Polymer seed film coating mixed with micronized natural minerals as a management tool against Aphanomyces root rot in field pea

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INTRODUCTION

- Canada is the second major producer and the primary exporter of field pea in the world.
- Field pea is susceptible to various root diseases such as *Pythium spp*, *Rhizoctonia spp*, *Fusarium spp* and *Aphanomyces euteiches* which occur together in nature in the Pea Root Rot Complex.

Characteristics of Aphanomyces euteiches

- It is a soil-borne oomycete pathogen.
- It was identified in Saskatchewan and Alberta in 2012 and 2013 respectively.
- It produces resting spores called oospore that can persist in soil longer than 10 years.
- Under favorable conditions, it can cause yield loss up to 70%.
- The infected roots show water soaked, honey brown, or caramel-colored appearance.

Integrated Disease Management

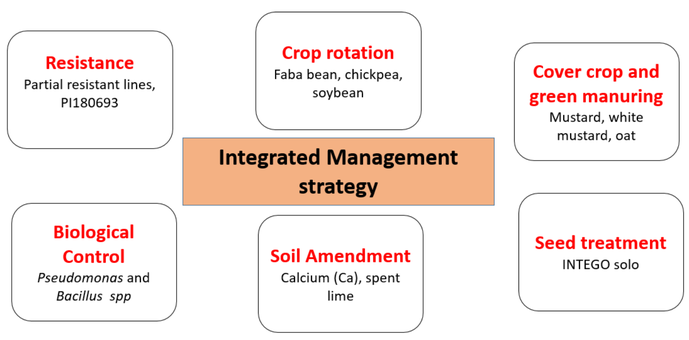

Figure 1: Integrated disease management strategies for *Aphanomyces euteiches.*

Zeolite and chitosan - the need for more tools!!!

- Zeolite is a natural mineral that has broad antifungal and antibacterial properties.
- Chitosan is a natural polymer with antifungal properties.

Research questions

- ✓ Can zeolite-based seed coatings mixed with polymer chitosan used as a management tool against Aphanomyces root rot**?**

OBJECTIVE

To screen the different types of zeolite-based seed coatings as a management tool against Aphanomyces root rot.

METHODOLOGY

- Seed material: CDC Lewachko, Isolates: Ae13
- Growth chamber experiment: conducted in completely randomized design with around 67 types of zeolite seed coatings and control replicated 5 times.
- The process is to be repeated for coatings showing promise (see **Figure 2**).

METHODOLOGY (continues)

