

# 2017 SOWING GUIDE



SOUTH AUSTRALIA



**SARDI** SOUTH AUSTRALIAN  
RESEARCH AND  
DEVELOPMENT  
INSTITUTE

National  
Variety  
Trials  
A GRDC INITIATIVE



## WHAT TO SOW NEXT SEASON

> THE ESSENTIAL GUIDE TO THE MOST SUITABLE VARIETIES

[grdc.com.au](http://grdc.com.au)



# SA GRAIN GROWERS FUNDING RESEARCH SOLUTIONS FOR 25 YEARS

SAGIT has invested \$2.3 million in new projects in 2016-17 supporting research crucial to the advancement of the SA grain industry with funds coming from the 30c a tonne contribution on all grain delivered by SA grain growers.

## In 2016-17, SAGIT is supporting 47 projects including:

- Adopting profitable crop sequences in the SA Mallee - Mallee Sustainable Farming
- AgEx Forum - Ag Excellence Alliance
- Agronomic evaluation of durum for crown rot resistance - Southern Australia Durum Growers Association
- Burning weed seeds in low rainfall cropping systems - SARDI
- Common vetch as a break crop for marginal cropping systems - SARDI
- Communicating innovations in Precision Agriculture: Factsheet series - SPAA
- Crown rot resistance in durums - SARDI
- Dual-purpose canola for SA's high rainfall zone - SARDI
- Efficiency of various fertiliser N products on sandy soil types - Agronomy Solutions
- Extension and outreach of SAGIT-funded projects - AgCommunicators
- EP Farming Systems Summary 2016-2018 - EPARF
- Genetic characterisation and exploitation of heat stress tolerant barley germplasm - AGT
- Genetic characterisation and exploitation of heat stress tolerant durum germplasm - AGT
- Getting crop management right for maximum 2016 profits - Agriculture Kangaroo Island
- Grain research internships - SARDI
- Growing durum demand in SA: gross margin sensitivity analysis trials - University of Adelaide
- Hi-tech crop monitoring stations - Agbyte
- Identification of sodicity tolerant oat varieties - University of Adelaide
- Identifying the causes of unreliable N fixation by medic based pastures - SARDI
- Improving fertiliser efficiency and reducing disease impacts using fluid delivery systems - SARDI
- Improving nitrogen use efficiency via legumes in high rainfall cropping - Ag KI
- Improving pre-emergent herbicide efficacy in stubble retention systems - Hart Field-site Group
- Improving soil health to maximise water use efficiency in the Upper North - Upper North Farming Systems
- Improving weed control in new herbicide tolerant lentils - SARDI
- Increasing lentil productivity on dune and swale soils - Trengrove Consulting
- Long-term cropping systems trial: Effect on soil biology and nitrogen mineralisation - Hart Field-site Group
- New field-based tools to rapidly assess crop nitrogen and stress status - University of Adelaide
- Novel genes for improved P efficiency and yield in barley - University of Adelaide
- Optimising legume inoculation for dry sowing - SARDI
- Publication of the 2017 Farm Gross Margin Guide for SA - Rural Solutions SA
- Reassessing the value of phosphorus replacement strategies on fixing soils - University of Adelaide
- Regional internship in applied grains research - Hart Field-site Group
- SA Crop Variety Sowing Guides - SARDI
- SANTFA 18th Annual Conference 2016 - SANTFA
- Seed to Store YouTube clip competition - AgCommunicators
- Sharing knowledge of agricultural innovations: Precision Ag expos and symposiums - SPAA
- Silverleaf nightshade - long-term management effects of annual herbicide applications - PIRSA
- SOILS - getting the most out of your sands - EPARF
- Sulphur deficiency research in lentils and wheat on dune swale soils - Northern Sustainable Soils
- Support for workshop on data presentation and interpretation - Ag Institute Australia
- The application of bent-leg technologies to higher speed, tined seeding of cereal grains - University of SA
- The H sensor: a weed ID and mapping system - SPAA
- The Peter Waite Centenary Scholarship - University of Adelaide
- Time of sowing influence on phosphorus requirements and soil testing - Agronomy Solutions
- Upper North time of sowing and yield loss from frost/heat stress - UNFS
- Upskilling women of the Upper North in sustainable and productive farming principles - UNFS
- Using soil water information to make better decisions on Eyre Peninsula - EPARF

For more information on the SA Grain Industry Trust and its activities:

**Michael Treloar**  
Chairman  
0427 765 034  
mbattreloar@bigpond.com

**Max Young**  
SAGIT Trustee  
0419 839 008  
young64@bigpond.com

**Bryan Smith**  
SAGIT Trustee  
0459 256 173  
kai.smith@bigpond.com

**Ted Langley**  
SAGIT Trustee  
0407 398 165  
eclangley@bigpond.com

**Caroline Rhodes**  
SAGIT Group B Trustee  
0408 331 223  
bespoke.rural@bigpond.com

**Malcolm Buckby**  
Project Manager  
08 8210 5230  
admin@sagit.com.au

**Dr Allan Mayfield**  
Scientific Officer  
0418 818 569  
allan@asmayfield.com.au



## South Australian Crop Variety Sowing Guide

This edition of the *SA Crop Variety Sowing Guide* has been compiled by officers with the South Australian Research and Development Institute.

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

The SARDI Sustainable Systems Division Officers acknowledge the sponsorship of this guide by the SA Grain Industry Trust (SAGIT) and the Grains Research and Development Corporation (GRDC), the contributions of New Variety Agronomy and Oat Breeding research staff in SA, as well as collaborative research staff in Victoria in producing results published in this edition.

The use of National Variety Trial (NVT) results and the analysis of individual and long term trial results by officers within Statistics for Australian Grains Industry (SAGI) and the Australian Crop Accreditation Service (ACAS) is also most appreciated.

Farmer cooperators are also to be thanked for the use of their land for the trials which have resulted in the data and information contained in this edition of the SA Sowing Guide.

The leadership and commitment to previous editions of the *SA Crop Variety Sowing Guide* by Rob Wheeler as he moves towards retirement from SARDI is also gratefully acknowledged.

### 4 Plant Breeder's Rights

Almost all new varieties are protected by PBR and growers need to be aware of the implications.

### 12 Wheat

Newly released wheat varieties give SA growers high yielding alternatives to Mace.

### 20 Barley

No new barley varieties were released in 2016. A range of high yielding malt and feed varieties are currently available to SA growers.

### 25 Herbicide tolerance

Crop variety sensitivity to herbicides can influence choice of variety or herbicide use.

### 36 Canola

Several new Clearfield® and Triazine Tolerant varieties available that will offer growers high yielding options with blackleg resistance.

### 41 Triticale

Many newer varieties offer alternative uses, broad adaptation, high yields, and improved grain quality relative to Tahara.

### 44 Beans

No new faba bean varieties were released in 2016. PBA Samira and PBA Zarah offer alternative to Nura and Farah for SA growers.

### 48 Lupins

No new lupin varieties were released in 2016. Seed available in South Australia for 2017 planting of new lupin variety PBA Jurien.

### 50 Oats

Likelihood of producing good milling or hay quality vary greatly between oat varieties and influence varietal choice and marketability.

### 56 Vetch

Morava, Rasina, Volga and Timok are resistant to rust and are the preferred varieties for grain in areas prone to rust infections.

### 60 Lentils

No new lentil varieties were released in 2016. Red lentil PBA Jumbo2 is currently the highest yielding Australian variety with good disease resistance.

### 64 Chickpeas

A change in the virulence of ascochyta blight pathogen now means all current varieties are either rated as susceptible or moderately susceptible in SA.

### 68 Field Peas

No new field pea varieties were released in 2016. Several existing field pea varieties have proven to be high yielding in SA.

Important notice: Although Primary Industries and Regions South Australia (PIRSA) and staff of SARDI's Sustainable Systems have taken all reasonable care in preparing information contained in this SA Crop Variety Sowing Guide, neither PIRSA, SARDI, nor their officers, staff or suppliers involved in the editing and production of this magazine accept any liability resulting from the interpretation or use of the information set out in this document. Information contained in this document is subject to change without notice.

# Plant Breeder's Rights information and variety update for 2017

By Andrew Ware, Peter McCormack and Rob Wheeler, SARDI

## KEY POINTS

- Almost all recently new varieties are protected by PBR and growers need to be aware of the implications.
- Seed of varieties with PBR protection can only be bought from the owner, commercial partner/licensee or an agent (seed merchant) authorised by the owner, although "farmer to farmer trading" is allowed for some wheat varieties.
- Once purchased, growers can maintain seed of a variety with PBR protection to satisfy their seed requirements for the following season.
- Farmers can sell the products of a protected variety for commercial use as feed or food (e.g. deliver to Glencore, flourmill or sell as animal feed) unless bound by a 'closed loop' contract.
- Farmers cannot sell, trade or give away the variety for seed without authorization of the owner.
- Farmer to farmer trading of seed without authorisation of the owner will make them liable to prosecution.
- Commercial marketing arrangements between the owners and the licensee can vary between crops and varieties, and farmers must be aware of the conditions of the marketing arrangements.
- Before you take delivery of certified seed of a new variety, you are encouraged to request a copy of the paddock inspection report and the certificate of analysis report. It is important that you read the information contained in the inspection report and the seed analysis certificate to make sure you are buying the best available seed.
- When purchasing seed of a PBR Cultivar you should purchase it in the name or names of the entity or entities in which you intend to deliver. You should retain invoices to prove that you have entitlement to that seed and the crop produced.
- If farmers are unsure, they should seek information from the owner, commercial partner/licensee or the selling agent (seed merchant).

This article explains some of the origins, benefits and restrictions associated with PBR.

## Plant Breeder's Rights

PBR was introduced to stimulate private investment in plant breeding by conferring ownership rights to varieties and thereby the potential to market those rights as part of a commercialisation process.

The Plant Breeder's Rights Act 1994 as amended act no:148 2002 gives an owner of PBR the exclusive right to sell, produce or reproduce, import, export, stock or condition the seed of a variety protected by PBR (or license another person or organisation to undertake these activities).

The rights are similar to patents or copyright, (these record ownership of the genetic material) and are administered under the Act. PBR protection can last up to 20 years for broadacre crops.

PBR guarantee ownership of a variety but do not specify how the variety should be commercialised or whether or where royalties should be charged.

In the absence of a contract stating otherwise, farmers can sell the harvest of a protected variety for direct consumption as food or feed (for example, deliver it for animal feed or to a flour mill) but they are not permitted to sell, trade or give away the variety for seed without the authorisation of the owners or licensee.

## Royalties

- The concept generally referred to as 'end point royalty' collection gives the licensee the right to collect royalties on harvested grain.
- Increasingly more varieties being grown by farmers use the 'end point royalty' method of royalty collection.
- Farmers should carefully read any documentation provided to be fully aware of the conditions when purchasing seed of a variety. While the restrictions in the use of seed under the PBR Act are clearly defined, other contractual arrangements may have been imposed by the licensee following agreement by the owners. For example, some contracts specify that the harvested grain must be delivered to certain collection agencies; these are commonly called 'closed loop' marketing arrangements or that EPR's are on total grain production of the variety excluding seed saved for the following years production, 'farmer saved seed'.
- In some instances growers are permitted to trade "farmer to farmer" subject to a three-party agreement involving the farmers and the licensee. This currently applies to varieties including: Axe, Cobra, Correll, Emu Rock, Espada, Estoc, Gladius, Mace, Scout, Scepter and Trojan wheats. ■

## PLANT BREEDERS' RIGHTS

WHEAT						
Variety	Owner	Year of registration	Commercial partner/ licensee	Royalty Type (\$/tonne ex.GST)	Maximum quality in SA	Comments
AGT Katana	AGT	2009	AGT#	EPR \$3.00	AH	Tested as RAC1423
AGT Scythe	AGT	2004	AGT	EPR \$1.50	APW	Tested as RAC1055
Axe	AGT	2007	AGT #	EPR \$2.50	AH	Tested as RAC1192
Beckom	AGT	2015	AGT	EPR \$3.25	AH	Tested as VQ6008-14
Bolac	AVS	2006	Seednet	EPR \$2.10	AH	Tested as VQ2621
Chief <sup>CL Plus</sup>	Intergrain	2016	Intergrain	EPR \$4.25	APW	Tested as IGW6089
Corack	AGT	2011	AGT #	EPR \$3.00	APW	Tested as VW2316
Correll	AGT	2006	AGT #	EPR \$2.00	AH	Tested as WI23322
Cosmick	Intergrain	2014	Intergrain	EPR \$3.85	AH	Tested as IGW3423
Cutlass	AGT	2015	AGT#	EPR \$3.00	APW	Tested as RAC2069
DBA-Aurora	Uni of Adelaide	2014	SADGA	EPR \$3.00	APDR1	Tested as UAD951096
DS Darwin	Dow Seeds	2015	Seednet	EPR \$4.25	AH	Tested as ADV03.0056
Emu Rock	Intergrain	2011	Intergrain#	EPR \$3.50	AH	Tested as IGW3167
Espada	AGT	2008	AGT #	EPR \$2.50	APW	Tested as RAC1263
Estoc	AGT	2010	AGT#	EPR \$3.00	APW	Tested as RAC1412
Gladius	AGT	2006	AGT #	EPR \$2.50	AH	Tested as RAC1262
Grenade <sup>CL Plus</sup>	AGT	2012	AGT	EPR \$3.80	AH	Tested as RAC1689R
Harper	Intergrain	2013	Intergrain#	EPR \$3.80	APW	Tested as IGW3170
Hatchet <sup>CL Plus</sup>	AGT	2015	AGT	EPR \$3.80	AH	Tested as RAC1843
Hyperno	AGT	2009	AGT/DGA	EPR \$3.00	APDR1	Tested as WID22209
Justica <sup>CL Plus</sup>	AGT	2011	AGT	EPR \$3.55	APW	Tested as RAC1683
Kord <sup>CL Plus</sup>	AGT	2011	AGT	EPR \$3.55	AH	Tested as RAC 1669R
LongReach Arrow	Longreach PB	2016	Advanta Seeds	EPR \$3.00	AH	Tested as LPB11-1728
Longreach Catalina	Longreach PB	2006	Seednet	EPR \$2.50	AH	Tested as LRPB0268
Longreach Cobra	Longreach PB	2011	Advanta Seeds#	EPR \$3.50	AH	Tested as LPB07-0956
Longreach Dart	Longreach PB	2012	Advanta Seeds#	EPR \$4.00	AH	Tested as LPB07-1325
Longreach Impala	Longreach PB	2011	Advanta Seeds	EPR \$3.50	ASFT	Tested as C51021
Longreach Orion	Longreach PB	2010	Advanta Seeds#	EPR \$3.00	ASFT	Tested as LRPB04-2039
Longreach Phantom	Longreach PB	2012	Advanta Seeds#	EPR \$3.80	AH	Tested as LPB06-1040
Longreach Scout	Longreach PB	2007	Advanta Seeds#	EPR \$2.80	AH	Tested as LPB05-1164
Longreach Trojan	Longreach PB	2013	Advanta Seeds#	EPR \$4.00	APW	Tested as LPB08-1799
Mace	AGT	2007	AGT#	EPR \$3.00	AH	Tested as RAC 1372
Manning	Ausgrainz	2013	Grainsearch	EPR \$3.50	Feed	Tested as WAWHT2726
Mackellar	HRZ wheats	2001	Seednet	EPR \$1.00	AWW/FEED	*See note below
Peake	Nugrain	2007	Seedcell	EPR \$2.95	AH	Tested as NGSP006
Saintly	AGT	2009	AGT/DGA	EPR \$3.00	APDR1	Tested as WID22279
Scepter	AGT	2015	AGT#	EPR \$3.25	AH	Tested as RAC2182
Shield	AGT	2012	AGT#	EPR \$3.25	AH	Tested as RAC1718
Tjilkuri	Uni of Adelaide	2010	Durum Growers Assoc	Seed	APDR1	Tested as WID801
WID802	Uni of Adelaide	2012	Durum Growers Assoc	Seed	APDR1	Tested as WID802
Wyalkatchem	Intergrain	2001	Heritage seeds	EPR \$1.92	APW	Tested as WAWHT2212
Yawa	Uni of Adelaide	2012	Durum Growers Assoc	Seed	APDR1	Tested as WID803
Yitpi	Uni of Adelaide	1999	Seednet	EPR \$1.00	AH	Tested as WI96080

All the varieties listed above are PBR varieties and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

\* These varieties may have 'End Point' (EP) royalty or 'grazing fee' depending on the 'end use' of the crop.

Growers purchasing seed of any of these varieties should seek information from the agent (seed merchant), or licensee regarding the type of royalty payment to be made.

# Farmer to Farmer trading of varieties including Axe, Cobra, Emu Rock, Espada, Estoc, Gladius, Correll, Corack, Mace, Scout, Scepter and Trojan is allowed subject to an agreement with the licensee where the original seed was purchased through a recognized retailer.

## PLANT BREEDERS' RIGHTS

BARLEY						
Variety	Owner	Year of registration	Commercial partner/ licensee	Royalty Type (\$/tonne ex.GST)	Maximum quality in SA	Comments
Admiral	UofA/Joe White Maltings		Seednet	EPR \$4.00	Malting	Tested as Wi4259
Bass	Intergrain	2011	Syngenta	EPR \$3.50	Malting	Tested as WABAR2315
Baudin	DAFWA	2002	Seednet	EPR \$3.00	Malting	Tested as WABAR2080
Buloke	AVS	2005	Seednet	EPR \$2.00	Malting	Tested as VB0105
Charger	UofA / Carlsberg	2013	Aust Grain Growers Co-op		Malting	Tested as Ca412402
Commander	UofA	2008	Seednet	EPR \$3.80	Malting	Tested as WI3416
Compass	UofA	2013	Seednet	EPR \$3.80	Pending classif	Tested as WI4593
Fathom	UofA	2011	Seednet	EPR \$2.00	Feed	Tested as WI4483
Flagship	UofA	2005	Seednet /Heritage seeds	EPR \$1.80	Malting	Tested as WI3408
Flinders	Intergrain	2012	Syngenta	EPR \$3.80	Pending classif	Tested as WABAR2537
Fleet	UofA	2006	Seednet	EPR \$1.50	Feed	Tested as WI3804
GrangeR	Nickersons	2010	Heritage seeds	EPR \$2.95	Malting	Tested as SMBA09-3353
Henley	Nickersons	2010	Heritage seeds	EPR \$2.95	Malting	
Hindmarsh	AVS	2006	Seednet	EPR \$1.50	Food	Tested as VB0324
LaTrobe	Intergrain	2013	Intergrain/Syngenta	EPR \$4.00	Malt	Tested as IGB1101
Lockyer	DAFWA	2007	InterGrain	EPR \$1.50	Feed	Tested as WABAR2288
Maritime	UofA	2002	Seednet	EPR \$1.50	Feed	Tested as WI3297
Navigator	UofA	2011	Seednet	EPR \$3.80	Malt	Tested as WI 4262
Oxford	Nickersons	2009	Heritage seeds	EPR \$2.50	Feed	
Roe	DAFWA	2007	InterGrain	EPR \$1.50	Feed	Tested as WABAR2310
Rosalind	Intergrain	2015	Intergrain/Syngenta	EPR \$3.50	Feed	Tested as IGB1302
Scope CL	AVS	2009	Seednet	EPR \$3.50	Malt	Tested as VB0805
Sloop SA	UofA	2002	Seednet/Heritage seeds	EPR \$1.70	Malting	Tested as WI3167
SouthernStar	UofA / Sapporo	2013		EPR \$3.80	Malting	
ShineStar	UofA / Sapporo	2015			Malting	Tested as SC11001-37
Spartacus CL	Intergrain	2015	Intergrain/Syngenta	EPR \$4.25	Pending classif	Tested as IGB1334T
Wimmera	UofA	2011			Pending classif	Tested as VB0432
Westminster	Nickersons	2010	Grainsearch	EPR \$3.00	Malting	Tested as GS 5033

Most of the varieties listed above are PBR varieties and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

Some malting quality varieties attract a lower EPR when grain is sold as feed quality. These included Baudin (EPR \$1.00 - feed), Flagship (EPR \$1.50 - feed), Vlamingh (EPR \$1.50 - feed)

LUPINS					
Variety	State of origin	Year of registration	Commercial partner/ licensee	Royalty (ex. GST)	Comments
Coromup	WA	2006	Coorow Seeds	EPR \$1.67	Tested as WALAN2173M
Jenabillup	WA	2007	Seednet	EPR \$2.30	Tested as WALAN2224
Jindalee	NSW	2000	Seednet	EPR \$1.25	Tested as WL318
Mandelup	WA	2005	Heritage Seeds	EPR \$2.30	
PBA Barlock	WA	2013	Seednet	EPR \$2.50	Tested as WALAN2325
PBA Gunyidi	WA	2011	Seednet	EPR \$2.50	Tested as WALAN2289
PBA Jurien	WA	2015	Seednet	EPR \$2.50	Tested as WALAN2385

All the varieties listed above are PBR varieties and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

## PLANT BREEDERS' RIGHTS

CANOLA			
Variety	Year of registration	Commercial partner/licensee	Royalty
Archer	2012	Heritage Seeds	Seed (hybrid)
ATR Bonito	2013	Nuseed	EPR \$5.00/t
ATR Gem	2011	Nuseed	Seed
ATR Mako	2015	Nuseed	EPR \$5.00/t
ATR Stingray	2011	Nuseed	Seed
ATR Wahoo	2013	Nused	EPR \$5.00/t
AV Garnet	2007	Nuseed	Seed
Banker CL	2015	Heritage Seeds	Seed (hybrid)
Carbine	2012	Heritage Seeds	Seed (hybrid)
Pioneer Atomic HT	2012	Pioneer/ NPZ Australia	Seed (hybrid)
Pioneer Sturt TT	2012	Pioneer/ NPZ Australia	EPR \$5.00/t
Hyola 474CL	2011	Advanta Seeds	Seed (hybrid)
Hyola 50	2007	Advanta Seeds	Seed (hybrid)
Hyola 559TT	2012	Advanta Seeds	Seed (hybrid)
Hyola 575CL	2010	Advanta Seeds	Seed (hybrid)
Hyola 577CL	2013	Advanta Seeds	Seed (hybrid)
Hyola 650TT	2014	Advanta Seeds	Seed (hybrid)
Hyola 970CL	2014	Advanta Seeds	Seed (hybrid)
InVigor T 4510 (TT)	2016	Bayer	Seed (hybrid)
Nuseed Diamond	2013	Nuseed	Seed (hybrid)
Monola 314TT	2013	Nuseed Crop Network	Seed (closed loop with premium)
Monola 416TT	2015	Nuseed Crop Network	Seed (closed loop with premium)
Monola 515TT	2014	Nuseed Crop Network	Seed (closed loop with premium)
Pioneer 43C80 (CL)	2008	Pioneer Brand Seeds	Seed
Pioneer 44T02 (TT)	2016	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 45T01 (TT)	2015	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 43Y85 (CL)	2012	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 44Y87 (CL)	2013	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 44Y89 (CL)	2014	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 44Y90 (CL)	2016	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 45Y86 (CL)	2012	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 45Y88 (CL)	2013	Pioneer Brand Seeds	Seed (hybrid)
Pioneer 45Y91 (CL)	2016	Pioneer Brand Seeds	Seed (hybrid)
Rimfire CL	2015	Heritage Seeds	Seed (hybrid)
SF Turbine TT	2015	Seed Force	Seed (hybrid)
Victory V3002	2011	Cargill/ AWB	Seed (hybrid)(closed loop with premium)
Yenta Convenient Canola	2015	Agronomy for Profit	Seed

All the varieties listed above are PBR varieties and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee. This is NOT a complete list of PBR's Canola varieties but a selection of recently released varieties. Space prevents us from listing all varieties. If growers intend sowing seed of varieties other than those listed above they will need to check the PBR status of those varieties.

## PLANT BREEDERS' RIGHTS

OATS					
Variety	State of origin	Year of registration	Commercial partner/licensee	Royalty (ex. GST)	Quality
Bannister	WA / DAFWA	2012	Seednet	EPR \$2.30	Milling/feed
Brusher	SA / SARDI	2002	AEXCO Pty Ltd	EPR \$2.00*	Hay
Dunnart	SA / SARDI	2013	Seednet	EPR \$2.00	Milling/feed
Forester	SA / SARDI	2011	AGF Seeds	Seed	Hay
Kangaroo	SA / SARDI	2003	AEXCO Pty Ltd	EPR \$2.00*	Hay
Mitika	SA / SARDI	2004	Heritage seeds	EPR \$2.00	Milling/Feed
Mulgara	SA / SARDI	2009	AEXCO Pty Ltd	EPR \$2.00*	Hay
Possum	SA / SARDI	2002	Seednet	EPR \$1.70	Milling/Feed
Tammar	SA / SARDI	2010	AEXCO Pty Ltd	EPR \$2.00	Hay
Tungoo	SA / SARDI	2008	AEXCO Pty Ltd	EPR \$2.00*	Hay
Williams	SA / SARDI	2013	Heritage seeds	EPR \$2.30	Milling/Feed
Wintaroo	SA / SARDI	2001	AEXCO Pty Ltd	EPR \$2.00*	Hay
Wombat	SA / SARDI	2011	Seednet	EPR \$2.00	Milling/Feed
Yallara	SA / SARDI	2008	Seednet	EPR \$2.00	Milling/Feed

All the varieties listed above are covered by PBR and therefore the seed cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

\*Notes on hay varieties

Growers wanting to purchase seed of Mulgara, Tammar, Tungoo, Wintaroo, Brusher and Kangaroo need to contact one of the AEXCO Export Hay Processors.

Growers will be asked to declare 'end use' (ie export hay or on farm feed) at the point of sale so as to determine the royalty type.

Hay sold through an AEXCO export hay processor will incur an 'end point' royalty while hay for 'domestic sale' or 'on farm use' will incur a seed royalty. This endpoint royalty will increase to \$2.00 from October 2013.

TRITICALE					
Variety	State of origin	Year of registration	Commercial partner/licensee	Royalty (ex. GST)	Comments
Astute	SA/AGT	2015	AGT	EPR \$2.75	
Berkshire	NSW		Waratah Seeds Co.		
Bison	SA / AGT	2014	AGT	EPR \$2.75	Tested as TSA0451
Bogong	UNE/NSW		Viterra	EPR \$2.20	
Canobolas	UNE/NSW	2008	Viterra	EPR \$2.20	
Chopper	SA	2010	AGT	EPR \$3.00	
Endeavour	NSW		Waratah Seeds Co.	Area based Royalty	Tested as AT528
Fusion	SA	2012	AGT	EPR \$3.00	Tested as TSA 291
Goanna	SA	2012	Cooper/Elleway	No PBR or royalty	
Hawkeye	SA	2007	AGT	EPR \$2.50	
Jackie	NSW	2001	Waratah Seeds Co.	Seed	Dual purpose/grazing
Jaywick	SA	2007	AGT	EPR \$2.50	
Kosciusko	NSW	2003	Wilson Bros.	Seed	
Tobruk	NSW		Waratah Seeds Co.	Area based Royalty	Tested as AT574
Tuckerbox	SA	2010	Cooper/Elleway	No PBR or royalty	
Speedee	SA	2003	Seed Distributors	No PBR or royalty	
Yowie	SA	2010	Cooper/Elleway	Seed	

Some of the varieties listed above are PBR varieties and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee. Credit, Rufus, Speedee, Tickit, Tahara, Tuckerbox, Treat and Yukuri are no longer covered by PBR and can be traded 'over the fence'.



## PLANT BREEDERS' RIGHTS

## FIELD PEAS

Variety	State of origin	Year of registration	Commercial partner/ licensee	Royalty (ex. GST)	Comments
Kaspa	Vic	2001	Seednet	EPR \$2.00	
Maki	NSW	2008	AGT	EPR \$4.00	Blue field pea
Morgan	VIC/NSW	1998	Hart Bros Seed		Dual purpose
Parafield	SA	1999	PlantTech Pty Ltd	Seed	No PBR
PBA Coogee	PBA	2013	Seednet	EPR \$2.60	Dual purpose, Non 'Kaspa' seed type
PBA Gunyah	PBA	2010	Seednet	EPR \$2.50	'Kaspa' seed type
PBA Hayman	PBA	2012	Seednet	Seed	Dual purpose
PBA Pearl	PBA	2012	Seednet	EPR \$2.70	White seed
PBA Percy	PBA	2011	Seednet	EPR \$2.60	Non 'Kaspa' seed type
PBA Oura	PBA	2011	Seednet	EPR \$2.60	Non 'Kaspa' seed type
PBA Twilight	PBA	2010	Seednet	EPR \$2.50	'Kaspa' seed type
PBA Wharton	PBA	2013	Seednet	EPR \$2.60	'Kaspa' seed type
Sturt	Vic	2003	Premier Seeds	Seed	White seed
Yarrum	NSW	2004	AGT	EPR \$4.00	Non 'Kaspa' seed type

All the varieties listed above are PBR varieties, except Parafield, and Bundi and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee. # contact DPI Victoria for seed.

## CHICKPEAS

Variety	State of origin	Year of registration	Commercial partner/ licensee	Royalty (ex GST)	Maximum quality	Comments
Almaz	CLIMA	2005	Seednet	EPR \$6.50	Kabuli type	Med size 8-9mm
Ambar	WA	2012	Heritage Seeds	EPR \$ 4.00	Desi type	Splitting and direct consumption
Genesis™509	Vic	2005	AACT	EPR \$5.00	Desi type	'splitting' enduse
Genesis™079	Vic	2007	AACT	EPR \$5.00	Kabuli type	Small size 6-7mm
Genesis™090	Vic	2004	AACT	EPR \$5.00	Kabuli type	Small size 7-8mm
Genesis™114	Vic	2007	AACT	EPR \$5.00	Kabuli type	Med size 8-9mm
Genesis™Kalkee	Vic	2011	AACT	EPR \$5.00	Kabuli type	Med-large size 8-10mm
Genesis™425	Vic	2007	AACT	EPR \$5.00	Kabuli type	Small size 7-8mm
Neelam	WA	2012	Heritage Seeds	EPR \$4.00	Desi type	Splitting and direct consumption
PBA Boundary	PBA	2011	Seednet	EPR \$4.00	Desi type	Splitting and direct consumption
PBA HatTrick	PBA	2009	Seednet	EPR \$4.00	Desi type	Splitting and direct consumption
PBA Maiden	PBA	2013	Seednet	EPR \$4.00	Desi type	Splitting and direct consumption
PBA Monarch	PBA	2013	Seednet	EPR \$6.50	Kabuli type	Med size 8-9mm
PBA Pistol	PBA	2011	Seednet	EPR \$4.00	Desi type	Splitting and direct consumption
PBA Slasher	PBA	2009	Seednet	EPR \$4.00	Desi type	Splitting and direct consumption
PBA Striker	PBA	2012	Seednet	EPR \$4.00	Desi type	Splitting and direct consumption

All the varieties listed above are PBR varieties or have 'commercial marketing arrangements' and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

## VETCH

Variety	State of origin	Year of registration	Commercial partner/ licensee	Royalty	Comments
Capello	SA	1999	Heritage seeds	Seed	Namoi alternative
Haymaker Plus	SA	1999	Heritage seeds	Seed	High level hard seed
Morava	SA	1999	Heritage seeds	Seed	Forage use
Rasina	SA	2006	Heritage seeds	Seed	Tested as SA34719

All the varieties listed above are PBR varieties or have 'commercial marketing arrangements' and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

## PLANT BREEDERS' RIGHTS

LENTILS					
Variety	State of origin	Year of registration	Commercial partner/licensee	Royalty (ex. GST)	Market restrictions
Boomer	CIPAL	2005	Seednet	EPR \$5.00	Delivery to nominated receivers
Nipper	CIPAL	2005	Seednet	EPR \$5.00	Open marketing to authorised traders
Nugget	CIPAL	1999	Heritage seeds	EPR \$5.00	Open marketing to authorised traders
PBA Ace	PBA	2012	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Bolt	PBA	2012	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Bounty	PBA	2009	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Blitz	PBA	2010	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Flash	PBA	2009	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Giant	PBA	2014	PB Seeds Pty Ltd	EPR \$5.50	Open marketing to authorised traders
PBA Greenfield	PBA	2014	PB Seeds Pty Ltd	EPR \$5.50	Open marketing to authorised traders
PBA Herald XT	PBA	2011	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Hurricane XT	PBA	2013	PB Seeds Pty Ltd	EPR \$5.50	Open marketing to authorised traders
PBA Jumbo	PBA	2010	PB Seeds Pty Ltd	EPR \$5.00	Open marketing to authorised traders
PBA Jumbo2	PBA	2014	PB Seeds Pty Ltd	EPR \$5.50	Open marketing to authorised traders

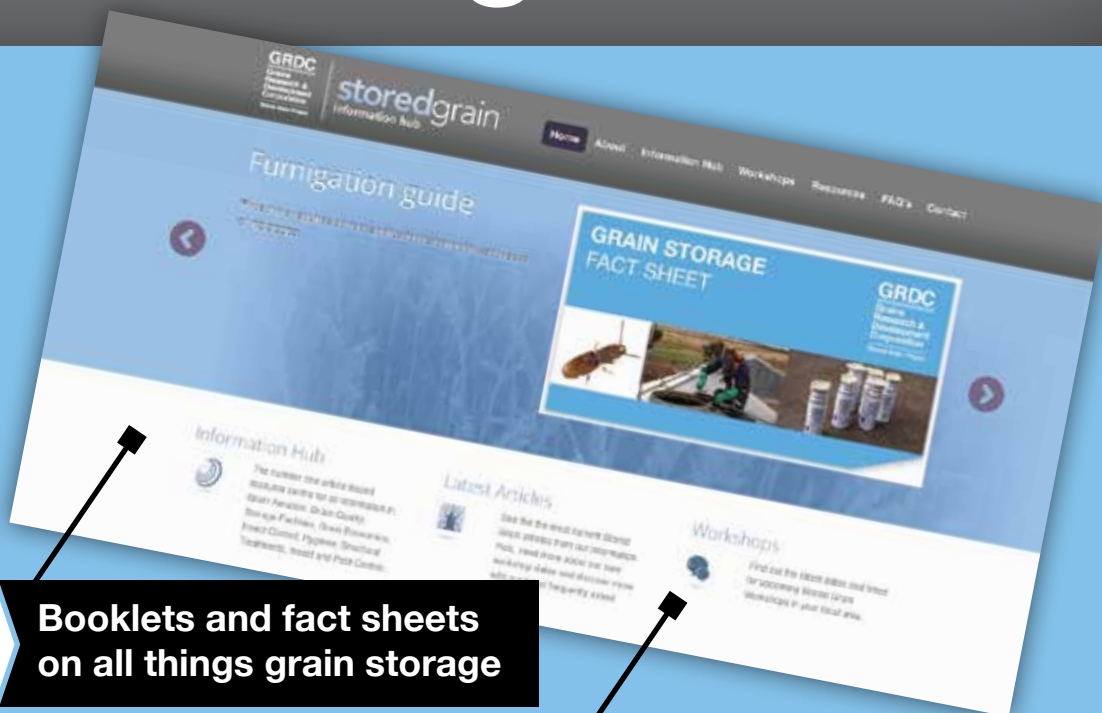
All the varieties listed above, except Aldinga, Northfield and Digger, are PBR varieties or have 'commercial marketing arrangements' and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

BEANS						
Variety	State of origin	Year of registration	Commercial partner/licensee	Royalty (ex. GST)	Maximum quality	Comments
Farah	SA	2003	Heritage Seeds	EPR \$3.00	Fie grade 1	Tested as 483/3
Fiesta VF	SA	1998	Heritage Seeds	No PBR or royalty	Fie grade 1	
Nura	SA	2005	Seednet	EPR \$3.00	Fie grade 1	
PBA Kareema	SA	2009	PGG Wrightson	EPR \$4.00	Broad bean	
PBA Rana	SA	2011	Seednet	EPR \$3.50	New category	Tested as 974*(611*974)/15-1
PBA Samira	SA	2014	Seednet	EPR \$3.50	Fie grade 1	Tested as AF05069
PBA Zahra	SA	2015	Seednet	EPR \$3.50	New category	Tested as AF05095-1

All the varieties listed above are PBR varieties or have 'commercial marketing arrangements' and therefore seed of these varieties cannot be sold, traded or given away, nor can it be 'traded over the fence' without the authorisation of the owners or licensee.

