thirds of total plantings and 80% of MALT1 stack allocations. In 2025, its dominance has slightly declined as growers explore alternatives. However, limited varietal diversity and low availability of barley suitable for processing-aid-free malting continue to constrain global demand.

The 2026–27 season is pivotal for WA's malting barley industry. Persistently low malt premiums are influencing growers, particularly in Esperance, to favour feed varieties or prioritise volume over quality. In favourable seasons, some feed barley may meet MALT1 specs and be delivered to cost-effective stacks, reflecting a pragmatic response to market pressures.

Deciding whether to grow barley for malt or feed classification still depends on 5 main factors:

1. Premiums paid for segregated varieties.
2. Relative grain yield of malt and feed-grade barley varieties.
3. Differences in input cost based on agronomic and disease traits.
4. Likelihood of meeting malt barley receival specifications with a malt variety.
5. Location of receival segregations for malt barley varieties.

The decision to sow wheat or even oats instead of barley depends on:

1. The price spread between wheat, oats and barley.
2. Relative grain yield of malt barley, feed barley, milling oats and wheat.
3. Availability of premiums for malt-grade barley.

Western Australia's BFED1 receival standards prioritise hectolitre weight, with a minimum requirement of 56 kilograms per hectolitre (kg/hL). This contrasts with eastern Australia, where GTA Barley1 (feed barley) standards require both a minimum hectolitre weight of 62.5 kg/hL and screenings below 15% (2.2 mm sieve). As a result, WA feed barley systems can focus on maximising yield, allowing growers to select the highest-yielding variety regardless of malt accreditation or segregation.

High-yield feed barley production typically involves sowing between mid-April and mid-May at a density of 180–220 plants per square metre (plants/m²), supported by tailored nutrition, herbicide, and fungicide programs based on site conditions and varietal characteristics.

The Australian barley industry is committed to maintaining the integrity of malt barley delivered to end users. Co-binning of segregated malt varieties is not permitted, even when varieties share similar agronomic traits. Intentional contamination of malt stacks is prohibited, and accurate variety declaration is legally required under the *Plant Breeders Rights Act 1994* and the *Bulk Handling Act 1967*. Growers should avoid mixing visually similar varieties (for example, La Trobe, Maximus CL, Spartacus CL). To support varietal integrity, machine learning-based identification is being progressively introduced at bulk-handling sites.

Growers targeting MALT1 should consult with domestic processors and traders before sowing to confirm the availability of segregations and potential premiums. Recommended grain specifications include:

- **Protein:** 10.3–10.8% (domestic), 10.5–11.0% (export)
- **Retention:** at least 80% on a 2.5 mm sieve
- **Hectolitre weight:** greater than 64 kg/hL
- **Contaminants:** Ryegrass ergot less than 3 cm, no whole snails
- **Harvest management:** Glyphosate must not be used as a desiccant

Barley varieties vary in agronomic suitability across WA, and market demand differs by port zone due to the distinct domestic and international markets each zone serves. Selecting the right variety requires balancing farm business objectives with customer requirements, making strategic planning essential.



Barley variety choice in 2026

– what should I grow?

Variety choice in WA is influenced by multiple agronomic and market factors, often in combination:

- **Soil pH:** in soils with pH_{Ca} below 4.5, varieties with improved tolerance to acidity and aluminium toxicity, such as Buff, Kirwan CL, and Litmus, perform best. Kirwan CL is a higher-yielding option than Buff and Litmus with the added advantage of tolerance to imidazolinone residues and herbicides.
- **Yield potential:**
 - in low-yielding (less than 3 t/ha) non-acidic environments, Beast sets the benchmark.
 - in high-yielding (greater than 5 t/ha) environments, Combat, Cyclops, and Neo CL are leading performers.
- **Herbicide tolerance:** since the release of Scope CL in 2011, herbicide-tolerant barley varieties have grown in popularity, accounting for 84% of barley hectares in the 2025 season. Barley varieties now offer 3 herbicide tolerance groups, enabling flexible weed control strategies:
 - imidazolinone: Bigfoot CL, Commodus CL, Granite CL, Kirwan CL, Maximus CL, Neo CL, Rocket CL, Scope CL, Soldier CL, Spartacus CL, Zena CL.
 - quizalofop-p-ethyl (as Aggressor® AX): PegasusAX, Titan AX.
 - dual tolerance (imidazolinone and quizalofop-p-ethyl): AGT-Bunyip IA.
- **Disease risk:** disease pressure varies by region and is subject to change over time. Resistance ratings for scald (Sc), net-form net blotch (NFNB), spot-form net blotch (SFNB), and powdery mildew (PM) may vary regionally due to local pathogen populations and the development of fungicide resistance. Growers observing unexpected disease levels in varieties rated moderately resistant to moderately susceptible (MRMS), moderately resistant (MR), or resistant (R) should report cases to DPIRD pathologists and, where appropriate, submit samples for pathotype and resistance testing.

Refer to Tables 1–2 and 14–16 for current WA resistance data. Note that field observations for Sc and PM may differ from the listed ratings due to the emergence of new pathotypes. Varieties with variable field reactions are marked with an asterisk (*) following their resistance score in Tables 1–2 and 14–15.

- **Malt premiums and availability of segregations:** with subdued malt premiums and limited segregations for varieties other than Maximus CL, many growers are opting for feed-only varieties or prioritising yield. However, in favourable seasons, feed-managed crops of malt-accredited varieties may meet MALT1 specifications and be delivered if there is a receival point close enough. Although malt-approved varieties still dominate WA barley hectares, the release of high-performing feed-only options is shifting grower preferences, especially in the Esperance Port Zone.

In 2025, Maximus CL dominated WA barley plantings, accounting for two-thirds of sown hectares. Its dominance has slightly declined in 2025, with growers exploring alternatives such as Combat and Neo CL, as well as Bigfoot CL, Cyclops, Granite CL, Laperouse, and PegasusAX to a lesser extent. By 2026, 5 new varieties, AGT-Bunyip IA, Ember, Kirwan CL, Rocket CL, and Soldier CL, will be available, and the varietal mix is expected to evolve rapidly.

This sowing guide outlines the agronomic and market characteristics of current malt barley varieties, emerging options, and selected legacy lines. Detailed varietal profiles are available in the Variety Snapshot section, with commentary on new releases provided in the 'New for planting in 2026' section. Market insights from the Grain Industry Association of Western Australia (GIWA) are summarised in the 'Market feedback' section. Ultimately, variety choice should align with your agronomic conditions, market access, and business goals.

Figure 1 presents changes in the popularity of barley varieties across WA from 2024 to 2025, based on available data. Tables 1 and 2 highlight key attributes of widely grown varieties (Table 1) and those likely to gain traction in WA (Table 2), supporting informed variety selection for both agronomic fit and market access. More variety-specific information can be found in Tables 4–16 and Figures 2–8.

Geraldton Port Zone

The Geraldton Port Zone is primarily focused on exporting barley as grain, with no malt segregations planned for this region. According to GIWA’s July estimates (2015–25), the zone accounts for a median of 90,000 hectares, representing approximately 6% of Western Australia’s total barley area.

In 2025, barley production in Geraldton was concentrated among 5 key varieties: Maximus CL, Litmus, Spartacus CL, Neo CL, and Yagan. These varieties accounted for 83% of the total barley area. Maximus CL dominated plantings, with an area nearly 7 times larger than that of Spartacus CL. Together, Maximus CL and Spartacus CL made up over half of the zone’s barley plantings. Imidazolinone-tolerant varieties — including Maximus CL, Spartacus CL, Neo CL, Commodus CL, and Scope CL, occupied 69% of the total area, underscoring the continued importance of imidazolinone-tolerant genetics in the region.

In contrast, acid-tolerant varieties such as Litmus and Buff accounted for 16%, while the CoAXium® variety Titan AX maintained a modest presence with just over 2% of the area planted to it. Maximus CL and Neo CL both gained ground significantly in 2025. Meanwhile, Scope CL and Spartacus CL saw the most notable declines in area as grower preferences shift.

Due to the region’s relatively low production base, the barley industry has opted not to recommend a malt barley segregation for the 2026–27 harvest. Maximus CL is the only malt-accredited variety grown in sufficient volume to justify segregation. Growers interested in pursuing malt premiums are advised to either establish relationships with domestic malt processors or deliver grain meeting MALT1 specifications to upcountry receival sites in the Kwinana-North (Midlands) Port Zone.

Maximus CL is expected to remain the leading variety in Geraldton in 2026, while Spartacus CL is expected to continue its decline. Scope CL and Yagan remain viable options. In response to local agronomic conditions, alternative strategies are being trialled, including early sowing of Neo CL under a feed-barley management approach, despite its malt accreditation. Neo CL may be suitable for areas where Scope CL has performed well previously. Beast, a feed-only variety, offers a reliable option for low-rainfall environments. Kirwan CL, a new feed barley with both imidazolinone and acid tolerance, is likely

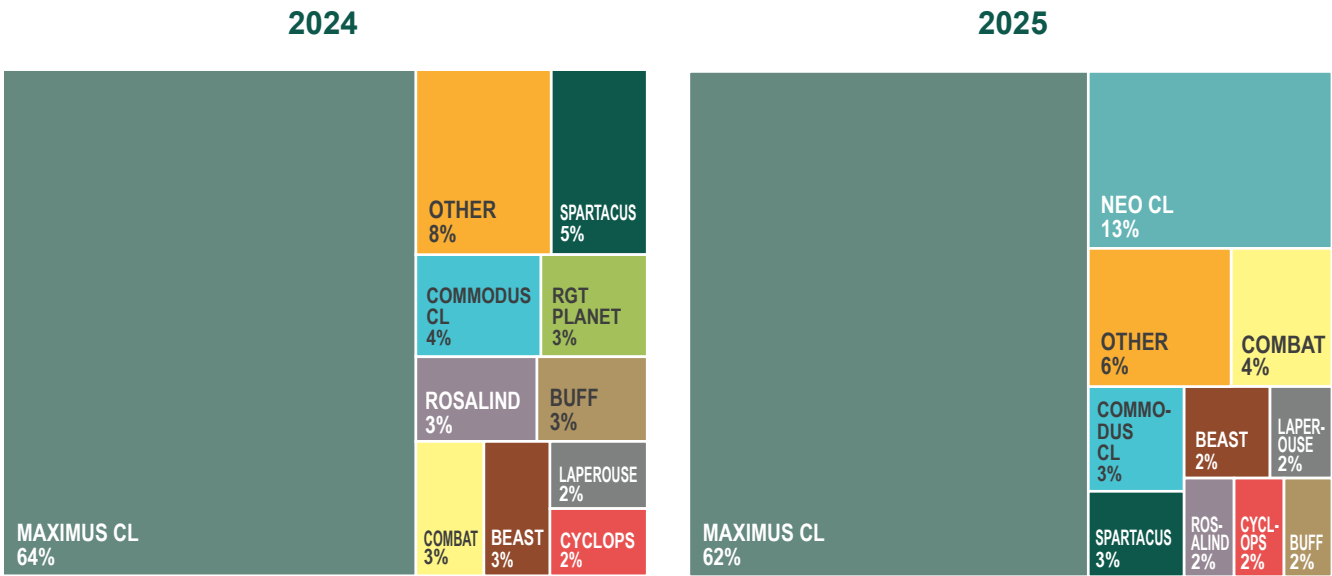


Figure 1: Relative popularity (percentage of barley area) of the top 10 barley varieties plus the combined area planted to the other 20 varieties planted in WA in 2024 and 2025. The top 10 varieties occupied 92% of the area planted to barley in 2024 and 95% in 2025

Source: grower estimates provided to CBH for 2024 and 2025

to be valuable on acid sands. Until its adoption increases, Buff and Litmus will continue to play a key role in managing acidic soils across the port zone.

Kwinana Port Zone

The Kwinana Port Zone plays a central role in WA's value-added barley supply chain. Most of the grain delivered in this zone is either processed in Perth and exported as malt or shipped as grain for shochu production in Japan. Only a small proportion is exported as grain to Africa, Southeast Asia, and Latin America. This export pattern reflects the zone's strong alignment with specialised market channels and domestic processing infrastructure.

According to GIWA's July estimates (2015–25), the Kwinana Port Zone accounted for a median of 555,000 hectares, representing approximately 35% of the state's total barley area. In 2025, the top 5 barley varieties, Maximus CL, Neo CL, Commodus CL, Titan AX, and Buff, accounted for 89% of total barley plantings in the zone. Maximus CL was the dominant variety, planted on nearly 70% of barley hectares, making it 7 times more prevalent than Neo CL. Several varieties saw significant declines in 2025. RGT Planet experienced an 80% decline in planted area compared to the previous year, reflecting a waning interest among growers. Buff and Spartacus CL also showed substantial declines in area planted. Neo CL was the standout, gaining significant traction among growers in 2025.

In terms of trait groups, imidazolinone-tolerant varieties, including Maximus CL, Neo CL, Commodus CL, Spartacus CL, Scope CL, Bigfoot CL, and Zena CL, accounted for 85% of the barley area. CoAXium®-tolerant varieties, Titan AX and PegasusAX, made up 3%. Acid-tolerant varieties, Buff and Litmus, accounted for 4%.

Looking ahead to 2026, Maximus CL is expected to remain the most widely planted variety, although its dominance may slightly decline. Neo CL is projected to gain significant ground as Spartacus CL and RGT Planet are phased out, with 2025 likely marking their final season for most growers. The varietal mix will remain diverse, incorporating Buff, Combat, Commodus CL, Laperouse, Litmus, and Titan AX, alongside the adoption of new feed lines such as Bigfoot CL, Granite CL, Kirwan CL, and PegasusAX.

AGT-Bunyip IA is the first barley variety with dual tolerance to imidazolinone and Aggressor® AX (quizalofop-p-ethyl), enabling broader herbicide rotation. Its ability to control barley and brome grass while enabling herbicide group rotation is a key driver behind its development and adoption. These new lines offer growers greater flexibility in managing weed resistance and optimising crop performance.

Albany Port Zone

The Albany Port Zone presents a strong market opportunity for barley, both as grain and as malt through domestic maltsters. While most grain delivered in this zone is exported directly, a portion is transported to Perth for malting before being shipped overseas. This dual pathway highlights Albany's strategic role in supporting both bulk grain exports and domestic value-added processing.

According to GIWA's July estimates (2015–25), the Albany Port Zone accounts for a median of 600,000 hectares, representing 38% of Western Australia's total barley area. In 2025, production was dominated by 5 varieties, Maximus CL, Neo CL, Laperouse, Combat, and Titan AX, which accounted for 89% of plantings. Maximus CL led with nearly two-thirds of the area, 3 times more than Neo CL. However, growers reduced their plantings of Maximus CL, RGT Planet, and Spartacus CL, while significantly increasing their plantings of Neo CL. Imidazolinone-tolerant varieties, including Maximus CL, Neo CL, Spartacus CL, Commodus CL, Zena CL, and Scope CL, comprised 84% of the total area, highlighting their regional importance. CoAXium® varieties, Titan AX and PegasusAX, made up 3%. Acid-tolerant types, Buff and Litmus, were scarcely planted.

Looking ahead to 2026, Maximus CL is expected to remain the most widely grown variety, although its dominance is projected to decline. Combat, Cyclops, Laperouse, and Neo CL are anticipated to rise in popularity. Neo CL will replace RGT Planet entirely. Changing pathogen virulence may influence some planting decisions, especially where Sc and PM are increasing in their prevalence.

In the Albany Port Zone, specific subregions favour barley varieties tolerant to Aggressor® AX herbicide, creating strong opportunities for herbicide-tolerant options such as Titan AX, PegasusAX, and AGT-Bunyip IA. These varieties support herbicide group rotation and enhance in-crop weed control, contributing to more sustainable agronomic practices. AGT-Bunyip IA is particularly well-positioned to challenge Maximus CL in rotations where Tomahawk CL Plus wheat is grown. This rotation strategy, alternating between AGT-Bunyip IA barley and Tomahawk CL Plus wheat or other Clearfield® wheat varieties, enables growers to maintain both genetic and species diversity in their cropping systems. Such diversity is a cornerstone of sustainable weed management, helping to reduce pressure from herbicide resistance and improve long-term system resilience.

Additionally, niche varietal preferences will continue to shape planting decisions. RGT Atlantis is expected to be used in waterlogged paddocks, while Kirwan CL will be targeted for bulk-up on acidic soils. Overall, the varietal mix in Albany is evolving to meet agronomic challenges and market demands, with Maximus CL and Neo CL remaining key targets for both grain and malt export opportunities. Limited segregations for Cyclops and Laperouse also provide scope for growers to access malt premiums where supported.

Esperance Port Zone

The Esperance Port Zone is focused on exporting barley as grain. According to GIWA's July estimates (2015–25), this zone accounts for a median of 290,000 hectares, representing 18% of Western Australia's total barley area.

In 2025, barley production in Esperance was concentrated among 5 key varieties: Maximus CL, Neo CL, Combat, Beast, and Spartacus CL. Together, these accounted for 87% of the total area planted, with Maximus CL alone representing more than half of all barley hectares. It was 7 times more prevalent than Neo CL and Combat. Imidazolinone-tolerant varieties, including Maximus CL, Neo CL, Spartacus CL, Commodus CL, and Zena CL, occupied 72% of the barley area. This level of adoption was comparable to that in Geraldton, although lower than in the Kwinana and Albany Port Zones. CoAXium® varieties, Titan AX and PegasusAX, and acid-tolerant types, Buff and Litmus, were scarcely planted. Several older varieties, including RGT Planet, Rosalind, and Spartacus CL, saw sharp declines in planted area compared to 2024. Neo CL was the standout mover, gaining significant ground. Consistent with previous years, Esperance maintained the strongest focus on feed-only barley production among all WA port zones.



Table 1: Comparison of barley variety traits across 7 popular varieties grown in WA

Trait	Beast	Combat	Commodus CL	Cyclops	Laperouse	Maximus CL	Neo CL
First year in variety trials in WA	2020	2021	2020	2020	2016	2018	2023
Statewide MET yield (% site mean) ¹	107%	109%	100%	108%	104%	105%	109%
Maturity (sown in late May)	Early spring	Medium spring	Early spring	Medium spring	Medium spring	Early spring	Medium spring
Deliverable as / accreditation stage ²	Feed	Feed	Feed	Malt	Malt	Malt	Malt
Brewing demand (barley and malt) ³	–	–	–	Being assessed	Being assessed	Acceptable	Being assessed
Straw strength (excl. head loss)	Fair	Fair	Fair	Moderately good	Good	Good	Good
Scald ⁴	S	S	MSS	MRMS#	S	MR#	MRMS#
Net-form net blotch (Beecher avirulent) ⁴	MS	MS	MRMS	MRMS	MRMS	MRMS	MR
Net-form net blotch (Oxford virulent) ⁴	MSS	MS	MSS	MS	MS	MSS	MS
Spot form net blotch ⁴	S	MRMS	MSS	MSS	MSS	MSS	MRMS
Powdery mildew ⁴	MR#	RMR#	MR#	MR	MR#	RMR#	R
Barley leaf rust ⁴	S	MRMS (late APR)	S	S	MSS	S	MSS

Source: Blakely Paynter, Sanjiv Gupta, GIWA, Grains Australia, and NVT nvt.grdc.com.au

¹ Regional differences in grain yield are masked when using a state wide average of the WA barley NVT multi-environment (MET) data (2020–24). Growers are directed to Tables 4–10 for a more precise estimate of variety performance in their region and Figures 2–3 for an indication of relative variety performance at different site yields.

² This section outlines whether a barley variety is deliverable in WA as malt or feed barley or is under accreditation. While some varieties may hold a malt classification from Grains Australia, they may still be delivered as feed in WA. Additionally, varieties currently under evaluation by Grains Australia are classified as Stage 0, 1, or 2 in the Malt Accreditation Program, indicating they are being assessed for their suitability for malting and brewing.

³ For more information on malting and brewing demand, go to the 'Market feedback' section.

⁴ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, # = reaction may differ in presence of alternative pathotypes, p = provisional rating, APR = adult plant resistance, – = no data available. Refer to page 4 for interpreting resistance classification.

Looking ahead to 2026, Maximus CL and Neo CL are expected to remain the leading varieties in the Esperance Port Zone. Their continued popularity is driven by strong agronomic performance, compatibility with imidazolinone herbicide rotations, and eligibility for MALT1 delivery. Established feed varieties, such as Beast and Combat, will continue to be widely grown, while growers are showing interest in new feed options, including Bigfoot CL, Ember, and Granite CL. Among these, Ember, a new long-season feed barley, is gaining attention for its robust disease resistance and suitability for early sowing in high-risk environments. It offers growers a resilient option for managing challenging conditions.

Although interest in herbicide-tolerant systems is growing, CoAXium®-tolerant barley varieties have seen slower uptake in Esperance compared to the Kwinana and Albany zones. However, PegasusAX, a CoAXium® variety with a Rosalind-like plant type, may appeal to growers targeting brome and barley grass in non-imidazolinone rotations. Cyclops is also expected to compete with Maximus CL in these systems, offering higher yield potential. AGT-Bunyip IA is likely to attract interest due to its dual tolerance to imidazolinone and Aggressor® AX herbicides, along with its plant type similarity to Maximus CL, which has performed strongly in the region. The adoption of Tomahawk CL Plus wheat will further support rotations involving AGT-Bunyip IA, enabling growers to maintain herbicide group diversity and improve long-term weed management outcomes.

Table 2: Comparison of barley variety traits across 6 newer varieties and the most widely sown variety, Maximus CL

Trait	AGT-Bunyip IA	Ember	Granite CL	Kirwan CL	Maximus CL	PegasusAX	Rocket CL
First year in variety trials in WA	2023	2023	2024	2023	2018	2023	2024
Statewide MET yield (% site mean) ¹	106%	97%	106%	101%	105%	107%	99%
Maturity (sown in late May)	Medium spring	Late spring	Medium spring	–	Early spring	Early spring	Very early spring
Deliverable as / accreditation stage ²	Stage 1	Feed	Feed	Feed	Malt	Feed	Stage 1
Brewing demand (barley and malt) ³	–	–	–	–	Acceptable	–	–
Straw strength (excl. head loss)	–	–	–	–	Good	–	–
Scald ⁴	MS	MRMS	MSp	Sp	MR#	MS	MSSp
Net-form net blotch (Beecher avirulent) ⁴	S	MRMS	MRp	MRMSp	MRMS	MR	Sp
Net-form net blotch (Oxford virulent) ⁴	MS	MRMS	MSp	MRMSp	MSS	MRMS	MSp
Spot form net blotch ⁴	MRMS	MS	MSp	Sp	MSS	MSS	Sp
Powdery mildew ⁴	MS	R	Rp#	Rp#	RMR#	MRMS	MRMSp#
Barley leaf rust ⁴	MSS	MRMS	Sp	Sp	S	MRMS	Sp

Source: Blakely Paynter, Sanjiv Gupta, GIWA, Grains Australia, and NVT nvt.grdc.com.au

¹ Regional differences in grain yield are masked when using a state wide average of the WA barley NVT multi-environment (MET) data (2020–24). Growers are directed to Tables 4–10 for a more precise estimate of variety performance in their region and Figures 2–3 for an indication of relative variety performance at different site yields.

² This section outlines whether a barley variety is deliverable in WA as malt or feed barley or is under accreditation. While some varieties may hold a malt classification from Grains Australia, they may still be delivered as feed in WA. Additionally, varieties currently under evaluation by Grains Australia are classified as Stage 0, 1, or 2 in the Malt Accreditation Program, indicating they are being assessed for their suitability for malting and brewing.

³ For more information on malting and brewing demand, go to the 'Market feedback' section.

⁴ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, # = reaction may differ in presence of alternative pathotypes, p = provisional rating, APR = adult plant resistance, – = no data available. Refer to page 4 for interpreting resistance classification.

Advice by rainfall zone

Barley varieties suited to low-rainfall environments include:

- Beast (tall plant, yield benchmark, weed competitive plant type)
- Bigfoot CL (shorter straw, weed-competitive, Compass background, imidazolinone-tolerant)
- Buff (acid soil tolerant)
- Commodus CL (imidazolinone-tolerant, weed-competitive plant type)
- Granite CL (imidazolinone-tolerant, Rosalind background)
- Kirwan CL (combines acid soil and imidazolinone tolerance)
- Litmus (acid tolerant)
- Maximus CL (suitable for MALT1 or imidazolinone herbicide systems)

- PegasusAX (quizalofop-p-ethyl tolerant, Rosalind background)
- Rocket CL (imidazolinone-tolerant)
- Rosalind (reliable yield performance)
- Titan AX (quizalofop-p-ethyl tolerant).

Barley varieties suited to medium-rainfall environments include:

- AGT-Bunyip IA (imidazolinone and quizalofop-p-ethyl tolerant barley, Maximus CL type)
- Bigfoot CL (shorter straw, weed-competitive, Compass background, imidazolinone-tolerant)
- Combat (yield benchmark, strong SFNB resistance)
- Commodus CL (imidazolinone-tolerant, weed-competitive plant type)

- Cyclops (Rosalind replacement, potential for MALT1 delivery)
- Granite CL (imidazolinone-tolerant, Rosalind background)
- Laperouse (suitable for delivery as MALT1)
- Maximus CL (suitable for MALT1 or imidazolinone herbicide systems)
- Neo CL (early planting, imidazolinone-tolerant)
- PegasusAX (quizalofop-p-ethyl tolerant, Rosalind background)
- Titan AX (quizalofop-p-ethyl tolerant).
- Combat (yield benchmark, strong SFNB resistance)
- Cyclops (Rosalind replacement, potential for MALT1 delivery)
- Ember (strong disease resistance, reduced lodging risk, suited to April planting)
- Laperouse (suitable for delivery as MALT1)
- Maximus CL (suitable for MALT1 or imidazolinone herbicide systems)
- Neo CL (yield benchmark, imidazolinone-tolerant)
- RGT Atlantis (ideal for waterlogged paddocks)
- Soldier CL (reduced lodging risk).

Barley varieties suited to high-rainfall environments include:

- AGT-Bunyip IA (imidazolinone and quizalofop-p-ethyl tolerant barley, Maximus CL type)



New varieties for 2026

Two new feed barley varieties: Ember and Kirwan CL, plus 3 new varieties undergoing malting and brewing accreditation with Grains Australia: AGT-Bunyip IA, Rocket CL, and Soldier CL, will be available for planting in 2026.

When deciding which barley variety to sow, the grain yield potential must be balanced against trade-offs in agronomic factors, disease resistance, grain quality, segregation opportunities, and market demand. Commonly grown varieties differ in their agronomic traits and the pathways to building yield (that is, trade-offs between tiller number, grains per ear and grain weight). These phenotypic differences may favour one variety over another in some seasons but not in others. Therefore, examining trends across seasons and sites is crucial when determining which variety best suits each farming business.

The following are notes on these recently released barley varieties: AGT-Bunyip IA, Ember, Kirwan, Rocket CL, and Soldier CL.

AGT-Bunyip IA

Key points:

- Currently in Stage 1 of the Grains Australia Malt Accreditation Program (2025), with the earliest possible accreditation in March 2027.
- Targeted as an alternative to Maximus CL in a similar plant type with a similar grain yield.
- Tolerant to both imidazolinone chemistry and quizalofop-p-ethyl herbicide (as Aggressor® AX).
- Third year of public testing in WA barley NVT in 2025.
- Rated as MS or lower to all leaf diseases as an adult plant, except SFNB (MRMS).

AGT-Bunyip IA (tested as AGTB0530) is a medium-height, medium-spring, 2-row barley variety bred by AGT and officially registered in June 2025. AGT-Bunyip IA is the first barley variety globally to offer dual herbicide tolerance, resistant to both imidazolinone and Aggressor® AX (quizalofop-p-ethyl). This enables sowing into imidazolinone residues and in-crop spraying with

either herbicide, improving flexibility for managing carry-over and controlling key weeds such as brome grass, barley grass, annual ryegrass, wild oats, and volunteer wheat. When partnered in rotations with Tomahawk CL Plus wheat or other Clearfield® tolerant wheat varieties, growers will be able to maintain herbicide group diversity, manage wheat volunteers and improve long-term weed management outcomes.

AGT-Bunyip IA has been tested in 55 WA barley NVT trials since 2023, with multi-environment trial (MET) data from 2020–24 showing a state wide yield of 106% of the site mean, comparable to Maximus CL at 105% (Table 10). In individual trials, AGT-Bunyip IA yielded lower than Maximus CL in 13%, equal in 58%, and higher in 29% of cases ($p=0.05$) (Table 12). Yield response was consistent across environments, indicating stable performance (Figure 4). Comparable yields of AGT-Bunyip IA and Maximus CL were also observed across 5 DPIRD nitrogen (N) management in response to increasing N supply (up to 150 kg N/ha) (based on unpublished DPIRD internal observations).

In terms of disease resistance, AGT-Bunyip IA shows moderate resistance (MRMS) to SFNB but is susceptible (MS or lower) to Sc, NFNB, PM, and barley leaf rust (BLR) as an adult plant (Table 15). A broad-spectrum fungicide program is likely to maintain crop health while observing best-practice integrated disease management practices.

In 5 DPIRD N management trials conducted in 2024, AGT-Bunyip IA exhibited more straw leaning than Maximus CL at a comparable plant height (data not presented), consistent with breeder observations (AGT publication #25-062, published August 2025). In those same trials, the level of leaning in AGT-Bunyip IA was comparable to Cyclops and RGT Planet.

According to the breeder, AGT-Bunyip IA is a quick-maturing variety, typically reaching awn emergence at a similar time to Maximus CL. However, in 2024, DPIRD phenology trials at Northam and Katanning showed that it reached awn emergence 3–4 days later than Maximus CL (data not presented). DPIRD is collecting additional phenology data to confirm those observations.

Seed is available for planting in 2026 through AGT Affiliates and authorised resellers. Growers may also trade seed farmer-to-farmer under the AGT Seed Sharing licence, which can be accessed at agtbreeding.com.au/sourcing-seed/seed-sharing. Importantly, any grower intending to use Aggressor® AX herbicide must complete the CoAXium® stewardship program, available online at CoAXium.com.au/stewardship. The stewardship program and distribution of Aggressor® AX are administered by Sipcam, ensuring responsible use of the technology and compliance with best practice guidelines.

Ember

Key points:

- Released as a feed-only variety and is not being evaluated for its malting and brewing potential.
- Best suited to early sowing (April) in high-rainfall environments, particularly where disease pressure is high.
- Third year of public testing in WA barley NVT in 2025, but only in Agzones 3 and 6.
- Adult disease resistance rating of MRMS or better to all leaf diseases except SFNB (MS).

Ember (tested as IGB21130) is a medium-height, late-spring, 2-row feed variety bred by InterGrain and registered as a variety in July 2025. In DPIRD phenology trials (2023–24), Ember reached awn emergence at a similar time to Baudin and Gairdner, but was 7–14 days slower than Maximus CL and Neo CL under April and May sowing conditions. These findings are consistent with the observations of InterGrain regarding Maximus CL and Neo CL.

Ember has not been widely tested in WA, having been included only in NVT trials in Agzones 3 and 6 (Tables 4–10). MET data (2020–24) show Ember achieving 97% of the site mean yield across WA, compared to 105% for Maximus CL and 109% for Neo CL (Table 10). In 17 individual trials, Ember yielded lower than Maximus CL in 59% of cases, equal in 29%, and higher in 12% (Table 12). Against Neo CL, it yielded lower in 88% of trials and never higher (Table 13).



InterGrain's product profile (released August 2025) suggests Ember performs similarly to Neo CL when planted in April but yields less with May planting. DPIRD N management trials in 2023 showed Ember's yield ranged between Maximus CL and Neo CL, depending on N rate (data not presented). Further data from April sowing is needed to confirm its fit, but its strong disease resistance makes it a promising option for southern regions with early sowing windows.

Ember offers robust disease resistance, rated MRMS or better for Sc, NFNB, PM, and BLR, but is moderately susceptible (MS) to SFNB (Table 15). Strong seedling resistance to NFNB and PM helps reduce the risk of early-season disease (Table 14). To maintain crop health, Ember should be grown using non-chemical control methods to reduce disease pressure, planted in rotations that minimise disease carryover, and sprayed only, if necessary, in a strategic manner with different modes of action.

Seed is available for planting in 2026 from Seedclub members and resellers. Seed is also free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence, which can be accessed at intergrain.com/epr/variety-license/.

Kirwan CL

Key points:

- Released as a feed-only variety and is not being evaluated for its malting and brewing potential.
- Best suited to low pH soils with high aluminium levels in low to medium rainfall environments.
- First barley variety combining imidazolinone tolerance and enhanced tolerance to acid soils.
- Second year of public testing in WA barley NVT in 2025, having been evaluated in 2023 but not in 2024.
- Has been released based on its performance in breeder trials.
- Provisional disease data suggest Kirwan CL has good resistance to NFNB as an adult plant, but is weak against Sc, SFNB and BLR. It may show variable reactions against different pathotypes of PM.

Kirwan CL (tested as IGB22014T) is a medium-height, early-spring, 2-row feed barley variety developed by InterGrain and registered in August 2025. It combines Clearfield® herbicide tolerance with acid soil tolerance, making it a strong candidate for low pH soils with high aluminium levels. While not yet independently field-tested by DPIRD, Kirwan CL is included in the 2025 DPIRD phenology series.

According to InterGrain's August 2025 product profile, Kirwan CL is positioned as an alternative to Buff and Litmus, offering improved adaptability to challenging soil conditions along with Clearfield® tolerance. Although not tested in WA barley NVT in 2024, Kirwan CL was released based on breeder trial data and its inclusion in 16 WA NVT trials in 2023. MET data (2020–24) show that Kirwan CL achieved 106% of the site mean yield across WA in 2023 (excluding Agzones 3 and 6), outperforming Buff (99%) and Litmus (97%) (Table 10). In individual trials, Kirwan CL yielded higher than Buff in 63% of cases, equal in 31%, and lower in only 6% (data not presented). Against Litmus, it performed equally in 55% of trials and better in 45% (data not presented).

Kirwan CL has a provisional adult plant resistance rating of MRMS to NFNB, but is susceptible (S) to Sc, SFNB and BLR (Table 15). Kirwan CL may be susceptible to emerging pathotypes of PM. Where necessary, a comprehensive strategic fungicide program is recommended to maintain crop health while adhering to best-practice integrated disease management practices.

Seed is available for planting in 2026 from Seedclub members and resellers. Seed is also free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence, which can be accessed at intergrain.com/epr/variety-license/.

Rocket CL

Key points:

- Currently in Stage 1 of the Grains Australia Malt Accreditation Program (2025), with the earliest possible accreditation in March 2028
- Targeted for sowing in low- and medium-rainfall areas, and for later planting.
- Tolerant to imidazolinone chemistry.
- First entered the WA barley NVT in 2024.
- Has been released based on its performance in breeder trials.
- Provisional adult disease resistance to PM of MRMS# but MS or lower for Sc, NFNB, SFNB, and BLR.

Rocket CL (tested as IGB22023T) is a medium-height, very early-spring, 2-row barley variety developed by InterGrain and registered in July 2025. It offers Clearfield® herbicide tolerance and appears well-suited to late May–early June sowing in WA's northern and eastern wheatbelt, where its early maturity helps avoid terminal drought and heat stress.

In DPIRD 2024 phenology trials (Northam and Katanning), Rocket CL reached awn emergence at a similar thermal time to Mundah and was approximately 7–10 days earlier than Maximus CL (2024 only, data not presented). While Beast and Commodus CL were not included, breeder data suggest Rocket CL matures more rapidly.

InterGrain's August 2025 product profile positions Rocket CL as an alternative to Beast and Commodus CL, with improved lodging tolerance and head retention. It was included in 22 WA barley NVT trials in 2024 (but not in Agzones 3 and 6) and released based on breeder trial performance. Across WA MET trials (2020–24), Rocket CL yielded 102% of the site mean, below Beast (108%) and comparable to Commodus CL (101%) (Table 10). In individual trials, Rocket CL outperformed Commodus CL in 55% of cases, matched it in 32%, and yielded a lower result in 14% (data not presented). Against Beast, it performed equally in 59% of trials and lower in 41% (data not presented).

Rocket CL has a provisional adult plant resistance rating of MRMS# to PM but is susceptible (MS or lower) to Sc, NFNB, SFNB and BLR (Table 15). Rocket CL may be susceptible to emerging pathotypes of PM. A strategic fungicide program and integrated disease management practices are recommended to maintain crop health.

Seed is available for planting in 2026 from Seedclub members and resellers. Seed is also free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence, which can be accessed at intergrain.com/epr/variety-license/.

Soldier CL

Key points:

- Currently in Stage 1 of the Grains Australia Malt Accreditation Program (2025), with the earliest possible accreditation in March 2028.
- Targeted for sowing in high rainfall zones.
- Tolerant to imidazolinone chemistry.
- Under evaluation in WA barley NVT for the first time in 2025, but only in Agzones 3 and 6.
- Limited public data on its long-term performance is available.
- Has been released based on its performance in breeder trials.
- Provisional adult disease tolerance rating data is unavailable from NVT consensus trials.

Soldier CL (tested as IGB22117T) is a short-height, early-spring, 2-row barley variety bred by InterGrain and registered in July 2025. It offers Clearfield® herbicide tolerance and is well-suited to high-rainfall environments where lodging is a common concern.

In DPIRD phenology trials in 2024 at Northam and Katanning, Soldier CL reached awn emergence at a similar time to Spartacus CL with April and May sowing and was up to a week quicker to awn emergence than Maximus CL and Neo CL (based on unpublished DPIRD internal observations).

In 5 DPIRD N management trials conducted in 2024, Soldier CL showed reduced lodging and stronger straw integrity compared to Compass, Maximus CL, and Neo CL (data not presented). This aligns with InterGrain's breeder observations of robust straw strength (InterGrain, published August 2025).

Soldier CL has been released based on InterGrain's internal data, as it had not been sown in WA NVT before 2025. InterGrain's August 2025 product profile positions Soldier CL as an alternative to Neo CL, where lodging is a frequent problem. InterGrain internal trials (2019–24) suggest that Soldier CL yields consistently between Neo CL and RGT Planet in environments yielding up to 7 t/ha (InterGrain product profile, August 2025). DPIRD 2024 season N trials support this trend (data not presented). Growers are encouraged to seek independent data before making decisions on whether or not to adopt any new variety, including Soldier CL.

As Soldier CL was not included in NVT pathology trials before 2025, consensus disease ratings are unavailable. However, InterGrain's August 2025 product profile lists Soldier CL as having good adult plant resistance (MRMS or better) to Sc, NFNB and PM in WA, but susceptible (MSS or lower) to SFNB and BLR. Its disease resistance profile is broadly similar to Neo CL, although it is much weaker for SFNB.

Seed is available for planting in 2026 from Seedclub members and resellers. Seed is also free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence, which can be accessed at intergrain.com/epr/variety-license/.

Other barley varieties to consider

Three new feed barley varieties, Bigfoot CL, Granite CL, and PegasusAX, were released in 2024. All 3 demonstrate comparable grain yield performance to each other and to the benchmark herbicide-tolerant variety Maximus CL. They have an advantage over Commodus CL once the site yield exceeds 4 t/ha. However, they differ in plant architecture, lodging resistance, herbicide compatibility, and other agronomic traits. Each offers distinct advantages over Commodus CL, making them strong alternatives in environments where higher yield potential can be achieved. The following comments are relevant.

Bigfoot CL

Key points:

- Released as a feed-only variety and is not being evaluated for its malting and brewing potential.
- Targeted for sowing in low to medium rainfall environments.
- Tolerant to imidazolinone chemistry.
- Third year of public testing in WA barley NVT in 2025.
- Adult disease resistance rating of MRMS to NFNB, MS or lower to other leaf diseases. It may show variable reactions against different pathotypes of PM.

Bigfoot CL (tested as AGTB0669) is a medium-height, early-spring, 2-row feed barley variety developed by AGT and first sown in WA NVT trials in 2023. It is targeted as an alternative to imidazolinone-tolerant varieties such as Commodus CL, Granite CL and Maximus CL. Bigfoot CL features a long coleoptile, supporting deeper sowing in dry or non-wetting soils (AGT publication #25-067, published August 2025).

Bigfoot CL has a comparable grain yield to Maximus CL and a higher yield potential than Commodus CL above 4 t/ha (Tables 4–10, Figure 4). MET data (2020–24) shows Bigfoot CL

achieved 106% of the site mean yield across WA, compared to 100% for Commodus CL and 105% for Maximus CL (Table 10). In 42 WA barley NVT (2023–24), Bigfoot CL outperformed Commodus CL in 69% of cases, and matched in 31% ($p=0.05$, data not presented). Against Maximus CL, Bigfoot CL yielded lower in 21% of trials, similar in 52%, and higher in 26% (Table 12). While Granite CL has only one year of NVT data, early results suggest similar yield performance to Bigfoot CL. In 24 WA NVT trials (2024–only), Bigfoot CL yielded similarly to Granite CL in 83% of cases and was lower in 17% ($p=0.05$, data not presented). Growers should not assume that Bigfoot CL's relative performance in 2023 and 2024 will be indicative of its future performance. At least 3 seasons of data are generally required to indicate long-term performance.

Bigfoot CL shares a Compass-type plant structure with Commodus CL, but has shorter straw and improved lodging tolerance. In contrast, Granite CL and Maximus CL have an erect plant type, which is generally considered less competitive with weeds than the semi-erect types of Bigfoot CL, Commodus CL, and Compass.

In terms of disease resistance, Bigfoot CL, Commodus CL, Granite CL, and Maximus CL have comparable adult plant ratings (Table 15). However, Bigfoot CL offers improved tolerance to the Oxford virulent pathotype of NFNB and enhanced seedling resistance to the Beecher avirulent NFNB pathotype, helping to limit early-season disease spread (Tables 14 and 15). Granite CL also shares this enhanced seedling resistance trait with NFNB (Beecher avirulent), while also exhibiting improved seedling resistance to SFNB. Bigfoot CL may be susceptible to emerging pathotypes of PM.

Seed is available for planting in 2026 through AGT Affiliates and authorised resellers. Growers may also trade seed farmer-to-farmer under the AGT Seed Sharing licence, which can be accessed at agtbreeding.com.au/sourcing-seed/seed-sharing.

Granite CL

Key points:

- Released as a feed-only variety and is not being evaluated for its malting and brewing potential.
- Targeted for sowing in low to medium rainfall environments.
- Tolerant to imidazolinone chemistry.
- Second year of public testing in WA barley NVT in 2025.
- Provisional adult disease resistance rating of MR to NFNB (Beecher avirulent), MS or lower to other leaf diseases. It may show variable reactions against different pathotypes of PM.

Granite CL (tested as IGB21092T) is a medium-height, medium-spring, 2-row feed barley bred by InterGrain and first sown in WA barley NVT in 2024. Granite CL is suited to low- and medium-rainfall zones, as an imidazolinone-tolerant alternative to varieties such as Bigfoot CL, Commodus CL, and Maximus CL. Its erect growth habit, inherited from the Rosalind family, may reduce weed competitiveness compared to semi-erect types.

In 24 WA barley NVT trials (2024-only and not tested in Agzone 4), Granite CL yielded similarly to Bigfoot CL in 83% of cases and higher in 17% ($p=0.05$, data not presented). It outperformed Commodus CL in two-thirds of trials, particularly at sites yielding above 4 t/ha. Compared to Maximus CL, Granite CL yielded lower in 17%, similar in 50%, and higher in 33% of trials. However, as Granite CL has only one year of NVT data, growers are advised to interpret these results cautiously; typically, 3 or more seasons of data are required to assess long-term performance.

Granite CL has comparable adult plant disease resistance to Bigfoot CL, Commodus CL, and Maximus CL. However, it is less tolerant than Bigfoot CL to the Oxford virulent pathotype of NFNB. It does offer enhanced seedling resistance to both the Beecher avirulent NFNB pathotype and SFNB, helping to reduce early-season disease pressure (Tables 14–15). Granite CL may be susceptible to emerging pathotypes of PM.

Seed is available for planting in 2026 from Seedclub members and resellers. Seed is also free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence, which can be accessed at intergrain.com/epr/variety-license/.

PegasusAX

Key points:

- Released as a feed-only variety and not being evaluated for its malting and brewing potential.
- Targeted for sowing in all environments where Rosalind has been successful.
- Tolerant to quizalofop-p-ethyl herbicide (as Aggressor® AX).
- Third year of public testing in WA barley NVT in 2025.
- Adult disease resistance rating of MRMS or better to NFNB, PM and BLR, MS or lower to Sc and SFNB.

PegasusAX (tested as AGTB0667) is a medium-height, early-spring, 2-row feed barley variety developed by AGT and first sown in WA NVT trials in 2023. PegasusAX is compatible with quizalofop-p-ethyl herbicide (Aggressor® AX) under the CoAXium® system. It is not tolerant to imidazolinone herbicides, offering an alternative mode of action for controlling grass weeds in barley. PegasusAX is suited to environments where Rosalind has performed well, particularly in medium to high-rainfall zones. Its erect growth habit (like Rosalind) and shorter straw reduce lodging risk (AGT publication #25-065, August 2025), making it suitable for high-biomass conditions. PegasusAX has a shorter coleoptile, so deep sowing should be avoided.

PegasusAX has demonstrated comparable grain yield to Bigfoot CL, Granite CL, Maximus CL, and Titan AX, and performs better than Commodus CL at sites yielding above 4 t/ha (Tables 4-10, Figure 4). Across 42 WA barley NVT trials (2023–24), PegasusAX yielded similarly to Titan AX in 38% of trials, was higher in 45% and lower in 17% ($p=0.05$, data not shown). Against Maximus CL, it yielded lower in 12% of trials, similar in 55%, and higher in 33% (Table 12).

PegasusAX offers improved adult plant tolerance to NFNB (Oxford virulent) and BLR compared to Commodus CL, Granite CL, Maximus CL, and Titan AX (Table 15). It also provides enhanced seedling resistance to the Beecher avirulent NFNB pathotype, helping to limit early-season disease spread (Table 14). The seedling and adult resistance of PegasusAX and Bigfoot CL is similar to the Oxford virulent pathotype of NFNB.

Seed is available for planting in 2026 through AGT Affiliates and authorised resellers. Growers may also trade seed farmer-to-farmer under the AGT Seed Sharing licence, which can be accessed at agtbreeding.com.au/sourcing-seed/seed-sharing. Importantly, any grower intending to use Aggressor® AX herbicide must complete the CoAXium® stewardship program, available online at CoAXium.com.au/stewardship. The stewardship program and distribution of Aggressor® AX are administered by Sipcam, ensuring responsible use of the technology and compliance with best practice guidelines.



Barley varieties in Stage 2 of malt accreditation

Spinnaker and Titan AX are in Stage 2 of the Grains Australia Malt Accreditation Program, with a decision expected in March 2026. Stage 2 indicates advanced evaluation of malt quality and brewing performance at a commercial scale. Each variety has a good fit in specific systems.

Spinnaker

Key points:

- Undergoing Stage 2 of the Grains Australia Malt Accreditation program in 2025, with the earliest accreditation date being March 2026.
- Targeted as an alternative to RGT Planet in low- to medium-rainfall zones.
- Fifth year of public testing in WA barley NVT in 2025.
- Rated as MRMS or better to Sc, NFNB (Beecher avirulent) and PM, and MS or lower to NFNB (Oxford virulent), SFNB and BLR.

Spinnaker (tested as SCA21-Y003) is a medium-height, early-spring, 2-row barley bred by SECOBRA Recherches. While not yet commercially available, a production crop was established in the south-west in 2025. Spinnaker is positioned as an alternative to RGT Planet in low- to medium-rainfall zones. It combines good straw strength with excellent head retention and does not carry tolerance to Clearfield® or CoAXium® herbicides (SECOBRA Recherches Spinnaker factsheet, October 2024).

Spinnaker's malt profile may allow processing without gibberellic acid, making it attractive to domestic maltsters supplying Heineken and Japanese brewers seeking malt produced without processing aids. It is also under evaluation for the Japanese shochu market.

In the WA barley NVT series (2023–24), Spinnaker demonstrated grain yield and hectolitre weight equivalent to RGT Planet, with moderately improved grain retention (Figures 5–7). It also showed slightly better seedling and adult resistance to NFNB and SFNB (Tables 14–15), 2 diseases that contributed to the decline

of RGT Planet but also pose risks to Spinnaker. Integrated disease management, including crop rotation and strategic fungicide use with varied modes of action, is necessary to manage disease risk effectively, especially where the RGT Planet virulent NFNB exists. Compared to Maximus CL, Spinnaker had lower grain yield, hectolitre weight, and retention in NVT trials. However, in 10 DPIRD N management trials (2023–24) in the Kwinana Port Zone, Spinnaker yielded similarly to Maximus CL, with its hectolitre weight slightly better than RGT Planet and retention between Maximus CL and RGT Planet across N fertiliser rates from 10 to 150 kg N/ha (data not presented). If received, the probability of Spinnaker achieving MALT1 specifications is expected to be lower than that of Maximus CL and slightly higher than that of RGT Planet. These results suggest Spinnaker may be a viable option for domestic malt supply, particularly in western regions of the Kwinana Port Zone, if its malt quality is accredited and a premium is offered to support its production.

Subject to Grains Australia accreditation and market demand, limited seed may be available for planting in 2026 through Seednet Partners and authorised resellers. Farmer-to-farmer trade of Spinnaker seed is prohibited.

Titan AX

Key points:

- Undergoing Stage 2 of the Grains Australia Malt Accreditation Program in 2025, with the earliest accreditation date being March 2026.
- Targeted as an alternative weed control option to the Clearfield® herbicide system in low- to medium-rainfall zones.
- Tolerant to quizalofop-p-ethyl herbicide (as Aggressor® AX).
- Fifth year of public testing in WA barley NVT in 2025.
- Rated as MRMS to NFNB (Beecher avirulent), and MS or lower to Sc, NFNB (Oxford virulent), SFNB and BLR. It may show variable reactions against different pathotypes of PM.

Titan AX (tested as AGTB0325) is a tall-height, medium-spring, 2-row variety bred by AGT. Titan AX is compatible with quizalofop-p-ethyl herbicide under the CoAXium® system (Aggressor® AX), offering an alternative to Clearfield® chemistry for grass weed control. It shares a genetic background with Compass and is suited to low- to medium-rainfall environments, particularly where early vigour and longer straw are preferred and lodging risk is minimal. Its tall Compass-type structure may increase head loss risk in longer-season or high yielding environments, requiring careful management of lodging and harvest timing (AGT publication #25-077, August 2025).

Titan AX is currently in commercial production in WA, contributing to the region's interest in herbicide-tolerant barley systems. Despite undergoing malt accreditation, Titan AX's medium fermentability profile, similar to Commodus CL, may limit its appeal in WA's export malt markets. Commodus CL was removed from segregation plans for the 2026–27 harvest due to weak demand, and Titan AX may face similar market constraints.

As a feed barley, Titan AX competes with other CoAXium® varieties such as AGT-Bunyip IA and PegasusAX, all of which show similar yield performance across site potentials (Table 10, Figure 4). Titan AX has a semi-erect early growth habit, whereas AGT-Bunyip IA and PegasusAX

are more erect, with shorter straw and improved lodging tolerance (AGT publications #25-062, #25-065 and #25-077, published August 2025). AGT-Bunyip IA also offers imidazolinone tolerance, providing greater flexibility for managing herbicide residues and controlling problem weeds. Across 89 WA barley NVT (2021–24), Titan AX yielded less than Maximus CL in 40% of trials, similarly in 17% and higher in 43% (Table 12). As site potential changes, Titan AX and Maximus CL yield similarly (Figures 4–5).

Disease strengths for Titan AX are NFNB (Beecher avirulent). However, it requires management for Sc, NFNB (Oxford virulent), SFNB, and BLR. Titan AX may be susceptible to emerging pathotypes of PM.

Seed is available for planting in 2026 through AGT Affiliates and authorised resellers. Growers may also trade seed farmer-to-farmer under the AGT Seed Sharing licence, which can be accessed at agtbreeding.com.au/sourcing-seed/seed-sharing. Importantly, any grower intending to use Aggressor® AX herbicide must complete the CoAXium® stewardship program, available online at CoAXium.com.au/stewardship. The stewardship program and distribution of Aggressor® AX are administered by Sipcam, ensuring responsible use of the technology and compliance with best practice guidelines.



Newly accredited malt varieties

Three newly accredited varieties: Cyclops, Laperouse, and Neo CL, have been added to the GIWA list of malt varieties for which segregations may be offered at the 2026-27 harvest following the removal of Buff, Commodus CL, and Spartacus CL. Segregation opportunities for these 3 varieties will depend on production volumes in specific regions and market demand. Cyclops, Laperouse and Neo CL are competitive with the entrenched malting variety Maximus CL, while offering growers differing agronomic packages and end-users different malt quality opportunities. Market-specific information can be found in the 'Market feedback' section. The following section describes the agronomic attributes of each variety.

Cyclops

Key points:

- Cyclops was accredited as a malt barley by Grains Australia in March 2025 and is eligible for MALT1 receival and malt contracts, subject to market demand.
- Targeted for sowing in all rainfall zones but better suited to medium to high rainfall areas.
- Cyclops has been tested in WA barley NVT since 2020.
- Grain yield advantage over Maximus CL at sites that yield more than 4 t/ha.
- Requires management of Sc, NFNB (Oxford avirulent), SFNB and BLR.

Cyclops (tested as AGTB0200) is a medium-height, medium-spring, 2-row malt barley variety developed by AGT. It does not carry tolerance to Clearfield® or CoAXium® herbicides. Cyclops is broadly adapted to all rainfall zones but performs best in medium to high rainfall environments, particularly where yield potential exceeds 4 t/ha. Its erect growth habit and short coleoptile may limit competitiveness in situations where weeds are a problem at emergence or under deep-sowing conditions. Cyclops grain has short rachilla hairs, classifying it as a low-itch variety (AGT publication #25-073, August 2025). Its early vigour

and plant height are comparable to Maximus CL, though it is more prone to lodging under high N input (Figure 8).

Cyclops has been extensively tested in WA, with 134 NVT trials since 2020. MET data (2020–24) show Cyclops achieved 108% of the site mean yield state wide, slightly outperforming Maximus CL at 105% (Table 10). In individual trials, Cyclops yielded lower than Maximus CL in 18% of cases, equal in 33%, and higher in 49% (Table 12). It shows a yield advantage over Maximus CL at sites yielding above 4 t/ha (Figure 5), and both varieties respond similarly to increasing N rates up to 150 kg N/ha (Figure 8).

Cyclops offers a competitive grain quality package. In WA NVT trials (2023–24), its hectolitre weight was 1.5–2.5 kg/hL lighter than Maximus CL near the MALT1 lower limit of 64 kg/hL (Figure 6), while retention was similar (Figure 7). DPIRD N management trials (2022–24) confirmed these trends (Figure 8). The probability of meeting MALT1 receival standards may be slightly lower than Maximus CL. Cyclops and Maximus CL have a similar risk of germ-end staining (black point) (Table 16).

Like Maximus CL, Cyclops exhibits useful resistance to NFNB (Beecher virulent), but may require management for Sc, NFNB (Oxford avirulent), and BLR (Tables 14–15). It is rated MS as a seedling and MSS as an adult to SFNB, limiting disease expression compared to more susceptible varieties like RGT Planet, Rosalind and Spartacus CL. It exhibits good resistance to the Medina pathotype of Sc; however, field observations may vary due to the evolving virulence of the pathogen.

Seed is available for planting in 2026 through AGT Affiliates and authorised resellers. Growers may also trade seed farmer-to-farmer under the AGT Seed Sharing licence, which can be accessed at agtbreeding.com.au/sourcing-seed/seed-sharing.

Laperouse

Key points:

- Laperouse was accredited as a malt barley by Grains Australia in May 2025 and is eligible for MALT1 receival and malt contracts, subject to market demand.
- Targeted for sowing in medium- to high-rainfall areas.
- Laperouse has been tested in WA barley NVT since 2016.
- Comparable grain yield and quality to Maximus CL.
- MSS or lower to most leaf diseases in adult plants, except NFNB (Beecher avirulent). It may show variable reactions against different pathotypes of PM.

Laperouse (tested as WI4592) is a medium-height, medium-spring, 2-row malt barley variety developed by the University of Adelaide Barley Breeding Program and licensed to SECOBRA Recherches. Laperouse is best suited to medium- and high-rainfall environments, where its strong straw and head retention traits help reduce harvest losses. It is not compatible with Clearfield® or CoAXium® herbicide systems (Figure 8, SECOBRA Recherches Laperouse factsheet, May 2025).

The variety has been extensively evaluated in WA, with 191 NVT trials conducted since 2016. In 134 WA barley NVT trials (2020–24), Laperouse yielded less than Maximus CL in 32% of trials, matched it in 43%, and outperformed it in 25% (Table 12). Its state wide MET yield was similar to Maximus CL at 104% of the site mean but slightly lower than Cyclops at 108% (Table 10). Yield comparisons indicate that Laperouse and Maximus CL perform similarly across different site yields. However, Laperouse tends to underperform relative to Cyclops at high-yielding sites (above 4 t/ha) (Figures 2 and 5). Laperouse shows a similar response to fertiliser N as Maximus CL, and yield is limited without adequate fertiliser N (Figure 8).

Grain quality assessments show that Laperouse generally achieves a hectolitre weight comparable to Maximus CL (Figure 6), with slightly improved grain retention (Figure 7) and lower grain protein concentration at equivalent yields (data not presented). These trends were confirmed in DPIRD N management trials (2022–24) (Figure 8), suggesting that Laperouse has a similar likelihood

of meeting MALT1 receival standards as Maximus CL. Laperouse and Maximus CL have a similar risk of germ-end staining (black point) (Table 16).

In terms of disease resistance, Laperouse exhibits excellent resistance to the South Perth pathotype of PM and useful resistance to NFNB (Beecher virulent) at both the seedling and adult stages (Tables 14–15). Laperouse may be susceptible to emerging pathotypes of PM. It is less suited to regions where Sc is a recurring issue and is rated as MSS or lower for NFNB (Oxford virulent), SFNB, and BLR.

Seed is available for planting in 2026 through Seednet Partners and authorised resellers. Growers may also trade seed with other farmers by complying with the Seednet Grower Agreement (contact Seednet directly for further information).

Neo CL

Key points:

- Neo CL was accredited as a malt barley by Grains Australia in March 2025 and is eligible for MALT1 receival and malt contracts, subject to market demand.
- Targeted for sowing in medium- and high-rainfall areas.
- First entered the WA barley NVT in 2023.
- Improved grain yield and grain retention compared to RGT Planet.
- Rated as MRMS or higher to NFNB (Beecher avirulent), SFNB, and PM, and is MS or lower to NFNB (Oxford virulent) and BLR. Neo CL is susceptible to emerging pathotypes of Sc.

Neo CL (tested as IGB22102T) is a medium-height, medium-spring, 2-row malt barley variety developed by InterGrain. It is a cross between RGT Planet and Australian genetics and carries tolerance to imidazolinone herbicides. Neo CL is best suited to medium and high rainfall zones, notably where improved lodging resistance and herbicide flexibility are required. Its semi-prostrate growth habit and shorter maturity height reduce lodging risk compared to RGT Planet (Figure 8, InterGrain Variety Guide 2025, July 2025).

Unlike Cyclops and Laperouse, Neo CL has only been included in NVT trials since 2023. However, MET data from 2020–24 predicts a state wide yield of 109% of the site mean, outperforming

Maximus CL (105%) and RGT Planet (98%) (Table 10). In 55 WA barley NVT trials (2023–24), Neo CL yielded lower than Maximus CL in 45% of cases, equal in 16%, and higher in 38% (Tables 12–13). Compared with RGT Planet, Neo CL yielded higher results in 93% of trials and similar results in 7% (Table 13). Neo CL exhibits a yield advantage over Maximus CL at high-yielding sites (greater than 5 t/ha), but tends to underperform when site yields are below 3 t/ha. Relative to RGT Planet, Neo CL performs better when site yields exceed 2.5 t/ha.

Across 14 DPIRD N management trials, Neo CL achieved high yields across all N supply levels (Figure 8). Neo CL responds well to fertiliser N but requires lower N input to reach 95% of maximum yield compared to Maximus CL. It is less responsive than Maximus CL but more responsive than RGT Planet, offering flexibility in N management strategies.

Grain quality assessments indicate that Neo CL has a hectolitre weight similar to RGT Planet but lower than Maximus CL (Figures 6 and 8). Its grain plumpness is comparable to Maximus CL and superior to RGT Planet (Figures 7 and 8). The lower grain protein observed in DPIRD N management trials (2022–24) was primarily due to protein dilution associated with higher yield

potential, as protein yield was similar across all N rates. NVT data (2023–24) suggests Neo CL may have a lower grain protein potential than Maximus CL. The probability of Neo CL meeting MALT1 receival standards is expected to be lower than Maximus CL, mainly due to its lower hectolitre weight, but higher than RGT Planet because of improved grain retention. Neo CL also has a lower provisional risk of germ-end staining (black point) than Maximus CL and a similar risk to RGT Planet (Table 16).

Neo CL offers improved disease resistance compared to Maximus CL and RGT Planet. It is rated MRMS or better for NFNB (Beecher avirulent), SFNB, and PM at both the seedling and adult stages, which helps limit canopy infection (Tables 14–15). It is rated MRMS as an adult plant to the Medina Sc pathotype; however, field observations indicate a susceptible response due to the evolving virulence of the pathogen. Neo CL is rated MS or lower for NFNB (Oxford virulent) and BLR at both growth stages.

Seed is available for planting in 2026 from Seedclub members and resellers. Seed is also free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence, which can be accessed at intergrain.com/epr/variety-license/.



Other considerations for barley growers

Changes in disease pathogens

Recent surveys confirm the widespread presence of the Oxford virulent NFNB pathotype in WA, along with increasing PM virulence in varieties previously rated as resistant. New Sc pathotypes have also emerged, requiring updated variety selection and fungicide strategies. More information can be found in the 'Disease and pest resistance' section, and in the 'Barley variety choice in 2026 – what should I grow' section.

Growers should monitor for unexpected disease severity in varieties rated MRMS or better and report findings to local agronomists or plant pathologists. The rising incidence of fungicide resistance further underscores the need for an integrated approach to disease management. The Australian Fungicide Resistance Extension Network (AFREN) recommends the following best-practice principles:

- avoid susceptible crop varieties,
- rotate crops and varieties,
- use non-chemical control methods,
- spray strategically and only if necessary, and
- rotate and mix fungicide groups.

Tips for managing grain protein in malt barley

Managing N is critical for achieving optimal grain protein levels in malting barley. Grain protein concentration is influenced by the balance between N supply and crop demand, which varies with seasonal conditions.

Traditional N strategies focused on early application (seeding to 4 WAS) are less effective for balancing yield and protein. Delayed N application, particularly around stem elongation, can improve grain protein with minimal yield penalty. Applying approximately two-thirds of the total N around stem elongation can increase grain protein. In some seasons, additional N at flag leaf emergence may further boost protein levels.

Delayed N strategies also enable growers to more accurately assess seasonal potential before committing to higher N inputs.

Other strategies to increase grain protein include applying higher N rates, sowing into legume stubble to enhance soil N supply, and selecting higher-protein varieties such as Maximus CL. These varieties can deliver up to 1% higher grain protein at similar yield levels compared to lower protein types.

Target plant density

Seeding rates should be calculated based on target plant density (plants/m²), accounting for seed size, germination, and establishment. Fixed machinery rates (kg/ha) can lead to under- or over-seeding, especially with variable seed lots.

When aiming for high grain yield in medium to high rainfall zones, feed barley requires a higher target plant density than malt barley. Maintaining 180–220 plants/m² in feed barley improves weed suppression and yield potential. Even in clean paddocks, this density can provide a 1–3% yield advantage with minimal impact on grain quality, typically reducing hectolitre weight by less than 0.5 kg/hL.

For malt barley, a target density of 150–180 plants/m² balances yield and grain quality.

The target density in plants/m² determines the seeding rate in kg/ha and is calculated using the following formula:

$$\text{Seed rate (kg/ha)} = \frac{1000 \text{ kernel weight (g)} \times \text{target density (plants/m}^2\text{)}}{\text{germination \%} \times \text{establishment \%} \times 100}$$

For example, if sowing RGT Planet barley with a kernel weight of 45 g per 1000 kernels at a target density of 180 plants/m² with a germination of 96% and an expected establishment of 80%, then the seed rate in kg/ha required to establish 180 plants/m² is:

$$\text{seed rate in kg/ha} = 105 \text{ kg/ha} = \frac{45 \times 180}{0.96 \times 0.80 \times 100}$$

Market feedback

Grain Industry Association of Western Australia (GIWA)

For the 2026–27 harvest, the following observations are relevant.

Global barley market overview

Global barley market dynamics remain essentially unchanged from the previous year. China continues to dominate as the world's largest barley importer, accounting for nearly half of global imports in 2023–24. Australia plays a significant role in the malt barley trade, contributing to around 30–40% of the global supply. China is also Australia's largest export destination, particularly for FAQ barley.

Meanwhile, Saudi Arabia has significantly reduced its presence in the global barley trade and is no longer a major player. This shift highlights the increasing significance of emerging markets and underscores the need for Australia to diversify its export strategy.

Emerging and niche markets

Africa and Latin America are showing strong demand for premium single-variety malt barley, with countries like Mexico, Peru, and Ecuador exclusively purchasing single-variety MALT1 grade barley, avoiding FAQ and feed grades entirely. Chile and Brazil have expressed interest in importing WA malt barley grain, but access constraints currently limit trade. As a result, Brazilian brewers are importing processed Australian malt instead.

These emerging and niche markets play a crucial role in maintaining the price spread between malt and feed barley. Without their demand, the gap would narrow further, putting additional pressure on profitability for WA growers and exporters.

Southeast Asia and Japan

There is sustained demand for barley that can be malted without the use of processing aids, particularly from premium beer producers like Heineken in Southeast Asia and brewers in Japan. These markets are strategically important for

domestic malt processors in WA, as they offer opportunities for value-added exports and long-term partnerships. However, meeting this demand is challenging due to limited varietal diversity, especially since Maximus CL, the dominant variety, is not preferred for this brewing segment. Expanding the range of suitable varieties will be essential to better serve these premium markets.

Market challenges

Despite emerging markets and trends toward premiumisation, malt premiums remain subdued. This is primarily due to declining beer consumption in mature markets traditionally served by Australian barley and malt. In China, beer production has peaked and is now in decline, although demand for premium beer is rising, which is increasing the need for high-quality malt barley in the brewing process.

Chinese malt exports are expanding, driven by lower domestic consumption and significantly reduced labour and energy costs, making Chinese malt more competitively priced than Australian malt. This shift is placing pressure on Australian malt houses, leading to reduced production levels and tighter business conditions. A substantial portion of Chinese malt is produced using FAQ barley sourced from WA. This includes out-of-spec Maximus CL barley that fails to meet MALT1 standards upon delivery, as well as other malt barley varieties that are binned into feed segregations (often due to the absence of a segregation option for the variety they planted near their growing location).

Variety constraints and opportunities

In 2025, only 11 of the 36 varieties planted were planted on more than 10,000 hectares in at least one port zone. Of those, 2 varieties reached that scale in 2 port zones, 4 in 3 zones, and just one, Maximus CL, was planted across all 4 port zones. Maximus CL dominated barley plantings in 2025, as it did in 2024, accounting for two-thirds of the total area. This led to 80% of the MALT1 bulk handling stacks within the CBH network being allocated to this variety in 2024.

In 2025, the dominance of Maximus CL has slightly declined as growers begin exploring alternative varieties. Despite this shift, the limited diversity in segregated varieties and the low availability of malting-suitable barley that doesn't require processing aids are constraining global demand for WA malt barley grain and malt.

The 2026–27 season represents a critical juncture for WA's malting barley industry, offering a chance to diversify the supply chain and better align with shifting market demands. However, persistently low malt premiums are influencing grower decisions, particularly in the Esperance Port Zone, where many are opting to plant feed-only barley varieties or prioritising volume over quality in malt barley production. In seasons with favourable growing conditions, some of this barley may meet MALT1 specifications and is then delivered to the nearest cost-effective MALT1 stack for the planted variety. This approach reflects a pragmatic response to market pressures but underscores the need for strategic adjustments to maintain WA's competitiveness in premium malt markets.

WA has traditionally focused on exporting medium to high fermentability barley varieties, such as Baudin, Bass, Flinders, Maximus CL, RGT Planet, and Spartacus CL, which align with the preferences of key international malt markets. Recently accredited varieties: Cyclops, Laperouse, and Neo CL, also meet this fermentability profile and are slated for commercial evaluation for their market suitability following the 2025–26 harvest. These varieties will reach sufficient on-farm production levels in 2026 to support segregation within the Bunge and CBH bulk handling systems. However, only Cyclops has been trialled at an industrial malting scale in WA, marking a key area for future development and market testing from the 2025–26 harvest. The adoption of Cyclops, Laperouse, and Neo CL could support market diversification, but segregation remains limited, and market acceptance is still in development.

Commodus CL, a medium fermentability variety considered in 2025, will not be segregated in 2026–27 due to limited market interest, despite ongoing market development in eastern Australia. Similarly, Spartacus CL has been removed from the segregable list due to insufficient supply, and Buff has been excluded because of a lack of domestic malting and market demand, despite its potential for malt production without the use of processing aids. Buff's future may be further constrained by the release of Kirwan CL, a new imidazolinone-tolerant feed barley suited to acid soils.

For the domestic market, niche storage solutions such as on-farm and small-scale bulk handling facilities may still support the procurement of key varieties like RGT Planet. However, general segregation will not be offered through Bunge or CBH systems.

Segregation opportunities for Cyclops, Laperouse, Maximus CL, and Neo CL will vary by port zone and within zones such as Kwinana and Albany, as outlined in Table 3.

Why rationalise malt varieties?

The WA barley industry supports a long-term strategy of segregating up to 2 malt barley varieties per port zone, occasionally 3, while limiting segregation for minor, new, or niche malt varieties. This approach is designed to improve logistical efficiency by reducing storage and handling costs, simplifying bin-level segregation planning, and encouraging stronger trader demand by avoiding small, unsaleable parcels of grain.

At the same time, maintaining a spread of malt varieties with differing agronomic and malting characteristics is essential. This diversity enables processors to blend malt according to specific customer requirements and helps growers manage agronomic risks across varying environments. It is essential to be aware that chemical treatments applied to malt barley crops can impact market access, as not all export markets have the same import tolerances as those in Australia. For instance, opportunistic markets, such as Europe, currently do not accept barley with imazapyr residue or detectable levels of diquat herbicide. Should these markets become regular buyers, specific segregation protocols may be required to meet their standards.

These recommendations have been developed by GIWA, through its Barley Council, in consultation with stakeholders across the WA barley supply chain. They are intended to guide growers and consultants in planning for the 2026 barley cropping season. A review of the plan will take place in autumn 2026, with any changes in market demand communicated to growers. It's important to note that WA's recommendations may differ from those in eastern Australia, reflecting WA's strong focus on international markets.

Malt variety-specific recommendations

The release and adoption of new malt barley varieties is occurring more rapidly than the phase-out of older varieties. This high turnover presents challenges for end users, who often prefer long-term supply and familiarity to optimise their brewing processes. Additionally, each new malt segregation increases storage and handling complexity and cost for bulk handlers.

To address these challenges, the GIWA Barley Variety Rationalisation Plan aims to balance 2 key priorities: enabling growers to access new, high-performing malt varieties, and ensuring customers have consistent access to large, uniform parcels of the same variety over a minimum 5-year period. This approach supports both agronomic innovation and market stability.

Each malt barley variety grown in WA has distinct malting characteristics, and brewers base their purchasing decisions on a combination of factors, including variety availability, familiarity, consistency, price, beer style requirements, and the type and level of adjuncts used in brewing recipes. This document outlines proposed segregation opportunities by port zone (Table 3) and varietal-specific comments.

Growers are encouraged to use the market signals provided in this document to inform their malt barley variety choices for the 2026 season. Key considerations include:

- Market demand and pricing signals.
- Segregation availability by location.
- Agronomic suitability and management requirements.
- Risk associated with achieving malt-grade specifications.

Varieties classified as PREFERRED are more likely to attract higher premiums than those listed as ACCEPTABLE. However, it is important to note that these recommendations are indicative only. Final segregation arrangements for the 2026–27 harvest may differ from those proposed in this document.

Growers should maintain regular communication with their bulk handlers to confirm segregation plans and ensure alignment with market opportunities.

The malt barley recommendations for the 2026 season are as follows:

Cyclops

- Cyclops is being assessed for multiple export opportunities, including grain, malt, and shochu production (in Japan).
- Grains Australia has identified Cyclops as a variety with a high fermentability profile.
- The Grains Australia Malt Performance Summary for Cyclops is available here: grainsaustralia.com.au/master-lists/malting-variety-list#barley-master-list/malt-performance-summaries/. It presents early commercial malt data and serves as a reference for industry stakeholders, highlighting Cyclops's anticipated quality traits.
- Breeder's data suggest that Cyclops has comparable grain and end-use quality to Spartacus CL, with the added benefit of lower wort β -glucan, which may enhance brewing performance (for example, filtration efficiency and beer clarity).
- Cyclops has been malted at an industrial scale in WA (2 batches in 2023). However, its commercial malting performance, both domestically and internationally, remains to be evaluated.
- Target production zones in 2026 include limited segregation in the Albany and Esperance Port Zones.

Laperouse

- Laperouse is being assessed for multiple export opportunities, including grain, malt, and shochu production (in Japan).
- Grains Australia has identified Laperouse as a variety with a medium to high fermentability profile, making it suitable for a range of brewing applications.
- The Grains Australia Malt Performance Summary for Laperouse is available here: grainsaustralia.com.au/master-lists/malting-variety-list#barley-master-list/malt-performance-summaries/. It presents early commercial malt data and serves as a reference for industry stakeholders, highlighting Laperouse's anticipated quality traits.

- Breeder's data demonstrates that Laperouse has a grain quality comparable to Maximus CL, while offering a distinct malt profile that enhances the diversity of Australian barley and malt options. To optimise malting performance, Laperouse benefits from the application of gibberellic acid and its low wort β -glucan levels support enhanced filtration efficiency and beer clarity.
- Laperouse has not yet been malted at an industrial scale in WA.
- Heineken has recognised Laperouse by including it in their "Yellow" variety list, indicating potential suitability for some of their brewing specifications. Further engagement is underway to elevate Laperouse to Heineken's "Green" list. If successful, this would represent full approval for use in their brewing operations, making it a preferred variety for Heineken's brewing operations.
- Target production zones in 2026 include limited segregations in the Kwinana-South and Albany Port Zones.
- The Grains Australia Malt Performance Summary for Neo CL is available here: grainsaustralia.com.au/master-lists/malting-variety-list#barley-master-list/malt-performance-summaries/. It presents early commercial malt data and serves as a reference for industry stakeholders, highlighting Neo CL's anticipated quality traits.
- Breeder's data indicates that Neo CL has improved grain retention relative to RGT Planet, along with an enhanced malt profile. While the need for gibberellic acid during its malting process remains unknown, micro-malt trials indicate that Neo CL malt delivers improved proteolytic activity and lower wort turbidity compared to RGT Planet malt.
- Neo CL has not yet been malted at an industrial scale in WA.
- Heineken has recognised Neo CL by including it in their "Yellow" variety list, indicating potential suitability for some of their brewing specifications.
- Growers should use recommended imidazolinone herbicides and remain aware of market advice regarding grain delivery from paddocks treated with these herbicides.
- Target production zones in 2026 include the Albany and Esperance Port Zones, with limited segregation in the Kwinana-South area.

Maximus CL

- Maximus CL is acceptable for export as both grain and malt and is preferred for shochu production in Japan.
- Grains Australia has identified Maximus CL as a variety with a high fermentability profile, making it well-suited to starch-adjunct brewing.
- Maximus CL malt delivers high extract and enzyme potential but requires the application of gibberellic acid to achieve suitable modification.
- The variety is approved by brewing customers outside Japan, with strong market acceptance in Latin America.
- Maximus CL is the dominant variety in all WA port zones.
- Growers should use recommended imidazolinone herbicides and remain aware of market advice regarding grain delivery from paddocks treated with these herbicides.
- Target production zones in 2026 include the Kwinana, Albany and Esperance Port Zones.

Neo CL

- Neo CL is being assessed for multiple export opportunities, including grain, malt, and shochu production in Japan.
- Grains Australia has identified Neo CL as a variety with a high fermentability profile, making it suitable for a range of brewing applications.

RGT Planet

- RGT Planet is preferred for export as malt, primarily due to its ability to be consistently malted without the use of gibberellic acid, offering processing efficiency for maltsters.
- Grains Australia has identified RGT Planet as a variety with a high fermentability profile.
- RGT Planet malt has excellent extract with moderate enzyme potential, making it well-suited for both sugar and starch based adjunct brewing.
- There is currently an insufficient supply of MALT1 grade RGT Planet to meet demand. This may result in premiums above Maximus CL, should the trade wish to accumulate RGT Planet through niche segregations with bulk handlers or on-farm storage.
- Target production zones in 2026 are niche or on-farm segregations in the Kwinana-South Port Zone.