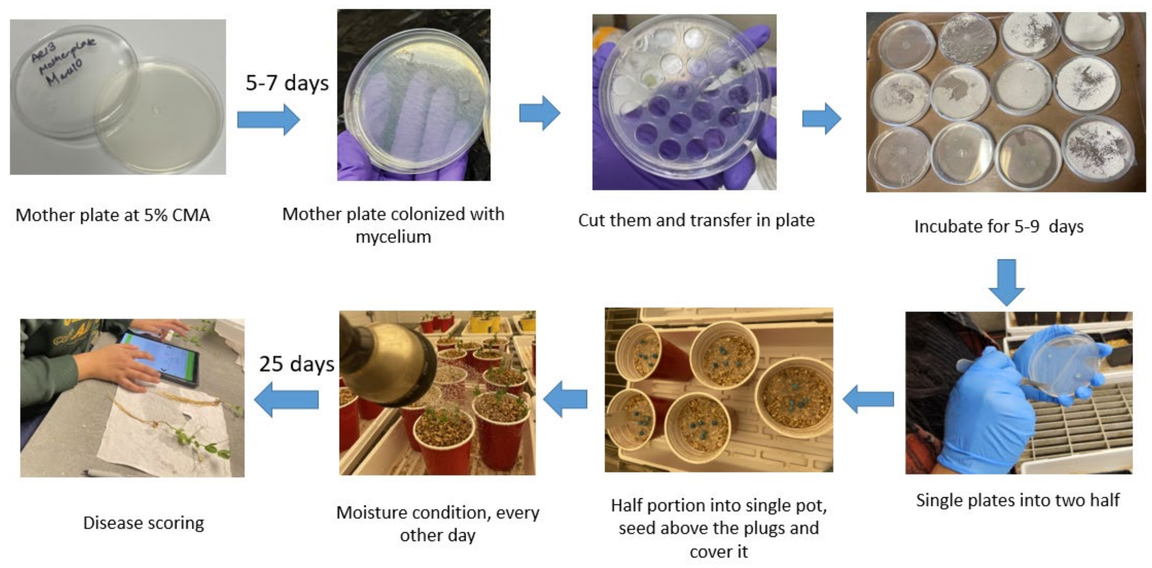

Figure 2: Flowchart of Ahanomyces infection

Figure 3: Disease Scoring Scale

PRELIMINARY RESULTS

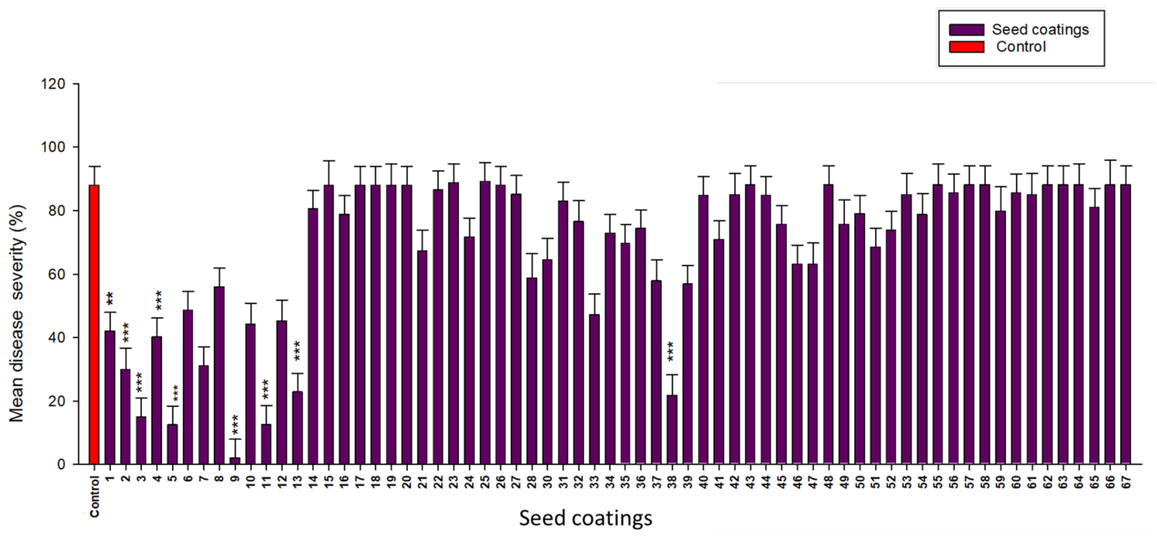

Figure 4: Mean disease severity of different seed coatings. The error bars indicate standard error of means. *, ** and * represents significance at p<0.05, <0.01 and <0.001 respectively**

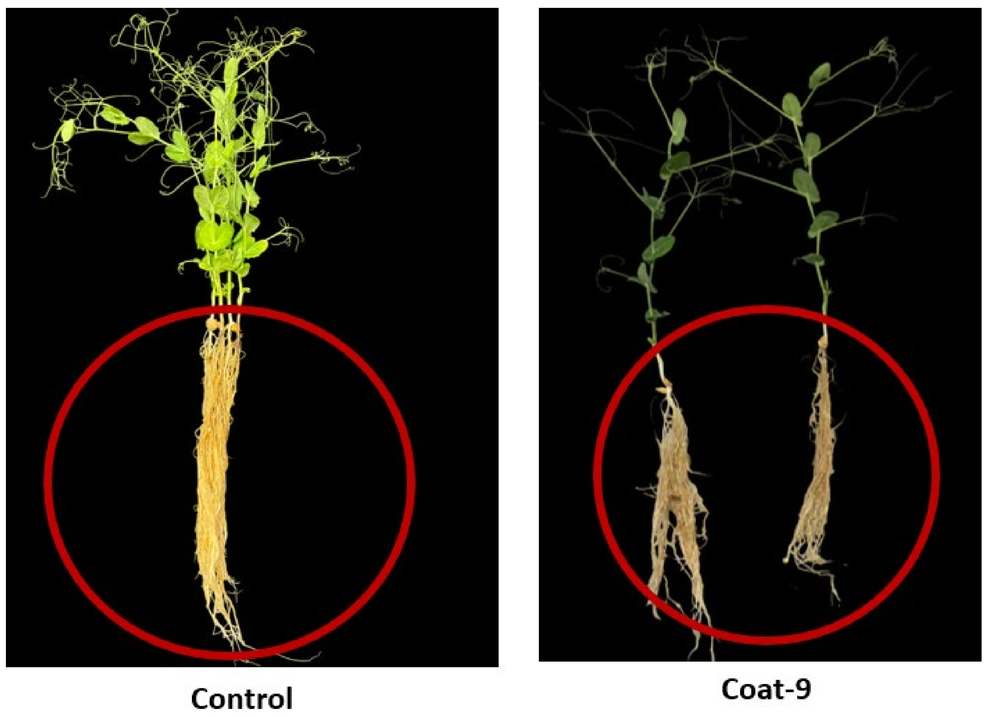

Figure 5: Visual symptoms comparisons

RESULTS

- Coat 1, 2, 3, 4, 5, 9, 11, 13 and 38 demonstrated significantly lower disease score compared to the checks.
- However, assessment is still in progress and so, final conclusions can not be made.

FUTURE WORK

- This experiment will be repeated twice.
- Once we narrow down effective seed coating/coatings, we will again confirm their effectiveness by inoculating with zoospore.
- Basic seed physiological processes such as imbibition will be assessed in promising seed coatings.
- Germination & imbibition data will be related to reserve mobilization during early seedling growth to ascertain seedling health.

ACKNOWLEDGEMENT

Technician Crew

- Salvador Lopez
- Karanjot Gill

Cropping Systems Team

- Fernando Guerrero Zurita
- Sumedha Nallanthighal
- Jedida Chirchir
- Priscillar Wenyika
- Suman Bagale
- Terence Simbo
- Nolan Johnson

Funders:

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