

Cereal Seed Treatments 2020

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Summary of 2019 season and implications for 2020

Foliar pathogens were generally at a higher level in 2019 than the previous year owing to some early seeding, lack of suitable crop rotations in some cases and a reasonably favourable winter season in some of the higher rainfall areas.

The most notable feature of 2019 was the appearance of resistance to QoI and some DMI fungicides in wheat powdery mildew and to SDHI and some DMIs in barley net form net blotch (NFNB) populations.

Resistance in the NFNB population to fluxapyroxad in the seed treatment Systiva was confirmed by the fungicide resistance group at Curtin University led by Fran Lopez. Samples taken from nine paddocks across the Yorke Peninsula south of Port Clinton showed high resistance ranging from 2-58 % of samples within paddocks and at least moderate resistance within 14-70% of samples. Given the severity and distribution of the resistance it is most likely to have emerged in 2018 or even earlier. Whilst testing for resistance to SDHI fungicides it was also discovered that there was a very high level of resistance to tebuconazole (used as an indicator DMI) in all 15 paddocks tested across the Yorke Peninsula including 6 sites north and east of Bute showing frequencies of resistance within paddocks of 36-100%. Testing so far has only been conducted on the Yorke Peninsula, but given the distribution of resistance and widespread dispersal of airborne spores it is likely that resistance to Systiva will have been widely dispersed in 2019 and will be present in other areas albeit at a low level. Resistance to tebuconazole and presumably some other DMIs is likely to be much more widely distributed across SA. The development and spread of fungicide resistance will have been greatly increased with the sowing of susceptible barleys into infected barley stubbles and with repeated use of Systiva and a narrow range of

DMI fungicides. Not using SDHI products south of Port Wakefield and Kadina in 2020 will help to check the build-up of resistance on the Yorke Peninsula so these products can be retained as useful tools in combination with other fungicide groups in future. Also greater use of a wider range of DMI foliar products in combination with strobilurins will help keep NFNB disease in check. Most importantly, growers should avoid growing barley into barley stubbles and should avoid the most susceptible varieties where possible. With large areas sown to Spartacus, this variety has gradually lost resistance to the evolving population of NFNB and this variety should now be considered as S or SVS in the worst affected areas.

Powdery mildew resistance to strobilurins and some DMI fungicides was detected in wheat crops on the northern Yorke Peninsula and confirmed by genetic and fungicide testing by the fungicide resistance group at Curtin University. The resistance to strobilurins and tebuconazole is at a high level while resistance to other DMI chemistry is still being investigated.

The appearance of resistance in mildews can be attributed to the large area sown to very susceptible wheat varieties in close rotation. This includes the varieties Scepter and Chief CL Plus, both of which are considerably more susceptible than Mace and most other older varieties. Also very susceptible are Sheriff CL Plus, Vixen and Arrow. Rockstar is also susceptible to the mildew population on the Yorke Peninsula.

In-furrow and early foliar treatments against septoria, eyespot and/or rust in wheat will help to contain the mildew by providing some early season protection. Growers should ensure that any fungicides used are rotated and/or mixed and planned with a view to manage fungicide resistance against all diseases.

