WSU Plant Pathology Seminar Series

Improving sustainable dryland winter pea production systems through enhancement of symbiotic nitrogen fixation and plant disease resistance

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Symbiotic nitrogen fixation is an important part of sustainable agriculture, which could reduce application of\synthetic nitrogen fertilizers in crop production. However, breeding legumes for improved yield and seed quality, coupled with extensive use of nitrogen fertilization may disrupt the ability of modern cultivars to establish symbiotic associations with native soil rhizobia. Autumn-sown food-quality winter pea cultivars represent an exciting new crop for growers in the Pacific Northwest. However, little is known about the ability of these new cultivars to establish associations with rhizobia and other bacteria native to Pacific Northwest soils. Therefore, a part of our research program is aimed to assess symbiotic potential of newly developed food-quality winter pea cultivars and their ability to establish effective symbiosis with nitrogen-fixing rhizobia native to Pacific Northwest soils. Our data indicate that there is a strong host specificity to rhizobial strains, with some strains not forming nodules on certain pea cultivars, while forming apparently effective nodules on others. Moreover, a better understanding of interactions between this crop and winter pea pathogens native to Pacific Northwest soils is necessary to improve crop production. To address this issue, the regional structuring of fungal microbiome in winter pea production system was evaluated and several putative pathogens preferentially colonizing the plants root and nodule tissue were identified. We showed that winter pea nodule microbiome was overpopulated with fungi from the family Sclerotiniaceae suggesting potential susceptibility of nodule tissue to the pathogens from this family. Additionally, genera *Cryptococcus*, and *Solicoccozyma* were significantly enriched in nodule microbiome, compared to the root, suggesting a role of these psychrophilic fungi in symbiotic legume-fungi interacseminartions.

Zoom link: https://wsu.zoom.us/j/99736419401?pwd=l1Ngq8fFeqmYt4At6jaB5lTP0U9mv5.1
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