

VOLATILE PROFILES AND TRAP CATCHES OF TWO PINE-HOST SPECIES OF *SIREX NOCTILIO*

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ABSTRACT

The woodwasp *Sirex noctilio*, Fabricius (Hymenoptera: Siricidae) is a pest of pine species first detected in the U.S. in New York state in 2004. Females inject mucus and the spores of the symbiotic fungus *Amylostereum aerolatum* when ovipositing or probing through the bark, which may eventually lead to the death of the tree. In North America the major host species are Scots pine (*Pinus sylvestris*), red pine (*P. resinosa*), and white pine (*P. strobus*). The use of herbicide treated trees for trapping is the most efficient way to monitor the insect; however this procedure causes death of the trap trees. Our goal is to develop a lure that is efficient enough to replace the herbicide treatment of trees.

We learned from studies conducted in 2006 by USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine (APHIS PPQ), in New York state, that Scots pine is the most attractive to the wasp among the above mentioned pine species. Moreover, it is widely accepted that volatile terpenes emitted by the trunk section of stressed trees play an important role in attracting the woodwasp to its host. Therefore we designed an experiment to investigate whether differences between the volatile production of Scots pine and white pine could possibly account for the difference in the observed preference of *S. noctilio*. We monitored the

volatile emission of untreated and herbicide treated Scots pines and white pines equipped with funnel traps in parallel with trap catches from early June through August 2008. A nondestructive volatile collection system developed at Penn State allowed us to collect samples multiple times from the same trees used in the experiment without causing additional damage. Herbicide treated Scots pines emitted significantly larger amounts of terpenes than herbicide treated white pines throughout the season, which correlates well with the significantly higher catches of the Scots pine trap trees. Furthermore, the percentage amount of a few terpenes, such as sabinene, β -myrcene, and Δ -3-carene, was significantly larger in the volatile blend emitted by herbicide treated Scots pines compared to herbicide treated white pines.

In our study in 2008 we were able to demonstrate that stress caused by injection of an herbicide affects the volatile production of Scots pine and white pine differently. Assuming that terpenes emitted through the trunk section of the trees attract *S. noctilio* to its host, the qualitative and quantitative differences observed between the volatile profiles of the two host species may explain the wasp's preference to Scots pine. We are planning to test this hypothesis in behavioral assays in the future.