

Cereal Disease Guide 2008

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Season 2007 in Summary

The good start to the season resulted in early sowing of many cereal crops. This provided ideal conditions for pathogens of the stubble borne diseases yellow leaf spot in wheat and the spot form of net blotch in barley to infect young crops. In many cases, however, these early infections had limited impact on yield.

The prolonged dry period during the spring greatly reduced disease development in most regions, thus minimising the impact of disease on cereal crops in Victoria. In parts of the Western District and in irrigated crops diseases were more significant with both leaf and stripe rust developing in wheat crops and scald, leaf rust and the spot form of net blotch developing in barley crops.

Both crown rot and take-all were common in 2007 and there were some reports of cereal cyst and root lesion nematodes causing concern.

Reports of barley crops infected with bunt highlights the importance of annual treatment of seed for the prevention of bunts and smuts.

Leaf and Stem Diseases: Wheat

Most foliar diseases are effectively managed by growing the more resistant varieties. The resistance required in a variety varies with the production region. Suggested minimum resistance levels for wheat are listed below. If a variety does not meet the minimum resistance level, cultural management practices must also be used.

Wheat: Suggested minimum levels of disease resistance

Annual rainfall	Rust			Yellow leaf spot	<i>Septoria tritici</i>
	Stem	Stripe	Leaf		
Low < 350 mm	S	MS	MS	S	S
Medium 350-500	MS	MR-MS	MS	S	MS
High > 500 mm	MR	MR	MR	S	MS

Stripe, stem and leaf rust are important diseases of wheat that growers must prepare to manage during 2008. A wet summer/autumn period in the lead up to the 2008 season can favour the build up of rust inoculum on wheat volunteers and therefore increase the risk to this season's crop.

Stripe rust was present across Victoria during 2007, but in most regions only at low levels because of the dry spring. Management of stripe rust was, however, required in parts of the Western District and in irrigated crops.

The strain of stripe rust virulent on the *Yr17* (or VPM) resistance gene, that was first detected in late 2006, has become widespread across eastern Australia in 2007. This has been named the WA *Yr17* strain. Variety ratings on the next page now reflect their reaction to this new strain of stripe rust. ***It is important that those growing varieties that rely on the Yr17 resistance note that the variety reaction to stripe rust has been down graded and appropriate management strategies need to be adopted.***

Late in 2007 there were reports of higher than expected levels of stripe rust in crops of GBA Ruby. Even though these observations are unconfirmed it suggests that a new strain of

stripe rust virulent on the *Yr27* resistance gene may now be present making the varieties GBA Ruby and Mira more susceptible to stripe rust. Those growing these varieties must plan to apply fungicides to these crops during 2008 if required.

To minimize the effects of stripe rust growers should be prepared with a management plan. Stripe rust can be effectively controlled when growers adopt an integrated approach, incorporating removal of volunteer wheat in the lead up to sowing, the use of seed or fertiliser treatments with activity on stripe rust, not growing susceptible and very susceptible varieties and by monitoring crops with a view to foliar fungicide applications if required.

Susceptible and very susceptible varieties should be avoided. Stripe rust is not only more difficult to manage in these varieties, but they also produce high numbers of spores that contribute to further infection within a region, especially on summer volunteers. Also, higher numbers of spores generated in any season will increase the likelihood of useful resistance genes being overcome (broken down) by mutations in the rust.

Stem rust was only observed late in the 2007 season and did not cause yield loss. Stem rust can be severe in susceptible varieties, especially following a wet summer/autumn that favours inoculum carry over on volunteers.

In 2008 minimise stem rust build up by controlling the 'green bridge' and avoiding susceptible varieties. All crops, especially those susceptible to stem rust in high risk areas, should be monitored for rust with a view to fungicide application if required.

Leaf rust was only observed in the Western District on susceptible varieties. Leaf rust can be an important disease in Victorian wheat crops if susceptible varieties are grown.

Recommendations for rust control in 2008

- Grow varieties with adequate resistance to the three rusts and note any changes in virulence,
- Control volunteer wheat plants over summer and autumn,
- Use seed or fertiliser treatments in high risk areas and on susceptible varieties for stripe rust suppression,
- Actively monitor all wheat crops with a view to timely fungicide application to control disease if necessary.

