Efficacy of different foliar fungicides to manage sclerotinia stem rot in canola

Dr Audrey Leo, Gerard O'Connor, Beverley Orchard and Dr Kurt Lindbeck (NSW DPI, Wagga Wagga)

Key findings

- Fungicides with different active ingredients had similar efficacy.
- Timing application was the most important factor in reducing sclerotinia stem rot development.
- Disease levels were reduced across all treatments, in particular at 30% bloom and the multiple applications at both 30% and 50% bloom stages.
- Yield increases were observed across all treatments, regardless of the fungicide's active ingredients.

Introduction

This study aimed to compare the efficacy of three different foliar fungicides in managing sclerotinia stem rot in canola. Applying foliar fungicides is the only foliar disease management strategy available for Sclerotinia. Currently there are a number of registered fungicides in Australia to manage the disease. These products contain active ingredients including iprodione, procymidone, and prothioconazole plus tebuconazole. The efficacy of fungicides in general depends on the active ingredient, application timing, fungicide rate and the environmental conditions.

Site details

The Sclerotinia fungicide evaluation experiment was conducted at the Wagga Wagga Agricultural Institute. This site represents the medium–high rainfall cropping region of southern NSW with intensive canola production and frequent Sclerotinia development. The experiment was sown on 6 May 2016 and relied on natural background inoculum to develop the disease. The above average spring rainfall was adequate to favour disease expression.

Treatments

Varieties

The conventional hybrid variety, Nuseed Diamond was used. Seed was treated with Jockey® and sown with Impact In-Furrow®-treated fertiliser.

Fungicide

Three currently registered fungicides were evaluated for their efficacy (Table 1). Each fungicide was applied at bloom stages 10%, 30% and 50%, and a treatment at both 30% and 50%. A nil treatment was included in the experiment as a control. The experiment was in a randomised block design with four replications.

Table 1. Fungicides and their active ingredients used in the experiment.

Fungicide	Active ingredients	Application rate*
Prosaro® 420 SC	125 g/L prothioconazole and 125 g/L tebuconazole	450 mL/ha
Rovral® Liquid	250 g/L iprodione	2 L/ha
Sumisclex® 500 SC	500 g/L procymidone	1 L/ha

* The commercially registered rate of application was used in this experiment.

Assessment

The guide to assess 10%, 30% and 50% bloom stages was adapted from the Canola Council of Canada bloom assessment guide (http://www.canolacouncil.org/canola-encyclopedia/diseases/sclerotinia-stem-rot/).

Sclerotinia was assessed at the end of the growing season by counting the number of infected plants at two central locations within each plot. Different types of infection were recorded: main stem (MS), lateral branch (LB) and basal (B). The total number of healthy and infected plants was recorded to calculate the percentage of plant infection. Grain yield was recorded from the experiment.

Results and discussion

The fungicide evaluation experiment showed that all fungicides tested were able to significantly reduce Sclerotinia development when compared with the nil treatment (Table 2). Different active ingredients were also shown to respond similarly when applied at a specific bloom stage. This indicated that no specific fungicide was consistently more effective in reducing the disease level. However, a significant reduction in disease was observed with respect to timing of fungicide application. A single application at the 30% bloom stage, as well as multiple applications at 30% and 50% bloom stages, reduced the disease level by an average of 25% and 30% respectively across all fungicides.

The results also showed that all fungicide treatments yielded significantly higher than the nil treatment (Table 2). Prosaro® was found to significantly improve canola yields when compared to Sumisclex® at 10%, 30% and 30% + 50% bloom stages. However, Prosaro did not significantly improve yield when compared to Rovral® at all bloom stages. Significant yield increase was apparent at all treatments across different bloom stages when compared to the nil treatment (Table 3).

Table 2. Effect of different fungicides on yield (t/ha) and Sclerotinia plant infection (%) at different bloom stages of canola.

Time of application	Fungicide	Yield (t/ha)	Infection (%)
10% bloom	Rovral®	2.49	17.62
	Sumisclex®	2.48	15.97
	Prosaro®	2.67	16.72
30% bloom	Rovral®	2.55	13.73
	Sumisclex®	2.54	11.09
	Prosaro®	2.73	8.63
30% + 50% bloom	Rovral®	2.68	6.03
	Sumisclex®	2.67	3.48
	Prosaro®	2.86	5.20
50% bloom	Rovral®	2.45	15.16
	Sumisclex®	2.44	19.30
	Prosaro®	2.62	27.83
Nil		2.30	35.85
l.s.d. ($P = 0.05$)		0.19	0.67

Table 3. Effect of fungicide applied at different bloom stages on yield (t/ha) of canola.

Time of application	Yield (t/ha)
10% bloom	2.56
30% bloom	2.62
50% bloom	2.52
30% + 50% bloom	2.75
l.s.d. ($P = 0.05$)	0.14

Summary

The fungicide evaluation experiment was conducted to examine the effectiveness of different active ingredients currently available to manage Sclerotinia in canola. Different fungicides had similar efficacy in controlling the disease. This indicated that a range of registered fungicides can be effective at reducing potential disease levels.

A fungicide products' efficacy depends on timing the application correctly. This was apparent in the experiment where fungicide applications at the 30% bloom stage and multiple applications at 30% and 50% bloom stages resulted in the best disease control, regardless of the fungicide used. If a single fungicide application is to be used to control Sclerotinia, early application at 30% bloom stage is the optimal time of application as it protects the main stem from early infection and the greatest yield loss potential.

In this study, the yield response was not consistent with the level of infection that developed across many of the treatments, except for the multiple-time application treatment. Fungicide performance depends on many factors such as background pathogen levels, crop growth stage and the environmental conditions that determine the disease pressure in the field. Therefore, results from this study are seasonal and site specific. Further assessment on fungicide efficacy is required to confirm yield benefits relative to different environmental conditions.

Acknowledgements

This study is part of the 'National Canola Pathology Project', UM0051, 2013–18, with joint investment by GRDC and NSW DPI.

The authors would like to thank Dr Sujeewa Rathnayake and Vincent West for technical support.