

1987

EC87-160 Musk Thistle....Its Appearance, Spread and Control

J. D. Furrer

F. W. Roeth

University of Nebraska-Lincoln, fwroeth41@gmail.com

A. R. Martin

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MUSK THISTLE...

● Its APPEARANCE, SPREAD and CONTROL



Issued in furtherance of Cooperative Extension work,
Acts of May 8 and June 30, 1914, in cooperation with the
U.S. Department of Agriculture. Leo E. Lucas, Director of
Cooperative Extension Service, University of Nebraska,
Institute of Agriculture and Natural Resources.



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Musk Thistle

J.D. Furrer, F.W. Roeth, A.R. Martin¹, and M.K. McCarty²

Musk thistle is the major headache for many Midwestern landowners. It reduces forage yields by robbing moisture and plant food from palatable grasses. Livestock refuse to enter heavily infested areas and will not graze close to the spiny plants.

Since its emergence as a serious weed problem in the late 1940's, musk thistle has invaded thousands of acres of Nebraska pastureland and even occurs in some cultivated fields. It has moved from the Kansas border to the South Dakota border and as far west as Colorado and Wyoming. It has not invaded the sandhill ranges in quantity; however, infestations are sometimes found in valley areas.

What It Looks Like

Musk thistle (*Carduus nutans* L.) is also known as nodding thistle. It is a relatively new weed in Nebraska as far as weed species are concerned. The deep reddish purple flowers are large and attractive. The head is solitary on the end of the stem and nods or hangs down as it grows in size.

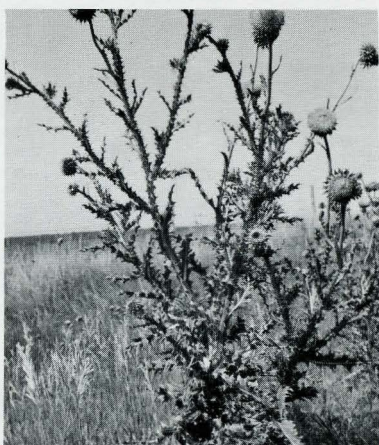
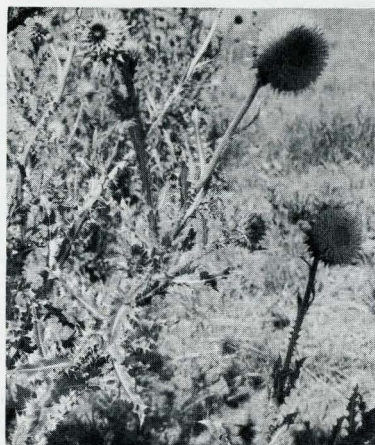
The deeply cut (segmented) leaves are dark green with a light green midrib. There is a grayish-green area at the outer edge of each spine-tipped leaf segment. The leaves extend onto the stem, giving it a winged or frilled appearance. The plant is relatively free of hairiness. Plant height varies between two and seven feet.

Musk thistle is a prolific seed producer. Large, extensively branched plants in sparse stands may have 100 or more heads with a total production of about 20,000 seeds. Individual terminal heads have been found with as many as 1,500 seeds. Smaller plants and those in thicker stands may produce from 5,000 to 10,000 seeds per plant.

Blooming starts with the terminal head the first week in June and continues until mid-August with lower branches. The main terminal head and terminal heads of the upper branches bear the bulk of the plump, well-filled seeds. Germination of these seeds may run as high as 95% a short time after dissemination.

¹Extension Weeds Specialists, Lincoln, Clay Center, and Lincoln, respectively.

²Retired Research Agronomist, USDA, ARS.



Note the large nodding flowers, light mid-rib of the leaves, and the continuation of the leaves onto the stems.

Musk thistle is primarily a biennial weed and normally requires two growing seasons to complete its life cycle. However, under conditions of reduced competition such as fall-sown grains, it may perform as a winter annual where the seeds germinate and start growth in the late summer or fall and bloom the following spring.

A very close relative, plumeless thistle (*Carduus acanthoides* L.), is found at several scattered locations in Nebraska. The general appearance of plumeless thistle is somewhat similar to musk thistle. The heads are smaller. The leaves are more finely cut and may vary from sparsely to noticeably hairy, particularly along the leaf veins and on the stems.

Its Origin and Spread

Musk thistle has been found in the United States for nearly 100 years. In the early 1900's it was listed as a weed in Pennsylvania, the District of Columbia, and New Jersey northward to New Brunswick and westward to Iowa. It probably came from Europe where it was grown as an ornamental.

In 1932 musk thistle was identified in Iowa. That same year a specimen was brought to a field day in Seward County, Nebraska for identification.

None of the extensive plant collections made in Nebraska during the late 20's and early 30's contain specimens of the species. According to Dr. Howard Reynolds, of Fort Hays Kansas State College, who made a botanical survey of Richardson County in 1940-41, musk thistle was found near Dawson, Nebraska, at that time.

In the mid-40's certain plumeless thistles were identified in northeast Nebraska. In the 1948 edition of *Kansas Wild Flowers* Professor Stevens of the University of Kansas wrote that they are "of rare occurrence; [on] roadsides, fields, pastures. Washington and Nemaha Counties (Kansas)."

