Developing Biological Control of Garlic Mustard

Conservation
CS-1146

Background:

Garlic mustard (*Alliaria petiolata*), an introduced European species, is one of the most serious invasive species in the Northeastern, Southeastern, and Midwestern United States. It replaces native spring wildflowers in forest communities. Physical, mechanical, and chemical means have failed to provide long-term control. However, the development of biological control appears to be a viable option for the ecologically-sound management of garlic mustard.

Objective:

The objective of this project was to develop and implement a standardized monitoring protocol to assess the impact of released biocontrol agents on target plant (i.e., garlic mustard) and associated plant communities.

Summary of Process/Technology:

Personnel at CABI Bioscience Center in Switzerland performed detailed investigations on the ecology, life history, and impact of six potential biocontrol agents for garlic mustard in Europe and determined their host specificity. To assess the impact of the release of biocontrol agents on garlic mustard and native plant communities, a standardized monitoring protocol was developed. Field sites were visited, twice annually, at established long-term monitoring sites in the Northeastern and Midwestern United States. Data was collected on garlic mustard performance (height and seed production) and abundance (presence/absence, number of stems, cover, and biomass) at sites in North America and in Europe. In addition, data on the presence of herbivores attacking garlic mustard in North America was recorded. Basic site-specific parameters (exposure, overstory species, soil types, etc.) were recorded to evaluate the influence of habitat types on the control success. Data collections occurred in the spring and fall.

Benefit:

The development and implementation of biological control programs offers an ecologically-sound, cost-effective, long-term management strategy for garlic mustard, thereby protecting numerous native species and their habitats.

Accomplishments:

Six beetle species were evaluated for their impact and host specificity in Europe. Of these, four showed great promise for garlic mustard biocontrol. In particular, *Ceutorhynchus scrobicollis* was observed to have the most potential. This root-mining weevil is active in the fall, winter and spring and reduces the plant survival, plant biomass and seed output, which are key variables in plant population d emography of garlic mustard. A standardized monitoring protocol was developed that incorporates measures of control agent abundance and feeding, garlic mustard performance, and the response of the associated plant community. This protocol was tested at four field sites followed by a workshop to introduce land managers to the procedures. In addition, a long-term monitoring program was developed that will be important in evaluating the success and safety of biological control of garlic mustard. This project was completed in FY 2002.

Photo by Victoria Nuzzo

Garlic Mustard

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