

MUSK THISTLE

(*Carduus nutans*)

Description: Musk thistle or nodding thistle, is a member of the Asteraceae or sunflower family. Musk thistle can grow up to 6 feet tall. Upright stems of the plant are winged and can be single or multiple and highly branched. Rosette leaves of the plant are elliptic to lanceolate and pinnately lobed with each lobe ending in a spine. Leaf surfaces are green, glabrous to densely pubescent with margins ranging from white to purple in color. Cauline leaves, of or attached to the stem, are similar to the rosette leaves, but are smaller, simple, alternate, and decurrent. Flower heads are terminal, solitary, 1 1/2 to 3 inches in diameter, and usually bent over. Flowers are typically deep rose, violet, or purple, or occasionally white in color and have very characteristic brown bracts that resemble a pine cone. Musk thistle seeds are shiny, yellowish-brown in color, 3/16 inches long with a plume of white hair-like fibers. There are two sub-species of the plant that differ in flower size and pubescence in North Dakota.

Musk thistle is considered a noxious weed under North Dakota state law, thus landowners are required to eradicate or control the spread of the plant.



Musk thistle

Plant Images:



Rosette



Stem



Flower

Distribution and Habitat: Musk thistle is native to Eurasia. The plant occurs primarily on pastures and rangeland, but can be found on disturbed sites, waste areas, stream banks, grain fields, along roadsides and in wooded bottoms. Musk thistle occurs in temperate regions and does not have specific climatic requirements, except that a cool period of vernalization is required for the plant to flower. Musk thistle can be found primarily on soils with high sand content and may be restricted by a low tolerance of extremes in soil water content, nutrient deficient, or acidic soils.

Life History/Ecology: Musk thistle is a herbaceous taprooted biennial, spring annual, or occasionally a winter annual. The plant reproduces solely from seed. Seeds usually germinate in the fall or spring and develop into rosettes fairly quickly. Plants overwinter in the rosette stage until early March when the plant bolts. Musk thistle begins to flower in May or early June and may continue through August. Each plant is capable of producing approximately 10,000 seeds and can average 1,200 to 1,500 seeds per flower head. Seeds of the plant may remain viable for at least ten years.

History of Introduction: Musk thistle is native to southern Europe and western Asia. The plant was first introduced in North America in the mid-1800s as an ornamental. Musk thistle has now been reported in all Canadian provinces except Prince Edward Island and in more than 40 states within the United States. Initially, musk thistle was reported largely in the northeast corner of North Dakota. Currently, the plant is found in 27 counties of the state which include Kidder, Towner, Pembina, McLean, Ward, Walsh, Ramsey, Benson, Bowman, Cavailier, Dickey, Golden Valley, Grand Forks, Mountrail, Nelson, Ransom, Richland, Sargent, Slope, Stark, Steele, Bottineau, Eddy, Billings, Mercer, Renville, and Burke Counties.

Effects of Invasion: Musk thistle is as an aggressive species that can form extremely dense stands. Infestations of the plant have the ability to reduce productivity of pasture and rangeland by suppressing growth of desirable plant species and preventing livestock from grazing plants in the surrounding vicinity.

Control:

Management objectives for successful musk thistle control should be to prevent seed production. Seeds of musk thistle can remain viable in the soil for at least ten years, therefore infestations should be monitored to prevent re-establishment. Preventing or reducing seed production and dispersal can decrease the spread of the plant. In order to prevent or reduce musk thistle infestations, preferred habitats of the plant should be maintained with healthy stands of desirable vegetation, since musk thistle seedlings can not tolerate intense competition. The seedling and rosette growth stages of the plant are the best times to implement control measures. Control methods should be combined into an integrated management system for the best long-term control of the plant. Management techniques selected are dependent upon a specific site and will be determined by land use objectives, extent of musk thistle infestations, desired plant community, and effectiveness and limitations of available control measures.

Mechanical - Repeated hand pulling and mowing has been used to control musk thistle. However, these methods should be conducted before the reproductive growth stages of the plant to prevent seed production. Hand pulling can be effective if plants are severed 2 to 4 inches below the soil surface to prevent resprouting from the root crown. A single mowing will not control musk thistle infestations because infestations generally consist of plants of variable ages in natural populations. Therefore, mowing may need to be repeated several times throughout the growing season to effectively reduce seed production. Musk thistle infestations may be increased or decreased by fire. In tallgrass prairie sites in Kansas and South Dakota, prescribed burns encouraged the growth of native plants and discouraged the growth of musk thistle. However, burning has not been an effective means to control musk thistle

because populations can colonize recently burned sites where competition is not vigorous. Further research is needed to determine the effects of prescribed burns for musk thistle control.

Chemical - A number of herbicides are available for musk thistle control. Clopyralid, clopyralid plus triclopyr, picloram, dicamba, 2, 4-D, glyphosate, and metsulfuron will control the plant. Herbicides should be applied in late fall or early spring when thistles are in the seedling to rosette stage. Musk thistle only reproduces by seed, therefore herbicides applied prior to flowering will eventually eradicate infestations.

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

Biological - Several insects have been released as biocontrol agents for musk thistle. Two weevils have been released for control of the plant. The thistlehead-feeding weevil, *Rhinocyllus conicus*, has been released in several western states and controls musk thistle by limiting seed production. The rosette weevil, *Trichosiocalus horridus*, was introduced in the United States in 1974. Larvae of the insect feed on growing points of the rosette and developing shoots, which decreases plant vigor and flowering. In 1990, *Cheilosa corydon*, was released on musk thistle. Larvae of the insect burrow into shoots, causing the shoots to break or dry prematurely.

Cattle generally will not graze musk thistle and sheep will only consume the plant during the rosette growth stage. However, some studies suggest that cattle, domestic sheep and goats may consume musk thistle flower and seedheads. There is a concern regarding whether or not cattle and domestic goats may easily spread musk thistle seeds therefore, grazing as a control measure is not recommended.

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Musk thistle and flower photographs courtesy of North Dakota State University, NDSU Extension Service.

Rosette photograph courtesy of the University of Arkansas Cooperative Extension Service.

Stem photograph courtesy of Dan Tenaglia, www.missouriplants.com and www.invasive.org.