

Yield loss study of Stemphylium blight on lentil

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$105,387.00	Completed	January 2011 – February 2016	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF)	\$197,029.00

Project Description

To develop a protocol for the mass production of spores (conidia) of *Stemphylium botryosum* for the purpose of controlled inoculations; to conduct replicated field experiments to determine yield loss through stemphylium blight; to evaluate and optimize the use of tunnels and spore inoculation for resistance screening of lentil germplasm to stemphylium blight.

This project was initiated with the objectives to develop a protocol for mass production of spores (conidia) of *Stemphylium botryosum* for the purpose of field inoculations, and using this protocol to then conduct replicated field experiments to determine yield loss through stemphylium blight, and to evaluate and optimize the use of tunnels and spore inoculation for resistance screening of lentil germplasm to stemphylium blight. A semi-solid state fermentation protocol for mass production of spores was successfully developed, where large baking trays filled with a solid growth medium are inoculated with a fungal spore suspension, and incubated in continuous light at 25°C for 20 days to allow for growth and sporulation. Upon drying, spores are scraped off with a sterile brush, collected in a glass container, dried at 35°C for 24 hours and stored at room temperature. They can be stored for several months without loss of viability.

Outcome

Yield loss experiments indicated that infection at the seedling stage, and possibly at early-to-mid-flower can affect seed quality, primarily in terms of seed staining, seed infection with the pathogen, and to a certain degree seed thickness. Therefore, early scouting should also include stemphylium blight. Considering the relatively high levels of seed infection it may be necessary to develop thresholds for stemphylium blight as are already in place for ascochyta blight in lentil. Although the use of inoculum and low tunnels overall worked well, experiments were confounded to a certain degree by natural inoculum, so future experiments may require the use of tunnels and fungicide applications in control plots. Assessments of low tunnels and spore inoculations for screening of breeding materials were overall positive and a wide range of disease was observed. For even stemphylium blight development a minimum plot size still needs to be determined as single-row plots were too small.

Research Objective

OBJECTIVE 1

To develop a protocol for the mass production of spores (conidia) of *Stemphylium botryosum* for the purpose of controlled inoculations.

OBJECTIVE 2

To conduct replicated field experiments to determine yield loss through stemphylium blight.

OBJECTIVE 3

To evaluate and optimize the use of tunnels and spore inoculation for resistance screening of lentil germplasm to stemphylium blight.