Efficacy and ecological impact of Neem Oil and *Bacillus thuringiensis* as control agents for the invasive earthworm *Amynthas agrestis* in Vermont Hardwood Forests

This research project investigates the efficacy of two pesticides, approved by the Organic Materials Review Institute, to control the earthworm species *Amynthas agrestis*, and the corresponding ecological consequences. Although there is a wide breadth of literature recording the progression and consequences of invasion by *Amynthas*, the literature lacks the practical application of these studies control of the species in an ecologically mindful manner. There is anecdotal evidence that pesticide application often also reduces earthworm abundance, however, there currently are no pesticides specific for this purpose. As *Bacillus thuringiensis* and Neem oil are relatively benign pesticides and are already widely used in organic agriculture, it is possible that they may have an adverse effect on *Amynthas* and would be readily available for use in heavily infested areas. Ideally, for a control to be considered for use, it would cause maximal *Amynthas* mortality, while conserving other insect and arthropod biodiversity present in the area. To investigate these two components, two research methods will be used: (1) in-field assessment of *Amynthas* populations and arthropod diversity and abundance using pitfall traps and in-plot sampling, within treatment plots placed in an area of established infestation and (2) laboratory assessment of *Amynthas* mortality in controlled mesocosms under the two treatments. Preliminary findings from the field experiment suggest greater earthworm mortality from *Bt* treated plots (p = .0432, .0517 in October and November respectively). From the pitfall traps, a total of 34 families were identified as well as other taxonomic groups. Of these, Isopoda, Formicidae, Trombidiidae, and Phalangidae were the most prevalent taxa. Shortly after the first applications, the abundance and diversity of arthropods decreased. However, subsequent samplings showed similar decreases in the control plots suggesting effects external to the treatments. Further analyses of these data and the execution of the mesocosm study are currently in progress.