Table 3: Western Australian malt barley variety segregation recommendations by Port Zone for the 2026–27 harvest

YES	This is a recommended variety for this production zone. Segregations will be preferentially allocated to this variety.
Limited	Limited segregations are likely due to low production hectares, limited market demand, a new variety going through market development or phasing out an old variety.
Niche	Subject to availability. Niche segregation is only available if a marketer has sufficient tonnage to supply domestic or international customers. Marketers should contact CBH to negotiate niche segregation, and growers should contact their preferred marketer to determine availability.
NO	Variety has been phased out, or marketers are not looking to accumulate this variety in this production zone.

Port Zone	Geraldton	Kwinana			Albany		Esperance	Comments
		North (Midlands)	South	North (East)	North	South		
Cyclops	NO	NO	NO	NO	Limited	Limited	Limited	Production volumes support limited segregation. Proactive market development is required for building international demand.
Laperouse	NO	NO	Limited	NO	Limited	Limited	NO	Production volumes support limited segregation. Proactive market development is required for building international demand.
Maximus CL	Limited	YES	YES	YES	YES	YES	YES	The leading variety across all port zones, offering reliable quality for most non-Japanese export markets. Optimal malt quality is achieved with the application of gibberellic acid.
Neo CL	NO	NO	Limited	NO	YES	YES	YES	Grower adoption is strong, and while international market awareness exists, formal acceptance has yet to be achieved.
RGT Planet	NO	NO	Niche	NO	NO	NO	NO	Due to limited production, segregation in bulk handling is not feasible. Contracting will be necessary for supply, particularly in markets that favour malt made without gibberellic acid treatment.

Source: GIWA Barley Council

Grain yield

Blakely Paynter (DPIRD)

The National Variety Trials (NVT), coordinated by the Grains Research and Development Corporation (GRDC), offer a nationally consistent and independent framework for evaluating varietal performance across diverse agroecological zones. These trials help growers and agronomists select barley varieties best suited to their local conditions.

Results are available as single-site reports, reflecting performance in a specific season and location, or multi-environment trials (METs), which compare varietal performance against the site mean across multiple seasons. Users can access and filter NVT data by state, region, location, port zone or Agzone through nvt.grdc.com.au, enabling informed and tailored decision-making.

This sowing guide is based on MET data from 2020–24, with an accuracy of ≥ 0.8 and variance accounted of $\geq 25\%$. Performance summaries are presented by Agzone and state wide (Tables 4–10). While port zone-based summaries are now available online, they are not included in this guide.

When 4 or more observations are available, a 5-year weighted average is calculated. However, growers should interpret these averages cautiously, as they may obscure seasonal variability and variety-by-environment (GxE) interactions. Tables 11–13 provide direct comparisons between varieties using least significant difference (LSD) analysis at a 95% confidence level, based on single-site MET data. These comparisons are valid but should not be relied upon in isolation.

To better understand varietal performance across yield environments, NVT presents data in half-tonne intervals (“yield groups”) via the Long-Term MET Yield Reporter. Figures 2–4 use linear regression to show how each variety performs as the site mean yield increases. These graphs assess deviations from the site mean and fit either linear or quadratic trends depending on statistical significance. If no trend is significant, the variety’s performance is considered stable across yield levels.

Figure 8 summarises grain yield responses to increasing N fertiliser rates (10–150 kg N/ha) across DPIRD-funded trials in the Kwinana Port Zone (including Yerecoin, Wongan Hills, Merredin, York, and Popanyinning) from 2022–24. These results help guide N management strategies for different varieties.

Grain yield – comparisons

The benchmark barley varieties for grain yield on non-acidic soils in WA are Beast and Neo CL (Figures 2–5). Beast is the benchmark for low-yielding environments (less than 3 t/ha), while Neo CL leads in high-yielding zones (more than 5 t/ha). Between 3 and 5 t/ha, varieties such as AGT-Bunyip IA, Bigfoot CL, Combat, Cyclops, Granite CL, Laperouse, Maximus CL, Minotaur, PegasusAX, Rosalind, and Titan AX are competitive, with selection depending on herbicide system, disease risk, and agronomic fit. Kirwan CL is the new benchmark for soils with an acidic profile (pH_{Ca} below 4.8). Where early vigour and weed competitiveness are primary factors in the variety choice in sub-3 t/ha environments, Beast, Bigfoot CL, Commodus CL, Compass, and Titan AX are considerations. Above 3.5 t/ha, Combat and Laperouse are higher yielding than Commodus CL and Compass, and just as effective as weed-suppressive options. While not included in this sowing guide, Banks is worth considering for early sowing opportunities in April due to its longer flowering duration than RGT Planet and Rosalind. Ember is the new alternative to Banks for these early planting scenarios. On soils prone to regular waterlogging, RGT Atlantis is the benchmark.

Table 4: Grain yield of barley varieties in AGZONE 1 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		5.07	3.53	5.18	1.90	4.11	3.86
Variety	(No. trials)	(1)	(2)	(2)	(2)	(3)	(10)
Deliverable as a malt variety							
Cyclops	(10)	104	107	106	105	109	107
Laperouse	(10)	100	104	102	101	105	103
Maximus CL	(10)	99	111	101	105	110	106
Neo CL	(5)	–	–	–	107	109	111
RGT Planet	(10)	103	94	102	93	94	96
Stage 2 malt accreditation							
Spinnaker	(7)	–	–	104	99	99	101
Titan AX	(7)	–	–	104	103	102	102
Deliverable as a feed variety							
AGT-Bunyip IA	(5)	–	–	–	108	110	108
Beast	(10)	102	109	104	114	112	109
Bigfoot CL	(3)	–	–	–	–	108	105
Buff	(10)	101	105	100	104	100	102
Combat	(9)	–	118	110	118	111	114
Commodus CL	(10)	97	99	98	104	102	101
Compass	(10)	99	98	101	107	105	103
Ember	(0)	–	–	–	–	–	–
Granite CL	(3)	–	–	–	–	107	105
Kirwan CL	(2)	–	–	–	108	–	104
La Trobe	(10)	98	105	99	105	105	103
Litmus	(10)	97	90	96	103	96	96
Minotaur	(10)	104	110	105	106	106	106
PegasusAX	(3)	–	–	–	–	112	111
RGT Atlantis	(0)	–	–	–	–	–	–
Rocket CL	(3)	–	–	–	–	109	106
Rosalind	(10)	105	114	106	113	112	111
Scope CL	(10)	94	94	91	94	90	92
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(10)	96	105	97	100	104	101
Zena CL	(9)	–	94	102	93	93	96

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 5: Grain yield of barley varieties in AGZONE 2 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		3.27	4.31	5.53	3.32	4.20	4.15
Variety	(No. trials)	(6)	(7)	(7)	(7)	(6)	(33)
Deliverable as a malt variety							
Cyclops	(33)	107	108	105	105	105	106
Laperouse	(33)	104	104	101	102	102	103
Maximus CL	(33)	107	104	102	102	104	104
Neo CL	(13)	–	–	–	105	111	111
RGT Planet	(33)	96	102	103	96	100	99
Stage 2 malt accreditation							
Spinnaker	(27)	–	103	105	99	103	102
Titan AX	(20)	–	–	101	105	101	102
Deliverable as a feed variety							
AGT-Bunyip IA	(13)	–	–	–	105	106	106
Beast	(33)	108	103	102	109	105	105
Bigfoot CL	(13)	–	–	–	106	103	104
Buff	(33)	101	100	100	102	100	101
Combat	(27)	–	111	109	110	108	110
Commodus CL	(33)	101	97	97	102	99	99
Compass	(33)	102	98	98	106	100	101
Ember	(0)	–	–	–	–	–	–
Granite CL	(6)	–	–	–	–	103	104
Kirwan CL	(7)	–	–	–	104	–	100
La Trobe	(33)	103	99	99	102	101	101
Litmus	(33)	92	88	97	100	98	95
Minotaur	(33)	106	107	105	103	104	105
PegasusAX	(13)	–	–	–	108	108	107
RGT Atlantis	(13)	–	–	–	93	97	96
Rocket CL	(6)	–	–	–	–	100	99
Rosalind	(33)	108	106	106	106	107	107
Scope CL	(33)	93	90	92	94	93	92
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(33)	103	99	98	99	100	100
Zena CL	(27)	–	101	103	96	100	99

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 6: Grain yield of barley varieties in AGZONE 3 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		4.77	5.67	6.07	4.08	5.81	5.27
Variety	(No. trials)	(6)	(5)	(6)	(6)	(6)	(29)
Deliverable as a malt variety							
Cyclops	(29)	109	108	107	107	109	108
Laperouse	(29)	106	103	103	104	105	104
Maximus CL	(29)	107	97	100	103	104	102
Neo CL	(12)	–	–	–	101	112	111
RGT Planet	(29)	101	105	104	95	98	100
Stage 2 malt accreditation							
Spinnaker	(23)	–	104	103	97	99	101
Titan AX	(18)	–	–	103	107	103	104
Deliverable as a feed variety							
AGT-Bunyip IA	(12)	–	–	–	105	105	105
Beast	(29)	104	103	100	111	105	105
Bigfoot CL	(6)	–	–	–	–	104	105
Buff	(29)	96	98	103	98	101	99
Combat	(23)	–	107	113	105	111	108
Commodus CL	(29)	98	98	95	104	99	99
Compass	(29)	100	103	96	110	100	102
Ember	(12)	–	–	–	91	101	100
Granite CL	(6)	–	–	–	–	108	106
Kirwan CL	(0)	–	–	–	–	–	–
La Trobe	(29)	100	95	96	102	100	99
Litmus	(29)	90	92	86	98	86	90
Minotaur	(29)	105	103	107	101	106	104
PegasusAX	(6)	–	–	–	–	104	105
RGT Atlantis	(12)	–	–	–	91	94	96
Rocket CL	(0)	–	–	–	–	–	–
Rosalind	(29)	105	99	102	103	104	103
Scope CL	(29)	89	89	93	92	92	91
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(29)	103	93	96	100	100	99
Zena CL	(23)	–	104	104	94	98	100

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 7: Grain yield of barley varieties in AGZONE 4 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		2.63	4.26	5.53	1.85	2.83	3.54
Variety	(No. trials)	(5)	(3)	(5)	(2)	(6)	(21)
Deliverable as a malt variety							
Cyclops	(21)	102	112	105	111	110	107
Laperouse	(21)	101	108	102	107	107	105
Maximus CL	(21)	108	110	98	114	112	108
Neo CL	(8)	–	–	–	94	101	103
RGT Planet	(21)	94	95	101	83	89	93
Stage 2 malt accreditation							
Spinnaker	(13)	–	–	101	91	93	97
Titan AX	(13)	–	–	105	107	104	103
Deliverable as a feed variety							
AGT-Bunyip IA	(8)	–	–	–	112	108	107
Beast	(21)	110	110	103	126	116	112
Bigfoot CL	(6)	–	–	–	–	111	108
Buff	(21)	100	100	102	97	100	100
Combat	(16)	–	111	110	108	109	108
Commodus CL	(21)	104	101	99	112	106	104
Compass	(21)	105	102	101	120	109	106
Ember	(0)	–	–	–	–	–	–
Granite CL	(0)	–	–	–	–	–	–
Kirwan CL	(2)	–	–	–	120	–	107
La Trobe	(21)	107	102	97	111	106	104
Litmus	(21)	108	83	92	105	92	96
Minotaur	(21)	102	107	104	102	104	104
PegasusAX	(6)	–	–	–	–	108	108
RGT Atlantis	(0)	–	–	–	–	–	–
Rocket CL	(6)	–	–	–	–	114	109
Rosalind	(21)	112	106	101	114	108	108
Scope CL	(21)	97	90	95	89	92	93
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(21)	106	104	95	109	107	104
Zena CL	(16)	–	93	101	81	87	92

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 8: Grain yield of barley varieties in AGZONE 5 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		2.56	4.35	4.20	3.17	4.40	3.74
Variety	(No. trials)	(6)	(5)	(5)	(5)	(7)	(28)
Deliverable as a malt variety							
Cyclops	(28)	114	109	112	112	108	111
Laperouse	(28)	109	104	107	108	105	107
Maximus CL	(28)	115	103	104	108	105	107
Neo CL	(12)	–	–	–	100	105	106
RGT Planet	(28)	87	99	98	90	96	94
Stage 2 malt accreditation							
Spinnaker	(17)	–	–	99	93	97	96
Titan AX	(22)	–	107	107	109	104	106
Deliverable as a feed variety							
AGT-Bunyip IA	(12)	–	–	–	108	105	108
Beast	(28)	120	109	108	116	108	112
Bigfoot CL	(12)	–	–	–	113	106	110
Buff	(28)	97	97	100	97	100	98
Combat	(22)	–	107	113	107	108	109
Commodus CL	(28)	108	101	99	107	102	103
Compass	(28)	113	107	102	112	104	108
Ember	(0)	–	–	–	–	–	–
Granite CL	(7)	–	–	–	–	106	108
Kirwan CL	(5)	–	–	–	109	–	105
La Trobe	(28)	107	100	99	103	101	102
Litmus	(0)	–	–	–	–	–	–
Minotaur	(28)	104	103	106	102	104	104
PegasusAX	(12)	–	–	–	107	105	107
RGT Atlantis	(7)	–	–	–	–	92	89
Rocket CL	(7)	–	–	–	–	102	104
Rosalind	(28)	110	104	103	104	104	105
Scope CL	(0)	–	–	–	–	–	–
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(28)	109	98	99	103	101	102
Zena CL	(22)	–	98	97	88	95	92

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 9: Grain yield of barley varieties in AGZONE 6 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		4.14	6.14	4.92	3.37	3.97	4.28
Variety	(No. trials)	(3)	(1)	(3)	(3)	(2)	(12)
Deliverable as a malt variety							
Cyclops	(12)	113	106	113	109	110	111
Laperouse	(12)	107	102	107	106	105	106
Maximus CL	(12)	104	99	104	106	103	104
Neo CL	(5)	–	–	–	106	109	117
RGT Planet	(12)	103	107	107	96	98	102
Stage 2 malt accreditation							
Spinnaker	(9)	–	106	105	98	98	101
Titan AX	(8)	–	–	102	105	107	105
Deliverable as a feed variety							
AGT-Bunyip IA	(5)	–	–	–	108	105	107
Beast	(12)	104	101	98	111	107	105
Bigfoot CL	(2)	–	–	–	–	106	105
Buff	(12)	98	97	102	96	100	99
Combat	(9)	–	105	117	105	110	111
Commodus CL	(12)	96	96	91	103	101	97
Compass	(12)	98	99	90	108	104	100
Ember	(5)	–	–	–	92	100	103
Granite CL	(2)	–	–	–	–	107	109
Kirwan CL	(0)	–	–	–	–	–	–
La Trobe	(12)	96	96	94	102	99	98
Litmus	(0)	–	–	–	–	–	–
Minotaur	(12)	107	103	112	102	104	106
PegasusAX	(2)	–	–	–	–	104	105
RGT Atlantis	(5)	–	–	–	91	93	96
Rocket CL	(0)	–	–	–	–	–	–
Rosalind	(12)	102	103	103	106	102	103
Scope CL	(0)						
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(12)	98	96	97	102	98	99
Zena CL	(9)	–	106	106	95	97	101

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 10: Grain yield of barley varieties averaged across AGZONES 1–6 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		3.52	4.63	5.32	3.25	4.29	4.21
Variety	(No. trials)	(27)	(23)	(28)	(25)	(30)	(133)
Deliverable as a malt variety							
Cyclops	(133)	109	109	107	108	108	108
Laperouse	(133)	105	104	103	104	104	104
Maximus CL	(133)	108	103	101	105	106	105
Neo CL	(55)	–	–	–	102	108	109
RGT Planet	(133)	97	101	103	94	96	98
Stage 2 malt accreditation							
Spinnaker	(96)	–	102	103	97	99	100
Titan AX	(88)	–	105	104	106	103	104
Deliverable as a feed variety							
AGT-Bunyip IA	(55)	–	–	–	106	106	106
Beast	(133)	108	105	102	112	108	107
Bigfoot CL	(42)	–	–	–	109	106	106
Buff	(133)	98	99	101	99	100	99
Combat	(106)	–	109	111	108	110	109
Commodus CL	(133)	101	99	97	104	101	100
Compass	(133)	103	101	98	109	103	103
Ember	(17)	–	–	–	90	96	97
Granite CL	(24)	–	–	–	–	107	106
Kirwan CL	(16)	–	–	–	106	–	101
La Trobe	(133)	102	99	98	103	102	101
Litmus	(93)	92	91	89	97	92	92
Minotaur	(133)	105	105	106	102	105	105
PegasusAX	(42)	–	–	–	108	106	107
RGT Atlantis	(37)	–	–	–	90	92	94
Rocket CL	(22)	–	–	–	–	102	99
Rosalind	(133)	107	104	103	106	106	105
Scope CL	(93)	90	90	92	92	92	91
Soldier CL	(0)	–	–	–	–	–	–
Spartacus CL	(133)	103	98	97	101	102	100
Zena CL	(106)	–	100	102	93	95	97

Source: based on MET analysis from the NVT nvt.grdc.com.au

Table 11: Direct comparisons between 2 varieties (yield difference compared using least significant difference, $p=0.05$, calculated using standard errors from single-site MET) – how many times (as a percentage) was variety A (comparator variety) lower-yielding, the same yield or higher-yielding than variety B (base variety) when sown together in WA barley NVT?

Variety A	Percentage of trials			Number of trials	Comparison years	Comparison
	Variety A is lower yielding than Variety B	Variety A and B yield the same	Variety A is higher yielding than Variety B			
Variety B: Combat						
AGT-Bunyip IA	53%	24%	24%	55	2023–24	AGT-Bunyip IA ≤ Combat
Beast	52%	23%	24%	107	2021–24	Beast ≤ Combat
Bigfoot CL	52%	33%	14%	42	2023–24	Bigfoot CL ≤ Combat
Buff	97%	3%	0%	107	2021–24	Buff < Combat
Commodus CL	75%	19%	7%	107	2021–24	Commodus CL < Combat
Compass	65%	21%	13%	107	2021–24	Compass ≤ Combat
Cyclops	44%	40%	16%	107	2021–24	Cyclops ≤ Combat
Ember	94%	6%	0%	17	2023–24	Ember < Combat
Granite CL	46%	46%	8%	24	2024 only	Granite CL ≤ Combat
Kirwan CL	38%	38%	25%	16	2023 only	Kirwan CL = Combat
La Trobe	81%	11%	7%	107	2021–24	La Trobe < Combat
Laperouse	66%	24%	9%	107	2021–24	Laperouse < Combat
Litmus	85%	9%	5%	75	2021–24	Litmus < Combat
Maximus CL	65%	19%	16%	107	2021–24	Maximus CL ≤ Combat
Minotaur	71%	25%	4%	107	2021–24	Minotaur < Combat
Neo CL	53%	29%	18%	55	2023–24	Neo CL ≤ Combat
PegasusAX	50%	26%	24%	42	2023–24	PegasusAX ≤ Combat
RGT Atlantis	97%	3%	0%	37	2023–24	RGT Atlantis < Combat
RGT Planet	89%	10%	1%	107	2021–24	RGT Planet < Combat
Rocket CL	45%	27%	27%	22	2024 only	Rocket CL = Combat
Rosalind	61%	24%	15%	107	2021–24	Rosalind ≤ Combat
Scope CL	99%	1%	0%	75	2021–24	Scope CL < Combat
Soldier CL	–	–	–	–	–	–
Spartacus CL	81%	8%	10%	107	2021–24	Spartacus CL < Combat
Spinnaker	86%	14%	0%	97	2021–24	Spinnaker < Combat
Titan AX	63%	31%	6%	89	2021–24	Titan AX ≤ Combat
Zena CL	92%	7%	1%	107	2021–24	Zena CL < Combat

Source: based on single-site MET data from NVT, nvt.grdc.com.au

Table 12: Direct comparisons between 2 varieties (yield difference compared using least significant difference, $p=0.05$, calculated using standard errors from single-site MET) – how many times (as a percentage) was variety A (comparator variety) lower-yielding, the same yield or higher-yielding than variety B (base variety) when sown together in WA barley NVT?

Variety A	Percentage of trials			Number of trials	Comparison years	Comparison
	Variety A is lower yielding than Variety B	Variety A and B yield the same	Variety A is higher yielding than Variety B			
Variety B: Maximus CL						
AGT-Bunyip IA	13%	58%	29%	55	2023–24	AGT-Bunyip IA = Maximus CL
Beast	13%	39%	49%	134	2020–24	Beast ≥ Maximus CL
Bigfoot CL	21%	52%	26%	42	2023–24	Bigfoot CL = Maximus CL
Buff	54%	27%	19%	134	2020–24	Buff ≤ Maximus CL
Combat	16%	19%	65%	107	2021–24	Combat ≥ Maximus CL
Commodus CL	58%	31%	11%	134	2020–24	Commodus CL ≤ Maximus CL
Compass	44%	25%	31%	134	2020–24	Compass = Maximus CL
Cyclops	18%	33%	49%	134	2020–24	Cyclops ≥ Maximus CL
Ember	59%	29%	12%	17	2023–24	Ember ≤ Maximus CL
Granite CL	17%	50%	33%	24	2024 only	Granite CL ≥ Maximus CL
Kirwan CL	6%	69%	25%	16	2023 only	Kirwan CL = Maximus CL
La Trobe	54%	40%	7%	134	2020–24	La Trobe ≤ Maximus CL
Laperouse	32%	43%	25%	134	2020–24	Laperouse = Maximus CL
Litmus	66%	18%	16%	93	2020–24	Litmus ≤ Maximus CL
Minotaur	33%	31%	36%	134	2020–24	Minotaur = Maximus CL
Neo CL	45%	16%	38%	55	2023–24	Neo CL = Maximus CL
PegasusAX	12%	55%	33%	42	2023–24	PegasusAX ≥ Maximus CL
RGT Atlantis	76%	19%	5%	37	2023–24	RGT Atlantis < Maximus CL
RGT Planet	63%	14%	23%	134	2020–24	RGT Planet ≤ Maximus CL
Rocket CL	27%	55%	18%	22	2024 only	Rocket CL = Maximus CL
Rosalind	22%	39%	39%	134	2020–24	Rosalind ≥ Maximus CL
Scope CL	85%	11%	4%	93	2020–24	Scope CL < Maximus CL
Soldier CL	–	–	–	–	–	–
Spartacus CL	74%	26%	0%	134	2020–24	Spartacus CL < Maximus CL
Spinnaker	56%	14%	30%	97	2021–24	Spinnaker = Maximus CL
Titan AX	40%	17%	43%	89	2021–24	Titan AX = Maximus CL
Zena CL	60%	16%	24%	107	2021–24	Zena CL ≤ Maximus CL

Source: based on single-site MET data from NVT, nvt.grdc.com.au

Table 13: Direct comparisons between 2 varieties (yield difference compared using least significant difference, $p=0.05$, calculated using standard errors from single-site MET) – how many times (as a percentage) was variety A (comparator variety) lower-yielding, the same yield or higher-yielding than variety B (base variety) when sown together in WA barley NVT?

Variety A	Percentage of trials			Number of trials	Comparison years	Comparison
	Variety A is lower yielding than Variety B	Variety A and B yield the same	Variety A is higher yielding than Variety B			
Variety B: Neo CL						
AGT-Bunyip IA	29%	29%	42%	55	2023–24	AGT-Bunyip IA = Neo CL
Beast	22%	24%	55%	55	2023–24	Beast ≥ Neo CL
Bigfoot CL	33%	31%	36%	42	2023–24	Bigfoot CL = Neo CL
Buff	64%	29%	7%	55	2023–24	Buff ≤ Neo CL
Combat	18%	29%	53%	55	2023–24	Combat ≥ Neo CL
Commodus CL	51%	18%	31%	55	2023–24	Commodus CL = Neo CL
Compass	36%	24%	40%	55	2023–24	Compass = Neo CL
Cyclops	27%	29%	44%	55	2023–24	Cyclops = Neo CL
Ember	88%	12%	0%	17	2023–24	Ember < Neo CL
Granite CL	46%	42%	13%	24	2024 only	Granite CL ≤ Neo CL
Kirwan CL	19%	38%	44%	16	2023 only	Kirwan CL ≥ Neo CL
La Trobe	44%	31%	25%	55	2023–24	La Trobe = Neo CL
Laperouse	38%	25%	36%	55	2023–24	Laperouse = Neo CL
Litmus	68%	13%	18%	38	2023–24	Litmus < Neo CL
Maximus CL	38%	16%	45%	55	2023–24	Maximus CL = Neo CL
Minotaur	38%	44%	18%	55	2023–24	Minotaur ≤ Neo CL
PegasusAX	33%	19%	48%	42	2023–24	PegasusAX = Neo CL
RGT Atlantis	97%	3%	0%	37	2023–24	RGT Atlantis < Neo CL
RGT Planet	93%	7%	0%	55	2023–24	RGT Planet < Neo CL
Rocket CL	36%	27%	36%	22	2024 only	Rocket CL = Neo CL
Rosalind	35%	27%	38%	55	2023–24	Rosalind = Neo CL
Scope CL	76%	21%	3%	38	2023–24	Scope CL < Neo CL
Soldier CL	–	–	–	–	–	–
Spartacus CL	45%	24%	31%	55	2023–24	Spartacus CL = Neo CL
Spinnaker	80%	20%	0%	55	2023–24	Spinnaker < Neo CL
Titan AX	42%	25%	33%	55	2023–24	Titan AX = Neo CL
Zena CL	93%	7%	0%	55	2023–24	Zena CL < Neo CL

Source: based on single-site MET data from NVT, nvt.grdc.com.au

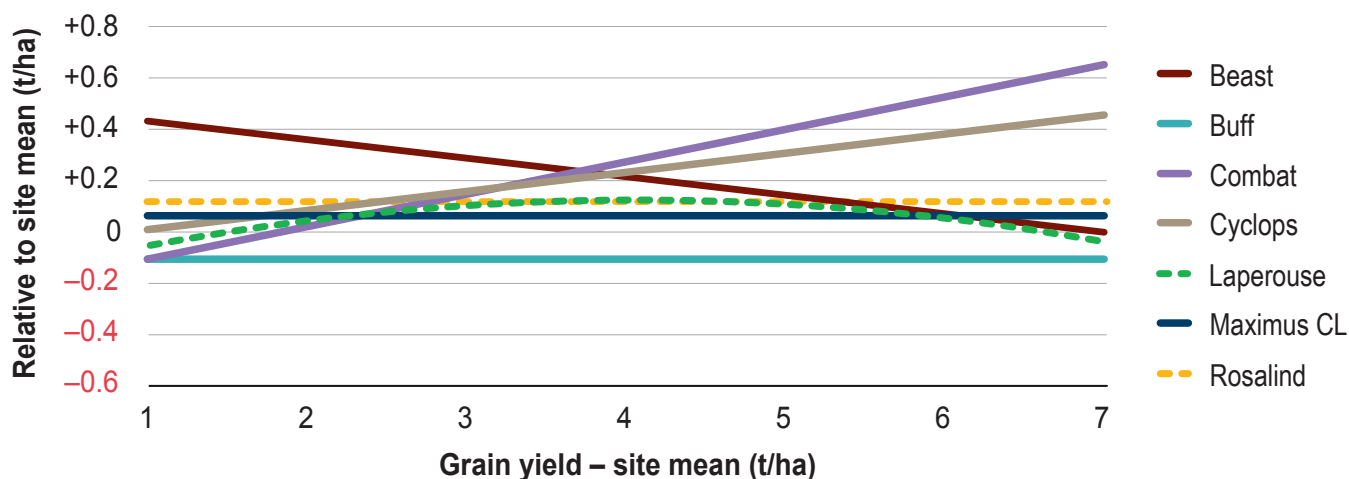


Figure 2: Fitted grain yield of Beast, Buff, Combat, Cyclops, Laperouse, Maximus CL and Rosalind at different site means

Source: based on NVT state wide tables of yield and grain quality (2021–24). Each variety sown in all 106 trial-years of data, NVT nvt.grdc.com.au

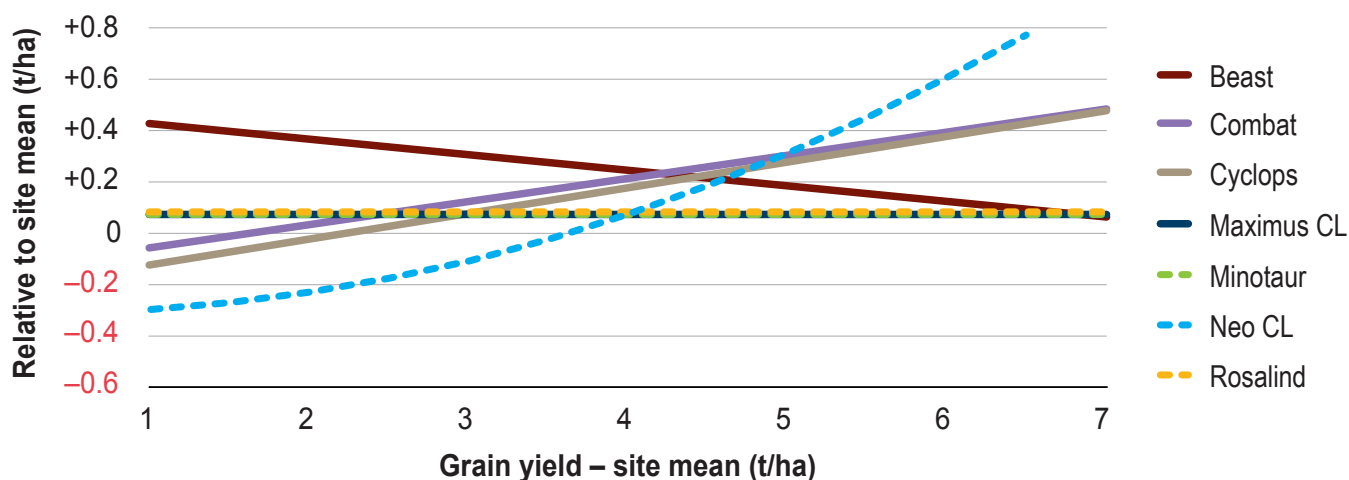


Figure 3: Fitted grain yield of Beast, Combat, Cyclops, Maximus CL, Minotaur, Neo CL and Rosalind at different site means

Source: based on NVT state wide tables of yield and grain quality (2023–24). Each variety sown in all 42 trial-years of data, NVT nvt.grdc.com.au

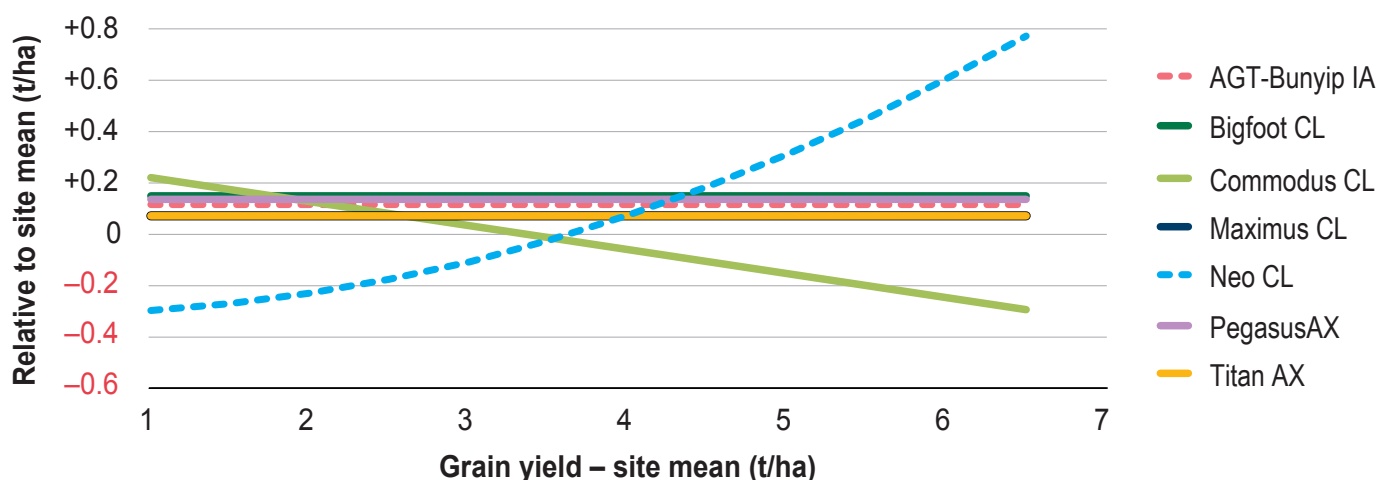


Figure 4: Fitted grain yield of varieties differing in their herbicide tolerance, AGT-Bunyip IA, Bigfoot CL, Commodus CL, Maximus CL, Neo CL, PegasusAX and Titan AX, at different site means

Source: based on NVT state wide tables of yield and grain quality (2023–24). Each variety sown in all 42 trial-years of data, NVT nvt.grdc.com.au

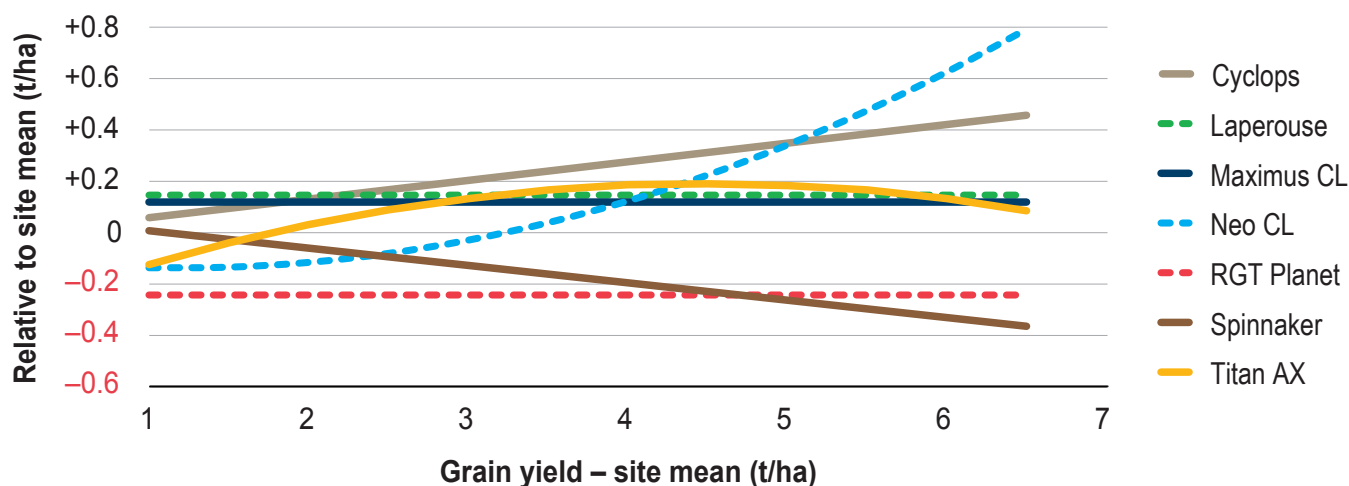


Figure 5: Fitted grain yield of malt accredited or undergoing accreditation with Grains Australia, Cyclops, Laperouse, Maximus CL, Neo CL, RGT Planet, Spinnaker and Titan AX, at different site means

Source: based on NVT state wide tables of yield and grain quality (2023–24). Each variety sown in all 55 trial-years of data, NVT nvt.grdc.com.au

Grain quality

Blakely Paynter (DPIRD)

For feed barley, grain yield remains the primary selection criterion, but agronomic traits such as straw strength and head retention are also important. In contrast, for malt barley, grain quality characteristics, particularly hectolitre weight and grain plumpness, are critical for achieving MALT1 receival standards. These traits become even more important in seasons with a dry finish, where varietal differences in grain quality are amplified.

As with the grain yield data presented in Figures 2–5, the physical grain qualities (hectolitre weight and retention above a 2.5 mm slotted sieve) of a variety have been plotted relative to the site mean as the site mean increases (Figures 6–7). The deviation from the site mean was similarly assessed for quadratic and linear trends. If neither the quadratic nor the linear trend was significant, the grain quality response of a variety was deemed to run parallel to the site mean quality at the average deviation for that variety. The data used for this analysis has been extracted from the ‘NVT state wide tables of yield and grain quality’ available at nvt.grdc.com.au.

Grain quality – hectolitre weight comparisons

Figure 6 compares the hectolitre weight of 3 recently accredited varieties (Cyclops, Laperouse, and Neo CL), 2 varieties currently in Stage 2 of the Grains Australia Malt Accreditation Program (Spinnaker and Titan AX), and 2 established malt varieties (Maximus CL and RGT Planet) across WA barley NVT trials for the 2023–24 seasons. Figure 8 compares Cyclops, Laperouse, and Neo CL against the established malt varieties Maximus CL and RGT Planet across 14 DPIRD-funded N management trials.

In WA barley NVT trials (2023–24), Maximus CL consistently recorded the highest hectolitre weight, outperforming Cyclops, Neo CL, RGT Planet, Spinnaker, and Titan AX (Figure 6). Cyclops averaged ~1.5 kg/hL lower, and Neo CL ~5 kg/hL lower, placing it near the MALT1 threshold of 64 kg/hL. Laperouse was similar to Maximus CL above this threshold. These trends were confirmed in DPIRD N management trials (2022–24) (Figure 8). In summary, Laperouse has a similar likelihood of meeting MALT1 hectolitre weight standards as Maximus CL, Cyclops slightly lower, and Neo CL comparable to RGT Planet.

If Spinnaker and Titan AX achieve malt accreditation and are segregated in WA, hectolitre weight will likely be a key factor limiting their success for MALT1 delivery (Figure 6). Spinnaker averaged about 1 kg/hL heavier than Neo CL across environments but remained approximately 4 kg/hL lighter than Maximus CL. Titan AX was 3–4 kg/hL lighter than Maximus CL. As with Neo CL, environmental conditions during grain filling will strongly influence the probability of Spinnaker and Titan AX meeting MALT1 hectolitre weight standards.

Grain quality – grain plumpness comparisons

Figure 7 compares grain retention (percentage of grain remaining on a 2.5 mm slotted sieve) for 3 recently accredited varieties (Cyclops, Laperouse, and Neo CL), 2 varieties in Stage 2 of the Grains Australia Malt Accreditation Program (Spinnaker and Titan AX), and 2 established malt varieties (Maximus CL and RGT Planet) across WA barley NVT trials for the 2023–24 seasons. Figure 8 compares Cyclops, Laperouse, and Neo CL against the established malt varieties Maximus CL and RGT Planet across 14 DPIRD-funded N management trials.

In WA barley NVT (2023–24), Laperouse produced slightly plumper grain than Maximus CL across a range of grain plumpness levels, with an average retention of about 2% higher (Figure 7). Neo CL showed retention comparable to Maximus CL, while Cyclops averaged around 3% lower retention than Maximus CL. These trends were confirmed in DPIRD N management trials (2022–24) (Figure 8), suggesting that Cyclops and Laperouse have a similar likelihood of meeting MALT1 retention standards as Maximus CL.

If accredited and received in WA, retention is unlikely to limit Titan AX's success for MALT1 delivery, as it is at least as plump, if not plumper, than Maximus CL (Figure 7). Spinnaker, while showing lower retention than Maximus CL, represents a significant improvement over RGT Planet. However, its lower grain plumpness relative to Maximus CL may restrict its ability to meet MALT1 standards in some seasons and environments.

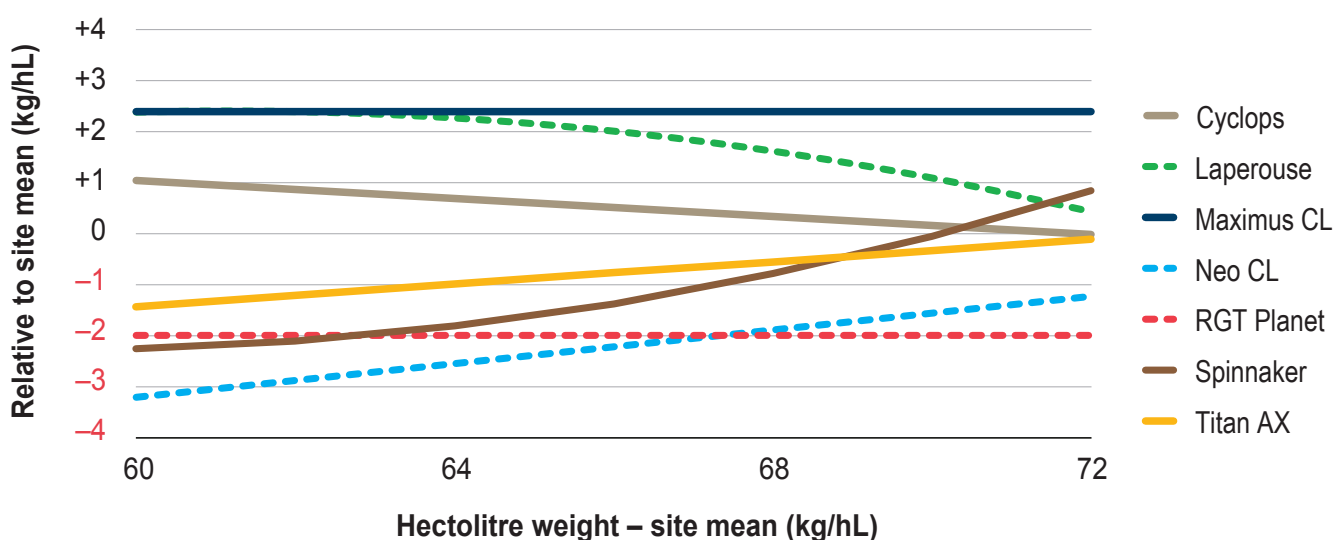


Figure 6: Fitted hectolitre weight of malt accredited or undergoing accreditation with Grains Australia, Cyclops, Laperouse, Maximus CL, Neo CL, RGT Planet, Spinnaker and Titan AX, at different site means

Source: based on NVT state wide tables of yield and grain quality (2023–24). Each variety sown in all 55 trial-years of data, NVT nvt.grdc.com.au

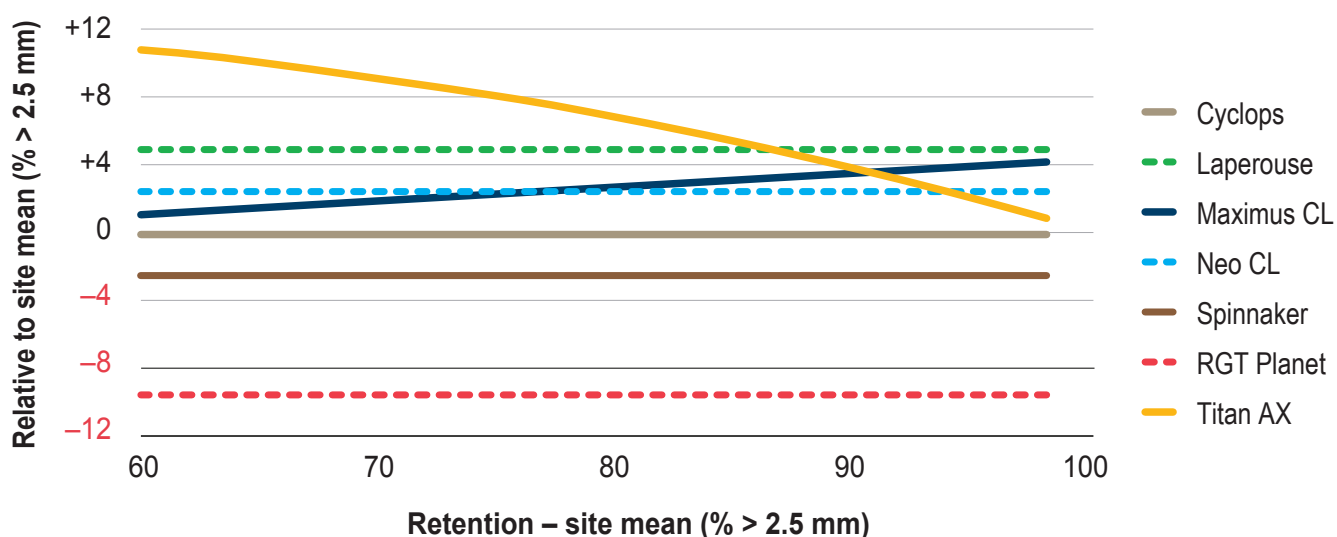


Figure 7: Fitted grain plumpness of malt accredited or undergoing accreditation with Grains Australia, Cyclops, Laperouse, Maximus CL, Neo CL, RGT Planet, Spinnaker and Titan AX, at different site means

Source: based on NVT state wide tables of yield and grain quality (2023–24). Each variety sown in all 55 trial-years of data, NVT nvt.grdc.com.au



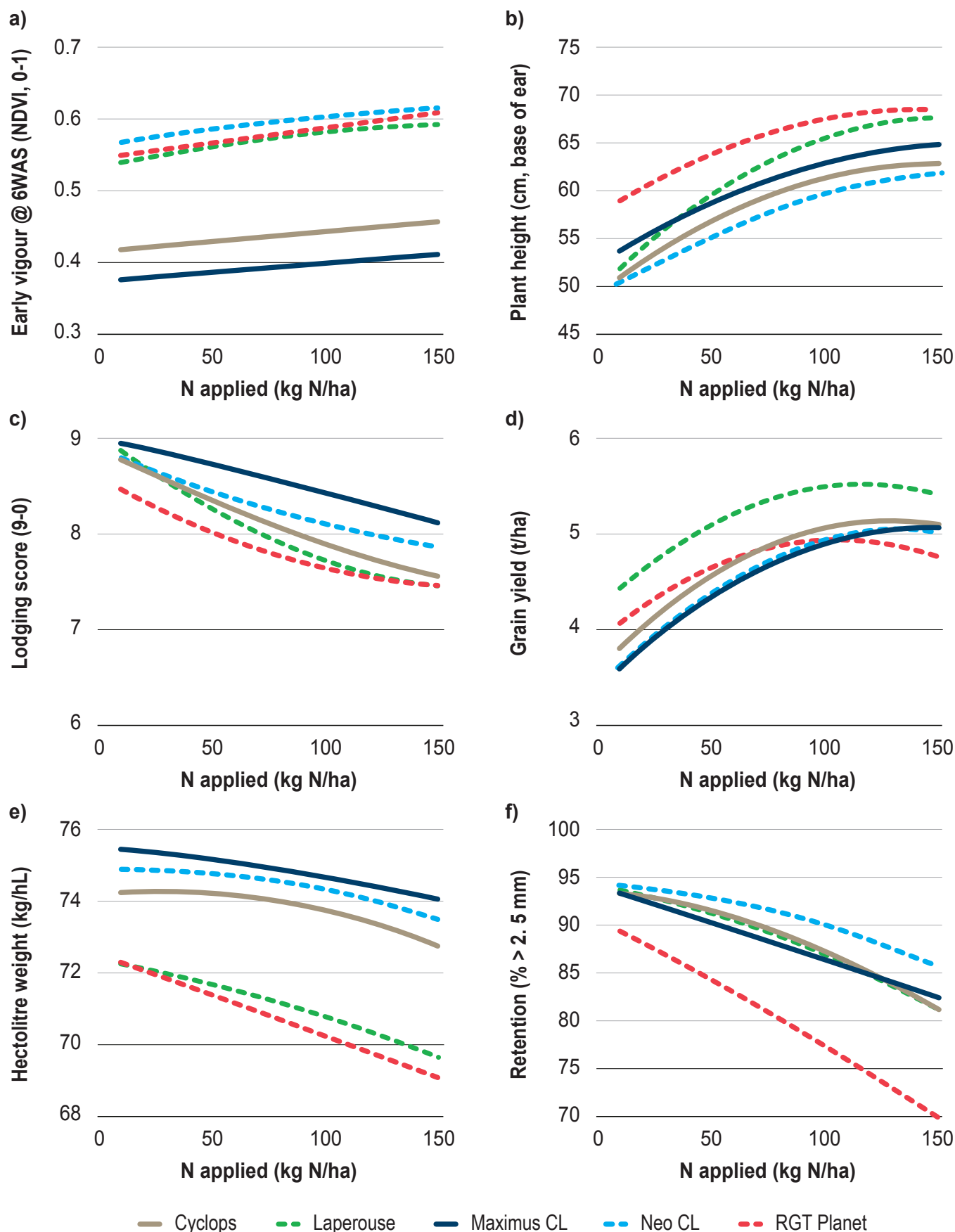


Figure 8: Fitted response of Cyclops, Laperouse, Maximus CL, Neo CL and RGT Planet to increasing N fertiliser for a) early vigour as scored by NDVI, b) plant height to base of ear at maturity, c) straw strength where 9 = fully erect and 0 = 100% lodged, d) grain yield, e) hectolitre weight, and f) grain plumpness

Source: Blakely Paynter, data averaged across 14 DPIRD N management sites in 2022 (Wongan Hills, Yerecoin, York, and Katanning), 2023 (Wongan Hills, Yerecoin, Merredin, Greenhills and Popanyinning), and 2024 (Wongan Hills, Yerecoin, Merredin, Greenhills and Popanyinning).

Disease and pest resistance

Sanjiv Gupta (Murdoch University), Geoff Thomas, Blakely Paynter, Carla Wilkinson, Sarah Collins, Daniel Huberli, Kithsiri Jayasena, and Andrea Hills (DPIRD)

Foliar disease abbreviations:

- **BLR** = barley leaf rust
- **BP** = black point
- **BYD/CYD** = barley yellow dwarf/cereal yellow dwarf
- **CCN** = cereal cyst nematode
- **CR** = crown rot
- **NFNB** = net-form net blotch
- **PM** = powdery mildew
- **PLS** = physiological leaf spotting
- **RLS** = ramularia leaf spot
- **RLN** = root lesion nematode
- **Sc** = scald
- **SFNB** = spot-form net blotch

Disease resistance abbreviations:

- **VS** = very susceptible
- **SVS** = susceptible to very susceptible
- **S** = susceptible
- **MSS** = moderately susceptible to susceptible
- **MS** = moderately susceptible
- **MRMS** = moderately resistant to moderately susceptible
- **MR** = moderately resistant
- **RMR** = resistant to moderately resistant
- **R** = resistant
- **#** = reaction may differ in the presence of alternative pathotypes
- **APR** = adult plant resistance
- *p* = provisional rating

Refer to page 4 to interpret resistance classifications.

Fungicide abbreviations:

- **DMI** = demethylation inhibitors (Group 3)
- **SDHI** = succinate dehydrogenase inhibitors (Group 7)
- **QoI** = quinone outside inhibitors (Group 11)

Seedling and adult resistance

Resistance data for fungal, viral, and nematode diseases, as well as germ-end staining (black point), are presented in Tables 14–16 and the variety snapshots. Leaf disease ratings in this guide include seedling and adult plant stage resistance ratings for the fungal diseases NFNB, SFNB, PM and BLR. There is only adult plant stage resistance data for Sc, BYD/CYD and BP.

Seedling resistance applies to early growth stages (typically 2–3 leaf stage) and is critical for decisions on seed or fertiliser applied fungicides. Adult plant resistance becomes relevant from late tillering to flag leaf emergence, depending on the disease and variety. Differences between seedling and adult ratings reflect the stage-specific expression of resistance genes. Varieties that are susceptible to stubble-borne diseases, such as Sc, NFNB, and SFNB, face a higher risk of infection when sown into barley stubble that is 1–2 years old.

Variety disease ratings may change over time due to seasonal disease pressure, regional spread, climate variability, stubble retention, and the emergence of new pathotypes or races. While minor adjustments to resistance scores may occur between sowing guide editions, no significant changes have been made in response to new pathotypes. However, emerging pathotypes are influencing field observations for certain varieties. In Tables 1–2 and 14–15, varieties showing variable field reactions are marked with an asterisk (*) following their resistance score for the relevant pathotype.

Changing pathotypes in scald (Sc)

A virulent Sc pathotype affecting Spartacus CL, Maximus CL, and Neo CL has become more widespread over the past 2 seasons. This new pathotype is also affecting Cyclops, La Trobe, RGT Atlantis, RGT Planet, and Zena CL. Growers should manage Sc based on observed disease levels, that is, treat what you see, regardless of the resistance rating of the variety. Growers are encouraged to report suspected cases of resistance failure to support ongoing monitoring and inform future breeding and management decisions.

New pathotype of net-form net blotch (NFNB)

Recent surveys highlight significant variability in the NFNB pathogen, with the Oxford virulent pathotype—and its variants—posing a serious threat to varieties such as Neo CL, RGT Atlantis, RGT Planet, and Spinnaker. Many varieties remain susceptible at the seedling stage, increasing the risk of early-season infection. Adult plant ratings of MS or MSS should be interpreted cautiously in high-pressure regions. Resistance data is detailed in Tables 14–15 and should inform variety selection in areas with known Oxford virulent NFNB presence.

New virulence to powdery mildew (PM)

A new PM pathotype has increased seedling and adult susceptibility on Beast, Combat, Commodus CL, and Maximus CL. This new pathotype may also affect Bigfoot CL, Granite CL, Kirwan CL, Laperouse, Rocket CL, and Titan AX. Growers should report unexpected PM outbreaks, especially in varieties rated MRMS or better. Early detection and reporting are crucial for supporting ongoing surveillance and informing future breeding and management strategies.

Pathotype surveillance and fungicide resistance

Growers and consultants who observe higher-than-expected leaf disease levels in barley varieties rated as MRMS, MR, or R should collect infected leaf samples for pathotype identification and fungicide resistance testing. To ensure sample viability, collect samples before applying fungicides.

Place infected Sc, NFNB, SFNB and BLR leaf material in paper envelopes marked with the location, variety, disease and date collected. Fold the leaf in half so the infected area is on the inside. Please do not wrap leaf material in plastic or send it in plastic-lined envelopes. Unlike other leaf diseases, PM-infected leaves should be placed into agar tubes to maintain a live culture for pathotyping. Sample collection kits for PM must be arranged before sampling and, therefore, before spraying.

Send leaf material infected with NFNB and SFNB in paper envelopes to DPIRD, 1 Nash Street, Perth WA 6000, marked attention, Simon Rogers. For more information, contact Simon Rogers via email at simon.rogers@dpiird.wa.gov.au or by phone at +61 429 151 665.

DPIRD has no funding for assessing virulence changes in Sc or PM in WA. If there is an unexpected susceptible response to Sc or PM of a resistant variety, growers and consultants should contact DPIRD plant pathologists or barley scientists for advice before sending any samples.

Send BLR samples in paper envelopes directly to the Australian Cereal Rust Survey, The University of Sydney, Reply Paid 88076, Narellan NSW 2567. For more information on sample collection and submission, contact Matthew Williams (Australian Cereal Rust Control Program (ACRCP) Operations and Technical Officer) via email at matthew.williams@sydney.edu.au or by phone at +61 409 552 349, or go to the Australian Cereal Rust Survey website (sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/cereal-rust-research/rust-reports).

To manage fungicide resistance and reduce future resistance development, growers should follow the disease management principles of the Australian Fungicide Resistance Extension Network (AFREN):

- avoid susceptible crop varieties
- rotate crops and varieties
- use non-chemical control methods
- spray strategically and only if necessary, and
- rotate and mix fungicide groups.

For more detailed information on fungicide resistance (incidence and management), see the AFREN website (afren.com.au/).

When disease response to fungicide control in barley crops is of concern, samples can be sent to Fran Lopez-Ruiz, Centre for Crop and Disease Management (CCDM), Curtin University, PO Box U1987, Perth WA 6845. Contact the Fungicide Resistance Group at frg@curtin.edu.au for details on collecting and submitting a sample.

Scald (Sc)

Scald (Sc) is a severe foliar disease of barley caused by *Rhynchosporium secalis*. It typically begins as pale grey-green, water-soaked blotches on older leaves. These lesions elongate into diamond-shaped patterns with a distinct brown margin and bleached centre. As the disease progresses, lesions coalesce into large necrotic areas, leading to premature leaf death and reduced photosynthetic capacity. Sc can significantly reduce barley performance by killing leaves prematurely (reducing photosynthetic capacity), lowering kernel weight, reducing the number of tillers and grain number per ear (especially with early infections). Yield losses of up to 45% are possible in S to VS varieties, often accompanied by quality defects. The disease survives between seasons on infected stubble, barley grass, and infected seed, making it a persistent threat in barley-on-barley rotations.

Sc hot spots are apparent in WA, with wide variability in pathotypes. Varieties at highest risk are Beast (S), Bigfoot CL (S), Combat (S), Kirwan CL (Sp), Laperouse (S), Litmus (SVS), Minotaur (VS), and Titan AX (S). Sc has also been reported in varieties such as Spartacus CL (MR), Maximus CL (MR), Neo CL (MRMS), and Zena CL (MR). Where disease reaches damaging levels, management should be undertaken regardless of the variety ranking.



Net-form blotch net blotch

Effective management includes using registered seed dressings, applying in-crop fungicides, and avoiding sowing barley into barley stubble. Although currently just under a fifth of the barley area is planted with varieties rated MS or lower, the increased adoption of S and VS varieties, along with the emergence of new pathotypes, could lead to a resurgence of Sc as a significant disease in WA. With infections now appearing in varieties rated MRMS or better (for example, Maximus CL and Neo CL), the risk is expected to rise in the coming seasons.

Net-form net blotch (NFB)

Net-form net blotch (NFB), caused by *Pyrenophora teres f. teres*, is a major foliar disease of barley. It begins as pinpoint brown lesions that elongate into fine, dark brown streaks, forming a distinctive net-like pattern across the leaf blade. As lesions mature, they continue to elongate along the veins, reducing green leaf area and photosynthetic capacity. This disease can cause grain yield losses of 20–30% and negatively impact grain quality. Risk is significantly increased in barley-on-barley rotations, making fungicide intervention essential in high-risk environments, particularly for susceptible varieties or when pathotype shifts occur.

Alarming, NFB isolates with resistance to 3 fungicide groups have been detected in the South Stirlings region. CCDM has detected NFB with resistance or reduced sensitivity to Group 3 DMI (for example, prothioconazole), Group 7 SDHI (for example, fluxapyroxad, benzovindiflupyr, and bixafen), and Group 11 QoI (for example, azoxystrobin) fungicides. Within the Group 11

QoL fungicides, there is some evidence that the resistance detected doesn't equally affect pyraclostrobin as severely as it affects azoxystrobin. These findings may compromise fungicide reliability. Integrated disease management is now essential to maintain control efficacy.

NFNB virulence varies by region and over time, influenced by varietal resistance genes in use. Historically, the Beecher avirulent (97NB1) pathotype has dominated across WA. However, the highly aggressive Oxford virulent pathotype is now widely distributed. RGT Planet is particularly susceptible to the Oxford virulent pathotype, with outbreaks in high-rainfall areas proving difficult to manage with fungicides. Varieties with better adult resistance (MRMS or MRMSp) to the Oxford virulent pathotype include Bigfoot CL, Ember, Kirwan CL, and PegasusAX, while most other varieties range from MS to SVS.

Most barley varieties remain susceptible at the seedling stage, thereby increasing the risk of early-season infection and canopy spread. Currently, under a fifth of the planted area is sown to barley varieties rated as MS or lower to the Beecher avirulent pathotype as an adult plant. However, nearly all the barley area is planted with varieties rated MS or lower to the Oxford virulent pathotype, with outbreaks which increases the risk of widespread infection. To reduce annual NFNB risk, growers should prioritise fungicide programs (with resistance management in mind), crop rotation, and reducing the area sown to highly susceptible varieties. Sowing barley-on-barley significantly increases the risk.

Spot-form net blotch (SFNB)

Spot-form net blotch (SFNB), caused by *Pyrenophora teres f. maculata*, is a common foliar disease of barley. It develops as small, circular or elliptical dark brown spots that become surrounded by a chlorotic zone of varying width. Unlike NFNB, these spots do not elongate into net-like patterns. Spots typically enlarge to 3–6 mm in diameter. SFNB can cause grain yield losses of 10–50% and reduce grain quality. Double-cropping of barley significantly increases the risk of infection.

SFNB populations in WA's Albany, Esperance, and Kwinana-West Port Zones have shown resistance or reduced sensitivity to key fungicide groups. The most affected compounds are Group 3 DMI fungicides, including epoxiconazole,

propiconazole, and tebuconazole, as well as Group 7 SDHI fungicides, particularly fluxapyroxad. Where fungicide resistance is suspected, growers are encouraged to submit samples to the CCDM for assessment.

To manage SFNB and slow further resistance development, growers should adopt fungicide mixtures and rotation strategies that incorporate effective DMIs alongside alternative modes of action, such as Group 7 SDHIs (for example, fluxapyroxad and bixafen) and Group 11 QoIs (for example, azoxystrobin and pyraclostrobin). Where fungicide resistance is suspected, samples should be submitted to CCDM for testing.

Varieties with the most effective combined seedling and adult resistance include AGT-Bunyip IA (MRMS), Combat (MR/MRMS), and Neo CL (MRMSp) (Tables 14–15). Partial tolerance (MSS or better) at both stages reduces the likelihood of severe infection, but SFNB can still establish under high disease pressure, particularly in barley stubble situations.

Just over 80% of the barley area is planted to varieties rated MS or lower for SFNB at the adult stage. To reduce annual disease risk, growers should continue to implement fungicide programs, crop rotation, and limit the acreage of susceptible varieties. Sowing barley-on-barley significantly increases the risk.

Powdery mildew (PM)

Powdery mildew (PM), caused by *Blumeria graminis f. sp. hordei*, appears as fluffy white fungal growth on the surface of barley leaves. As the fungus extracts nutrients from the leaf, the surrounding tissue turns a yellowish colour. Over time, older infections become grey and may develop small black fruiting bodies. Early infection can cause yield losses of up to 25%, while later infections (post-stem elongation) typically reduce yield by around 10%.

The most effective long-term strategy for managing PM is genetic resistance, which is increasingly vital due to the emergence of *CYP51* gene mutations in the PM pathogen. These mutations have reduced the efficacy of several Group 3 DMI fungicides (for example, tebuconazole, triadimefon, and flutriafol) at label rates. Newer Group 3 DMIs and alternative modes of action, such as Group 5 amines (for example, spiroxamine), Group 7 SDHIs (for example, fluxapyroxad), and Group 11 QoIs (for example, azoxystrobin and pyraclostrobin), remain effective.



Powdery mildew

Varieties grown in WA with intermediate resistance or better (MRMS, MR, R) to PM fall into nine broad groups based on postulated or known effective resistance genes. This genetic diversity reduces the likelihood that all varieties will become susceptible simultaneously if new virulence mutations emerge. However, only varieties carrying the *mlo* gene, such as RGT Atlantis, RGT Planet, and Zena CL, have durable resistance to PM. Most other widely grown varieties remain vulnerable to evolving PM pathotypes.

Field scouting indicates increasing variation in the PM pathogen, including confirmed virulence to the *MILa* gene in southern WA. The variety Rosalind is significantly affected by this new virulence, while other varieties such as Beast, Combat, Commodus CL, Compass, and Maximus CL have shown variable responses. Close monitoring of these varieties is recommended in seasons and environments that favour mildew.

Currently, less than a tenth of the planted area is sown to varieties rated as MS or lower to PM as adult plants. Still, new pathotypes are emerging that are defeating resistance genes in varieties previously carrying tolerance to PM (e.g. Combat and Maximus CL). To reduce annual PM risk, growers should continue to use sustainable fungicide programs and limit the acreage of susceptible varieties.

Barley leaf rust (BLR)

Barley leaf rust (BLR), caused by *Puccinia hordei*, appears as small, circular to oval pustules containing light-brown powdery spores on the upper surface of leaves. In severe infections, pustules may also develop on leaf sheaths. As the crop matures, these pustules darken, producing black spores that are embedded in the leaf tissue. Severe BLR infections can lead to yield losses exceeding 30%.

Among current varieties, Rosalind (MR) has the best rating, followed by Combat, Ember, PegasusAX, RGT Atlantis, RGT Planet, and Zena CL, all of which are rated MRMS. Several of these varieties, including Combat, RGT Atlantis, RGT Planet, and Zena CL, rely on adult plant resistance (APR), which often expresses late in the season. The effectiveness of APR can vary with temperature and the genetic background of the variety.

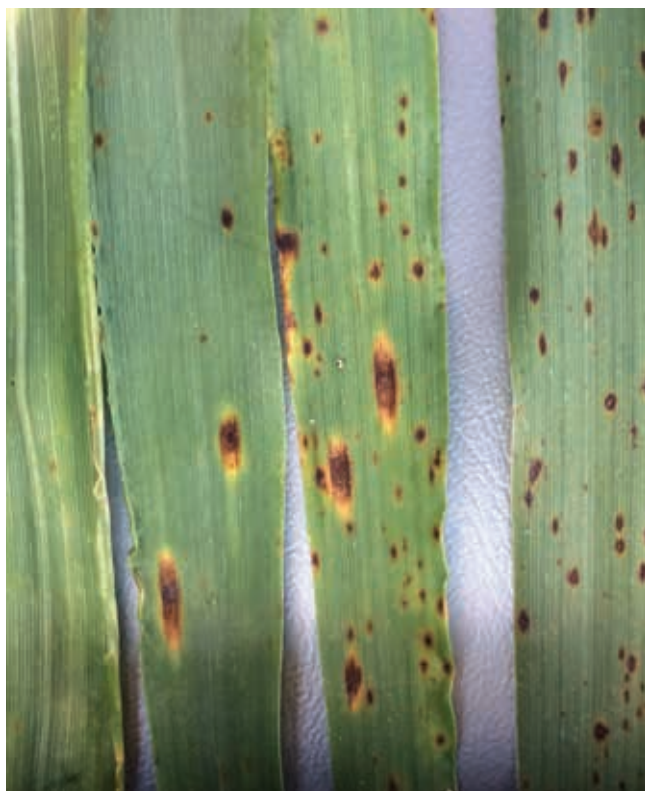
APR genes are not pathotype-specific, making them less vulnerable to future pathotype changes. However, APR develops fully only at the adult plant stage, typically after flag leaf emergence, though earlier expression can occur in some seasons. Until APR is fully active, these varieties remain susceptible to early rust infection, and fungicide protection may be necessary during early growth stages.

Currently, the majority of the barley area is planted to varieties rated MS or lower for BLR at the adult stage. To reduce BLR risk, growers should limit the planting of susceptible varieties, apply fungicides strategically, and monitor varietal performance, particularly in environments prone to rust.

Ramularia leaf spot (RLS)

Ramularia leaf spot (RLS) is caused by the fungus *Ramularia collo-cygni*. It was first detected in WA in 2018. RLS typically becomes visible after flowering, making early detection difficult. Lesions can resemble those caused by SFNB, PLS and boron toxicity. Abiotic symptoms, such as PLS, do not respond to fungicides, making an accurate diagnosis essential. Where established, RLS can cause yield losses of up to 25%.

Infected seed is the primary source of long-distance spread. Localised spread occurs via airborne spores from infected barley and grasses. Spread is favoured by prolonged leaf wetness, making medium- and high-rainfall areas more vulnerable.



Ramularia leaf spot

Varietal responses to RLS are only available from the NVT (nvt.grdc.com.au) and are based primarily on NSW outbreaks.

There are no specific management recommendations for the disease in WA. However, the fungicides currently used to manage net blotches in barley are likely to be active on RLS when applied at the booting stage. Two products are registered for RLS management, Revystar® (mefentrifluconazole + fluxapyroxad) and Elatus® Ace (benzovindiflupyr + propiconazole). As RLS is at high risk of developing fungicide resistance, sustainable rotation of fungicides should always be practised.

Crown rot (CR)

Crown rot (CR), caused by *Fusarium pseudograminearum*, is a stubble-borne fungal disease most common in cereal-based rotations. It infects the sub-crown internode, crown, and lower stems, and is typically not visible until after heading, when whiteheads may appear. Unlike take-all, whiteheads caused by CR are usually scattered throughout the crop rather than appearing in patches.

Diagnostic features include honey-brown discolouration at the base of infected tillers, often visible under leaf sheaths. Pink discolouration may also occur around the crown or beneath leaf sheaths. Browning at the tiller base is the most reliable indicator, particularly in seasons with good spring rainfall when whiteheads may not develop. Infected heads often contain shrivelled or no grain.

Management options are limited. Seed dressings are registered to suppress CR, but no foliar fungicides are available once the crop is established. The most effective strategies include rotating with non-cereal crops (for example, pulses, oilseeds, lupins, or grass-free pastures) to reduce inoculum, inter-row seeding to minimise contact with infected stubble, and maintaining grass weed control in break crops and fallows.

Varietal resistance and tolerance to CR are limited. DPIRD research in WA indicates that while varietal differences exist, most barley varieties are susceptible and suffer yield loss under high CR pressure. Of the varieties tested, Litmus has shown the lowest yield loss in the presence of severe CR infection.

Black point (BP)

Black point (BP), also known as germ-end staining, refers to a dark discolouration at the embryo end of the grain, historically attributed to fungal colonisation. However, Australian research has not confirmed a link to fungi. Instead, the darkening is believed to result from biochemical reactions, particularly involving peroxidase enzymes, during the grain-filling period, especially between the milk and dough stages of kernel development.

The BP varietal scores in Table 16 are sourced from SARDI and published on the GRDC NVT website (nvt.grdc.com.au/nvt-disease-ratings). The scoring methodology involves assessing the level of BP on 500 grains per replicate from selected GRDC barley NVT and then annualising varietal rankings against checks and historical data. Genetic variation exists. Minotaur, Neo CL, RGT Atlantis, RGT Planet, Spinnaker and Zena CL at a lower BP risk (rated as MRMS or better). Despite the availability of moderately resistant varieties, less than a fifth of the planted barley area is currently sown to varieties rated MRMS or better for BP.

Barley and cereal yellow dwarf (BYD/CYD)

Both barley yellow dwarf (BYD) and cereal yellow dwarf (CYD) viruses are present in WA, with BYD occurring approximately twice as frequently as CYD. Resistance screening is conducted under field conditions, so varietal resistance scores reflect the combined impact of both viruses. Early seedling infection by BYD can result in yield losses of up to 80%. Later infections (post-tillering) may reduce yield by up to 20%. Infected plants often exhibit stunted growth, leaf yellowing, and reduced tillering. Barley plants are primarily infected by aphids, including those of the species *Rhopalosiphum padi* (oat aphids) or *Rhopalosiphum maidis* (corn leaf aphids).

Varietal resistance helps reduce the impact of the virus but does not prevent aphid feeding damage. Even in resistant varieties, aphid control is essential to prevent yield loss. Aphids must be sprayed once they reach threshold levels in the crop (50% of tillers with 15 or more aphids) to prevent yield loss from feeding damage.

Root lesion nematode (RLN)

Root lesion nematodes (RLN) caused by *Pratylenchus* species, are microscopic, worm-like organisms that feed on plant roots, reducing water and nutrient uptake and causing yield losses in susceptible crops such as barley, wheat, and canola. RLN populations increase when susceptible crops and varieties are repeatedly grown, thereby raising the risk of economic damage. In WA, RLN infestations occur across approximately 6.25 million hectares, covering nearly 74% of the winter cropping area. The most common species is *Pratylenchus neglectus* (found in 70% of paddocks), followed by *Pratylenchus quasitereoides*. Many paddocks contain multiple RLN species. These nematodes can limit barley and wheat yields in over 50% of infested paddocks, with yield losses of up to 18% in barley.

Effective RLN management begins with identifying paddocks with yield-limiting nematode populations. Key strategies include rotating with resistant crops, using resistant varieties, or implementing fallow periods to reduce nematode numbers. Incorporating non-host crops such as

pulses, oilseeds, lupins, or grass-free pastures can suppress RLN populations. Additionally, understanding the species-specific feeding preferences of nematode species allows for more effective and tailored crop rotations.

The resistance scores in this guide are based on glasshouse and field trials conducted in WA. Varieties tested in fewer than 5 trials or lacking field verification of glasshouse ratings are assigned provisional ratings.

Cereal cyst nematode (CCN)

Cereal cyst nematode (CCN), caused by *Heterodera australis*, is present in cropping regions around Geraldton, Esperance, and the Avon Valley, but can occur sporadically across the WA grain belt. CCN feeds on cereals and grasses, causing significant yield losses in wheat and oats. Barley is more tolerant, and yield loss is generally limited, even when infection occurs. Planting CCN-resistant wheat and barley varieties helps suppress the development of nematodes. Rotating with grass-free legumes or pasture reduces the populations of CCN in the soil. These practices help retard nematode development and lower the risk of future crop damage. CCN resistance ratings in this guide are not based on WA trials. Ratings should be considered indicative only, and not definitive for WA conditions.



Cereal cyst nematode

Table 14: Seedling (2– to 3–leaf stage) leaf disease resistance profiles when grown in WA

Disease ¹	Scald	Net-form net blotch ⁴		Spot-form net blotch	Powdery mildew ⁵	Barley leaf rust
Pathotype ²	Medina	Beecher avirulent (97NB1)	Oxford virulent (EDRS)	(South Perth)	(South Perth)	(5457 P-)
Growth stage ³	Seedling	Seedling	Seedling	Seedling	Seedling	Seedling
Deliverable as a malt variety						
Cyclops	–	MRMS	MSS	MS	RMR	S
Laperouse	–	MRMS	S	MSS	R#	S
Maximus CL	–	MS	S	MRMS	R#	S
Neo CL	–	MR	MS	MRMS	R	S
RGT Planet	–	MS	SVS	S	R	MSS
Stage 2 malt accreditation						
Spinnaker	–	MRMS	MS	MSS	R	MSS
Titan AX	–	MS	SVS	MS	R#	S
Deliverable as a feed variety						
AGT-Bunyip IA	–	MSS	MRMS	MRMS	S	MSS
Beast	–	MS	S	MS	MR#	S
Bigfoot CL	–	MRMS	MS	MS	RMR#	S
Buff	–	MRMS	MSS	MSS	SVS	SVS
Combat	–	MS	SVS	MR	RMR#	S
Commodus CL	–	MS	MSS	MRMS	R#	S
Compass	–	MS	S	MRMS	R#	S
Ember	–	MRMS	MRMS	MS	R	S
Granite CL	–	R _p	MS _p	MRMS _p	R _p #	MS _p
Kirwan CL	–	MRMS _p	MS _p	MS _p	RMR _p #	Sp
La Trobe	–	MRMS	MSS	SVS	MS	MS
Litmus	–	MSS	S	MS	R	S
Minotaur	–	MRMS	MS	S	S	S
PegasusAX	–	MRMS	MS	MS	S	MSS
RGT Atlantis	–	MRMS	MS	MSS	R	MSS
Rocket CL	–	MSS _p	SVSp	MRMS _p	Sp	MSS _p
Rosalind	–	MR	MSS	MS	MSS	MRMS
Scope CL	–	MR	MSS	MS	MR	S
Soldier CL	–	–	–	–	–	–
Spartacus CL	–	MRMS	MSS	SVS	S	S
Zena CL	–	MRMS	S	MSS	R	MSS

Source: Sanjiv Gupta and NVT, nvt.grdc.com.au

¹ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, # = reaction may differ in presence of alternative pathotypes, *p* = provisional rating, – = no rating available Refer to page 4 for interpreting resistance classification.

² Pathotype: strain of the pathogen used in evaluating the disease reaction of the different barley varieties, which represents the most common pathotype present in WA. Therefore, on-farm reactions of varieties may differ if the pathotype present differs from the pathotype used in testing.

³ Growth stage: the seedling resistance score reflects resistance at the 2 to 3–leaf stage. Use data cautiously after the 4–leaf stage. Varieties with a VS or S rating at the seedling stage are at a higher risk of early infection.

⁴ Net-form net blotch: 2 pathotypes (97NB1 and Oxford) of NFNB are present in WA. The Beecher avirulent (97NB1) pathotype is dominant, while the Oxford virulent pathotype is increasing in prevalence across the state.

⁵ Powdery mildew: varieties with a VS or S rating at the seedling stage should be treated with a seed dressing active against PM to prevent early infection during the tillering phase. Resistant varieties (non-*mlo*) may show a variable reaction to strains of PM present in the southern regions of WA. Varieties with an asterisk (#) should be monitored for reaction to PM following reports of increased virulence.

