
Ontario Beetles

Galerucella beetles for purple loosestrife biocontrol

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Frequently Asked Questions about the classical biological control of purple loosestrife

In 1992, the Canadian and American governments approved the release of two species of leaf-feeding beetles, *Galerucella pusilla* and *G. calmariensis*, as classical biological control agents against purple loosestrife, *Lythrum salicaria*, in North America.

Why was purple loosestrife targeted for control in North America? Purple loosestrife is a herbaceous perennial that is an exotic species in North America, having been imported from Eurasia early in the 19th century. Populations of this plant now can be found across the continent in all types of wetland habitats. Purple loosestrife can grow in large, dense, virtually-monospecific stands that persist for many years. It can outcompete and displace other plant species, resulting in reductions in abundance of native plants and animals in affected habitats. For more information, request to see our Technical Support Document #2, “Is purple loosestrife really the problem that it was once thought to be?”

What is the "theoretical" reason that exotic species can cause ecological problems in their new habitats? When a species from one continent is transported to another, it usually leaves behind the complement of natural enemies that, through predation, parasitism or herbivory, keep this species in balance in its native ecosystem. With no specific natural enemies to restrict their population growth in their new habitat, some exotic species develop larger, more invasive populations than would ever occur in their area of origin.

What is classical biological control? The basic principle of classical biological control is that populations of organisms can be regulated by the actions of their natural enemies (predators, herbivores, pathogens and parasites). The fundamental technique of classical biological control is to reunite an exotic pest species with some of its traditional natural enemies in the hope of reducing the pest's populations to ecologically tolerable levels. For more information, request to see our Technical Support Document #1, “What happens to the *Galerucella* beetles when the purple loosestrife plants are gone?”

What is the principle concern about introducing a living biological control agent to control a weed species? Once a biological control agent becomes established in the new environment, it is virtually impossible to remove it. Thus, prior to an introduction, the primary concern is that the agent will be specific to the targeted plant species. Well-established protocols exist to assess the host range of potential agents, which are usually required to be virtually or absolutely specific to their host plant, before they are considered for importation. For more information, request to see our

Technical Support Document #3, “What is the potential for non-target effects when releasing *Galerucella* beetles to control purple loosestrife?”

What is the history of the biological control efforts against purple loosestrife in North America?

Classical biological control is thought to be the best option for achieving the long-term suppression of purple loosestrife (for more information see our Technical Support Document #4, “Are there other effective means of controlling purple loosestrife?”). Searching for suitable biological control agents, biologists assessed two species of *Galerucella* beetles in trials conducted from 1987 to 1991. The *Galerucella* beetles did feed on several non-target plant species examined in their tests (notably, *Lythrum alatum* and *Decodon verticillatus*), however the beetles did not feed on these other species if allowed to choose between them and purple loosestrife. It was concluded that damage to these species by *Galerucella* beetles would be negligible when compared with the threat of displacement posed by purple loosestrife itself. After evaluating the results of the specificity trials, regulatory experts in both Canada and the USA approved the release of the two *Galerucella* species in North America in 1992. By 2002, nine Canadian provinces and over 25 American states had become involved in successful field release programs using *Galerucella* beetles.

Can the biological control agents eradicate purple loosestrife at a release site?

No, this type of release program cannot result in the eradication of the pest (host) species. The beetles can only survive on purple loosestrife, so they will not eradicate their only food source. This being said, the biological control program can result in greatly reduced (90-99%) purple loosestrife populations. Such populations will come to resemble those found in Europe - where purple loosestrife is not an invasive pest species. With the decreased availability of host plant material, beetle populations will become smaller locally, however the adult beetles will fly and move to neighboring loosestrife infestations. At a release site, some beetles will survive into perpetuity, constantly regulating the plant's populations. For more information, request to see our Technical Support Document #1, “What happens to the *Galerucella* beetles when the purple loosestrife plants are gone?”

What can you expect to happen at a release site? The beetles at a newly established release site will be the founders of what should become permanently established populations. It will take at least 2-4 years for the beetles to build up sufficient numbers to have any large-scale impact. The first signs of impact include reductions in plant size and flowering in areas near the release point. Over time, these areas will expand in size and the plants at the centres of these areas will become increasingly heavily damaged by the beetle activity. Once the beetle populations are high enough to prevent flowering, the plants are unlikely to flower again. When the loosestrife plants are severely knocked back in size and number, other plant species will quickly move in to take advantage of the newly-opened, fertile growing areas.

Can we guarantee that every release site will be successful? Unfortunately, the beetles may not thrive at every release site, for various reasons. However, we believe that the release techniques used by Ontario Beetles (e.g. using the proper life stages of beetles reared from well-established sites and proper timing/placement of the release) will result in beetle establishment and plant impact at most sites. In the first several seasons after the release is done, it is especially important not to disturb the release site any more than is necessary, to ensure strong establishment of beetle populations.