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G80-509 Canada Thistle

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Canada Thistle

The growth and control of Canada thistle is covered here.

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Canada thistle plant

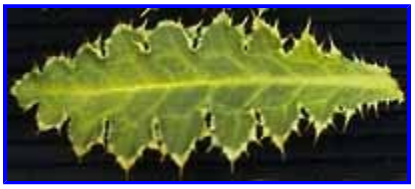
Canada thistle [*Cirsium arvense* (L) Scop.] is a native of Eurasia and was probably introduced to America around 1750. Since that time it has spread throughout the northern part of the United States. Canada thistle is estimated to infest 800,000 acres in northern and western Nebraska.

A perennial that reproduces from seed and by an extensive root system, Canada thistle is dioecious, with the male and female flowers on separate plants. For viable seed to be produced, both male and female plants need to be present.

The number of seed produced per head will vary from 0 to 100, with a large plant capable of producing 5,000 seeds. A high percentage of the seeds will be viable from heads that have been open eight to 10 days after blooming.

Viable seeds generally will not be produced if plants are mowed during the week they bloom. Seeds may germinate once they have left the seed head, or remain in the soil until environmental conditions are favorable. Seed can remain viable in the soil for up to 20 years.

Germination will take place on the soil surface or from soil depths up to 3 inches. Seed is important in the spread of Canada thistle, and can be carried by wind for distances up to a half mile. It also can be carried by irrigation water, streams and rivers, and by man as a contaminant in crop seed.



Leaf (top)

The root system of Canada thistle allows the plant to spread rapidly once it has become established in an area. Nearly all parts of the roots can produce buds that gradually develop into shoots that grow and

form new plants. Root segments as small as 1 inch can produce new shoots.

Canada thistle seedlings that have four true leaves and are 20 to 30 days old can regenerate by their root system. Tillage equipment operated through Canada thistle easily can spread pieces of roots to noninfested areas and result in new infestations.

Leaf (underside)

Heavy infestations of Canada thistle growing in corn, soybeans and wheat have been shown to reduce crop yields by 81, 95, and 60 percent, respectively. Heavy infestations growing in pasture can reduce native grass production by as much as 60 percent. It also harbors insects and is an alternative host for some disease-causing organisms.

Canada thistle produces toxic substances that are released into the soil and inhibit the growth of certain plants. When roots and shoots of Canada thistle were mixed with soil, growth of sugarbeets, wheat, alfalfa and Canada thistle seedlings was reduced.

Canada thistle can be controlled by chemical, mechanical and biological methods. Cultivation has been used to starve the plant roots by repeatedly destroying new shoots. It should be started in May and continued for up to two years at 10 to 15 day intervals during the growing season.

Cultivation can be used in conjunction with herbicides to improve Canada thistle control. In winter wheat fallow areas, cultivation easily can fit into the cropping sequence. Cultivate with an implement that will cut the thistle off about 3 to 4 inches below the soil surface. Begin in May and continue until mid-August. Canada thistle then can be allowed to grow, and treated with a herbicide. Continual cultivation reduces the root reserves that will weaken the plant and make it more susceptible to herbicides.

Crop competition can be an effective tool in Canada thistle control if a vigorous crop is established. Alfalfa and forage grasses have been the best competitors due to the repetitive cutting associated with these crops.

The greatest success has occurred when Canada thistle infestations are weakened by treating with a short residual herbicide before the land is prepared for seeding. Alfalfa and forage grass seeding should be delayed until the herbicide has degraded in the soil.

Flower

Forage grasses differ in their ability to suppress Canada thistle. Intermediate wheat grass and tall fescue reduced Canada thistle density 60 percent when the competitive grasses were combined with mowing.

Several native North American insects can cause damage to Canada thistle, but none has been found to cause sufficient damage to control the plant. Two insects from continental Europe have been established and studied for biological control of Canada thistle; *Ceutorhynchus litura* (F.), and *Urophora cardui* L. (Diptera).

The weevil, *Ceutorhynchus litura* (F.), was released in the United States in several northern states. The insect feeds within the thistle stem from April through June. The adults feed through the summer and overwinter in the soil. Eggs are laid in the spring on early bolting plants.

Flower

The weevil can spread up to 5 miles in a 10 year period and can increase in numbers to infest over 80 percent of the Canada thistle stems. The weevil also can attack the underground shoots of Canada thistle. That weakens the plant and results in death of the shoot over winter.

The weevil alone is not capable of eradicating Canada thistle but could be combined with other biocontrol agents or stresses to reduce thistle vigor.