Yellow leaf spot was observed during 2007, especially in crops sown early into old wheat stubble. In most cases where yellow leaf spot was observed in young crops the disease did not progress because of the dry spring conditions. Since this is predominantly a stubble borne disease do not sow susceptible varieties into wheat stubbles. Note that stubble from 2006 and 2007 may still be an important source of inoculum.

Recommendations for control in 2008

- Do not sow wheat into infected wheat stubbles,
- Avoid susceptible varieties and/or delay sowing,
- Foliar fungicide treatments are available if required.

Wheat Disease Reactions

Variety	Rust		CCN		Yellow leaf spot	Septoria tritici	Root lesion nematode (<i>Pratylenchus</i>)				Common root		Black tip*	Flag smut	
	Stem	Stripe	Leaf	Res			Tol	<i>P. neglectus</i>		<i>P. thornei</i>		Crown rot			rot
BREAD WHEAT															
Annuello	R	MS	MR	R	I	MS-S	S	MS-S	MI	S	-	S	-	MR-MS*	MR
Axe	MS	MR	MR	S	-	MS-S	MS-S	S	-	S	-	S	MS	S	MS*
Bolac	MS	R	MS	S	I	MS-S	MS*	-	-	-	-	S	-	MR-MS*	R-MR
Bullett	MR	-	MR-MS	MR	-	MS-S*	-	-	-	-	-	-	-	-	-
Camm	S	MS-S ^{vpm}	S	S	MI	S	S	MS	-	MS*	-	S	MS-S	MS*	MR
Carinya	MR	MR-MS*, ^{vpm}	MR-MS	S	-	S	MS	S	-	MS-S	-	S	MS-S	S	MS
Catalina	MR-MS	MR-MS	MR	R	-	MS-S	MS-S	S	-	MS	-	S	MR-MS	-	R-MR
Chara	MR-MS	MS-S	MS	R	MI	MS-S	MS-S	S	MT	MR	MT	S	S	MS	MR
Clearfield JNZ	MR	MS	MS	S	I	S	MS	MS-S	MI	S	-	S	MS-S	S	R-MR
Correll	MR-MS	MR-MS	MS	MR	-	S-VS	MS	S	-	MS	-	-	MS-S	MR-MS	R
Crusader	R-MR	MR-MS	MR	MS	-	-	-	-	-	-	-	-	-	-	-
Derrimut	R-MR	MR-MS*, ^{vpm}	R	R	-	MS-S	MS-S*	S	-	MS-S	-	S	S	S	R
Diamondbird	R	MS-S	MR	S	I	MS-S	MR-MS	MS	MI	-	-	-	-	MS	MR
Drysdale	MR	MS	MS	S	-	MS-S	MS-S	MS-S	-	-	-	-	S-VS*	MS*	MR
EGA Gregory	-	R-MR	MR	S	-	MS-S*	-	-	-	-	-	S	-	-	R
EGA Wedgetail	-	MR-MS	MS	S	-	MS-S	MR	-	-	-	-	-	-	MS*	MR-MS
Frame	MS	MR-MS	MS	MR	MT	S-VS	MS	MS-S	MT	S	MI	S	S	MS	MR
GBA Ruby	MR-MS*	R-MR#	MR	S	-	MR-MS	MR-MS*	-	-	-	-	-	-	MR-MS	S
Gladius	MR	MR-MS	MS	MS	-	MS	S-VS	MS-S	-	MS-S	-	S	MS-S	MR*	R-MR
Guardian	MR	MS	MS	R	-	MS-S*	MS	S	-	MS	-	S	MS	MS	S
H45	MR-MS	VS	MR	S	I	MR	VS	MS	MT	MS*	-	S	MS	MS	MR
H46	MR-MS	VS ^{vpm}	R	S	MI	MR-MS	VS	MS	-	MS-S	-	S	MS-S	MR-MS	R-MR
Janz	MR	MR-MS	MS	S	I	S	MS	MS-S	MI	S	MI	MS-S	MS-S	S	R
Kelalac	MS-S	MR-MS	S-VS	MR	MI	S	MS	-	-	S	MT	-	-	-	R
Lincoln	R-MR	R-MR	R-MR	S	-	MS-S*	MS*	-	-	-	-	S	-	-	-
Livingston	MR	R-MR	R-MR	S	-	MS-S	-	S	-	MR	-	S	MS-S*	-	-
Meering	S	MS	MS	S	I	S	S	S	-	S	MI	S	MS-S	S*	R
Merinda	R-MR	R-MR*	R-MR	S	-	MS-S	-	-	-	-	-	S	-	-	-
Mira	R	MR#	MR-MS	R	-	S	MS-S	-	-	S	-	-	-	-	MS
Mitre	R	MS-S	MS	R	MI	S	MS-S	S	-	S	-	S	S	S-VS*	MR
Ouyen	MR-MS	MR-MS	S	R	MI	S	MS	MS	-	S	I	-	-	-	R
Peake	MR-MS	MR-MS*	R	R	-	MS-S*	S*	S	-	MS	-	S	S-	MS-S	MR-MS
Pugsley	MS	S ^{vpm}	MR	MS	MI	S	MS	S	MT	-	-	S	MS	MS	MR
Rosella	MR	MR-MS	MS	S	I	MS-S	MS	MS	I	S	-	VS	S	S	S
Sentinel	R-MR	R-MR	R	S	-	MR-MS*	-	S	-	MS	-	MS	MS-S	-	MS-S
Ventura	R#	MS ^{*,vpm}	MR-MS	S	-	MS-S	MS	MS-S	-	MR	-	MS	MS-S	MR	MR
Wyalkatchem	MS	MS-S	R	S	MI	MR-MS	MR-MS	MR	MT-T	S*	-	S	S	MR-MS	S
Yitpi	S	MR-MS	MS	MR	MT	S-VS	MS	MR-MS	MT	S	-	S	MS	MS	MR
Young	MR	MS ^{vpm}	MR-MS	R	-	MR-MS	MS*	S	-	MR-MS	-	S	MS-S	MR*	MS
BISCUIT WHEAT															
Barham	MR	MS ^{vpm}	MR	MR	-	S	S	MR	-	MS	-	S	MS-S	MS	MR-MS
Bowie	S*	S ^{vpm}	MR#	MR	MT	S	MS	MR	MT	MS	MI	S	S	MR-MS	MS
Yenda	R	MS-S ^{vpm}	R	S	-	MR	MS-S	MR*	MT-T*	S	-	S	MS-S	-	MR