### Explanation of abbreviations

AEXCO = Australian Exporters Company, SAGIT = South Australian Grains Industry Trust, AGT = Australian Grain Technologies, AAC = Australian Agricultural Commodities, COGGO = Council of Grain Grower Organisations, DAFWA = Dept Agriculture and Food Western Australia, DGA = Durum Growers Association, PBA = Pulse Breeding Australia, UofA = University of Adelaide



**Booklets and fact sheets  
on all things grain storage**

**Workshops in all regions  
covering topics such as:**

- Economics of on-farm storage
- Grain storage hygiene
- Aeration cooling or drying
- Managing high moisture
- Fumigation
- Insect pest management
- Managing different storages
- Storage facility design
- Storing pulses and oilseeds



Call the  
National  
Grain  
Storage  
Information

Hotline **1800 WEEVIL**  
(1800 933 845) to  
speak to your local  
grain storage specialist  
for advice or to arrange  
a workshop

**Download the new  
storedgrain app  
to get the latest  
information and  
storage recording  
tool on your  
iPhone or iPad**



**GRDC**  
GRAINS RESEARCH  
& DEVELOPMENT  
CORPORATION

STORED GRAIN PROJECT

# Wheat variety sowing guide 2017

By Andrew Ware and Rob Wheeler, SARDI

This sowing guide provides data and guidance on hard, soft and durum wheat varieties for sowing in South Australia in 2017.

Since publication of the 2016 sowing guide, two new milling wheat varieties have been released and targeted at South Australian (SA) production with seed potentially available for 2017. These are LongReach Arrow and Chief CL Plus. These new varieties, together with other recent releases Cutlass and Scepter, have had limited evaluation in National Variety Trials (NVT) and in some cases, no long term SA grain yield or grain quality data can be provided within this publication.

However, these varieties have good potential to be grown in SA and are included with provisional commercial data and notes for grower consideration.

Extensive state-wide evaluation within NVT over coming seasons will provide more confidence in their suitability and any specific adaptation requirements. The varieties Bolac, Correll, Espada, Estoc, Forrest, Justica, Peake, Phantom, Wallup, WID802 and Yawa have been deleted from the list below, as they have been considered to be well outclassed by newer varieties.

Growers should note that a number of newer varieties listed in this guide are below acceptable industry standards for rust resistance but offer other important or useful attributes. If grown, these varieties should be accompanied by suitable rust preventative strategies.

Where varieties do not meet minimum disease resistance standards for rust, as set by industry, they are listed with a cautioning note.

Varieties have been listed according to maximum market receival quality classification and are listed in alphabetical order and not in order of preference.

## Selection criteria

Information on the most important selection criteria, grain yield, quality, maturity and disease resistance for each variety can be found in tables 2 and 3.

While the varieties listed above are considered likely to provide the best return within each quality grade, farmers need to consider their individual farm and paddock situation and make their selection based on all available information.

Where possible, the growing of a single variety only should be avoided. Climatic, disease and price risks should be spread by growing at least two or more varieties with varying maturity,

disease resistance and/or quality classification. Average protein content for current wheat varieties is very similar and rarely varies by more than one percent when grown under identical conditions. Perceived differences in protein achieving capability between varieties should be given only minor emphasis and protein should be managed through appropriate crop nutrition.

## Notes on varieties

**AGT Katana** is an early flowering, premium AH classification variety. Derived from Kukri, Katana has good physical grain quality, similar to Yitpi, and yields similar to Wyalkatchem on average. Katana has modest rust resistance and is moderately susceptible to CCN but rated MS to yellow leaf spot and MRMS to powdery mildew. Seed available from AGT (conditional Seed Sharing allowed).

**Axe** is a vigorous growing, very early flowering, AH quality variety. With large grain and low screenings, it has shown high yield potential in SA under very dry and sharp finishing conditions albeit with more moderate yields under favourable spring conditions and is susceptible to sprouting.

Axe has moderate stripe rust resistance but is susceptible to leaf rust, septoria tritici blotch, yellow leaf spot and CCN. Seed available from AGT (conditional Seed Sharing allowed).

**Beckom** is a mid-season maturing AH wheat suited to the medium-high yield potential environments of SA. Beckom carries good resistance to acid soils as well as boron toxic soils, and suits mid-season sowings.

Beckom is resistant to CCN and show moderate resistance to stripe rust, but is susceptible to leaf rust and septoria tritici blotch. Beckom has a tendency towards small grain size especially in tight finishing seasons. Seed available from AGT (conditional Seed Sharing allowed).

**Chief CL Plus** is a mid-season maturing, imidazolinone herbicide tolerant (Clearfield type) APW wheat, derived from Wyalkatchem and released in 2016 by Intergrain. Chief CL Plus is rated as moderately resistant to leaf and stem rust but is susceptible to yellow spot.

Chief CL Plus was evaluated in SA NVT trials in 2014, but not in 2015. Limited results from 2014 showed grain yields higher than other released CL Plus varieties. Further evaluation is needed. Limited seed for 2017 planting is available from Intergrain affiliates.

**Corack** is an early maturing, APW quality wheat derived from



## WHEAT

Table 1.	
Variety and current max. grade	Suitability and significant features
<b>HARD</b>	
AGT Katana	Low to medium rainfall districts but below minimum standards for stem rust resistance
Arrow	All districts, below minimum standards for stripe rust resistance. LongReach suggest similar yields to Mace with shorter plant height.
Axe	Low to medium rainfall districts, particularly areas with sharp dry finish, potential pre harvest sprouting risk. Below minimum standards for leaf rust resistance
Beckom	Low to medium rainfall districts
Bolac	High rainfall districts especially South East region and Kangaroo Island
Chief <sup>CL Plus</sup>	All districts, imidazolinone tolerant
Cobra	Medium to high rainfall districts and note below minimum standards for stripe rust resistance
Correll	All districts, avoid low test weight situations and wheat stubbles due to yellow leaf spot susceptibility. Below minimum standards for leaf rust resistance
Cosmick	All districts but below minimum standards for stripe rust resistance, wheat on wheat option
Derrimut	Medium to high rainfall districts but below minimum standards for stripe rust resistance
DS Darwin	Low to medium rainfall districts, more evaluation needed. Below minimum standards for leaf rust resistance
Emu Rock	Low to medium rainfall districts but below minimum standards for leaf rust resistance
Gladius	All districts but avoid areas with potential pre harvest sprouting risk
Grenade <sup>CL Plus</sup>	All districts, imidazolinone tolerant
Hatchet <sup>CL Plus</sup>	Low to medium rainfall districts, imidazolinone tolerant, potential pre harvest sprouting risk. Below minimum standards for leaf rust resistance
Kiora	High rainfall districts especially South East region and Kangaroo Island
Kord <sup>CL Plus</sup>	All districts, imidazolinone tolerant but avoid areas with potential pre harvest sprouting risk
Mace	All districts but well below minimum standards for stripe rust resistance, wheat on wheat option
Peake	Medium to high rainfall districts and marginal grain size
Phantom	Medium to high rainfall districts, avoid wheat stubbles due to yellow leaf spot susceptibility
Scepter	All districts but below minimum standards for stripe rust resistance, wheat on wheat option, more evaluation needed
Scout	All districts, avoid wheat stubbles due to yellow leaf spot susceptibility and note below minimum standards for stripe rust resistance
Shield	Low to medium rainfall districts
Wallup	Medium to high rainfall districts
Yitpi	All districts, avoid wheat stubbles due to yellow leaf spot susceptibility and note well below minimum standards for stem rust resistance
<b>APW</b>	
Corack	Low to medium rainfall districts and note below minimum standards for stripe and leaf rust resistance
Cutlass	Medium to high rainfall districts and early sowing situations
Espada	All districts but avoid areas with a potential pre harvest sprouting risk
Estoc	Medium to high rainfall districts and early sowing situations
Forrest	High rainfall, long season districts especially the South East region
Justica <sup>CL Plus</sup>	All districts, imidazolinone tolerant but below minimum standards for leaf rust resistance
Trojan	Medium to high rainfall districts and early sowing situations
Wyalkatchem	All districts but below minimum standards for stripe rust resistance and now also more susceptible to leaf rust
<b>SOFT</b>	
Barham	Soft wheat producing districts and Bowie replacement but below minimum standards for stripe rust resistance
Impala	Soft wheat producing districts but below minimum standards for leaf rust resistance
Orion	Soft wheat producing districts
<b>DURUM</b>	
Caparoi	All durum districts
DBA-Aurora	All durum districts
Hyperno	All durum districts although now generally outclassed by newer varieties
Saintly	All durum districts and potential for hay production
Tjilkuri	All durum districts
WID802	All durum districts and particularly the Upper SE, but note marginal grain size
Yawa	All durum districts but note marginal grain size, avoid late sowings

## WHEAT

Wyalkatchem. It has CCN resistance and good yellow leaf spot resistance but is moderately susceptible to stripe rust and very susceptible to powdery mildew and leaf rust.

Long term NVT results in SA show a high yield potential, particularly in low to medium rainfall situations, with good grain quality size. Seed available from AGT (conditional Seed Sharing allowed).

**Cosmick** is an early to mid-season flowering, AH quality wheat targeted at medium rainfall districts. Cosmic has moderate susceptibility to stem and stripe rusts but is susceptible to leaf rust and CCN.

Cosmick is rated MRMS to yellow leaf spot. Cosmick has shown high grain yield potential in SA NVT but more moderate grain size characteristics. Seed from Intergrain affiliates.

**Cutlass** has an APW classification in SA and was released by AGT in 2015. Cutlass is a mid to late maturing variety comparable to Yitpi. Cutlass is rated as moderately resistant to CCN with good levels of resistance to all rusts (MS to stripe rust) but moderately susceptible (MSS) to yellow leaf spot.

Limited yield data is available for Cutlass as it was first tested in SA NVT trials in 2015 but commercial data suggests it has an application for early sowing and frost risk management where Yitpi has been successful. Seed available from AGT (conditional Seed Sharing allowed).

**Darwin** is the first variety released by Dow Seeds in 2015, targeted for Southern Australia. It has AH quality and is early to mid-season flowering. Darwin is MR to stem rust, MR to stripe rust and is very susceptible (SVS) to leaf rust.

Darwin is susceptible to septoria tritici blotch and has very limited testing in NVT in SA prior to 2015 but commercial data suggests it has high yield potential and acceptable grain quality. Seed is available through accredited Dow Seed outlets.

**Emu Rock** is a high yielding, AH quality variety for mid to late sowings in a broad range of environments across southern Australia. This early maturing, large grained wheat, derived from Kukri, is susceptible to CCN, septoria tritici blotch (SVS) and powdery mildew but has moderate to good resistance to stem and stripe rust and is susceptible to leaf rust and MRMS to yellow leafspot.

Across NVT in SA, Emu Rock has shown yields aligning with Wyalkatchem. Seed is available from Intergrain (conditional Seed Sharing allowed).

**Gladius** has an AH classification and is broadly adapted, high yielding and well adapted to low rainfall environments. It has boron tolerance, and has good resistance to stem rust, MRMS to stripe rust and MS to leaf rust, CCN and yellow leaf spot. Gladius has midseason maturity and good grain size like Yitpi albeit with slightly lower test weight. It is susceptible to pre harvest sprouting. Trials indicate Gladius to have a lower tolerance to Ally® and Hussar®. Seed available from AGT (conditional Seed Sharing allowed).

**Grenade CL Plus** is an imidazolinone herbicide tolerant (Clearfield type) AH variety. It is early to mid-season flowering with moderate resistance to CCN, stem rust (MR) and stripe rust (MRMS). It is however susceptible to leaf rust and yellow

leafspot. Seed available from AGT affiliates.

**Harper** is derived from Yitpi and Stylet and was released by Intergrain in 2013 as a mid to long season APW variety. Harper has moderate resistance to CCN and stripe rust but moderate susceptibility to stem rust and is susceptible to leaf rust and yellow leaf spot.

Harper is an alternative to Yitpi and Estoc with slightly higher yield. Seed available from Intergrain.

**Hatchet CL Plus** is an imidazolinone herbicide tolerant (Clearfield type) replacement for Axe released by AGT in early 2015. It is derived from Axe but is much earlier flowering and has improved CCN resistance (MR), but like Axe, is susceptible to yellow leaf spot, leaf rust and sprouting. Hatchet has an AH classification with seed available from AGT affiliates.

**Kiora** was released by AGT in 2014 as an alternative to Bolac for higher rainfall districts with AH quality, mid to late maturity and excellent rust resistance but susceptibility to CCN and black point.

Slightly earlier flowering than Bolac, Kiora offers higher yields with improved grain size. Seed is available from AGT (conditional Seed Sharing allowed).

**Kord CL Plus** carries two genes for Clearfield resistance and is derived from Gladius with similar maturity and susceptibility to pre harvest sprouting but is MR to CCN. Kord CL Plus has an AH classification and has yielded similar to Gladius in all districts. Seed is available from AGT affiliates.

**Longreach Arrow** is a new mid-season AH quality wheat from Longreach Plant breeders, released in 2016. SA NVT trials in 2015, Arrow yields were similar to Mace. Arrow is MR to yellow leaf spot.

Arrow is rated as susceptible to stripe and leaf rust. Arrow has good physical grain quality with good black point resistance with relatively short plant height suited to stubble retained systems. Further evaluation is needed. Seed is available from Pacific Seeds.

**Longreach Cobra** was released as an early maturing Westonia derivative with AH quality and high yield potential particularly in the medium to higher rainfall districts of SA. Cobra has good resistance to stem and leaf rust but rated MSS to stripe rust, MS to CCN and MRMS to yellow leaf spot. Cobra has good grain size and moderate test weight and is moderately susceptible to pre-harvest sprouting. Seed available from Pacific Seeds (conditional Seed Sharing allowed).

**Longreach Scout** is an AH quality variety with mid-season maturity, derived from Yitpi. It has moderate resistance to stem rust but is rated MS to stripe and leaf rust. Scout is R to CCN and MS to powdery mildew but rated SVS to yellow leaf spot.

Scout has good physical grain quality and similar sprouting tolerance to Yitpi but more susceptible to black point. Seed available from Pacific Seeds (conditional Seed Sharing allowed).

**Longreach Trojan** is a mid to late maturing, APW quality variety with high yield potential, particularly in medium to high rainfall districts and early sown (pre-May) situations. It is moderately susceptible to CCN, moderately resistant to stripe rust but

## WHEAT

Table 2: Some agronomic characteristics of selected varieties under SA conditions.

Variety	Max. Quality	Flowering	Coleoptile length	Boron tol.	CCN resis.	Sprouting tolerance	Other features
AGT Katana	AH	EM	-	MI	MS	MI*	Strong dough properties like Kukri
Arrow	AH	EM	-	-	-	-	Limited SA NVT evaluation
Axe	AH	E	VS	I	S	I / VI	Good early vigour, moderate test weight
Barham	ASFT	EM	M	MI	MS	I*	Bowie plant type
Beckom	AH	M	-	MT	R	MI/I	Acid soil tolerance, mod grain size
Bolac	AH	L	M	-	S	I*	Acid soil tolerance
Chief <sup>CL Plus</sup>	APW	EM	-	-	-	-	2 gene Imidolazine tolerant, limited SA NVT evaluation
Cobra	AH	EM	M	MI	MS	I	Potential for moderate test weight
Corack	APW	EM	MS	I	RMR	MI	Below minimum disease standards for Yr
Correll	AH	M	ML	MT	MR	I / VI*	Potential for low test weight
Cosmick	AH	EM	L	-	S	-	moderate grain size
Cutlass	APW	ML	ML	MT	MR	I	moderate grain size, limited evaluation
DS Darwin	AH	M	-	-	MSS	-	limited SA NVT evaluation very susceptible to septoria
Emu Rock	AH	E	M	-	S	-	Plump grain like 'Kukri'
Espada	APW	M	-	MT	MS	I / VI	Moderate test weight
Estoc	APW	ML	ML	MT	MR	MT/MI	Good test weight
Gladius	AH	EM	M	MT	MS	I / VI	Moderate test weight, low tolerance of Hussar®
Grenade <sup>CL Plus</sup>	AH	EM	M	T	MR	MI / I	2 gene Imidolazine tolerant
Harper	APW	ML	ML	-	MR	MI	
Hatchet <sup>CL Plus</sup>	AH	VE	S	MI	MR	I/VI	2 gene Imidolazine tolerant
Impala	ASFT	EM	M	-	S	I	Below minimum standards for leaf rust
Kord <sup>CL Plus</sup>	AH	EM	S	MT	MR	I	2 gene Imidolazine tolerant
Justica <sup>CL Plus</sup>	APW	M	-	MT	MS	MI	2 gene Imidolazine tolerant, below minimum standards for leaf rust
Mace	AH	EM	MS	MT	MRMS	MI / I	Well below minimum disease standards for Yr
Phantom	AH	ML	MS	MT	MS	MI / I	Potential early growth yellowing
Scepter	AH	EM	MS	MT	MRMS	MI/I	limited SA NVT evaluation
Scout	AH	M	ML	MT	R	MT/MI	Below minimum disease standards for Yr
Shield	AH	EM	VS	MI	MRMS	MI	Potential for moderate test weight, acid soils tolerance
Trojan	APW	ML	M	MT	MS	MI	
Wallup	AH	M	M	I	MR	MI / I*	
Wyalkatchem	APW	EM	MS	MI	S	I	Short stiff straw, below minimum disease standards for Yr.
Yitpi	AH	ML	M	MT	MR	MI / I	Well below minimum disease standards for Sr
Durums							
Aurora	APDR	M			MS		good early vigour and weed competitiveness
Caparoi	APDR	M		MT	MS	MI / I*	Plump and high protein achiever
Hyperno	APDR	M			MS	I*	Some high temperature tolerance
Saintly	APDR	E		I	MS	MI / I*	Awnless head
Tjilkuri	APDR	M			MS	I*	
WID802	APDR	M		T	MS		
Yawa	APDR	M			MS		Potential for small grain size

\* provisional rating

\* indicative rating more data needed

Flowering: VE= very early; E= early; EM= early to mid season; M= midseason; ML= mid to late season; L=late

Coleoptile: I = intermediate; L = long; VL = very long S = short

Boron tolerance: I = intolerant; MI = moderately intolerant; MT = moderately tolerant; T = tolerant

- variety yet to be fully evaluated. \* provisional rating based on limited NVT data

CCN tolerance indicates the ability of the variety to grow and yield in the presence of CCN. Resistance refers to the ability of the variety to reduce CCN carryover.

Information on sprouting tolerance was provided by Prof Daryl Mares, University of Adelaide and disease resistances were provided by Dr Hugh Wallwork, SARDI

## WHEAT

MRMS to leaf rust and MSS to yellow leaf spot.

Trojan has moderate boron tolerance and large grain with low screenings and high test weight and good black point resistance. Seed from Pacific Seeds (conditional Seed Sharing allowed).

**Mace** with early to mid-season maturity, has an AH classification, is MR to stem rust, and rated MRMS to CCN and YLS. Mace is now rated as MSS to a new leaf rust strain in SA and rated SVS to stripe rust.

If grown, Mace must be carefully monitored and best avoided in districts prone to stripe rust unless a fungicide regime is in place. Mace has been widely tested since 2009 in NVT in SA and shows wide adaptation coupled with high yield potential and wheat on wheat application. Seed is available from AGT (conditional Seed Sharing allowed).

**Manning** was released in 2013 as a very late flowering white grained feed wheat for high rainfall zones in SE Australia.

It is a dual purpose, grazing/grain yield wheat with high yield potential and BYDV resistance coupled with good resistance to stem and stripe rust and other foliar diseases except leaf rust to which it is MSS. Seed is available from Grainsearch affiliates.

**Scepter** has an AH classification in SA and was released by AGT in 2015. Scepter is derived largely from Mace with many similar characteristics but improved grain yield and stripe rust

resistance and slightly lower black point tolerance.

Scepter is rated MR to stem rust, MSS to leaf rust and is rated MRMS to CCN and YLS. Scepter is susceptible to stripe rust early in the season but may show useful resistance later in the season when the temperature warms up. It is rated as MSS for stripe rust and if grown, must be monitored and best avoided in districts prone to stripe rust unless a fungicide regime is in place.

Scepter was first tested in SA NVT trials in 2015 and yielded 3% higher than Mace on average across South Australia and more in the low yielding environments. Scepter showed wide adaptation and is suitable for wheat on wheat application. Seed is available from AGT (conditional Seed Sharing allowed).

**Shield** is an early to mid-season flowering, moderate yielding milling wheat with AH classification and acid soils tolerance. Shield has resistance to CCN, good resistance to all rusts (stem rust – RMR, stripe rust – MR and leaf rust – R) and rated MSS to yellow spot. Shield has moderate black point susceptibility, moderate test weight and a low sprouting risk (MI). Seed available from AGT (conditional Seed Sharing allowed).

### Soft wheats

**Barham** is a mid-season ASF1 grade variety producing large grain with low screenings losses but low test weights. It has



Disease Pest Weed  
**Notifications**  
SMS EMAIL TWITTER WEB APP



**SUBSCRIBE  
TODAY FOR  
YOUR FREE  
ALERTS...  
& get a free  
SUPER  
MACRO  
LENS**



[www.grdc.com.au/grownotesalert](http://www.grdc.com.au/grownotesalert)

[grownotesalert@ecodev.vic.gov.au](mailto:grownotesalert@ecodev.vic.gov.au)



@GNAAlertNorth @GNAAlertSouth @GNAAlertWest #grownotesalert





## WHEAT

Table 3. Mean yield (% of yield group) of main season varieties from NVT trials (2011-2015), and reaction to common disorders.

	Yield Group						Stem Rust	Stripe Rust#	Leaf Rust	Septoria tritici blotch	Yellow leaf spot	Powdery Mildew	Black point
	<1.5 t/ha	1.5-2.0 t/ha	2-2.5 t/ ha	2.5-3.5 t/ha	3.5-4.5 t/ha	>4.5 t/ ha							
MILLING WHEAT													
AGT Katana	105	104	104	103	101	101	MSS	MRMS	MS	MS	MS	MRMS	S
Arrow*	-	-	-	-	-	-	-	S	S	S	MR	S	-
Axe	103	99	96	97	97	96	MS	RMR	SVS	SVS	S	MS	S
Barham	99	95	95	90	92	90	MR	MSS	MRMS	MSS	MSS	SVS	MRMS
Beckom	110	111	111	109	108	106	MR	MRMS	S	SVS	MSS	MS	-
Chief <sup>CLPlus*</sup>	-	-	-	-	-	-	RMR	MSS	MR*R	S	RMR	MR	-
Cobra	92	98	98	105	104	107	RMR	MSS	MR	MSS	MS	MRMS	MSS
Corack	112	112	111	112	110	109	MR	MS	S	SVS	MRMS	SVS	S
Correll	102	100	101	96	97	96	MRMS	MRMS	S	S	SVS	MRMS	MS
Cosmick	107	107	109	108	107	107	MS	MRMS	SVS	SVS	MRMS	MSS	-
Cutlass*	100	100	105	103	105	105	R	MS	RMR	MSS	MSS	MSS	-
DSDarwin	97	98	99	99	99	100	MR	MR	SVS	S	S	MRMS	MR
Emu Rock	111	108	104	104	103	101	MRMS	MRMS	SVS	SVS	MRMS	S	MSS
Espada	108	106	105	102	101	99	MR	MRMS	R	S	MS	S	S
Estoc	102	103	102	99	99	98	MR	MS	MSS	S	MSS	MSS	MS
Gladius	101	101	99	99	99	98	MR	MRMS	MS	S	MS	MSS	MS
Grenade <sup>CLPlus</sup>	104	102	99	97	98	95	MR	MRMS	S	S	S	MS	MS
Harper	103	102	102	97	97	96	MRMS	MS	S	MSS	MSS	MS	-
Hatchet <sup>CLPlus</sup>	101	100	92	97	97	96	MS	MRMS	SVS	SVS	S	MS	-
Impala	102	99	98	95	97	95	MR	MR	SVS	SVS	MSS	RMR	MRMS
Justica <sup>CLPlus</sup>	100	99	99	95	95	94	MR	MRMS	MSS	SVS	SVS	S	S
Kord <sup>CLPlus</sup>	107	104	102	99	99	97	MR	MRMS	MS	MSS	MSS	MSS	MRMS
Mace	111	113	110	111	109	107	MR	SVS	MSS	SVS	MRMS	MSS	MRMS
Orion	91	89	92	87	90	91	MR	MSS	R	MS	MSS	MS	S
Phantom	94	93	96	95	98	98	MS	MR	MSS	S	SVS	MRMS	MRMS
Scepter*	118	118	115	113	111	108	MR	MSS	MSS	SVS	MRMS	S	-
Scout	100	100	102	102	103	104	MR	MS	MS	S	SVS	MS	SVS
Shield	110	106	105	100	99	98	RMR	MR	R	S	MS	MRMS	MS
Trojan	102	105	107	107	107	107	MRMS	MR	MRMS	MSS	MSS	MSS	MRMS
Wallup	95	96	96	99	99	100	MRMS	MRMS	S	S	MSS	S	MS
Wyalkatchem	101	105	103	105	104	104	MS	S	SVS	SVS	MR	SVS	MRMS
Yitpi	98	96	96	93	95	94	S	MRMS	S	MSS	SVS	MRMS	MS
av. yield t/ha	1.11	1.78	2.26	3	4	5.20							
Number of trials	18	22	20	24	31	19							

**DURUMS**

	< 2.0 t/ha	2.0 to 3.0 t/ha	3.0 to 4.0 t/ha	> 4.0 t/ha									
Caparoi	62	94	101	99	-	-	RMR	RMR	RMR	RMR	MR	MS	MSS
DBA-Aurora	97	104	106	105	-	-	RMR	RMR	R	MS	MRMS	MR	MSS
Hyperno	80	93	100	97	-	-	RMR	MR	R	MRMS	MRMS	MR	MS
Saintly	107	107	106	103	-	-	MR	MR	MRMS	S	MRMS	MSS	MS
Tjilkuri	46	90	100	100	-	-	MR	MR	R	MSS	MRMS	MRMS	MSS
WID802	85	99	103	101	-	-	RMR	MR	R	MS	MRMS	MRMS	MSS
Yawa	77	98	106	101	-	-	RMR	MR	R	MR	MRMS	MS	MRMS
av. yield t/ha	1.45	2.45	3.34	5	-	-							
Number of trials	2	6	13	7	-	-							

- insufficient data R = resistant MR = moderately resistant MS = moderately susceptible S = susceptible VS = very susceptible - = variety yet to be fully evaluated # = ratings for new WA Yr17 strain. Varieties with 1 have the Yr17 (VPM) seedling resistance and so will be resistant to the original WA and Jackie strains. 2 = some susceptible plants in mix \* provisional rating based on limited NVT data Black Point is not a disease but is a physiological response to certain humid conditions. Information on disease reaction was provided by the Field Crop Pathology Unit (SARDI) and compiled before the full data from 2016 was available. Contact Dr Hugh Wallwork (08) 8303 9382.

## WHEAT

CCN resistance but is MSS to stripe rust and is MS to black point. Barham is available from Seednet.

**Longreach Impala** is an early to midseason soft biscuit (ASF1) wheat targeted to eastern Australia. Impala has mid-season maturity, is susceptible to CCN, has good stem and stripe rust resistance, but is susceptible to leaf rust. Impala produces large grain and low screenings losses and is MRMS to black point. Seed is available from Pacific Seeds

**Longreach Orion** is a mid to long season maturing soft biscuit (ASF1) wheat targeted to eastern Australia. Orion, is susceptible to CCN and YLS but has good stem and leaf rust resistance and is MSS to stripe rust. Orion is susceptible to black point and susceptible to sprouting. Seed available from Pacific Seeds.

### Durum wheats

**Caparoi** was developed and released by the Tamworth durum program and has been widely tested in SA, showing slightly earlier flowering than Tamaroi, similar yields and good semolina colour. Caparoi has excellent physical grain quality and high grain protein coupled with moderate yields. Seed available from Seednet.

**DBA-Aurora** was released from the University of Adelaide in 2014 with seed currently available from the Durum Growers Association.

DBA-Aurora has a similar, good, disease resistance profile to other recently released varieties and grain yield slightly lower than Yawa but significantly improved grain size and lower screenings more similar to Hyperno and Saintly. DBA-Aurora has shown good early vigour and grass weed competitiveness.

**Hyperno** has a similar maturity, adaptation and disease

resistance profile to Kalka and Tamaroi, but generally offers greater yields, improved semolina colour and better sprouting and black point tolerance. Hyperno is eligible for APDR grade in SA and was released from AGT with seed available from the Durum Growers Association.

**Saintly** is awnless, earlier flowering than Kalka and Tamaroi, and has performed very well in dry finishing conditions in SA. Saintly has slightly less stem and leaf rust resistance compared to Hyperno. Saintly was released from AGT with seed available from the Durum Growers Association.

**Tjilkuri** has a similar maturity, adaptation and disease resistance profile to Tamaroi, but generally offers greater yields, like Hyperno together with improved semolina colour. Tjilkuri is eligible for APDR grade in SA and was released from the University of Adelaide in 2010.

### Domestic flours millers' wheat variety preferences

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

The domestic flour millers can have different quality requirements to export markets due to different end products and processes employed. Table 5 lists the flour millers' variety quality ratings, which provide growers with an indication of the most highly sought varieties. For further information, contact Laucke Flour Mills (03 5431 5201). ■

Table 4: Mean yield (% site mean) for long season wheat varieties from NVT trials (2011-2015), and reaction to common disorders

Variety	Yield (as % of mean)	No. Sites	Stem Rust	Stripe Rust#	Leaf Rust	Septoria tritici blotch	Yellow leaf spot	Powdery Mildew	Black point
Beaufort	110	4	MRMS	RMR	MS	MSS	S	MRMS	MSS
Bolac	103	4	MRMS	RMR	MRMS	MSS	MSS	MRMS	MS
DS Darwin	95	4	MR	RMR	RMR	MR	MRMS	MR	MRMS
DS Pascal	106	3	MR	RMR	VS	MRMS	MRMS	MRMS	S
EGA Gregory	93	3	MR	MSS	R	MSS	MSS	MS	S
EGA Wedgetail	92	4	RMR	R	SVS	MS	MS	MR	MS
Kiora	108	4	RMR	RMR	MRMS	S	MSS	MRMS	MS
Manning	114	3	MR	RMR	RMR	MR	MRMS	S	MRMS
SQP Revenue	99	4	RMR	R	S	MS	MS	MR	MRMS
Trojan	106	3	MRMS	MR	MS	MSS	MSS	MSS	MRMS
av. yield t/ha	5.72								

R = resistant MR = moderately resistant MS = moderately susceptible S = susceptible VS = very susceptible - = variety yet to be fully evaluated # = ratings for new WA Yr17 strain. Varieties with 1 have the Yr17 (VPM) seedling resistance and so will be resistant to the original WA and Jackie strains. 2 = some susceptible plants in mix \* provisional rating based on limited NVT data. Black Point is not a disease but is a physiological response to certain humid conditions.

Information on disease reaction was provided by the Field Crop Pathology Unit (SARDI) and compiled before the full data from 2016 was available. Contact Dr Hugh Wallwork (08) 8303 9382. Please note these data are generated from only the Conmurra site in the South East using trials conducted between 2012-15. Sowing dates of from these trials have ranged from 10 May - 28 May during this period, earlier sowing wasn't possible due to dry soil conditions.



## WHEAT

Table 5. Domestic Flour Millers Assessment - S.A. Wheat Varieties (updated September 2015)

1 = not sought 2 = some requirement 3 = highly sought

VG = very good, G = good, A = acceptable, M = marginal, P = poor, VP = very poor, H = High, PV - MED = Medium

Variety	End Product Category							Quality Parameters							Comments	
	Preferred Grade	Max Class Grade	Plant Bakery	Artisan breads	Biscuit	Cake	Hot plate goods	Milling quality	Flour colour	Water absorption	Extensibility	Max resistance	Paste viscosity	Rapid dough		
Barham	Soft	SF1			2	3	2	G	A	VG	VG	G	MED /H&A			Acceptable Biscuit quality
Bowie	Soft	SF1			3	3	2	A	A	G	A	A	H&A			Acceptable Biscuit quality
Impala	Soft	SF1			2											Appears suitable for Domestic Mills as soft wheat
Axe	AH	AH	1	1				G	A	VP	P	VP	MED&A	G	VP	Very poor WA with strong inextensible dough, excessive bakery mix time
Bolac	AH	AH	2	2				G	A	G	G	G	MED&A	G	P	Has good water absorption and dough strength, but long mix time
Cobra	AH	AH	3	1				A	M	M	G	A	P	A	A	Appears suitable for Domestic Mills. Low viscosity & colour a concern
Corack	APW	APW	3	1				A	A	A	A	A	A	A	A	Good usable APW. Appears suitable for Domestic Mills
Correll	AH	AH	3	1				G	A	A-M	G	A	MED&A	G	A	Acceptable AH quality
Dart	AH	AH	3	2				G	A	VG	VG	A	A	A		Appears Good AH quality. High WA, long mix, balance dough & acceptable bake quality.
Estoc	APW	APW	2	1				A	A	G	M	A	A	P	P	Marginal APW Quality expect some interest from Domestic Mills
Emu Rock	AH	AH	2	2				A	G	A	VG	M	M	A	A	Appears suitable for Domestic Mills. Tough dough & marginal long mix time only concern.
Frame	APW	APW	3	2				G	M	G	M	A	MED/H	VG	VG	Good APW quality - has short extensibility
Gladius	AH	AH	1	3				G	A	A/M	M	P	MED&A	G	VP	Inextensible and bucky doughs with excessive Bakery mix times.
Grenade <sup>CL Plus</sup>	AH	AH	2	2				G	A	G	A	M	A	M	M	Marginal Strong AH. Expect some interest from Domestic Mills.
Justica <sup>CL Plus</sup>	APW	APW	1	3				M	A	A	A	M	M	A	P	Strong dough, suit specialist use only
AGT Katana	AH	AH	1	3												Very strong variety. Closed loop release system.
Kukri	AH	AH	1	3				G	G	M	G	P	MED/H &A	P	VP	Optimum value as separate segregation due to excess mix requirement
Kord <sup>CL Plus</sup>	AH	AH	3	1				A	A	A	A	A	M	A	M	Suitable for Domestic Mills
Mace	AH	AH	3	1				G	G	G	A	A	G	A	M	suitable AH quality for Domestic Mills
Phantom	AH	AH	3	1				A	A	G	A	A	A	M	M	Appears suitable as AH for Domestic Mills
Scout	AH	AH	2	1				G	A	M	A	A	G	A	M	Suitable as AH for Domestic Mills
Shield	AH	AH	3	1				A	A	A	A	A	A	M	M	Marginal strong AH. Should suit Domestic Mills.
Wallup	AH	AH	1	2				A	A	A	A	M	A	P	P	Long Mix requirement. Suit specialist segregation. Limited interest
Wyalkatchem	APW	APW	3	1				G	A	M	G	A	A	G	G	Good APW quality - but marginal WA
Yitpi	AH	AH	3	2				G	A	A	A	A	MED/H &A	G	A	Acceptable Hard wheat quality.
NEW VARIETIES - INDICATIVE ASSESSMENTS ONLY																
Beckom	AH	AH	2	2				G	A	M	G	P	A	A	A	Some interest for Domestic Millers marginal long mix & tough dough
Cosmick	AH	AH	3	1				A	M	A	A	A	G	A	G	Suitable for Domestic Mills. Comparable quality to Yitpi & Janz wheats.
Cutlass	APW	APW	3	1				G	A	G	G	A	A	A	A	Suit Domestic Millers. Good WA and acceptable bake.
Hatchet <sup>CL plus</sup>	AH	AH	2	2				A	M	G	G	P	M	A	M	Some interest for Domestic Millers, marginal strong dough
LRPB Trojan	APW	APW	2	1						M						Some interest for Domestic Mills. Marginal low WA, long mix time but good bake volume.
Scepter	AH	AH	3	1				G	G	A	A	A	A	A	A	Suit Domestic Millers. Acceptable AH quality.

