Smart Ag Research

Sclerotinia Disease Data Collection for Multiple Biomass Zones Utilizing METOS Canada Weather Stations in Canola: 2021 Summary

This project includes collecting data with multiple Pessl METOS in-field weather stations for sclerotinia disease prediction modelling in canola. In-field weather stations with accurate disease risk utilities have the potential to assist producers in making informed spray decisions for sclerotinia.

Objectives

- Compilation of sensor data for each installed Pessl METOS device.

- Ground truthed information from each zone, including disease severity ratings and petal test sample results.

Introduction

OCCI collaborated with METOS Canada to collect data relevant to sclerotinia in canola using multiple Pessl METOS in-field weather and crop monitoring technologies.

Canola is an important crop in Canadian agriculture and sclerotinia is one of the major diseases in canola with losses ranging from 5% to 100% for individual fields. The decision to apply fungicide is based on the presence and severity of the disease, and is influenced by numerous factors including plant density, humidity, and current/forecasted weather.

Study Details

- Data was collected in three different levels of biomass zones in a canola field on the Smart Farm; zones chosen from biomass predictions using NDVI satellite imagery.

- Three identical sets of Pessl METOS devices were installed within the canola crop boundary (ECO D3 with 60 cm soil probe and CropView Dual Camera). One permanent weather station was installed three meters outside of the field (ECO D3 with 90 cm Sentek soil probe) which measured leaf wetness, air temperature, relative humidity, wind speed/direction, and rainfall as well as soil moisture, salinity and temperature.

- The setup enabled the collection of relevant weather and crop condition data specific to sclerotia development and infection.

- The FieldClimate platform was used to regularly monitor incoming data and photos from the equipment to ensure they were accurate and functioning properly.

- The crop was continually monitored; the research team also scouted the field twice per week during flowering. They collected data relevant to sclerotinia development and a set of canola petal tests from each of the three sites which were sent to the lab for analysis.

- To measure pre-harvest disease infection levels, sites were analyzed for signs of disease following the Canadian Canola Council for sclerotinia infection level rating protocol.

Results

- Growing conditions (below average annual precipitation, above average growing season temperatures, extended interval of canola in crop rotation and low biomass production) were not conducive to disease development; level of disease infection was identified as very-low to low based on petal testing and pre-harvest disease assessments.

- Petal tests showed disease incidence which averaged 3.3% infection on the petals.

- A pre-harvest disease assessment indicated a field average of 2.1% infection.

- Recommendations for project set-up and protocols were made to improve the accuracy of data collected and reduce plant damage for future growing seasons.

Future Research

In 2022, OCCI will be working with METOS Canada to collect sensor data and observational field information for the further development of their predictive yield modelling in wheat. This same set of installed sensors will also be used in the 2022 Pan Canadian Smart Farm Network project to assess if a single weather station placed at the edge-of-field effectively captures in-field variability of micro-climate conditions.