Table 1: Seed-borne disease control

Product	Active ingredient		Company	Form	Rates per 100 kg	Smuts controlled at low/high rates					Net form net blotch seed infection
	Fungicide	Insecticide				Wheat & barley		Oats	Flag smut		
						Loose	Covered †		seed-borne	soil-borne	
Vitaflo C	carboxin	cypermethrin	UPL	f	125/250mL	—/✓	✓	✓	✓	—	—
Vitavax 200FF	carboxin + thiram	—	UPL	f	250/500 mL	—/✓	✓	✓	✓	—/✓	✓
Vibrance	difenoconazole + metalaxyl + sedaxane	—	Syngenta	f	90/180 mL	✓b/✓	✓/✓	—/✓	✓/✓	✓/✓	—/✓
Vibrance Extreme	difenoconazole + metalaxyl + sedaxane	thiamethoxam	Syngenta	f	325 mL	✓	✓	✓	✓	✓	✓
Pontiac	flutriafol + metalaxyl	imidacloprid	Nufarm	f	400 mL	✓	✓	✓	✓	✓	—
Veteran C	flutriafol	cypermethrin	Nufarm	p/f/l	100 g/mL	✓	✓	✓	✓	✓	—
Vibrant 25C	flutriafol	cypermethrin	Conquest	l	100 mL	✓	✓	✓	✓	✓	—
Superstar	flutriafol	cypermethrin	Apparent	l	100 mL	✓	✓	✓	✓	✓	—
Vincit C	flutriafol	cypermethrin	FMC	p/f/l	100 g/mL	✓	✓	✓	✓	✓	—
Systiva	fluxapyroxad	—	BASF	f	150 mL	✓	-	-	-	-	✓
Rancona C	ipconazole	cypermethrin	UPL	me	100 mL	✓	✓	✓	✓	✓	—
Rancona Dimension	ipconazole + metalaxyl	—	UPL	me	80-200 mL	✓/✓b	✓/—	✓/—	✓/—	✓/—	—
Evergol Energy	prothioconazole + penflufen + metalaxyl	—	Bayer	f	65/130 mL	—/✓	✓	✓	—/✓	—/✓	—
EverGol Prime	penflufen	—	Bayer	f	40-80 mL	✓	✓	✓	✓	✓#	—
Axle	tebuconazole	cypermethrin	Apparent	f	100 mL	✓	✓	✓	✓	✓	—
Veto C	tebuconazole	cypermethrin	Conquest	f	100 mL	✓	✓	✓	✓	✓	—
Kingpin	tebuconazole	triflumuron	Apparent	f	100 mL	✓	✓	✓	✓	✓	—
Veto T	tebuconazole	triflumuron	Conquest	p	100 g	✓	✓	✓	✓	✓	—
Tebu T	tebuconazole	triflumuron	Genfarm	f	100 mL	✓	✓	✓	✓	✓	—
Raxil T	tebuconazole	triflumuron	Bayer	p/f	100 g/mL	✓	✓	✓	✓	✓	—
Tebuconazole 25T	tebuconazole	triflumuron	4 Farmers	f	100 mL	✓	✓	✓	✓	✓	—
Triticonazole 200C	triticonazole	cypermethrin	4 Farmers	f	75-150 mL	✓	✓	—	✓	✓	—
Premis Pro C	triticonazole	cypermethrin	BASF	F	100 mL	✓	✓	✓	✓	✓	—

p = powder
f = flowable

l = liquid
me = micro-emulsion

φ Bunt in wheat

b = barley only

* Suppression only in barley

—/✓ = Only registered at the higher rate

= suppression only

Table 2: Soil-borne disease suppression

Product	Active ingredient		Company	Form	Rates per 100 kg or per ha	Pythium	Rhizoctonia	Take-all
	Fungicide	Insecticide						
Vibrance	difenoconazole + metalaxyl + sedaxane	—	Syngenta	f	180/360 mL	✓	✓/✓	—
Vibrance Extreme	difenoconazole + metalaxyl + sedaxane	Thiamethoxam	Syngenta		325/650 mL	✓	✓b/✓	—
Jockey Stayer	fluquinconazole	—	Bayer	f	450 mL	—	—	✓
Quantum Pro	fluquinconazole	—	UPL	f	450 mL	—	—	✓
Pontiac	flutriafol + metalaxyl	imidacloprid	Nufarm	f	400 mL	✓	✓#	—
Systiva	fluxapyroxad	—	BASF	f	150 mL	—	✓	—
Rancona Dimension	ipconazole + metalaxyl	—	UPL	me	200/320 mL	✓	-/✓	—
Evergol Energy	prothioconazole + penflufen + metalaxyl	—	Bayer	f	100/130-260 mL	✓	-/✓	—
EverGol Prime	penflufen	—	Bayer	f	40-80 mL	—	✓	—
Uniform	azoxystrobin + metalaxyl	—	Syngenta	spray	200-400 mL	✓	✓	—
Evergol Energy	prothioconazole + penflufen + metalaxyl	—	Bayer	spray	200-300 mL	✓	✓	—
EverGol Prime	penflufen	—	Bayer	spray	60-120 mL	—	✓	—
Intake HiLoad Gold / Combi Sapphire	flutriafol 500 g/L	—	Nufarm	spray	200/400 mL	—	—	✓
Various	flutriafol 250 g/L	—	Various	spray	400 mL	—	—	✓
Various	flutriafol 500 g/L	—	Various	spray	200 mL	—	—	✓
Various	flutriafol 600 g/L	—	Various	spray	167 mL	—	—	✓

