

Monitoring Sclerotinia stem rot development in commercial canola crops in southern NSW

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Key findings

- » Sclerotinia stem rot is a very sporadic disease in southern NSW. Variations in the level of disease can occur between districts, between years and between paddocks.
- » The best indicators of a high Sclerotinia risk district are a high intensity of canola production, frequent development of Sclerotinia stem rot (e.g. every year) and reliable spring rainfall during flowering.
- » Results indicate that prolonged (at least 48 hours) durations of relative humidity above 95% can trigger Sclerotinia stem rot development.
- » A high level of petal infestation with Sclerotinia ascospores does not guarantee that stem rot will develop.

Introduction

In 2015 commercial canola crops in southern NSW were closely monitored to increase our knowledge of Sclerotinia stem rot epidemiology. Six commercial crops in districts where the disease is known to frequently occur were specifically chosen to identify the trigger points that lead to Sclerotinia stem rot outbreaks. This is the third season of this study.

The outcome of this work is to improve our understanding of the interaction between the pathogen life cycle, the host crop and environmental conditions with the view to developing a disease prediction model for industry to use.

Sites and monitoring

Six commercial canola crops were chosen and located in districts with a high Sclerotinia risk. These districts feature high yield potential with reliable spring rainfall, extended flowering periods for canola and a high frequency of canola in the district (meaning ample inoculum availability). The crops were located at Howlong, Alma Park (south-west of Henty), Morven (east of Culcairn) and two crops located east of Cootamundra.

Each crop had half hourly recordings of relative humidity (RH) and temperature using electronic data loggers located within the crop canopy. The nearest Bureau of Meteorology (BOM) weather station was used to access rainfall records. Weekly observations were taken within each crop from early stem elongation to maturity. These included scouting for apothecia development, sampling petals for levels

of ascospore infestation and counting the level of plant infection within the crop. The type of infection (leaf, lateral branch or main stem) was recorded.

Results

Of the six commercial crops monitored, all developed varying levels of Sclerotinia stem rot in spring (Table 1).

Table 1. Date of first observed stem lesion and highest level of stem infection recorded in six commercial canola crops in southern NSW

Site	Date of 1st stem lesion – 2015	Highest level of stem infection
Howlong	13 October	13.6%
Alma Park 1	14 September	21%
Alma Park 2	21 September	7%
Morven	14 September	3.6%
Cootamundra 1	07 October	10%
Cootamundra 2	14 October	3%

Apothecia were observed in all crops from the start of flowering. Petal testing showed high levels (over 90%) of petal infestation by Sclerotinia ascospores for virtually all of the flowering period until the first week of October (see report 'A petal survey for Sclerotinia in canola across NSW and northern Victoria').

Using a similar approach to previous years, RH, rainfall and temperature data were plotted against plant infection observations made during the growing season to identify infection events.

