

WSU Plant Pathology Seminar

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Know thy enemy: mining *Meloidogyne chitwoodi* effectors

Abstract: The Columbia Root-Knot Nematode (CRKN) *Meloidogyne chitwoodi* infects potato roots and tubers, impacting yield, product value and exports. To succeed in parasitism, CRKN use a needle-like structure to secrete proteins called effectors into plants. Investigating these effectors is important for the development of alternative nematode management tools. Because effectors are typically produced in the nematode esophageal glands, we performed a gland-specific transcriptome analysis to help identify novel candidate effectors. Our gland library analysis resulted in the identification of 5,213 transcripts that were mapped to the annotated genome. Among the transcripts, we identified several novel proteins and, among these, some that seem to be *M. chitwoodi* specific. We validated effector gland localization by in situ hybridization for a select subset of transcripts. Then their roles in potato parasitism were further explored. Expression analysis during the CRKN life cycle showed they were more expressed by pre-parasitic J2s, showing a role early in the nematode parasitism. Interestingly, transgenic plants ectopically expressing two of the putative effectors, Mc3254 and Mc11154, were more susceptible to CRKN, while the expression of a third putative effector, Mc8727, resulted in increased resistance. Our data shows that using the gland transcriptome, good quality genome annotation and a stringent criterion, we can increase the efficiency of CRKN effector identification. Additionally, our preliminary data shows that while two novel effectors seem to facilitate CRKN parasitism, a third one is recognized by the plant innate immunity, triggering defense responses. In the future, we will be identifying these effector interaction targets in potato.

Short biography of Dr. Teixeira

Dr. Teixeira began working in nematology as an undergraduate student, studying the impact of various management practices on nematode communities. She earned an MSc from the University of Brasília and a PhD in Plant Pathology from the University of California, Riverside. During her PhD, she had highly productive research experience, publishing seven papers and securing a patent. Dr. Teixeira serves as a reviewer for several journals and recently joined *Plant Physiology* as an Assistant Features Editor. For the past year and a half, she has been working with Dr. Gleason. Today's talk presents findings from a manuscript currently under review for publication.