Table 15: Adult (after flag leaf emergence) leaf disease resistance profiles when grown in WA

Disease ¹	Scald	Net-form net blotch ⁴		Spot-form net blotch	Powdery mildew ⁵	Barley leaf rust
Pathotype ²	Medina	Beecher avirulent (97NB1)	Oxford virulent (EDRS)	(South Perth)	(South Perth)	(5457 P-)
Growth stage ³	Adult	Adult	Adult	Adult	Adult	Adult
Deliverable as a malt variety						
Cyclops	MRMS#	MRMS	MS	MSS	MR	S
Laperouse	S	MRMS	MS	MSS	MR#	MSS
Maximus CL	MR#	MRMS	MSS	MSS	RMR#	S
Neo CL	MRMS#	MR	MS	MRMS	R	MSS
RGT Planet	MR	MS	SVS	S	R	MRMS (late APR)
Stage 2 malt accreditation						
Spinnaker	MRMS	MRMS	MSS	MSS	R	MS
Titan AX	S	MRMS	MS	MSS	RMR#	S
Deliverable as a feed variety						
AGT-Bunyip IA	MS	S	MS	MRMS	MS	MSS
Beast	S	MS	MSS	S	MR#	S
Bigfoot CL	S	MRMS	MRMS	MS	RMR#	S
Buff	MS	MRMS	MS	S	S	S
Combat	S	MS	MS	MRMS	RMR#	MRMS (late APR)
Commodus CL	MSS	MRMS	MSS	MSS	MR#	S
Compass	MS	MS	MSS	MSS	RMR#	S
Ember	MRMS	MRMS	MRMS	MS	R	MRMS
Granite CL	MS _p	MR _p	MS _p	MS _p	R _p #	Sp
Kirwan CL	Sp	MRMS _p	MRMS _p	Sp	R _p #	Sp
La Trobe	MR#	MS	MSS	S	MS	MSS
Litmus	SVS	MS	S	S	RMR	S
Minotaur	VS	MRMS	MS	S	S	S
PegasusAX	MS	MR	MRMS	MSS	MRMS	MRMS
RGT Atlantis	MR#	MRMS	MS	MSS	R	MRMS (late APR)
Rocket CL	MSS _p	Sp	MS _p	Sp	MRMS _p #	Sp
Rosalind	MSS	MR	MS	S	MSS	MR
Scope CL	MS	MRMS	MS	S	MR	MSS
Soldier CL	–	–	–	–	–	–
Spartacus CL	MR#	MS	MSS	SVS	MS	MSS
Zena CL	MR	MRMS	MSS	SVS	R	MRMS (late APR)

Source: Sanjiv Gupta and NVT, nvt.grdc.com.au

¹ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, # = reaction may differ in presence of alternative pathotypes, *p* = provisional rating, – = no rating available Refer to page 4 for interpreting resistance classification.

² Pathotype: strain of the pathogen used in evaluating the disease reaction of the different barley varieties, which represents the most common pathotype present in WA. Therefore, on-farm reactions of varieties may differ if the pathotype present differs from the pathotype used in testing.

³ Growth stage: the seedling resistance score reflects resistance at the 2 to 3-leaf stage. Use data cautiously after the 4-leaf stage. Varieties with a VS or S rating at the seedling stage are at a higher risk of early infection.

⁴ Net-form net blotch: 2 pathotypes (97NB1 and Oxford) of NFNB are present in WA. The Beecher avirulent (97NB1) pathotype is dominant, while the Oxford virulent pathotype is increasing in prevalence across the state.

⁵ Powdery mildew: varieties with a VS or S rating at the seedling stage should be treated with a seed dressing active against PM to prevent early infection during the tillering phase. Resistant varieties (non-*mlo*) may show a variable reaction to strains of PM present in the southern regions of WA. Varieties with an asterisk (#) should be monitored for reaction to PM following reports of increased virulence.

Table 16: Black point, virus and nematode resistance profiles when grown in WA

Issue ¹	Black point	Barley and cereal yellow dwarf ³	Root lesion nematode ⁴		Cereal cyst nematode ⁵
Species	–	–	<i>Pratylenchus neglectus</i>	<i>Pratylenchus quasitereoides</i>	<i>Heterodera australis</i>
Growth stage ²	Adult	Seedling & Adult	Seedling & Adult	Seedling & Adult	Seedling & Adult
Deliverable as a malt variety					
Cyclops	MSS	MSS	–	MSS	S
Laperouse	MSS	MRMS	–	MS	S
Maximus CL	MSS	MRMS	–	S	R
Neo CL	MRMS _p	MRMS	–	Sp	R
RGT Planet	MRMS	MRMS	MSS	MS	R
Stage 2 malt accreditation					
Spinnaker	MRMS	MRMS	–	MS _p	S
Titan AX	MSS	MS	–	MS _p	MR
Deliverable as a feed variety					
AGT-Bunyip IA	MSS _p	MRMS	–	–	R
Beast	MSS	MS	–	MSS	MR
Bigfoot CL	Sp	MS	–	MSS _p	R
Buff	MS	MRMS	–	S	–
Combat	MSS	MSS	–	Sp	MR
Commodus CL	MS	MS	–	MS	R
Compass	MSS	MSS	MSS	S	R
Ember	–	MRMS	–	Sp	R
Granite CL	–	MRMS _p	–	–	–
Kirwan CL	–	MRMS _p	–	–	MR _p
La Trobe	MSS	MSS	MS	S	R
Litmus	MS	MSS	–	MSS _p	MS
Minotaur	MRMS	MS	–	MS	R
PegasusAX	MSS _p	MRMS	–	MSS _p	R
RGT Atlantis	MRMS _p	MRMS	–	Sp	R
Rocket CL	–	MRMS _p	–	–	–
Rosalind	MS	MS	–	MSS	R
Scope CL	MS	MRMS	MSS	MRMS	S
Soldier CL	–	–	–	–	–
Spartacus CL	MSS	MS	MSS	MSS	R
Zena CL	MRMS _p	MS	–	MS _p	R

Source: Tara Garrard, Sanjiv Gupta, Carla Wilkinson, Sarah Collins and NVT, nvt.grdc.com.au

¹ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, # = reaction may differ in presence of alternative pathotypes, p = provisional rating, – = no rating available Refer to page 4 for interpreting resistance classification.

² Growth stage: the resistance to barley and cereal yellow dwarf virus and the varietal impacts on nematode numbers do not differ between growth stages. It applies equally throughout the life of the plant.

³ Barley and cereal yellow dwarf: plants become infected from infected oat and corn leaf aphids. Varietal resistance reduces the effect of the virus on plant growth, but does not reduce the impact of aphid feeding on plant growth.

⁴ Root lesion nematode: barley varieties vary in the impact of root-lesion nematode on their growth. A resistant variety retards nematode development, leading to lower nematode levels in the soil for subsequent crops. Ratings are based on data collected in WA.

⁵ Cereal cyst nematode: all barley varieties are tolerant of CCN, but a resistant variety retards nematode development, leading to lower nematode levels in the soil for subsequent crops. CCN resistance data is based on variety responses in SA.

Variety snapshots

Blakely Paynter (DPIRD)

Variety snapshots are presented for:

- **Malt varieties to be segregated in WA at the 2026–27 harvest (5):** Cyclops, Laperouse, Maximus CL, Neo CL and RGT Planet. These are deliverable into malt barley segregations as per the GIWA Western Australian malt barley variety receival recommendations for the 2026–27 harvest.
- **Stage 2 malt accreditation (2):** Spinnaker and Titan AX are undergoing Stage 2 malting and brewing assessment with Grains Australia. These are deliverable into feed barley segregations unless they become part of the GIWA malt barley receival recommendations.
- **Deliverable as a feed variety (21):** AGT-Bunyip IA, Beast, Bigfoot CL, Buff, Combat, Commodus CL, Compass, Ember, Granite CL, Kirwan CL, La Trobe, Litmus, Minotaur, PegasusAX, RGT Atlantis, Rocket CL, Rosalind, Scope CL, Soldier CL, Spartacus CL and Zena CL. These are deliverable into feed barley segregations.

Each snapshot includes key agronomic and quality traits, highlighting yield performance, strengths, and weaknesses. Yield comparisons are based on data from the Long Term MET Yield Reporter (available at NVT online, nvt.grdc.com.au), presented relative to a control variety, typically Maximus CL, rather than the site mean yield shown in Tables 4–10. Additionally, single-site MET data presented in Tables 11–13 is used to indicate the likelihood of a variety yielding less, the same, or more than another when grown under identical agronomic conditions.

Disease resistance ratings for grain varieties are primarily sourced from DPIRD under a service agreement with GRDC for the NVT system. Where data gaps exist, supplementary information may be obtained from AGT, InterGrain, RAGT and SECOBRA Recherches. Ratings for diseases and nematodes are presented for adult plant stages (where available) and are based on data from Tables 14–16.

Phenology data is generated using DPIRD's predictive model, FlowerPower barley (fp.dpiird.app/). This statistical tool estimates the date of the awn emergence (Z49) for barley in 2 WA environments, Northam and Katanning, based on historical temperature data (sourced from the SILO database: longpaddock.qld.gov.au/silo/point-data/).

Predictions are provided for 4 sowing dates: 15 April, 5 May, 25 May and 15 June. The phenology data shown in the snapshots reflect the median predicted date to Z49 (that is, the date expected in 50% of seasons), based on FlowerPower barley version v2025.02.24. Varieties have been graded on their phenology relative to Stirling, where very early = -15 to -4 days, early = -3 to +3 days, medium = +4 to +10 days and late = +11 to +17 days after Stirling when sown on 5 May at Northam. Maturity ranking with an early May sowing may differ from that when crops are planted in April or after mid-June. Where DPIRD collected data is not yet available in 'FlowerPower', unpublished or breeder information is used.

The comment section in each snapshot describes essential varietal characteristics, including yield relative to other varieties, key weaknesses and strengths (including, where appropriate, disease resistance, straw strength, and head loss), and relevant market information for varieties segregated as malt.

Agronomic characteristics are compiled from multiple sources, including DPIRD trials, GRDC co-funded projects (DAW00190 and DAW00224) and, in some cases, from the breeder. Traits covered include:

- **Coleoptile length:** short = 40–60 mm, medium = 60–80 mm, long = 80–100 mm, very long = 100–120 mm and extremely long ≥ 120 mm. At DPIRD, the coleoptile lengths were measured after germinating seeds in rolled, moistened filter paper for 15 days at 15 °C in the dark. The data was sourced from DPIRD and breeder brochures.
- **Plant height:** plant height to the base of the ear (cm) at maturity at sites where the straw of control varieties (for example, Compass, Scope CL, and Stirling) was 65–75 cm long. Very short ≤ 45 cm, short = 45–55 cm, medium = 55–65 cm and tall = 65–75 cm. Data from DPIRD-GRDC, DPIRD internal agronomy trials and breeder brochures.

- **Lodging resistance:** straw strength is based on lodging scores taken at maturity and ranked relative to control varieties. Data from DPIRD-GRDC, DPIRD internal agronomy trials and breeder brochures.
- **Head loss:** head loss risk, assessed in small plot trials and ranked based on counting heads post-harvest at sites where high levels of head loss were recorded in high-risk varieties (for example, Scope CL). Data from DPIRD-GRDC, DPIRD internal agronomy trials and breeder brochures.
- **Grain protein:** grain protein deviation (relative to the average) as calculated and ranked using NVT (2005–24) and DPIRD-GRDC-funded barley agronomy trials (2006–24). Lower = <-0.3%, slightly lower = -0.3 to -0.1%, average = -0.1 to +0.1%, slightly higher = +0.1 to +0.3% and higher = > +0.3%. Grain protein deviation analyses the relationship between

grain yield and grain protein concentration in barley varieties grown under similar management and environmental conditions in WA. A typical relationship exists in which grain yield increases and grain protein concentration decreases (yield dilution). Deviations from the relationship between grain yield and grain protein were used to classify varieties based on their grain protein deviation and determine relative levels of inherent grain protein concentration.

Details on seed licensees, trading restrictions, and End Point Royalties (EPRs) are sourced from breeding companies, Variety Central (varietycentral.com.au/) and IP Australia's Plant Breeders' Rights database (ipsearch.ipaustralia.gov.au/pbr/).



Cyclops^(b)

Deliverable as a malt variety

Comments

Cyclops (AGTB0200) is a medium-height, medium-spring, 2-row malt barley. It is being assessed for multiple export opportunities, including grain, malt, and shochu production in Japan. Cyclops does not carry tolerance to Clearfield® or CoAXium® herbicides. It has a short coleoptile and should not be sown deep. Cyclops shares the erect growth habit of Maximus CL but has different genetics. Its early vigour and plant height are comparable to Maximus CL, although it is more prone to lodging under high nitrogen input. Across 134 WA barley NVT trials (2020–24), Cyclops yielded less than Maximus CL in 18% of trials, the same in 33%, and higher in 49%. It is a higher-yielding option in environments producing more than 4 t/ha. Cyclops provides valuable resistance to NFNB (Beecher avirulent), and PM. However, management is required for NFNB (Oxford virulent), SFNB, and BLR, as well as emerging pathotypes of Sc. In terms of grain quality, Cyclops has similar grain plumpness to Maximus CL but a lower hectolitre weight, suggesting a slightly lower probability of meeting MALT1 receival standards. Target production zones for 2026 include limited segregations in the Albany and Esperance port zones.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	105	96	105	100	99
Agzone 2	100	104	103	103	101
Agzone 3	102	111	107	104	105
Agzone 4	94	102	107	97	98
Agzone 5	99	106	108	104	103
Agzone 6	109	107	109	103	107
Statewide	101	106	106	103	102
Disease resistance	Seedling		Adult		
Sc	–		MRMS#		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MSS		MS		
SFNB	MS		MSS		
PM	RMR		MR		
BLR (5457P-)	S		S		
BP	–		MSS		
BYD and CYD	MSS		MSS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MSS		MSS		
CCN	S		S		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	+0	+3	+1	+0	
Katanning	+1	+3	+1	+0	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Grain protein deviation	Average				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t, excl. GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

Laperouse^(b)

Deliverable as a malt variety

Comments

Laperouse (WI4592) is a medium-height, medium-spring, 2-row malt barley. It is being assessed for multiple export opportunities, including grain, malt, and shochu production in Japan. Laperouse offers good straw strength and head retention but does not carry tolerance to Clearfield® or CoAXium® herbicide technologies. Across 134 WA barley NVT trials (2020–24), Laperouse yielded less than Maximus CL in 32% of trials, matched it in 43%, and outperformed it in 25%. Yield comparisons indicate that Laperouse and Maximus CL perform similarly across a range of site yields. Grain quality assessments show that Laperouse generally achieves a hectolitre weight comparable to Maximus CL, with slightly improved grain retention and a lower grain protein concentration at equivalent yields. These characteristics suggest that Laperouse has a similar likelihood of meeting MALT1 receival standards as Maximus CL. Laperouse provides good tolerance to NFNB (Beecher avirulent) but requires management for Sc, NFNB (Oxford virulent), SFNB, and BLR and emerging pathotypes of PM. Target production zones for 2026 include limited segregations in the Kwinana-South and Albany port zones.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	101	94	101	96	95
Agzone 2	97	100	99	100	98
Agzone 3	99	106	103	101	101
Agzone 4	94	98	104	94	96
Agzone 5	95	101	103	100	100
Agzone 6	103	103	103	100	102
Statewide	97	101	102	99	98
Disease resistance	Seedling		Adult		
Sc	–		S		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	S		MS		
SFNB	MSS		MSS		
PM	R#		MR#		
BLR (5457P-)	S		MSS		
BP	–		MSS		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MS		MS		
CCN	S		S		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	+0	+3	+3	+1	
Katanning	+5	+7	+6	+4	
Agronomic traits					
Early growth habit	Intermediate				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Grain protein deviation	Slightly lower				
Variety information					
Breeder / Seed licensee	SECOBRA Recherches / Seednet				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$3.80				

Refer to page 4 for interpreting resistance classification.

Maximus[Ⓛ] CL

Deliverable as a malt variety

Comments

Maximus CL (IGB1705T) is a medium-height, early-spring, 2-row malt barley. It is accepted for export as both grain and malt and is preferred for shochu production in Japan. Maximus CL has a short coleoptile and should not be sown deep. Across 55 WA barley NVT trials (2023–24), Maximus CL yielded less than Neo CL in 38% of trials, the same in 16%, and higher in 45%, performing better in environments yielding less than 3 t/ha. Maximus CL is considered the new benchmark for grain quality, except for BP. It produces plumper grain than Spartacus CL with a similar hectolitre weight, resulting in a higher probability of meeting MALT1 receival standards. Growers should use only recommended imidazolinone herbicides and remain aware of market advice regarding grain delivery from paddocks treated with these products. Maximus CL is most at risk from NFNB (Oxford virulent), SFNB, and BLR, with increasing reports of changing Sc and PM virulence on this variety. Maximus CL should be grown using non-chemical control methods to reduce disease pressure, planted in rotations that minimise disease carryover, and sprayed only if necessary, in a strategic manner with different modes of action. It appears to have a low risk of head loss. Target production zones in 2026 include Kwinana, Albany and Esperance port zones.

Yield (% Rosalind)	2020	2021	2022	2023	2024
Agzone 1	94	97	95	93	98
Agzone 2	99	98	96	96	97
Agzone 3	102	98	98	100	100
Agzone 4	96	104	97	100	104
Agzone 5	105	99	101	104	101
Agzone 6	102	96	101	100	101
State wide	101	99	98	99	100
Disease resistance	Seedling		Adult		
Sc	–		MR#		
NFNB (Beecher avirulent)	MS		MRMS		
NFNB (Oxford virulent)	S		MSS		
SFNB	MRMS		MSS		
PM	R#		RMR#		
BLR (5457P-)	S		S		
BP	–		MSS		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	S		S		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Rosalind				
	15-Apr	05-May	25-May	15-Jun	
Northam	+10	+3	+2	+3	
Katanning	+9	+3	+1	+2	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Grain protein deviation	Slightly higher				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$4.25				

Refer to page 4 for interpreting resistance classification.

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

Neo[Ⓛ] CL

Deliverable as a malt variety

Comments

Neo CL (IGB22102T) is a medium-height, medium-spring, 2-row malt barley. It is currently being evaluated for multiple export markets, including grain, malt, and shochu production in Japan. The variety carries tolerance to imidazolinone herbicides; however, growers should use only recommended products and remain informed about market requirements for grain delivery from treated paddocks. It demonstrates early vigour comparable to RGT Planet but is shorter in height at maturity and offers improved lodging resistance. In 55 WA NVT barley trials (2023–24), Neo CL yielded lower than Maximus CL in 45% of cases, equal in 16%, and higher in 38%. It exhibits a yield advantage over Maximus CL at high-yielding sites (greater than 5 t/ha), but tends to underperform when site yields fall below 3 t/ha. The likelihood of meeting MALT1 receival standards is expected to be lower than Maximus CL (due to lower hectolitre weight) but higher than RGT Planet (due to improved retention). Neo CL provides useful resistance to NFNB (Beecher avirulent), SFNB, and PM. However, it may require management for Sc, NFNB (Oxford virulent), and BLR. Target production zones for 2026 include the Albany and Esperance port zones, with limited segregation available in the Kwinana-South region.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	102	99
Agzone 2	–	–	–	103	107
Agzone 3	–	–	–	98	108
Agzone 4	–	–	–	82	90
Agzone 5	–	–	–	93	100
Agzone 6	–	–	–	100	106
State wide	–	–	–	97	102
Disease resistance	Seedling		Adult		
Sc	–		MRMS#		
NFNB (Beecher avirulent)	MR		MR		
NFNB (Oxford virulent)	MS		MS		
SFNB	MRMS		MRMS		
PM	R		R		
BLR (5457P-)	S		MSS		
BP	–		MRMS _p		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	Sp		Sp		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	+2	+3	+3	+3	
Katanning	+5	+4	+5	+5	
Agronomic traits					
Early growth habit	Semi-prostrate				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Medium				
Grain protein deviation	Lower				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$4.25				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

RGT Planet^(b)

Deliverable as a malt variety

Comments

RGT Planet (SFR85-104) is a medium-height, medium-spring, 2-row malt barley. It is preferred for export malt due to its consistent malting performance without the need for gibberellic acid, offering processing efficiencies for maltsters. However, its initial advantages in WA have diminished due to its phenotype not matching recent seasonal conditions, the release of newer varieties, and increasing disease susceptibility, leading to a decline in grower adoption. Across 134 WA NVT barley trials (2020–24), RGT Planet yielded less than Maximus CL in 63% of cases, matched in 14%, and exceeded in 23%. On average, it yields approximately a third of a tonne less than Maximus CL across varying site potentials. Effective disease management is essential, particularly for NFNB and SFNB, to which it is susceptible, as well as emerging pathotypes of Sc. RGT Planet should be grown using integrated disease management strategies, including crop rotation and strategic fungicide use with varied modes of action. Currently, the supply of MALT1-grade RGT Planet is insufficient to meet end-user demand. Target production zones for 2026 are limited to niche or on-farm segregations within the Kwinana-South port zone.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	104	85	101	89	85
Agzone 2	90	98	101	94	96
Agzone 3	94	108	104	92	94
Agzone 4	87	86	103	73	79
Agzone 5	76	96	94	83	91
Agzone 6	99	108	103	91	95
Statewide	90	98	102	90	91
Disease resistance	Seedling		Adult		
Sc	–		MR#		
NFNB (Beecher avirulent)	MS		MS		
NFNB (Oxford virulent)	SVS		SVS		
SFNB	S		S		
PM	R		R		
BLR (5457P-)	MSS		MRMS (late APR)		
BP	–				
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	MSS		MSS		
RLN (<i>P. quasitereoides</i>)	MS		MS		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-3	+1	+3	+3	
Katanning	+0	+4	+5	+5	
Agronomic traits					
Early growth habit	Semi-prostrate				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Grain protein deviation	Slightly lower				
Variety information					
Breeder / Seed licensee	RAGT Semences				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

Spinnaker^(b)

Stage 2 malt accreditation

Comments

Spinnaker (SCA21-Y003) is a medium-height, early-spring, 2-row barley. It is currently undergoing Stage 2 Malt Accreditation with Grains Australia, with the earliest possible accreditation date in March 2026. End-user interest is emerging, as Spinnaker appears to offer a malt quality profile similar to RGT Planet and may be malted without the use of processing aids. Spinnaker combines good straw strength with excellent head retention but does not carry tolerance to Clearfield® or CoAXium® herbicides. In 97 WA NVT barley trials (2020–24), it yielded less than Maximus CL in 56% of cases, matched in 14%, and exceeded in 30%. Across varying NVT site potentials, Spinnaker showed lower grain yield, hectolitre weight, and retention compared to Maximus CL. If received, its probability of meeting MALT1 specifications is expected to be lower than Maximus CL but slightly higher than RGT Planet. Like RGT Planet, Spinnaker is sensitive to NFNB and SFNB. Integrated disease management, including crop rotation and strategic fungicide use with varied modes of action, will be necessary to manage diseases effectively. If accredited, Spinnaker may be a viable option for domestic malt supply, particularly in western areas of the Kwinana port zone, if a production premium is offered.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	103	94	90
Agzone 2	–	99	103	97	99
Agzone 3	–	107	103	94	95
Agzone 4	–	–	103	80	83
Agzone 5	–	–	95	86	92
Agzone 6	–	107	101	92	95
Statewide	–	99	102	92	93
Disease resistance	Seedling		Adult		
Sc	–		MRMS		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MS		MSS		
SFNB	MSS		MSS		
PM	R		R		
BLR (5457P-)	MSS		MS		
BP	–		MRMS		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MS _p		MS _p		
CCN	S		S		
'FlowerPower' predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-prostrate				
Coleoptile length	–				
Plant height	Medium				
Straw strength	Good				
Head loss risk	–				
Grain protein deviation	Average				
Variety information					
Breeder / Seed licensee	SECOBRA Recherches / Seednet				
Access to seed	Seednet Partners				
EPR (\$/t, excl. GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Titan AX[Ⓛ]

Stage 2 malt accreditation

Comments

Titan AX (AGTB0325) is a tall, medium-spring, 2-row barley, featuring CoAXium® herbicide tolerance. It is currently in Stage 2 of the Grains Australia Malt Accreditation process, with the earliest possible accreditation date in March 2026. Titan AX shares a genetic background with Compass and is best suited to low- to medium-rainfall environments where early vigour, longer straw, and minimal lodging risk are preferred. While it performs well in these conditions, straw strength may be a concern in longer-season or high-yielding environments, with head loss risk expected to be similar to Compass. In 89 WA NVT barley trials (2021–24), Titan AX yielded less than Maximus CL in 40% of cases, matched in 17%, and exceeded in 43%. Overall, the two varieties perform similarly across varying site potentials. Titan AX shows resistance to NFNB (Beecher avirulent) but will require management for Sc, NFNB (Oxford virulent), SFNB, and BLR, as well as emerging pathotypes of PM. It has a medium fermentability profile similar to Commodus CL. However, with Commodus CL removed from segregation plans for the 2026–27 harvest due to weak market demand for that fermentability profile, Titan AX may face similar market limitations if accredited and is therefore unlikely to be segregated in WA.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	103	98	93
Agzone 2	–	–	99	103	97
Agzone 3	–	–	103	104	99
Agzone 4	–	–	107	94	93
Agzone 5	–	104	103	101	99
Agzone 6	–	–	98	99	104
Statewide	–	102	103	101	97
Disease resistance	Seedling		Adult		
Sc	–		S		
NFNB (Beecher avirulent)	MS		MRMS		
NFNB (Oxford virulent)	SVS		MS		
SFNB	MS		MSS		
PM	R#		RMR#		
BLR (5457P-)	S		S		
BP	–		MSS		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MS _p		MS _p		
CCN	MR		MR		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Tall				
Straw strength	Fair				
Head loss risk	Medium				
Grain protein deviation	Average				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t, excl. GST)	\$4.55				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

AGT-Bunyip IA[Ⓛ]

Deliverable as a feed variety

Comments

AGT-Bunyip IA (AGTB0530) is a medium-height, medium-spring, 2-row barley. It is currently undergoing Stage 1 of the Grains Australia Malt Accreditation program, with the earliest possible accreditation date in March 2027. AGT-Bunyip IA is the first barley variety globally to offer dual herbicide tolerance, resistant to both imidazolinone herbicides and Aggressor® AX (quizalofop-p-ethyl). This enables sowing into imidazolinone soil residues and in-crop spraying with either herbicide, providing growers greater flexibility in managing residue carryover and controlling key weeds such as brome grass, barley grass, annual ryegrass, wild oats, and volunteer wheat. In 55 WA NVT barley trials (2023–24), AGT-Bunyip IA yielded lower than Maximus CL in 13% of cases, matched in 58%, and exceeded in 29%. Its yield response across environments was consistent with Maximus CL, indicating similar performance as site potential varied. The variety shows moderate resistance to SFNB but may need management for Sc, NFNB, PM, and BLR. A broad-spectrum fungicide program, aligned with integrated disease management practices, will be necessary to maintain crop health.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	103	100
Agzone 2	–	–	–	103	102
Agzone 3	–	–	–	102	101
Agzone 4	–	–	–	98	96
Agzone 5	–	–	–	100	100
Agzone 6	–	–	–	102	102
Statewide	–	–	–	101	100
Disease resistance	Seedling			Adult	
Sc	–			MS	
NFNB (Beecher avirulent)	MSS			S	
NFNB (Oxford virulent)	MRMS			MS	
SFNB	MRMS			MRMS	
PM	S			MS	
BLR (5457P-)	MSS			MSS	
BP	–			MSS _p	
BYD and CYD	MRMS			MRMS	
RLN (<i>P. neglectus</i>)	–			–	
RLN (<i>P. quasitereoides</i>)	–			–	
CCN	R			R	
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	–				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t, excl. GST)	\$5.50				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Beast^(b)

Deliverable as a feed variety

Comments

Beast (AGTB0113) is a tall, early-spring, 2-row feed barley developed for low- to medium-rainfall environments. It combines the genetics of Compass and Hindmarsh and shares a similar plant type to Compass, including comparable lodging risk. Beast offers strong early vigour, aiding weed suppression, and is particularly well suited to sub-3 t/ha environments where its taller straw and longer coleoptile provide agronomic advantages. In 134 WA NVT barley trials (2020–24), Beast yielded less than Maximus CL in 13% of cases, matched in 39%, and exceeded in 49%. Its performance is strongest in lower-yielding environments. Beast may be vulnerable to Sc, NFNB, SFNB, and BLR. It has good PM tolerance but can show variable responses across WA in the presence of other pathotypes.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	103	98	103	109	102
Agzone 2	101	99	100	107	101
Agzone 3	97	106	100	108	101
Agzone 4	102	100	105	111	104
Agzone 5	104	106	104	107	103
Agzone 6	100	102	94	105	104
Statewide	100	102	101	107	102
Disease resistance	Seedling		Adult		
Sc	–		S		
NFNB (Beecher avirulent)	MS		MS		
NFNB (Oxford virulent)	S		MSS		
SFNB	MS		S		
PM	MR#		MR#		
BLR (5457P-)	S		S		
BP	–		MSS		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MSS		MSS		
CCN	MR		MR		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-8	-3	-3	-5	
Katanning	-5	+0	+0	-2	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Tall				
Straw strength	Fair				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t, excl. GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

Bigfoot CL^(b)

Deliverable as a feed variety

Comments

Bigfoot CL (AGTB0669) is a medium-height, medium-spring, 2-row feed barley developed as an alternative to imidazolinone-tolerant lines such as Commodus CL, Granite CL, and Maximus CL. It features a long coleoptile, supporting improved establishment under deeper sowing conditions. Bigfoot CL shares a Compass-type plant structure with Commodus CL but offers shorter straw and improved lodging tolerance. In 42 WA NVT barley trials (2023–24), Bigfoot CL outperformed Commodus CL in 69% of cases and matched in 31%. Compared to Maximus CL, it yielded lower in 21% of trials, similar in 52%, and higher in 26%. Bigfoot CL shows useful resistance to NFNB, but will likely require management for Sc, SFNB, and BLR. It may be susceptible to emerging pathotypes of PM.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	98
Agzone 2	–	–	–	104	99
Agzone 3	–	–	–	–	100
Agzone 4	–	–	–	–	99
Agzone 5	–	–	–	105	101
Agzone 6	–	–	–	–	103
Statewide	–	–	–	104	100
Disease resistance	Seedling		Adult		
Sc	–		S		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MS		MRMS		
SFNB	MS		MS		
PM	RMR#		RMR#		
BLR (5457P-)	S		S		
BP	–		Sp		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MSSp		MSSp		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Long				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	–				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t, excl. GST)	\$4.35				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Buff[Ⓛ]

Deliverable as a feed variety

Comments

Buff (IGB1506) is a medium-height, early-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. It carries aluminium tolerance genetics similar to Litmus but differs in having a white aleurone. Buff has a short coleoptile and may present a moderate risk of head loss. Buff performs competitively with feed and malt varieties on non-acidic soils, except where imidazolinone herbicides are used. In 93 WA NVT barley trials (2020–24), Buff yielded higher than Litmus in 62% of cases, matched in 18%, and lower in 20%. Across 134 WA barley NVT (2020–24), Buff has yielded less than Maximus CL in 54%, the same in 27% and higher in 19%. Fungicides may be required to manage Sc, SFNB, PM and BLR.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	102	95	99	99	91
Agzone 2	94	96	98	100	96
Agzone 3	90	101	103	95	97
Agzone 4	93	91	104	85	89
Agzone 5	84	94	96	90	95
Agzone 6	94	98	98	91	97
Statewide	91	96	100	94	94
Disease resistance	Seedling		Adult		
Sc	–		MS		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MSS		MS		
SFNB	MSS		S		
PM	SVS		S		
BLR (5457P-)	SVS		S		
BP	–		MS		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	S		S		
CCN	–		–		
'FlowerPower' predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-10	-1	+1	-1	
Katanning	-8	+1	+3	+1	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	AgVic Services / InterGrain				
Access to seed	Free to trade				
EPR (\$/t. excl. GST)	\$3.50				

Refer to page 4 for interpreting resistance classification.

Combat[Ⓛ]

Deliverable as a feed variety

Comments

Combat (IGB1944) is a medium-height, medium-spring, 2-row feed barley suited to a wide range of environments, from low- to high-rainfall zones. It has a semi-erect growth habit, offering improved weed competitiveness compared to Rosalind. Combat is moderately susceptible to lodging and head loss. In 107 WA NVT barley trials (2021–24), Combat outperformed Rosalind in 61% of cases, matched in 24%, and yielded lower in 15%. Against Maximus CL, it yielded higher in 69% of trials, the same in 19%, and lower in 19%. Combat is a yield benchmark in environments exceeding 5 t/ha, second only to Neo CL. It has valuable resistance to SFNB, PM, and BLR (late APR), but requires management for NFNB. Increasing reports of PM infections highlight the need for a broad-spectrum fungicide program and integrated disease management.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	106	109	112	101
Agzone 2	–	107	107	108	104
Agzone 3	–	110	113	102	107
Agzone 4	–	101	112	95	97
Agzone 5	–	104	109	99	103
Agzone 6	–	106	113	99	107
Statewide	–	106	110	103	104
Disease resistance	Seedling		Adult		
Sc	–		S		
NFNB (Beecher avirulent)	MS		MS		
NFNB (Oxford virulent)	SVS		MS		
SFNB	MR		MRMS		
PM	RMR#		RMR#		
BLR (5457P-)	S		MRMS (late APR)		
BP	–		MSS		
BYD and CYD	MSS		MSS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	Sp		Sp		
CCN	MR		MR		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Fair				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$3.50				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Commodus^(b) CL

Deliverable as a feed variety

Comments

Commodus CL (IGB1908T) is a tall-height, early-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. Modelled on Compass, it is suited to low- to medium-rainfall regions and lighter soils. Commodus CL has a medium coleoptile, good early canopy development, and strong ground coverage for weed suppression. However, it is susceptible to lodging and head loss. Across 134 WA barley NVT (2020–24), Commodus CL yielded less than Maximus CL in 58% of trials, the same in 31% and higher in 11%. It tends to underperform relative to Maximus CL when site yields exceed 4 t/ha. It has valuable resistance to NFNB (Beecher avirulent), but may require management for Sc, STNB, and BLR. Emerging virulence shifts are increasing its susceptibility to PM.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	98	89	97	99	93
Agzone 2	94	93	95	100	95
Agzone 3	92	101	95	101	95
Agzone 4	96	92	101	98	95
Agzone 5	94	98	95	99	97
Agzone 6	92	97	88	97	98
Statewide	94	96	96	99	95
Disease resistance	Seedling		Adult		
Sc	–		MSS		
NFNB (Beecher avirulent)	MS		MRMS		
NFNB (Oxford virulent)	MSS		MSS		
SFNB	MRMS		MSS		
PM	R#		MR#		
BLR (5457P-)	S		S		
BP	–		MS		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MS		MS		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-7	-4	-2	-3	
Katanning	-3	-1	+0	+0	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Tall				
Straw strength	Fair				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$4.25				

Refer to page 4 for interpreting resistance classification.

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

Compass^(b)

Deliverable as a feed variety

Comments

Compass (WI4593) is a tall-height, early-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. Best suited to low- and medium-rainfall environments with a yield potential below 4 t/ha and where weed-competitive barley is required. Compass is susceptible to lodging, particularly in high-yielding situations. Many newer varieties, including Beast, Bigfoot CL, Combat, Granite CL, Maximus CL, and PegasusAX, have surpassed Compass in performance. In 134 WA NVT barley trials (2020–24), Compass yielded less than Beast in 63% of cases, matched in 36%, and exceeded in just 1%. Against Maximus CL, it yielded lower in 44%, equal in 25%, and higher in 31%. Compass underperforms both varieties as site yield increases, falling behind Beast at yields above 2.5 t/ha and Maximus CL at yields above 4 t/ha. Compass requires active integrated disease management for Sc, NFNB, SFNB, and BLR. Emerging virulence shifts are increasing its susceptibility to PM.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	100	88	100	102	95
Agzone 2	95	94	96	104	96
Agzone 3	93	106	96	107	96
Agzone 4	97	93	103	105	97
Agzone 5	98	104	98	104	99
Agzone 6	94	100	87	102	101
Statewide	95	98	97	104	97
Disease resistance	Seedling		Adult		
Sc	–		MS		
NFNB (Beecher avirulent)	MS		MS		
NFNB (Oxford virulent)	S		MSS		
SFNB	MRMS		MSS		
PM	R#		RMR#		
BLR (5457P-)	S		S		
BP	–		MSS		
BYD and CYD	MSS		MSS		
RLN (<i>P. neglectus</i>)	MSS		MSS		
RLN (<i>P. quasitereoides</i>)	S		S		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-6	-2	+0	+0	
Katanning	-3	+0	+2	+2	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Tall				
Straw strength	Fair				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	University of Adelaide / Seednet				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$3.80				

Refer to page 4 for interpreting resistance classification.

Ember[Ⓛ]

Deliverable as a feed variety

Comments

Ember (IGB21130) is a medium-height, late-spring, 2-row feed barley. It reaches awn emergence one to two weeks later than Maximus CL and Neo CL, aligning more closely with Baudin and Gairdner under April–May sowing. Ember is best suited to early- to mid-April sowing opportunities and has underperformed in WA NVT trials at standard sowing dates. Further data from April sowing is needed to confirm its fit, but its strong disease resistance makes it a promising option for southern regions with early sowing windows. Ember offers robust resistance to Sc, NFNB, PM, and BLR, and shows strong seedling resistance to NFNB and PM, reducing early disease risk. It is moderately susceptible to SFNB. To maintain crop health, Ember should be grown using integrated disease management practices, including non-chemical controls, strategic fungicide use with varied modes of action, and crop rotations that minimise disease carryover.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	–	–	–	–	–
Agzone 3	–	–	–	88	97
Agzone 4	–	–	–	–	–
Agzone 5	–	–	–	–	–
Agzone 6	–	–	–	87	97
Statewide	–	–	–	86	91
Disease resistance	Seedling		Adult		
Sc	–		MRMS		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MRMS		MRMS		
SFNB	MS		MS		
PM	R		R		
BLR (5457P-)	S		MRMS		
BP	–		–		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	Sp		Sp		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Prostrate				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & resellers				
EPR (\$/t, excl. GST)	\$3.75				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Granite[Ⓛ] CL

Deliverable as a feed variety

Comments

Granite CL (IGB21092T) is a medium-height, medium-spring, 2-row feed barley developed as an imidazolinone-tolerant alternative to Bigfoot CL, Commodus CL, and Maximus CL. It shares the erect plant architecture of the Rosalind family and carries Clearfield® herbicide tolerance. In 24 WA NVT barley trials (2024 only, excluding Agzone 4), Granite CL demonstrated comparable grain yield to Bigfoot CL and Maximus CL, and outperformed Commodus CL at sites yielding above 4 t/ha. It yielded similarly to Bigfoot CL in 83% of trials and higher in 17%. Against Maximus CL, it yielded lower in 17%, equal in 50%, and higher in 33%. Granite CL exhibits useful resistance to NFNB (Beecher avirulent), but will require integrated disease management to manage Sc, NFNB (Oxford virulent), SFNB, and BLR. It may be susceptible to emerging pathotypes of PM.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	97
Agzone 2	–	–	–	–	99
Agzone 3	–	–	–	–	104
Agzone 4	–	–	–	–	–
Agzone 5	–	–	–	–	101
Agzone 6	–	–	–	–	104
Statewide	–	–	–	–	101
Disease resistance	Seedling		Adult		
Sc	–		MSp		
NFNB (Beecher avirulent)	Rp		MRp		
NFNB (Oxford virulent)	MSp		MSp		
SFNB	MRMSp		MSp		
PM	Rp#		Rp#		
BLR (5457P-)	MSp		Sp		
BP	–		–		
BYD and CYD	MRMSp		MRMSp		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	–		–		
CCN	–		–		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$3.90				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

Kirwan[Ⓛ] CL

Deliverable as a feed variety

Comments

Kirwan CL (IGB22014T) is a medium-height, early-spring, 2-row feed barley positioned as an alternative to Buff and Litmus. It offers adaptability to challenging low soil pH soil conditions and carries tolerance to Clearfield® herbicides. In 16 WA NVT barley trials (2023, excluding Agzones 3 and 6), Kirwan CL outperformed Buff in 63% of cases, matched in 31%, and yielded lower in only 6%. Against Litmus, it performed equally in 55% of trials and better in 45%. Kirwan CL has useful (provisional) resistance to NFNB, but will require management for Sc, SFNB and BLR. It may be susceptible to emerging pathotypes of PM. A strategic fungicide program, aligned with best-practice integrated disease management, is recommended to maintain crop health.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	103	–
Agzone 2	–	–	–	102	–
Agzone 3	–	–	–	–	–
Agzone 4	–	–	–	105	–
Agzone 5	–	–	–	101	–
Agzone 6	–	–	–	–	–
Statewide	–	–	–	101	–
Disease resistance	Seedling		Adult		
Sc	–		Sp		
NFNB (Beecher avirulent)	MRMSp		MRMSp		
NFNB (Oxford virulent)	MSp		MRMSp		
SFNB	MSp		Sp		
PM	RMRp#		Rp#		
BLR (5457P-)	Sp		Sp		
BP	–		–		
BYD and CYD	MRMSp		MRMSp		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	–		–		
CCN	MRp		MRp		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & resellers				
EPR (\$/t, excl. GST)	\$4.10				

Refer to page 4 for interpreting resistance classification.
p = provisional rating

La Trobe[Ⓛ]

Deliverable as a feed variety

Comments

La Trobe (IGB1101) is a medium-height, early-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. While once widely grown, La Trobe has been surpassed in performance by newer varieties such as Beast, Bigfoot CL, Combat, Granite CL, Maximus CL, and PegasusAX. In 134 WA NVT barley trials (2020–24), La Trobe yielded less than Beast in 83% of cases, matched in 16%, and exceeded in just 1%. Against Maximus CL, it yielded lower in 54%, equal in 40%, and higher in 7%. La Trobe underperforms both varieties as site yield increases, falling behind Beast above 1 t/ha and Maximus CL above 2.5 t/ha. An integrated disease management package will be required to manage NFNB, SFNB, PM, and BLR. Emerging virulence shifts are increasing its susceptibility to Sc.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	99	95	98	100	95
Agzone 2	96	95	97	100	97
Agzone 3	93	98	96	99	96
Agzone 4	99	93	99	97	95
Agzone 5	93	97	95	95	96
Agzone 6	92	97	90	96	96
Statewide	94	96	97	98	96
Disease resistance	Seedling		Adult		
Sc	–		MR#		
NFNB (Beecher avirulent)	MRMS		MS		
NFNB (Oxford virulent)	MSS		MSS		
SFNB	SVS		S		
PM	MS		MS		
BLR (5457P-)	MS		MSS		
BP	–		MSS		
BYD and CYD	MSS		MSS		
RLN (<i>P. neglectus</i>)	MS		MS		
RLN (<i>P. quasitereoides</i>)	S		S		
CCN	R		R		
'FlowerPower' predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-7	-1	-1	-2	
Katanning	-8	-1	+0	-2	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	Medium				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

Litmus[Ⓛ]

Deliverable as a feed variety

Comments

Litmus (WABAR2625) is a tall, very early-spring, 2-row feed barley with enhanced tolerance to low pH and high aluminium soils, making it well-suited to environments where the soil pH_{Ca} at 10–30 cm is below 4.8. Buff and Kirwan CL are higher-yielding alternatives on most acidic and non-acidic soils. On more acutely acidic soils, Litmus may be a better choice. In 93 WA NVT barley trials (2020–24), Litmus yielded less than Buff in 62% of cases, matched in 18%, and exceeded in 20%. In 11 WA NVT trials (2023 only), Litmus yielded less than Kirwan CL in 45% of cases and matched in 55%. Litmus has fair straw strength and is susceptible to all major leaf diseases except PM. However, it demonstrates the lowest yield loss in the presence of crown rot. An integrated disease management program is required to manage Sc, NFNB, SFNB, and BLR. Due to its blue aleurone, Litmus is only deliverable to sites equipped to manage blue aleurone in feed barley stacks.

Minotaur[Ⓛ]

Deliverable as a feed variety

Comments

Minotaur (AGTB0213) is a medium-height, medium-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. It is best suited to medium- to high-rainfall environments. Minotaur features a semi-prostrate growth habit, a long coleoptile for deeper sowing, strong straw strength to reduce lodging risk, and good head retention. Across 134 WA barley NVT (2020–24), Minotaur yielded less than Maximus CL in 33% of trials, the same in 31% and higher in 38%. Relative to Neo CL, across 55 WA barley NVT (2023–24), Minotaur yielded less in 38% of trials, the same in 44% and higher in 18% of trials. Minotaur performs similarly to Maximus CL below 5 t/ha but is outperformed by Neo CL at higher-yielding sites. Minotaur has valuable resistance to NFNB (Beecher avirulent). It requires an integrated disease management plan for all other leaf diseases, especially Sc.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	98	81	95	98	87
Agzone 2	86	85	95	98	94
Agzone 3	84	95	86	95	83
Agzone 4	100	75	94	92	82
Agzone 5	–	–	–	–	–
Agzone 6	–	–	–	–	–
Statewide	85	88	88	92	87
Disease resistance	Seedling		Adult		
Sc	–		SVS		
NFNB (Beecher avirulent)	MSS		MS		
NFNB (Oxford virulent)	S		S		
SFNB	MS		S		
PM	R		RMR		
BLR (5457P-)	S		S		
BP	–		MS		
BYD and CYD	MSS		MSS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MSS _p		MSS _p		
CCN	MS		MS		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-18	-8	-4	-5	
Katanning	-17	-8	-4	-5	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Tall				
Straw strength	Fair				
Head loss risk	High				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$3.80				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	105	99	104	101	96
Agzone 2	99	103	103	101	100
Agzone 3	98	106	107	98	102
Agzone 4	94	97	106	89	93
Agzone 5	90	100	102	94	99
Agzone 6	103	104	108	96	101
Statewide	97	102	105	97	99
Disease resistance	Seedling		Adult		
Sc	–		VS		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MS		MS		
SFNB	S		S		
PM	S		S		
BLR (5457P-)	S		S		
BP	–		MRMS		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MS		MS		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	+0	+6	+5	+2	
Katanning	+2	+7	+5	+3	
Agronomic traits					
Early growth habit	Semi-prostrate				
Coleoptile length	Very long				
Plant height	Short				
Straw strength	Good				
Head loss risk	–				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t. excl. GST)	\$4.00				

Refer to page 4 for interpreting resistance classification.

PegasusAX[Ⓛ]

Deliverable as a feed variety

Comments

PegasusAX (AGTB0667) is a medium-height, early-spring, 2-row feed barley variety compatible with Aggressor® AX herbicide, offering an alternative weed control option to imidazolinone-tolerant varieties. It shares the erect plant architecture of the Rosalind family, with shorter straw, lower lodging risk, and a shorter coleoptile than Titan AX. In 42 WA NVT barley trials (2023–24), PegasusAX yielded similarly to Titan AX in 38% of cases, higher in 45%, and lower in 17%. Against Maximus CL, it yielded lower in 12%, equal in 55%, and higher in 33%. It has demonstrated comparable grain yields to Bigfoot CL, Granite CL, Maximus CL, and Titan AX, and outperforms Commodus CL at sites yielding above 4 t/ha. PegasusAX offers excellent resistance to NFNB, PM, and BLR, but will require integrated disease management for Sc and SFNB.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	102
Agzone 2	–	–	–	106	104
Agzone 3	–	–	–	–	100
Agzone 4	–	–	–	–	96
Agzone 5	–	–	–	99	100
Agzone 6	–	–	–	–	101
Statewide	–	–	–	103	100
Disease resistance	Seedling			Adult	
Sc	–			MS	
NFNB (Beecher avirulent)	MRMS			MR	
NFNB (Oxford virulent)	MS			MRMS	
SFNB	MS			MSS	
PM	S			MRMS	
BLR (5457P-)	MSS			MRMS	
BP	–			MSSp	
BYD and CYD	MRMS			MRMS	
RLN (<i>P. neglectus</i>)	–			–	
RLN (<i>P. quasitereoides</i>)	MSSp			MSSp	
CCN	R			R	
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	–				
Variety information					
Breeder / Seed licensee	AGT				
Access to seed	AGT Affiliates & Seed Sharing™				
EPR (\$/t, excl. GST)	\$4.15				

Refer to page 4 for interpreting resistance classification.
p = provisional rating

RGT Atlantis[Ⓛ]

Deliverable as a feed variety

Comments

RGT Atlantis (RP22054) is a medium-height, medium-spring, 2-row barley currently undergoing Stage 1 Malt Accreditation with Grains Australia, with the earliest possible accreditation date in March 2027. It is the first commercial Australian barley with enhanced tolerance to transient waterlogging, developed by backcrossing a wild barley gene into RGT Planet to promote aerenchyma formation, allowing oxygen retention in waterlogged roots. RGT Atlantis is targeted for sowing in medium- to high-rainfall environments prone to transient waterlogging. It shares the plant structure, height, disease resistance, and lodging risk of the RGT Planet family but has lower yield potential in the absence of waterlogging. In 37 WA NVT barley trials (2023–24), RGT Atlantis yielded lower than RGT Planet in 62% of cases and similarly in 38%. RGT Atlantis is susceptible to NFNB (Oxford virulent) and SFNB, similar to RGT Planet. Like RGT Planet, it is also showing increased susceptibility to Sc. To maintain crop health, it should be grown using integrated disease management practices, including non-chemical controls, strategic fungicide use with varied modes of action, and crop rotations that minimise disease carryover.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	–	–	–	91	93
Agzone 3	–	–	–	88	90
Agzone 4	–	–	–	–	–
Agzone 5	–	–	–	–	88
Agzone 6	–	–	–	86	90
Statewide	–	–	–	86	87
Disease resistance	Seedling		Adult		
Sc	–		MR#		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	MS		MS		
SFNB	MSS		MSS		
PM	R		R		
BLR (5457P-)	MSS		MRMS (late APR)		
BP	–		MRMS _p		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	Sp		Sp		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-prostrate				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Variety information					
Breeder / Seed licensee	RAGT Semences				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$4.25				

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Rocket[Ⓢ] CL

Deliverable as a feed variety

Comments

Rocket CL (IGB22023T) is a medium-height, very early-spring, 2-row barley currently undergoing Stage 1 Malt Accreditation with Grains Australia, with the earliest possible accreditation date in March 2028. It offers Clearfield® herbicide tolerance and is well-suited to northern wheatbelt environments and planting windows from late May to early June. Rocket CL reaches awn emergence earlier than Beast and Commodus CL, aligning more closely with Mundah under April–May sowing. It is positioned as a potential alternative to Beast and Commodus CL, with improved lodging tolerance and head retention. In 22 WA NVT barley trials (2024, excluding Agzones 3 and 6), Rocket CL outperformed Commodus CL in 55% of cases, matched in 32%, and yielded lower in 14%. Against Beast, it performed equally in 59% of trials and lower in 41%. Rocket CL shows provisional resistance to PM, although it may be susceptible to emerging pathotypes of PM. It is susceptible to Sc, NFNB, SFNB, and BLR. A strategic fungicide program and integrated disease management practices are recommended to maintain crop health.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	99
Agzone 2	–	–	–	–	96
Agzone 3	–	–	–	–	–
Agzone 4	–	–	–	–	102
Agzone 5	–	–	–	–	97
Agzone 6	–	–	–	–	–
Statewide	–	–	–	–	96
Disease resistance	Seedling		Adult		
Sc	–		MSSp		
NFNB (Beecher avirulent)	MSSp		Sp		
NFNB (Oxford virulent)	SVSp		MSp		
SFNB	MRMSp		Sp		
PM	Sp		MRMSp#		
BLR (5457P-)	MSSp		Sp		
BP	–		–		
BYD and CYD	MRMSp		MRMSp		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	–		–		
CCN	–		–		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Long				
Plant height	Medium				
Straw strength	Moderately good				
Head loss risk	Low-medium				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$4.35				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

Rosalind[Ⓢ]

Deliverable as a feed variety

Comments

Rosalind (IGB1302) is a medium-height, early-spring, 2-row feed barley variety suitable for all environments. Once the yield benchmark for WA barley, Rosalind has now been surpassed by newer varieties, including Beast, Combat, Cyclops, and Neo CL. Rosalind offers good straw strength and head retention. In 134 WA NVT barley trials (2020–24), it yielded less than Beast in 40% of cases, matched in 36%, and exceeded in 24%, with Beast showing a slight advantage below 3 t/ha. In 107 trials (2021–24), Rosalind yielded less than Combat in 61%, equal in 24%, and higher in 15%, with Combat outperforming Rosalind above 4.5 t/ha. Rosalind requires an integrated disease management program to control Sc, NFNB (Oxford virulent), SFNB, and PM (where *MiLa* virulent strains are present). It has useful resistance to NFNB (Beecher avirulent) and BLR.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	106	103	105	108	102
Agzone 2	101	102	104	104	103
Agzone 3	98	102	102	100	100
Agzone 4	104	96	103	100	96
Agzone 5	96	101	99	96	99
Agzone 6	98	104	99	100	99
Statewide	99	101	102	101	100
Disease resistance	Seedling		Adult		
Sc	–		MSS		
NFNB (Beecher avirulent)	MR		MR		
NFNB (Oxford virulent)	MSS		MS		
SFNB	MS		S		
PM	MSS		MSS		
BLR (5457P-)	MRMS		MR		
BP	–		MS		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MSS		MSS		
CCN	R		R		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-10	-3	-2	-3	
Katanning	-9	-3	-1	-2	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$3.50				

Refer to page 4 for interpreting resistance classification.

Scope CL[Ⓛ]

Deliverable as a feed variety

Comments

Scope CL (VBHT0805) is a tall-height, medium-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. Better adapted than Commodus CL, Maximus CL, and Spartacus CL to April sowing opportunities, and an alternative to Neo CL. Across 93 WA barley NVT (2020–24), Scope CL yielded less than Maximus CL in 85% of trials, the same in 11% and higher in 4%. Across 38 WA barley NVT (2023–24), Scope CL yielded less than Neo CL in 76% of trials, the same in 21% and higher in 3%. Fungicides in an integrated disease management package will be required to manage Sc, NFNB (Oxford virulent), SFNB and BLR. It has useful resistance to NFNB (Beecher avirulent) and PM. It should be harvested when ripe due to a high head loss risk.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	95	85	90	90	82
Agzone 2	87	87	90	92	89
Agzone 3	83	92	93	89	88
Agzone 4	90	82	97	78	82
Agzone 5	–	–	–	–	–
Agzone 6	–	–	–	–	–
Statewide	83	87	91	88	87
Disease resistance	Seedling		Adult		
Sc	–		MS		
NFNB (Beecher avirulent)	MR		MRMS		
NFNB (Oxford virulent)	MSS		MS		
SFNB	MS		S		
PM	MR		MR		
BLR (5457P-)	S		MSS		
BP	–		MS		
BYD and CYD	MRMS		MRMS		
RLN (<i>P. neglectus</i>)	MSS		MSS		
RLN (<i>P. quasitereoides</i>)	MRMS		MRMS		
CCN	S		S		
‘FlowerPower’ predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	+5	+5	+6	+3	
Katanning	+8	+7	+6	+5	
Agronomic traits					
Early growth habit	Semi-erect				
Coleoptile length	Medium				
Plant height	Tall				
Straw strength	Fair				
Head loss risk	High				
Variety information					
Breeder / Seed licensee	AgVic Services / Seednet				
Access to seed	Free to trade				
EPR (\$/t, excl. GST)	\$3.50				

Refer to page 4 for interpreting resistance classification.

Soldier[Ⓛ] CL

Deliverable as a feed variety

Comments

Soldier CL (IGB22117T) is a short-height, early-spring, 2-row barley variety currently undergoing Stage 1 Malt Accreditation with Grains Australia, with the earliest possible accreditation date in March 2028. It offers Clearfield® herbicide tolerance and is well-suited to high-rainfall environments where lodging is a frequent concern. Soldier CL reaches awn emergence at a similar time to Spartacus CL under April–May sowing and is up to a week earlier than Maximus CL and Neo CL. There is no WA barley NVT data available to quote for this sowing guide. It has been released based on InterGrain's internal trial data (2019–24). Internal results suggest it yields between Neo CL and RGT Planet at site yields up to 7 t/ha. Growers are encouraged to seek independent trial data before making adoption decisions. NVT consensus disease ratings are not yet available, but InterGrain's product profile indicates useful resistance to Sc, NFNB, and PM. Integrated disease management is recommended for SFNB and BLR.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	–	–	–	–	–
Agzone 3	–	–	–	–	–
Agzone 4	–	–	–	–	–
Agzone 5	–	–	–	–	–
Agzone 6	–	–	–	–	–
Statewide	–	–	–	–	–
Disease resistance	Seedling		Adult		
Sc	–		–		
NFNB (Beecher avirulent)	–		–		
NFNB (Oxford virulent)	–		–		
SFNB	–		–		
PM	–		–		
BLR (5457P-)	–		–		
BP	–		–		
BYD and CYD	–		–		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	–		–		
CCN	–		–		
'FlowerPower' predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	–	–	–	–	
Katanning	–	–	–	–	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Short				
Straw strength	Good				
Head loss risk	Low				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$4.35				

Refer to page 4 for interpreting resistance classification.

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

Spartacus CL[Ⓛ]

Deliverable as a feed variety

Comments

Spartacus CL (IGB1334T) is a medium-height, early-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. It is tolerant to Clearfield® herbicides but has a short coleoptile and should not be sown deep. Across 134 WA barley NVT (2020–24), Spartacus CL yielded less than Maximus CL in 74% of trials and the same in 26% of trials. An integrated disease management plan is warranted to manage NFNB, SFNB, PM, and BLR. Emerging virulence shifts are increasing its susceptibility to Sc.

Zena[Ⓛ] CL

Deliverable as a feed variety

Comments

Zena CL (IGB20125T) is a medium-height, medium-spring, 2-row malt barley that is not segregated in WA and is only deliverable into feed barley segregations. It is targeted for sowing in medium- to high-rainfall zones. It shares the plant structure, height, disease resistance, and lodging risk of the RGT Planet family with identical grain yield but is tolerant of Clearfield® herbicides. Across 107 WA barley NVT (2021–24), Zena CL yielded the same as RGT Planet in all 107 trials. Zena CL is susceptible to NFNB (Oxford virulent) and SFNB, similar to RGT Planet. Emerging virulence shifts are increasing its susceptibility to Sc. To maintain crop health, it should be grown using integrated disease management practices, including non-chemical controls, strategic fungicide use with varied modes of action, and crop rotations that minimise disease carryover.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	97	95	96	95	95
Agzone 2	96	95	96	97	96
Agzone 3	96	96	96	97	96
Agzone 4	98	95	97	96	96
Agzone 5	95	95	95	95	96
Agzone 6	94	97	93	96	95
Statewide	95	95	96	96	96
Disease resistance	Seedling		Adult		
Sc	–		MR#		
NFNB (Beecher avirulent)	MRMS		MS		
NFNB (Oxford virulent)	MSS		MSS		
SFNB	SVS		SVS		
PM	S		MS		
BLR (5457P-)	S		MSS		
BP	–		MSS		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	MSS		MSS		
RLN (<i>P. quasitereoides</i>)	MSS		MSS		
CCN	R		R		
'FlowerPower' predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-7	-1	-1	-3	
Katanning	-6	-1	+0	-2	
Agronomic traits					
Early growth habit	Erect				
Coleoptile length	Short				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Variety information					
Breeder / Seed licensee	InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t, excl. GST)	\$4.25				

Refer to page 4 for interpreting resistance classification.

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

Yield (% Maximus CL)	2020	2021	2022	2023	2024
Agzone 1	–	85	101	89	85
Agzone 2	–	97	101	94	96
Agzone 3	–	107	104	91	94
Agzone 4	–	85	103	71	78
Agzone 5	–	95	93	81	90
Agzone 6	–	107	102	90	94
Statewide	–	97	101	89	90
Disease resistance	Seedling		Adult		
Sc	–		MR#		
NFNB (Beecher avirulent)	MRMS		MRMS		
NFNB (Oxford virulent)	S		MSS		
SFNB	MSS		SVS		
PM	R		R		
BLR (5457P-)	MSS		MRMS (late APR)		
BP	–		MRMS _p		
BYD and CYD	MS		MS		
RLN (<i>P. neglectus</i>)	–		–		
RLN (<i>P. quasitereoides</i>)	MS _p		MS _p		
CCN	R		R		
'FlowerPower' predicted flowering date (days to Z49)	Relative to Maximus CL				
	15-Apr	05-May	25-May	15-Jun	
Northam	-2	+3	+5	+4	
Katanning	+0	+5	+7	+7	
Agronomic traits					
Early growth habit	Semi-prostrate				
Coleoptile length	Medium				
Plant height	Medium				
Straw strength	Good				
Head loss risk	Low				
Variety information					
Breeder / Seed licensee	GIA / InterGrain				
Access to seed	Seedclub members & F2F				
EPR (\$/t. excl. GST)	\$4.25				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

F2F = free to trade from farmer-to-farmer by complying with the InterGrain Industry Standard Seed Licence.

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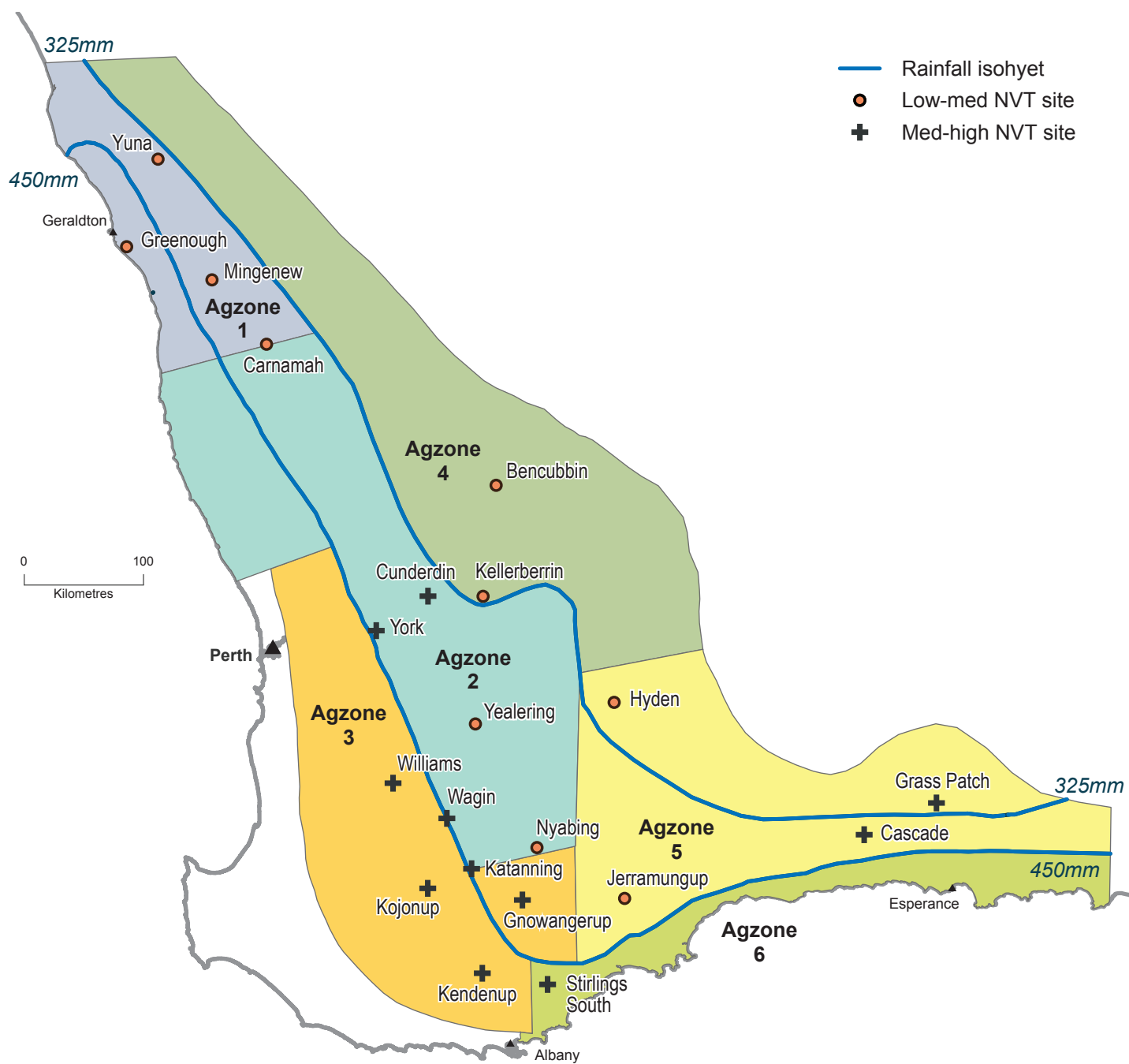


Figure 1: Location of low-medium rainfall and medium-high rainfall canola NVT across Western Australian agzones, 2024

Canola

Introduction

Bronte Wackett (DPIRD)

The 2024 season

Across all canola series in the 2024 National Variety Trials (NVT), average yields were higher than in 2023 (Tables 2–6). Yields in the medium-high rainfall zone ranged from 2.30–3.09 t/ha between the herbicide tolerance groups (Tables 2–4). In the low-medium rainfall zone yields were lower, ranging from 2.16–2.63 t/ha for triazine tolerant (TT) and glyphosate tolerant (GT) varieties respectively (Tables 5–6). A total of 1.65 million hectares in WA was dedicated to

canola production, a reduction of 220,000 hectares from 2023 (GIWA, 2025). Despite this, production was 280,000 tonnes higher in 2024, with estimates of statewide canola production totalling 2.8 million tonnes. The increase in production is likely due to more favourable climate conditions in the 2024 season. Despite the late break to the season, there were fewer reports of water logging and frost in high rainfall regions (GIWA, 2025). Canola prices at the start of 2024 were lower than at the beginning of 2023. However, the prices steadily rose over the 2024 season and were higher than 2023 at the conclusion of the season in December (ABARES, 2025).



Canola types

The most widely grown herbicide tolerance groups in canola are glyphosate tolerant (GT), triazine tolerant (TT) and imidazolinone tolerant (IMI). There are many varieties with single herbicide tolerance available to WA growers. However, there are also many varieties offering dual or 'stacked' tolerance with combinations of TT + IMI or GT + IMI. Another option is LibertyLink® (LL), which is tolerant of glufosinate-ammonium and is usually offered in dual tolerance varieties in combinations such as GT + LL and TT + LL. The herbicide tolerance of current varieties can be found in Table 1.

The GT group includes both Roundup Ready® and TruFlex® types, which share the same single gene genetic modification licensed from Bayer. TruFlex® canola types allow for higher glyphosate rates and a wider application window than Roundup Ready® canola. Pioneer also offers Optimum GLY® varieties. These varieties have a similar glyphosate application pattern to TruFlex® canola but are based on a different gene modification. For more detailed information on herbicide tolerance and weed control in canola see Dhammu et al. (2020).

IMI varieties are usually developed through traditional breeding, using the Clearfield® (CL) production system. However, there are also some IMI varieties available that do not use CL branding.

Canola is available as open pollinated (OP) or hybrid breeding types. OP seed is created through self-pollination and harvested OP seed is often retained on-farm for use in subsequent seasons. Only TT and conventional canola are currently available for purchase as OP varieties. Due to a lack of chemical options for weed control, very little conventional canola is grown in WA. Consequently, conventional varieties are no longer tested in any NVT trials and are therefore not included in this guide.

Hybrid seed is produced from managed crosses between elite canola lines and harvested seed should not be retained for subsequent seasons. Hybrid TT varieties usually higher yielding than OP TT varieties and may be a good choice where there is higher yield potential. Despite possible reductions in yield, OP varieties may be an alternative option in high-risk scenarios due to lower seed costs, as harvested seed can be retained.

Some longer maturity 'winter types' with CL herbicide tolerance are available for dual purpose use (Graze and Grain). These varieties need a long period of cold before entering the reproductive stage and are suitable only for cooler southern areas. Dual purpose types provide an opportunity to graze the vegetative crop before flowering begins.

Graze and Grain varieties are not included in NVT trials and are not reported in yield tables in this guide. Information on the management and yields of winter canola types are available from the seed company websites listed at the end of this chapter.

Choosing a canola variety

Considerations when choosing a canola variety include:

- **Herbicide tolerance:** Herbicide tolerance is dependent on weed species present in the paddock and chemical residue from previous rotations. Herbicide spray window is another consideration, with TruFlex® and Optimum GLY® varieties able to be sprayed with glyphosate until first flower. It should be noted that continued use of a single herbicide group in subsequent years can result in development of herbicide resistance in weeds. To avoid this, it is recommended to rotate the use of herbicide groups.
- **Hybrid vs OP:** Most hybrids have a higher yield potential but are associated with higher seed costs, as new seed must be bought every year. Despite the possibility of reduced yields, OP varieties may be more economically competitive in some scenarios due to the lower seeds costs as harvested seed can be retained for subsequent seasons.
- **Yield:** Choose varieties with proven high yields and reliability across seasons and yield ranges. Tables 2–7, show yield averages of varieties from the NVT. Use Figure 1 to identify which rainfall zone your region falls into to ensure use of the appropriate yield table.
- **Variety maturity:** Maturity of the variety should match the intended time of sowing. Late maturity varieties will generally perform best when sown early and earlier maturity varieties will perform best when sown later. Early-mid and mid-maturing varieties can be adaptable across both early and late sowing times.

- **Blackleg resistance:** Select a variety with the highest possible blackleg resistance rating and follow the 8 management steps to control blackleg, as listed in the GRDC *Blackleg management guide* (grdc.com.au/GRDC-FS-BlacklegManagementGuide). DPIRD has also developed a tool called BlacklegCM to assist growers with decisions relating to the control of blackleg (<https://www.dpiird.wa.gov.au/online-tools/blacklegcm/>).
- **Risk:** Yield potential of the season and variety need to be balanced with the cost of seed and other inputs such as herbicide, fungicide and fertiliser.
- **Oil content:** Oil content should be considered as a part of the overall assessment of variety performance and is likely to be greatest with early sowing.
- **Pod shattering:** Genetics can be manipulated to make varieties less prone to shattering using genes such as PodGuard®. Variety selection should consider varieties with lower shattering tendencies, especially in regions with climates that pose an increased shattering risk. Contact the seed distributor for information on the shattering tolerance of varieties. However, it should be noted that there is not a standardised method for testing shattering tolerance. Caution should be used when comparing varieties from different companies.

Herbicide tolerance, blackleg resistance, maturity and oil content of current canola varieties can be found in Table 1. Limited pod shattering information is also presented.

Establishment of canola

Larger seeding programs are causing the timing of sowing of canola crops to shift, trending towards dry seeding at earlier dates. While the yield potential of canola is higher with earlier establishment, uncertainty in climatic conditions, such as rainfall and temperature, pose a threat to successful crop establishment. Canola crops face greater challenges than cereals, as establishment is limited by small seed size and epigeal germination. It is not uncommon to need to re-seed canola due to poor establishment and small changes to seeding factors can affect crop establishment.

Seeding considerations for improved crop establishment:

- **Sowing rate:** Plant density is managed through seeding rates and is fundamental to achieving yield potential. Recommended target plant densities (plants/m²) will differ depending on the rainfall zone and whether the variety used is a hybrid or OP. Higher plant density are often preferred for OP canola crops to account for the possibility of reduced vigour. Additionally, it is generally more financially viable to increase the sowing rate to mitigate possible establishment issues with OP canola crops as seed costs tend to be lower. Seeding rates can be calculated using the target plant density, expected field establishment, seed size and germination percentage. DPIRD provides an online Canola Seeding Rate Calculator to aid in determining seeding rate (<https://www.dpiird.wa.gov.au/online-tools/canola-seeding-rate-calculator/>).
- **Fertiliser placement:** Canola seedlings are vulnerable to fertiliser toxicity when it is in close proximity to the seed. Care should be taken during sowing to keep the fertiliser separated from the seed, and excessive fertiliser rates should be avoided.
- **Seeding depth:** In other commodities, deeper seeding depths are often used as a tactic to access greater soil moisture, especially when dry seeding. However, canola seedlings have difficulty emerging from greater depths due to the small seed size. It is generally recommended to seed canola at a depth between 1.2 and 2.5 cm (GRDC, 2018) but other factors such as soil type and soil moisture can alter ideal depth.
- **Seed size:** Larger seed size has been associated with better establishment due to increased seedling vigour. Some varieties have a larger seed size, but caution must be used when comparing varieties, as seed size can vary a lot between individual seed lots within a variety. If retaining OP seed, consider seed sizing and using larger seed for subsequent year's crop.
- **Seed type:** Hybrid varieties tend to have greater seedling vigour than OP varieties. Seedling vigour helps with establishment, particularly in poor conditions, with hybrids commonly achieving 10–15% higher establishment. However, the gap in establishment with OP varieties can be alleviated through elevating the sowing rate.

- **Press wheels:** There is a range of press wheel types available on the market. The type of press wheel and the pressure it applies will alter the degree of soil compaction the canola seedling must break through to reach the surface. The type of press wheel chosen should be suitable for shallow seeding and the soil type of the paddock.
- **Insect damage:** Canola in the seedling stage is extremely vulnerable to insect damage, which can be prevented through seed dressings and chemical sprays. Non-chemical factors, such as crop rotations, stubble management and site selection can also influence insect damage.

Current research in this area

WA farmers have reported field establishment rates of 60–80% (Fletcher et al., 2024). However, field establishment rates as low as 40% are not uncommon. Additionally, two-thirds of farmers have reported establishment poor enough that re-seeding has occurred at least once in the last 5 years. As a result, a national research investment from GRDC and led by CSIRO, began in 2023 to investigate risk factors surrounding dry sown canola. As part of this project, DPIRD has conducted field trials in 2023, 2024 and 2025 seasons aiming to identify critical limits of soil temperature and moisture to better understand the effect these factors have on canola establishment. Additionally, other agronomic factors are being investigated to determine the effect of seeding depth and press wheel pressure on establishment. This research will be used to develop a decision-making tool for farmers manage the risks associated with early seeding of canola.

Trials across 2023, 2024 and 2025 have shown that canola seed is able to sit in dry soil for a long period (up to 8 weeks) and still provide high plant numbers at establishment. However, very little moisture is needed to start degrading the seed underground and cause poor establishment. The critical threshold of soil moisture needed to degrade the seed underground will depend on environmental factors such as soil type and climate. It is important to note that in many situations the timing of canola establishment is more important than the number of plants established. Fewer plants established early can yield more than lots of plants established later in the season.



Results from trials in 2023 and 2024 suggest that seeding deep (>3 cm) is not recommended with current varieties due to reductions in establishment (Fletcher et al., 2024). However, growers planning to increase seeding depth to chase soil moisture should consider removing press wheels or reducing press wheel pressure. The effect of press wheel pressure on establishment was investigated further in the 2025 season. These results indicated that the effect of press wheel pressure is heavily dependent on soil moisture at seeding and soil texture, with establishment decreasing under heavy press wheel pressure in a sandy soil with adequate moisture and the reverse effect in a heavier soil with marginal moisture. The difference in press wheel response between sites is likely due to the soil-to-seed contact and soil texture but additional research is needed to validate this. For more detailed information on results from the Canola Establishment project see Fletcher et al. (2024), (https://www.agronomyaustraliaproceedings.org/images/sampledata/2024/2024ASAfletcher_andrew-161-892-Fletcher-Andrew.pdf).

CSIRO is also leading a GRDC supported project exploring the role of hypocotyl length in canola establishment. Longer hypocotyls in canola are associated with improved emergence from deeper sowing (Nelson et al., 2024) but current Australian varieties tend to have short hypocotyls and emerge poorly from deep sowing compared with international varieties. There is potential to reduce the risks with early sown canola through the development of canola varieties with longer hypocotyls that can be sown deeper to access moisture deeper in the soil. This project is developing Australian adapted germplasm with longer hypocotyls and better selection tools so that canola breeders can develop long hypocotyl varieties that are better able to emerge from deeper sowing.

New varieties for 2026

TT varieties:

- **AGT Insurgent TT** is an open-pollinated variety with early-mid maturity. This variety had a high yield in the 2024 NVT for an open pollinated TT variety and yielded higher than some hybrids. Additionally, the variety has a high oil content.
- **Pioneer PY432T** is an early-mid maturity hybrid and had a high yield across both zones in the NVT in 2024.

TT + LL varieties:

- **InVigor LT 4030P** is an early-mid maturity variety with PodGuard® to protect against shattering. The variety had high yields across both NVT zones in 2024.

GT varieties:

- **DG Buller G** is an early-mid maturity variety that utilises Optimum GLY® for glyphosate tolerance. This variety had moderate yields in the 2024 NVT but has a high oil content.

GT + IMI varieties:

- **Chronos TFI** is an early-mid maturity variety that uses TruFlex® technology for glyphosate tolerance. NVT data for this variety is not yet available. However, based on Nufarm internal data, this variety has a recommended target yield similar to Hunter TF.

IMI varieties:

- **Vesta IMI** is an early-mid maturity variety with a high oil content and is resistant to blackleg. This variety was not present in 2024 NVT in the low-medium rainfall zone but had moderate yields in the medium-high rainfall zone.