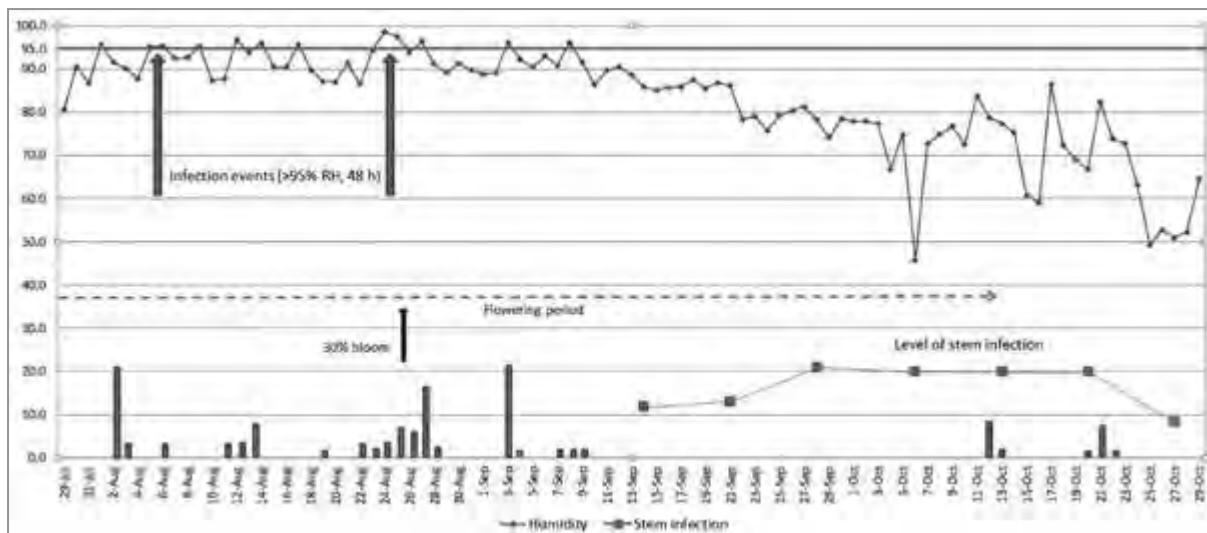


Figure 1. Relationship between relative humidity (diamond line) and level of Sclerotinia stem rot at Alma Park in 2015. The square line represents the level of main stem and branch infection from Sclerotinia stem rot. Flowering period is represented by the dashed line, with 30% bloom indicated. The solid line at the top represents 95% relative humidity (RH), it is assumed above this level there is free water within the crop canopy. Infection events (>95% RH, 48 h) are indicated by the two large arrows. Rainfall events (mm) are represented by the pale columns along the bottom line of the graph.

Figure 1 shows the typical Sclerotinia stem rot development pattern within a canola crop, which was observed at an Alma Park site in 2015. Infection events have been defined as durations of RH above 95% for 48 hours or more. When RH is above 95% it is likely that free water is present within the crop canopy and this time allows Sclerotinia ascospores to germinate and infect. These events occurred twice, 5–6 August and 24–26 August. The second infection event also occurred as the crop was reaching 30% bloom. At this point, significant numbers of petals are developing, but also senescing into the crop canopy, allowing infection to spread from petals onto canola stems. Hence, the first signs of stem rot symptoms were expressed about 14 days later on 14 September, which is typical. Dry conditions in September and October prevented the formation of a wet crop canopy and any further stem rot symptoms from developing.

Summary

Results from previous years validate the strong relationship between the duration of high RH (at least 95% for 48 hours), rainfall events, and stem rot symptom development. Petal testing in past years and in 2015 indicated that the presence of fungal inoculum (as viable ascospores) was not limiting in those crops monitored, with petal infestation levels above 90% for most of the flowering period. This implies that there was a high potential for Sclerotinia stem rot to develop in those crops. However, the presence of infested petals is only one part of the Sclerotinia equation, with the development of stem rot symptoms also reliant on favourable conditions within the crop canopy.

Results from this study are indicating that prolonged (48 hours) durations of high RH and rainfall during flowering (particularly after the 30% bloom stage) are the major influences in the Sclerotinia stem rot development in southern NSW. Symptom development relies on events to provide sufficient leaf wetness periods for ascospores to germinate and the infection of petals and leaves. The crop observations indicate that only one infection event is required to trigger significant levels of the disease to develop in the crop, with follow up rainfall events promoting further symptom development.

Results collated from the past three years of observations further reinforce the reputation of Sclerotinia stem rot as a sporadic disease, varying in incidence and severity between regions and years. Rainfall event at the critical crop development stage largely determines the severity of yield loss in any year.

Note: This is an industry summary provided pre-publication. Further information and analysis will be published at a later date.

Acknowledgements

This study is part of the 'National canola pathology project', UM0051, 2013–18; the 'National pathogen modelling project' DAW00228, 2013–18; and the 'Improving grower surveillance, management, epidemiology knowledge and tools to manage crop disease in southern NSW project', DAN00177, 2013–18. These projects are jointly funded by GRDC and NSW DPI.