



Some Wyoming invasive weed areas are biological warfare battlegrounds

By Travis Ziehl

Biological warfare has been banned since the Geneva Convention of 1925, right?

What if I told you biological warfare is going on right here in Wyoming, maybe even on your land or your neighbor's property?

The biological warfare I'm referring to is being conducted by local weed and pest control districts in response to declared and designated noxious weeds. These programs date back to at least the 1970s and primarily use insects to control invasive weeds.

The weeds targeted for biological control are introduced and invasive species, often from other continents. They have become problematic by out-competing native biodiversity for resources. One of the reasons is these plants are in an environment in which they have no natural enemies. The biological control program seeks to find insect "enemies" from the weed's native range and use them to help control the invader.

Biological Control Successes

There have been several successes in this biological control program. Multiple insect species, such as gall forming wasps, seed head weevils, and root mining weevils, have been released on many problematic thistles and knapweeds such as Canada thistle, musk thistle, spotted knapweed, diffuse knapweed, and Russian knapweed. These insects attack

Dalmatian toadflax infestations can create near monocultures causing a multitude of natural resource issues.

Since being introduced in 1995, the weevil has been shown to reduce densities of Dalmatian toadflax by more than 75 percent.



The Dalmatian toadflax stem mining weevil attacks this noxious weed from the inside weakening the plant and reducing infestations.



Mecinus janthinus is the stem mining weevil that attacks Dalmatian toadflax.

the plant in a variety of ways, from insects that eat seeds in the flowers to others that cause energy draining galls, and even ones that mine into the roots. These insect attacks collectively stress the weed and combine to reduce its vitality and reproductive potential.

There are also insects available for control of leafy spurge, yellow and

Dalmatian toadflax, common mullein, St. Johnswort, and purple loosestrife.

A specific success story is the introduction of the stem mining weevil, *Mecinus janthinus*, on Dalmatian toadflax. Dalmatian toadflax is an aggressive invader that spreads by producing thousands of seeds and an advantageous rhizomatous root system. Upon introduction, toadflax quickly creates monocultures, reduces forage value of rangelands, and it can contribute to erosion on steep slopes as it displaces bunchgrasses.

Dalmatian toadflax is difficult to control with herbicides as it has a very waxy leaf surface that herbicides have trouble penetrating. The stem mining weevil attacks the plant in several phases of its life cycle, including causing stem mortality as well as feeding on the leaves and flowers. Since being introduced in 1995, the weevil has been shown to reduce densities of this difficult invasive weed by more than 75 percent.

Remember, these kinds of biological controls are usually considered the best option for large-scale

weed infestations and often take several years to establish before results are noticed. Some weed and pest control districts provide cost-share on biological controls and others provide them at no cost; it varies by district – yet another reason to contact your local district to determine what assistance is available.

The Wyoming Weed and Pest Council (www.wyoweed.org) has been an active participant in getting these biological control agents imported to North America. The process is lengthy. Before an insect can be introduced as a biological control agent, it first must be tested in overseas laboratories to determine it won't attack any native plants or become problematic in other ways. Before it can be introduced, an insect goes through a rigorous process of quarantines, and the request advances in a process of petitions and permitting. Although time consuming, it is often worth the wait as weed species targeted for biological control occupy thousands of acres across Wyoming.



Dalmatian toadflax dominates this scenic view.

Other Forms of Biological Control

Beyond the use of insects to control weeds, there are other forms of biological control. People can use timed grazing to control certain types of invasive weeds. This process can cause additional stresses on the target weeds and, with proper management, can reduce targeted weed infestations.

This grazing approach often uses goats and sheep to intensely graze infestations (see "Weed warriors purge their spurge" in the Spring 2009 *Barnyards & Backyards* magazine at <http://barnyardsandbackyards.com/articles.htm>), and these animals often receive "training" to acquire a taste for the target plant. The animals are fed the targeted species and learn to acquire a taste for the target. Additionally, there is ongoing research at the University of Wyoming College of Agriculture on different types of pathogenic fungi used to control epidemic levels of grasshoppers. Also, the use of fungi is an



Crews carefully release new stem mining weevils onto Dalmatian toadflax.

approach that has been looked at and is being researched for other weedy plant species, including the control of cheatgrass with a "head smut" fungus and the control of rush skeletonweed with a pathogenic rust fungus.

What about the Future?

What does the future hold for Wyoming's biological warfare program? There are several insects in various stages of research at Montana State University and the University of Idaho (UW lacks necessary quarantine

facilities for such work) for such noxious weeds as houndstouge, whitetop, perennial pepperweed, and several others including species that have current insect releases.

If interested in biological controls or want to find out how you can help, contact your local weed and pest control district (online information at www.wyoweed.org/addresses.html). For more information on using animals as a grazing tool, try www.sheepinstitute.montana.edu or www.wyowool.org/WPGLt/index.htm.

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