BOTANY AND PLANT PATHOLOGY SPECIAL SEMINAR

FRIDAY, APRIL 10, 2026 AT 10:00 AM
IN-PERSON IN LILY 2-425
ZOOM: HTTPS://PURDUE-EDU.ZOOM.US/MY/ABBIEROGERS

PURDUE UNIVERSITY

Botany and Plant Pathology

www.ag.purdue.edu/btny

* *In full or partial fulfillment of their Master's of Science or PhD.*

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MOLECULAR VIRULENCE MECHANISMS OF PHYTOPATHOGENS: CHARACTERIZING EFFECTORS FROM *RALSTONIA SOLANACEARUM* AND *PHYLLACHORA MAYDIS*

Developing genetic sources of host resistance in agronomically important crops relies on understanding host-pathogen interactions to identify sources of host resistance and susceptibility. Proteinaceous virulence molecules known as effectors are used as molecular probes to assist in this identification and to clarify the molecular crosstalk between hosts and pathogens. Effectors are secreted by both bacterial and fungal pathogens to facilitate pathogen proliferation in the host and promote disease development. These proteins can target and disrupt numerous host processes including immune signaling. Thus, characterizing effector function in plants often reveals the host protein targets of effectors, creating the foundation for developing host resistance. To this end, effectors from two economically impactful phytopathogens were assessed for their immune suppression activities and function *in planta*. We find that three effector proteins from the fungal pathogen *P. maydis*, causal agent of tar spot disease of maize, consistently suppress basal host immune responses. In-depth characterization of the effector RipU from bacterial wilt disease pathogen *Ralstonia solanacearum* revealed that this effector associates with and alters the organization of both the actin and microtubule cytoskeleton in plant cells. Deletion of RipU from wild type *R. solanacearum* reduced tomato plant disease symptoms and bacterial colonization. Expressing RipU in transgenic *Arabidopsis thaliana* led to phenotypes consistent with cytoskeleton disruption. *In silico* protein folding analysis coupled with *in planta* RipU mutant protein expression identified a region of RipU required for consistent microtubule localization. Collectively, these experiments suggest that cytoskeleton disruption is important for the virulence function of RipU, and thus for virulence of an agriculturally significant bacterial plant pathogen.