Report for 2005DE55B: The Impact of Predation on the Galerucella Beetle, a Purple Loosestrife Biocontrol Agent

Publications

- Water Resources Research Institute Reports:
    - Hough-Goldstein, Judith, and Jason Graham, 2006, The Impact of Predation on the Galerucella Beetle, a Purple Loosestrife Biocontrol Agent, Delaware Water Resources Center, University of Delaware, Newark, Delaware, 13 pages.
- Other Publications:
    - Boyd, Amy, ed., 2005, Delaware Water Resources Center WATER NEWS Vol. 6 Issue 1 "DWRC Announces New Undergraduate Interns for 2005 – 2006", http://ag.udel.edu/dwrc/newsletters/Summer2005.pdf, p. 4-5.

Report Follows

Undergraduate Internship Project #3 of 17 for FY05

Jason Graham's internship was one of two ***DWRC / University of Delaware College of Agriculture and Natural Resources*** co-sponsored internships, both advised by Dr. Judith Hough-Goldstein of the ***UD*** Department of Entomology and Wildlife Ecology. Dealing with purple loosestrife, an invasive plant clogging Delaware freshwater ponds, his project was titled "*The Impact of Predation on the* **Galerucella** *Beetle, a Purple Loosestrife Biocontrol Agent*". Jason hopes that beetle biological controls he applied to loosestrife at Flat Pond near the Chesapeake & Delaware canal will reduce these stands significantly.

"It was very rewarding to research in greater depth some of the observations made last summer working with the Purple Loosestrife Project. Our efficiency increased, allowing us to make a greater impact in preserving the biodiversity of the wetlands." -- Jason Graham (pictured above, left)

Abstract

During the summer of 2004, two species of *Galerucella* beetle were released in two distinct ecosystems to control stands of the invasive plant, purple loosestrife. These two species, *G. pusilla* and *G. calmariensis*, are indistinguishable by the unaided eye and were reared and shipped together from the Phillip Alampi Beneficial Insect Laboratory, New Jersey Department of Agriculture.

The ecosystems were distinctly different in that Flat Pond, bordering the C&D canal is a near monoculture of purple loosestrife while the stand of loosestrife at Burrows Run, Ashland Nature Center is mixed with a diverse selection of plants. The *Galerucella* beetles were successful in establishing at Flat Pond, while they were not successful at establishing at Ashland.

These observations led to the hypothesis that the high diversity of plants at Ashland resulted in more arthropod predators as opposed to the less diverse Flat Pond. Therefore the beetles at Ashland were impeded in their establishment by arthropod predators. This hypothesis was tested by sampling the insects at both sites on a weekly basis throughout the summer of 2005.

The sampling consisted of 20 sweeps with a standard insect collection net at five locations at each of the two sites on a weekly basis. The samples were conducted throughout the summer and the specimens collected were keyed to the family level. This enabled the determination of what predators were prevalent during what points in the summer. Predators were present at both sites, yet there were differences in the types of predaceous arthropods present. There was a higher occurrence at the Ashland site of most

predaceous groups. The trend at Ashland shows a higher population of Heteroptera in early June, the same time period that the *Galerucella* beetles were released the year before.