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2018 **Wheat** **variety sowing guide** for Western Australia



WESTERN AUSTRALIA



National
Variety
Trials
A GRDC INITIATIVE

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Abbreviations used are:

- CCN = Cereal cyst nematode
- RLN = Root lesion nematode
- PM = Powdery mildew
- YLS = Yellow leaf spot
- FNI = Falling Number Index
- AH = Australian Hard (min protein 11.5%)
- APW = Australian Premium White (min protein 10%)
- APW-im1 = Australian Premium White (min. protein 10%) with imidazolinone tolerance
- APWN = Australian Premium Noodle
- ANW = Australian Standard Noodle (protein 9.5–11.5%)
- FEED = Australian Feed
- EPR = End Point Royalty 2017-18 quoted \$/tonne ex-GST
- CL = Clearfield

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2018 **Wheat** **variety sowing guide** **for Western Australia**

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Contents

Introduction	4
What's new	4
What should I grow and when?	5
Variety performance in Agzones and suggested planting times	9
Disease update.....	16
Variety management - Agronomy	20
Herbicide tolerance	25
Fact sheets	27
Seed distributor's information	41
Essentials for a successful wheat crop	42

Introduction

The 2018 Wheat variety sowing guide for Western Australia provides information to support growers with decisions on variety selection and management. This publication contains a summary on the yield performance of varieties in the NVT, disease resistance ratings and agronomic information. A quick reference for 21 common and recently released varieties is also available as fact sheets.

When deciding whether to implement a new variety into your farming system, it's important to determine whether the change will provide an advantage. A new variety should

- have better or equal yield and disease traits,
- provide diversity or risk mitigation and
- suit the current market requirements.

Reviewing available trial information (NVT or DPIRD trials) is recommended. This bulletin provides available information on disease, agronomy, yield and quality characteristics to assist you with variety choice and management.

What's new

Since the last variety guide, there have been eight new premium wheat varieties released.

Chief CL Plus [Ⓛ] is an Australian Premium White – imidazolinone (APW- imi) tolerant variety which was released in 2016 by InterGrain. This variety was the highest yielding APW-imi variety in its two years of inclusion in NVT (2014 and 2016) and has potential for an IMI wheat on wheat option as the variety has good yellow spot resistance. The variety is useful for weedy paddocks (particularly brome grass) and is registered for use with the label rate of Intervix® herbicide. It is susceptible to stripe rust.

Cutlass [Ⓛ] is an Australian Premium White (APW) variety which was released by AGT in 2015. This variety is useful where a mid-long maturing variety is required. Cutlass has a strong rust resistance package and has performed similarly to Magenta and better than Yitpi in NVT. It has a provisional powdery mildew rating of susceptible.

DS Pascal is a mid-long maturing wheat variety which has recently been classified as an APW by Wheat Quality Australia. The outstanding characteristic of DS Pascal is its ability to maintain falling numbers after pre-harvest rain.

It was the best performing variety in DPIRD's falling number index testing from 2014 to 2016. DS Pascal is resistant to powdery mildew and moderately resistant to stripe rust. It was included in the 2016 NVT in Agzones 3 and 6 however its yields were not better than Mace and is susceptible to crown rot.

LRPB Arrow [Ⓛ] was released in 2016 and is an APW variety. This variety has out-yielded or equalled Mace in a majority of the NVT over the last two years. LRPB Arrow has a below average disease package. It is susceptible to stem, stripe and leaf rust and very susceptible to powdery mildew. Access to seed in WA is limited.

LRPB Havoc [Ⓛ] is an Australia Hard (AH) variety with expected release in spring 2017. It is an earlier maturing variety with a yield similar to or slightly higher than Mace. In 2016 this variety yielded better than Mace in Agzones 1 to 4 and slightly less in Agzones 5 and 6. The variety also has good resistance to stripe rust and leaf rust.

Ninja [Ⓛ], the latest Australian Noodle Wheat (ANW) variety from InterGrain was released in 2016. This variety was the highest yielding ANW variety in the 2015 and 2016 NVT and out-yielded Mace in a majority of locations. This variety could be useful in seasons where a premium is paid for noodle varieties. It is very susceptible to powdery mildew and susceptible to very susceptible to stem rust but has a very useful black point rating (MR).

Scepter [Ⓛ], is a high yielding AH Variety released in 2015 from AGT. Scepter may be chosen to replace areas that previously grew Mace because of its increased yield, same AH classification and overall similar agronomic characteristics. Its maturity is slightly later than Mace and its powdery mildew and black point rating are poorer than Mace. Scepter has a strong rust resistance package.

Tungsten [Ⓛ] was released by Elders in 2016 and is an AH variety. This variety is described by the breeding company as a short-mid maturity, however observations in the northern WA NVT in 2016 have indicated a longer maturity. Tungsten has generally yielded similarly or less than Mace in NVT. It is susceptible to very susceptible to stem rust. Tungsten's black point rating is similar to Mace (MRMS).

What should I grow and when?

Mace has dominated plantings in recent years (Figure 1) due to its consistent high yields when sown across a range of environments. It has been considered the benchmark variety for yield and its AH classification and other agronomic traits combine for it to be a reliable and easy variety to grow. A number of recently released varieties have out-yielded Mace in the NVT

(Table 1). However, all varieties have strengths and weaknesses which will likely determine their overall success in a farming system. It is important to consider their yield performance in your environment, grain quality, risk from disease, pre-harvest sprouting (PHS) risk and if its maturity matches targeted sowing times. This assists with variety selection and managing the adopted varieties agronomy package.

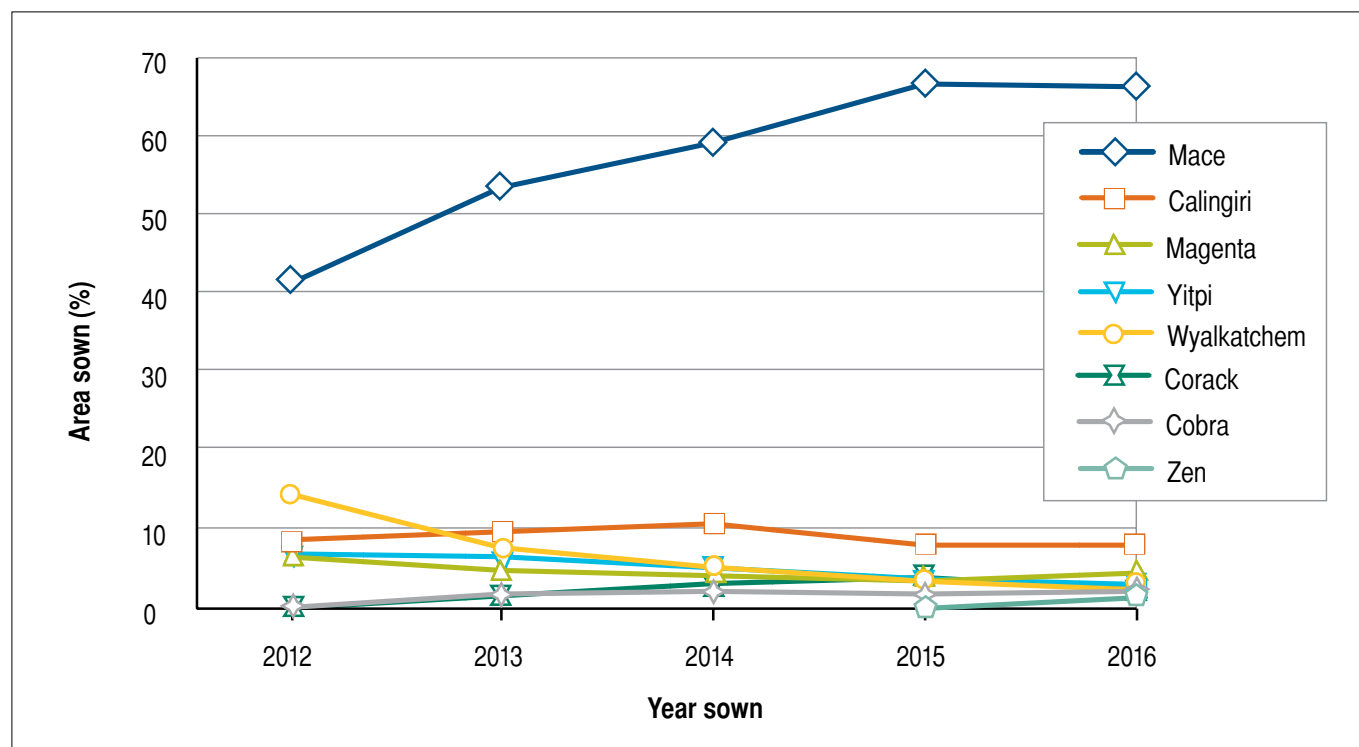


Figure 1 Estimated area sown (% of state plantings) of wheat varieties in Western Australia between 2012 and 2016. Source: CBH Group. Note: Top eight varieties based on area sown are listed

Table 1 Summary of the top 10 yielding WA milling wheat varieties from the NVT MET analysis from 2015 and 2016

Variety*	Grade	Maturity	Disease strengths	Disease risks	FNI
Scepter	AH	Mid	All rusts	PM, RLN (<i>P. neg</i>)	5
Ninja	ANW	Mid	Black point	Stem rust, PM	4p
Hydra	APW	Short-mid	Black point		3
LRPB Arrow	APW	Mid		All rusts, PM	5p
LRPB Cobra	AH	Short-mid	Stem + leaf rust		3
Cutlass	APW	Mid-long	All rusts and CCN	PM	4
Magenta	APW	Mid-long	YLS and PM		3
Chief CL Plus	APW-imi	Mid	Stem + leaf rust	Stripe rust	4p
Zen	ANW	Mid-long	RLN (<i>P. neg</i>), leaf rust	PM	3
Mace	AH	Short-mid	Stem + stripe rust	PM	5

*: Varieties ranked based on state-wide MET analysis from 2015-16.

As a means of comparing the performance of varieties across a range of environments it is useful to assess the relative varietal performance at different yield potentials. The following figures show the mean relative yields of varieties from each quality grade across groupings of sites with a similar site mean yield (grain yield groups) (Figures 2-5) in 2015 and 2016.

AH

Scepter has led the yield performance across the NVT in 2015 and 2016 and was on average higher yielding than Mace at site means of 2t/ha and above (Figure 2). Most other new AH were on average within 0.1t/ha of the site mean yield. Tungsten was generally 0.1t/ha lower than Mace through the yield groups. LRPB Cobra yields were slightly less than Mace in lower yielding trials and slightly better in higher yielding environments. Yitpi averaged around 0.1t/ha below average overall but its longer maturity provide an option for earlier sowing opportunities.

APW

The new releases with APW classification show a general increasing of relative yield as site mean yield increased (Figure 3). None of the new APW varieties matched Scepter across the yield

groups. Hydra and LRPB Arrow were the highest yielding APW (Table 1). Their average yields were better than Mace at sites with mean yields of 2t/ha and greater. Cutlass and Magenta performed similar to each other with yields averaging 0.1t/ha less than Mace at sites with site mean yields <3t/ha. Cutlass out-yielded Yitpi (AH) and with improved rust and yellow leaf spot resistance and may be a suitable replacement on a maturity basis.

APW-imi

Imidazolinone tolerant wheat varieties have a new yield benchmark variety, Chief CL Plus. Prior to its release Justica CL Plus was the superior option and Impress CL Plus performed poorly in 2016. Chief CL Plus is competitive with Mace across the yield groups (Figure 4). While CL wheats have to date lagged behind the popularity of CL barley options, the more competitive yields of Chief CL Plus may see growers integrating this option to assist with in-season control of grass weeds such as brome and barley grass, as well as in plant back options.

ANW

ANW wheat growers have two new options with robust yield performance of Ninja and Zen. Ninja was the second highest yielding milling wheat

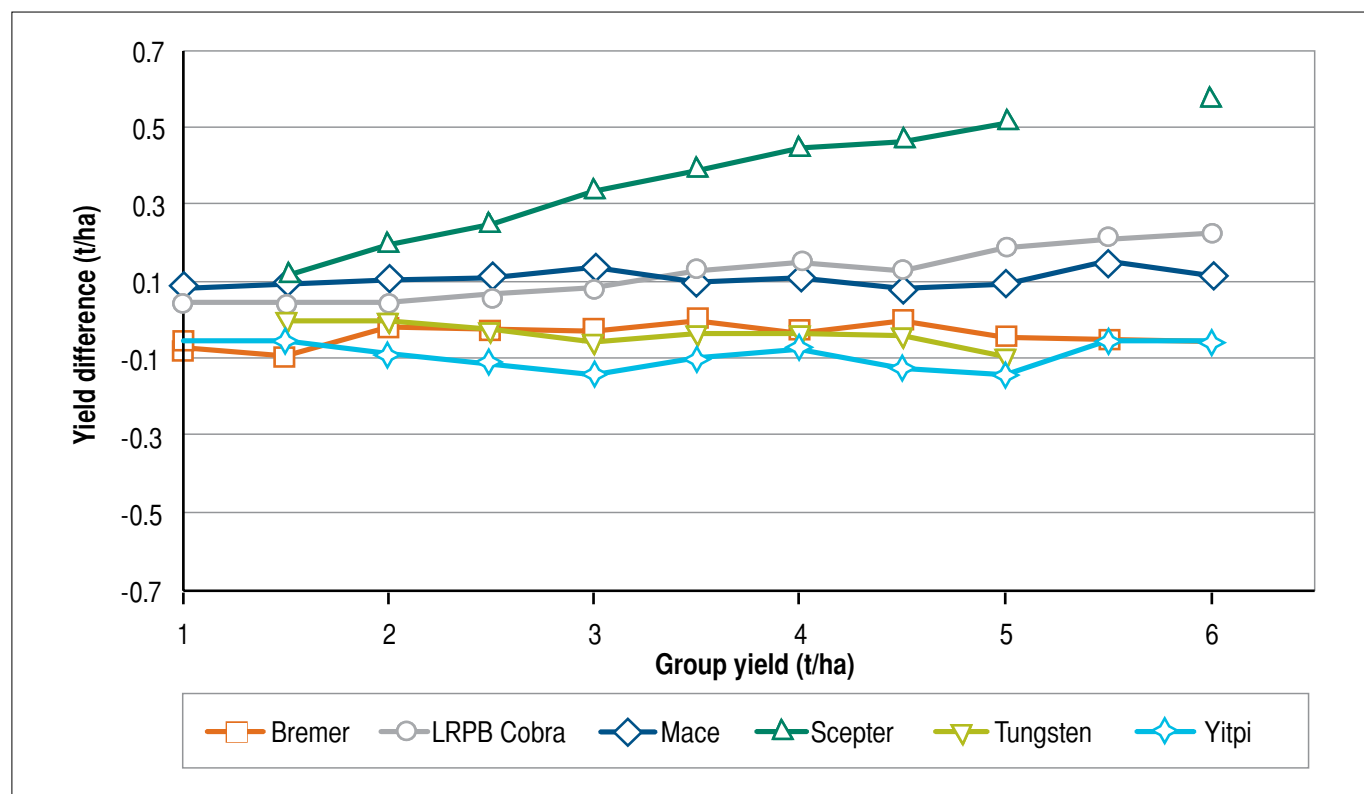


Figure 2 Difference in the grain yield of AH varieties and site mean yield at different yield groups in the NVT between 2012 and 2016

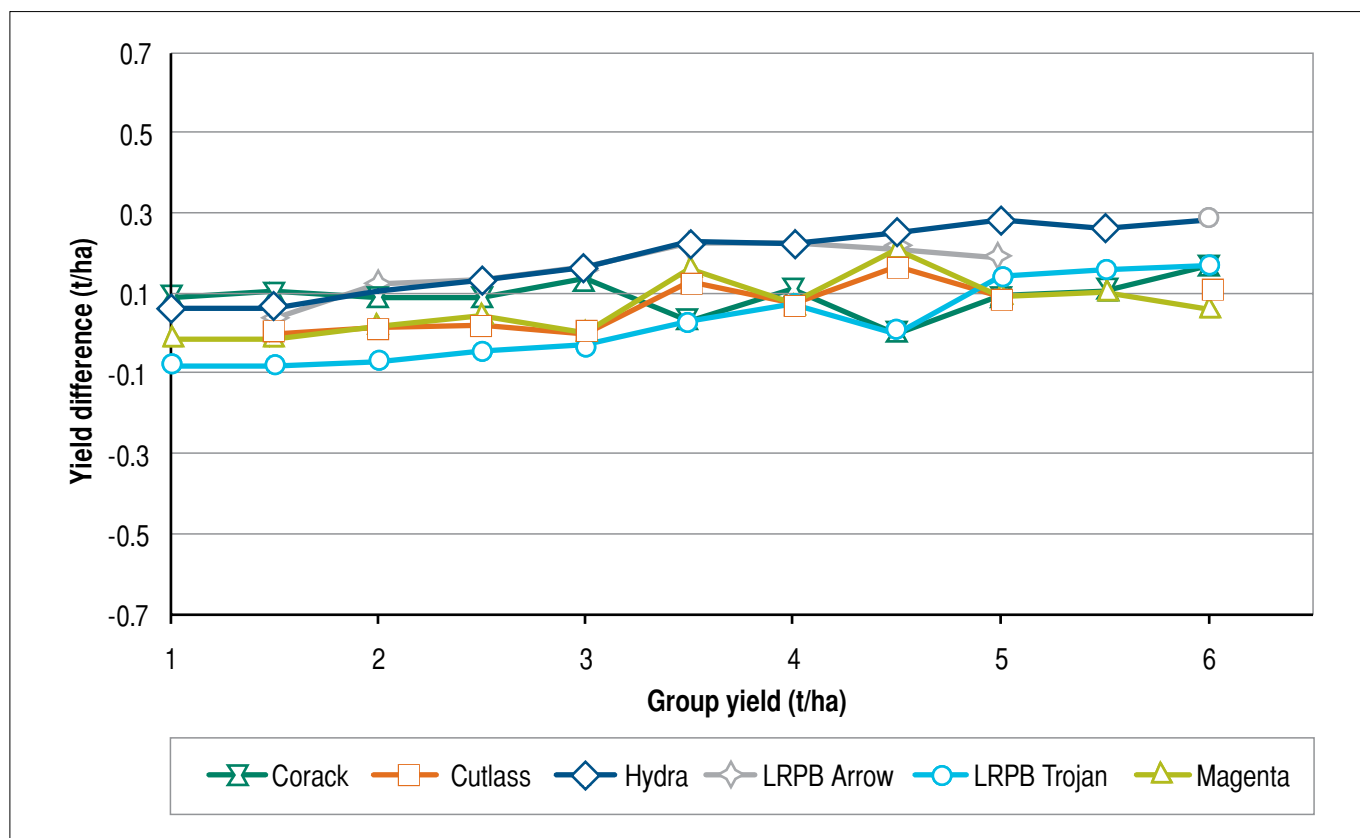


Figure 3 Difference in the grain yield of APW varieties and site mean yield at different yield groups in the NVT between 2012 and 2016