Varieties marked may no longer be resistant due to the occurrence of new races making these varieties susceptible. * These ratings are less reliable and should be treated with caution

^{vpm} These varieties have the stripe rust resistance gene *Yr17* that has been overcome by the new strain of stripe rust, but will be more resistant to the older WA strain of stripe rust.

R= Resistant

MR = Moderately resistant

MS = Moderately susceptible

S = Susceptible

VS = Very susceptible

T = Tolerant

MT = Moderately tolerant

MI = Moderately intolerant

I = Intolerant

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Wheat Disease Reactions (continued)

Variety	Rust			CCN		Yellow leaf spot	Septoria tritici	Root lesion nematode (<i>Pratylenchus</i>)				Crown rot	BYDV	Black tip	Flag smut
	Stem	Stripe	Leaf	Res	Tol			<i>P. neglectus</i>	<i>P. thornei</i>	Res	Tol				
DURUM WHEAT															
Kalka	R	MR	MR	MS	MT	MR	MS	MR-MS	-	R*	-	VS	-	-	R
Tamaroi	R	MR	MR	MS	-	MR	S	MR-MS	MI	R	MT	VS	-	MR-MS	R
Yallaroi	R	MR	MR	MS	MT	MR	MR	MR-MS	MI	R	MT	VS	-	MR-MS	R
FEED WHEAT															
Brennan	MS-S	MR	R	-	-	MS	MR	-	-	-	-	-	-	-	R
Mackellar	MR	R	S	-	-	MS	MR	-	-	-	-	-	R	-	MS*
Rudd	R#	R	R#	-	-	MS	R	-	-	-	-	-	-	-	MR
Tennant	R	MR	MS-S	-	-	MR	R	-	-	-	-	-	-	-	MS

