

Musk Thistle (*Carduus nutans*): An Undesirable Range Plant

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Highlight: Musk thistle, a spiny, unpalatable biennial plant native to Europe and Asia, is becoming widely established on western ranges. It is a vigorous grower and prolific seed producer and is spreading rapidly to uncultivated areas and wild lands used for ranges and watersheds. Though musk thistle spreads faster and is more vigorous where there is little plant competition, it is also spreading and growing well in good native and seeded ranges and in irrigated pastures and meadows. It is relatively easy to control with herbicides. It should be controlled before it spreads to larger acreages.

Musk or nodding thistle (*Carduus nutans* L.), a plant native to Europe and Asia, is now widely established on western ranges. This thistle was introduced over 75 years ago into the eastern United States, where it apparently is not a serious problem. Though this plant has been sparingly established on midwestern and western ranges for a long time, only recently has it increased, become a problem, and been declared a noxious weed (Higgins, 1966; Furrer and McCarty, 1966; Nilson, 1969; Alley and Lee, 1969; Holmgren and Andersen, 1970; Jensen, 1970).

Description and Growth Characteristics

Musk thistle is a vigorous, aggressive plant with large, showy, purple flowers. Terminal heads are born singly on a relatively leaf-free stem and are usually at right angles to the stem. Lower down, the stem has clasping, spiny leaves. The stout, spiny, spreading involucre distinguishes this plant from other thistles. Plants are normally about 36 inches tall and have 10 to 100 seedheads, but they vary greatly in

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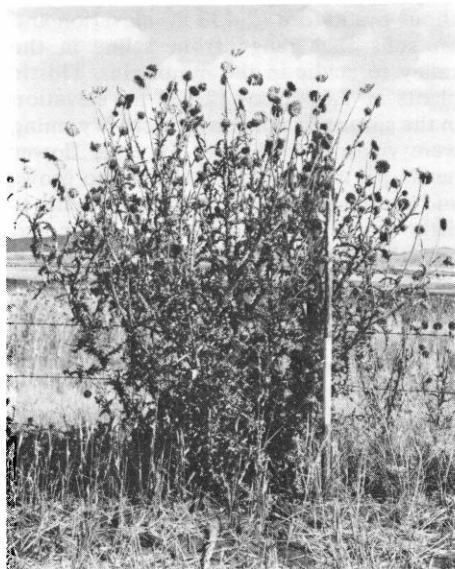


Fig. 1. A robust musk thistle along the fence line in a dry-land grain area north of Soda Springs, Ida., is 6 feet (1.8 m) tall and has 643 heads.

size with site and growing conditions. In southeastern Idaho, plants growing in a good stand of native vegetation varied from 8 to 40 inches (20 to 102 cm) in height and had from 1 to 40 or more heads. A single thistle was growing a few feet away on the edge of a wheat field with little plant competition. It was 6 feet (1.8 m) tall and widely branched and had 643 seedheads (Fig. 1).

Musk thistle is a biennial or winter annual in that it forms a rosette in spring, late summer, or fall and then develops flowers and seeds the next year (McCarty and Scifres, 1966). Flowers and seeds are produced over a long period. Seed production begins with the maturing of the first flowers in June and continues as later flowers mature until after fall frost (Fig. 2). The seeds or achenes are attached to plumes or plume bristles and can be carried long distances, primarily by wind and to a lesser extent by water, animals, machinery, and vehicles (Fig. 3).

Musk thistle is an abundant seed producer. Ten large terminal seedheads from plants in southern Idaho, northern Utah, and western Wyoming had an average of

535 seeds; one large head had 752. Ten smaller heads midway up the stem averaged 298 seeds. Assuming 40 heads per plant and 400 seeds per head, this is 16,000 seeds per plant. Seeds collected in Idaho, Utah, and Wyoming in September 1972 averaged 81% germination when placed in moist sand in the greenhouse. Most seeds germinate readily, but some remain dormant in the soil for 4 or more years (Higgins, 1966).

Adaptation

Musk thistle has a wide range of adaptation. It grows from sea level to about 8,000-foot (2,438 m) elevation and on soils that range from saline in the valley to acidic in the mountains. Thistle plants at 7,000-foot (2,134 m) elevation in the spruce-fir zone in western Wyoming were vigorous with over 50 large flower heads per plant. Musk thistle also grows and produces viable seed in areas with as little as 10 inches (25 cm) of annual rainfall.

