

BIOLOGICAL CONTROL

Insects That Attack Invasive Plants In The Okanagan-Similkameen



Produced by the Regional District of Okanagan-Similkameen

Invasive plants or weeds cause serious economic and environmental problems in the Okanagan-Similkameen. They aggressively out-compete desirable vegetation thereby reducing range and cropland productivity, recreational enjoyment and habitat value. Established infestations are difficult to control and often persist for many years, costing landowners time and money.

Chemical and physical control measures can effectively reduce invasive plant infestations in many situations. However, these options can also be impractical, labour intensive and costly. When infestations are large and dense or occur in sensitive habitats, biological control is often the only suitable option for long-term, effective control.

What is Biological Control?

Biocontrol reunites invasive plants with their natural enemies, predominantly insects and plant diseases, in an attempt to suppress weed infestations to a more environmentally and economically acceptable level. **Biological control will not eradicate weed infestations.**

Most of the Okanagan-Similkameen's invasive plants were first introduced to North America from regions of Europe and Asia. In their native range, natural enemies keep invasive plants in balance with their surrounding environment. Some of these enemies are so specialized that they depend exclusively on their host plant or group of closely related plants for survival & reproductive success.

Finding potential biological control agent begins by studying these natural enemies. When a candidate bioagent is identified it is tested for host specificity to the target weed as well as potential for damage to closely related native plants and agricultural crops. This research requires years of evaluation and testing and many stages of approval before the agent is ready for release. While these pre-release studies are costly, they are justified expenditures when considering the potential control benefits obtained, specifically in terms of cost savings from increased crop yields and reduced needs for other control methods, as well as the undetermined benefits to previously displaced native plants and wildlife.

How do Biological Control Agents Reduce the Impact of Invasive Plants?

- ★ Destroys vital plant tissues and functions
- ★ Increases stress on weeds thereby reducing their competitive ability
- ★ Reduces seed production

Successful biological control is generally achieved by using a variety of agents that attack different parts of the weed throughout its lifecycle.

Be Patient. Biological control is a gradual process. It may take several years for bioagents to build to an adequate number to provide effective control. You can assist this process by restricting herbicide use and not mowing in areas close to the release site. When insects increase in number and the host weed infestation becomes less abundant, bioagents search for other stands of their host weed. This natural dispersal yields a long-term, self-sustaining method of control.

Are You Interested in Biological Control on Your Property?

Is biological control the right option for your property? Check the list below to see if the invasive plant problem on your land meets the criteria for a potential release site.

- ✓ Sizeable weed infestation, one acre or more;
- ✓ Will not be treated with herbicide;
- ✓ Soil disturbance, such as vehicular traffic or cultivation is minimal; and
- ✓ Agents are available for your target species

It will be necessary to have a weed specialist conduct a site visit to determine whether this option is suitable for your property and to identify if bioagents are already present. Regular monitoring will be required to determine insect establishment and success.

RESOURCES

For further information on invasive plants contact the Regional District of Okanagan-Similkameen at (250) 492-0237 or toll free at 1-877-610-3737.

Information is also available on the following websites: www.rdos.bc.ca or www.weedsbc.ca
For more specific information on biological control, link to the Ministry of Forests and Range website at www.for.gov.bc.ca/hfp/biocontrol/bcmatrix.htm

Updated March 2010

Information compiled by: L. Scott and K. Robbins
Editorial comments provided by: D. Ralph and M. Betts, Ministry of Agriculture and Lands
Photos provided by: L. Scott, B. Van Hezewijk, Dr. R. DeClerk-Floate, United States Dept. of Agriculture

Financial support provided by:



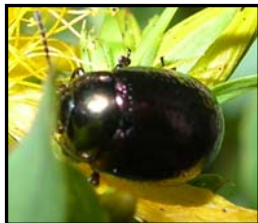
Bioagents Available for Release in the Okanagan-Similkameen

Hound's-tongue (*Cynoglossum officinale*)



Mogulones crucifer is the first biological control agent approved for hound's-tongue control within Canada. These root-mining weevils are oval-shaped and blackish brown with a distinctive white cross marked at the centre top of the wing covers. Young weevils and larvae weaken hound's-tongue by feeding primarily on the root, but they have also been observed to attack other parts of the plant. These bioagents are extremely fast acting, often attacking hound's-tongue so aggressively that they eat themselves out of house and home.