Barley Disease Reactions

Variety	Scald	Spot form net blotch	Net form net blotch	Powdery mildew	Leaf rust	BYDV	CCN		Root lesion nematode (<i>Pratylenchus</i>)				Barley grass		
							Resistance	Tolerance	<i>P. neglectus</i>	<i>P. thornei</i>	Resistance	Tolerance	Stipe	Rust	
MALTING BARLEY															
Baudin	S	S	MS	S-VS	VS	MR	S	T	-	-	-	-	-	-	R
Buloke	MS	MS-S	MR	MR	MS-S	S*	S	T	-	-	-	-	-	-	R
Flagship	MS	MS	MR-MS	MR-MR	MS-S	S	R	T	MR	-	MR-MS	T	-	-	R
Franklin	MS-S	S-VS	S	R	S	MR	S	T	MR	-	MS	MT	-	-	R
Gairdner	S-VS	S-VS	MR-MS	MR	MS-S	MR	S	T	MR	MT	MR-MS	I	-	-	R
Schooner	MS	MS-S	MR-MS	VS	S-VS	S	S	T	MR-MS	MT	R	MT	-	-	R
Sloop	S	S	MR-MS	VS	S-VS	S	S	T	MS	T	MR	T	-	-	R
SloopSA	S	S	MR	VS	S	S	R	T	MS	MT	R	-	-	-	R
SloopVic	S	MS-S	MR	MR-MS	MS	S	R	T	MS	MT	R	-	-	-	R
Vlamingh	MR-MS	MS-S	MR	S	MS-S	-	S	T	-	-	-	-	-	-	R
FEED BARLEY															
Barque	S-VS	MR	MS	MR-MS	MS-S	S	R	T	MR	MT	MR	MT	-	-	MR
Capstan	S	MS-S	MR-MS	MR	MS-S	S	R	T	MR	T	-	-	-	-	MR
Cowabbie	MR	S	VS	MS*	S	-	S	T	-	-	-	-	MR-MI	-	MR
Fleet	MR-MS	MR-MS	MR-MS	MR	MS	S	R	T	-	-	-	-	MT	-	R
Hindmarsh	MR	S	MR-MS	MS	MS	S	R	T	-	-	-	-	-	-	R
Keel	MS	MR	MR	MS	VS	S	R	T	MR	T	MR	-	-	-	MS
Maritime	S	MS	MR	S	MS	S	R	T	MR	T	-	-	-	-	S
Tantangara	MR-MS	S-VS	MS	VS	MR-MS	S	S	T	-	-	-	-	T-MT	-	S
Yarra	S-VS	MS-S	MR-MS	S-VS	R	S	R	T	-	-	-	-	-	-	R

Varieties marked may no longer be resistant due to the occurrence of new races making these varieties susceptible.

* These ratings are less reliable and should be treated with caution

R= Resistant MR = Moderately resistant MS = Moderately Susceptible S = Susceptible VS = Very Susceptible

T = Tolerant MT = Moderately tolerant MI = Moderately intolerant I = Intolerant

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Leaf and Stem Diseases: Barley

The most effective means of controlling foliar disease in barley is to grow resistant varieties. The suggested level of resistance to the important foliar diseases in each region is shown below. If a variety does not meet the minimum resistance level, other management practices must also be considered.

Barley: Suggested minimum levels of disease resistance

Annual rainfall	Scald	Net blotch		Powdery mildew	Rust	
		Spot form	Net form		Leaf	Barley grass stripe
Low < 350 mm	S	S	MS	S	S	S
Medium 350-500 mm	MS	S	MS	MS	S	S
High > 500 mm	MR	MS	MR	MR	MS	MS

Scald was not common during 2007, but can be a problem when susceptible varieties are sown early.

Recommendations for control in 2008

- Treat seed or fertiliser to suppress early scald infection,
- Do not sow barley into infected barley stubbles,
- Grow resistant varieties, noting changes in resistance,
- Use foliar fungicides to provide some protection.

Spot form of net blotch was common in barley crops in 2007, but in general its impact on yield was low due to the dry spring. Often high levels of infection on young plants have a limited effect on yield if the disease does not progress during the growing season.

There is likely to be inoculum carry over into 2008 on infected stubbles that may be of concern when very susceptible varieties are grown. Note that due to the dry conditions this disease will also survive on stubbles from 2006.

