Investigating the potential for non-target impacts of basal bark application of the insecticide, imidacloprid, on the forest arthropod communities in old eastern hemlock (*Tsuga canadensis*) forests in southwestern Nova Scotia

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As the invasive and highly destructive hemlock woolly adelgid (*Adelges tsugae*), or HWA, continues to spread through Nova Scotia, novel treatment methods are being investigated for use against the pest in Canadian eastern hemlock (*Tsuga canadensis*) forests. One such treatment is a basal bark application of the imidacloprid-based insecticide, Xytect 2F™, a product and application method that have not previously been used in the context of an eastern Canadian forest landscape. Prior to the insecticide's adoption in HWA control programs in Canada, studies must be undertaken to better understand the product's potential to cause unintended non-HWA arthropod mortality. In 2020, two old hemlock forest locations were selected for experimental, in-situ trialling of Xytect 2F™. Native and naturalized Forest arthropod communities at both sites were sampled during the summer prior to application (2020) and again during the summer following application (2021) in a series of treated and control forest plots. A range of arthropod taxa were sampled using insect traps placed on the forest floor, in addition to targeted sampling of forest longhorn beetles in the forest subcanopy and canopy layers. By analyzing differences in the diversity and abundance of the target groups between 2020 and 2021, we can detect impacts to these non-target taxa that might be caused by environmental exposure to imidacloprid in their hemlock forest habitats in the first year following treatment.

Keywords: arthropods, insecticides, beetles, eastern hemlock, hemlock woolly adelgid, old forests

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