

Organic Noxious Weed Management
Canada Thistle, *Cirsium arvense*
Family Asteraceae

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Canada thistle is one of the top ten worst noxious weeds in Colorado. It is a perennial native to Europe and Mediterranean regions. It is an aggressive invader of distributed areas and can be difficult to eradicate, as the root system is extensive and provides a considerable energy reserves that allows it to regrow quickly after control methods applied.

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Canada thistle's root is vigorously creeping, growing up to 19 feet per season laterally and 22 feet deep. The majority of root development occurs in the top 2 feet of soil. Stems are erect and increasingly hairy as the plant matures. Leaf shape and size is highly variable. Most have wavy edges and spined margins. They are lobed and end in a spike. Leaves may be hairy or glabrous on the underside. Shoots begin to elongate in February and a rosette forms above ground. Stems begin to lengthen as daylight lengths reach 14-16 hours. Flowering occurs from June to October when sunlight is 14-16 hours long. Flowering clusters form on the ends of branches. Color is white, purple, or pink. Numerous spineless bracts are also characteristic. A single seed is formed in a flattened fruit (achene) attached to a tuft of white bristles. Seed are formed from July to October and remain viable for several years. Most spreading results from vegetative buds that arise from the roots.

Control Methods

Hand Weeding: Not effective on a large scale. Hoeing and hand pulling provide temporary control. Hand pulling under wet soil conditions allows for extraction of more roots. Use gloves!

Mechanical: Cultivation schedules have been found to be effective on moderate infestations. Such schedules should start in May and continue for up to two years at 10-15 day intervals during the growing season. Crop competition, such as forage grasses and the usage of goats and sheep, can be an effective tool combined with other management strategies.

Mowing can produce varied degrees of control if the timing is correct. Mowing is a short term method to prevent seed spread. It should be done during the bloom stage only due to the ability to regenerate by small root parts. If late then this strategy will only spread seed. It is helpful for reducing photosynthesis and additions to carbon reserves in the roots.

Biological: *Ceutorhynchus litura* weevil adults feed on leaf and stem tissue and they make cavities in the midrib of the leaf in which females deposit eggs. High populations of larvae kill by feeding within the stem and crown of the plant and then chewing an exit or escape hole below the soil surface. Secondary damage to the plant is caused by other organisms that enter the stem in the winter through the exit holes made by the larvae. *Ceutorhynchus litura* is known as an effective agent because it does reduce the overwintering survival of Canada thistle.

Urophora cardui is a gall fly that causes galls and prevents flowering and seed spread. They attack the primary lateral stems of Canada thistle. Plants infested with this insect are stunted, even though most look very healthy, and the roots and stems have reduced growth. This species may have difficulty establishing in areas with cold winters and hot, dry summers. This agent is common in Colorado but has little if any impact on the plant.

Larinus planus, Canada thistle bud weevil is not approved for release in the U.S., as it also feeds on a wide array of native plants. It should not be redistributed or otherwise spread.

Many of the biological control agents are available for free or at a small cost. Contact the Palisade Insectary at 970-464-7916 or if a Colorado resident you can call toll-free at 1-866-324-2963 to get specific details on availability.

Cultural Practice: Sod forming grass, perennial grasses, or alfalfa competition, in combination with mowing can be competitive means of control after they are established. Allow crops to have multiple cultivation/seasons and full plowing that

exposes roots to dehydration and freezing.

Mowing is a short term method to prevent seed spread. It should be done during the bloom stage only due to the ability to regenerate by small root parts. The use of competition planting is dependent on the situation. For some rotation sequences such as corn, beans or onions extremely competitive grasses such as Sudan grass or forage sorghum will help to control Canada thistle. In other situations such as fruit crop trees, very aggressive sod forming grasses are excellent choices within tree rows and cultivation can be practiced to control Canada thistle between tree rows. Sod forming grasses will require more maintenance such as irrigation and mowing. Plant competition can be a good means to control Canada thistle but always will have to be coupled with mechanical control measures, whether invoked when plant competition is present or during other segments of crop rotation, to be effective.

Early emerging grass species such as smooth brome, streambank wheatgrass, 'Luna' pubescent wheatgrass, western wheatgrass, Sherman big bluegrass or Bozoiisky Russian wild rye can be used to compete with Canada thistle and slow the spread and establishment of new infestations. Competition alone, however, is seldom effective on Canada thistle.

The use of thermal (steam) weed control systems can be used as an alternative method from mechanical cultivation. Weeds are steamed using two trailer mounted Atarus Stinger Streamer generators that heat steam up to 800 degrees F. Good activity was seen immediately after treatment of steam on Canada thistle, however, rapid re-growth reduced control levels from fair to poor after 8 days from the first stem application and 4 days after the second stem application. Multiple applications are needed to provide season long management.

Organic Herbicides: There are two products with acetic acid that are effective over many years and are registered in Colorado. These are AllDown and BurnOut II. AllDown Green Chemistry Herbicide Organic Weed & Grass Killer is a non-selective herbicide manufactured by KPT, LLC dba, Summerset Products, that contains high concentrations of vinegar, garlic, and other organic ingredients. BurnOut II is a non-selective herbicide manufactured by St. Gabriel Laboratories, that contains acetic acid and other organic ingredients. These products provide non-translocating, burndown action (May not kill whole plant. Implies plant can re-grow). Extra precautions may be needed when using vinegar. Read label carefully.

Successes & Failures in Control Methods

Successes:

“When dealing with creeping perennials and tillage, sweeping plows would be a better tillage choice than using a disk. When disking, root segments are “chopped up” and can actually increase populations if adequate moisture exists.” **Wayne Cooley**

“Mechanical strategies aim to exhaust carbohydrate stores in the deep extensive root systems. Any persistent strategy that curtails photosynthesis while preventing vegetative distribution of Canada thistle will exhaust the plant stands over several years.” **Adrian Card**

“Above ground fresh weight of Canada thistle foliage treated with just one flame application averaged a 63.3% reduction when compared to the untreated check.”
“Flaming decreased above ground biomass by 86.6% after 5 applications. Below ground root biomass was reduced by 55% after flamed treatment of Canada thistle.”
“Acetic acid based Alldown and Burnout: Canada thistle foliage (above ground biomass) was reduced by an average of 87% after 5 applications.” **Thaddeus Gourd**

Failures:

“Caution against disking and rotary tillage!” **Wayne Cooley**

“Rotary tillage (walk behind, tractor, and driven rototillers) distribute vegetative pieces of Canada thistle like disks, which should be avoided. Moldboard plowing (breaking plow, turning plow, etc.) in the fall has been shown to stress Canada thistle stands and diminish the vigor of spring regrowth.” **Adrian Card**

“Rototilling may propagate this weed.” **Adriane Elliott**

“Acetic acid based Alldown and Burnout are very expensive. Cost ranges from \$419 for vinegar to \$6038 per acre for each application of Burnout.” **Thaddeus Gourd**

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Data for and review of this factsheet were given by growers, researchers and extension experts.