

# Epidemiology and management of sclerotinia stem rot of canola in 2024

*Kurt Lindbeck<sup>1</sup>, Ian Menz<sup>1</sup>, Steve Marcroft<sup>2</sup>*

<sup>1</sup>NSW Department of Primary Industries, Wagga Wagga Agricultural Institute, Pine Gully Road, Wagga Wagga, NSW 2650

<sup>2</sup>Marcroft Grains Pathology, Grains Innovation Park, Horsham Vic 3400

## Key words

Sclerotinia stem rot, canola, foliar fungicides

## GRDC code

DPI2206-023RTX - Managing sclerotinia in oilseed and pulse crops in Northern and Southern farming systems

### Take home message

- Outbreaks of sclerotinia stem rot are sporadic and dependent on the growing season conditions. Saturated canopy conditions for more than 48 hours during flowering favour the development of disease epidemics
- Outbreaks of sclerotinia stem rot were restricted in spring of 2023 due to warm, dry conditions
- The sclerotinia outbreaks in 2022 will continue to have a legacy effect for following broadleaf crops as the sclerotia can survive in soil for many years
- The frequency of canola or lupin in a paddock is very important in determining the risk of a sclerotinia outbreak, as both crops are very good hosts for the disease and can quickly build up levels of soil borne sclerotia
- Foliar fungicides for management of the disease are best applied at 20 – 30% bloom (15–20 flowers off the main stem) for main stem protection.

### Where did sclerotinia stem rot develop in 2023

In contrast to the extraordinary rainfall conditions across central and southern NSW in spring 2022 that favoured the development of sclerotinia stem rot in canola, dry conditions in late winter and spring 2023 greatly restricted disease severity. Warm, dry growing conditions across central NSW did not favour moisture retention within the crop canopy that is necessary for the disease to develop. In southern NSW more frequent rainfall events and larger crops drove sclerotinia development, but disease progress was halted with hot temperatures in mid-late September. Surveys of commercial canola crops in central and southern NSW found the disease to be present in 42% of crops assessed, indicating the widespread presence of the pathogen across the region in 2023.

### How does the disease develop?

Sclerotinia stem rot is a complex disease with sporadic outbreaks due to the synchronisation and completion of various key development stages necessary for plant infection to occur. The pathogen responsible for this disease requires favourable weather conditions at every stage in its disease cycle. The stages of development include:

1. Softening and germination of soil borne sclerotia.
2. Apothecia development and release of ascospores.
3. Infection of petals by air-borne ascospores.
4. Senescence of infected petals in the presence of moisture and subsequent stem infection.

**Weather conditions during flowering play a major role in determining the development of the disease.** The presence of moisture during flowering and petal fall will determine if sclerotinia stem

rot develops. Dry conditions during this time can quickly prevent development of the disease, hence even if flower petals are infected, dry conditions during petal fall will prevent stem infection development. Temperature will determine how quickly infections develop, with infections by *Sclerotinia* capable of occurring between 5°C and 25°C.

#### What are the factors that drive the development of sclerotinia stem rot?

- **Frequency of sclerotinia outbreaks.** The past frequency of sclerotinia stem rot outbreaks in the district can be used as a guide to the likelihood of sclerotinia developing this season. Paddocks with a recent history (last 5 years) of sclerotinia outbreaks are an indicator of potential risk, as well as those paddocks that are adjacent. The frequency of canola and lupin in the paddock can also increase disease risk. Canola and lupin are very effective hosts for the disease and can quickly build up levels of soil-borne sclerotia.
- **Commencement of flowering.** The commencement of flowering can determine the severity of a sclerotinia outbreak. Spore release, petal infection and stem infection have a better chance of occurring when conditions are wet for extended periods, especially for more than 48 hours. **Canola crops which flower earlier in winter (late June – July) are more prone to disease development and exposure to multiple infection events.**
- **Spring rainfall.** Epidemics of sclerotinia stem rot occur in districts with reliable late winter and spring rainfall with long flowering periods for canola. These provide long periods of canopy wetness necessary for the disease to develop, at least 48 hours or more. Overnight dews generally won't trigger widespread epidemics of the disease.

