

Management Methods: Biological Control

MONITORING BIOCONTROL: PURPLE LOOSESTRIFE AT RACHEL CARSON NWR

Why Monitor?

Monitoring is a critical component of any biocontrol effort. The data collected during monitoring can be used to measure how effective biocontrol agents are in suppressing a particular invasive plant population, and can contribute to the overall scientific basis and success of biocontrol on a larger scale.

Sensitive Habitat

Long-term monitoring is an important element of the biocontrol program at Rachel Carson NWR in Maine. The refuge uses biocontrol to manage purple loosestrife (*Lythrum salicaria*) at four sites, including a sensitive freshwater marsh habitat. Purple loosestrife occurs in six different areas of the refuge, infesting a total of about three acres. Hand-pulling is used to control smaller infestations (less than 20 plants) of purple loosestrife in other areas of the refuge. In honor of the refuge's namesake, herbicide use is kept to a minimum.

Releases

Purple loosestrife is a perennial European herbaceous plant that can invade wetland communities in North America. Since 1992, four insect species have been released to control purple loosestrife in at least 34 states in the United States.

Protocols

Rachel Carson NWR uses standardized biocontrol monitoring protocols developed by Bernd Blossey at Cornell University (Ithaca, NY). These protocols are made available to practitioners nationwide to help gather standardized data from the release sites across the varied climate zones and landscapes in the United States where purple loosestrife occurs.

Protocols are designed to balance scientific sophistication with ease of application. Biocontrol programs require long-term monitoring (over 10 years) and Blossey's protocols can provide methodological consistency even if individuals performing the monitoring change over time.

Baseline Data

As suggested in the protocols, refuge managers at Rachel Carson NWR initiated their biocontrol monitoring program prior to releasing two biocontrol beetle species (*Galerucella californiensis* and *G. pusilla*).

They collected data about the purple loosestrife population so that they would have a baseline by which to measure any changes that occur after biocontrol agents were

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released. In addition, information about the release site characteristics and habitat type were also recorded.

Results

Three years later, the same purple loosestrife data were collected, as well as data about *Galerucella* beetle abundance and extent of damage to the purple loosestrife plants.

Their data indicate that

1. beetle populations successfully established
2. beetles extensively attacked purple loosestrife plants
3. purple loosestrife cover, stem density, and plant height decreased compared to data collected prior to beetle releases

National Level

Because standardized protocols were followed, monitoring data collected by staff at Rachel Carson NWR can be compared with other release sites throughout the United States where the same methods are used.

With an estimated 100 release sites where these monitoring protocols are being used, Blossey hopes to create a centralized database where the information can be stored and accessed through the Internet. Eventually, these data will help evaluate the success of the purple loosestrife biocontrol program on a national scale, and increase knowledge of and ability to predict outcomes of future biocontrol releases.

Local Level

The Rachel Carson NWR also makes an important contribution to purple loosestrife biocontrol efforts on a local level. The refuge shares their knowledge and biocontrol insects reared through their *Galerucella* rearing program with other agencies, conservation groups, and nearby communities. They host many workshops and have developed a detailed *Galerucella* rearing guide and a number of outreach materials to help others in their community to use biocontrol effectively.

Learn More

Purple Loosestrife Monitoring Protocol
www.invasiveplants.net

Biology and Biological Control of Purple Loosestrife
<http://www.invasive.org/weeds/loosestrife/>

Galerucella Rearing Guide
<http://www.yorkswcd.org/Invasives%20Files/Beetle%20Rearing%20Protocol.pdf>

Rachel Carson National Wildlife Refuge
<http://www.fws.gov/northeast/rachelcarson/>