

Isolation and characterization of *Aphanomyces euteiches* antagonistic bacteria from pea root and rhizosphere soil

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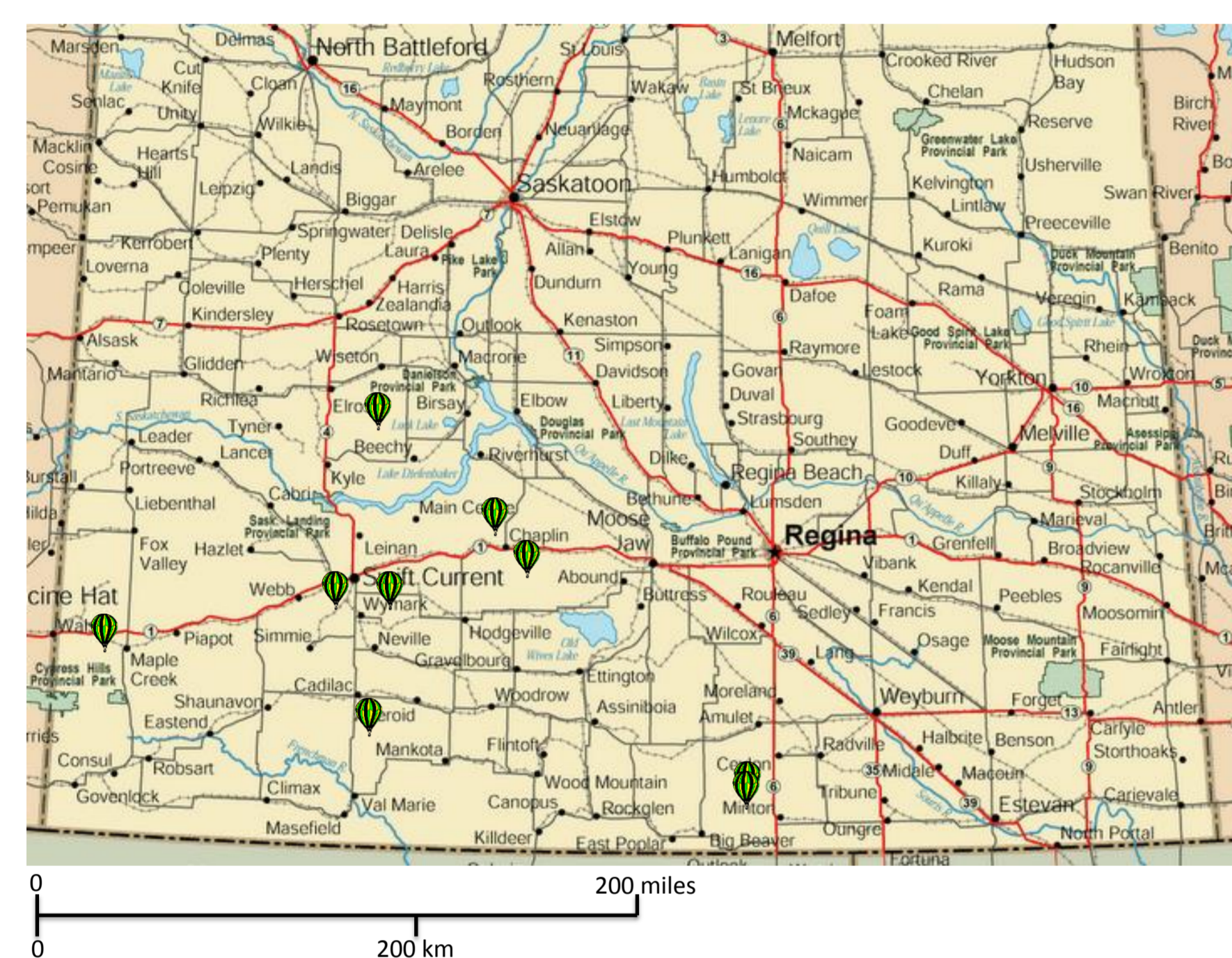
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Background

- Aphanomyces root rot caused by *A. euteiches* is a serious disease of pea worldwide
- A major threat to pea (*Pisum sativum* L.) and lentil (*Lens culinaris* Medik.) in Canada
- This oomycete pathogen is not responsive to available control measures
- The resting spores of the pathogen can remain active in the soil > 10 years
- Long-term crop rotation is the only option available to avoid this disease



