

perennial weed control

Larry W. Mitich
Assistant Agronomist

L. A. Jensen
Agronomist

CIRCULAR A-194

FEBRUARY 1964

- CANADA THISTLE
- PERENNIAL SOWTHISTLE
- FIELD BINDWEED
- LEAFY SPURGE
- RUSSIAN KNAPWEED
- PERENNIAL PEPPERGRASS

Weed control information in this circular is based on data from the North Dakota Agricultural Experiment Station and the Research Committee of the North Central Weed Control Conference.

Use of chemicals as suggested here is contingent upon registration by the U. S. Department of Agriculture and/or establishment of residue tolerance where necessary by the U. S. Department of Health, Education and Welfare. Use each chemical only as recommended on the container.

LARGE STANDS OF PERENNIAL WEEDS usually can be controlled most satisfactorily by combining cultural and chemical weed control practices. Complete eradication is possible only by continued use of the best weed control practices and a thorough follow-up to eliminate seedlings and stray plants. Soil sterilants are practical on small scattered stands to prevent weeds from spreading.

2,4-D at rates necessary for weed control cannot be used in growing crops underseeded to legumes without serious injury to the legumes, especially sweetclover and alfalfa. If chemical control of perennial weeds with 2,4-D is planned in growing crops, the more tolerant cereals - rye, wheat and barley - should be grown.

CANADA THISTLE AND PERENNIAL SOWTHISTLE

Cultural Control Practices

1. Plow thistles just before freeze-up to weaken growth. Treat small grain sown the next spring with 2,4-D or MCPA.
2. Plow or cultivate 4 to 6 inches deep early in the fall right after harvest. Cultivate again every 2 to 3 weeks after the thistles emerge; repeat as often as necessary with a final cultivation just before freeze-up.
3. Cultivate as in paragraph 2 until about July 1 the following year. Then plant a smother crop such as sudangrass or millet. Immediately after forage or seed harvest, cultivate every 2 to 3 weeks until freeze-up.
4. Cultivate as in paragraph 2 until early September, then plant fall rye. After harvesting this crop, repeat cultivations until freeze-up.

5. Cultivate intensively for at least 3 months, then sow alfalfa, grass or an alfalfa-grass mixture to be cut for hay over several years.

Control in Growing Grain Crop

Chemicals weaken weeds and prevent their seed production in growing grain. MCPA is more effective than 2,4-D on Canada thistle, but 2,4-D gives better sowthistle control. Use MCPA to control perennial thistles in oats or flax. However, these crops do not tolerate application rates high enough to give adequate thistle control. Sowthistle is easier to control than Canada thistle, especially if ester formulations are used.

When spraying thistles in a growing crop, use as much chemical per acre as the crop will tolerate. Apply chemicals as near to the bud stage of the thistle as possible without spraying at the sensitive stage of the grain crop. See table 1.

Follow chemical treatment in the growing crop with after-harvest cultural operations which are listed in order of effectiveness:

1. Cultivate 4 to 6 inches deep at 2 to 3 week intervals. Begin immediately after harvest and continue until freeze-up.
2. Plow after harvest and spray after thistles are up, with 1/2 to 3/4 lb/A of 2,4-D or MCPA ester.
3. Spray thistle rosettes in stubble with 1/2 to 3/4 lb/A and plow 2 weeks after application.
4. Spray only in rosette stage with 1/2 to 3/4 lb/A of 2,4-D or MCPA ester.

Case
S
544.3
N 9
A 8
no. 194

Control in Grassland

Two applications of 2,4-D at 3/4 lb/A each year, over 2 or more years, generally are necessary to eradicate Canada thistle and sowthistle. Make the first application each year to the thistles at the early bud stage and treat one or more times later in the summer and/or early fall. Rates of over 1 lb/A tend to be less effective than the lower rate.

Control of Small Patches

1. Use soil sterilants and other chemicals as suggested in table 2 to eradicate small areas of thistle in either crop or non-cropland.

2. Amitrole (ATA) gives good control of Canada thistle at rates of 4 to 6 lb/A in 30 gallons of water. Treat just before bud stage for best results, but when this is not possible, mow the thistles and spray the regrowth at above rates. Further treatment may be necessary the following year.