St John's-wort (*Hypericum perforatum*)

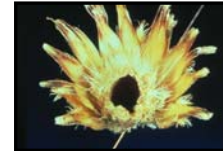


Adult ***Chrysolina*** beetles feed on flower buds and terminal leaves of St. John's-wort during the summer, while the larvae feed nocturnally on shoot tips and new leaves in the spring. Adults are a distinctive metallic bronze-, blue, green- or purple-colour. Feeding reduces foliage and lowers food reserves. This bioagent is considered highly effective.

Diffuse and spotted knapweed (*Centaurea diffusa* and *Centaurea biebersteinii*)

Twelve bioagents have been released in BC. This brochure highlights some of the most effective species.

★ ***Larinus minutus*** and ***L. obtusus*** adults feed on young knapweed leaves and flowers during the spring/early summer and their larvae consume the entire contents of the flower head in which they were laid. When established these brownish-grey weevils will significantly damage knapweed plants and reduce seed-output.



★ ***Cyphocleonus achates*** is a large, mottled grey-brown weevil that feeds on knapweed foliage throughout its 10-week lifespan in the summer. The larval, or overwintering stage, provides the most damage as it tunnels through and feeds on root reserves until pupation the following spring.



★ ***Sphenoptera jugoslavica*** is a dark copper to black, elongated beetle that emerges in July. The larvae have an enlarged head and a long thin body. Larvae cause gall-like swelling in the roots near the crown, stunting knapweed growth and reducing flower production.



Purple loosestrife (*Lythrum salicaria*)



Galerucella californiensis and ***G. pusilla*** beetles are reddish-brown with black markings. Adults emerge in May and feed on shoot tips and young foliage. Larvae develop during late spring/summer, feeding initially on leaf and flower buds and then on all parts of the plant. After pupae develop into adults, they will again feed on foliage prior to hibernation. *Galerucella* will often completely defoliate plants to the point where they are incapable of blooming.

Dalmatian toadflax (*Linaria dalmatica*)



Mecinus janthinus directly weakens Dalmatian toadflax by attacking the centre of the shoot, yielding plants with stunted growth, reduced flowering and wilted shoots. This black weevil feeds on the external foliage in May and produces larvae from June to July. Larvae hatch within a week and feed from within the plant, damaging growth tissues. You can confirm the presence of *Mecinus* by looking for 'shot holes' through the leaves and pinpricks on the stems.

The larvae of the ***Calophasia lunula*** moth



are a pearl colour with five distinctive yellow stripes along the back and sides. Adults are pale to dark brown with a white crescent marking on the central portion of the wing. Larvae feed on Dalmatian toadflax leaves during the summer, chewing from the outside edge inwards, which also weakens plants by damaging growth tissues.

Tansy Ragwort (*Senecio jacobaea*) - Hope for the Future: Although tansy ragwort is primarily thought of as a coastal species, the largest provincial infestation occurs at Okanagan Mountain located northeast of Penticton. To date, biological control has not been successful in comparison to the coast. The most effective agent - *Longitarsus jacobaeae* – is a fall breeder along Vancouver's coastline, which does not bode well for the higher elevation sites in the Okanagan. However, scientists have discovered a higher elevation Swiss strain of this beetle that breeds during the summer months. Testing has shown this strain to be a suitable bioagent for release in the Okanagan. A release of this insect is anticipated to occur in 2010 or 2011 in the Okanagan Mountain area. The area will be closely monitored.