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A New Stripe Rust Pathotype Adapted to Triticale

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A feature of the stripe rust epidemic in 2007 has been the unexpected severe rust responses in commercial fields of triticale (Cereal Rust Report Volume 5, Issue 2, September 2007). The most notable cultivar affected has been Jackie, and severe stripe rust has been reported on this cultivar from all areas of NSW and one location in Victoria. Stripe rust samples from other triticale cultivars in all eastern states have also been received. In contrast, there have been no stripe rust samples from triticale in WA.

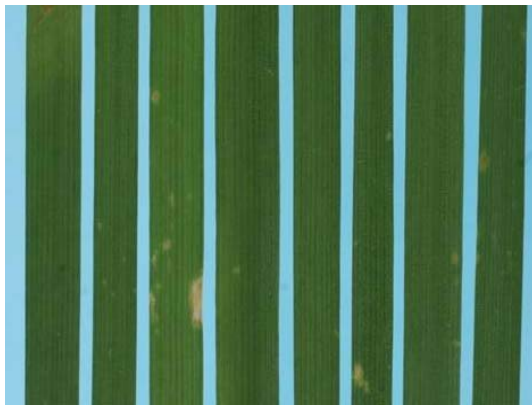
Greenhouse tests revealed that the early triticale rust samples were the original WA pathotype, *ie* 134 E16 A+. An experiment was undertaken using 14 triticale cultivars inoculated as seedlings with a range of stripe rust pathotypes, including an isolate from Jackie collected in Bingara (northern NSW) in late July. The results of this experiment are presented in Table 1 and illustrated in Figure 1.

Interpretation of the results

1. Pathotype 110 E143 A+ was the common pathotype in eastern Australia just prior to the introduction of the now dominant WA pathotype. All triticales in this experiment were highly resistant to this pathotype since it is avirulent for *Yr9* - a stripe rust resistance derived from cereal rye and which is common in triticale.
2. Pathotype 238 E143 A+ is identical to pt 110 E143 A+ but with additional virulence for *Yr9*. This pathotype produced a susceptible reaction to the one triticale that carried only *Yr9*, *ie* Hillary. All other cultivars produced an intermediate infection type, indicating that *Yr9* was present but also that an additional resistance/s was protecting these cultivars.
3. Pathotypes 134 E16 A+ and 134 E16 A+ Yr17+ produced a similar pattern of infection types as 238 E143 A+. This is because these pathotypes were also virulent for *Yr9*.
4. Pathotype 134 E16 A+ isolate 071503 (collected from cultivar Jackie at Bingara NSW) produced susceptible infection types on Breakwell, Kosciuszko, Speedee, Abacus, Prime 322, Hillary, Madonna, Satu and the Mexican triticale Polmer. It was concluded that this isolate represents a new pathotype which combines virulence for *Yr9* and a yet to be determined resistance. This pathotype will be described as the Jackie pathotype and will be designated 134 E16 A+ J+.

Conclusions and Implications

1. The Jackie pathotype is expected to be widespread in 2007. It is commonly anticipated that a new pathotype is detected some time before it becomes common in commercial fields. However in this case, triticale has not been used in the stripe rust survey and hence it is likely that the Jackie pathotype may have been in cereal growing regions for several years but remained undetected.
2. The Jackie pathotype will have a comparative advantage to survive and multiply on vulnerable triticale cultivars. However, it can be expected that wheats susceptible and moderately susceptible to the WA pathotype will also be susceptible to the Jackie pathotype.
3. In the limited greenhouse tests conducted to date, it is clear that effective resistance continues to be present in cultivars Everest, Tickit, Tahara and in certain plants of Treat. The Jackie pathotype will now be used in screening for resistance to stripe rust in triticale.
4. Variety choice will be an important strategy in minimizing risk of crop losses to stripe rust in triticale. This will be particularly important in long season triticales such as Jackie which are typically sown from March and hence have the potential to develop pathogen inoculum from an early stage of crop establishment. Grazing and strategic fungicide applications will assist in minimising the commercial effects of this new pathotype.



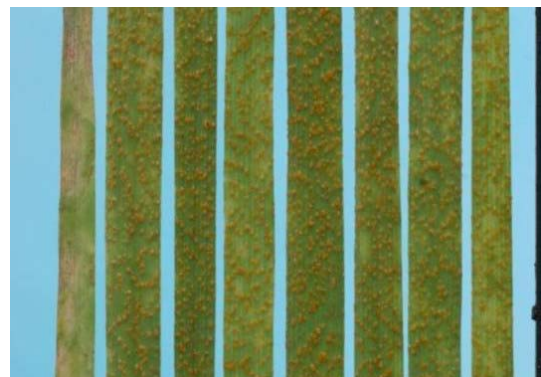
Pathotype 110 E143 A+ (avirulent Yr9, YrJ)



Pathotype 238 E143 A+ (virulent Yr9, avirulent YrJ)



Pathotype 134 E16 A+ (virulent Yr9, avirulent YrJ)



Pathotype 134 E16 A+ YrJ+ (virulent Yr9, virulent YrJ)

Figure 1. Illustration of disease responses of seven triticale cultivars and one wheat derivate carrying Yr9 to four pathotypes of stripe rust. Cultivars (left to right) Tickit, Breakwell, Abacus, Prime 322, Satu, Polmer, Hillary, Yr9 Avocet S.

Table 1 Seedling disease responses among a range of triticale cultivars to selected stripe rust pathotypes.

Cultivar	Stripe Rust Pathotype				
	110 E143 A+	238 E143 A+	134 E16 A+	134 E16 A+ Yr17+	134 E16 A+ 071503
Breakwell	R	I	I	I	S
Crackerjack	R	I	I	I	I,S
Tahara	R	I	I	I	I
Kosciuszko	R	I	I	I	S
Tickit	R	I	I	I	I
Speedee	R	I	I	I	S
Abacus	R	I	I	I	S
Prime 322	R	I	I	I	S
Treat	R	I	I	I	I,S
Everest	R	I	I	I	I
Hillary	R	S	S	S	S
Madonna	R	I	I	I	S
Satu	R	I	I	I	S
Polmer	R	I	I	I	S
Yr9 Avocet S	R	S	S	S	S

R= resistant, I=intermediate, S=susceptible

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Cereal rust samples may be collected and posted in paper envelopes to the following address:

Australian Cereal Rust Survey
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