Because musk thistle is a biennial and does not resprout, plants may be easily killed by cultivation and also controlled by mowing; hence, it is not a major problem on either dry or irrigated cropland. It is spreading fastest and is most abundant along roadsides, fencelines, and areas with poor stands of vegetation. Though musk thistle plants are larger and more vigorous where there is little plant competition, musk thistle plants are also



Fig. 4. Musk thistle plants growing in a good stand of native vegetation on rangeland north of Soda Springs, Ida.

spreading and growing well in good native and seeded ranges, irrigated pastures, and in wet meadows with dense stands of grasses, rushes, and sedges (Fig. 4).

Control Methods

Musk thistle is relatively easy to control with herbicides. One pound of 2,4-D (2,4-dichlorophenoxyacetic acid) mixed with 1/2 pound of dicamba (3,6-

dichloro-*o*-anisic acid) in 30 gal of water per acre gives excellent control. Although not registered, a mixture of 2,4-D and picloram (4-amino-3, 5,6-trichloropicolinic acid), mixed as above, is also effective in controlling musk thistle (Jensen, 1970).¹ Picloram beads are easy to use and are effective on small patches or isolated plants. Herbicide treatments may be applied in spring or fall when plants are in the rosette stage and most certainly before the flower heads begin to form.

Individual plants may be cut below the crown at any time. If cut plants have flower heads, these should be burned or otherwise destroyed so that the seeds will not mature. The possibility of biological control with insects is being investigated, and hopefully this method will have promise.

Is Control Feasible and Desirable?

A survey was made of the western states and some midwestern states where musk thistle poses a problem. In addition, 30 counties in Idaho, Utah, and Wyoming were asked to survey their musk thistle infestations. All of the county extension workers who replied, most state workers, and published reports indicate that musk thistle is a problem and that control should be undertaken immediately while infestations are small (Furrer and McCarty, 1966; Higgins, 1966; Nilson,

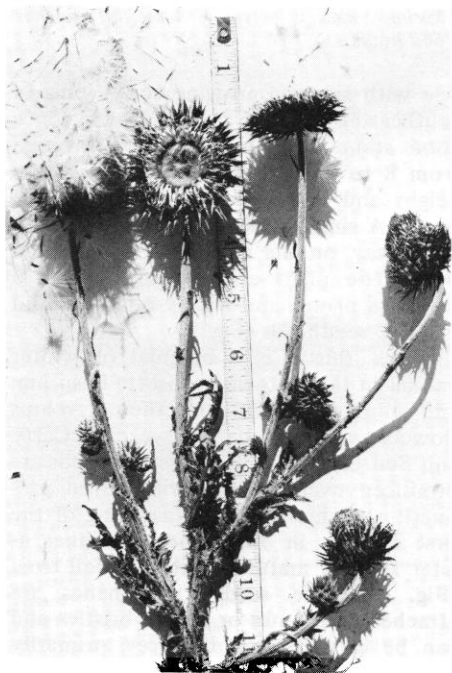


Fig. 2. Flower heads on a branch of a musk thistle plant range from small seedheads in bud on the lower stems to seedheads at the top where the seed has long since disseminated.



Fig. 3. Seeds of musk thistle showing plumes capable of carrying the seeds long distances on the wind.

¹Dicamba and 2,4-D are registered with the Environmental Protection Agency for use on rangelands, pastures, noncrop lands, fence rows, and similar areas. Picloram is registered for use only on rights-of-way, roadsides, and other areas that will not be cropped or grazed. All chemicals should be applied in accordance with directions on the manufacturer's label.

1969; Alley and Lee, 1969; and Jensen, 1970). To let musk thistle grow in waste places and on watershed lands will furnish seeds to infest pastures, meadows, and rangelands where it reduces the amount of forage available and hinders the movement of grazing animals. Also, most people do not like its sharp spines on picnic and camping areas.

The best way to prevent or reduce the amount of musk thistle is to deny it a suitable habitat. Therefore, areas that are susceptible to invasion by musk thistle or from which musk thistle has been eradicated should be treated or managed so that they will grow good stands of vegetation that will prevent or at least slow down reinvasion of this and other undesirable plants.

After an area has been treated and all

thistle plants have apparently been killed and the land has been revegetated, control methods must be continued for plants that were missed, plants from seeds that were in the soil, and reinvading plants from seed from adjacent areas. Successful weed control is not a once-over treatment. It can be achieved only with follow-up to prevent reinfestation. Because this plant is a prolific seed producer and the seeds can be carried long distances, control should be simultaneous on all lands, both public and private.

Some Utah ranchers with large infestations of musk thistle on rangelands have been able to control the plant. However, because their lands have recurrent infestations from adjacent lands, they practice recontrol on a continuing basis.

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