Withdrawn varieties

TT Varieties:

- ATR Bonito*, ATR Stingray, InVigor T 4510, InVigor T 6010

GT Varieties:

- DG Bindo TF, DG Drummond TF, Pioneer 44Y30RR

GT + IMI Varieties:

- Hyola Garrison XC

IMI Varieties:

- Hyola Continuum CL, Pioneer 45Y93CL

**ATR Bonito still included in Guide as harvested OP seed can be retained for subsequent years and this variety was still in use in WA in 2025.*



Table 1: Herbicide tolerance, harvest maturity, oil content, blackleg ratings and commercial information of current canola varieties

Herbicide tolerance ¹	Variety	Harvest maturity ²	Oil content ³ (diff. to mean)	Blackleg resistance rating ⁴ (bare seed)	Blackleg resistance rating (Upper Canopy Infection) ⁴	Blackleg group ⁵	EPR \$/t delivered	Release year	Seed access
TT (OP)	AFP Cutubury	4	-0.9	MS ⁶	MS-UCI ⁶	AB ⁶	4	2020	Agronomy for Profit
TT (OP)	ATR Bluefin	3	+1.1	RMR	MR-UCI	AB	5	2021	Nufarm
TT (OP)	ATR Bonito	4	+0.4	MS	MS-UCI	A	5	2013	Nufarm
TT (OP)	ATR Swordfish	4	+0.8	MRMS	MRMS-UCI	AB	5	2023	Nufarm
TT (OP)	DG Avon TT	3	+0.4	MR	MR-UCI	AC	5	2023	Nutrien Ag Solutions
TT (OP)	DG Bidgee TT	4.5	-0.8	R	R-UCI	H	5	2021	Nutrien Ag Solutions
TT (OP)	DG Murray TT	6	+0.6	R ⁶	–	H ⁶	5	2021	Nutrien Ag Solutions
TT (OP)	DG Torrens TT	4.5	+0.7	RMR	R-UCI	H	5	2022	Nutrien Ag Solutions
TT	Dynatron TT	5	+0.9	MRMS	MRMS-UCI	BC	10	2020	RAGT
TT	Hyola Blazer TT	4	+0.2	RMR	MR-UCI	ADF	–	2020	Pacific Seeds
TT	HyTTec Trident	3	+0.5	R	MR-UCI	AD	5	2019	Nufarm
TT	HyTTec Trifecta	5	-0.2	R	MR-UCI	ABD	5	2020	Nufarm
TT	HyTTec Trophy	4	-0.4	R	MR-UCI	AD	5	2017	Nufarm
TT	HyTTec Velocity	3	-0.2	MR	MR-UCI	AB	5	2022	Nufarm
TT (OP)	AGT Insurgent TT	5	+1.0	MRMS	MRMS-UCI	Unknown	11	2025	AGT
TT	InVigor T 4511	4	+0.7	RMR	MR-UCI	Unknown	–	2022	BASF
TT	Pioneer PY429T	4	-1.3	R	R-UCI	ABH	–	2024	Pioneer
TT	Pioneer PY432T	4	-0.2	RMR	MR-UCI	B	–	2025	Pioneer
TT (OP)	Renegade TT	4	-0.3	MR	MR-UCI	A	10	2022	AGT
TT	RGT Baseline TT	6	+0.8	MRMS	MRMS-UCI	B	10	2022	RAGT
TT	RGT Capacity TT	4	-0.5	MRMS	MRMS-UCI	B	10	2021	RAGT
TT	Spark TT	3	+1.5	MR	MR-UCI	ABDS	10	2018	RAGT
TT + IMI	Griffon TTI	4	-0.3	RMR	MR-UCI	AC	–	2024	Nufarm
TT + IMI (CL)	Hyola Defender CT	4	+0.3	R	MR-UCI	ADF	–	2023	Pacific Seeds
TT + IMI (CL)	Hyola Enforcer CT	4	-0.2	R ⁶	MR-UCI ⁶	ADF ⁶	–	2020	Pacific Seeds
TT + IMI (CL)	Pioneer PY520TC	5	-0.8	RMR	MR-UCI	BC	–	2022	Pioneer
TT + LL	InVigor LT 4030P*	4	-0.9	MR	MR-UCI	B	–	2025	BASF
TT + LL	InVigor LT 4530P*	4.5	-0.6	RMR	MR-UCI	BF	–	2021	BASF

[Table 1. continued]

Varieties listed in alphabetical order within herbicide tolerance groups; = new varieties are highlighted in yellow.

¹ Herbicide tolerance: TT =triazine tolerant (OP = open pollinated), IMI = imidazolinone tolerant (CL = Clearfield®), GT = glyphosate tolerant (RR = Roundup Ready®, TF = TruFlex®, OG = OptimumGLY®), LL = LibertyLink® (glufosinate tolerant).

² Harvest maturity key: 3=early, 4=early-mid and mid-early, 5=mid, 6=mid-late, 7=late, 8=winter, 9=very late winter (provided by seed companies).

³ Oil content variety averages calculated using linear mixed model: TT = 44.7, GT = 45.7 and IMI = 45.4 (6% moisture oil data from 2020–2024 NVT, nvt.grdc.com.au).

⁴ Blackleg resistance rating key: R = resistant, MR = moderately resistant, RMR = resistant to moderately resistant, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, UCI= Upper Canopy Infection.

⁵ Blackleg information from GRDC Blackleg Management Guide 2025 Spring Fact Sheet, see further information at grdc.com.au/GRDC-FS-BlacklegManagementGuide

⁶ Blackleg resistance rating and/or Blackleg group not present in GRDC Blackleg Management Guide 2025 Spring Fact Sheet, information from previous versions of fact sheet (– means not data was available in current or previous versions).

* Varieties with PodGuard®.

Table 1: Herbicide tolerance, harvest maturity, oil content, blackleg ratings and commercial information of current canola varieties (continued)

Herbicide tolerance ¹	Variety	Harvest maturity ²	Oil content ³ (diff. to mean)	Blackleg resistance rating ⁴ (bare seed)	Blackleg resistance rating (Upper Canopy Infection) ⁴	Blackleg group ⁵	EPR \$/t delivered	Release year	Seed access
GT (OG)	DG Buller G	5	+0.7	RMR	R-UCI	H	–	2025	Nutrien Ag Solutions
GT (TF)	DG Hotham TF	5	+0.2	R	R-UCI	ABH	–	2022	Nutrien Ag Solutions
GT (TF)	DG Lofty TF	4	-0.0	R	R-UCI	ABH	–	2021	Nutrien Ag Solutions
GT (TF)	Eagle TF	5	+0.4	R	MR-UCI	ABD	–	2022	Nufarm
GT (TF)	Emu TF	3	-0.2	MR	MR-UCI	AB	–	2021	Nufarm
GT (TF)	Hunter TF	4	+0.3	RMR	MR-UCI	AB	–	2022	Nufarm
GT (TF)	Hyola 410XX	4	+0.8	MR ⁶	–	ABD ⁶	–	2018	Pacific Seeds
GT (TF)	InVigor R 4520P*	4.5	-1.4	MRMS	MRMS-UCI	B	–	2020	BASF
GT (RR)	Pioneer 44Y27RR	4	-0.4	RMR	MR-UCI	B	–	2017	Pioneer
GT (RR)	Pioneer 45Y28 RR	5	+1.4	RMR ⁶	MR-UCI ⁶	BC ⁶	–	2018	Pioneer
GT (OG)	Pioneer PY323G	3	+0.8	MR	MR-UCI	BC	–	2023	Pioneer
GT (RR)	Pioneer PY428R	4	-0.5	MR	MR-UCI	B	–	2024	Pioneer
GT (OG)	Pioneer PY525G	5	-1.1	MR	MR-UCI	AB	–	2023	Pioneer
GT (TF)	Raptor TF	4	-0.3	R	MR-UCI	AD	–	2019	Nufarm
GT (TF) + IMI	Chronos TFI	4	–	–	–	–	–	2025	Nufarm
GT (TF) + IMI (CL)	Hyola Battalion XC	3.5	-0.9	RMR ⁶	MR-UCI ⁶	ADF ⁶	–	2021	Pacific Seeds
GT (TF) + IMI (CL)	Hyola Regiment XC	4	+0.4	R	R-UCI	ADFH	–	2022	Pacific Seeds
GT (OG) + IMI (CL)	Pioneer PY424GC	4	+0.0	MR	MR-UCI	BC	–	2023	Pioneer
GT (RR) + LL	InVigor LR 3540P*	3.5	+0.8	MR	MR-UCI	AB	–	2024	BASF
GT (TF) + LL	InVigor LR 4540P*	4.5	+0.2	RMR	MR-UCI	B	–	2023	BASF
GT (TF) + LL	InVigor LR 5040P*	5	-0.5	RMR	MR-UCI	AB	–	2024	BASF
IMI	Ceres IMI	3	-0.3	RMR	MR-UCI	AD	–	2023	Nufarm
IMI (CL)	Hyola Equinox CL	5	+0.6	R ⁶	–	ADF ⁶	–	2021	Pacific Seeds
IMI (CL)	Hyola Solstice CL	4	+0.7	R	R-UCI	ADFH	–	2022	Pacific Seeds
IMI (CL)	Pioneer 43Y92CL	3	-0.4	RMR	MR-UCI	B	–	2017	Pioneer
IMI (CL)	Pioneer 44Y94CL	4	+0.3	RMR	MR-UCI	BC	–	2020	Pioneer
IMI (CL)	Pioneer 45Y95CL	5	-1.8	RMR	MR-UCI	C	–	2021	Pioneer
IMI (CL)	Pioneer PY421C	4	+0.0	RMR	MR-UCI	A	–	2023	Pioneer
IMI	Vesta IMI	4	+0.7	R	MR-UCI	ABD	–	2025	Nufarm

Varieties listed in alphabetical order within herbicide tolerance groups; ■ = new varieties are highlighted in yellow.

¹ Herbicide tolerance: TT = triazine tolerant (OP = open pollinated), IMI = imidazolinone tolerant (CL = Clearfield®), GT = glyphosate tolerant (RR = Roundup Ready®, TF = TruFlex®, OG = OptimumGLY®), LL = LibertyLink® (glufosinate tolerant).

² Harvest maturity key: 3=early, 4=early-mid and mid-early, 5=mid, 6=mid-late, 7=late, 8=winter, 9=very late winter (provided by seed companies).

³ Oil content variety averages calculated using linear mixed model: TT = 44.7, GT = 45.7 and IMI = 45.4 (6% moisture oil data from 2020–2024 NVT, nvt.grdc.com.au).

⁴ Blackleg resistance rating key: R = resistant, MR = moderately resistant, RMR = resistant to moderately resistant, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, UCI= Upper Canopy Infection.

⁵ Blackleg information from GRDC Blackleg Management Guide 2025 Spring Fact Sheet, see further information at grdc.com.au/GRDC-FS-BlacklegManagementGuide

⁶ Blackleg resistance rating and/or Blackleg group not present in GRDC Blackleg Management Guide 2025 Spring Fact Sheet, information from previous versions of fact sheet (– means not data was available in current or previous versions).

* Varieties with PodGuard®.

NVT results

Data analysis

NVT results are available as single-site reports or as multi-environment trial long-term summaries (MET data). MET data establishes relationships between varieties, comparing results from similar environments and considers issues that affect a single site, such as poor establishment or variable soil types. Because of this, MET data is preferred over single-site reports. Additionally, MET data is used to generate predicted yields, even when a variety is not present in a trial. This is particularly useful for canola, as new varieties are often released with limited NVT testing.

In this guide, data from the NVT Long-Term MET Yield Reporter (data accuracy $\geq 80\%$ and Variant Allele Frequency $\geq 25\%$) is presented for each NVT series for the years 2020–24. During this period, there were 215 canola NVT in WA. The locations of the 2024 trials can be seen in Figure 1.

The data is presented as a table of performance values for each variety compared to the mean of all NVT sites within that rainfall series (either low-medium or medium-high rainfall, see Figure 1). Shaded cells in Tables 2–7 represent predicted yield values from the MET analysis even though the variety was not present in the trials that year. Yield values for varieties that have been included in trials over multiple seasons should be considered more robust than yield values for varieties that have been included in a limited number of seasons.

MET data from 2020–24 was used to calculate a weighted average for each herbicide group within the 2 rainfall zones. Weighted averages are not presented in cases where a variety has only been present in a single year of NVT testing. The weighted averages are based on a variety's average performance over several years and across an entire rainfall zone. Caution should be used when interpreting the weighted averages as these factors can mask interactions between the variety and the environment. Growers should consider the relative performance of varieties within an individual season, and whether their location fits into the low-medium or medium-high rainfall zone, to help explain how a variety might perform on their farm.

Results of individual NVT trials and MET analyses are available online at nvt.grdc.com.au.

Medium-high rainfall NVT

The 2024 NVT in the medium-high rainfall zone were sown between 24 April and 11 May. Yields in 2024 were greater across all trial series than in 2023. In total, there were 21 trials across the 3 herbicide tolerance trial series.

TT varieties

The hybrid TT varieties outperformed all TT OP varieties, with the exception of AGT Insurgent TT (Table 2). This new variety yielded similarly to moderately yielding hybrids such as RGT Capacity TT and InVigor T 4511 in 2024. AGT Insurgent TT also had a high oil content but is not well suited if there is a high risk of blackleg yield reductions (Table 1). DG Bidgee TT and Renegade TT had reduced yield and a lower oil content (Table 1) in 2024 NVT compared to AGT Insurgent TT but have remained reliable high yielders for OP varieties over several seasons (Table 2). Additionally, DG Bidgee TT and Renegade TT have stronger blackleg resistance compared to AGT Insurgent TT (Table 1). All 3 of these varieties have similar mid-early maturity, making the varieties adaptable to varied sowing dates. DG Avon TT has early maturity, making this variety suitable for later sowing dates. Alternatively, the mid-late maturity DG Murray TT is more suitable for earlier sowing dates. Both these varieties have lower yields than top performing OPs (Table 2), but both have moderate oil contents (Table 1) and should be considered when intended sowing dates are outside the range of early-mid or mid maturity varieties.

Pioneer PY429T, Hyola Blazer TT and HyTTec Trophy are all high yielding (Table 2) options for an early-mid maturity variety (Table 1). Hyola Blazer TT has a higher oil content compared to the other 2 varieties, while HyTTec Trophy has a higher blackleg resistance rating (Table 1). The 5 year average yield for Pioneer PY429T was greater than the other varieties but it has only been in the last 2 years of NVT and therefore the reliability of the yield of this variety is not as robust compared to Hyola Blazer TT and HyTTec Trophy (Table 2).

Other varieties that have been reliably high yielders over multiple seasons include HyTTec Trifecta and HyTTec Trident.

HyTTec Trifecta is an option for a mid-maturity variety with a good blackleg resistance rating (Table 1). HyTTec Trident has a similar yield reliability and blackleg resistance but also provides an option for an early maturity variety with improved oil content.

Although slightly lower in yield compared to HyTTec Trifecta (Table 2), Pioneer PY520TC is a similar maturity type but has additional benefits with dual tolerance to TT and IMI, which widens the options for chemical weed control and protects against chemical residues in soils. Hyola Defender CT did not yield as high as Pioneer PY520TC but has the same dual tolerance benefits with a higher oil content and blackleg rating (Table 1). InVigor LT 4030P is a new variety with dual tolerance to TT and LL and has had a high yield in the last 2 years of NVT, similar to HyTTec Trophy (Table 2). Additionally, InVigor LT 4030P utilizes PodGuard® technology, making this variety suitable for areas more prone to shattering (Table 1).

GT varieties

Hunter TF has consistently achieved high yields over multiple NVT seasons (Table 3). Pioneer PY428R has a similar 5-year average to Hunter TF, but has not got the same reliability over multiple seasons due to limited testing in the NVT. Both are high yielding options for early mid maturity varieties, which provides a degree of flexibility in sowing dates (Table 1). However, Hunter TF has slightly improved oil content and blackleg resistance. Pioneer PY323G has had slightly reduced yields compared to Hunter TF (Table 3), but has a high oil content and is an early maturity variety, providing an option for later sowing dates (Table 1). Pioneer 45Y28RR is an option when targeting earlier sowing dates, as this variety is a mid-maturity variety. Although the yield of this variety is slightly lower compared to Hunter TF (Table 3), Pioneer 45Y28RR offers similar resistance to blackleg but has a vastly improved oil content (Table 1). Pioneer 44Y27RR is similar in yield to Pioneer 45Y28RR and has slightly earlier maturity. It is important to note that seed for Pioneer 44Y27RR will only be available for the 2026 season before being withdrawn, with Pioneer intending to replace this variety with Pioneer PY428R. The new variety, DG Buller G,

has a high oil content and good blackleg resistance, but only moderate yields in the 2024 NVT (Table 3).

Hyola Regiment XC is another variety that has had stable yields across multiple seasons in the NVT (Table 3). This variety has a reduced average yield compared to Hunter TF and Pioneer PY428R but has additional tolerance to IMI, which can be useful in alleviating concerns with soil chemical residues and allows a broader range of chemical control options for weeds. Hyola Regiment XC is similar to Hunter TF in oil content and maturity allowing for flexibility in sowing dates (Table 1). However, Hyola Regiment XC has an excellent blackleg package with a high resistance rating and utilises multiple gene groups. InVigor LR 4540P was on par with top yielding varieties, like Hunter TF and Pioneer PY428R (Table 3). The oil content and maturity of InVigor LR 4540P is also similar to Hunter TF but this variety has the extra advantage of dual tolerance for GT and LL (Table 1).

IMI varieties

Pioneer PY421C, Pioneer 45Y95CL and Pioneer 44Y94CL all have high yield averages (Table 4). However, there is a greater variation in yield results across seasons for Pioneer 45Y95CL, indicating this variety is less stable under different seasonal conditions. Despite this, Pioneer 45Y95CL is still an option for a mid-maturity variety which provides opportunity for earlier sowing dates (Table 1). Pioneer PY421C and Pioneer 44Y94CL have improved oil content compared to Pioneer 45Y95CL and both are early-mid maturity types making them more suitable for slightly later seeding dates. Despite slightly reduced yields (Table 4), compared to other IMI varieties in this series, the new variety, Vesta IMI, has a high oil content and improved disease resistance (Table 1).



Table 2: Grain yield of triazine tolerant canola varieties in the WA MED-HIGH RAINFALL NVT, expressed as a percentage of site mean yield for each trial year (2020–24), and the weighted average over the 5 year period

Medium-high rainfall, triazine tolerant canola varieties								
Herbicide tolerance ¹	Variety	Year	2020	2021	2022	2023	2024	2020–24
		Site mean yield (t/ha)	2.83	3.02	2.92	2.09	2.30	2.63
		No. trials	(8)	(11)	(11)	(11)	(9)	(50)
TT	Pioneer PY429T	(16)	111	114	110	115	111	112
TT	HyTTec Trifecta	(43)	109	115	110	112	108	111
TT	HyTTec Trident	(14)	106	109	110	117	111	111
TT	Pioneer PY432T	(5)	113	112	105	100	111	–
TT	Hyola Blazer TT	(50)	109	114	108	112	107	110
TT	HyTTec Trophy	(50)	108	111	109	112	109	110
TT	Dynatron TT	(47)	107	109	106	110	108	108
TT	HyTTec Velocity	(7)	105	104	107	108	111	107
TT	InVigor T 4511	(42)	104	106	105	106	106	105
TT (OP)	AGT Insurgent TT	(9)	104	104	103	104	104	–
TT	RGT Baseline TT	(38)	104	108	102	101	99	103
TT	RGT Capacity TT	(47)	103	104	102	101	102	102
TT	Spark TT	(17)	98	98	100	100	100	99
TT (OP)	DG Bidgee TT	(42)	97	100	97	97	92	97
TT (OP)	Renegade TT	(42)	99	95	96	94	100	97
TT (OP)	DG Torrens TT	(46)	95	95	94	92	91	93
TT (OP)	DG Avon TT	(8)	90	86	91	90	91	90
TT (OP)	DG Murray TT	(20)	90	91	92	87	85	89
TT (OP)	ATR Bonito	(43)	90	83	88	83	90	86
TT (OP)	ATR Swordfish	(34)	88	80	86	83	88	85
TT (OP)	AFP Cutubury	(16)	86	79	85	82	85	83
TT (OP)	ATR Bluefin	(10)	84	76	84	79	85	81
TT + IMI (CL)	Pioneer PY520TC	(31)	107	112	107	111	106	109
TT + IMI (CL)	Hyola Defender CT	(31)	106	109	104	108	104	106
TT + IMI	Griffon TTI	(15)	105	104	104	107	107	105
TT + IMI (CL)	Hyola Enforcer CT	(30)	99	100	102	101	100	101
TT + LL	InVigor LT 4030P	(14)	106	105	107	109	112	108
TT + LL	InVigor LT 4530P	(50)	101	97	100	98	104	100

Varieties listed in descending 5-year average yield order (data from single year used where 5-year average not presented) within herbicide tolerance groups; new varieties are highlighted in yellow.

¹ Herbicide tolerance: TT = triazine tolerant (OP = open pollinated), IMI = imidazolinone tolerant (CL = Clearfield®), LL = LibertyLink® (glufosinate tolerant).

Yield data based on MET analysis from NVT nvt.grdc.com.au

Weighted average is not presented where a variety has been present in only one year of NVT testing.

 Shaded cells indicate that a variety was not included in a trial and yield has been predicted from MET analysis.

Table 3: Grain yield of glyphosate tolerant canola varieties in the WA MED-HIGH RAINFALL NVT, expressed as a percentage of site mean yield for each trial year (2020–24), and the weighted average over the 5 year period

Medium-high rainfall, glyphosate tolerant canola varieties								
Herbicide tolerance ¹	Variety	Year	2020	2021	2022	2023	2024	2020–24
		Site mean yield (t/ha)	2.86	3.21	2.85	2.28	2.59	2.74
		No. trials	(8)	(11)	(10)	(12)	(10)	(51)
GT (TF)	Hunter TF	(36)	107	108	109	110	111	109
GT (RR)	Pioneer PY428R	(13)	109	111	108	106	109	109
GT (TF)	InVigor R 4520P	(51)	107	106	106	104	109	106
GT (RR)	Pioneer 45Y28RR	(37)	104	108	105	106	103	105
GT (RR)	Pioneer 44Y27RR	(46)	102	102	105	106	106	104
GT (TF)	Eagle TF	(37)	103	106	104	106	101	104
GT (TF)	Raptor TF	(51)	102	104	104	106	102	104
GT (OG)	Pioneer PY323G	(16)	101	101	104	106	103	103
GT (OG)	DG Buller G	(10)	101	103	102	104	101	–
GT (TF)	Emu TF	(9)	99	96	103	104	105	101
GT (TF)	DG Hotham TF	(33)	98	99	99	101	98	99
GT (OG)	Pioneer PY525G	(11)	99	102	98	97	95	98
GT (TF)	DG Lofty TF	(15)	94	92	97	100	97	96
GT (TF)	Hyola 410XX	(17)	93	91	95	96	93	94
GT (TF) + IMI (CL)	Hyola Regiment XC	(38)	102	104	105	105	102	104
GT (OG) + IMI (CL)	Pioneer PY424GC	(20)	101	100	102	102	104	102
GT (TF) + IMI (CL)	Hyola Battalion XC	(22)	95	93	96	94	95	95
GT (TF) + LL	InVigor LR 4540P	(32)	108	107	109	107	113	109
GT (TF) + LL	InVigor LR 5040P	(32)	107	106	105	102	110	106

Varieties listed in descending 5-year average yield order (data from single year used where 5-year average not presented) within herbicide tolerance groups; new varieties are highlighted in yellow.

¹ Herbicide tolerance: GT = glyphosate tolerant (RR = Roundup Ready®, TF = TruFlex®, OG = OptimumGLY®), IMI = imidazolinone tolerant (CL = Clearfield®), LL = LibertyLink® (glufosinate tolerant).

Yield data based on MET analysis from NVT nvt.grdc.com.au

Weighted average is not presented where a variety has been present in only one year of NVT testing.

 Shaded cells indicate that a variety was not included in a trial and yield has been predicted from MET analysis.

Table 4: Grain yield of imidazolinone tolerant canola varieties in the WA MED-HIGH RAINFALL NVT, expressed as a percentage of site mean yield for each trial year (2020–24), and the weighted average over the 5 year period

Medium-high rainfall, imidazolinone tolerant canola varieties								
Herbicide tolerance ¹	Variety	Year	2020	2021	2022	2023	2024	2020–24
		Site mean yield (t/ha)	3.32	3.52	3.69	2.52	3.09	3.26
		No. trials	(3)	(3)	(2)	(2)	(2)	(12)
IMI (CL)	Pioneer PY421C	(6)	115	118	117	117	115	116
IMI (CL)	Pioneer 45Y95CL	(9)	111	123	118	119	108	116
IMI (CL)	Pioneer 44Y94CL	(12)	112	116	115	115	111	114
IMI	Vesta IMI	(4)	106	110	106	108	104	107
IMI (CL)	Hyola Solstice CL	(9)	105	111	104	108	102	106
IMI (CL)	Pioneer 43Y92CL	(5)	103	103	102	105	103	103
IMI (CL)	Hyola Equinox CL	(6)	101	100	96	99	100	99

Varieties listed in descending 5-year average yield order (data from single year used where 5-year average not presented) within herbicide tolerance groups; ■ new varieties are highlighted in yellow.

¹ Herbicide tolerance: IMI = imidazolinone tolerant (CL = Clearfield®).

Yield data based on MET analysis from NVT nvt.grdc.com.au

Weighted average is not presented where a variety has been present in only one year of NVT testing.

■ Shaded cells indicate that a variety was not included in a trial and yield has been predicted from MET analysis.

Low-medium rainfall NVT

Sowing dates for 2024 NVT in the low-medium rainfall zone fell between 25 April and 1 June. As in the medium-high rainfall zone, 2024 NVT yields were higher than the previous year in the TT series and the GT series. In total, there were 18 trials in these 2 herbicide trial series but there were no IMI trials in the low-medium rainfall zone in 2024.

TT varieties

AGT Insurgent TT was higher yielding than other OP varieties in the 2024 NVT but was still only comparable to moderately yielding hybrids (Table 5). However, AGT Insurgent TT offers flexibility in sowing dates through early-mid maturity and has a high oil content (Table 1). The yield of the next best OP varieties, DG Avon TT and Renegade TT, were a long way behind AGT Insurgent TT in the 2024 NVT but have remained stable as high yielding varieties across several seasons (Table 5). The oil contents of DG Avon TT and Renegade TT were lower than AGT Insurgent TT, but the oil content of DG Avon TT was still above the herbicide group average (Table 1). DG Avon TT and Renegade TT had the additional benefit of stronger blackleg resistance, compared to AGT Insurgent TT. Renegade TT is an early-mid variety, like

AGT Insurgent TT and therefore offers similar flexibility in sowing dates. However, DG Avon TT is more suitable for later sowing dates as this variety is an early maturity type.

HyTTec Velocity and HyTTec Trident have had reliable high yields across the 5-year period (Table 5), but HyTTec Trident has a higher oil content and blackleg resistance rating (Table 1). Both varieties are early maturity types, making them suitable for later sowing dates. High yielding options for varieties suited to earlier sowing dates include Pioneer PY432T, Pioneer PY429T and HyTTec Trophy, all of which have early-mid maturity. Pioneer PY432T is a new variety that showed promise with a high yield in the 2024 NVT, but limited testing in the NVT across multiple seasons means the yield stability of this variety is uncertain (Table 5). Likewise, the yield stability across seasons is not clear for Pioneer PY429T, despite the high yield of this variety in the 2023 NVT. Pioneer PY429T has good resistance to blackleg but the oil content of Pioneer PY432T was higher (Table 1). Although slightly lower in yield, HyTTec Trophy has remained reliable across multiple seasons (Table 5). Additionally, HyTTec Trophy had similar blackleg resistance to Pioneer PY429T and also a higher oil content (Table 1). Dynatron TT was the highest yielding mid-maturity type, with yields slightly lower than

HyTTec Trophy (Table 5). However, the mid-maturity of this variety makes Dynatron TT well suited for earlier sowing dates (Table 1). Dynatron TT and Spark TT have the highest oil content of all TT hybrids. Be aware that Dynatron TT is not recommended if there is a high risk of blackleg reducing yield.

Griffon TTI was the highest yielding TT + IMI dual tolerance variety, with yields equivalent to Dynatron TT (Table 5). Hyola Enforcer CT and Hyola Defender CT had lower yields, but both provide better protection against blackleg (Table 1). Despite a slightly reduced yield compared to Hyola Defender CT (Table 5), Hyola Enforcer CT had a higher oil content (Table 1). All 3 of these TT + IMI varieties are early-mid maturity types offering flexibility in sowing dates and provide a broader range of chemical weed control options and alleviate concerns of chemical residues in soils. InVigor LT 4030P is a new variety offering dual tolerance to TT and LL. The yield stability of this variety is uncertain due to limited NVT testing. However, this variety had promising results in the 2024 NVT, with a high yield equivalent to HyTTec Trophy (Table 5). InVigor LT 4530P is the other option for TT + LL dual tolerance and despite a reduction in yield, InVigor LT 4530P could still be advantageous in regions prone to blackleg (Table 1).

GT varieties

Hunter TF and Pioneer 44Y27RR have both had reliably high yields over multiple NVT seasons (Table 6). These varieties have good blackleg resistance, but Hunter TF has a higher oil content (Table 1). It is important to note that seed for Pioneer 44Y27RR will only be available for the 2026 season before being withdrawn, with Pioneer intending to replace this variety with Pioneer PY428R. There is limited NVT data available for Pioneer PY428R (Table 6). However, in the 2024 NVT trial, Pioneer PY428R achieved a higher yield than the variety it will replace (Pioneer 44Y27RR) with the yield only slightly lower compared to Hunter TF. All these varieties provide flexibility in sowing dates due to the early-mid maturity (Table 1). Varieties better suited to later seeding dates include early maturity types such as Emu TF and Pioneer PY323G. Emu TF had a higher 5-year average yield compared to Pioneer PY323G (Table 6). However, the yield of Emu TF in 2020 was abnormally high. In the 2 years where both varieties were present in the NVT, Emu TF and Pioneer PY323G achieved similar yields, equivalent to Pioneer 44Y27RR. Both Emu TF

and Pioneer PY323G had moderate resistance to blackleg, but Pioneer PY323G was superior in oil content compared to all GT varieties previously mentioned (Table 1). The only new variety entered in this trial series was DG Buller G. Despite moderate yields (Table 6), this mid maturity variety may be suitable if a higher oil content or earlier sowing date is required (Table 1).

Pioneer PY424GC is similar in yield to Pioneer 44Y27RR but had the additional benefit of dual tolerance for GT and IMI, which allows for a broader spectrum of chemical weed control and protects against chemical residues in soils (Table 6). Hyola Regiment XC has slightly lower yields compared to Pioneer PY424GC but provides the same dual tolerance benefits with a much stronger blackleg resistance package and improved oil content (Table 1). InVigor LR 4540P has had high yields in this NVT series with only slightly reduced yield compared to Hunter TF (Table 6). The variety offers similar flexibility in sowing dates to Hunter TF, as they are both early-mid maturity types, but InVigor LR 4540P also widens options for chemical weed control through dual tolerance to GT + LL (Table 1). InVigor LR 4540P also utilises the PodGuard® gene making this variety ideal for regions prone to shattering.

IMI varieties

Extreme caution should be used when comparing NVT yield results from IMI varieties in the low medium rainfall zone due to the limited number of years of NVT data available across all varieties (Table 7). Hyola Solstice CL had the highest 4-year average yield. However, there was a large discrepancy in the yield between the 2 years Hyola Solstice CL was present in the trials, suggesting a lack of yield stability across seasons. Hyola Solstice CL does have a strong blackleg resistance package and a high oil content (Table 1). The 4-year average yields for Pioneer 44Y94CL and Pioneer 43Y92CL were lower than Hyola Solstice CL but were more consistent across season variations (Table 7). Both varieties have good disease packages but were weaker in blackleg resistance compared to Hyola Solstice CL and also had reduced oil contents (Table 1). Considerations should be made for the varied maturity type of the 3 above varieties. Ceres IMI and Pioneer PY421C had high yields in 2023 season, equivalent to Hyola Solstice CL, but more NVT testing in this zone is required to make more robust comparisons (Table 7).

Table 5: Grain yield of triazine tolerant canola varieties in the WA LOW-MED RAINFALL NVT, expressed as a percentage of site mean yield for each trial year (2020–24), and the weighted average over the 5 year period

Low-medium rainfall, triazine tolerant canola varieties								
Herbicide tolerance ¹	Variety	Year	2020	2021	2022	2023	2024	2020–24
		Site mean yield (t/ha)	1.80	2.39	2.55	1.95	2.16	2.21
		No. trials	(9)	(12)	(12)	(7)	(10)	(50)
TT	HyTTec Velocity	(31)	121	114	111	112	112	114
TT	HyTTec Trident	(45)	115	115	113	110	112	113
TT	Pioneer PY432T	(4)	113	105	106	113	114	–
TT	HyTTec Trophy	(27)	106	110	109	108	110	109
TT	Pioneer PY429T	(7)	106	116	116	108	111	–
TT	Dynatron TT	(26)	104	110	108	105	106	107
TT	InVigor T 4511	(41)	105	106	106	105	108	106
TT	Hyola Blazer TT	(40)	99	108	107	107	106	106
TT (OP)	AGT Insurgent TT	(10)	108	108	106	106	105	–
TT	Spark TT	(50)	106	102	103	103	105	104
TT	RGT Capacity TT	(34)	106	102	101	105	103	103
TT	RGT Baseline TT	(8)	94	103	101	102	98	100
TT (OP)	DG Avon TT	(29)	102	94	95	93	94	96
TT (OP)	Renegade TT	(39)	94	97	96	94	90	94
TT (OP)	AFP Cutubury	(24)	94	88	88	94	90	90
TT (OP)	ATR Bonito	(45)	90	88	90	88	87	89
TT (OP)	DG Torrens TT	(17)	89	89	88	90	85	88
TT (OP)	DG Bidgee TT	(14)	84	88	87	91	83	86
TT (OP)	ATR Swordfish	(25)	86	86	89	84	85	86
TT (OP)	ATR Bluefin	(34)	87	82	84	83	82	84
TT + IMI	Griffon TT1	(13)	108	106	106	107	109	107
TT + IMI (CL)	Hyola Enforcer CT	(30)	97	100	101	105	107	102
TT + IMI (CL)	Hyola Defender CT	(29)	92	101	100	100	98	98
TT + LL	InVigor LT 4030P	(8)	113	107	107	108	110	–
TT + LL	InVigor LT 4530P	(49)	98	106	106	98	100	102

Varieties listed in descending 5-year average yield order (data from single year used where 5-year average not presented) within herbicide tolerance groups; new varieties are highlighted in yellow.

¹ Herbicide tolerance: TT = triazine tolerant (OP = open pollinated), IMI = imidazolinone tolerant (CL = Clearfield®), LL = LibertyLink® (glufosinate tolerant).

Yield data based on MET analysis from NVT nvt.grdc.com.au

Weighted average is not presented where a variety has been present in only one year of NVT testing.

 Shaded cells indicate that a variety was not included in a trial and yield has been predicted from MET analysis.

Table 6: Grain yield of glyphosate tolerant canola varieties in the WA LOW-MED RAINFALL NVT, expressed as a percentage of site mean yield for each trial year (2020–24), and the weighted average over the 5 year period

Low-medium rainfall, glyphosate tolerant canola varieties								
Herbicide tolerance ¹	Variety	Year	2020	2021	2022	2023	2024	2020–24
		Site mean yield (t/ha)	1.79	2.74	2.56	2.07	2.63	2.41
		No. trials	(8)	(11)	(11)	(6)	(8)	(44)
GT (TF)	Hunter TF	(32)	109	109	110	108	110	109
GT (TF)	Emu TF	(40)	120	103	104	104	104	107
GT (RR)	Pioneer PY428R	(6)	106	102	103	105	107	–
GT (RR)	Pioneer 44Y27RR	(44)	109	105	106	103	103	105
GT (OG)	Pioneer PY323G	(14)	110	100	101	103	103	103
GT (TF)	InVigor R 4520P	(44)	96	104	102	101	99	101
GT (TF)	Raptor TF	(22)	93	102	103	99	102	100
GT (OG)	DG Buller G	(8)	98	98	98	98	98	–
GT (TF)	DG Lofty TF	(28)	92	96	98	95	98	96
GT (TF)	Hyola 410XX	(30)	101	91	91	100	99	96
GT (OG) + IMI (CL)	Pioneer PY424GC	(14)	107	104	105	102	102	104
GT (TF) + IMI (CL)	Hyola Regiment XC	(25)	102	100	100	103	103	101
GT (TF) + IMI (CL)	Hyola Battalion XC	(36)	100	97	99	97	99	98
GT (TF) + LL	InVigor LR 4540P	(25)	104	109	109	106	107	107
GT (TF) + LL	InVigor LR 5040P	(6)	97	105	104	101	101	–
GT (RR) + LL	InVigor LR 3540P	(25)	104	101	101	98	96	100

Varieties listed in descending 5-year average yield order (data from single year used where 5-year average not presented) within herbicide tolerance groups; ■ new varieties are highlighted in yellow.

¹ Herbicide tolerance: GT = glyphosate tolerant (RR = Roundup Ready®, TF = TruFlex®, OG = OptimumGLY®), IMI = imidazolinone tolerant (CL = Clearfield®), LL = LibertyLink® (glufosinate tolerant).

Yield data based on MET analysis from NVT nvt.grdc.com.au

Weighted average is not presented where a variety has been present in only one year of NVT testing.

■ Shaded cells indicate that a variety was not included in a trial and yield has been predicted from MET analysis.

Table 7: Grain yield of imidazolinone tolerant canola varieties in the WA LOW-MED RAINFALL NVT, expressed as a percentage of site mean yield for each trial year (2020–23), and the weighted average over the 5 year period

Low-medium rainfall, imidazolinone tolerant canola varieties								
Herbicide tolerance ¹	Variety	Year	2020	2021	2022	2023	2024	2020–23
		Site mean yield (t/ha)	1.81	1.81	2.4	1.85	–	1.97
		No. trials	(2)	(2)	(2)	(2)	(0)	(8)
IMI	Ceres IMI	(1)	119	109	112	108	–	–
IMI (CL)	Hyola Solstice CL	(4)	115	94	101	118	–	107
IMI (CL)	Pioneer PY421C	(2)	90	101	101	106	–	–
IMI (CL)	Hyola Equinox CL	(2)	110	96	102	117	–	–
IMI (CL)	Pioneer 44Y94CL	(6)	96	106	105	102	–	102
IMI (CL)	Pioneer 43Y92CL	(8)	101	101	101	101	–	101

Varieties listed in descending 4-year average yield order (data from single year used where 4-year average not presented) within herbicide tolerance groups; new varieties are highlighted in yellow.

Note: There was no trials in low-medium rainfall zone in 2024

¹ Herbicide tolerance: IMI = imidazolinone tolerant (CL = Clearfield®)

Yield data based on MET analysis from NVT nvt.grdc.com.au

Weighted average is not presented where a variety has been present in only one year of NVT testing.

 Shaded cells indicate that a variety was not included in a trial and yield has been predicted from MET analysis.



Canola varieties grown in WA, 2020–25

The usage of TT varieties continued to decline in 2025, with 5% less land in 2025 dedicated to TT canola than in 2024 (Table 8). GT varieties still dominate in usage and account for half of the area sown to canola in 2025. However, the use of dual tolerance varieties has doubled since 2024 with area sown to dual tolerance varieties now

overtaking TT varieties. GT + IMI and GT + LL varieties were the most common dual tolerance types, accounting for 50% and 40% of area sown to dual tolerance varieties respectively (Figure 2). TT + IMI was less common covering only 7% of dual tolerance area.

Table 8: Proportion (% area) of canola herbicide systems in WA 2020–25

Herbicide tolerance ¹	2020	2021	2022	2023 ²	2024	2025
TT	62	56	47	36	24	19
GT	32	37	45	53	60	50
IMI	3	3	3	4	4	7
Dual tolerance	3	4	6	8	12	24

Source: grower estimates provided to CBH

Note: 2022 total is 101% due to rounding

¹Herbicide tolerance: TT = triazine tolerant, GT = glyphosate tolerant, IMI = imidazolinone tolerant

²2023 data has been updated since the 2024 sowing guide

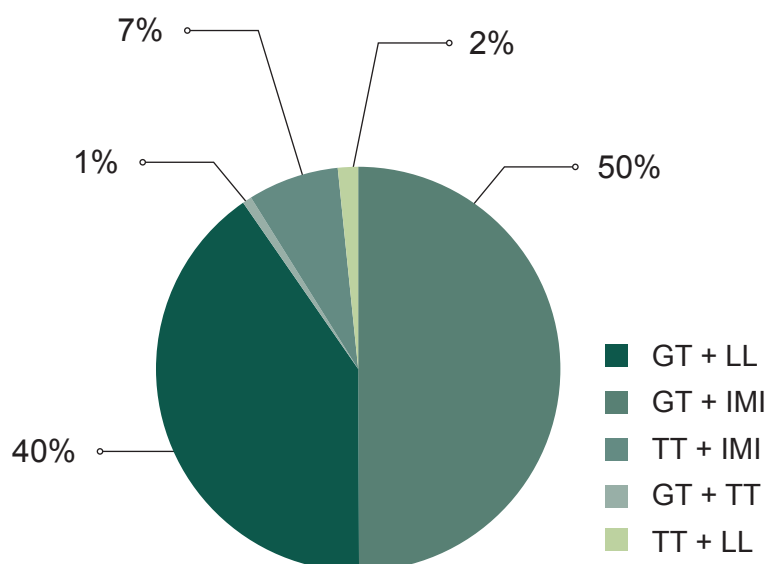


Figure 2: Proportion (% of dual tolerance area) of types of dual tolerant canola in WA in 2025

Source: grower estimates provided to CBH

Herbicide tolerance: TT = triazine tolerant, IMI = imidazolinone tolerant, GT = glyphosate tolerant, LL = LibertyLink® (glufosinate tolerant).





Figure 3 shows the proportion of canola area sown to each herbicide tolerance type for each port zone. In Geraldton, use of GT varieties was highly dominant, accounting for 79% of canola land use in this region. TT and IMI varieties were uncommon in Geraldton, with only 6% of the area using these herbicide systems. Dual tolerance varieties utilised 15% of the canola area, with almost all combinations comprising of a GT component and only 1% using TT combinations (Figure 4).

Usage of herbicide systems in Kwinana followed a similar pattern. However, GT systems were not quite as dominant, as more TT varieties were used (Figure 3). Despite greater use of TT systems, dual tolerance systems were still more prevalent and combinations using GT tolerance were preferred (Figure 4). However, compared to Geraldton, a greater proportion of the canola area utilised TT dual tolerance varieties in Kwinana, totalling 9%.

While the split of herbicide systems within Albany was more even compared to Geraldton and Kwinana, the usage of these systems followed the same trend (Figure 3). GT systems were utilised over the greatest proportion of land, followed by dual tolerance, TT and then IMI. Albany had the highest proportion of IMI usage at 16%, when no other region dedicated more than 5% of the canola area to this system. Combinations using GT were still the most prevalent type of dual tolerance system, with TT combinations accounting for 7% of dual tolerance area (Figure 4).

Esperance was the only region where GT systems were not dominant (Figure 3). Despite TT systems utilising the largest proportion of canola area, there was less than 10% difference between area of GT, dual tolerance and TT systems. Dual tolerance combination including TT were the highest in this region, accounting for 13% of dual tolerance varieties used (Figure 4). However, GT combinations were still preferred and accounted for 87% of dual tolerance use in Esperance.

The top 5 varieties used in 2025 were Hunter TF, Emu TF, Hyola Regiment XC, InVigor LR 4540P and InVigor R 4520P. These varieties combined accounted for just over half of the total area of canola in WA (Table 9). All these varieties utilise the GT (TF) system, which offers a broad-spectrum chemical control option for weeds and flexibility in the timing of applications.

The most prevalent TT varieties, HyTTec Trident, HyTTec Trophy and Hyola Blazer TT, have all decreased in usage since 2023, but were still in the top 10 varieties used. The use of TT (OP) varieties has declined since 2020, likely due to the potential yield and vigour penalties of OP varieties compared to hybrid TT varieties. Only 3 OP varieties had more than 0.5% of area, ATR Bonito, Renegade TT and DG Avon TT. Renegade TT and DG Avon TT are relatively new varieties, but ATR Bonito has declined in area usage by 31.9% since 2020.

IMI varieties were also uncommon, with Pioneer 44Y94CL, Pioneer 45Y95CL and Pioneer PY421C being the only varieties with areas greater than 0.5%. Hyola Regiment XC was the dual tolerance variety that covered the largest proportion of area sown to canola, with use of this variety increasing 4.2% since 2023. This variety is combines GT + IMI, which was the most used dual tolerance combination. Only a single variety with TT + IMI had an area greater than 0.5%, which was Pioneer PY520TC and used 0.7% of area in 2025. Likewise, only a single GT + LL variety, InVigor LR 4540P, had an area greater than 0.5% but this variety covered a much larger proportion of area sown to canola at 8.9%.

Across all varieties used in WA, early-mid maturity was the most common type. Further, all new varieties for 2026 are also early-mid maturity (Table 1). The popularity of this maturity type is likely due to the flexibility of sowing dates that this maturity type provides.

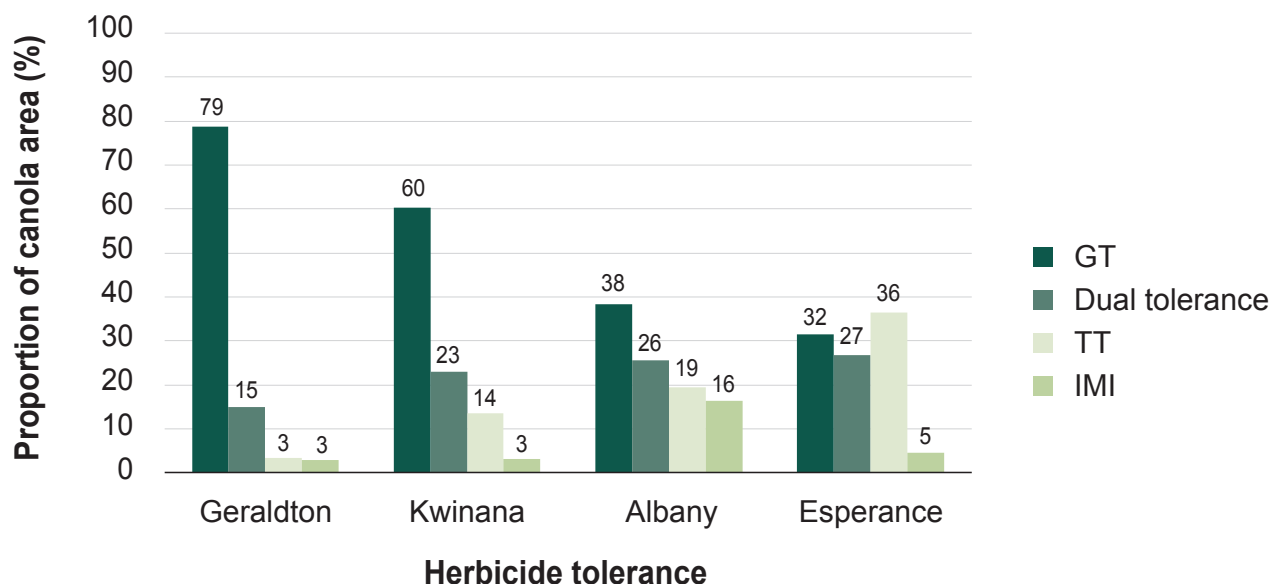


Figure 3: Proportion (% area within port zone) of canola herbicide systems in each WA port zone, 2025

Source: grower estimates provided to CBH

Herbicide tolerance: GT = glyphosate tolerant, TT = triazine tolerant, IMI = imidazolinone tolerant

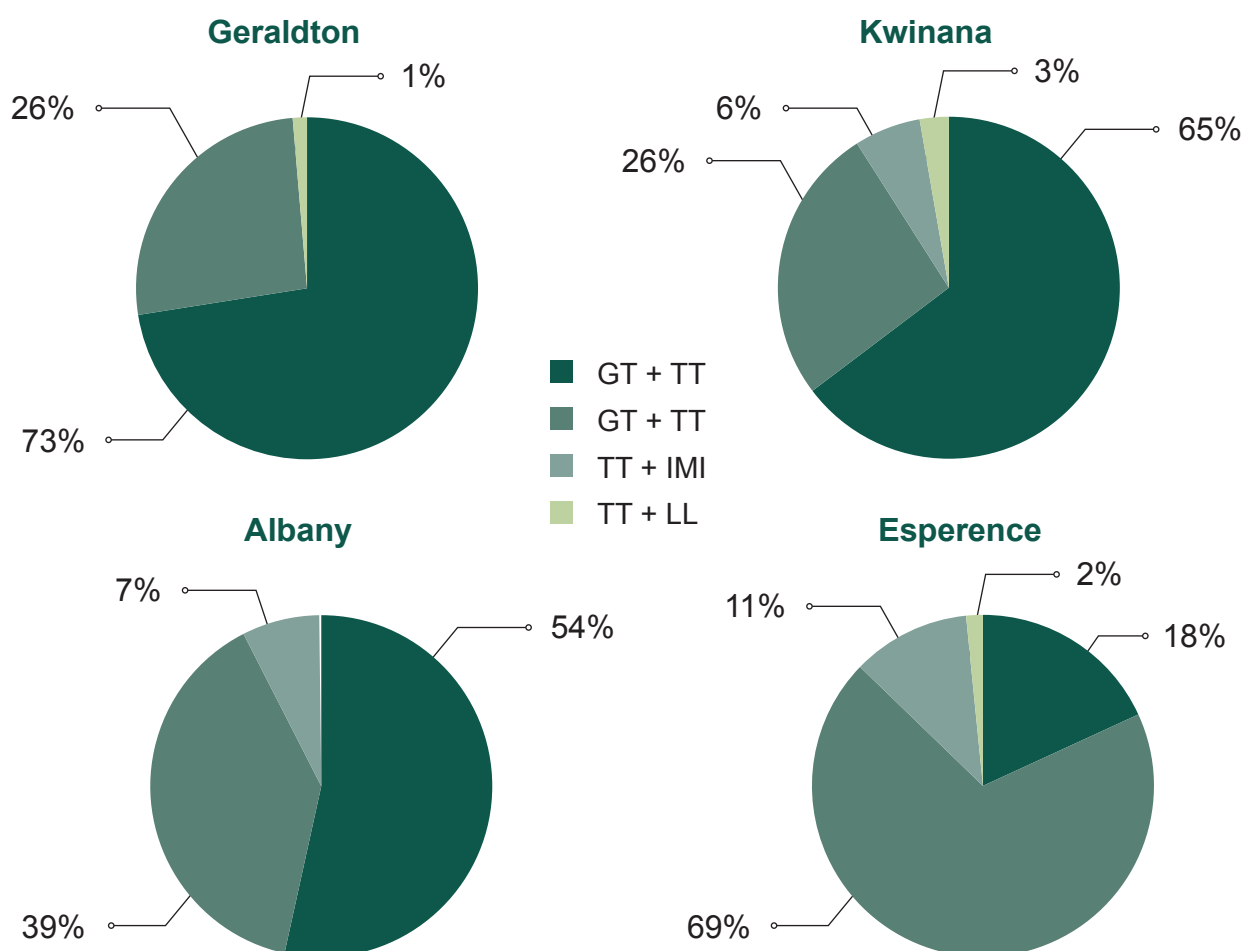


Figure 4: Proportion (% of dual tolerance area within port zone) of types of dual tolerant canola area in each WA port zone 2025

Source: grower estimates provided to CBH

Herbicide tolerance: TT = triazine tolerant, IMI = imidazolinone tolerant, GT = glyphosate tolerant, LL = LibertyLink® (glufosinate tolerant).

Table 9: Proportion (% of total area) of canola varieties in WA 2020–25

Variety	Herbicide Tolerance ¹	2020	2021	2022	2023 ²	2024	2025
Hunter TF	GT (TF)	–	–	–	1.0	11.8	18.5
Emu TF	GT (TF)	–	–	3.8	11.2	14.6	12.4
Hyola Regiment XC	GT (TF) + IMI (CL)	–	–	–	–	5.1	9.3
InVigor LR 4540P	GT (TF) + LL	–	–	–	–	2.6	8.9
InVigor R 4520P	GT (TF)	–	–	0.8	5.3	9.8	4.9
Pioneer 44Y94CL	IMI (CL)	–	0.9	1.7	2.2	3.0	4.1
Pioneer 44Y27RR	GT (RR)	5.5	7.1	10.2	11.5	6.0	3.8
HyTTec Trident	TT	5.2	11.3	8.0	7.5	5.0	3.6
HyTTec Trophy	TT	5.9	5.6	6.9	6.1	4.6	3.0
Hyola Blazer TT	TT	–	0.0	0.8	3.3	3.3	2.8
ATR Bonito	TT (OP)	34.6	26.4	18.4	8.1	3.7	2.7
HyTTec Velocity	TT	–	–	–	–	1.4	2.1
Pioneer PY428R	GT (RR)	–	–	–	–	–	1.9
Pioneer PY424GC	GT (OG) + IMI (CL)	–	–	–	–	–	1.6
Eagle TF	GT (TF)	–	–	–	1.9	2.1	1.6
HyTTec Trifecta	TT	0.3	1.2	4.0	4.5	2.4	1.5
Pioneer 44Y30RR	GT (RR)	–	–	6.9	6.7	5.1	1.4
Pioneer PY323G	GT (OG)	–	–	–	–	–	1.4
Pioneer PY525G	GT (OG)	–	–	–	–	1.4	1.3
Pioneer 45Y95CL	IMI (CL)	–	–	–	1.5	1.0	1.1
Pioneer PY429T	TT	–	–	–	–	–	0.7
Pioneer PY421C	IMI (CL)	–	–	–	–	0.0	0.7
Pioneer PY520TC	TT + IMI (CL)	–	–	–	1.1	1.0	0.7
Renegade TT	TT (OP)	–	–	–	–	0.7	0.6
Raptor TF	GT (TF)	1.0	3.1	2.5	3.9	1.2	0.6
DG Avon TT	TT (OP)	–	–	–	–	0.0	0.5
Hyola Battalion XC	GT (TF) + IMI (CL)	–	–	0.9	2.2	1.4	0.5
Hyola 410XX	GT (TF)	2.5	2.6	3.5	0.8	0.6	0.5
Pioneer PY422G	GT (OG)	–	–	–	–	2.3	0.5

Source: grower estimates provided to CBH

Varieties listed in descending order of proportions.

Records of 0.0 indicate percentages below 0.5.

¹ Herbicide tolerance: TT =triazine tolerant (OP = open pollinated), IMI = imidazolinone tolerant (CL = Clearfield®), GT = glyphosate tolerant (RR = Roundup Ready®, TF = TruFlex®, OG = OptimumGLY®), LL = LibertyLink® (glufosinate tolerant).

² 2023 data has been updated since the 2024 sowing guide.

Varieties are included in table only when they account for over 0.5% of the area sown in 2025.

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- Blackleg information was reproduced from the GRDC Spring 2025 *Blackleg management guide fact sheet* produced by Marcroft Grains Pathology.
- Variety harvest maturity was provided from company fact sheets and technical notes or directly from company representatives.
- CBH for the canola area data.

Canola seed commercialisation companies

Agronomy for Profit

Peter Norris 0428 850 850

AGT

agtbreeding.com.au/varieties

Floyd Sullivan 0499 580 260

BASF

crop-solutions.basf.com.au/seed/invigor

Michael Allingame 0437 454 283

Declan Sephton 0408 086 156

Nufarm (formerly Nuseed)

nuseed.com/au/crop/canola

Hugh Trenorden 0437 206 313

Andrew Royce 0427 466 916

Andrew Suverijn 0409 484 702

Callum Pestell 0427 168 356

Nutrien Ag Solutions/Dynagro Seed

seednet.com.au/products/dyna-gro-canola

David Clegg 0408 630 641

Kate Light 0455 159 379

Pacific Seeds

pacificseeds.com.au/products/canola

Andrew Heinrich 0473 520 818

Ella McDonald 0448 014 892

Mila Fotiou 0456 899 542

Justin Kudnig 0408 408 616

Mackenzie McIntosh 0429 619 103

Pioneer Brand Seeds

pioneerseeds.com.au/our-products/canola

Peter Bostock 0427 549 826

Erinn McCartney 0400 557 076

Tony Munns 0429 861 092

Rob Bagley 0428 212 652

Owen Boxall 0428 899 024

RAGT

ragt.au/our-varieties

David Peake 0408 780 577

Richard Prusa 0467 770 353

Oats

Introduction

Blakely Paynter (DPIRD)

This oat guide is designed to help growers determine which milling oat or export hay variety to grow. The guide provides characteristics, disease ratings and agronomic information for oat varieties that offer the best opportunity to meet market requirements (Tables 1–14 and Figures 1–11).

Many oat grain varieties are available for delivery into the CBH Group system. Grain Industry of Western Australia (GIWA) oat delivery grades available at selected CBH receival bins are OAT1 and OAT2, while OWAN is an exclusive segregation for Wandering oats. All milling oat varieties, except Wandering, can be delivered as OAT1, provided they meet the required quality specifications. Each variety has its strengths and weaknesses across different growing regions. Most successful oat growers choose to grow more than one variety because no single oat variety is likely to provide optimum agronomic traits, disease resistance, yield and quality in any one year. Some milling oat varieties are suitable for baling as export hay, but hay-only varieties may provide a better option for dedicated export hay growers. This guide summarises the suitability of oat varieties for grain and hay (Table 1). It also outlines the characteristics of 3 new oat varieties relative to 4 established oat varieties (Table 2). The variety 'snapshots' at the end of this section summarise the strengths and weaknesses of all grain and hay varieties documented in this bulletin.



The decision on whether to grow an OAT1, OAT2 or OWAN grain oat depends on 5 main factors:

1. The premium paid for different varieties based on their receival grade.
2. Relative grain yield of oat varieties.
3. Differences in input costs due to their agronomic and disease characteristics.
4. Likelihood of meeting oat receival specifications.
5. Location of receival segregations for OAT1 and OAT2 varieties.

Grain oat variety choices in 2026 – what should I grow?

Responsibility for oat classification in WA has transitioned from GIWA (a regional classification) to Grains Australia (a national classification). Following consultation with Grains Australia, CBH, and domestic oat processors, it has been confirmed that the existing segregation terminology—OAT1, OAT2, and OWAN—will remain in place. From the 2024–25 harvest, all varieties classified by Grains Australia as milling oats are eligible for delivery into the highest GIWA segregation, OAT1, provided they meet the required quality specifications. The newly accredited milling varieties Goldie (tested as 13008-18), Koala (09143-35), and Minnie (15010-09) are eligible for delivery as OAT1.

A further review of the WA classification systems has led to the acceptance of Durack into OAT1 stacks starting from the 2025–26 harvest. However, no changes were made for Wandering, which remains eligible only for OAT2 and OWAN delivery.

Bannister was the dominant grain oat variety grown in WA, accounting for just under 60% of the area sown to oats in 2025 (Figure 1). Other widely planted grain oat varieties include, in decreasing popularity, Carrolup, Goldie, Yallara, Williams, and Wandering. The area sown to Goldie increased significantly from 2024 to 2025, with a slight increase for Koala and Kowari. The area sown to Bannister, Pallinup, Wandering, Williams, and Yallara decreased. Goldie, Koala, and Minnie are expected to be more widely planted in 2026 as seed availability increases.

Goldie is emerging as a strong replacement for Bannister across most production areas in WA. It offers improved grain yield, particularly in environments that consistently yield below 5 tonnes per hectare and has a higher likelihood of meeting OAT1 receival standards due to its plumper grain shape. Koala is well-suited for very early sowing and performs best in high-yielding environments where yields consistently exceed 5 tonnes per hectare. Minnie, on the other hand, is ideal for medium to high rainfall zones, especially where lodging is a concern, most notably with April sowing.

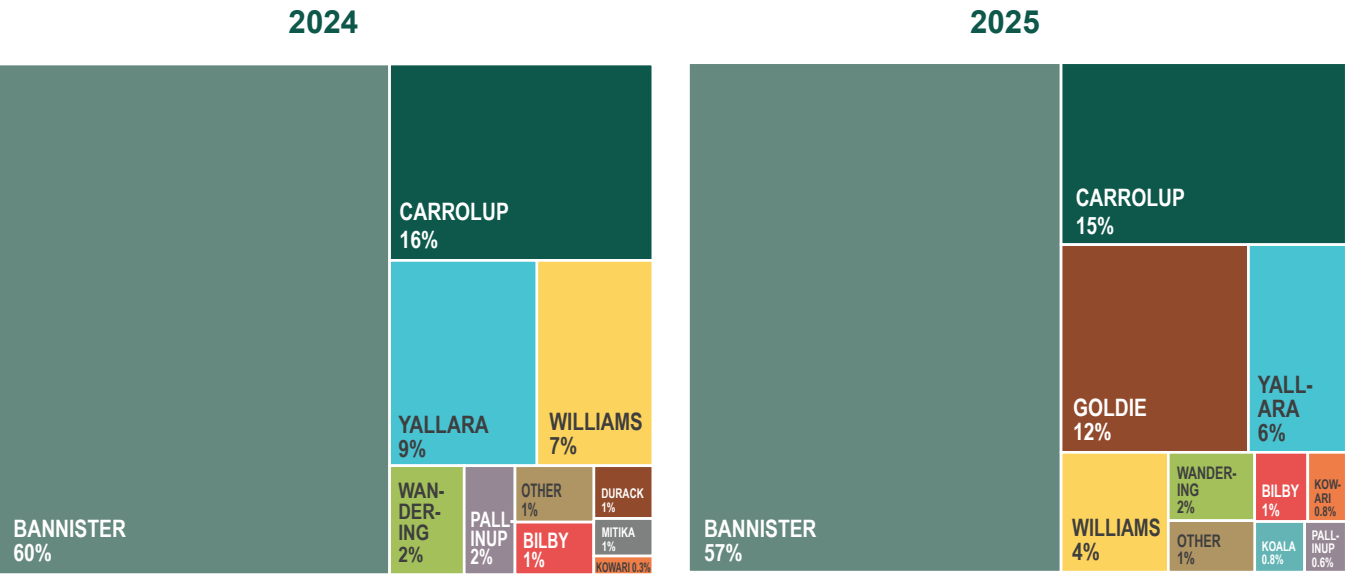


Figure 1: Relative popularity (percentage of oat area) of the top 10 oat varieties plus the combined area sown to the remaining 7 varieties delivered in WA in 2024 and 2025. The top 10 varieties occupied 99% of the area planted to oats in both seasons, while the top 5 occupied 94%

Source: grower estimates as provided to CBH for 2024 and 2025

Table 1: Suitability of oat varieties for grain (OAT1, OAT2, OWAN) and export hay

Variety	OAT1	OAT2	OWAN	Export hay
Archer	–	–	–	✓
Bannister	✓	✓	–	✓
Bilby	✓	✓	–	–
Brusher	–	–	–	✓
Carrolup	✓	✓	–	✓
Durack	✓	✓	–	✓
Goldie	✓	✓	–	✓
Kingbale	–	–	–	✓
Koala	✓	✓	–	✓
Kojonup	✓	✓	–	✓
Koorabup	–	–	–	✓
Kowari	✓	✓	–	–
Kultarr	–	–	–	✓
Minnie	✓	✓	–	–
Mitika	✓	✓	–	–
Mulgara	–	–	–	✓
Wallaby	–	–	–	✓
Wandering	–	✓	✓	–
Williams	✓	✓	–	✓
Wintaroo	–	–	–	✓
Yallara	✓	✓	–	✓

Source: GIWA and the Australian Exporters Company (AEXCO)

**Table 2: Summary of oat variety traits across 7 grain–oat varieties in WA**

Trait	Bannister	Bilby	Carrolup	Goldie	Koala	Minnie	Williams
First year in variety trials in WA	2006	2013	1993	2021	2017	2022	2006
Statewide MET yield (% site mean) ¹	106%	106%	88%	111%	104%	107%	102%
Maturity relative to Carrolup (sown in late April) ²	+11 days	+8 days	–	+3 days	+19 days	-3 days	+7 days
GIWA maximum receival grade	OAT1	OAT1	OAT1	OAT1	OAT1	OAT1	OAT1
Suitable for export hay	Yes	No	Yes	Yes	Yes	Unlikely	Yes
Oat septoria ³	MSS	S	S	MSS	MSS	S	MSS
Oat leaf rust ³	RMR	MR	VS	RMR	MR	RMR	MR
Oat stem rust ³	MS	SVS	MSS	MSS	MRMS	MSS	MSS
Barley and cereal yellow dwarf ³	MSS	S	SVS	MS	MSS	S	MSS
Bacterial blight ³	S	SVS	MSS	MSS	S	S	MSS

Source: Blakely Paynter and Manisha Shanker (DPIRD), and National Variety Trials (NVT), nvt.grdc.com.au

¹ Regional differences in grain yield are masked when using a state wide average of the WA oat NVT multi-environment trial (MET) data (2020–24). Growers are directed to Tables 3–8 for a more precise estimate of variety performance in their region and Figures 3 and 4 for relative variety performance at different site yields.

² Days to panicle emergence from a 25 April sowing at Northam based on output from DPIRD FlowerPower, fp.dpiird.app/

³ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant. Refer to page 4 for interpreting resistance classification.

Hay oat variety choices in 2026 – what should I grow?

The Australian Exporters Company (AEXCO) collects tonnage data for oat varieties with a hay End Point Royalty (EPR), excluding varieties whose EPR has expired (e.g. Brusher, Wintaroo) or non-EPR varieties (e.g. Carrolup). This makes it difficult to accurately determine what is being planted and cut for export hay.

In 2024–25, Bannister was the dominant export hay variety in WA, accounting for nearly half of all deliveries with an EPR. Other key varieties (for which data is collected), in order of delivery volume, included Yallara, Kingbale, and Archer, with smaller contributions from Williams, Koorabup, Mulgara, and Wallaby. Although Brusher and Carrolup remain important, their impact is not reflected in AEXCO data. As a proportion of the total hay crop, the percentage delivered as Archer and Bannister increased from the 2023–24 to the 2024–25 financial year, while Koorabup and Mulgara decreased.

Dual-purpose varieties, those suitable for both milling and export hay, made up the bulk of deliveries. New milling varieties Goldie and Koala are suitable for dual-purpose use. In contrast, Minnie is unlikely to be suitable for export hay due to its short stature.

Of the hay-only varieties, the single-gene imidazolinone (IMI) tolerant varieties, Archer and Kingbale, together accounted for nearly one quarter of export hay deliveries among varieties with an EPR. Archer and Kingbale are fit for rotations where IMI residues exist or where incorporated before sowing (IBS) use of Sentry® (imazapic + imazapyr) is being considered to manage barley grass, brome grass, wild oats and other weeds on the label. Sentry® herbicide is approved for IBS application in Archer and Kingbale hay, forage, seed and grain crops (domestic feed market only). For more information, see nufarm.com/au/product/sentry/. Excess grain, seed and screenings produced from the single-gene IMI-tolerant oat hay varieties Archer and Kingbale can be used for domestic livestock feed. However, the grain of these two varieties cannot be delivered into the Bunge and CBH bulk handling systems.

New hay-only varieties Kultarr and Wallaby show promise but have yet to be widely adopted. Both offer hay yield and quality comparable to Brusher, with reduced lodging risk and good leaf greenness, particularly in Wallaby. Wallaby is shorter and matures later than Brusher, offering flexibility in cutting schedules. Kultarr is slightly earlier in phenology, with similar hay length to Brusher.

Traditional hay-only varieties, Koorabup, Mulgara, and Wintaroo, represented a small share of deliveries in 2025–26, indicating a shift in grower preferences. In 2024–25, Brusher was nearly a fifth of plantings, so it would be fair to assume that Brusher is still popular for export hay.



New for planting in 2026

No new milling or hay oat varieties have been released in 2025. However, growers now have access to three newly accredited milling oat varieties, Goldie, Koala, and Minnie, which were released in 2024. These varieties offer improved agronomic performance and grain quality attributes compared to existing varieties.

Goldie

Key points:

- Accredited as a milling oat variety by Grains Australia in February 2024.
- Targeted as a replacement for Bannister in all growing regions.
- Dual-purpose variety.
- Earlier to panicle emergence than Bannister, around one week earlier, with late April to early May sowing.
- Taller than Bannister with a lodging risk similar to Williams.
- Carries a similar disease-resistance package to Bannister.
- Enhanced grain yields relative to Bannister in less than 5 t/ha environments.
- Improved receival quality (lower screenings with equivalent or better hectolitre weight).
- Goldie offers growers greater flexibility in nitrogen (N) fertiliser management compared to Bannister.

Goldie (tested as 13008-18) is a medium-spring, tall-grain oat variety derived from Bannister, with the pedigree 02095-9/Bannister. It exhibits enhanced grain yield (below 5 t/ha) and grain plumpness (Figures 3–11), with an improved likelihood of meeting OAT1 receival standards.

In an economic analysis of 12 DPIRD N management trials (2022–24), using an OAT1 price of \$360/t, urea at \$835/t, and fixed costs (seeding, spraying and harvest) of \$290/ha, the optimal N rate for Bannister was 45–55 kg/ha. For Goldie, optimal profit occurred at 70–80 kg N/ha, with higher returns than Bannister at 45–55 kg N/ha. Goldie, therefore, offers growers greater flexibility in their fertiliser N management strategies than Bannister.

The main risk, however, is a potential for Goldie to lodge under high N rates (Figure 2).

Goldie has demonstrated suitability for export hay, reaching watery ripe earlier than Brusher and Bannister when sown in early May. It produces shorter hay than Brusher with moderate stem thickness and reduced lodging risk. While panicle emergence may be less consistent than hay-only varieties, Goldie has shown promising results in DPIRD and InterGrain trials (Tables 11–12). If Goldie hay meets export receival standards it will be received by export hay companies.

Goldie seed will be available for planting in 2026 through resellers, Seedclub Members, and farmer-to-farmer trade.

Koala

Key points:

- Accredited as a milling variety by Grains Australia in August 2024.
- Targeted as an alternative to Bannister in high-yielding environments (>5 t/ha).
- Dual-purpose variety.
- Later to panicle emergence than Bannister, with late April to early May planting.
- Slightly taller than Bannister with a lodging risk similar to Williams.
- Offers improved resistance to OSR over Bannister.
- Enhanced grain yields relative to Bannister in greater than 5 t/ha environments.
- Similar receival quality (equivalent screenings and hectolitre weight) to Bannister.
- The suggested N strategy for this variety aligns closely with that used for Bannister.

Koala (tested as 09143-35) is a very late-spring, tall-grain oat variety derived from Bannister, with the pedigree 02088-70/Bannister. Has a different grain yield response to environments than Bannister, with a similar grain quality package (Figures 3–11) and a similar probability of meeting OAT1 receival specifications. DPIRD research suggests that Koala responds differently to

fertiliser N than Bannister. High N rates (above 100 kg N/ha) should generally be avoided, as Koala is less responsive to N (Figure 5).

In an economic analysis of 12 DPIRD N management trials (2022–24), using an OAT1 price of \$360/t, urea at \$835/t, and fixed costs (seeding, spraying and harvest) of \$290/ha, the optimal N rate for Bannister and Koala was 45–55 kg/ha. The suggested N strategy for Koala, therefore, aligns closely with that used for Bannister. Where high N rates are used, there is the potential for Koala to lodge (Figure 2).

Koala shows potential for export hay, being ready to cut about a week later than Brusher and Mulgara when sown in early May. It produces shorter hay with moderate stem thickness and a reduced risk of lodging compared to Brusher. However, panicle emergence was lower than that of Brusher in the 2023 trials. If Koala hay meets export receival standards it will be received by export hay companies.

Koala seed will be available for planting in 2026 through Seednet partners and farmer-to-farmer trade.



Minnie (tested as 15010-09) is a medium spring, short-height grain oat variety derived from Bannister, with the pedigree Bannister/07251-9. It exhibits enhanced grain yield (below 4 t/ha) and grain plumpness (Figures 3–11), although its hectolitre weight may limit delivery as OAT1 in some seasons and environments. Among the three newly accredited milling oat varieties, Minnie has the lowest lodging risk (Figure 2), making it particularly suitable for environments prone to leaning. It also demonstrates high yield potential and a slightly stronger response to applied N than Bannister (Figures 4 and 5).

In an economic analysis of 8 DPIRD N management trials (2023–24), using an OAT1 price of \$360/t, urea at \$835/t, and fixed costs (seeding, spraying and harvest) of \$290/ha, the optimal N rate for Bannister was 60–70 kg/ha. For Minnie, optimal profit occurred at 80–90 kg N/ha (the same as Goldie), with higher returns than Bannister at 60–70 kg N/ha. Minnie, therefore, offers growers greater flexibility in their fertiliser N management strategies than Bannister, but without the lodging risk associated with growing Goldie (Figure 2).

Due to its shorter height, Minnie may not be suitable for export hay production. Further feedback from export hay companies and growers is needed to determine its viability at an industrial scale.

Minnie seed will be available for planting in 2026 through resellers, Seedclub Members, and farmer-to-farmer trade.

Minnie

Key points:

- Accredited as a milling variety by Grains Australia in September 2024.
- Targeted as an alternative to Bannister in medium to high rainfall environments.
- Potential as a dual-purpose variety is likely limited by its short stature.
- Earlier to panicle emergence than Bannister, closer to Carrolup when sown in late April to early May.
- Minnie has a shorter height straw than Bannister, with a lower lodging risk.
- Carries a similar disease-resistance package to Bannister.
- Enhanced grain yields relative to Bannister in less than 4 t/ha environments.
- Improved grain plumpness relative to Bannister, with a hectolitre weight equivalent to Williams.
- Minnie offers growers greater flexibility in N fertiliser management compared to Bannister.

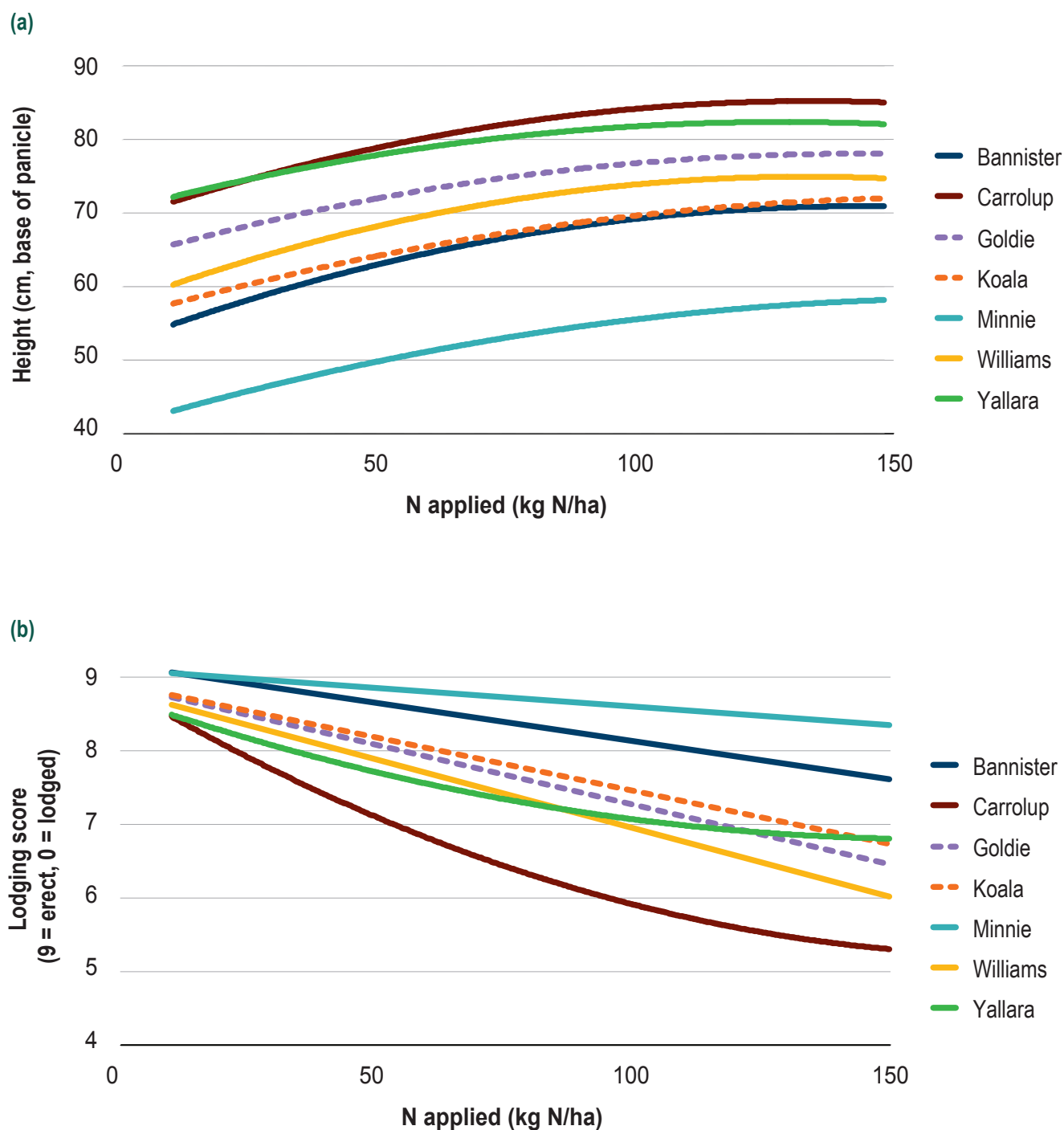


Figure 2: a) Plant height to base of panicle and b) DPIRD lodging score of Bannister, Carrolup, Goldie, Koala, Minnie, Williams and Yallara with changes in fertiliser N supply. Lower number = higher levels of lodging. Scores from 9 to 7 indicate increased leaning. Scores from 6 to 0 indicate an increased proportion of the plot that has collapsed

Source: data averaged across 8 DPIRD trial sites, 4 trials in each of 2023 and 2024 at Wongan Hills, Yerecoin, Greenhills and Popanyinning

Grain – yield and quality

Blakely Paynter (DPIRD)

Grain yield

The National Variety Trials (NVT), coordinated by the Grains Research and Development Corporation (GRDC), offer a nationally consistent and independent framework for evaluating varietal performance across diverse agroecological zones. These trials help growers and agronomists select oat varieties best suited to their local conditions.

