

Fungicide treatments to control stripe rust in AGT varieties with differing levels of rust resistance



September 2017

Key messages

- ✓ Scepter has more effective Adult Plant Resistance (APR) than Mace.
- ✓ Two strategic fungicide treatments were effective in controlling the stripe rust epidemic regardless of the level of susceptibility in this situation where the epidemic started relatively late in the season.
- ✓ Significant yield losses occur where stripe rust is not controlled in susceptible varieties.

Why do the trial?

To evaluate the effectiveness of various fungicide treatments for control of stripe rust in a range of AGT varieties with differing levels of stripe rust resistance.

Trial parameters

- Design:** 2 sites (Kabinga, Collingullie)
4 replications, split plot
6 main plots (varieties): Beckom, Condo, Coolah, Mace, Scepter, Suntop
6 sub plots (fungicide treatments): Nil, Impact at seeding, foliar at GS35, foliar at GS35 + GS39, Impact + Foliar at GS39, Impact at seeding + foliar at GS35 + GS39
- Fungicide:** Impact applied to MAP fertiliser
145ml/ha Tebuconazole foliar applied 12th August (GS35)
250ml/ha Epoxiconazole foliar applied 12th September (GS49 for Mace)
- Sowing Date:** May 16

What happened?

The 2016 season was very favourable for crop growth with very high yields achieved. Stripe rust appeared relatively late in the season and moved slowly early in the epidemic, presumably because the frequent rain events washed the spores off the canopy and limited the normal air borne spread of the disease. Once the weather warmed and the frequency of rain events reduced, the epidemic progressed rapidly.

At the time of the first foliar fungicide application (GS35) on the 12th August, stripe rust infection was very low. The GS39 application was delayed until approximately GS49 (Mace) on the 12th September when stripe rust was present.

The varieties Condo, Coolah and Beckom had very low or nil levels of stripe rust in all treatments and so are not included in the graphs. Suntop had a higher level of infection but achieved a maximum % leaf area rusted of only 6% at Kabinga and 0.4% at Collingullie, so this data has also been excluded from the graphs. For Mace (the most susceptible variety), the 2 or 3 fungicide strategy kept the level of stripe rust to below 2% so again, this data is not presented for simplicity of the graphs.

Mace was the most susceptible variety, with up to 85% leaf area lost due to stripe rust. By comparison, Scepter reached a maximum of 29%. In the early stages of the epidemic, up to approximately GS49, Mace and Scepter showed a similar level of susceptibility, and achieved 22% and 23% respectively in leaf area rusted at Kabinga. However, from GS49 (14th October) when the epidemic had reached maximum severity there was a large difference in the level of stripe rust between the two varieties. Whilst Mace continued to display a highly susceptible phenotype, Scepter showed reasonable levels of APR with a final stripe rust level of 29% versus Mace at 85%. These differing levels of stripe rust resistance are also reflected in the final grain yields of the varieties.

Mace with Nil fungicide lost 32.7% of yield potential at Collingullie and 37.5% at Kabinga compared to the mean of the full control treatment, whereas Scepter lost 19.6% at Collingullie and 23.3% at Kabinga.

There was an important interaction of fungicide treatment and variety (level of susceptibility). In Mace, 2 fungicides were required to achieve effective control of stripe rust to a maximum of 1.6% leaf area at Kabinga, and the same treatment achieved a maximum of 0.1% in Scepter.

Where a single fungicide was used (Impact or GS35), stripe rust levels were kept to a maximum of 63.8% in Mace, with Scepter suffering a maximum level of 11%. This resulted in a maximum yield loss of 18.5% in Mace and 14.6% in Scepter.

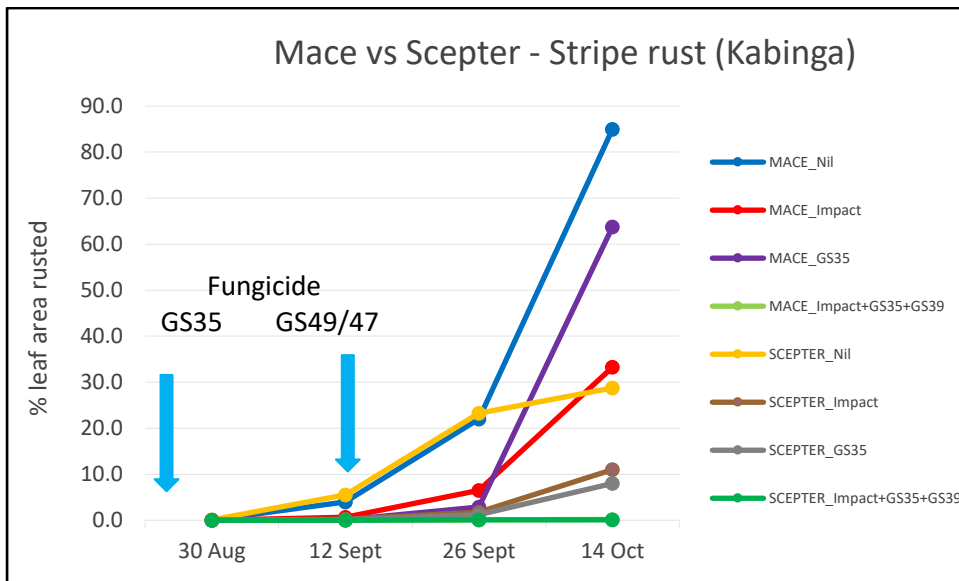


Figure 1: Stripe rust reaction between varieties Mace and Scepter at Kabinga trial site.

