

WRITTEN FINDINGS OF THE WASHINGTON STATE NOXIOUS WEED CONTROL BOARD

Scientific Name: *Cirsium arvense* L.

Common Name: Canada thistle

Family: Asteraceae

Legal Status: Class C

Description and Variation: Perennial herb with a deep-seated complex system of roots spreading horizontally which give rise to aerial shoots; stems 1 - 4 feet tall, slender, green, freely branched; leaves alternate, sessile, deeply lobed, margined with stiff yellowish spines; heads many, relatively small; plants dioecious, all flowers on a plant are either male or female; flowers purple; fruits about 1/8 inch long, somewhat flattened, brownish with an apical circle of long hairs, these eventually falling. Four varieties of *C. arvense* have been recognized based on variation in leaf characters, texture, vestiture, segmentation and spininess.

Economic Importance:

Detrimental: *C. arvense* is found in virtually all crops, and is also found in pastures and rangelands where it reduces forage. The weed is an effective competitor for light, moisture and nutrients and is thus able to reduce crop yields. *C. arvense* also serves as an alternate host for insects and pathogenic microorganisms that attack various crops.

Beneficial: *C. arvense* is regarded as a good source of nectar and pollen for honey bees. The shoots and roots are consumed by some people in Russia and by North American Indians.

Habitat: Climatic requirements: *C. arvense* is found in open mesophytic areas. It does best with a temperature range of 0-32 degrees C and a rainfall range of 400 mm - 750 mm per year. In northern Canada it exists where winter temperatures of -27 to -35 degrees C are common.

Substratum: *C. arvense* can grow on a wide variety of soil types; clay loam, sandy loam, sandy clay and sand dunes. It does poorly on wet soils without much aeration. Communities in which the species occurs: *C. arvense* is found in almost every plant community disturbed by man. It is common to roadsides, railway embankments, lawns, gardens, abandoned fields, sand dunes, agricultural fields, margins of forests and waterways. It grows poorly in shaded conditions and produces few flowers.

Geographic Distribution: In North America it occurs approximately from latitudes 37degrees N to 59 degrees N. It does not survive in the southern United States. *C. arvense* is probably native to southeastern Europe and the eastern Mediterranean area. It now occurs throughout Europe, North Africa, Asia Minor and across central Asia to Japan. It is also naturalized in South Africa, New Zealand and southeastern Australia.

History: Canada thistle was probably introduced to North America by early colonists in the 17th Century. Control legislation was enacted in Vermont in 1795 and by New York in 1831. It was not reported west of the Allegheny Mountains until after 1835.

Growth and Development: Morphology - Survival and spread of this species is due to the highly successful vegetative propagation carried on by the creeping horizontal roots which survive winters and continue to give rise to numerous aerial shoots year after year. Perennation - The plants can survive indefinitely through the root system. Phenology - Shoots emerge in the spring when the mean weekly temperature reached 5 - 8 degrees C. Different ecotypes vary as to when they emerge. After shoot emergence, the rosettes develop, followed by rapid vertical growth for several weeks. Growth slows somewhat and flowering commences in early summer and continues for several months.

Reproduction: Floral Biology - Since the plant is dioecious, they are mainly insect pollinated. Many insect visitors have been reported. Seed Production and Dispersal - Average seed production is about 1,530, but exceptional plants may produce up to 5,300. Dispersal of the seeds, long distance, is not known. Irrigation water is one possible means of transport. Viability of Seeds and Germination - Studies have shown that freshly collected seed had germination rates of up to 95%. Different ecotypes of this species have different germination rates. Two year old seed germinated 38-71%. Vegetative Reproduction - Seedlings develop a fibrous taproot, and within a few months, the main root thickens and develops lateral roots. After growing 6-12 cm, the horizontal roots bend downwards, growing towards the water table. A new horizontal root develops at this point of bending and continues the horizontal spread. Aerial shoots develop from the original vertical root or from buds on the arching branches of the horizontal system. The weedy nature of this plant is also due to the ability of the root to regenerate from small pieces. Root fragments as small as 3-6 mm thick and 8 mm in length have been found to produce shoots about 15% of the time. Fragments of 12.5mm produce shoots 100% of the time.

Hybrids - In Europe, *C. arvense* hybridizes with nine other species of *Cirsium*. It has been found to hybridize with only *C. hookerianum* Nutt. in North America.

Population Dynamics - By vegetative propagation, a single seedling can establish a large patch of stems. No seeds will occur in such a case. Seed production requires the presence of both sexes. More than one introduction is thus needed. Plant competitors vary in their effectiveness. In one study, the percentage of thistles increased by 192% in 4 years in a continuous cropped spring wheat, but decreased to 1% in alfalfa grown for hay.

Response to Herbicide: Effective control can be achieved by using several broad-leaved herbicides that do not harm grasses. For more site specific control recommendations, please refer to the latest edition of the PNW Weed Control Handbook.

Response to Cultural Methods: Competitive crops, such as alfalfa and forage grasses, are very effective in controlling an infestation.

Response to Mechanical Methods: Repeated tillage at 21-day intervals for about 4 months can be effective on mild infestations. Repeated mowing to weaken stems and prevent seeding is also effective in low infestations.

Biocontrol Potentials: Many insects, a few nematodes and the American Goldfinch have been reported to feed on various parts of Canada thistle. Most of these do very little damage. Three insects from Europe have been studied for biological control - *Altica carduorum* Guer (flea beetle), a leaf feeder, has not established itself well. Adults of the beetle *Ceutorhynchus litura* F. eat young thistle shoots, but do little damage. The fly, *Urophora cardui* L. is the most promising biological control agent. Eggs are laid in the terminal buds and galls develop which divert nutrients and stress the plant. Many microorganisms have been found associated with Canada thistle, but no potential biocontrol agents are known.

References:

Moore, R.J. 1975. The Biology of Canadian Weeds. 13. *Cirsium arvense* L. Scop. Can J. Plant Sci. 55: 1033-1048.