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BIOLOGICAL CONTROL

A Guide to Natural Enemies in North America
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Galerucella calmariensis and *G. pusilla* (Coleoptera: Chrysomelidae)

These native European beetles were introduced to North America in 1992 as part of a 5-15 year program to control purple loosestrife, an exotic weed infesting North American wetlands. Release sites were New York, Pennsylvania, Maryland, Virginia, Minnesota, Oregon, and Washington state in the United States, and sites in Canada. Since 1992, releases have been made in Ohio, Indiana, Illinois, Iowa, Michigan, Wisconsin, South Dakota, Colorado and Montana. Colonization of these introduced populations appears to have been successful.

Appearance

G. calmariensis: Light brown, usually with a black triangle or a broad, dark stripe on the thorax. The body has parallel sides, is 3-5 mm long and half as wide, and is punctuated with coarse dots and fine, dense hairs.

G. pusilla: Light brown, usually with a narrow dark stripe on the thorax. The body has fine, dense hairs, parallel sides, is 3-4 mm long and about half as wide, with a slight narrowing toward the head. *G. pusilla* is also punctate, but less coarsely so than *G. calmariensis*.

Habitat

Purple loosestrife is a weed species in wetlands over much of temperate North America, and the aim of the introduction program of *G. calmariensis* and *G. pusilla* is to locate the releases so that these beetles will be able to easily colonize and spread. Currently, purple loosestrife exists in monotypic stands throughout the northeastern U.S. and southeastern Canada, the Midwestern U.S., and in isolated locales in the western U.S. and southwestern Canada. Irrigation systems provide conduits for its spread in dry areas.

Pests Attacked

G. calmariensis and *G. pusilla* are considered host-specific to purple loosestrife (*Lythrum salicaria*). Before introduction to North America, approximately 50 native plants, including some close relatives of purple loosestrife, were tested for susceptibility to these beetles. Only winged loosestrife (*Lythrum alatum*) was a potential host, and under field conditions in Europe, it was determined that if given a choice, *G. calmariensis* and *G. pusilla* avoided the North American native.

Life Cycle

G. calmariensis and *G. pusilla* have very similar life habits. Adults emerge in spring from hibernation in leaf litter and feed on the new leaves and shoots of purple loosestrife. The egg laying phase lasts approximately two months in the spring and eggs are laid in clusters of two to ten daily on the plant stem and in the leaf axils. A female can lay 300-400 eggs per year, and the adult lives 8-10 weeks. Larvae feed on bud, leaf, and stem tissue. Pupation takes place in the soil or ground cover near the plants. From egg to adult takes about 6 weeks, and there is generally one generation per year.

Adults are very mobile and successful in seeking out new stands of purple loosestrife. Most searching for a host plant occurs after hibernation when plant growth is at a peak, and again following the emergence of new beetles in July and August. Once a host has been located, migration slows. The overwintered adults die by late June, soon after the reproduction phase has been completed.

Top: A large stand of purple loosestrife. Photo: R.A.Malecki

Center: Galerucella adult. Photo: B.Blossey

Bottom: Leaf damage caused by Galerucella. Photo: B.Blossey

Relative Effectiveness

In Europe, there are several insects which act together to control purple loosestrife. As a result, only small, scattered stands of the plant exist. The current program includes the introduction of these *Galerucella* spp., the weevil *Hylobius transversovittatus* and the planned release of two flower-eating species which are also specific to purple loosestrife. It is predicted that upon establishment of these species, North American purple loosestrife will be reduced by 90% over approximately 90% of its present range.

Plants growing in high water and in shade are not hospitable sites for *Galerucella*.

Pesticide Susceptibility

Early indications are that the *Galerucella* spp are very susceptible to pesticides; exposure should be strictly avoided. Conservation sites where purple loosestrife is continuously distributed and which are free of standing water most of the year are optimal. To establish a colony of *Galerucella* will probably take 7-10 years and the site (5-10 acres is adequate) should be safe from land development and broad spectrum

insecticides during that time.

Commercial Availability

Not available commercially at this time.

Acknowledgments

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