Recommendations for control in 2008

- Do not sow barley into infected barley stubbles,
- Grow varieties with some resistance,
- In severe cases fungicides can give some protection.

Net form of net blotch can be a devastating disease (worse than the spot form) if susceptible varieties are grown.

Recommendations for control in 2008

- Avoid growing susceptible varieties,
- Use foliar fungicides to provide some protection.

Leaf rust was common in barley crops in parts of the Western District and may have reduced yield in some cases during 2007. Rust survives the summer on volunteer barley plants and it will be important to control these after a wet summer/autumn. Avoid very susceptible varieties in high risk areas.

Recommendations for control in 2008

- Control volunteer barley plants,
- Avoid susceptible varieties,
- Use foliar fungicides to provide some protection.

Bunts and Smuts

Wheat, barley and oat seed should be treated **every year** with a fungicide to control bunt and smuts. Seed treatments are cheap and effective. Without treatment these diseases can increase rapidly, resulting in unsaleable seed. Also note that fertiliser treatments applied for take-all or stripe rust control do not control bunts and smuts and seed should still be treated with a fungicide.

Recommendations for control in 2008

- Treat all seed with a smuticide, every year,
- Use clean seed from another source if a seed lot has become infected.

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Root and Crown Diseases

During 2007 crown rot was the most important disease of wheat in Victoria. In the Wimmera and Mallee approximately 75% of wheat crops had crown rot and these crops lost an average of 5% yield with some crops losing greater than 20% of their yield. Take-all was also common, occurring in about half of the wheat crops with an average yield loss of 3% in affected crops and greater than 10% in some situations. There were also reports of cereal cyst and root lesion nematodes causing concern.

Under normal conditions, most cereal root/crown diseases (take-all, crown rot, and cereal cyst and root lesion nematode) can be controlled with a one or two year break from susceptible hosts. However, experience during the dry season of 2002 showed that this length of break was ineffective in dry soil, and that a two or three year break should be given after the dry season of 2006. It is also important that break crops are kept free of grass weeds to be effective.

Growers can have their paddocks tested prior to sowing to determine the risk associated with the important cereal root/crown diseases. Contact your local agronomist for soil testing. For more information on the management of root and crown diseases consult the Agricultural Note "Cereal Root Diseases".

Interpreting Resistance Classifications

Below is an explanation of the resistance ratings used in this guide and how they should be interpreted.

- R** Resistant; The disease will not multiply or cause any damage on this variety.
- MR** Moderately Resistant; the disease may be visible and multiply slightly but will not cause significant loss.
- MS** Moderately Susceptible; the disease may cause losses up to 15%, and more in very severe cases.
- S** Susceptible; the disease can be severe on this variety and losses of 15-50% can occur.
- VS** Very Susceptible; Where a disease is a problem this variety should not be grown. Losses greater than 50% are possible and the variety may create large problems to other growers.

These classifications are only a guide and yield losses will depend on the environment and seasonal conditions.

New stripe rust strain attacking triticale

During 2007 a new strain of stripe rust was detected in many locations in eastern Australia that is virulent on many cultivars of triticale. This new strain resulted from a mutation in the WA stripe rust. This strain is now known as the "Jackie" pathotype.

Triticale growers will now need to take note of the reaction of their cultivars to the new stripe rust, as shown in the Table below, and implement appropriate management when necessary.

Reaction of triticale varieties to the new "Jackie" stripe rust

Cultivar	Reaction	Cultivar	Reaction
Abacus	MS	Muir	S
Breakwell	MS-S	Prime 322	MS
Credit	MS	Rufus	R
Endeavour	R	Speedee	S
Everest	MR-MS	Tahara	MR
Hawkeye	R	Tickit	MR
Jackie	S	Tobruk	R
Jaywick	R	Treat	MR
Kosciuszko	S		

Further Information

Detailed information on each of the cereal diseases can be obtained in Agricultural Notes: www.dpi.vic.gov.au/notes (click on Crops and pastures, Cereals)

Wallwork, H (2000) Cereal Leaf and Stem Diseases
 Wallwork, H (2000) Cereal Root and Crown Diseases
 Wallwork, H (2008) Cereal Seed Treatments 2008