

Musk thistle

Carduus nutans L.



Dirk V. Baker, Tara L. Steinke, Sandra K. McDonald 1/03



Other common names: nodding plumeless thistle, nodding thistle, plumeless thistle

Family: Asteraceae (Sunflower)

USDA Code: CANUM2

Bayer Code (WSSA): CARNU

Life cycle classification: Biennial (or winter annual)

Legal Status: Colorado Noxious Weed (among top ten worst)

Native to: Eurasia

Entry into Colorado: No information available

Current distribution in Colorado: In Colorado, Musk thistle is found up to approximately 10,000 feet in elevation (Beck 1999).



Biology

Seasonal development: Seeds germinate in the fall, forming a rosette of leaves. Typically, musk thistle over-winters as a rosette and bolts the following spring between April-June. Flowering begins in late May or early June and continues through mid July (Butterfield et al. 1996). Seeds mature and disperse 1-3 weeks after flowering. Seedlings usually establish only on bare soil and grow less when shaded by neighboring plants (Beck 1999).

Reproduction

Most commonly reproduces by: Solely by seed

Numbers of seeds/plant: An average plant produces 10,000 to 11,000 seeds (McCarty 1982) but may reach 100,000 or more (Holm et al. 1997).

Description

Roots: Musk thistle has a fleshy taproot (Stubbendieck et al. 1995) that is capable of penetrating the soil to depths of 40 cm or more.

Stems: Stems are erect, highly branched, with spiny wings (5-20 mm wide) (Stubbendieck et al. 1995).

Leaves: Leaves are alternate, dark green, deeply lobed, and spiny margined. The leaf margins are often white and usually have a distinct light-green mid-vein. The leaves extend onto the stem giving a winged appearance. Basal rosettes are well developed with leaves similar to stem leaves (Whitson et al. 2000, Stubbendieck et al. 1995).

Flowers: Heads consist of deeply lobed, purple to pink, (rarely white) disk flowers. Phyllaries spine-tipped and overlapping in several rows. Receptacles flat and densely covered with cream-colored bristles interspersed among the disk flowers. Insects are the principal pollinators.

Fruits & seeds: One-seeded oblong fruit (achene) about 0.2" long, shiny, yellowish-brown with a plume of white hair-like bristles (CNAP 2000).

Value & Uses

Wood products: No information available

Importance to/impact on livestock & wildlife

Palatability: Unpalatable to livestock (CNAP 2000), though some animals will browse the flowers.

Nutritional value: No information available

Cover value: No information available

Value for rehabilitation of disturbed sites: No information available

Other uses & values: Musk thistle seeds are eaten by songbirds (Stubbenieck et al. 1995)

Infestations

Habitat: Musk thistle does not appear to have any specific climatic requirements other than a cool period of vernalization for flowering (Butterfield et al. 1996). It occurs in areas with as little as 10" of annual precipitation (FEIS 1996).

Impacts/Threats:

Special Challenges to Management: Musk thistle is a highly competitive weed which invades disturbed areas, pasture, rangeland, forest land, cropland, and waste areas throughout most of the United States. This thistle spreads rapidly and forms extensive stands, which force out desirable vegetation (Rutledge and McLendon 1998). Thistles compete poorly with healthy established grasses and other vegetation. Disturbances such as fire, overgrazing, or trampling create prime sites for thistle colonization.

Control Methods

Physical

Manual: Hand pulling, or cutting can be used to stop the spread of Musk thistle. Hand chopping after flowering, but before seed set, prevents seed development and dispersal (Heidel 1987), however plants will re-sprout if the root crown is not removed. If pulling Musk thistle, it is important to completely remove the crown so that the plant does not re-bolt and produce seeds. Cut plants should be deeply buried or burned because seeds can mature and become viable after cutting (Rutledge and McLendon 1998).

Mechanical:

Cultivation: Tillage can also be used to control musk thistle. However, this technique is not always practical in non-crop areas.

Mowing: Mowing can be used to stop the spread of musk thistle, however repetition is necessary due to re-growth. Much like hand pulling, mowing should be done after flowering, but before seed set, this prevents seed development and dispersal (Heidel 1987).

