



# FORAGE FACTS

*Publication Series*

## MUSK THISTLE CONTROL

### INTRODUCTION

Musk thistle is an introduced invasive broadleaf weed native to Europe, Siberia, Asia Minor and North Africa. It was first introduced into the United States in 1852 in Pennsylvania. Musk thistle now occurs throughout most of the United States and is found in nearly all 105 Kansas counties. Musk thistle was first reported in Kansas in 1932 and was declared a noxious weed in 1963. It can be found growing on roadsides, railroad right-of-ways, building sites, vacant lots, range and pastureland, alfalfa fields and in wheat fallow.

Musk thistle is primarily a biennial or winter annual, relying on seed to reproduce. Seedlings may emerge any time during the growing season with optimum germination occurring in moist soils with temperatures between 59 to 86°F. The plant spends about 90 percent of its lifecycle as a rosette. The rosettes can be identified by the distinct light green midrib. Leaves are coarsely lobed, spiny, hairless and often have a silver-gray leaf margin. The stem elongates (bolts) in late April and May and the plants can exceed 6 feet in height. Flowering generally starts in May and may last several weeks. Musk thistle flower heads are large and have a “powder puff” shape in comparison to the “shaving brush” heads of many other thistles. Musk thistle flowers generally are rose-purple in color. Seed dispersal occurs 7 to 10 days after blooming. A single plant is capable of producing in excess of 10,000 seeds. Seeds can remain viable in the soil for a decade or longer.

### CONTROL OPTIONS

The goal of any control practice should be to prevent seed production. The first line of defense against musk thistle invasion on range and pasture is good grazing management. Use stocking rates designed to avoid overgrazing, that maintain a competitive cover and prevent bare ground. Prescribed burning in the late spring just as the grasses are starting growth will not directly kill musk thistle, but does stimulate the warm season grasses that help prevent musk thistle from becoming established. Cool-season pastures should also be managed to maintain vigorous competitive stands. Proper stocking rates, proper season of use for grazing or haying, and maintenance of soil fertility will generally reduce the likelihood of musk thistle invasion in cool-season grass stands.

### MECHANICAL

Scattered plants of musk thistle can be effectively controlled by hand cutting and digging. Cut through

the taproot at least 2 inches below the crown to prevent resprouting. Individual flowering heads can be removed but new heads will develop in the leaf axils unless the entire plant is dug and allowed to dry out. Flowering heads that are removed should be placed in a tight container and either buried or allowed to rot to prevent possible seed germination.

Mowing can be an effective control of musk thistle if done when the plants are in the late-bloom stage. Repeated mowing is generally necessary to eliminate seed production and control musk thistle. Research at Kansas State University has shown that a single mowing at the late bud stage only killed 11 percent of the musk thistle plants. A second mowing, 4 weeks later, increased control to 79 percent.

### CHEMICAL

A number of herbicides are labeled and effective for control of musk thistle. These include 2,4-D,

dicamba, picloram and metsulfuron methyl. All chemicals must be applied according to label directions. Specific recommendations can be found in the annual issue of *Chemical Weed Control for Field Crops, Pastures, Rangeland and Noncropland* available from Kansas State University.

Chemical control of musk thistle declines after the plant bolts and begins to flower. Treatment of musk thistle rosettes in the fall or spring with recommended herbicides typically results in 90 to 100 percent control. Herbicide treatment after musk thistle bolts and begins to flower may control some plants but will probably not completely eliminate seed production.

Musk thistle control with herbicides is more effective when the plant is actively growing under conditions of good soil moisture and favorable air temperatures (70 to 90°F). Air temperatures should exceed 50°F when herbicides are applied in the fall. A 6-hour rain-free period after application is sufficient to ensure adequate absorption of the herbicide.

#### BIOLOGICAL

The head weevil, *Rhinocyllus conicus*, can provide biological control of musk thistle. The head weevil was first released in Kansas in 1973 in Riley County with widespread release of the organism by 1982. The head weevil is now commonly found in musk thistle stands throughout most of northeast and north central Kansas. The adult weevil lays its eggs on the bracts of the flower buds. The eggs hatch in 6 to 9 days and the larvae feed on the seed-producing tissue. Adults emerge starting in mid-July. The head weevil overwinters as an adult seeking protection under litter, at the base of plants and in wooded areas.

The rosette weevil, *Trichosirocalus horridus*, was first imported and released in Kansas in 1978. The adults begin laying eggs in the fall within the midrib on the undersides of the leaves on musk thistle rosettes. As larvae hatch, they begin feeding within the midrib and migrate toward the center of the rosette. Continual feeding by the larvae causes a blackened ne-

crotic center on the thistle plant. This feeding may eventually kill the plant but often results in shorter, multistemmed plants the next spring.

Biological control is a long-term approach to musk thistle control. Typically, it takes 6 to 10 years after weevil release to see a significant impact on the thistle population. Any plan relying on the use of the musk thistle head or rosette weevil needs to be approved by the Kansas Department of Agriculture. Contact your local county weed director for assistance in developing a plan for biological control of musk thistle.

#### INTEGRATED PEST MANAGEMENT

Mechanical, chemical and biological options exist for control of musk thistle. The approach to use depends on the severity and location of the infestation. A single approach will work in many cases but long-term control may be enhanced by integration of methods. Control options can be integrated in time or space. Stands with head weevils can be sprayed in the fall or early spring when thistles are in the rosette stage. Mowing can be used after the primary heads have started to die and the adult weevils are emerging. Biological control might be used exclusively in remote or environmentally sensitive areas with large thistle populations. Herbicides or mechanical methods could be used in adjacent areas to prevent the spread of musk thistle, allowing time for the weevils to establish and for suppression to occur.

#### OTHER PUBLICATIONS

*Chemical Weed Control for Field Crops, Pastures, Rangeland and Noncropland* (Report of Progress issued annually)

*Musk Thistle Identification and Control* (L-231 revised)

*Biological Control of Musk Thistle in Kansas* (L-873)

*Kansas Department of Agriculture. Musk Thistle Official Control Program* (<http://www.ink.org/public/kda/phealth/phprot/mthistle.html>)

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