PURDUE UNIVERSITY

PURDUE EXTENSION WEED SCIENCE

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Musk Thistle And Its Control

When in full bloom, musk thistle, also known as nodding thistle, is an impressive plant. That does not mean we want it in our pastures or in our yards. We are not alone in having to deal with this established visitor of Eurasia, for Australia and Argentina also have problems with musk thistle in their pastures. Musk thistle is on several states noxious weed lists.

Identification

Musk thistle is a biennial, meaning that it takes two years to complete its life cycle. It germinates in the fall or spring from seeds that are disseminated by the wind. In its first year it lives discreetly as a rosette (Figure 1). Musk thistle rosette leaves are hairless, lanceolate to elliptic. The leaf margins are serrated and in many cases the serrations are in an opposite pattern. Older rosette leaves have thick light colored mid-ribs. The rosettes can get quite large when the conditions are right, up to 20 inches across. As the rosette, musk thistle will over winter and in the next growing season it will send up a flowering stalk or bolt as it goes through it's reproduction phase.

Figure 1. Musk thistle rosette

When we often notice musk thistle is in the second year of its life cycle when the flower is present. The musk thistle flowering stalk can reach a height anywhere from one and a half feet to as tall as nine and a half feet. Most plants that I have come in contact with in Indiana are around three to five feet tall. Its stems appear to have spiny wings, margins that protrude from the circular stem (Figure 2). Upper leaves clasp the stem and can be smaller than an inch to six inches long. The most identifying character of musk thistle is its large purple flowers (Figure 3). The flowers can get heavy enough to literally bend the stem allowing the flower to droop, hence the common name "nodding thistle". Flowers can be up to three inches wide. Flowers bloom from May to August, the picture in this publication was taken June 8th (Figure 4).

Figure 1. Musk thistle inmature flower

Figure 1. Musk thistle mature flower

Cultural Control

A pasture that is well maintained and competitive can suppress musk thistle establishment. Often pastures that have been over grazed or not well maintained will have problems with musk thistle. We often see musk thistle in waste areas that have not been mowed regularly. A long term strategy is to keep it from going to seed. Mowing pastures during stem elongation, but before flowering can inhibit seed production. In many cases expect regrowth; so a second mowing event will most likely be necessary. To inhibit infestation again, also prevent musk thistle from growing along fence rows and waste areas and going to seed. If you find yourself clipping the flowers, dispose of them in plastic bags.

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Chemical Control

Unfortunately the best time to control musk thistle is when we don't notice it. Optimum time of control is in the fall or early spring when it is in the rosette stage, before it bolts. Do not apply when rosettes are under stress by drought or excessive temperatures. Many of the products that have activity on thistles require the plant to be actively moving sugars from the leaves into the root stocks. Not controlling the root stocks will result in regrowth. There are several herbicides that are active on musk thistle. For a list of herbicides see Table 1. Many of the products that are excellent on musk thistle are from the growth regular group of herbicides. These are generally labeled for established grass pastures and will injure any clover that might be mixed with the grasses. In a legume grass pasture you are restricted to the use of glyphosate as a spot or rope wick application.

Biological Control

Musk thistle is a good candidate for biological control. It is a weed that is aggressive and on the increase, but generally affects marginal low economic valued lands. Two weevils have been used in the past. The seed head weevil (Rhinocyllus conicus) lays its eggs in the flowers. The eggs hatch and the larvae feed on musk thistle's seed. Another weevil used for biocontrol is the rosette crown weevil (Trichosirocalus horridus). This weevil feeds on the crowns of musk thistle. Fungi have also been released for the control of musk thistle. The rust, Puccinia carduorum was released in western Virginia in 1987. For a list of insect and fungi that have been investigated as biocontrol agents for musk thistle see the following web site on The Invasive Species web site (http://www.invasive.org/eastern/biocontrol/18MuskThistle.html). In most cases an integrated management approach is required

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Reference:

1) Richard W. Medd and Richard C. G. Smith. 1978. Prediction of the potential distribution of Carduus nutans (nodding thistle) in Australia. Journal of Applied Ecology 15:603-612.