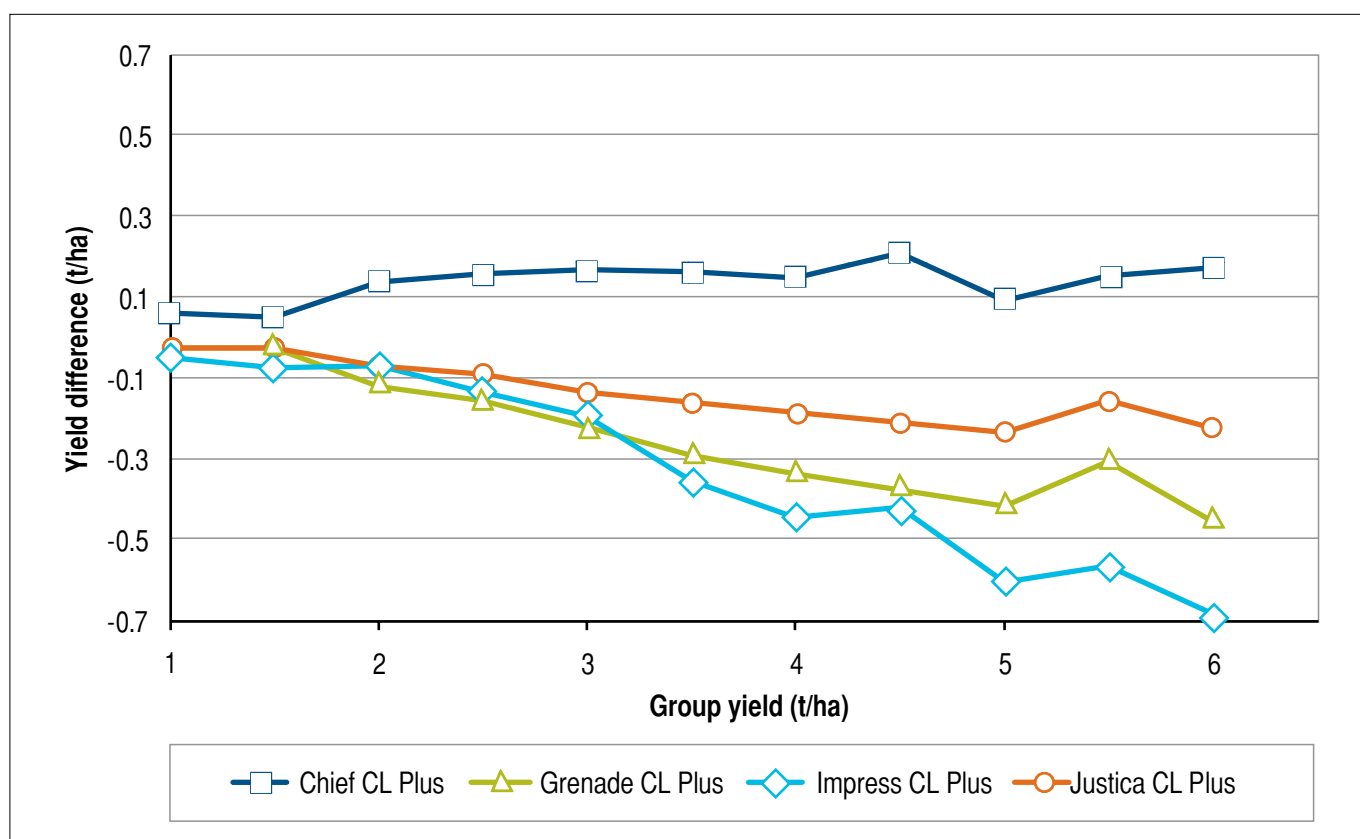


Figure 4 Difference in the grain yield of APW-im varieties and site mean yield at different yield groups in the NVT between 2012 and 2016

after Scepter (Table 1). It has improved yields over Mace with ANW premium opportunities. Ninja has a mid-maturity while Zen has a mid-long maturity similar to Calingiri.

Zen has also out-yielded Calingiri across all the yield groupings and yielded slightly better than Mace in high yielding sites in the last two seasons of NVT sites (Figure 5). Zen also has an equal best MR rating for RLN (*P. neglectus*), compared to Calingiri's equal worst SVS. Ninja has a better falling number rating than other ANW varieties (except Supreme). Although its disease resistance package is an overall improvement on Calingiri it is very susceptible to powdery mildew and susceptible to very susceptible to stem rust.

Variety classification

In 2018 Wheat Quality Australia (WQA) will downgrade:

- Carnamah from AH to APW
- Halberd from APW to ASW
- Spear from APW to ASW

Chief CL Plus, EGA Bonnie Rock, King Rock, Mace and Wyalkatchem are also suitable for delivery as APWN.

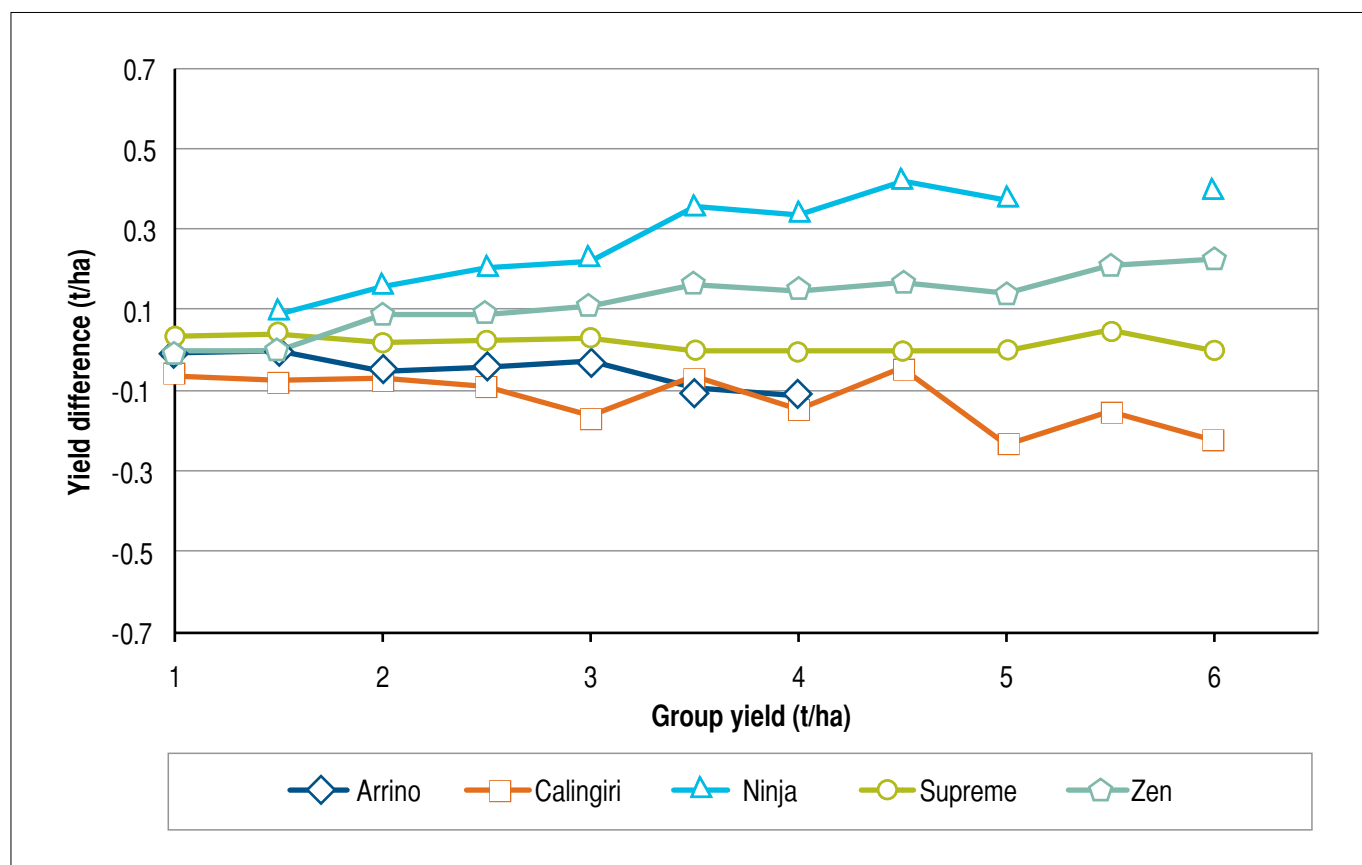


Figure 5 Difference in the grain yield of ANW varieties and site mean yield at different yield groups in the NVT between 2012 and 2016

Variety performance in Agzones and suggested planting times

The NVT data can also provide an insight into the stability of each variety's yield over a number of years (Table 2–7), in a particular Agzone (Figure 6). Comparisons are available from 2012 to 2016 however results for recently released wheat varieties have only been presented when tested in NVT.

Many of the recently released varieties have only been tested in the 2015 and 2016 NVT. Each of these years had very different growing conditions. There was stored moisture at seeding in 2015 but temperatures were above average and growing season rainfall below average. In contrast in 2016, there was some stored moisture in

locations but it was a very cold growing season. There were significant areas which experienced frost across the state. In 2016, nineteen NVT were not included in the meta-analysis for predicted yield due to frost damage at these sites. The results of these trials can be viewed separately on the NVT website. Visit nvtonline.com.au for a comprehensive report on the performance of a larger range of varieties between 2012 and 2016.

Suggested sowing times

A suggested planting time for varieties within each Agzone has been developed (Table 2-7) to support variety decisions. The suggestions are based on the knowledge of the varieties, their performance in NVT and agronomy trials and risk factors to production within each Agzone. The output has been developed in consultation with breeding companies and researchers. Refer to the maturity class of a variety to assess the suggested sowing time for varieties not listed in the table.

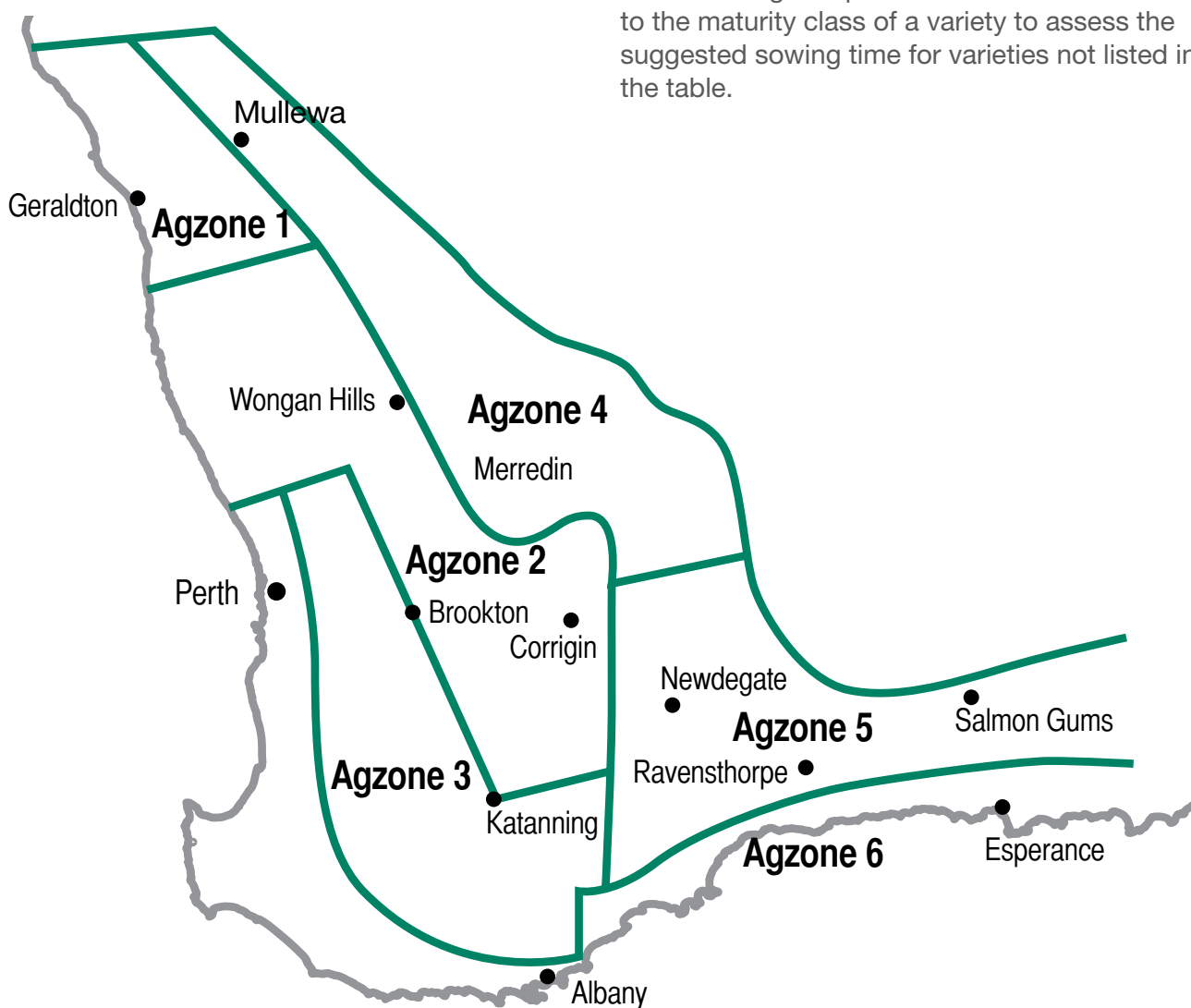


Figure 6 Agzones in Western Australia

Table 2a Long term predicted yield expressed as a percentage of Mace mean yield in Agzone 1, WA

Class	Variety	Maturity	Year Mace yield (t/ha)	2012 1.72	2013 2.15	2014 2.06	2015 2.32	2016 4.18
			Trial #	6	6	5	6	5
AH	Bremer	mid	22	—	100	90	108	96
	Emu Rock	short	28	94	88	97	89	98
	LRPB Cobra	short-mid	22	—	98	94	104	101
	LRPB Havoc	short-mid	5	—	—	—	—	105
	Mace	short-mid	28	100	100	100	100	100
	Scepter	mid	11	—	—	—	112	108
	Tungsten	short-mid	11	—	—	—	102	96
	Yitpi	mid-long	28	84	89	85	99	95
APW	Corack	short-mid	28	98	97	101	96	101
	Cutlass	mid-long	11	—	—	—	110	99
	Envoy	mid	6	88	—	—	—	—
	Harper	mid-long	—	—	—	—	—	—
	Hydra	short-mid	22	—	103	97	109	103
	LRPB Arrow	mid	11	—	—	—	106	101
	LRPB Scout	mid	28	86	89	89	99	101
	LRPB Trojan	mid-long	22	83	—	86	105	100
	Magenta	mid-long	28	91	101	90	112	99
	Wyalkatchem	short-mid	28	95	99	95	100	97
APW-imi	Chief CL Plus	mid	10	—	—	100	—	100
	Grenade CL Plus	short-mid	28	86	86	88	91	90
	Impress CL Plus	short-mid	28	91	96	94	95	87
	Justica CL Plus	mid-long	28	87	90	89	97	93
ANW	Calingiri	mid-long	28	85	96	86	106	92
	Ninja	mid	11	—	—	—	114	105
	Supreme	short-mid	22	—	95	94	99	98
	Zen	mid-long	22	—	103	94	108	100
Feed	Tenfour	short	22	—	97	99	105	107
Site	mean yield (t/ha)			1.56	2.07	1.91	2.39	4.10

Table 2b Suggested sowing time of varieties in Agzone 1 of Western Australia

Agzone 1	April wk4	May wk1	wk2	wk3	wk4	June wk1	wk2
Mid-long (Calingiri, Cutlass, Magenta, Trojan, Zen)							
Mid (Bremer, Chief CL Plus, Ninja, Scepter)							
Short-mid (Hydra, LRPB Cobra, Mace)							
Short (Emu Rock)							

