Yellow leaf spot yield loss experiment – southern NSW 2015

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Key findings

» Fungicide reduced disease levels in all varieties, but failed to eliminate the disease completely.

» Observed differences in disease levels were broadly in agreement with published variety resistance ratings.

» Yield losses were observed in the more susceptible varieties due to early disease development.

» Low disease levels from an early stage can cause yield losses.

» Variety selection will always play an important role in managing disease in high risk areas.

Introduction

This experiment examined the effect of yellow leaf spot (YLS) on yield in three wheat varieties of differing resistance in southern NSW.

Site details

Wagga Wagga was selected for the experiment as it represents the medium–high rainfall winter cropping regions of southern NSW.

Varieties

Three locally relevant varieties ranging in resistance to YLS were used (Table 1). Varieties with adequate stripe rust resistance were selected to reduce confounding effects from this disease.

Yellow leaf spot treatment

The experiment (disease plots) was inoculated with YLS-infected stubble on 19 May 2015 at 250 g/m^2, which is equivalent to 2.5 t/ha. Control plots also had non-infected stubble applied at the same rates. The experimental crop was sown on 15 May 2015.

Supplementary spray irrigations were applied to promote disease in the experiment; timing and rate varied in response to seasonal factors between August and November to ensure a conducive disease environment.

Table 1. Varieties included in YLS experiments 2015.

Variety	YLS rating #
Phantom⁽ᶦ⁾	Susceptible–very susceptible (S–VS)
EGA_Gregory⁽ᶦ⁾	Susceptible (S)
Strzelecki⁽ᶦ⁾	Moderately susceptible (MS)

As published in the NSW DPI Winter crop variety sowing guide 2015.

The experiment was sown on 15 May and there were four fungicide treatments applied in the experiment (tables 2 and 3).

Table 2. The four YLS treatments applied in the experiment.

Treatment	Stubble application	Fungicide application
Full control#	Non-infected stubble added 2.5 t/ha	Multiple applications of Bumper® (propiconazole 250 g/L) at 500 mL/ha
Fungicide at 5-leaf stage	Infected stubble added 2.5 t/ha	Bumper® (propiconazole 250 g/L) at 500 mL/ha
Fungicide at GS31+GS39	Infected stubble added 2.5 t/ha	Bumper® (propiconazole 250 g/L) at 500 mL/ha applied at growth stage 31 and growth stage 39
No fungicide	Infected stubble added 2.5 t/ha	No foliar fungicide applications

All plots were sown with Jubilee® (flutriafol 250 g/L) treated fertiliser at 800 mL/ha for stripe rust control.

#Disclaimer: The full control treatment used in this experiment does not constitute a recommendation for grower practice. Growers must follow label guidelines to ensure minimum residue levels are not exceeded.

Table 3. Fungicide application dates.

Growth stage	Fungicide application dates
Full control	30 July, 1 September, 1 October (approximately every 3–4 weeks)
5-leaf stage	30 July
GS31	1 September
GS39	1 October

Results

Disease severity

Disease development was expressed early at the 5-leaf stage in all varieties and treatments. This was due to heavy disease pressure from the stubble collected from a susceptible variety infected with YLS the previous year.

Disease development did not conform to the disease progress curves observed in many other crop diseases. There was no extended lag period when the disease was at a low level relative to the amount of green leaf area in the canopy. Disease symptoms were expressed continuously throughout the season, which illustrates that conditions conducive to YLS can result in disease symptoms keeping pace with new leaf production as the plants grow.

Fungicide applications throughout the growing period separated the treatments to some extent, but they did not give complete control of the disease. This is more noticeable in the S–VS variety Phantom than in the S variety EGA_Gregory or the MS variety Strzelecki (Figure 1).

Yield

Yield loss due to treatment effects were observed in all varieties. However, it was most evident in the S–VS variety Phantom with a yield loss of 26% between the full control and no fungicide treatments (Figure 2). The benefit of higher varietal resistance was observed with EGA_Gregory and Strzelecki having yield losses of only 17% and 12% respectively.

Fungicide applied at the 5-leaf stage improved yield, but it was not significantly different to the no fungicide treatment. Phantom and EGA_Gregory had significant higher yields when fungicides were applied at GS31 and GS39, but this effect was not observed for Strzelecki.