Results are available as single-site reports, reflecting performance in a specific season and location, or multi-environment trials (METs), which compare varietal performance against the site mean across multiple seasons. Users can access and filter data by state, region, or location through nvt.grdc.com.au, enabling informed and tailored decision-making.

This sowing guide is based on MET data from 2020–24 (excluding Agzone 1), with an accuracy of ≥ 0.8 and variance accounted of $\geq 25\%$. Performance summaries are presented by Agzone and state wide (Tables 3–8). While port zone-based summaries are now available online, they are not included in this guide.

When 4 or more observations are available, a 5-year weighted average is calculated. However, growers should interpret these averages cautiously, as they may obscure seasonal variability and variety-by-environment (GxE) interactions. Table 9 provides direct comparisons between varieties using least significant difference (LSD) analysis at a 95% confidence level, based on single-site MET data. These comparisons are valid but should not be relied upon in isolation.

To better understand varietal performance across yield environments, NVT presents data in half-tonne intervals (“yield groups”) via the Long-Term MET Yield Reporter. Figures 3 and 4 use linear regression to show how each variety performs as the site mean yield increases. These graphs assess deviations from the site mean and fit either linear or quadratic trends depending on statistical significance. If no trend is significant, the variety’s performance is considered stable across yield levels.

Figure 5 presents average grain yield responses to increasing N fertiliser rates across DPIRD-funded trials in the Kwinana port zone (Yerecoin, Wongan Hills, York, and Popanyinning) from 2022–24 and 2023–24.

Based on NVT and DPIRD data (Tables 3–9; Figures 3–5), the highest-yielding oat varieties in WA include:

- **Bilby:** Superior to Bannister in <3 t/ha environments since 2021; remains competitive in higher-yielding zones.
- **Goldie:** Benchmark performer in environments yielding below 4 t/ha; consistently outperforms Bannister in sub-5 t/ha conditions.
- **Koala:** Best suited to high-yielding environments (above 5 t/ha); shows improved yield over Bannister in these zones.
- **Minnie:** Performs similarly to Goldie with slightly lower yield potential; consistently exceeds Bannister below 4 t/ha since 2022.
- **Wandering and Williams:** Competitive performers depending on region and environmental yield potential.

In contrast:

- **Carrolup and Yallara:** Generally, they underperform relative to Goldie and Minnie.
- **Durack:** Competitive in very low-yielding environments (below 1.5 t/ha), particularly with June sowing.



Table 3: Grain yield of oat varieties in AGZONE 2 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		2.78	3.90	4.13	3.08	3.84	3.53
Variety	(No. trials)	(4)	(4)	(4)	(4)	(3)	(19)
Deliverable as OAT1							
Bannister	(19)	101	108	108	103	106	105
Bilby	(19)	107	106	103	110	105	106
Carrolup	(19)	85	88	86	89	91	88
Durack	(19)	96	86	87	92	90	90
Goldie	(15)	–	111	111	110	109	111
Koala	(19)	94	109	108	99	106	103
Kojonup	(19)	87	104	103	98	101	98
Minnie	(11)	–	–	114	106	104	108
Williams	(19)	94	106	100	102	105	101
Yallara	(19)	94	83	82	85	89	86
Deliverable as OAT2/OWAN							
Wandering	(19)	109	108	107	107	106	107

Source: based on MET analysis from the NVT, nvt.grdc.com.au

Table 4: Grain yield of oat varieties in AGZONE 3 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		3.01	4.18	4.91	4.11	4.41	4.20
Variety	(No. trials)	(2)	(3)	(3)	(3)	(3)	(14)
Deliverable as OAT1							
Bannister	(14)	107	105	111	103	109	107
Bilby	(14)	102	103	100	107	108	104
Carrolup	(11)	85	96	91	90	–	90
Durack	(14)	90	93	85	93	85	89
Goldie	(12)	–	105	109	109	115	110
Koala	(14)	105	106	116	100	107	107
Kojonup	(14)	93	103	109	96	100	101
Minnie	(9)	–	–	105	104	107	105
Williams	(14)	100	106	108	102	106	105
Yallara	(14)	94	93	86	92	83	89
Deliverable as OAT2/OWAN							
Wandering	(14)	109	104	106	107	110	107

Source: based on MET analysis from the NVT, nvt.grdc.com.au

Table 5: Grain yield of oat varieties in AGZONE 4 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.26	3.56	4.46	1.16	1.95	2.39
Variety	(No. trials)	(1)	(1)	(1)	(1)	(2)	(6)
Deliverable as OAT1							
Bannister	(6)	79	111	113	95	92	97
Bilby	(6)	131	97	107	110	123	115
Carrolup	(6)	67	84	74	86	85	80
Durack	(6)	111	88	77	104	100	97
Goldie	(5)	–	113	121	111	113	115
Koala	(6)	48	112	113	82	76	85
Kojonup	(6)	61	95	104	76	83	84
Minnie	(4)	–	–	124	108	111	119
Williams	(6)	62	99	100	90	94	90
Yallara	(6)	70	94	67	101	82	83
Deliverable as OAT2/OWAN							
Wandering	(6)	112	109	113	109	110	111

Source: based on MET analysis from the NVT, nvt.grdc.com.au

Table 6: Grain yield of oat varieties in AGZONE 5 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		2.13	2.44	4.42	2.71	3.68	3.01
Variety	(No. trials)	(2)	(2)	(2)	(2)	(1)	(9)
Deliverable as OAT1							
Bannister	(9)	109	110	109	97	97	105
Bilby	(9)	104	98	103	112	113	105
Carrolup	(9)	85	92	87	91	90	89
Durack	(9)	87	88	85	99	99	91
Goldie	(7)	–	108	111	108	109	110
Koala	(9)	108	114	112	88	87	103
Kojonup	(9)	95	103	106	90	88	97
Minnie	(5)	–	–	111	106	104	106
Williams	(9)	104	107	103	97	98	102
Yallara	(9)	92	94	82	91	92	90
Deliverable as OAT2/OWAN							
Wandering	(9)	111	106	107	106	107	107

Source: based on MET analysis from the NVT, nvt.grdc.com.au

Table 7: Grain yield of oat varieties in AGZONE 6 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		3.55	4.84	5.37	2.00	–	3.94
Variety	(No. trials)	(1)	(1)	(1)	(1)	(0)	(4)
Deliverable as OAT1							
Bannister	(4)	117	110	111	94	–	108
Bilby	(4)	110	105	102	116	–	108
Carrolup	(4)	90	84	89	92	–	89
Durack	(4)	71	83	83	102	–	85
Goldie	(3)	–	114	110	108	–	–
Koala	(4)	124	111	116	83	–	109
Kojonup	(4)	124	105	111	87	–	107
Minnie	(2)	–	–	108	101	–	–
Williams	(4)	122	103	107	99	–	108
Yallara	(4)	64	77	80	93	–	79
Deliverable as OAT2/OWAN							
Wandering	(4)	109	109	106	106	–	108

Source: based on MET analysis from the NVT, nvt.grdc.com.au

Table 8: Grain yield of oat varieties averaged across AGZONES 2–6 expressed as a percentage of the site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		2.62	3.77	4.54	3.02	3.59	3.52
Variety	(No. trials)	(10)	(11)	(11)	(11)	(9)	(52)
Deliverable as OAT1							
Bannister	(52)	105	108	110	101	104	106
Bilby	(52)	107	103	102	109	109	106
Carrolup	(49)	85	90	87	90	88	88
Durack	(52)	91	88	84	95	90	90
Goldie	(42)	–	109	111	109	112	111
Koala	(52)	101	109	112	96	101	104
Kojonup	(52)	93	103	106	95	97	99
Minnie	(31)	–	–	111	105	106	107
Williams	(52)	99	105	104	101	103	102
Yallara	(52)	88	88	81	89	86	86
Deliverable as OAT2/OWAN							
Wandering	(52)	109	107	107	107	109	108

Source: based on MET analysis from the NVT, nvt.grdc.com.au

TABLE 9: Direct comparisons between 2 varieties (yield difference compared using least significant difference, $p=0.05$, calculated using standard errors from single-site MET) – how many times (as a per cent) was variety A (comparator variety) lower-yielding, the same yield or higher-yielding than variety B (base variety) when sown together in WA oat NVT?

Variety A	Percentage of trials			Number of trials	Comparison years	Comparison
	Variety A is lower yielding than Variety B	Variety A and B yield the same	Variety A is higher yielding than Variety B			
Variety B: Bannister						
Bilby	31%	37%	33%	52	2020–24	Bilby = Bannister
Carrolup	80%	20%	0%	49	2020–24	Carrolup < Bannister
Durack	75%	17%	8%	52	2020–24	Durack < Bannister
Goldie	2%	52%	45%	42	2021–24	Goldie ≥ Bannister
Koala	19%	77%	4%	52	2020–24	Koala = Bannister
Kojonup	50%	48%	2%	52	2020–24	Kojonup ≤ Bannister
Minnie	16%	48%	35%	31	2022–24	Minnie ≥ Bannister
Wandering	6%	75%	19%	52	2020–24	Wandering = Bannister
Williams	21%	77%	2%	52	2020–24	Williams = Bannister
Yallara	79%	21%	0%	52	2020–24	Yallara < Bannister
Variety B: Carrolup						
Bannister	0%	20%	80%	49	2020–24	Bannister > Carrolup
Bilby	2%	6%	92%	49	2020–24	Bilby > Carrolup
Durack	18%	57%	24%	49	2020–24	Durack = Carrolup
Goldie	5%	0%	95%	39	2021–24	Goldie > Carrolup
Koala	8%	20%	71%	49	2020–24	Koala > Carrolup
Kojonup	0%	37%	63%	49	2020–24	Kojonup ≥ Carrolup
Minnie	4%	11%	86%	28	2022–24	Minnie > Carrolup
Wandering	0%	6%	94%	49	2020–24	Wandering > Carrolup
Williams	0%	20%	80%	49	2020–24	Williams > Carrolup
Yallara	20%	65%	14%	49	2020–24	Yallara = Carrolup

Source: based on single-site MET data from NVT, nvt.grdc.com.au

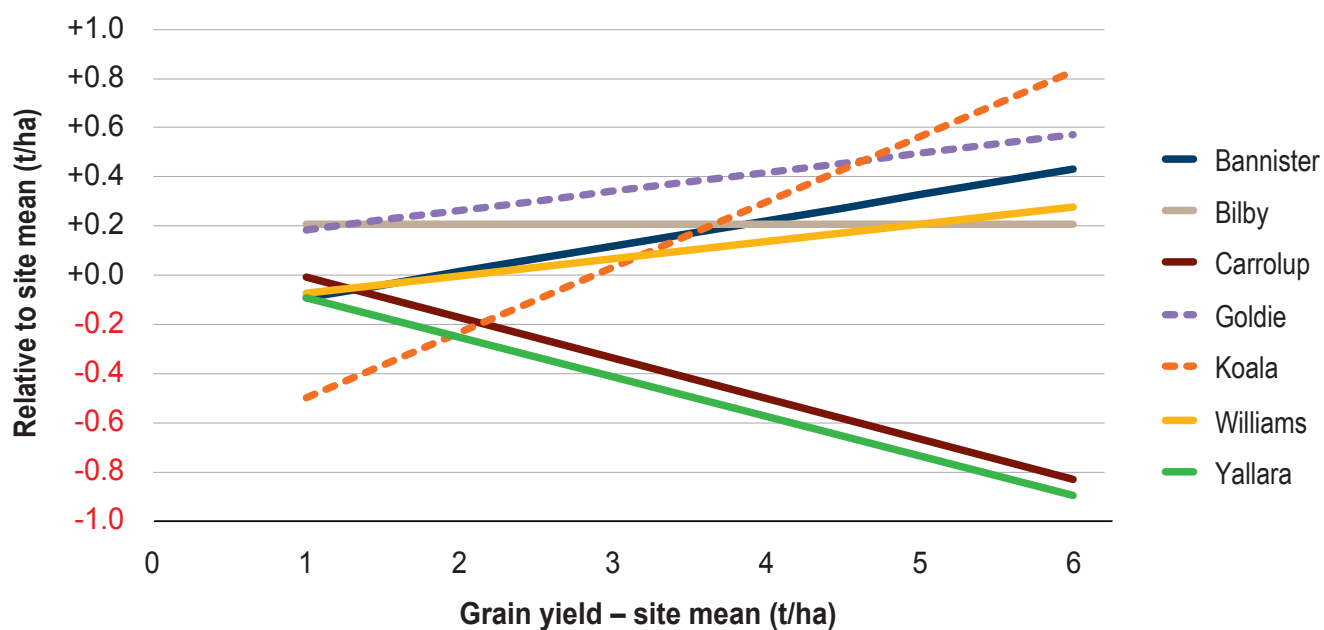


Figure 3: Fitted grain yield of Bannister, Bilby, Carrolup, Goldie, Koala, Williams, and Yallara at different site means

Source: based on NVT state wide tables of yields and grain quality (2021–24). Each variety is sown in all 39 trial-years of data, NVT, nvt.grdc.com.au

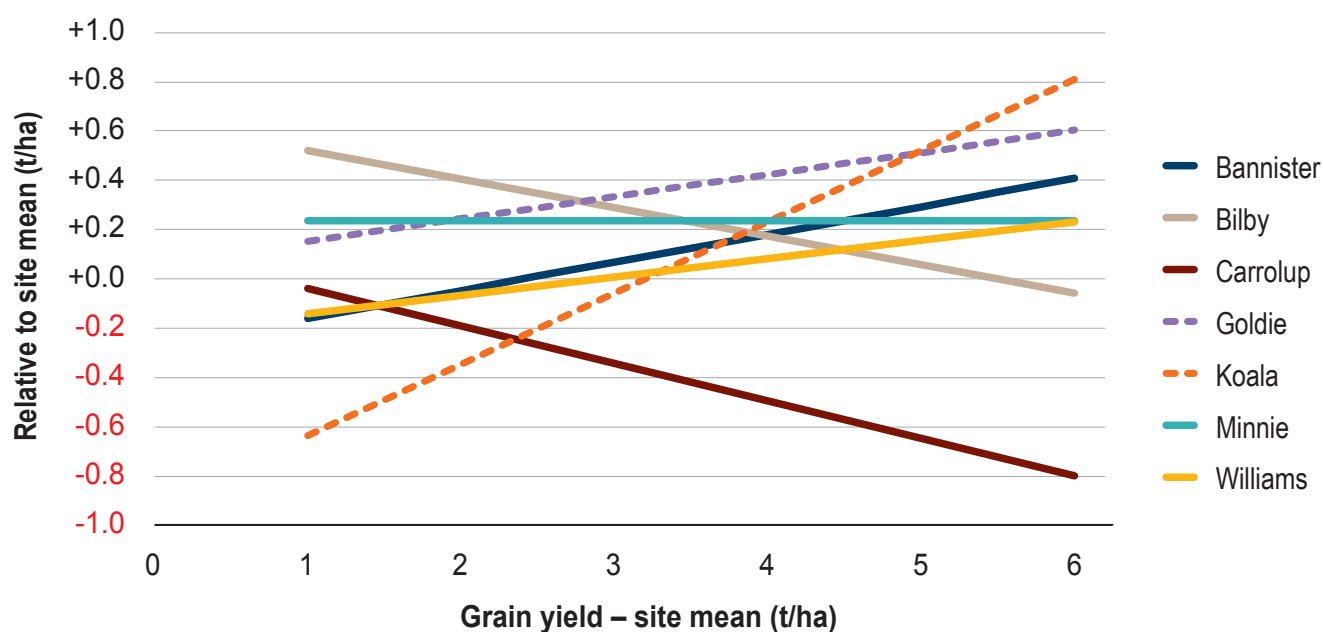


Figure 4: Fitted grain yield of Bannister, Bilby, Carrolup, Goldie, Koala, Minnie, and Williams at different site means

Source: based on NVT state wide tables of yields and grain quality (2022–24). Each variety is sown in all 28 trial-years of data, NVT, nvt.grdc.com.au

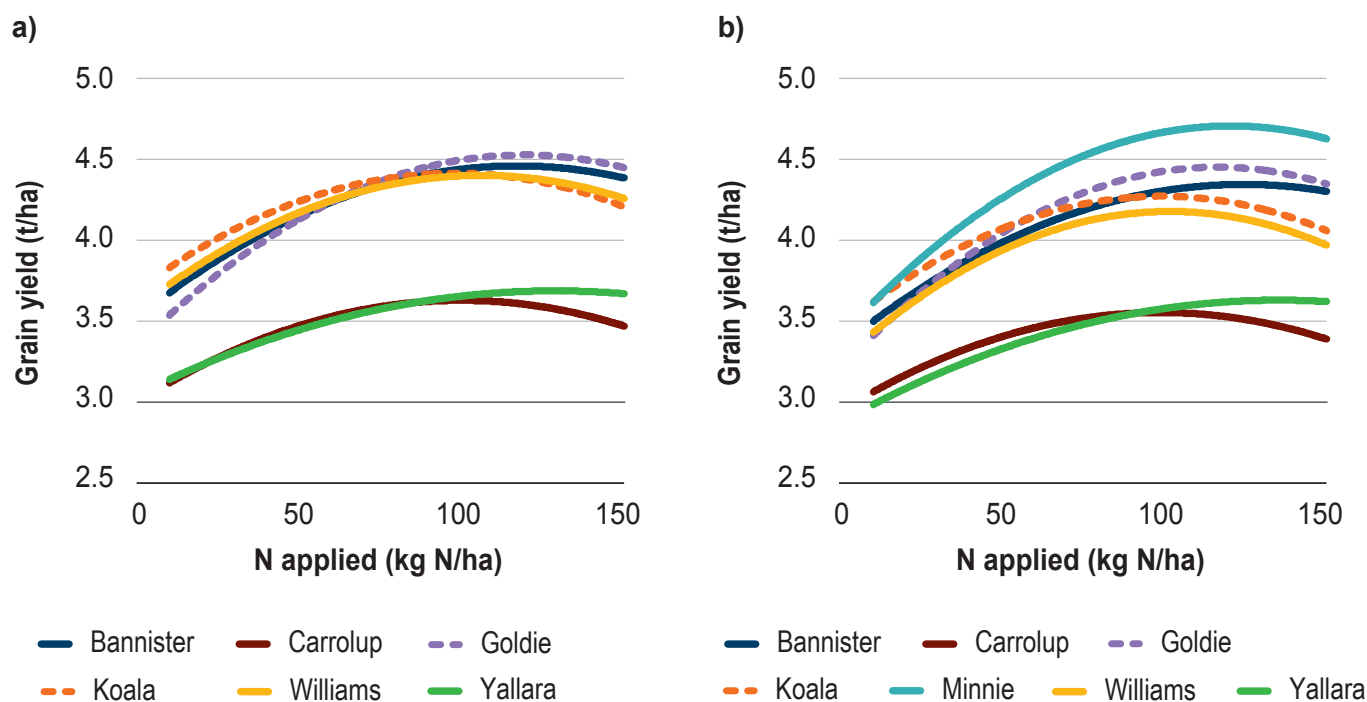


Figure 5: Grain yield of Bannister, Carrolup, Goldie, Koala, Minnie, and Williams with changes in fertiliser N supply for a) 12 DPIRD trials, 2022–24, and b) 8 DPIRD trials, 2023–24

Source: data averaged across multiple DPIRD trial sites in the Kwinana port zone

Grain quality

Grain quality is a critical determinant of market suitability for milling oat varieties. Key physical traits include hectolitre weight and screenings (measured using a 2.0 mm slotted sieve). Figures 6–7 and 9–10 present these traits relative to the site mean across both established and newly accredited varieties. Where statistically significant, linear or quadratic trends were fitted; otherwise, varietal responses were considered stable across yield levels. Data were sourced from the NVT State wide Yield and Grain Quality tables available at nvt.grdc.com.au.

Figures 5 and 8 illustrate the average grain quality responses to increasing N fertiliser rates across DPIRD-funded trials in the Kwinana port zone (Yerecoin, Wongan Hills, York, and Popanyinning) for the periods 2022–24 and 2023–24.

Currently, no milling oat variety combines both high hectolitre weight and low screenings. Goldie is the closest candidate. Yallara previously held this position but has since underperformed in yield, falling below Bannister in 79% of WA NVT trials (Table 9).

Carrolup remains the benchmark for hectolitre weight, followed by Durack (not shown) and Yallara (Figures 6–8). Bannister and Williams exhibit weaker hectolitre weights, with Bannister slightly outperforming Williams. Bilby and Goldie generally show improved hectolitre weight compared to Bannister, though both are inferior to Carrolup. Goldie's hectolitre weight is comparable to Yallara's. Koala performs slightly below Bannister but better than Williams, while Minnie's hectolitre weight is similar to or better than Williams.

Goldie and Yallara are the benchmark varieties for grain plumpness (Figures 9–11). Genetic differences in screenings are evident at the OAT1 receival limit (10% through a 2.0 mm slotted sieve), with even more pronounced variation at the OAT2 limit (15%). Williams has the poorest grain plumpness, posing the highest risk of failing milling receival standards. Bannister shows improvement over Williams but remains less plump than Goldie. Koala performs similarly to Bannister and is an improvement over Williams. Bilby offers a slight advantage over Bannister and a more apparent improvement over Williams. Minnie matches Goldie in grain plumpness and exceeds both Bannister and Koala.

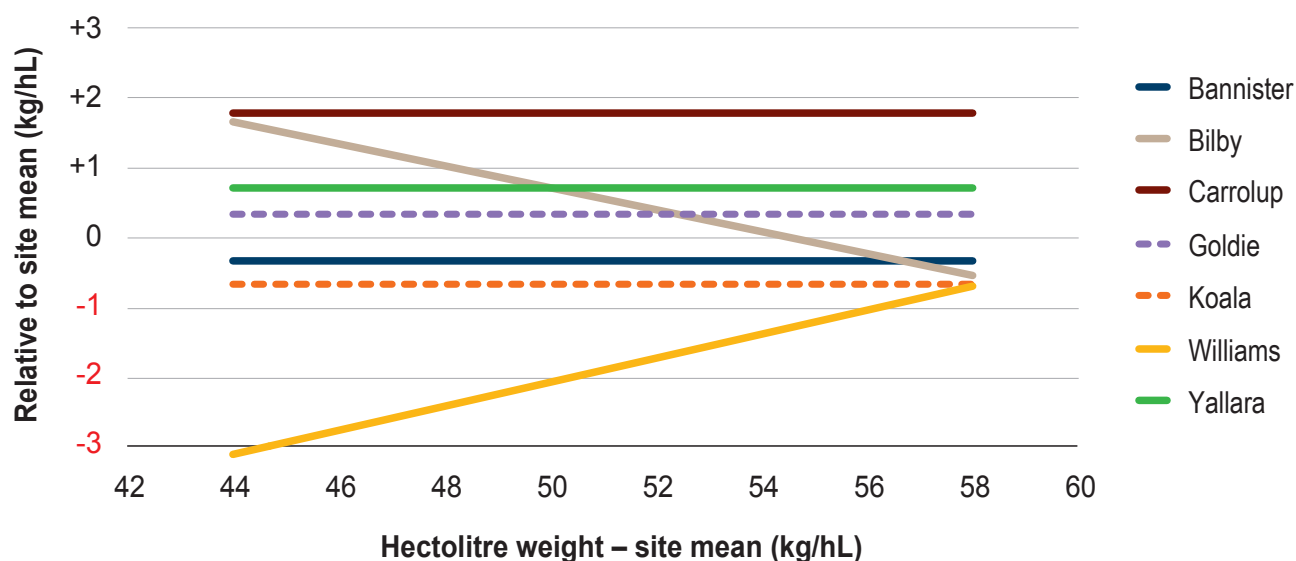


Figure 6: Fitted hectolitre weight of Bannister, Bilby, Carrolup, Goldie, Koala, Williams, and Yallara at different site means

Source: based on NVT state wide tables of yields and grain quality (2021–24). Each variety is sown in all 39 trial-years of data, NVT, nvt.grdc.com.au

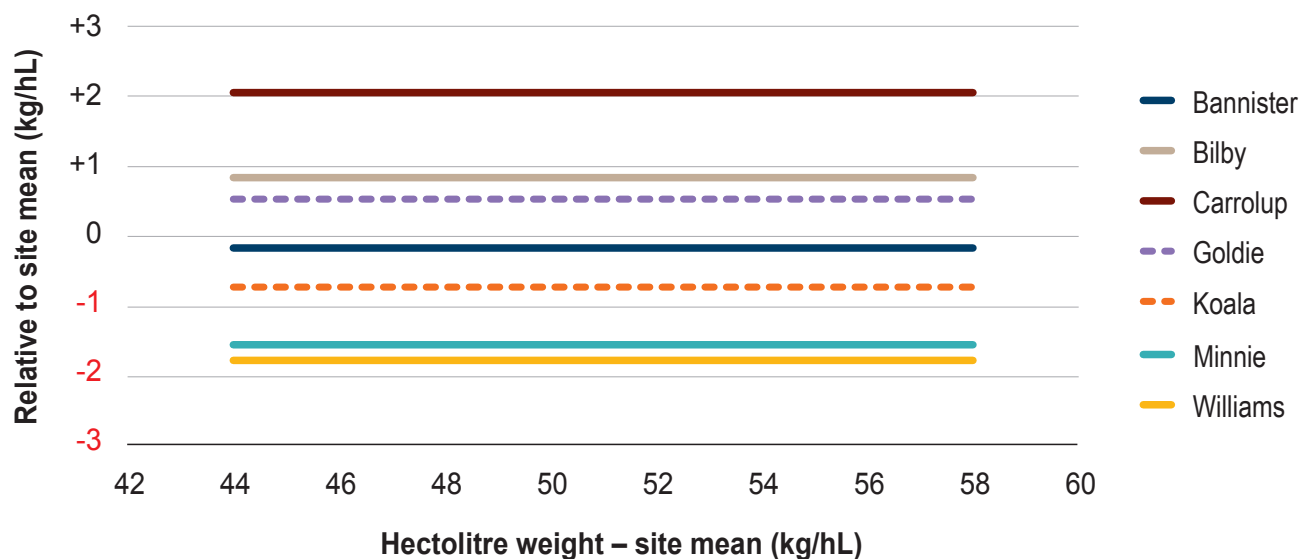


Figure 7: Fitted hectolitre weight of Bannister, Bilby, Carrolup, Goldie, Koala, Minnie, and Williams at different site means

Source: based on NVT state wide tables of yields and grain quality (2022–24). Each variety is sown in all 28 trial-years of data, NVT, nvt.grdc.com.au

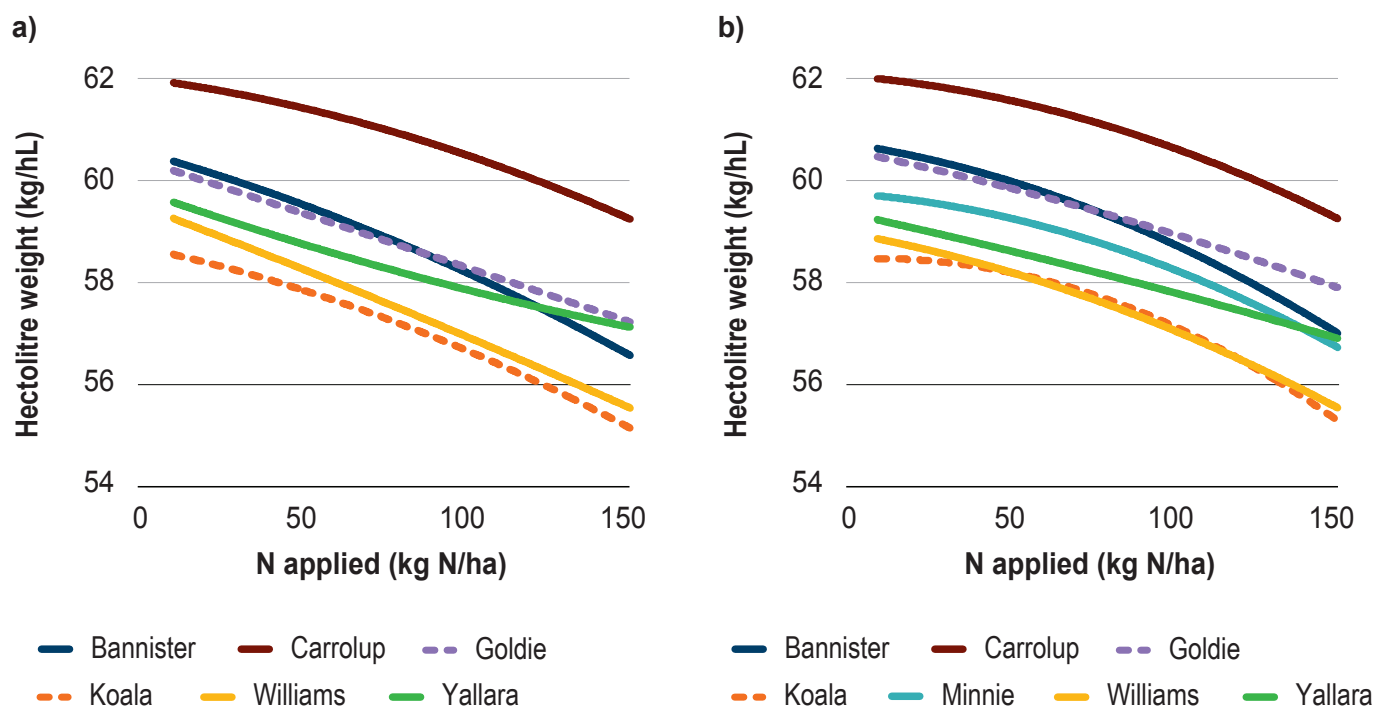


Figure 8: Hectolitre weight of Bannister, Carrolup, Goldie, Koala, Minnie, and Williams with changes in fertiliser N supply for a) 12 DPIRD trials, 2022–24, and b) 8 DPIRD trials, 2023–24

Source: data averaged across multiple DPIRD trial sites in the Kwinana port zone

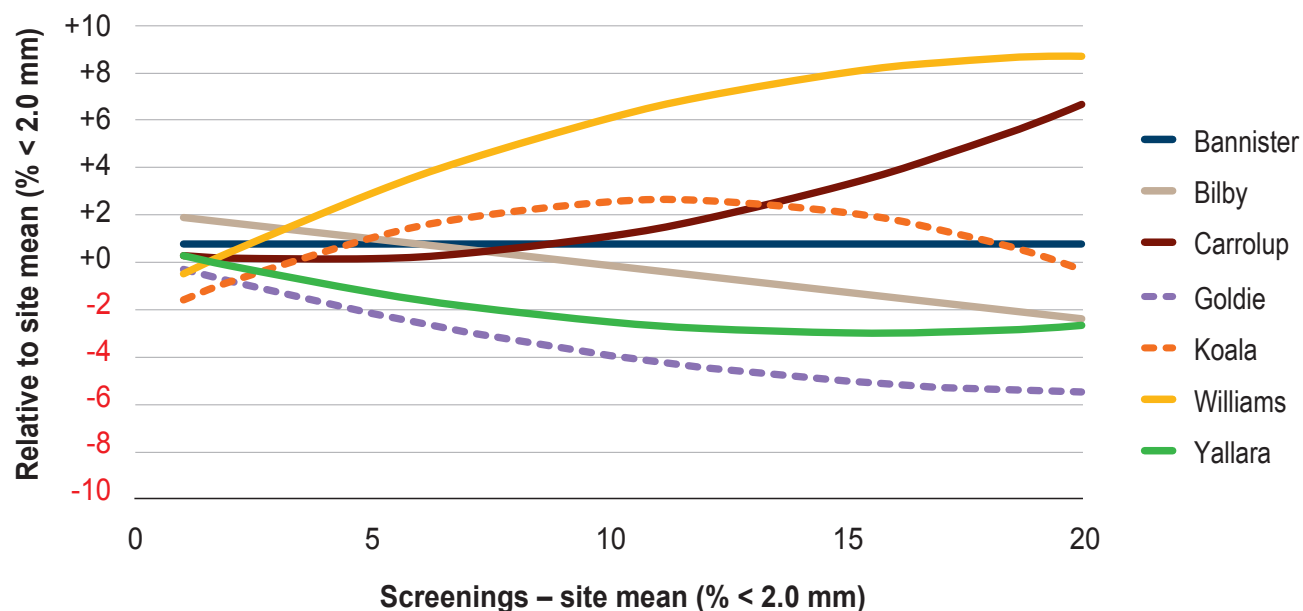


Figure 9: Fitted grain plumpness of Bannister, Bilby, Carrolup, Goldie, Koala, Williams and Yallara at different site means

Source: based on NVT state wide tables of yields and grain quality (2021–24). Each variety is sown in all 39 trial-years of data, NVT, nvt.grdc.com.au

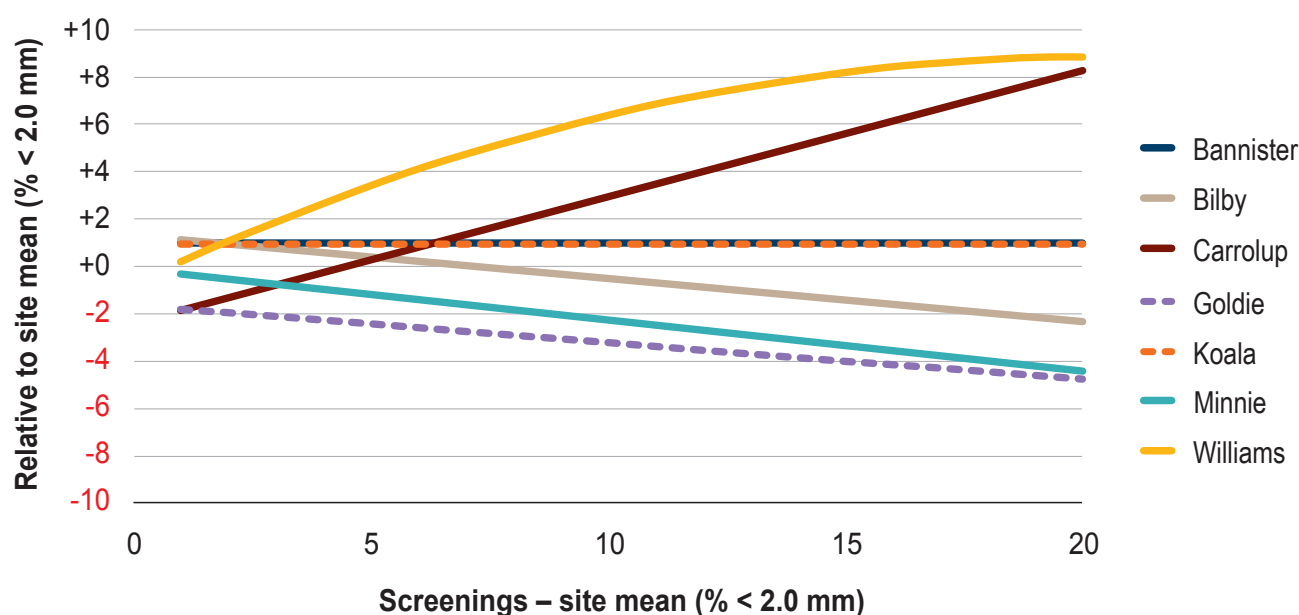


Figure 10: Fitted grain plumpness of Bannister, Carrolup, Goldie, Koala, Minnie, and Williams at different site means

Source: based on NVT state wide tables of yields and grain quality (2022–24). Each variety is sown in all 28 trial-years of data, NVT, nvt.grdc.com.au

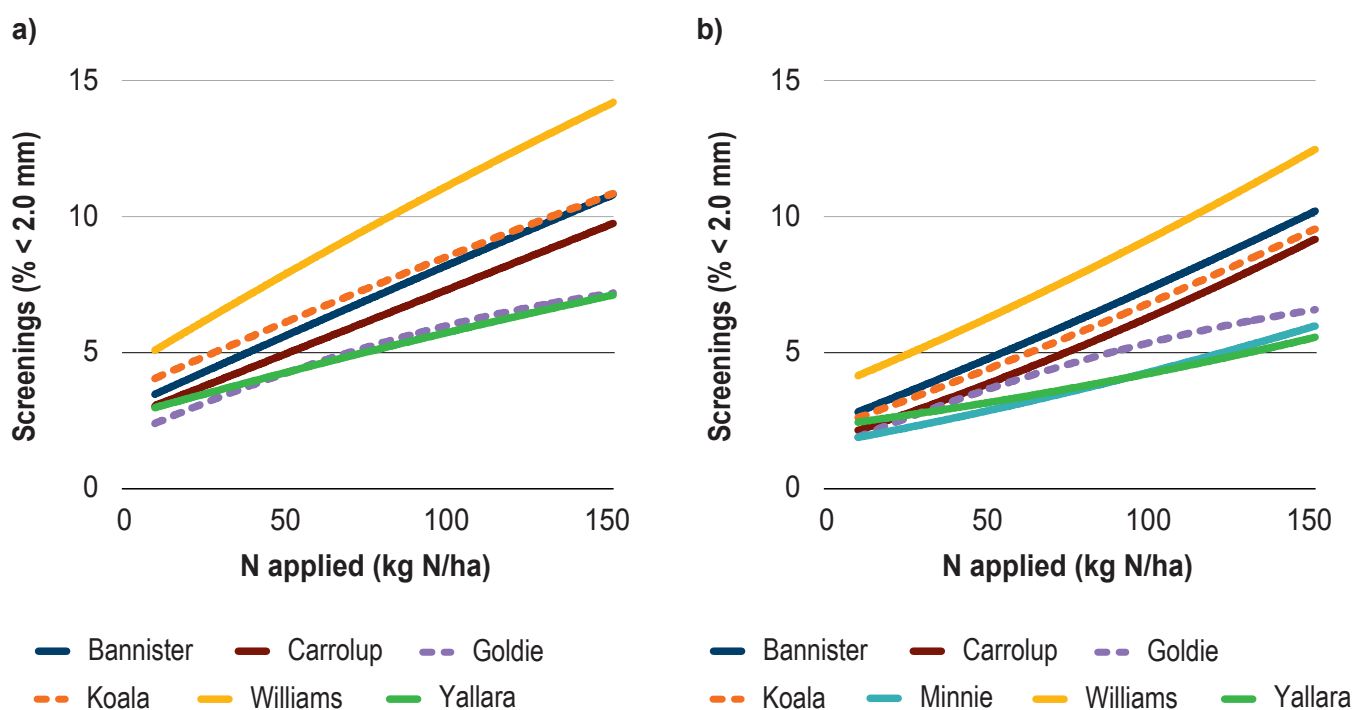


Figure 11: Grain plumpness of Bannister, Carrolup, Goldie, Koala, Minnie, and Williams with changes in fertiliser N supply for a) 12 DPIRD trials, 2022–24, and b) 8 DPIRD trials, 2023–24

Source: data averaged across multiple DPIRD trial sites in the Kwinana port zone

Management advice for grain oat growers

Blakely Paynter (DPIRD)

Target April sowing when growing milling oats

Grain with more than 15% screenings through a 2.0 mm slotted sieve is not accepted into the bulk handling system. Research conducted by DPIRD, in collaboration with GRDC (project DAW1901-002RTX), has demonstrated that sowing milling oats in early April significantly reduces the risk of screenings. Across two seasons (2019 and 2020), early planted oats exhibited:

- Increased hectolitre weight (up to +3 kg/hL),
- Reduced screenings (–9%), and
- Higher grain yield (+0.65 t/ha) compared to oats sown after the first week of May.

Grain staining was below reportable thresholds and did not affect quality. Importantly, early planting combined with appropriate variety selection proved more effective in reducing screenings than lowering fertiliser N rates. These practices are essential for achieving OAT1 quality standards and optimising gross margins.

Oats are particularly well-suited to April sowing due to their elongated mesocotyl, which, together with the coleoptile, supports enhanced emergence from sowing depths beyond 5 cm, and up to 12 cm depending on soil type. This enables effective establishment in conditions with stored subsoil moisture and limits the effect of pre-emergence herbicides on establishment. Milling oats benefit from April emergence and demonstrate greater tolerance to flowering frost than wheat and barley. Their flexibility in sowing depth enhances productivity when sown in April, and being able to be sown early reduces their risk of failing to meet OAT1 grain receival standards.

Tips for nitrogen fertiliser on milling oats

N strategies differ between grain and hay oats. For milling oats, the rate of N application has a greater influence on yield than the timing. The recommended approach is:

- Apply one-third of the target N at seeding,
- Apply the remaining two-thirds 6 weeks after sowing (WAS).

Applying all N at seeding often results in reduced yield. Timing has minimal impact on grain quality.

Varieties such as Carrolup and Williams are more sensitive to increasing N rates than Bannister, with higher risks of low hectolitre weight and elevated screenings (Figures 8 and 11). These risks can be mitigated by sowing in April and selecting varieties with superior grain plumpness and hectolitre weight. Goldie and Minnie outperform Bannister in grain plumpness, making them more resilient to high N rates. However, Minnie's lower hectolitre weight may limit its yield potential under elevated N levels.

Milling oats are generally less responsive to fertiliser N than barley. In 12 DPIRD trials (2022–24), oat yield peaked between 50 and 100 kg N/ha, compared to 100–150 kg N/ha in barley. Maximus CL barley increased yield by 1.7 t/ha with the addition of N (from 10 to 150 kg/ha), while Bannister and Goldie gained 0.8 and 0.9 t/ha, respectively. The rate of N applied to milling oats should be less than what is applied to Maximus CL, the dominant barley variety in WA.

Hectolitre weight in oats declines more sharply with increasing N than in barley. For every 50 kg N applied, hectolitre weight dropped by 1.4 kg/hL in Bannister, 1.1 in Goldie, and 1.2 in Koala, compared to just 0.4 in Maximus CL (12 trials, 2022–24). Minnie's response was similar to Goldie and Koala across 8 trials (2023–24).

Screenings also increase with higher N rates. Choosing a variety with higher grain plumpness (e.g. Goldie) can mitigate the risks associated with higher N fertiliser application. Across the 12 DPIRD trials, for every extra 50 kg of N applied, screenings rose by 2.6% in Bannister, 1.7% in Goldie, and 2.4% in Koala (2.0 mm sieve), compared to 3.6% in Maximus CL (2.5 mm sieve). Minnie's screening response was comparable to Goldie across 8 trials (2023–24).

Varietal difference in the target nitrogen rate for milling oats

In an economic analysis of 12 DPIRD N management trials (2022–24), using an OAT1 price of \$360/t, urea at \$835/t, and fixed costs (seeding, spraying and harvest) of \$290/ha, the optimal N rate for Bannister and Koala was 45–55 kg/ha compared to Goldie at 70–80 kg N/ha. Goldie outperformed Bannister and Koala at their optimal N rate.

In an economic analysis of 8 DPIRD N management trials (2023–24), using the same pricing, Bannister's optimal N rate was 60–70 kg/ha, while profit peaked at 50–60 kg N/ha for Koala. For Goldie and Minnie, it was 80–90 kg/ha, with both outperforming Bannister and Koala in gross margin at their optimal N rates.

Goldie and Minnie offer growers greater flexibility in N management than Bannister and Koala. However, Goldie and Koala carry a higher lodging risk under elevated N rates, whereas Minnie does not.

Target plant density

Target plant density for oats should be calculated based on end-use (grain or hay), rainfall zone, kernel weight, viability and establishment conditions. Rather than using a fixed machinery seeding rate (kg/ha), growers should calculate seeding rates based on target plant density (plants/m²).

For grain oats (based on a kernel weight of 30–45 mg):

- **Low rainfall zone:** Target density = 160 plants/m² → Seeding rate = 55–85 kg/ha
- **Medium rainfall zone:** Target density = 240 plants/m² → Seeding rate = 85–130 kg/ha
- **High rainfall zone:** Target density = 240 plants/m² → Seeding rate = 85–130 kg/ha

In 2025, DPIRD is investigating whether Goldie, when sown at hay production densities, can still meet OAT1 grain quality standards. This research addresses outdated density recommendations following the shift from mid-May to early April sowing.

The target density in plants/m² determines the seeding rate in kg/ha and is calculated using the following formula:

$$\text{Seed rate (kg/ha)} = \frac{1000 \text{ kernel weight (g)} \times \text{target density (plants/m}^2\text{)}}{\text{germination \%} \times \text{establishment \%} \times 100}$$

For example, if sowing Bannister oats with a kernel weight of 35 g per 1000 kernels at a target density of 240 plants/m² with germination of 96% and an expected establishment of 80%, the seeding rate in kg/ha required to establish 240 plants/m² is:

$$\text{seed rate in kg/ha} = 109 \text{ kg/ha} = \frac{35 \times 240}{0.96 \times 0.80 \times 100}$$

Management of grain staining in grain oats

Fungicide strategies can reduce, but not eliminate, the risk of grain staining. In high-risk environments, variety selection is the most effective tool for mitigating risk. DPIRD research indicates that untreated varieties with partial septoria resistance had lower levels of stained grain compared to highly susceptible varieties treated with multiple fungicide applications.

Bannister is WA's most widely sown oat variety for grain due to its yield advantage over Carrolup and better grain quality than Williams. However, despite sharing the same septoria resistance rating, Bannister is more prone to grain staining, especially in high rainfall zones, increasing the risk of receival downgrading.

Bannister is WA's most widely sown oat variety for grain due to its yield advantage over Carrolup and better grain quality than Williams. However, despite sharing the same septoria resistance rating, Bannister is more prone to grain staining, especially in high rainfall zones, increasing the risk of receival downgrading. The relative risk of Goldie, Koala, and Minnie is unknown.

In high disease pressure situations, such as oat-on-oat rotations, high rainfall regions, or when growing susceptible varieties, a 2-spray fungicide regime is recommended: one at stem elongation (when more than 5% of the leaf area is affected) and another at flag leaf emergence. Under lower disease pressure or late-season infection, a single spray at flag leaf emergence is sufficient. Late-season rainfall can also cause staining, but fungicide applications at Z55–59 are generally ineffective.

Harvest timing for grain oats

Timely harvest is essential to maximise yield and minimise losses due to shedding or lodging, particularly in non-dwarf varieties. Direct harvesting is preferred when grain moisture is below 12%. If moisture exceeds 12%, post-harvest aeration or drying is required. In uneven ripening or slow drying conditions, swathing should be considered. Desiccation is not permitted for oats in Australia.

DPIRD research (2019) on 12 milling oat varieties found that delayed harvest significantly reduces yield. A 3-week delay resulted in a 10% reduction in grain yield, while a 6-week delay led to a 25% reduction. All varieties responded similarly to delayed harvest, reinforcing the importance of timely operations.



Hay – yield and quality

Blakely Paynter (DPIRD)

Quality standards for export hay

Establishing a contract with an exporter before sowing oats for export hay is essential to ensure alignment with market-specific quality requirements. Optimal hay yield and quality are typically achieved by cutting at or just before the watery ripe stage (Z71). Cutting earlier may improve quality, provided panicles are not retained within the boot. A harvest window of approximately 5–7 days post-Z71 allows flexibility before hay quality begins to decline. Rainfall events exceeding 10 mm after cutting can significantly compromise the quality of hay.

Unlike grain, there is no universal standard for hay grading. In WA, processors assess the nutritional value of export hay using near-infrared spectroscopy (NIR) and wet chemistry, alongside physical traits like colour and stem thickness. Grading systems vary by processor; some use 4 or 5 grades, others a 100-point scale, depending on their target markets.

Common grading parameters across exporters include:

- **Crude protein (CP):** Reflects N concentration; essential for livestock maintenance and production.
- **Metabolisable energy (ME):** Indicates usable energy after digestion losses.
- **Dry matter digestibility (DMD):** Simulates rumen digestion; values greater than 65% indicate high-quality feed. Feed with a DMD below 55% is of poor quality and will not maintain live weight even if the stock has free access.
- **Water soluble carbohydrates (WSC):** Measures total digestible sugars, including glucose and fructans.
- **Neutral detergent fibre (NDF):** Quantifies structural fibre (hemicellulose, cellulose, lignin); a high NDF intake reduces feed intake. NDFDom30 assesses digestibility after 30 hours.
- **Fibre digestibility (NDFDom):** Evaluates digestible fibre via rumen incubation; reported on an organic matter basis.

- **Acid detergent fibre (ADF):** Measures less digestible fibre (cellulose and lignin); lower ADF correlates with higher energy.
- **Stem thickness:** Influences fibre content; however, the stem-to-leaf ratio may be more critical.
- **Greenness:** Assessed via near-infrared (NIR), Soil Plant Analysis Development (SPAD), photo analysis, or visual inspection. While not directly linked to nutrition, greenness reflects the impact of weathering and disease.

While benchmarks for hay quality vary between exporters, DPIRD's Table 10 outlines typical standards for WA export hay. Hay can also be downgraded for non-nutritional factors such as excessive moisture, weed contamination, and damage from disease or weather.

To prevent spoilage, hay should be delivered with a maximum bale moisture of 14%, with some exporters requiring a moisture level as low as 12%. Hay with moisture above 18% risks spoilage from mould and self-combustion during storage.

Most processors have a limit of 1% by weight of broadleaf plants and 5% of other cereals/ryegrass/wild oats. Zero tolerance exists for toxic plants, double-gee, and foreign material, such as dirt, stones, sticks, insects, wool, wire, and carcasses.

Livestock deaths from annual ryegrass toxicity (ARGT) in importing countries pose a serious threat to Australia's hay export industry. All export hay must be tested for the bacterium *Rathayibacter toxicus*, the causal agent of ARGT. If contamination is suspected, growers should implement a formal ARGT management plan.

Most processors permit up to 10% disease-affected leaves. Growers must observe fungicide withholding periods and refrain from applying fungicides close to harvest time. Planting disease-resistant varieties is recommended. Export markets expect a clean, green product and monitor for breaches of maximum residue limits (MRLs) for herbicides, insecticides, and fungicides. Always follow label registrations for all chemical applications.

Table 10: Quality standards required to meet export hay requirements

Parameter	Grade 1	Grade 2	Grade 3	Grade 4
Crude protein (% dm)	4–10	<4	<4	<4
Estimated metabolisable energy (MJ/kg dm)	>9.5	<9.5	<9.5	<9.5
Dry matter digestibility (% dm)	>60	>58	>56	>53
Water-soluble carbohydrates (% dm)	>22	>18	>14	>14
Neutral detergent fibre (% dm)	≤55	≤55–59	≤57–60	≤60–64
Acid detergent fibre (% dm)	<30–32	>32–35	>35–37	>37–40
Stem thickness (mm)	<6	<8	<9	>9

Source: DPIRD

Fibre digestibility

Digestibility is increasingly recognised as a critical trait in export hay markets, particularly as highly digestible feeds enhance nutrient uptake in livestock and are associated with reduced methane emissions in the dairy industry.

While digestibility is influenced by complex interactions between fibre, sugars, minerals, and rumen microflora, fibre content remains the most significant factor. Consequently, WA exporters are transitioning from using Dry Matter Digestibility (DMD) to Neutral Detergent Fibre Digestibility (NDFDom) as a more precise indicator of feed quality.

NDFDom specifically evaluates the digestibility of the neutral detergent fibre (NDF) fraction, offering a more accurate assessment than whole-feed digestibility metrics. This trait is now widely adopted in hay grading systems across WA's export markets and is considered a key benchmark for nutritional quality.



Variety performance in hay variety trials

Hay variety performance in WA is informed by three primary sources:

- InterGrain breeding trials (national MET analysis) (2018–24),
- AgriFutures-supported National Hay Agronomy (NHA) trials (2019–21), and
- DPIRD agronomy trials (2022–23).

Table 11 presents MET data from 64 national trials, including 5 AgriFutures-funded and 2 DPIRD-supported trials. Of the 64 trials in the national MET, 5 were part of the AgriFutures-funded research and 2 were supported by DPIRD. Table 12 summarises DPIRD trial results from 4 WA sites over 2 years. Katanning (2022) and Wongan Hills (2023) were excluded due to poor conditions. Koala was trialled in 2023 but excluded from Table 12. DPIRD evaluated the hay performance of 3 dual-purpose oat varieties (Carrolup, Goldie, Yallara) and 6 hay-only varieties (Archer, Brusher, Koorabup, Kultarr, Mulgara, Wallaby).

AgriFutures NHA trials (PRJ-011029) assessed 4 dual-purpose (Carrolup, Durack, Williams, Yallara) and four hay-only varieties (Brusher, Koorabup, Mulgara, Wintaroo) across WA, SA, Vic, and NSW over 2 sowing dates and 3 N rates (averaged due to the absence of variety × N interaction). Data from these trials is not included in this guide.

The key findings across the InterGrain breeding (Table 11), NHA agronomy and DPIRD hay agronomy (Table 12) trials were:

- **Hay yield:**
 - InterGrain MET: hay-only varieties (except Koorabup) yielded 10.0–10.4 t/ha; dual-purpose varieties averaged 0.3 t/ha less.

- DPIRD trials: most hay-only varieties (except Koorabup) yielded over 11 t/ha (ranging from 11.2 to 12.3 t/ha), while the dual-purpose varieties yielded about 1 t/ha less and ranged from 10.3 to 10.9 t/ha.
- NHA trials: yields ranged from 2–18 t/ha; 50% of cuts yielded 4.5–10.5 t/ha. Wintaroo had the highest average yield, Durack the lowest. Brusher was most affected by delayed sowing (–1.8 t/ha); Carrolup and Durack were least affected (–1.0 t/ha).
- **CP:** Minimal genetic variation (1%). Minnie, Williams (dual-purpose), and Archer (hay-only) were the highest; Kultarr, Kingbale and Wintaroo were the lowest.
- **DMD:** Genetic variation of over 3%, up to 6%. Of the varieties suitable for export hay, Bannister, Goldie, Mulgara, Wallaby, and Yallara generally had higher digestibility; Carrolup, Durack, and Kingbale had lower.
- **WSC:** Goldie and Wallaby were the highest, followed by Mulgara, Kultarr, and Yallara. Archer, Durack and Koorabup were the lowest.
- **NDF:** Genetic variation of 2 to 5%. Goldie had the lowest NDF among export-suitable varieties; Kingbale and Koorabup were among the highest.
- **NDFDom30:** Genetic variation of 3 to 7%. Of the varieties suitable for export hay, Bannister, Goldie, Mulgara, and Wallaby had the most digestible NDF; Carrolup and Kingbale were among the lowest.
- **ADF:** Genetic difference was 3 to 5%. Bannister, Goldie, Koala and Wallaby had the lowest ADF of the varieties suitable for export hay. Kingbale had the highest.

Table 11: Weighted WA MET prediction for oaten hay yield and national MET for oaten hay quality (predicted by near-infrared analysis, NIR) cut around the watery ripe stage from breeding and agronomy trials from 2018–24 (data is only presented where there are 4 or more observations)

Trait	Hay yield (t/ha)	CP (% dm)	DMD (% dm)	WSC (% dm)	NDF (% dm)	NDFDom30 (% NDF)	ADF (% dm)	No. environments
Deliverable as OAT1								
Bannister	9.9	6.8	65.2	24.3	54.9	49.9	30.9	64
Bilby	–	–	–	–	–	–	–	–
Carrolup	9.6	6.8	62.3	23.6	55.1	46.9	32.6	64
Durack	9.5	6.8	62.3	23.0	55.5	47.8	32.6	64
Goldie	10.3	6.7	65.3	26.0	54.2	49.8	31.0	64
Koala	9.7	6.9	64.8	23.6	54.8	48.8	31.1	64
Kojonup	–	–	–	–	–	–	–	–
Minnie	9.7	7.0	65.6	23.9	54.4	50.2	30.5	64
Williams	9.7	7.0	63.0	22.5	55.3	48.2	32.2	64
Yallara	9.6	6.6	63.4	24.8	54.5	48.0	31.9	64
Deliverable as OAT2/WAN								
Wandering	–	–	–	–	–	–	–	–
Hay-only variety								
Archer	10.0	7.2	63.1	22.5	55.3	48.6	32.3	64
Brusher	10.3	6.7	64.1	24.5	54.9	48.7	31.9	64
Kingbale	10.4	6.1	62.3	23.1	56.2	47.7	33.3	64
Koorabup	9.4	6.4	62.6	22.2	55.6	48.1	32.9	64
Kultarr	10.4	6.1	63.3	24.9	55.3	48.6	33.0	64
Mulgara	10.0	6.4	63.9	25.1	55.1	49.2	32.2	64
Wallaby	10.3	6.5	65.8	25.8	54.3	50.2	31.0	64

Source: InterGrain, SARDI and DPIRD

CP = crude protein, DMD = dry matter digestibility, WSC = water soluble carbohydrates, NDF = neutral detergent fibre, NDFDom30 = neutral detergent fibre digestibility after 30 hours, ADF = acid detergent fibre, – = no data available

Table 12: Average oaten hay yield and quality (predicted by near-infrared analysis, NIR) cut around the watery ripe stage from DPIRD agronomy trials from 2022–23

Trait	Hay yield (t/ha)	CP (% dm)	DMD (% dm)	WSC (% dm)	NDF (% dm)	NDFDom30 (% NDF)	ADF (% dm)	No. environments
Deliverable as OAT1								
Bannister	–	–	–	–	–	–	–	–
Bilby	–	–	–	–	–	–	–	–
Carrolup	10.3	6.5	59.7	24.9	56.0	46.2	30.9	5
Durack	–	–	–	–	–	–	–	–
Goldie	10.9	6.3	64.1	29.1	52.2	52.3	28.9	5
Koala	–	–	–	–	–	–	–	–
Kojonup	–	–	–	–	–	–	–	–
Minnie	–	–	–	–	–	–	–	–
Williams	–	–	–	–	–	–	–	–
Yallara	10.8	6.3	61.6	27.7	53.6	47.6	30.2	5
Deliverable as OAT2/WAN								
Wandering	–	–	–	–	–	–	–	–
Hay-only variety								
Archer	11.1	6.2	60.7	26.2	54.4	47.7	30.7	5
Brusher	12.3	6.1	62.3	28.6	53.2	49.2	30.1	5
Kingbale	12.3	5.4	58.1	24.3	56.8	45.7	32.7	5
Koorabup	10.7	5.8	59.5	23.9	56.8	48.6	32.1	5
Kultarr	11.6	5.5	61.2	28.4	54.4	48.7	31.4	5
Mulgara	11.2	6.1	62.6	28.3	53.4	50.7	30.2	5
Wallaby	11.7	5.7	62.2	27.7	53.4	50.1	30.1	5

Source: DPIRD

CP = crude protein, DMD = dry matter digestibility, WSC = water soluble carbohydrates, NDF = neutral detergent fibre, NDFDom30 = neutral detergent fibre digestibility after 30 hours, ADF = acid detergent fibre, – = no data available

New variety highlights for export-hay:

- **Archer:** Offers lower digestibility (DMD and NDFDom30), WSC, and higher fibre hay than Brusher, but enables export hay production in rotations with imidazolinone residues without yield loss. Registered for the IBS application of Sentry® to manage barley and brome grass in-crop. Ready for cutting about a week later than Brusher from the same sowing date, with good early vigour, straw strength and hay colour retention. Archer is an ideal replacement for Yallara, which has proven to perform well with high WSC, low fibre (ADF, NDF), thin stems, competitive yield, low lodging risk, and good colour. It should be noted that Archer is later to cut than Yallara from the same sowing date and has thicker stems.
- **Goldie:** Goldie consistently delivers high hay yield and quality, with superior digestibility (DMD, NDFDom30) and WSC compared to Brusher. Disease reactions are similar to Brusher, with cutting readiness a few days later. Produces shorter hay than Brusher with lower lodging risk, though panicle emergence may be less consistent. Goldie can be grown as a dual-purpose variety. Ongoing research is assessing whether Goldie, when sown at the hay target density (320 plants/m²), can meet OAT1 receival standards as reliably as at the grain target density (240 plants/m²). Success would confirm Goldie's suitability as a true dual-purpose variety.
- **Kingbale:** Lower hay quality than Archer and Brusher, but provides management flexibility by reaching watery ripe later at the same sowing date. Shows slightly better septoria tolerance than Archer and Brusher, but is susceptible to oat leaf (crown) rust (OLR). Yield and quality are comparable to Wintaroo, with the added benefit of imidazolinone residue tolerance and registered for use with an IBS application of Sentry®. Best suited to planting in April or sowing in environments where it rains through until October. Like Wintaroo, it is susceptible to lodging.

- **Koala:** Koala is a dual-purpose variety and is suitable for export hay. Comparable to Brusher in yield and quality. Reaches watery ripe later than Brusher and Goldie, allowing earlier sowing (including April) or later cutting. Produces shorter, stiffer straw than Brusher, and like many varieties targeted for grain, may have reduced panicle emergence compared to Brusher. Offers improved oat stem rust (OSR) resistance and comparable septoria and OLR resistance relative to Brusher.
- **Koorabup:** Underperforms relative to other hay-only varieties, with lower yield, higher fibre, lower WSC, and reduced digestibility than Brusher. However, it offers the best septoria resistance among current hay-only and dual-purpose varieties.
- **Kultarr:** Similar hay yield to Brusher but with slightly lower quality. Matures later and is more susceptible to OSR. Best suited to northern production areas, particularly north of the Great Eastern Highway.
- **Minnie:** Performs well in research trials but is likely unsuitable for export hay due to short straw. Further feedback from industry and growers is required to confirm commercial suitability.
- **Wallaby:** Exhibits the best overall hay quality among new oat lines, with high digestibility (DMD, NDFDom30), high WSC, and lower NDF and ADF than Brusher at equivalent yield. Offers improved OSR resistance and comparable septoria and OLR resistance. As it matures later, it supports alternate cutting dates when matched on-farm with other varieties, such as Brusher or Carrolup. The performance of Wallaby, however, is likely to be optimised when sown in April compared to those varieties.

Varietal response to sowing date was inconsistent in small-plot trials and not easily predictable. While early sowing generally improves yield potential, further evaluation is needed for the new hay-only varieties, Archer, Kingbale, Kultarr, and Wallaby, as well as the dual-purpose varieties, Goldie and Koala.



Management advice for hay oat growers

Blakely Paynter, Kylie Chambers, and Bronte Wackett (DPIRD)

Meeting export hay standards requires a combination of high-yielding varieties with favourable quality traits, optimal crop nutrition and disease management, and timely cutting and curing. While most varieties respond similarly to agronomic practices, selecting varieties with genetically superior quality traits increases the likelihood of meeting export specifications, especially when management inputs such as sowing date and N application vary.

Time of sowing

Earlier sowing (late April to early May) increases the potential for higher hay yield but does not always improve hay quality compared to later sowing (late May to early June). Early sown hay typically has increased lodging risk, thicker stems, lower CP, higher lignin content, higher WSC, lower fibre digestibility and a greener appearance.

Delaying sowing by 3–4 weeks may increase fibre content (NDF) but does not consistently improve fibre digestibility (NDFDom). This suggests that elevated lignin levels in early sown hay may have a stronger negative impact on digestibility than fibre content alone. Further research is required to validate the relationship between digestibility, yield, and fibre, as well as the response of these parameters to sowing date.

Timing of cutting

Cutting oat hay at the watery-ripe stage (Z71), when the grain contains a clear, greenish liquid, is considered optimal for achieving a balance between yield and quality. At this stage, the crop is not heavily drawing on carbohydrates, and hay traits such as WSC, fibre content, and digestibility are near their peak.

Practical tip – Spikelets ripen from top to bottom. Inspect top florets to determine cutting stage. Note that panicle emergence and grain filling may not follow a strict sequence due to the influence of both genetic and environmental factors.

Choosing the optimal cutting time involves a careful balancing of quality, yield, panicle emergence, and current and forecasted weather conditions. The time to flowering of oats can affect hay quality. Climate conditions, particularly warm temperatures, can shorten this period. This can cause rapid maturation of oats, resulting in a higher ratio of stems to leaves and reducing hay quality due to its higher fibre content. It is vital to constantly monitor hay crops in the face of warmer conditions to ensure the Z71 stage is not missed, as the decline in quality will occur more rapidly. Weather considerations must be taken into account when selecting a cutting time, as rainfall events of 10 mm or more after cutting can drastically reduce quality.

Cutting Before Z71:

- **Pros:** Higher WSC, lower fibre and lignin, thinner stems, improved digestibility.
- **Cons:** Lower yield, poor panicle emergence, and a risk of missing quality targets.

Cutting after Z71:

- **Pros:** Higher yield.
- **Cons:** Reduced hay quality due to increased fibre and lignin, lower digestibility.

NHA trials demonstrated the effect of spring growing conditions on delayed cutting and the subsequent effect on hay quality. In 2020, WA trials at Muresk experienced a drier-than-average spring. Hay quality and quantity were optimised between full panicle emergence (Z59) and Z71. During this growth window, traits such as WSC, NDF, ADF, and leaf chlorophyll content plateaued but then deteriorated as the crop growth progressed beyond Z71. Crude protein progressively reduced following Z59. Further yield increases beyond Z71 were outweighed by lower quality, and profitability declined.

Victorian trials at Rupanyup experienced a wetter-than-average spring, and most oat varieties held hay quality from Z59 to 14 days after Z71. Yield increased significantly as the crop matured. Cutting in the Z59 to Z71 window helps minimise curing time before quality rapidly declines. Slight delays in cutting can be tolerated when there are adequate spring moisture and mild conditions.

Tips for nitrogen fertiliser on export hay

N strategies for hay oats differ from those for grain oats, and excessive N rates can negatively impact both yield and quality. For hay delivery, the recommended strategy is to apply two-thirds of the target N at seeding and one-third at 6 WAS. In research conducted by DPIRD, hay produced using this timing strategy was greener and more digestible, with lower fibre and elevated WSC than other timing strategies while maintaining yield. To maximise quality, late N should be applied before stem elongation.

The recommended N application timing for grain (one-third at seeding, two-thirds at 6 WAS) produced hay yields and hay greenness on par with the hay recommended treatment. However, this timing reduced the quality. Despite this, when high hay quality is not a concern, the grain-recommended treatment can still be a good strategy for dual-purpose crops in uncertain weather conditions.

Hay research in WA found that:

- **Lodging:** High N application results in more biomass and taller and greener plants with an increased risk of lodging (especially in susceptible varieties).
- **Optimal yield:** The peak hay yield was achieved with 90 kg N/ha across all varieties and locations. In lower rainfall areas or where soil N exceeds 70 kg N/ha, 60 kg N/ha was often sufficient.
- **CP:** N increased CP.
- **WSC:** N decreased WSC. Applying more than 90 kg N/ha increased the risk of falling below the 22% WSC threshold for premium hay and raised lodging risk.
- **Fibre:** N had neutral or negative effects on fibre traits (stem diameter, NDF, ADF, lignin) in NHA trials (2019–21) but increased these traits in DPIRD trials (2022–23).

Varietal responses:

- Hay quality traits responded similarly to increasing N across varieties.
- Varieties with higher genetic WSC (e.g. Yallara) can tolerate more N before dropping a grade, unlike lower-WSC varieties like Koorabup.

Care must be taken to avoid excessive N rates. Excessive fertiliser N can lead to nitrate accumulation in plant tissue, especially in years with low rainfall. This poses serious health risks to livestock, including digestive, respiratory, and reproductive issues, and can be fatal in extreme cases.

Target plant density

Target plant density for oats varies depending on the intended end-use (grain or hay) and the rainfall zone.

As with grain production, determining the correct seeding rate requires focusing on the target plant density (plants per square metre, plants/m²) rather than relying on a fixed machinery rate (kg/ha). Using a standard seeding rate can lead to inconsistent plant densities across seasons due to differences in seed size (by variety and source), seed viability, and establishment conditions.

For hay production, a target density of 240 plants/m² is suitable in low rainfall zones, while 320 plants/m² is recommended in medium to high rainfall zones.

To achieve 240 plants/m², the seeding rate should range from 85 to 130 kg/ha, assuming a 1000-kernel weight of 30–45 mg per kernel.

To achieve 320 plants/m², the seeding rate should range from 110 to 170 kg/ha, based on the same kernel weight range.

Lodging management in hay oats?

Lodging presents a logistical challenge for export hay producers, particularly in high-rainfall zones and for crops with vigorous early canopy growth due to high soil fertility. Lodging reduces hay yield, causes uneven crop ripening, complicates cutting at a uniform height, and affects curing time.

One strategy to reduce lodging risk is the use of Moddus® Evo (250 g/L trinexapac-ethyl). This gibberellin biosynthesis inhibitor enhances stem strength and reduces plant height, though it may also delay flowering. The label rate for oats is 300–400 mL/ha, with application restricted to early stem elongation, specifically when the second node is detectable on the main tiller (Z32) and most other tillers have the first node detectable (Z30).

An alternative approach is pre-stem elongation grazing, which can also reduce canopy bulk and lodging risk.

While applying Moddus® Evo at Z30–32 can improve straw strength and reduce lodging, it carries risks. In some cases, it has led to yield reductions and affected panicle emergence, although hay quality remained unaffected. Because lodging risk cannot be reliably predicted at the time of application, careful consideration is needed before applying Moddus® Evo at the full label rate.

Research from the National Hay Agronomy (NHA) project indicates that a lower rate of 200 mL/ha is safer for hay oats, offering improved straw strength and reduced lodging risk without significant yield penalties. The hay industry should consider seeking a label extension to permit this lower application rate, which would reduce both cost and risk.

Gibberellic acid and stuck panicles in export hay

In dry seasons and low-rainfall environments, certain oat varieties may exhibit delayed or incomplete panicle emergence, where panicles remain partially enclosed in the leaf sheath until the top florets reach the watery-ripe stage. This presents a challenge for hay producers, who must choose between delaying cutting until panicles fully emerge or cutting at the optimal growth stage and enduring a longer curing time. Both scenarios can reduce hay quality due to:

- Declining WSC levels.
- Increased fibre content from later growth stages.
- Extended environmental exposure during curing.
- Additionally, stuck panicles increase the risk of saprophytic colonisation, further compromising hay quality.

To address this, the National Hay Agronomy (NHA) project evaluated the use of gibberellic acid (GA), specifically ProGibb® SG, applied at Z30–32 (early stem elongation), Z37–39 (flag leaf emergence), and at both stages.

GA application successfully elongated internodes, including the peduncle, resulting in taller plants. Notably, there were no adverse effects on hay yield or quality. However, later applications

(post-flag leaf emergence) may be more effective in targeting peduncle elongation specifically, which is critical for panicle emergence.

The most reliable long-term solution is breeding oat varieties with strong peduncle elongation capacity, ensuring panicle emergence under a range of seasonal conditions. Further research is needed to refine the timing and rate of GA and other growth regulators to selectively promote peduncle elongation and reduce the risk of stuck panicles.

Using fungicides to protect hay quality in the swath

Rainfall and overcast conditions during windrow curing create ideal environments for saprophytic fungi such as *Alternaria* spp. and *Cladosporium* spp. to colonise dead or dying plant tissue. These fungi cause dark discolouration or spotting on oaten hay, significantly reducing its visual quality. Since visual appeal is a key determinant of market suitability in export hay markets, this staining can lead to lower economic returns for producers.

The curing process itself becomes a risk factor when it coincides with or follows rainfall, as it extends the time hay remains exposed to environmental conditions that favour fungal growth. This not only affects appearance but also prolongs curing time, increasing the likelihood of further degradation. Current research suggests the variety of oat planted does not appear to influence susceptibility to post-cutting saprophytic colonisation or staining.

Research conducted by DPIRD, with support from AgriFutures (projects PRJ-011029 and PRJ-016604), has explored the potential of foliar fungicides to reduce saprophytic colonisation after cutting. While these fungicides are primarily used for in-crop disease control, they may offer off-target benefits by limiting fungal growth on bleached leaf material in windrows. The findings suggest that fungicides should be applied during the season as needed to manage foliar diseases and maintain a healthy green leaf area, which indirectly reduces the substrate available for saprophytes.

Late-season applications of Group 11 (QoIs) and Group 3 (DMIs) fungicides have shown off-target promise in reducing saprophytic growth.

Among these, strobilurins consistently provided the greatest reduction in fungal colonisation. Importantly, applications made 28 to 35 days before cutting were just as effective as those applied at the standard withholding period of 21 days, offering growers a wider cutting window and reducing the risk of chemical residues.

It is essential that fungicide applications are made only when necessary and strictly in accordance with label recommendations, including rates and withholding periods. This ensures compliance with maximum residue limits (MRLs) and protects access to export markets. Growers are strongly advised to consult their fodder exporters regarding any concerns about chemical residues to confirm that treated hay remains suitable for export.



Disease and pest resistance

Manisha Shankar, Kylie Chambers, Geoff Thomas, Blakely Paynter, Carla Wilkinson and Daniel Huberli (DPIRD)

Foliar disease abbreviations:

- **BB** = bacterial blight
- **BYD/CYD** = barley and cereal yellow dwarf
- **CR** = crown rot
- **OLR** = oat leaf (crown) rust
- **OSR** = oat stem rust
- **RLL** = red leather leaf

Disease resistance abbreviations:

- **VS** = very susceptible
- **SVS** = susceptible to very susceptible
- **S** = susceptible
- **MSS** = moderately susceptible to susceptible
- **MS** = moderately susceptible
- **MRMS** = moderately resistant to moderately susceptible
- **MR** = moderately resistant
- **RMR** = resistant to moderately resistant
- **R** = resistant
- *p* = provisional rating

Refer to page 4 for interpreting resistance classification.

Adult resistance

Information on disease and virus resistance for oat grain and hay varieties is presented in Tables 13 and 14, along with the variety snapshots included in this guide. Ratings are based on adult plant stage resistance, which typically applies after flag leaf emergence. In some varieties and for certain diseases, these ratings may be relevant from late tillering to stem elongation.

Resistance scores may change due to seasonal fluctuations in disease pressure, regional spread of diseases, climatic conditions, stubble retention practices, and the emergence of new pathotypes or races. In this sowing guide, there have been no significant changes in resistance scores due to the introduction of new pathotypes.

Pathotype surveillance and fungicide resistance

Any oat varieties rated as MRMS, MR, or R that carry significantly higher levels of disease than expected should be sent for pathotype identification and fungicide resistance testing. Collect leaf samples before spraying the crop with a fungicide to ensure sample viability.

Place samples infected with septoria, OLR, OSR or RLL in paper envelopes marked with the location, variety, disease and date collected. Fold the leaf in half so the infected area is on the inside. Please do not wrap leaf material in plastic or send it in plastic-lined envelopes.

Send septoria-infected leaf material in paper envelopes to DPIRD, 1 Nash Street, Perth 6000, marked 'Attention: Manisha Shankar'. For more information, contact Manisha Shankar via email at manisha.shankar@dpiird.wa.gov.au or by phone at +61 8 9368 3533.

Send OLR and OSR samples in paper envelopes directly to the Australian Cereal Rust Survey, The University of Sydney, Reply Paid 88076, Narellan NSW 2567. For more information on sample collection and submission, contact Matthew Williams (Australian Cereal Rust Control Program (ACRCP) Operations and Technical Officer) via email at matthew.williams@sydney.edu.au or by phone at +61 409 552 349, or go to the Australian Cereal Rust Survey website (sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/cereal-rust-research/rust-reports).

Samples suspected of infection with RLL can be sent to Kylie Chambers, DPIRD, 75 York Road (PO Box 483), Northam, WA, 6401, for inclusion in the DPIRD National Grains Diagnostic and Surveillance Initiative (NGDSI) project, supported by GRDC (project number DAW2305-004RTX). For more information, contact Kylie Chambers at kylie.chambers@dpiird.wa.gov.au or by phone at +61 400 278 068.

Oat septoria

Oat septoria, caused by *Phaeosphaeria avenaria* f.sp. *avenaria* (asexual stage: *Stagonospora avenae* f.sp. *avenaria*) is the most common oat disease in WA. Also known as septoria avenae blotch, it was detected in 90% of paddocks surveyed through the AgriFutures NHA project (PRJ-011029) and GRDC disease surveillance projects (DAW1907-002RTX and DAW2104-003RTX). Oat septoria is host-specific; it does not infect wheat, and wheat septoria does not infect oats.