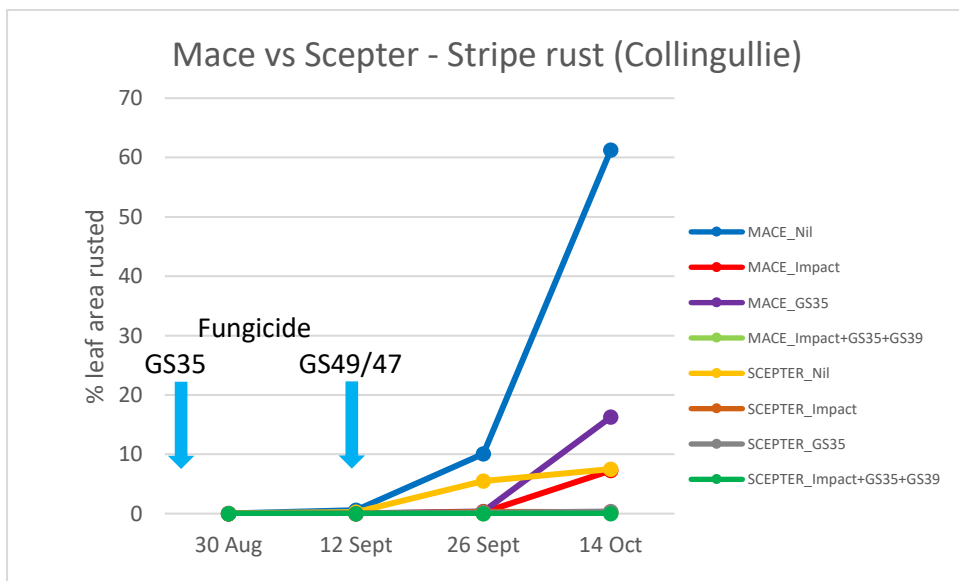


Figure 2: Stripe rust reaction between varieties Mace and Scepter at Collingullie trial site.

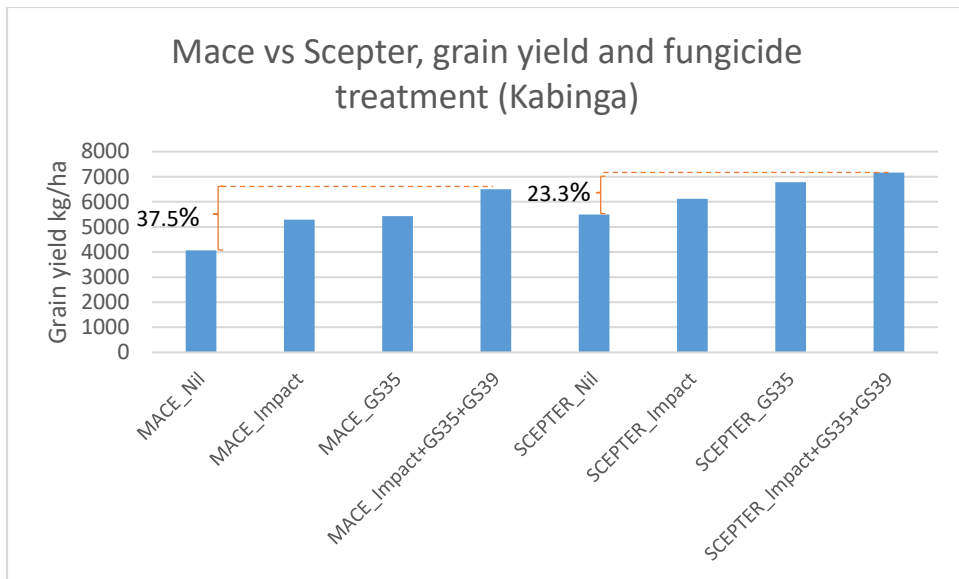


Figure 3: Comparison between grain yield in Mace and Scepter at different fungicide treatments at Kabinga.