Spray = application to
fertiliser or in furrow
spray

b = barley only

= low level of
suppression only

-/✓ = Only registered at the higher
rate

Table 3: Foliar disease suppression

Product	Active ingredient		Company	Form	Rates per 100kg or per ha	Foliar diseases suppressed at low/high rates								Smuts controlled	
	Fungicide	Insecticide				Stripe rust	Wheat leaf rust	Barley leaf rust	Yellow leaf spot	Net blotches	Barley scald	Barley mildew	Septoria	Wheat/barley	Oats
Jockey Stayer	fluquinconazole	—	Bayer	f	300/450 mL	✓	✓	—	—	—	✓*	✓*	✓	✓*	—
Quantum Pro	fluquinconazole	—	UPL	f	300/450 mL	✓	✓	—	—	—	✓*	✓*	✓	✓*	—
Fluquinconazole	fluquinconazole	—	4 Farmers	f	300/450 mL	✓	✓	—	—	—	✓*	✓*	✓	✓*	—
Armour C	flutriafol	cypermethrin	FMC	p/f	100 g/mL	✓	—	—	—	—	✓	✓	✓	✓	—
Arrow C	flutriafol	cypermethrin	Nufarm	f	100 mL	✓	—	—	—	—	✓	✓	✓	✓	—
Systiva	fluxapyroxad	—	BASF	f	150 mL	—	—	✓	—	✓	✓	✓	—	✓b	—
Foliarflo C	triadimenol	cypermethrin	UPL	f	100/150 mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Triadimenol 150+/150C	triadimenol	cypermethrin	4 Farmers	p/f	100/150 g/mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Apparent Suntan	triadimenol	cypermethrin	Apparent	f	100/150 g/mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Baytan T	triadimenol	triflumuron	Bayer	f	100/150 mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Triadimenol T	triadimenol	triflumuron	Genfarm	f	100/150 mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Vanguard C	triadimenol	triflumuron	Conquest	f	100/150 mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Proleaf T	triadimenol	triflumuron	UPL	f	100/150 mL	✓	—	—	—	—	✓	✓	—/✓	✓	✓
Uniform	azoxystrobin + metalaxyl-m	—	Syngenta	spray	200-400 mL 300-400 mL	✓	—	✓	✓	✓	—	✓	—	—	—
Intake HiLoad Gold / Combi Sapphire	flutriafol 500 g/L	—	Nufarm	spray	100/200/300/400 mL	✓§	—	— /—/✓/✓	—	— /—/✓/✓	✓§	✓§	—/✓/—	—	—
Bayonet 250	flutriafol 250 g/L	—	Conquest	spray	200/400/800 mL	✓§	—	—	—	— /—/✓	✓§	✓§	—/✓/—	—	—
Bayonet 500 Flex In-furrow	flutriafol 500 g/L	—	Conquest	spray	100/200/400 mL	✓§	—	—	—	— /—/✓	✓§	✓§	—/✓/—	—	—
Impact Endure	flutriafol 500 g/L	—	FMC	spray	100/200/400 mL	✓§	—	—	—	—	✓/✓/—	✓/✓/—	—/✓/—	—	—
Various	flutriafol 250 g/L	—	Various	spray	200/400 mL	✓	—	—	—	—	✓	✓	—/✓	—	—
Various	flutriafol 500 g/L	—	Various	spray	100/200 mL	✓	—	—	—	—	✓	✓	—/✓	—	—
Various	flutriafol 600 g/L	—	Various	spray	83-167 mL	✓	—	—	—	—	✓	✓	—/✓	—	—

p =
powder
f =
flowable
—/✓ = Only registered at the higher
rate

* Barley disease control is only registered where Raxil/Proguard Plus is added

b = barley loose smut only
§ = prolonged control is
provided at the higher rates

Table 4: Control of aphids and therefore barley and cereal yellow dwarf virus (BYDV and CYDV). Also stored grain insect pests

