Canada Thistle Biocontrol

What is Canada thistle?

Cirsium arvense (Canada-, California-, Creeping thistle) is an invasive plant known to invade open, disturbed habitats. It colonizes new areas through the production of nearly 1,500 seeds per stem. Once established, it spreads through clonal underground shoots.


Spores On Diseased Shoot

How do I recognize it?

Canada thistle is a perennial weed that can grow over 6 ft. tall (more commonly ~3 ft.). Each branch of the plant typically bears 3-5 (dandelion sized) flowers that range from white to purple (more commonly pink). Canada thistle leaves are rigid and glossy, and stems are virtually spineless.

Effects of Canada thistle

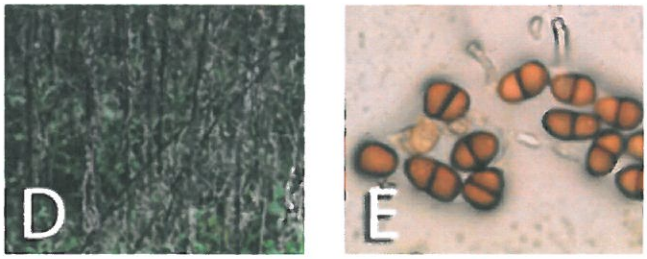
It was introduced to North America in the 1600's from Europe. Today, it is distributed throughout temperate regions of the globe and has become one of the most problematic weeds of crop, range, and pasture lands. Canada thistle is generally unpalatable to grazing animals and continues to cause severe economic losses. Canada thistle can form monocultures that outcompete and replace native plants, invade critical riparian habitat, dominate lawns, and congest roadsides.

Biological control of Canada thistle

Since the 1970's, a Canada thistle gall-fly (Urophora cardui) and a stem-mining weevil (Hadroplontus litura) have been used to control Canada thistle in North America. However, these two insects have been very limited in field settings and are ineffective overall. Recent research now allows us to utilize a host-specific pathogenic rust fungus (Puccinia punctiformis) that was likely introduced with early Canada thistle infestations and is present in nearly every location where Canada thistle occurs.

Life Stages and Cycle of Rust Fungus

In early spring, diseased Canada thistle shoots emerge that appear unusually tall, sparse, and are covered with yellow speckling (spores) on the underside of the leaves (A-B). During this time the diseased stems emit a sweet floral fragrance. In late spring to early summer, diseased shoots will cross with other nearby diseased shoots and the spores on leaf tissues will turn a rusty red-brown color (C). Spores from diseased shoots from the spring will infect neighboring Canada thistle stems throughout the summer via wind-blown spores. Finally, during late summer or fall, diseased stems die and the leaf tissue falls on fall emergent rosettes (D) that allow the fungus to quickly move to the roots where it overwinters (E).



FAQ

What else does the rust fungus attack?

The rust fungus is host-specific, meaning; Canada thistle is the only organism the rust fungus can attack. It is safe to use around water, livestock, and other plants. It does not even attack other thistle species. Once the Canada thistle is gone, the rust fungus dies with it.

Will the rust kill the thistle?

Unlike many classical biological control agents that limit or control the spread of an infestation, the Canada thistle rust fungus has the potential to significantly decrease infestations. This rust fungus has evolved to be very effective at causing thistle mortality. In past trials, the worst case was a 45% reduction of thistles over five years, while the best case was 100% after 18 months...largely dependent on the current density of thistle and surrounding vegetation.

How long will it take to control my Canada thistle?

Because the rust fungus is so effective at killing its host plant, it spreads slowly to ensure new thistles will be present to infect in later years. However, after nearly 100 years of study, we have recently determined the best way to quickly spread the disease. Significant declines in the number of thistle stems can be seen 1-2 years after establishment. By the 3-4 year mark, the thistle is often just a small percentage of its original infestation. Do not be concerned if there appears to be very little diseased plants after rust spore application. The real killing work is done in the root system, so above ground symptomatic stems are typically not an accurate representation of the infection rate overall.

Where can I get some rust and how do I apply it?

Canada thistle rust fungus is likely already nearby your property. It has been found in every state and country where Canada thistle has been found. However, at this time, appropriate application timing and methods are being evaluated in Colorado. Currently, insectary staff conducts the application. In the future, land-owners will likely be able to receive spores from the insectary, or collect spores already present on their land, and spread the rust fungus to new locations.

What is the best release site?

Because the rust fungus lives within plant tissues, environmental conditions are unlikely to affect the rust fungus. As long as there is Canada thistle present, the rust can establish. Shorter vegetation does allow spores to spread faster. Because it is an organism with a complex life cycle, sites with rust fungus are best left untouched (no herbicide, heavy grazing, or short mowing).

Is there a charge for the control?

Canada thistle rust fungus is currently free, as we are in initial testing phases of implementation. All we ask of the land-owner is that they allow us to establish a monitoring transect in the thistle patch that will remain undisturbed for a 3-4 year period. Also, we will need access to the property for one or two days a year to monitor thistle decline.

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