

## Infectivity model for *Aphanomyces euteiches* in Saskatchewan soils

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Total Project Cost
\$290,000.00	Completed	April 2015 – March 2018	\$290,000.00

### Project Description

To develop an infectivity model between *A. euteiches* DNA quantity in soil and disease severity in the field; to determine spatial distribution of *A. euteiches* in vertical and horizontal soil profiles, and in different soil zones.

### Outcome

*Aphanomyces* root rot was recently detected in pea fields in Alberta and Saskatchewan, and has become a serious threat to sustainable pea and lentil production in the Prairies. *Aphanomyces euteiches* survives in soil as resilient thick-walled oospores, which are produced in decaying root tissues after infection. The threshold level for disease in raw soils was 50-100 oospores/g soil in all soil types, and severe root rot was observed at above 500 oospores/g soil. Dark brown soils were the most conducive to disease development. The presence of other soilborne microorganisms, such as *Fusarium* species, increases disease risk. The limit of detection needs improvement so that fields with oospore levels below 100 oospores/g soil do not return false negatives. Disease levels were highest in the top 0-20 cm layer, and decreased with increasing depth. However, horizontal distribution of *A. euteiches* varied between fields, with some fields showing uniform distribution throughout the 11 sampling sites, and other fields showing a patchy distribution between sites. Our results suggest that assessment of field history and landscape is sufficient to identify sites with *A. euteiches* inoculum for soil sampling, and that a specific sampling pattern is not required. Further refinement of DNA extraction protocols from different soil types to improve the oospore detection limit is needed to develop a decision support system.

### Research Objective

#### OBJECTIVE 1

To develop an infectivity model between *A. euteiches* DNA quantity in soil and disease severity in the field.

#### OBJECTIVE 2

To determine spatial distribution of *A. euteiches* in vertical and horizontal soil profiles, and in different soil zones.