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5-1959

Control and Elimination of Thistles

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Recommended Citation

Derscheid, L. A. and Wallace, K. E., "Control and Elimination of Thistles" (1959). *Agricultural Experiment Station Circulars*. Paper 145.
http://openprairie.sdstate.edu/agexperimentsta_circ/145

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CONTROL AND ELIMINATION OF

thistles

Canada Thistle



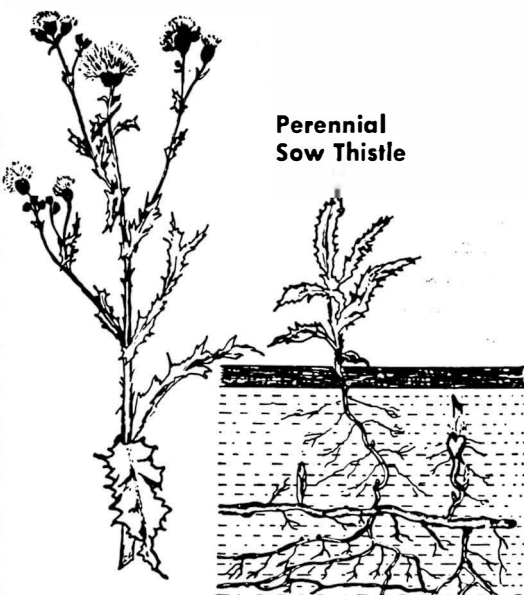
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Canada thistle (*Cirsium arvense* L.) and perennial sowthistle (*Sonchus arvensis* L. or *S. uliginosus* Bieb.) are deep-rooted perennials that spread by underground parts and by seed.

All species emerge later in the spring and are less difficult to control or eliminate than leafy spurge, hoary cress, or Russian knapweed. They emerge about the same time as field bindweed. Prevention of seed production is more important for thistles than for most perennial weeds. Wind currents carry the seeds great distances.

Thistles reduce crop yields. The amount of reduction depends on how thick they are. Two plants of Canada thistle per square yard reduced wheat yields 18%, and 19 plants per square yard decreased yields 36%. A heavy infestation of sowthistle caused a 69% reduction of oat yields.

Perennial Sow Thistle



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To control or eliminate these thistles, use intensive cultivation, soil sterilant chemicals, certain competitive crops, selective herbicides, or several combinations of cultivation, crops, and chemicals.

INTENSIVE CULTIVATION

Intensive cultivation from spring until freeze-up will kill a high percentage of the thistles. Cultivation from immediately after harvest one year until freeze-up the next is more effective.

A duckfoot field cultivator or one-way disk are equally satisfactory implements. However, it is frequently desirable to perform the first operation with a plow if there is considerable plant residue. Equip the duckfoot cultivator with wide sweeps (12 to 24 inches) that overlap 3 or 4 inches. Keep them sharp and see that they are flat when in the soil and operating at a depth of 4 to 5 inches. The same is true for the one-way disk—keep the disks sharp and operate at a depth of 4 to 5 inches. It is essential to cut each thistle root at each cultivation.

It takes 10 to 15 days for the plants to emerge after the roots have been cut. Another 10 to 15 days elapse before there are enough leaves to produce more food than is needed for growth. Therefore, little food is stored in the roots and root reserves are being used for plant growth for a period of 20 to 30 days. Each cultivation has a similar effect. Cultivate every 3 weeks during good growing conditions and every 4 weeks during periods of dry, hot weather when the plants are growing less rapidly. This generally means that cultivations should be done at 3-week intervals during June and July and at 4-week intervals during August, September, and October.

A disk harrow is not a satisfactory implement. Experiments have

shown that double disking with a tandem disk was unsatisfactory even when used every 2 weeks.

Combining intensive cultivation for part of the season with the production of a crop and a chemical application is generally more practical than an entire season of cultivation. Income from the crop is obtained and the hazards of erosion, resulting from a full season of cultivation, are greatly reduced.

SPRAYING

There are several chemicals that can be used for controlling thistles. For controlling sowthistle, 2,4-D is generally more effective than 2,4,5-T or MCPA; however, MCPA is often equal to and sometimes superior to 2,4-D on Canada thistle. An ester formulation of 2,4-D is sometimes superior to an amine formulation for controlling sowthistle, but there is seldom much difference between the two on Canada thistle.

Use one-third to one-half pound acid equivalent per acre of 2,4-D or MCPA to kill seedlings, prevent seed production on mature plants, and kill some old plants and weaken others so that later treatments kill them. Treat when the weeds are in the rosette stage of growth (either spring or fall). Two treatments in 1 year (spring and fall rosettes) will kill up to 85% of the thistles. As a general rule, however, thistles that are not killed by two treatments the first year are more resistant to the chemical and cannot be killed by spraying. Some other treatment, such as cultivation, is needed to eliminate them.

Amitrol (sometimes called ATA, amizol, or amino triazole) generally kills over 90% of Canada thistles. Apply at the rate of 4 to 6 pounds acid equivalent in 10 to 30 gallons of water per acre when the thistles are starting to bud. Similar treatments made to thistles 6 to 8 inches

tall generally give good top kill but very little root kill. Excellent results are sometimes obtained by treating regrowth of thistles that have been mowed or plowed. Treatments should be made with 4 to 6 pounds acid equivalent per acre after regrowth is 8 inches tall and before buds start.