Septoria begins as small, dark brown to purple oval or elongated spots on leaves. The lesions expand into larger light or dark brown blotches with yellow/brown borders. They can cover and kill entire leaves. They may also appear on panicles, leaf sheaths, and stems, forming greyish-brown or shiny black lesions. In severe cases, infection can lead to lodging. Septoria can cause a loss of up to 20% in grain yield, although 10% is more typical in high-rainfall zones. It reduces grain weight and increases screenings. In some varieties (e.g. Bannister), late-season rain can cause grain discolouration. Tall or slow-maturing varieties are generally less affected than short or fast-maturing types. Septoria can also reduce hay yield, quality, and appearance. It is a significant constraint to hay production.

Almost all oat varieties planted in WA are rated as MSS or below to septoria. No milling variety has acceptable resistance to oat septoria, while the only hay-only variety with good tolerance is Koorabup (MRMS).

Oat leaf (crown) rust (OLR)

Oat leaf rust (OLR), caused by *Puccinia coronata* var. *avenae*, is a significant foliar disease in oats. Commonly referred to as crown rust, the name derives from the shape of the spores, not the appearance of the symptoms.

OLR appears as small, circular to oval pustules containing orange to yellow powdery spores. The pustules are primarily found on leaf tissue, but under heavy infection, it may also appear on stems and panicles. As the crop matures, pustules darken, producing black spores that are embedded in the leaf tissue. Spore masses are easily dislodged, aiding in disease spread. Disease develops most rapidly under moist conditions and at temperatures between 15 and 22 °C. OLR is host-specific; it does not infect wheat, and wheat leaf rust does not infect oats. Wild oats, however, do host OLR.

OLR can cause losses of up to 50% in forage, hay and grain yield. It reduces forage and hay quality, affecting both nutritional value and palatability. It also affects grain quality, resulting in lower grain weight and increased screenings.

Over 80% of the oat acreage is planted to varieties with moderate resistance (MRMS or better) to oat leaf rust (OLR), excluding Carrolup (VS), Kojonup (SVS), and Wandering (VS). Among hay-only types, Kingbale (SVS) has the weakest resistance.

Oat stem rust (OSR)

Oat stem rust (OSR), caused by *Puccinia graminis* var. *avenae*, is a serious fungal disease of oats. It typically appears as elongated pustules containing reddish-brown powdery spores, primarily on stems, but can also affect leaves and panicles. The spore masses are easily dislodged, facilitating rapid spread. OSR is host-specific; it does not infect wheat, and wheat stem rust does not infect oats. Managing wild oat populations is vital as they host OSR.

OSR thrives in warm (18–30°C) and humid conditions. Epidemics are more likely during wet spring seasons. The latent period (time from infection to new spore production) is 7–10 days under optimal conditions. Once a crop is uniformly infected, disease severity can increase rapidly. OSR can cause a yield loss of up to 90% in susceptible varieties. It also reduces hay yield, hay appearance, and nutritional value, as well as grain quality. While widespread outbreaks are rare, regional outbreaks are more common and can cause significant localised damage.

Milling oats and most hay-only varieties are generally rated as MS or below to OSR, with Bilby (SVS), Kultarr (SVS) and Wandering (SVS) the most susceptible. Koala (MRMS), Mulgara (MR) and Wallaby (MRMS) have the best resistance to OSR.

Red leather leaf (RLL)

Red leather leaf (RLL), caused by *Neospermospora avenae*, is a fungal disease of oats that typically appears during the tillering stage. It was first officially detected in WA in 2021, though it has likely been present for several seasons before that. Early symptoms include small, light grey to pale blue lesions with red or red-brown edges. From stem elongation to head emergence, red, irregular-shaped lesions spread across the leaves. Later in the season, the leaves develop a leathery texture, turning red to brown, and may appear slightly rolled.

The impact of RLL on the yield and quality of hay and grain in WA is currently unknown. In eastern Australia, RLL has caused yield losses of up to 10% in susceptible varieties during favourable seasons. RLL is a significant concern for hay production, affecting both yield and appearance.

RLL is most likely to affect WA oat crops in cooler, high- to medium-rainfall zones, particularly in the Great Southern region. Favourable conditions include high humidity, mild temperatures, and wet winters. RLL survives on crop residue, with infection arising from spores produced in infested residue. Secondary spread is from infected plants.

Crown rot (CR)

Crown rot (CR), caused by *Fusarium pseudograminearum*, is a fungal, stubble-borne disease most commonly associated with continuous cereal rotations. It affects the sub-crown internode, crown, and lower stems, and is typically not visible until after the plant has headed. Unlike wheat and barley, whiteheads are generally not observed in oats. The most reliable indicator of CR in oats is browning at the base of infected tillers. Infected tissue may also show pink discolouration under the leaf sheaths or around the crown.

While wheat and barley can suffer average yield losses of nearly 20% under high CR pressure, milling oats have shown an average yield loss of just under 5%. No significant differences in CR tolerance have been observed among oat varieties tested to date.

No in-crop fungicides are available to control CR once the crop is established. Registered seed dressings can help suppress early infection. To reduce inoculum levels, rotate with non-cereal crops (e.g. pulses, oilseeds, lupins, grass-free

pastures, use inter-row sowing, and maintain effective grass weed control in break crops and fallows. Infected oat tillers can carry the pathogen into subsequent cereal crops; therefore, oats are not considered an effective break crop for crown rot.

Barley and cereal yellow dwarf (BYD/CYD)

Both barley yellow dwarf (BYD) and cereal yellow dwarf (CYD) viruses are present in WA, with BYD occurring approximately twice as frequently as CYD. Resistance screening is conducted under field conditions, so varietal resistance scores reflect the combined impact of both viruses. Early seedling infection by BYD can result in yield losses of up to 80%. Later infections (post-tillering) may reduce yield by up to 20%. Infected plants often exhibit stunted growth, leaf yellowing, and reduced tillering. Oat plants are primarily infected by aphids, including those of the species *Rhopalosiphum padi* (oat aphids) or *Rhopalosiphum maidis* (corn leaf aphids).

Varietal resistance helps reduce the impact of the virus, but does not prevent aphid feeding damage. Even in resistant varieties, aphid control is essential to prevent yield loss. Aphids must be sprayed once they reach threshold levels in the crop (50% of tillers with 15 or more aphids) to prevent yield loss from feeding damage.

Most oat varieties are rated as MS or below to BYD and CYD. Carrolup is particularly susceptible and rated as SVS.

Bacterial blight (BB)

Bacterial blight (BB) is a moisture-driven disease complex affecting oats, with stripe blight (*Pseudomonas syringae* pv. *striafaciens*) being the predominant form observed in WA. Halo blight (*Pseudomonas syringae* pv. *coronafaciens*) is less common.

BB was present in 41% of paddocks surveyed over three years in the AgriFutures-supported NHA project (PRJ-011029). Disease severity was generally low, and damaging levels were rare. Risk is increased by high canopy humidity and wetness, sowing of BB-susceptible varieties (e.g. Bannister), and continuous oat cropping (oats-on-oats rotation). Higher temperatures and lower spring humidity reduce upper canopy infection.

Stripe blight is found mainly on leaves and begins as water-soaked spots (no halo). The spots elongate into red-brown stripes, distorting the growth of young leaves. Stripes may develop yellow and red margins. The lesions can merge into irregular blotches, causing premature leaf senescence. If infection occurs at the boot stage, florets may appear rotten or stained, while emerged florets may be mottled brown to white and sterile.

Halo blight causes oval, water-soaked spots that are pale green or yellow in colour. The centres turn yellow-brown, surrounded by a yellow-green halo. The lesions darken and merge into irregular blotches. Severe infection leads to premature leaf senescence.

No registered products are currently available for BB control. As BB is a bacterial disease, fungicides are ineffective. Management relies on avoiding susceptible varieties, reducing moisture retention in the canopy, and rotating crops to break disease cycles.

Most oat varieties are rated as MSS or below to BB. Bilby, Brusher and Kojonup are particularly susceptible and rated as SVS.

Root lesion nematode (RLN)

Root lesion nematodes (RLN) caused by *Pratylenchus species*, are microscopic, worm-like organisms that feed on plant roots, leading to yield losses in susceptible crops such as barley, wheat, and canola. RLN populations increase when susceptible crops and varieties are repeatedly grown, thereby raising the risk of economic damage. RLN infestations are found across approximately 6.25 million hectares, covering nearly 74% of WA's winter cropping area. The most common species is *Pratylenchus neglectus* (found in 70% of paddocks), followed by *Pratylenchus quasitereoides*. Many paddocks contain multiple RLN species. Nematode populations potentially limit the yield of barley and wheat in over 50% of infested paddocks. However, yield loss in oat crops has not been investigated in WA.

Effective RLN management begins with identifying paddocks with yield-limiting nematode populations. Key strategies include rotating with resistant crops or varieties or incorporating fallow periods to reduce nematode numbers.

Additionally, incorporating non-host crops, such as pulses, oilseeds, lupins, or grass-free pastures, can help suppress RLN populations. Additionally, understanding the species-specific feeding preferences of nematode species allows for more effective and tailored crop rotations.

The resistance scores in this guide are based on glasshouse and field trials conducted in WA. Varieties with fewer than 5 observations, or those for which there has been no field trial verification of the glasshouse rating, receive provisional ratings. All oat varieties tested caused RLN nematodes to increase over the growing season, with Williams being the most resistant milling variety and Mulgara the most resistant hay-only variety for both *P. neglectus* and *P. quasitereoides*.

Cereal cyst nematode (CCN)

Cereal cyst nematode (CCN), caused by *Heterodera australis*, is present in cropping regions around Geraldton, Esperance, and the Avon Valley, but can occur sporadically across the WA Wheatbelt. Oat varieties are less tolerant to CCN than barley. Yield loss can occur when oats are grown in paddocks infested with pests. CCN also poses a risk to future crops by increasing nematode populations.

Choose a more resistant and tolerant variety if growing oats in a paddock infested with CCN. This should limit nematode multiplication for future crops and yield loss in the current oat crop.

Planting CCN-resistant oat varieties slows nematode development, leading to lower nematode levels in the soil for subsequent crops. The milling oat varieties, Bannister, Durack, Goldie, Koala, Minnie and Yallara, can slow CCN numbers. Brusher, Kingbale, Kultarr, and Mulgara can slow CCN numbers among the hay-only varieties.

Further reading

In Australia, fungal, bacterial, and viral pathogens can infect oats, impacting both grain and hay yield and quality. However, the overall effect of these diseases on oaten hay production remains poorly researched and understood, especially when compared to other cereal crops.

The influence of disease on the nutritional quality of hay is not well defined. Export hay is assessed based on physical attributes (e.g. stem thickness, greenness) and nutritional metrics (e.g. WSC, ADF, NDF, and DMD). Diseases can reduce greenness and visual quality through lesions and chlorosis, as well as the growth of saprophytic fungi on dead tissue. These symptoms can lead to a downgrading of export hay, even if nutritional values are unaffected.

A comprehensive 22-page review titled “Plant Diseases Impacting Oaten Hay Production in Australia” was published by DPIRD in September 2020 as part of the National Hay Agronomy (NHA) project, supported by AgriFutures (Project PRJ-011029).

This review encompasses disease symptoms and epidemiology, current control strategies, a list of registered seed dressings, in-furrow treatments, and foliar fungicides (as of August 2020), as well as withholding periods for grazing and harvesting after fungicide application. The review can be found online at agrifutures.com.au/product/plant-diseases-impacting-oaten-hay-production-in-australia-a-review/.

Fact sheets on oat septoria, rusts (both OLR and OSR) and RLL published by the National Hay Agronomy Project are available on the AgriFutures Knowledge Hub at agrifutures.com.au/knowledge-hub.

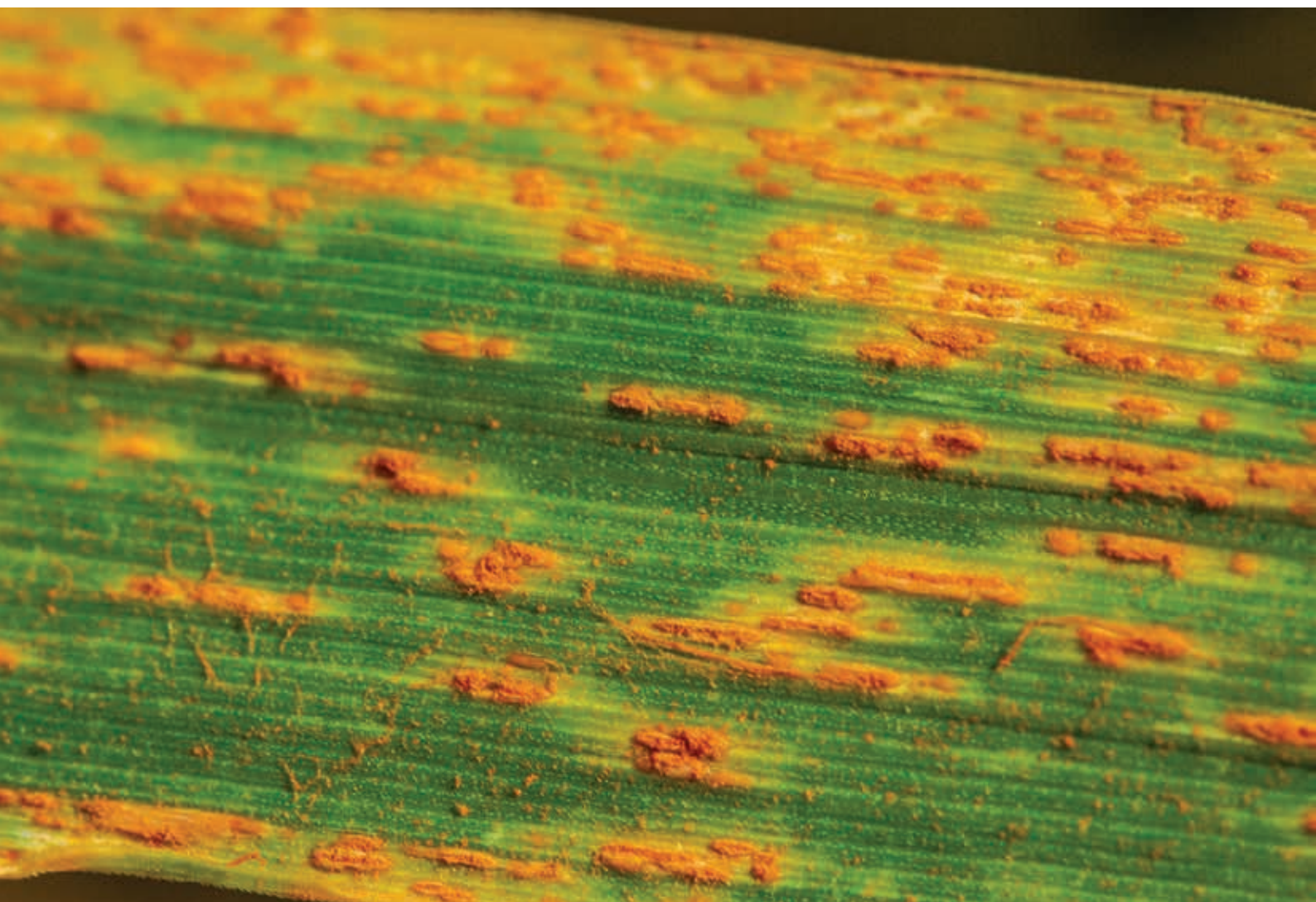


Table 13: Oat leaf disease resistance profiles when grown in WA

Disease ¹	Oat septoria	Oat leaf (crown) rust	Oat stem rust	Barley and cereal yellow dwarf ⁴
Pathotype ²	Mixed	0001-2 [4,7]	94-1,2,4	–
Growth stage ³	Adult	Adult	Adult	Seedling & adult
Deliverable as OAT1				
Bannister	MSS	RMR	MS	MSS
Bilby	S	MR	SVS	S
Carrolup	S	VS	MSS	SVS
Durack	S	MSS	S	S
Goldie	MSS	RMR	MSS	MS
Koala	MSS	MR	MRMS	MSS
Kojonup	S	SVS	MSS	MSS
Minnie	S	RMR	MSS	S
Williams	MSS	MR	MSS	MSS
Yallara	MSS	RMR	S	MSS
Deliverable as OAT2/OWAN				
Wandering	MSS	VS	SVS	MSS
Hay-only variety				
Archer	MSS	MR	MSS	MSS
Brusher	MSS	MR	S	S
Kingbale	MS	SVS	MSS	MS
Koorabup	MRMS	MRMS	MSS	MSS
Kultarr	MS	MR	SVS	MSS
Mulgara	MS#	MR	MR	MSS
Wallaby	MSS	MR	MRMS	MSS

Source: Manisha Shanker (DPIRD) and NVT, nvt.grdc.com.au

¹ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, p = provisional, # = may be more susceptible to alternate pathotypes over east, and – = no data available. Refer to page 4 for interpreting resistance classification.

² Pathotype: the strain of the pathogen used in evaluating the disease reaction of the different oat varieties, representing the most common pathotype in WA. Therefore, on-farm reactions of varieties may differ if the pathotype present differs from the pathotype used in testing.

³ Growth stage: the seedling resistance score reflects resistance at the 2 to 3-leaf stage, and the adult resistance score reflects resistance after the emergence of the flag leaf.

⁴ Barley and cereal yellow dwarf: plants become infected from infected oat and corn leaf aphids. Varietal resistance reduces the virus's effect on plant growth, but does not mitigate the impact of aphid feeding on plant growth.

Table 14: Oat bacterial blight and nematode resistance profiles

Disease ¹	Bacterial blight	Root lesion nematode ³	Root lesion nematode ³	CCN resistance ⁴
Species	<i>Pseudomonas spp</i>	<i>Pratylenchus neglectus</i>	<i>Pratylenchus quasitereoides</i>	<i>Heterodera australis</i>
Growth stage ²	Seedling & adult	Seedling & adult	Seedling & adult	Seedling & adult
Deliverable as OAT1				
Bannister	S	MSS	Sp	MRMS
Bilby	SVS	MSp	VSp	VS
Carrolup	MSS	S	Sp	VS
Durack	S	MS	Sp	MRMS
Goldie	MSS	–	–	MR
Koala	S	–	–	R
Kojonup	SVS	MSS	SVSp	VS
Minnie	S	–	–	RMR
Williams	MSS	MRMS	MSSp	VS
Yallara	S	–	–	R
Deliverable as OAT2/OWAN				
Wandering	S	–	–	VS
Hay-only variety				
Archer	MSS	–	–	VS
Brusher	SVS	MS	SVSp	MR
Kingbale	MSS	MSp	VSp	R
Koorabup	–	MSp	VSp	MS
Kultarr	MSS	–	–	MRMS
Mulgara	MSS	MS	MSSp	R
Wallaby	MSS	–	–	MR

Source: Carla Wilkinson (DPIRD) and NVT, nvt.grdc.com.au

¹ Resistance rating: VS = very susceptible, SVS = susceptible to very susceptible, S = susceptible, MSS = moderately susceptible to susceptible, MS = moderately susceptible, MRMS = moderately resistant to moderately susceptible, MR = moderately resistant, RMR = resistant to moderately resistant, R = resistant, p = provisional, and – = no data available. Refer to page 4 for interpreting resistance classification.

² Growth stage: the seedling resistance score reflects resistance at the 2 to 3-leaf stage, and the adult resistance score reflects resistance after the emergence of the flag leaf.

³ Root lesion nematode: oat varieties vary in the impact of root-lesion nematode on their growth. A resistant variety retards nematode development, leading to lower nematode levels in the soil for subsequent crops. Ratings are based on data collected in WA.

⁴ CCN: oat varieties differ in their resistance (a resistant variety retards nematode development) and tolerance (tolerant varieties yield better in the presence of nematodes). CCN resistance and tolerance data are based on variety responses in SA.

Variety snapshots

Blakely Paynter (DPIRD)

This document presents snapshots for oat varieties grown in Western Australia, grouped by their suitability for milling and export hay markets:

- **Dual-purpose varieties (9):** Bannister, Carrolup, Durack, Goldie, Koala, Kojonup, Wandering, Williams, and Yallara. These are deliverable into milling oat segregations in WA and are also suitable for export hay.
- **Grain-only varieties (2):** Bilby and Minnie. These are deliverable into milling oat segregations in WA but unsuitable for export hay.
- **Hay-only varieties (7):** Archer, Brusher, Kingbale, Koorabup, Kultarr, Mulgara, and Wallaby. These are suitable for export hay but cannot be delivered into milling oat segregations in WA.

Each snapshot includes key agronomic and quality traits, highlighting yield performance, strengths, and weaknesses. Yield comparisons are based on data from the Long Term MET Yield Reporter (available at NVT, nvt.grdc.com.au) presented relative to a control variety, typically Bannister, rather than the site mean yield shown in Tables 3–8. Additionally, single-site MET data from Table 9 are used to indicate the likelihood of a variety yielding less, the same, or more than another when grown under identical agronomic conditions.

Disease resistance ratings for grain varieties are primarily sourced from DPIRD under a service agreement with GRDC for the NVT system. Where data gaps exist, supplementary information may be obtained from InterGrain. Ratings for diseases and nematodes are presented for adult plant stages (where available) and are drawn from Tables 13 and 14.

Phenology data is generated using DPIRD's predictive model, FlowerPower oat (fp.dpiird.app/). This statistical tool estimates the date of the panicle emergence (Z49) for oats in 2 WA environments, Northam and Katanning, based on historical temperature data (sourced from the SILO database: longpaddock.qld.gov.au/silo/point-data/).

Predictions are provided for 5 sowing dates: 10 April, 20 April, 10 May, 20 May, and 10 June. The phenology data shown in the snapshots reflect the median predicted date to Z49 (i.e. the date expected in 50% of seasons), based on FlowerPower oat version v2025.02.24. Varieties have been graded on their phenology relative to Carrolup, where early = -10 to -3 days, medium = -3 to +4 days, late = +4 to +11 days, very late = +11 to +18 days, and very, very late = +18 to +25 days after Carrolup when sown on 25 April at Northam and Katanning.

Agronomic characteristics are compiled from multiple sources, including SARDI newsletters, DPIRD trials, GRDC co-funded projects (DAW00107, DAW00227, DAW1901-002RTX), and InterGrain. Traits covered include:

- **Plant type:** Based on the genetic background of the variety. Data sourced from SARDI.
- **Coleoptile and coleoptile + mesocotyl length:** Short = 40–60 mm, medium = 60–80 mm, long = 80–100 mm, very long = 100–120 mm and extremely long = >120 mm. Oats are unique among winter cereals in possessing a mesocotyl, an organ between the seed and coleoptile that aids emergence from deep sowing. In contrast, wheat and barley rely solely on coleoptile elongation. At DPIRD, the coleoptile and mesocotyl lengths were measured after germinating seeds in rolled, moistened filter paper for 15 days at 15 °C in the dark. The data was sourced from DPIRD and InterGrain.
- **Stem diameter:** Ratings based on data published by SARDI, where fine = <4 mm, moderate = 4–6 mm, thick = 7–8 mm and very thick = >8 mm. Data sourced from SARDI.

Details on pedigree, seed licensees, trading restrictions, and End Point Royalties (EPR) are sourced from breeding companies, Variety Central Central (varietycentral.com.au/) and IP Australia's Plant Breeders Rights database (ipsearch.ipaustralia.gov.au/pbr/).

Bannister^(b)

OAT1 grain and hay variety

Comments

Bannister (tested as WAOAT2354) is a tall, late-maturing milling oat variety widely used for export hay. It was WA's most sown oat in 2025, covering just under 60% of the area. Bannister accounted for half of export hay deliveries reported by AEXCO. It is susceptible to grain staining, so growers should avoid sowing in high-risk environments, oat-on-oat rotations, or areas prone to pre-harvest rain. With early May sowing, Bannister reaches watery ripe about a week and half later than Brusher and a week later than Mulgara. In breeder trials, it showed better hay quality than Carrolup and comparable quality to Brusher, though with slightly lower hay yield.

Grain yield (% Carrolup)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	119	123	126	116	116
Agzone 3	126	109	122	114	–
Agzone 4	118	132	153	110	108
Agzone 5	128	120	125	107	108
Agzone 6	130	131	125	102	–
Statewide	124	120	126	112	118
Disease resistance	Rating				
Septoria	MSS				
OLR	RMR				
OSR	MS				
BYD and CYD	MSS				
BB	S				
RLN (<i>P. neglectus</i>)	MSS				
RLN (<i>P. quasitereoides</i>)	Sp				
CCN (resistance)	MRMS				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+10	+10	+10	+9	+10
Katanning	+12	+11	+10	+8	+7
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+14	+11	+10	+7	+7
Katanning	+16	+12	+11	+8	+6
Agronomic traits					
Plant type		Dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderate			
Variety information					
Breeder / Seed licensee		DPIRD / Seednet			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.30 / \$2.00			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Carrolup

OAT1 grain and hay variety

Comments

Carrolup (tested as 81Q:346) is a tall, medium-spring milling oat variety suitable for export hay. It has excellent hectolitre weight, the highest among current milling varieties, but tends to have high screenings, similar to Williams. Grain yield is significantly lower than Bilby, Bannister, Goldie, Koala, Minnie, and Williams. Carrolup is very susceptible to OLR and should be managed accordingly. With early May sowing, it reaches watery ripe a few days earlier than Brusher and a week earlier than Mulgara. Hay quality is comparable to specialist hay varieties, though yield is lower. Carrolup remains WA's second most sown oat, occupying 16% of the area in 2025. Its planted area has remained stable between 16–20% since Bannister's release in 2014.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	84	81	80	86	86
Agzone 3	79	91	82	87	–
Agzone 4	85	76	65	91	92
Agzone 5	78	84	80	94	93
Agzone 6	77	76	80	98	–
Statewide	81	83	79	89	85
Disease resistance	Rating				
Septoria	S				
OLR	VS				
OSR	MSS				
BYD and CYD	SVS				
BB	MSS				
RLN (<i>P. neglectus</i>)	S				
RLN (<i>P. quasitereoides</i>)	Sp				
CCN (resistance)	VS				
'FlowerPower' predicted days to Z49	Relative to Bannister				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-10	-10	-10	-9	-10
Katanning	-12	-11	-10	-8	-7
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+4	+1	+0	-2	-3
Katanning	+4	+1	+1	+0	-1
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderate			
Variety information					
Breeder / Seed licensee		DPIRD			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		No EPR payable			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Durack[Ⓛ]

OAT1 grain and hay variety

Comments

Durack (tested as WA02Q302-9) is an early-spring, mid-tall milling oat variety suitable for export hay and deliverable into OAT1 segregations from the 2025–26 harvest. It has similar height, grain yield, and hectolitre weight to Carrolup and Yallara, but offers improved grain plumpness over Carrolup and similar screenings to Yallara. Durack is the earliest maturing oat variety among current milling and hay types. While early flowering supports large grain development, it may increase frost risk—so sowing between May and mid-June is recommended in frost-prone areas. With early May sowing, Durack reaches watery ripe just over a week earlier than Brusher and nearly two weeks earlier than Mulgara. It is suitable for export hay, though hay yields are generally lower than Carrolup and Williams. Durack is susceptible to oat septoria and OLR. It's popularity with growers has slipped. In 2025, Durack occupied less than 0.5% of the total oat area.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	95	80	81	89	85
Agzone 3	84	89	77	90	78
Agzone 4	141	79	68	109	109
Agzone 5	80	80	78	102	102
Agzone 6	61	75	75	109	–
Statewide	87	81	76	94	87
Disease resistance	Rating				
Septoria	S				
OLR	MSS				
OSR	S				
BYD and CYD	S				
BB	S				
RLN (<i>P. neglectus</i>)	MS				
RLN (<i>P. quasitereoides</i>)	Sp				
CCN (resistance)	MRMS				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-9	-10	-9	-8	-5
Katanning	-10	-9	-11	-9	-7
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-5	-9	-9	-10	-8
Katanning	-6	-8	-10	-9	-8
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderate			
Variety information					
Breeder / Seed licensee		SARDI / Barenbrug			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.30 / \$2.00			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Goldie[Ⓛ]

OAT1 grain and hay variety

Comments

Goldie (tested as 13009-18) is a medium-spring, tall milling oat derived from Bannister that is suitable for export hay. It is taller than Bannister but shorter than Carrolup, with a higher leaning risk than Bannister and a similar disease resistance profile. Goldie offers plumper grain and equal or better hectolitre weight than Bannister, improving its likelihood of meeting OAT1 specifications. It also shows higher yield potential below 5 t/ha, supporting stronger gross margins. With early May sowing, Goldie reaches watery ripe a few days earlier than Brusher and a week earlier than Mulgara. Its hay is shorter than Brusher's, with lower lodging risk at cutting and moderate stem thickness. Panicle emergence was lower than Brusher in DPIRD (2022–23) and InterGrain (2021–23) hay trials. If Goldie hay meets export receival standards it will be received by export hay companies. The area planted to Goldie jumped in 2025. It is now the third most popular variety, occupying 12% of the total oat area.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	–	103	103	107	103
Agzone 3	–	100	98	106	106
Agzone 4	–	102	107	117	123
Agzone 5	–	98	102	111	112
Agzone 6	–	104	99	115	–
Statewide	–	101	101	108	108
Disease resistance	Rating				
Septoria	MSS				
OLR	RMR				
OSR	MSS				
BYD and CYD	MS				
BB	MSS				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	MR				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-1	+3	+4	+6	+9
Katanning	+0	+3	+6	+6	+7
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+3	+4	+4	+4	+6
Katanning	+4	+4	+7	+6	+6
Agronomic traits					
Plant type	–				
Coleoptile length	–				
Coleoptile + mesocotyl length	Extremely long				
Stem diameter	Moderate				
Variety information					
Breeder / Seed licensee	SARDI / InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST) (grain / hay)	\$3.50 / \$3.50				

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Koala^(b)

OAT1 grain and hay variety

Comments

Koala (tested as 09143-35) is a tall, very late-spring milling oat derived from Bannister that is suitable for export hay. It shares similar tolerance to oat septoria and OLR as Bannister but offers improved resistance to OSR. Grain quality is comparable to Bannister, with similar hectolitre weight and screenings. With early May sowing, Koala reaches watery ripe a week later than Brusher and Mulgara. Its hay is shorter than Brusher's, with lower lodging risk at cutting and moderate stem thickness. Panicle emergence was lower than Brusher in DPIRD's 2023 hay trials and appears similar to Bannister. If Koala hay meets export receival standards it will be received by export hay companies. There has been a modest update of Koala. In 2025, it occupied just under 1% of the total oat area.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	93	101	100	96	100
Agzone 3	98	101	105	97	98
Agzone 4	61	101	100	86	83
Agzone 5	99	104	103	91	90
Agzone 6	106	101	105	88	–
Statewide	96	101	102	95	97
Disease resistance	Rating				
Septoria	MSS				
OLR	MR				
OSR	MRMS				
BYD and CYD	MSS				
BB	S				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	R				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+13	+16	+15	+13	+12
Katanning	+15	+19	+16	+13	+10
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+17	+17	+15	+11	+9
Katanning	+19	+20	+17	+13	+9
Agronomic traits					
Plant type		Dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		–			
Variety information					
Breeder / Seed licensee		SARDI / Seednet			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.50 / \$2.00			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Kojonup^(b)

OAT1 grain and hay variety

Comments

Kojonup (tested as 91Q291-23-23) is a medium-spring, medium-height milling oat suitable for export hay, though not preferred. It yields between Carrolup and Bannister and offers large seed size, high hectolitre weight, and low screenings. However, it is susceptible to oat septoria and OLR and not recommended for low rainfall regions (<200 mm GSR). While suitable for export hay, Kojonup's hay yields are generally lower than Carrolup. It remains a minor variety, occupying less than 0.5% of WA's oat area in 2025.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	86	96	95	95	95
Agzone 3	87	98	98	93	92
Agzone 4	77	86	92	80	90
Agzone 5	87	94	97	93	91
Agzone 6	106	95	100	93	–
Statewide	89	95	96	94	93
Disease resistance	Rating				
Septoria	S				
OLR	SVS				
OSR	MSS				
BYD and CYD	MSS				
BB	SVS				
RLN (<i>P. neglectus</i>)	MSS				
RLN (<i>P. quasitereoides</i>)	SVSp				
CCN (resistance)	VS				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	–	–	–	–	–
Katanning	–	–	–	–	–
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	–	–	–	–	–
Katanning	–	–	–	–	–
Agronomic traits					
Plant type		Dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		–			
Variety information					
Breeder / Seed licensee		DPIRD			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.25 / \$2.00			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Williams[Ⓛ]

OAT1 grain and hay variety

Comments

Williams (tested as WAOAT2332) is a mid-tall, late-spring milling oat suitable for export hay. It has grain yield similar to Bannister and Wandering but may lodge in high-yielding environments. Grain quality is lower than Bannister and Yallara, with reduced hectolitre weight and higher screenings, especially in low rainfall areas. It contains elevated grain β -glucan. With early May sowing, Williams reaches watery ripe a few days later than Brusher and is similar to Mulgara. Hay yields are 0.5–1.0 t/ha lower than specialist hay varieties like Brusher, Mulgara, and Winjardie, though hay quality is comparable, with slightly lower WSC and slightly higher crude protein. Due to thick stems, a target density of 320 plants/m² is recommended for export hay production. Williams was WA's fifth most sown oat in 2025, occupying 4% of the planted area..

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	93	98	93	99	99
Agzone 3	93	101	97	99	97
Agzone 4	78	89	88	95	102
Agzone 5	95	97	94	100	101
Agzone 6	104	94	96	105	–
Statewide	94	97	95	100	99
Disease resistance	Rating				
Septoria	MSS				
OLR	MR				
OSR	MSS				
BYD and CYD	MSS				
BB	MSS				
RLN (<i>P. neglectus</i>)	MRMS				
RLN (<i>P. quasitereoides</i>)	MSS _p				
CCN (resistance)	VS				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+6	+5	+3	+4	+6
Katanning	+8	+7	+5	+4	+4
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+10	+6	+3	+2	+3
Katanning	+12	+8	+6	+4	+3
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Very long			
Stem diameter		Moderately thick			
Variety information					
Breeder / Seed licensee		SARDI / Barenbrug			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.30 / \$2.00			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Yallara[Ⓛ]

OAT1 grain and hay variety

Comments

Yallara (tested as SV97001-13-4) is a tall, medium-spring milling oat suitable for export hay. It has grain yield similar to Carrolup, with better disease resistance, including good tolerance to OLR and some resistance to oat septoria. Grain quality features include slightly lower hectolitre weight than Carrolup, improved grain plumpness, and bright, highly digestible grain, making it suitable for the horse racing industry. With early May sowing, Yallara reaches watery ripe at a similar time to Brusher and a few days earlier than Mulgara. Hay yields are slightly higher than Williams and comparable to Brusher, producing high-quality hay with moderately fine stems. In 2025, Yallara was WA's fourth most popular oat, covering 4% of the grain area and 16% of hay deliveries of varieties with an EPR.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	93	77	76	83	84
Agzone 3	88	89	77	89	76
Agzone 4	89	85	59	106	89
Agzone 5	84	85	75	94	95
Agzone 6	55	70	72	99	–
Statewide	84	81	74	88	83
Disease resistance	Rating				
Septoria	MSS				
OLR	RMR				
OSR	S				
BYD and CYD	MSS				
BB	S				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	R				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+2	+1	+1	+3	+5
Katanning	+2	+1	+0	+1	+2
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+6	+2	+1	+1	+2
Katanning	+6	+2	+1	+1	+1
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderately fine			
Variety information					
Breeder / Seed licensee		SARDI / Seednet			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.00 / \$2.00			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Wandering

OAT2/OWAN grain and hay variety

Comments

Wandering (tested as WAOAT2052) is a medium-height, very late-spring feed oat received as OAT2 and OWAN only. It has grain yield comparable to Bannister and Williams but performs less competitively at sites yielding above 3 t/ha. Wandering is suitable for hay cutting, though not preferred by the export industry. With early May sowing, it reaches watery ripe a few days later than Brusher and is similar to Mulgara. Hay yields are higher than Carrolup, with improved digestibility and WSC. It is very susceptible to OSR and was WA's sixth most sown oat in 2025, occupying just under 2% of the planted area.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	108	100	99	104	100
Agzone 3	102	99	95	104	101
Agzone 4	142	98	100	115	120
Agzone 5	102	96	98	109	110
Agzone 6	93	99	95	113	–
Statewide	104	99	97	106	105
Disease resistance	Rating				
Septoria	MSS				
OLR	VS				
OSR	SVS				
BYD and CYD	MSS				
BB	S				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	VS				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+16	+11	+7	+7	+8
Katanning	+17	+13	+9	+7	+6
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+20	+12	+7	+5	+5
Katanning	+21	+14	+10	+7	+5
Agronomic traits					
Plant type		Dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderate			
Variety information					
Breeder / Seed licensee		DPIRD			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		No EPR payable			

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Bilby^(b)

OAT1 grain variety

Comments

Bilby (tested as 06204-16) is a short, medium-spring milling oat variety unsuitable for export hay. It offers higher yield than Bannister below 3 t/ha, and grain with a higher hectolitre weight, and similar to lower screenings. Bilby grain also contains high β-glucan. It is susceptible to oat septoria and OSR, and was WA's seventh most sown oat in 2025, occupying 1% of the planted area.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	106	98	95	107	99
Agzone 3	95	98	90	104	99
Agzone 4	166	87	95	116	134
Agzone 5	95	89	94	115	116
Agzone 6	94	95	92	123	–
Statewide	102	95	93	108	105
Disease resistance	Rating				
Septoria	S				
OLR	MR				
OSR	SVS				
BYD and CYD	S				
BB	SVS				
RLN (<i>P. neglectus</i>)	MSp				
RLN (<i>P. quasitereoides</i>)	VSp				
CCN (resistance)	VS				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+1	+3	+1	+3	+5
Katanning	+5	+8	+5	+4	+4
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+5	+4	+1	+1	+2
Katanning	+9	+9	+6	+4	+3
Agronomic traits					
Plant type	Dwarf				
Coleoptile length	Medium				
Coleoptile + mesocotyl length	Extremely long				
Stem diameter	–				
Variety information					
Breeder / Seed licensee	SARDI / Barenbrug				
Access to seed	Free to trade				
EPR (\$/t, excl GST) (grain / hay)	\$2.50 / –				

Refer to page 4 for interpreting resistance classification.
p = provisional rating

Minnie^(p)

OAT1 grain variety

Comments

Minnie (tested as 15010-09) is a short, medium-spring grain oat derived from Bannister, designed for environments prone to lodging and well-suited to April sowing. It has improved straw strength, a similar disease resistance package to Bannister, and plumper grain (similar to Goldie). However, hectolitre weight is lower than Bannister and Goldie based on NVT and DPIRD data. Due to its short height, Minnie is likely unsuitable for export hay, though industry feedback is needed to confirm its acceptability at scale. Grower adoption of Minnie should begin in 2026.

Grain yield (% Bannister)	2020	2021	2022	2023	2024
Agzone 1	–	–	–	–	–
Agzone 2	–	–	106	103	98
Agzone 3	–	–	95	101	98
Agzone 4	–	–	110	114	121
Agzone 5	–	–	102	109	107
Agzone 6	–	–	97	107	–
Statewide	–	–	101	104	102
Disease resistance	Rating				
Septoria	S				
OLR	RMR				
OSR	MSS				
BYD and CYD	S				
BB	S				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	RMR				
'FlowerPower' predicted days to Z49	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-8	-4	-1	+1	+2
Katanning	-8	-3	-2	-1	+1
'FlowerPower' predicted days to Z49	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-4	-3	-1	-1	-1
Katanning	-4	-2	-1	-1	+0
Agronomic traits					
Plant type	–				
Coleoptile length	–				
Coleoptile + mesocotyl length	Extremely long				
Stem diameter	–				
Variety information					
Breeder / Seed licensee	SARDI / InterGrain				
Access to seed	Free to trade				
EPR (\$/t, excl GST) (grain / hay)	\$3.50 / \$3.50				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Archer^(p)

Hay variety

Comments

Archer (tested as GIA1803-040) is a medium-height, late-spring hay-only oat designed for use in paddocks with imidazolinone residues without yield loss and for IBS application with Sentry® herbicide. With early May sowing, it reaches watery ripe a few days later than Brusher and is similar to Mulgara. Archer is comparable to Yallara in panicle emergence, height, hay yield, and quality, but has a slightly later cutting date (up to one week) and improved tolerance to oat septoria. Has good early vigour and high hay colour retention. A target density of 320 plants/m² is recommended to manage its slightly thicker stems. CCN requires rotational management. Archer comprised 10% of AEXCO hay deliveries in 2024. Archer has high grain yield, aiding seed bulk-up for future hay crops. However, grain cannot be delivered to Bunge or CBH but may be used for domestic feed or on-farm consumption. Farmer-to-farmer trade of seed is not permitted.

Hay yield and quality	Archer		Brusher		
Hay yield (t/ha)	10.0		10.3		
CP (% dm)	7.2		6.7		
DMD (% dm)	63.1		64.1		
WSC (% dm)	22.5		24.5		
NDF (% dm)	55.3		54.9		
NDFDom30 (% NDF)	48.6		48.7		
ADF (% dm)	32.3		31.9		
Disease resistance	Rating				
Septoria	MSS				
OLR	MR				
OSR	MSS				
BYD and CYD	MSS				
BB	MSS				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	VS				
‘FlowerPower’ predicted days to watery ripe (Z71)	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+1	+5	+5	+6	+7
Katanning	+0	+3	+6	+4	+4
‘FlowerPower’ predicted days to watery ripe (Z71)	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+5	+6	+5	+4	+4
Katanning	+4	+4	+7	+4	+3
Agronomic traits					
Plant type	Non-dwarf				
Coleoptile length	Medium				
Coleoptile + mesocotyl length	Extremely long				
Stem diameter	Moderate				
Variety information					
Breeder / Seed licensee	GIA / InterGrain				
Access to seed	Seedclub members & resellers				
EPR (\$/t, excl GST) (grain / hay)	\$3.65 / \$3.65				

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Brusher

Hay variety

Comments

Brusher (tested as SV87103-109) is a very tall, medium-spring hay-only oat and the most widely sown hay-only variety for export hay. With early May sowing, it reaches watery ripe a few days earlier than Mulgara and a couple of days later than Carrolup. Brusher hay is similar in height to Mulgara and Kingbale, but with thinner stems, lower fibre, and improved DMD, ME, and WSC compared to Kingbale. It delivers better hay yield and quality than Carrolup and is suitable for lower rainfall regions. Brusher grain has low hull lignin, enhancing feed grain quality. However, it is susceptible to OSR, and like other specialist hay varieties, requires more detailed management than dual-purpose types. Statistics on the tonnages of Brusher received for export hay are no longer kept by AEXCO following the expiry of its plant breeder rights.

Hay yield and quality		Brusher		Carrolup	
Hay yield (t/ha)		10.3		9.6	
CP (% dm)		6.7		6.8	
DMD (% dm)		64.1		62.3	
WSC (% dm)		24.5		23.6	
NDF (% dm)		54.9		55.1	
NDFDom30 (% NDF)		48.7		46.9	
ADF (% dm)		31.9		32.6	
Disease resistance	Rating				
Septoria	MSS				
OLR	MR				
OSR	S				
BYD and CYD	S				
BB	SVS				
RLN (<i>P. neglectus</i>)	MS				
RLN (<i>P. quasitereoides</i>)	SVSp				
CCN (resistance)	MR				
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-4	-1	+0	+2	+3
Katanning	-4	-1	-1	+0	+1
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Bannister				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	-14	-11	-10	-7	-7
Katanning	-16	-12	-11	-8	-6
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderate			
Variety information					
Breeder / Seed licensee		SARDI / AEXCO			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		No EPR payable			

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Kingbale[Ⓛ]

Hay variety

Comments

Kingbale (tested as GIA17010-1) is a very tall, very late-spring hay-only oat designed for use in paddocks with imidazolinone residues and for IBS application with Sentry® herbicide. With early May sowing, it reaches watery ripe nearly two weeks later than Brusher and Mulgara, mirroring Wintaroo. It shares a similar profile to Wintaroo, with good early vigour, hay colour retention, high panicle emergence, CCN resistance, and a tall plant type. However, it is susceptible to lodging at cutting, and a larger seed area is needed for bulk-up due to poor grain yield (lower than Carrolup). Kingbale comprised 12% of AEXCO hay deliveries in 2024. Kingbale is best suited to April sowing or environments with rainfall extending into October. Grain cannot be delivered to Bunge or CBH but may be used for domestic feed or on-farm consumption. Farmer-to-farmer trade of seed is not permitted.

Hay yield and quality		Kingbale		Brusher	
Hay yield (t/ha)		10.4		10.3	
CP (% dm)		6.1		6.7	
DMD (% dm)		62.3		64.1	
WSC (% dm)		23.1		24.5	
NDF (% dm)		56.2		54.9	
NDFDom30 (% NDF)		47.7		48.7	
ADF (% dm)		33.3		31.9	
Disease resistance	Rating				
Septoria	MS				
OLR	SVS				
OSR	MSS				
BYD and CYD	MS				
BB	MSS				
RLN (<i>P. neglectus</i>)	MSp				
RLN (<i>P. quasitereoides</i>)	VSp				
CCN (resistance)	R				
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+18	+17	+14	+14	+14
Katanning	+23	+21	+18	+16	+14
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+22	+18	+14	+12	+11
Katanning	+27	+22	+19	+16	+13
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Medium			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		–			
Variety information					
Breeder / Seed licensee		GIA / InterGrain			
Access to seed		Seedclub members & resellers			
EPR (\$/t, excl GST) (grain / hay)		\$3.65 / \$3.65			

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Koorabup^(b)

Hay variety

Comments

Koorabup (tested as 05096-32) is a very late-spring hay-only oat developed for WA. With early May sowing, it reaches watery ripe a week later than Brusher and Mulgara and is just over a week and a half weeks later to cut than Carrolup. It has similar height and hay yield to Carrolup, but with better resistance to oat septoria. Koorabup offers comparable grain yield to Carrolup, supporting easy seed bulk-up for future hay crops. Hay yields are lower than Archer and Brusher, and similar to Carrolup. It has better lodging and shattering resistance than Wintaroo and Brusher and is similar to Mulgara. However, hay quality has tested poorly in breeder and NHA trials since 2017, and Koorabup remains a minor export hay variety.

Hay yield and quality		Koorabup		Brusher		
Hay yield (t/ha)		9.4		10.3		
CP (% dm)		6.4		6.7		
DMD (% dm)		62.6		64.1		
WSC (% dm)		22.2		24.5		
NDF (% dm)		55.6		54.9		
NDFDom30 (% NDF)		48.1		48.7		
ADF (% dm)		32.9		31.9		
Disease resistance		Rating				
Septoria		MRMS				
OLR		MRMS				
OSR		MSS				
BYD and CYD		MSS				
BB		–				
RLN (<i>P. neglectus</i>)		MSp				
RLN (<i>P. quasitereoides</i>)		VSp				
CCN (resistance)		MS				
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Carrolup					
	10-Apr	20-Apr	10-May	20-May	10-Jun	
Northam		+17	+11	+8	+8	+10
Katanning		+17	+12	+9	+7	+7
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Brusher					
	10-Apr	20-Apr	10-May	20-May	10-Jun	
Northam		+21	+12	+8	+6	+7
Katanning		+21	+13	+10	+7	+6
Agronomic traits						
Plant type			Non-dwarf			
Coleoptile length			Medium			
Coleoptile + mesocotyl length			Extremely long			
Stem diameter			Moderately fine			
Variety information						
Breeder / Seed licensee			SARDI / AEXCO			
Access to seed			Free to trade			
EPR (\$/t, excl GST) (grain / hay)			\$2.00 / \$2.00			

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Kultarr^(b)

Hay variety

Comments

Kultarr (tested as 07423-18) is a very tall, late-spring hay-only oat with hay yields comparable to established varieties. With early May sowing, it reaches watery ripe nearly a week later than Brusher and is similar to Mulgara. It has good early vigour, moderate stem thickness, high panicle emergence, and a suitable hay quality profile based on small plot trial data. Kultarr offers valuable resistance to oat septoria, OLR and CCN but is sensitive to OSR. Grain yield is similar to Carrolup, supporting easy seed bulk-up for future hay crops. However, adoption for export hay production has been limited to date. Suits production areas north of Great Eastern Highway. Still a minor export hay variety

Hay yield and quality		Kultarr		Brusher	
Hay yield (t/ha)		10.4		10.3	
CP (% dm)		6.1		6.7	
DMD (% dm)		63.3		64.1	
WSC (% dm)		24.9		24.5	
NDF (% dm)		55.3		54.9	
NDFDom30 (% NDF)		48.6		48.7	
ADF (% dm)		33.0		31.9	
Disease resistance	Rating				
Septoria	MS				
OLR	MR				
OSR	SVS				
BYD and CYD	MSS				
BB	MSS				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	MRMS				
‘FlowerPower’ predicted days to watery ripe (Z71)	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+3	+7	+8	+7	+9
Katanning	+6	+11	+12	+12	+10
‘FlowerPower’ predicted days to watery ripe (Z71)	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+7	+8	+8	+5	+6
Katanning	+10	+12	+13	+12	+9
Agronomic traits					
Plant type		–			
Coleoptile length		Long			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		–			
Variety information					
Breeder / Seed licensee		SARDI / InterGrain			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$3.00 / \$3.00			

Refer to page 4 for interpreting resistance classification.

p = provisional rating

Mulgara[Ⓛ]

Hay variety

Comments

Mulgara (tested as SV96025-7) is a very tall, late-spring hay-only oat with excellent resistance to OLR and OSR but rated S/MS to oat septoria. With early May sowing, it reaches watery ripe a few days later than Brusher and about a week after Carrolup. Mulgara offers improved lodging and shattering resistance, as well as stronger early vigour compared to Kingbale. Hay yield is higher than Carrolup and comparable to Brusher, with better digestibility (DMD and NDFDom30) and WSC, similar fibre, and excellent hay colour with resistance to brown leaf tipping. Mulgara is a strong alternative to Kingbale in environments with recurring OLR or lodging issues. Due to its large seed size, sowing rates should be adjusted to achieve 320 plants/m² in medium to high rainfall areas. However, area sown to Mulgara is declining. South Australian research indicates good tolerance to sodic and saline soils, better performing than Brusher.

Hay yield and quality		Mulgara		Brusher	
Hay yield (t/ha)		10.0		10.3	
CP (% dm)		6.4		6.7	
DMD (% dm)		63.9		64.1	
WSC (% dm)		25.1		24.5	
NDF (% dm)		55.1		54.9	
NDFDom30 (% NDF)		49.2		48.7	
ADF (% dm)		32.2		31.9	
Disease resistance	Rating				
Septoria	MS#				
OLR	MR				
OSR	MR				
BYD and CYD	MSS				
BB	MSS				
RLN (<i>P. neglectus</i>)	MS				
RLN (<i>P. quasitereoides</i>)	MSS _p				
CCN (resistance)	R				
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+15	+10	+4	+4	+6
Katanning	+17	+13	+9	+8	+8
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+19	+11	+4	+2	+3
Katanning	+21	+14	+10	+8	+7
Agronomic traits					
Plant type		Non-dwarf			
Coleoptile length		Long			
Coleoptile + mesocotyl length		Extremely long			
Stem diameter		Moderate			
Variety information					
Breeder / Seed licensee		SARDI / AEXCO			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$2.00 / \$2.00			

Refer to page 4 for interpreting resistance classification.

= may be more susceptible to alternate pathotypes over east
p = provisional rating

Wallaby[Ⓛ]

Hay variety

Comments

Wallaby (tested as 07079-9) is a medium to tall, very late-spring hay-only oat with hay yields comparable to established varieties. With early May sowing, it reaches watery ripe two weeks later than Brusher and just over a week later than Mulgara, offering flexibility in cutting programs. Wallaby has good hay quality, including high digestibility (DMD and NDFDom30), WSC, hay colour, moderate stem diameter, and reasonable panicle emergence (lower than Brusher in 2022–23 DPIRD trials). It provides strong resistance to OLR, OSR, and CCN. Grain yield is at least equivalent to Carrolup, supporting easy seed bulk-up for future hay crops. Wallaby remains a minor export hay variety, but its popularity is slowly growing.

Hay yield and quality		Wallaby		Brusher	
Hay yield (t/ha)		10.3		10.3	
CP (% dm)		6.5		6.7	
DMD (% dm)		65.8		64.1	
WSC (% dm)		25.8		24.5	
NDF (% dm)		54.3		54.9	
NDFDom30 (% NDF)		50.2		48.7	
ADF (% dm)		31.0		31.9	
Disease resistance	Rating				
Septoria	MSS				
OLR	MR				
OSR	MRMS				
BYD and CYD	MSS				
BB	MSS				
RLN (<i>P. neglectus</i>)	–				
RLN (<i>P. quasitereoides</i>)	–				
CCN (resistance)	MR				
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Carrolup				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+19	+18	+16	+16	+15
Katanning	+21	+21	+18	+16	+14
'FlowerPower' predicted days to watery ripe (Z71)	Relative to Brusher				
	10-Apr	20-Apr	10-May	20-May	10-Jun
Northam	+23	+19	+16	+14	+12
Katanning	+25	+22	+19	+16	+13
Agronomic traits					
Plant type		–			
Coleoptile length		Long			
Coleoptile + mesocotyl length		Very long			
Stem diameter		–			
Variety information					
Breeder / Seed licensee		SARDI / InterGrain			
Access to seed		Free to trade			
EPR (\$/t, excl GST) (grain / hay)		\$3.00 / \$3.00			

Refer to page 4 for interpreting resistance classification.

p = provisional rating

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Pulse guide

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Introduction

Pulses can be useful break crops to grow in rotation with cereals and canola. A well-managed pulse crop can reduce disease in following crops, control grass weed populations and fix nitrogen. Cereal yields and grain protein are usually maximised following a pulse, lupin or pasture legume. After peaking in the 1990s, pulse crop areas declined due to an expansion of canola and difficulties with in-crop control of broadleaf weeds and diseases.

New varieties with improved herbicide tolerance and resistance to key pathogens are now available to address these challenges.

Relative yield of crops in WA

Table 1: Crop yields in NVT experiments conducted in the last 5 years in WA (Source NVT 2018 to 2022) and break-even yield (PIRSA Farm gross margin guide 2022)

Crop	Agzone						Break even yield (t/ha)		
	1	2	3	4	5	6	Low rainfall	Medium rainfall	High rainfall
Barley	3.5	3.9	5	3.8	3.2	4.6	1.3	2.1	1.7
Canola	1.7	2.2	3.3	1.8	2	2.6	0.7	1	1.2
Chickpea	1.4	1	–	1.1	1.1	–	0.5	0.6	0.8
Faba bean	–	–	2.4	–	2.2	–	0.6	0.9	1.2
Field pea	2	1.7	1.7	1.5	1.2	–	0.8	0.9	1.2
Lentil	1.6	1.7	2.1	0.5	1.1	–	0.5	0.7	0.8
Lupin	2.2	2.2	–	1.9	1.9	1.7	0.8	1.1	1.3
Oat	–	3.6	4.1	2.6	2.8	4.7	1.1	1.8	2.5
Wheat	3.3	3.7	4.2	3	2.9	4.1	0.9	1.7	2.7

Source: NVT, nvt.grdc.com.au, PIRSA Farm Gross Margin Guide 2022.

Lentil 2020–2022, Agzone mean data presented if more than 1 trial conducted since 2020.

Break even yields – based off forecast prices; Grades = malting barley, milling oats, red lentil, APW wheat, TT canola.

Picking a pulse

Inoculation of pulse crops

One of the key benefits of growing pulses is their ability to fix atmospheric nitrogen, resulting in high protein content in both the pulse grain and the stubble remaining in the paddock. To nodulate roots and fix nitrogen, pulses need to be inoculated with a specific species of rhizobia bacteria. Due to environmental factors limiting bacteria survival, it is recommended that inoculation of pulses happens each season, particularly where the soil is acidic or a pulse in the same inoculation group hasn't been grown

in several years. Previously, Group E (field pea, lentil, and vetch) and Group F (faba bean and broad bean) inoculants have been sold in combination. These groups are now sold separately, as new high-performing rhizobia strains for each species have become available. The new strains retain the ability of the old strains to nodulate roots in paddocks where acidity is not an issue, and they can effectively nodulate crop roots at lower pHs than previous strains, giving farmers more confidence in achieving optimal nodulation at the lower end of the suitable pH range.



Nicky Tesoriero, DPIRD Esperance, inspecting a faba bean trial

Table 2: Adaptation of broadleaf crops to some soil factors

Crop	pH	Inoculant group	Soil texture	Salinity tolerance rank	Boron tolerance rank	Comments
Canola	4–9	—	All	—	—	
Chickpea	5.5–9	N	Sandy loam to clay	5	2 (Kabuli varieties) 5 (Desi varieties)	
Faba bean	5.2–9	F	Loam-clay	1	1	Lower pH ok in higher rainfall areas
Field pea	5–9	E	Loamy sand to clay	2	2 (Dun varieties) 4 (White varieties)	
Lentil	5.2–9	E	Loam-clay	4	5	Herbicide damage an issue on sandier soils
Lupin: narrow-leaf	4–7	G	Sand to sandy loam	3	—	
Lupin: albus	6–7.5	G	Loamy sand to loam	4	—	Higher pH than narrow-leaf lupins
Vetch	5–9	E	Loamy sand to clay	2	1	

1 = least sensitive, 5 = most sensitive

Table 3: Recent experiences and comments on broadleaf crops in WA

Crop	Comments
Canola	• Hard to beat in WA. Well-adapted to WA soils and climate – plus excellent weed control. • Appears to be more sensitive to delayed sowing and patchy emergence than most pulse crops. • Consider alternative breaks to canola if root lesion nematodes are an issue.
Chickpea	• Due to a lack of cold tolerance, best results in warmer areas – but high prices make them an option throughout WA. • Low weed burdens and a wider range of chemical options have improved weed control – but no viable crop-topping option = sow in relatively weed-free paddocks.
Faba bean	• Lower pH is ok in areas of higher rainfall. • Recent varieties x agronomy = lower disease risk.
Field pea	• Robust varieties and agronomy package – best weed control package of the pulses. • Lack of early sowing option and higher forecast prices for other pulses may put peas under pressure in the rotation.
Lentil	• Seek advice before growing lentils. • Wide range of farmer experiences from very good yields to very poor results. • Herbicide damage is an issue on sandier soils. • Can be sown in April in frost-free areas.
Lupin: narrow-leaf	• Lupins are resistant to <i>P. neglectus</i> and <i>P. quasitereoides</i>, hence a useful break crop if the root lesion nematodes are an issue. • Early sowing of canola has reduced the pressure on lupin as a break crop. • Sclerotinia stem and pod rot are an increasing risk for lupin crops, with denser canopies in regions and seasons with known disease risk. • All current lupin varieties appear to be susceptible.
Lupin: albus	• Best suited to medium rainfall areas of the northern wheatbelt. • Adapted to loams with pH 6.0 or above. • Early sowing is critical to ensure an ok flowering window. • Avoid paddocks with blue lupins due to anthracnose. • Niche market, so investigate marketing options.
Vetch	• Particularly suited to farmers with livestock. • Species available that can be sown very early and grazed multiple times. • Grain vetch growers need to talk to marketers as the demand for grain can be variable.





Lupin

Introduction

Narrow-leaf lupins are uniquely suited to the acid and sandy soils found across large tracts of the WA grainbelt and play an important role in breaking cereal disease cycles and adding fixed nitrogen to cropping systems.

Increased use of canola as a break crop in recent years has seen lupin production in WA decline from a high of more than one million hectares in the late 1990s to about 300,000 to 400,000 hectares, with a current gross value of production of about \$200 million.

In September 2019 a new variety of narrow-leaf lupin called Coyote was released. It is early maturing (similar to PBA Jurien), with metribuzin tolerance similar to Mandelup. Coyote is susceptible to phomopsis stem infection, so lupin stubbles should be grazed with care in high-risk environments.

Tables 1 to 8 have data on varietal performance across Agzones as well as other important information such as disease and lodging ratings, and the seed quality of narrow-leaf lupins.

Recent release

Australian Grain Technologies (AGT) released a narrow-leaf lupin variety, Rosemont, in September 2023, with an end point royalty (EPR) of \$4.50 per tonne (GST exclusive).

Rosemont has excellent early vigour, with taller plant height and better lodging resistance than PBA Jurien. It's a slower maturing variety that is broadly adapted to all WA regions, including the south. It has a white flower and seed coat.

Rosemont has had good yields in National Variety Trials (NVT), particularly in Agzones 1 and 2, although it has only been trialed since 2022. It has good tolerance of metribuzin.

What variety should I grow?

Besides stable high yields, growers generally choose varieties with sufficient metribuzin tolerance for broadleaf weed control, as well as anthracnose tolerance and low pod shatter. In recent years the most widely grown variety has been PBA Jurien.



Table 1: Grain yield of narrow-leaf lupin varieties in AGZONE 1 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than 1 year of data or 4 or more observations)

Year	2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)	1.31	3.50	2.73	1.95	1.38	2.17
No. of trials	(1)	(1)	(1)	(1)	(1)	(5)
Coromup	94	94	92	101	97	96
Coyote	123	109	116	114	112	115
Lawler	107	102	109	105	–	106
Mandelup	102	101	102	100	101	101
PBA Barlock	106	106	101	100	99	102
PBA Bateman	113	107	104	106	103	107
PBA Gunyidi	107	104	102	102	101	103
PBA Jurien	112	–	108	104	104	107
PBA Leeman	91	93	93	99	98	95
Rosemont	–	–	118	109	112	113
Wonga	79	91	77	88	84	84

Source: NVT, nvt.grdc.com.au

NOTE: For all Agzones in 2021, PBA Jurien was not included due to seed source issues

Table 2: Grain yield of narrow-leaf lupin varieties in AGZONE 2 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than 1 year of data or 4 or more observations)

Year	2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)	1.94	2.96	2.31	1.43	2.27	2.18
No. of trials	(5)	(5)	(6)	(6)	(4)	(26)
Coromup	90	96	96	98	93	95
Coyote	122	114	115	120	107	116
Lawler	110	103	106	105	105	106
Mandelup	102	101	101	101	102	101
PBA Barlock	104	106	102	105	102	104
PBA Bateman	109	109	106	112	101	108
PBA Gunyidi	104	106	103	107	101	104
PBA Jurien	112	–	107	109	106	109
PBA Leeman	90	93	95	95	94	94
Rosemont	–	–	113	112	111	112
Wonga	73	89	85	86	87	84

Source: NVT, nvt.grdc.com.au

NOTE: For all Agzones in 2021, PBA Jurien was not included due to seed source issues

Table 3: Grain yield of narrow-leaf lupin varieties in AGZONE 4 expressed as a percentage of site mean yield for each trial year (20–24) and the weighted average over the 5-year period (where there is more than 1 year of data or 4 or more observations)

Year	2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)	1.35	2.03	2.72	1.07	1.43	1.72
No. of trials	(3)	(5)	(5)	(2)	(4)	(19)
Coromup	95	94	98	101	99	97
Coyote	124	110	113	106	118	114
Lawler	107	105	106	104	104	105
Mandelup	101	101	101	100	101	101
PBA Barlock	106	102	99	97	105	102
PBA Bateman	113	104	103	99	111	106
PBA Gunyidi	108	102	101	99	107	103
PBA Jurien	112	–	104	100	108	106
PBA Leeman	92	94	98	100	96	96
Rosemont	–	–	112	107	110	110
Wonga	80	87	85	91	88	86

Source: NVT, nvt.grdc.com.au

NOTE: For all Agzones in 2021, PBA Jurien was not included due to seed source issues

Table 4: Grain yield of narrow-leaf lupin varieties in AGZONE 5 expressed as a percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there is more than 1 year of data or 4 or more observations)

Year	2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)	1.50	2.62	2.23	1.03	2.22	1.92
No. of trials	(1)	(2)	(2)	(2)	(2)	(9)
Coromup	96	92	88	99	92	92
Coyote	118	109	105	107	104	109
Lawler	106	104	106	102	102	104
Mandelup	101	102	102	100	101	101
PBA Barlock	103	104	101	101	104	103
PBA Bateman	109	103	98	103	103	103
PBA Gunyidi	105	102	99	102	102	102
PBA Jurien	108	–	107	103	107	106
PBA Leeman	95	92	91	98	92	94
Rosemont	–	–	114	105	107	109
Wonga	84	87	83	94	92	88

Source: NVT, nvt.grdc.com.au

NOTE: For all Agzones in 2021, PBA Jurien was not included due to seed source issues

Table 5: Grain yield of narrow-leaf lupin varieties in AGZONE 6 expressed as a percentage of site mean yield for each trial year (2020–24)

Year	2020	2021	2024
Site mean yield (t/ha)	2.16	1.75	3.11
No. of trials	(1)	(1)	(1)
Coromup	86	87	100
Coyote	112	105	105
Lawler	114	109	100
Mandelup	103	103	100
PBA Barlock	94	98	104
PBA Bateman	92	94	106
PBA Gunyidi	94	96	104
PBA Jurien	105	–	104
PBA Leeman	93	92	98
Rosemont	–	–	102
Wonga	65	77	99

Source: NVT, nvt.grdc.com.au

NOTE: For all Agzones in 2021, PBA Jurien was not included due to seed source issues. There was no NVT in Agzone 6 in 2022. The 2023 NVT had high variability, so results have been withheld.

Table 6: Lupin variety NVT disease ratings

Variety	Anthracnose	Brown leaf spot	Cucumber mosaic virus	Phomopsis (pod infection)	Phomopsis (stem infection)	Sclerotinia stem rot
Coromup	MR	MS	MR	MS	MR	Sp
Coyote	MRMS	MS _p	MRMS	MRMS	S	Sp
Jenabillup	MS	MRMS	MRMS	MR	MS	Sp
Lawler	MR	–	MRMS	MS	MR	Sp
Mandelup	MRMS	MS	MRMS	S	MR	Sp
PBA Barlock	RMR	MS	MRMS	MR	MR	Sp
PBA Bateman	MRMS	MS	MR	MS	RMR	Sp
PBA Gunyidi	MRMS	MS	MRMS	MRMS	RMR	Sp
PBA Jurien	RMR	MS	MS	MRMS	RMR	Sp
PBA Leeman	MRMS	MS	MRMS	MRMS	MR	Sp
Rosemont	MRMS	MS _p	MR	MRMS _p	MR	Sp

Source: NVT, nvt.grdc.com.au, AGT and DPIRD

S = Susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, RMR = Resistant to moderately resistant, *p* = provisional rating

Table 7: Lodging, disease and insect ratings for narrow-leaf lupins in WA

Variety	Lodging (high rainfall)	Grey spot	BYMV	Aphid
Coromup	MRMS	R	S	R
Coyote	–	R	MR	–
Jenabillup	MRMS	R	MR	R
Lawler	–	R	MS _p	–
Mandelup	MS	R	S	R
PBA Barlock	MR	R	MS	R
PBA Bateman	MRMS	R	MR	R
PBA Gunyidi	MR	S	MS	R
PBA Jurien	MRMS	R	MRMS	R
PBA Leeman	MRMS	R	S	R
Rosemont	–	R	MRMS _p	–

Source: DPIRD

S = Susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible,
 MR = Moderately resistant, R = Resistant, _p = provisional rating

Table 8: Seed quality of narrow-leaf lupin varieties as a percentage of Mandelup

Variety	100-seed weight (g)*	Protein as % of Mandelup [#]	Alkaloid as % of Mandelup [#]
Mandelup	16.0	100 (32%)	100 (0.017%)
Coromup	15.7	–	99
Coyote	15.1	Similar to Mandelup [^]	60
Jenabillup	16.5	103	99
Lawler	15.9	–	98
PBA Barlock	14.9	97	99
PBA Bateman	16.1	–	53
PBA Gunyidi	14.4	102	98
PBA Jurien	14.4	102	104
PBA Leeman	15.9	–	88
Rosemont	14.5	–	98
Wonga	14.2	–	115

Source: *NVT data (2019–23); [#] PBA variety release documents summarising protein and alkaloid percentage
 (whole seed, 6 sites, 2010–14); [^]AGT data

Lupin agronomy guide

Paddock selection

- Sandy textured soils with a pH of 4.5–7.0 (calcium chloride – CaCl₂) and good depth.
- Avoid saline soils, those subject to waterlogging, alkaline and shallow duplex soils.
- A relatively low weed burden.
- Avoid paddocks with large areas of WA blue lupins, particularly in northern areas.
- Ideally paddocks with reasonably heavy stubble from the previous year (i.e. cereal) to reduce brown spot risk.
- The interval between lupin crops is determined by several factors including the level of brown spot and weed burden.
- Soils must be free of sulfonylurea herbicide residues (e.g. Glean®, Logran®).

Rotation

- Growing lupins following a cereal crop minimises disease risk.
- Lupins should never be grown following lupins.

Sowing window

Growing environments with higher rainfall can tolerate later sowing times.

TABLE 9: Recommended sowing times for each Agzone

Agzone	Rainfall	Suggested sowing date
Agzone 1	High	Late April to early June
	Medium	Late April to mid-May
Agzone 2	High	Late April to early June
	Medium	Late April to mid-May
Agzone 3	High	Early May to early June
Agzone 4	Low	Late April to mid-May
Agzone 5	Low–Medium	Late April to mid-May
Agzone 6	High	Late April to early June

Sowing depth

- Sow seeds 3–5 cm below the soil surface.

Seed dressing and inoculation

- Seed should be treated with iprodione or procymidone based fungicide to reduce the risk of brown spot and pleiochaeta root rot on old lupin country.
- In high-risk areas, thiram seed dressing should be applied to reduce the transmission of seed-borne anthracnose at the rate of 100 g active ingredient per 100 kg of seed. Thiram is not compatible with rhizobium inoculums.
- Apply Group G (or S) inoculum to seed or as dry granules where lupins have not been grown during the past 5 years. On neutral and alkaline soils, inoculate every time a lupin crop is grown.

Fertiliser

- Rates should be determined by soil tests and paddock history.
- Deep-band phosphate at seeding for maximum efficiency and to minimise salt toxicity to seedlings.
- On soils with potential manganese deficiency, manganese can be drilled with compound fertiliser or applied as a foliar spray. This is important for paddocks growing the next year's lupin seed. Testing for manganese level in the plants can be done by submitting main stems for lab analysis at mid-flowering time.

Target density

- 40–45 plants/m².
- Yields can decline below 40 plants/m².

Seeding rate

- Between 90–120 kg/ha — adjust for germination rate and seed size.

Seed source

- Use high quality seed from paddocks with good fertiliser history.
- Check the seed for germination percentage, seed size, freedom from cucumber mosaic virus (CMV) and anthracnose. Use seed that has less than 0.5% CMV-infected seed.
- In areas where manganese deficiency is identified, test for manganese levels. Replace seed if manganese is below 20 mg/kg.

Row spacing

- In the warm, dry environments of the medium- and low-rainfall northern wheatbelt, wider rows (50 cm or more) are likely to yield better than narrower rows (18–25 cm).
- Narrower rows are most likely to yield better in cooler, longer season environments where terminal drought is not severe and yield potential is very high.
- Narrow rows and/or high density can help reduce infection of bean yellow mosaic virus in high-risk paddocks.

Herbicide options

The following herbicides are registered on lupins in WA. It's advisable to check labels of specific herbicide products for rates, crop and weed growth stages for application, recommended surfactants and oils, withholding and plant-back periods etc.

Pre-seeding and incorporated-by-sowing (IBS) herbicides

- Atrazine 900 g/kg, Group 5/C, e.g. Atradox® WG at 280–560 g/ha. Apply atrazine in mixture with simazine 900 (e.g. Simagranz®) at 280–560 g/ha. Use a maximum of 930 g/ha of atrazine and simazine mixture on yellow sands and 1.12 kg/ha on all other soil types.
- Carbetamide 900 g/kg, Group 23/E, e.g. Ultro® 900 WG at 1.1–2.3 kg/ha. Apply the lower rate on sandy soils and where lower weed densities are expected. However, use the higher rate on heavier soils and where the weed densities are expected to be moderate to high. Do not apply carbetamide pre-sowing if planting with a disc seeder, as increased contact between the germinating seed and herbicide may reduce crop safety.
- Dimethenamid-P 720 g/L, Group 15/K, e.g. Outlook® at 1 L/ha. Annual ryegrass suppression only at higher density.
- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 1.1 kg/ha. Do not use on white or grey sands.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.5 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals) on lighter texture and/ or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Metribuzin 750 g/kg, Group 5/C, e.g. Mentor® at 200 g/ha. A permit (PER94921) with validity up to 31 October 2029 is in place for this use pattern on metribuzin tolerant varieties only, including Mandelup, PBA Barlock, PBA Jurien and PBA Leeman. Follow all relevant directions on the product label.
- Pendimethalin 440 g/L, Group 3/D, e.g. Stomp® at 1.5–2.25 L/ha. Apply 1.5 L/ha in mixture with simazine 900 at 0.55 kg/ha up to 24 hours before lupin sowing.
- Propyzamide 900 g/kg, Group 3/D, e.g. Edge® 900 WG at 0.56–1.11 kg/ha. Use higher rates on heavy soils under sub-optimal conditions or where a heavy grass population is expected.
- Prosulfocarb 800 g/L (Group 15/J) + s-metolachlor 120 g/L (Group 15/K), e.g. Boxer Gold® at 2.5 L/ha.
- Pyroxasulfone 850 g/kg, Group 15/K, e.g. Sakura® at 118 g/ha.
- Simazine 900 g/kg, Group 5/C, e.g. Simagranz® at 0.55–1.6 kg/ha. Apply 0.55–1.1 kg/ha on light soils and 1.1–1.6 kg/ha on heavy soils. Do not use on whitish or grey sands.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow lupin at least 3 cm and preferably 5 cm deep. Do not use rates higher than 0.86 kg/ha on soils with a pH of 8 and above as unacceptable crop damage may occur.

- Terbutylazine 600 g/kg (Group 5/C) + propyzamide 300 g/kg (Group 3/D), e.g. Effigy® 900 WG at 1.25–1.75 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow lupin at least 5 cm deep. Using rates higher than 1.25 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.
- Tri-allate 500 g/L, Group 15/J, e.g. Avadex® Xtra at 1.6 L/ha.
- Trifluralin 480 g/L, Group 3/D, e.g. TriflurX® at 1.2–1.7 L/ha. The rate depends upon the soil type; refer to label.
- Trifluralin 350 g/L (Group 3/D) + tri-allate 550 g/L (Group 15/J), e.g. Jeti Duo® at 1.45–1.8 L/ha. For best results apply within 12 hours of crop sowing. Use it with a knife/ blade point sowing system.

Post-sowing pre-emergent (PSPE) herbicides

- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 1.1 kg/ha. Do not use on white or grey sands and must be applied before crop emergence.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.25 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Simazine 900 g/kg, Group 5/C, e.g. Simagranz® at 0.55–1.6 kg/ha. Apply 0.55–1.1 kg/ha on light soils and 1.1–1.6 kg/ha on heavy soils. Do not use on whitish or grey sands.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.6–0.86 kg/ha. Apply within 2 days of sowing. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow lupin at least 3 cm and preferably 5 cm deep. Do not use rates higher than 0.86 kg/ha on soils with a pH of 8 and above as unacceptable crop damage may occur. Heavy, intense rainfall following application may cause crop damage.

Important points to consider when using pre-emergent herbicides

- Soil type will influence the maximum rate of pre-emergent herbicides that can be applied; check the herbicide labels for details. For example, in WA, simazine (900 g a.i./kg) at 0.55–1.1 kg/ha (Group 5/C) is registered on light soils, whereas the rate registered for gravelly-loam soils is 1.1–1.6 kg/ha.
- Adding 0.55–1.1 kg/ha of diuron (900 g a.i./kg) will help manage wild radish resistant to simazine or atrazine. It will also improve control of capeweed and doublegee.
- Crop damage can occur if diuron is added to higher rates of simazine, atrazine or terbutylazine. For improved crop safety, reduce the rate of triazines (e.g. simazine).
- If grass weed populations are high, add grass herbicides such as trifluralin, propyzamide, pyroxasulfone, to the recommended rates of simazine, atrazine or terbutylazine.
- Use of soil-applied residual herbicides on mouldboard ploughed/renovated soils could cause crop damage, especially when lupins are sown shallower than the recommended depth of 3–5 cm.

Post-emergent herbicides for broadleaf weed control

- Diflufenican 500 g/L, Group 12/F, e.g. Brodal® Options or Bonanza® Elite at 100–200 mL/ha. Apply from second-leaf stage to big bud stage of lupins (before start of main stem flowers). For wild radish, hedge mustard, Indian hedge mustard and wild turnip, apply diflufenican 500 g/L at 100 mL, 150 mL and 200 mL/ha for control of up to 2, 4 and 6-leaf stage weeds respectively. Use at 200 mL/ha rate for suppression of capeweed up to 4-leaf stage.
- Metosulam 100 g/L, Group 2/B, e.g. Eclipse® at 50–70 mL/ha. Use 50 mL/ha when wild radish population is low (less than 100 plants/m²) and growing conditions are optimal. Apply 70 mL/ha where wild radish density is high, or crop competition is poor. Application window is between 8-leaf stage of crop to the appearance of flower bud/big bud for control of up to 8-leaf wild radish. Do not use wetting agents, spray oils and surfactants with this herbicide.