Key

Best bet	More risk
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Table 3a Long term predicted yield expressed as a percentage of Mace mean yield in Agzone 2, WA

Class	Variety	Maturity	Year Mace yield (t/ha)	2012 2.46	2013 3.38	2014 2.75	2015 2.45	2016 3.66
			Trial #	15	16	15	14	9
AH	Bremer	mid	54	–	97	96	101	93
	Emu Rock	short	69	95	92	96	92	95
	LRPB Cobra	short-mid	54	–	98	99	100	106
	LRPB Havoc	short-mid	9	–	–	–	–	101
	Mace	short-mid	69	100	100	100	100	100
	Scepter	mid	23	–	–	–	110	111
	Tungsten	short-mid	23	–	–	–	96	99
	Yitpi	mid-long	69	85	88	94	92	101
APW	Corack	short-mid	69	99	99	101	100	97
	Cutlass	mid-long	23	–	–	–	99	109
	Envoy	mid	–	–	–	–	–	–
	Harper	mid-long	52	–	89	95	94	99
	Hydra	short-mid	54	–	103	101	104	106
	LRPB Arrow	mid	23	–	–	–	104	103
	LRPB Scout	mid	69	88	92	98	97	105
	LRPB Trojan	mid-long	53	84	–	98	100	103
	Magenta	mid-long	69	90	99	95	100	107
	Wyalkatchem	short-mid	69	95	96	98	99	96
APW-imi	Chief CL Plus	mid	24	–	–	100	–	98
	Grenade CL Plus	short-mid	69	88	85	89	86	92
	Impress CL Plus	short-mid	69	90	91	88	91	75
	Justica CL Plus	mid-long	69	88	88	92	91	96
ANW	Calingiri	mid-long	69	85	91	91	94	99
	Ninja	mid	23	–	–	–	107	111
	Supreme	short-mid	54	–	95	97	97	100
	Zen	mid-long	54	–	100	100	103	102
Feed	Tenfour	short	55	94	105	101	106	100
Site	mean yield (t/ha)			2.24	3.25	2.64	2.40	3.62

Table 3b Suggested sowing time of varieties in Agzone 2 of Western Australia

Agzone 2	April wk4	May wk1	wk2	wk3	wk4	June wk1	wk2
Mid-long (Calingiri, Cutlass*, LRPB Trojan, Magenta, Yitpi*, Zen)							
Mid (Bremer, Chief CL Plus, Ninja, Scepter)							
Short-mid (Hydra, LRPB Cobra, Mace)							
Short (Emu Rock)							

* In southern districts for frost mangement

Key

Best bet	More risk
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Table 4a Long term predicted yield expressed as a percentage of Mace mean yield in Agzone 3, WA

Class	Variety	Maturity	Year Mace yield (t/ha)	2012 3.11	2013 5.48	2014 4.71	2015 4.00	2016 3.15
			Trial #	4	5	5	6	3
AH	Bremer	mid	19	—	95	99	92	94
	Emu Rock	short	23	91	92	94	96	98
	LRPB Cobra	short-mid	23	100	103	100	93	107
	LRPB Havoc	short-mid	3	—	—	—	—	101
	Mace	short-mid	23	100	100	100	100	100
	Scepter	mid	9	—	—	—	101	111
	Tungsten	short-mid	9	—	—	—	90	100
	Yitpi	mid-long	23	96	97	96	83	103
APW	Corack	short-mid	23	97	98	100	102	98
	Cutlass	mid-long	9	—	—	—	85	109
	DS Pascal	mid-long	3	—	—	—	—	96
	Envoy	mid	23	92	94	100	94	95
	Harper	mid-long	19	—	96	98	85	102
	Hydra	short-mid	19	—	104	101	96	107
	LRPB Arrow	mid	9	—	—	—	96	103
	LRPB Scout	mid	23	95	99	99	88	109
	LRPB Trojan	mid-long	23	94	99	101	86	107
	Magenta	mid-long	23	100	102	97	87	107
	Wyalkatchem	short-mid	23	100	99	101	95	97
APW-imi	Chief CL Plus	mid	8	—	—	102	—	97
	Grenade CL Plus	short-mid	23	92	90	90	85	93
	Impress CL Plus	short-mid	17	86	83	90	—	74
	Justica CL Plus	mid-long	23	95	94	94	86	97
ANW	Calingiri	mid-long	23	97	97	95	83	98
	Ninja	mid	9	—	—	—	97	110
	Supreme	short-mid	19	—	98	97	93	101
	Zen	mid-long	19	—	103	103	94	102
Feed	Tenfour	short	23	89	96	99	101	104
Site	mean yield t/ha			2.96	5.32	4.57	3.67	3.15

Table 4b Suggested sowing time of varieties in Agzone 3 of Western Australia

Agzone 3	April wk4	May wk1	wk2	wk3	wk4	June wk1	wk2
Mid-long (Calingiri, Cutlass, LRPB Trojan, Magenta, Yitpi, Zen)							
Mid (Bremer, Chief CL Plus, Ninja, Scepter)							
Short-mid (LRPB Cobra, Hydra, Mace, Supreme)							

Key

Best bet	More risk
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Table 5a Long term predicted yield expressed as a percentage of Mace mean yield in Agzone 4, WA

Class	Variety	Maturity	Year Mace yield (t/ha)	2012 1.13	2013 2.22	2014 1.81	2015 2.09	2016 3.20
			Trial #	7	8	6	9	4
AH	Bremer	mid	27	—	99	83	101	91
	Emu Rock	short	34	101	95	106	96	97
	LRPB Cobra	short-mid	27	—	101	95	104	99
	LRPB Havoc	short-mid	4	—	—	—	—	106
	Mace	short-mid	34	100	100	100	100	100
	Scepter	mid	13	—	—	—	109	108
	Tungsten	short-mid	13	—	—	—	99	93
	Yitpi	mid-long	34	85	95	87	97	90
APW	Corack	short-mid	34	100	99	104	98	100
	Cutlass	mid-long	13	—	—	—	105	96
	Envoy	mid		—	—	—	—	—
	Harper	mid-long	13	—	—	—	97	90
	Hydra	short-mid	27	—	103	94	106	102
	LRPB Arrow	mid	13	—	—	—	101	98
	LRPB Scout	mid	34	89	98	95	102	97
	LRPB Trojan	mid-long	26	78	—	85	103	94
	Magenta	mid-long	34	88	102	86	106	96
	Wyalkatchem	short-mid	34	90	98	91	97	94
APW-imi	Chief CL Plus	mid	10	—	—	94	—	99
	Grenade CL Plus	short-mid	34	91	92	92	91	86
	Impress CL Plus	short-mid	34	81	93	87	89	84
	Justica CL Plus	mid-long	34	88	95	90	95	90
ANW	Calingiri	mid-long	34	82	98	81	99	88
	Ninja	mid	13	—	—	—	110	105
	Supreme	short-mid	27	—	98	95	99	96
	Zen	mid-long	27	—	102	88	102	96
Feed	Tenfour	short	34	89	103	103	109	107
Site	mean yield t/ha			1.00	2.20	1.66	2.11	3.05

Table 5b Suggested sowing time of varieties in Agzone 4 of Western Australia

Agzone 4	April wk4	May wk1	wk2	wk3	wk4	June wk1	wk2
Mid-long (Calingiri, Cutlass*, Magenta, LRPB Trojan, Yitpi* Zen)							
Mid (Chief CL Plus, Ninja, Scepter)							
Short-mid (Corack, Mace, Supreme)							
Short (Emu Rock)							

*Southern districts for frost management

Key

Best bet	More risk
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Table 6a Long term predicted yield expressed as a percentage of Mace mean yield in Agzone 5, WA

Class	Variety	Maturity	Year Mace yield (t/ha)	2012 2.27	2013 3.45	2014 2.74	2015 3.40	2016 3.00
			Trial #	6	6	6	6	3
AH	Bremer	mid	21	—	92	93	90	90
	Emu Rock	short	27	95	93	95	95	98
	LRBP Cobra	short-mid	24	96	98	100	95	109
	LRPB Havoc	short-mid	3	—	—	—	—	98
	Mace	short-mid	27	100	100	100	100	100
	Scepter	mid	9	—	—	—	105	113
	Tungsten	short-mid	9	—	—	—	89	99
	Yitpi	mid-long	27	88	93	96	84	105
APW	Corack	short-mid	27	99	100	100	102	99
	Cutlass	mid-long	9	—	—	—	86	110
	Envoy	mid	27	89	95	97	94	94
	Harper	mid-long	21	—	93	96	86	103
	Hydra	short-mid	21	—	100	100	97	107
	LRPB Arrow	mid	9	—	—	—	99	105
	LRPB Scout	mid	27	91	96	100	91	111
	LRPB Trojan	mid-long	27	85	94	98	88	108
	Magenta	mid-long	27	91	93	95	87	106
	Wyalkatchem	short-mid	27	95	98	99	95	97
APW-imi	Chief CL Plus	mid	9	—	—	99	—	96
	Grenade CL Plus	short-mid	27	88	88	91	82	93
	Impress CL Plus	short-mid	21	84	83	85	—	66
	Justica CL Plus	mid-long	27	89	91	93	85	97
ANW	Calingiri	mid-long	27	86	89	92	81	97
	Ninja	mid	9	—	—	—	99	111
	Supreme	short-mid	21	—	95	97	93	101
	Zen	mid-long	21	—	100	100	96	102
Feed	Tenfour	short	27	92	96	96	101	101
Site	mean yield (t/ha)			2.06	3.22	2.61	3.09	2.97

Table 6b Suggested sowing time of varieties in Agzone 5 of Western Australia

Agzone 5	April wk4	May wk1	wk2	wk3	wk4	June wk1	wk2
Mid-long (Calingiri, Cutlass, Magenta, LRPB Trojan, Yitpi, Zen)							
Mid (Bremer, Chief CL Plus, Ninja, Scepter)							
Short-mid (Hydra, Mace, Corack)							
Short (Emu Rock)							

Key

Best bet	More risk
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Table 7a Long term predicted yield expressed as a percentage of Mace mean yield in Agzone 6, WA

Class	Variety	Maturity	Year Mace yield (t/ha)	2012 3.91	2013 3.90	2014 2.96	2015 4.37	2016 3.95
			Trial #	3	3	3	3	2
AH	Bremer	mid	11	—	101	98	98	96
	Emu Rock	short	14	90	88	87	91	101
	LRPB Cobra	short-mid	11	—	100	95	101	108
	LRPB Havoc	short-mid	2	—	—	—	—	99
	Mace	short-mid	14	100	100	100	100	100
	Scepter	mid	5	—	—	—	113	109
	Tungsten	short-mid	5	—	—	—	93	102
	Yitpi	mid-long	14	92	91	86	90	107
APW	Corack	short-mid	14	98	98	98	100	99
	Cutlass	mid-long	5	—	—	—	97	111
	DS Pascal	mid-long	2	—	—	—	—	99
	Envoy	mid	14	91	95	95	96	97
	Harper	mid-long	11	—	92	88	92	105
	Hydra	short-mid	11	—	105	100	104	106
	LRPB Arrow	mid	5	—	—	—	104	103
	LRPB Scout	mid	14	94	94	87	98	111
	LRPB Trojan	mid-long	14	94	98	91	100	109
	Magenta	mid-long	14	100	101	94	98	108
	Wyalkatchem	short-mid	14	98	99	100	97	98
APW-imi	Chief CL Plus	mid	5	—	—	107	—	96
	Grenade CL Plus	short-mid	14	88	84	82	81	98
	Impress CL Plus	short-mid	11	85	90	95	—	78
	Justica CL Plus	mid-long	14	91	90	87	88	101
ANW	Calingiri	mid-long	11	—	95	91	89	102
	Ninja	mid	2	—	—	—	—	109
	Supreme	short-mid	5	—	95	—	—	103
	Zen	mid-long	8	—	105	—	102	102
Feed	Tenfour	short	14	95	102	95	108	104
Site	mean yield (t/ha)			3.72	3.79	2.77	4.20	4.03

Table 7b Suggested sowing time of varieties in Agzone 6 of Western Australia

Agzone 6	April wk4	May wk1	wk2	wk3	wk4	June wk1	wk2
Mid-long (Cutlass, DS Pascal, Harper, LRPB Trojan, Yitpi)							
Mid (Bremer, Chief CL Plus, Scepter)							
Short-mid (Mace)							

Key

Best bet	More risk
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Disease update

- Plan ahead. Be aware of your variety's disease package so you can plan your disease management.
- Choose your variety wisely. Don't plant a susceptible crop into a high disease risk paddock.
- Diversify your wheat varieties as well as your crop type.

When selecting a wheat variety to implement into the farming system, it is important to consider not only the yield or potential grade but the disease resistance of each variety (Table 10, see page 18). Disease incidence and severity and subsequent yield losses are generally lower in varieties of higher resistance category for that disease. Understanding the likelihood of disease occurring in your paddocks is vital so that preparations can be made ahead of time to manage the crop depending on its susceptibility. Being aware of which diseases to keep an eye out for in each variety will save time and money on unnecessary fungicide applications or to help avoid yield losses through uncontrolled disease outbreaks. For example, Magenta is resistant to leaf rust but moderately susceptible to stripe rust; in this instance, your understanding of the varieties susceptibility would assist you when monitoring for symptoms of rust in your paddock.

For disease to spread from season to season there needs to be a presence of inoculum carried over from last season, favourable seasonal conditions and a susceptible host crop to become infected. **Depending on the disease in question, inoculum carry over can be on infested stubble or trash (yellow spot, *Septoria nodorum*, powdery mildew, crown rot), on a green bridge (rusts, mildews, viruses), in seed (loose smut) or soil borne (root lesion nematode, rhizoctonia).** When deciding what to sow in each paddock, consideration should

be given to residue from the previous crops and whether it could be a host for disease. If the paddock's rotation is wheat on wheat, avoid selecting varieties with similar disease packages. Diversifying wheat varieties across your enterprise will reduce the likelihood of a disease taking hold of all wheat on your property and requiring management at the same time.

Table 8, below, provides suggested minimum resistance for wheat varieties in three different disease risk profiles to five common diseases. This table is a useful guide of what to expect when selecting a suitable variety in problem paddocks.

Over the last five years, Mace has become the most popular variety in the state with 66% of wheat area sown to this variety. If substituting a new variety for Mace, growers need to consider the strengths and weakness of a variety. For example, if adopting Scepter growers need to be mindful of its powdery mildew rating of susceptible to very susceptible. The key to controlling powdery mildew is control of the green bridge over summer, avoiding sowing wheat onto heavily affected stubble. Where varieties are known to be susceptible use seed dressing or in-furrow fungicides and monitor the crop to ensure early detection followed by timely fungicide application. Along with this, diversification of varieties will reduce the risk of whole farm infection, especially when there are a few key varieties being sown across a district. Diversification also reduces the risk associated with the emergence of a new pathotype that could render a significant proportion of a farm or region susceptible, requiring region wide management responses. Recent (2013 and 2015) incursions of leaf rust have rendered Mace MSS, a significant concern given its regional dominance.

In 2016, the DPIRD and GRDC **national crown rot epidemiology and management program** released relative yield losses in WA from crown rot for 13 commonly grown wheat varieties (Table 9).

Table 8 Suggested minimum resistance for wheat varieties in different disease risk areas to common diseases

Disease risk*	Stem rust	Stripe rust	Leaf rust	Yellow spot	Septoria nodorum blotch
Low risk	MSS	MS	MS	MSS	MSS
Medium risk	MS	MRMS	MRMS	MS	MS
High risk	MR	MR	MR	MRMS	MRMS

*Determined by taking into account factors such as disease history in previous years, presence and amount of primary inoculum and prevailing weather conditions (temperature, rainfall and relative humidity).

These new ratings provide information on the predicted average yield loss of these varieties based on trials conducted in Wongan Hills and Merredin between 2014 to 2016. Overall, Emu Rock had the lowest yield loss with Justica CL Plus being the highest. This information is useful for situations where there may be the need to sow wheat into cereal stubble infected with high levels of crown rot. In this situation, choosing a variety with low to moderate yield loss, such as Emu Rock or LRPB Trojan, would reduce the risk of yield loss from crown rot infections.

Crown rot yield loss information was provided by Daniel Huberli along with Miriam Connor and Kris Gajda from DPIRD with funding from the GRDC. Ratings were collected and provided as weighted average yield loss to fusarium crown rot in inoculated trials at Merredin and Wongan Hills between 2014 and 2016.

