

Biological agents will not eradicate the weed population because they depend on the weed for their life cycle. Insect species lay their eggs on these weeds and progress through their development while feeding on these weeds.

### What You Can Do

Landowners need to be patient in waiting for the benefits from introduced enemies of noxious weeds. Because biological control is a gradual process it will take time to see results. Landowners can help the process by restricting their use of herbicides and insecticides at or near insect release sites, thus enabling beneficial insects to multiply without harm from agricultural chemicals. Still it can take many years to build up adequate numbers of a weed's natural enemies at any specific location. When the insects increase in number and knapweed becomes less abundant, the natural enemies search for other stands of the weed to attack. This process will continue for as long as the noxious weeds are present.

Landowners and outdoor enthusiasts can help by being conscientious and careful not to spread noxious weeds into new areas.

Noxious weed seeds travel along unobtrusively on vehicles driven off maintained roads. Bumpers, doors, and undercarriages should always be checked before moving a vehicle to make certain the weeds are cleared away. Seeds also travel along in hay and as a contaminate of forage seed and grain. Hay contaminated with noxious weed seeds should not be moved. Cultivating equipment and trucks should be checked before being moved to make sure that the weed has been cleared away.



Through conscientious monitoring of land-use habits, landowners and recreationists can help control the spread of noxious weeds.

*Are you interested in having biological agents released on your property?*

If you have a sizeable weed infestation on your property, one acre or more, it may be possible to use biological agents. Potential areas for bioagent release should be free of vehicular traffic and insecticide use. The presence of livestock is fine.

If a release is made on your property, we ask that you allow access to the site for approximately seven years. It will be necessary to monitor the sites to see if the insects are able to establish. If they do establish and the population becomes high enough, then collections will need to be made for further redistributions.

If you would like to be placed on a list to have biological control agents released on your land, please contact:

Okanogan County  
Noxious Weed Control Board  
P.O. Box 791

Okanogan, WA 98840  
Phone: 509-422-7165

Email: [noxiousweeds@co.okanogan.wa.us](mailto:noxiousweeds@co.okanogan.wa.us)  
Website: [www.okanogancounty.org/nw](http://www.okanogancounty.org/nw)

or

Dale Whaley  
WSU Douglas County Extension  
P.O. Box 550  
203 S. Rainier St.  
Waterville, WA 98858

Okanogan County  
Noxious Weed Control Board

## BIOLOGICAL CONTROL OF NOXIOUS WEEDS



Larinus minutus  
Knapweed weevil

Okanogan County  
Noxious Weed Control Board

1234 2nd Avenue S.  
Suite B

Okanogan, WA 98840  
Phone: 509-422-7165

Email: [noxiousweeds@co.okanogan.wa.us](mailto:noxiousweeds@co.okanogan.wa.us)  
Website: [www.okanogancounty.org](http://www.okanogancounty.org)

## What is Biological Control?

- Bio-control is the intentional use of living organisms (insects) to try to suppress the population of a pest (noxious weeds) to an acceptable level. These insects are natural enemies of the targeted weeds that come from the weeds' native ecosystem.
- Biological agents are discovered and tested by the USDA Agricultural Research Service European Biological Control Laboratory. Insects are tested extensively to be specific to the plant being targeted for biological control.
- Once insects are introduced it must be seen if they will become established. If the bio-control agent does establish, it may take several years (5-7) for the agent to reach a density where it will have an impact on the weed.
- Biological control agents impact weeds in 2 ways:
  - The direct impact destroys vital plant tissues and functions.
  - Indirect impact increases stress on the weeds, which may reduce their ability to compete with desirable plants.

## Bioagents Available for Purple Loosestrife



*Galerucella pusilla* feed on the leaves and buds of purple loosestrife. Feeding on the leaves defoliates the plants so completely that they are often killed. The resulting seed reduction is especially important whereas a single plant can produce up to two million seeds.



## Bioagents Available for Diffuse and Spotted Knapweed



*Larinus minutus* is a brown-grey weevil with a very large, bulbous snout. It measures 4-5 mm in length. The larvae destroy up to 100% of the seed in an infested knapweed seedhead. This weevil along with other seed feeders will further reduce the seed that spotted and diffuse knapweed are dependent on for reproduction, dispersal, and survival.

*Cyphocleonus achates* is a large weevil that prefers spotted knapweed, but will attack diffuse knapweed. The larva mines down into the root and feeds on the root reserves.



*Sphenoptera jugoslavica* is a flat, metallic, copper colored, elongated beetle measuring 7 mm long. The larvae have an enlarged head and a long thin body. The larvae cause a gall-like swelling in the knapweed root near the crown. Small knapweed rosettes that have been attacked often die by the end of the next season. Diffuse knapweed plants that survive are stunted and produce less flowers. After 5 to 6 years, the knapweed population may collapse with only scattered plants remaining.

*Urophora affinis* larvae form a gall in the seed head, which is a hard shell that they live in during all their life except for the adult stage. This stresses the weed, and it also slows the seed production of the plant by up to 40%. They are usually 4 mm long, black, and have faint horizontal bands along the wings.



## Bioagents Available for Dalmatian Toadflax

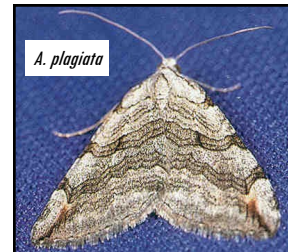


*Calophasia lunula*, a caterpillar, was released for the first time in 1991. It feeds on the plant, defoliating it. It is difficult for this insect to over-winter and become established in our county.

*Mecinus janthinus* is a weevil that we have recently been releasing. This bio-agent mines the stem's larva and feeds extensively on the stems and leaves of the plants as adults. The stem mining by the larva causes premature wilting and suppresses flower formation which results in reduction of seed production.

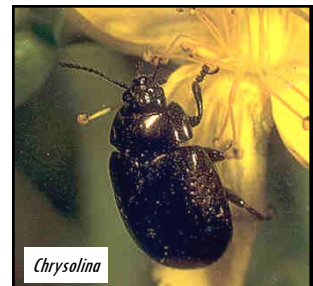


## Bioagents Available for St. Johnswort



*Aplocera plagiata* larvae, resembling an inchworm, attack the leaves and flowers of St. Johnswort. Feeding reduces foliage and lowers root reserves.

*Chrysolina* species, both adults and larvae, attack the leaves. Feeding reduces foliage and lowers food reserves, making it difficult for plants to survive harsh conditions.



## Why use Biological Control?

- The use of biological agents is cost effective. After the initial introduction of the species, little management or input is needed to maintain the population. Biological agents also reduce the need for chemical or mechanical control.