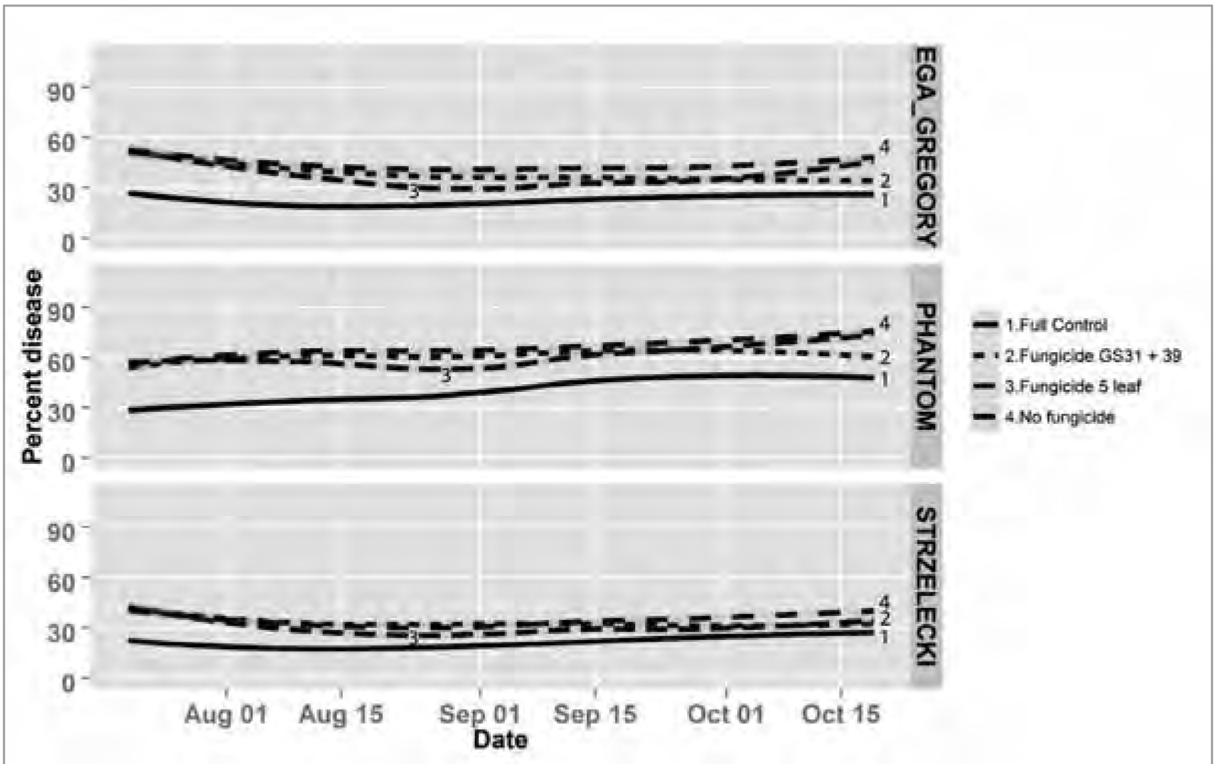

Figure 1. Disease progress in the YLS experiment at Wagga Wagga, 2015.

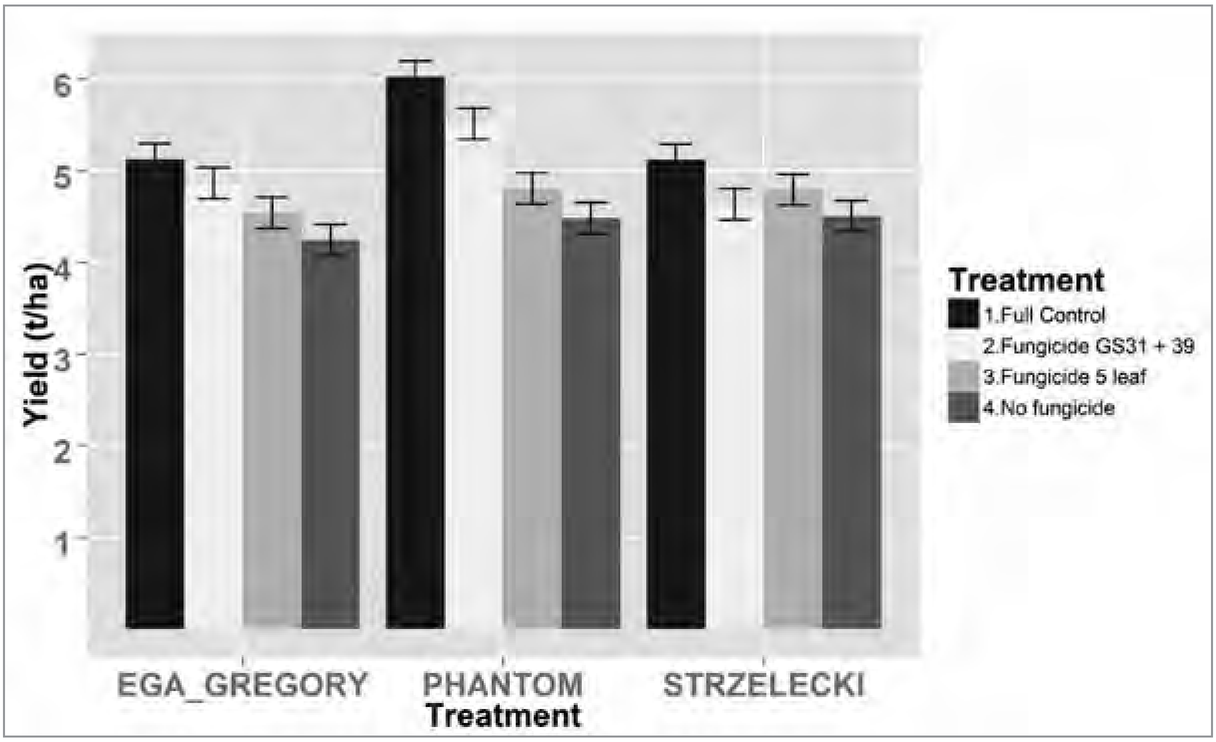

Figure 2. Yellow leaf spot yield experiment at Wagga Wagga, 2015. Where standard error bars do not overlap indicates a significant difference between treatments.

Summary

This experiment confirms the susceptibility of Phantom to YLS relative to EGA_Gregory and Strzelecki. High levels of disease can result in a significant yield loss in susceptible varieties such as Phantom. Variety selection needs more consideration in high YLS risk areas.

Low levels of disease can result in significant yield losses in higher yielding situations as was observed in the susceptible-rated variety EGA_Gregory. However, infection timing plays an important role in determining if there will be an effect on yield.

Complete control of YLS with fungicides was not achieved in the susceptible varieties, even with regular applications throughout the growing season.

Note: This is an industry summary provided pre-publication. Further information and analysis will be published in due course.

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