

MS Thesis
Department of Environmental Science and Policy
George Mason University

Candidate: Olivia Taylor

Defense Date and Time: April 16, 2018 at 3:00pm

Defense Location: RM 3306 David King Hall

Title: The Competitive Relationship of the Ectomycorrhizal Fungus *Tuber Melanosporum* with Common Native Mid-Atlantic Ectomycorrhizal Fungi

Thesis Director: Dr. Albert Torzilli

Committee: Dr. Patrick Gillevet, Dr. R.C Jones

ABSTRACT

This study provides a better understanding of various fungal types which share the soil in a North American orchard colonized with *Tuber melanosporum* and identifies major fungal competitors for colonization of tree roots. This work also determines various soil conditions in the Mid- Atlantic region of the United States which can encourage or discourage *Tuber melanosporum* colonization. *Quercus robur* seedlings were inoculated with *Tuber melanosporum*. Groups of inoculated trees were split into six separate soil groups. After one year from inoculation mycorrhized root tips were sampled from each seedling. Fungal DNA was extracted, amplified, and sequenced. Multi-variant analyses were run to identify possible correlations of environment and speciation. The results indicate that there are fungal types with the potential for competition with *T. melanosporum* and that these types change as the conditions in the soil change, and that *T. melanosporum* struggles to colonize trees outside of an established orchard.