Urophora cardui (L.) is a black fly of European origin. It induces a large, structurally complex gall in stems of Canada thistle plants. Plants infested with the insect are stunted, and root and stem growth are reduced, but the stress is considered minor in the absence of other thistle control.

Several plant pathogens have been examined for suppression of Canada thistle. The possibility of controlling Canada thistle with thistle rust, *Puccinia punctiformis*, was investigated as early as 1923. Plants infected with thistle rust are stunted, chlorotic, with injury symptoms resembling those caused by a growth regulator herbicide. White mold, *Sclerotinia sclerotiorum* (Lib.) deBary, also may have potential as a biocontrol agent for Canada thistle.

Canada thistle shoot density was reduced 80 percent when plants were inoculated with white mold. Another organism, *Pseudomonas syringae* pv *tagetis*, infests Canada thistle and causes the plant to become chlorotic and in some instances to die.

Thistle plant

Canada thistle rust, white mold, and *P. syringae* are pathogenic to Canada thistle, and by themselves can cause limited injury to the plant. In a similar fashion the insects *C. litura* and *U. cardui* feed on Canada thistle and weaken the plant, but by themselves cannot kill the plant.

Insects, diseases, and crop competition are alternate methods for Canada thistle control. By themselves they cannot eradicate the plant, but when combined in an integrated system they may provide satisfactory Canada thistle suppression.

Herbicides have been used with varying success for Canada thistle control. There are many reasons results from herbicides vary among areas. Numerous strains of Canada thistle exist and these strains vary in their resistance to herbicides. If you have been treating an infestation of Canada thistle for a number of years with limited success, it may be desirable to rotate herbicides.

Control of Canada thistle with herbicides is decreased when plants are under moisture stress. If plants are wilted or soil moisture appears poor in the upper 1 foot of soil, it is desirable to delay herbicide

application until after rainfall has occurred.

The area where the infestation is found will partially determine the herbicide used. No matter what herbicide is used, **Canada thistle cannot be controlled with one herbicide application.** Seedlings may emerge in treated areas for up to 20 years. Once you have controlled the perennial plant you must be on the lookout for seedlings.

The two most effective times for herbicide application to Canada thistle are at the bud stage and during regrowth in the fall. Results from experiments conducted in western Nebraska indicate that herbicides applied in September have generally provided 15 to 20 percent more Canada thistle control than herbicides applied in June (*Table I*). Herbicides such as Banvel, Curtail, Glean/Telar, Roundup, Stinger and Tordon all have been successfully used for Canada thistle control.

Table I. Results from Canada thistle control studies conducted in western Nebraska.

Herbicide	Rate commercial product/acre	Time of treatment	Percent Canada thistle shoot control 1 year after treatment
Banvel	1 qt	June September	81 86
Banvel + 2,4-D	1 qt + 1 qt	June September	54 69
Glean/Telar	0.5 oz	June September	40 77
Roundup	2 qt	June September	20 80
Stinger	0.3 pt	June September	45 57
Stinger	0.6 pt	June September	75 73
Stinger	1.3 pt	June September	90 92
Tordon	0.5 pt	June September	93 88
Tordon	1 pt	June September	92 98
Tordon	2 pt	June September	91 99

Persistence is the key to a successful Canada thistle control program. You must use multiple herbicide treatments to achieve control. Choose control measures that can be used for at least two to three successive years. Thoroughly plan your control program in advance and adhere to it until control is complete. Some examples of possible control schemes are:

1. **Control in corn.** Apply atrazine preemergence to corn growth, follow up with Banvel or Stinger postemergence before corn is 24 inches tall. Treat Canada thistle again in the fall of the year with Banvel, Roundup or Stinger. Follow this program for two or three years.

2. **Control in pasture.** Apply Banvel, Curtail, or Tordon in the spring of the year when Canada thistle is about 10 to 20 inches tall. Follow up with another treatment in the fall if active Canada thistle growth is evident. Follow this program for two to three years.
3. **Control in winter wheat.** Apply Alley or Curtail in the spring to growing wheat before it reaches the boot stage of growth. Treat Canada thistle again after wheat harvest in the fall with either Banvel, Curtail, or Roundup. Follow this program for two to three years.
4. **Control near water.** Apply Rodeo plus surfactant in the spring and again in the fall. Follow this program for two to three years.

See Nebraska Cooperative Extension Bulletin *A Guide for Herbicide Use in Nebraska* for more information on herbicide recommendations.

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