



Sclerotinia stem rot: a decreasing biosecurity risk under a changing climate

NSW will likely become less suitable for Sclerotinia stem rot under a changing climate. This may allow the canola industry to reduce fungicide use and the impact on production.

Developing industry-informed climate planning information

Climate change is altering the biosecurity risks for many agricultural commodities across NSW. Primary producers need evidence-based information about the changing climate, and the risks and opportunities it may bring.

Through its Vulnerability Assessment Project, the NSW Department of Primary Industries is increasing the resilience of our primary industries by providing information and data to help the sector better plan for, and respond to, climate change. The project has determined climate change impacts for extensive livestock, broadacre cropping, marine fisheries, forestry, horticulture and viticulture, and important cross-cutting biosecurity risks to inform sound planning, risk management and adaptation decisions.



Sclerotinia stem rot in NSW

Sclerotinia sclerotiorum is one of the most non-specific and successful plant pathogens with a host range of over 400 plant species. Stem rot is one of the most serious diseases of broadleaf crops such as canola, chickpea and lupin in Australia, causing high yield losses (up to 24%) when conditions for the disease are favourable. Outbreaks of stem rot are difficult to predict, as the potential for infection is related to combinations of climatic variables including rainfall, humidity, and temperature, as well as previous outbreaks and crop rotations.

In a survey conducted in NSW in 2020, Sclerotinia diseases were found to be widespread in broadleaf crops and pulses, due to a combination of good crop growth and ideal conditions for the disease. Crops susceptible to Sclerotinia stem rot are grown across inland NSW (Figure 1). An important example in NSW is canola. Canola production is on the rise, with Australian canola globally sought-after for use as food-grade oil, in biofuel production and for stock feed. Canola is grown in all areas of the NSW cropping zone with production encompassing central and southern NSW.

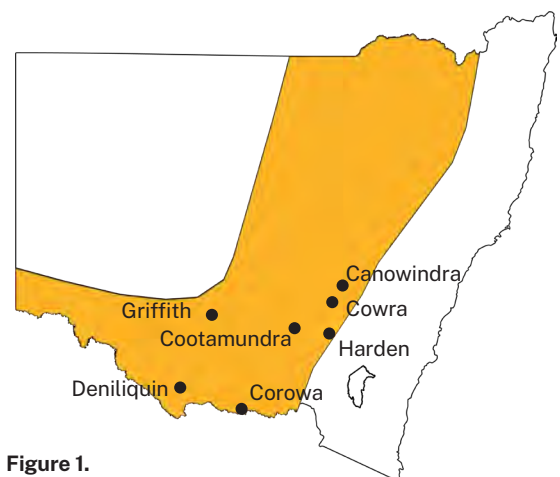


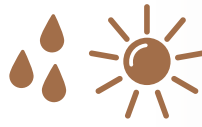
Figure 1.

Cropping region where crops which are susceptible to Sclerotinia stem rot are grown in NSW (yellow). Locations indicate sites where sclerotinia is known to occur in NSW.

Climate and Sclerotinia stem rot

Overall, the likely impacts of Sclerotinia stem rot by 2050 under a changing climate in NSW are projected to slightly decrease throughout the year. Changes in climate suitability are likely to occur across all the stages of the Sclerotinia stem rot life cycle.

Climate risks likely to change the occurrence and distribution of Sclerotinia stem rot include:



Warmer temperatures and changing rainfall will likely decrease the duration of favourable conditions for disease development and thus reducing the Sclerotinia stem rot impact on production.

Climate impacts: what to expect

Parasitic stage I Infection and germination

- **Decreased climate suitability** in the cropping region in January and from May to November (*low to high confidence*).
- **Maintained historical climate suitability** in the cropping region from February to April and in December (*low to high confidence*).

Parasitic stage II Stem infection

- **Decreased climate suitability** in the cropping region from June to November (*low to high confidence*).
- **Maintained historical climate suitability** in the cropping region from December to May (*low to high confidence*).

Dormant Stage

- **Decreased climate suitability** in the cropping region in January and from March to November (*low to high confidence*).
- **Increased climate suitability** in the cropping region in February (*low to high confidence*).
- **Maintained historical climate suitability** in the cropping region in December (*low to high confidence*).

Impact on key NSW primary industries

Overall, changes to climate suitability for Sclerotinia stem rot by 2050 are likely to have minimal impacts on NSW's key canola production regions. Decreases in climate suitability during August may allow the canola industry to reduce fungicide treatment during this period. A minimal reduction in climate suitability may occur in some areas, potentially reducing the duration of favourable conditions for disease development and thus reducing the disease's impact on production. A reduction in disease management and production costs may result. Current strategies to manage the disease are likely to remain effective.

Methodology and data

Climate projections were sourced from Climate Change in Australia's 'Application Ready Data'. This dataset is comprised of projections from an ensemble of 8 global climate models, each presenting a plausible future climate. The models differ in their projections, giving rise to uncertainty in our modelling. Low confidence in the projected changes due to differences between the models is noted in the text. Care should be taken when interpreting these results.

The Vulnerability Assessment Project is intended to highlight potential industry- or regional-level changes. Intermediate and high emissions scenarios were used in the assessments (RCP4.5 and RCP8.5), but these are not the only future scenarios possible. The inclusion of climate variables important to each biosecurity risk was based on published research, expert knowledge and data quality and availability.

FOR MORE INFORMATION

Please get in touch with vulnerability.assessment@dpi.nsw.gov.au

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