# Barley variety sowing guide 2017

By Kenton Porker, SARDI

This sowing guide provides data and guidance on the most suitable barley varieties for sowing in South Australia in 2017.

Since publication of the 2016 sowing guide no new varieties of barley have been released or are available for planting in South Australia in 2017.

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

- Market demand and malting varietal storage segregations in bulk storage facilities (Table 2);
- The difference in payments between malting and feed grades compared to yield differences (Table 3).
- The likelihood of producing a malting grade barley within malt receival specifications;
- The disease resistance and agronomic considerations (Table 4 and Table 5 respectively).

Growers need to consider which varietal option will lead to the greatest profitability. The relative difference in the price premium paid for malt relative to feed may counteract the yield difference between malt and feed or food varieties.

Other scenarios may favour high yielding feed or food varieties where there is a low probability of achieving malt and a desire for lower input costs.

Furthermore amongst malt and food varieties differential pricing will be a continuing trend and growers need to consider market premiums and discounts in addition to agronomic performance to maximize profitability.

Newer food and malt varieties are now offering good yield potential. For long term stability in farm returns and to maintain market supply and demand, farmers now growing only feed varieties should consider including some malting varieties in

**Table 1.** Suitable barley varieties for planting in SA, according to current (2016/17) quality classification grade and in alphabetical order and not in order of preference

Variety	Max. Grade	Suitability and significant features
Buloke <sup>Ⓛ</sup>	malting	All areas except where leaf rust and CCN is a problem.
Commander <sup>Ⓛ</sup>	malting	All areas, except areas prone to net form net blotch.
Flagship <sup>Ⓛ</sup>	malting	Central Region close to domestic markets and Eyre Region, with timely harvest a priority.
Gairdner <sup>Ⓛ</sup>	malting	Medium to high rainfall areas (>400 mm), now agronomically outclassed
La Trobe <sup>Ⓛ</sup>	malting	All areas, note modest early vigour and weed competitiveness especially in light soils.
Navigator <sup>Ⓛ</sup>	malting	South East region but very susceptible to leaf rust
Schooner	malting	All areas except leaf rust prone areas, now agronomically outclassed, declining industry demand
Scope <sup>Ⓛ</sup>	malting	All areas except where leaf rust and CCN is a problem. imidazolinone tolerant
Westminster <sup>Ⓛ</sup>	malting	High rainfall long season South East region
Hindmarsh <sup>Ⓛ</sup>	food	All areas, noting modest early vigour and weed competitiveness especially in light soils.
Capstan <sup>Ⓛ</sup>	feed	Medium to high rainfall areas where very high yields are targeted and test weight is easily achieved.
Compass <sup>Ⓛ</sup>	feed	All areas, being evaluated for malting accreditation. At risk with some strains of leaf rust and lodging in high yielding environments
Fathom <sup>Ⓛ</sup>	feed	All areas, noting susceptibility to net form net blotch
Fleet <sup>Ⓛ</sup>	feed	All areas, particularly for districts with lower rainfall and light soils noting high net form net blotch risk
Keel	feed	All areas except deep sandy soils of lower fertility and avoid areas prone to leaf rust. Outclassed
Maritime	feed	low to medium rainfall areas (<400mm) except in areas prone to net form net blotch
Oxford <sup>Ⓛ</sup>	feed	Medium to high rainfall areas (>400mm) especially where leaf rust is prevalent
Rosalind <sup>Ⓛ</sup>	feed	All areas
Spartacus CL <sup>Ⓛ</sup>	feed	All areas, imidazolinone tolerant, being evaluated for malting accreditation. Similar competitive characteristics as Hindmarsh



## BARLEY

Table 2. Malt variety market suitability and demand in SA

	Export grain use	Domestic malt use	Shochu use	Current SA segregations
Buloke	PREFERRED (increasing)	PREFERRED (decreasing)	no demand	widespread (decreasing)
Commander	PREFERRED (increasing)	PREFERRED (stable)	acceptable	widespread (stable)
Flagship	PREFERRED (stable)	low demand (decreasing)	acceptable	limited (stable)
La Trobe	PREFERRED (increasing)	being assessed (increasing)	being assessed	limited (increasing)
Navigator	no demand	low demand (decreasing)	no demand	limited (SE)
Scope	acceptable (low premium)	PREFERRED (increasing)	no demand	widespread (stable)
Westminster	acceptable	low demand	no demand	limited (SE - VIC)

their cropping program. However, it is important that growers contact their grain marketers of choice to discuss market demand prior to sowing a malting variety. Malting barley is grown, stored and sold on a variety-specific basis and it is important to ascertain if the variety chosen is able to be stored and marketed in your area (Table 2).

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

Cereal cyst nematode levels should be carefully monitored where there is a history of the susceptible varieties such as Schooner, Scope, Buloke, Oxford and Gairdner grown. Seed dressings having activity on powdery mildew should be applied to all varieties susceptible to powdery mildew, particularly when sown before June.

Hindmarsh, Latrobe and Spartacus CL+ are more susceptible to loose smut than other varieties and an appropriate seed smuticide in addition to foliar control of powdery mildew should be considered.

The varieties, Charger and SouthernStar are niche malting quality varieties grown under closed loop contract. See more information within the variety notes section. Flagship is most suitable for Central districts close to domestic markets and Eyre Peninsula where export malting and Shochu segregations are established.

Westminster, while not yet segregated for malt in SA has some limited direct marketing opportunities in the South East and into Port Adelaide. Segregations are available in a number of regions for Compass to support market development.

## Notes on older varieties

**Bass**<sup>®</sup> has been recently developed by Intergrain and is targeted as an export quality malting accredited variety principally for WA. It is a mid to late maturing variety with variable resistance to scald and leaf rust, resistance to barley yellow dwarf virus but no CCN resistance and it is susceptible to both net and spot form net blotch. Bass has shown very good physical grain quality with high test weight and low screenings. Seed is available from Syngenta.

**Buloke**<sup>®</sup> is an export quality profile malting variety developed by VicDPI and released in 2005. It is a tall, midseason variety, with a flowering time similar to Commander. Buloke has shown

consistent high yield and has useful resistance to net form of net blotch and powdery mildew but susceptibility to CCN and some leaf rust strains.

Buloke has averaged slightly lower retention and higher screenings but similar test weight to Commander and is moderately susceptible to black point. Buloke has a moderately short coleoptile and moderately slow early growth. Seed is available through Seednet.

**Charger**<sup>®</sup> is a malting barley, accredited in 2014 and developed by Carlsberg and Heineken Breweries in collaboration with the University of Adelaide. It is mid maturing with good straw strength and resistance to leaf rust and powdery mildew but is very susceptible to net form of net blotch and leaf scald. Charger has shown consistently high grain yield particularly in favourable environments. Contract production is exclusively managed by Australian Grain Growers Cooperative.

**Commander**<sup>®</sup> is a malting quality variety released by the University of Adelaide in 2008 and suitable for domestic, Chinese and SE Asian export brewing markets. Commander has mid-season maturity and across many seasons, demonstrates wide adaptation and very high yield relative to other malting varieties, particularly in seasons with favourable spring finishes.

Commander has excellent grain plumpness, but has generally lower test weight relative to LaTrobe. Commander is resistant to CCN but is moderately susceptible to most foliar diseases including net form net blotch and therefore should not be grown on barley stubble and areas prone to net form net blotch. Seed is available through Seednet.

**Fathom**<sup>®</sup> is an early maturing feed quality variety developed using wild barley to improve stress tolerance and water use efficiency. Fathom has averaged very high yields similar to Hindmarsh based on NVT data since 2010 and shows good early vigour and weed competitiveness. Fathom typically flowers three to four days later than Hindmarsh with early may sowing and similar with later sowings.

Fathom has good levels of resistance to CCN, powdery mildew and spot form net blotch. Fathom has shown susceptibility to net form net blotch, scald and leaf rust and is not recommended for growing in high risk situations unless an appropriate fungicide strategy is applied. Seed is available from Seednet.

**Flagship**<sup>®</sup> was released from the University of Adelaide in 2005 and has an export malt quality profile. Flagship is a tall, midseason maturity variety with good early vigour and weed competitiveness, but modest straw strength. Flagship can show

## BARLEY

high levels of soil boron toxicity symptoms, which may reduce grain size but otherwise has slightly lower retention and higher screenings than Commander. Flagship is very susceptible to sprouting and timely harvest is recommended. Flagship is available through Seednet and Heritage Seeds.

**Fleet<sup>®</sup>** is a midseason maturing, CCN resistant feed barley, developed by the University of Adelaide and released in 2006. Fleet has a long coleoptile and has shown wide adaptation combined with good yield potential. Fleet exhibits an excellent disease resistance profile, although now highly susceptible to net form net blotch and some leaf rust strains. Fleet has plump grain but slightly lower test weights than other feed types. Its strong awn can reduce threshability and attention to concave and thresher adjustment is important, especially in maintaining

test weight. Seed is available through Seednet.

**GrangeR<sup>®</sup>** is a high yielding variety accredited for malting in 2013. It is mid maturing and targeted for areas with more than 400mm rainfall. GrangeR has good levels of resistance to powdery mildew and net form net blotch, variable resistance to leaf rust and leaf scald and susceptibility to spot form net blotch. Seed is available from Heritage Seeds.

**Hindmarsh<sup>®</sup>** is an early maturing, semi-dwarf, food quality variety developed by VicDPI, and released in 2006. Hindmarsh offers excellent yield potential and grain quality with resistance to CCN, variable resistance to leaf rust and leaf scald and susceptibility to spot form net blotch. In 2016 it appeared to become MS to net form net blotch.

Hindmarsh has slow early growth and a short coleoptile and

**Table 3:** Yield of barley varieties in South Australia as a percentage of yield brackets across South Australia (ACAS/NVT data 2011 - 2015 inclusive, with number of observations in italics).

	< 2.0 t/ha	2.0 to 3.0 t/ha	3.0 to 4.0 t/ha	4.0 to 5.0 t/ha	5.0 to 6.0 t/ha	> 6.0 t/ha
<b>MALTING (SA)</b>						
Bass	99	100	101	102	102	103
Buloke	104	102	101	100	98	97
Charger	115	112	108	108	108	109
Commander	106	106	106	104	104	103
Fairview	95	99	99	102	106	108
Flagship	99	97	96	95	93	92
Flinders	100	99	98	99	100	101
Gairdner	95	96	95	93	94	92
GrangeR	104	104	103	105	107	109
La Trobe	117	112	111	111	107	108
Macquarie	94	97	95	93	96	94
Navigator	86	93	96	92	92	88
Schooner	90	90	92	89	87	84
Scope CL	104	102	100	99	98	96
SY Rattler	100	99	98	99	100	100
Westminster	91	94	94	95	101	101
<b>FOOD</b>						
Hindmarsh	116	111	110	110	104	106
<b>FEED</b>						
Barque	102	101	100	97	95	93
Capstan	104	107	107	106	107	107
Fathom	117	112	111	109	104	103
Fleet	113	111	109	106	103	102
Keel	108	104	105	102	95	93
Maritime	99	99	99	96	94	92
Oxford	97	101	100	103	109	111
Rosalind	127	120	118	122	118	123
<b>PENDING MALT ACCREDITATION</b>						
Alestar	100	102	101	104	108	110
Compass	129	121	117	116	110	111
Maltstar	98	101	101	103	107	108
Spartacus CL	119	113	112	113	107	109
Average yield (t/ha)	1.68	2.60	3.51	4.50	5.29	6.30
No. of trials	15	37	34	30	13	1

## BARLEY

attention to seeding depth is important in stubble retained systems. Where triadimenol seed dressing and pre-emergent herbicide is used, research has shown shallow sowing with increased seed rates to be more advantageous than deeper sowing to avoid potential damage. Seed is available from Seednet.

**Maritime<sup>®</sup>** is a tall, early maturing feed variety with CCN resistance released by the University of Adelaide in 2004. Maritime was developed specifically for manganese deficient soils where it exhibits good adaptation. Maritime has moderate to high yield potential on other soil types but is very susceptible to the net form net blotch.

Maritime has excellent physical grain quality and early vigour, and is a good option for lower rainfall environments where tall straw and high test weights are sought but areas of low risk of net form net blotch. Seed is available through Seednet.

**Oxford<sup>®</sup>** is a feed quality variety which has shown very high yield potential in seasons with high spring rainfall. Oxford has late maturity, good straw strength and low shattering. While Oxford is susceptible to CCN, leaf scald and spot form net blotch, it has good resistance to leaf rust and powdery mildew. It is also susceptible to some strains of net form net blotch. Oxford is a useful option for SE high rainfall districts. Seed is available through Heritage Seeds.

**Scope<sup>®</sup>** is a tall, malting quality, mid-season maturing, imidazolinone tolerant barley with moderate to high yield

potential across a range of medium rainfall environments. Its disease resistance profile is very similar to Buloke with susceptibility to some strains of leaf rust but good resistance to net form net blotch and powdery mildew. Scope has registration for use with an appropriate BASF Clearfield herbicide and this herbicide tolerance makes Scope an attractive option for brome and other grass control, particularly in mallee type soils. Seed is available through Seednet.

**SouthernStar<sup>®</sup>** is a new malting barley developed by Sapporo Breweries and the University of Adelaide. SouthernStar is a Flagship plant type and incorporates a patented novel gene for improved beer quality. It has almost identical agronomic characteristics to Flagship with good early vigour, CCN resistance and a strong foliar disease resistance profile.

SouthernStar also has sensitivity to sprouting so timely harvest must be a priority. SouthernStar can be grown under production contract to Barrett Burston Maltings and Cargill malting.

**Westminster<sup>®</sup>** was developed by European based Nickersons Plant Breeders and is a mid-late maturing variety with medium-tall, stiff straw and improved shattering tolerance compared to Gairdner. Malting accreditation was completed in March 2013.

Westminster has excellent foliar disease resistance coupled with good resistance to black point but is susceptible to spot form of net blotch. Westminster is well suited to the SE of South Australia and higher rainfall environments. Seed is available from Heritage Seeds.

Table 4: Disease reaction of selected barley varieties

Variety	CCN resistance	CCN tolerance	Leaf rust	Net blotch (net form)	Net blotch (spot form)	Leaf scald	Powdery mildew	Black point
Barque	R	T	MRMS-S	MSS	RMR	SVS	MR	S
Bass	S	T	MR-VS	MS-SVS	MSS	MR-S	MSS	MS
Buloke	S	T	MS-SVS	MR	MS-S	MS-S	RMR	MS
Charger	R	T	MR-S	VS	SVS	VS	RMR	MRMS
Commander	R	T	MS-S	MS-S	MSS	S-SVS	MRMS	MSS
Compass	R	T	SVS	MR-MRMS	MR-MSS	MS-SVS	MR	MS
Fathom	R	T	MRMS-S	MR-MS	RMR	R-MS	MRMS	S
Flagship	R	T	MS-S	MR	MRMS	MS-SVS	S	MSS
Fleet	R	T	MRMS-S	S-VS	MR	MR-SVS	MRMS	MS
Flinders	S	T	MRMS-S	MR-MS	S	S	RMR	MRMS
GrangeR	S	T	MR-MS	MR-MSS	S	MS-SVS	R	MS
Hindmarsh	R	T	MRMS-S	MR-MS	S	R-VS	R-S	MSS
Keel	R	T	VS	MS	MR	MS-SVS	S	SVS
La Trobe	R	T	MRMS-S	MR-MS	MSS	R-VS	MR-S	MSS
Maritime	R	T	MRMS-S	R-VS	MRMS	MS-S	SVS	MSS
Navigator	R	T	VS	MR-MS	MR	R-S	R	MSS
Oxford	S	T	R-MR	MR-SVS	MSS	MS-SVS	R	MR
Rosalind	R	T	MR-MS	MR	MSS	MR-S	RMR-S	MS
Schooner	VS	T	S-VS	MR	MS	MS-S	SVS	MS
Scope CL	S	T	MS-SVS	MR	MS-S	MS-S	R-MR	MSS
Spartacus CL	R	T	MRMS-S	MRMS-MSS	MSS-SVS	R-VS	R-S	MSS
Westminster	-	T	R-MRMS	MR	S	R-S	R	MRMS

Disease rating codes: R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; VS = very susceptible

A range of reactions is provided where different strains of the pathogen exist and where the variety may respond differently to them. Information on disease reaction was supplied by the Field Crop Pathology Unit (SARDI). Contact Dr Hugh Wallwork (08) 8303 9382.

## BARLEY

### Newer varieties

**Compass<sup>®</sup>** has been developed by the University of Adelaide as an early to mid-season maturing, potential malting quality variety and is expected to complete Barley Australia malt accreditation in March 2018. It is closely related to Commander but is significantly higher yielding, has a similar growth habit to Commander but is earlier flowering with typical may sowing and improved net form net blotch resistance.

Compass has similar straw strength to Commander and will be prone to lodging in high yielding environments. Compass is now susceptible (SVS) to a new strain of leaf rust in SA. Compass has shown good physical grain quality with high retention and low screenings and moderate test weight. Seed is available from Seednet.

**La Trobe<sup>®</sup>** is a malting accredited variety released from Intergrain in 2014 with early maturity and semi dwarf growth habit and plant architecture very similar to Hindmarsh. Its yield and agronomic performance in SA NVT since 2013 has also been very similar to Hindmarsh with slightly higher yield.

La Trobe is resistant to CCN but S to SFNB and MS to net form of net blotch but shows variable resistance to leaf rust and leaf scald. La Trobe seed is available from Syngenta.

**Flinders<sup>®</sup>** is a malting accredited variety developed by Intergrain and market development is in progress. It is a mid to late maturing variety with variable resistance to leaf rust and is susceptible to spot form net blotch, scald, and CCN. Seed is available from Syngenta.

**Rosalind<sup>®</sup>** is a feed quality variety recently released by Intergrain in 2015. It has been evaluated in SA NVT since 2014 and has demonstrated broad adaptation and very high yields in high rainfall environments.

Rosalind has a Hindmarsh plant type and flowers two to three days later than Hindmarsh and La Trobe. Rosalind has resistance to CCN, net form net blotch, leaf rust, and variable resistance to powdery mildew and leaf scald but susceptibility to spot form net blotch. Seed is available from Syngenta.

**Spartacus CL<sup>®</sup>** is a new imidazolinone tolerant barley developed by Intergrain and released in 2016 with a similar plant type and flowering behaviour to Hindmarsh and La Trobe. Within SA NVT during 2014 and 2015, Spartacus CL has also exhibited similar agronomic performance for grain yield and disease resistance profile including resistance to CCN and susceptibility to loose smut.

Yields have averaged around 5% below Compass but more than 15% above the widely grown imidazolinone tolerant Scope CL.

Spartacus CL has commenced Barley Australia malt accreditation with a decision on its suitability expected March 2018. Seed is available for sowing as a feed option while industry accreditation is completed. Seed is available from Syngenta. ■

*Acknowledgements: The assistance of Rob Wheeler, Hugh Wallwork (SARDI) and Stewart Coventry (University of Adelaide) is gratefully acknowledged.*

Table 5: Agronomic characteristics of selected barley varieties

Variety	Coleoptile length	Early vigour	Standing ability	Height to head	Earliness to flower	Head retention	Ease of threshing	Boron tox symptoms	Manganese efficiency
Barque	-	6	6	7	6	5	3	6	3
Bass	5	4	7	4	4	6		8	-
Buloke	4	5	5	7	5	4	8	3	-
Commander	6	6	4	6	5	5	7	6	-
Compass	6	6	4	6	7	7	7	6	-
Fathom	7	7	7	6	7	6	4	5	-
Flagship	5	5	5	6	5	7	7	8	-
Fleet	8	6	3	7	6	6	4	5	-
Gairdner	5	4	6	5	4	8	6	7	3
GrangeR	5	5	7	6	5	8	-	-	-
Hindmarsh	3	3	7	5	7	7	7	8	-
Keel		6	5	6	8	5	6	6	4
La Trobe	3	3	7	5	7	7	7	8	-
Maritime	7	8	4	6	6	7	7	8	7
Navigator	6	4	7	4	4	7	8	2	-
Oxford	5	6	8	4	3	8	7	7	-
Rosalind	-	-	8	-	6	8	-	-	-
Schooner	6	6	6	7	5	4	7	7	5
Scope CL	4	5	5	7	5	4	8	3	-
Spartacus CL	3	3	7	5	7	7	7	-	-
Westminster	-	4	8	5	3	7	-	-	-

Relative values based on a 0-9 scale, a high figure indicating the variety expresses the character to a high degree. These values are only a guide; growing conditions greatly influence differences. \* A high boron toxicity symptom score relates to high presence of leaf symptoms.



# Herbicide tolerance of cereal and pulses

By David Brunton, Rob Wheeler and Larn McMurray, SARDI

The level of tolerance to commonly used herbicides in cereal and pulse varieties has been found to vary between cultivars.

Small yield reductions to sensitive varieties caused by herbicide damage may be easily detected on a large scale, but can be very costly. The variation in tolerance may be due to any combination of differences in morphological or physiological traits among the varieties.

Australian cereal and pulse varieties are extensively tested to determine level of tolerance to commonly used herbicides in South Australia as part of a national GRDC funded program.

All newly released varieties are tested to identify any potential herbicide sensitivity to provide additional information to growers for the agronomic management of new varieties. Varieties are first tested in preliminary trials at higher than recommended rates of the herbicides to identify any sensitivity to specific herbicides.

Once a significant variety and herbicide interaction has been identified, the variety is tested with the specific herbicide in more advanced trials using recommended and higher than recommended herbicide rates to determine the severity of the yield reductions caused by the herbicide.

Given that environmental conditions strongly influence the level of safety of most herbicides it is important that varieties are tested over a number of seasons to clearly identify the level of tolerance.

Cereal field trials are conducted at Mallala and Kybunga, while the pulses are tested at Minlaton. The level of sensitivity is determined by yield reductions in comparison to unsprayed controls of the same variety.

The long-term results are presented in the following tables, summarised using the symbols below:

The sensitivity of the variety is summarised, using the following symbols based on the yield responses across all trials:	
-	not tested or insufficient data.
✓	no significant yield reductions at label or higher than recommended rates in (z) trials.
N (w/z)	narrow margin, significant yield reductions at higher than recommended rate, but not at recommended rate. Significant event occurring in w trials out of z trials tested. Eg. (2/5) = tested in 5 trials, 2 trials returning a significant yield reduction.
x% (1/z)	yield reduction (warning) significant yield reduction at recommended rate in 1 trial only out of z trials conducted.
x-y% (w/z)	yield reductions (warning) significant yield reductions at recommended rate in w trials out of z trials conducted.
Always follow label recommendations. All pesticide applications must accord with the currently registered label for that particular pesticide, crop, pest and region.	
Any research regarding pesticides of their use reported in this PUBLICATION does not constitute a recommendation for that particular use by the authors, the author's organisations of ACAS. It must be emphasised that crop tolerance and yield responses to herbicides are strongly influenced by seasonal conditions.	

## BARLEY VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of barley vary in tolerance to commonly used herbicides.

Herbicide		Paradigm + LVE MCPA	Precept	Tigrex
		Halaxifen + Florasulam + LVE MCPA	Pyrasulfotole + MCPA	MCPA + Diflufenican
Variety	Years Tested	2015	2014-2015	1996-2015
Bass	2010-2011	-	-	P(2)
Baudin	2009-2012	-	-	P(2)
Barque	1995-2000			5-8 (3/5)
Brewstar	2014-2015	P(1)	P(2)	P(2)
Buloke	2006-2009	-	-	P(4)
Capstan	2002-2004	-	-	10 (1/3)
Charger	2011-2013	-	-	P(3)
Commander	2007-2015	P(1)	P(2)	P(9)
Compass	2013-2015	P(1)	P(2)	P(3)
Dhow	2001-2003	-	-	P(3)
Fairview	2013 - 2014	P(1)	P(2)	P(2)
Fathom	2012-2013	-	-	P(2)
Finniss	2008-2009	-	-	P(2)
Flagship	2004-2009	-	-	8 (1/6)
Fleet	2004-2006	-	-	7-8 (2/3)
Flinders	2013 - 2014	P(1)	P(2)	N (1/2)
Gairdner	1998-2001	-	-	3 (1/4)
GrangeR	2013 - 2015	P(1)	P(2)	P(3)
Hindmarsh	2007-2015	P(1)	P(2)	8 (1/8)
Keel	1998-2001	-	-	4-6 (3/4)
La Trobe	2013-2015	P(1)	P(2)	N (1/4)
Maltstar	2014-2015	P(1)	P(2)	N (1/2)
Maritime	2003-2005	-	-	7 (1/3)
Oxford	2009-2012	-	-	P(2)
Schooner	1993-1997	-	-	P(2)
Scope	2010-2012	-	-	P(2)
Sloop	1994-2000			4-9 (2/5)
Sloop SA	2009-2010	-	-	P(2)
Spartacus	2015	P(1)	P(1)	P(1)
SY Rattler	2012-2013	-	-	P(2)
Torrens	2001-2003	-	-	P(3)
Vlamingh	2009-2010	-	-	P(2)
Westminster	2011-2013	-	-	P(3)
Wimmera	2010-2012	-	-	P(2)
Yarra	2004-2007	-	-	P(3)
Rates (product/ha)		25 g + 400 mL	1 L	1 L
Crop stage at spraying		3 leaf	4 leaf	5 leaf

## HERBICIDE TOLERANCE

### BARLEY VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of barley vary in tolerance to commonly used herbicides.

Herbicide		2,4-D Amine 500/625	Achieve	Affinity® + MCPA	Ally® + MCPA	Axial	Banvel M	Boxer Gold®
		2,4-D Amine	Tralkoxydim	Carfentrazone - Ethyl + MCPA	Metsulfuron- methyl + MCPA	Pinoxaden + Cloquintocet- Methyl	MCPA + Dicamba	Prosulfocarb + S-Metolachlor
Variety	Years Tested	1993-2015	1993-2015	2006-2015	1993-2015	2006-2015	1993-2013	2009-2015
Bass	2010-2011	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Baudin	2009-2012	✓(2)	✓(1)	✓(2)	✓(2)	✓(2)	✓(1)	✓(2)
Barque	1995-2000	6 (1/6)	N (1/6)	-	✓(6)	-	6-10 (5/6)	-
Brewstar	2014-2015	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Buloke	2006-2009	✓(4)	N (1/4)	12 (1/4)	N (1/4)	✓(4)	N (1/4)	✓(1)
Capstan	2002-2004	N (1/3)	N (2/3)	-	✓(3)	-	N (3/3)	-
Charger	2011-2013	✓(3)	✓(3)	✓(3)	✓(3)	✓(3)	-	✓(3)
Commander	2007-2015	N (1/9)	✓(9)	✓(9)	4-10 (3/9)	✓(9)	N (2/3)	✓(6)
Compass	2013-2015	✓(3)	✓(3)	✓(3)	✓(3)	✓(3)	-	✓(3)
Dhow	2001-2003	N (1/3)	✓(3)	-	4 (1/3)	-	N (2/3)	-
Fairview	2013 - 2014	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Fathom	2012-2013	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Finniss	2008-2009	✓(2)	9 (1/2)	✓(2)	✓(2)	7 (1/2)	✓(2)	N (1/1)
Flagship	2004-2009	10 (1/6)	5 (1/6)	N (1/4)	✓(6)	N (1/4)	16 (1/6)	6 (1/1)
Fleet	2004-2006	✓(3)	N (1/3)	✓(1)	✓(3)	✓(1)	5 (1/3)	-
Flinders	2013 - 2014	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Gairdner	1998-2001	N (3/4)	7 (1/4)	-	✓(4)	-	4 (1/4)	-
GrangeR	2013 - 2015	✓(3)	✓(3)	✓(3)	✓(3)	✓(3)	-	✓(3)
Hindmarsh	2007-2015	✓(8)	✓(8)	N (2/8)	11-23 (3/8)	11 (1/8)	8 (1/5)	✓(8)
Keel	1998-2001	✓(4)	✓(4)	-	✓(4)	-	4 (1/4)	-
La Trobe	2013-2015	N (1/4)	N (1/4)	14 (1/4)	✓(4)	✓(4)	✓(4)	✓(4)
Maltstar	2014-2015	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Maritime	2003-2005	✓(3)	N (1/3)	-	N (1/3)	-	✓(3)	-
Oxford	2009-2012	✓(2)	✓(1)	✓(2)	✓(2)	✓(2)	N (1/4)	✓(2)
Schooner	1993-1997	✓(5)	✓(5)	-	✓(5)	-	9-46 (2/5)	-
Scope	2010-2012	✓(2)	-	✓(2)	✓(2)	9 (1/4)	✓(2)	✓(2)
Sloop	1994-2000	N (2/7)	✓(7)	-	9 (1/7)	-	12-24 (3/7)	-
Sloop SA	2009-2010	✓(2)	✓(1)	✓(2)	✓(2)	✓(2)	✓(1)	✓(2)
Spartacus	2015	✓(1)	✓(1)	✓(1)	✓(1)	✓(1)	-	✓(1)
SY Rattler	2012-2013	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)	-	✓(2)
Torrens	2001-2003	✓(3)	N (1/3)	-	✓(3)	-	N (2/3)	-
Vlamingh	2009-2010	✓(2)	✓(1)	✓(2)	✓(2)	✓(2)	✓(1)	✓(2)
Westminster	2011-2013	✓(3)	✓(3)	✓(3)	✓(3)	✓(3)	N (1/3)	✓(3)
Wimmera	2010-2012	✓(2)	-	✓(2)	✓(2)	✓(2)	✓(2)	✓(2)
Yarra	2004-2007	5 (1/3)	✓(3)	✓(2)	N (1/3)	✓(2)	N (1/3)	-
Rates (product/ ha)		1.4 L	380 g	100 mL + 330 mL	7 g + 330 mL	250 mL	1.4 L	2.5 L
Crop stage at spraying		2 node	4 leaf	4 leaf	4 leaf	4 leaf	6 leaf	IBS

## HERBICIDE TOLERANCE

BARLEY VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA								
This research has been conducted across the mid north of South Australia to determine if new and existing varieties of barley vary in tolerance to commonly used herbicides.								
Herbicide		Broadstrike	Bromoxynil MCPA	Cadence® + MCPA	Decision	Diuron + MCPA Amine	Glean	Hoegrass®
	Years Tested	Flumetsulam	Bromoxynil + MCPA	Dicamba + MCPA	Diclofop-methyl + Sethoxydim	Diuron + MCPA Amine	Chlorsulfuron	Diclofop-methyl
Variety		1993-2015	1994-2015	2006-2015	2005-2012	1993-2015	1993-2009	1993-2004
Bass	2010-2011	P(2)	P(2)	N (1/2)	-	P(2)	-	-
Baudin	2009-2012	P(1)	P(2)	N (1/3)	P(2)	P(2)	P(1)	-
Barque	1995-2000	P(6)	7-8 (2/6)	-	-	P(6)	P(3)	4 (1/6)
Brewstar	2014-2015	P(2)	P(2)	P(2)	-	P(2)	-	-
Buloke	2006-2009	P(4)	10 (1/4)	9-11 (2/4)	12 (1/4)	13 (1/4)	P(2)	-
Capstan	2002-2004	8 (1/3)	P(3)	-	-	N (1/3)	P(3)	N (1/3)
Charger	2011-2013	P(3)	P(3)	P(3)	-	P(3)	P(3)	-
Commander	2007-2015	P(9)	8 (1/9)	12 (1/9)	P(6)	7-10 (2/9)	P(3)	-
Compass	2013-2015	P(3)	P(3)	P(3)	-	P(3)	P(3)	-
Dhow	2001-2003	P(3)	15 (1/3)	-	-	P(3)	P(3)	P(3)
Fairview	2013 - 2014	P(2)	P(2)	P(2)	-	N (1/2)	-	-
Fathom	2012-2013	N (1/2)	P(2)	N (1/2)	-	P(2)	-	-
Finniss	2008-2009	10 (1/2)	P(2)	N (1/2)	N (1/2)	N (1/2)	-	-
Flagship	2004-2009	P(6)	12 (1/6)	14 (1/4)	P(5)	N (1/6)	P(4)	N (1/1)
Fleet	2004-2006	P(3)	N (1/3)	N (1/1)	N (1/2)	7 (1/3)	P(3)	N (1/1)
Flinders	2013 - 2014	P(2)	P(2)	P(2)	-	P(2)	-	-
Gairdner	1998-2001	P(4)	7 (1/4)	-	-	6 (1/4)	P(3)	6 (1/4)
GrangeR	2013 - 2015	P(3)	P(3)	P(3)	-	N (1/3)	-	-
Hindmarsh	2007-2015	N (2/8)	6 (2/8)	P(8)	7 (1/3)	3-10 (2/8)	P(1)	-
Keel	1998-2001	P(4)	3-8 (2/4)	-	-	P(4)	N (1/3)	P(4)
La Trobe	2013-2015	P(4)	N (1/4)	P(4)	-	P(4)	-	-
Maltstar	2014-2015	P(2)	P(2)	P(2)	-	P(2)	-	-
Maritime	2003-2005	5 (1/3)	N (1/3)	-	P(1)	N (2/3)	N (1/3)	9 (1/2)
Oxford	2009-2012	P(1)	P(2)	P(2)	P(2)	P(2)	P(1)	-
Schooner	1993-1997	14 (1/5)	N (1/4)	-	-	N (2/5)	P(1)	9 (1/5)
Scope	2010-2012	P(2)	P(2)	P(2)	P(2)	P(2)	-	-
Sloop	1994-2000	16 (1/7)	3-4 (2/7)	-	-	P(7)	P(3)	22 (1/7)
Sloop SA	2009-2010	P(1)	P(2)	P(2)	P(2)	P(2)	P(1)	-
Spartacus	2015	P(1)	P(1)	P(1)	-	P(1)	P(1)	-
SY Rattler	2012-2013	P(2)	P(2)	P(2)	-	P(2)	-	-
Torrens	2001-2003	N (1/3)	N (1/3)	-	-	P(3)	P(3)	P(3)
Vlamingh	2009-2010	P(1)	P(2)	P(2)	P(2)	P(2)	P(1)	-
Westminster	2011-2013	P(3)	P(3)	P(3)	N (1/3)	N (1/3)	P(3)	-
Wimmera	2010-2012	P(2)	N (2/4)	P(2)	P(2)	P(2)	-	-
Yarra	2004-2007	4 (1/3)	N (2/3)	N (2/2)	P(3)	P(3)	P(3)	-
Rates (product/ha)		25 g	1.4 L	200 g + 330 mL	1.0 L	280 g + 330 mL	20 g	1 L
Crop stage at spraying		5 leaf	3 leaf	6 leaf	4 leaf	3 leaf	4 leaf	4 leaf