For more information

- Crop diseases - forecasts and management (agric.wa.gov.au/n/2319).
- Wheat disease ratings at agric.wa.gov.au
- Download the 'Australian Field Crop Disease Guide App'



Table 9 Crown rot predicted yield loss for 13 commonly grown wheat varieties in Western Australia. Source: GRDC national crown rot epidemiology and management program DAN00175

Variety	Resistance rating	# trials	Year/s	Categorised yield loss
Justica CL Plus	S	6	2014-2016	high (>20%)
Wyalkatchem	S	6	2014-2016	high (>20%)
Magenta	MSS	6	2014-2016	high (>20%)
Mace	S	6	2014-2016	high (>20%)
LRPB Cobra	S	6	2014-2016	moderate (10-20%)
Calingiri	S	6	2014-2016	moderate (10-20%)
Harper	S	6	2014-2016	moderate (10-20%)
Westonia	S	6	2014-2016	moderate (10-20%)
Corack	S	6	2014-2016	moderate (10-20%)
Yitpi	S	4	2014-2015	moderate (10-20%)
LRPB Trojan	MS	6	2014-2016	moderate (10-20%)
Scepter	Sp	2	2016	moderate (10-20%)
Emu Rock	MS	6	2014-2016	low (<10%)

Table 10 Disease resistance ratings for wheat varieties grown in Western Australia

Variety	Grade	Septoria nodorum blotch	Septoria tritici blotch	Yellow spot	Stem rust	Stripe rust	Leaf rust	Powdery mildew	Flag smut
Arrino	ANW	MSS	MS	MSS	SVS	S	SVS	MR	MSS
Bonnie Rock	AH	MSS	S	MRMS	MSS	VS	SVS	S	S
Bremer	AH	MS	S	MSS	RMR	MR*	MR	SVS	S
Calingiri	ANW	MSS	S	MSS	S	S	MS#	S	RMR
Carnamah	APW	MSS	S	MS	MRMS	S	MS	S	MSS
Chief Cl Plus	APW-imi	–	–	MRMS	RMR	S	R	–	–
Clearfield Stl	APW-imi	MRMS	MSS	MSS	RMR	S	SVS	SVS	MS
Corack	APW	MSS	S	(MR)	MR	MS	S	SVS	MRMS
Cutlass	APW	MRMS _p	MSS _p	MSS	R	RMR*	RMR	Sp	MS _p
DS Pascal	APW	MRMS	MS	MRMS	MSS	RMR	MRMS#	R	S
Eagle Rock	AH	MS	S	S	MR	MS	RMR	MSS	S
Emu Rock	AH	SVS	S	MRMS	MRMS	MRMS	S	S	R
Eradu	ANW	S	S	MSS	MR	SVS	S	MRMS	MSS
Fortune	ANW	MSS	MRMS	MS	MS	MS	MR	MRMS	R
Frame	APW	MS	MSS	S	MRMS	MS	MS	MRMS	RMR
Grenade CL Plus	APW-imi	MSS	MSS	S	MR	RMR	MS#	MS	MR
Halberd	ASW	S	S	S	S	MRMS	MS	SVS	MRMS
Harper	APW	MS	S	S	MRMS	RMR	MRMS#	S	RMR
Hydra	APW	MSS	MRMS	MRMS	MRMS*	MS	MRMS#	S	SVS
Impress CL Plus	APW-imi	MSS	S	MRMS	MR	MSS	R	SVS	MSS
Justica CL Plus	APW-imi	MS	SVS	S	MR	RMR*	MS#	MSS	RMR
King Rock	AH	MSS	S	MRMS	MRMS	RMR*	MS#	S	SVS
LRPB Arrow	APW	MSS _p	MSS _p	MRMS	S	S	S	VS	MS _p
LRPB Cobra	AH	MRMS	MSS	MRMS	RMR	MSS	MR	MSS	MS
LRPB Havoc	AH	–	–	MRMS _p	Sp	MR _p	RMR _p	–	–
LRPB Scout	APW	SVS	MSS	SVS	MR	RMR*	R#	MS	MR
LRPB Trojan	APW	MS	S	MSS	MRMS	MR	MR#	SVS	SVS
Mace	AH	MS	S	MRMS	MR	RMR*	MS#	MSS	S
Magenta	APW	MRMS	MRMS	(MR)	RMR	MS	R*	MRMS	MSS
Ninja	ANW	MSS _p	MSS _p	MRMS	SVS	MS	MS#	VS	RMR _p
Sapphire	AH	MSS	MRMS	MSS	MR	MSS	RMR*	S	MRMS
Scepter	AH	MRMS _p	Sp	MRMS	MR	MR*	MR#	SVSp	MS _p
Stiletto	APW	MS	MSS	S	MR	MSS	SVS	MSS	MS
Supreme	ANW	S	MS	MS	RMR	MR*	RMR	MSS	MS
Tammarin Rock	AH	MSS	S	SVS	MSS	MSS	MSS	S	RMR
Tungsten	AH	MRMS _p	Sp	MSS	SVS	RMR	MS#	MS	RMR _p
Westonia	APW	MSS	SVS	MSS	SVS	VS	MS	S	SVS
Wyalkatchem	APW	MSS	S	(MR)	MS	S	MSS	SVS	SVS
Yitpi	AH	MS	MRMS	SVS	S	MRMS	MSS	MRMS	MR
Zen	ANW	MRMS	S	MRMS	MSS	MRMS	MR#	SVS	MS

Variety	Grade	Common bunt	RLN (<i>P. teres</i>)	RLN (<i>P. neglectus</i>)	CCN	Crown rot
Arrino	ANW	MS	S	S	–	–
Bonnie Rock	AH	MS	S	S	S	–
Bremer	AH	RMR	–	S	MRMS	S
Calingiri	ANW	MRMS	S	SVS	–	S
Carnamah	APW	MS	SVS	SVS	S	–
Chief Cl Plus	APW-imi	–	–	–	–	MSp
Clearfield Stl	APW-imi	MS	–	S	–	–
Corack	APW	MSS	MSS	MSS	RMR	S
Cutlass	APW	Sp	–	MS	MR	Sp
DS Pascal	APW	SVS	–	MSS	MS	S
Eagle Rock	AH	MRMS	S	MSS	S	–
Emu Rock	AH	S	MRMS	MSS	S	MS
Eradu	ANW	S	–	MS	–	–
Fortune	ANW	MR	Sp	MS	–	S
Frame	APW	MS	–	MSS	MR	–
Grenade CL Plus	APW-imi	SVS	–	MSS	R	S
Halberd	ASW	S	–	S	S	–
Harper	APW	MSS	–	S	MRMS	–
Hydra	APW	SVS	–	MSS	S	Sp
Impress CL Plus	APW-imi	RMR	–	MR	MS	S
Justica CL Plus	APW-imi	SVS	SVS	S	MS	S
King Rock	AH	MSS	–	MSS	MS	S
LRPB Arrow	APW	Rp	–	MRMS	MS	Sp
LRPB Cobra	AH	SVS	MS	MSS	MS	S
LRPB Havoc	AH	–	–	–	–	–
LRPB Scout	APW	MSS	S	S	–	S
LRPB Trojan	APW	S	MRMS	MSS	MS	MS
Mace	AH	MR	MRMS	MS	MRMS	S
Magenta	APW	S	MSS	MSS	S	MSS
Ninja	ANW	–	–	S	MS	SVSp
Sapphire	AH	MS	S	MSS	S	–
Scepter	AH	MRMSp	–	S	MRMS	Sp
Stiletto	APW	MS	MRMS	MS	S	–
Supreme	ANW	SVS	–	MSS	S	MSS
Tammarin Rock	AH	MR	SVSp	MS	–	–
Tungsten	AH	Sp	–	MSS	–	Sp
Westonia	APW	S	S	SVS	S	S
Wyalkatchem	APW	RMR	MSS	MRMS	S	S
Yitpi	AH	S	MS	MSS	MR	S
Zen	ANW	MRMS	–	MR	S	S

Disease information key

VS = Very susceptible, SVS = Susceptible to very susceptible, S = Susceptible, MSS = Moderately susceptible to susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, RMR = Resistant to moderately resistant, R = Resistant. No score '–' = no rating is currently available. p = Provisional assessment. / = Scores separated by '/' indicate the response to the 'currently predominant' and 'alternate' strains of stem rust existing in WA. * = Some races in eastern Australia can attack these varieties. # = May be more susceptible to the new 104 leaf rust pathotype. () = Higher disease at some sites. Combined RLN ratings from DPIRD, SARDI, AgVic and DAFQ data. CCN ratings from SARDI data Wallwork and Zwer (2016) Cereal Variety Disease Guide 2016, Factsheet Feb 2016. R = resistant - nematode numbers will decrease when this variety is grown. MR = Moderately resistant - nematode numbers will slightly decrease when this variety is grown. MS = Moderately susceptible - nematode numbers will slightly increase when this variety is grown. S = Susceptible - nematode numbers will increase greatly when this variety is grown. Crown rot ratings from SARDI data 2009-2014 (Butt, Edmondson, and Wallwork), Qld data 2009-2014 (Bottomley, Herde, Neate, Percy, and Walters) and DPI NSW data 2013-2014 (Simpfendorfe).

Variety management - Agronomy

Frost management

All wheat varieties are susceptible to frost however their risk profile during flowering can differ. The Frost Performance Values provided on the National Variety Trial website (nvtonline.com.au) gives an indication of a variety's risk to frost damage during flowering.

- Variety choice and time of sowing are still the most reliable way of reducing yield losses from frost
- Select varieties adapted to your region and then match to the appropriate sowing time to ensure the variety flowers in the optimum flowering period
- Sowing the correct variety early can lengthen the growing season and deliver increased yields. However, when sowing early, it is critical to choose a variety that flowers during the optimum flowering window (agric.wa.gov.au/n/68)
- Consider using multiple varieties (with different flowering times and maturities) to target flowering throughout the optimal flowering period for your location.

Grain weight and plant density at seeding

Varieties differ in seed weight. Check out Table 11 to compare the average grain weight of varieties in selected NVT sites. Factors such as nutrition and growing conditions eg rainfall, heat and frost will also affect the seed weight and quality from season to season.

If a variety has a larger seed weight there are fewer seeds in each kilogram of seed. At lower seeding rates there will be less seeds per m² if the seed is large and this could result in a reduced yield potential. Furthermore, if the aim is to seed at a higher density for weed competition, there will be fewer plants if the seed is large and the crop will be less competitive against the weeds.

Measuring a variety's seed weight and adjusting seeding rates accordingly will reduce the risk of a reduced plant density leading to a reduced yield potential.

Further information: [Wheat seed weight - differs between varieties \(agric.wa.gov.au/n/6279\)](http://agric.wa.gov.au/n/6279)

Coleoptile length and seeding depth

The ability to establish wheat crops from seed placed deeper in the soil could be useful in situations where the soil surface is dry but the subsoil is moist. The longer the coleoptile length of a variety, the better the chance of establishment if seeding depth increases. Varieties will have inherently different coleoptile lengths. An index value for coleoptile length (Table 11) replaces reporting of a varieties coleoptile length as short, medium or long.

- Review the coleoptile index to compare varieties and gauge risk of reduced emergence if the seeding depth is greater than the coleoptile index.
- Majority of current wheat varieties have a coleoptile index of 6-7cm. Seeding into moisture at 2-4cm is preferred.
- Varieties with longer coleoptile indexes include Cutlass (7.3), Harper (8.1), Magenta (7.5), Scout (7.3) and Yitpi (7.8).
- If dry seeding, increase the seed rate as there is the risk of staggered emergence with a false break.

Growing conditions during development and at seeding the following year will influence the coleoptile length so the range of values from testing is provided (Table 11). The impact of deep sowing on grain yield depends on the capacity and seasonal opportunity to compensate for low crop density through increases in other yield components such as grain numbers per square metre and grain weight.

To determine the average seed weight, count and weigh 1000 seeds of the graded sample (note if 1000 seeds weigh 40g, then an individual seeds weight is 40mg). The seed rate calculation is:

$$\text{Seed rate (kg/ha)} = \frac{[\text{Target plant density (plants/m}^2\text{)} * \text{seed weight (mg)}]}{\text{Expected establishment percent (\%)}}$$

Table 11 Classification and agronomic traits for wheat varieties in 2017

Variety	Class	Coleoptile Index	Seed weight (mg)	Seed weight # trials	Black point	Falling Number Index
Arrino	ANW	6.8 (5.8 - 7.7)	35	15	MS	2
Bonnie Rock	AH	6.6 (5.6 - 7.6)	36	129	MR	4
Bremer	AH	6.8 (5.8 - 7.8)	40	116	MRMS	5
Calingiri	ANW	6.4 (5.5 - 7.3)	40	133	MS	4
Carnamah	APW	7.4 (6.3 - 8.3)	37	18	MS	2
Chief CI Plus	APW-imi	7.0 (6.0 - 7.9)	46	46	MS	4p
Clearfield Stl	APW-imi	6.8 (5.8 - 7.8)	36	18	MRMS	6
Corack	APW	6.8 (5.8 - 8.0)	43	134	S	4
Cutlass	APW	7.3 (6.2 - 8.3)	35	42	MS	4p
DS Pascal	APW	6.0 (5.1 - 7.3)	36	4	MS	7p
Eagle Rock	AH	–	–	–	MS	6
Emu Rock	AH	6.5 (5.5 - 7.6)	42	134	MS	2
Eradu	APW	–	–	–	SVS	2
Fortune	ANW	6.4 (5.4 - 7.4)	–	–	MS	2
Frame	APW	7.9 (6.7 - 8.9)	–	–	MS	5
Grenade CL Plus	APW-imi	6.6 (5.6 - 7.5)	38	134	MSS	5
Halberd	ASW	–	–	–	MS	5
Harper	APW	8.1 (6.7 - 9.3)	36	83	MRMS	5
Hydra	APW	6.9 (5.9 - 7.9)	38	116	MRMS	3
Impress CL Plus	APW-imi	6.8 (5.8 - 7.7)	46	127	S	2
Justica CL Plus	APW-imi	6.7 (5.7 - 7.5)	35	134	MSS	5
King Rock	AH	6.3 (5.4 - 7.4)	37	18	MRMS	4
LRPB Arrow	APW	6.5 (5.5 - 7.5)	38	42	MRMS	5p
LRPB Cobra	AH	6.6 (5.6 - 7.6)	37	116	MSS	2
LRPB Scout	APW	7.3 (6.2 - 8.4)	38	134	S	6
LRPB Trojan	APW	6.9 (5.9 - 7.8)	39	107	MRMS	5
Mace	AH	6.9 (5.8 - 7.9)	39	134	MRMS	5
Magenta	APW	7.5 (6.4 - 8.3)	39	134	S	3
Ninja	ANW	6.4 (5.4 - 7.4)	38	39	MR	4p
Sapphire	AH	7.0 (5.9 - 8.1)	36	1	MS	5
Scepter	AH	6.6 (5.6 - 7.6)	41	42	MS	5
Stiletto	APW	–	–	–	MS	5
Supreme	ANW	5.7 (4.8 - 6.8)	34	110	MSS	4
Tammarin Rock	AH	6.4 (5.4 - 7.4)	–	–	MS	3
Tenfour	Feed	6.6 (5.6 - 7.5)	39	126	MS	–
Tungsten	AH	6.3 (5.3 - 7.3)	37	42	MRMS	–
Westonia	APW	7.0 (5.9 - 8.0)	38	129	MS	2
Wyalkatchem	APW	6.4 (5.4 - 7.4)	41	134	MS	3
Yitpi	AH	7.8 (6.4 - 8.7)	38	134	MS	5
Zen	ANW	6.6 (5.6 - 7.6)	40	113	MRMS	3

Note:

- Coleoptile lengths (cm) are based on predicted mean length of main season sown wheats at 55 NVT during 2007 and 2015. Screening of varieties is undertaken as part of the National Variety Trials project.
- Black point causes a darkening at the embryo end of the seed. It is not a disease but a physiological response to certain humid conditions. Black point ratings are provided through the NVT project and based on the research of Dr H Wallwork at the Field Crop Pathology Unit (SARDI).

Flowering time and maturity of varieties

- Varieties are broadly classified into maturity categories of short, short to mid, mid and mid to long in WA based on how long they take to flower.
- There are longer maturing spring wheats and winter wheats but these are not commonly grown in WA.
- The majority of wheat varieties grown in WA have a very low response to vernalisation and photoperiod and a medium Basic Vegetative Period (BVP), hence are suitable for mid-May sowings.
- Varieties with a higher response to vernalisation (Magenta) or photoperiod (Yitpi) and BVP can be sown from late April as their maturity is delayed.
- Flowering dates do change from location to location and also from season to season due to differences in temperatures experienced.

Temperature is the main parameter that controls when a variety will flower in a particular season. As temperatures increase the plant develops

more rapidly. The relative maturity of varieties is mainly controlled by particular responses to vernalisation (cold temperatures), photoperiod (day length) and basic vegetative period (BVP) (accumulated temperature).

Varieties can be grouped according to their response to these parameters which provides information to explain why varieties flower at different times in the year and at different times from season to season. Varieties grouped with a similar vernalisation or photoperiod response in Figure 7 are likely to flower at a similar time. Some varieties can flower earlier or later depending on when their vernalisation requirements are met during the season (for example, LRPB Trojan).

Temperatures experienced each season are different and there will be discrepancies between the data obtained in controlled environment trials (Figure 7), field data (Table 12) and using genetic markers (topic not discussed). It is important to consider all types of data as the genetic control of flowering is complex.

