Emission of Volatile Organic Compounds by 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; bark beetles

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

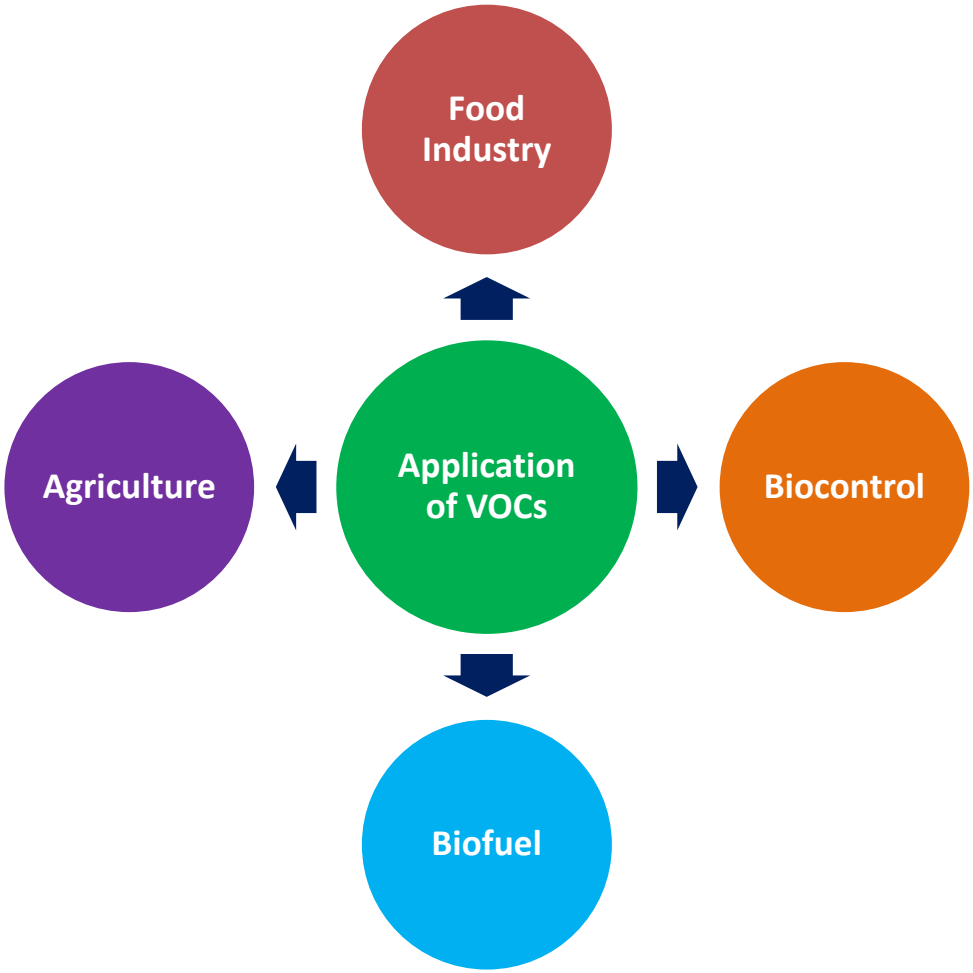
The fungi also cause mortality by blocking vascular tissues

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


Food Industry
Agriculture
Application of VOCs
Biocontrol
Biofuel

Background

Fungal volatiles facilitate the association between insect and fungi, acting as semiochemicals

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

Application of verbenone significantly reduced attack of mountain pine beetle in California (Gillette et al; 2012)