Cultural: Prevent the establishment of new infestations by minimizing disturbance, seed production and dispersal and by maintaining healthy native communities. Maintaining healthy pastures with vigorous perennial grass stands is the best cultural control method for musk thistle. Musk thistle germination and establishment is favored in open areas and, hence, by disturbance. Therefore, reseeding or replanting with desirable vegetation in areas of soil disturbance is necessary to prevent musk thistle invasions (Beck 1999, CNAP 2000).

Biological:

Insects: *Rhinocyllus conicus*, *Trichosiromalus horridus*

Pathogens: None known

Chemical

Conventional:

Trade Name (common name)	Active ingredient/Acre (Product/Acre)	Remarks
Several trade names (2,4-D)	(1.5-2 qt)	Use 2,4-D in the spring
Ally/Escort (metsulfuron)	(0.5 oz)	Add a good surfactant at 0.25% v/v2
Curtail (clopyralid + 2 4-D)	0.19 + 1.0 lb (2 qt)	Optimum timing is from mid-bolt to bud growth stage
Telar (chlorsulfuron)	0.375 oz (0.5 oz)	Apply in spring. Always add a NIS
Tordon (picloram)	0.13 – 0.25 lb (0.5-1 pt)	Apply in spring or fall to rosette growth stage
Vanquish/Clarity (dicamba)	2 lb (0.5-2 qt)	Apply when weeds are actively growing
Vanquish/Clarity + 2,4-D (dicamba + 2,4-D)	0.5 + 1.0 lb (0.5 + 1 qt)	Apply spring or fall when in the rosette stage before bolting

Organic: No information available

USE PESTICIDES WISELY: Always read the entire pesticide label carefully, follow all mixing and application instructions and wear all recommended personal protective gear and clothing.

NOTICE: Mention of pesticide products in this profile does not constitute endorsement of any material.

Additional comments:

Contacts:

Links:

Colorado Natural Areas Program

http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm

Colorado State University Extension Fact Sheet

<http://www.ext.colostate.edu/pubs/natres/03102.html>

Plants National Database:

<http://plants.usda.gov>

Weed Science Society of America

<http://www.wssa.net>

Western Society of Weed Science

<http://www.wsweedscience.org>

References:

- Beck, K.G. 2000. Colorado State University Cooperative Extension Fact Sheets. No. 3.102. Musk Thistle. www.ext.colostate.edu/pubs/natres/03102.html. 3 pages.
- Beck, K.G., S.K. McDonald, S.J. Nissen, P.H. Westra. 2002. Colorado Weed Management Guide. Colorado State University Cooperative Extension. Fort Collins, CO. XCM-205.
- Beck, K.G. 1999. Biennial thistles. *In* R.L. Sheley and J.K. Petroff, eds. Biology and Management of Noxious Rangeland Weeds. p.145-162. Oregon State University Press, Corvallis, OR.
- Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/othrdata/exoticab/exoticab.htm> [Version 16 Jul 97].
- Colorado Natural Areas Program. 2000. Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Values. Colorado Natural Areas Program, Colorado State Parks, Colorado Department of Natural Resources; and Division of Plant Industry, Colorado Department of Agriculture. Denver, CO. pp 135-137. http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm
- Heidel, B. 1987. Element Stewardship Abstract for *Carduus nutans*, musk thistle. The Nature Conservancy, Wildland Weeds Management & Research Program. <http://tncweeds.ucdavis.edu/esadocs/documnts/cardnut.html> [30 Jul 98].
- Holm, L., J. Doll, E. Holm, J. Pancho, & J. Hergerger. 1997. World Weeds. Natural Histories and Distributions. John Wiley and Sons, New York.
- McCarty, M.K. 1982. Musk thistle (*Carduus thoermeri*) seed production. *Weed Science*. 30:441-445.
- Rutledge, C. R. and T. McLendon. No Year. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> [Version 15 Dec 98].
- Stubbendieck, J., G.Y. Friisoe, M.R. Bolick. 1995. Weeds of Nebraska and the Great Plains. Nebraska Department of Agriculture. Lincoln, NE. pp 100-101.
- USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). [National Plant Data Center](http://plants.usda.gov), Baton Rouge, LA 70874-4490 USA.
- Zimdahl, R.L. 1999. Fundamentals of Weed Science. Academic Press. San Diego, CA. pp 222