## HERBICIDE TOLERANCE

### WHEAT VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of barley vary in tolerance to commonly used herbicides.

Herbicide		2,4-D Amine 625	Achieve®	Affinity® + MCPA	Ally® + MCPA	AtlantisOD®	Axial®	Banvel M®	Boxer Gold®
	Years Tested	2,4-D Amine	Tralkoxydim	Carfentrazone - Ethyl + MCPA	Metsulfuron-methyl	Mesosulfuron	Pinoxaden + Cloquintocet-Methyl	MCPA+ Dicamba	Prosulfocarb + S-Metolochlor
Variety		1993-2015	1993-2015	2006-2015	1993-2015	2011-2012	2006-2015	1993-2009	2009-2015
AGT Katana	2009-2012	P(4)	P(4)	P(4)	6 (1/4)	P(1)	N (1/4)	-	P(4)
Axe	2008-2009	6 (1/2)	N (1/2)	P(2)	7 (1/2)	-	5 (1/2)	N (2/2)	P(1)
Caparoi	2009-2010	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Catalina	2007-2012	N (1/3)	N (1/3)	P(3)	N (1/3)	N (1/1)	P(3)	N (1/3)	P(1)
Cobalt	2015	P(1)	P(1)	P(1)	P(1)	-	P(1)	-	P(1)
Cobra	2012-2013	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Cosmick	2014-2015	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Corack	2012-2013	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Correll	2006-2009	14 (1/4)	10 (1/4)	P(4)	8-15 (3/4)	P(1)	P(4)	6 (1/4)	P(1)
Dart	2013-2015	N (2/3)	P(3)	P(3)	N (1/2)	-	P(3)	-	P(3)
DBA Aurora	2013-2015	P(3)	P(3)	P(3)	P(3)	-	P(3)	-	P(3)
Derrimut	2006-2007	N (1/2)	P(2)	P(2)	N (1/2)	-	P(2)	10 (1/2)	-
EGA Gregory	2009-2010	P(2)	P(2)	N (1/3)	N (1/3)	-	P(2)	-	P(2)
Emu Rock	2012-2015	P(4)	P(4)	P(4)	P(4)	-	P(4)	-	P(4)
Espada	2009-2010	N (1/2)	7 (1/2)	P(2)	P(2)	-	P(2)	7 (1/2)	P(2)
Estoc	2009-2012	P(2)	P(2)	P(2)	P(2)	-	N (1/4)	-	P(2)
Frame	1993-2010	5-18 (3/18)	3-12 (2/18)	P(5)	4-21 (4/18)	P(1)	P(5)	5-21 (2/17)	P(2)
Gladius	2006-2012	6-11 (2/4)	5 (1/4)	P(4)	9-18 (2/4)	P(2)	P(4)	N (2/4)	N (1/1)
Grenade CL Plus	2013-2015	N (1/3)	N (1/3)	P(3)	P(3)	-	N (1/3)	-	P(3)
Guardian	2008-2012	9 (1/2)	P(2)	P(2)	N (1/2)	-	P(2)	P(2)	P(1)
Harper	2013-2015	P(3)	N (1/3)	P(3)	P(3)	-	P(3)	-	P(3)
Hatchet CL Plus	2014-2015	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Hyperno	2009-2012	P(2)	P(2)	N (2/4)	9 (1/1)	P(2)	P(2)	-	P(2)
Impose CL Plus	2013	-	N (1/3)	-	N (1/3)	-	N (1/3)	-	-
Janz	1993-00,08	3-5 (2/9)	P(9)	P(1)	N (3/9)	-	P(1)	5-15 (2/9)	-
Justica CL Plus	2012-2013	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Kalka	2001-2004	6 (1/3)	N (1/4)	-	N (1/4)	-	-	N (2/4)	-
Kord CL Plus	2012-2013	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Kukri	2000-2002	3 (1/3)	P(3)	-	4-6 (2/3)	-	-	4 (1/3)	-
Kunjin	2009-2010	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	6 (1/1)
Mace	2009-2015	P(5)	P(5)	P(5)	P(5)	P(1)	N (2/5)	-	N (1/5)
SF Ovalo	2015	P(1)	P(1)	P(1)	P(1)	-	P(1)	-	P(1)
Orion	2009-2010	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Peake	2008-2009	11 (1/2)	P(2)	P(2)	N (1/2)	-	P(2)	P(2)	P(1)
Phantom	2012-2013	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Saintly	2009-2012	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Sentinel	2009-2012	N (1/3)	P(1)	P(1)	N (1/3)	-	N (1/3)	-	P(1)
Scout	2009-2012	P(2)	P(2)	P(2)	P(2)	P(2)	P(2)	-	P(2)
Shield	2013-2015	P(3)	N (1/3)	P(3)	N (1/3)	-	P(3)	-	P(3)
Supreme	2015	P(1)	P(1)	P(1)	P(1)	-	P(1)	-	P(1)
Tamaroi	1996-2003	3-4 (2/8)	5 (1/8)	-	11 (1/8)	-	-	P(8)	-
Tenfour	2015	P(1)	P(1)	P(1)	P(1)	-	P(1)	-	P(1)
Tjilkuri	2009-2010	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Trojan	2013-2015	N (1/3)	N (1/3)	P(3)	P(3)	-	P(3)	-	P(3)
Viking	2014-2015	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
Wallup	2012-2013	P(2)	P(2)	P(2)	P(2)	-	P(2)	-	P(2)
WID802	2010-2012	-	-	-	N (1/2)	-	P(1)	-	-
Wyalkatchem	2003-2005	9 (1/3)	N (1/3)	-	4-8 (2/3)	-	-	P(3)	-
Yawa	2010-2011	-	-	N (1/2)	8 (1/2)	-	N (1/2)	-	P(1)
Yitpi	1998-2015	2-9 (3/5)	P(5)	N (1/5)	2-8 (2/5)	P(2)	P(5)	N (1/5)	P(5)
Young	2005-2006	P(2)	P(2)	P(1)	9 (1/2)	-	P(1)	4 (1/2)	-
Rates (product/ha)		1.4 L	380 g	100 mL + 330 mL	7 g + 330 mL	330 mL	250 mL	1.4 L	2.5 L
Crop stage at spraying		2 node	3 leaf	3 leaf	5 leaf	3 leaf	3 leaf	5 leaf	IBS



## HERBICIDE TOLERANCE

## WHEAT VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of barley vary in tolerance to commonly used herbicides.

Herbicide		Bromoxynil MCPA	Cadence® + MCPA	Crusader®	Diuron + MCPA	Hussar®	Logran®	Paradigm + LVE MCPA	Sakura®	Tigrex®
	Years Tested	Bromoxynil + MCPA	Dicamba + MCPA	Pyrox-sulam	Diuron + MCPA Amine	Iodosulfuron-Merhylsodium	Triasulfuron	Halauxifen + Florasulam + LVE MCPA	Pyroxa-sulfone	MCPA + Diflufenican
Variety		1994-2015	2006-2015	2011-2012	1993-2015	2005-2015	1993-2009	2015	2010-2015	1996-2015
AGT Katana	2009-2012	P(4)	P(4)	-	P(4)	P(4)	-	-	P(1)	P(4)
Axe	2008-2009	P(2)	10 (1/2)	-	6 (1/1)	10 (1/2)	N (1/2)	-	-	P(2)
Caparoi	2009-2010	P(2)	P(2)	-	P(2)	P(2)	P(2)	-	-	P(2)
Catalina	2007-2012	P(3)	6-10 (2/3)	N (1/1)	P(2)	P(2)	-	-	-	P(2)
Cobalt	2015	P(1)	P(1)	-	P(1)	P(1)	-	P(1)	P(1)	P(1)
Cobra	2012-2013	P(2)	N (2/3)	-	P(2)	P(2)	-	-	P(2)	P(2)
Cosmick	2014-2015	P(2)	P(2)	-	N (1/2)	P(2)	-	P(1)	P(2)	P(2)
Corack	2012-2013	P(2)	N (1/4)	-	N (1/2)	P(2)	-	-	P(2)	P(2)
Correll	2006-2009	P(4)	N (1/4)	P(1)	P(3)	12 (1/4)	P(4)	-	P(2)	7 (1/4)
Dart	2013-2015	P(3)	N (1/3)	-	N (2/3)	P(3)	-	P(1)	P(3)	P(3)
DBA Aurora	2013-2015	P(3)	P(3)	-	P(3)	P(3)	-	P(1)	-	P(3)
Derrimut	2006-2007	N (1/2)	P(2)	-	P(2)	P(2)	N (1/2)	-	-	N (1/2)
EGA Gregory	2009-2010	P(2)	N (1/3)	-	P(2)	P(2)	-	-	-	P(2)
Emu Rock	2012-2015	P(4)	N (1/4)	-	P(4)	P(4)	-	P(1)	8 (2/4)	P(4)
Espada	2009-2010	P(2)	P(2)	-	-	P(2)	N (1/2)	-	-	7 (1/2)
Estoc	2009-2012	P(2)	P(2)	-	P(2)	P(2)	-	-	-	P(2)
Frame	1993-2010	2-7 (5/17)	8 (1/5)	P(1)	4-6 (3/17)	N (2/6)	2 (1/17)	-	P(2)	N (4/15)
Gladius	2006-2012	P(4)	9 (1/4)	P(2)	P(3)	17-19 (2/4)	5 (1/4)	-	P(2)	7 (1/4)
Grenade CL Plus	2013-2015	P(3)	P(3)	-	P(3)	P(3)	-	P(1)	P(3)	P(3)
Guardian	2008-2012	P(2)	N (1/2)	-	-	P(2)	P(2)	-	P(2)	6 (1/2)
Harper	2013-2015	P(3)	P(3)	-	P(3)	P(3)	-	P(1)	P(2)	P(3)
Hatchet CL Plus	2014-2015	P(2)	P(2)	-	P(2)	P(2)	-	P(1)	P(2)	P(2)
Hyperno	2009-2012	5 (1/2)	9 (1/2)	9 (1/2)	P(2)	N (1/4)	-	-	-	P(2)
Impose CL Plus	2013	N (1/2)	N (2/3)	-	-	N (1/3)	-	-	P(1)	P(1)
Janz	1993-00,08	6 (1/8)	P(1)	-	2 (1/9)	8 (1/1)	2 (1/9)	-	-	5 (1/6)
Justica CL Plus	2012-2013	P(2)	N (2/2)	-	P(2)	P(2)	-	-	P(2)	P(2)
Kalka	2001-2004	N (1/4)	-	-	6 (1/4)	-	P(4)	-	-	5 (1/4)
Kord CL Plus	2012-2013	P(2)	N (1/2)	-	P(2)	P(2)	-	-	P(2)	P(2)
Kukri	2000-2002	4 (1/3)	-	-	P(3)	-	8 (1/3)	-	-	9 (1/3)
Kunjini	2009-2010	N (2/3)	P(2)	-	P(2)	P(2)	-	-	-	P(2)
Mace	2009-2015	N (125)	N (2/5)	P(1)	N (2/5)	P(5)	-	P(1)	P(5)	P(5)
SF Ovalo	2015	P(1)	P(1)	-	P(1)	P(1)	-	P(1)	P(1)	P(1)
Orion	2009-2010	P(2)	P(2)	-	P(2)	P(2)	-	-	-	P(2)
Peake	2008-2009	5 (1/2)	P(2)	-	P(1)	P(2)	6 (1/2)	-	-	P(2)
Phantom	2012-2013	P(2)	9 (1/2)	-	P(2)	P(2)	-	-	P(2)	P(2)
Saintly	2009-2012	P(2)	P(2)	-	6 (1/2)	N (1/3)	-	-	-	P(2)
Sentinel	2009-2012	P(1)	P(1)	-	P(1)	P(1)	-	-	-	-
Scout	2009-2012	P(2)	P(2)	P(2)	P(2)	P(2)	-	-	P(2)	P(2)
Shield	2013-2015	P(3)	P(3)	-	P(3)	N (1/3)	-	P(1)	P(3)	P(3)
Supreme	2015	P(1)	P(1)	-	P(1)	P(1)	-	P(1)	P(1)	P(1)
Tamaroi	1996-2003	N (3/8)	-	-	4 (1/8)	-	N (2/8)	-	-	P(8)
Tenfour	2015	P(1)	P(1)	-	P(1)	P(1)	-	P(1)	P(1)	P(1)
Tjilkuri	2009-2010	P(2)	P(2)	-	P(2)	P(2)	-	-	-	P(2)
Trojan	2013-2015	P(3)	N (1/2)	-	N (1/3)	P(3)	-	P(1)	P(3)	P(3)
Viking	2014-2015	P(2)	N (1/2)	-	N (1/2)	P(2)	-	P(1)	P(2)	P(2)
Wallup	2012-2013	P(2)	N (1/2)	-	P(2)	P(2)	-	-	P(2)	P(2)
WID802	2010-2012	-	-	-	-	-	-	-	-	-
Wyalkatchem	2003-2005	P(3)	-	-	5 (1/3)	4 (1/1)	N (1/3)	-	-	7 (1/3)
Yawa	2010-2011	-	-	-	-	-	-	-	-	-
Yitpi	1998-2015	N (3/5)	P(5)	P(2)	P(5)	P(5)	6-8 (2/4)	P(1)	P(5)	N (3/5)
Young	2005-2006	P(2)	N (1/1)	-	P(2)	3 (1/2)	P(2)	-	-	P(2)
Rates (product/ha)		1.4 L	200 g + 330 mL	500 mL	280 g + 250 mL	200 g	35 g	25 g + 400 mL	118 g	1 L
Crop stage at spraying		3 leaf	5 leaf	3 leaf	3 leaf	3 leaf	PSPE	3 leaf	IBS	5 leaf

## HERBICIDE TOLERANCE

## OAT VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of oats vary in tolerance to commonly used herbicides.

Herbicide	2,4-D Amine 625	Affinity® + MCPA	Ally + MCPA	Banvel M	Boxer Gold®*	Broadstrike	Bromoxynil MCPA	Cadence®	Cadence® + MCPA
	2,4-D Amine 625	Carfentrazone - Ethyl + MCPA	Metsulfuron- methyl + MCPA	MCPA+Dicamba	Prosulfocarb + S-Metolachlor	Flumetsulam	Bromoxynil + MCPA	Dicamba	Dicamba + MCPA
Variety	1995-2015	2012-2015	1995-2015	1995-2015	2011-2015	1995-2015	1995-2015	2011-2013	2014-2015
Bannister	P(3)	P(3)	P(3)	-	P(3)	P(3)	P(3)	P(3)	-
Brusher	7 (1/2)	-	P(2)	5 (1/2)	-	8 (1/2)	N (1/2)	-	-
Dunnart	P(5)	N (1/3)	P(5)	N (2/5)	P(2)	P(5)	P(5)	10-18 (2/5)	P(2)
Forester	P(2)	P(2)	P(1)	P(1)	P(2)	P(2)	P(2)	N (1/3)	-
Glider	8 (1/3)	-	P(3)	9 (1/3)	-	P(3)	P(3)	-	-
Kangaroo	4-17 (2/3)	-	P(3)	15-35 (2/3)	-	10 (1/3)	16 (1/3)	-	-
Mitika	6 (1/4)	-	7 (1/4)	8-40 (3/4)	-	7 (1/4)	6 (1/4)	-	-
Mulgara	N (2/3)	-	6 (1/2)	7 (1/3)	-	P(3)	7 (1/3)	-	-
Numbat	P(2)	-	11 (1/1)	N (2/2)	-	P(2)	P(2)	-	-
Possum	6-8 (2/3)	-	P(3)	15-22 (3/3)	-	N (1/3)	4-13 (2/3)	-	-
Potoroo	P(3)	P(3)	P(3)	P(3)	P(3)	P(3)	P(3)	N (1/3)	P(2)
Quoll	7 (1/5)	-	4-10 (2/5)	8 (1/5)	-	P(5)	9 (1/5)	-	-
Tammar	P(2)	P(2)	P(2)	P(1)	P(2)	P(2)	P(2)	P(1)	-
Tungoo	N (1/4)	-	9 (1/4)	12 (1/4)	-	P(4)	8 (1/4)	-	-
Williams	P(2)	P(2)	P(2)	P(2)	P(2)	P(2)	P(2)	-	P(2)
Wintaroo	N (1/3)	-	N (1/3)	35 (1/3)	-	P(3)	P(3)	-	-
Wombat	P(5)	N (1/3)	P(5)	N (1/5)	P(5)	N (1/5)	N (1/5)	38-67 (2/5)	P(1)
Yallara	6 (1/3)	-	N (1/3)	27-54 (3/3)	-	4 (1/3)	N (2/3)	-	-
Rates (product/ ha)	1 L	100 mL + 500 mL	7 g + 1 L	1.4 L	2.5 L	25 g	1.4 L	200 g	200 g + 330 mL
Crop stage at spraying	2 node	3 leaf	3 leaf	3-5 leaf	IBS	5-6 leaf	3 leaf	5 leaf	5 leaf

## HERBICIDE TOLERANCE

### OAT VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of oats vary in tolerance to commonly used herbicides.

Herbicide	Years Tested	Conclude®	Diuron + Dual Gold	Diuron + MCPA	Eclipse + LVE MCPA	Glean	Paradigm + LVE MCPA	Terbutryn	Tigrex®
Variety		2011-2015	1995-2006	1995-2015	1995-2015	1995-2015	2015	1995-2010	1995-2015
Bannister	2013-2015	P(3)	-	P(3)	P(3)	P(3)	P(1)	-	P(3)
Brusher	2003-2004	-	P(2)	6 (1/2)	P(2)	P(2)	-	8 (1/2)	13 (1/3)
Dunnart	2011-2015	P(5)	-	P(5)	P(5)	P(5)	-	-	N (1/5)
Forester	2011-2013	P(2)	-	P(2)	P(1)	P(2)	-	-	P(2)
Glider	1998-2003	-	P(3)	P(3)	P(3)	P(3)	-	P(3)	N (1/3)
Kangaroo	2004-2006	-	P(3)	16-20 (2/3)	N (1/3)	P(3)	-	6-19 (2/3)	5-17 (3/3)
Mitika	2003-2006	-	P(4)	N (1/3)	3 (1/4)	P(4)	-	7 (1/4)	9-13 (3/4)
Mulgara	2008-2010	-	-	P(3)	P(3)	12 (1/3)	-	N (1/3)	N (1/3)
Numbat	1998,2001	-	P(2)	P(2)	N (1/2)	P(2)	-	6 (1/2)	11 (1/2)
Possum	2001-2004	-	P(3)	13 (1/3)	P(3)	P(3)	-	12 (1/3)	18 (1/3)
Potoroo	2013-2015	P(1)	-	P(1)	P(1)	P(1)	-	-	P(2)
Quoll	1995-2001	-	P(4)	P(5)	8-9 (2/5)	P(5)	-	10 (1/5)	8-14 (2/5)
Tammar	2012-2013	P(2)	-	P(2)	P(2)	P(2)	-	-	P(2)
Tungoo	2007-2009	-	-	P(4)	N (1/4)	9 (1/4)	-	N (2/4)	N (1/4)
Williams	2014-2015	P(2)	-	P(2)	P(2)	P(2)	P(1)	-	P(2)
Wintaroo	2001-2003, 2007	-	P(2)	P(3)	7 (1/3)	P(3)	-	P(3)	10 (1/3)
Wombat	2011-2015	P(5)	-	P(5)	P(5)	P(5)	-	-	11-23 (2/5)
Yallara	2005-2007	-	P(2)	N (1/3)	N (1/3)	7 (1/3)	-	7 (1/3)	8-11 (3/3)
Rates (product/ha)		700 mL	830 g + 1 L	280 g + 350 mL	7 g + 700 mL	20 g	25 g + 400 mL	850 mL	1 L
Crop stage at spraying		5 leaf	PSPE	3 leaf	3 - 6 leaf	3 leaf	3 leaf	3 leaf	5-6 leaf

## HERBICIDE TOLERANCE

### LENTIL VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of lentils vary in tolerance to commonly used herbicides.

Herbicide		Broadstrike®	Brodal Options®	Boxer Gold®	Diuron	Dual Gold®*
		Flumetsulam	Diflufenican	Prosulfocarb + S-metolochlor	Diuron	S-metolochlor
Variety	Years Tested	1994-2015	1994-2015	2015	1996-2015	1997-2000
PBA Ace	2012-2014	N (1/3)	P(3)	-	P(3)	-
PBA Blitz	2010-2012	10-13 (2/3)	P(3)	-	N (1/3)	-
PBA Bolt	2013-2015	14 (1/3)	P(3)	P(1)	P(3)	-
Boomer	2005-2009	7-19 (2/5)	7-11 (2/4)	-	P(5)	-
Bounty	2009-2011	12 (2/3)	9 (1/3)	-	N (1/3)	-
Cassab	1999-2001	N (1/3)	7 (1/3)	-	N (2/3)	8 (1/2)
Cobber	1994-2002	10 (1/4)	22 (1/4)	-	N (1/2)	P(1)
Digger	1994-2001	8-18 (2/7)	15-23 (2/7)	-	N (3/5)	N (2/3)
PBA Flash	2006-2013	10-14 (3/8)	N (3/8)	-	N (1/8)	-
Greenfield	2014-2015	N (1/2)	N (1/2)	P(2)	P(2)	-
PBA Giant	2014-2015	P(2)	P(2)	P(2)	P(2)	-
PBA Herald XT	2012-2014	P(3)	P(3)	-	P(3)	-
PBA Hurricane XT	2013-2015	P(3)	P(3)	P(1)	P(3)	-
PBA Jumbo 2	2014-2015	P(2)	N (1/2)	13 (1/1)	P(2)	-
PBA Jumbo	2011-2012	12 (1/2)	P(2)	-	P(2)	-
Nipper	2004-2015	8-20 (5/12)	7 (1/12)	P(1)	N (3/12)	-
Northfield	1994-2004	10-25 (3/9)	16-24 (3/9)	-	14 (1/7)	21 (1/2)
Nugget	1999-2005	6-20 (3/6)	11 (1/6)	-	N (1/6)	N (1/2)
Rates (product/ha)		20 g	150 mL	2.5 L	1 kg	500 mL
Crop stage at spraying		6 weeks	6 weeks	IBS	PSPE	PSPE

\* Denotes an off label use. This use is not endorsed by this data and no responsibility will be taken for its interpretation.

### FIELD PEA VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of peas vary in tolerance to commonly used herbicides.

Herbicide		Broadstrike®	Brodal Options® + MCPA Amine	Boxer Gold®	Diuron	Lexone®	Lexone®	Lexone® *
	Years Tested	Flumetsulam	Diflufenican + MCPA Amine	Prosulfocarb + S-metolochlor	Diuron	Metribuzin	Metribuzin	Metribuzin
Variety		1994-2015	1994-2015	2015	2011-2014	1994-2010	1994-2015	2005-2008
Bundi	2006-2007	P(2)	P(2)	-	-	P(2)	P(2)	P(2)
Kaspa	2002-2012	N (1/11)	11 (1/11)	-	N (1/2)	N (2/9)	N (4/11)	9 (1/4)
PBA Gunyah	2008-2015	N (1/8)	P(8)	P(1)	P(4)	9 (1/3)	N (3/8)	P(1)
PBA Oura	2011-2013	P(3)	P(3)	-	P(3)	-	P(3)	-
PBA Twilight	2008-2011	N (1/4)	N (1/4)	-	P(1)	N (1/3)	13 (1/4)	16 (1/1)
OZP1101	2012-2015	N (1/4)	14 (1/4)	P(1)	P(3)	-	P(4)	-
Parafield	1996 - 2005	11-13 (2/10)	P(10)	-	-	N (3/10)	N (5/10)	P(1)
Percy	2014-2015	13 (1/2)	P(2)	P(1)	P(1)	-	P(2)	-
PBA Pearl	2012-2013	P(2)	P(2)	-	P(2)	-	P(2)	-
Sturt	2002-2005	10-13 (2/4)	P(4)	-	-	8 (1/4)	12-17 (2/4)	10 (1/1)
SW Celine	2006-2007	P(2)	P(2)	-	-	P(2)	P(2)	N (1/2)
PBA Wharton	2012-2015	P(3)	P(3)	P(1)	P(2)	-	P(3)	-
Rates (product/ha)		25 g	125 mL + 80 mL	2.5 L	1 kg	280 g	280 g	280 g
Crop stage at spraying		5 node	5 node	IBS	PSPE	PSPE	3 node	6 node

\* Denotes an off label use. This use is not endorsed by this data and no responsibility will be taken for its interpretation.



## HERBICIDE TOLERANCE

Lexone®	Lexone®*	Simazine*	Simazine*	Simazine + Diuron500*	Status®*	Terbyne®*	Terbyne®
Metribuzin	Metribuzin	Simazine	Simazine	Simazine + Diuron	Clethodim	Terbutylazine	Terbutylazine
1994-2015	2005-2008	2004-2015	2001-2004	1992-2002	2014	2009-2013	2014-2015
30-35 (2/3)	-	21-35 (2/3)	-	-	P(1)	N (2/2)	10 (1/1)
10 (1/3)	-	N (3/3)	-	-	-	N (3/3)	-
12 (1/3)	-	28 (1/3)	-	-	P(1)	29 (1/1)	P(2)
19 (1/5)	34 (1/4)	P(5)	-	-	-	N (1/1)	-
N (2/3)	-	9 (1/3)	-	-	-	11 (1/3)	-
N (2/3)	-	-	P(1)	N (1/3)	-	-	-
12 (1/4)	-	-	-	-	-	-	-
32 (1/7)	-	-	P(1)	6 (1/3)	-	-	-
N (5/8)	42 (1/3)	42 (1/8)	-	-	-	26 (1/5)	-
P(2)	-	P(2)	-	-	-	-	P(2)
P(2)	-	P(2)	-	-	-	-	P(2)
13-21 (3/3)	-	13-39 (3/3)	-	-	P(1)	N (2/2)	P(1)
N (1/3)	-	10-33 (2/3)	-	-	P(1)	N (1/3)	P(2)
30 (1/2)	-	8-25 (1/2)	-	-	P(1)	-	N (1/2)
N (2/2)	-	N (2/2)	-	-	-	N (1/2)	-
10-25 (7/12)	26-52 (3/4)	13-64 (4/12)	N (1/2)	P(1)	P(1)	21-40 (2/5)	P(2)
17-19 (2/9)	14 (1/1)	P(1)	N (2/3)	12 (1/4)	-	-	-
6 (1/6)	P(2)	P(2)	7 (1/3)	15 (1/4)	-	-	-
280 g	180 g	1 kg	1.2 L	500 mL + 500 mL	1 L	1 kg	1 kg
PSPE	3 node	PSPE	6 weeks	PSPE	3 node	PSPE	IBS

MCPA Sodium	Outlook®	Simazine	Simazine + Diuron*	Spinnaker®	Sakura®	Status®*	Raptor®	Terbyne®
MCPA Sodium	Di-methenamid-P	Simazine	Simazine + Diuron	Imazethapyr	Pyroxasulfone	Clethodim	Imazamox	Terbutylazine
1994-2008	2011-2013	2011-2015	1994-2010	1994-2010	2015	2014	1994-2015	2009-2015
P(2)	-	-	P(2)	15 (1/2)	-	-	N (2/2)	-
10 (1/7)	P(2)	N (1/2)	N (1/8)	P(9)	-	-	P(10)	N (1/4)
P(1)	P(3)	14 (1/5)	9-11 (2/3)	N (1/3)	P(1)	P(1)	11 (1/8)	9 (1/7)
-	N (1/3)	P(3)	-	-	-	-	P(3)	P(3)
P(1)	P(1)	P(1)	9 (1/3)	11 (1/3)	-	-	P(4)	N (2/3)
-	P(2)	16 (1/4)	-	-	P(1)	P(1)	N (1/4)	N (1/4)
5-20 (2/10)	-	-	29 (1/10)	11-15 (2/10)	-	-	7 (1/10)	-
-	-	P(2)	-	-	P(1)	P(1)	P(2)	N (1/2)
-	P(2)	15 (1/2)	-	-	-	-	N (1/2)	N (1/2)
P(4)	-	-	P(4)	7 (1/4)	-	-	N (1/4)	-
P(2)	-	-	P(2)	P(2)	-	-	N (1/2)	-
-	P(1)	P(3)	-	-	P(1)	P(1)	P(3)	P(3)
900 mL	1 L	1 kg	350 mL + 650 mL	70 g	118 g	1 L	45 g	1 kg
5 node	IBS	PSPE	PSPE	3 node	IBS	3 node	3 node	PSPE



## HERBICIDE TOLERANCE

## CHICKPEA VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of chickpea vary in tolerance to commonly used herbicides.

Herbicide	Years Tested	Balance®	Boxer Gold®	Broadstrike®	Diuron	Lexone®	Outlook®	Sakura®	Simazine	Simazine*	Status**	Terbyne®
		Isoxaflutole	Prosulfocarb + S-metolochlor	Flumetsulam	Diuron	Metribuzin	Di-methenamid-P	Pyroxasulfone	Simazine	Simazine	Clethodim	Terbutylazine
Variety		2004-2015	2015	2004-2015	2004-2010	2004-2015	2012-2013	2015	2004-2014	2004-2008	2014	2009-2015
Almaz	2006-2007	P(2)	-	N (1/2)	P(2)	N (1/2)	-	-	P(2)	P(2)	-	-
Genesis 090	2004-2015	P(12)	P(1)	N (2/12)	14 (1/7)	P(12)	8 (1/4)	P(1)	11 (1/12)	8 (1/5)	P(1)	N (1/12)
Genesis 079	2007-2009	P(3)	-	16-20 (2/3)	P(3)	P(3)	-	-	P(3)	N (2/2)	-	P(1)
Genesis 114	2010-2011	P(2)	-	P(2)	P(1)	P(2)	P(1)	-	N (1/2)	-	-	N (1/2)
Genesis 509	2005-2006	P(2)	-	P(2)	11 (1/2)	P(2)	-	-	P(2)	10 (1/2)	-	-
PBA Monarch	2012-2015	P(4)	P(1)	11 (1/4)	-	P(4)	P(2)	P(1)	N (1/4)	-	P(1)	P(4)
PBA Slasher	2008-2011	P(4)	-	N (1/4)	P(3)	P(4)	P(1)	-	N (1/4)	N (1/1)	-	N (1/3)
PBA Striker	2012-2015	P(4)	P(1)	N (1/4)	-	N (1/4)	P(2)	P(1)	13 (1/4)	-	P(1)	N (2/4)
Rates (product/ha)		100 g	2.5 L	20 g	1 kg	280 g	1 L	118 g	1 kg	1.2 L	1 L	1 kg
Crop stage at spraying		PSPE	IBS	6 weeks	PSPE	PSPE	IBS	IBS	PSPE	6 weeks	3 node	PSPE

\* Denotes an off label use. This use is not endorsed by this data and no responsibility will be taken for its interpretation.

## FABA BEAN VARIETY RESPONSE TO HERBICIDES IN SOUTH AUSTRALIA

This research has been conducted across the mid north of South Australia to determine if new and existing varieties of faba beans vary in tolerance to commonly used herbicides.

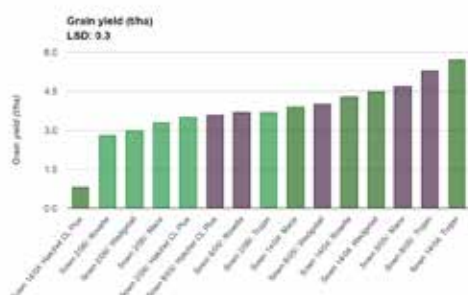
Herbicide	Years Tested	Boxer Gold®	Diuron®	Outlook®	Simazine	Simazine	Simazine	Lexone®	Spinnaker®	Raptor®	Status**	Terbyne®
		Prosulfocarb + S-metolochlor	Diuron	Di-methenamid-P	Simazine	Simazine	Simazine	Metribuzin	Imazethapyr	Imazamox	Clethodim	Terbutylazine
Variety		2015	2000-2015	2011-2013	2000-2015	2001-2008	2003-2010	2000-2015	2000-2015	2003-2015	2014	2009-2015
PBA Samira	2013-2015	P(1)	P(3)	P(1)	P(3)	-	-	P(3)	P(3)	30-35 (2/3)	P(1)	P(3)
Farah	2002-2008	-	P(7)	-	N (1/7)	6-18 (3/7)	P(6)	28-39 (2/3)	28-39 (2/3)	N (3/6)	-	-
Fiesta	2000-2007	-	N (1/8)	-	18 (1/8)	21 (1/7)	P(5)	11-32 (2/8)	11-32 (2/8)	N (4/5)	-	-
Fjord	2000-2002	-	N (1/3)	-	N (2/3)	N (1/2)	-	18-30 (2/3)	18-30 (2/3)	-	-	-
PBA Rana	2009-2011	-	P(3)	P(1)	P(3)	-	N (1/2)	14 (1/3)	14 (1/3)	18 (1/3)	-	N (1/3)
Nura	2003-2015	P(1)	P(12)	P(2)	N (2/12)	N (1/7)	P(8)	10-53 (8/12)	10-53 (8/12)	8-20 (4/12)	P(1)	10 (4/6)
Rates (product/ha)		2.5 L	1 kg	1 L	1 kg	1.5 L	280 g	85 g	85 g	45 g	1 L	1 kg
Crop stage at spraying		IBS	PSPE	IBS	PSPE	6 weeks	PSPE	PSPE	PSPE	3-4 leaf	3 node	PSPE

\* Denotes an off label use. This use is not endorsed by this data and no responsibility will be taken for its interpretation.

# OFT Online Farm Trials

Knowledge • Technology • Smarter Farming

Looking for relevant and freely accessible information on issues such as crop nutrition, disease control or stubble management in your region? The Online Farm Trials (OFT) website contains over 3,000 on-farm trial projects from across Australia on a wide variety of crop management issues and methods.



Grower and farming system groups, government researchers and industry are using the OFT platform to share information on solutions that address local or regional issues to increase productivity and sustainability of farming enterprises.

Use the OFT website to discover relevant trial research information and result data from your region or across Australia. Apply search filters, view result charts, access research report documents and view associated rainfall, temperature and soil information. Visit the OFT website to get started or to learn more about using OFT to publish your research online.



[www.farmtrials.com.au](http://www.farmtrials.com.au)

@onlinefarmtrial

# Canola variety sowing guide 2017

By Andrew Ware, SARDI

At the time of writing there have been four canola varieties released and available for planting in South Australia since the publication of the 2016 Canola Variety Sowing Guide. Of these, Pioneer 44Y90 and Pioneer 45Y91 are two new Clearfield tolerant varieties, and Pioneer 44T01 TT and InVigor T 4510 are new hybrid TT varieties. There may be further variety releases in the months to follow, with seed possibly being available for planting in 2017, but these can't be confirmed at this time.

The number of entries in Canola NVT trials planted across South Australia has reduced slightly in 2016 compared to 2015 trials but will still provide growers options of several varieties that are suited to each rainfall environment and each herbicide tolerance group.

It should be noted that the marketing company responsible for each of the varieties listed in this document has advised that they are planning to have seed available for each of these varieties for planting in 2017, however not all varieties that are still marketed have been tested in NVT trials in 2016. Some older varieties have not been evaluated in NVT trials for several years, but seed remains available.

There are two groups NVT canola trials, mid-maturity and early maturity series.

Both sets of trials have similar sowing and harvest times and have a similar complement of varieties, although there may be several early maturity varieties in the early series that are not tested in the mid series, or vice versa.

The main difference between the series is that the trials are located in areas suited to their maturity, with the majority of the early series in the lower rainfall zone and the mid-season in the medium to high rainfall zones.

## Speciality Types

In recent years a number of specialty canola varieties have been released. These include the Victory® varieties (marketed by Cargill) and Monola® varieties (marketed by Nuseed).

These varieties have a different oil profile than commodity canola that is more suitable for use in the food industry. Agronomically specialty canola is the same as commodity canola. Specialty canola is being offered to growers in a closed loop marketing systems, attracting a significant premium price. Production contracts for these varieties are available in the South East and Mid North regions.

## Winter Type/ Grain 'n Graze Canola

A number of winter type canola varieties have been released in recent years. These varieties have a high vernalisation (or cold) requirement which mean they are capable of producing high quantities of biomass before they commence flowering and make use of extended growing seasons. This enables them to be grazed over a relatively large window with often little damage to grain yield.

These varieties are not evaluated in NVT trials, however are suited to some environments that have a long growing season, such as the lower South East and Kangaroo Island. They include varieties such as Brazzil, Sensation (conventional type) and Hyola® 970CL and Edimax CL (Clearfield® tolerant types).

## Varietal selection

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

- The weed species expected may dictate the need for a herbicide tolerant production system (e.g., triazine tolerant or Clearfield). It should be noted that a triazine tolerant variety will incur a yield and oil penalty when grown in situations where they are not warranted.

- Blackleg has the potential to be a very destructive disease in canola and its management through varietal selection, fungicides and cultural practices are important in maximising yield potential.

Varietal blackleg resistance and/or fungicide use should be considered, particularly when rotations are close.