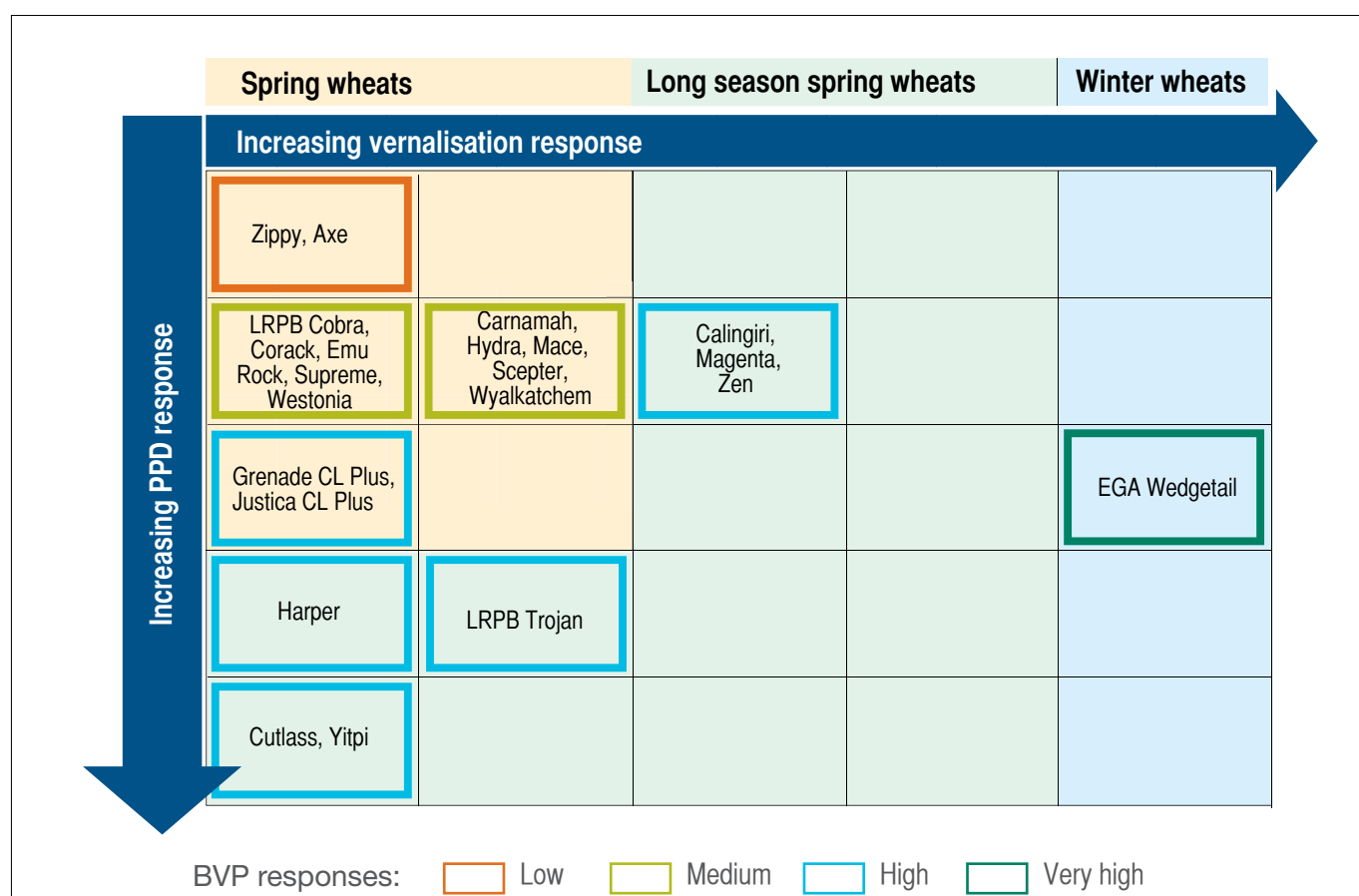


Figure 7 Estimated response of some WA wheat varieties to vernalisation, photoperiod (PPD) and BVP. Note: These categories are estimations, developed to show how varieties may respond to comparison to others given the different temperatures experienced from season to season.

Table 12 Number of days to flowering after/before Mace on selected NVT trials in 2016

Variety	Maturity	Mullewa*	Wyalkatchem	York	Kojonup#	Gibson^	Average
		Sown 5 May	Sown 4 May	Sown 11 May	Sown 17 May	Sown 1 May	
Bremer	Mid	5	3	3	3	6	4
Calingiri	Mid-long	9	6	8	3	6	7
Chief CL Plus	Mid	-1	0	2	0	-1	0
Cobalt	Short-mid	-3	1	0	-1	2	0
Corack	Short-mid	1	-4	-3	-2	-7	-3
Cutlas	Mid-long	15	17	12	9	15	14
DS Pascal	Mid-long	–	–	15	9	13	12
Emu Rock	Short	-3	-10	-10	-2	-9	-7
Grenade CL Plus	Short-mid	-1	2	0	3	-1	1
Harper	Mid-long	13	10	7	6	10	9
Hydra	Short-mid	3	0	0	0	-5	0
Impress CL Plus	Short-mid	-2	0	0	-1	-3	-1
Jade	Short-mid	-3	0	0	5	–	1
Justica CL Plus	Mid-long	4	5	5	6	6	5
LRBP Arrow	Mid	–	3	5	1	6	4
LRPB Cobra	Short-mid	-2	0	0	-1	-4	-1
LRPB Trojan	Mid-long	8	8	9	4	7	7
Magenta	Mid-long	6	9	13	8	9	9
Ninja	Mid	12	3	7	1	6	6
Scepter	Mid	4	3	1	0	5	3
Supreme	Short-mid	1	-2	-2	3	-5	-1
Tenfour	Short	-3	-12	-10	-2	-11	-7
Tungsten	Short-mid	14	15	15	2	-2	9
Wyalkatchem	Short-mid	3	1	0	1	5	2
Yitpi	Mid-long	13	12	13	6	13	11
Zen	Mid-long	11	5	8	2	7	7
Mace's date of flowering in 2016		14 Aug	5 Sep	12 Sep	12 Oct	6 Sep	
Mace (Flower Power)		30 Jul	13 Aug	3 Sep	22 Sep	25 Aug	
Difference between 2016 and Flower Power		+ 15 days	+ 23 days	+ 9 days	+ 20 days	+ 12 days	

*: 2 replicates only, #: Frost damage at site, ^: Waterlogging occurred



Mace is classified as short to mid maturity and Table 12 shows how other varieties compare over selected NVT trial locations in 2016. Scepter is slightly longer in maturity than Mace with the difference varying between 0-5 days depending on the location. Chief CL Plus is similar to Mace. On average Ninja was similar to Calingiri and Zen in 2016, although InterGrain data suggests Ninja completes flowering earlier. The 2016 season was one of the coldest on record and it is estimated that flowering in 2016 was delayed by just over two weeks compared to an average season (displayed in Flower Power).

Pre-harvest sprouting and Falling Number Index

Since 2013, DPIRD's wheat agronomy project has assigned a Falling Number Index (FNI) that rates varieties for their ability to maintain Falling Number after rainfall prior to harvest (Table 11). The data from these experiments are also validated using other field data from crops left exposed in the field, as well as laboratory data that measures dormancy (Germination Index).

The Falling Number Index is designed to guide growers to the relative differences between varieties so that it can be used as a tool to manage risk.

Pre-harvest sprouting is a quality risk that occurs when cereals are exposed to rain prior to harvest and the grain within the head begins to germinate. The minimum Falling Number for AH, APW, ASW and ANW grades is 300, for AGP the minimum is 200, with wheat below a Falling Number of 200 being delivered as Feed.

There is significant variation between current wheat varieties in regards to the level of pre-

harvest sprouting damage that will occur after harvest rainfall.

- Varieties differ in their levels of grain dormancy, where highly dormant grains will forgo germination even under favourable conditions until this dormancy wears off (days to months later). This highly heritable trait is a primary focus of breeders and researchers in developing more sprouting resistant varieties.
- Additionally, the physical attributes of the head and grain (for example, waxiness, absence of awns, tight glumes) as well as physiological factors (for example, presence of black point) may increase or decrease PHS susceptibility, particularly in varieties with minimal grain dormancy.

Since dormancy is an attribute that wears off over time rendering the grain more susceptible to sprouting, the stage of maturity of a crop is extremely important in terms of assessing PHS susceptibility.

- A crop that has been harvest ready for a number of weeks that is exposed to rainfall will have more readiness to sprout than a crop that has just reached maturity (and hence has more dormancy).
- Temperature, moisture stress and the nature and extent of rainfall events both during grain filling and at maturity can impact dormancy levels and the level of sprouting that will occur, and the stage of maturity at which these occur can have important implications.
- Therefore, the risk of a particular crop exhibiting extensive sprouting damage is complex and determined by a number of genetic and environmental factors, and how these interact.

Herbicide tolerance

Varieties differ in their tolerance to herbicides because of differences in morphological or physiological characters and/or internal ear development stages. The level of tolerance amongst varieties varies with the rate of herbicide, the environmental conditions when the herbicide is applied and the stage of the crop growth. The risk of crop damage from a herbicide should be balanced against the potential yield loss from both the weed competition and the number of weed seeds returning to the soil seed bank.

Safe use of herbicides

Sakura® 850 WG

Sakura® 850 WG at 118g/ha is registered as a pre-emergent herbicide on bread wheat (not durum wheat) for the control of annual ryegrass, barley grass, silver grass, toad rush and annual phalaris. Crop damage can occur if Sakura® becomes concentrated in the planting row, or if the herbicide moves to the depth of the crop seed. This response is similar to other soil active residual pre-emergent herbicides and can occur if the herbicide moves in to the furrow following heavy rainfall soon after sowing. For detail please see the Sakura® label.

Trifluralin, trifluralin + oryzalin, pendimethalin and tri-allate

Ensure sown seed is placed below the herbicide treated soil band when using trifluralin, trifluralin + oryzalin (for example, Yield®), pendimethalin (for example, Stomp®) and tri-allate (for example, Avadex®) otherwise severe root retardation may result. Surface crusting may exacerbate emergence problems. Old seed with reduced vigour, varieties with short coleoptiles, and seed dressings that reduce coleoptile length should be avoided. If sowing with knife points, and using higher label rates, ensure that treated soil does not get thrown, blown or washed into the furrows.

Diuron and Metolachlor

There are reports that Diuron at 1.0L + Dual® (Metolachlor 720g/L) at 0.5L/ha cause more crop damage on lighter than heavier soil types. If using knife point and press wheels to sow the crop, apply this mixture pre plant only (0-7 days before sowing) as knife points can leave the furrows/slots open. Crop damage can result if herbicide is washed into the furrows. If using a 'Full Cut'

seeding system, that leaves a relatively smooth surface, this mixture can be applied post plant pre-emergent within 3-4 days of planting.

Metribuzin

Metribuzin at 75g a.i./ha as an early post-emergent is registered on all wheat varieties for control of toad rush (*Juncus bufonius*). However, metribuzin at 150g a.i./ha as a pre-emergent herbicide is registered only on metribuzin tolerant wheat varieties Blade and EGA Eagle Rock for suppression/control of annual ryegrass, barley grass, brome grass, wild radish, capeweed, doublegee, etcetera. To achieve good control of annual ryegrass and barley grass, trifluralin 480g a.i./ha can also be mixed with the recommended rate of metribuzin. A two way mix of metribuzin 150g a.i./ha (for example, Lexone® 200g/ha) with Diuron® 1.0L or Stomp® 330E (pendimethalin) 1.0L or three way mix with Diuron 1.0L and Dual Gold® (s-metolachlor) 250mL/ha was safe on EGA Eagle Rock and Blade. Any weeds that escape, especially brome grass after pre-emergent metribuzin application could possibly be controlled or suppressed, by the application of Monza® (sulfosulfuron) at 25g/ha at 2-3 leaf or Atlantis® (mesosulfuron) at 330mL/ha at 3-4 leaf stage of the crop.

Talinor® (Bicyclopyrone + Bromoxynil)

Talinor®, a contact herbicide (Group H and C) for post-emergent control of a range of broadleaf weeds like Wild Radish, Capeweed, Doublegee, Fumitory, Bifora, volunteer canola and legumes, is recently registered on wheat (not durum wheat) and barley. Talinor® at higher label rates could cause transient leaf bleaching or interveinal yellowing and Mace appears to show more intense symptoms than other wheat varieties. To minimise the risk of these symptoms and possible yield loss, apply this herbicide between mid-morning and mid-afternoon to a healthy and actively growing crop. Stress, from high temperatures, drought or frost will reduce the crops' ability to effectively metabolise the herbicide. Barley shows much greater tolerance than wheat. Please read Talinor® label for more details.

Chlorsulfuron and triasulfuron

Where marginal zinc and copper deficiency conditions exist, chlorsulfuron (for example, Glean®) and triasulfuron (for example, Logran®) may aggravate such deficiencies.

Safe timing for phenoxy application

Wheat varieties are sensitive to phenoxy herbicides during ear development and between flag leaf emergence and soft dough. MCPA, 2,4-D and dicamba are the main phenoxy herbicides used in wheat. The timing of their application is much more critical than for other herbicides because they often produce morphological abnormalities in both the vegetative parts and ears of wheat plants and could result in grain yield loss.

Wheat tolerance to these herbicides depends on the stage of ear development. Wheat is most sensitive to phenoxy herbicides at the double ridge/floral initiation stage of ear development. At this stage, cells change from producing leaves and begin to form the ear. The embryonic ear continues to form until the 'terminal spikelet' stage is reached.

It is safe to apply phenoxy herbicides after terminal spikelet (for example, once floral initiation is complete and nodes are detected) and before flag leaf emergence.

Spraying advice is based on leaf and tiller development. Different varieties become safe to phenoxy spray at slightly different growth stages. Long season varieties take longer to reach the safe stage.

To use higher rates of MCPA amine (2.0L/ha) and 2,4-D amine 625 (1.3L/ha) in Bonnie Rock, Cobra, Corack, Emu Rock, King Rock, Mace, Westonia, Wyalkatchem, and Zippy apply these herbicides at Z15–Z16 (5–6 leaves on the main stem); in Carnamah, EGA Eagle Rock, Magenta, Scout, Stiletto, and Yitpi at Z16–Z17, and in Endure, Calingiri and Spear at Z17–Z18. At these stages floral initiation will be completed in the above varieties.

Do not apply these phenoxy herbicides between flag leaf emergence and the soft dough stage on any variety.

Generally MCPA amine is safer than 2,4-D amine especially on later developing varieties.

Dicamba (and mixtures with 2,4-D or MCPA) should not be applied after Zadoks 30 (pseudo-stem elongation, that is, first node not yet above soil surface).

Research indicates that caution should be used if applying phenoxy herbicides in dry seasons when there is moisture stress. Calingiri wheat was found to be more sensitive to phenoxy herbicides than the other varieties under moisture stress conditions.

There are wild radish populations with confirmed resistance to phenoxy herbicides so it is important to

- rotate the phenoxies with other herbicides or
- apply as a mix with other herbicides at full rates to keep these herbicides working.

Waterlogging and crop safety

A number of products, including Group A and B herbicides are tolerated by wheat because they are metabolised within the seedling. If a seedling's growth is retarded by waterlogging, cold or any other factor, its metabolism is reduced, and toxic levels of herbicide can accumulate within the plant. There were also many examples of trifluralin reducing emergence when the paddocks were waterlogged. It is suspected that this was due to increased uptake by the coleoptile from the wet soil. If there is any chance of extreme waterlogging just after seeding, crop damage is more likely and growers should consider using safer products, or spraying post-emergence.