Left – healthy, right – infected pea seedlings



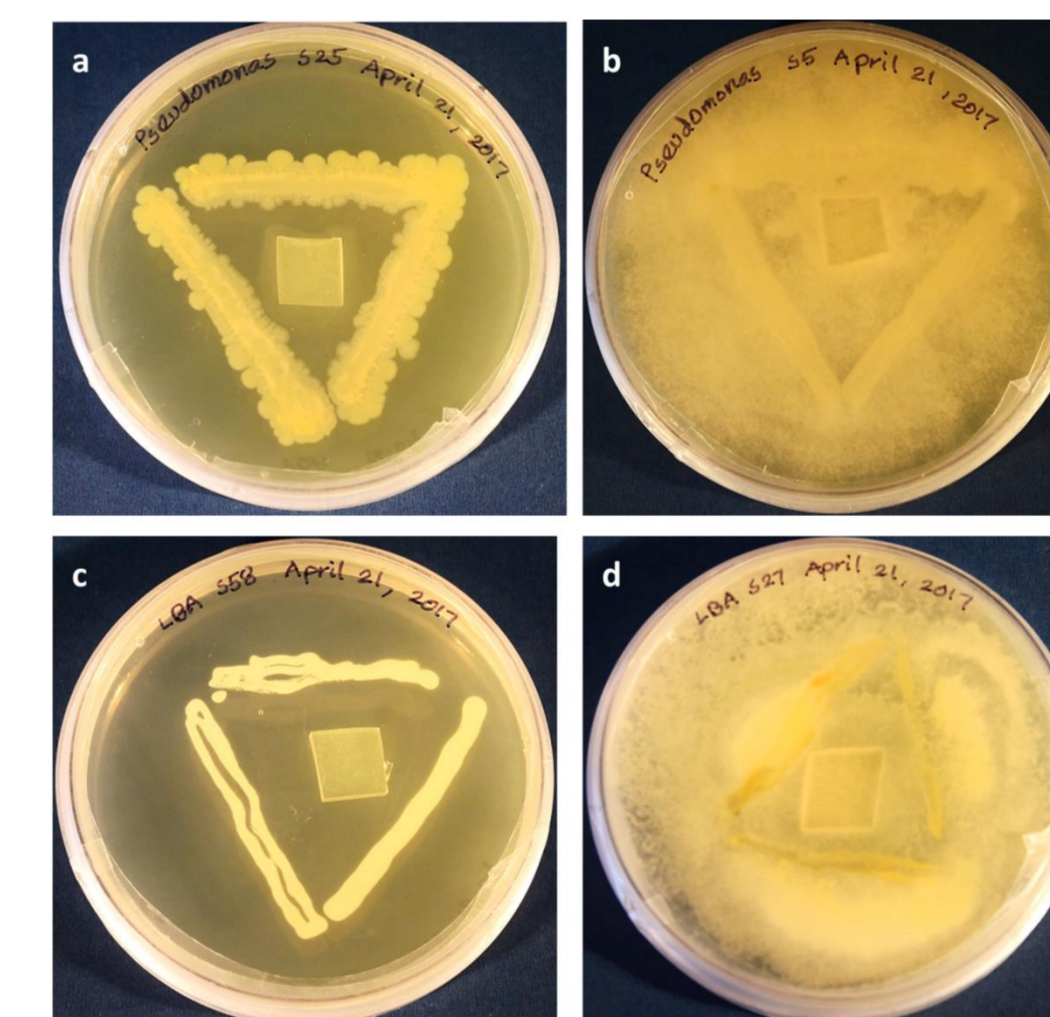
Sample collection sites

Materials and Methods

- Samples collected from 9 locations across south Saskatchewan
- Four healthy and 4 diseased plants from each location just before flowering
- The bacteria isolated on Luria Bertani, Potato Dextrose, Pseudomonas, and Tryptic Soy agar media
- Bioassays on PDA plates with bacterial isolates and *A. euteiches*
- Scored for antagonism 10-days after co-incubation
- in vitro antagonism study on pea plants on Murashige-Skoog medium
- In greenhouse trial, approx. 45 thousands zoospores and 2-ml overnight grown bacterial culture used in each pot

