Effects on wild bumblebees of insecticidal controls of Hemlock Woolly Adelgid in South-West Nova Scotia

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Eastern hemlocks (*Tsuga canadensis*) are a foundational species in eastern North American, with stands that provide unique cool, damp microclimates, which are especially important given current global warming. They also provide overwintering habitat and early season foraging opportunities for, among other organisms, native pollinators. These forests are under threat from the invasive insect Hemlock Woolly Adelgid (*Adelges tsugae*; HWA), which is currently being controlled by two neonicotinoid insecticides, dinotefuran and imidacloprid, applied as basal bark sprays. Neonicotinoid insecticides are lethal to bees at high doses; however, at low doses, they can have negative effects on motor functions, reproduction, and thermoregulation. W e are investigating how application of these insecticides on hemlock stands in south-western Nova Scotia affect wild bumblebee (Genus: *Bombus*) abundance and species diversity. We collected 693 bees from 9 sites across south-western Nova Scotia in summers of 2025 and 2026 using blue-vane traps (BVTs). Of the 9 sites, three were treated with imidacloprid, three were treated with a combination of dinotefuran and imidacloprid, and three were untreated. Canopy cover and temperature and relative humidity at the canopy, ground, and soil were also measured at each site. Preliminary results are that bumblebee abundance is likely influenced more by abiotic differences among sites, such as temperature and humidity, than by insecticide treatment. Our research will improve understanding of the *in-situ* effects of neonicotinoid insecticide use on native pollinators and will provide further information on ecological risks of HWA management.

Keywords: Hemlock Woolly Adelgid, invasive species, Native bees, neonicotinoid insecticides