Fact sheets

Bremer [Ⓛ]					
AH					
Comments					
A mid maturing AH variety which was released in 2015. The strength of this variety is its triple rust resistance. Bremer has useful black point rating. It maintains falling number after pre-harvest rain, similar to Mace. Yields in each agzone have not consistently exceeded Mace.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	–	100	90	108	96
Agzone 2	–	97	96	101	93
Agzone 3	–	95	99	92	94
Agzone 4	–	99	83	101	91
Agzone 5	–	92	93	90	90
Agzone 6	–	101	98	98	96
Disease resistance		Adult rating			
S. nodorum blotch		MS			
S. tritici blotch		S			
Yellow spot		MSS			
Stem rust		RMR			
Stripe rust		MR*			
Leaf rust		MR			
Powdery mildew		SVS			
Flag smut		S			
Common bunt		RMR			
RLN (<i>P. quasitereoides</i>)		–			
RLN (<i>P. neglectus</i>)		S			
CCN		MRMS			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.8 (5.8 - 7.8)			
Crown rot yield loss		–			
Blackpoint		MRMS			
Maturity		Mid			
Herbicide tolerance information					
Herbicide tolerance information is not available for this variety. As information becomes available, it will be added.					
Variety information					
Pedigree		DM02-25-SB02-167/Correll// Mace			
Breeder / Seed licensee		AGT			
Access to seed		AGT Affiliates, retailers, or Seed Sharing			
EPR (\$/t, excl GST)		\$3.25			

Emu Rock [Ⓛ]						
AH						
Comments						
Short maturing AH wheat best suited to mid to late sowings in low rainfall environments. Useful tolerance to crown rot. Large grain size. Amongst most susceptible varieties to septoria nodorum and leaf rust. Susceptible to low falling numbers after pre harvest rain, hence not suited to the south coast.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	94	88	97	89	98	
Agzone 2	95	92	96	92	95	
Agzone 3	91	92	94	96	98	
Agzone 4	101	95	106	96	97	
Agzone 5	95	93	95	95	98	
Agzone 6	90	88	87	91	101	
Disease resistance		Adult rating				
S. nodorum blotch		SVS				
S. tritici blotch		S				
Yellow spot		MRMS				
Stem rust		MRMS				
Stripe rust		MRMS				
Leaf rust		S				
Powdery mildew		S				
Flag smut		R				
Common bunt		S				
RLN (<i>P. quasitereoides</i>)		MRMS				
RLN (<i>P. neglectus</i>)		MSS				
CCN		S				
Crown rot		MS				
Agronomic traits						
Coleoptile length (cm)		6.5 (5.5 - 7.6)				
Crown rot yield loss		Low (<10%)				
Blackpoint		MS				
Maturity		Short				
Herbicide tolerance information						
Low crop safety margin for diuron + MCPA amine at label rate applied at the 3-4 leaf stage.						
Variety information						
Pedigree		96W657-37/Kukri				
Breeder / Seed licensee		InterGrain				
Access to seed		Free to trade				
EPR (\$/t, excl GST)		\$3.50				

LRPB Cobra [Ⓛ]						
AH						
Comments						
Cobra is an AH variety with a Westonia background which has yielded well in most NVT grown on acid soils. Performs well in high yielding environments. Cobra is susceptible to low falling number after pre-harvest rain.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	—	98	94	104	101	
Agzone 2	—	98	99	100	106	
Agzone 3	100	103	100	93	107	
Agzone 4	—	101	95	104	99	
Agzone 5	96	98	100	95	109	
Agzone 6	—	100	95	101	108	
Disease resistance		Adult rating				
S. nodorum blotch		MRMS				
S. tritici blotch		MSS				
Yellow spot		MRMS				
Stem rust		RMR				
Stripe rust		MSS				
Leaf rust		MR				
Powdery mildew		MSS				
Flag smut		MS				
Common bunt		SVS				
RLN (<i>P. quasitereoides</i>)		MS				
RLN (<i>P. neglectus</i>)		MSS				
CCN		MS				
Crown rot		S				
Agronomic traits						
Coleoptile length (cm)		6.6 (5.6 - 7.6)				
Crown rot yield loss		Moderate (10-20%)				
Blackpoint		MSS				
Maturity		Short-mid				
Herbicide tolerance information						
Low crop safety margin for diuron + MCPA amine and Aptitude® (carfentrazone + metribuzin) + MCPA amine at label rates applied at the 3-4 leaf stage. May have low crop safety margin for Talinor® (cyclopyrone + bromoxynil) at label rates and timings						
Variety information						
Pedigree		Westonia/W29				
Breeder / Seed licensee		LongReach Plant Breeders				
Access to seed		Free to trade farmer to farmer				
EPR (\$/t, excl GST)		\$3.50				

LRPB Havoc [Ⓛ]					
AH					
Comments					
LRPB Havoc is the latest Australian Hard variety released by LongReach this year. In 2016 it yielded above Mace in the Agzones 1 to 4. This variety is suitable in situations where an earlier maturing variety is needed. More information on this variety will becomes available after this year's harvest.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	—	—	—	—	105
Agzone 2	—	—	—	—	101
Agzone 3	—	—	—	—	101
Agzone 4	—	—	—	—	106
Agzone 5	—	—	—	—	98
Agzone 6	—	—	—	—	99
Disease resistance		Adult rating			
S. nodorum blotch		—			
S. tritici blotch		—			
Yellow spot		MRMSp			
Stem rust		Sp			
Stripe rust		MRp			
Leaf rust		RMRp			
Powdery mildew		—			
Flag smut		—			
Common bunt		—			
RLN (<i>P. quasitereoides</i>)		—			
RLN (<i>P. neglectus</i>)		—			
CCN		—			
Crown rot		—			
Agronomic traits					
Coleoptile length (cm)		—			
Crown rot yield loss		—			
Blackpoint		—			
Maturity		Short-mid (p)			
Herbicide tolerance information					
Herbicide tolerance information is not available for this variety. As information becomes available. It will be added.					
Variety information					
Pedigree		Mace/LPB07-0980			
Breeder / Seed licensee		LongReach Plant Breeders			
Access to seed		Seed associate and farmer to farmer (WA)			
EPR (\$/t, excl GST)		\$4.00			

Mace [Ⓛ]					
AH					
Comments					
Mace is a high yielding AH variety with a Wyalkatchem background. The benchmark variety for yield in WA, it has been very popular and is widely planted. In the coming years Mace may be superseded by Scepter due to its superior yield potential. Mace has been popular due to its ability to adapt to a range of regional conditions and soil types. Superior to Wyalkatchem for falling number after pre harvest rain.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	1.72	2.15	2.06	2.32	4.18
Agzone 2	2.46	3.38	2.75	2.45	3.66
Agzone 3	3.11	5.48	4.71	4.00	3.15
Agzone 4	1.13	2.22	1.81	2.09	3.20
Agzone 5	2.27	3.45	2.74	3.40	3.00
Agzone 6	3.91	3.90	2.96	4.37	3.95
Disease resistance		Adult rating			
S. nodorum blotch		MS			
S. tritici blotch		S			
Yellow spot		MRMS			
Stem rust		MR			
Stripe rust		RMR*			
Leaf rust		MS#			
Powdery mildew		MSS			
Flag smut		S			
Common bunt		MR			
RLN (<i>P. quasitereoides</i>)		MRMS			
RLN (<i>P. neglectus</i>)		MS			
CCN		MRMS			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.9 (5.8 - 7.9)			
Crown rot yield loss		High (>20%)			
Blackpoint		MRMS			
Maturity		Short-Mid			
Herbicide tolerance information					
May be sensitive to pre-emergent Boxer Gold [®] (s-metolachlor + prosulfocarb) [®] , Sakura [®] (pyroxasulfone), trifluralin, and post-emergent Achieve [®] (tralkoxydim), Ally [®] (metsulfuron) and Jaguar [®] (bromoxynil + diflufenican) at label rates and timing of application. May also have low crop safety margin for Terbyne [®] Xtreme [®] (terbuthylazine), Aptitude [®] (carfentrazone + metribuzin) + MCPA, diuron + MCPA, Flight [®] EC (picolinafen + bromoxynil + MCPA), Talinor [®] (cyclopyrone + bromoxynil) and 2,4-D amine at label rates and timings.					
Variety information					
Pedigree		Wyalkatchem/Stylet/Wyalkatchem			
Breeder / Seed licensee		AGT			
Access to seed		AGT Affiliates, retailers, or Seed Sharing			
EPR (\$/t, excl GST)		\$3.00			

Scepter [Ⓛ]						
AH						
Comments						
Scepter, released in 2015, was the highest yielding AH variety in the NVT in 2015 and 2016. The strength of this variety is its triple rust resistance package. Scepter appears to have a similar pre-harvest sprouting tolerance to Mace, but its powdery mildew and black point ratings are poorer than Mace (which is one of its parents).						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	–	–	–	112	108	
Agzone 2	–	–	–	110	111	
Agzone 3	–	–	–	101	111	
Agzone 4	–	–	–	109	108	
Agzone 5	–	–	–	105	113	
Agzone 6	–	–	–	113	109	
Disease resistance		Adult rating				
S. nodorum blotch		MRMS <i>Sp</i>				
S. tritici blotch		<i>Sp</i>				
Yellow spot		MRMS				
Stem rust		MR				
Stripe rust		MR*				
Leaf rust		MR#				
Powdery mildew		SV <i>Sp</i>				
Flag smut		MS <i>Sp</i>				
Common bunt		MRMS <i>Sp</i>				
RLN (<i>P. quasitereoides</i>)		–				
RLN (<i>P. neglectus</i>)		S				
CCN		MRMS				
Crown rot		<i>Sp</i>				
Agronomic traits						
Coleoptile length (cm)		6.5 (5.6 - 7.5)				
Crown rot yield loss		Moderate (10-20%)				
Blackpoint		MS				
Maturity		Mid				
Herbicide tolerance information						
Herbicide tolerance information is not available for this variety. As information becomes available, it will be added.						
Variety information						
Pedigree		RAC1480/2*Mace				
Breeder / Seed licensee		AGT				
Access to seed		AGT Affiliates, retailers, or Seed Sharing				
EPR (\$/t, excl GST)		\$3.25				

Tungsten [Ⓛ]					
AH					
Comments					
Tungsten was released in 2016 as an Australian Hard variety. This variety is described by the breeding company as a short-mid maturity however observations in the northern WA NVT in 2016 have indicated a longer maturity. Tungsten has generally yielded similarly or less than Mace. It is susceptible to very susceptible to stem rust. Tungsten's black point rating is similar to Mace (MRMS).					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	—	—	—	102	96
Agzone 2	—	—	—	96	99
Agzone 3	—	—	—	90	100
Agzone 4	—	—	—	99	93
Agzone 5	—	—	—	89	99
Agzone 6	—	—	—	93	102
Disease resistance		Adult rating			
S. nodorum blotch		MRMS <i>Sp</i>			
S. tritici blotch		<i>Sp</i>			
Yellow spot		MSS			
Stem rust		SVS			
Stripe rust		RMR			
Leaf rust		MS#			
Powdery mildew		MS			
Flag smut		RMR <i>p</i>			
Common bunt		<i>Sp</i>			
RLN (<i>P. quasitereoides</i>)		—			
RLN (<i>P. neglectus</i>)		MSS			
CCN		—			
Crown rot		<i>Sp</i>			
Agronomic traits					
Coleoptile length (cm)		6.3 (5.3 - 7.3)			
Crown rot yield loss		—			
Blackpoint		MRMS			
Maturity		Short-mid			
Herbicide tolerance information					
Herbicide tolerance information is not available for this variety. As information becomes available, it will be added.					
Variety information					
Pedigree		Axe with a European winter wheat background			
Breeder / Seed licensee		Elders			
Access to seed		Elders			
EPR (\$/t, excl GST)		\$3.00			

Yitpi [Ⓛ]						
AH						
Comments						
Yitpi is the Western Australian industry standard for early sowing because of its longer maturity and maintenance of falling number after pre-harvest rain. Yitpi has a long coleoptile but is very susceptible to yellow spot.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	84	89	85	99	95	
Agzone 2	85	88	94	92	101	
Agzone 3	96	97	96	83	103	
Agzone 4	85	95	87	97	90	
Agzone 5	88	93	96	84	105	
Agzone 6	92	91	86	90	107	
Disease resistance		Adult rating				
S. nodorum blotch		MS				
S. tritici blotch		MRMS				
Yellow spot		SVS				
Stem rust		S				
Stripe rust		MRMS				
Leaf rust		MSS				
Powdery mildew		MRMS				
Flag smut		MR				
Common bunt		S				
RLN (<i>P. quasitereoides</i>)		MS				
RLN (<i>P. neglectus</i>)		MSS				
CCN		MR				
Crown rot		S				
Agronomic traits						
Coleoptile length (cm)		7.8 (6.4 - 8.7)				
Crown rot yield loss		Moderate (10-20%)				
Blackpoint		MS				
Maturity		Mid-Long				
Herbicide tolerance information						
May be sensitive to Flight [®] EC (picolinafen + bromoxynil + MCPA) and Talinor [®] (cyclopyrone + bromoxynil) at label rates applied at the 3-4 and 6-7 leaf stages, respectively. May also have low crop safety margin for pre-emergent Boxer Gold [®] (s-metolachlor + prosulfocarb) [®] , Sakura [®] (pyroxasulfone) and Terbyne [®] Xtreme [®] (terbuthylazine), and post-emergent Aptitude [®] (carfentrazone + metribuzin) + MCPA amine and 2,4-D amine at label rates and timing of application.						
Variety information						
Pedigree		C8MMC8HMM/Frame				
Breeder / Seed licensee		SeedNet				
Access to seed		SeedNet				
EPR (\$/t, excl GST)		\$1.00				

Corack ^(b)					
APW					
Comments					
Corack is an APW variety with a Wyalkatchem background which is suitable for sowings from mid-May. Corack is useful for planting where resistance to CCN and yellow spot is required. Corack is less suitable to higher rainfall zones because of its susceptibility to black point and powdery mildew.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	98	97	101	96	101
Agzone 2	99	99	101	100	97
Agzone 3	97	98	100	102	98
Agzone 4	100	99	104	98	100
Agzone 5	99	100	100	102	99
Agzone 6	98	98	98	100	99
Disease resistance		Adult rating			
S. nodorum blotch		MSS			
S. tritici blotch		S			
Yellow spot		(MR)			
Stem rust		MR			
Stripe rust		MS			
Leaf rust		S			
Powdery mildew		SVS			
Flag smut		MRMS			
Common bunt		MSS			
RLN (<i>P. quasitereoides</i>)		MSS			
RLN (<i>P. neglectus</i>)		MSS			
CCN		RMR			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.8 (5.8 - 8.0)			
Crown rot yield loss		Moderate (10-20%)			
Blackpoint		S			
Maturity		Short-mid			
Herbicide tolerance information					
May be sensitive to label rates of Triathlon® (bromoxynil + diflufenican + MCPA) applied at the 3-4 leaf stage and Jaguar (bromoxynil + diflufenican) applied at the 6-7 leaf stage. Registered low crop safety margin for diuron + MCPA amine and Talinor® (cyclopyrone + bromoxynil) at label rates and timing of application.					
Variety information					
Pedigree		Wyalkatchem/Silverstar A// Wyalkatchem			
Breeder / Seed licensee		AGR			
Access to seed		AGT Affiliates, retailers, or Seed Sharing			
EPR (\$/t, excl GST)		\$3.00			

Cutlass ^(b)						
APW						
Comments						
Cutlass is a recently released variety with a later maturity, similar to Yitpi but with an APW classification. It had superior yields to Yitpi in the 2015 and 2016 NVT. Cutlass has a very useful triple rust resistance rating and is MSS to yellow spot (compared to Yitpi's SVS). Early research points to slightly less tolerance to sprouting than Yitpi.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	–	–	–	110	99	
Agzone 2	–	–	–	99	109	
Agzone 3	–	–	–	85	109	
Agzone 4	–	–	–	105	96	
Agzone 5	–	–	–	86	110	
Agzone 6	–	–	–	97	111	
Disease resistance	Adult rating					
S. nodorum blotch	MRMSp					
S. tritici blotch	MSSp					
Yellow spot	MSS					
Stem rust	R					
Stripe rust	RMR*					
Leaf rust	RMR					
Powdery mildew	Sp					
Flag smut	MSp					
Common bunt	Sp					
RLN (<i>P. quasitereoides</i>)	–					
RLN (<i>P. neglectus</i>)	MS					
CCN	MR					
Crown rot	Sp					
Agronomic traits						
Coleoptile length (cm)	7.3 (6.2 - 8.3)					
Crown rot yield loss	–					
Blackpoint	MS					
Maturity	Mid-long					
Herbicide tolerance information						
Herbicide tolerance information is not available for this variety. As information becomes available, it will be added.						
Variety information						
Pedigree	RAC1316/2*Fang					
Breeder / Seed licensee	AGT					
Access to seed	AGT Affiliates, retailers, or Seed Sharing					
EPR (\$/t, excl GST)	\$3.00					

Hydra [Ⓛ]						
APW						
Comments						
Hydra is an APW variety with a Bonnie Rock and Strzelecki background. Performs well in a broad range of environments. However, there are early indications of screenings risk and susceptibility to low falling number after harvest rainfall. Hydra has a useful blackpoint rating.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	–	103	97	109	103	
Agzone 2	–	103	101	104	106	
Agzone 3	–	104	101	96	107	
Agzone 4	–	103	94	106	102	
Agzone 5	–	100	100	97	107	
Agzone 6	–	105	100	104	106	
Disease resistance						
Disease resistance	Adult rating					
S. nodorum blotch	MSS					
S. tritici blotch	MRMS					
Yellow spot	MRMS					
Stem rust	MRMS*					
Stripe rust	MS					
Leaf rust	MRMS#					
Powdery mildew	S					
Flag smut	SVS					
Common bunt	SVS					
RLN (<i>P. quasitereoides</i>)	–					
RLN (<i>P. neglectus</i>)	MSS					
CCN	S					
Crown rot	Sp					
Agronomic traits						
Coleoptile length (cm)	6.9 (5.9 - 7.9)					
Crown rot yield loss	–					
Blackpoint	MRMS					
Maturity	Short-mid					
Herbicide tolerance information						
May be sensitive to or have low crop safety margin for Affinity® (carfentrazone) + MCPA amine and Ally® at label rates and timing of application.						
Variety information						
Pedigree	Strzelecki/2* Bonnie Rock					
Breeder / Seed licensee	InterGrain					
Access to seed	Free to trade WA only					
EPR (\$/t, excl GST)	\$3.85					

LRPB Trojan [Ⓛ]						
APW						
Comments						
LRPB Trojan is an APW variety with a maturity between Yitpi and Mace. LRPB Trojan has a longer coleoptile and has been reasonably popular in higher rainfall areas. LRPB Trojan has a falling number rating with pre-harvest rain of 5 which is similar to Mace. Its powdery mildew rating is similar to Wyalkatchem (SVS). LRPB Trojan has a useful black point rating.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	83	–	86	105	100	
Agzone 2	84	–	98	100	103	
Agzone 3	94	99	101	86	107	
Agzone 4	78	–	85	103	94	
Agzone 5	85	94	98	88	108	
Agzone 6	94	98	91	100	109	
Disease resistance		Adult rating				
S. nodorum blotch		MS				
S. tritici blotch		S				
Yellow spot		MSS				
Stem rust		MRMS				
Stripe rust		MR#				
Leaf rust		MR				
Powdery mildew		SVS				
Flag smut		SVS				
Common bunt		S				
RLN (<i>P. quasitereoides</i>)		MRMS				
RLN (<i>P.neglectus</i>)		MSS				
CCN		MS				
Crown rot		MS				
Agronomic traits						
Coleoptile length (cm)		6.9 (5.9 - 7.8)				
Crown rot yield loss		Moderate (10-20%)				
Blackpoint		MRMS				
Maturity		Mid				
Herbicide tolerance information						
May be sensitive to post-emergent 2,4-D LVE 680 and have low crop safety margin for Aptitude® (carfentrazone + metribuzin) + MCPA and diuron + MCPA at label rates and timing.						
Variety information						
Pedigree		LPB 00LR000041/Sentinel ^{3R}				
Breeder / Seed licensee		LongReach Plant Breeders				
Access to seed		Free to trade farmer to farmer				
EPR (\$/t, excl GST)		\$4.00				

