

90th Annual ESA Meeting

Monday, August 8, 1:30 PM - 5:00 PM, Meeting Room 518 C, Level 5, Palais des congrès de Montréal

Soil conditions, host community, and infestations of the hemlock woolly adelgid (*Adelges tsugae*) affects ectomycorrhizal diversity in eastern temperate forests.

Sirulnik, Abby^{*1}, Lewis, James¹, Tuininga, Amy¹, Johnson, Jacqui¹, ¹ Louis Calder Biological Field Station, Armonk, NY

ABSTRACT- Eastern hemlock (*Tsuga canadensis*) mortality associated with infestations of the invasive exotic hemlock woolly adelgid (HWA; *Adelges tsugae*) may result in altered soil conditions and ectomycorrhizal (EM) fungal communities. In a watershed of a mixed conifer-hardwood forest in southeastern New York, soil edaphic factors and EM communities were compared among three forest types: 1) HWA-infested eastern hemlock-dominated stands, 2) healthy eastern hemlock-dominated stands and 3) oak (*Quercus sp.*) dominated stands. Soils obtained from each forest type were analyzed for extractable N (NH_4^+ and NO_3^-), pH, and gravimetric water content. EM species on root tips were identified by morphotype. Higher NO_3^- in HWA-infested hemlock-dominated stands suggests that hemlock mortality is associated with increased N cycling. Oak-dominated stands had the highest soil pH levels, followed by the HWA-infested hemlock-dominated stands. Soil gravimetric water content did not vary among forest types. The intermediate pH status and higher NO_3^- levels of the HWA-infested hemlock-dominated stands indicates that hemlock mortality may result in soil conditions favorable to EM species that are adapted to such conditions. EM morphotype results show that EM communities have been affected by HWA-infestation. EM tip density was lowest in HWA infested stands. Species richness was higher in oak-dominated than healthy hemlock-dominated stands. The intermediate EM species richness status of the HWA-infested hemlock-dominated stands suggests that hemlock mortality associated with HWA-infestation may result in EM community attributes that are in between those of oak-dominated and healthy hemlock-dominated stands. Forest types were generally similar in the composition and abundance of their dominant EM species. However, one dominant species was more abundant in the healthy hemlock-dominated stands than in the oak-dominated stands. Results show that HWA-induced defoliation may result in reduced EM density and species richness and increased N cycling in hemlock stands. Spatial variation in EM density and richness may be linked to variation in both host community composition and soil chemistry.

Key words: ectomycorrhizae, *tsuga canadensis*, *Adelges tsugae*, nitrogen