Since 2011, NVT trials have been sown with the same fungicide treatment on all varieties so that the reaction to blackleg will be more difficult to assess from looking at the trials.

## Varietal Characteristics

### Notes on recently released conventional varieties

**AV-Garnet.** Mid-early to mid to maturing. Medium height. Moderate – high oil content. Widely adapted. Rated MR for blackleg (resistance group A). Tested in NVT trials 2006-2016.



## CANOLA

## South Australia mid-season long term canola yields &amp; agronomic information

Variety	Licensee	Release Year	Type^	Maturity	Yield Group (% mean yield)				Oil (%)	Blackleg Rating (Bare)	Blackleg Rating (+Jockey)	Blackleg Resistance Group
					< 1.0 t/ha	1.0 to 2.0 t/ha	2.0 to 3.0 t/ha	3.0 to 4.0 t/ha				
CONVENTIONAL												
AV Garnet	Nuseed	2007	OP	M	93	102	104	-	43.9	MR-MS	-	A
Nuseed Diamond	Nuseed	2013	Hybrid	E	153	118	108	-	44.3	R-MR	-	ABF
Victory® V3002	Cargill/ AWB	2012	OP - Spec. Oil	M	108	108	107	-	43.8	R-MR	R	ABF
Conventional Mean Yield (t/ha)					0.86	1.58	2.37	-				
Number of trials					2	16	14	-	16			
CLEARFIELD												
Archer	Heritage Seeds	2012	Hybrid	ML	88	103	106	103	42.3	MR-MS	R-MR	C
Banker CL	Heritage Seeds	2015	Hybrid	M	112	115	112	108	39.8	MR	R	A
Carbine	Heritage Seeds	2012	Hybrid	EM	119	101	97	102	44.3	MS	MR	A
Hyola® 474CL	Advanta Seeds	2011	Hybrid	ME	92	100	103	95	43.7	R	-	BF
Hyola® 575CL	Advanta Seeds	2010	Hybrid	M	87	100	103	95	43.2	R	-	BF
Hyola® 577CL	Advanta Seeds	2013	Hybrid	ML	81	100	104	96	42.9	R	-	B
Pioneer 43Y85 (CL)	Pioneer	2012	Hybrid	E	-	-	-	-	-	MR	R-MR	A
Pioneer 44Y87 (CL)	Pioneer	2013	Hybrid	EM	106	103	103	102	41.2	MR	R-MR	A
Pioneer 44Y89 (CL)	Pioneer	2014	Hybrid	EM	126	109	105	105	41.7	R-MR	R	BC
Pioneer 44Y90 (CL)	Pioneer	2016	Hybrid	EM	-	-	-	-	-	R-MR	R	B
Pioneer 45Y88 (CL)	Pioneer	2013	Hybrid	M	94	105	106	102	41.2	MR	MR	A
Pioneer 45Y91 (CL)	Pioneer	2016	Hybrid	M	-	-	-	-	-	R-MR	R	B
Clearfield Mean Yield (t/ha)					0.86	1.58	2.37	3.45				
Number of trials					2	19	17	4	19			
TRIAZINE TOLERANT												
ATR Bonito	Nuseed	2013	OP	EM	100	99	98	103	43.5	MR-MS	-	A
ATR Gem	Nuseed	2011	OP	EM	86	95	97	99	43.5	MR-MS	-	A
ATR Mako	Nuseed	2015	OP	EM	96	100	101	102	40.4	MR	R	A
ATR Stingray	Nuseed	2011	OP	E	100	94	93	94	44.5	MR	-	C
ATR Wahoo	Nuseed	2013	OP	ML	74	94	98	100	43.4	MR-MS	-	A
DG 560 TT	Seednet	2016	Hybrid	M	111	105	103	105	39.6	MR	R	BF
Hyola® 450TT	Advanta Seeds	2013	Hybrid	ME	100	100	100	97	43.9	R	-	ABD
Hyola® 559TT	Advanta Seeds	2012	Hybrid	M	110	107	105	105	42.9	R	-	ABD
Hyola® 650TT	Advanta Seeds	2014	Hybrid	ML	82	102	106	98	41.7	R	-	ABD
InVigor T 4510	Bayer	2016	Hybrid	EM	-	-	-	-	-	-	MR*	-
Monola® 314TT	Nuseed	2014	OP - Spec. Oil	E	96	86	86	95	40.9	MR	-	unknown
Monola® 416TT	Nuseed	2015	OP - Spec. Oil	EM	96	93	92	94	41.3	MR	R	B
Monola® 515TT	Nuseed	2015	OP - Spec. Oil	ML	63	83	89	88	40.2	R-MR	-	unknown
Pioneer 44T02 TT	Pioneer	2016	Hybrid	EM	-	-	-	-	-	R-MR	R	ABD
Pioneer 45T01 TT	Pioneer	2015	Hybrid	M	106	101	100	104	44.0	MR-MS	R-MR	AB
Pioneer Atomic HT	Pioneer	2013	Hybrid	EM	107	101	99	106	41.9	MS	MR	AB
SF Turbine TT	Seed Force	2015	Hybrid	M	110	107	106	103	38.8	MR	R	BF
Triazine Tolerant Mean Yield (t/ha)					0.86	1.58	2.37	3.45				
Number of trials					2	20	18	4	20			

Data source: ACAS/GRDC, NVT 2011-2015 MET data analysis by National Statistics Program.

^Type: OP = Open Pollinated Spec. Oil = High Stability Specialty Oil

Maturity: E= early, M= mid, L= Late  
moderately susceptible, S= susceptible.

Oil = % oil content of trials yielding between 1-2t/ha.

Jockey® seed dressing contains fluquinconazole

Blackleg rating key: R = resistant, MR = moderately resistant, MS = moderately susceptible, S= susceptible.  
Blackleg resistance group refers to the combinations of blackleg resistance genes carried by each variety.

\* Provisional blackleg rating



## CANOLA

Bred by DPI Victoria. Marketed by Nuseed Pty Ltd.

**Nuseed Diamond.** Early maturing hybrid, very early to flower. Medium plant height. High oil content. Blackleg rating of R-MR (resistance groups ABF). Tested in NVT trials in 2012-16. Bred and marketed by Nuseed Pty Ltd.

**Victory V3002.** Early-mid maturing conventional specialty (high oleic, low linolenic oil) hybrid. Moderate to high oil content. Blackleg resistance of R-MR (resistance group C). Tested in NVT trials in 2011-2016. Bred by Cargill and DPI Victoria. Marketed by AWB under contract.

**Withdrawn and no longer available: AV-Zircon, Hyola 50**

### HERBICIDE TOLERANT

#### Notes on newly released Clearfield (imidazolinone tolerant) varieties

**Pioneer 44Y90 (CL).** An early-mid maturing hybrid. High oil content. Medium plant height. A blackleg rating of R-MR (resistance group B). Tested in NVT trials in 2015-16. Grain yields of 44Y90 in 2015 South Australian NVT trials generally showed a yield improvement over 44Y89. Marketed by Pioneer Brand Seeds.

**Pioneer 45Y91 (CL).** A mid maturing hybrid variety. Medium – tall plant height. Unique phenology driven by photoperiod sensitivity, allows early planting. A blackleg of R-MR, (resistance group B). Tested in NVT trials in 2015-16. Marketed by Pioneer Brand Seeds.

#### Notes on recently released Clearfield (imidazolinone tolerant) varieties

**Archer.** Mid-late maturing hybrid. Moderate-high oil content. Medium plant height. Blackleg rating of MR-MS (resistance group C). Tested in NVT trials 2011-15. Marketed by Heritage Seeds.

**Banker CL.** Mid maturing hybrid. High oil content. Medium plant height. Blackleg rating MR (resistance group A). Tested in NVT trials 2014-16, marketed by Heritage Seeds.

**Carbine.** Early-mid maturing hybrid. Moderate-high oil content. Medium plant height. MS blackleg rating (resistance group A). Tested in NVT trials 2011-13. Marketed by Heritage Seeds.

**Hyola® 474CL.** Mid-early maturing hybrid. Medium-high oil content. Medium-tall plant height. Suited to medium-low rainfall areas, and exhibits excellent hybrid vigour. Blackleg resistance rating R (resistance group BF). Tested in NVT trials in 2011-15. Bred and marketed by Advanta Seeds. Final year of commercial sale is 2017.

**Hyola® 575CL.** Mid maturing hybrid. Medium-high oil content. Medium plant height. Blackleg resistance rating R (resistance group BF). Tested in SA NVT trials in 2010-16. Bred and marketed by Advanta Seeds.

**Hyola® 577CL.** Mid to mid-late maturing hybrid. High oil content. Medium – tall plant height. Adapted to medium-high rainfall areas. Blackleg resistance rating R (resistance group B). Tested in NVT trials in 2013-16. Bred and marketed by Advanta Seeds. Final year of commercial sale is 2017.

**Hyola® 970CL.** Late maturing, winter graze and grain dual

purpose hybrid. Pacific Seeds indicate high-very high biomass, good grain yield and oil content Early-mid autumn and spring sowing graze and grain option for very high rainfall zones. Blackleg resistance rating 2015 R-MR (new resistance group H). Not tested in NVT trials due to being a graze n grain winter type hybrid. Marketed by Advanta Seeds.

**Pioneer 43Y85 (CL).** Early maturing hybrid. Moderate oil content. Medium plant height. Blackleg resistance rating of MR (resistance group A). Suited to low rainfall areas and short season growing zones. Tested in NVT trials 2011-14. Marketed by Pioneer Brand Seeds.

**Pioneer 44Y87 (CL).** Early-Mid maturing hybrid. Moderate-high oil content. Medium plant height. Suited to medium rainfall areas. Blackleg resistance rating of MR (resistance group A). Tested in NVT trials 2012-15. Marketed by Pioneer Brand Seeds.

**Pioneer 44Y89 (CL).** An early-mid season for low to medium rainfall zones. Moderate-high oil content. It has a shorter plant height and is slightly earlier than Pioneer 44Y87CL. It is rated R-MR for blackleg resistance (resistance groups BC). Tested in NVT trials 2013-16. Marketed by Pioneer Brand Seeds.

**Withdrawn and no longer available: Pioneer 43C80 CL, Pioneer 45Y88 CL, Pioneer 45Y86 CL, Rimfire.**

#### Notes on newly released and potential new release Triazine tolerant (TT) varieties for 2017

**Pioneer 44T02 (TT).** An early-mid maturing hybrid variety. Medium plant height and high oil content. A blackleg resistance rating of R-MR (resistance group ABD). Tested in NVT trials 2015-16. Marketed by Pioneer Brand Seeds.

**In Vigor T 4510.** A new hybrid Triazine Tolerant mid-season variety. 2016 is the first year In Vigor T 4510 (PJTT3) has been tested in NVT. Bayer suggests a blackleg rating of MR. Marketed by Bayer.

#### Notes on recently released Triazine tolerant (TT) varieties

**ATR Bonito.** Early-mid season maturing open pollinated variety. Short-medium height. High oil content. Blackleg rating of MR-MS (resistance group A). Tested in NVT trials 2012-16. Bred and marketed by Nuseed. An EPR of \$5 per tonne (GST ex) applies.

**ATR Gem.** Early-mid maturity variety open pollinated. High oil content. Medium plant height. Blackleg resistance rating of MR-MS (resistance group A). Tested in NVT trials 2011-16. Bred and marketed by Nuseed Pty Ltd.

**ATR Mako.** Early-mid maturity triazine tolerant open pollinated variety – similar maturity to ATR Gem. Moderate to high oil content. Medium plant height. Blackleg resistance rating of MR (resistance group A).

Tested in NVT trials 2013-16. Bred and marketed by Nuseed Pty Ltd. Will be marketed as an alternative to ATR Gem. An EPR of \$5 per tonne (GST ex) applies.

**ATR-Stingray.** Early maturing open pollinated variety. Short height. High oil content. Blackleg resistance rating MR (resistance group C). Tested in NVT trials 2011-16. Bred by

South Australia early-season long term canola yields & agronomic information										
Variety	Licensee	Release Year	Type^	Maturity	Yield group (% mean yield)			Blackleg Rating (Bare)	Blackleg Rating (+Jockey)	Blackleg Resistance Group
					< 1.0 t/ha	1.0 to 2.0 t/ha	2.0 to 3.0 t/ha			
CONVENTIONAL										
AV Garnet	Nuseed	2007	OP	M	96	103	109	MR-MS	-	A
Nuseed Diamond	Nuseed	2013	Hybrid	E	193	117	104	R-MR	-	ABF
Victory® V3002	Cargill/ AWB	2012	OP - Spec. Oil	M	145	107	102	R-MR	R	ABF
Conventional Mean Yield (t/ha)					0.63	1.52	2.15			
Number of trials					3	5	1			
CLEARFIELD										
Archer	Heritage Seeds	2012	Hybrid	ML	78	102	103	MR-MS	R-MR	C
Banker CL	Heritage Seeds	2015	Hybrid	M	101	105	102	MR	R	A
Carbine	Heritage Seeds	2012	Hybrid	EM	120	104	102	MS	MR	A
Hyola® 474CL	Advanta Seeds	2011	Hybrid	ME	95	108	104	R	-	BF
Hyola® 575CL	Advanta Seeds	2010	Hybrid	M	95	108	104	R	-	BF
Hyola® 577CL	Advanta Seeds	2013	Hybrid	ML	101	107	105	R	-	B
Pioneer 43Y85 (CL)	Pioneer	2012	Hybrid	E	101	97	99	MR	R-MR	A
Pioneer 44Y87 (CL)	Pioneer	2013	Hybrid	EM	106	104	102	MR	R-MR	A
Pioneer 44Y89 (CL)	Pioneer	2014	Hybrid	EM	133	111	105	R-MR	R	BC
Pioneer 44Y90 (CL)	Pioneer	2016	Hybrid	EM	-	-	-	R-MR	R	B
Pioneer 45Y88 (CL)	Pioneer	2013	Hybrid	M	67	100	101	MR	MR	A
Pioneer 45Y91 (CL)	Pioneer	2016	Hybrid	M	-	-	-	R-MR	R	B
Clearfield Mean Yield (t/ha)					0.61	1.62	2.32			
Number of trials					5	9	5			
TRIAZINE TOLERANT										
ATR Bonito	Nuseed	2013	OP	EM	98	100	97	MR-MS	-	A
ATR Gem	Nuseed	2011	OP	EM	82	98	97	MR-MS	-	A
ATR Mako	Nuseed	2015	OP	EM	109	102	101	MR	R	A
ATR Stingray	Nuseed	2011	OP	E	100	99	94	MR	-	C
ATR Wahoo	Nuseed	2013	OP	ML	64	91	93	MR-MS	-	A
DG 560 TT	Seednet	2016	Hybrid	M	117	106	106	MR	R	BF
Hyola® 450TT	Advanta Seeds	2013	Hybrid	ME	101	110	112	R	-	ABD
Hyola® 559TT	Advanta Seeds	2012	Hybrid	M	115	111	109	R	-	ABD
Hyola® 650TT	Advanta Seeds	2014	Hybrid	ML	-	-	-	R	-	ABD
InVigor T 4510	Bayer	2016	Hybrid	EM	-	-	-	-	MR*	-
Monola® 314TT	Nuseed	2014	OP - Spec. Oil	E	106	92	92	MR	-	unknown
Monola® 416TT	Nuseed	2015	OP - Spec. Oil	EM	101	92	89	MR	R	B
Monola® 515TT	Nuseed	2015	OP - Spec. Oil	ML	61	88	90	R-MR	-	unknown
Pioneer 44T02 TT	Pioneer	2016	Hybrid	EM	-	-	-	R-MR	R	ABD
Pioneer 45T01 TT	Pioneer	2015	Hybrid	M	83	101	105	MR-MS	R-MR	AB
Pioneer Atomic HT	Pioneer	2013	Hybrid	EM	101	103	106	MS	MR	AB
SF Turbine TT	Seed Force	2015	Hybrid	M	107	105	104	MR	R	BF
Triazine Tolerant Mean Yield (t/ha)					0.59	1.69	2.37			
Number of trials					4	8	3			
Data source: ACAS/GRDC, NVT 2011-2015 MET data analysis by National Statistics Program.      ^Type: OP = Open Pollinated   Spec. Oil = High Stability Specialty Oil										
Maturity: E= early, M= mid, L= Late      Blackleg rating key: R = resistant, MR = moderately resistant, MS = moderately susceptible, S= susceptible.										
Jockey® seed dressing contains fluquinconazole      Blackleg resistance group refers to the combinations of blackleg resistance genes carried by each variety.										

## CANOLA

Nuseed Pty Ltd and DPI Victoria. Marketed by Nuseed Pty Ltd.

**ATR Wahoo.** Mid maturity open pollinated variety. Medium plant height. High oil content. Blackleg rating of MR-MS (resistance group A). Tested in NVT trials 2012-16. Bred and marketed by Nuseed. An EPR of \$5 per tonne (GST ex) applies.

**DG 560TT.** A mid maturity hybrid. DG 560TT has excellent early vigour with medium to tall plant height. DG 560TT has moderate oil content and high yield potential in medium to high rainfall areas. A blackleg resistance of MR (resistance group BF). Trialled in NVT in 2015-16. Marketed by Seednet.

**Hyla® 450TT.** Early to mid-maturing hybrid. Medium plant height. High-very high oil content. Blackleg resistance rating of R (resistance group ABD). Tested in NVT trials in 2013-16. Bred and marketed by Advanta Seeds. Final year of commercial sale is 2017.

**Hyla® 559TT.** Mid-early maturing hybrid. High oil content. Medium plant height. Suited to low-medium through to high rainfall areas. Blackleg resistance rating R, (resistance group ABD). Tested in NVT trials in 2012-16. Bred and marketed by Advanta Seeds.

**Hyola® 650TT.** Mid to mid-late maturing hybrid. Medium-high oil content. Medium-tall plant height. Suited to medium-high rainfall areas. Blackleg resistance rating of R (resistance group ABD). Tested in NVT trials in 2013-16. Bred and marketed by Advanta Seeds.

**Monola® 314TI.** Early-mid specialty oil open pollinated variety. Medium plant height. Blackleg rating of MR (resistance group unknown). Tested in NVT trials in 2013-15. Bred and marketed

by Nuseed Pty Ltd. A premium payment applies to Monola 314TT. Must be delivered to Glencore Grain at Tarlee and Coomandook.


**Monola® 416TT.** A mid maturing specialty oil open pollinated variety. A blackleg rating of R-MR (resistance group B). Tested in NVT trials in 2014-16. Bred and marketed by Nuseed Pty Ltd. A premium payment will apply to Monola 416TT. Must be delivered to Glencore Grain at Tarlee and Coomandook.

**Monola® 515TT.** A mid to late maturing specialty oil open pollinated variety. Blackleg rating of R-MR (resistance group unknown). Tested in NVT trials in 2014-16. Bred and marketed by Nuseed Pty Ltd. A premium payment of \$95/t applies to Monola 515TT. Must be delivered to Glencore Grain at Tarlee and Coomandook.

**Pioneer 45T01 (TT).** A mid maturing triazine tolerant hybrid. High oil content. A blackleg rating of MR-MS (resistance group AB). Tested in NVT trials in 2013-16. Marketed by Pioneer Brand Seeds.

**Pioneer Atomic HT.** Mid maturing hybrid. Medium height. Moderate-high oil content. Suited to medium to high rainfall zones. Blackleg rating of MS. Tested in NVT trials in 2012-15. Marketed by Pioneer Brand Seeds.

**SF Turbine TT.** Early-Mid maturing hybrid. Excellent early vigour with a moderate height. Moderate oil content. Suited to medium rainfall areas. Blackleg resistance rating 2016 MR (resistance group BF). Tested in NVT 2015-16. Marketed by Seed Force.

**Withdrawn and no longer available: Pioneer Sturt TT.** 

## NOTES

# Triticale variety sowing guide 2017

By Charlton Jeisman, SARDI

One new triticale variety has been released since the 2016 Sowing Guide - Astute triticale, released by AGT.

2015 was the last year that Triticale was evaluated as part of the NVT program.

Triticale is a very adaptable crop and grows well on a wide range of soil types. In South Australia, triticale is often grown on sandy soils for its vigorous early growth, with a strong fibrous root system protecting fragile soils from wind erosion.

Triticale is recognised for its good performance on a range of less favourable soil types including acidic and alkaline soils and soils with low fertility.

Triticale also performs well in soils with high boron content and areas prone to moderate waterlogging. Many triticale varieties feature a high level of resistance to cereal cyst nematode, meaning the crop is a valuable rotation option, especially in low rainfall farming systems where break crop options are often limited.

Many varieties have good resistance to stripe rust although resistance has broken down in some varieties which now have increased susceptibility to some new rust strains. Growers should observe resistance levels when selecting varieties. Please refer to table 1 and the latest disease guides for the most up to date information.

Growers should observe resistance levels when selecting varieties. Please refer to table 1 and the latest disease guides for the most up to date information.

Triticale is primarily grown for stockfeed as the starch component is readily digestible by livestock. A small component is used for human consumption; however as the milling techniques employed for triticale are different to that used for milling of wheat; triticale is unlikely to become a simple substitute for wheat in the near future.

Dual purpose triticale varieties, suitable for grazing and grain production, are an option for the higher rainfall areas of the state. Refer to table 1 for further information about the suitability of certain varieties in different rainfall zones.

## Variety performance

Fusion and newly released Astute were the highest yielding triticale varieties in the National Variety Trials across South Australia in 2015 with yield of Fusion up to 12% across the

State, while Astute performed 9% above site mean yields when averaged across all SA sites.

Bison also performed well in trials across South Australia in 2015, yielding 7% above the site mean across all sites. Tahara triticale has now been outclassed by many new triticale varieties across all environments, with the newer varieties offering broad adaptation, high yields, and improved grain quality relative to Tahara.

Grain quality characteristics and feed value are similar for most varieties with the exception of Berkshire which has been bred specifically for use in the pig industry.

## Notes on current triticale varieties

**Astute** was released by AGT in 2015. It is a mid-season variety suited to medium to high yield potential environments, and is an alternative to Hawkeye. Astute is tolerant of acid soils and has very high and stable grain yields. Seed is protected by PBR and is available to growers through AGT affiliates.

**Berkshire** was developed in collaboration with the University of Sydney and the Pork CRC. Berkshire has been purpose bred for its feed quality traits for pigs and has a higher digestible energy level and amino acid content compared with other varieties. Berkshire is mid-season maturity (similar to Tahara) with good straw strength but is moderately susceptible to stripe rust. Seed is available from Waratah Seed Co. Ltd.

**Bison** was released in 2014 by AGT and is a Rufus alternative for the low to medium rainfall zone. It has a reduced awn head type, is early to mid-season maturity and has good resistance to stem, stripe and leaf rusts. Bison is protected by PBR. Seed is available to growers through AGT affiliates.

**Bogong** was released by the University of New England, Armidale, in 2008 and is a grain variety with early to mid-season flowering. It is fully awned, has stiff straw and has good resistance to all common field strains of rust. Bogong has consistently yielded up to 15% above Tahara over the past eight seasons across all environments. It is a widely adapted spring variety that is moderately susceptible to CCN. Bogong is protected by PBR with seed marketed by Viterra.

## TRITICALE

**Canobolas** was released in 2008 by the University of New England, Armidale. It is an early to mid season grain variety, is fully awned, has stiff straw but is MSS to stripe rust. Canobolas is a widely adapted spring variety that has improved tolerance to acidic soils. Canobolas is protected by PBR with seed marketed by Viterra.

**Chopper** was released by AGT in 2010. Chopper is a very early maturing (7-15 days earlier than Tahara), fully awned spring triticale and is seen as an alternative to Speedee offering CCN and rust resistance.

It is a semi dwarfed variety (shorter than all other triticale varieties and approximately 15% shorter than Tahara) significantly reducing its tendency to lodge when grown in high yielding environments. Like Speedee, Chopper performs best in short growing season environments (and especially seasons with dry finishes) or late sowing situations. Grain quality is good and similar to other new grain variety releases. It is protected by PBR with seed available from AGT Seeds.

**Fusion** was released by AGT in 2012 and is a mid season maturing spring triticale (similar to Tahara). It is fully awned and has excellent resistance to leaf, stripe and stem rust. It has CCN

resistance and has a moderately tall plant height, similar to Rufus. Fusion is a well adapted, high yielding triticale with good grain size and low screenings.

Fusion has been one of the top yielding varieties over the past four seasons (up to 17% above Tahara). It is protected by PBR with seed available from AGT Seeds.

**Goanna** was released in 2011 by Cooper & Elleway as an early-medium season spring type grain variety. Goanna has good resistance to current pathotypes of leaf, stem, and stripe rust. Goanna is a fully awned, tall variety with CCN resistance with a reliable grain production and quality (good protein and test weight) under drier conditions. Goanna is a non PBR variety and seed is available from Cooper & Elleway.

**Hawkeye** was released by AGT in 2007 and is a broadly adapted, mid maturing variety with high yield potential and CCN resistance. It has good resistance to all rusts and produces large grain with low screenings (similar to Tahara) and good test weight. It is considered a high yielding alternative to Tahara and a CCN and stripe rust resistant alternative to Kosciuszko. It is protected by PBR with seed available from AGT Seeds.

**Jaywick** was released by AGT in 2007 and is a broadly adapted,

**Table 1. Agronomic and disease characteristics of triticale varieties**

Variety	Origin	Purpose	Height	Maturity	Head Type	Stripe Rust	CCN Resistance	Pratylenchus neglectus Resistance	Pratylenchus thornei Resistance	Rainfall Zone and environment
Astute	AGT	Grain	T	M	W/Awned	RMR	R	R	MRMS	
Berkshire	NSW	Grain	T	E-M	W/Awned	MRMS	-	MR	MS	
Bison	SA	Dual Purpose	T	M	W/R Awn	RMR	R	MR	RMR	
Bogong	NSW	Grain	M-T	E-M	W/Awned	RMR	MS	MR	S	
Canobolas	NSW	Grain	M-T	E-M	W/Awned	MRMS	-	MR	MSS	
Chopper*	SA	Grain	S-M	Very E	W/Awned	MRMS	R	MRMS	MSS	
Fusion	SA	Grain	M-T	M	W/Awned	R	R	RMR	MS	Low rainfall (<375mm)
Goanna	SA	Grain	M	E-M	W/Awned	R	R	MRMS	SVS	
Hawkeye	SA	Grain	M-T	M	W/Awned	RMR	R	MR	MS	
Jaywick	SA	Grain	M-T	M	W/Awned	MR^	R	-	-	
KM10	SA	Grain	M-T	E	W/R Awn	R	S	MR	MS**	
Rufus	NSW	Dual Purpose	T	M	W/R Awn	MRMS	R	MRR	MRR	
Tahara	Vic	Grain	T	M	W/Awned	MS	R	MRR	R	
Yowie	SA	Grain	M-T	M	W/Awned	MR	R	MR	MSS	
Endeavour	NSW	Dual Purpose	-	Very L	W/R Awn	RMR	R	MR	SVS	High rainfall (>500mm)
Tuckerbox	SA	Dual Purpose	T	M	W/R Awn	MR	R	MRMS	S	
Yukuri	NSW	Dual Purpose	-	M-L	W/R Awn	RMR	S	-	-	

\* Suits late Sowing Height: S= Short, M= Medium, T= Tall Maturity: E= Early, M= Mid, L= Late

Head Type: W= White (versus brown), R Awned= Reduced Awned

Disease resistance: S= Susceptible, MS Moderately Susceptible, MR= Moderately Resistant, R= Resistant (^ some Susceptible plants in mix, \*\* provisional rating)

Note that all recommended varieties are MR-R to stem and leaf rust, yellow leaf spot, mildew and scald.

All varieties are S to crown rot and MS to common root rot



## TRITICALE

mid maturing variety with high yield potential and CCN resistance. It has moderate to good resistance to all rusts and produces large grain with low screenings and good test weight. It is considered a slightly earlier, higher yielding alternative to Tahara. It is protected by PBR with seed available from AGT Seeds.

**KM10** is a new release from Cooper and Elleway. It is very fast growing and is a reduced awn head type with excellent early forage production in all rainfall zones. Although tending to have reduced grain size, KM10 is particularly suited to grain production in shorter season areas but could also be considered as a dual purpose variety when grown under the right conditions.

It has good resistance to all three rusts but is susceptible to CCN. It is a non PBR variety and seed is available from Cooper & Elleway.

**Rufus** was released by the University of New England in 2004, as a dual purpose or hay type. It is a tall, mid-season maturity, CCN-resistant variety with wide adaptation offering good rust resistance. It is suitable for use as a grain variety although its

reduced awn length, good early vigour and height attributes make it suitable for hay production or as a dual purpose variety. Rufus is 2-3 days earlier maturing and is slightly taller than Tahara, indicating lodging may be a problem in high rainfall situations. It is a non PBR variety and seed is widely available.

**Tahara** has long been the benchmark variety for use in cereal rotations in most districts up to 500 mm average annual rainfall however its tall plant height makes it prone to lodging under high yielding situations.

Tahara has good resistance to CCN and root lesion nematode (*Pratylenchus neglectus*) making it a valuable disease break option. Tahara is moderately susceptible to stripe rust and largely outclassed for yield by many newer grain varieties. Tahara seed can be purchased from commercial growers.

**Yowie** was released in 2010 as a medium season spring type, grain variety. It is slightly later heading than Tahara and has good resistance to current pathotypes of stem, stripe, and leaf rust, as well as CCN. Yowie is a fully awned, medium-tall, modest yielding variety, with relatively good test weight and low screenings. Yowie is a non-PBR variety available from Cooper & Elleway.

**Table 2.** Predicted yield of triticale varieties in SA by yield group as a % of Mean Yield.

Variety	Yield Bracket				
	< 1.0 t/ha	1.0 to 2.0 t/ha	2.0 to 3.0 t/ha	3.0 to 4.0 t/ha	> 4.0 t/ha
Abacus	81	88	87	93	91
Astute	120	108	111	109	113
Berkshire	108	102	104	104	103
Bison	128	111	113	111	110
Bogong	113	101	106	108	109
Canobolas	104	99	103	104	106
Chopper	114	105	104	105	99
Endeavour	59	92	86	81	87
Fusion	130	112	113	111	109
Goanna	98	99	99	99	99
Hawkeye	104	103	104	101	103
Jaywick	92	99	99	97	101
KM10	102	106	102	98	94
Rufus	97	100	98	98	97
Tahara	97	99	98	98	96
Tuckerbox	65	90	86	85	87
Yowie	81	95	94	92	95
Mean Yield	0.55	1.63	2.52	3.49	5.15
Number of Trials	3	11	13	13	19

Data source: ACAS/ GRDC South Australian NVT trials 2011-2015

## Dual purpose triticale varieties

Dual purpose varieties produce high volumes of dry matter and are comparable to production of forage oats. Dual purpose varieties can be grown as a hay crop or grazed during winter and then stock removed for forage conservation or grain recovery, although to achieve significant grain production, they need to be sown very early to offer a longer growing season.

**Endeavour** was released in 2007 by the University of Sydney. It is a long season variety suited to high rainfall regions, offering potential for hay production. It has reduced awns and good rust resistance. Certified seed can be obtained from Waratah Seed Co. Ltd.

**Tuckerbox** is a late-medium season, tall, high tillering variety with reduced awn head type, which may be grown for forage or grain. Released in 2010, Tuckerbox has good resistance to all rusts and CCN.

Tuckerbox is available from Yankalilla Seeds. Yukuri was bred by the University of New England in 2004 and is a late-medium season variety with reduced awn head type. It is suitable for forage and grain production in environments with 450 mm+ rainfall. It has very good rust resistance, but is susceptible to CCN.

**Yukuri** is a non-PBR variety. ■

For further information on triticale as a stock feed: [www.porkcrc.com.au/1A-102\\_Triticale\\_Guide\\_Final\\_Fact\\_Sheets.pdf](http://www.porkcrc.com.au/1A-102_Triticale_Guide_Final_Fact_Sheets.pdf)

# Faba bean variety sowing guide 2017

By Amanda Pearce and Rohan Kimber, SARDI and Jeff Paull, University of Adelaide

Faba bean variety choice for South Australian growers will remain the same in 2017, with no new varieties released in 2016.

AF09169 and AF15369 are two advanced breeding lines from the University of Adelaide PBA breeding program, which are being considered for release in coming years and contain new and improved traits compared to existing varieties.

AF09169 is adapted to medium to low rainfall areas and has produced significantly higher yields than current varieties in regions that are generally considered marginal for faba bean production. It is resistant to ascochyta blight pathotype 1 (widely distributed in the southern region), however it is MS/MR to pathotype 2 (recently identified in the mid-north of SA). AF15369 is from a PBA Samira background and is the first faba bean line developed with improved tolerance to Group B herbicides.

The faba bean choices for growers in the major bean production regions in South Australia have tended to be Nura and Farah. However, the new widely adapted high yielding varieties PBA Zahra and PBA Samira are expected to be grown widely and become the dominant varieties.

Yields of PBA Zahra and PBA Samira have averaged approximately 5-10 % more than current varieties in most regions. In 2015 yields of both varieties were lower than long-term trends due to seasonal conditions, but generally their overall yields were greater than current varieties.

PBA Zahra was released for cultivation in 2016. PBA Zahra has the highest long-term average at all sites. It is particularly responsive to high yielding environments, demonstrated in 2015 at Millicent, where its yield was 135 % of the site mean.

It has uniform large seeds and colour, superior to PBA Rana. PBA Zahra has a good overall level of disease resistance, similar to that of PBA Rana, with resistance to the most prevalent strain of ascochyta blight (pathotype 1) found in the southern region. PBA Zahra is less susceptible to chocolate spot and faba bean rust than Farah and Fiesta VF.

PBA Samira, released in 2015, is high yielding and responsive to high yielding situations. It is resistant to both ascochyta blight pathotype 1 (widely distributed in the southern region) and pathotype 2 (recently identified in the mid-north of SA), and together with Nura, are the only varieties that are resistant to both pathotypes.

PBA Samira is similar to Nura in response to chocolate spot. PBA Samira is relatively late flowering, but matures at the same time as other faba bean varieties.

PBA Rana continues to be grown in the medium to high rainfall regions of southern Australia with growers utilising its disease resistance.

PBA Rana generally requires one less fungicide spray compared with other varieties. PBA Rana is resistant to the ascochyta blight pathotype 1, however, a shift in virulence for ascochyta blight found in the mid-north of SA (pathotype 2) and its MS/MR rating to this pathotype, may mean it will require an application during podding.

Long term trial results show Farah tends to have slightly higher yields than Nura in SA. Both varieties are MR/R to ascochyta blight pathotype 1, but Nura is more resistant to ascochyta blight pathotype 2 than Farah.

In addition Nura has better rust resistance than Farah. Disease management strategies for control of chocolate spot should essentially be the same for both Nura and Farah, although in some situations Nura will display better resistance than Farah.

Nura is about a week later flowering than Farah, and is generally more responsive to earlier sowing dates than other varieties. Nura has a shorter crop height which can cause harvest difficulties and grain loss in low rainfall districts and drier seasons. Both varieties produce highly marketable seed.

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

## Varieties and market preferences

Australian faba beans are preferred by the Middle East human consumption market, although competition for market share from France and the United Kingdom occurs.

To access the export human food markets Australian beans must be of a high quality, free from mechanical damage, weathering and disease staining and storage problems. Faba beans darken over time while in storage and seed can become unsuitable for the export market after about 9 months.

Farah, Nura and Fiesta VF varieties are well accepted in the Middle East. PBA Samira is of similar size to these varieties and is expected to be accepted by the same markets.

Market signals indicate that small seeded faba bean varieties, such as the old Fiord and Ascot varieties, are no longer desired in the Middle East.

## BEANS

Mixing smaller seeded varieties into the accepted larger "Fiesta grade" will downgrade the overall quality of the product.

PBA Rana seed is larger than other varieties and is considered to be of high quality by the major Egyptian market, representing a different grain category for faba bean production and marketing in Australia.

