MUSK THISTLE CONTROL

On-Farm Demonstrations
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A special thanks goes to Jerry Ryen, Tarkio; Don Phillippe, Savannah; and Bob Parman, Barnard, for all of their cooperation and help.
Musk Thistle is a noxious weed which is continuing to flourish in our local counties. Controlling this pest is costing farmers and others thousands of dollars each year by lost production, money spent for chemical control and the amount of physical labor used to eradicate thistles. The weed is fast becoming a problem in alfalfa and small grains.

Last fall, a team of Extension Specialists of different disciplines worked together to see if there were more effective techniques in controlling thistle.

**ON-FARM DEMONSTRATIONS**

Three sites were chosen to conduct fall and spring applications of chemical control to musk thistle. The applications were made in strips with check plots between treatments.

The sites chosen were as follows: Bob Parman - site located on Highway 71, 10 miles south of Maryville; Jerry Ryen - site located on Highway 59, 1 1/4 miles south of Tarkio; and Don Phillippe - site located on blacktop D, 6 miles east of Savannah.

Fall application was made at the Barnard site on October 26, when the air temperature was 65 degrees F.; Tarkio on October 31 with air temperature at 48 degrees F.; and Savannah on November 2, with air temperature 35 degrees F.

Spring application was made at both the Savannah and Barnard location on April 4 and the Tarkio location on April 11.

The following herbicides were applied to the sites:

- **Fall:** 2 qt. 2,4-D LV4
- 1/2 pt. Banvel plus 3/4 qt. 2,4-D LV4
- 2/3 pt. Banvel
- 1/2 pt. Tordon

- **Spring:** 1 1/2 qt. 2,4-D LV4

Ally was applied as a spring application at the Savannah and Barnard site at a rate of 0.2 oz./A.
RESULTS

Observations were made throughout fall and spring. The final evaluation was made June 1 and following are the results by site:

**MUSK THISTLE CONTROL — BARNARD**
Cooperator — B. Parman

![Graph showing percent control of MUSK THISTLE CONTROL — BARNARD](image)

**MUSK THISTLE CONTROL — TARKIO**
Cooperator — J. Ryan

![Graph showing percent control of MUSK THISTLE CONTROL — TARKIO](image)
MUSK THISTLE CONTROL – SAVANNAH
Cooperator – D. Phillippe

PERCENT OF CONTROL

LEgend
FALL
SPRING

2,4-D  BANVEL  ALY
2,4-D + BANVEL  TORDON
TREATMENT USED

MUSK THISTLE CONTROL
AVERAGE OF SITES

PERCENT OF CONTROL

LEgend
FALL
SPRING

2,4-D  BANVEL
2,4-D + BANVEL  TORDON
TREATMENT USED
Fall application of all products were superior to spring application. We would encourage growers to try fall application to increase herbicide effectiveness.

Tordon gave excellent control. This product works well in adverse weather conditions.

The Banvel + 2,4-D combination controlled thistle equally well. Many area dealers have been using a full 1 qt. of 2,4-D instead of the rate we used.

Banvel applied at the 2/3 pt. rate did not provide effective control. The rate should be adjusted to 1 pt. for musk thistle control.

When applying 2,4-D in the fall, the rate should be 2 qt. of LV4 and in the spring, 1 1/2 qt. of LV4.

Ally is a new product which we applied only as a spring treatment. The product worked well and is slow acting. BEWARE: the product lasts a long time in the soil, so check rotational guidelines.

Did new seedlings emerge in the spring after the fall treatments? We examined plots on June 15 and used a rating system of none, slight, moderate, and heavy to evaluate numbers of germinated thistle. We found the 2,4-D treatment had moderate levels; Banvel and Banvel + 2,4-D had slight levels; and Tordon had none.

GUIDELINES FOR INCREASING HERBICIDE EFFECTIVENESS

FALL APPLICATION:

During the fall, a large majority of thistles are in the rosette stage of growth. The fall period from October 1 to soil freeze-up is an excellent time to control musk thistle. However, soil moisture may be limited and temperatures may be cool. To obtain best control of musk thistle under these conditions in the fall, apply 2 lb. 2,4-D low volatile ester. Application of 2,4-D when temperatures exceed 60 degrees and preferably 70 degrees, for several hours, may provide more favorable conditions for 2,4-D absorption and control of musk thistle than if application was made at lower temperatures.

Fall application has several advantages. There is no hazard of injury from spray drift to foliage of nearby desirable plants after a killing freeze. Control treatments may be applied to rosettes over a longer period in the fall than in the spring. Herbicide application may be made after crop harvest, if before soil freeze-up and air temperatures permit.
SPRING APPLICATION:

For most effective control in the spring, apply the herbicide(s) while the musk thistle is in the rosette stage of growth. Apply the control treatments during active thistle growth; after the soil thaws but before the flower stalk develops (bolting), usually in early May.

If farm work or other activities delay spring treatment until musk thistle bolts, the herbicide(s) provide less effective control. Research at K-State University shows that if herbicide treatments are applied after the flower stalk develops, musk thistle control decreases by 20 percent. Studies also show that a herbicide application to musk thistle while in bloom reduces but does not prevent viable seed production.

FACTORS FOR OPTIMUM CONTROL

Plants growing rapidly are most easily killed by the herbicide. Musk thistle are most susceptible when they are growing rapidly under good soil moisture and favorable air temperatures (70 to 90 degrees). A 6 to 12 hour rain-free period after application at the recommended rate in most cases is adequate to prevent loss of the herbicide.

