CANADA THISTLE
(*Cirsium arvense*)

Description: Canada thistle, also referred to as creeping thistle and California thistle, is a member of the Asteraceae or sunflower family. The plant is a herbaceous perennial that can grow up to 4 feet tall. Stems of the plant are erect, grooved, nearly smooth or hairy. Mature leaves are spiny with deeply lobed leaves and several branching flower stalks. Leaves are alternate, oblong, or lanceolate, usually with crinkled edges and spiny-toothed margins that terminate in a spine. Leaves of the plant can be hairy or smooth. Canada thistle flowers can vary in color from pale blue to shades of purple with an occasional white ecotype. Variations in leaf and flower structures can be due to development of several ecotypes. Seeds of the plant are about 1/8 inch long, somewhat flattened, brownish, with a tuft of hair at the top.

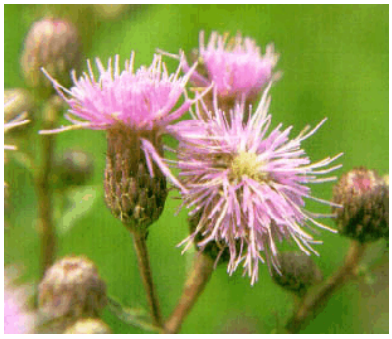
Canada thistle has also been classified into four varieties or subspecies based on morphological variation within the species, namely *vestitum*, *integrifolium*, *arvense*, and *horridum*.

Canada thistle

Plant Images:

Rosette

Leaf


Flowers

Distribution and Habitat: Canada thistle is native to Eurasia but is now considered to be naturalized worldwide. The plant is generally found in the northern temperate region of North America because Canada thistle growth is limited by short day length and temperatures that exceed 86 EF for an extended

period of time. Canada thistle can thrive in many environments but is most commonly found in relatively mesic areas. Canada thistle is occasionally found in dry habitats, such as sand dunes, but more often occurs in wet areas, such as stream banks, marshes, along ditches, and lake shores. Cultivated fields, pastures, roadsides, and disturbed areas, such as road or fence construction sites, are also areas where the plant can flourish.

Life History/Ecology: Canada thistle is a herbaceous perennial that reproduces by a spreading root system and seed. Seedlings of the plant begin to emerge in May. Spring rosette formation follows emergence, and rapid vertical growth begins in mid- to late June. Horizontal and vertical roots can produce new shoots or roots from any location, with above ground shoots producing new shoots at any node. The plant can also produce new plants from root segments that have been cut or segmented. Canada thistle flowers from June through August. Canada thistle is a long-day plant that requires a 14 to 16 hour photoperiod to bolt or flower. Each plant can produce up to 5,300 seeds with an average production of 1,530 seeds per plant. Canada thistle seed can remain viable in soil for approximately 21 years.

Canada thistle may release allelopathic substances. Allelopathy may explain the absence of annual broadleaf plants in Canada thistle patches and a reduction in species diversity in pastures.

History of Introduction: Canada thistle is native to southeastern Europe and the eastern Mediterranean but is now thought to be naturalized worldwide. The plant was introduced into the United States and Canada in the late 17th century with imported hay, straw, and/or crop seed that was contaminated with Canada thistle seeds. Canada thistle is now considered a noxious weed in at least 39 states. In North Dakota, Canada thistle is found extensively and has been reported in all counties.

Effects of Invasion: Canada thistle is an aggressive species that has the ability to adapt to a wide range of habitats. The plant may decrease or limit forage and livestock production on rangeland. Spiny leaves of Canada thistle are unpalatable to livestock; therefore, the forage productivity of pasture and rangeland is reduced. The plant can also displace desirable plant communities. Land values for crop production, grazing, and recreation areas can also decline with increased infestations of Canada thistle.

Control:
Canada thistle is a persistent weed that may resist any single management practice. Mechanical, chemical, and biological control methods have all been used to manage the plant. To date, no single treatment has eradicated Canada thistle. Management objectives should involve eradicating established populations since Canada thistle spreads primarily by an expanding root system and vegetative reproduction. Seeds of the plant can remain viable in the soil for 21 years therefore, preventing seed production should also be considered. Combinations of control practices, such as grassland management; a well-designed IPM program; or mowing, fire, herbicides, and biological control agents together, may reduce Canada thistle infestations the most successfully.