PBA Zahra should be suitable to co-mingle with PBA Rana for a medium-large bean category for export market to the major food markets in the Middle East.

The medium seed size "Fiesta grade" is expected to remain the dominant quality type as it is currently well accepted in the Middle East market and also is easier to manage for on-farm operations. The PBA faba bean breeding program has a major focus on developing new varieties to fit this grade. New varieties will also be developed for the large seed quality type where premium prices might be obtained.

Product that does not meet export standards or is surplus to demand is consumed domestically in stockfeed rations, often at lower prices.

Sound beans are also finding a place in many integrated cropping and grazing enterprises as a means of finishing lambs on farm. Strong demand by graziers for feed beans can occur in dry conditions.

## Varieties and disease management

In growing regions or seasonal conditions that favour chocolate spot development, all varieties require a protective fungicide spray before canopy closure, when the crop is at the early flowering stage.

Additional applications will be required if wet conditions continue, particularly when disease symptoms are evident, soil moisture is high and dense canopy growth retains moisture levels within the canopy.

Chocolate spot typically develops during early spring as temperatures increase; however it can infect crops earlier, so faba beans should be monitored from later winter.

A shift in virulence for ascochyta blight found in the mid-north of SA has seen the disease rating for ascochyta blight separated

into pathotype 1 (widely distributed in the southern region) and pathotype 2 (recently identified in the mid-north of SA).

Nura and PBA Samira are the only varieties resistant to both pathotypes. Farah, PBA Rana and PBA Zahra are only resistant to the most prevalent form of ascochyta blight.

Resistant varieties allow growers to be more reactive to ascochyta blight than in susceptible varieties and disease management strategies can be based on monitoring levels in high risk situations.

Fiesta VF is susceptible to ascochyta blight. Growers must maintain disease control in crops, until after flowering is finished to ensure seed staining is minimised. Similarly, this management strategy must be adopted for Farah crops in regions where pathotype 2 is present.

In varieties that are partially resistant to ascochyta blight pathotype 2, such as PBA Rana and PBA Zahra, management in those crops (mid-north of SA) will need close monitoring of disease levels and protective fungicides are recommended during podding to prevent seed staining.

Rust can be a problem in faba beans, causing significant yield loss. The disease can survive over summer on volunteer bean plants and become a problem the following season. Faba bean crops need to be monitored to reduce the impact of rust on production.

Farah and Fiesta VF are susceptible to rust, often displaying more pronounced symptoms than other varieties. The chance of rust infection will be higher for early sown crops, or where beans are sown adjacent to the previous year's bean stubbles.

Where these situations occur, control using suitable fungicides may be required before flowering. Given good conditions for crop production and disease development, fungicide applications to control rust may be necessary at the same time as chocolate spot is being targeted.

Cercospora leaf spot continues to be widely reported in faba beans. The disease is soil borne and typically occurs in paddocks with a history of faba beans in the rotation, particularly where they have been grown in close rotation (less than 4-6 years) or within close proximity of these paddocks.

Table 1. Faba bean variety sowing guide 2017.

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

Table 3. Faba bean yields

Yield Group	< 1.0 t/Ha	1.0 to 2.0 t/Ha	2.0 to 4.0 t/Ha	> 4.0 t/Ha
Mean Yield	0.80	1.53	2.93	4.57
Number of Trials	9	30	62	17
Farah	97	101	99	101
Fiesta VF	96	100	99	102
Nura	92	96	97	98
PBA Rana	81	90	92	96
PBA Samira	100	102	105	107
PBA Zahra	99	102	109	110
Aquadulce*	78	89	86	92
PBA Kareema*	79	89	86	91
* Broad bean varieties				

## BEANS

Early control (5-8 weeks post sowing) with carbendazim or tebuconazole is most effective in preventing disease establishment and consequent yield loss from *Cercospora*. All current faba bean varieties are susceptible, thus early preventative control measures are best practice.

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

### Harvest

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

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

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

### Notes on newer faba bean varieties

#### PBA Zahra

PBA Zahra (evaluated as AF05095 and re-selection AF05095-1) is the result of a cross between Farah and an Accession 920/3 which originated from Morocco. It has shown wide adaption throughout southern Australia and is very responsive to high yielding situations.

PBA Zahra seed is uniform large size and colour and should be suitable to co-mingle with PBA Rana for a medium-large faba bean category for the Egyptian market. PBA Zahra is mid-late flowering, similar to Nura, PBA Rana and PBA Samira and mid maturity similar to PBA Rana. It is a medium/tall plant similar to PBA Rana and taller than other varieties.

It is resistant to the old strain of ascochyta blight (pathotype 1) but is MS/MR to pathotype 2. PBA Zahra is rated as moderately susceptible to chocolate spot and rust. It is susceptible to *Cercospora* leaf spot. PBA Zahra is licensed to Seednet and an end point royalty applies.

#### PBA Samira

PBA Samira (tested as AF05069 and the re-selection AF05069-2) is one of the highest yielding faba bean varieties for southern Australia. It is widely adapted and is responsive to high yielding situations.

It has mid flowering (similar to Nura and PBA Rana) and 5-10

days later than Fiesta VF and Farah, but matures at the same time as other varieties. PBA Samira is resistant to ascochyta blight pathotype 1 and pathotype 2. It is moderately susceptible to chocolate spot and rust, and susceptible to *Cercospora* leaf spot. Seed of PBA Samira is slightly larger than Fiesta VF, Farah and Nura, but the overall seed colour is similar for all varieties.

PBA Samira can be co-mingled with these other varieties for the Middle East market. PBA Samira is licensed to Seednet and an end point royalty applies.

### Notes on faba bean varieties

#### PBA Rana

PBA Rana (tested as AF01006-1 or 974\*(611\*974)/15-1) has good vigour and stem strength. It has mid to late flowering (similar to Nura) and mid maturity (later than Nura and Farah). PBA Rana is well adapted to high rainfall areas with long growing seasons.

PBA Rana has good resistance to ascochyta blight pathotype 1 and MS/MR to pathotype 2. This variety is moderately susceptible to chocolate spot. It has demonstrated very useful resistance to rust (MS). PBA Rana produces large, plump, light brown seeds and is suited to meeting Egyptian market requirements for that grade. PBA Rana represents a unique category for faba bean marketing.

As PBA Rana is three quarters Manafest in its breeding, it should establish itself into areas where Manafest was grown before ascochyta blight saw its demise. PBA Rana is licensed to Seednet and an end point royalty applies.

#### Nura

Nura is a medium-sized faba bean with resistance to both strains of ascochyta blight (pathotype 1 & 2) and moderate susceptibility to rust. Nura is moderately susceptible to chocolate spot, especially in situations when sown early and where disease pressure is high.

Nura is susceptible to *Cercospora* leaf spot, similar to Farah and Fiesta VF. Protection from ascochyta blight and rust is only required in high risk situations which is a major advantage for growers, as it means a likely reduction in fungicide sprays. Nura is more sensitive to high rates of imazethapyr (e.g. Spinnaker®) than Farah but is more tolerant of simazine and metribuzin. It is generally shorter than Fiesta VF and Farah meaning it is less likely to lodge.

However, since its bottom pods are closer to the ground, harvest can be more difficult in lower rainfall districts or when sown late. In most areas long-term yields of Nura tend to be slightly lower than Farah, although this is improved when Nura is sown early. It has good seed appearance, light buff in colour, with minimal seed staining and discolouration.

Flowering time of Nura is generally around 7 days later than Farah, although has similar maturity. Seed is available from Seednet and an end point royalty applies.

#### Farah

Farah was selected directly from Fiesta VF and is identical in many respects, except for its moderate resistance to ascochyta blight pathotype 1 and more uniform seed size and colour.

## BEANS

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

(National disease ratings as supplied by Pulse Breeding Australia (PBA).

Variety	Plant height	Flower time	Maturity	Lodging resist-ance	Ascochyta blight*		Chocolate spot	Cercospora	Rust	PSbMV seed staining
					Patho-type 1	Patho-type 2				
FABA BEANS										
Farah <sup>Δ</sup>	Medium	Early-mid	Early-mid	MS	MR/R	S	S	S	S	S
Fiesta VF	Medium	Early-mid	Early-mid	MS	MS	S	S	S	S	S
Nura <sup>Δ</sup>	Short	Mid	Early-mid	MR	MR/R	MR/R	MS	S	MS	VS
PBA Rana <sup>Δ</sup>	Medium/Tall	Mid	Mid	MR	R	MS/MR	MS	S	MS	MR
PBA Samira <sup>Δ</sup>	Medium	Mid	Early/Mid	MR	MR/R	MR/R	MS	S	MS	S
PBA Zahra <sup>Δ</sup>	Medium/Tall	Mid	Mid	MR	R	MS/MR	MS	S	MS	S
BROAD BEANS										
Aquadulce	Tall	Mid	Late	MS	MS	MS	MS	S	MS	S
PBA Kareema <sup>Δ</sup>	Tall	Mid	Late	MS	MR	MR	MS	S	MS-MR	S

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

\* Ascochyta blight ratings for pathotype 1 which is widely distributed throughout the southern region, and pathotype 2, which has been recently identified in the mid-north of South Australia.

The risk of crop infection and seed staining from ascochyta blight is reduced with Farah, if managed properly. In the mid-north of SA where pathotype 2 of ascochyta blight has developed Farah will exhibit a susceptible reaction to ascochyta blight, comparable to Fiesta VF.

Farah's yields are similar to Fiesta VF and slightly higher than Nura in most regions of southern Australia. The major advantage of Farah over Fiesta VF is the increased likelihood of achieving market standards for freedom from seed staining and a likely reduction in fungicide sprays required for controlling ascochyta blight. Farah is licensed to Heritage Seeds and an end point royalty applies.

**Fiesta VF**

Fiesta VF seed is buff coloured and larger than Fiord. Fiesta VF has good seedling vigour, is of medium height and is early to mid flowering. It is classed as susceptible to chocolate spot, although it is less susceptible than Fiord.

Fiesta VF is susceptible to ascochyta blight pathotype 1 and 2, so a proactive disease management strategy is recommended to achieve clean seed and ensure market standards are met. Fiesta VF is no longer protected by PBR, and no end point royalty applies.

**Broad bean varieties****PBA Kareema**

PBA Kareema was selected from Aquadulce and has similar plant type and adaptation to this variety, but larger and more uniform seed and no "evergreens". It is well adapted to the very high rainfall, broad bean districts in the Lower South-East of SA.

It has significantly improved resistance to ascochyta blight (MR) and better rust resistance (MR) than Aquadulce and is

slightly less susceptible to chocolate spot than other faba bean varieties. Like Aquadulce, PBA Kareema is more tolerant of waterlogging than most varieties of faba bean, and is more tolerant of iron and manganese deficiencies.

Trials in the South-East of SA have shown PBA Kareema yields to be similar to, or slightly less than, Aquadulce. PBA Kareema is licensed to PGG Wrightson and an end point royalty applies.

**Aquadulce**

Aquadulce is a tall broad bean variety, with late flowering and maturity, suited to areas with at least 500 mm average annual rainfall, such as the Lower South-East of SA. It is rated MS for chocolate spot, but can succumb under high disease pressure and rainfall situations.

Aquadulce is more tolerant of waterlogging than most faba bean varieties and tolerates soils with iron and manganese deficiencies. The large seed size of Aquadulce means it must be considered a specialty bean as it has different marketing opportunities to faba beans. It commands a price premium over faba beans, dependent on grading and seed size. ■

**For further information:** Variety Management Packages (VMP) for all varieties (except Aquadulce), are available on the Pulse Australia website: <http://www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean>



# Lupin variety sowing guide 2017

By Amanda Pearce, SARDI

Lupin variety choice for South Australian growers will remain the same in 2017, with no new varieties released in 2016.

A new line, WALAN2533, will be launched in the eastern states in the spring of 2017 available to growers in 2018. WALAN2533 has significant yield improvements over current narrow-leaved lupin varieties in the majority of growing regions in South Australia (SA). It will be released by PBA lupin partner Seednet. This will be the last PBA lupin variety released for the eastern states. The lupin breeding program has been privatised, with AGT now managing the program for Australian growers.

Given 2015 growing season conditions the long-term performance of varieties should be considered, with other varietal attributes, when making decisions.

In 2015 PBA Gunyidi was the highest yielding lupin variety across SA National Variety Trials (NVT), out-yielding Mandelup by 4 % when averaged across all sites. PBA Gunyidi was released in 2011 as a potential Mandelup replacement. It improves on Mandelup by having more shatter resistant pods, giving growers the option of being able to harvest without incurring significant losses.

PBA Barlock was the second top-performing variety in 2015. PBA Barlock was released in 2013 and has been widely evaluated in South Australia. It was released as a Tanjil/Wonga replacement, having good resistance to anthracnose and high yields. PBA Barlock out-classed Wonga in all trials in 2015.

Both PBA Gunyidi and PBA Barlock tend to have their greatest advantage over Mandelup on the Upper Eyre Peninsula and in the South East.

New variety PBA Jurien, released in 2015, out-performed Mandelup on the Upper Eyre Peninsula and the South East. PBA Jurien has the highest regional long-term yield for Eyre Peninsula and South East.

Narrow-leaved lupins (*Lupinus angustifolius*) are well suited to acidic and sandy soils. They continue to be grown in suitable

areas as a key component of the farming system.

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

## Domestic marketing

For producers wanting to sell lupin grain into Vic and NSW markets they must satisfy anthracnose freedom, market access and transporting protocols. Anthracnose grain tests are the most common means of identifying anthracnose freedom for marketing.

## Grazing of lupin stubbles

Lupin stubbles can be a high value feed source for livestock, however growers have lost stock to lupinosis. This livestock health problem occurs as a result of toxins being produced from the phomopsis fungus that develops in the lupin stem as the plant matures. All current varieties have a reasonable level of resistance that slows the development of the phomopsis fungus. However, when significant rains occur while the crop matures and afterwards, fungal development can still occur, regardless of the resistance level of the plant.

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

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

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

Rainfall zone (average annual rainfall)		
Low	Medium	High
< 375 mm	375-500 mm	> 500 mm
Mandelup <sup>Ⓛ</sup>	Mandelup <sup>Ⓛ</sup>	Jenabillup <sup>Ⓛ</sup>
Jenabillup <sup>Ⓛ</sup>	Jenabillup <sup>Ⓛ</sup>	PBA Gunyidi <sup>Ⓛ</sup>
PBA Gunyidi <sup>Ⓛ</sup>	PBA Gunyidi <sup>Ⓛ</sup>	PBA Barlock <sup>Ⓛ</sup>
PBA Jurien <sup>Ⓛ</sup>	PBA Jurien <sup>Ⓛ</sup>	PBA Jurien <sup>Ⓛ</sup>

Table 3. Lupin yields

Yield Group	< 1.0 t/ha	1.0 to 2.0 t/ha	2.0 to 3.0 t/ha	> 3.0 t/ha
Mean Yield	0.70	1.54	2.58	3.27
Number of Trials	11	25	14	9
Jenabillup	102	101	101	102
Jindalee	85	82	87	80
Mandelup	99	104	101	99
PBA Barlock	102	101	101	106
PBA Gunyidi	103	105	102	103
PBA Jurien	104	104	104	107

## LUPINS

Table 2. Agronomic features of narrow-leaved lupin varieties.

Variety	Flowering	Height	Early vigour	Lodging (high rainfall)	Pod loss/shatter	Anthrachnose	Brown leaf spot	Grey Spot	CMV on seed	Phomopsis on stem	Phomopsis on pod/seed	BYMV Resistance
Jenabillup <sup>Ⓛ</sup>	Mid	Tall	Med	MS/MR	MS	S	MS/MR	R	MS/MR	MS	R	MR
Jindalee <sup>Ⓛ</sup>	Late	Tall	Slow	MR	R	MS	MR	R	MS	R	R	MS
Mandelup <sup>Ⓛ</sup>	Vearly	Tall	Fast	MS	MS	MR	MS	R	MS	R	MR/MS	S
PBA Barlock <sup>Ⓛ</sup>	Mid	Med	Med	MR	R	R	MS	R	MR	MR	R	MS
PBA Gunyidi <sup>Ⓛ</sup>	Early	Med	Fast	MR	R	MR	MS	S	MS/MR	R	R	MS
PBA Jurien <sup>Ⓛ</sup>	Early	Tall	Fast	MS	MR	R	MS	R	MS/MR	R	MR/MS	MR

R = Resistant; MR = Moderately resistant; MS = Moderately susceptible; S = Susceptible. Source: Pulse Breeding Australia (PBA) trials program 2008-2014

## Lupin Agronomy

A common problem reported by SA growers is the poor emergence and establishment of lupin crops. This is particularly prevalent in Mandelup. This obviously effects crop establishment and early vigour, but it also enhances any effects of pre-emergent herbicides. Growers are encouraged to seek germination tests on sowing seed so that seeding rates can be increased to compensate for poor germination rates or alternative seed sourced.

Manganese deficiency has been a problem for a number of growers in recent seasons. Lupin plants have a high demand for manganese during seed development and maturity. Manganese deficiency can have a negative influence on seed development and cause seed to split or shrivel in pods. Deficient plants can be slow to ripen, remaining green for longer and causing difficulty at harvest. Manganese deficiency can be overcome by applying 1 kg/ha of manganese at flowering. Timing is important and manganese should be applied at mid-flowering of the first lateral, by which time growth of the first pods on the main stem should be 2 - 2.5 cm.

## Notes on current narrow-leaved lupin varieties

**PBA Barlock** (tested as WALAN2325) was released in WA in spring 2013. It is a high yielding variety which provides a significant yield improvement in most regions of SA. PBA Barlock has improved metribuzin tolerance over the varieties Tanjil and Wonga, allowing growers to use metribuzin for weed control. PBA Barlock is early flowering and maturing, is MR to lodging in high rainfall regions, and shows improved pod shatter resistance compared to Mandelup. It is R to anthracnose and MR to phomopsis stem blight. PBA Barlock has its greatest long-term yield advantage over Mandelup on the Eyre Peninsula. PBA Barlock seed is available through Seednet.

**PBA Gunyidi** (tested as WALAN2289) was released in WA in September 2011 as a potential Mandelup replacement with improved resistance to pod shattering. This feature has enabled growers to harvest later without incurring significant losses. PBA Gunyidi is MR to anthracnose and R to phomopsis stem blight. It flowers and matures slightly later than Mandelup. It is R to metribuzin herbicide, but is more susceptible to damage from Eclipse®. Long-term trials in SA show PBA Gunyidi is particularly well suited to the Eyre Peninsula region. Seed is available through Seednet.

**Jenabillup** has been extensively trialled in SA trials, where it typically has an advantage over Mandelup in regions with a longer growing season. In these regions its extended flowering window can assist with increased yield. Jenabillup flowers slightly later and for a longer period than Mandelup, making

it less suitable to crop topping. Jenabillup is R to black pod syndrome, although this rarely occurs in SA. Jenabillup does not have tolerance to metribuzin herbicide and has an S anthracnose rating. Jenabillup was first available to SA growers in 2011 and seed is available through Seednet.

**Jindalee** is the latest flowering and maturing variety currently available. It is suited to early sowing in higher rainfall districts where its vernalisation (cold requirement) prevents it from flowering too early. It is suited to situations of bulky dense canopies that would otherwise lead to poor pod set in other varieties. Jindalee can benefit from late spring rains. Jindalee long-term yield performance is well below Mandelup across all districts in SA. Jindalee's anthracnose rating is MS, this level is generally adequate if combined with seed testing, paddock monitoring and sound crop hygiene management. Jindalee is R to phomopsis and MR to brown leaf spot. In SA it appears to have improved resistance to root rots and premature wilting that occurs on duplex soils with shallow underlying clay. Jindalee has speckled seed and medium seed alkaloid levels. Seed is available through Seednet.

**PBA Jurien** (tested as WALAN2385) was released in WA in spring 2015. It has improved yields compared to Mandelup across most SA regions, with long-term yield advantages observed on the Eyre Peninsula. It is R to anthracnose, phomopsis on stem and grey spot. Although rated R to anthracnose seed dressings are still recommended to reduce the risk of soil borne disease. It is tolerant to metribuzin, superior to PBA Barlock.

PBA Jurien has similar agronomic characteristics to PBA Gunyidi, flowering slightly earlier than PBA Barlock. It is similar to Mandelup in height and is MS to lodging in high rainfall regions. PBA Jurien has medium to large seed, similar to Mandelup and the alkaloid content is similar to PBA Gunyidi.

PBA Jurien is available to Eastern states growers for 2017 planting. Growers should contact Seednet Partners for supply of seed.

**Mandelup** is widely adapted to SA conditions and as such is established as a leading variety. Mandelup is a tall variety, with good early vigour and very early flowering and maturity, making it well-suited to low/medium rainfall districts in SA while still yielding well in higher rainfall areas. Its early maturity makes it suitable for crop topping, with careful attention to correct timing. Mandelup is MR to anthracnose. It is R to phomopsis on stem and MS to brown leaf spot. It can suffer pod loss/partial pod shattering with delayed harvest and seed quality can suffer if wet conditions occur during harvest.

A possible weakness in higher rainfall districts is its relatively poorer stem strength and potential lodging, although this has not been observed at wet sites in recent years. Mandelup seed is available in SA through Heritage Seeds Pty Ltd. ■

# Oats variety sowing guide 2017

By Pamela Zwer, Sue Hoppo, Peter McCormack, Mark Hill, Peter Wheeler, KerryLee McMurray and Michelle Williams, SARDI

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

Varieties adapted to low, medium, and high rainfall regions and categorised by grain and hay end-use are shown in Table 1. Select the group of varieties suited to your rainfall region and end use. Consult Tables 2 to 7 to refine the list to one or two varieties. Consult Tables 2 and 3 for hay and grain production

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

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

End use	Annual Rainfall (mm)		
	<375	375-500	>500
Milling grain	Mitika	Mitika	Mitika
	Yallara	Yallara	Yallara
	Wombat	Wombat	Wombat
	Bannister	Possum	Possum
	Durack	Bannister	Bannister
		Williams	Williams
Feed grain - sheep, cattle	Mitika	Mitika	Mitika
	Yallara	Yallara	Yallara
	Wintaroo	Wintaroo	Wintaroo
	Mulgara	Mulgara	Mulgara
	Wombat	Wombat	Wombat
	Echidna	Echidna	Echidna
Feed grain - pigs, poultry	-	Numbat	Numbat
Oat hay	Brusher	Wintaroo	Forester
	Mulgara	Mulgara	Tammar
	Wintaroo	Tammar	Tungoo
	Walleraro	Tungoo	Glider
	Durack	Kangaroo	Kangaroo
		Brusher	Brusher
Hay and legume mixes		Durack	Mulgara
			Wintaroo
	Brusher	Wintaroo	Forester
	Mulgara	Tammar	Tammar
	Wintaroo	Tungoo	Tungoo
	Yallara	Kangaroo	Glider
	Walleraro	Brusher	Kangaroo
		Potoroo	

comparisons, Table 4 for agronomic features, Table 5 for disease resistance, Table 6 for grain quality and Table 7 for hay quality. Certain varieties are preferred for particular end-uses, so check with hay processors and millers prior to variety selection.

## Is cereal cyst or stem nematode a production constraint?

Cereal cyst nematode (CCN) and stem nematode (SN) are major soil-borne diseases limiting the yield of oats in certain areas of southern Australia. Due to the significant effect of CCN and SN on varietal performance, soil testing is recommended to assess if either of these nematodes will be a significant problem.

The PreDicta™ B Root Disease Testing Service (RDTS) provides a diagnostic service to assess the levels of both nematodes prior to sowing. This is available through your local accredited agronomist or contact Alan Mackay (SARDI Plant and Soil Health ph. 8303 9375) for your local accredited agronomist.

Varieties contained in Table 1 provide options for different end uses. Table 5 should then be used in conjunction with this table to determine if the variety of choice has both resistance and tolerance to CCN if it is a problem or resistance and tolerance to SN if it is a problem. Varieties grown where CCN or SN is present should be resistant to the particular nematode which is a problem so that multiplication of the nematode is limited. The variety should also be tolerant so that it yields well in the

**Table 2.** Six year (2010-2015) average grain yield (t/ha) of oat varieties tested in grain trials.

			Region				
	Lower EP	Upper EP	Yorke Pen.	Mid North	South East	Murray Mallee	Overall
SEMI-DWARF (HUSKED)							
Bannister	3.1	1.5	3.9	3.6	3.7	1.4	3.3
Mitika	2.9	1.3	3.9	3.4	3.4	1.3	3.1
Possum	2.8	1.4	3.7	3.4	3.5	1.2	3.1
Potoroo	2.8	1.4	3.7	3.3	3.5	1.6	3.1
Wombat	2.9	1.5	3.6	3.3	3.5	1.1	3.0
SEMI-DWARF (NAKED)							
Numbat	2.2	0.8	2.9	2.3	2.4	0.4	2.1
TALL (HUSKED)							
Durack	2.7	1.2	3.3	3.2	3.3	1.2	2.9
Williams	3.3	1.5	3.6	3.6	3.7	1.4	3.2
Yallara	2.4	1.3	2.9	3.0	3.4	1.2	2.8
No. trials	3	3	5	18	15	5	49

Table 3. Five year (2011-2015) average hay and grain production of oat varieties tested in hay trials.

	Hay yield (t/ha)			Grain yield (t/ha)		
	Rainfall zone			Rainfall zone		
	<375mm	375-500 mm	>500mm	<375mm	375-500 mm	>500mm
<b>TALL (HUSKED) - EARLY TO MID SEASON MATURITY</b>						
Brusher	8.7	9.7	13.3	1.9	2.6	2.5
Durack	8.1	8.9	12.6	2.6	3.4	3.5
Mulgara	8.2	10.0	13.5	2.2	2.8	2.9
Wallaroo	8.3	9.6	12.9	2.1	2.6	2.6
Wintaroo	8.9	9.9	14.2	2.2	2.7	2.8
Yallara	8.7	9.9	14.0	2.6	3.2	3.4
<b>TALL (HUSKED) - MID LATE TO VERY LATE MATURITY</b>						
Forester	na	8.8	12.7	1.6	2.0	2.2
Glider	na	9.3	13.1	1.7	2.3	2.4
Kangaroo	na	9.7	13.0	2.1	2.6	2.8
Tammar	na	9.5	13.8	2.0	2.5	2.7
Tungoo	na	9.3	13.3	1.8	2.4	2.3
No. trials	9	26	5	12	20	8

presence of the nematode. *Yield penalties of up to 80% can occur if an intolerant variety is sown in a paddock where CCN or SN is a problem.*

There are ten varieties resistant to CCN listed in Table 5 and eight of these are also tolerant: Wombat, Tammar, Mulgara, Tungoo, Kangaroo, Wintaroo, Wallaroo and Potoroo are all varieties with both CCN resistance and tolerance. The remaining two resistant varieties, Yallara and Brusher are intolerant of CCN. There are eight varieties tolerant to stem nematode. These are Wombat, Tammar, Mulgara, Tungoo, Wintaroo, Glider, Quoll and Echidna. All of these are rated as resistant or moderately resistant to SN except Echidna which is rated as moderately susceptible. Bannister, Kangaroo, Potoroo and Wallaroo are intermediate in their reaction to SN. In cold wet seasonal conditions these varieties may suffer more yield loss than in warmer, drier winter conditions.

### Is leaf disease a production constraint?

Resistance to leaf diseases is important in most environments. However, even though varieties are listed as resistant to stem and leaf rust, changes in rust pathotypes can occur. Recently a stem rust pathotype moved into the southern region of South Australia from northern NSW causing all stem rust resistance to be ineffective in the presence of this pathotype. Table 5 indicates a range of resistance reactions for stem rust depending on whether the new pathotype of stem rust is present or not. Monitoring of disease levels is essential and application of fungicide may still be required depending on seasonal conditions. Table 1 should be used to determine the variety options available for a particular end use.

Next, Table 5 should be used to further refine your choice. For example, if a variety for oat hay is required in a high rainfall environment, Forester, Tammar, Tungoo, Glider and Kangaroo are suitable (Table 1).

Table 3 indicates that Kangaroo is the highest yielding for hay in this environment. However, using Table 5 Forester, Tammar, Tungoo, and Glider have better resistance to both stem and leaf rust. These varieties also vary in their level of resistance to

septoria, barley yellow dwarf virus (BYDV), bacterial blight and red leather leaf which may be also be important.

Table 4 should then be used to determine if the variety selected matures at the time required.

### Is milling quality required?

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

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

### If export hay quality is required

Hay quality is essential to meet export hay standards and is greatly influenced by seasonal and nutritional conditions. However, some varieties are more likely to produce hay of a higher quality than others. It is imperative that you check with your hay processor about the quality standards required to make export grade quality hay before you sow a hay crop. Use

## OATS

Table 7 to refine your choice after first ensuring that the criteria in Tables 1, 4 and 5 are met for your situation.

### Oats for grazing

This guide contains no guidelines for oats suited to grazing plus feed grain production and repeated grazing from early sowing. A more comprehensive guide for grazing varieties is contained in the Winter Crop Variety Sowing Guide produced annually by NSW DPI. Please contact the National Oat Breeding or New Variety Agronomy Groups for information on how to obtain a copy of this publication.

### Notes on recently released varieties

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

### Milling varieties

**Durack<sup>®</sup>** is an extremely early, moderately tall variety

commercialised by Heritage Seeds and released in WA in 2016. It is similar in height to Carrolup and Yallara. Check out this new variety as it is a minimum of one week earlier than any other variety released from the program.

Durack has good lodging and shattering resistance and good early vigour. It is susceptible to very susceptible for stem rust in South Australia & Victoria so a fungicide application will be mandatory if grown in areas where stem rust is a problem. Durack is rated resistant to susceptible for leaf rust depending on which pathotype of the rust is present.

Again a fungicide may be required in leaf rust prone areas. Durack is moderately susceptible to septoria, moderately resistant to susceptible for bacterial blight, moderately susceptible to red leather leaf and intolerant to stem nematode. Durack is however resistant and moderately intolerant to moderately tolerant to CCN.

Grain yield is similar to the tall varieties Carrolup and Yallara and an improvement compared to tall varieties bred for hay. Grain quality for this line is excellent with high protein levels.

Hay yield averaged over low, medium, and high rainfall sites is lower than other longer season varieties and care will need to be taken to cut this very early maturing variety at the correct growth stage. Monitoring the crop will be the key to achieving the highest hay quality.

**Williams<sup>®</sup>** is a tall milling variety commercialised by Heritage and released in Western Australia in 2013. Williams, formerly known as the breeding line WA2332, is a high yielding early to

Table 4. Agronomic features of oat varieties.

Variety	Early vigour	Plant height	Heading	Maturity	Shattering resistance	Standing ability
<b>SEMI-DWARF (HUSKED)</b>						
Bannister	G	D	EM	EM	R	R
Echidna	G	D	EM	EM	R	R
Mitika	G	D	E	E	R	R
Possum	G	D	EM	EM	R	R
Potoroo	G	TD	E	E	MR	MR
Wombat	G	D	M	M	R	R
<b>SEMI-DWARF (NAKED)</b>						
Numbat	MG	D	EM	EM	MR	R
<b>TALL (HUSKED)</b>						
Brusher	G	T	E	EM	MS	MR
Durack	G	MT	VE	VE	MS	MR
Forester	VG	MT	VL	VL	R	R
Glider	P	MT	L	L	MS	MR
Kangaroo	MG	MT	ML	ML	MS	R
Mulgara	G	T	EM	EM	MR	MR
Tammar	M	MT	LM	LM	MS	R
Tungoo	MP	MT	ML	ML	MS	MS
Wallaroo	G	MT	E	E	MS	MS
Williams	G	ST	EM	EM	R	R
Wintaroo	MG	T	M	EM	MS	MR-MS
Yallara	VG	MT	EM	EM	MR	R

Value for trait: Early vigour: VG=very good, G=good, MG = moderately good, M=moderate, P=poor, MP = moderately poor

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

Heading and maturity: VE = very early, E = early, EM = early mid, M = mid season, ML = mid late season, LM = late mid season, L = late, VL=very late

Shattering and standing ability: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible,



midseason variety with similar maturity compared to Yallara. It is three to seven days later maturing than Mitika. Williams is 15 cm taller than Mitika, 5 cm taller than Bannister, and 15 cm shorter than Yallara.

Although classified as MS for septoria, Williams has the highest level of septoria resistance compared to all other current oat varieties. It is resistant to leaf rust and depending on the stem rust pathotype present can range from moderately resistant to susceptible. Williams is resistant to bacterial blight and moderately resistant to moderately susceptible for BYDV. It is susceptible and intolerant to CCN.

Williams has similar grain yield to Bannister with slightly inferior grain quality. Screenings are similar to Wombat and can be high, especially in the low rainfall regions. Williams has high B-glucan levels.

Williams averages slightly lower hay yield compared to other hay varieties. Hay quality is similar to Wintaroo with slightly lower water soluble carbohydrates and slightly higher crude protein.

**Bannister<sup>Ⓢ</sup>** is a dwarf milling variety with high grain yield

released for Western Australia in 2012. Bannister is suited to eastern Australia as well as Western Australia. It is adapted to low, medium, and high rainfall zones of Southern Australia. It is 13 cm taller than Mitika and heads about 3 to 4 days later than Mitika. Seednet is the commercial partner. Bannister is resistant to leaf rust and moderately resistant to bacterial blight. It is susceptible and intolerant to CCN. Bannister has slightly lower hectolitre weight and slightly higher screenings compared to Mitika. It is similar to Mitika for groat percent.

**Wombat<sup>Ⓢ</sup>** is a dwarf milling variety commercialised by Seednet. It is similar in height to Possum and slightly taller than Mitika. It is a midseason variety flowering about six days later than Mitika. Wombat is the first dwarf milling variety with CCN resistance and tolerance.

It is also moderately tolerant and moderately resistant to stem nematode. It has improved BYDV resistance compared to other dwarf varieties and improved bacterial blight resistance compared to other dwarf varieties except Mitika.

Wombat has high hectolitre weight and low screenings compared to the feed variety Potoroo, which was the first dwarf variety with CCN resistance and tolerance. It also has

Table 5. Disease resistance of oat varieties - field reactions.

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

	Rust		Barley yellow dwarf virus <sup>2</sup>	CCN		Stem nematode		Septoria	Bacterial blight	Red leather leaf
Variety	stem <sup>1</sup>	leaf		resistance	tolerance	resistance	tolerance			
SEMI-DWARF (HUSKED)										
Bannister	MR-S	R	MS	VS	I	-	MI	-	MR-S	MS
Echidna	S	S	MS	S	I	MS	MT	S	S	MS
Mitika	MR-S	R	S	VS	I	S	I	S	MR	S
Possum	MS-S	MS	S	VS	I	S	I	MS	S	MS-S
Potoroo	S	S	MS	R	T	S	MI	S	VS	S-VS
Wombat	MS-S	MS	MR	R	MT	MR	MT	MS	MS	MS
SEMI-DWARF (NAKED)										
Numbat	MR-S	R	S	S	I	S	I	MR	S	MS
TALL (HUSKED)										
Brusher	MS-S	MR-MS	MS	R	MI	MS	I	MS	MR-MS	MR-MS
Durack	S-VS	R-S	MS-S	R	MI-MT	-	I	MS	MR-S	MS
Forester	R-S	MR-MS	MR-S	MS	MI	S	I	MR	MS-S	R-MR
Glider	MR-S	R	S-MR	MS	I	R	T	R	R	R
Kangaroo	MS-S	MS	MR-S	R	MT	MS	MI	MR-MS	MR-MS	MS
Mulgara	MS-S	MR	MS	R	MT	R	MT	MS	MR	MS
Tammar	MR-S	MR	MS	MR	MT	R	MT	MR	MR	R-MS
Tungoo	MS-S	MR	MR-MS	R	MT	R	MT	MR	MR	R
Wallaroo	S	S	MS	R	MT	MS	MI	S	S	MS
Williams	MR-S	R	MR-MS	S	I	-	I	MS	MR	MS
Wintaroo	S	MS	MR-MS	R	MT	MR	MT	MR-MS	MR	MS
Yallara	MR-S	R	MS	R	I	S	I	MS	MR-MS	MS

<sup>1</sup>Disease reactions to stem rust will vary with pathotype, <sup>2</sup>Disease reactions to BYDV may vary with the strain of the virus

Key to symbols used: VS = very susceptible, S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant,

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

## OATS

Table 6. Grain quality comparisons.

