UNIVERSITY OF SASKATCHEWAN

College of Agriculture and Bioresources

Evaluation of pea (*Pisum sativum* L.) rhizosphere bacteria as bioinoculants for the control of Aphanomyces root rot

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Introduction

Aphanomyces root rot is an emerging problem that could significantly affect the sustainability of field pea production in Western Canada[1]. Currently, disease avoidance and crop rotation practices are the recommended control measures. Therefore, the search for other effective control measures is needed. One such alternative is the development of a biological control method[2] that disrupts the pathogen life cycle (Fig. 1).

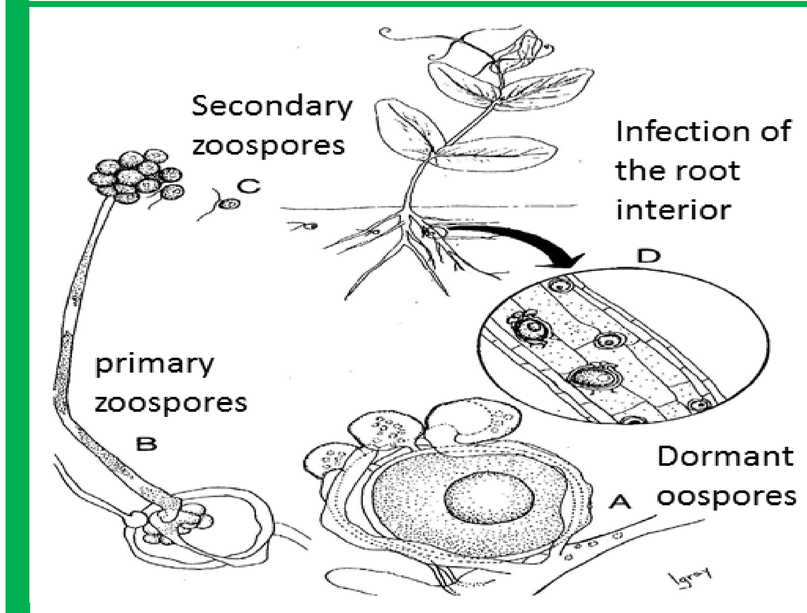

Fig.1. *Aphanomyces euteiches* life cycle[3].

Objective

To investigate the biological control potential of rhizosphere bacteria for biological control of *Aphanomyces euteiches* under Saskatchewan field conditions.

Materials and Methods

A pure culture of *Aphanomyces euteiches* was obtained from Plant Science-Crop Development Centre, University of Saskatchewan. Pea rhizosphere bacteria were obtained from pure culture collection previously isolated from Saskatchewan soils.

Aphanomyces euteiches mycelial growth inhibition assay

Rhizosphere bacterial strains are inoculated 1.5 cm from at two opposite edges on potato dextrose agar (PDA) plate (Fig. 2). A plug with *Aphanomyces euteiches* (5 mm diameter) taken from a 3 d PDA culture was placed at the center of the plate.
The assay plates were incubated for one week at 23^{O}C under dark conditions. The plates were examined for the presence of inhibition zones (Fig.2).

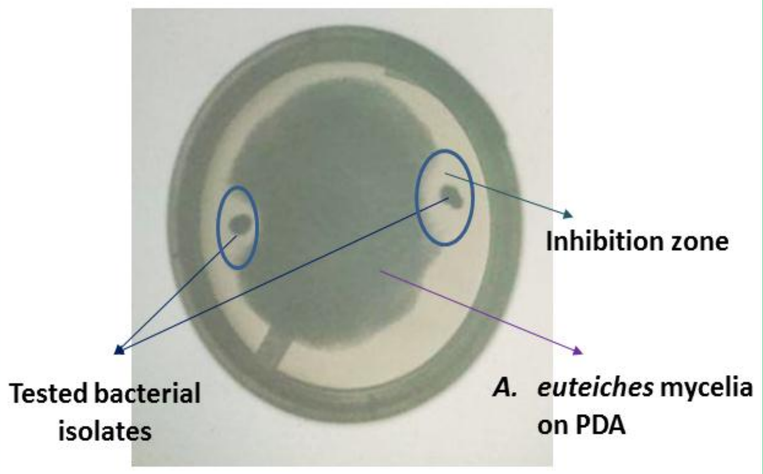

Fig.2. *Aphanomyces euteiches* mycelial growth inhibition assay.