TABLE 1. MAXIMUM 2,4-D AND MCPA TOLERANCES FOR CROPS

Crop	Chemical	Rate per acre (lbs.)	Latest stage for safe applications
Wheat or Barley	2,4-D amine	3/4	early boot
	2,4-D ester	1/2	early boot
Oats	2,4-D amine	1/3	early boot
	MCPA	1/2	
Flax	2,4-D amine	1/4	before buds develop
	MCPA	1/3	
Rye	2,4-D amine	3/4	early jointing
	2,4-D ester	1/2	

Heavier rates, if used, can be expected to injure the crop severely but may be worthwhile, particularly in small areas, to attain necessary weed control.

FIELD BINDWEED (CREEPING JENNY)

Cultural Control Practices

1. Two years of intensive cultivation 4 inches deep, each time growth is 4 inches tall (2 to 4 weeks), usually will eliminate field bindweed. Soil erosion may be a serious problem with this procedure.

2. Plow or cultivate 4 to 6 inches deep just before freeze-up to retard plants and give early-sown spring grain crops a better chance to compete. This practice, followed with an application of 2,4-D in the growing crop, usually controls but does not eradicate bindweed.

3. Repeat cultivations over a 2 to 4 year period and use smother crops to control bindweed. Use a duckfoot cultivator and cultivate about 4 inches deep to cut off all plants. Repeat operation 8 to 10 days after each emergence.

Make the first cultivation in early fall as soon as the crop is harvested. Continue cultivating through the next year and the following spring until late June. These cultivations will weaken the plants. Planting a smother crop of sudangrass, millet or buckwheat will weaken the plants further, in addition to reducing erosion and giving a return from the land. Cultivate again as soon as the smother crop is removed.

4. Control is possible on fallow by cultivating in the spring and applying 1/2 to 3/4 lb/A of 2,4-D after allowing bindweed to come into the bud or early bloom stage.

5. Duckfoot cultivate 1 growing season until fall and plant grass. Next year, spray with 3/4 to 1 lb/A of 2,4-D ester during bud to early bloom stage. Continue spraying each year until control is satisfactory.

6. Duckfoot cultivate until early September and seed fall rye. Next year spray rye crop with 1/2 to 3/4 lb/A of 2,4-D and continue cultivating after harvest. Usually requires several years to give control.

Control in Growing Grain

Applying 2,4-D in growing grain usually will control top growth and prevent seed formation. Use as much chemical per acre as the grain crop will tolerate. Apply as near to bud stage of the bindweed as possible without spraying during the sensitive stage of the grain crop. See table 1.

Treat active fall regrowth with up to 1 lb/A of 2,4-D. However, frequent fall cultivation usually is more practical under dry conditions.

For maximum effectiveness, combine 2,4-D in the growing crop with tillage practices suggested under cultural control.

Control in Grassland

Apply 2,4-D at 3/4 to 1 lb/A in the bud to early bloom stage. One treatment per year is enough. Retreating annually for 3 to 5 years usually is necessary to thin or eradicate bindweed.

Control of Small Patches

1. Use soil sterilants as suggested in table 2 to control small patches of bindweed in either crops or pasture.

2. Recommended soil sterilants are TBA and Benzabor. Apply TBA at 10 to 20 lb/A in 30 to 50 gallons of water at the pre-bud stage. Benzabor applied dry at 1 to 1-1/2 lb/sq rod in late fall or early spring gives long soil sterility. During the fallow year as patches become evident is a good time to spray. Residual effect on the following year's crop is likely.

LEAFY SPURGE

Cultural Control Practices

1. Two years of continuous cultivation 4 inches deep with a duckfoot cultivator, until freeze-up, each time growth is 4 inches tall, usually will eliminate leafy spurge. This is conducive to soil erosion. (A duck-foot field cultivator is one of the few implements that will cut the heavy tough roots of leafy spurge.)

2. Plow 4 to 6 inches deep in the fall after harvest and cultivate as described in paragraph 1 until freeze-up. Several follow-up alternatives are possible.

