Effects of the Insecticide Imidacloprid on Fungal Mycelial Growth

Eastern hemlock (*Tsuga canadensis*), a foundation species, is a widespread dominant species in the eastern USA and is associated with a unique suite of habitat characteristics, including dense shade, acidic soils, deep litter layer and cool moist conditions. *Tsuga canadensis* is being attacked by the Hemlock woolly adelgid, which is an aphid-like insect native to Asia that was introduced into the eastern USA in the 1950s. Eastern hemlock has no apparent resistance to Hemlock woolly adelgid, and Hemlock woolly adelgid introduction generally leads to mortality of infested trees within 5–15 years (McClure 1991, Orwig and Foster 1998). A variety of insecticides are capable of controlling hemlock woolly adelgid. The use of a systemic insecticide, imidacloprid, has gained widespread acceptance and use in the plant care industry (Webb et al 2003, Bayer. 1998). There has been a lot of research done on the effectiveness of this solution and the effects of imidacloprid on the overall health of the tree, but there has been very little research into the effects of these treatments on fungi that occupy the soil around the trees. This research hopes to find out if imidacloprid has an effect on the growth of fungal mycelia.

Fungi play an important role in the ecosystem, whether they are being saprotrophic and recycling nutrients, or they are making symbiotic associations with the surrounding flora. As fungal species are lost from a community, there are functional consequences for the productivity of plant life. (Lewis et al, 2008). Fungal communities may respond to ecological disturbance agents such as pollutants, fire or clear-cutting well before plant or animal communities (Durall et al 2005, Houston et al 1998, Pennanen et al 1996, Zak 1992). Imidacloprid, the most widely used chemical to treat Hemlock woolly adelgid is 100% volatile to bees and aquatic life, and it's also toxic to many mammals (Wismer 2004). There isn't much information on the effects of Imidacloprid on fungi, but one study showed an inhibitory effect on fungal numbers after two weeks incubations (Tu 1995).

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