Aphanomyces euteiches zoospore germination inhibition assay

Aphanomyces euteiches mycelia from a (Corn Meal Agar + Yeast Extract + Phosphate Buffer) CYP agar was transferred with wheat leaves into a flask containing distilled water, in which *Aphanomyces euteiches* zoospores are produced (Fig. 3).
This research is on progress and future studies will use these antagonistic bacteria to test for zoospore germination inhibition potential.

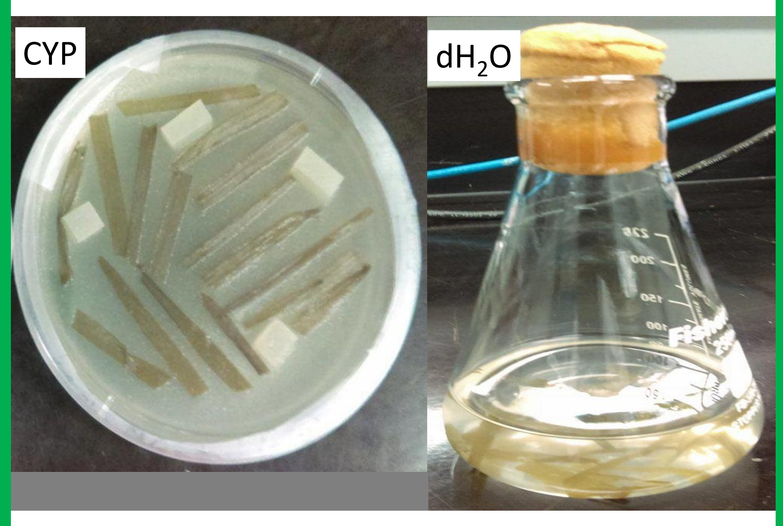

Fig.3. *Aphanomyces euteiches* zoospore production.

Potential bacterial isolates inhibiting both mycelia growth and zoospore germination will be used as soil inoculants in pot experiments.
The central idea of this approach is that Aphanomyces root rot disease may be controlled or reduced by interrupting the lifecycle of the pathogen (Fig. 1).

Results

- Screening of over 150 rhizosphere bacteria identified 15 that inhibited *Aphanomyces euteiches* mycelial growth on lab media.
- Variations in the inhibition zone were noted among the promising antagonistic bacteria (Fig.4).

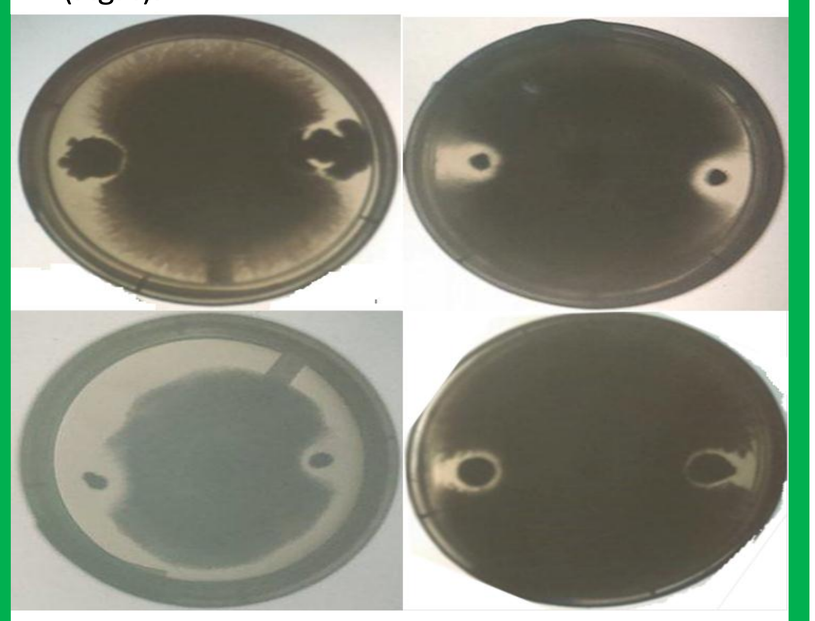

Fig.4. Variation in inhibition zone.

Discussion and Conclusions

- The identification of *Aphanomyces euteiches* mycelial growth inhibitor bacteria is an indication that the pathogen lifecycle can be interrupted.
- As a result, the mycelogenic mode of disease (i.e., disease due to mycelia growth) causing potential of the pathogen can be challenged.
- Varying inhibition zone sizes indicates differences in antagonistic potential among the promising bacteria.
- Preliminary results of this study have indicated the potential promises for the biological control of *Aphanomyces euteiches* using rhizosphere bacteria as bioinoculants.

References

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Acknowledgements

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