



BIOLOGICAL CONTROL OF CANADA THISTLE WITH STEM-MINING WEEVILS



Canada thistle (*Cirsium arvense*) is a vigorous, highly adaptable, highly competitive weed that occurs in a wide range of habitats. Canada thistle is the species most frequently declared noxious under state or provincial weed control legislation in the United States and Canada because it causes extensive crop yield losses. It is listed as “Noxious” under the Alberta Weed Control Act, meaning that the plants must be controlled.

A density of 20 Canada thistle shoots per square metre can cause estimated yield losses of 34% in barley, 26% in canola, 36% in winter wheat, and 48% in alfalfa seed. Field infestations can reach 173 shoots per square metre. The prickly mature foliage is also thought to reduce productivity of pastures by deterring livestock from grazing.

This weed is so hard to deal with because it can propagate through two methods, by seed and by its ability to regrow from its extensive, deep creeping root system. It spreads rapidly by root segments less than an inch in length (so tillage can spread it), and lateral roots 3 or more feet deep give rise to aerial shoots which are sent up at 2 to 6 inch intervals. A single plant also produces an average of 1500 (but up to 5300) bristly-plumed seeds which are easily dispersed by the wind and can remain viable in soil up to 20 years.

It is prevalent in areas that do not allow for chemical/mechanical removal. It has been said “almost anywhere there is water some Canada thistle can be found”, making biological control a natural fit.

The Canada thistle stem-mining weevil (*Hadroplontus litura*, formerly *Ceutorhynchus litura*) occurs naturally in France, Switzerland, Austria, Germany, Britain, and southern Scandinavia. It was first introduced into Canada as a biological pest control agent in 1965 and into the US in the early 1970s.

Eggs are laid in the mid-vein of the rosette leaves in early spring, and hatch after five to nine days. Larvae internally mine the inside of the stem of the thistle plant as the shoot elongates during the summer. Fully developed larvae will exit the plant at the root and enter the soil to pupate. They will emerge again in their adult form later in the summer, and feed on thistle leaves before winter. Adults will over winter in the soil, ready to attack the emerging thistle the following spring. The adults are cold hardy and can tolerate wet spring snow storms, and some light flooding, without difficulty.



When the larvae mine the stem, they consume plant tissue, and leave exit holes when they emerge, which may allow other micro-organisms to enter the thistle stem, with adverse consequences for the thistle.

FREQUENTLY ASKED QUESTIONS:

Will the bugs become invasive? Of course, the answer is NO. They would not be approved as bio-control agents, and therefore would not be allowed in the country, if they were a risk to agricultural crops. The host range of the weevil is restricted to *C. arvensis* and some *Carduus* species (plumeless thistles, but not nodding thistle).

How quickly will they work? Even in the most successful of cases, years are required before an insect can catch up with an exotic weed species. It is not a quick fix, but a permanent, self-perpetuating weed control tactic. Canadian field studies indicate a spread on average of 90 m in 6 years, but results seem to vary regionally. Infestation at several initial release sites located in Bozeman, Montana (where we get the bugs) was slow to expand in the first few seasons, but after ten years weevils were found 9 km from these release sites.



2010



2013

How many insects are enough for my infestation? Unfortunately, it isn't as simple as saying that you need two trays for your two acres of thistle. However, there are three approaches to determining how many you might need/want:

One approach is to inundate your infestation with as many releases as is affordable during the first couple years of introduction. After that, one should make additional releases in isolated areas in future years. This method is the most dramatic. It reduces the time, in years, for an insect to build up and disperse to the limits of your infestation.

Another approach is to release insects into your most critical areas in the first year. Then, reinforce these releases with additional insects in future years. This method strives to achieve a balance between what is affordable and the degree of infestation in your area.

The least costly approach is to introduce one or two releases into your infestation and do nothing more. This method will get a colony started. It may also take many more years for the insect to distribute itself throughout your entire infestation.

For more information: contact Stewardship Alliance for Conservation Agriculture 780-621-8670 or conservationag@westcentralforage.com