- Duckfoot cultivate for 1 full year and until late June the second year, then plant sudangrass as a smother crop. After sudangrass is harvested, cultivate again until freeze-up. This practice has given good control.
- Duckfoot cultivate until late June and plant sudangrass as a smother crop. When sudangrass is harvested, cultivate until freeze-up. Repeating this operation a second season gives good spurge control.
- Apply 1 lb/A of 2,4-D ester the spring after fall plowing when spurge has started to grow actively. Then duckfoot cultivate until freeze-up each time a 4-inch regrowth occurs.
- Duckfoot cultivate until early September, seed fall rye and repeat cultivation after rye harvest until time to seed rye again. Applying 1/2 to 3/4 lb/A of 2,4-D to the rye crop may increase spurge control. Several years of this practice generally are required for complete elimination of the weed.
- Duckfoot cultivate for one complete season. Seed wheat or barley the second year and apply 1/2 lb/A of 2,4-D ester before the sensitive stage of the crop. See table 1. Plow after harvest and cultivate intensively until freeze-up. Repeating the second year program for 4 to 5 years will control spurge.
- Duckfoot cultivate until fall and plant brome-grass. Next year spray with 1 lb/A of 2,4-D ester both spring and fall. Spraying again the second year usually will control most of the spurge.

Control in Growing Grain Crop

Applying 1/2 lb/A of 2,4-D usually retards top growth and prevents seed formation. Apply as late as possible without injury to the crop. See table 1. The ester formulation of 2,4-D is the most effective. Spraying in small grain crops should be combined with some cultural practice.

Control in Grassland

1. When a full season of cultivation does not precede the seeding of perennial grass, two applications of 2,4-D ester at 1 lb/A are required annually for 3 or 4 years to control spurge.

2. On non-cropland, several repeated applications of 1 to 2 lb/A of 2,4-D ester applied at pre-bud stage will reduce stands of leafy spurge in 3 or 4 years.

3. On hilly or stony pasture, apply 2 lb/A of 2,4-D ester during bud stage. Repeat application when regrowth is 4 to 6 inches tall. A spring application of 50 lb/A of nitrogen to stimulate growth of the grasses is desirable. Treated areas may be grazed moderately. Spurge will be controlled but several years of treatment are required to decrease the stand materially.

4. Sheep can be used to control large areas of leafy spurge. Put sheep in the pasture in early spring and allow them to graze the spurge closely. The degree of control depends upon intensity of grazing and use of a good follow-up practice. Grazing leafy spurge does not harm sheep.

Control of Small Patches

1. Soil sterilants and other chemicals suggested in table 2 are effective in controlling small patches of leafy spurge.

2. A heavy application of 2,4-D gives good spurge control. Apply 40 lb/A of 2,4-D in fall after Sept. 20. Seedlings and regrowth in following years can be eliminated by applying 1/2 to 1 lb/A of 2,4-D.

RUSSIAN KNAPWEED

Cultural Control Practices

1. Two years of intensive duckfoot cultivation at 2-week intervals will eliminate Russian knapweed. This practice, however, is conducive to soil erosion.

2. Fall cultivation at 2-week intervals immediately after harvest and until freeze-up offers several opportunities for follow-up practices the next season:

- Duckfoot cultivate at 2-week intervals from early spring until early September and plant rye. Apply 1/2 to 3/4 lb/A of 2,4-D ester in growing rye the next summer and 1 lb/A in stubble immediately after harvest, followed after 2 weeks by plowing and reseeding to rye. This practice for 3 years should control knapweed. Fall treatment is more effective than summer treatment in controlling knapweed.
- Another possibility is same as above except, during either of the last 1 or 2 years, cultivate until late June and plant sudangrass as a smother crop. Then cultivate until freeze-up, after sudan is harvested.
- Duckfoot cultivate at 2-week intervals from spring until early fall and seed brome-grass. Spray brome-grass with 1-1/2 lb/A of 2,4-D ester both spring and fall for 2 or 3 years. The fall application is more effective.

Control in Growing Grain Crop

Applying 1/2 to 3/4 lb/A of 2,4-D ester in the grain crop prevents seed formation in the knapweed. Make 2,4-D application as late as is possible without injury to crop. See table 1. When fall knapweed growth permits, apply 1 to 1-1/2 lb/A of 2,4-D ester in the stubble after harvest and follow after 2 weeks with plowing. Then cultivate until freeze-up.

Control in Grassland

Two applications of 2,4-D ester at 1 to 2 lb/A, applied just before the knapweed blooms and again in fall when considerable regrowth has occurred, will prevent seed production and reduce the stand. Satisfactory chemical control is seldom obtained without the use of previous cultural treatments.