REASONS FOR POOR CONTROL

In heavy infestations, small rosettes may be under the leaf cover of other thistle. Of course, this prevents spray from contacting small rosettes. Those products without soil residual activity will require another application.

Thick weed growth or other plant growth above the rosettes can result in reduced spray coverage on musk thistles.

Low spray volume can result in poor spray distribution and coverage of thistles.

Environmental conditions such as dry soil or cool temperatures can affect control. This can result in little or no translocation of the herbicide.

Musk thistle treated at stages later than the recommended stage can result in less effective control.

Improper nozzle height may result in incomplete spray coverage or excess application. Improper speed or pressure of the sprayer can result in improper rate of application.
SPOT SPRAYING THISTLE

Always check product label as directions for use may change. The following are guides, but the label should be consulted before mixing.

When choosing 2,4-D products, use 4 to 5 ounces of 4 lb. material per gallon of water. Rates will vary with different 2,4-D products. Completely wet the foliage and stems to the point of run-off.

Banvel use rates for spot spraying are given on a per acre basis on the label. Also, the rate is dependent upon the stage of growth of the thistle.

Tordon 22K is used as a spot spray by mixing 2 1/2 ounces in 2 gallons of water. Use 1 gallon of this mixture on a 25 foot diameter patch of weeds. Additional information is available on label.

Roundup may also be used in controlling musk thistle, but will also harm other foliage the spray contacts. For control, mix a 1 1/2 percent solution by adding 2 ounces of product per gallon of water.

When applying any of these products, beware of grazing restrictions, rotational guidelines, potential run-off problems and other product specific precautions.

MECHANICAL CONTROL

The best time to mow musk thistle is within two days after the terminal flower head blooms. This inhibits seed production the most and has maximum effect on re-bolting. However, thistles will regrow and repeated mowings will have to be made.

HAND CONTROL

Remove scattered musk thistle plants in a field by hand. Dig below the crown of a musk thistle rosette to prevent further development of this plant. Dig, remove from the field, and burn musk thistle that are in the late bud, or bloom stage. This method can prevent possible seed development and further infestation of adjacent land areas.
BIOLOGICAL CONTROL

Specific natural enemies can aid in controlling the spread of musk thistle. One such natural enemy is the musk thistle weevil. The larvae feed in the receptacle of the developing flower, disrupting seed formation.

BIOLOGY OF THE MUSK THISTLE WEEVIL:

Musk thistle weevils overwinter as adults. In early spring, the adults crawl and feed on the leaves of musk thistle rosettes. Mating takes place shortly thereafter, and by the time musk thistles begin to bolt, the females are ready to lay eggs. By mid-May, most musk thistles have budded or flowered.

Weevils lay eggs on the bracts of developing flowers and cover each egg with a secretion of chewed plant material. This secretion gives the eggs a dirty, scale-like appearance. Each female lays an average of 100 eggs during its lifetime.

The eggs hatch in six to eight days. The larvae tunnel into the receptacle, the swollen base of the thistle flower, where they feed. As many as 40 larvae have been found per terminal head. The number of larvae per head decreases as more flowers develop. Some flower heads turn brown prematurely because many larvae are feeding in the receptacle, or because larvae are feeding in the stem just below the receptacle. If you see incompletely filled flower heads with dead plant tissue in the center, you might also suspect musk thistle weevils are present.

Larvae take about 25-30 days to complete development. They stop feeding and begin a resting stage, called pupation, which lasts another 8 - 14 days. The pupa rests in an excavated cell in the receptacle where it transforms into an adult.

The adults emerge in July and seek over-wintering sites under new musk thistle rosettes, ground litter and wooded areas, where they will remain dormant until the following year. For this reason, the insect is said to produce only one generation per year in Missouri.
MAKING A WEEVIL RELEASE ON YOUR FARM:

Choose a site that will not be mowed or sprayed. Often a wooded site which cannot be controlled or a field border will be helpful. The site should be away from roads so it is not unsightly, and to prevent neighbors from feeling you are letting your thistles go to seed.

The area where the weevils are released should be infested with at least 1000 musk thistle plants. Also, sites that have a good soil moisture base, such as a creek or pond will improve chances of a successful release.

When making the release, put all the weevils in the same area. Release weevils away from livestock.

Most importantly, it is a slow process. It takes an average of 5 to 7 years for weevil population to build to a point where thistle control occurs. But, once established, thistle problems will remain in check.

If you have musk thistle weevil present on your farm, you can follow the following recommendations to prevent reductions of weevil populations. You can spray rosettes in mid-March to late April, mow in mid-July and spray rosettes in September and October.

Thistle weevil can be purchased commercially from a number of sources. There are a number of sources in Nebraska where the thistle weevil have been successfully introduced. Thistle weevil from Nebraska are better suited to our climate and will over-winter better.

To make a release, one should have at least 500 weevils. The larger the number, the faster the population will increase. Sprinkle weevils over the musk thistle plants at the new release site at a rate of 5 to 10 per plant. Normal movement of the weevils from plant to plant provides adequate dispersal. Keep a record of the release area to monitor the site.

ADDITIONAL RESOURCES:

Additional information available at your local Extension Office:

Musk and Other Thistles - Guide 4864
Weeds of the North Central States - RP0281