These scattered reports, references and collections indicate that sometime around 1945 to 1950 musk thistle emerged as a weed species of economic importance. By 1959 it was such a pest in eastern Nebraska pastures and waste areas that the Nebraska Legislature declared it a noxious weed.

Control with Herbicides

Some of the first work on musk thistle control was done in southeast Nebraska in November, 1957. One to two pounds of 2,4-D gave 75 to 100 percent control. Even though good control resulted from fall applications, a large number of seedlings were present in the spring. Musk thistle has the ability to establish new seedlings in warm periods in late fall and early winter.

In the 1960's work of the Agricultural Research Service and University of Nebraska showed that late September or October treatments with one pound per acre of 2,4-D (one quart of the four pound per gallon material) gave good control of musk thistle. If conditions are drier, or cooler than normal, 1½ or 2 pounds per acre will be needed. *Over a period of years fall treatments applied between late September and early November, when growing conditions are favorable, have given effective control of musk thistle.*

Work in central Nebraska reconfirmed the effectiveness of 2,4-D treatments in the rosette stage. In addition, Tordon 22K at 6 to 8 ounces per acre or one pound 2,4-D plus 1/2 pint Banvel applied in the late rosette stage showed more consistency than 2,4-D applied alone. *Considering soil moisture variations, temperature, stage of growth, and application timing, Tordon 22K applied in mid to late fall has provided the most consistent control.* All treatments become less effective when made after the plants bolt and begin to send up flowering stalks in the spring.

Musk thistle is one of the earliest flowering thistles. The first flowers show around June 1 in the southern part of the State. Flower stalk lengthening begins about one month before bloom. Along the Kansas-Nebraska border treatments should be made between April 15 and May 1. Northward to the South Dakota border, spray 10 days later. From east to west there is further delay in plant development because of the higher altitude and average lower temperature. At Lincoln, spring herbicide treatments applied during the first 10 days of May are clearly more effective than those applied on June 1.

Regardless of location, make sure spring treatments are applied before stems lengthen and rapid plant growth begins. One pound of 2,4-D per acre (one quart of four pounds per gallon material) can be used when growing conditions are exceptionally favorable. Increase the amount of 2,4-D to 1½ or 2 pounds if moisture supply is short or daytime temperatures are below 60°F or use the 2,4-D + Banvel combination. Tordon treatments are most effective when made in the fall.

Applications will probably have to be repeated because of seed in the soil. Much of the seed germinates during the first year after production but some will germinate three to four years later.

Never let a plant go to seed. Cut scattered plants three to four inches below the surface of the soil, or treat chemically. For spot chemical treatment, use 2 to 4 tablespoons of 2,4-D per gallon of water and thoroughly wet all plants. The importance of making 2,4-D treatments before the flowering stalk begins to lengthen cannot be over-emphasized.

Caution

Lactating dairy cows should not graze treated pastures for one week after using herbicides. Traces of chemical have been found in milk where lactating animals grazed 2,4-D sprayed forage prior to the one week waiting period.

Observe all precautions and instructions printed on the label concerning the use and handling of all pesticides.

Mechanical and Cultural Control

If an area of infestation has been allowed to get to the bud or bloom stage, mowing will temporarily prevent seed production. It is only a temporary measure, however, as buds in the axils of the basal leaves will very quickly start growth and produce branches that will bear flowers and produce seed if no further control measures are taken.

Musk thistle does not become troublesome in spring planted crops. Badly infested fields that are tillable could be cropped for two to three years with row crops or spring small grain. Normally, musk thistle does not affect fall sown wheat, rye or barley unduly, but occasionally it sets seed by harvest time. The Nebraska Crop Improvement Association has rejected wheat fields for certification because of the presence of musk thistle.

Grassland that is properly managed—well-fertilized and not grazed too closely—is less subject to infestation. However, not even the best managed pastures are immune, inasmuch as musk thistle plants have been found in brome grass fields that have been protected from grazing for several years.



Musk thistle in the rosette stage. Applications of herbicides are most effective during this stage—either fall or spring.

Biological Control

When a plant is introduced into a new area, natural enemies which help keep it suppressed are sometimes left behind. This apparently happened when musk thistle entered North America. In European countries where musk thistle has existed for hundreds of years, it is little more than “another weed”. Natural enemies have kept it under control.

One of those natural enemies, the musk thistle seed weevil, *Rhinocylus conicus*, was introduced into the United States from southern Europe in 1969. Successful releases have been made in Nebraska since 1972.

The weevils overwinter as adults. In mid-May to mid-June the adults congregate on bolting musk thistle plants, feed, mate, and deposit eggs. The larvae feed at the base of the flower and interfere with seed production and viability. Six to ten years after release, thistle decline may be noticeable.

Musk thistle weevils can be introduced at two different times. They are collected as adults during feeding in the spring or as larvae or pupa in the heads during July. They are then transported to the new site. A minimum of 500 adults or seed heads should be collected for the new location.

New release sites should not be grazed, mowed, or sprayed for 2 years. Mowing is most detrimental. Control in areas adjacent to the release site with herbicides can be done without harmful effects.

Issued April, 1964, 20,000
Reprinted June, 1964, 20,000
Revised February, 1966, 65,000
Reprinted February, 1967, 10,000
Revised May, 1976, 10,000
Revised March, 1987, 5,000