- Metosulam 100 g/L, Group 2/B, e.g. Eclipse® at 50 mL/ha + diflufenican 500 g/L, Group 12/F, e.g. Brodal® Options at 100 mL/ha. Application window is between 8-leaf stage of crop to pre-big bud stage (main stem flowering) for control of up to 8-leaf wild radish and suppression of up to 6-leaf capeweed.
- Metribuzin 750 g/kg, Group 5/C, e.g. Stacato® or Mentor® WG at 100–150 g/ha plus 100 mL/ha Brodal® Options (diflufenican 500 g/L), Group 12/F. Apply to actively growing lupins from 3–4 leaves until bud emergence stage for control of wild radish up to 250 mm diameter in size and suppression of capeweed, doublegee and larger wild radish. Use higher rates for heavy weed burden and larger weed size. Do not use wetting agents and spray oils with this herbicide mixture.
- Picolinafen 750 g/kg, Group 12/F, e.g. Glocker® 750 WG at 33–50 g/ha. Apply at 2–6 leaf stage of lupins. Use the lower rate on 2–4 leaf and higher rate on 6–8 leaf wild radish; good spray coverage of the weeds is essential. Suppression of capeweed is only at the higher rate.
- Simazine 900 g/kg, Group 5/C, e.g. Simagrano® at 0.4–1.1 kg/ha. Use as a top-up application within 4 weeks of sowing following a pre-emergence application of simazine at the label rates.
- The lower rates will provide effective control if applied under ideal conditions to weeds that are smaller, actively growing and free from temperature or water stress. Do not apply after 80% of lupin flowers have opened.
- Diclofop-methyl 375 g/L, Group 1/A, e.g. Di-Grass or Sirofop® at 1–2 L/ha + wetting agent (e.g. Wetspray® 1000) at 0.25% (v/v*) to control 2–4 leaf stage weeds. The rate selection depends upon the weed species and their size; refer to label. Do not spray when temperatures are higher than 25 °C.
- Fluazifop-p 128 g/L, Group 1/A, e.g. Fusilade® Forte at 410–820 mL/ha. Use a lower rate for 2–5 leaf stage weeds and a higher rate for 5-leaf to early tillering weeds. Apply up until 17 weeks before crop harvest.
- Haloxypop-R 520 g/L, Group 1/A, e.g. Verdict® at 50–100 mL/ha + Uptake® oil at 0.5% or non-ionic wetting agent (e.g. BS1000®) at 0.2% (v/v*). The application rate depends on weed size, adjuvant type and mix partner; refer to label. Apply from 2-leaf to pre-flowering crop growth stages. Do not apply in mixture with diflufenican (e.g. Brodal® Options), Group 12/F, or simazine, Group 5/C, as crop yellowing may occur; separate applications are recommended. Withholding periods are not required when used as directed.

Lupin growers targeting the European Union market are advised to consult with their grain trader prior to the use of haloxypop.

Post-emergent herbicides for grass weed control

- Butoxydim 250 g/kg, Group 1/A, e.g. Factor® WG at 80–180 g/ha + Supercharge® Elite® at 1% (v/v*) to control 2-leaf to early tillering weeds. The lower rates are for younger weeds growing actively under ideal conditions. The higher rates are for weeds that are at early tillering stage, or in dense populations, or growing in poor growing conditions. For improved control of ryegrass and other grass weeds, it must be combined with clethodim or fop herbicide containing fluazifop-p, haloxypop-R, propaquizafop or quizalofop. Do not apply at flowering stage of crop.
- Clethodim 240 g/L, Group 1/A, e.g. Select® or Status® at 150–500 mL/ha + D-C-Trate® at 2% or Hasten® at 1% or Kwickin® at 1% or Uptake® oil at 0.5% (v/v*) for control of 2-leaf to fully tillered grass weeds; refer to label.
- Propaquizafop 100 g/L, Group 1/A, e.g. Shogun® at 200–450 mL/ha + Hasten® or Kwickin® at 0.5% or non-ionic wetting agent (e.g. BS1000®) at 0.2% (v/v*) to control 3-leaf to mid tillering weeds. Use 300 mL/ha where ryegrass is not the dominant weed. Use a higher rate for ryegrass control and for best results wait until 75% of ryegrass has begun tillering. Apply up until 15 weeks before crop harvest.
- Quizalofop-p-ethyl 200 g/L, Group 1/A, e.g. Elantra® Xtreme® or Leopard® 200 at 65–190 mL/ha + Hasten®/Plantocrop™ at 1% or non-ionic surfactant (e.g. BS1000®, Wetspray®) at 0.2% or non-ionic surfactant (1,000 g a.i./L) at 0.1% plus a mineral spray oil at 1% (v/v*) to control 3-leaf to early tillering weeds. The rate depends upon the weed species and their size; refer to label. Use a higher rate under heavy weed pressure, and/or when weeds have commenced tillering. Apply up until 6 weeks before crop harvest.

*v/v = volume by volume of final spray solution.

Important points to consider when using post-emergent herbicides

- High uptake of pre-emergent triazines (e.g. simazine, atrazine or terbuthylazine, Group 5/C) following good soil moisture or high usage rates may predispose the lupin crop to damage by typically 'safe rates' of post-emergent broadleaf herbicides. Symptoms may include leaf whitening or root rot.
- Diflufenican (e.g. Brodal® Options) and picolinafen (e.g. Glocker®), Group 12/F, alone, or in combination with other herbicides, can cause bleaching or leaf spotting on most lupin varieties. Typically, symptoms diminish over time and the crop outgrows the effects.
- The use of metribuzin (Group 5/C) alone, or in combination with other herbicides, can cause leaf burn and slight crop suppression in most varieties. Newer lupin varieties such as PBA Gunyidi, PBA Barlock, PBA Leeman and Coyote have better metribuzin tolerance than older varieties such as Tanjil.
- It is not advisable to apply metribuzin, Group 5/C, in mixture with other herbicides if brown leaf spot or other leaf diseases are present.
- Metosulam (e.g. Eclipse®), Group 2/B, often causes yellowing, height and/or biomass reduction in most lupin varieties. Plants typically recover rapidly in normal growing conditions.
- Broadleaf herbicides should not be mixed with oil or products containing emulsifying agents.
- Application of broadleaf post-emergent herbicides to moisture-stressed lupins, or when moisture stress is likely soon after application, can lead to crop damage from herbicides that are typically safe when used in typical growing conditions.
- All grass-selective herbicides at label rates are typically safe when used on lupins. It's not advisable to apply such products in a tank mix with broadleaf herbicides because crop damage will result.
- Ensure at least a 10-day break between spraying broadleaf herbicides and a grass-selective herbicide.

Crop-topping

- Paraquat 250 g/L, Group 22/L, e.g. Gramoxone® or Shirquat®, is registered for crop-topping at 400 or 800 mL/ha for ground application only. Using a higher rate is usually more reliable and provides a greater reduction in annual ryegrass seed-set. For best results crop-top when 80% of lupin leaves have fallen off and ryegrass is at the flowering to soft dough stage.
- If the target lupin and ryegrass windows are not going to match up, but weed control is the highest priority, some lupin yield may need to be sacrificed (which could be more than 25%). Spray before 80% leaf drop. The higher label rate may also exacerbate yield reduction.
- Do not harvest within 7 days of application.

Desiccation

- Diquat 200 g/L, Group 22/L, e.g. Reglone® at 2–3 L/ha as a pre-harvest desiccant at full crop maturity helps overcome slow and uneven crop ripening and weed problems at harvest.
- Glyphosate, Group 9/M, e.g. Crucial® (glyphosate 600 g/kg) at 0.6 to 1.6 L/ha and Weedmaster® DST® (glyphosate 470 g/kg) at 0.77 to 2.0 L/ha are registered as harvest-aid and for control of annual weeds. Apply at or after crop maturity when seed moisture content is below 30%. Use higher label rates where crops or weeds are dense and where faster desiccation is required. Do not use on crops intended for seed production and sprouting. Do not harvest crop within 7 days of application. Not all glyphosate products are registered for this use; refer to the registered product (Crucial® and Weedmaster® DST®) labels.
- Pyraflufen-ethyl 25 g/L, Group 14/G, e.g. Sledge® at 200 mL/ha alone or in mixture with the label rate of paraquat (e.g. Inferno®) is registered as a harvest-aid and for the reduction of seed-set and viability of weed seeds. Apply to lupins at or after 80% lupin leaf-drop and to weeds, preferably at full flowering stage, for maximum weed-seed-set reduction. Application before windrowing will result in severe loss in lupin seed yield. Adhere to the crop growth stage for this application to minimise yield losses. Do not use it with glyphosate. Do not apply less than 7 days before harvest.

- Saflufenacil 700 g/kg, Group 14/G, e.g. Sharpen® WG is registered as a harvest-aid at 34 g/ha in a mixture either with paraquat or glyphosate at the above-mentioned label rates plus 1% Hasten® or high-quality methylated seed oil (MSO). Apply when 80% of lupin leaves have dropped. Earlier applications than the recommended growth stage may result in grain yield penalties. Do not harvest within 7 days of application.

Insect control

- **Emergence:** 3 weeks post-emergence — red legged earth mite, cutworm and lucerne flea.
- **Flowering:** aphids — consider controlling aphids in flowering lupins if more than 30% of the crop is infested.
- **Pod fill:** native budworm — consider controlling budworm in lupins if more than 8 budworms over 15 mm are found in one square metre of crop (10 sweeps using a sweep net is about one square metre).

Disease management

- Lupins are susceptible to a wide range of diseases. Roots, hypocotyls, stems, pods and seeds are all subject to infection by disease organisms. Several of these diseases have the capacity to cause catastrophic losses, but this is rare if management guidelines are followed.
- Key steps in the integrated management of lupin diseases include crop rotation, stubble management, fungicide or pesticide application, variety selection and seed testing.

Clean seed

- Where possible, choose seed with a low risk of anthracnose or CMV infection. Tolerance of seed infection is lower in more susceptible varieties.

Phomopsis and lupinosis

- A potential issue with grazing lupin stubble or lupin seed is the risk of lupinosis. Lupinosis is a disease that is caused by toxins produced by the phomopsis fungus (*Diaporthe toxica*) as it grows in the stem after maturity. All varieties carry some lupinosis risk, but it is most pronounced in susceptible varieties. Grazing infected stubbles or desiccated fodder crops, following late season or summer/autumn rain poses greatest risk, particularly when black fruiting bodies (leopard spotting) are visible on stems.

Seed dressings fungicides

- **Brown spot:** may appear on paddocks that have previously grown lupins. Seed should be treated with iprodione or procymidone to reduce the risk of brown spot and pleiochaeta root rot.
- **Anthracnose:** products containing mancozeb are registered for anthracnose management. An Australian Pesticides and Veterinary Medicines Authority (APVMA) permit for products containing chlorothalonil (PER82209) for control of anthracnose in albus lupin is current.

Post-emergent fungicide options

Several foliar fungicide products are registered for control of lupin diseases; refer to Table 10.

- **Anthracnose:** products containing mancozeb are registered for anthracnose management. An APVMA permit for products containing chlorothalonil (PER82209) for control of anthracnose in albus lupin is current.

Harvesting

- Harvest lupin crops as soon as they are ripe. Delays can result in significant yield loss due to lodging, pod shattering and pod drop. Start harvesting as soon as the moisture content reaches 14%. In some seasons this will occur when the stems are still pale green.
- Harvest losses can be substantially reduced by harvesting when humidity is high. Lupin plants strip well during the night and early morning. If possible, do not harvest in the middle of the day when it is very hot. In cooler southern environments, daytime temperatures often do not become warm enough to cause major problems for harvest. In these areas it may be better to harvest the crop as quickly as possible, rather than swapping between lupins and cereals.
- Harvest seed for next year's crop as soon as it is mature. Set the harvester drum or rotor speed to a minimum and have the concave opened fairly wide. This will reduce damage to the embryo and help to ensure a high germination percentage. The seed embryo is very sensitive to impact if it becomes dry and brittle. Even seed with no visible damage may have low percentage germination if it suffered a high impact when its moisture content was low.

Table 10: Foliar fungicides that are registered for use in lupin crops in WA

Active ingredient	Example product	Group	Disease			Withholding period (weeks)		Special comments
			Anthrachnose	Botrytis grey mould	Sclerotinia stem rot	Harvest	Graze	
Azoxystrobin (200 g/L) + cyproconazole (80 g/L)	Amistar® Xtra	101	–	400–800 mL	–	8	4	Do not apply after 50% of pods on main stem have reached typical length (BBCH 75)
Mancozeb (750 g/kg)	Dithane® Rainshield®, Neo Tec®	107	1.0–2.2 kg	1.0–2.2 kg	–	4 (check label)	2	Less effective on Botrytis grey mould than alternative products
Mancozeb (625 g/kg) + Zn as EDTA (17.3 g/ha)	Manic WG Plus®	105	1.2–2.64 kg	1.2–2.64 kg	–	1	2	Less effective on Botrytis grey mould than alternative products
Pydiflumetofen (100 g/L) + fludioxonil (150 g/L)	Miravis® Star	99	–	750–1000 mL	750–1000 mL	Not required when used as directed	6	Do not apply more than twice per crop. Apply up to the end of flowering
Tebuconazole (370 g/L) + azoxystrobin (222 g/L)	Veritas® Opti	107	–	400–540 mL	–	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses
Azoxystrobin (625 g/L) tank mix with Tebuconazole (430 g/L)	Mirador 625 mixed with Orius 430 SC	105	–	150–190 mL Mirador 625 mixed with 350–460 mL Orius 430 SC	–	4	4	–



Chickpea

Introduction

Chickpea is a suitable break crop for heavier soils with a pH above 5.5.

There was an expanding chickpea industry in WA during the 1990s until the arrival of ascochyta blight. Since then, new varieties with improved tolerance to ascochyta have become available however, the pathogen's ability to overcome this resistance has seen a decline in the tolerance of these varieties in recent years. All current varieties are now rated moderately susceptible or susceptible. Robust fungicide packages have been developed to manage ascochyta blight.

New herbicides have also become available for extended control of wild radish.

For trouble-free chickpea growing, it is important to:

- Select a variety with tolerance to ascochyta.
- Have a disease management plan.
- Use an inoculant and a seed dressing at sowing.
- Sow into a relatively clean paddock as post-emergent broadleaf herbicides can be ineffective.

Using seed that is free of ascochyta and has a high germination percentage is critical to achieving good crop establishment.

What type and variety should I grow?

WA growers have traditionally chosen to plant Desi chickpea types as they have been higher yielding and easier to market than Kabuli types. Desi chickpea types have small angular seeds weighing about 120 mg, which are wrinkled at the beak and range in colour from brown to light brown and fawn. Seeds are normally dehulled



Chickpea

and split to obtain dhal. Kabuli types have larger, rounder seeds that are white-cream in colour and almost exclusively used whole, so seed size and appearance are critically important. Yields of Kabulis are generally lower and more variable than Desi varieties, although premiums for larger chickpeas can offset the yield disadvantage.

In April 2025, India reinstated a 10% tariff on the importation of Australian chickpeas. Recent years have seen high prices, enticing some growers to start planting chickpeas again. However, prices remain somewhat volatile. Regardless of the type of chickpea grown, it is a good idea to discuss with potential buyers before sowing.

Desi varieties

CBA Captain is a taller variety that performs well in WA and is now available for sale to growers. Older varieties, PBA Striker and Neelam, are also consistent performers across WA.

Kabuli varieties

Kabulis are often more difficult to sell than Desi chickpeas – so seek advice from potential buyers before growing Kabulis in WA.

Genesis 090 is the most readily available Kabuli variety in WA. It can command a premium price above varieties such as Genesis 079, but there is no guarantee that WA growers will be able to produce the required seed size in all years.

Chickpea seed size guide

Table 1: Chickpea seed size guide

	Grade	Seed diameter (mm)	Seed weight (gms per 100)	Varieties
Desi type	Medium	–	18–27	CBA Captain, Neelam, PBA Striker, Genesis 836
Kabuli type	Small	6–8	20–35	Genesis 090, Genesis 079
	Medium	7–9	35–45	PBA Royal, PBA Monarch, Almaz
	Large	8–10	40–50	PBA Magnus, Kalkee
	Very large	9–11	50–65	Kimberley Large

Source: Australian Pulse Variety Guide 2021 (Pulse Australia)

Recent release

In October 2020 the NSW DPI released CBA Captain. CBA Captain is an erect Desi chickpea with medium seed size and angular shape. In all agzones where NVT evaluation has been done, CBA Captain out-yielded Genesis 836, a current variety with a similar erect plant type. CBA Captain has achieved similar yields to PBA Striker but offers excellent harvestability compared to PBA Striker because its lowest pod is higher in the canopy at maturity.

CBA Captain has a moderately susceptible ascochyta blight rating, which is greater than PBA Striker (rated as susceptible).

CBA Captain has superior grain quality (coat colour, texture and shape) to all current WA chickpea varieties and is considered a 'Jimbour type'. This variety is also produced in eastern Australia and will provide WA growers with an opportunity to access established markets.

Grain yield of chickpea varieties

Refer to Tables 2 to 6.

Table 2: Grain yield of chickpea varieties in AGZONE 1 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2024	2020–24
Site mean yield (t/ha)		1.56	1.78	1.59	1.40	1.58
Variety	No. of trials	(1)	(1)	(1)	(1)	(4)
Desi type						
CBA Captain	(4)	114	105	108	102	107
Genesis 836	(4)	94	98	86	94	93
Neelam	(4)	111	103	100	110	106
PBA Maiden	(4)	95	97	95	103	98
PBA Slasher	(4)	101	100	106	105	103
PBA Striker	(4)	114	104	110	112	110
Kabuli type						
Genesis 090	(4)	75	91	72	90	82

Source: NVT, nvt.grdc.com.au

Note: The NVT in AGZONE 1 in 2023 had very low yields, so results have been withheld.

Table 3: Grain yield of chickpea varieties in AGZONE 2 expressed as percentage of site mean yield for each trial year (2020–23) and the weighted average over the 4-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2020–23
Site mean yield (t/ha)		0.82	1.58	1.15	0.47	1.01
Variety	No. of trials	(2)	(2)	(2)	(2)	(8)
Desi type						
CBA Captain	(8)	105	99	94	108	102
Genesis 836	(8)	91	93	89	94	92
Neelam	(8)	97	101	101	98	99
PBA Maiden	(8)	91	95	99	98	96
PBA Slasher	(8)	100	101	106	103	103
PBA Striker	(8)	101	101	103	105	103
Kabuli type						
Genesis 090	(8)	80	89	91	85	86

Source: NVT, nvt.grdc.com.au

There was no NVT in AGZONE 2 in 2024.

Table 4: Grain yield of chickpea varieties in AGZONE 3 expressed as percentage of site mean yield for 2017

Year	2017
Site mean yield (t/ha)	1.89
No. of trials	(1)
Desi type	
Ambar	96
CBA Captain	104
Genesis 836	97
Neelam	97
PBA Striker	105
Kabuli type	
Genesis 090	94

Source: NVT, nvt.grdc.com.au

There has not been a chickpea NVT in AGZONE 3 since 2017.



Chickpea

Table 5: Grain yield of chickpea varieties in AGZONE 4 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.27	1.27	0.69	0.54	0.56	0.93
Variety	No. of trials	(2)	(2)	(1)	(2)	(1)	(8)
Desi type							
CBA Captain	(8)	114	99	106	102	103	105
Genesis 836	(8)	94	96	98	92	98	95
Neelam	(8)	101	99	93	96	94	97
PBA Maiden	(8)	90	92	89	98	93	93
PBA Slasher	(8)	98	97	95	103	97	99
PBA Striker	(8)	106	96	94	102	96	100
Kabuli type							
Genesis 090	(7)	74	92	88	88	92	98

Source: NVT, nvt.grdc.com.au

Table 6: Grain yield of chickpea varieties in AGZONE 5 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.22	0.83	1.17	0.94	1.12	1.06
Variety	No. of trials	(1)	(1)	(1)	(1)	(1)	(5)
Desi type							
CBA Captain	(5)	107	99	85	100	100	98
Genesis 836	(5)	89	84	87	106	93	92
Neelam	(5)	97	120	98	97	94	101
PBA Maiden	(5)	91	101	93	96	88	94
PBA Slasher	(5)	102	109	103	94	97	101
PBA Striker	(5)	104	119	95	93	94	101
Kabuli type							
Genesis 090	(4)	76	78	93	–	85	83

Source: NVT, nvt.grdc.com.au

Disease ratings for selected chickpea varieties

Highly aggressive strains of *Ascochyta rabiei* are now present in WA. Ratings provided in Table 7 are those for the northern growing region. *Ascochyta* isolates collected from WA are used in the development of these ratings, therefore results are relevant to growers here, although performance of varieties may differ depending on the locally dominant pathotype. Growers need to be vigilant and apply fungicides if disease levels are higher than expected for the resistance rating of the variety.

Pratylenchus neglectus, a root lesion nematode (RLN), is found in approximately 70% of broadacre paddocks in WA. Ratings in Table 7 have been established following testing in WA. This has found that currently available chickpea varieties exhibit some level of resistance to *P. neglectus*, which may minimise nematode populations by the end of the season and lessen the yield impact of RLN on following cereal and canola crops.

Table 7: Disease ratings for selected chickpea varieties

Variety	<i>Ascochyta</i> blight resistance ¹	<i>Botrytis</i> grey mould resistance ²	<i>Pratylenchus neglectus</i> resistance ³
Desi type			
CBA Captain	MSp	S	MRMS
Genesis 836	S	S	MSS
Neelam	S	S	MS
PBA Striker	S	S	MR
Kabuli type			
Genesis 090	MS	S	MSS

Source: ¹DPIRD and CBA; ²NVT, nvt.grdc.com.au; ³DPIRD

S = Susceptible, MSS = moderately susceptible to susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant

Variety traits

Table 8: Desi chickpea variety traits

Variety	Plant height (cm) ¹			Maturity ²	Lodging resistance ²
	Dalwallinu NVT 2021	Mingenew NVT 2021	Merredin NVT 2020		
Desi type					
Ambar	–	–	–	Early	Very good
CBA Captain	69	67	60	Early-Mid	Moderate
Genesis 836	69	66	59	–	–
Neelam	64	62	55	Mid	Very good
PBA Striker	67	61	57	Early	Moderate
Kabuli type					
Genesis 090	66	58	56	Mid-Late	Good

Source: ¹DPIRD; ²NSW DPI Winter Crop Sowing Guide (2020)

Chickpea agronomy guide

Paddock selection

- Well-drained loamy sands to clay loams with a pH above 5.5 (CaCl₂).
- No sulfonylurea or Lontrel® herbicide residues.
- A low broadleaf weed burden.
- Minimal rocks and roots so paddock can be left relatively flat and even after sowing.

Rotation

- One in 4 years.
- At least 500 metres away from previous year's chickpea, faba, vetch, lentil or narbon bean stubble.



Sowing window

Table 9: Recommended sowing times for chickpeas in WA

Agzone	Rainfall	Suggested sowing date	
		Desi	Kabuli
Agzone 1	Medium	25 April to 31 May	20 April to 20 May
	High	1 May to 31 May	25 April to 31 May
Agzone 2	Medium	25 April to 31 May	20 April to 20 May
	High	1 May to 31 May	25 April to 31 May
Agzone 3	High	25 April to 31 May	25 April to 31 May
Agzone 4	Low	25 April to 25 May	Not recommended*
Agzone 5	Low	25 April to 25 May	Not recommended*
	Medium	1 May to 31 May	20 April to 20 May
Agzone 6	High	25 April to 31 May Consider spring sowing to reduce disease risk	25 April to 31 May Consider spring sowing to reduce disease risk

*Not generally recommended because failure to meet seed size requirement (>8mm) results in loss of Kabuli premium price. A market for small seed Kabuli (>7mm) does, however, command a premium above Desi types.

Target density and seeding rate

- Desi: 40–45 plants/m²
- Kabuli: 30–35 plants/m².

Recommended plant density provides better competition with weeds than lower densities and aids efficient harvest.

- Desi between 90–110 kg/ha.
- Kabuli between 130–150 kg/ha.

Reduce seeding rate in early-sown high rainfall crops to reduce disease.

Calculate seeding rate as seed size and germination vary considerably. Stored chickpea seeds can lose viability. It is important to determine the germination rate of the chickpea seed to be sown.

Sowing depth

- Aim for 5 cm
- Can be sown deeper to chase moisture and reduce transmission of seed borne ascochyta blight.

Row spacing

- Up to 50 cm appears to have little effect on yield
- Wider than 50 cm will require specialist equipment for inter-row spraying.

Seed dressing and rhizobia

- Apply a thiram and thiabendazole seed dressing, e.g. Evershield® Seed Treatment, let dry, then apply Group N inoculum or use granular products such as ALOSCA at 10 kg/ha.
- If chickpeas have not been grown in the paddock for several years, growers should aim to maximise rhizobia inoculation. For example, mixing ALOSCA with seed is likely to provide more effective nodulation than mixing ALOSCA with fertiliser.

Fertiliser

- It takes about 8 units of Phosphorus (P) to grow a one-tonne chickpea crop.
- If soil P levels are between 10 mg/kg and 20 mg/kg, add at least 8 kgP/ha. P can be applied with compounds containing Nitrogen (N) (MAP, DAP, Agras etc.) or as single superphosphate.



Weed control

The following herbicides are registered on chickpeas in WA. It is advisable to check labels of specific herbicide products for rates, crop and weed growth-stages for application, recommended surfactants and oils, withholding and plant-back periods etc.

Pre-seeding and incorporated-by-sowing (IBS) herbicides

- Carbetamide 900 g/kg, Group 23/E, e.g. Ultro® 900 WG at 1.1 kg/ha. Do not apply carbetamide pre-sowing if planting with a disc seeder, as increased contact between the germinating seed and herbicide may reduce crop safety. For broadening the spectrum of weeds controlled, carbetamide can be applied mixed with the label rate of simazine. Heavy, intense rainfall following application may cause crop damage.
- Cyanazine 900 g/kg, Group 5/C, e.g. Bladex® at 1.1 kg/ha. Do not use on sand or sandy loam soils as crop damage may result. Where annual ryegrass and wireweed are a major problem, add pendimethalin or trifluralin at the recommended rates. Do not add anti-evaporant spraying oils.
- Dimethenamid-P 720 g/L, Group 15/K, e.g. Outlook® at 1 L/ha. Annual ryegrass suppression only in higher weed density situations.
- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG (not all brands) at 0.83–1.1 kg/ha. Use the lower rate on light sandy soils.
- Flumioxazin 500 g/kg, Group 14/G, e.g. Terrain® at 180 g/ha. Do not use on lighter soil types (sand), as shorter periods of residual control and unacceptable crop damage can occur.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.5 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Pendimethalin 440 g/L, Group 3/D, e.g. Stomp® at 1.5–2.25 L/ha. Use the lower rates on light textured soils and the higher rates on medium to heavy textured soils.
- Propyzamide 900 g/kg, Group 3/D, e.g. Edge® 900 WG at 0.56–1.11 kg/ha. Use rates towards the higher end of the range on heavy soils, if conditions are not optimal or where a heavy grass population is expected.
- Prosulfocarb 800 g/L (Group 15/J) + s-metolachlor 120 g/L (Group 15/K), e.g. Boxer Gold® at 2.5 L/ha.
- Pyroxasulfone 850 g/kg, Group 15/K, e.g. Sakura® at 118 g/ha.
- Saflufenacil 250 g/L (Group 14/G) + trifludimoxazin 125 g/L (Group 14/G), e.g. Voraxor® at 200 mL/ha for residual control of some broadleaf weeds and suppression of key grass weeds. Apply it pre-sowing and incorporate during sowing to ensure good physical separation of the planted seed and herbicide.
- Simazine 900 g/kg, Group 5/C, e.g. Simagranz® at 0.55–1.1 kg/ha. Use 0.55–0.775 kg/ha on lighter soils and in the northern agricultural areas, and up to 1.1 kg on heavier soil types. Do not use on whitish or grey sands.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow chickpea at least 3 cm and preferably 5 cm deep. The rates higher than 0.86 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha + Imazethapyr 700 g/kg, Group 2/B, e.g. Skipper® 700 WG at 20 g/ha.
- Terbutylazine 750 g/kg (Group 5/C) + isoxaflutole 75 g/kg (Group 27/H), e.g. Palmero® TX at 1 kg/ha. Seed crop at 5 cm depth. Heavy rains after application may cause crop damage, particularly in sandy or gravelly soils.
- Terbutylazine 600 g/kg (Group 5/C) + propyzamide 300 g/kg (Group 3/D), e.g. Effigy® 900 WG at 1.25–1.75 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow crop at least 5 cm deep. The rates higher than 1.25 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage.
- Tri-allate 500 g/L, Group 15/J, e.g. Avadex® Xtra at 1.6 L/ha.

- Trifluralin 480 g/L, Group 3/D, e.g. TriflurX® at 1.25–1.7 L/ha + 1.1 kg/ha Simazine 900, Group 5/C. Use with knife-point and press-wheel seeding system only.
- Trifluralin 350 g/L (Group 3/D) + tri-allate 550 g/L (Group 15/J), e.g. Jetti Duo® at 1.45–1.8 L/ha. For best results apply within 12 hours of crop sowing. Use with knife/blade-point sowing system.

Post-sowing pre-emergent (PSPE) herbicides

- Carbetamide 900 g/kg, Group 23/E, e.g. Ultro® 900 WG at 1.1 kg/ha. Apply within 2 days of sowing to soil that is relatively flat after sowing operation. Do not apply post-sowing pre-emergent if using knife-point and press-wheel seeding system. For broadening the spectrum of weeds controlled, it can be applied mixed with label rate of simazine. Heavy, intense rainfall following application may cause crop damage.
- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG (not all brands) at 550–830 g/ha. Use the lower rate on light sandy soils.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.25 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750m L/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Isoxaflutole 750 g/kg, Group 27/H, e.g. Balance® or Palmero® at 100 g/ha. Heavy rain after its application on sandy or gravelly soils, or soils low in clay or organic matter, may result in crop damage.
- Metribuzin 750 g/kg, Group 5/C, e.g. Mentor® WG or Stacato® at 180–380 g/ha. The rate is influenced by soil type, refer to label. Crop should be sown at least 5 cm deep. Weeds should be from pre-emergence to 3-leaf stage, except wireweed (Hogweed), which should not be beyond the cotyledon stage. Do not apply to chickpeas grown on sandy soils (silt plus clay less than 40%).
- Simazine 900 g/kg, Group 5/C, e.g. Simagranz® at 0.55–1.1 kg/ha. Use 0.55–0.775 kg/ha on lighter soils and in the northern agricultural areas, and up to 1.1 kg on heavier soil types. Do not use on whitish or grey sands.

- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.6–0.86 kg/ha. Apply within 2 days of sowing. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow at least 3 cm and preferably 5 cm deep. Heavy, intense rainfall following application may cause crop damage.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.6–0.86 kg/ha + Imazethapyr 700 g/kg, Group 2/B, e.g. Skipper® 700 WG at 20 g/ha.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86 kg/ha + isoxaflutole 750 g/kg, Group 27/H, e.g. Boundary® 750 WG at 80 g/ha.
- Terbutylazine 750 g/kg (Group 5/C) + isoxaflutole 75 g/kg (Group 27/H), e.g. Palmero® TX at 0.7–1 kg/ha. Sow crop at 5 cm depth. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%).

Post-emergent herbicides for broadleaf weed control

- Flumetsulam 800 g/kg, Group 2/B, e.g. Broadstrike® at 25 g/ha. Apply at 4–6 branch stage and no later than 6 weeks after crop emergence. Do not use any spray additives or tank mix with other chemicals.

Post-emergent herbicides for grass weed control

- Butroxydim 250 g/kg, Group 1/A, e.g. Factor® WG at 80–180 g/ha + Supercharge® Elite® at 1% (v/v*) to control 2-leaf to early tillering weeds. The lower rates are for younger weeds growing actively under ideal conditions. The higher rates are for weeds that are at early tillering stage, or in dense populations, or growing in poor growing conditions. For improved control of ryegrass and other grass weeds, butroxydim must be combined with clethodim or fop herbicide containing fluazifop-p, haloxyfop-R, propaquizafop or quizalofop. Do not apply at the flowering stage of crop.
- Clethodim 240 g/L, Group 1/A, e.g. Select® or Status® at 150–500 mL/ha + D-C-Trate® at 2% or Hasten® at 1% or Kwickin® at 1% or Uptake® oil at 0.5% (v/v*) to control 2-leaf to fully tillered grass weeds. The lower rates will provide effective control if applied under ideal

*v/v = volume by volume of final spray solution.

conditions to weeds that are smaller, actively growing and free from temperature or water stress. Do not apply beyond full flowering.

- Fluazifop-p 128 g/L, Group 1/A, e.g. Fusilade® Forte at 500 mL/ha to control actively growing 2–5 leaf brome grass before it starts tillering. Apply up until 7 weeks before crop harvest.
- Haloxifop-R 520 g/L, Group 1/A, e.g. Verdict® at 50–100 mL/ha + Uptake® oil at 0.5% or non-ionic wetting agent (e.g. BS1000®) at 0.2% (v/v*). The application rate depends on weed size, adjuvant type and mix partner; refer to label. Apply from second leaf to pre-flowering crop growth stages. Do not apply haloxifop-R in mixture with broadleaf weed herbicides; apply these at least a week apart. Withholding periods are not required when used as directed.

Chickpea growers targeting the European Union market are advised to consult with their grain trader before using haloxifop-R.

- Propaquizafop 100 g/L, Group 1/A, e.g. Shogun® at 200–450 mL/ha + Hasten® or Kwickin® at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*) to control 3-leaf to mid tillering weeds. Use 300 mL/ha where ryegrass is not the dominant weed. Use higher rate for ryegrass control and for best results wait until 75% of ryegrass have begun tillering. Apply up until 12 weeks before crop harvest.
- Quizalofop-p-ethyl 200 g/L, Group 1/A, e.g. Elantra® Xtreme® or Leopard® 200 at 65–190 mL/ha + Hasten®/Plantocrop™ at 1% or non-ionic surfactant (e.g. BS1000®, Wetspray®) at 0.2% or non-ionic surfactant (1000g a.i./L) at 0.1% plus a mineral spray oil at 1% (v/v*) to control 3-leaf to early tillering weeds. The selection of rates depends upon the weed species and their size (refer to label). Use higher rate under heavy weed pressure, and/or when weeds have started tillering. Apply up until 12 weeks before crop harvest.

Insect management

Budworm threshold – very low

- **Desi:** one caterpillar per 10 sweeps.
- **Kabuli:** one caterpillar per 20 sweeps.

Disease management

Ascochyta blight is the most significant disease affecting chickpea crops in WA. It is both seed and stubble borne. Management methods, including paddock rotation and seed dressing, are recommended.

Pre-seeding fungicide options

Apply a seed dressing that contains both thiram and thiabendazole, e.g. Evershield® Seed Treatment. This gives about 4 weeks of protection, after which the requirement for foliar fungicide application should be assessed.

Post-emergent fungicide options

- Botrytis grey mould (BGM) can be a problem on Kabuli grown in higher rainfall regions in the Geraldton port zone, with all varieties of chickpea rated susceptible to BGM.
- The management of ascochyta blight has traditionally been done using preventative fungicides. A robust fungicide package includes a thiram and thiabendazole based seed dressing followed by a foliar fungicide 4 to 6 weeks after emergence, then monitoring regularly for disease. If disease is detected, apply fungicide at 3-week intervals before rain fronts. Any crop to be retained for seed that has disease present should have a podding spray applied.

Refer to Table 10.

*v/v = volume by volume of final spray solution.

Table 10: Foliar fungicides that are registered for use in chickpea crops in WA

Active ingredient	Example product	Group	Disease			Withholding period (weeks)		Special comments
			Ascochyta blight	Botrytis grey mould	Sclerotinia	Harvest	Graze	
Azoxystrobin (200 g/L) + cyproconazole (80 g/L)	Amistar® Xtra	101	400–800 mL	400–800 mL	–	8	4	Do not apply after 50% of pods on main spike have reached typical length (BBCH 75)
Carbendazim (500 g/L)	Spin Flo® – Nufarm	95	–	500 mL	–	4	4 (check label for export lambs and livestock that may be used to produce milk for human consumption)	–
Chlorothalonil (720 g/L)	Bravo® Weather Stik®, Barrack Betterstick®, Nufarm Unite® 720	99	1.0–2.0 L	–	–	2	2 (check label for export lambs and livestock that may be used to produce milk for human consumption)	Not all products are registered for ascochyta blight – check labels
Chlorothalonil (900 g/kg)	Sipcam Echo® 900 WDG	96	0.8–1.6 kg	–	–	2	2 (check label for export lambs and livestock that may be used to produce milk for human consumption)	Not all products are registered for ascochyta blight – check labels
Mancozeb (750 g/kg)	Dithane® Rainshield® Neo Tec®	107	1.0–2.2 kg	1.0–2.2 kg	–	4 (check label)	2	Less effective on BGM than alternative products
Mancozeb (625 g/kg) + Zn as EDTA (17.3 g/kg)	Manic WG Plus®	105	1.2–2.64 kg	1.2–2.64 kg	–	1	2	Less effective on BGM than alternative products
Pydiflumetofen (100 g/L) + fludioxonil (150 g/L)	Miravis® Star	99	250–500 mL	750–1000 mL	750–1000 mL	Not required when used as directed	6	Do not apply more than twice per crop. Apply up to the end of flowering.
Prothioconazole (150 g/L) + bixafen (75 g/L)	Aviator® Xpro®	96	400–600 mL	–	–	Not required when used as directed	5	Do not apply after late flowering
Tebuconazole (370 g/L) + azoxystrobin (222 g/L)	Veritas® Opti	107	400–540 mL	400–540 mL	–	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses
Azoxystrobin (625 g/L) tank mix with tebuconazole (430 g/L)	Mirador 625 tank mix with Orius 430 SC	105	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	–	4	4	–

Crop-topping

- Paraquat 250 g/L, Group 22/L, e.g. Gramoxone® at 400 or 800 mL/ha. Spray the crop when annual ryegrass is at the optimum stage, that is when the last annual ryegrass seed heads at the bottom of the plant have emerged, and most are at or just past flowering (with anthers present or glumes open) but before haying off is evident – usually October to November.
- Reduction in crop yield can occur (more than 25%) especially if the crop is less advanced relative to the ryegrass, i.e. if crops have mostly green immature pods. The higher label rate may also exacerbate any yield reduction. Do not harvest within 7 days of application.

Caution is advised, as unacceptable yield loss have been observed in WA trials.

Desiccation

Desiccation can be used as a harvest-aid.

- Diquat 200 g/L, Group 22/L, e.g. Reglone® at 2–3 L/ha. Spray as soon as the crop has reached full maturity as this helps overcome slow and uneven ripening, and weed problems at harvest. Do not harvest for 2 days after application.
- Glyphosate, Group 9/M, several glyphosate formulations are registered as a harvest-aid and for the control of annual weeds, including Crucial® (600 g/kg) at 0.6–1.6 L/ha, Genfarm Panzer® 450 (450 g/L) at 0.81–2.2 L/ha, Raze® (510 g/L) at 0.72–1.2 L/ha, Roundup Ready® Herbicide with PLANTSHIELD® (690 g/kg) at 0.53–1.4 kg/ha, Roundup UltraMax® (570 g/L) at 0.645–1.7 L/ha, and Weedmaster® DST® (470 g/L) at 0.77–2.0 L/ha. Both Crucial® at 0.45–0.95 L/ha and Weedmaster® DST® at 0.6–1.2 L/ha can be applied mixed with 5 g/ha metsulfuron-methyl 600 (e.g. Associate®). Apply when crop is physiologically mature and has less than 15% green pods. Do not harvest crop within 7 days of application. Use higher label rates where crops or weeds are dense and where faster desiccation is required. Not all glyphosate products are registered for this use; refer to the registered product labels.

- Pyraflufen-ethyl 25 g/L, Group 14/G, e.g. Sledge® at 200 mL/ha alone, or in mixture with the label rate of paraquat (e.g. Inferno®) or glyphosate (e.g. Raze®), is registered as a harvest-aid and for reduction in seed-set and viability of weed seeds. Compared to pyraflufen-ethyl alone, the tank mixture of pyraflufen-ethyl and paraquat or glyphosate may improve harvest efficiency and weed control, and reduce seed-set and viability of weed seeds. Apply to chickpea at or after 90–95% of the chickpea seeds have reached physiological maturity, typically when 80–85% of pods in a crop have turned yellow-brown. For maximum weed-seed-set reduction, weeds should be sprayed at full flowering stage, but adhere to crop growth stage to minimise yield losses. Do not apply less than 7 days before harvest.
- Saflufenacil 700 g/kg, Group 14/G, e.g. Sharpen® WG at 34 g/ha in mixture with recommended label rate of glyphosate or paraquat plus 1% Hasten® or high-quality methylated seed oil (MSO). Apply when 80–85% of chickpea pods in a crop have turned yellow-brown. Applications earlier than the recommended growth stage can result in grain yield losses. Do not harvest within 7 days of application.

Harvesting

Refer to Table 11 below.

Table 11: Recommended harvest settings for chickpeas

Reel speed	1.0 x ground speed
Table auger	10–20 mm
Drum or rotor speed	300–600rpm
Concave clearance	10–25 mm (start at clearance 10 mm)
Fan speed	75–100% (start at 100%)
Top sieve	16–25 mm (start at 25 mm)
Bottom sieve	8–16 mm (start at 16 mm)



Faba bean

Introduction

Faba bean is best grown in medium and high-rainfall areas on medium-heavy textured soils, where it has the highest yield potential of all pulse crops. It is best suited to early sowing in April. Unlike most pulses, faba beans can tolerate transient waterlogging and mild frosts, but are particularly sensitive to dry conditions.

New bean cultivars have superior disease resistance to those widely grown in the 1990s. Combined with advances in fungicide and spray technology, the risk of epidemics like those seen in the late 1990s is now much lower.

Recent releases

Released in 2019, PBA Amberley is a mid-season flowering faba bean with high yield potential in higher rainfall and long growing-season districts. It has a higher level of resistance to chocolate spot than all current varieties and is also moderately resistant to ascochyta blight. The improved disease resistance of PBA Amberley offers the potential to reduce the risk and cost of faba bean production in high rainfall areas where foliar fungal diseases are a major constraint. In trials in WA, PBA Amberley yields have been comparable to PBA Samira. An end point royalty (EPR) of \$3.50/t (GST exclusive), which includes breeder royalty, applies upon delivery of this variety. Seed is available from Seednet.

PBA Bendoc was released in 2018 as the first faba bean line with improved tolerance to imidazolinone (IMI) herbicides, and the residues of some Group 2 (formerly Group B) herbicides, including some sulfonylureas. The herbicide Intercept® (containing imazamox and imazapyr) is registered for use on imidazolinone-tolerant faba bean varieties such as PBA Bendoc.

PBA Bendoc has a small-medium sized seed (640 mg) suited to Middle East markets. It has lower disease resistance ratings for ascochyta and chocolate spot than the most widely grown bean variety, PBA Samira. Seed is available from Seednet with an EPR of \$3.90/t (GST exclusive).

PBA Marne was released in 2018. It is an early flowering line with potential for lower rainfall regions. Seed is available from Seednet with an EPR of \$3.50/t (GST exclusive).

What variety should I grow?

PBA Samira is considered the yield benchmark variety for WA and is the most widely grown variety. Growers who can benefit from using an IMI-tolerant variety should try PBA Bendoc, but they must also be prepared to have a robust fungicide program as PBA Bendoc has lower disease ratings than PBA Samira. PBA Amberley is a suggested variety for high rainfall zones with high disease pressure.

PBA Marne performs well in variety trials throughout WA but should only be grown in lower rainfall areas where disease risk is low.

Grain yield of faba bean varieties

Table 1: Grain yield of faba bean varieties in AGZONE 3 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 4-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–23
Site mean yield (t/ha)		1.66	2.82	2.78	1.53	2.19	2.26
Variety	(No. trials)	(1)	(2)	(2)	(2)	(1)	(8)
Farah	(8)	96	106	94	110	116	104
Fiesta VF	(8)	103	105	97	109	109	104
Nura	(8)	93	104	94	98	115	100
PBA Amberley	(8)	97	99	94	95	110	98
PBA Bendoc	(8)	83	104	98	100	112	100
PBA Marne	(8)	76	110	105	122	106	107
PBA Rana	(7)	–	92	85	82	99	88
PBA Samira	(8)	103	100	94	100	110	100
PBA Zahra	(8)	86	104	94	106	116	101

Source: NVT, nvt.grdc.com.au

Table 2: Grain yield of faba bean varieties in AGZONE 5 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 4-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–23
Site mean yield (t/ha)		2.00	2.54	2.32	1.50	1.50	1.97
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(5)
Farah	(5)	92	94	88	94	94	92
Fiesta VF	(5)	97	95	92	96	95	95
Nura	(5)	93	97	93	102	96	96
PBA Amberley	(5)	90	97	92	101	95	95
PBA Bendoc	(5)	98	101	98	100	102	100
PBA Marne	(5)	109	102	102	90	110	103
PBA Rana	(4)	–	85	82	111	67	86
PBA Samira	(5)	89	95	89	98	92	93
PBA Zahra	(5)	90	96	89	95	97	93

Source: NVT, nvt.grdc.com.au

Faba bean variety characteristics

Table 3: Faba bean agronomy characteristics

Variety	Seed grade	Seed size (mg, mean and range)	Seed colour	Plant height	Flowering time	Maturity	Lodging	Necking*
Farah	Medium	690 (590–760)	Light brown–brown	Medium	Early-mid	Early-mid	MS	MS
Nura	Small-med	680 (550–790)	Light brown	Short	Mid	Early-mid	MR	MS
PBA Amberley	Medium	720 (600–840)	Light brown	Medium	Mid	Mid	MR	R
PBA Bendoc	Medium	640 (500–720)	Light brown	Medium	Mid	Early-mid	MS	MS
PBA Marne	Medium	740 (610–870)	Light brown	Medium	Early-mid	Early-mid	MR	MR
PBA Rana	Med-large	750 (650–900)	Light brown	Med/tall	Mid	Mid	MR	MR
PBA Samira	Medium	740 (580–870)	Light brown	Medium	Mid	Mid	MR	MS
PBA Zahra	Med-large	740 (620–860)	Light brown	Med/tall	Mid	Mid-late	MR	S

Source: PBA variety release documents.

*Necking occurs under strong winds or moisture stress and results in the stem bending over sharply at about pod height, so that the upper part of the plant is less able to assist in grain-fill. Sometimes plants recover partially from necking and the growing points turn and grow upright again.

S = Susceptible, MS = Moderately susceptible, MR = Moderately resistant, R = Resistant

Table 4: Faba bean variety disease ratings

Variety	Ascochyta blight	Cercospora leaf spot	Chocolate spot	<i>Pratylenchus thornei</i> [#]	Rust
Farah	MS _p	S	S	MRMS	VS
PBA Amberley	MR	S	MRMS	MRMS	VS
PBA Bendoc	MR	S	S	MRMS	VS
PBA Marne	MS	S	MS	MS	MRMS
PBA Rana	MRMS _p	S	MS	MS	VS
PBA Samira	MR _p	S	MS	MRMS	S
PBA Zahra	MRMS	S	MS	MRMS	S

Source: NVT, nvt.grdc.com.au

VS = Very susceptible, S = Susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant

[#] = Nematode resistance ratings have not been tested in WA and should be used as a guide only.

_p = provisional rating.

Faba bean agronomy guide

Paddock selection

- Most suited to fine-textured or duplex soils, neutral to alkaline with a surface pH of 5–8 (in CaCl₂). Soils with a surface pH of 5–6 need to be more alkaline (pH >6) at depth (>20 cm). In high-rainfall southern areas (e.g. Esperance sandplain) faba beans can be grown on lower pH sandy duplex paddocks but will benefit from double the normal rate of rhizobia inoculation.
- Soils must be free of sulfonylurea herbicide residues (e.g. Glean®, Logran®), clopyralid residues (Lontrel®) and high exchangeable sodium.
- Paddocks need to have a low broadleaf weed and herbicide resistant ryegrass burden.
- Sow different faba bean varieties at least 500 m away from each other to prevent cross-pollination.

Rotation

- Faba bean fixes large amounts of Nitrogen (N), providing large rotation benefits for following crops.
- To reduce disease risk, grow no more often than one year in 4 in the same paddock.
- Avoid close rotations with vetch, narbon bean and lentil because some foliar diseases are common between these species.
- Retained cereal stubble can minimise the impact of a dry or hot spring, reduce aphids and lower disease spore splash.

Characteristics

- Vigorous early growth
- Tolerates transient waterlogging and frosts better than most grain legumes
- Early flowering enables spring drought to be avoided, but dry and hot weather at flowering can reduce yields.

Sowing window

Dry seeding is possible but not preferred due to poor rhizobia survival.

Table 5: Recommended sowing times for faba beans in WA

Rainfall	Suggested sowing date
Low (<350 mm)	15 April to 15 May Faba bean is not well suited to lower rainfall areas in most years, especially on lighter soils. If sowing in these areas, early sowing is important.
Medium (350–450 mm)	15 April to 30 May
High (>450 mm)	15 May to 7 June In higher rainfall areas, early sowing can predispose the crop to disease.

Target density and seeding rate

- Aim to establish 25–30 plants/m².
- Sow at 150–200 kg/ha depending on seed size and germination percentage.
- Reduced sowing rates may be beneficial in high yielding situations.
- Seed size can vary markedly between varieties and larger seed may require a different seeding set-up to prevent blockages. This may include minor modifications to the metering mechanism, seed tubes or dividing heads on air seeders.
- Seed should be tested for germination and vigour, with a minimum germination requirement of 70%.

Sowing depth

- 5–8 cm
- Can be sown at 8–10 cm.

Seed dressing and rhizobia

- Seed should be inoculated with Group F rhizobia using a peat or liquid slurry, or with liquid or granules in furrow.
- If using a slurry, inoculate at least 24 hours after applying fungicidal seed treatment and sow within 12 hours.

- Double the recommended inoculum rates if soils are not optimal for faba bean (i.e. pH less than 6.0 or sandy soil).
- Avoid putting rhizobia down the same tube as acidic fertiliser, as it will kill the rhizobia.

Fertiliser

- 100–200 kg/ha superphosphate, depending on soil test
- Trace elements as for cereals.

Weed control

The following herbicides are registered on faba bean in WA. It is advised to check labels of specific herbicide products for rates, crop and weed growth stages for application of recommended surfactants and oils, withholding and plant back periods.

Pre-seeding and incorporated-by-sowing (IBS) herbicides

- Bixlozone 400 g/L, Group 13/Q, e.g. Overwatch® at 1.25 L/ha. Seed faba bean at least 3 cm deep using a seeding system that can ensure adequate spatial separation of seed and herbicide, e.g. knife-point tynes and press wheels.
- Carbetamide 900g/kg, Group 23/E, e.g. Ultro® 900 WG at 1.1–1.7 kg/ha. Apply the lower rate on sandy soils and where lower weed densities are expected. However, use the higher rate on heavier soils and where the weed densities are expected to be moderate to high. Do not apply carbetamide pre-sowing if planting with disc seeder as greater contact between the germinating seed and herbicide may reduce crop safety.
- Cyanazine 900 g/kg, Group 5/C, e.g. Bladex® at 1.1 kg/ha. Do not use on sand or sandy loam soils as crop damage may result. Where annual ryegrass and wireweed are a major problem, add pendimethalin or trifluralin at the recommended rates. Do not add anti-evaporant spraying oils.
- Diuron 900g/kg, Group 5/C, e.g. Diurex® WG at 0.83–1.1 kg/ha. Use the lower rate on light sandy soils.
- Flumioxazin 500 g/kg, Group 14/G, e.g. Terrain® at 180 g/ha. Do not use on lighter soil types (sand) as shorter periods of residual control and unacceptable crop damage may occur.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.5 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Pendimethalin 440 g/L, Group 3/D, e.g. Stomp® at 1.5–2.25 L/ha. Use the lower rates on light textured soils and the higher rates on medium to heavy textured soils.
- Propyzamide 900 g/kg, Group 3/D, e.g. Edge® 900 WG at 0.56–1.11 kg/ha. Use higher rates on heavy soils under sub-optimal conditions or where a heavy grass population is expected.
- Prosulfocarb 800 g/L (Group 15/J) + s-metolachlor 120 g/L (Group 15/K), e.g. Boxer Gold® at 2.5 L/ha.
- Saflufenacil 250 g/L (Group 14/G) + trifludimoxazin 125 g/L (Group 14/G), e.g. Voraxor® at 200 mL/ha for residual control of some broadleaf weeds and suppression of key grass weeds. Apply it pre-sowing and incorporate by sowing to ensure good physical separation of the planted seed and herbicide.
- Simazine 900 g/kg, Group 5/C, e.g. Simagranz® at 1.1–1.4 kg/ha. Use the lower rate on light soils.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow faba bean at least 3 cm and preferably 5 cm deep. Rates higher than 0.86 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.
- Terbutylazine 600 g/kg (Group 5/C) + propyzamide 300 g/kg (Group 3/D), e.g. Effigy® 900 WG at 1.25–1.75 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow faba bean at least 5 cm deep. Rates higher than 1.25 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage.
- Tri-allate 500 g/L, Group 15/J, e.g. Avadex® Xtra at 1.6 L/ha.
- Trifluralin 480 g/L, Group 3/D, e.g. TriflurX® at 800 mL/ha + 1.1 kg/ha Simazine 900 DF, Group 5/C. Use with knife-point and press-wheel seeding system only.

Post-sowing pre-emergent (PSPE) herbicides

- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 550–830 g/ha. Use the lower rate on light, sandy soils.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.25 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Imazethapyr 700 g/kg, Group 2/B, e.g. Spinnaker® WDG at 70 g/ha. Do not use on light sandy soils. The risk of crop damage on alkaline soils may increase under adverse growth conditions.
- Metribuzin 750 g/kg, Group 5/C, e.g. Stacato® or Mentor® WG at 180–380 g/ha. Use the lower rate on light sandy soils and higher label rate on heavy clay-loam soils. Crop should be sown at least 5 cm deep. Weeds should be from pre-emergence to 3-leaf stage, except wireweed (Hogweed), which should not be beyond the cotyledon stage.
- Simazine 900 g/kg, Group 5/C, e.g. Simagranz® at 1.1–1.4 kg/ha. Use the lower rate on light soils. Sow crop at least 5 cm deep. Do not use rates higher than 1.1 kg/ha on soils with pH 8.0 and above as unacceptable crop damage may occur. At 0.55–0.8 kg/ha, it can be applied mixed with trifluralin 480 at 0.83 L/ha; refer to label.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 600–860 g/ha. Apply within 2 days of sowing. Use the lower rate on sandy loams to loamy sand soils and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow crop at least 3 cm and preferably 5 cm deep. Heavy, intense rainfall following application may cause crop damage.
- Imazamox 700 g/kg, Group 2/B, e.g. Raptor® WG at 50 g/ha + BS1000® 0.2% (v/v*). A permit (PER14726) with a validity up to 30 September 2029 is in place for this use pattern. Apply the herbicide at the 3–6 node growth stage, approximately 30–40 days after sowing, when frost is not forecast. Use herbicide rates according to the product labels. Do not use oil or mix with other products containing emulsifying agents. Follow permit restraints carefully.
- PBA Bendoc was released in 2018 as the first faba bean line with improved tolerance to imidazolinone (IMI) herbicides and the residues of some Group 2/B herbicides, including some sulfonylureas. Imazamox 33 g/L + imazapyr 15 g/L, Group 2/B, e.g. Nufarm Intercept® at 350–750 mL/ha + Nufarm CanDo™ Spray Adjuvant at 0.5% (v/v*) is registered on IMI-tolerant faba bean varieties such as PBA Bendoc. Intercept® has efficiency on both Group 2/B herbicide susceptible grass and broadleaf weeds. Apply the herbicide when crop is at 3–8 leaf stage and most of the grass weeds are at 2–4 leaf stage.

Post-emergent herbicides for grass weed control

- Butoxydim 250 g/kg, Group 1/A, e.g. Factor® WG at 80–180 g/ha + Supercharge® Elite® at 1% (v/v*) to control 2-leaf to early tillering weeds. The lower rates are for younger weeds growing actively under ideal conditions. The higher rates are for the weeds at early tillering stage, or in dense populations, or growing in poor growing conditions. For improved control of ryegrass and other grass weeds, butoxydim must be combined with clethodim or fop herbicide containing fluazifop-p, haloxyfop-R, propaquizafop or quizalofop. Do not apply at flowering stage of crop.
- Clethodim 240 g/L, Group 1/A, e.g. Select® or Status® at 150–500 mL/ha + D-C-Trate® at 2% or Hasten® at 1% or Kwickin® at 1% or Uptake® oil at 0.5% (v/v*) to control 2-leaf to fully tillered grass weeds; refer to label. The lower rates will provide effective control if applied under ideal conditions to weeds that are smaller, actively growing and free from temperature or water stress. Do not apply beyond full flowering.

Post-emergent herbicides for broadleaf weed control

- Pyraflufen-ethyl 20 g/L, Group 14/G, e.g. Ecopar® at 800 mL/ha + BS1000® 0.2% (v/v*). Apply when crop is at 3–5 leaf stage to control 2–4 leaf stage weeds that are not more than 6 cm in diameter.

*v/v = volume by volume of final spray solution.

- Fluazifop-p 128 g/L, Group 1/A, e.g. Fusilade® Forte at 410 mL/ha to control actively growing 2–5 leaf weeds before commencement of tillering. Apply up until 5 weeks before crop harvest.
- Haloxypop-R 520 g/L, Group 1/A, e.g. Verdict® at 50–100 mL/ha + Uptake® oil at 0.5% or non-ionic wetting agent (e.g. BS1000®) at 0.2% (v/v*). Application rate depends on weed size, adjuvant type and mix partner; refer to label. Apply from 2-leaf to pre-flowering crop growth stages. Do not apply haloxypop-R in mixture with broadleaf weed herbicides and apply these at least a week apart. Withholding periods are not required when used as directed.

Faba bean growers targeting the European Union market are advised to consult with their grain trader prior to the use of haloxypop-R.

- Propaquizafop 100 g/L, Group 1/A, e.g. Shogun® at 200–450 mL/ha + Hasten® or Kwickin® at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*) to control 3-leaf to mid tillering weeds. Use 300 mL/ha where ryegrass is not the dominant weed. Use higher rate for ryegrass control and for best results wait until 75% of ryegrass has begun tillering. Apply up until 7 weeks before crop harvest.
- Quizalofop-p-ethyl 200 g/L, Group 1/A, e.g. Elantra® Xtreme® or Leopard® 200 at 65–190 mL/ha + Hasten®/ Plantocrop™ at 1% or non-ionic surfactant (e.g. BS1000®, Wetspray®) at 0.2% or non-ionic surfactant (1000 g a.i./L strength) at 0.1% plus a mineral spray oil at 1% (v/v*) to control 3-leaf to early tillering weeds. The selection of rates depends upon the weed species and their size; refer to label. Use higher rate under heavy weed pressure, and/or when weeds have started tillering. Apply up until 12 weeks before crop harvest.

Insect management

- The main insect pest is native budworm (*Helicoverpa*); crops need to be monitored for grubs regularly late in the season.
- Budworm control is vital if producing quality beans for human consumption. Spray if there is one or more grubs per 10 sweeps.
- Crops also need to be monitored for redlegged earth mite, lucerne flea, cutworm and cowpea aphid.

*v/v = volume by volume of final spray solution.

Disease management

- Avoid previous year's bean stubble and only grow beans once every 4 years in the same paddock.
- New bean cultivars have superior disease resistance compared to those widely grown in the 1990s. Combined with advances in fungicide and spray technology, the risk of epidemics like those of the late 1990s is much lower.
- Ascochyta blight mostly occurs in the southern agricultural region and becomes evident in the first month after sowing. In the north, do not buy seed from the south. Many newer varieties have excellent ascochyta resistance and it is less common to see symptoms, but monitoring is still recommended.
- Chocolate spot (*Botrytis fabae*) is the main disease that will require control in WA. Growers should plan to apply most fungicide sprays around flowering to maximise pod set. Monitor crops in late vegetative stage for symptoms with an aim to spray at canopy closure/start of flowering.
- Rust usually occurs from September in WA. Early detection and control are necessary

Post-emergent fungicide options and timing

It is common to have more than one disease in the crop and fungicide mixes may be required.

Refer to Table 6.

Ascochyta blight

- Early vegetative stages – monitor to ensure disease is apparent.

Chocolate spot

- At canopy closure/flowering.

Cercospora leaf spot

- Often seen 6–8 weeks after sowing.

Crop-topping

- Paraquat 250 g/L, Group 22/L, e.g. Gramoxone® at 400 or 800 mL/ha. Spray the crop when annual ryegrass is at the optimum stage, that is when the last annual ryegrass seed heads at the bottom of the plant have emerged, and most are at or just past flowering (with anthers present or glumes open) but before haying off is evident – usually October to November.
- Reduction in crop yield can occur (more than 25%) especially if the crop is less advanced relative to the ryegrass, i.e. if crops have mostly green immature pods. The higher label rate may also exacerbate any yield reduction. Do not harvest within 7 days of application.

Desiccation

- Diquat 200 g/L, Group 22/L, e.g. Reglone® at 2 to 3 L/ha. Spray as soon as the crop has reached full maturity as this helps overcome slow and uneven crop ripening and weed problems at harvest. Do not harvest for 7 days after application.
- Glyphosate, Group 9/M, several glyphosate formulations are registered as a harvest-aid and for the control of annual weeds, including Crucial® (600 g/kg) at 0.6–1.6 L/ha, Genfarm Panzer® 450 (450 g/L) at 0.81–2.2L, Raze® (510 g/L) at 0.335–1.2 L/ha, Roundup Ready® Herbicide with PLANTSHIELD® (690 g/kg) at 0.53–1.4 kg/ha, Roundup UltraMax® (570 g/L) at 0.645–1.7 L/ha, and Weedmaster® DST® (470 g/L) at 0.77–2.0 L/ha. Apply when faba bean pods turn black and average seed moisture content is below 30%. Application before this time could significantly reduce yields (in practice losses more than 25% can occur). Use lower rate if ryegrass is flowering and higher label rate if ryegrass is at milky dough stage. Use higher label rates where crops or weeds are dense and faster desiccation is required. Do not use on crops intended for seed or sprouting. Do not harvest within 7 days of application. Not all glyphosate products are registered for this use; refer to the registered product labels.
- Pyraflufen-ethyl 25 g/L, Group 14/G, e.g. Sledge® at 200 mL/ha alone or in mixture with the label rate of paraquat (e.g. Inferno®) or glyphosate (e.g. Raze®), is registered as a harvest-aid and for reduction in seed-set

and viability of weed seeds. Compared to pyraflufen-ethyl alone, the tank mixture of pyraflufen-ethyl and paraquat or glyphosate may improve harvest efficiency and weed control, and reduce of seed-set and viability of weed seeds. Apply to faba bean at or after hilum turns black in the pods at the top of the crop canopy, typically when 30–80% of pods are ripe and dark. The faba bean plants may still be green at this stage, particularly if it is a late maturing variety. For maximum weed-seed-set reduction, weeds should preferably be sprayed at full flowering stage, but adhere to crop growth stage to minimise yield losses. Do not apply less than 7 days before harvest.

- Saflufenacil 700 g/kg, Group 14/G, for example, Sharpen® WG at 34 g/ha in mixture with label rate of glyphosate or paraquat + 1% Hasten® or high-quality methylated seed oil (MSO). Apply when 30–80% of pods are ripe and dark (hilum black in the pods at the top of the canopy). Applications made before the recommended growth stage could result in grain yield losses. Do not harvest within 7 days of application.

Harvesting

- Faba beans turn black at maturity and are ready to harvest when the pods are black and stems are still slightly green.
- Delayed harvest will increase the risk of staining, lodging, shattering and pod loss. Handle seed minimally to reduce physical damage.
- Use a conventional open front header. Every second wire and blanking off plates may need to be removed. Use barley sieves.

Refer to Table 7 below.

Table 7: Recommended harvest settings for faba beans

Reel speed	1.0 x ground speed
Spiral clearance	High
Drum speed	300–600rpm
Top sieve	32–38mm
Fan speed	High
Concave clearance	15–35mm
Bottom sieve	8–16mm

Table 6: Foliar fungicides for faba bean crops in WA

Active ingredient	Example product	Group	Disease				Withholding period (weeks)		Special comments
			Ascochyta blight	Cercospora leaf spot	Chocolate spot	Rust	Harvest	Graze	
Azoxystrobin (200 g/L) + Cyproconazole (80 g/L)	Amistar® Xtra	11 + 3	400–800 mL	400–800 mL	400–800 mL (suppression)	400–800 mL	8	4	Do not apply after 50% of pods on main spike have reached typical length (BBCH 75)
Carbendazim (500 g/L)	Spin Flo® – Nufarm	1	–	–	500 mL	–	4	4	–
Chlorothalonil (720 g/L)	Bravo® Weather Stik®, Barrack Betterstick®, Nufarm Unite® 720	M5	–	–	1.4–2.3 L	1.4–2.3 L	2	2 (check label for export lambs and livestock that may be used to produce milk for human consumption)	–
Chlorothalonil (900 g/kg)	Sipcam Echo® 900 WDG	M5	–	–	1.2–1.9 kg	1.2–1.9 kg	2	2 (check label for export lambs and livestock that may be used to produce milk for human consumption)	–
Mancozeb (750 g/kg)	Dithane® Rainshield® Neo Tec®	M3	1.0–2.2 kg	1.0–2.2 kg	1.0–2.2 kg	1.0–2.2 kg	4 (check label)	2	Less effective on chocolate spot than alternative products
Mancozeb (625 g/kg) + Zn as EDTA (17.3 g/kg)	Manic WG Plus®	M3	1.2–2.64 kg	1.2–2.64 kg	1.2–2.64 kg	1.2–2.64 kg	1	2	Less effective on chocolate spot than alternative products
Pydiflumetofen (100 g/L) + fludioxonil (150 g/L)	Miravis® Star	7 + 12	250–500 mL	750–1000 mL	750–1000 mL	–	Not required when used as directed	6	Do not apply more than twice per crop. Apply up to the end of flowering
Procymidone (500 g/L)	Fortress® 500, Sumisole® 500	2	500 mL	500 mL	500 mL	–	3	3	Permit conditions of use for chocolate spot and Botrytis grey mould: https://permits.apvma.gov.au/PER92791.PDF , permit valid until 31 July 2027
Procymidone (800 g/L)	Intrade Nosclex 800 WG	2	–	–	0.3 kg	–	3	3	Permit conditions of use for chocolate spot and Botrytis grey mould: https://permits.apvma.gov.au/PER92791.PDF , permit valid until 31 July 2027
Prothioconazole (150 g/L) + bixafen (75 g/L)	Aviator® Xpro®	3 + 7	400–600 mL	400–600 mL	600 mL	600 mL	Not required when used as directed	5	Do not apply after early flowering in faba bean
Tebuconazole (430 g/L)	Orius 430 SC	3	–	145 mL	–	145 mL	3	2	Needs to be applied with 1 L/ha non-ionic surfactant
Tebuconazole (370 g/L) + azoxystrobin (222 g/L)	Veritas® Opti	3 + 11	400–540 mL	160 mL	400–540 mL	160 mL	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses
Azoxystrobin (625 g/L) tank mix with tebuconazole (430 g/L)	Mirador 625 tank mix with Orius 430 SC	3 + 11	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	60 mL Mirador 625 + 140 mL Orius 430 SC	60 mL Mirador 625 + 140 mL Orius 430 SC	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses

Stubble grazing

- Faba bean stubble can be a useful sheep feed over summer but avoid over-grazing stubbles on fragile soils.
- Most of the feed value is in the spilt grain.
- To minimise risk of wind erosion, leave sheep in the paddock no longer than is necessary to recover the spilt grain.
- Graze soon after harvest, relying on summer rain to stabilise the soil, or late in autumn after most of the erosion risk has passed.



Field pea

Introduction

Field pea is the most widely adapted pulse species to WA conditions and is grown in most regions. It is adapted to a wide range of soil types and there is widespread experience with this pulse among growers and agronomists. Excellent weed control options are available for field pea, which combined with delayed sowing and crop-topping, enable very clean paddocks for following crops.

Most field peas grown in WA are of the dun grade – either Kasper types or Australian dun (e.g. Parafield). Kasper types are favoured in the Indian subcontinent, while some sprouting markets still favour trailing varieties such as PBA Percy and Parafield. White varieties are rarely grown in WA, so the marketing of white peas can be problematic. Mixing white and dun types together will result in a downgrade to feed.

Recent releases

APB Bondi is a new erect, semi-leafless Kasper type field pea bred and released by Agriculture Victoria and commercialised for sale by Seednet in September 2024. It has consistently yielded very well in WA NVTs since its inclusion in 2020. APB Bondi is rated as resistant to pea seed borne mosaic virus and resistant to moderately resistant to downy mildew. It is tolerant of high soil boron and moderately tolerant of high salinity. An EPR of \$2.97/t (GST inclusive) applies.

PBA Taylor (tested as OZP1408) was released in 2021. Compared to our benchmark variety, PBA Butler, PBA Taylor has improved resistance to viruses, less resistance to bacterial blight and similar susceptibility to fungal diseases. PBA Taylor has yielded well in all agzones where it has been tested. Seed is available from Seednet, with an EPR of \$2.97/t (GST inclusive).

GIA Kastar and GIA Ourstar were released in 2020 by Grains Innovation Australia (GIA). GIA Kastar and GIA Ourstar have improved tolerance to IMI herbicides and GIA Ourstar also has improved tolerance to sulfonylurea residues and improved tolerance to Broadstrike®. GIA Ourstar is a dun type and GIA Kastar is a Kasper type. In NVT testing in WA, GIA Kastar and GIA Ourstar have produced low yields. Seed is available from AG Schilling & Co and both varieties have an EPR of \$3.30/t (GST inclusive).

What variety should I grow?

APB Bondi, PBA Butler and PBA Gunyah are the top-yielding Kasper-type field pea varieties in WA. PBA Wharton also produces high yields in trials, but most farmers have found that PBA Gunyah and, more recently, PBA Butler produce superior results on farm. PBA Taylor shows promise in central and northern wheatbelt areas.

For farmers wishing to grow trailing field pea types, PBA Percy reliably out-yields Parafield.

It is advisable to grow only one type of field pea (Kasper, dun, or white) on your farm to avoid an admixture of white peas within dun peas, or vice versa, as contamination can result in downgrading.

Grain yield of field pea varieties

Refer to Tables 1 to 5.

Table 1: Grain yield of field pea varieties in AGZONE 1 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		3.12	2.14	2.89	0.51	1.57	2.05
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(5)
APB Bondi	(5)	109	107	104	105	112	107
GIA Kastar	(5)	104	83	80	77	80	85
GIA Ourstar	(5)	93	89	88	87	85	88
Kaspa	(5)	103	100	102	101	101	101
PBA Butler	(5)	108	106	107	104	115	108
PBA Gunyah	(5)	98	100	102	101	99	100
PBA Oura	(5)	95	99	100	101	97	98
PBA Pearl	(1)	101	–	–	–	–	–
PBA Percy	(1)	90	–	–	–	–	–
PBA Taylor	(5)	103	104	104	105	103	104
PBA Twilight	(5)	97	96	95	95	92	95
PBA Wharton	(5)	100	99	97	99	95	98

Source: NVT, nvt.grdc.com.au**Table 2: Grain yield of field pea varieties in AGZONE 2 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)**

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.94	2.32	2.35	0.98	1.86	1.89
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(5)
APB Bondi	(5)	118	111	114	107	113	113
GIA Kastar	(5)	91	71	92	86	84	85
GIA Ourstar	(5)	86	86	83	86	77	84
Kaspa	(5)	98	98	102	102	100	100
PBA Butler	(5)	105	110	104	102	86	101
PBA Gunyah	(5)	96	100	98	100	99	99
PBA Oura	(5)	97	101	96	99	100	99
PBA Pearl	(1)	111	–	–	–	–	–
PBA Percy	(1)	86	–	–	–	–	–
PBA Taylor	(5)	108	104	110	108	120	110
PBA Twilight	(5)	97	93	97	97	101	97
PBA Wharton	(5)	104	96	105	102	116	105

Source: NVT, nvt.grdc.com.au

Table 3: Grain yield of field pea varieties in AGZONE 3 expressed as percentage of site mean yield for each trial year (2019–23) and the weighted average over the 4-year period (where there are 4 or more observations)

Year		2019	2020	2022	2023	2019–23
Site mean yield (t/ha)		2.13	2.05	1.55	1.27	1.64
Variety	(No. trials)	(1)	(1)	(1)	(1)	(4)
APB Bondi	(3)	–	115	101	121	–
GIA Kastar	(3)	–	87	58	69	–
GIA Ourstar	(3)	–	77	77	60	–
Kaspa	(4)	101	104	102	112	105
PBA Butler	(4)	110	105	95	123	108
PBA Gunyah	(4)	104	98	105	100	102
PBA Oura	(4)	104	95	104	90	98
PBA Pearl	(2)	105	100	–	–	–
PBA Percy	(2)	106	88	–	–	–
PBA Taylor	(4)	107	113	113	116	112
PBA Twilight	(4)	95	95	95	86	93
PBA Wharton	(4)	99	105	103	97	101

Source: NVT, nvt.grdc.com.au

Results for field pea NVT in Agzone 3 were not released in 2021 due to trial quality being compromised.