Mechanical – Hand pulling is not effective for controlling established stands of Canada thistle because root reserves can survive if the plant is not completely removed. Regular cultivation has been used to control Canada thistle in cropland. Cultivation can break up the root system, but the land is susceptible to reinvasion if not cultivated regularly. In Montana, tilling that was repeated every 21 days at a depth of 2 ½ to 4 inches deep reduced Canada thistle shoots by 98 percent. Mowing can reduce Canada thistle in pastures and in areas where the infestation is not severe. Mowing temporarily reduces above-ground biomass of Canada thistle, but does not kill the plant unless repeated at 7 to 28 intervals for several years. One study found that mowing at 21-day intervals prevented seed production and weakened roots.

Mowing monthly for four consecutive years in another study also reduced infestations. Alfalfa fields that were mowed twice annually in early to mid-June when Canada thistle was in the early-bud to pre-flowering growth stage and early fall, had a reduction in Canada thistle infestations. Canada thistle response to fire has been variable with infestations decreased or sometimes enhanced by fire. Regularly burned areas in Colorado were more resistant to invasion of the plant than areas that were infrequently burned. Annual spring burns controlled Canada thistle and promoted growth of grasses, while an infrequent burn was followed by a rapid increase in Canada thistle. Late spring and late summer prescribed burns in a native mixed-grass prairie in North Dakota, increased seed production and seedling numbers of the plant but Canada thistle density decreased the following years after the burn. In North Dakota in Theodore Roosevelt National Park, a fall prescribed burn created a disturbance that may have favored growth and reproduction of Canada thistle and promoted early emergence and rapid growth characteristics. However, this study suggested that the prescribed burns did not increase the density of Canada thistle. Canada thistle density was initially higher following the prescribed burn but was similar in the burned and non-burned areas by the end of the first growing season. The initial disturbance of the prescribed burn may have favored the early growth and reproduction of the plant for a short period of time.

Chemical – Several herbicides have been labeled for Canada thistle control in annual and perennial crops, fallow cropland, rangeland, pasture, and on non-cropland. Herbicides such as 2,4-D, clopyralid, dicamba, triclopyr and glyphosate are effective for Canada thistle control. Herbicides that contain picloram or clopyralid provide season-long Canada thistle control, however success may be dependant on application timing and rate. Herbicide re-treatment may be needed to provide the Canada thistle control desired in a long-term management plan.

The rosette technique for Canada thistle control has been effective. The rosette technique has been implemented in croplands and includes the use of cultivation followed by a fall-applied herbicide treatment. Cultivation to remove shoot growth of Canada thistle should be conducted in July when the photoperiod is less than 16 hours. Newly emerged Canada thistle plants will remain as rosettes and form dense clusters of leaves without any stem elongation. In one study, glyphosate applied at the rosette growth stage resulted in fewer shoots the next year than the same rate of glyphosate applied at the bud growth stage. Likewise, clopyralid applied at the Canada thistle rosette stage allowed for less regrowth the following growing season than when applied to bolted plants.

Contact your local county extension agent for recommended use rates, locations, and timing.

Biological – Canada thistle was among the first 19 weed species selected as targets for biological control in 1959. The painted lady butterfly (*Vanessa cardui* L.) is believed to be the only native insect that attacks Canada thistle. Larvae of *Larinus planus*, a seedhead weevil, feed on developing seedheads of the plant. Larvae of a stem gall fly, *Urophora carduii*, produce galls in the stem of Canada thistle that act as a nutrient sink. *Cassida rubiginosa*, a leaf-feeding beetle, reduces biomass and survival of Canada thistle. These biological control agents have been largely unsuccessful due to biological agents not being host specific and/or doing little to reduce Canada thistle infestations. However, *Ceutorynchus litura*, a stem-boring weevil, was recently released in North Dakota. Larvae hatch in the mid-veins of rosette leaves and mine down through the vein into the base of the stem and upper taproot, thus stressing the plant. Weevils exit the Canada thistle stems leaving holes that make the plant vulnerable to pathogens.

Several pathogens have been examined for Canada thistle control. *Sclerotinia sclerotiorum* causes wilting and death of shoots and roots of Canada thistle. The rust fungus, *Puccinia punctiformis*, causes

etiolation of systemically infected shoots and necrosis of stems of leaves. *Pseudomonas syringae* pv. *tagetis* is a pathogen that causes apical chlorosis and leaf spot on the plant. These pathogens may or may not be successful in controlling Canada thistle.

Grazing as a control method for Canada thistle is generally ineffective. In Australia, sheep and goats have been used for early-season grazing for young Canada thistle shoots. However, sheep and goats will rarely eat the Canada thistle shoots after maturity due to the spines on the plant.

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Canada thistle photograph courtesy of J. C. Schou, Biopix.dk.

Rosette photograph courtesy of Sari and Skye Breitenfeldt, www.mtwow.org.

Leaf photograph courtesy of Mehrhoff, Leslie J./IPANE.

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