



4-2019

Developing a translatable model system to investigate the chemistry of fungal-host ectomycorrhizal interactions

Anne Murray

Purni Wickramasinghe

John P. Munafo Jr.

Mid-Atlantic States Mycological Conference (MASMC)
University of Tennessee – Knoxville
12-14 April 2019

ABSTRACTS – Posters

Developing a translatable model system to investigate the chemistry of fungal-host ectomycorrhizal interactions

Anne Murray, Purni Wickramasinghe, John Munafa
Department of Food Science, University of Tennessee

To establish translatable methods for studying chemical communication between ectomycorrhizal (EcM) symbionts and their host plant, a model system has been developed. This study investigates a model fungus *Suillus punctipes*, known as the spicy bolete, a fragrant edible mushroom whose plant host in the southeast is (often) the Loblolly pine, *Pinus taeda*. While the EcM fungal plant host relationship is characterized by the well-known exchange of essential nutrients and carbon, the chemical communication between the fungi and plant-host is poorly understood. To address this knowledge gap, we investigate different phases of the fungal host-plant colonization, with the consequent objectives: 1) the identification of fungal volatile organic compounds (VOCs) emitted by *S. punctipes* as part of the early stages of fungal-host plant colonization, using gas chromatography-mass spectrometry (GC-MS); 2) to identify the non-volatile compounds (nVCs) produced in the fungal-host interaction, where compounds are purified from *P. taeda* root and spiked into *S. punctipes* cultures, with the bio-transformed products (plant derived fungal metabolites) identified through tandem liquid chromatography mass spectrometry (LC-MS/MS); and 3) to quantitate fungal-host nVCs in an EcM inoculated tree population to establish a chemical profile of late stage fungal-host interactions.

This poster highlights the development of a robust model to aid in the study of chemical communication pathways between symbionts by offering a clearer understanding of the complex interactions of organisms in the forest ecosystem.