Variety	Hectolitre Weight (kg/hl)	Screenings <2mm	1000 Grain weight (g)	Kernel (%)	Probability of reaching milling grade	Protein (%)	Oil(fat) (%)	Hull lignin content
<b>SEMI-DWARF (HUSKED)</b>								
Bannister	MH	ML	MH	MH	H	M	M	H
Echidna	M	MH	M	ML	L	M	M	MH
Mitika	H	L	H	MH	H	MH	MH	L
Possum	MH	L	MH	MH	H	MH	M	H
Potoroo	L	MH	M	ML	-	M	MH	H
Wombat	H	M	MH	H	H	MH	M	H
<b>SEMI-DWARF (NAKED)</b>								
Numbat	VH	H	L	-	-	H	VH	-
<b>TALL (HUSKED)</b>								
Brusher	M	M	MH	M	-	MH	M	L
Durack	H	L	H	MH	H	MH	MH	H
Forester	L	M	L	L	-	M	M	H
Glider	L	M	M	ML	-	MH	ML	L
Kangaroo	M	ML	MH	ML	-	M	M	H
Mulgara	M	M	MH	MH	-	MH	M	H
Tammar	L	H	L	ML	-	MH	M	SEG
Tungoo	L	H	L	ML	-	MH	M	L
Wallaroo	M	M	M	MH	-	M	MH	L
Williams	MH	M	M	M	MH	M	M	MH
Wintaroo	M	M	MH	MH	-	M	M	L
Yallara	H	L	H	H	VH	MH	L	H

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

high groat percent, slightly higher than Mitika. Wombat can have slightly higher screenings than Mitika, Yallara and Possum depending on seasonal conditions. Wombat will develop leaf reddening symptoms similar to Mitika and Possum post flowering. This does not affect grain yield or quality.

**Mitika**<sup>®</sup> is an early maturing dwarf milling oat developed by SARDI and now commercialised by Heritage Seeds. It is resistant to leaf rust and moderately resistant to stem rust and bacterial blight. However, Mitika is susceptible to CCN, BYDV, septoria and red leather leaf and intolerant to CCN and stem nematode.

Mitika is a milling quality oat with high hectolitre and grain weight, low screenings percent and moderately high groat percent. It is also a high feed value oat with low hull lignin and high grain digestibility. Mitika averages higher levels of beta-glucan than Possum, Yallara and Euro. It is recommended for all rainfall zones where CCN or stem nematode is not a problem.

**Yallara**<sup>®</sup> is a medium-tall milling oat variety developed by SARDI and commercialised by Seednet. Yallara is a backcross line using Euro as the recurrent parent and a North Dakota line as the source of rust resistance.

It is moderately resistant to stem rust and resistant to leaf rust. Long term yield of this variety is a 2% improvement compared to Euro. However, yield increases of between 40 and 100% have been recorded for varieties with stem rust resistance similar

to Yallara in years where stem rust is yield limiting. Yallara is slightly taller than Euro and 2 days earlier to head. It has premium oat quality and averages higher hectolitre weight and groat percent and lower screenings percent than Euro, Mitika, Possum and Wombat.

Yallara is an improvement compared to Euro for bacterial blight resistance. Like Euro, Yallara is resistant to CCN but intolerant, moderately susceptible to septoria and red leather leaf and intolerant to stem nematode. Yallara is recommended to replace Euro in all areas but particularly where stem and leaf rust can be yield limiting. In addition, Yallara has bright grain and high grain digestibility making it suitable for the horse racing industry.

Based on herbicide tolerance trials conducted by the SARDI New Variety Agronomy Group, Yallara is particularly sensitive to applications of Banvel-M®. For more information about the herbicide tolerance of Yallara go to [www.nvtonline.com.au](http://www.nvtonline.com.au)

## Hay varieties

**Forester**<sup>®</sup> is a very late hay variety adapted to high rainfall and irrigated cropping regions. It is seven to 10 days later than Glider, three days later than Riel, two days later than Targa, and three weeks later than Wintaroo. Forester has excellent early vigour and is an improvement compared to Glider. It has excellent lodging and shattering resistance.

Forester has an excellent foliar disease resistance spectrum. It

Table 7. Hay quality comparisons.

Variety	Digestible dry matter (%dm)	Crude protein (%dm basis)	Neutral detergent fibre (%dm basis)	Water soluble carbohydrate (%dm basis)	Stem diameter
<b>TALL (HUSKED)</b>					
Brusher	MH	M	M	MH	M
Durack	M	M	M	M	M
Forester	MH	M	ML	MH	MH
Glider	M	M	M	M	M
Kangaroo	ML	MH	MH	ML	ML
Mulgara	M	M	M	M	M
Tammar	M	MH	M	M	ML
Tungoo	M	MH	M-MH	M	M
Wallaroo	M	M	M	M	L
Wintaroo	M	M	M	M	M
Yallara	MH	M	ML	H	ML

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

is moderately susceptible to CCN. It has good hay colour, but like all late hay varieties may not resist hot dry winds as well as earlier varieties. Forester has excellent hay quality and is an improvement compared to Glider, Tammar, Targa, and Vasse, but similar to Riel.

Seed of Forester is available from AGF Seeds.

**Tammar<sup>®</sup>** is a new late tall hay oat variety later in cutting time than Kangaroo and Tungoo but not as late as Glider. It is available to growers through AEXCO Pty Ltd.

Tammar has excellent hay colour and resists brown leaf at hay cutting. Hay yields are slightly lower than Wintaroo and similar to Tungoo and Kangaroo. Grain yield is better than Kangaroo, Tungoo, Glider and Riel. Hay quality is better than Kangaroo and similar to Tungoo and Wintaroo.

Hay digestibility and ADF are better than Tungoo and Wintaroo. Tammar is moderately resistant and moderately tolerant to CCN and resistant and moderately tolerant to SN. Tammar has an excellent foliar disease resistance profile and is an improvement compared to Tungoo for stem rust resistance.

Tammar is similar in height to Kangaroo, Tungoo and Wintaroo and has better lodging resistance than Tungoo, Wintaroo, Glider and Riel.

Tammar has better early vigour than Tungoo and Glider. Tammar has grain quality similar to Tungoo and Kangaroo with slightly smaller grain weight and slightly more screenings. It has improved grain quality compared to Glider, Riel and Vasse.

Tammar is recommended for medium and high rainfall zones and gives a slightly later option for cutting time than Tungoo and Kangaroo.

**Mulgara<sup>®</sup>** is a tall mid season hay oat similar in heading time and height to Wintaroo. It is available to growers through AEXCO Pty Ltd.

Mulgara is an improvement compared to Wintaroo for resistance to stem rust and bacterial blight. It is also an

improvement compared to Wintaroo for lodging and shattering resistance and early vigour. Hay yield is an improvement compared to Brusher but is slightly lower than Wintaroo. Hay quality is similar to Wintaroo.

Mulgara has excellent hay colour and resists brown leaf at hay cutting. Grain yield and quality is similar to Wintaroo with lower screenings, higher protein and groat percent. Mulgara has high grain hull lignin.

Mulgara is recommended to replace Wintaroo in areas with stem nematode due to its higher level of resistance. In tests conducted over six years, Mulgara averaged 70 nematodes per plant compared to Wintaroo's 1065. It is also recommended to replace Wintaroo where improved lodging resistance, stem rust, or bacterial blight resistance is required.

The seed size of Mulgara is larger than other hay varieties and similar to Swan. Care should be taken to sow this variety at the correct seed density.

**Tungoo<sup>®</sup>** is a medium tall mid to late season hay variety similar in heading date to Kangaroo. Seed of this line is available to growers through AEXCO Pty Ltd.

Tungoo has an excellent disease resistance profile and resists leaf browning from hot dry winds. It combines resistance and moderate tolerance to CCN and SN. Levels of stem nematode resistance are similar to Glider and an improvement compared to Wintaroo. Tested over six years, Tungoo averaged 24 nematodes per plant compared to Wintaroo's 1065. Tungoo is also resistant to leaf rust and red leather leaf, moderately resistant to BYDV, septoria, and bacterial blight and moderately susceptible to stem rust.

Hay yield is similar to Kangaroo but grain yield and quality is similar to Glider. Hay digestibility is similar to Wintaroo (better than Kangaroo), although it tends to be higher in NDF and lower in WSC than Wintaroo but an improvement compared to Kangaroo. Early vigour is an improvement compared to Glider, but not as good as Kangaroo. It has moderately low hull lignin.

**Brusher<sup>®</sup>** is an early-mid season tall oat developed by SARDI and commercialised by AEXCO Pty Ltd in 2003. It is two to four days earlier to head than Wintaroo and this suits it well to low rainfall areas. Although Brusher has inferior hay yield when compared to Wintaroo it is recommended to replace this variety where improved resistance to stem and leaf rust or improved hay quality is desired.

Grain yield and grain quality is similar to Wintaroo, Wallaroo and Kangaroo with higher grain protein. Brusher is moderately susceptible to stem rust, BYDV, septoria, red leather leaf and bacterial blight. It is resistant to leaf rust, resistant but moderately intolerant of cereal cyst nematode and intolerant of stem nematode. When there is a high CCN population in a paddock with favourable seasonal conditions, Brusher will have significantly lower hay yield than tolerant varieties. Brusher is moderately low in grain lignin.

## Notes on interstate varieties

Many of the varieties released interstate are evaluated in a limited number of trials in southern Australia. More information is available from the SARDI National Oat Breeding Program and should be sought before attempting to grow these varieties. ■

# Vetch variety sowing guide 2017

By Rade Matic, Stuart Nagel and Gregg Kirby, SARDI

Vetch is a multi-purpose crop grown mostly as a disease break crop in rotation with cereals in a wide range of soil types from light sands to heavier clay soils. Common Vetch varieties (Languedoc, Blanchefleur, Morava®, Rasina®, Volga®, Timok® and Cummins) versatility 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 lower to mid-rainfall cereal areas of southern Australia, and their grain yields have been similar to pea yields in these areas. Note that vetch grain is not used for human consumption and can be used up to 20% in pig rations.

Grain from Morava, Rasina, Volga and Timok can be used without limit to feed all ruminants and as up to 20% in the diet of pigs. These 4 varieties possess toxin in grain <0.65% compare with Blanchefleur 0.95% and Languedoc 1.65%.

Forage vetches are used for hay, green manure or mid to late winter feed for grazing. They are purple vetch (*V. benghalensis*) variety Popany, or Woolly pod vetches (*V. villosa* ssp. - varieties Namoi, Capello®, Haymaker® and RM4®). Forage vetches can grow successfully in areas of 400 to 650mm of annual rainfall. Grain from woolly pod vetch varieties CAN NOT be used to feed any livestock.

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

Morava, Rasina, Volga and Timok are resistant to rust and are the preferred varieties for grain in areas prone to rust infections.

Disease management is critical when growing a vetch crop regardless of the end use, where possible disease resistant varieties should be planted as a preference. Care must be taken when growing rust susceptible varieties as grazing or feeding hay/silage from rust infected plants may induce abortions in pregnant livestock.

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

Ascochyta blight occurs in earlier stages of the vetch crop and can reduce grain and dry matter production, but not like a heavy infestation of Botrytis grey mould (BGM) can in cool/wet growing seasons with high amounts of vegetative growth.

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

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

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

**Table 3:** provides information on the most important selection/recommended criteria for planting for grain and hay, disease resistance, maturity, shattering resistance and hard seed percentage for each variety.

**Table 4:** displays yield results for grain and dry matter production of common vetches varieties tested between 2011-14 in SA by ANVBP.

Table 1. Vetch grain variety rainfall zones (mm).

<350	350-400	400-450	450-600	>600
Rasina	Rasina	Morava	Morava	Morava
Cummins	Blanchefleur	Rasina	Rasina	Timok
Volga	Cummins	Blanchefleur	Timok	
Timok	Morava	Cummins		
	Volga	Volga		
	Timok	Timok		

Table 2. Vetch hay/silage/grazing and green manuring variety selection

<350	350-400	400-450	450-600	>600
Rasina	Rasina	Morava	Morava	Capello
Blanchefleur	Morava	Rasina	Popany	Haymaker
Cummins	Cummins	Popany	Capello	Morava
Morava	Popany	Capello	Haymaker	Popany
Volga	Blanchefleur	Haymaker	Timok	Timok
Timok	Volga	Volga	RM4	RM4
RM4	Timok	Timok		
	RM4	RM4		

## VETCH

Table 3. Characteristics of selected vetch varieties

Variety	Maturity	Yield potential		Flower colour	% of pod shattering	% of hard seeds	Disease reaction*		
		Grain	Dry matter				Rust	Asochyta	Botrytis
COMMON VETCH VARIETIES ( <i>Vicia sativa</i> )									
Blanchefleur	Mid	High	Mod	White	5-10	5-10	VS	MS	S
Cummins	Mid-early	High	Mod	White	5-10	5-15	VS	MS	S
Morava	Late	High	High	Purple	0	0	R	S	VS
Rasina	Early-mid	High	Mod	Purple	0-2	0	R	MS	S
Volga	Early	V. high	High	Purple	0-2	2-5	R	MS	S
Timok	Mid	High	V. high	Purple	0-2	0-2	R	MS	S
PURPLE VETCH ( <i>Vicia benghalensis</i> )									
Popany	Very late	Low	High	Purple	20-30	5-10	R	S	VS
Woolly pod vetches ( <i>Vicia villosa</i> subsp.)									
Haymaker	Late	Low	Very high	Purple	5-10	20-30	R	S	VS
Capello	Late	Low	Very high	Purple	5-10	15-20	R	S	VS
RM4	Mid	Moderate	Very high	Purple	2-5	2-5	R	MR	VS

**Table 5:** provides dry matter yield for woolly pod and purple vetch varieties tested between 2011-14 in SA by ANVBP.

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

When selecting a vetch variety growers also need to consider their individual farm and paddock situation and most importantly the end use targeting for the crop and to make this selection on all the available information.

## Notes on varieties

### Common vetch (*Vicia sativa*)

**Languedoc** is an early flowering and maturing variety recommended for low rainfall areas although its can lodge severely making harvest difficult under certain conditions. Languedoc generally exceeds Blanchefleur's grain yield in areas with less than 350mm rainfall. Its hard seed content is generally around 5-10% and it is highly susceptible to rust. Languedoc grains possess 1.0-1.6% of anti-nutritional level (BCN).

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

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

**Cummins** is a mid to early maturing, white flowering variety selected from Languedoc. It is well adapted to medium to low

rainfall areas where it generally yields higher than Blanchefleur. Cummins is susceptible to rust and moderate susceptible to Ascochyta blight. Cummins possess similar % of BCN to Blanchefleur.

**Morava** is a rust resistant late flowering vetch variety with 100% soft seeds, develop in 1998 by SARDI's Australian National Vetch Breeding Program (ANVBP), led by R. Matic and assist by I. Pearce. Grain yield is superior to other vetches in the high rainfall areas and to Blanchefleur, Languedoc and Cummins in all other areas in the presence of rust. It is larger seeded and more resistant to shattering than other vetch varieties.

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

Morava is later flowering and maturing than Blanchefleur and grain yield will be reduced in environments with dry finishes. Morava is susceptible to Ascochyta blight and very susceptible to Botrytis, because Morava produces very high biomass in wet/cool zones.

Morava is a PBR variety and can be sourced from Heritage Seeds.

**Rasina** is soft seeded vetch from the ANVBP, developed in 2006 by R. Matic and assist by S. Nagel and G. Kirby. Rasina replaces Languedoc, Blanchefleur and Cummins in low to medium rainfall areas for grain production.

Rasina is 5-10 days earlier than Blanchefleur and 10 to 15 days earlier than Morava. A significant advantage over Languedoc, Blanchefleur and Cummins is Rasina's resistance to rust and is slightly more tolerant to ascochyta blight and Botrytis.

However, Rasina is not expected to replace Morava in higher rainfall districts or for hay production. The level of anti-nutritional factors is 0.6 to 0.8 compared to 0.9 to 1.6 in Blanchefleur and Languedoc, respectively. Rasina possesses a



## VETCH

Table 5: 2010-14 Woolly pod vetch varieties

Variety	Dry matter (t/ha)	% of Capello
Cappello	6.23	100.0
Haymaker	6.26 (2009-12)	100.4
RM 4	6.71	107.7
Mean yield	6.4	
<b>PURPLE VETCH VARIETY</b>		
Popany	5.28 (2009-12)	84.75

distinctive uniform dark brown speckled seed coat with dark beige cotyledons. Rasina is a PBR variety and can be sourced from Heritage Seeds.

**Volga** developed in 2012 by SARDI's Australian National Vetch Breeding Program (ANVBP), led by R. Matic and assist by S. Nagel and G. Kirby.

Volga is high yielding grain/seed variety for low and mid rainfall areas. It is particularly suited to shorter season areas where the growing season finishes sharply.

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

Volga has high grain and herbage yields and is well adapted to all areas where vetch is currently grown. Volga is well suited to situations where the season finishes sharply (dry September & October, a common issue in many low to mid rainfall areas) because of its early flowering and maturing characteristics.

It can be successfully grown in many Australian soil types; from non-wetting sand to heavy clay loam with pH 5.8 – 9.4, like other common vetch varieties. Volga is moderately susceptible to ascochyta blight, whereas Morava is susceptible. The early maturity of Volga may limit yield potential relative to longer growing season varieties like Morava in high rainfall areas.

Toxin levels in the grain are around 0.54% lower compared to Morava at 0.65% and Blanchefleur 0.95%. Volga seed size is very similar to Morava seeds (100seeds weight 7.82g). See data in following tables.

Volga is a PBR variety and can be sourced from Heritage Seeds.

**Timok** developed in 2012 by SARDI's Australian National Vetch Breeding Program (ANVBP), led by R. Matic and assist by S. Nagel and G. Kirby.

**Timok** was bred to complement Morava in mid/high rainfall areas for grain/seed and especially for hay/silage production. Timok yielded more grain than Rasina, Morava and Blanchefleur by 9%, 18% and 21%, respectively over five years at five sites in SA.

Timok has better initial establishment than Morava, and will improve the reliability of vetch and economic production in crop rotations especially in mid and high rainfall areas, 350-450 mm/yr. Morava will still be the preferable variety for hay/silage in rainfall areas with greater than 450mm per year.

Table 4: 2010-14 grain and dry matter yield for common vetch varieties,

(5 sites * 5yrs)				
Variety	Grain yield (t/ha)	% of Blanchefleur	Dry matter yield (t/ha)	% of Morava
Blanchefleur	2.15	100	4.03 (2009-13)	80
Rasina	2.37	110	4.7 (2009-13)	93
Morava	2.16	100	5.06	100
Volga	2.75	128	5.51	109
Timok	2.48	115	5.26	104
Mean yield	2.38		4.91	

Timok is high yielding, highly rust resistant common vetch variety, moderately susceptible to ascochyta blight, susceptible to botrytis, has good early establishment, and is a soft seeded variety.

Timok matures between Rasina and Morava (100-105 days from seeding to full flowering). Timok is very well adapt for grain production in rainfall areas >380mm/yr, and dry matter production is similar to Morava in high rainfall regions (>400mm), but 19% higher than Morava in low to medium rainfall regions (330-380mm). Timok is multipurpose variety--can be used for grain, hay/silage, grazing or green/brown manure.

Toxin levels in the grain are around 0.57%. Seed weight is 6.88g per 100 seeds, similar size to Rasina 6.92g/100seeds. See data in following tables.

Timok is a PBR variety and can be sourced from Pasture Genetics.

Herbicide tolerance; no differences between these varieties to registered herbicides to control broad leaf weeds. Also, no differences between varieties to registered herbicides for grass weed control.

### Purple Vetch (*Vicia benghalensis*)

**Popany** (*V. benghalensis*) is purple vetch. Grain yield is significantly lower than yields from common vetch varieties. But, seeds are smaller than seeds from common vetch varieties therefore the seeding rate are lower at approximately 30-35kg/ha.

Grain from this variety can be used as a bird feed in mix with other recommended grains. Popany is a late maturity variety, >125 days from seeding to podding. It is a good variety in mid to high rainfall areas for hay/silage. Popany, possesses 5-10% hard seeds. This variety is resistant to rust but susceptible to ascochyta and chocolate spot. Seed coat is black with distinctive white hilum.

### Woolly pod vetches

**Capello and Haymaker** (*Vicia villosa* subsp. *dasycarpa*). Woolly pod vetches are lower in grain yield compared with common vetches, but are much higher in dry matter production than common vetch varieties in rainfall areas >450mm/yr. Grain from these varieties cannot be used to feed any livestock.

Also, these varieties can only be grazed from the 10-node stage to podding stage. It is not recommended that grazing occur

**VETCH**

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

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

earlier and also once plants begin to develop seeds in pods. These two varieties are very good for hay/silage production in areas >400mm of rainfall annually.

Haymaker and Capello are selected soft seed varieties from Narmoi. In last few years these two varieties have become prone to hard/dormant seeds. Both varieties are owned by Heritage Seeds.

**RM4** (*Vicia villosa* subsp. *eriocarpa*) was selected by Australian National Vetch Breeding Program lead by Rade Matic and assisted by Stuart Nagel and Gregg Kirby.

RM 4 is high producer of dry matter, has very good early establishment, moderately resistant to ascochyta blight, and susceptible to botrytis, soft seed variety (>94%); emerged in 15-20 days on the field; earlier in maturity by 10-15 days than Haymaker or Capello, significantly higher in dry matter production in mid/low rainfall areas (<380mm/yr) than Haymaker or Capello. Also, this variety is suitable for higher rainfall areas >400-650mm/yr.

RM4 is multipurpose variety- that can be used for hay/silage, grazing, green/brown manure or for seeds.

RM 4 can be successfully grown, like other woolly pod varieties in many Australian soil types, like other vetches is excellent for soil fertility/structure and nitrogen fixation, graze from 10 nodes up to finish flowering, for hay/silage, cut in full flowering for the best balance of feed value. RM 4 performs better in grain productions than other woolly pod varieties when season finishes sharply.

Herbicide tolerance: RM 4 was not sensitive to any herbicides recommended/registered for use in woolly pod vetch varieties.

Insect pests: RM 4 is susceptible in early growth stages to red-legged earth mite and lucerne flea, like other woolly pod vetch varieties. Also, RM 4 is susceptible to blue green and cowpea aphids from early growth through to pod maturity, as well as to native budworm during pod formation and filling.

Grain from this variety, like other woolly pod vetches, cannot be used to feed any livestock. RM4 is a PBR variety and can be sourced from Heritage Seeds. ■

## NOTES

# Lentil variety sowing guide 2017

By Sarah Day, Larn McMurray, Jenny Davidson, SARDI and Matthew Rodda, PBA Lentil Breeder DEDJTR Victoria

Lentil variety choice remains the same for 2017 with no new varieties being released in 2016. The most recent lentil varieties released were PBA Jumbo2, PBA Giant and PBA Greenfield, which were released for sowing in 2015. PBA Jumbo2 is a red lentil and the highest yielding Australian variety with a strong disease resistance profile and improved agronomic characteristics over PBA Jumbo.

Crop monitoring and a fungicide application for BGM at canopy closure is still recommended for PBA Jumbo2, particularly in favourable seasons and disease prone areas. PBA Giant has the largest seed size of all Australian green lentils and has similar yield but improved shattering resistance compared to Boomer. PBA Greenfield is the highest yielding Australian green lentil, with a medium seed size, good early vigour and moderate resistance to AB, BGM and shattering.

Botrytis grey mould (BGM) continues to be a major disease limitation to SA lentil production and a foliar fungicide spray at the canopy closure stage in all varieties is recommended in favourable seasons and disease prone areas.

This is particularly important in varieties with low levels of resistance such as PBA Hurricane XT but also in varieties with improved resistance to BGM such as PBA Jumbo2, although follow up sprays may not be needed in the latter. Early sowing is not recommended for varieties rated susceptible or moderately susceptible to BGM in disease prone areas.

Although PBA Hurricane XT has moderate resistance to foliar AB and does not require fungicide sprays if no disease is visible, low amounts of AB infection were identified in several paddocks in 2015 and 2016. Growers are urged to monitor crops regularly for disease and podding sprays may be required if disease is present during the growing season in this variety.

The rapid and dominant uptake of PBA Hurricane XT, particularly on the Yorke Peninsula, threatens the longevity of the AB resistance in this cultivar. It is important to diversify variety selections within a year and across rotations, alongside agronomic and disease management practices to maintain the sustainability of the system and reduce the risk of crop failures.

Price differences can occur between varieties across seasons, however growers need to produce high quality seed in all varieties to secure markets and achieve the highest prices. On farm storage can assist in attaining the highest price for grain in some seasons and allow lentils with poor quality issues or contaminants to be stored until appropriate cleaning and marketing can occur.

Timely harvesting is recommended in lentils to minimise seed

discolouration and weather damage and also to reduce the risk of yield loss from shattering.

## Selection criteria

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

## Notes on selected varieties

### Small Red Lentils

**PBA Hurricane XT** was the second lentil variety to be released with improved tolerance to the herbicides imazethapyr and flumetsulam, plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues.

However, it is important to note that product label rates, plant-back periods and directions for use must still be adhered to. It is a mid-flowering, mid maturing variety with small red seed and a grey seed coat, although the seed size is slightly larger than Nipper and PBA Herald XT. PBA Hurricane XT has a MR rating for foliar AB and a MR/MS rating for BGM.

In disease prone areas a strategic fungicide programme for BGM will be required and early sowing should be avoided. Plant height and early vigour are improved over Nipper and PBA Herald XT, improving weed competition and harvestability. Like PBA Herald XT and Nipper, PBA Hurricane XT has been found to be more sensitive to Group C herbicides such as metribuzin and simazine than other lentil varieties, however, label rates of these herbicides have been used on most evaluation trials.

It is important to be cautious when applying these herbicides on variable soil types, especially if weather conditions conducive to crop damage are forecast. PBA Hurricane XT is the highest yielding small red lentil and is commercialised by PB Seeds.

**PBA Herald XT** was the first lentil variety with improved tolerance to the herbicides imazethapyr and flumetsulam, plus reduced sensitivity to some sulfonylurea and imidazolinone herbicide residues. However it is important to note that product label rates, plant-back periods and directions for use must still

## LENTILS

be adhered to. It is a mid to late flowering and maturing lentil with yields lower than PBA Hurricane XT. It has high levels of disease resistance to both AB (R) and BGM (R/MR), however disease monitoring and a fungicide application for BGM prior to canopy closure is still recommended.

PBA Herald XT is more sensitive than most other varieties to group C herbicides such as metribuzin and simazine and caution is urged with the application of these products particularly on variable soil types. As a natural part of its genetic make-up PBA Herald XT has very low levels (0.1% or less) of seed with a black seed coat, which is classified at receipt point with seeds of a contrasting colour limited at 1%. PBA Herald XT is commercialised by PB Seeds.

**Nipper** is rated R/MR to BGM but its AB rating has been reduced to MR/MS, similar to Nugget. Strategic vegetative and podding sprays for AB are now recommended in this variety in disease prone areas. Nipper has a small seed size similar to PBA Herald XT. Nipper, like PBA Herald XT, flowers later than Nugget but often matures earlier. Nipper is more sensitive to

metribuzin than most other varieties and caution is required to avoid application when conditions are conducive to damage. Nipper is licensed to Seednet.

## Medium Red Lentils

**PBA Ace** is a vigorous growing, mid flowering and mid maturing variety with high yield potential and broad adaptation. It provides an alternative to Nugget in all regions. PBA Ace has resistance to AB and is rated MR/MS to BGM. PBA Ace is one of the highest yielding medium red lentils in long term trials in all regions of SA and Victoria, but due to its later maturity than PBA Bolt, PBA Blitz and PBA Flash is likely to be better suited to areas where mid maturing varieties are favoured.

PBA Ace can be prone to lodging under conditions of high biomass production often making BGM difficult to control. When grown in favourable environments particularly when sown early a small reduction in seeding rate may be beneficial in this variety to reduce biomass and lodging.

A small level of shattering has been observed under some conditions in PBA Ace at maturity but it is unlikely to cause significant yield loss. PBA Ace has a grey seed coat colour and is licensed to PB Seeds.

**PBA Bolt** is a mid flowering but early to mid maturing lentil with excellent lodging resistance at maturity and high yield in drought years and dry areas. It provides an alternative to PBA Flash in all areas, particularly in areas where AB, harvestability and drought tolerance are major issues.

Like PBA Flash it has improved tolerance to boron and salt over most other varieties. PBA Bolt has moderate resistance to AB but is susceptible to BGM and this disease will need to be carefully managed in disease prone areas. It has a grey seed coat colour and is licensed to PB Seeds.

**PBA Blitz** is suited to all current lentil growing areas, with particular adaptation to shorter-season areas, where its combination of early to mid flowering, early maturity, moderate disease resistance and medium seed size will improve lentil reliability and economics of production. PBA Blitz is the earliest maturing lentil variety and the best option where crop topping and/or delayed sowing are practised.

It has a good level of early vigour and an erect plant type. PBA Blitz is a medium sized red lentil (larger than PBA Flash and Nugget) with a grey coloured seed coat. PBA Blitz has a low level of "pale coat Blitz" seeds which still have red cotyledons and are a natural part of the genetic make-up of the variety.

These do not affect the splitting or cooking characteristics of the variety. These "pale coat Blitz" seeds are classified at receipt point as seeds of contrasting colour with a limit of 1% allowed. PBA Blitz is commercialised by PB Seeds.

**PBA Flash** is a red lentil with a green seed coat and medium seed size. It has been well suited to shorter seasons and lower yielding lentil growing areas where its earlier maturity improves reliability of yield. It is rated moderately susceptible to AB and requires strategic foliar fungicide sprays prior to flowering and at podding in disease prone areas.

Earlier maturity makes PBA Flash better suited to crop topping than Nugget and PBA Ace although caution is still required with this practice due to seasonal variation in weed and crop

Table 1. Lentil variety sowing guide 2017

Rainfall zones (mm)			
Below 400	400-450	450-500	Above 500
<b>SMALL RED</b>			
PBA Bounty	PBA Bounty	Nipper	Nipper
Nipper#	Nipper	PBA Bounty	PBA Bounty
Northfield	Northfield	Northfield	Northfield
PBA Hurricane XT+	PBA Hurricane XT+	PBA Hurricane XT+	PBA Hurricane XT+
PBA Herald XT+#	PBA Herald XT+	PBA Herald XT+	PBA Herald XT+
<b>MEDIUM RED</b>			
PBA Bolt	PBA Bolt	PBA Blitz~	PBA Ace
PBA Flash	PBA Flash	PBA Flash	PBA Blitz~
PBA Ace	PBA Ace	PBA Ace	PBA Flash
Nugget	PBA Blitz~	PBA Bolt	PBA Bolt
PBA Blitz~	Nugget	Nugget	Nugget
<b>LARGE RED</b>			
PBA Jumbo2	PBA Jumbo2	PBA Jumbo2	PBA Jumbo2
PBA Jumbo	PBA Jumbo	PBA Jumbo	PBA Jumbo
Aldinga	Aldinga	Aldinga	Aldinga
<b>MEDIUM &amp; LARGE GREEN</b>			
PBA Greenfield	PBA Greenfield	PBA Greenfield	PBA Greenfield
PBA Giant	PBA Giant	PBA Giant	PBA Giant
Boomer	Boomer	Boomer	Boomer
# = not well suited to low rainfall areas or dry seasonal conditions due to low biomass type, must be sown early in these situations ~ = variety best suited to crop-topping + = herbicide tolerant variety			

## LENTILS

maturity. PBA Flash is MR/MS to BGM but has improved tolerance to both boron and salt over all varieties but PBA Bolt. PBA Flash is commercialised by PB Seeds.

### Large Red Lentils

**PBA Jumbo2** is the highest yielding red lentil available for SA. PBA Jumbo2 was released as a direct replacement for PBA Jumbo although grain size is almost the only similarity. It has improved agronomic characteristics over PBA Jumbo, including greater early vigour, improved lodging, shattering and disease resistance.

It is rated R for AB and R/MR for BGM, however disease monitoring and a fungicide application prior to canopy closure is still recommended for the latter. It has a seed size and shape similar to PBA Jumbo and Aldinga (20% larger than Nugget) but with a grey seed. As with other large seeded varieties PBA Jumbo2 is well suited to the post-harvest removal of small broadleaf weeds seeds. PBA Jumbo is licensed to PB Seeds.

**PBA Jumbo** is a high yielding large seeded red lentil. PBA Jumbo is moderately susceptible to BGM and this disease will need to be managed in disease prone areas. It is rated MR/MS to AB and this will also need to be managed in conditions conducive to disease.

PBA Jumbo has moderate early vigour and is moderately susceptible to lodging. It has a seed size and shape similar to Aldinga (20% larger than Nugget) but with a grey seed coat and like Aldinga is well suited to the post-harvest removal of small broadleaf weeds seeds. PBA Jumbo is commercialised by PB Seeds.

### Medium and Large Green Lentils

**PBA Giant** is the largest seeded Australian green lentil available. It is a broadly adapted variety with similar yield to Boomer but improved shattering resistance and produces a slightly larger and more consistent seed size.

Although shattering resistance is improved over that of Boomer, it is rated MR/MS for this trait and timely harvest is important to prevent seed loss. PBA Giant has moderate resistance to AB but is rated moderately susceptible to BGM, and therefore monitoring and timely application of fungicides will be important to ensure the control of disease.

As pods are susceptible to AB infection a strategic fungicide application at podding may also be required to minimise seed staining and maximise seed quality. The large seed size may provide opportunity for removal of small broadleaf weed seeds from the harvested sample. PBA Giant is commercialised by PB Seeds.

**PBA Greenfield** is the highest yielding Australian green lentil variety. It is a medium sized green lentil with broad adaptation and good early vigour. It is rated MR/MS for AB, and is moderately resistant to BGM. PBA Greenfield is mid flowering and like the other green lentils has a mid to late maturity rating. PBA Greenfield has improved shattering resistance over both Boomer and PBA Giant with an MR rating, however timely harvest is still important to produce good coloured seed for ease of marketing. This may also be aided by strategic

fungicide applications during podding to minimise seed staining from AB. PBA Greenfield is commercialised by PB Seeds.

**Boomer** was the first large seeded green lentil, released as an Australian adapted variety for all lentil growing areas. Boomer has good early vigour and can produce large amounts of biomass making it prone to lodging under favourable growing conditions.

It is rated moderately resistance to foliar AB and MR/MS to BGM. Boomer is susceptible to pod infection from AB, and therefore this must be managed with strategic fungicides during podding to avoid disease staining on the seed coat.

