**PS06**

# EAB induced tree mortality impacts on ecosystem respiration and tree water use in an experimental forest

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The mechanism by which EAB impacts ash trees is through larval gallery formation which alters the transport of water and nutrients. Such disturbances impact photosynthesis and indirectly soil respiration and hydrology which respectively drives forest nutrient cycling and successional dynamics. Here we assess the impacts of EAB larval feeding on tree-level water relations and the impacts of EAB induced ash mortality on soil respiration. In an EAB infested ash dominated experimental forest located near Delaware, OH we randomly assigned eleven 12x12m plots to the following treatments: girdle, insecticide and control. Soil respiration ($R_{Soil}$) was measured weekly during mid-day at 22 locations (2 collars per plot). Additionally, thermal dissipation probes were deployed to measure sap flow in 9 ash trees along a gradient of EAB infestation. The treatments resulted in significant shifts in rates of soil respiration. Specifically, the insecticide and control treatments exhibited significantly greater $R_{Soil}$ than the girdled treatment (RMANOVA; $P<0.05$). The girdling treatment resulted in ~30% reduction in $R_{soil}$ compared to the non-girdled treatments. As expected, ash trees exhibited diurnal variability in sap flux density, driven by the photoperiod (RMANOVA; $P<0.01$). Heavily infested trees exhibited lower sap flux densities compared to lightly infested trees which led to reduced quantities of daily water use (ANOVA; $P<0.01$). This research demonstrates how the pest disturbances may impact ecosystem carbon budgets through reductions in soil respiration and highlights how EAB-induced tree decline can reduce sapflux rates and alter forest water use driving shifts in local hydrology.

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