Table 4: Grain yield of field pea varieties in AGZONE 4 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.53	1.00	2.38	1.06	0.89	1.37
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(5)
APB Bondi	(5)	124	110	98	103	109	109
GIA Kastar	(5)	103	66	80	76	90	83
GIA Ourstar	(5)	84	95	96	97	102	95
Kaspa	(5)	100	89	99	94	89	94
PBA Butler	(5)	111	104	102	98	90	101
PBA Gunyah	(5)	93	99	102	101	97	98
PBA Oura	(5)	92	106	103	106	106	103
PBA Pearl	(1)	109	–	–	–	–	–
PBA Percy	(1)	76	–	–	–	–	–
PBA Taylor	(5)	109	99	100	101	102	102
PBA Twilight	(5)	96	96	97	98	103	98
PBA Wharton	(5)	104	96	96	99	106	100

Source: NVT, nvt.grdc.com.au

Table 5: Grain yield of field pea varieties in AGZONE 5 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.19	1.54	1.49	1.45	1.57	1.44
Variety	(No. trials)	(4)	(4)	(4)	(3)	(3)	(18)
APB Bondi	(18)	112	115	112	103	110	111
GIA Kastar	(18)	88	79	73	72	80	79
GIA Ourstar	(18)	90	82	84	89	82	85
Kaspa	(18)	97	101	99	99	100	99
PBA Butler	(18)	104	112	113	108	98	107
PBA Gunyah	(18)	98	98	99	102	100	99
PBA Oura	(18)	99	97	99	102	100	99
PBA Pearl	(4)	112	–	–	–	–	112
PBA Percy	(4)	93	–	–	–	–	93
PBA Taylor	(18)	105	107	104	102	111	106
PBA Twilight	(18)	97	93	92	94	97	95
PBA Wharton	(18)	101	98	95	95	106	99

Source: NVT, nvt.grdc.com.au

Field pea variety characteristics

Table 6: Agronomic characteristics of field pea varieties suited to WA

Variety	Seed type	Plant habit	Plant vigour, early season	Flowering time	Maturity time	Lodging	Pod shattering	Boron tolerance	Salinity tolerance
APB Bondi	Kaspa dun	SD–SL	High	Mid	Mid	Fair-good	R: SP	T	MT
GIA Kastar	Kaspa dun	SL	–	Mid	Early-mid	Fair-good	R	–	–
GIA Ourstar	Aus dun	SL	–	Early-mid	Early-mid	Fair	MR	–	–
Kaspa	Kaspa dun	SD–SL	Moderate	Late	Mid	Fair-good	R: SP	I	I
PBA Butler	Kaspa dun	SD–SL	High	Mid-late	Mid	Good	R: SP	I	I
PBA Gunyah	Kaspa dun	SD–SL	High	Early-mid	Early	Fair-good	R: SP	I	IMI
PBA Oura	Aus dun	SD–SL	Moderate	Early-mid	Early	Fair-good	MR: NSP	MI	I
PBA Pearl	White	SD–SL	Moderate	Early-mid	Early-mid	Good	MR: NSP	MI	MI
PBA Percy	Aus dun	C	High	Early	Early	Poor	MR: NSP	I	MT
PBA Taylor	Kaspa dun	SD–SL	High	Mid	Early-mid	Fair-good	R: SP	I	I
PBA Twilight	Kaspa dun	SD–SL	High	Early	Early	Fair-good	R: SP	I	I
PBA Wharton	Kaspa dun	SD–SL	Moderate	Early-mid	Early	Fair-good	R: SP	MT	MT

Source: PBA and GIA variety release documents

SD = Semi-dwarf, C = Conventional, SL = Semi-leafless, R = Resistant, MR = Moderately resistant, SP = Sugar pod type, NSP = Non-sugar pod type, MT = Moderately tolerant, MI = Moderately intolerant, IMI = Intolerant to moderately intolerant, I = Intolerant

Table 7: Resistance of field pea varieties to diseases commonly found in WA crops

Variety	Blackspot ^a	Downy mildew	PSbMV ^b
APB Bondi	MS	RMR	R
GIA Kastar	MS	S	–
GIA Ourstar	MS	S	–
Kaspa	MS	S	S
PBA Butler	MS	S	S
PBA Gunyah	MS	S	S
PBA Oura	MS	S	S
PBA Pearl	MS	S	S
PBA Percy	MS	S	S
PBA Taylor	MS	S	R
PBA Twilight	MS	S	S
PBA Wharton	MS	S	R

Source: NVT, nvt.grdc.com.au and NSW-DPI

^aAlso known as ascochyta blight, ^bPea seedborne mosaic virus
S = Susceptible, MS = Moderately susceptible, RMR = Resistant to moderately resistant, R = Resistant

Table 8: Resistance of field pea varieties to diseases rarely found in WA crops

Variety	Powdery mildew	Bacterial blight	Bean leafroll virus
APB Bondi	RMR	S	R
GIA Kastar	RMR	S	–
GIA Ourstar	S	Sp	–
Kaspa	S	S	S
PBA Butler	S	MS	S
PBA Gunyah	S	S	S
PBA Oura	S	MS	MR
PBA Pearl	S	MS	R
PBA Percy	S	MRMS	S
PBA Taylor	S	S	R
PBA Twilight	S	S	S
PBA Wharton	R	S	R

Source: NVT, nvt.grdc.com.au and NSW-DPI

S = Susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, RMR = Resistant to moderately resistant, R = Resistant. *p* = provisional rating

Table 9: Nematode resistance of field pea varieties (Victorian ratings)

Variety	<i>Pratylenchus neglectus</i> resistance	<i>Pratylenchus thornei</i> resistance
APB Bondi	RMR	MSS
GIA Kastar	MR	MS
GIA Ourstar	MRMS	MS
Kaspa	RMR	MRMS
PBA Butler	RMR	MRMS
PBA Gunyah	RMR	MRMS
PBA Oura	MR	MRMS _p
PBA Pearl	MR	MRMS
PBA Percy	RMR	RMR
PBA Taylor	RMR	MRMS
PBA Twilight	MR	MRMS
PBA Wharton	MR	MRMS

Source: NVT, nvt.grdc.com.au

Note: Nematode resistance relates to the effect of the variety on the nematode density present in the paddock.
MSS = Moderately susceptible to susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, RMR = Resistant to moderately resistant.
p = provisional rating

Field pea agronomy guide

Paddock selection

- Well-drained loamy sands to clay loams with a pH of 4.5–9.0 (CaCl₂).
- A soil structure or slope that allows good drainage.
- Rocks and roots removed to enable a flat and even sowing surface.
- No sulfonylurea herbicide residues, such as chlorsulfuron (e.g. Nufarm Lusta®) and triasulfuron (e.g. Logran®).
- Avoid Lontrel® residues.
- A low frost risk.
- A low broad-leaved weed burden.
- To minimise the risk of diseases, do not grow field peas more often than one year in 3 in the same paddock, or adjacent to last year's field pea stubble.
- Because field pea stubble does not provide good protection against wind erosion after harvest, field peas should not be grown on soils with a sandy surface prone to wind erosion.

Sowing window

- Plant at the correct time. Planting immediately after the break increases the severity of blackspot by exposing field pea seedlings to spore release in autumn.
- During the growing season, DPIRD produces a field pea sowing time guide based on the blackspot risk. It is available on the web (<https://www.dpiird.wa.gov.au/businesses/plant-and-crop-farming/grains/pulses/blackspot-field-peas-disease-forecast/#:~:text=The%20Blackspot%20Manager%20is%20a,black%20spot%20may%20be%20higher>) and also by SMS.
- The ideal sowing window for field pea occurs 7 to 28 days after the break of the season irrespective of the rainfall zone. Varieties grown in WA are best suited to sowing in the following window with adjustments each year being based on the blackspot forecast.

Table 10: Recommended sowing dates for field peas in WA

Rainfall	Suggested sowing date Adjust depending on blackspot risk
Low (<350 mm)	Early May to late June
Medium (350–450 mm)	Mid May to late June
High (>450 mm)	Late May to late June

Seed source

- When sourcing new seed, where possible, use certified seed where details of germination percentage, seed size and presence of seed-borne diseases are provided.
- Avoid seed with high levels of fungal infection – use seed with less than 15% blackspot infection.
- If using uncertified seed, seed from low-rainfall areas is likely to carry less blackspot infection than seed from high-rainfall areas.

Target density and seeding rate

- On average, the optimum plant density is 50 plants/m².
- Actual sowing rates will depend on seed size, germination percentage and field pea type.
- In most situations, a seeding rate of 120 kg/ha is adequate.

Sowing depth

- Recommended planting depth is 5–8 cm.

Seed dressing and rhizobia

Seed should be inoculated with Group E inoculum every year, particularly on marginal (acid) soil types. With a good history of field pea production and alkaline soils, inoculating in WA mallee areas might not be necessary. With pickled seed, sow seed within 6–10 hours of inoculation.

Fertiliser

- A maintenance application of 50–100 kg/ha superphosphate is recommended.
- Fertiliser treated with fungicides such as flutriafol may reduce early blackspot infection in high-risk areas.

Rolling

- Field pea paddocks should be rolled with rubber tyre or steel rollers to level the paddock surface and partially bury any cereal stubble, rocks and sticks present after sowing.
- Roll before the crop emerges or after the 3-node growth stage.
- Rolling should not be done 2 weeks before or after the application of post-emergent herbicides.
- Rolling should be done before the plants are 20–25 cm tall.

Weed control

- The delayed sowing of field pea, which is necessary to avoid blackspot, provides a good opportunity to control weeds using knockdown herbicides or cultivation.
- Field pea should be planted in paddocks with as few broadleaf weeds as possible, i.e. doublegee, wild mustard and wild radish. For this reason, field pea should be sown into paddocks with cereal stubbles and where weeds are primarily controlled pre-sowing.
- Numerous herbicides are registered on field pea in WA. Check labels of specific herbicide products for rates, crop and weed growth stages for application, recommended surfactants and oils, withholding and plant-back periods etc.

Pre-seeding and incorporated-by-sowing (IBS) herbicides

- Bixlozone 400 g/L, Group 13/Q, e.g. Overwatch® at 1.25 L/ha. Seed field pea at least 3 cm deep using a seeding system that can ensure adequate spatial separation of seed and herbicide, e.g. knife-point tynes and press wheels.
- Carbetamide 900 g/kg (e.g. Ultro® 900 WG), Group 23/E, at 1.1–1.7 kg/ha. Do not apply carbetamide pre-sowing if planting with a disc seeder as increased contact between the germinating seed and herbicide may reduce

crop safety. Apply the lower rate on sandy soils and where lower weed densities are expected. Apply the higher rate on heavier soils and where the weed densities are expected to be moderate to high.

- Cyanazine 900 g/kg, Group 5/C, e.g. Bladex® at 1.1 kg/ha. Do not use on sand or sandy loam soils as crop damage may result. Where annual ryegrass and wireweed are a major problem, add pendimethalin or trifluralin at the recommended rates. Do not add anti-evaporant spraying oils.
- Dimethenamid-P 720 g/L, Group 15/K, e.g. Outlook® at 1 L/ha. Annual ryegrass suppression only if weeds are at high density.
- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 0.83–1.1 kg/ha. Use the lower rate on light sandy soils.
- Flumioxazin 500 g/kg, Group 14/G, e.g. Terrain® at 180 g/ha. Do not use on lighter soil types (sand) as shorter periods of residual control and unacceptable crop damage can occur.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.5 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Metribuzin 750 g/kg, Group 5/C, e.g. Stacato® at 180–380 g/ha. Use an IBS application when furrow seeding using knife points and press wheels. Use lower rate on light sandy soils and higher label rates on heavy clay loam soils. Sow field pea 5 cm deep.
- Pendimethalin 440 g/L, Group 3/D, e.g. Stomp® at 1.5–2.25 L/ha. Use the lower rates on light textured soils and the higher rates on medium to heavy textured soils.
- Propyzamide 900 g/kg, Group 3/D, e.g. Edge® 900 WG at 0.56–1.11 kg/ha. Use higher rates on heavy soils under sub-optimal conditions or where a heavy grass population is expected.
- Prosulfocarb 800 g/L (Group 15/J) + s-metolachlor 120 g/L (Group 15/K), e.g. Boxer Gold® at 2.5 L/ha.
- Pyroxasulfone 850 g/kg, Group 15/K e.g. Sakura® at 118 g/ha.

- Saflufenacil 250 g/L (Group 14/G) + trifludimoxazin 125 g/L (Group 14/G), e.g. Voraxor® at 200 mL/ha for residual control of some broadleaf weeds and suppression of key grass weeds. Apply it pre-sowing and incorporate by sowing to ensure good physical separation of the planted seed and herbicide.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow field pea at least 3 cm and preferably 5 cm deep. Rates higher than 0.86 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.
- Terbutylazine 600 g/kg (Group 5/C) + propyzamide 300 g/kg (Group 3/D), e.g. Effigy® 900 WG at 1.25–1.75 kg/ha. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow crop at least 5 cm deep. Rates higher than 1.25 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage.
- Tri-allate 500 g/L, Group 15/J, e.g. Avadex® Xtra at 1.6 L/ha.
- Trifluralin 480 g/L, Group 3/D, e.g. TriflurX® at 1.2–1.7 L/ha. The rates depend upon the soil type; refer to label.
- Trifluralin 350 g/L (Group 3/D) + tri-allate 550 g/L (Group 15/J), e.g. Jetti Duo® at 1.45–1.8 L/ha. For best results apply within 12 hours of crop sowing. Use with a knife/blade point seeding system.
- Imazethapyr 700 g/kg, Group 2/B, e.g. Spinnaker® WDG at 70 g/ha. Some of the weeds will not be completely controlled but will be retarded enough not to compete with the crop.
- Metribuzin 750 g/kg, Group 5/C, e.g. Stacato® at 180–380 g/ha. PSPE application is recommended for flat surfaces created with use of harrows and/or rolling of paddock after crop sowing. Use lower rate on light sandy soils and higher label rates on heavy clay loam soils. Sow field pea 5 cm deep.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 600–860 g/ha. Apply within 2 days of crop sowing. Use the lower rate on light soils (sandy loams to loamy sands) and the higher rate on heavier soils (loams, silt plus clay 40–60%). Sow crop at least 3 cm and preferably 5 cm deep. Rates higher than 0.86 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.

Post-emergent herbicides for broadleaf weed control

- Cyanazine 900 g/kg, Group 5/C, e.g. Bladex® at 0.55–1.1 kg/ha. Apply at 3–5 crop nodes. Use the higher rate on heavier soil types and under high weed pressure.
- Diflufenican 500 g/L, Group 12/F, e.g. Brodal® Options or Bonanza® Elite at 100–200 mL/ha. Apply from third node to pre-flowering of crop growth stages. For wild radish, hedge mustard, Indian hedge mustard and wild turnip, apply diflufenican 500 at 100 mL, 150 mL and 200 mL/ha for control of up to 2, 4 and 6-leaf stage weeds respectively. For suppression of capeweed up to 4 leaf stage use at 200 mL/ha rate.
- Flumetsulam 800 g/kg, Group 2/B, e.g. Broadstrike® at 25 g/ha. Apply at 2–6 crop nodes and no later than 6 weeks after crop emergence. Do not tank-mix any spraying additives or other chemicals.
- Imazamox 700 g/kg, Group 2/B, e.g. Raptor® at 45 g/ha + BS1000® at 0.2% (v/v*). If planning to use imazamox, the maximum recommended rate of pre-emergent diuron is 250 g/ha and do not roll field peas after germination. Do not apply after 4-node stage of crop or if frost is in the forecast.

Post-sowing pre-emergent (PSPE) herbicides

- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 550–830 g/ha. Use the lower rate on light sandy soils.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.25 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/ or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.

*v/v = volume by volume of final spray solution.

- Imazamox 33 g/L + imazapyr 15 g/L, Group 2/B, e.g. Intercept® at 375–750 mL/ha + Nufarm CanDo™ Spray Adjuvant at 0.5% (v/v*) for IMI-tolerant varieties only (e.g. GIA Ourstar and varieties derived from it). Apply at 3–6 leaf/node stage of crop to target 2–4 leaf stage grass weeds.
- Metribuzin 750 g/kg, Group 5/C, e.g. Stacato® at 180–380 g/ha. Use lower rate on light sandy soils and higher label rates on heavy clay-loam soils up to 3-node stage of the crop. Apply as an early post-emergent application up to 3-node stage of the crop to control weeds up to 4-true-leaf stage that are not more than 120 mm in diameter. Consider alternatives to avoid damage on lighter soil types.
- MCPA 250 g/L K and Na salts, Group 4/I, e.g. Nufarm MCPA 250 at 1 L/ha. Apply when crop is 10–15 cm high. Do not apply if flowering has begun. It could delay maturity by up to 2 weeks when applied at the recommended growth stage.
- Picolinafen 750 g/kg, Group 12/F, e.g. Glocker® 750 WG at 33–50 g/ha. Apply from third node to pre-flowering crop growth stages. Use the lower rate on 2–4 leaf and higher rate on 6–8 leaf wild radish. Good spray coverage of weeds is essential. Suppression of capeweed only at the higher rate.
- Pyraflufen-ethyl 20 g/L, Group 14/G, e.g. Ecopar® at 400 mL/ha + 200 mL/ha Aspect® Options (diflufenican 500 g/L), Group 12/F or Ecopar® at 400 mL/ha + 200 g/ha Stacato® 750 (metribuzin 750 g/kg), Group 5/C, for medium to heavy soils only (see restraints on the Ecopar® label). Apply at 2–5 crop nodes to control 2–4 leaf stage weeds that are not more than 6 cm in diameter.

Post-emergent herbicides for grass weed control

- Butroxydim 250 g/kg, Group 1/A, e.g. Factor® WG at 80–180 g/ha + Supercharge® Elite® at 1% (v/v*) to control 2-leaf to early tillering weeds. The lower rates are for younger weeds growing actively under ideal conditions. The higher rates are for weeds that are at early tillering stage, or in dense populations, or growing in poor growing conditions. For improved control of ryegrass and other grass weeds, it must be combined with clethodim or fop herbicide containing fluazifop-p, haloxyfop-R, propaquizafop or quizalofop. Do not apply at flowering stage of the crop.

*v/v = volume by volume of final spray solution.



Field pea

- Clethodim 240 g/L, Group 1/A, e.g. Select® or Status® at 150–500 mL/ha + D-C-Trate® at 2% or Hasten® at 1% or Kwickin® at 1% or Uptake® oil at 0.5% (v/v*) to control 2-leaf to fully tillered grass weeds; refer to label. The lower rates will provide effective control if applied under ideal conditions to weeds that are smaller, actively growing and free from temperature or water stress. Do not apply beyond full flowering of field peas.
- Diclofop-methyl 375 g/L, Group 1/A, e.g. Di-Grass or Sirofop® at 1–2 L/ha + wetting surfactant (e.g. Wetspray® 1000) at 0.25% (v/v*) to control 2–4 leaf weeds. The rate selection depends upon the weed species and their size; refer to label. Do not spray when temperatures are higher than 25 °C.
- Fluazifop-p 128 g/L, Group 1/A, e.g. Fusilade® Forte at 500 mL/ha to control actively growing 2–5 leaf brome grass before it begins tillering. Apply up until 7 weeks before crop harvest.
- Haloxyfop-R 520 g/L, Group 1/A, e.g. Verdict® at 50–100 mL/ha + Uptake® oil at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*). Application rate depends on weed size, adjuvant type and mix partner; refer to label. Apply from second-node stage to before crop flowering. Do not apply it in mixture with diflufenican (e.g. Brodal® Options) as crop yellowing can occur – separate applications are recommended. Withholding periods are not required when used as directed.

Field pea growers targeting the European Union market are advised to consult with their grain trader before using haloxyfop-R.

- Propaquizafop 100 g/L, Group 1/A, e.g. Shogun® at 200–450 mL/ha + Hasten® or Kwickin® at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*) to control 3-leaf to mid tillering weeds. Use 300 mL/ha where ryegrass is not the dominant weed. Use higher rate for ryegrass control and for best results wait until 75% of ryegrass has begun tillering. Apply up until 12 weeks before crop harvest.
- Quizalofop-p-ethyl 200 g/L, Group 1/A, e.g. Elantra® Xtreme® or Leopard® 200 at 65–190 mL/ha + Hasten®/ Plantocrop™ at 1% or non-ionic surfactant (e.g. BS1000®, Wetspray®) at 0.2% or non-ionic wetting surfactant (1000 g a.i./L strength) at 0.1% plus a mineral spray oil at 1% (v/v*) to control 3-leaf to early tillering weeds. The selection of rate depends upon the weed species and their size; refer to label. Use higher rate under heavy

weed pressure, and/or when weeds have commenced tillering. Apply up until 9 weeks before crop harvest.

Insect management

- During emergence, monitor crop for red-legged earth mite and lucerne flea.
- Following emergence, monitor crop for pasture looper cutworm.
- During and after flowering, monitor for pea weevil and budworm.
- Budworm can reduce grain quality considerably. The plant is very susceptible to budworm from flowering through to pod fill. Spray if there are one or more grubs per 10 sweeps of a sweep net. Spray before the grubs grow to 1 cm. Controlling large grubs (20–25 mm) is costly, as most of the damage to the crop has already occurred for the grubs to grow to this size.
- At early flowering, spray for pea weevil as the first pods are appearing (10–14 days after flowering begins). Border spraying is an effective strategy in most areas. Control of pea weevil is needed when there is more than one weevil per 100 sweeps of a sweep net (human consumption) or one weevil per 10 sweeps (stock feed).
- Some growers try to control budworm and pea weevil with one spray – very careful monitoring is required for this to be successful.

Disease management

Blackspot is the most serious disease of field pea and can be minimised by:

- sowing field pea at least 500 m from the previous season's pea stubble
- not sowing in paddocks where peas have been grown in the previous 3 years
- sowing crops after 60% or more spores have been released from previous seasons' stubble. The DPIRD Blackspot Manager website provides this information. Refer to <https://www.dpiird.wa.gov.au/businesses/plant-and-crop-farming/grains/pulses/blackspot-field-peas-disease-forecast/#:~:text=The%20Blackspot%20Manager%20is%20a,black%20spot%20may%20be%20higher.>

Refer to Table 11 for foliar fungicide recommendations.

*v/v = volume by volume of final spray solution.

Table 11: Foliar fungicides for field pea crops in WA

Active ingredient	Example product	Group	Disease				Withholding period (weeks)		Special comments
			Blackspot	Downy mildew	Botrytis grey mould	Powdery mildew	Harvest	Graze	
Azoxystrobin (200 g/L) + Cyproconazole (80 g/L)	Amistar® Xtra	11 + 3	–	400–800 mL	–	–	8	4	Do not apply after 50% of pods on main spike have reached typical length (BBCH 75)
Chlorothalonil (720 g/L)	Bravo® Weather Stik®, Barrack Betterstick®, Nufarm Unite® 720	M5	–	–	1.1–1.8 L	–	2	² (check label for export lambs and livestock that may be used to produce milk for human consumption)	–
Chlorothalonil (900 g/kg)	Sipcam Echo® 900 WDG	M5	–	–	0.9–1.5 kg	–	2	² (check label for export lambs and livestock that may be used to produce milk for human consumption)	–
Mancozeb (750 g/kg)	Dithane® Rainshield® Neo Tec®	M3	1.0–2.2 kg	1.0–2.2 kg	–	–	⁴ (check label)	2	–
Mancozeb (625 g/kg) + Zn as EDTA (17.3 g/kg)	Manic WG Plus®	M3	1.2–2.64 kg	1.2–2.64 kg	–	–	1	2	Less effective on BGM than alternative products.
Pydiflumetofen (100 g/L) + fludioxonil (150 g/L)	Miravis® Star	7 + 12	–	750–1,000 mL	–	–	Not required when used as directed	6	Less effective on BGM than alternative products.
Prothioconazole (150 g/L) + bixafen (75 g/L)	Aviator® Xpro®	3 + 7	600 mL	–	–	–	Not required when used as directed	5	Do not apply more than twice per crop. Apply up to the end of flowering
Tebuconazole (430 g/L)	Orius® 430 SC	3	–	–	–	145 mL	3 days	3 days	Do not apply after early flowering in field pea
Tebuconazole (370 g/L) + azoxystrobin (222 g/L)	Veritas® Opti	3 + 11	400–540 mL	400–540 mL	–	–	4	4	–
Azoxystrobin (625 g/L) tank mix with tebuconazole (430 g/L)	Mirador 625 tank mix with Orius 430 SC	3 + 11	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	–	–	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses

Marketing

- Field peas find a ready market as a component in animal feed rations due to their high lysine content.
- Given WA's time of harvest and geographic location, varieties that can be split can be sold as whole seed to South-East Asia and the Indian subcontinent for human consumption.
- Field pea can be delivered to CBH in some locations.
- Buyers of field pea are readily available in Perth and Esperance.

Crop-topping

- Paraquat 250 g/L, Group 22/L, for example, Gramoxone® or Shirquat® at 400 or 800 mL/ha. Use of higher rate is usually more reliable and provides a greater reduction in annual ryegrass seed set.
- Spray the crop when the annual ryegrass is at the optimum stage; that is, when the last annual ryegrass seed heads at the bottom of the plant have emerged, and most plants are at or just past flowering (with anthers present or glumes open) but before haying off is evident – usually October to November.
- Reduction in crop yield can occur (more than 25%) especially if the crop is less advanced relative to the ryegrass; i.e if crops have mostly green immature pods. The higher-label rate can exacerbate any yield reduction. Do not harvest within 7 days of application.

Desiccation

- Diquat 200 g/L, Group 22/L, e.g. Reglone® at 2–3 L/ha. Spray as soon as the crop has reached full maturity.
- Glyphosate, Group 9/M, several glyphosate formulations are registered as a harvest-aid and for the control of annual weeds, including Crucial® (600 g/kg) at 0.6–1.6 L/ha, Genfarm Panzer® 450 (450 g/L) at 0.81–2.2L, Raze® (510 g/L) at 0.335–1.2 L/ha, Roundup Ready® Herbicide with PLANTSHIELD® (690 g/kg) at 0.53–1.4 kg/ha, Roundup UltraMax® (570 g/L) at 0.645–1.7 L/ha, and Weedmaster® DST® (470 g/L) at 0.77–2.0 L/ha. Apply when field pea seeds turn yellow and average seed moisture content is below 30%. Application before this time could significantly reduce yields (in practice, losses higher than 25% can occur). Use lower rate if ryegrass is

flowering and higher label rate if ryegrass is at milky dough stage. Use higher label rates where crops or weeds are dense and faster desiccation is required. Do not use on crops intended for seed or sprouting. Do not harvest within 7 days of application. Not all glyphosate products are registered for this use; refer to the registered product labels.

- Pyraflufen-ethyl 25 g/L, Group 14/G, e.g. Sledge® at 200 mL/ha, alone or in mixture with the label rate of paraquat (e.g. Inferno®) or glyphosate (e.g. Raze®), is registered as a harvest-aid and for reduction in seed-set and viability of weed seeds. Compared to pyraflufen-ethyl alone, the tank mixture of pyraflufen-ethyl and paraquat or glyphosate may improve harvest efficiency, weed control and reduce seed-set and viability of weed seeds. Apply to field pea at or after seed moisture is less than 30%, typically when the pods are leathery, and the lower 75% of pods are brown with firm seeds. For maximum weed-seed-set reduction, weeds should preferably be sprayed at full flowering stage, but adhere to crop growth stage to minimise yield losses. Do not apply less than 7 days before harvest.
- Saflufenacil 700 g/kg, Group 14/G, e.g. Sharpen® WG at 34 g/ha in mixture with recommended label rate of glyphosate or paraquat plus 1% Hasten® or high-quality methylated seed oil (MSO). Apply when lower 75% of pods are brown with firm seeds and leathery pods or at 30% seed moisture. Applications made before the recommended growth stage could result in grain yield losses. Do not harvest within 7 days of application.

Harvesting

- As field pea lodges at maturity, crop lifters or pea pluckers are often required. In recent years, growers with harvesters with good height control have successfully harvested semi-leafless field pea using only the reel to bring the crop in, significantly reducing the amount of soil brought into the harvester.
- Field pea is easily threshed, so concave clearances should be opened, and the drum speed reduced.
- Every second wire and blanking plates on the concave may need to be removed.

Refer to Table 12.

Table 12: Suggested harvest settings or modifications for trailing and semi-leafless field pea

Plant type	Trailing e.g. Parafield	Semi-leafless sugar pod varieties e.g. Kspa
Harvest timing	Cool conditions At beginning of program	Warm conditions – sugar pod plant trait makes the vines ropery and hard to thresh and chop in cool damp conditions Harvest may be delayed provided pea weevil management and marketing is not compromised
Crop lifters	Essential	May be possible to remove lifters if crop is upright, resulting in less dirt in sample
Finger tyne adjustment	Tilted back slightly to assist lifting of material	Set in vertical position to force material down and onto draper fronts
Reel speed	1.1 times ground speed	1.0–1.3 times ground speed
Raised cross auger	Not required in most crops	Essential for draper fronts Improves speed of harvest of pluckers
Raised cross auger with paddles on middle section	Not required in most crops	–
Lupin breakers	Not required in most crops	Useful addition to raised cross auger for draper fronts and table auger for conventional fronts Essential addition for table auger of plucker fronts if no raised cross auger fitted
Position of broad elevator feeder house auger	Set back	Moving the feeder house auger forward may reduce blockages
Stripper plate	–	Thought to be a useful addition to stop material building up behind raised cross augers and going over the rear of the table
Flexible fingers above plucker	Useful addition	Useful addition
Wire fence across back of fronts	Useful addition	May assist in light crops but not a reliable method compared to raised cross auger fitted with paddles
Crop dividing coulters	Useful addition	Most setups will benefit
Drum or rotor speed	Low (300–600rpm)	Low (300–600rpm)
Engine capacity		More power required
Concave	Easy to thresh 10–25mm	Ensure concave wire gaps are at least 7mm and not blocked. The extra time taken for the increased dry matter to be threshed when sieves are blocked may lead to seed damage.
Fan speed	60–75%	60–75%
Screens	Crop is likely to pick up dirt; fit screens to remove dirt wherever possible	Correct screen size is required, or damage will occur due to increased threshing time
Top sieve	20–25mm	20–25mm
Bottom sieve	10–15mm	10–15mm
Straw chopper	Useful addition	Essential due to the ropery nature of the vine

Further reading

GRDC GrowNotes: <https://grdc.com.au/resources-and-publications/grownotes>



Lentil

Introduction

There is a small but rapidly expanding lentil industry developing in the Esperance Port Zone. Growers have had success sowing lentils in mid to late April, which has resulted in rapid growth and good yields of 1.4–2.5 t/ha in recent years. Lentil can also produce good yields when sown in May – albeit with much slower growth.

Lentil grows best on soils with a pH above 5.2. The crop is particularly susceptible to transient waterlogging. Growers should expect to see more crop variability across paddocks than in most other crops.

There have been issues with herbicide damage on WA soils. Growers are encouraged to seek advice before growing lentil and to choose paddocks with a low burden of broadleaf weeds.

Modern harvester fronts have made harvesting easier, but it is still important to have clean paddocks and to roll the lentils to ensure a flat surface and minimise header damage.

As WA has only recently recommenced growing lentils, disease pressure is low. However, most growers budget one or 2 fungicide sprays from canopy closure onwards.

As of March 2025, India has imposed an 8% tariff on lentils produced in Australia.

Recent releases

GIA Colombo was released by PB Seeds on behalf of Grains Innovation Australia in Spring 2025, with seed available in 2026. GIA Colombo is a large seeded, red, imidazolinone (IMI) tolerant lentil. It is mid to late flowering, and mid maturing, suited to longer growing season environments. GIA Colombo is rated resistant to moderately resistant to *Ascochyta* blight (Hurricane Virulent) and has

good botrytis and nematode resistance. An EPR of \$5.94 (GST inclusive) per tonne applies.

ALB Burdett is a non-IMI tolerant red lentil released in 2025 for WA. It is early flowering and maturing, moderately resistant to moderately susceptible to *Ascochyta* blight (Hurricane Virulent) and has improved resistance to shattering and lodging. ALB Burdett is intolerant of boron. The variety is being marketed as a potential replacement for PBA Bolt in the Esperance region (Agzone 5) where it outperforms PBA Bolt from early sowing. ALB Burdett is licensed to Seednet and will be available for purchase in 2026.

ALB Dane was released in 2025. It is a large seeded IMI tolerant lentil, broadly adapted to Australian lentil growing regions. ALB Dane has good early vigour, mid to late flowering and maturity and is moderately resistant to lodging, pod drop and shattering. It is moderately resistant to Hurricane Virulent *Ascochyta* blight and is moderately tolerant of salinity. ALB Dane is licensed to Seednet and will be available for purchase in 2026. An EPR of \$6.16 (GST inclusive) applies.



Lentil

What variety should I grow?

PBA Bolt is the most widely grown variety in WA, particularly in the Esperance mallee. Growers have commented favourably on its harvestability and capacity to perform on soils with a sodic subsoil with elevated levels of boron. In recent years, WA grown PBA Bolt has been readily accepted by overseas markets. PBA Bolt is available for grower-to-grower sales if registered directly with PB Seeds.

In other parts of WA, varieties with tolerance to applied IMI herbicides, and reduced sensitivity to residual levels of IMI and sulfonylurea herbicides,

such as the PBA XT and GIA varieties, outperform PBA Bolt. Dual herbicide tolerance (IMI and metribuzin) is also available, providing expanded production and weed control options, particularly on light textured soils.

In recent years it has been an advantage to wait for market acceptance of new varieties in the eastern states before adopting new lines in WA.

Growers should note that due to variations in seed size and colour, not all lentil varieties can be co-mingled. Similarly, not all varieties are sought after by WA marketers – therefore it is vital that growers talk to potential buyers before committing to a variety.

Grain yield of lentil varieties

Refer to Tables 1 to 3.

Table 1: Grain yield of lentil varieties in AGZONE 1 and AGZONE 3 expressed as percentage of site mean yield for each trial year (2020–21)

Agzone	Agzone 1		Agzone 3
Year	2020	2021	2021
Site mean yield (t/ha)	1.66	1.57	2.13
No. of trials	(1)	(1)	(1)
Conventional lentil			
Nipper	60	–	–
PBA Ace	97	–	–
PBA Blitz	92	98	86
PBA Bolt	102	100	104
PBA Jumbo2	113	106	99
Imidazolinone-tolerant lentil			
ALB Terrier	–	108	104
GIA Leader	88	98	95
GIA Lightning	121	109	114
GIA Thunder	129	113	109
PBA Hallmark XT	94	96	99
PBA Highland XT	106	101	103
PBA Hurricane XT	97	100	97
PBA Kelpie XT	102	101	91
Dual-herbicide tolerant lentil			
GIA Metro	–	73	65
GIA Sire	–	76	87

Source: NVT, nvt.grdc.com.au

Note: The NVT in Agzone 1 in 2023 had very low yields and in 2022 was impacted by disease, so results have been withheld. There has not been an NVT in Agzone 3 since 2021

Table 2: Grain yield of lentil varieties in AGZONE 2 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		1.48	1.69	1.86	0.65	1.39	1.41
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(5)
Conventional lentil							
ALB Burdett	(1)	–	–	–	–	107	–
Nipper	(3)	64	–	86	66	–	–
PBA Ace	(3)	83	–	84	107	–	–
PBA Blitz	(3)	70	97	90	–	–	–
PBA Bolt	(5)	95	95	94	105	112	100
PBA Jumbo2	(5)	104	109	108	99	98	104
Imidazolinone-tolerant lentil							
ALB Dane	(2)	–	–	–	131	83	–
ALB Terrier	(4)	–	111	108	107	94	105
GIA Colombo	(1)	–	–	–	115	–	–
GIA Leader	(5)	98	100	97	97	92	97
GIA Lightning	(5)	114	106	105	117	109	110
GIA Thunder	(5)	120	115	115	111	99	112
PBA Hallmark XT	(5)	106	99	103	98	90	99
PBA Highland XT	(5)	104	99	103	102	102	102
PBA Hurricane XT	(5)	96	101	98	97	99	98
PBA Kelpie XT	(5)	86	101	100	87	104	96
Dual-herbicide tolerant lentil							
GIA Metro	(4)	–	77	73	60	83	73
GIA Sire	(4)	–	75	90	79	86	83

Source: NVT, nvt.grdc.com.au

Table 3: Grain yield of lentil varieties in AGZONE 5 expressed as percentage of site mean yield for each trial year (2020–24) and the weighted average over the 5-year period (where there are 4 or more observations)

Year		2020	2021	2022	2023	2024	2020–24
Site mean yield (t/ha)		0.52	1.77	1.13	0.78	0.83	1.01
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(5)
Conventional lentil							
Nipper	(3)	68	–	79	70	–	–
PBA Ace	(3)	82	–	94	87	–	–
PBA Blitz	(3)	78	78	102	–	–	–
PBA Bolt	(5)	110	98	118	104	98	106
PBA Jumbo2	(5)	89	100	90	106	108	99
Imidazolinone-tolerant lentil							
ALB Dane	(2)	–	–	–	120	93	–
ALB Terrier	(4)	–	109	83	103	101	99
GIA Colombo	(1)	–	–	–	109	–	–
GIA Leader	(5)	90	101	83	88	93	91
GIA Lightning	(5)	113	110	111	114	101	110
GIA Thunder	(5)	97	110	92	116	109	105
PBA Hallmark XT	(5)	103	104	94	97	99	99
PBA Highland XT	(5)	108	101	109	107	104	106
PBA Hurricane XT	(5)	93	97	94	96	99	96
PBA Kelpie XT	(5)	84	87	98	100	110	96
Dual-herbicide tolerant lentil							
GIA Metro	(4)	–	73	75	50	83	70
GIA Sire	(4)	–	92	112	83	95	96

Source: NVT, nvt.grdc.com.au

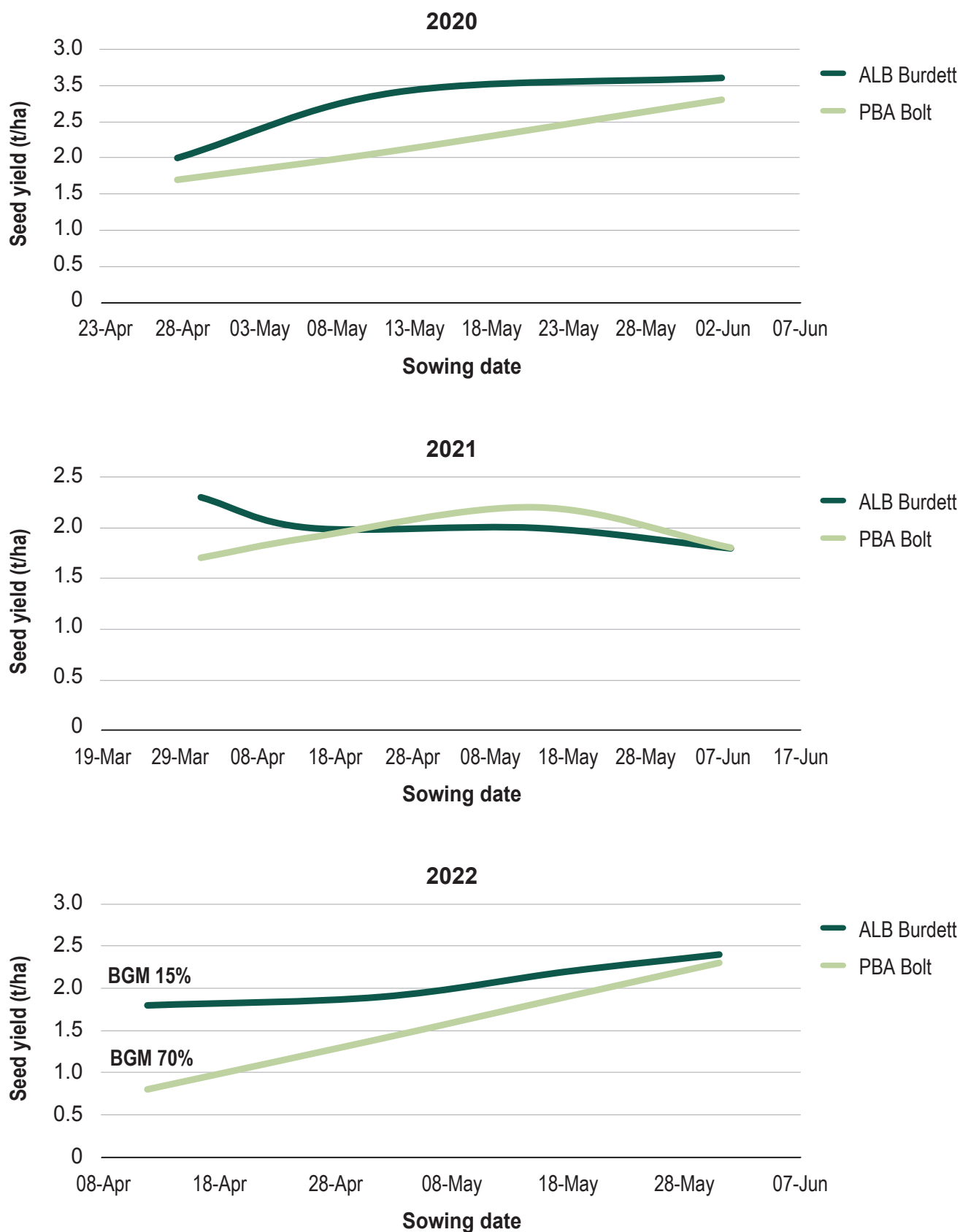


Figure 1: Comparison of ALB Burdett and PBA Bolt in time of sowing experiments conducted in the medium to low rainfall (Agzone 5) sites at Grass Patch (2020 and 2021) and Mt Ridley (2022, Botrytis Grey Mould [BGM] rated as % of plot affected in August).

Source: Mark Seymour DPIRD

Lentil variety characteristics

Table 4: Agronomic characteristics of lentil varieties suited to WA

Variety	Market category	Seed shape	Flowering time	Maturity	Lodging
ALB Burdett	Medium red	Lens	Early	Early	MR
ALB Dane	Large		Mid-Late	Mid-Late	MRMS
ALB Terrier	Small red	Round	Mid	Mid	MRMS
GIA Colombo	Large red	Lens	Mid-Late	Mid	MR _p
GIA Leader	Medium red	Lens	Mid-Late	Mid-Late	MR
GIA Lightning	Small red	Round	Mid-Late	Mid	MR
GIA Metro	Large red	Lens	Late	Mid-Late	MR
GIA Sire	Small red	Round	Mid-Late	Mid	MR
GIA Thunder	Small red	Round	Mid	Mid	MRMS
PBA Bolt	Medium red	Lens	Early-Mid	Early-Mid	R
PBA Hallmark XT	Medium red	Lens	Mid	Mid	MR
PBA Highland XT	Small red	Round	Early	Early-Mid	MR
PBA Hurricane XT	Small red	Round	Mid	Mid	MR
PBA Jumbo2	Large red	Lens	Mid	Mid	MRMS
PBA Kelpie XT	Large red	Lens	Mid	Mid	MR

Source: ALB, PBA and GIA Variety Fact Sheets

MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, R = Resistant. _p = provisional rating

No variety is immune to disease, and fungicide application could be required under severe disease pressure.

Table 4: Agronomic characteristics of lentil varieties suited to WA

Variety	Botrytis grey mould	Ascochyta blight (Hurricane Virulent)	Ascochyta blight (Nipper Virulent)	Nematode resistance # (<i>Pratylenchus neglectus</i>)
ALB Burdett	MS _p	MRMS _p	R _p	MRMS
ALB Dane	MRMS	MR _p	R _p	MRMS
GIA Colombo	MRMS _p	RMR _p	R _p	MR _p
ALB Terrier	MRMS	MR _p	R _p	MRMS
GIA Leader	MRMS _p	MR	MR	MRMS
GIA Lightning	MS	MRMS _p	R _p	MRMS _p
GIA Metro	MRMS	RMR	MR	MRMS
GIA Sire	MS	MRMS _p	R _p	MRMS
GIA Thunder	MRMS	MRMS _p	R _p	MRMS
Nipper	MRMS	MR	MRMS	RMR
PBA Ace	MS	MR	R	MR
PBA Bolt	S	MRMS	MR	MR
PBA Hallmark XT	MRMS	MRMS	RMR	MR
PBA Highland XT	MS	MR	MR	MRMS
PBA Hurricane XT	S	MRMS _p	RMR	MRMS
PBA Jumbo2	MR	RMR	R	MR
PBA Kelpie XT	MS	MRMS	MRMS	MR

Source: NVT, nvt.grdc.com.au and Agriculture Victoria

S = Susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, RMR = Resistant to moderately resistant, R = Resistant. _p = provisional rating

Nematode resistance ratings have not been tested in WA and should be used as a guide only.

Table 6: Lentil tolerance to soil conditions

Variety	Boron	Salinity
ALB Burdett	I	MT
ALB Dane	MI _p	MT _p
ALB Terrier	MI	MI
GIA Colombo	I _p	I _p
GIA Leader	I _p	I _p
GIA Lightning	MI	MI
GIA Metro	I	I
GIA Sire	I	MI _p
GIA Thunder	MI	MI
PBA Bolt	MI	MI
PBA Hallmark XT	I	MI
PBA Highland XT	I	MI
PBA Hurricane XT	I	I
PBA Jumbo2	MI	I
PBA Kelpie XT	I	MI

Source: ALB, PBA and GIA Variety Fact Sheets

MI = Moderately intolerant, I = Intolerant. _p = provisional rating

Below: Ron Longbottom in his lentil crop at Grass Patch



Lentil agronomy guide

Paddock selection

- Relatively flat without rocks or large stones.
- Well drained loamy sands to clay loams with a pH above 5.2 (CaCl₂).
- Avoid sulfonylurea (SU) or Lontrel® (clopyralid) herbicide residues, except for varieties with specific tolerance, e.g. GIA Sire.
- A low broadleaf weed burden – avoid paddocks with a history of vetch.
- Avoid paddocks prone to waterlogging.
- XT varieties have improved tolerance to SU residues.

Rotation

- One in 3 years.
- Avoid lentil, chickpea, vetch, or faba bean stubble – at least 500m away from previous year's stubble.

Sowing window

Table 7: Recommended sowing times for lentils in WA

Rainfall	Suggested sowing date
Low and medium	April 15 to end of May Best results when sown early, but this increases frost risk
High	Delay seeding (late May to 20 June) to reduce disease risk Lentils might not be the best crop choice as they are very susceptible to waterlogging

Target density and seeding rate

100–110 plants/m². Recommended plant density provides better competition with weeds than lower densities and aids efficient harvest:

- small-seeded varieties (PBA Highland XT, GIA Lightning) 35–40 kg/ha
- medium-sized varieties (PBA Bolt) 40–50 kg/ha
- large-seeded varieties (PBA Jumbo2) 50+ kg/ha.

Always check seed size and germination percentage as both vary widely from year to year.

Seeding depth

- 4–6cm.

Row spacing

- There is similar yield response on a wide range of row spacings. Inter-row sowing between the previous year's cereal rows can assist harvest and has been shown to increase yields by 10%.

Rhizobia

- Group E inoculum.

Fertiliser

- Maintenance of 5–10 kg/ha of phosphorus, which can be applied with compounds containing nitrogen (MAP, DAP, Agras etc.) or as single superphosphate.

Rolling

- Rolling the paddock after sowing improves harvest efficiency and reduces the risk of harvester damage.
- Lentils can be rolled after sowing but before crop emergence or post-emergent at the 3–5 leaf stage.
- Depth of sowing, seeding systems (furrow sowing, harrows etc.) and time of rolling can alter the safety of herbicides.
- Rolling post-emergent is preferred on lighter soil types to reduce wind erosion risk and improve crop safety from herbicides applied immediately before sowing.

Weed control

A range of herbicides are registered on lentils in WA. It is advisable to check labels of specific herbicide products for rates, crop and weed growth stages for application, recommended surfactants and oils, withholding and plant-back periods etc.

Pre-seeding and incorporated-by-sowing (IBS) herbicides

- Carbetamide 900 g/kg, Group 23/E, e.g. Ultro® 900 WG at 1.1–1.7 kg/ha. Apply the lower rate on sandy soils and where lower weed densities are expected. Apply the higher rate on heavier soils and where the weed density is expected to be moderate to high. Do not apply carbetamide pre-sowing if planting with a disc seeder, as greater contact between the germinating seed and herbicide may reduce crop safety.
- Cyanazine 900 g/kg, Group 5/C, e.g. Bladex® at 1.1 kg/ha. Do not use on sand or sandy loam soils as crop damage may result. Where annual ryegrass and wireweed are a major problem, add pendimethalin at the recommended rates. Do not add anti-evaporant spraying oils.
- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 0.83–1.1 kg/ha. Use lowest rate or consider alternatives to avoid damage on lighter soil types.
- Flumioxazin 500 g/kg, Group 14/G, e.g. Terrain® at 120 g/ha. Do not use on lighter soil types (sand) as shorter periods of residual control and unacceptable crop damage may occur. Avoid rolling the paddock before lentil emergence as it can reduce crop establishment.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.0 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Pendimethalin 440 g/L, Group 3/D, e.g. Stomp® at 1.5–2.25 L/ha. Use the lower rates on light textured soils and the higher rates on medium to heavy textured soils.
- Prosulfocarb 800 g/L (Group 15/J) + s-metolachlor 120 g/L (Group 15/K), e.g. Boxer Gold® at 2.5 L/ha.
- Propyzamide 900 g/kg, Group 3/D, e.g. Edge® 900 WG at 0.56–1.1 kg/ha. Use higher rates on heavy soils under sub-optimal conditions or where a heavy grass population is expected.
- Pyroxasulfone 850 g/kg, Group 15/K, e.g. Sakura® at 118 g/ha.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha. Sow lentil at least 3 cm and preferably 5 cm deep using knife points and press wheels only. Do not use on light soils (i.e. sandy loams to loamy sands, less than 40% clay). Use the lower rate on light weed infestations. Rates higher than 0.86 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.
- Terbutylazine 600 g/kg (Group 5/C) + propyzamide 300 g/kg (Group 3/D), e.g. Effigy® 900 WG at 1.25–1.75 kg/ha. Do not use on sandy loam to loamy sand soils with less than 40% clay. Use higher rates on heavier soils like loams (silt plus clay 40–60%). Sow crop at least 5 cm deep. Rates higher than 1.25 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage.

Post-sowing pre-emergent (PSPE) herbicides

- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 0.55–0.83 kg/ha. Rolling before spraying can improve crop safety. Use lowest rate or consider alternatives to avoid damage on lighter soil types.
- Imazethapyr 700 g/kg, Group 2/B, e.g. Genfarm Imazethapyr at 70 g/ha on IMI-tolerant varieties only; refer to label. Some of the weeds will not be completely controlled, but will be suppressed enough to be uncompetitive with the crop.
- Metribuzin 750 g/kg, Group 5/C, e.g. Stacato® at 180–380 g/ha. Rolling before spraying can improve crop safety. Consider alternatives to avoid damage on lighter soil types or use a lower rate on light sandy soils and higher label rates on heavy clay-loam soils. Crop should be sown at least 5 cm deep. Crop vigour may be reduced, especially if heavy rain falls after spraying. Weeds should be from pre-emergence to 3-leaf stage, except wireweed (Hogweed), which should not be beyond the cotyledon stage.

Post-emergent herbicides for broadleaf weed control

- Diflufenican 500 g/L, Group 12/F, e.g. Brodal® Options at 100–200 mL/ha. Application window is between third leaf and start of crop flowering. For wild radish, hedge mustard, Indian hedge mustard and wild turnip, apply diflufenican 500 at 100 mL, 150 mL and 200 mL/ha for control of up to 2, 4 and 6-leaf stage weeds respectively. For suppression of capeweed apply up to 4-leaf stage at 200 mL/ha rate.
- Flumetsulam 800 g/kg, Group 2/B, e.g. Broadstrike® at 25 g/ha + Uptake® oil at 0.5% or BS1000® at 0.2% (v/v*). Do not apply later than 6 weeks after crop emergence, i.e. 4–8 fully expanded leaves of crop. Flumetsulam may cause transient height reduction, crop discolouration and delayed flowering without yield reduction in most situations.
- Imazamox 33 g/L + imazapyr 15 g/L, Group 2/B, e.g. Intercept® at 375–750 mL/ha + Nufarm CanDo™ Spray Adjuvant at 0.5% (v/v*) for XT (IMI-tolerant) varieties only. Apply at 3–6 leaf/node stage of crop to target 2–4 leaf stage grass weeds.
- Metribuzin 750 g/kg, Group 5/C, e.g. Mentor® at 180–380 g/ha. A permit (PER92810) with validity up to 31 December 2025 is in place for using metribuzin post-emergent from 3 to 6 node lentil growth stage (BBCH 13-16) on metribuzin-tolerant lentil varieties like GIA Metro only. The herbicide rate is influenced by soil type; refer to the permit. Adhere to the permit conditions for optimum herbicide efficacy and crop safety. At the time of this publication, this permit was under consideration for renewal by APVMA. Users must ensure that an up-to-date permit is available for this use pattern prior to application in the 2026 season.

Post-emergent herbicides for grass weed control

Lentil markets have low tolerance for cereals, therefore include products in grass selective mixes that control volunteer cereals.

- Butoxydim 250 g/kg, Group 1/A, e.g. Factor® WG at 80–180 g/ha + Supercharge® Elite® at 1% (v/v*) to control 2-leaf to early tillering weeds. The lower rates are for younger weeds growing actively under ideal conditions. The

higher rates are for weeds that are at early tillering stage, or in dense populations, or growing in poor growing conditions. For improved control of ryegrass and other grass weeds, butoxydim must be combined with clethodim or fop herbicide containing fluazifop-p, haloxyfop-R, propaquizafop or quizalofop. Do not apply at flowering stage of crop.

- Clethodim 240 g/L, Group 1/A, e.g. Select® or Status® at 150–500 mL/ha + D-C-Trate® at 2% or Hasten® at 1% or Kwickin® at 1% or Uptake® oil at 0.5% (v/v*) to control 2-leaf to fully tillered grass weeds; refer to label. The lower rates will provide effective control if applied under ideal conditions to weeds that are smaller, actively growing and free from temperature or water stress. Apply up to the 7-node/early branching of lentils.
- Haloxyfop-R 520 g/L, Group 1/A, e.g. Verdict® at 50–100 mL/ha + Uptake® oil at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*). Application rate depends on weed size, adjuvant type and mix partner; refer to label. Apply from second-node to pre-flowering crop growth stages. Do not apply haloxyfop-R in mixture with broadleaf weed herbicides, and apply these at least a week apart. Withholding periods are not required when used as directed.

Lentil growers targeting the European Union market are advised to consult with their grain trader prior to the use of haloxyfop-R.

- Propaquizafop 100 g/L, Group 1/A, e.g. Shogun® at 200–450 mL/ha + Hasten® or Kwickin® at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*) to control 3-leaf to mid tillering weeds. Use 300 mL/ha where ryegrass is not the dominant weed. Use higher rate for ryegrass control and for best results wait until 75% of ryegrass has begun tillering. Apply up until 12 weeks before crop harvest.
- Quizalofop-p-ethyl 200 g/L, Group 1/A, e.g. Elantra® Xtreme® or Leopard® 200 at 65–190 mL/ha + Hasten®/ Plantocrop™ at 1% or non-ionic surfactant (e.g. BS1000®, Wetspray®) at 0.2% or non-ionic surfactant (1000 g a.i./L strength) at 0.1% plus a mineral spray oil at 1% (v/v*) to control 3-leaf to early tillering weeds. The selection of rates depends upon the weed species and their size; refer to label. Use a higher rate under heavy weed pressure, and/or when weeds have commenced tillering. Apply up until 12 weeks before crop harvest.

*v/v = volume by volume of final spray solution.

Aphid threshold

- More than 30% of plants colonised.

Insect management

- One budworm caterpillar per 30 sweeps – very low threshold compared to other pulse crops.

Disease management

Numerous foliar fungicide products are registered for control of foliar diseases in lentils; refer to Table 8.

Botrytis grey mould (BGM)

- BGM is the most likely disease in WA lentil crops. Regular crop monitoring and protection will be required in high-risk situations, e.g. immediately adjacent to last year's crop; in bulky, dense canopies sown with narrow row spacing; non-optimal paddock selection (e.g. waterlogging); high disease pressure the previous year; a susceptible variety is planted; or lentil has been grown on the paddock in the past 2 years.

- Varieties vary in their susceptibility to BGM.
- The best time to apply the first fungicide for BGM is just before canopy closure, which occurs about 12 weeks after sowing. Follow-up applications can be required during early to mid-flowering to maintain protection, depending on growth, seasonal conditions and the varietal susceptibility (R and MR varieties might not require follow-up sprays in low-risk situations). Depending on seasonal conditions, further sprays can become necessary through pod fill.

Ascochyta blight

Most lentil varieties grown in WA are rated moderately resistant to moderately susceptible (MRMS) or higher for resistance to ascochyta, therefore early sprays might not be required.

Monitor crops. Spraying can be required during podding to produce clean seed.

Visit Pulse Australia web site to find latest fungicide product information – www.pulseaus.com.au/growing-pulses/crop-protection-products



Table 8: Foliar fungicides for lentil crops in WA

Active ingredient	Example product	Group	Disease			Withholding period (weeks)		Special comments
			Ascochyta blight	Botrytis grey mould	Sclerotinia	Harvest	Graze	
Azoxystrobin (200 g/L) + cyproconazole (80 g/L)	Amistar® Xtra	11 + 3	400–600 mL	400–600 mL	–	8	4	Do not apply after 50% of pods on main spike have reached typical length (BBCH 75)
Boscalid (500 g/kg)	Filan®	7	600 g	600 g	600 g	3	3	Permit conditions of use: https://permits.apvma.gov.au/PER82476.PDF ; permit valid until 31 May 2027
Carbendazim (500 g/L)	Spin Flo® – Nufarm	1	–	500 mL	–	4	4	–
Chlorothalonil (720 g/L)	Bravo® Weather Stik®, Barrack Betterstick®, Nufarm Unite® 720	M5	1.0–2.0 L	1.0–2.0 L	–	2	2	–
Chlorothalonil (900 g/kg)	Sipcam Echo® 900 WDG	M5	0.8–1.6 kg	0.8–1.6 kg	–	2	2	Only some chlorothalonil products are registered in lentil, so check labels
Mancozeb (750 g/kg)	Dithane® Rainshield® Neo Tec®	M3	1.0–2.2 kg	1.0–2.2 kg	–	4 (check label)	2	Less effective on BGM than alternative products
Mancozeb (625 g/kg) + Zn as EDTA (17.3 g/kg)	Manic WG Plus®	M3	1.2–2.64 kg	1.2–2.64 kg	–	1	2	Less effective on BGM than alternative products
Pydiflumetofen (100 g/L) + fludioxonil (150 g/L)	Miravis® Star	7 + 12	250–500 mL	750–1,000 mL	750–1,000 mL	Not required when used as directed	6	Do not apply more than twice per crop. Apply up to the end of flowering.
Procymidone (500 g/L)	Fortress® 500, Sumisclex® 500	2	–	500 mL	–	3	3	
Prothioconazole (150 g/L) + bixafen (75 g/L)	Aviator® Xpro®	3 + 7	400–600 mL	400–600 mL	–	Not required when used as directed	5	Do not apply after early flowering in lentil.
Tebuconazole (370 g/L) + azoxystrobin (222 g/L)	Veritas® Opti	3 + 11	400–540 mL	400–540 mL	–	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses
Azoxystrobin (625 g/L) tank mix with tebuconazole (430 g/L)	Mirador 625 tank mix with Orius 430 SC	3 + 11	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	–	4	4	–

Crop-topping

- Paraquat 250 g/L, Group 22/L, e.g. Gramoxone® or Shirquat® at 400–800 mL/ha. The higher rate is usually more reliable and provides a greater reduction in annual ryegrass seed set.
- Spray the crop when the annual ryegrass is at the optimum stage, i.e. when the last annual ryegrass seed heads at the bottom of the plant have emerged, and most are at or just past flowering (with anthers present or glumes open), but before haying off is evident – usually October to November.
- Reduction in crop yield can occur (more than 25%) especially if the crop is less advanced relative to the ryegrass, i.e. if crops have mostly green immature pods. The higher label rate might also exacerbate any yield reduction. Do not harvest within 7 days of application.
- Pyraflufen-ethyl 25 g/L, Group 14/G, e.g. Sledge® at 200 mL/ha, alone or in mixture with the rate of paraquat (e.g. Inferno®) or glyphosate (e.g. Raze®), is registered as a harvest-aid and for reduction in seed-set and viability of weed seeds. Compared to pyraflufen-ethyl alone, the tank mixture of pyraflufen-ethyl and paraquat or glyphosate may improve harvest efficiency, weed control and reduce seed-set and viability of weed seeds. Apply to lentils at or after the crop starts to turn yellow (or senesce), typically when less than 15% of the pods are still green. For maximum weed-seed-set reduction, weeds should preferably be sprayed at full flowering stage, but adhering to crop growth stage is important to minimise yield losses. Do not apply less than 7 days before harvest.
- Saflufenacil 700 g/kg, Group 14/G, e.g. Sharpen® WG at 34 g/ha in mixture with the recommended label rate of glyphosate or paraquat plus 1% Hasten® or high-quality methylated seed oil (MSO). Apply just after crop starts to yellow (or senesce). Sharpen® WG can have a negative effect on lentil germination. Do not use Sharpen® WG on lentil crops for seed production.

Desiccation

- Diquat 200 g/L, Group 22/L, e.g. Reglone® at 2–3 L/ha. Spray as soon as the crop has reached full maturity – more than 50% of seeds have changed colour to yellow-buff.
- Glyphosate, Group 9/M, several glyphosate formulations are registered as a harvest-aid and for the control of annual weeds, including Crucial® (600 g/kg) at 0.6–1.6 L/ha, Genfarm Panzer® 450 (450 g/L) at 0.81–2.2 L/ha, Raze® (510 g/L) at 0.72–1.2 L/ha, Roundup Ready® Herbicide with PLANTSHIELD® (690 g/kg) at 0.53–1.4 kg/ha, Roundup UltraMax® (570 g/L) at 0.645–1.7 L/ha, and Weedmaster® DST® (470 g/L) at 0.77–2.0 L/ha. Apply when crop is physiologically mature and has less than 15% green pods. Use higher label rates where crops or weeds are dense and faster desiccation is required. Do not harvest within 7 days of application. Application to crops intended for seed production might reduce germination percentage to commercially unacceptable levels. Not all glyphosate products are registered for this use; refer to the registered product labels.

Harvesting

- Harvesting reel speed slightly faster than ground speed.
- Table auger 7–10 mm.
- Drum or rotor speed 300–600 rpm.
- Concave clearance 10–12 mm (start at clearance 10 mm).



Vetch

By Mark Seymour and Harmohinder Dhammu (DPIRD), Stuart Nagel (SARDI) and Gregg Kirby (SARDI)

Introduction

Vetch is a multi-purpose crop grown mostly for a disease break in rotation with cereals on a wide range of soil types from light sands to heavier clay soils. The versatility of common vetch varieties (Morava, Rasina, Volga, Timok and Studenica) allows cropping for grain or hay production, early grazing as green pasture or for dry grazing, hay production or green manure. Grain vetches have been grown in low–medium rainfall cereal areas where they have achieved similar grain yields to peas.

Vetch grain is not used for human consumption due to the presence of neurotoxins. Common vetch grain can be used without limit to feed all ruminants and used in pig rations up to a maximum inclusion rate of 20%. Modern varieties such as Studenica, Morava, Rasina, Volga and Timok possess less toxin in grain (<0.65%) compared with older varieties such as Blanchefleur (0.95%) and Languedoc (1.65%).

Forage vetches are used for hay, green manure or mid–late winter feed for grazing. They include purple vetch (*V. benghalensis*, e.g. Barloo) and/or woolly pod vetches (*V. villosa* ssp., e.g. RM4). Grain from woolly pod vetch varieties CANNOT be used to feed any livestock.

Disease management is critical when growing a vetch crop regardless of end use. Where possible, disease-resistant varieties should be planted. The most common disease in WA vetch is Botrytis grey mould (BGM), which favours cool/wet growing seasons with high amounts of vegetative growth. Although there is little difference between vetch varieties in their resistance to BGM, varieties such as Morava, which produce more vegetative growth and have denser canopies, will be more prone to this disease in higher-rainfall areas.

Ascochyta blight occurs in earlier stages of the vetch crop and can reduce grain and dry matter production, but it is less common than BGM in WA. Later in the season rust can also infect common vetch varieties that are not resistant, and damage can occur very quickly in spring. Care must be taken when growing rust-susceptible varieties, as grazing or feeding hay/silage from rust-infected plants can induce abortions in pregnant livestock. Fortunately, newly released common vetch varieties have good resistance to rust.

What variety should I grow?

Pek is the newest common vetch release from the National Vetch Breeding Program (NVBP). It is a mid-maturing variety, with a demonstrated yield improvement (both dry matter and grain) compared to current varieties in South Australia. It has performed well in acid soils down to pH 5.5 and neutral soils. Pek is provisionally rated susceptible to BGM and moderately susceptible to Ascochyta. Limited seed of Pek is available from Alfa Gen for the 2026 season.

Kingsford is a new woolly pod vetch, released by the NVBP in 2025. Kingsford is late flowering, with similar maturity to Capello. It is a soft seeded variety with high dry matter and mid to high rainfall environments. Kingsford has provisional ratings of moderately resistant to Ascochyta and susceptible to botrytis. Seed is available from Synergy Seeds.

Studenica, Morava, Rasina, Volga and Timok are resistant to rust and are the preferred varieties for grain in areas prone to rust infections. Morava's late flowering/maturity results in more variable yield than other vetch varieties, and it is best suited to long seasons.

Studenica was released by the NVBP in 2021 and is the earliest common vetch variety (flowering in about 85–90 days). It has improved winter growth and vigour over existing varieties with better frost tolerance. It is targeted at low-rainfall mixed-farming systems looking to fill the late-winter feed gap. Results of limited testing in WA are presented below, along with more detailed data from South Australia through the NVBP.

See Tables 1 to 3 for performance of vetch varieties in WA trials, and Table 4 for our suggested varieties for different end uses.

Table 5 shows the performance of woolly pod vetch varieties in South Australia over 4 years, and Table 6 agronomic traits and disease resistance ratings of selected vetch varieties.

Table 1: Grain and dry matter yield of grain vetch varieties in WA in 2023

Agzone Location		Agzone 1 Northampton	Agzone 4 Merredin	Agzone 2 Lake Grace	Agzone 5 Wittenoom Hills
Growing season rainfall (May–Oct) (mm)		194	118	187	237
	Variety				
Hay dry matter (t/ha). Cut in September	RM4	5.1	1.3	3.5	5.9
	Volga	5.2	1.0	5.7	8.0
Grain yield (t/ha)	Morava	1.0	0.2	0.7	1.5
	Pek	1.6	0.4	1.0	2.1
	RM4	–	0.2	0.4	1.3
	Studenica	1.4	0.5	0.9	1.8
	Timok	1.4	0.2	1.0	1.9
	Volga	1.7	0.4	1.2	1.9
Total dry matter (t/ha)	Morava	4.4	1.5	6.0	10.2
	Pek	5.9	2.0	7.8	10.0
	RM4	–	1.3	5.9	10.1
	Studenica	3.7	2.1	7.6	8.9
	Timok	4.9	1.6	7.1	8.6
	Volga	5.2	1.8	7.4	9.5

Source: DPIRD

Table 2: Grain and dry matter yield of grain vetch varieties in the West Midlands in 2021 and 2022

Year	2021		2022
Variety	Grain yield (t/ha)	Dry matter in early September (t/ha)	Dry matter (t/ha)
Morava	2.6	3.3	9.3
Studenica	2.4	4.4	7.8
Timok	2.5	3.9	9.5
Volga	2.7	3.6	9.5

Source: Data courtesy of Stuart Nagel, SARDI

Table 3: Grain yield of grain vetch varieties in AGZONES 2, 3 and 5 expressed as percentage of site mean yield for each trial year (2015–18)

Agzone Location		Agzone 2 Cunderdin			Agzone 3 Kojonup		Agzone 5 Grass Patch		Multi-site
Year		2016	2017	2018	2015	2016	2016	2017	2015–18
Site mean yield (t/ha)		1.7	2.5	1.2	1.4	1.2	1.8	2.3	1.7
Variety	(No. trials)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(7)
Morava	(7)	97	109	59	80	125	101	33	86
Timok	(7)	110	107	118	136	96	93	103	109
Volga	(7)	118	114	123	101	95	96	116	109
Rasina	(7)	95	118	–	–	–	–	109	–

Source: PBA and DPIRD

Table 4: Suggested vetch varieties for WA by rainfall zone and usage type

Use	Low	Medium	High	Very high
Late summer/early autumn sown – grazing	RM4	RM4	RM4	RM4
April sown – green manure	RM4	RM4	RM4	RM4
	Morava	Morava	Morava	Morava
April sown – graze and grain	Studenica	Studenica	Morava	Morava
	Volga	Pek	Pek	Pek
	Pek	Timok	Timok	Timok
	Timok	Volga	Volga	–
	Rasina	Rasina	–	–
	–	Morava	–	–
May sown – grain	Studenica	Studenica	Timok	Morava
	Volga	Rasina	Rasina	Timok
	Pek	Pek	Pek	Pek
	Timok	Timok	Morava	–
	Rasina	Volga	–	–

Source: Data courtesy of Stuart Nagel, SARDI

Table 5: Woolly pod vetch dry matter (t/ha) as % of site mean yield (12 sites for 4 years in 450mm+ rainfall in South Australia)

Year		2021	2022	2023	2024
Site mean yield (t/ha)		5.64	6.84	4.81	5.45
Variety	(No. trials)	(4)	(2)	(4)	(2)
Capello	(12)	93	101	91	102
Kingsford	(12)	99	99	104	98
RM4	(12)	94	109	101	103

Source: Data courtesy of Stuart Nagel, SARDI

Table 6: Characteristics of selected vetch varieties

Variety	Maturity	Grain yield	Dry matter yield	Flower colour	Pod shatter (%)	Hard seed (%)	Rust	Ascochyta	Botrytis	BCN (%)
Common vetch (<i>Vicia sativa</i>)										
Morava	Late	High	High	Purple	0	0	R	MS _p	VS _p	0.65
Pek	Mid	High	High	Purple	–	–	R	MS _p	Sp	–
Rasina	Early-mid	High	Mod	Purple	0–2	0	R	Sp	Sp	0.60
Studenica	Very early	High	High	White	0–2	0	R	MR _p	Sp	0.65
Timok	Mid	High	Very high	Purple	0–2	0–2	R	Sp	Sp	0.57
Purple vetch (<i>Vicia villosa subsp. benghalensis</i>)										
Barloo*	Mid	Low	High	Purple	20–30	5–10	R	S	VS	NS
Benatas	Very late	Low	High	Purple	–	–	–	MRMS _p	Sp	NS
Popany	Very late	Low	High	Purple	20–30	5–10	R	MR _p	Sp	NS
Presto	Early	Low	–	Purple	0–2	–	–	–	–	NS
Woolly pod vetch (<i>Vicia villosa subsp. dasycarpa</i>)										
Capello	Late	Low	Very high	Purple	5–10	15–20	R	MR _p	Sp	NS
Haymaker	Late	Low	Very high	Purple	5–10	20–30	R	S	VS	NS
Kingsford	Late	Moderate	Very high	Purple	–	–	R	MR (P)	S (P)	NS
RM4	Mid	Moderate	Very high	Purple	2–5	2–5	R	MR _p	Sp	NS

Source: Data courtesy of Joshua Fanning, Agriculture Victoria

*Also known as Early Purple or Early Popany

VS = Very susceptible, S = Susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, R = Resistant

_p = provisional rating.

BCN = cyanoalanines – which limit their safe use for human consumption and some feed markets

NS = grain is not suitable for consumption



Vetch agronomy guide

Weed control

The following herbicides are registered on different vetch species:

Pre-seeding and incorporated-by-sowing (IBS) herbicides

- Carbetamide 900 g/kg, Group 23/E, e.g. Ultro® 900 WG at 1.1–1.7 kg/ha. Do not apply carbetamide pre-seeding if planting with a disc seeder, as increased contact between the germinating seed and herbicide may reduce crop safety. Apply the lower rate on sandy soils and where lower weed densities are expected. Apply the higher rate on heavier soils and where the weed density is expected to be moderate to high.
- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 0.83–1.1 kg/ha (Common vetch only). Use the lower rate on light sandy soils.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 0.5–1.5 L/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Terbutylazine 875 g/kg, Group 5/C, e.g. Terbyne® Xtreme® at 0.86–1.2 kg/ha. Sow vetch at least 3 cm and preferably 5 cm deep using knife points and press wheels only. Do not use on light soils (i.e. sandy loams to loamy sands, less than 40% clay). Use the lower rate on light weed infestations. Rates higher than 0.86 kg/ha on soils with a pH of 8 or above could cause unacceptable crop damage. Heavy, intense rainfall following application may cause crop damage.
- Trifluralin 480 g/L, Group 3/D, e.g. TriflurX® at 1.7 L/ha.

Post-sowing pre-emergent (PSPE) herbicides

- Diuron 900 g/kg, Group 5/C, e.g. Diurex® WG at 550–830 g/ha (Common vetch only). Use the lower rate on light sandy soils.
- Fomesafen 240 g/L, Group 14/G, e.g. Reflex® at 500–900 mL/ha. Use higher rates where higher weed densities are expected, or longer residual control is required. To reduce the risk of injury to the following crops in rotation (e.g. cereals and canola) on lighter texture and/or non-wetting soils with low organic carbon (0.5% to 1.5%), use a maximum rate of 750 mL/ha. Do not use Reflex® on soils that have less than 0.5% organic carbon.
- Metribuzin 750, Group 5/C, at 180–380 g/ha. The rate is influenced by soil type; refer to label. At the time of application, weeds should be from pre-emergence to 3-leaf stage, except wireweed (Hogweed), which should not be beyond the cotyledon stage.

Post-emergent herbicides for broadleaf weed control

- Flumetsulam 800 g/kg, Group 2/B, e.g. Broadstrike® at 25 g/ha at 3 fully expanded leaves onwards (Purple or Popany vetch only). Do not apply tank-mixed with other herbicides.
- Pyraflufen-ethyl 20 g/L, Group 14/G, e.g. Ecopar® at 800 mL/ha + BS1000® 0.2% (v/v*) at 3–5 crop leaves to control 2–4 leaf stage weeds that are not more than 6 cm in diameter. It is registered only on certain vetch varieties; refer to label.

Post-emergent herbicides for grass weed control

- Butroxydim 250 g/kg, Group 1/A, e.g. Factor® WG at 80–180 g/ha + Supercharge® Elite® at 1% (v/v*) to control 2-leaf to early tillering weeds. The lower rates are for younger weeds growing actively under ideal conditions. The higher rates are for weeds that are at early tillering stage, or in dense populations, or growing in poor growing conditions. For improved control of ryegrass and other grass weeds, it must be combined with fop herbicide containing fluazifop-p, haloxyfop-R, propaquizafop or quizalofop. Do not apply at flowering stage of crop.

*v/v = volume by volume of final spray solution.

- Fluazifop-p 128 g/L, Group 1/A, e.g. Fusilade® Forte at 820 mL/ha for control of actively growing 5-leaf to early tillering weeds.
- Haloxyfop-R 520 g/L, Group 1/A, e.g. Verdict® at 50–100 mL/ha + Uptake® oil at 0.5% or non-ionic wetting agent (e.g. BS1000®) at 0.2% (v/v*). Application rate depends on weed size, adjuvant type and mix partner; refer to label. Apply from second crop leaf to pre-flowering growth stages. Do not apply haloxyfop-R in mixture with broadleaf weed herbicides, and apply these at least a week apart. Withholding periods are not required for seed harvest when used as directed.

Vetch growers targeting the European Union market are advised to consult with their grain trader prior to the use of haloxyfop-R.

- Propaquizafop 100 g/L, Group 1/Ac, e.g. Shogun® at 200–450 mL/ha + Hasten® or Kwickin® at 0.5% or non-ionic wetting surfactant (e.g. BS1000®) at 0.2% (v/v*) to control 3-leaf to mid tillering weeds. Use 300 mL/ha where ryegrass is not the dominant weed. Use higher rate for ryegrass control and for best results wait until 75% of ryegrass has begun tillering. Do not graze or cut for stock food for 3 days after application.
- Quizalofop-p-ethyl 200 g/L, Group 1/A, e.g. Elantra® Xtreme® or Leopard® 200 at 65–190 mL/ha + Hasten®/ Plantocrop™ at 1% or non-ionic surfactant (e.g. BS1000®, Wetspray®) at 0.2% or non-ionic surfactant (1000 g a.i./L) at 0.1% plus a mineral spray oil at 1% (v/v*) to control 3-leaf to early tillering weeds. The selection of rates depends upon the weed species and their size; refer to label. Use a higher rate under heavy weed pressure, and/or when weeds have commenced tillering. Apply up until 12 weeks before crop harvest.

Disease management

Refer to Table 7 for foliar fungicide recommendations.

*v/v = volume by volume of final spray solution.

Crop-topping

- Paraquat 250 g/L, Group 22/L, e.g. Gramoxone® or Shirquat® at 400–800 mL/ha. Use of higher rate is usually more reliable and provides a greater reduction in annual ryegrass seed set.
- Spray the crop when the annual ryegrass is at the optimum stage, i.e. when the last annual ryegrass seed heads at the bottom of the plant have emerged, and most are at or just past flowering (with anthers present or glumes open), but before haying off is evident – usually October to November.
- Reduction in crop yield can occur (more than 25%) especially if the crop is less advanced relative to the ryegrass, i.e. if crops have mostly green immature pods. The higher label rate might also exacerbate any yield reduction. Do not harvest within 7 days of application.

Desiccation

- Glyphosate, Group 9/M, e.g. Crucial® (glyphosate 600 g/kg) at 0.6–1.6 L/ha and Weedmaster® DST® (glyphosate 470 g/kg) at 0.77–2.0 L/ha are registered as a harvest-aid and for control of annual weeds. Apply at or after crop maturity when seed moisture content is below 30%. Use higher label rates where crops or weeds are dense and where faster desiccation is required. Do not use on crops intended for seed production and sprouting. Do not harvest crop within 7 days of application. Not all glyphosate products are registered for this use; refer to the registered product labels.



Table 7: Foliar fungicides for vetch crops in WA

Active ingredient	Example product	Group	Disease			Withholding period (weeks)		Special comments
			Ascochyta blight	Botrytis grey mould	Rust	Harvest	Graze	
Azoxystrobin (200 g/L) + cyproconazole (80 g/L)	Amistar® Xtra	11 + 3	400–800 mL	400–800 mL	400–800 mL	8	4	Do not apply after 50% of pods on main spike have reached typical length (BBCH 75)
Carbendazim (500 g/L)	Spin Flo® – Nufarm	1	–	500 mL	–	4	4	–
Mancozeb (750 g/kg)	Dithane® Rainshield® Neo Tec®	M3	1.0–2.2 kg	1.0–2.2 kg	1.0–2.2 kg	4 (check label)	2	Less effective on BGM than alternative products
Mancozeb (625 g/kg) + Zn as EDTA (17.3 g/kg)	Manic WG Plus®	M3	1.2–2.64 kg	1.2–2.64 kg	1.0–2.2 kg	1	2	Less effective on BGM than alternative products
Pydiflumetofen (100 g/L) + fludioxonil (150 g/L)	Miravis® Star	7 + 12	250–500 mL	750–1,000 mL	–	–	6	Do not apply more than twice per crop. Apply up to the end of flowering
Tebuconazole (370 g/L) + azoxystrobin (222 g/L)	Veritas® Opti	3 + 11	–	400–540 mL	–	4	4	Do not apply more than 1.08 L/ha of Veritas® Opti per season in pulses
Azoxystrobin (625 g/L) tank mix with tebuconazole (430 g/L)	Mirador 625 tank mix with Orius 430 SC	3 + 11	1.2–2.64 kg	150–190 mL Mirador 625 + 350–460 mL Orius 430 SC	–	4	4	–

