Yellow leaf spot epidemiology trial – southern NSW 2015

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Key findings

- Fungicide reduced disease levels in all varieties, but failed to eliminate disease completely.
- Observed differences in disease levels agreed with published variety resistance ratings.
- Early infection of yellow leaf spot (YLS) caused high yield losses in the more susceptible varieties.
- Variety selection will always play an important role in high risk areas.
- Crop rotation and best practice methods are required to maximise the benefits of correct variety selection.

Introduction

The aim of this experiment was to develop disease response curves indicating potential yield losses for a selection of varieties that represent various resistance categories for YLS.

Site details

Wagga Wagga was selected for the experiment as it represents the medium–high rainfall winter cropping regions of southern NSW. The site has an overhead irrigation system available to promote disease in trials. The experimental crop was sown on 15 May 2015.

Varieties

Five locally relevant varieties of similar maturity and with a range of YLS resistance ratings were used (Table 1). Varieties with adequate stripe rust resistance were selected to reduce confounding effects from this disease.

Treatments

YLS-infected stubble was collected locally and applied to disease plots on 19 May 2015 to simulate stubble retained from the previous year's crop. The treatments ranged from full control to high disease pressure (Table 2). All plots were sown with Jubilee® (flutriafol 250 g/L) treated fertiliser at 800 mL/ha for stripe rust control. Supplementary spray irrigations were applied to promote disease in the experiment. The timing and rate of these varied in response to seasonal factors between August and November to ensure a conducive disease environment.

Table 1. Yellow leaf spot (YLS) and stripe rust (Yr) ratings for varieties included in the YLS trial, 2015.

Variety	YLS rating #	YR rating #
Emu Rock[Φ]	Moderately resistant–moderately susceptible (MR–MS)	Moderately resistant–moderately susceptible (MR–MS)
Espada[Φ]	Moderately susceptible (MS)	Moderately resistant–moderately susceptible (MR–MS)
Lincoln[Φ]	Moderately susceptible–susceptible (MS–S)	Resistant–moderately resistant (R–MR)
EGA_Gregory[Φ]	Susceptible (S)	Moderately resistant (MR)
Phantom[Φ]	Susceptible–very susceptible (S–VS)	Moderately resistant (MR)

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

Table 2. Treatments applied in the experiment.

Treatment	Stubble and fungicide application
Full control #	Five applications of Bumper® (propiconazole 250 g/L) at 500 mL/ha (30 July, 19 August, 1 September, 1 October and 27 October)
High disease pressure	Infected stubble applied at 2.5 t/ha
Medium disease pressure	Infected stubble applied at 0.5 t/ha
Low disease pressure	Infected stubble applied at 0.1 t/ha
Very low disease pressure	Natural infection only (no stubble applied)
# Disclaimer: The full control treatments used in this experiment do not constitute a recommendation for grower practice. Growers must follow label guidelines to ensure minimum residue levels are not exceeded.	

Results

Disease severity

Disease development was expressed early in all varieties, with spores released from the stubble inoculum as soon as the seedlings emerged. With the ability to maintain an extended leaf wetness period throughout the day and the mild temperatures, conditions for disease development were ideal. Disease progression differed in the treatments for most of the growth cycle indicating the amount of infected stubble present in a paddock affects the epidemic development. This was more noticeable in the S–VS variety Phantom and the S variety EGA_Gregory (Figure 1).

