Emission of Volatile Organic Compounds by *Amylostereum* and Ophiostomatoid Fungi

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Background

- The southeastern US is one of the most productive timber regions of the world
- Pine plantations in the southeastern US covers about 12.2 million hectares
- Over 80% of pine plantations are composed of loblolly pine
- Loblolly is threatened by insect pest; *Sirex* and bark beetles

Background

Sirex noctilio and *Sirex nigricornis* are important *sirex* species

Have symbiotic association with *Amylostereum* fungi

Inoculates new wood during wasp oviposition

Attacked trees have resin dripping from oviposition sites subsequently causing mortality

Background

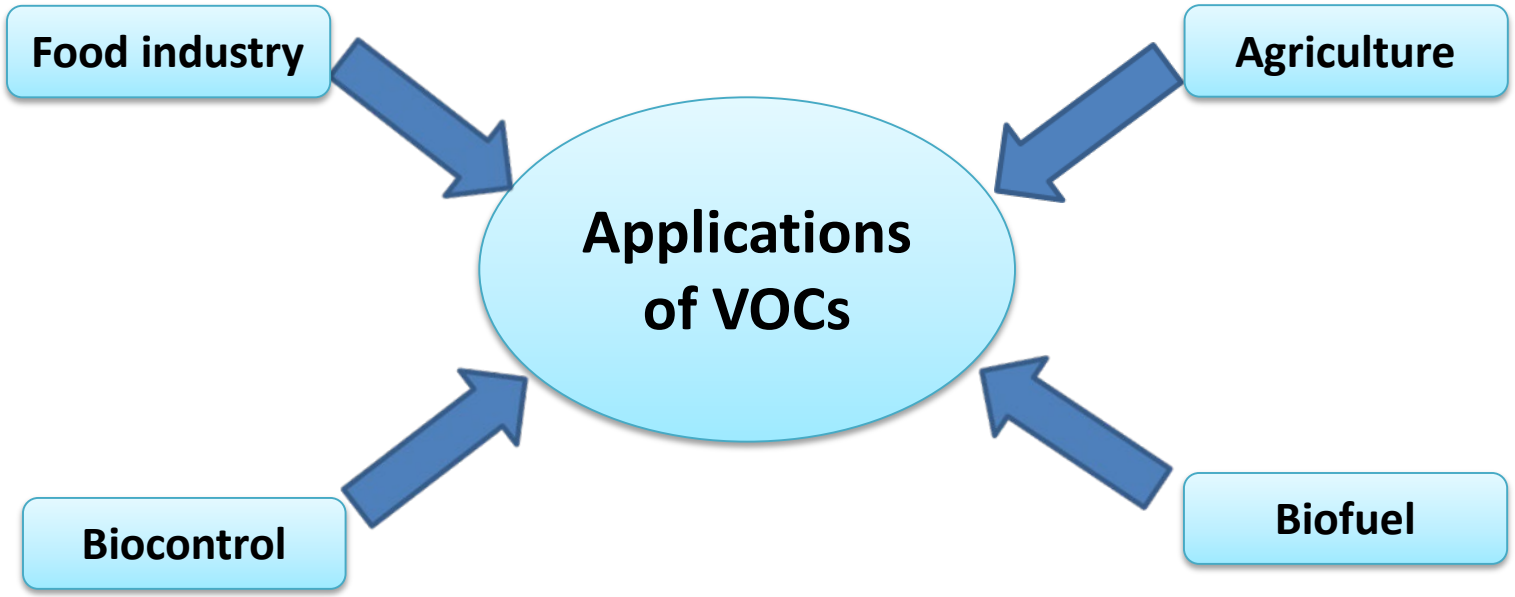
Bark beetles have symbiotic association with ophiostomatoid fungi

They are noted for blue stains in the sapwood of conifer trees and logs, and black stain root disease of conifers

The fungi also cause mortality by blocking vascular tissues

Background

- The interaction between insect pest and fungi are mediated by Volatile Organic Compounds (VOCs)
- VOCs are carbon-based solids and liquids that vaporize and enter the gas phase at normal atmospheric temperature and pressure



Background

Fungal volatiles facilitates the association between insect and fungi, acting as pheromones, kairomones and allomones

VOCs from well studied insects e.g. frontalin, verbenone

Application of verbenone significantly reduced attack of mountain pine beetle in California

Fungal VOCs are poorly studied

Goal

Contribute towards the use of VOCs as cues in insect pest management

Objectives

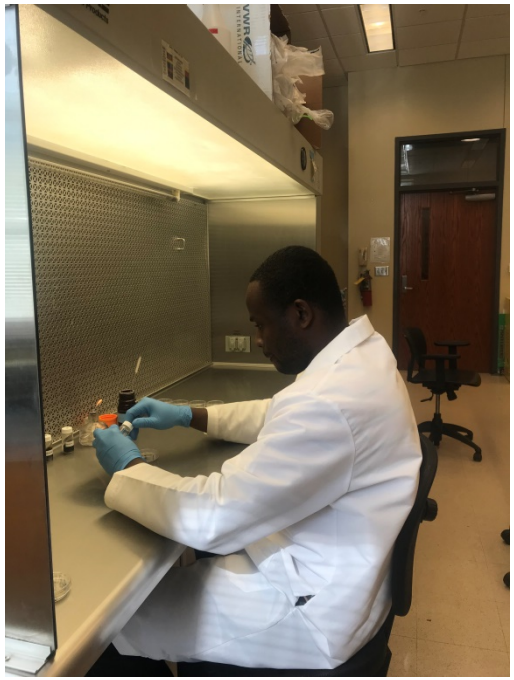
Determine the qualitative and quantitative VOCs associated with *Amylostereum* and ophiostomatoid fungi

Determine the VOCs among the interacting fungi

Assess the influence of VOCs on the growth and development of fungi

Approach

The study will be conducted at FHDL, Auburn University



Cultures grown on media

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Cultures placed in volatile collection chamber fitted with metal caps

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Metal cap has 2 holes having Teflon tubes, one tube is inlet and the other to a volatile trap

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Vacuum pump to suck air from volatile chamber

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Volatiles to be extracted in dichloromethane

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Vortexed → Sonicated → Centrifuged

Extracts will be analyzed with GC-MS

Analysis

All statistical analyses will be done by using the R software

Descriptive statistics will be calculated for culture area, fungal VOC concentrations and culture density

Quantitative differences in fungal VOC profiles among fungi and identification of fungal VOCs will be examined by permutational MANOVA (PerMANOVA)

Potential Impacts of the Study

Characterized VOCs will be used as cues for managing insect pest

- traps for luring insects
- aggregation disruptor

Sirex species

Bark beetles

Acknowledgements

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