Results

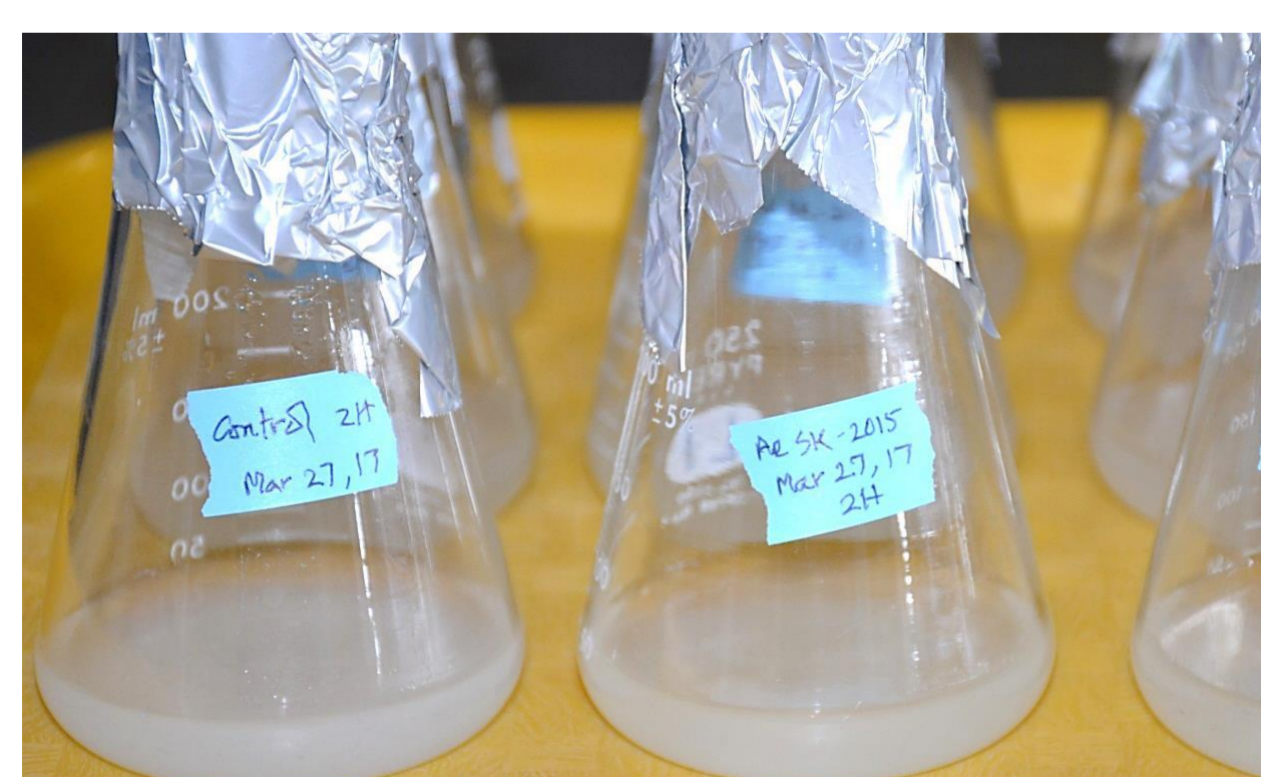
- About 6 thousands rhizosphere and endophytic bacteria isolated
- Selected 410 bacteria used in in vitro antagonism study
- Thirty five isolates selected from the replicated bioassays
- Ten isolates tested in vitro on field pea showed antagonism
- All 35 bacteria then tested in the greenhouse using sterile soil
- Twenty four bacteria selected for further study



Suppression of *A. euteiches* by bacteria



Suppression of *A. euteiches* on pea seedlings



Production of zoospores in oatmeal broth



Fifteen-day seedlings; left to right: control, pathogen, pathogen + bacteria



Roots of 15-day seedlings; left to right: Control, pathogen, pathogen + bacteria



Mature plant; left- control, right - pathogen + bacteria

Conclusion

Soil bacteria hold the promise of managing *Aphanomyces* root rot. Technologies developed from this project may provide a disease management strategy for sustainable and profitable pulse production systems in the Canadian prairies.

Acknowledgements

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