

Why Sclerotinia was so bad in 2013? Understanding the disease and management options

Ravjit Khangura, A. Van Burgel, M. Salam, M. Aberra, and WJ MacLeod, Department of Agriculture and Food, Western Australia

Key messages

- Sclerotinia stem rot in canola was widespread in most of the canola growing regions of Western Australia in 2013. Production losses from Sclerotinia are estimated at over \$59M in WA last year.
- Late applications of Prosaro @ 450ml/ha at or after 50% bloom were most effective in controlling the disease and improving the yield in canola in 2013.
- Variety maturity (flowering time) had no effect on Sclerotinia incidence in 2013.
- Trial data suggest that it may be possible to predict the outbreak of disease. This could aid in decision making with regards to timings of spray application of fungicide in 2014.

Aims

To optimise the timing of foliar fungicide application for the cost-effective management of Sclerotinia stem rot in canola and to investigate the non chemical means (flowering time) in managing Sclerotinia stem rot.

Method

Sclerotinia survey

A survey was undertaken across Western Australia for the incidence of Sclerotinia stem rot in 2013. A total of 55 samples were collected. In addition, Sclerotinia incidence was also measured in 31 samples collected from focus paddocks. In each sample, per cent plants with Sclerotinia were recorded.

Timing of fungicide application

A field trial was conducted at East Chapman to determine the optimum timing of application of foliar fungicide to manage Sclerotinia stem rot in canola. Variety Cobbler was sown in a paddock which had a history of severe Sclerotinia. Fungicide Prosaro[®] was applied either as a single application or two applications (450ml/ha each application) at various bloom stages as described in Table 1. Trial design was a randomised block with three replications. Sclerotinia assessments were made on 50 plants per plot two weeks before harvest, and disease incidence was calculated. All plots were harvested for yield. Data were analysed by REML (Residual maximum likelihood) using Genstat release 16.

Effect of flowering time on incidence of Sclerotinia

A second trial was conducted at East Chapman in the same paddock, to determine the influence of flowering time on the incidence of Sclerotinia stem rot. Four canola varieties (Telfer, Hyola 555TT, Hyola 559TT and Hyola 656TT) with a range of maturities were sown. Trial design was a randomised block design with three replications. Incidence of Sclerotinia was assessed for all treatment plots two weeks before harvest. All plots were harvested for yield. Data were analysed using Genstat release 16.

Results

Sclerotinia survey

Sclerotinia stem rot in canola was widely distributed both in the northern and southern canola growing regions including some crops in the eastern wheatbelt of Western Australia. The mean incidence across all samples was 29% and it ranged between 0-80%. Sclerotinia caused widespread damage in many crops. In worst affected crops yield losses ranged between 0.5-1t/ha. Sclerotinia caused an estimated loss of over \$59M to the WA canola industry in 2013.

Timing of fungicide application

Late fungicide application applied at, or after, 50% bloom significantly reduced the Sclerotinia stem rot incidence and significantly improved the seed yield compared to nil treatment (Table 1). The change in gross margin was highest (\$102/ha) with a single application of Prosaro[®] applied at 50% bloom (Table 1). Very early spray at 6-7 leaf stage (prior to commencement of flowering) did not significantly increase yield and gave a negative change in gross margin. The increase in seed yield ranged between 5 to 35% above the untreated control. The potential yield loss from Sclerotinia in this trial was 26%.

Effect of flowering time on the severity of Sclerotinia

Telfer was the earliest flowering variety in the trial and had the lowest disease severity expressed as per cent disease index (PDI). The late maturing variety Hyola 656TT did not differ significantly in disease index from intermediate flowering varieties (Figure 1). However, there is a relationship between later flowering and increasing disease index.

The yield loss in each variety due to Sclerotinia was not assessed, however, the seed yield was highest (1.47t/ha) in Hyola 559TT and lowest in Telfer (1.08 t/ha)

Table 1 Timing of application of Prosaro[®] (one or two applications) in managing Sclerotinia stem rot in canola

| Treatment | Incidence | Yield (kg/ha) | Gross Margin (\$) |
|----------------------------|-----------|---------------|-------------------|
| Nil | 48 | 980 | 0 |
| 6-7 leaf | 35 | 1029 | -13 |
| 10% bloom | 31 | 1138 | 41 |
| 30% bloom | 33 | 1091 | 17 |
| 50% bloom | 24 | 1260** | 102 |
| 1 wk after 50% | 17 | 1208** | 76 |
| 6-7 leaf + 10%* | 37 | 1196 | 32 |
| 10% + 50%* | 21 | 1324** | 96 |
| 50% + 3 wks* | 23 | 1263** | 65 |
| LSD ($P < 0.05$) for PDI | 10 | | |

* Prosaro was applied twice in these treatments.

