

Plant Pathology Seminar Series

“INFECTIVITY OF *VERTICILLIUM DAHLIAE* ISOLATES ON WEEDY HOSTS, LITCHI TOMATO, AND TEFF, AND THE EFFECT OF ALFALFA RESIDUE INCORPORATION ON THE NUMBER OF *VERTICILLIUM DAHLIAE* MICROSCLEROTIA, AND SOIL BACTERIAL METAGENOMICS”

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Verticillium wilt, caused by *Verticillium dahliae*, is an important disease of many dicotyledonous crops due to a wide host range and the persistent, long-term survival of microsclerotia in soil for up to 14 years. Some *V. dahliae* isolates are aggressive on specific a plant host, such as potato, but can still infect a range of crops. Isolates of *V. dahliae* that are aggressive on potato are referred to as the potato pathotype. It is unknown if litchi tomato (*Solanum sisymbriifolium*), teff (*Eragrostis tef*), or weeds could serve as sources of inoculum for the potato pathotype of *V. dahliae*. Black nightshade (*Solanum nigrum*) was the only one of 16 weeds evaluated to yield greater numbers of microsclerotia of the *V. dahliae* potato pathotype than any other *V. dahliae* isolate in three of four greenhouse trials (second trial False Discovery Rate (FDR)-adjusted $P < 0.0158$, third trial $P < 0.0264$, fourth trial $P < 0.0193$). No isolate or pathotype of *V. dahliae* produced greater numbers of microsclerotia in infected teff than any of the other isolates, while the potato pathotype of *V. dahliae* produced greater numbers of microsclerotia than other isolates in only one of six trials (first trial FDR-adjusted $P < 0.0149$) on litchi tomato. Soil incorporation of alfalfa residues prior to planting potato could be a nonchemical Verticillium wilt management strategy by reducing the number of viable microsclerotia in field soil. The impact of incorporating alfalfa residue on soil metagenomics is unknown yet possibly an important aspect of facilitating disease-suppressive soils. The number of *V. dahliae* microsclerotia in soil where alfalfa was incorporated was unexpectedly greater than when residue was not incorporated ($P = 0.0003$), but only when field soils were subject to soil fumigation with chloropicrin. The soil bacterial metagenome in field soils subjected to alfalfa residue incorporation did not differ from those not subject to residue incorporation after one year. Alfalfa residue incorporation alone did not reduce *V. dahliae* microsclerotia in the soil or impact soil metagenomics, and the practice by itself is not a nonchemical Verticillium wilt management strategy or method to enhance a disease-suppressive soil.

10:10 am | Friday, April 7, 2017 | Johnson Hall 343

PhD Exit Seminar



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