MONOTERPENE COMPOSITION IN LOBLOLLY PINE ATTACKED BY SOUTHERN PINE BEETLE

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Abstract. Exudation of oleoresin is one form of defense that pines have against attack by the southern pine beetle (SPB; *Dendroctonus frontalis* Zimm.; Coleoptera:Scolytidae). This resin flow functions primarily to expel the beetles and associated fungi vectored by the beetle from inside the tree. In addition, monoterpene fractions of the resin can be toxic to both the beetle and fungi, and therefore, the resin flow also acts as a chemical barrier. In an SPB attack, there are individual trees that are missed or for some reason not attacked by the beetles. These trees may possess some resistance or repellant that protects these trees from the beetles. In this study, we compared the monoterpene composition in trees attacked and missed during an SPB outbreak in Gainesville, Florida during 1995 and 1996.

Cortical samples were collected from 117 loblolly pine trees *(Pinus taeda* L.) growing in three separate stands that were being actively attacked by SPB. Within a stand, trees that were attacked (as evidenced by numerous pitch tubes) were sampled as well as those adjacent trees that were missed (lacking any pitch tubes). In total, 59 attacked trees and 58 missed trees were sampled and headspace analyzed with gas chromatography. The chemical composition 0f oleoresin differed significantly between attacked and missed trees. Missed trees showed generally higher percentage of all monoterpenes including a– and ß–pinene, myrcene, limonene, ß-phellandrine, and an unknown compound. In contrast, attacked trees showed significantly higher percentage of camphene and another unknown terpene component. Of the monoterpenes that have been tested, camphene is considered to be one of the least toxic to SPB. Identification of the two unknown monoterpenes is ongoing. The results suggest that terpene profiles may be a useful tool for identifying susceptible and "resistant" genotypes and could be used in tree improvement programs for selection of families with less susceptibility to SPB attack.

Keywords: *Pinus taeda* L., *Dendroctonus frontalis* Zimm., terpene.