

### **AGR1616: Enhancing the long-term sustainability of pulse cultivation using system approaches**

Aphanomyces root rot is becoming a serious threat to field pea and lentil production on the Canadian prairies. Because of a lack of conventional control measures, this project was undertaken to discover *Aphanomyces euteiches* antagonistic bacteria for developing alternative control measures. Rhizosphere soil and root samples from both diseased and healthy pea plants were collected from farmers' fields at nine locations across southern Saskatchewan in June and July, 2016. Several thousand rhizosphere and endophytic bacteria were isolated on four kinds of microbial media. More than 400 bacteria were evaluated *in vitro* for their ability to suppress *A. euteiches* growth. Based on the bioassay results, 35 bacteria have been identified and selected for further experimentation. In addition, rhizosphere soil and endophytic microbial DNA were extracted and sent for sequencing to compare the microbial population diversity and abundance between healthy and diseased environments.

Two established experiments, located at Swift Current, SK and Brooks, AB, are being investigated for changes in soil quality due to rotating wheat in alternate years with pulse crops, compared to growing wheat continuously. We will determine if including pulse crops in rotations has a longer-term effect on soil quality, beyond the contribution of biologically fixed nitrogen (N) to the rotation. Additionally, we will determine if any of the three pulse crops under investigation (field pea, lentil, or chickpea) have a better (or worse) influence on soil quality than the others.