

Epidemiology of chocolate spot on faba bean

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$121,296.25	Completed	May 2017 – March 2021	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF); Alberta Pulse Growers Commission; Western Grains Research Foundation	\$515,571.25

Project Description

To assess incidence and severity of chocolate spot and other foliar diseases on faba bean in Saskatchewan and Alberta; to determine conditions leading to Botrytis spore release and infection in the field; to evaluate conditions for chocolate spot disease development in controlled studies.

Outcome

Surveys for foliar diseases of commercial faba bean fields in Saskatchewan and Alberta were completed in 2017, 2018, and 2019. All faba bean crops surveyed had foliar lesions in all years, but disease severity was low across all fields. Botrytis species that cause chocolate spot were commonly present but inflict higher disease severity in wet years. Furthermore, Stemphylium blight was common, sometimes more so than chocolate spot, and its etiology and impact on yield need further study. Information on chocolate spot risk periods and weather factors leading to inoculum release under prairie conditions is lacking. Therefore, spore trapping in field trials was conducted in 2017, 2018, and 2019 at three locations in Saskatchewan to determine the duration of inoculum discharge and infectious periods under field conditions by using 3-week old faba bean plants as trap plants. Results indicated that infectious periods varied greatly by location and year, and that multiple infectious periods can occur within a growing season. Only in 2017 did disease severity increase later in the season. Data analysis showed that temperature and dew point temperature significantly affected disease development and progression. High temperatures were consistently negatively correlated with disease severity while all other factors were positively correlated to disease severity, indicating that cooler temperatures and wetter environments contribute to infectious periods. However, threshold levels or specific ranges of weather variables could not be directly calculated to predict infectious periods based on correlations to disease severity, as there was too much variability in the patterns from year to year. Experiments were also performed to determine the optimum inoculum concentration, temperature and leaf wetness durations necessary for the disease development. The results from the experiments confirmed findings from the field trapping experiments, as disease was highest at cooler night time temperatures of 10–15°C, and exposure to dew point temperature of 5°C for 3 hours. Minimum inoculum concentration required to cause disease was 103 conidia/ml but maximum disease occurred at inoculum concentrations greater than 105 conidia/ml. In conclusion, because inoculum was present throughout the growing season, it did not appear to be closely correlated to any specific weather patterns. This means that disease development, or progression of an infection to disease symptoms, is more heavily dependent on environmental conditions, and particularly cool night-time temperatures and dew periods. These environmental conditions should be considered as risk factors for chocolate spot development and fungicide timing, since inoculum is always present.

Research Objective

OBJECTIVE 1

To assess incidence and severity of chocolate spot and other foliar diseases on faba bean in Saskatchewan and Alberta.

OBJECTIVE 2

To determine conditions leading to Botrytis spore release and infection in the field.

OBJECTIVE 3

To evaluate conditions for chocolate spot disease development in controlled studies.