

## ML 2015, Ch. 76. Art. 2, Sec. 6a Project Abstract

**PROJECT TITLE:** Sub-project #1: Garlic Mustard Biocontrol: Ecological Host Range of Biocontrol Agents  
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**FUNDING SOURCE:** Environment and Natural Resources Trust Fund  
**LEGAL CITATION:** ML 2015, Ch. 76. Art. 2, Sec. 6a

**APPROPRIATION AMOUNT:** \$570,173  
**AMOUNT SPENT:** \$570,173  
**AMOUNT REMAINING:** \$ 0

### Sound bite of Project Outcomes and Results

We were integral in the release of *Ceutorhynchus scrobicollis* in Canada, the first biological control agent for garlic mustard in North America. We moved closer to federal regulatory approval to release *C. scrobicollis* and *C. constrictus* in the United States. When achieved, these will offer the first viable control of garlic mustard in Minnesota woodlands.

### Overall Project Outcome and Results

Garlic mustard poses significant threats to our forest ecosystem. Research supported by this grant develops effective biological control of garlic mustard in Minnesota, the United States, and Canada, offering the first viable control option for this troublesome invasive plant. We gained a recommendation that *Ceutorhynchus scrobicollis* be considered for a release in the U.S. from the APHIS PPQ Technical Advisory Group. In follow-up consultation between USDA-APHIS-PPQ and USFWS, questions were generated that were intended to expedite writing the Biological Assessment for *C. scrobicollis*. Funding from this grant enabled us to address those questions with specific research on three federally listed species. COVID-19 altered our timeline, yet we will be submitting the third edition of the response in August 2021. This funding supported Entomology PhD candidate Mary Marek-Spartz analyze predictive tools used to determine the expected range of biological control insects introduced to a new region, define specific biological thresholds of *C. scrobicollis*, and develop a novel biennial stage-structured plant-herbivore population model. She improved the accuracy of this model through data generated in our monitoring efforts funded from this grant. Also supported on this grant, Project Scientist Dr. Katovich further defined the vernalization requirements for a garlic mustard which will greatly improve the accuracy of the projected range of garlic mustard in the US, a key factor in determining the risk of introducing specific biological control insects to North America. Additionally, she completed host specificity testing for *C. scrobicollis* and made significant progress towards completing the registration package for *C. constrictus*. We have a draft of the petition for the release of *C. constrictus* for biological control of garlic mustard. Due to technical difficulties in rearing threatened and endangered species out of their normal habitats, we will complete the few species needed at CABI, Delémont CH.

**Project Results Use and Dissemination** Knowledge gains have been distributed widely through professional and land manager meetings. Additionally, we presented our findings to our colleagues at the triennial International Symposium on the Biological Control of Weeds, hosted in 2018 by our cooperators from CABI, CH.

Generations.py is a software program publicly available with a novel biennial component enabling modelers to improve predictions of the dynamics and biology of biennial organisms. We played a key role in the first release of a biological control insect for garlic mustard in North America. Additionally, four to six papers will be published in professional journals. A petition for the release of *C. constrictus* will be submitted to USDA APHIS PPQ TAG this fall or early next spring.