Boomer is rated susceptible to shattering at maturity, and therefore delayed harvest can result in grain loss and also a reduction of its green seed colour resulting in downgrading in this variety. Boomer is licensed to Seednet. ■

**Table 3.** Predicted long term yields of selected lentil varieties grouped by yield bracket mean. Yields expressed as a percentage of yield bracket mean (SARDI, PBA & NVT data, 2011–2015)

Yield Group	< 1.0 t/ha	1.0 to 2.0 t/ha	2.0 to 3.0 t/ha	> 3.0 t/ha
Mean Yield	0.70	1.55	2.49	3.55
Number of Trials	11	22	25	21
Aldinga	87	95	93	93
Boomer	73	91	90	93
Nipper	81	86	90	92
Northfield	74	82	85	88
Nugget	92	93	93	96
PBA Ace	104	104	102	103
PBA Blitz	88	103	104	99
PBA Bolt	110	104	101	96
PBA Bounty	106	100	99	99
PBA Flash	104	104	104	101
PBA Giant	87	96	92	93
PBA Greenfield	94	102	102	105
PBA Herald XT	73	83	85	88
PBA Hurricane XT	101	100	100	101
PBA Jumbo	91	101	103	106
PBA Jumbo2	109	114	115	113



## LENTILS

Table 2. Characteristics of selected lentil varieties

Variety	Seed coat colour	Cotyledon colour	Seed size relative to Nugget	Market category	Vigour	Plant height	Flowering time	Maturity time	Lodging resistance	Pod drop	Shattering	Botrytis grey mould	Ascochyta blight		Boron	Salt
													Foliage	Seed		
SMALL RED																
PBA Bounty	Grey	Red	90	SRP	Moderate	Short/Med	Mid/Late	Mid	S	R	R	MS	MR/MS	MS	I	MI
PBA Herald XT	Grey	Red	75	SR	Poor/Mod	Short	Mid/Late	Mid/Late	MR/MS	MR	MR	R/MR	R	R	I	I
Nipper	Grey	Red	75-80	SRP	Poor/Mod	Short	Mid/Late	Mid	MR	MR	MR	R/MR	MR/MS	MR	I	MT
PBA Hurricane XT	Grey	Red	85	SRP	Moderate	Medium	Mid	Mid	MR	MR	R	MR/MS	MR	R/MR	I	I
Northfield	Tan	Red	80	SRP	Poor/Mod	Short	Mid	Mid	MR/MS	MR/MS	MR	S	MR/MS	MR	I	I
MEDIUM RED																
Nugget	Grey	Red	100	MRS	Moderate	Medium	Mid	Mid/Late	MS	MR	R	MR/MS	MR/MS	MR/MS	I	I
PBA Ace	Grey	Red	100	MRS	Good	Medium	Mid	Mid	MR/MS	R	MR/MS	MR/MS	R	R	I	I
PBA Blitz	Grey	Red	115-120	MRS	Mod/Good	Med/Tall	Early	Early	MR	MR	MR	MR	MR	MR/MS	I	I
PBA Bolt	Grey	Red	100	MRS	Mod/Good	Medium	Early/Mid	Early/Mid	R	R	R	S	MR	R/MR	MI	MI
PBA Flash	Green	Red	100-110	MRS	Moderate	Medium	Early/Mid	Early/Mid	MR	MR	MR	MR/MS	MS	MS	MI	MI
LARGE RED																
Aldinga	Green	Red	120	LRS	Moderate	Medium	Mid	Mid	S	R	MR/MS	MS	MR/MS	MS	I	MI
PBA Jumbo	Grey	Red	120	LRS	Moderate	Medium	Early/Mid	Mid	MS	MR	MR	MS	MR/MS	S	MI	I
PBA Jumbo2	Grey	Red	120	LRS	Mod/Good	Med/Tall	Mid	Mid	MR/MS	MR	R	R/MR	R	R	MI	I
MEDIUM AND LARGE GREEN																
Boomer	Green	Yellow	150	LG	Good	Tall	Mid	Mid/Late	S	R	S	MR/MS	MR	MR/MS	MI	I
PBA Greenfield	Green	Yellow	130	LG	Good	Tall	Mid	Mid/Late	MS	R	MR	MR	MR/MS	MR/MS	I	MI
PBA Giant	Green	Yellow	170	LG	Good	Tall	Mid	Mid/Late	S	R	MR/MS	MS	MR	MS	MI	I
R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, I = intolerant, MI = moderately intolerant, Market category: MRS = medium red split, SRP = small red premium round (football), SR = small red round (football), LRS = large red split, LG = large green																

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, I = intolerant, MI = moderately intolerant, Market category: MPS = medium red split, SRP = small red premium round (football), SR = small red round (football), LRS = large red split, LG = large green

# Chickpea variety sowing guide 2017

By Sarah Day, Larn McMurray and Jenny Davidson, SARDI and Kristy Hobson, NSW DPI

A virulence change in the ascochyta blight (AB) pathogen in southern Australia now means that all current varieties are rated as either susceptible or moderately susceptible to AB infection. This follows observations of severe AB on previously resistant chickpea varieties in 2015 and 2016 across South Australia and Victoria.

Chickpea growers now need to carefully consider their risk to AB infection along with the ability to effectively control the disease prior to choosing to grow this crop in southern Australia. This will be the case in both high and low rainfall regions as severe disease outbreaks can still occur in the latter in all current variety options during wet seasons such as 2016.

All chickpea crops will need to be regularly monitored for AB infection. Moderately susceptible varieties will require 3 to 4 strategic fungicide sprays ahead of rain events offering 2 to 3 weeks protection, starting at 6 to 8 weeks post sowing.

Susceptible varieties will require regular fungicide sprays every 2-3 weeks throughout the growing season in front of rainfall events. As the pods of all commercial varieties are susceptible

to AB they will also require fungicide sprays during pod setting ahead of rain fronts to protect the pods from seed staining and seed abortion. It is imperative that all chickpea seed is treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017.

The disease will also survive on stubble and organic matter for a number of years so growers must observe a minimum of a three year rotation between chickpeas in the same paddock, and avoid planting adjacent to last year's chickpea stubble.

Kabuli and desi chickpea variety options for southern region growers remain the same in 2017 with no new varieties released in 2016 suitable for southern chickpea growing regions. With a combination of high yields, medium seed size and broad adaptation, PBA Monarch continues to be good alternative to small seeded kabuli varieties Genesis™ 090 and Genesis™ 079, and the large seeded kabuli variety Genesis™ Kalkee however it is now rated susceptible to AB compared to a rating of moderately susceptible in the other three varieties.

## Selection Criteria

The list of suggested varieties for 2017 is shown in Table 1. A range of chickpea types are now available offering growers the opportunity to exploit particular management and or market opportunities, providing AB can be managed effectively. Information on key selection criteria and yield for each variety can be found in Tables 2, 3 and 4.

When selecting a chickpea type and variety to grow, growers need to make their decision on the basis of AB resistance, yield, price and marketability. Other agronomic traits such as maturity, cold tolerance, root lesion nematode susceptibility and lodging resistance also need to be considered.

## Desi types

Larger seeds are preferred for desi types, regardless of whether they are used for splitting or whole seed use. There has been an increasing use of large whole seeded desi types in a range of food preparations in the sub-continent and a small premium has been available for types fitting this use.

Newer desi varieties have improved seed size and colour over older varieties such as Genesis™ 509 and Tyson, and are suited to whole and splitting markets. They are therefore more likely to achieve the higher prices of the benchmark northern region varieties (eg Jimbour).

Table 1. Chickpea variety sowing guide 2017

Seed type	Rainfall zones (mm)			
	Below 400	400-450	450-500	Above 500
Desi	PBA Slasher	PBA Slasher	PBA Slasher	PBA Slasher
	PBA Striker	PBA Striker	PBA Maiden*	PBA Maiden*
	PBA Maiden*	PBA Maiden*	PBA Striker	Neelam
	Neelam	Neelam	Neelam	Ambar
	Ambar	Ambar	Ambar	
Small kabuli	Genesis™ 090	Genesis™ 090	Genesis™ 090	Genesis™ 090
	Genesis™ 079	Genesis™ 079	Genesis™ 079	
Medium/ large kabuli	PBA Monarch	Genesis™ Kalkee	Genesis™ Kalkee	Genesis™ Kalkee
		PBA Monarch	PBA Monarch	PBA Monarch
		Genesis™ 114	Genesis™ 114	Genesis™ 114
		Almaz	Almaz	Almaz

\* = high quality seed type



## CHICKPEAS

Table 2. Agronomic features of chickpea varieties

Variety	Seed size g/100 seeds	Kabuli main seed size (mm)	Seed colour	Market type suitability	Early vigour	Flowering	Maturity	Plant height	Ascochyta blight		Botrytis grey mould	Flowering cold tolerance	Lodging resistance maturity	Pratylenchus neglectus	
DESI TYPE															
Ambar	16		light brown	split & whole		early	early	short-medium	MS	S	S		MR		
Genesis™ 509	15-17		dark brown	split	moderate	mid	early-mid	medium	MS	S	MS	S	MR	MS	
Howzat	19-21		light brown	split & whole	poor/mod	mid	mid	medium	S	S	MS	S	MS	S	MI
Neelam	17		brown	split & whole		mid	mid	medium-tall	MS	S	S		MR		
PBA HatTrick	19-21		light brown	split & whole	moderate	mid-late	mid-late	tall	S	S	S	S	MR		
PBA Maiden	21-24		yellow-tan	premium whole	moderate	early-mid	mid	short-medium	S	S	S	S	MS		
PBA Slasher	17-19		light brown	split & whole	poor/mod	mid	mid	short-medium	MS	S	S	S	MS		
PBA Striker	20-22		light brown	split & whole	good	early	early	short-medium	S	S	S		MS		
Sonali	16-20		dark brown	split	good	early	early	medium	S	S	S	T	MS	MR	
KABULI TYPE															
Almaz	36-42	8-9	cream	8-9mm	poor	mid	mid-late	medium-tall	MS	S	S	S	MR	MR	
Genesis™ 079	24-28	6-7	cream	6-7mm	moderate	early	early	short	S	S	MS	S	MR	MS	
Genesis™ 090	26-35	7-8	cream	6-8mm	good	mid	mid	medium	MS	S	S	S	MR	MR	
Genesis™ 114	36-42	8-9	cream	8-9mm	good	mid	mid-late	tall	S	S	S	S	R		
Genesis™ Kalkee	40-46	8-9	cream	8-10mm	good	mid-late	late	tall	MS	S	S	S	R		
PBA Monarch	37-43	8-9	cream	8-9mm	poor/mod	early	early	medium	S	S	S	S	MS		
R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, T = tolerant, MI = moderately intolerant, I = intolerant, NA = not available due to no data.															

R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible, T = tolerant, MI = moderately intolerant, I = intolerant, NA = not available due to no data.

## CHICKPEAS

### Small kabuli types

Bulk markets for the small kabuli, Genesis™ 090, have been developed in recent years and generally have attracted a higher price than the desi types. However, growers need to be aware that these bulk markets have been over supplied in the past by a number of overseas countries and that they may have to hold seed from time to time as the marketing opportunities are not always available or they may be limited in terms of size and price.

Seed size is small, 6-8mm, so will not attract the higher prices of the larger seeded kabuli types (e.g. PBA Monarch, Genesis™ Kalkee). Further premiums may be obtained by grading and selling the seed on size. Genesis™ 079 produces predominantly 6-7mm seed for the bulk small kabuli markets and generally attracts a price at the bottom end of the Genesis™ 090 range.

### Medium-large kabuli types

PBA Monarch, Almaz, Genesis™ 114 and Genesis™ Kalkee produce predominantly 8 to 10mm seed for traditional larger seeded kabuli markets where larger seed size is imperative to attract premium prices.

Uniformity of seed size is also important in these markets and may be difficult to achieve in the large types e.g. Genesis™ Kalkee due to its relative poor adaptation to dry finishing conditions. The medium sized type PBA Monarch is likely to produce more uniform sized seed under these conditions.

### Notes on selected desi chickpea varieties

**PBA Maiden** is now rated as susceptible to foliar infection by AB and will require regular vegetative and reproductive foliar fungicide sprays every 2 to 3 weeks. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017.

PBA Maiden is a large seeded high quality desi chickpea for the medium to low rainfall environments of southern Australia. It is broadly adapted to these regions and has shown similar yields to PBA Slasher. PBA Maiden has a semi-spreading plant type and height similar to PBA Slasher. It has a seed size greater than current southern desi varieties (approximately 30% larger than PBA Slasher) with a yellow-tan seed coat.

This variety is targeted for whole seed markets where its large, angular shaped and bright yellow-tan coloured seed coat are well suited to the specific requirements of these markets. Growers are advised to investigate delivery and marketing options for PBA Maiden prior to growing this variety, due to its unique and favourable seed characteristics. Larger uniform seed size is more likely in medium rainfall regions. Seed is licensed to Seednet.

**PBA Striker** is now susceptible to AB and will require regular vegetative and reproductive foliar fungicide sprays every 2 to 3 weeks. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. PBA Striker is a high yielding desi chickpea with very good early vigour. It is an early flowering and maturing variety and will provide a high yielding alternative to all chickpea varieties in the medium to low rainfall environments

**Table 3.** Predicted long term yields of selected desi chickpea varieties grouped by yield bracket. Yields expressed as a percentage of yield bracket mean (SARDI, PBA & NVT data, 2011-2015).

Yield Group	< 1 t/ha	1 to 2 t/ha	> 2 t/ha
Mean Yield	0.70	1.5	2.42
Number of Trials	7	13	13
Ambar	110	104	105
Genesis 079	115	106	114
Genesis 090	93	101	106
Genesis 509	96	93	90
Genesis 836	94	95	95
Howzat	102	100	104
Neelam	112	109	107
PBA Boundary	97	100	99
PBA Hatrick	92	95	95
PBA Maiden	111	105	110
PBA Slasher	113	111	109
PBA Striker	122	110	111
Sonali	102	92	96

of western and southern Australia, providing AB can be managed. PBA Striker has a similar plant type to PBA Slasher but with larger seed size than all other southern desi varieties.

Seed of PBA Striker is also light in colour and has good milling characteristics. Due to its early maturity and AB susceptibility, PBA Striker is not recommended for high rainfall and long growing season districts. Seed is licensed to Seednet.

**Ambar** is an early flowering and maturing desi type chickpea. It is now rated as moderately susceptible to AB and will require 3 to 4 strategic fungicide sprays during the season ahead of rain fronts, the sprays offering 2-3 weeks protection against infection.

All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. Ambar has had similar but generally lower yields than PBA Slasher in southern Australia. It produces a short to medium canopy that can be difficult to harvest in some seasons and it has a seed size smaller than PBA Slasher and PBA Striker but light in colour. Seed is licensed to Heritage Seeds.

**Neelam** is a mid flowering and maturing desi type chickpea. It is now rated as moderately susceptible to AB and will require 3 to 4 strategic fungicide sprays during the season ahead of rain fronts, the sprays offering 2-3 weeks protection against infection. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017.

Neelam has similar yields to PBA Slasher but lower yields than PBA Striker in South Australia and produces seed smaller than

## CHICKPEAS

both these varieties. Neelam has a medium tall plant height, taller than Amber and PBA Slasher. Seed is licensed to Heritage Seeds.

**PBA Slasher** is now rated as moderately susceptible to AB and will require 3 to 4 strategic fungicide sprays during the season ahead of rain fronts, the sprays offering 2-3 weeks protection against infection. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. PBA Slasher is high yielding in all chickpea growing areas of SA, providing AB can be managed. It has a semi-spreading plant type with mid flowering and mid maturity similar to Howzat. PBA Slasher is suitable for both the split and whole seed markets as it has improved seed size and colour over varieties like Genesis™ 509 which are only suited to split seed markets. Seed is licensed to Seed Net.

**PBA Seamer , PBA HatTrick , PBA Pistol & PBA Boundary.** These varieties have been released for northern NSW/southern Qld (PBA Seamer, PBA HatTrick & PBA Boundary) and Central Queensland (PBA Pistol) where they offer specific production advantages. All four have limited suitability to SA and Victoria due to late maturity and low relative yields.

### Notes on selected kabuli chickpea varieties

**PBA Monarch** is a high yielding medium sized kabuli chickpea with adaptation to all kabuli growing areas of Australia. The AB rating for PBA Monarch has been reduced to susceptible and crops will require regular vegetative and reproductive foliar fungicide sprays every 2 to 3 weeks. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. It is particularly well suited to the shorter seasoned medium rainfall environments of south eastern Australia due to improved adaptation through earlier flowering and maturity compared to Genesis™ 090, Almaz and Genesis™ Kalkee.

It is adapted to the traditional kabuli chickpea growing regions and has shown a consistent and significant yield advantage over all current medium and large seeded kabuli varieties, providing AB can be managed.

It has similar yields and larger seed size than Genesis™ 090 although is higher yielding than this variety in low yielding (< 1 t/ha) situations. In shorter growing seasons, PBA Monarch may have larger and more consistent seed size than other medium sized varieties due to its earlier pod filling timing. Seed is licensed to Seednet.

**Almaz** is a medium to large seeded kabuli type. It is moderately susceptible to AB and will require 3 to 4 strategic fungicide sprays during the season ahead of rain fronts, the sprays offering 2-3 weeks protection against infection. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. Almaz is a mid flowering and mid to late maturing variety and is lower yielding than Genesis™ 090 in southern Australia. Seed is licensed to Seednet.

**Genesis™ 079** is a high yielding small seeded kabuli type. It is now rated as susceptible to AB and will require regular vegetative and reproductive foliar fungicide sprays every 2-3 weeks. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to

**Table 4.** Predicted long term yields of selected kabuli chickpea varieties grouped by yield bracket. Yields expressed as a percentage of yield bracket mean (SARDI, PBA & NVT data, 2011–2015).

Yield Group	< 1 t/ha	1 to 2 t/ha	> 2 t/ha
Mean Yield	0.52	1.54	2.38
Number of Trials	3	9	14
Almaz	89	95	97
Genesis 079	118	107	104
Genesis 090	101	107	101
Genesis 114	88	90	93
Genesis Kalkee	96	92	95
PBA Monarch	119	101	103

the emerging seedlings in 2017. Genesis™ 079 has a short plant type and is an early flowering and maturing variety that produces small seed (6-7 mm), smaller than Genesis™ 090. It has produced high and consistent yields in medium and low rainfall districts of SA. Seed of Genesis™ 079 is available through Australian Agricultural Crop Technologies.

**Genesis™ 114** is a medium to large seeded (8-9 mm) kabuli type chickpea. The AB rating for Genesis™ 114 has been reduced to susceptible and it will require regular vegetative and reproductive foliar fungicide sprays every 2 to 3 weeks. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017.

Its flowering time is similar to Almaz but later than Genesis™ 090. It has a medium to tall erect plant type. Harvestability of Genesis™ 114 is excellent with greater height to lowest pod than Genesis™ 090 and Almaz. Genesis™ 114 is licensed to Australian Agricultural Crop Technologies.

**Genesis™ 090** is a small to medium seeded kabuli (7-8 mm). The AB rating for Genesis™ 090 has been reduced to moderately susceptible and crops will now require 3 to 4 strategic fungicide sprays during the season ahead of rain fronts, the sprays offering 2-3 weeks protection against infection. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. Genesis™ 090 has medium height with erect branches and yields similar to PBA Monarch but lower than PBA Slasher and PBA Striker. Seed is licensed to Australian Agricultural Crop Technologies.

**Genesis™ Kalkee** is a medium to large seeded kabuli type, late in flowering and large in seed size. It is rated as moderately susceptible to AB and will require 3 to 4 strategic fungicide sprays during the season ahead of rain fronts, the sprays offering 2-3 weeks protection against infection. All chickpea seed should be treated with a thiram based fungicide to prevent seed transmission of AB on to the emerging seedlings in 2017. It has the largest seed size of all commercial kabuli types hence more able to meet the size requirements of premium high valued markets. However yield is inferior to the small kabuli types and PBA Monarch but generally similar to Almaz in SA. It is licensed to Australian Agricultural Crop Technologies. ■



# Field pea variety sowing guide 2017

By Sarah Day, Larn McMurray, Jenny Davidson, SARDI and Garry Rosewarne PBA Field Peas DEDJTR Victoria

There have been no new field pea varieties released for 2017. A high yielding advanced PBA breeding line, OZP1101 is currently being bulked up by Seednet for expected release to growers in 2018. It is a mid to late flowering 'kasper seed type' with less susceptibility to bacterial blight and improved yields over Kasper particularly in South Australia (SA).

Severe levels of bacterial blight (*p. syringae*) were reported in the Mid and Upper North and Upper Eyre Peninsula of SA in 2016, no doubt increased by frost events which are known to increase infection.

As infection can spread easily through paddocks on tyres or boots, it is recommended to avoid entering infected crops to prevent spreading the disease further. Bacterial blight is a bacterial infection rather than a fungal infection and therefore the use of fungicides will not help an infected crop to recover. Unfortunately there is nothing that can be done to prevent bacterial blight once it's infected a crop.

Infected paddocks should be harvested after healthy pea crops to prevent the trash from infecting field pea grain of non-infected crops. No seed should be kept from an infected crop as there is a high chance of seed infection. If you grow field peas in a frost prone area, the preferred field pea varieties are PBA Oura or PBA Percy as they have improved resistance to bacterial blight over all other varieties. In addition, consider removing the stubble from frost prone paddocks, as there is evidence that stubble intensifies frosts and therefore will increase the severity of bacterial blight.

Blackspot was also a major disease concern in 2016 and delayed sowing is the main cultural practice for reducing the risk of this disease. 'Blackspot Manager' should be used to guide sowing times to avoid the initial flush of spores.

However, in 2016, the predicted medium to high blackspot risk levels in many regions of SA remained in place past the optimum sowing window. In seasons where delayed sowing is not a viable option, growers are advised to select another paddock or break crop to sow.

Growers should select paddocks not previously sown to field peas, or paddocks with at least four years break from field peas and with a low history of blackspot disease infection. They should also not sow field peas in close vicinity to last year's field pea stubble. In areas where a yield of at least 2 t/ha is achievable, they can consider using a fungicide strategy of P-Pick T seed dressing combined with two mancozeb foliar fungicide sprays (6-10 weeks post sowing and at early flowering). In situations where delayed sowing is undertaken for

blackspot management, a number of recently released, earlier flowering and maturing varieties will provide improved yield stability over later flowering types such as Kasper.

Predictions of blackspot spore release times in each pea growing district can be obtained through 'Blackspot Manager' via the internet ([www.agric.wa.gov.au/cropdiseases](http://www.agric.wa.gov.au/cropdiseases)) or a free SMS service (to subscribe email Jenny Davidson: [jenny.davidson@sa.gov.au](mailto:jenny.davidson@sa.gov.au)).

## Selection criteria

The list of suggested varieties is shown in Table 1 and is based on performance within different rainfall zones. Information on the most important agronomic characteristics and grain

Table 1. Pea variety sowing guide 2017

Seed type	Rainfall zone (mm)			
	Below 350	350-425	425-500	Above 500
Dun - "Kasper type"	PBA Wharton	PBA Wharton	PBA Wharton	PBA Wharton
	PBA Twilight	PBA Twilight	PBA Gunyah	Kasper
	PBA Gunyah	PBA Gunyah	Kasper	PBA Gunyah
	Kasper	Kasper	PBA Twilight	PBA Twilight
Dun - Other	PBA Oura^	PBA Oura^	PBA Oura^	PBA Oura^
	PBA Percy^	PBA Percy^	PBA Percy^	PBA Percy^
	PBA Coogee*	PBA Coogee*	Yarrum	Yarrum
	Parafield^	Parafield^	PBA Coogee*	PBA Coogee*
	Yarrum	Yarrum	Parafield^	Parafield^
	Morgan*	Morgan*	Morgan*	Morgan*
White	PBA Pearl	PBA Pearl	PBA Pearl	PBA Pearl
	Sturt	Sturt	Sturt	Sturt
	PBA Hayman**	PBA Hayman**	PBA Hayman**	PBA Hayman**
Blue	Excell	Excell	Excell	Excell
	Maki	Maki	Maki	Maki

\* Green manure/forage option \*\* Green manure/forage ONLY ^ Preferred varieties where bacterial blight is a production constraint.



## FIELD PEAS

Table 2. Variety characteristics of selected pea varieties

Variety	Seed type	Seed size	Plant habit	Plant height	Early vigour	Flower colour	Flowering time	Maturity time	Pod shattering, at maturity	Lodging resistance at maturity	Downy mildew		Blackspot	Powdery mildew	Bacterial blight ( <i>pv syringae</i> )
											Parafield strain	Kaspa strain#			
Alma	Dun	Me	C	T	High	P	M-L	L	MR: NSP	Poor	S	S	MS	S	-
Dundale	Dun	Me	C	T	High	P	E	M	MR: NSP	Poor	S	-	MS	S	-
Excell	Blue	Me	SL	Me-T	High	W	E-M	L	S: NSP	Good	MR	S	MS	S	S
Kaspa	Dun (K)	Me	SL	Me-T	High	Pi	L	M	R: SP	Fair-Good	MR	S	MS	S	S
Maki	Blue		SL	Sh	Mod	W	E	E	S: NSP	Poor-Fair	S	S	S	R	S
Morgan	Dun	Sm	SL	T	High	P	L	L	MR: NSP	Poor-Fair	MR	S	MS	S	MS
Parafield	Dun	Me-Lg	C	T	High	P	M	M	MR: NSP	Poor	S	S	MS	S	MS
PBA Coogee	Dun	Lg	C	T	High	P	M	M	MR: NSP	Poor	-	-	MS	R	MS
PBA Gunyah	Dun (K)	Me	SL	Me-T	High	Pi	E-M	E	R: SP	Fair-Good	R	S	MS	S	S
PBA Hayman	White	Sm	C	T	Low-Mod	W	VL	VL	MR: NSP	Fair	MR/R	-	MS	R	MR
PBA Oura	Dun	Me	SL	Me-T	High	P	E	E	MR: NSP	Fair-Good	MR	MR/MS	MS	S	MR/MS
PBA Pearl	White	Me-Lg	SL	Me-T	High	W	E-M	E	MR: NSP	Good	MS	S	MR/MS	S	MS
PBA Percy	Dun	Me-Lg	C	T	High	P	E	E	MR: NSP	Poor	S	S	MS	S	MR
PBA Twilight	Dun (K)	Me	SL	Me-T	High	Pi	E	E	R: SP	Fair-Good	R	S	MS	S	S
PBA Wharton	Dun (K)	Me	SL	Me-T	High	Pi	E-M	E	R: SP	Fair-Good	R	S	MS	R	S
Sturt	White	Me-Sm	C	T	High	W	E-M	M	MR: NSP	Poor	MS	S	MS	S	MS
Yarrum	Dun	Me	SL	Me-Sh	Mod	P	L	M	MR: NSP	Poor-Fair	S	S	MS	R	MS

K = Kaspa type, Sm = small, Me = medium, Lg = large, C = conventional, SL = semi-leafless, P = purple, W = white, Pi = pink, T = tall, Sh = short, E = early, M = mid, L = late  
H = high, M = moderate, L = low, S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant, SP = sugar pod, NSP = non-sugar pod

## FIELD PEAS

yield for each variety can be found in Tables 2 and 3. When selecting a variety, growers need to make their selection on all the available information, including their individual farm and paddock situation, the access and availability of the target markets, and storage and handling facilities.

Due to white and blue peas not being accepted in the bulk dun segregation, growers need to also consider the different quality types within peas (Table 1) and where they can be delivered before deciding whether to grow these types.

### Notes on selected varieties

#### DUN TYPES

Dun peas are segregated from white and blue peas due to the different quality market specifications. Some pea markets in India and Sri Lanka prefer Australian dun peas due to their distinct 'nutty' taste.

'Kaspa seed type' grain is also preferred over dimpled grain (such as Parafield and PBA Oura) in these markets due to its round shape and lack of dimples allowing easier seed coat removal and greater split returns. It is important to check segregation plans for local delivery points as some will segregate the 'kaspa seed type' from the dimpled dun type.

#### Kaspa seed type

**PBA Wharton** is a 'Kaspa seed type' dun pea offering improved powdery mildew and virus resistances (Bean Leaf Roll and Pea Seed Borne Mosaic viruses). It provides the same agronomic benefits as Kaspa (eg lodging and shattering resistance), and will provide a reliable alternative in those areas where powdery mildew and viruses are regular problems.

PBA Wharton is early to mid flowering and early maturing, making it well suited to the practices of crop topping and delayed sowing for blackspot management. It was the highest yielding variety in SA NVT and PBA trials in 2014 and second highest behind PBA Pearl in 2015, but has yielded similarly to PBA Gunyah and PBA Twilight in previous years. Seed is licensed to Seednet.

**PBA Gunyah** is a 'Kaspa seed type' field pea that flowers earlier than Kaspa but has a longer flowering window. These characteristics make it higher yielding in shorter and/or drier seasons (yield potential below 2.25 t/ha) than Kaspa. It is early to mid flowering and early maturing, making it more suitable than Kaspa to the practice of crop topping.

It is better suited to delayed sowing than Kaspa for disease management. Its disease resistance profile is similar to Kaspa and therefore not well suited to bacterial blight prone environments. Despite being susceptible to powdery mildew it is likely that PBA Gunyah will incur less yield loss from this disease than Kaspa due to its earlier maturity. PBA Gunyah is licensed to Seednet.

**PBA Twilight** is a 'Kaspa seed type' with similar attributes to PBA Gunyah. It has a shorter flowering period and is earlier in maturity than PBA Gunyah making it well suited to the low rainfall and very short season field pea growing environments. Widespread evaluation over a number of years shows that it is higher yielding than Kaspa when yield potential is below 1.5 t/

**Table 3.** Predicted long term yields of selected pea varieties grouped by yield bracket. Yields expressed as a percentage of yield bracket mean (SARDI, PBA and NVT data, 2011-2015).

Yield Group	< 1.0 t/ha	1.0 to 2.0 t/ha	2.0 to 3.0 t/ha	> 3.0 t/ha
Mean Yield	0.79	1.53	2.51	3.43
Number of Trials	7	28	36	8
Excell	84	91	88	91
Kaspa	88	94	95	97
Morgan	88	88	91	89
Parafield	91	82	84	84
PBA Gunyah	99	98	96	99
PBA Oura	119	100	98	98
PBA Pearl	128	108	107	105
PBA Percy	125	98	95	96
PBA Twilight	98	96	94	98
PBA Wharton	102	101	100	100
Sturt	121	97	99	95
Yarrum	87	99	99	101

ha. Its disease resistance profile is similar to Kaspa and therefore not well suited to bacterial blight prone environments.

Despite being susceptible to powdery mildew it is likely that PBA Twilight will incur less yield loss from this disease than Kaspa due to its earlier maturity. PBA Twilight is licensed to Seednet.

**Kaspa** is semi-leafless, late flowering variety with resistance to shattering, good early season vigour and moderate resistance to lodging. Kaspa is susceptible to powdery mildew, blackspot and the "Kaspa strain" of downy mildew. The seed of Kaspa is distinct from traditional dun types (e.g. Parafield) in that it is red brown in colour and almost spherical in shape.

Kaspa needs to be considered carefully before use as an option in low rainfall areas or areas prone to early periods of high temperature and drought stress due to its late and condensed flowering period.

Kaspa also should be considered carefully in areas prone to frequent severe vegetative frosts due to potential for yield loss to bacterial blight. Kaspa is under contract to Seednet.

#### Traditional dimpled dun seed type

**PBA Oura** is a high yielding early to mid flowering semi-dwarf dun variety with high yields and improved resistance (MR/MS) to bacterial blight (*pv syringae*) over Kaspa, PBA Gunyah, PBA Twilight and PBA Wharton. This line has broad adaptation and high yield potential in short growing seasons.

It produces non sugar-type pods, but is not prone to shattering and has fair to good lodging resistance at maturity. PBA Oura seed is dimpled and not a 'kaspa seed type'. PBA Oura has

## FIELD PEAS

improved resistance (MR/MS) to the 'Kaspa' strain of downy mildew and improved tolerance to metribuzin herbicide over Kaspa. Seed is licensed to Seednet.

**PBA Percy** is an early flowering conventional dun variety with improved resistance (MR) to bacterial blight (pv syringae) over all other varieties making it a good option in areas prone to this disease.

Its early flowering and early maturity make it well suited to delayed sowing for disease management and the agronomic practice of crop-topping. It produces non sugar-type pods, but is not prone to shattering (similar to PBA Oura).

PBA Percy seed is dimpled and not a 'kaspa seed type'. PBA Percy generally produces yields similar to PBA Oura but in low rainfall environments can be the highest yielding dun variety in trials. Seed is licensed to Seednet.

**PBA Coogee** is a mid flowering and mid maturing conventional dun pea suitable for either grain or forage production. It has higher grain yield and similar biomass production to Morgan, and grain yield between Parafield and Kaspa.

Flowering and pod set is generally slightly later than both Parafield and Kaspa. PBA Coogee is resistant to powdery mildew and has improved tolerance to soil boron and salinity compared to other varieties. Seed is licensed to Seednet.

## WHITE TYPES

White peas cannot be delivered to bulk export markets with dun peas. Some high quality specialised white peas may fit into specific premium value markets for split peas.

Higher prices may be achieved if supplying specific niche markets, but these markets may be small. Small seeded white peas are likely to only suit domestic stock feed markets. Growers are advised to secure markets before deciding to grow these pea types.

**PBA Pearl** is a semi-leafless white pea variety which is broadly adapted and the highest yielding field pea in long term evaluation trials in all areas of SA. It has an erect growth habit, often with excellent lodging resistance at maturity. It is early to mid flowering and produces non sugar-type pods but is not prone to shattering (similar to PBA Oura).

It has a favourable disease resistance profile, with good resistance to Bean Leaf Roll virus, and moderate susceptibility to bacterial blight. Seed is available through Seednet and growers are advised to secure markets before deciding to grow

white peas as they cannot be delivered to bulk dun or Kaspa type export markets.

**Sturt** is a conventional leaf type, small seeded white pea similar to Parafield in height, lodging resistance and disease susceptibility. Flowering and maturity time of Sturt is similar but generally slightly earlier than Parafield.

It has consistently yielded higher than other varieties in trials affected by reproductive frosts, indicating some level of tolerance to this stress. Sturt is more sensitive than Kaspa and Parafield to label rates of both post sowing pre-emergent and post emergent applications of metribuzin. Sturt is licensed to Premier Seeds.

**PBA Hayman** is a late flowering and late maturing conventional pea suitable for forage production as a potential alternative to vetch. It has lower grain yield than Morgan (which has been considered a dual purpose variety) but has higher biomass production.

Due to its low yields (20-80% of Kaspa) grain retrieval in dry seasons or low rainfall districts can be difficult. Flowering and maturity of PBA Hayman is much later than other field pea varieties and peak growth rates and biomass accumulation also occurs much later than other varieties.

PBA Hayman is rated R for powdery mildew, MR for bacterial blight (similar to PBA Percy), and MR/R for the Parafield downy mildew strain (although its response against the Kaspa downy mildew strain is unknown). It is more susceptible to blackspot than all varieties and this must be considered carefully before growing this variety. Seed is licensed to Seednet.

## BLUE TYPES (GREEN COTYLEDONS)

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

Two blue field pea varieties, Excell and Maki, have been available to growers in the past. Maki is best suited to the north-eastern field pea growing areas of northern Australia, and limited testing has occurred in southern Australia.

Both varieties are outclassed for yield and agronomic adaptation by the newer dun and white pea releases in the southern region of Australia and they have a relatively poor disease resistance profile, as shown in Table 2. ■

# NVT

National  
Variety  
Trials  
A GRDC INITIATIVE

## making variety selection easy

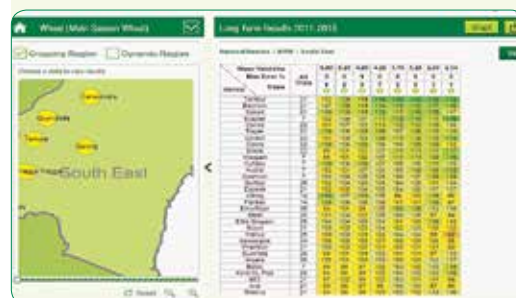
Presents data on 10 crops and approximately 300 varieties, with more than 630 trials conducted annually across all states.



The **Crop Disease AU** application provides quick access to current disease resistance ratings, disease information and an extensive disease image library. Compare disease symptoms with photographs and access detailed descriptions of each disease with management controls. Explore detailed information on crop varieties, map diseases, and automatically share photographs with friends or colleagues via email.



The **NVT Long Term Yield** app provides growers and advisors with easy access to the analysed NVT Multi Environment Trial (MET) data. Results are presented on a state, region or locality basis or by customised trial groupings. Data is presented in table or graph format across the range of trial mean yields. Once downloaded, the app works offline and is available on PC and iOS & Android tablets.



FOLLOW US ON TWITTER:  
@NVT\_Online  
[https://twitter.com/NVT\\_Online](https://twitter.com/NVT_Online)



[www.nvtonline.com.au](http://www.nvtonline.com.au)

