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Apr 12th, 8:41 AM - 8:53 AM

# Ant and Detrital Communities Impacted by Bluestain Fungi (Ascomycota: Ophiostomatoid) Inoculation in Coarse Woody Debris

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### Recommended Citation

Morin, Casey; Tang, Juliet; Siegert, Courtney; Little, Nathan; Riggins, John; and Clay, Natalie, "Ant and Detrital Communities Impacted by Bluestain Fungi (Ascomycota: Ophiostomatoid) Inoculation in Coarse Woody Debris" (2018). *ANS Research Symposium*. 4.

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**Presenter Information**

Casey Morin, Juliet Tang, Courtney Siegert, Nathan Little, John Riggins, and Natalie Clay

## **Ant and Detrital Communities Impacted by Bluestain Fungi (Ascomycota: Ophiostomatoid) Inoculation in Coarse Woody Debris**

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Global change is driving biodiversity loss and altering the distribution and intensity of biotic interactions within communities. One example is the increasing population of bark and root beetles due to warmer climate, which are major disturbance agents in southeastern US coniferous forests. Bark beetles kill thousands of trees annually, which ultimately become coarse woody debris (CWD) that is uniquely pre-inoculated with ophiostomatoid (bluestain) fungi. Bluestain fungi is vectored by bark beetles and root weevils during the attack of the host tree and does not degrade the wood but attracts invertebrate species, such as mites and termites. These species can support predatory species, such as ants. Ants are widespread and abundant and are frequently the dominant predator in invertebrate communities. Although ants are common ecosystem engineers that can have significant impacts on decomposer communities, how ants impact CWD decomposer communities remains relatively unexplored. Because bluestain fungi attracts invertebrate species that are common prey of ants, we hypothesized that bluestain fungi will increase ant diversity and alter ant species assembly in CWD. Additionally, we predicted that ant communities in CWD would differ from the local ant species pool due to large habitat differences. To test this, 72 loblolly pine trees were inoculated with one of five bluestain treatments or water as a control in 2011. The four bluestain species used are typically vectored by 2 aboveground bark beetles and 2 root weevils, the fifth treatment was a combination of 2 bluestain species. Two randomly selected trees from each treatment were then felled at six different times over a four-year period. In 2015, ~1m x 25 cm diameter logs from felled trees were collected and invertebrates extracted from the logs. Ant species and other invertebrates were identified from 3 year old CWD using only pine trees felled in October 2012 and collected in March 2015 (n=12). To determine if CWD ant communities differ from the local species pool, we collected ants in summer 2017 and spring 2018 via hand sampling, pitfall traps, baiting, and leaf litter and wood collection. We collected 24 ant species from CWD. The average ant richness in bluestained wood is ~2 fold greater than in controls. Wood inoculated with *Ophiostoma ips* fungi trended greater average ant richness (9±2.8) by ~72% versus controls. The majority of ant species from CWD tended to be generalist predators, indicating a general increase in prey rather than an increase in a certain prey species. Ant richness from the local species pool is still being determined but preliminary results suggest the CWD serves as an environmental filter by selecting against certain ant species. Additionally, preliminary results suggest that invertebrate communities differed in bluestained CWD from the controls. CWD constitutes a significant carbon store in forest ecosystems. Changes in bluestained CWD detrital communities will likely impact wood decomposition rates and nutrient cycling.