

Title: Disease resistance in pea towards the root rot pathogen *Aphanomyces euteiches*

Background

The oomycete pathogen *Aphanomyces euteiches* causes root rot in various legume species such as in pea (*Pisum sativum* L.). *Aphanomyces* root rot is the major constraint for increased pea production in Europe and can cause very high yield losses and affect quality negatively. Common symptoms of infection include root browning, reduction of root volume and function and in extreme cases plant death. However, sources of root rot resistance in pea are scarce. The pea landrace PI180693 was shown to carry partial resistance towards root rot caused by *A. euteiches*, although it also possesses many commercially disadvantageous properties. A better understanding of the genetics underlying both disease resistance in pea towards *A. euteiches* as well as the pathogen's aggressiveness on its host are essential for improved pea breeding and deployment of resistant cultivars in agriculture.

Objectives

The main study objective includes phenotyping experiments, i.e. infection assays including the pea line PI180693 and several European *A. euteiches* strains with varying levels of virulence. Infected pea roots will be scored for disease severity and compared to data from previous experiments and/or field data. In parallel, the dynamics of the infection process will be monitored using molecular methods, including host and pathogen gene expression patterns during infection.

Proposed Methodology

The practical work will include experiments in the growth chambers, disease scoring, cultivation of oomycete strains and basic laboratory procedures. The molecular work will include DNA and RNA extractions, and quantitative PCR. The MSc candidate will document the work progress, perform basic statistical analyses and is required to write up the work in form of a MSc thesis and/or project report.

Qualifications

We're looking for a motivated, reliable student with a keen interest in plant breeding and phytopathology. Basic knowledge of statistics and R, as well as basic lab experience are a plus.

Other information

Language: English

Proposed time: summer term 2022

Location of Research: Swedish University of Agricultural Sciences (SLU), Department of Forest Mycology and Plant Pathology, Campus Ultuna, Uppsala

Application deadline: 30.04.2022

Contact persons: Magnus Karlsson: magnus.karlsson@slu.se

Carol Kälin: carol.kalin@slu.se