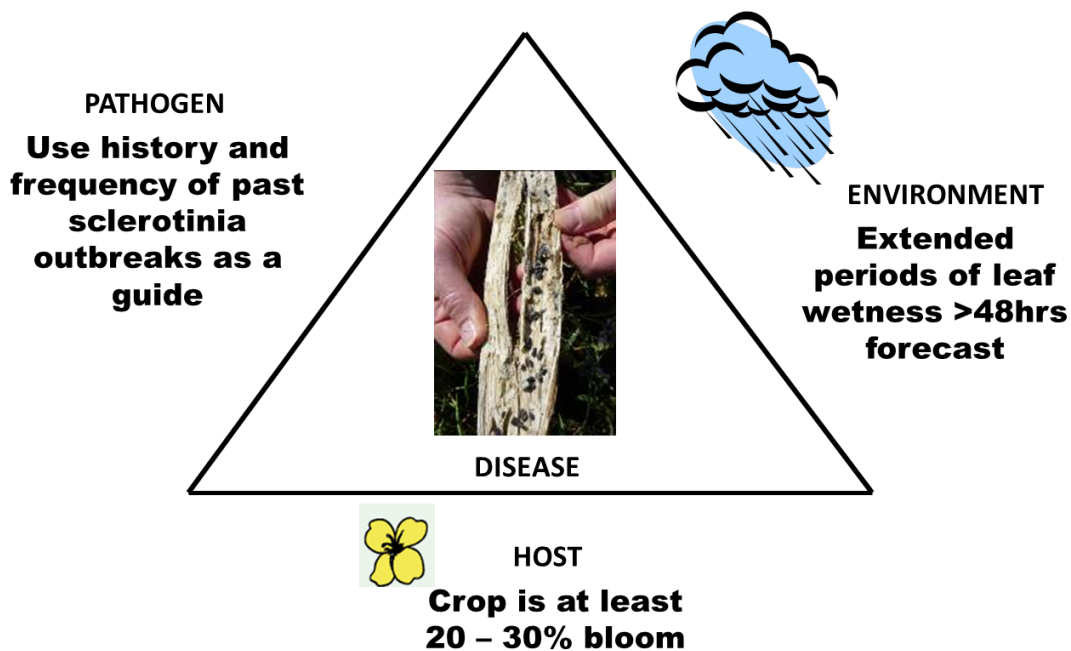


Figure 1. Factors that drive the development of sclerotinia stem rot

## **Pre-sowing sclerotinia management**

### ***Crop rotation***

- Rotate canola once in every 4 to 5 years to reduce build-up of sclerotia
- Incorporate lower-risk crops into the crop rotation e.g. cereals, field pea and faba bean
- Separate last year's canola stubble and new seasons' crops by at least 500m
- Ascospores of sclerotinia spread from 100m to 400m of apothecia (fruiting structures).

### ***Clean seed***

- Always use seed free of sclerotia where possible
- Grade retained seed for sowing to remove sclerotia if in doubt
- Grain receival standards allow a maximum of 0.5 per cent sclerotes in the sample.

### ***Variety selection***

- There are no Australian canola varieties with known resistance to sclerotinia. Some differences may be observed in the level of stem rot in some seasons. This is likely to be related to the variety maturity, and timing of flowering with infection events.
- Early maturing varieties sown early can be prone to developing stem infection due to the earlier commencement of flowering when conditions are more likely to be wet for prolonged periods

### ***Crop management***

- Always follow the recommended sowing time and seeding rate for your region
- Once flowering starts, the crop becomes susceptible to infection and prolonged exposure to infected senescent petals means greater chance of stem infection
- Bulky crop canopies can retain more moisture and are conducive for the development of stem infections
- Wider row spacing or reduced seeding rates can increase air-flow through the canopy, reducing moisture retention and potential for infection.

### ***Burning***

- Burning stubbles and windrows will kill some sclerotia, but will not significantly reduce the risk of disease.

*Use SclerotiniaCM app (see useful resources) to determine the most appropriate management strategies for your district and/or cropping system.*

## **In-crop sclerotinia management – fungicides**

- Use foliar fungicides to prevent early stem infection via infected petals.
- Always use fungicide products that are currently registered in your state
- Timing of foliar fungicide application is more important than choice of fungicide product in reducing potential levels of stem infection
- Foliar fungicide application is most effective before an infection event
- Application of foliar fungicide at 20–30% bloom stage is most effective in reducing main stem infection. Yield loss can be significantly reduced by protecting early petals from infection, and the penetration of fungicide into the crop canopy to protect potential infection sites where petals lodge.

- Multiple foliar fungicide applications may be needed in high disease risk districts to protect high yield potential. Applications at both 10–20% and 50% bloom provide critical early and follow up protection from multiple infection events.
- Fungicide applications made during full bloom will have limited penetration into the crop canopy and will not protect main stems from infection.
- Use high water rates (at least 100 litres per hectare) to achieve adequate coverage and penetration into the crop canopy
- Be aware of the protection period provided by the foliar fungicide being applied. The current effective protection period offered by registered products ranges from 2 to 5 weeks. The protection provided may wear off during the critical infection period or where crops have an extended flowering period. A single fungicide application early may not be effective at preventing late infections.
- Foliar fungicides will have no effect on managing basal infections, as this occurs below the soil surface and beyond the activity of foliar fungicides. Foliar fungicides do not travel down the vascular tissue in plants.

### **Always**

- Determine disease risk as your crop enters the flowering period
- Assess bloom stage, seasonal conditions, and weather forecasts to identify the potential risk periods to your crop
- Identify how many consecutive wet days are forecast as the crop commences flowering and for the week ahead; especially consecutive wet days of 48 hours or more
- Monitor crops for disease development and identify the types of infection. Basal and main stem infections cause the most yield loss.

### **Useful resources**

NSW DPI Winter Crop Variety Sowing Guide (Disease updates, fungicide products).

<https://www.dpi.nsw.gov.au/agriculture/broadacre-crops/guides/publications/nsw-winter-crop-variety-sowing-guide-2023>

SclerotiniaCM App for iPad and android tablets. Available from <https://grdc.com.au/resources-and-publications/apps>

### **Acknowledgements**

The authors wish to thank NSW DPI and GRDC for co-investment into this research.

### **Contact details**

Kurt Lindbeck (Senior Pulse and Oilseed Pathologist)

NSW Department of Primary Industries, Wagga Wagga Agricultural Institute

02 69 381 608

email: [kurt.lindbeck@dpi.nsw.gov.au](mailto:kurt.lindbeck@dpi.nsw.gov.au)

### **Date published**

February 2024