** Yields of these treatments were significantly ($P < 0.05$) higher than Nil.

For calculating Gross Margins, canola price was assumed at \$500/t, cost of fungicide \$32/ha and cost of fungicide application \$6/ha.

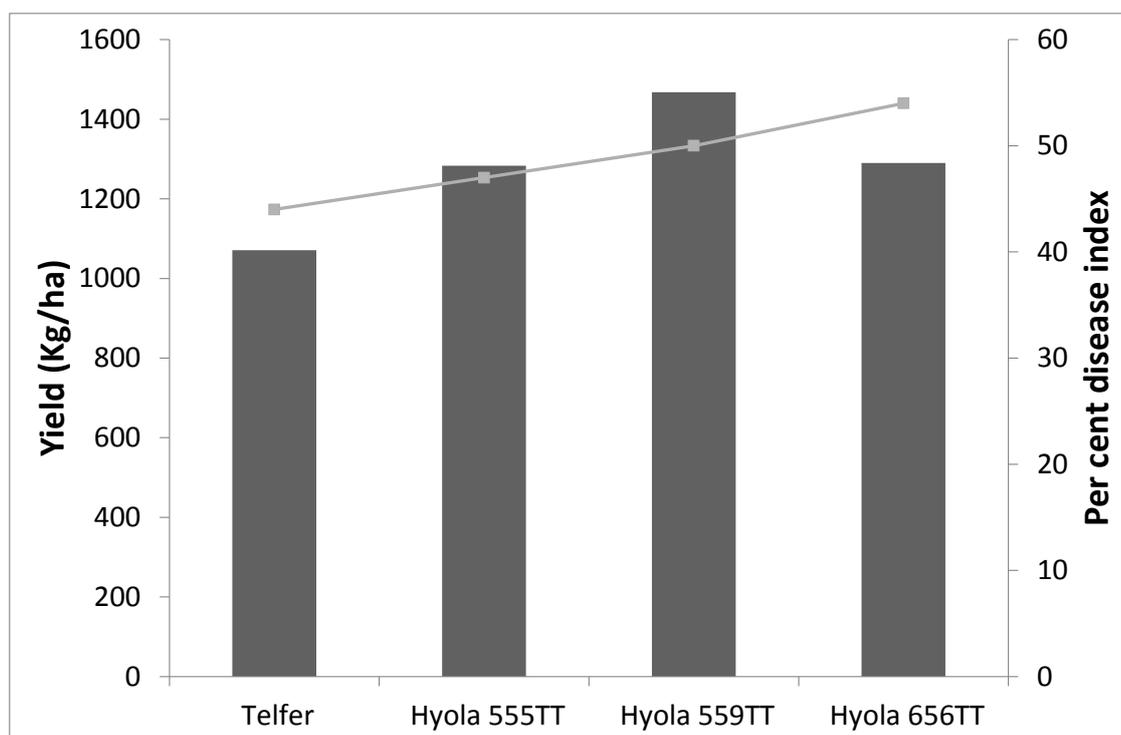


Figure 1 Effect of varieties with different maturities on per cent disease index (line) and yield (bars) of canola at East Chapman in 2013. LSD ($P < 0.05$) for per cent disease index is 7 and for yield is 186 kg/ha.

Conclusion

Why Sclerotinia was so bad in 2013?

High levels of Sclerotinia stem rot and its wide scale damage in 2013 was due to five main factors.

1. Substantial canola plantings over the last few years resulted in the build-up of inoculum
2. Tight canola rotations have also increased inoculum pressure.
3. Varietal susceptibility coupled with and extended flowering period.
4. Coincidence of flowering with spore release from the Sclerotinia pathogen.
5. Favourable environmental conditions for flower infection and subsequent stem infections.

In 2013, conditions favoured wide-spread epidemics and severe development of Sclerotinia stem rot in canola. Later (at or after 50% bloom) applications of foliar fungicide were effective and more economical than the early spray applications in managing Sclerotinia stem rot. This is possibly due to the later onset of spore release in 2013. Therefore, timing of fungicide application should coincide with the onset of spore release but also taking into account whether subsequent seasonal conditions will be conducive for disease development. Fungicide application is the only means for in-crop management of this disease. Late maturing varieties resulted in increased disease in the trial at East Chapman as the stages of flowering in these varieties coincided with the start of spore release. However, in a normal season with the early onset of disease late maturing varieties may escape serious infection.

Key words

Disease management, Sclerotinia stem rot, canola, fungicides,

Acknowledgments

We thank GRDC for funding this research, Jenny Garlinge, DAFWA for reviewing the paper and Geraldton Research Support Unit for managing the trials.

GRDC Project No.: DAW00229/UM00051

Paper reviewed by: Jenny Garlinge