Amitrol is not a selective spray and will injure most crops. It acts slowly and thistles may not be completely dead for 6 weeks. Thistles droop and turn yellow in about 10 days; however, they sometimes appear to recover by the end of 3 or 4 weeks but then die. Regrowth will generally be yellow. Amitrol is somewhat expensive but is frequently useful for eliminating patches. It is generally less effective on sow-thistle than on Canada thistle.

One to 2 pounds acid equivalent per acre of 2,4-DB frequently prevent seed production of Canada thistle and weaken the plants. Because of its cost, its use will probably be limited to controlling broad-leaved weeds in new seedlings of alfalfa. However, it may be useful in checking Canada thistle until the legume can become established.

CULTIVATION, CROPS, CHEMICALS

Small grains. A high percentage of thistles can be eliminated in a year when small grain is being produced. Since barley and wheat are generally more tolerant than oats to 2,4-D, they are usually better adapted for this use. Spray the grain with one-half to three-fourths pound acid equivalent of 2,4-D amine or MCPA amine per acre about June 1 when the thistles are not over 6 inches tall and the grain is in the 5- to 6-leaf stage of growth. Such a treatment will prevent the production of seed and will weaken the plants. Follow-up treatments

after harvest will deliver the knock-out punch.

Experimental results indicate that the percentage of thistles killed will depend on the type of follow-up treatment used.

(1) Three cultivations after harvest (one plowing and two cultivations with duckfoot cultivator or one-way disk) killed 85% of the weeds the first year. A second year of spraying in the grain and three cultivations after harvest gave 100% elimination.

(2) Plowing after harvest and spraying thistles with three-fourths pound 2,4-D or MCPA acid equivalent per acre after they emerged on the plowing killed 85% of the weeds in 1 year. A second year of spraying in the grain, plowing after harvest, and spraying after thistles emerged on the plowing gave 98% elimination.

(3) Spraying in the stubble after harvest gave 50% kill. Three years of spraying in the grain and again after harvest gave over 90% elimination.

(4) Late fall plowing (late October) gave 70% kill in 3 years when used as the only fall treatment after spraying in the grain each year. However, it did not improve results when any of the fall treatments listed were used.

One application of 2,4-D or MCPA in corn kills very few thistles. However, two applications of one-half to three-fourths pound per acre (once before the second cultivation and once after tasseling with drop nozzles) can be expected to kill about 40% of the weeds. Sprayed weeds should not be cultivated for about 1 week after spraying.

One season of intensive cultivation followed by a crop of winter wheat or rye will kill a high percentage of thistles in 1 year and keep the soil from eroding over winter. Likewise, complete elimination can

usually be achieved in 2 or 3 years by growing a crop of winter wheat or rye and cultivating every 3 or 4 weeks between harvest and seeding.

Summer Crops. Two or three cultivations, followed by a late June seeding of soybeans, sorghum, or sudan grass with a grain drill, generally eliminate a high percentage of thistles in 1 year. The crop should be harvested for forage and the area cultivated twice after harvest to get the best results. At least two crops and sometimes three are generally required to give complete kill of all thistles.

Forage Crops. A good crop of alfalfa or alfalfa-bromegrass mixture, which is cut regularly for hay, almost eliminates thistles in 3 years. The use of 2,4-DB may be useful for controlling annual broad-leaved weeds and Canada thistle the first year when establishing the stand. Likewise dalapon at the rate of 2 pounds acid equivalent per acre may be used to control annual grassy weeds in alfalfa the first year. If either chemical is used, however, *hay produced the first year should not be fed to livestock.*

A good crop of bromegrass which is cut regularly for hay will generally give over 90% elimination in 3 years. Spraying with 2,4-D twice a year (early June and mid-August) in a good stand of bromegrass, crested wheatgrass, or other strongly competitive perennial grass will generally kill over 90% of the thistles in 3 years. Use three-fourths pound acid equivalent of 2,4-D, except use only one-half pound the spring that the grass is seeded.

Elimination of thistles can be achieved in less time by intensively cultivating the infested area five times prior to the seeding of a forage crop in mid-August. About 90% elimination can be obtained the first year and 95% the second year. How-

ever, the use of 2,4-D in grasses the second year will generally give 100% elimination by the end of the second year.

SOIL STERILANTS

Numerous soil sterilants can be used to eliminate patches of thistles with one treatment. Most of the chemicals give best results when applied between September 1 and December 1; however, good results are often obtained from summer applications. Apply the chemical to a band 6 or 8 feet wide around the outside of the patch to kill roots that extend beyond the patch.

The following chemicals are generally effective in giving at least 95% elimination when applied at the rates designated for each square rod. The lower rates are satisfactory for fall treatments, but the higher rates are sometimes needed for summer applications.

Ammate "X"	4 to 6 pounds
Atlacide	6 to 8 pounds
Baron	½ to 1 pound
Chlorax	10 to 12 pounds
Chlorea	6 to 8 pounds
Concentrated	
Borascu	12 to 15 pounds
DB Granular	5 to 6 pounds
Polybor-chlorate ...	10 to 12 pounds
Sodium chlorate ...	5 to 6 pounds

CONTROL SEED PRODUCTION

Since thistle seeds can be carried many miles by wind and water, it is imperative that thistles be prevented from producing seed. A high percentage of the seeds will germinate (viable) in thistle heads that have been open 8 to 10 days. Viable seeds will not be produced if the plants are mowed during the week they bloom or earlier. Likewise, spraying with one-third to one-half pound of 2,4-D ester will generally prevent the production of viable seed if the flowers have not been open more than 4 days at the time of spraying.