2) James Stubbendieck, Mitchell J. Coffin, and L. M. Landholt. 2003. Weeds of the Great Plains. Nebraska Department of Agriculture. pp 96 and 97.

3) Merrill A. Ross and Daniel J. Childs. 1993. Musk Thistle Control in Permanent Grass Pastures. Purdue University Cooperative Extension Service. WS-19 (out of print).

5) M. M. Loux, J. M. Stachler, W. G. Johnson, G. R. W. Nice, and T. T. Bauman. 2005. Weed Control Guide for Ohio and Indiana.

4) Musk Thistle Biological Control Plan. Accessed June 9th, 2005. The Colorado Department of Agriculture. http://www.ag.state.co.us/DPI/publications/muskthistle.html

5) A. B. A. M. Baudoin and W. L. Bruckart. 1996. Population dynamics and spread of Puccinia carduorum in the eastern United States. Plant Disease. 80:1193-1196.

Common name	*Trade name*	*Rate / A*	*Efficacy*	*Comments*
2,4-D	Many	1.5 - 2 pt	Fair	See specific product's label for details. Amine and ester formulations are both effective. Do not graze dairy cattle for 7 days after treatment and remove livestock from treated fields at least 3 days before slaughter. Do not apply to grass in the boot to milk state if seed productions is desired. Can injury legumes
dicamba	Banvel, Clarity, Sterling, Oracle	1.5 - 3 pt	Excellent	Labeled in pasture, hay, non-crop lands. Remove livestock from treated fields at least 30 days before slaughter. Do not graze lactating animals for 7 to 10 days depending on rate used. See specific product label. Will injure legumes
clopyralid	Stinger	0.7-1.3 pt	Excellent	Labeled for permanent grass pastures, rangeland, non-crop lands, and CRP. New grass seelings my be injured. Will injury legumes. Allow 6 to 8 hours between applications and rainfall. There are no grazing restrictions. Allow 7 days before transferring animals from treated pastures to sensitive crop pastures. Apply only once per 12 month period.
clopyralid + 2,4-D	Curtail	2-4 qt	Excellent	Labeled for permanent grass pastures, rangeland, non-crop, and CRP. Will injury legumes. Do not graze lactating dairy cattle for 14 days. Animals should be removed from treated areas for 7 days before slaughter (not necessary if 12 weeks have passed since application). Allow 7 days before transferring animals from treated pastures to sensitive crop pastures. Do not cut for hay for 30 days after treatment.
glyphosate	many	2% solution	Good	See specific product's for details. Roundup Weathermax is labeled in pastures, rangeland, CRP, and non-crop areas. It is generally labeled for renovating, spot treatments, and rope wick applications. Will injury desired legumes and grasses. Spray foliage of musk thistle completely and uniformly, but not to the point of run off.
metsulfuron methyl.	Ally/ Cimmaron	0.2-0.3 oz	Excellent	Labeled for grass pastures and rangeland. Grasses should be well established. May stunt, yellow, and suppress seed head formation in fescues and Timothy should be at least 6" tall. Tank mixing with 2,4-D may reduce injury to fescues. Ryegrass is highly sensitive There is not grazing restrictions. Due to a long residual period, see label for rotation and reseeding restrictions.
metsulfuron methyl + dicamba + 2,4-D	Cimmaron Max	Co-pack 0.25 oz part A + 1 pt part B	Excellent	Labeled for grass pastures, rangeland, and established grasses in the CRP. Will injury legumes. Do not apply to timothy for 12 months after establishment. Do not graze lactating animals for 7 days. Meat animals have to be removed from treated areas 30 day before slaughter. Do not harvest for dry hay for 37 days after treatment. Due to a long residual period, see label for rotation and reseeding restrictions.
triclopyr + 2,4-D	Crossbow	1.5% solutions or 4 qt	Excellent	Labeled for perminant grass pastures, rangeland, CRP, and non-crop lands. Will injury legumes. Do not graze dairy animals for 14 days. Remove meat animals from treated areas at least 3 days before slaughter.