Magenta [Ⓛ]						
APW						
Comments						
Magenta is a high yielding wheat suited to early to mid sowing opportunities. This variety has a good disease package so it's suitable for wheat on wheat situations and is among the longest coleoptile varieties. Magenta is amongst the better varieties for powdery mildew resistance. Similar falling number risk to Wyalkatchem and is susceptible to blackpoint, so is not suited to south coast.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	91	101	90	112	99	
Agzone 2	90	99	95	100	107	
Agzone 3	100	102	97	87	107	
Agzone 4	88	102	86	106	96	
Agzone 5	91	93	95	87	106	
Agzone 6	100	101	94	98	108	
Disease resistance		Adult rating				
S. nodorum blotch		MRMS				
S. tritici blotch		MRMS				
Yellow spot		(MR)				
Stem rust		RMR				
Stripe rust		MS				
Leaf rust		R*				
Powdery mildew		MRMS				
Flag smut		MSS				
Common bunt		S				
RLN (<i>P. quasitereoides</i>)		MSS				
RLN (<i>P. neglectus</i>)		MSS				
CCN		S				
Crown rot		MSS				
Agronomic traits						
Coleoptile length (cm)		7.5 (6.4 - 8.3)				
Crown rot yield loss		High (>20%)				
Blackpoint		S				
Maturity		Mid-long				
Herbicide tolerance information						
May be sensitive to Sakura [®] (pyroxasulfone), Cheetah [®] Gold (diclofop + sethoxydim + fenoxaprop), Velocity [®] (bromoxynil + pyrosulfotole), Velocity [®] (bromoxynil + pyrosulfotole) [®] + Ecopar [®] (pyraflufen-ethyl) and Jaguar [®] (bromoxynil + diflufenican) at label rates and timing of application. May also have low crop safety margin for Boxer Gold [®] (s-metolachlor + prosulfocarb) 2.5L/ha applied pre-emergent.						
Variety information						
Pedigree		Carnamah/Tammin-18				
Breeder / Seed licensee		InterGrain				
Access to seed		Free to trade				
EPR (\$/t, excl GST)		\$3.00				

Wyalkatchem [Ⓛ]						
APW						
Comments						
Wyalkatchem is an APW variety with a Machete background. This variety is suitable for wheat on wheat plantings due to resistances to yellow spot and ease of stubble management. Wyalkatchem has tolerance to acidic soils and low screenings. However, the variety has a short coleoptile length and is less competitive with weeds due to poor early vigour. It's one of the lowest ranked varieties for powdery mildew resistance and has a low falling number rating with pre-harvest rain.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	95	99	95	100	97	
Agzone 2	95	96	98	99	96	
Agzone 3	100	99	101	95	97	
Agzone 4	90	98	91	97	94	
Agzone 5	95	98	99	95	97	
Agzone 6	98	99	100	97	98	
Disease resistance		Adult rating				
S. nodorum blotch		MSS				
S. tritici blotch		S				
Yellow spot		(MR)				
Stem rust		MS				
Stripe rust		S				
Leaf rust		MSS				
Powdery mildew		SVS				
Flag smut		SVS				
Common bunt		RMR				
RLN (<i>P. quasitereoides</i>)		MSS				
RLN (<i>P. neglectus</i>)		MRMS				
CCN		S				
Crown rot		S				
Agronomic traits						
Coleoptile length (cm)		6.4 (5.4 - 7.4)				
Crown rot yield loss		High (>20%)				
Blackpoint		MS				
Maturity		Short-mid				
Herbicide tolerance information						
Has shown sensitivity to post-emergent Hoegrass [®] 375 (diclofop-methyl) 200mL + Achieve [®] (tralkoxydim) 200g/ha, Velocity [®] (bromoxynil + pyrosulfotole) [®] 670mL/ha and 2,4-D amine 700 1.5L/ha at label recommend timings. May be sensitive to pre-emergent diuron + Dual Gold [®] (s-metolachlor), and post-emergent Glean [®] (chlorsulfuron), Hoegrass [®] (diclofop-methyl), Affinity [®] (carfentrazone) + MCPA, Ally [®] (metsulfuron), Buctril [®] MA (bromoxynil + MCPA), Flight [®] EC (picolinafen + bromoxynil + MCPA), Jaguar [®] (bromoxynil + diflufenican), 2,4-D ester 800 and dicamba at label rates and timing of application. Low crop safety margin for Talinor [®] (cyclopyrone + bromoxynil) at maximum label rate and timing of application. May also have low crop safety margin for Boxer Gold [®] (s-metolachlor + prosulfocarb), Sakura [®] (pyroxasulfone), Crusader [®] (pyroxysulam) + Lontrel [®] (clopyralid) and Tigrex [®] (diflufenican + MCPA) at label rates and timing.						
Variety information						
Pedigree		Machete/W84-129*504				
Breeder / Seed licensee		InterGrain				
Access to seed		Free to trade				
EPR (\$/t, excl GST)		\$1.92				

Chief CL Plus [Ⓛ]					
APW-imi					
Comments					
Chief CL Plus is an APW-imi variety which was released in 2016. This variety was the highest yielding APW-imi variety in its two years of NVT (2014 and 2016) with yields which were competitive with Mace in last year's trials. Potential for IMI wheat on wheat option as the variety has good yellow spot resistance. Registered for label rate applications of Intervix [®] herbicide.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	–	–	100	–	100
Agzone 2	–	–	100	–	98
Agzone 3	–	–	102	–	97
Agzone 4	–	–	94	–	99
Agzone 5	–	–	99	–	96
Agzone 6	–	–	107	–	96
Disease resistance		Adult rating			
S. nodorum blotch		–			
S. tritici blotch		–			
Yellow spot		MRMS			
Stem rust		RMR			
Stripe rust		S			
Leaf rust		R			
Powdery mildew		–			
Flag smut		–			
Common bunt		–			
RLN (<i>P. quasitereoides</i>)		–			
RLN (<i>P. neglectus</i>)		–			
CCN		–			
Crown rot		MSp			
Agronomic traits					
Coleoptile length (cm)		7.0 (6.0 - 7.9)			
Crown rot yield loss		–			
Blackpoint		MS			
Maturity		Mid			
Herbicide tolerance information					
Herbicide tolerance information is not available for this variety. As information becomes available, it will be added.					
Variety information					
Pedigree		Wyalkatchem derivative			
Breeder / Seed licensee		InterGrain			
Access to seed		Intergrain Seed Club Members or Seed Retailers			
EPR (\$/t, excl GST)		\$4.25			

Grenade CL Plus ^(b)					
APW-imi					
Comments					
Grenade CL Plus is an APW-imi released in 2014. This variety has not out-yielded Justica CL Plus or Chief CL Plus in the majority of NVT. An advantage of this variety is its resistance to CCN. Registered for Intervix [®] use.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	86	86	88	91	90
Agzone 2	88	85	89	86	92
Agzone 3	92	90	90	85	93
Agzone 4	91	92	92	91	86
Agzone 5	88	88	91	82	93
Agzone 6	88	84	82	81	98
Disease resistance		Adult rating			
S. nodorum blotch		MSS			
S. tritici blotch		MSS			
Yellow spot		S			
Stem rust		MR			
Stripe rust		RMR			
Leaf rust		MS#			
Powdery mildew		MS			
Flag smut		MR			
Common bunt		SVS			
RLN (<i>P. quasitereoides</i>)		–			
RLN (<i>P. neglectus</i>)		MSS			
CCN		R			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.6 (5.6 - 7.5)			
Crown rot yield loss		–			
Blackpoint		MSS			
Maturity		Short-mid			
Herbicide tolerance information					
May be sensitive or have low crop safety margin for Hoegrass [®] 375 (diclofop-methyl) 200mL + Achieve [®] (tralkoxydim) 200g/ha applied at Z12-Z13.					
Variety information					
Pedigree		Gladius/4/RAC1268*2/3/Janz*2//Wilg4/11A			
Breeder / Seed licensee		AGT			
Access to seed		AGT Affiliates or retailers			
EPR (\$/t, excl GST)		\$3.80			

Impress CL Plus ^{db}					
APW-imi					
Comments					
An APW-imi Wyalkatchem type. This variety has not out-yielded Justica CL Plus or Chief CL Plus in the majority of NVT trials. Large grain size. Impress is susceptible to powdery mildew, blackpoint and has a low falling number rating after pre-harvest rainfall.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	91	96	94	95	87
Agzone 2	90	91	88	91	75
Agzone 3	86	83	90	–	74
Agzone 4	81	93	87	89	84
Agzone 5	84	83	85	–	66
Agzone 6	85	90	95	–	78
Disease resistance		Adult rating			
S. nodorum blotch		MSS			
S. tritici blotch		S			
Yellow spot		MRMS			
Stem rust		MR			
Stripe rust		MSS			
Leaf rust		R			
Powdery mildew		SVS			
Flag smut		MSS			
Common bunt		RMR			
RLN (<i>P. quasitereoides</i>)		–			
RLN (<i>P. neglectus</i>)		MR			
CCN		MS			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.8 (5.8 - 7.7)			
Crown rot yield loss		–			
Blackpoint		S			
Maturity		Short-mid			
Herbicide tolerance information					
May be sensitive to or have low crop safety margin for Affinity [®] (carfentrazone) + MCPA amine and Ally [®] at label rates and timing of application.					
Variety information					
Pedigree		Wyalkatchem derivative			
Breeder / Seed licensee		InterGrain			
Access to seed		InterGrain Seedclub member or seed retailer			
EPR (\$/t, excl GST)		\$4.10			

Justica CL Plus ⁽¹⁾					
APW-imi					
Comments					
A mid-long maturing APW-imi with Spear background. This variety generally has a higher yield than Impress CL Plus and Grenade CL Plus in NVT across the state. Contact AGT to find out about seed availability.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	87	90	89	97	93
Agzone 2	88	88	92	91	96
Agzone 3	95	94	94	86	97
Agzone 4	88	95	90	95	90
Agzone 5	89	91	93	85	97
Agzone 6	91	90	87	88	101
Disease resistance		Adult rating			
S. nodorum blotch		MS			
S. tritici blotch		SVS			
Yellow spot		S			
Stem rust		MR			
Stripe rust		RMR*			
Leaf rust		MS#			
Powdery mildew		MSS			
Flag smut		RMR			
Common bunt		SVS			
RLN (<i>P. quasitereoides</i>)		SVS			
RLN (<i>P. neglectus</i>)		S			
CCN		MS			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.7 (5.7 - 7.5)			
Crown rot yield loss		High (>20%)			
Blackpoint		–			
Maturity		Mid-long			
Herbicide tolerance information					
Low crop safety margin for diuron + MCPA amine at label rate applied at Z13-Z14 (3-4 leaves on the main stem) and 2,4-D LVE 680 applied at Z15-Z16. Do not apply phenoxy herbicides like MCPA and 2,4-D between flag leaf emergence and the soft dough stage.					
Variety information					
Pedigree		Gladius/4/RAC1268*2/3/Janz*2/Wilg4/11A			
Breeder / Seed licensee		AGT			
Access to seed		AGT Affiliates or retailers			
EPR (\$/t, excl GST)		\$3.55			

Calingiri					
ANW					
Comments					
Calingiri has remained a popular mid to long maturing ANW. Yields potentially superseded by Zen and Ninja and some growers are replacing Calingiri with these varieties. Calingiri has poor disease tolerance.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	85	96	86	106	92
Agzone 2	85	91	91	94	99
Agzone 3	97	97	95	83	98
Agzone 4	82	98	81	99	88
Agzone 5	86	89	92	81	97
Agzone 6	–	95	91	89	102
Disease resistance		Adult rating			
S. nodorum blotch		MSS			
S. tritici blotch		S			
Yellow spot		MSS			
Stem rust		S			
Stripe rust		S			
Leaf rust		MS#			
Powdery mildew		S			
Flag smut		RMR			
Common bunt		MRMS			
RLN (<i>P. quasitereoides</i>)		S			
RLN (<i>P. neglectus</i>)		SVS			
CCN		–			
Crown rot		S			
Agronomic traits					
Coleoptile length (cm)		6.4 (5.5 - 7.3)			
Crown rot yield loss		Moderate (10-20%)			
Blackpoint		MS			
Maturity		Mid-long			
Herbicide tolerance information					
Has shown sensitivity to pre-emergent Glean® (chlorsulfuron) at 12.5g/ha and Sakura® (pyroxasulfone) at 118g/ha, and post-emergent Jaguar® (bromoxynil + diflufenican) at 1L/ha, Affinity® (carfentrazone) 100g + MCPA amine 500 0.5L/ha and Diuron 500 0.35L + MCPA amine 500 0.4L/ha applied at the label recommended timing. May be sensitive to pre-emergent Boxer Gold® (s-metolachlor + prosulfocarb) and post-emergent Eclipse® (metosulam), Velocity® (bromoxynil + pyrosulfotole), Ally® (metsulfuron), Buctril® MA (bromoxynil + MCPA), Tigrex® (diflufenican + MCPA), Talinor® (cyclopyrone + bromoxynil), MCPA amine and 2,4-D amine 700 at label recommended rates and timings.					
Variety information					
Pedigree		Chino/Kulin//Reeves			
Breeder / Seed licensee		InterGrain			
Access to seed		Free to trade			
EPR (\$/t, excl GST)		–			

Ninja ^(b)					
ANW					
Comments					
Ninja is the newest noodle wheat variety, released in 2016 with a Calingiri and Wyalkatchem background. Ninja is the highest yielding ANW variety and out-yielded Mace in most of the NVT trials in 2015 and 2016. This variety is very susceptible to stem rust and powdery mildew. However it has a very useful blackpoint rating.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	—	—	—	114	105
Agzone 2	—	—	—	107	111
Agzone 3	—	—	—	97	110
Agzone 4	—	—	—	110	105
Agzone 5	—	—	—	99	111
Agzone 6	—	—	—	—	109
Disease resistance		Adult rating			
S. nodorum blotch		MSSp			
S. tritici blotch		MSSp			
Yellow spot		MRMS			
Stem rust		SVS			
Stripe rust		MS			
Leaf rust		MS#			
Powdery mildew		VS			
Flag smut		RMRp			
Common bunt		—			
RLN (<i>P. quasitereoides</i>)		—			
RLN (<i>P. neglectus</i>)		S			
CCN		MS			
Crown rot		SVSp			
Agronomic traits					
Coleoptile length (cm)		6.4 (5.4 - 7.4)			
Crown rot yield loss		—			
Blackpoint		MR			
Maturity		Mid			
Herbicide tolerance information					
Herbicide tolerance information is not available for this variety. As information becomes available, it will be added.					
Variety information					
Pedigree		Calingiri/Wyalkatchem			
Breeder / Seed licensee		InterGrain			
Access to seed		Free to trade			
EPR (\$/t, excl GST)		\$4.25			

Supreme [Ⓛ]					
ANW					
Comments					
Supreme is an Arrino derivative with improved yield and disease resistance. Supreme is a premium noodle quality wheat and there may be the opportunity for containerised marketing. A strength of this variety is its triple rust resistance package and the best powdery mildew rating of the noodle wheats. It has a very short plant height.					
Yield (% of Mace)	2012	2013	2014	2015	2016
Agzone 1	–	95	94	99	98
Agzone 2	–	95	97	97	100
Agzone 3	–	98	97	93	101
Agzone 4	–	98	95	99	96
Agzone 5	–	95	97	93	101
Agzone 6	–	95	–	–	103
Disease resistance		Adult rating			
S. nodorum blotch		S			
S. tritici blotch		MS			
Yellow spot		MS			
Stem rust		RMR			
Stripe rust		MR*			
Leaf rust		RMR			
Powdery mildew		MSS			
Flag smut		MS			
Common bunt		SVS			
RLN (<i>P. quasitereoides</i>)		–			
RLN (<i>P. neglectus</i>)		MSS			
CCN		S			
Crown rot		MSS			
Agronomic traits					
Coleoptile length (cm)		5.7 (4.8 - 6.8)			
Crown rot yield loss		–			
Blackpoint		MSS			
Maturity		Short-mid			
Herbicide tolerance information					
May be sensitive to Glean [®] (chlorsulfuron) and recorded low crop safety margin for Affinity [®] (carfentrazone) + MCPA amine at label rates and timing of application. Do not apply phenoxy herbicides like MCPA and 2,4-D between flag leaf emergence and the soft dough stage.					
Variety information					
Pedigree		LoPh-Nyabing.3*Calingiri/4*VPM Arrino			
Breeder / Seed licensee		InterGrain			
Access to seed		Free to trade - WA only			
EPR (\$/t, excl GST)		\$3.85			