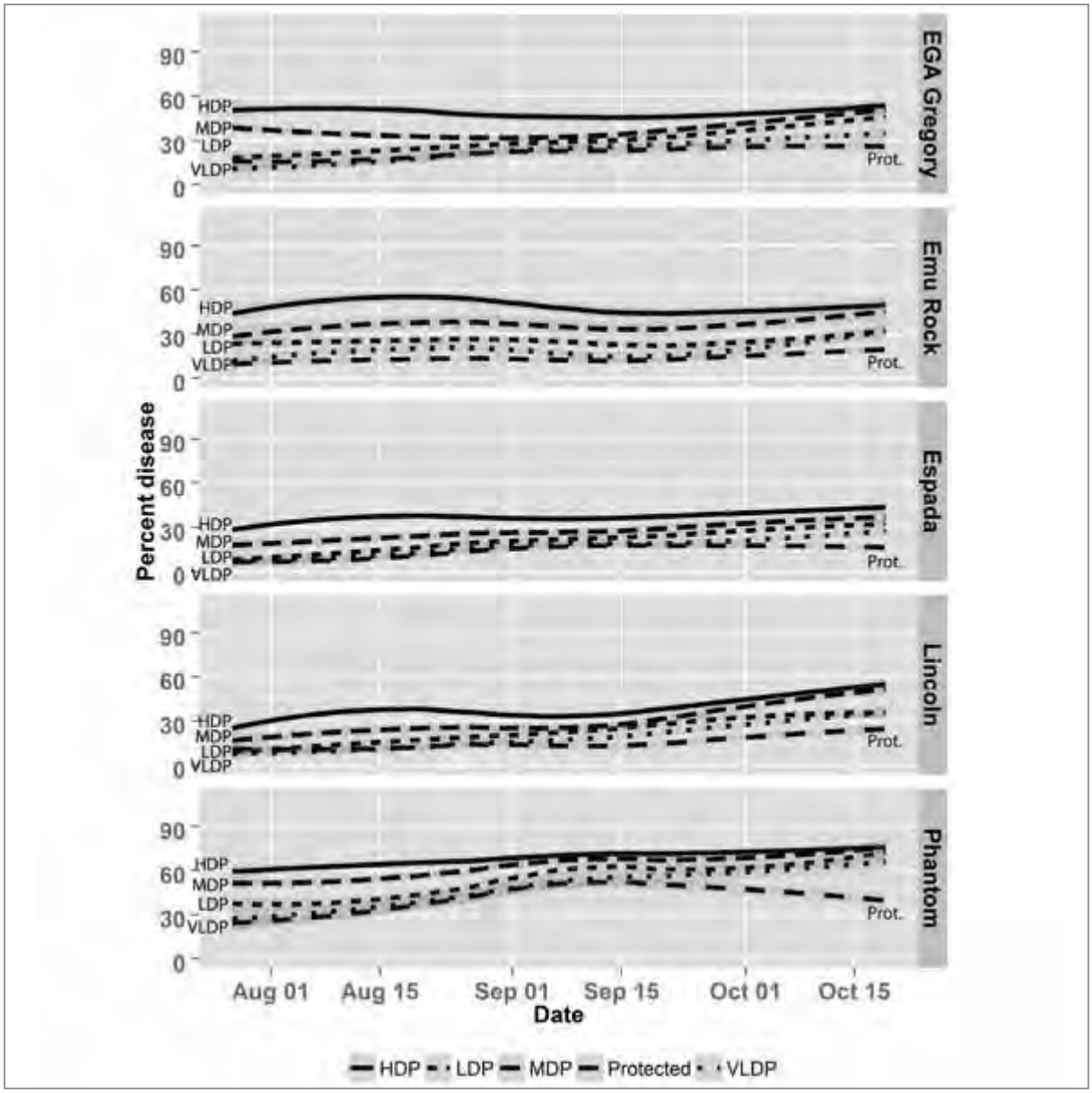

Figure 1. Disease progress in the YLS epidemiology trial at Wagga Wagga, 2015.