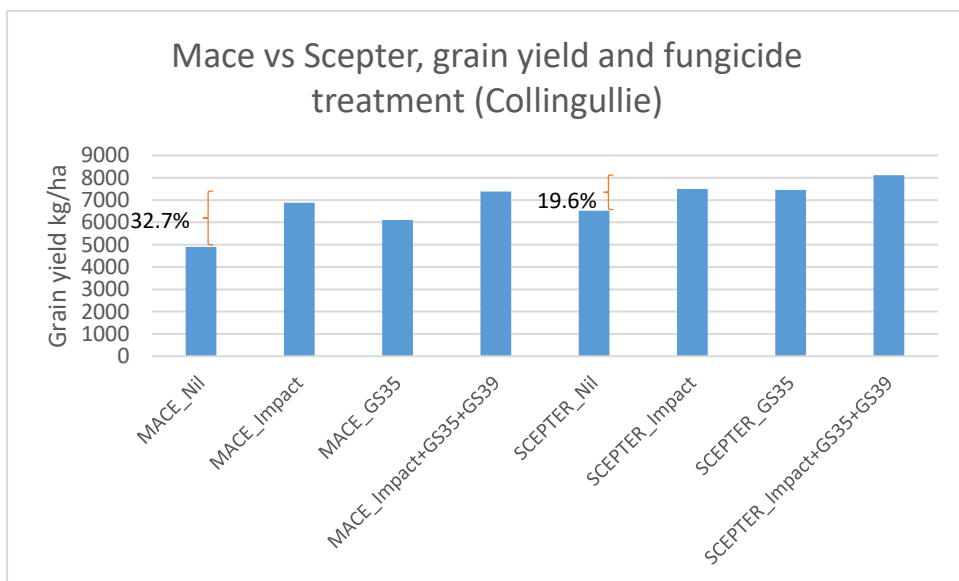


Figure 4: Comparison between grain yield in Mace and Scepter at different fungicide treatments at Collingullie.

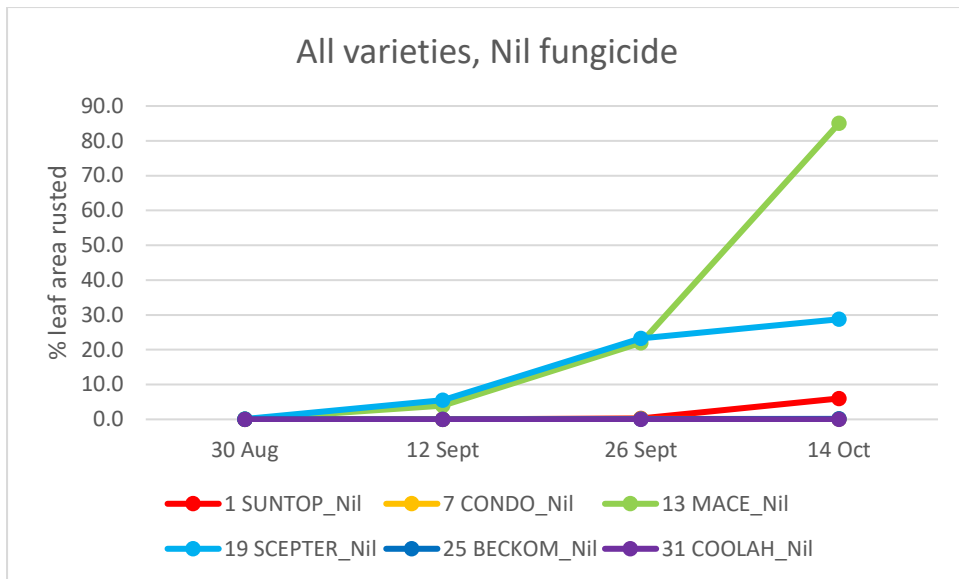


Figure 5: Level of leaf area affected by stripe rust in all trialed varieties without any fungicide applications.

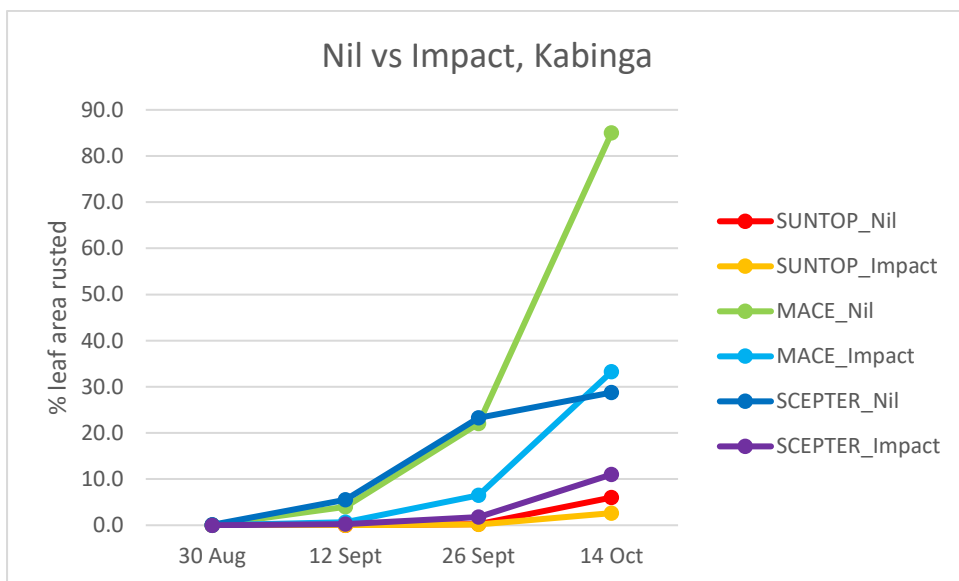


Figure 6: Level of leaf area affected in Mace, Scepter and Suntop in both nil and impact treatments.

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