Zen [Ⓛ]						
ANW						
Comments						
A noodle variety with a Calingiri and Wyalkatchem background. Zen offers yield and disease improvements on Calingiri including a better rust resistance package and yellow leaf spot and S. nodorum resistance (MRMS). Zen is very susceptible to powdery mildew. Useful black point rating.						
Yield (% of Mace)	2012	2013	2014	2015	2016	
Agzone 1	—	103	94	108	100	
Agzone 2	—	100	100	103	102	
Agzone 3	—	103	103	94	102	
Agzone 4	—	102	88	102	96	
Agzone 5	—	100	100	96	102	
Agzone 6	—	105	—	102	102	
Disease resistance		Adult rating				
S. nodorum blotch		MRMS				
S. tritici blotch		S				
Yellow spot		MRMS				
Stem rust		MSS				
Stripe rust		MRMS				
Leaf rust		MR#				
Powdery mildew		SVS				
Flag smut		MS				
Common bunt		MRMS				
RLN (<i>P. quasitereoides</i>)		—				
RLN (<i>P. neglectus</i>)		MR				
CCN		S				
Crown rot		S				
Agronomic traits						
Coleoptile length (cm)		6.6 (5.6 - 7.6)				
Crown rot yield loss		—				
Blackpoint		MSS				
Maturity		Mid-long				
Herbicide tolerance information						
Has shown no sensitivity to a range of pre and post-emergent herbicides / herbicide mixtures at higher than label rates applied at label recommended timings, in small plot screening herbicide tolerance trials conducted at Katanning during 2014 and 2015. Do not apply phenoxy herbicides like MCPA and 2,4-D between flag leaf emergence and the soft dough stage.						
Variety information						
Pedigree		Calingiri/Wyalkatchem				
Breeder / Seed licensee		InterGrain				
Access to seed		Free to trade				
EPR (\$/t, excl GST)		\$3.85				

Table 13 Percentage of planned area sown to wheat varieties for the 2010/11 to 2016/17

Data from CBH Group. Varieties with less than 0.06% of total crop area in 2016/17 season are not included

Variety	2010/11 %	2011/12 %	2012/13 %	2013/14 %	2014/15 %	2015/16 %	2016/17 %
Mace	4.6	18.0	41.4	53.4	59.1	66.7	66.3
Calingiri	5.6	8.5	8.6	9.5	10.8	8.1	8.2
Magenta	9.1	9.5	6.5	4.7	3.8	3.5	4.1
Yitpi	10.7	9.8	7.0	6.3	4.9	3.4	3.1
Wyalkatchem	29.7	22.7	14.5	7.7	5.0	3.3	2.4
Corack	–	–	0.1	1.6	3.2	4.0	2.4
LRPB Cobra	–	–	0.2	1.7	2.2	1.8	1.9
Zen	–	–	–	–	–	0.0	1.4
LRPB Trojan	–	–	–	–	–	0.1	0.9
Justica CL Plus	–	0.0	0.5	1.0	1.1	1.0	0.8
Harper	–	–	–	–	0.1	0.6	0.8
Bonnie Rock	4.6	3.3	2.6	1.6	0.9	0.9	0.7
Stiletto	5.1	4.4	2.9	2.2	1.7	1.0	0.7
Carnamah	5.0	3.6	1.9	1.3	0.8	0.6	0.6
Bremer	–	–	–	–	–	0.0	0.6
Emu Rock	–	–	0.0	0.3	0.4	0.6	0.6
Westonia	3.8	3.2	2.6	1.5	0.9	0.8	0.5
Impress CL Plus	–	–	–	–	–	0.0	0.5
Arrino	1.9	2.4	1.4	0.8	0.6	0.4	0.5
Spear	1.1	1.0	0.7	0.5	0.6	0.4	0.3
Machete	0.3	0.2	0.1	0.2	0.3	0.2	0.3
Halberd	0.6	0.6	0.4	0.5	0.4	0.2	0.2
Scepter	–	–	–	–	–	–	0.2
Grenade CL Plus	–	–	–	–	0.0	0.2	0.2
King Rock	0.0	0.2	0.4	0.2	0.2	0.2	0.2
Frame	0.4	0.3	0.2	0.2	0.2	0.2	0.1
Fortune	1.0	1.1	0.6	0.4	0.3	0.2	0.1
Sapphire	2.7	1.3	0.9	0.4	0.3	0.1	0.1
Eagle Rock	1.9	1.3	0.9	0.5	0.4	0.2	0.1
Clearfield STL	2.0	1.4	0.9	0.4	0.3	0.2	0.1
Supreme	–	–	–	–	–	0.0	0.1
Hydra	–	–	–	–	–	0.0	0.1
Kalannie	0.0	0.2	0.1	0.1	0.0	0.1	0.1
Tammarin Rock	0.7	0.8	0.6	0.5	0.2	0.1	0.1
Eradu	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Classification

(Source: Wheat Quality Australia)

Classification of varieties involves comparing new varieties for 30 or more quality parameters with a group of control varieties grown at the same time and place over a minimum of three seasons. Quality characteristics assessed during variety classification are more comprehensive than those possible at the point of receipt. This process delivers classes of Australian wheat with distinct quality attributes and processing virtues. Wheat varieties grown in WA are primarily either premium hard wheats or specialty wheats

Premium Hard wheats

Australian Hard (AH)

High and mid protein selected white-grained wheats, AH is ideal for European pan and hearth breads, Middle Eastern style flat breads, yellow alkaline noodles, dry white salted noodles and steamed products.

Australian Premium White (APW)

Mid protein hard white wheats, APW is ideal for the production of a variety of noodle types, including Hokkien, instant and fresh noodles, and Middle Eastern and sub-continental flat breads and Chinese steamed bread. APW wheat is also widely used as blending wheat in a range of baking processes internationally and is the mainstay of the domestic baking industry.

Specialty wheats

Australian Noodle (ANW)

Varieties in this class are particularly suited to the manufacture of the Japanese udon-style noodle.

For udon manufacture, flours are generally milled to a patent flour extraction to produce a maximum ash level of 0.36–0.40% with minimal bran contamination, as bran specks result in a visually unappealing final product. Whilst being produced largely in WA, ANW is also segregated in the eastern states.

Australian Premium Noodle (APWN)

APWN is mainly used in an export blend with ANW for a range of white salted and instant noodle types in specific Asian markets but its inherent processing characteristics are fully compatible with those of APW. APWN is currently grown only in WA.

Price difference by class

To assess the relative return of different varieties, the best method is to compare gross margins for the two varieties. The gross margin calculations used for the comparison must include the EPR on that variety, difference in yield and where applicable the difference in expected price.

To assist in making this comparison, Table 14 provides the expected spread of prices for common grades relative to APW2. The median values are the expected spread to APW, based on prices of grain priced Free-In-Store (FIS) Kwinana, adjusted to 2017 dollars.

End point royalties

Varieties with a plant breeder rights (PBR) are subject to end point royalties (Table 15). For a full variety list check out varietycentral.com.au. Arrino, Calingiri, Carnamah and Westonia do not have PBR.

Table 14 Percentiles of APW2 prices, and the spread between APW2 and other common grades, for the period 2009-2017. Difference quoted as FIS Kwinana \$AUD 2017 (March) (Source AEGIC)

	25 percentile	Median	75 percentile
APW2	\$272	\$301	\$343
<i>Difference to APW2</i>	–	–	–
AGP1	-\$32	-\$26	-\$19
ASW1	-\$16	-\$12	-\$7
AH1	\$8	\$17	\$23
ANW1	-\$2	\$14	\$37

Table 15 Wheat varieties (subject to End Point Royalties (EPR) seed distribution arrangements 2017/18)

Wheat variety	Variety owner	Royalty manager (EPR collector)	EPR rate \$/tonne (ex-GST)	Seed distribution arrangements for 2017	Grower to grower sales permitted
Bonnie Rock	InterGrain	InterGrain	\$2.50	Free to trade WA only	Yes WA only
Bremer	AGT	AGT	\$3.25	AGT Affiliates, retailers, or Seed Sharing	Yes
Chief CL Plus	InterGrain	InterGrain	\$4.25	Intergrain Seed Club Members or Seed Retailers	No
Clearfield STL	InterGrain	InterGrain	\$1.12	Contact your local Intergrain Territory Manager	No
Corack	AGT	AGT	\$3.00	AGT Affiliates, retailers, or Seed Sharing	Yes
Cutlass	AGT	AGT	\$3.00	AGT Affiliates, retailers, or Seed Sharing	Yes
DS Pascal	DOW Seeds	SeedNet	\$4.25	Dow Seeds	No
Eagle Rock	InterGrain	InterGrain	\$2.50	Free to trade WA only	Yes WA only
EGA Wedgetail	NSW I&I	SeedNet	\$1.45	SeedNet	No
Emu Rock	InterGrain	Intergrain	\$3.50	Free to trade	Yes ^A
Endure	InterGrain	InterGrain	\$3.00	Free to trade	Yes
Forrest	HRZ Wheats	SeedNet	\$3.50	SeedNet	No
Fortune	InterGrain	InterGrain	\$3.00	Free to trade WA only	Yes WA only
Grenade CL Plus	AGT	AGT	\$3.80	AGT Affiliates, or retailers	No
Harper	InterGrain	InterGrain	\$3.80	Free to trade	Yes
Hydra	InterGrain	InterGrain	\$3.85	Free to trade WA only	Yes WA only
Impress CL Plus	InterGrain	InterGrain	\$4.10	Intergrain Seed Club Members or Seed Retailers	No
Justica CL Plus	AGT	AGT	\$3.55	AGT Affiliates, or retailers	No
King Rock	InterGrain	InterGrain	\$3.00	Free to trade	No
LRPB Arrow	LRPB	Pacific Seeds	\$3.00	Associate (PacSeeds) or Retailer of your choice in all states	No
LRPB Cobra	LRPB	Pacific Seeds	\$3.50	Free to trade	Yes
LRPB Havoc	LPB	Pacific Seeds	\$4.00	Associate (PacSeeds), Bulkup growers or Retailer of your choice	Yes WA only
LRPB Scout	LRBPB	Pacific Seeds	\$2.80	Free to trade	Yes
LRPB Trojan	LRPB	Pacific Seeds	\$4.00	Free to trade	Yes
Mace	AGT	AGT	\$3.00	AGT Affiliates, retailers, or Seed Sharing	Yes
Magenta	InterGrain	InterGrain	\$3.00	Free to trade	Yes
Ninja	InterGrain	InterGrain	\$4.25	Free to trade	Yes
Sapphire	GBA	COGGO Seeds	\$3.00	COGGO Seeds	No
Scepter	AGT	AGT	\$3.25	AGT Affiliates, retailers, or Seed Sharing	Yes
Supreme	InterGrain	InterGrain	\$3.85	Free to trade WA only	Yes
Tammarin Rock	InterGrain	InterGrain	\$2.50	Free to trade	Yes
Tenfour	Elders	Elders	\$3.00	Elders	No
Tungsten	Elders	Elders	\$3.00	Elders	No
Wyalkatchem	InterGrain	InterGrain	\$1.92	Free to trade	Yes
Yitpi	ARI	SeedNet	\$1.00	SeedNet	No
Zen	InterGrain	InterGrain	\$3.85	Free to trade	Yes
Zippy	InterGrain	InterGrain	\$3.00	Free to trade	Yes

Seed distributor's information

Australian Seed and Grain

Moora, +61 (0)8 9651 1069

austseedgrain.com.au

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate
- Seednet partner

Coorow Seeds

Coorow, +61 (0)8 9952 1088

coorowseeds.com.au

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate

Eastern Districts Seed Cleaning Co

Kellerberrin, +61 (0)8 9045 4036

easterndistrictsseedcleaningco.webs.com

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate
- Seednet partner

Melchiorre Seeds

Narrogin, +61 (0)8 9881 1155

melchiorreseeds.com.au

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate

MultiSEED Production

Esperance, +61 (0)8 9071 1053

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate
- Seednet partner

Marketers

AGT

+61 (0)8 9622 8935

ausgraintech.com

COGGO Seeds

+61 (0)8 9310 2636

coggo.net.au

Elders

Contact your local Agronomist

eldersrural.com.au/locations

InterGrain

+61 (0)8 9419 8000

InterGrain.com

Pacific Seeds

+61 (0)7 4690 2666

pacificseeds.com.au

Seednet

+61 (0)8 8752 1777

seednet.com.au

Essentials for a successful wheat crop

Pre-season

Rotation

- Canola based rotations provide a disease break for the following wheat crop and alternative weed control options.
- Legume based rotation provides more nitrogen through nitrogen fixation and a disease break. They also provide alternative weed control.
- Continuous wheat rotations are not recommended on sandy and sandy earth soils because of disease risk. Avoid sowing varieties with a similar disease package. Some weeds may be difficult to control in crop so may need to delay seeding to manage weeds pre-seeding.

Soil testing

- Soil testing is important to develop fertiliser and liming strategies.
- Soil pH: Sample and test the soil every 3-4 years at 10-20 and 20-30cm as well as the topsoil. Aim to maintain pH_{Ca} at or above 5.5 in the topsoil and 4.8 in the subsurface. Apply lime if the pH falls below targets.
- Nutrient testing: Develop a plan to monitor nutrient status of paddocks over a number of seasons. Take soil samples at 0-10cm depth. Target deeper soil sampling on targeted paddocks such as sandy soils.

Variety selection

Choose varieties wisely.

- A new variety should have better or equal yield and disease traits, provide diversity or risk mitigation and suit the current market requirements.
- Review the performance of varieties in the NVT over a number of years of testing and suggested planting time within each Agzone to support variety decisions.
- Be aware of the variety's disease package to plan disease management. Don't plant a susceptible crop onto infected stubble. Diversify your wheat varieties as well as your crop type.

Seeding

Sowing time

- Match a varieties sowing time to its maturity. The aim is to maximise yield and minimise risks of leaf disease, frost during flowering and/or terminal drought/heat stress during grain fill.
- Use the Flower Power tool to predict wheat flowering times of different varieties and the risk of frost or heat stress at a range of locations in WA.

Nutrition

- Potassium (K): The critical range for Colwell K on sandy soils, sandy loams and duplex soils is 32-52, 45-52 and 35-45mg/kg respectively. Top dressing can generally correct a deficiency in the crop.
- Phosphorus (P): Check soils P status as maintenance rates at seeding may only be required.
- Nitrogen (N): Develop the nitrogen strategy by considering the crops potential yield, soil test results and other rotational, soil type and rainfall information. Nitrogen can be applied upfront at seeding (separated from the seed) or split with post emergence applications.
- Micro nutrients: Monitor the crop within the season and tissue test to identify deficiencies to micro nutrients.

Sowing depth

- Majority of current wheat varieties have a coleoptile index of 6-7cm. Seeding into moisture at 2-4cm is preferred. A few varieties have a longer coleoptile index.
- If dry seeding increase the seed rate as there is the risk of staggered emergence with a false break.

Seed rate

- Target 50 plants/m² for every tonne per hectare, that is, 2t/ha expected yield requires 100 plants/m².
- Adjust seed rate for grain weight as varieties have inherently different grain weights and vary these from season to season.
- Increase plant densities for weed competition.

In crop

Weed management

Relying solely on herbicides for weed control is not sustainable because there is a risk of herbicide resistance. Consider the **10 point plan to be weed smart** (adapted from [Weedsmart.org.au](https://weedsmart.org.au)).

1. Stop weed set to reduce the weed burden
2. Capture weed seeds at harvest
3. Rotate crops and herbicide modes of action
4. Test for resistance to establish a clear picture of paddock-by-paddock farm status
5. Never cut the rate of herbicide
6. Don't automatically reach for glyphosate for knockdown of weeds
7. Carefully manage spray events
8. Plant clean seed into clean paddocks with clean borders
9. Use the double knock technique
10. Employ crop competitiveness to combat weeds

Disease management

- Monitor the crop throughout the season.
- Seed treatments, in-furrow fertiliser applications and fungicide spray provide an extra option. Overuse of fungicides may lead to resistance.
- For foliar diseases it is important to protect the top three leaves, especially the flag leaf which is a major contributor to yield.
- As a general rule, root diseases will not build up if there is greater diversity of non-cereal crop rotation species.

Insect management

- Control the green bridge prior to sowing to prevent windborne wheat curl mites from transferring viruses (e.g. Wheat streak mosaic virus) into germinating seedlings. If cockchafer activity observed in previous years use high seed rates and an imidacloprid seed dressing.
- Inspect crops regularly to avoid crop damage from sporadic pests such as cutworm, pasture webworm and armyworm.

- Control mites and Lucerne flea during the seedling stage if necessary.
- If necessary control aphids to prevent virus spread, for example, barley yellow dwarf virus (BYDV) in the first 10 weeks after emergence.
- Spraying aphids for feeding damage in crops is worthwhile if crops are expected to yield 3t/ha and in which 50% of tillers have 15 or more aphids.

Harvest

- Consider management of stubble at harvest which can impact the succeeding crop.
- Revise each variety's falling number index to gauge risk to pre harvest sprouting. Consider harvesting varieties with a low Falling Number Index as soon after they have reached maturity as harvest rainfall is likely to affect quality.



NVT apps

National
Variety
Trials
A GRDC INITIATIVE



The NVT LONG-TERM YIELD REPORTS provide Australian growers and advisers with the best available tool for making variety selection decisions based on crop yield. Information is available for all cropping regions in Australia for 10 crops: wheat, barley, canola, oats, triticale, chickpeas, field peas, faba beans, lentils and lupins.



The CROP DISEASE AU application has been developed by the Australian National Variety Trials program (NVT) and funded by the GRDC. It provides access to up-to-date variety information from the NVT database, as well as current disease-resistance ratings, disease information and an extensive disease image library.