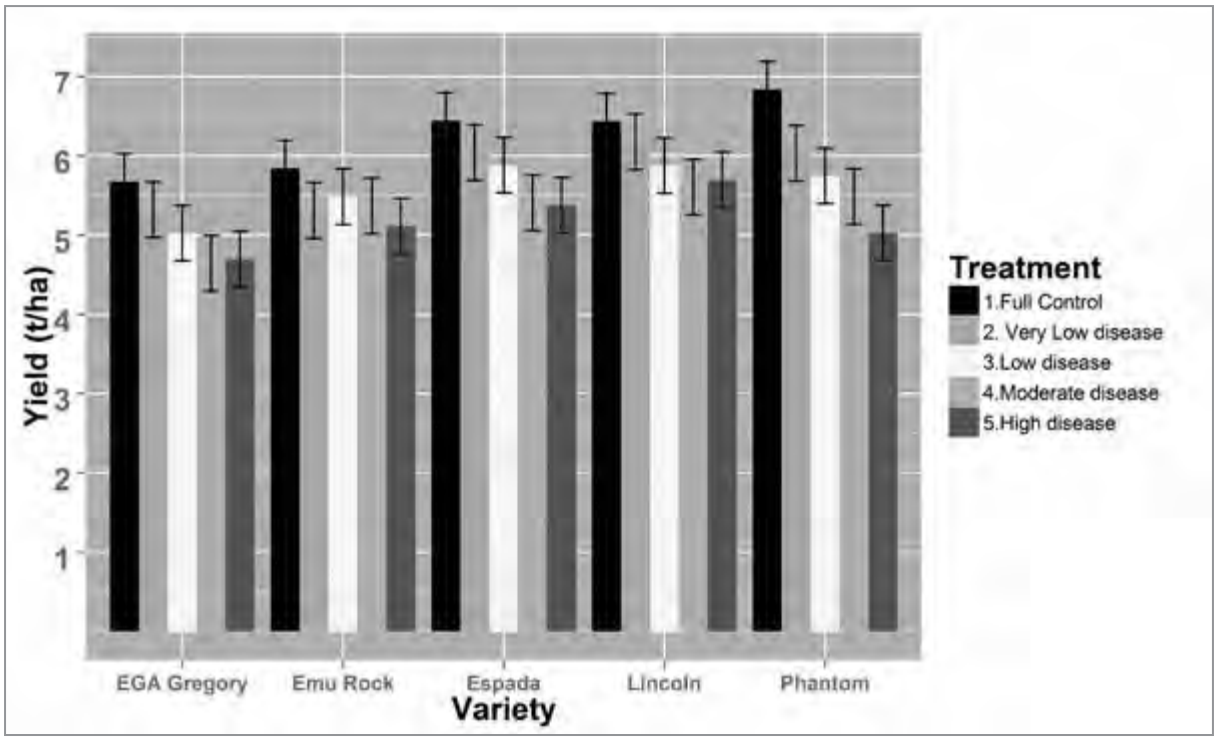

Figure 2. Yield of five varieties in the YLS epidemiology trial at Wagga Wagga, 2015. Standard error bars indicate a significant difference between treatments where they do not overlap.

The final expression of disease varied between 40%–75% on the S–VS variety Phantom. Although there was little difference between the plots that had no fungicide applied, the level of disease ranged from 60% to 75% of total leaf area diseased, with the more resistant varieties able to limit the amount of leaf area infected. The disease progress observed in this experiment shows no lag phase where the disease is low then progressively gets higher through the season. This could be due to the short life cycle of the YLS pathogen, *Pyrenophora tritici-ripentis*, which allows for rapid spore production and re-infection of newly emerged leaves.

Yield

The different rates of infected stubble applied to the plots affected yield, with the biggest differences in the S–VS variety Phantom (Figure 2).

Differences between treatments with no fungicide applied were not significant in the MR–MS variety Emu Rock, but total yield loss was still 13% compared with the full control treatment. Early YLS infection clearly had a larger impact on the S–VS variety Phantom (with a total yield loss of 26% and leaf necrosis up to 75%) and S variety EGA_Gregory (with a total yield loss of 18% and leaf necrosis up to 55%). The MS variety Espada had a total yield loss of 17%, which was higher than that of the MS–S variety Lincoln, which had a total yield loss of 13%.

Summary

These results confirm the susceptibility of Phantom and EGA_Gregory to early YLS infection. In high risk areas, disease resistance should be considered when selecting a suitable variety for your region confirmed by the MR–MS varieties that reduce yield losses under high disease pressure. Full control of YLS was not achieved by the fungicides used, but the infection rate was slowed and disease restricted to the lower canopy of the plant, achieving higher yields in the control plots.

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

Acknowledgements

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