Fungal VOCs are poorly studied

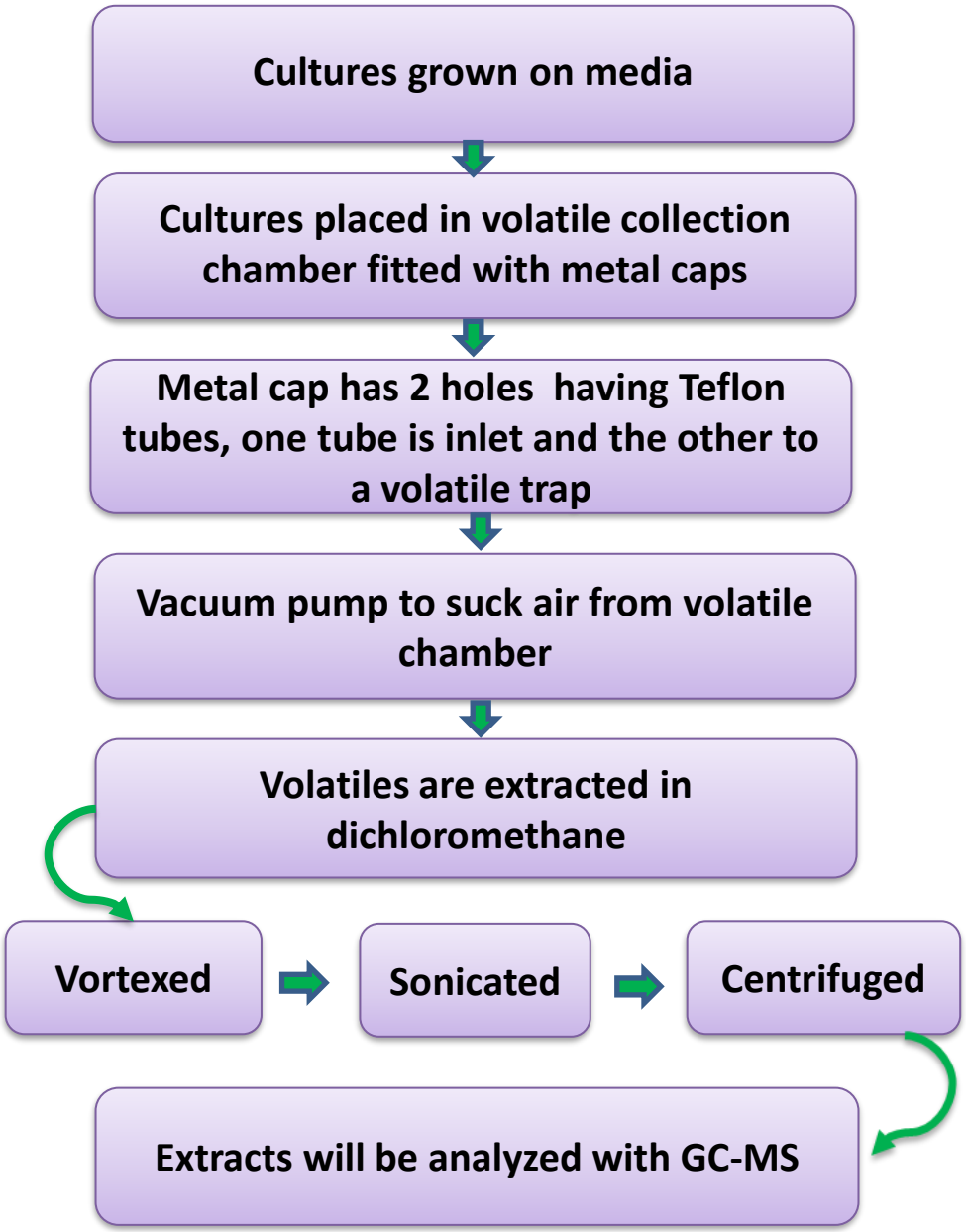
Goal

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

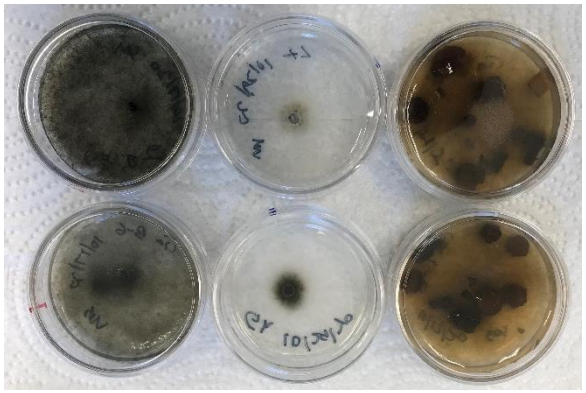
Objective

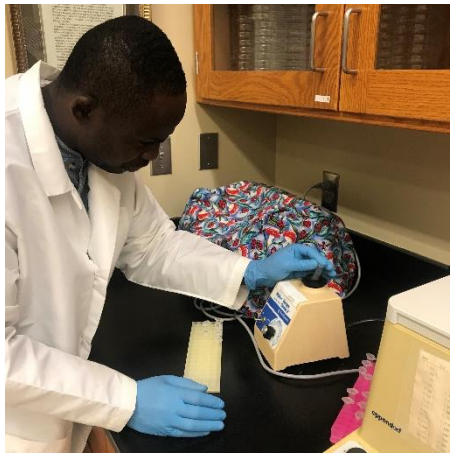
Determine the qualitative and quantitative VOCs associated with ophiostomatoid fungi

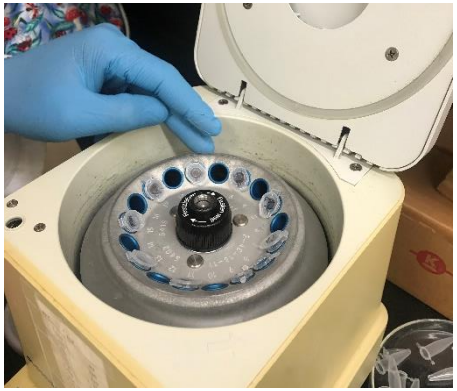
Approach

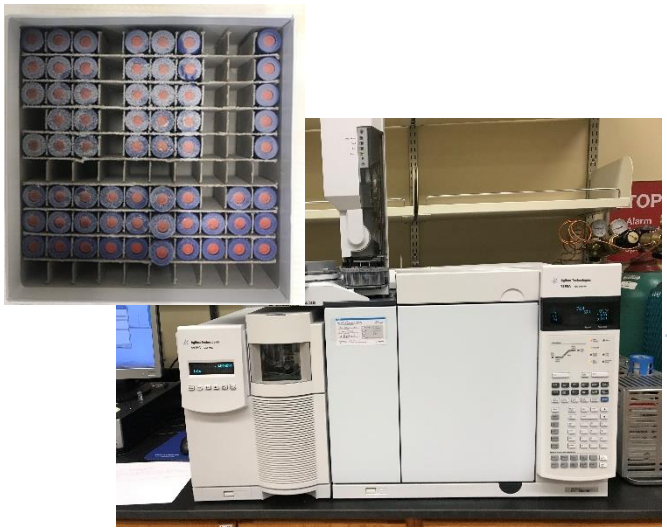

Cultures grown on media
Cultures placed in volatile collection chamber fitted with metal caps
Metal cap has 2 holes having Teflon tubes, one tube is inlet and the other to a volatile trap
Vacuum pump to suck air from volatile chamber
Volatiles are extracted in dichloromethane
Vortexed
Sonicated
Centrifuged
Extracts will be analyzed with GC-MS

Methods









120 samples extracted from individual fungi
Four fungal species; *Leptographium terebrantis, L. procerum, Grosmannia huntii* and *G. alacris*

96 samples extracted from interacting fungi

Methods

150 samples extracted from inoculated

Potential Impacts of the Study

Characterized VOCs will be used as cues for managing insect pest

- traps for luring insects
- aggregation disruptor

Acknowledgements

Committee members: Dr. Lori Eckhardt (AU), Dr. Jonathan Cale (CGC), Dr. Angela Calderon (AU)

Research Assistants: Tina Ciaramitaro, Luis Mendez, Angelica Baker, Jessica Ahl

GC-MS: Dr. Henry Fadamiro, Dr. Rammohan Balusu, Dr. Younis Abiedalla, Dr. Beatriz Iris Vega Erramuspe, Dr. Cheryl Colquhoun, Jeffery Estep

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Undergraduate Student: Logan Jones, Amelia Harrison, Jaliyl Collins

Funding Agencies: Forest Health Cooperative, Forest Health Dynamics Laboratory, AU Internal Grants Program, Project Number 190567

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