Control of Small Patches

1. Soil sterilants recommended in table 2 are effective in eliminating small patches of knapweed.

PERENNIAL PEPPERGRASS (HOARY CRESS)

Cultural Control Practices

1. Intensive cultivation each time growth reaches 3 to 4 inches over a 2-year period will eliminate peppergrass, but this practice is conducive to soil erosion.

2. One year of intensive cultivation controls perennial peppergrass, permitting a crop to be grown the next year, but this practice is not likely to eliminate the weed. Fair to good control may be obtained by applying 2,4-D at 1/2 to 3/4 lb/A to infested crops during the growing season. See table 1.

3. A combination of fallow and smother crops eliminates perennial peppergrass. Cultivate annually both before and after the smother crop. Follow practice as outlined under cultural control practices for Russian knapweed.

4. Treat rosettes in the fall with 1 to 2 lb/A of 2,4-D, followed by clean tillage until fall of the next season, then seed to grass. The following season, apply 2,4-D at 1 lb/A in bud stage and 1 to 2 lb/A in fall rosette stage. Continue to treat as needed to obtain control.

Control in Growing Crop

Applying 2,4-D at 1/2 to 3/4 lb/A will control top growth of perennial peppergrass when treated near or during bud stage. Treat as late as is possible without injury to crop. See table 1. When moisture is available for growth of rosettes in the fall, treat them with 1 to 2 lb/A of 2,4-D. Two chemical treatments per year should give almost complete elimination of pepper-

grass after 2 or 3 seasons. Tillage in alternate seasons with chemical application as described above is effective in controlling perennial peppergrass.

Control in Grassland

Treating grassland with 1 lb/A of 2,4-D during the bud stage, followed with application of 1 to 2 lb/A of 2,4-D during the fall rosette stage, should give nearly complete control of this weed after 2 or more seasons.

Control of Small Patches

Soil sterilants as suggested in table 2 are effective in eliminating small patches of peppergrass.

TABLE 2. SOIL STERILANTS AND OTHER HERBICIDES FOR CONTROL OF SMALL PATCHES OF PERENNIAL WEEDS

Weed	Herbicide	Rate ^{1/}	Remarks
Field bindweed	TBA (Benzoic)	10 to 20 lb/A	Apply during bud stage
	Benzabor	1 to 1½ lb/sq rd	Long time sterility
Leafy spurge	Ammate X	1 to 3 lb/sq rd	Use with a spreader sticker
	2,4-D	40 lb/A	Apply after Sept. 20
	TBA (Benzoic)	20 lb/A	Residual 2 or more years
	Benzabor	1 to 1½ lb/sq rd	Long time sterility
	Erbon (Baron)	¾ lb/sq rd	Affects both tops and roots
Canada thistle	Amitrole or Amitrole-T	4 lb/A	Thoroughly wet all leaves
	TBA (Benzoic)	10 to 20 lb/A	Residual 2 or more years
	Benzabor	1 to 1½ lb/sq rd	Long time sterility
Perennial sowthistle, Russian knapweed and Perennial peppergrass	TBA (Benzoic)	10 to 20 lb/A	Residual 2 or more years
	TBA (Benzoic)	10 to 20 lb/A	Residual 2 or more years
	Benzabor	1 to 1½ lb/sq rd	Long time sterility
	Erbon (Baron)	¾ lb/sq rd	For knapweed & peppergrass. Slow acting.

^{1/} Active ingredient in lb/A or lb/sq rd.

Amitrole or Amitrole-T--Spray when most thistles are coming into bud stage, in 30 to 50 gallons of water.

Ammate X--Apply as a spray in early bud stage.

Benzabor (sodium borate-TBA mixture)--Apply dry in late fall or early spring. Moisture is necessary for activation.

Erbon (Baron)--Apply in the fall or early spring.

TBA (Benzoic)--Apply in bud stage in 30 to 50 gallons of water.

2,4-D--Apply in fall after Sept. 20.

CIVIL DEFENSE TIP: To protect livestock feed from radioactive fallout, place a cover over it. Fresh fallout is like coarse dust, a cover will prevent it from coming into contact or mixing with the feed.