Product	Active ingredient		Company	Form	Rates (per 100kg)	BYDV/CYDV	Stored grain pests	Smuts	Foliar diseases †
	Fungicide	Insecticide							
Pontiac	flutriafol + metalaxyl	imidacloprid	Nufarm	f	400 mL	✓	✓	✓	—
Various	tebuconazole	imidacloprid	Various	f	200 mL	✓	✓	✓	—
Imid-Triadimenol	triadimenol	imidacloprid	4 Farmers	f	400 mL	✓	—	✓	✓
Gaucho 600	—	imidacloprid	Bayer	f	120-240 mL	✓	✓	—	—
Senator 600	—	imidacloprid	Nufarm	f	120-240 mL	✓	✓	—	—
Guardian	—	imidacloprid	UPL	f	120-240 mL	✓	✓	—	—
Various	—	imidacloprid	Various	f	120-240 mL	✓	—	—	—
Cruiser 350FS	—	thiomethoxam	Syngenta	f	100-200 mL	✓	✓	—	—

† See diseases controlled by triadimenol in Table 3

Smut Control

Loose smut continues to be observed in many barley crops, particularly Spartacus CL+. The disease is very visible at flowering but in most cases the spores are rapidly dispersed and not detectable at harvest. In 2019 loose smut was detected in barley receivals at Snowtown. Initially this looked like covered smut owing to clumped spores still being visible on sections of the rachis. However it is likely that failure of heads to emerge from the boot owing to drought prevented dispersal of the loose smut spores until harvest.

To manage loose smut, higher rates of registered products should be used. Be aware that some products have unsatisfactory control. These include those relying on triadimenol and to a lesser extent tebuconazole and flutriafol. All products may allow low levels of infection to persist but in most cases this will not be at a level high enough to cause serious concern.

Bunt and covered smut spores are spread from infected heads onto healthy seed during harvest. Loose smut spores spread in the wind at flowering time and infect developing embryos. Loose smut infection remains hidden inside the seed and so is more resistant to seed treatments than the surface borne bunt and covered smuts. Flag smut spores spread by wind from infected leaves and infect developing heads. They can also survive in soil for several years infecting subsequent crops.

Choice of seed or in-furrow treatments

Wheat

There are four principal reasons for applying a fungicide treatment to wheat at sowing.

- For smut control alone: use a product from Table 1.
- For suppression of soil-borne diseases: use a product from Table 2.
- For control of foliar fungi as well as smuts: use a product from Table 3.
- For control of aphids and therefore BYDV: use a product from Table 4.

None of the registered treatments tested by SARDI have demonstrated control or suppression of crown rot.

This factsheet does not include information on the control of stored grain pests. However many of the products listed in this sheet do provide some control of these pests.

Barley

All barley seed except fully resistant varieties should be treated with a product from Table 3 that controls powdery mildew to delay the development of fungicide resistance. Where the inclusion of a product for control of loose smut is a priority this should be mixed with one that provides control of powdery mildew.

Where growers seek to suppress *Rhizoctonia* then a product from Table 2 may be used in addition to the mildew control.

Treatments, other than Systiva®, registered for the suppression of net form net blotch are only effective for seed borne inoculum and not for stubble borne inoculum and so are likely to have limited value.

Emergence problems

Caution should be taken in using seed treatment products in Table 3 on wheat as they may reduce coleoptile length and cause emergence problems under some conditions.

Factors other than seed treatments can cause poor seedling emergence: these include deep sowing, surface crusting, short coleoptile varieties, soil temperatures and trifluralin.

Sowing too deep is a common cause of emergence problems. The coleoptile, which surrounds the first leaf until the shoot emerges, protects and guides the shoot as it grows through the soil. If seed is sown deeper than the length of the coleoptile the plant can fail to emerge. Because coleoptile lengths vary from one variety to another some varieties can tolerate deeper sowing than others. Coleoptile lengths vary greatly from one batch of seed to another. The source of seed is often more critical than the variety in determining coleoptile length. For this and other reasons farmers should seek to use the best seed possible.

Most emergence problems occur in heavy clay soils where surface sealing occurs. Extra care is required when treated seed and/or trifluralin is used in such soils.

Further advice:

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