



perennial weed control

CANADA THISTLE
SOWTHISTLE
CREEPING JENNY
LEAFY SPURGE
RUSSIAN KNAPWEED
PERENNIAL PEPPERGRASS

L. A. Jensen
Extension Agronomist

Dr. E. A. Helgeson, Botanist
Experiment Station

Weed control suggestions in this circular are based on information available 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 United States Department of Agriculture and/or establishment of residue tolerance where necessary by the United States Department of Health, Education and Welfare. Use any chemical only as recommended on the label of the container.

Perennial weeds in large areas can usually be controlled best with a combination of cultural and chemical practices. Complete eradication can be accomplished only by continued use of the best methods and follow-up control to take care of seedlings and stray plants. For small patches soil sterilants are practical and will prevent weeds from spreading.

The chemical 2,4-D cannot be used in growing crops underseeded to legumes without serious injury to the legumes, especially sweetclover and alfalfa. When using 2,4-D for control of perennial weeds in growing crops, the more tolerant cereals, rye, wheat and barley, are preferred.

CANADA THISTLE - SOWTHISTLE

Cultural Control Practices

1. Plowing just before freeze-up sets the plants back. Small grain planted the next season should then be treated with 2,4-D or MCP.
2. Plow or cultivate 4 to 6 inches deep early in the fall, as soon as the small grain crop is harvested. Cultivate again about 2 to 3 weeks after the thistles come up; repeat as often as possible with a final cultivation just before freeze-up.
3. Cultivate as in paragraph 2 above until about July 1 the following year. Then plant a good smother crop such as sudangrass or millet. As soon as the crop is cut for forage or seed, repeat the cultivation until freeze-up.
4. Cultivate as in paragraph 2 until early September and plant fall rye. After rye is harvested, repeat cultivations until freeze-up.

5. Cultivate intensively for at least 3 months, followed by seeding of alfalfa, grass, or alfalfa-grass mixture to be cut for hay over several years.

Control in Growing Grain Crop

Use chemicals to weaken the weed plants and prevent seed production in growing grain; MCP is somewhat more effective on Canada thistle, while 2,4-D is better on sowthistle. When treating oats or flax it is better to use MCP, but these crops do not tolerate heavy enough applications to give much control. Sowthistle is easier to control than Canada thistle, especially if ester formulations are used.

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

Chemical treatment in the growing crop should be followed with after-harvest operations in the following order of effectiveness:

NDSU LIBRARIES

NDAC Extension Service, Fargo

NORTH DAKOTA AGRICULTURAL COLLEGE

Case
S
544.3
.N9
A8
no.194

1. Cultivate 4 to 6 inches deep at 2 to 3-week intervals, beginning immediately after harvest and continuing until freeze-up.
2. Plow after harvest and spray the thistles with $\frac{1}{2}$ to $\frac{3}{4}$ pound of 2,4-D or MCP ester after they emerge.
3. Spray rosettes in stubble at rates suggested in paragraph 2 and then plow in the fall.
4. Spray only, at rates suggested in paragraph 2, in rosette stage.

Control in Grassland

Usually, at least two applications of 2,4-D at $\frac{3}{4}$ pound per acre each year, over a period of 2 or more years, are necessary to eradicate Canada thistle and sowthistle. Make the first application each year at the early bud stage and treat one or more times later in the summer and/or early fall. Rates of over 1 pound per acre tend to be less effective.

Control of Small Patches

1. Soil sterilants and other chemicals as suggested in table II can be used to eradicate small areas of thistle in either crop or non-cropland.
2. Amino triazole (ATA), gives good control of Canada thistle at rates of 4 to 6 pounds per acre in 30 gallons of water. Treat just before the bud stage for best results. Where this is not possible, mow the thistles and spray the regrowth at the above rates. Further treatment may be necessary the following year.

TABLE I MAXIMUM 2,4-D AND MCP TOLERANCE FOR CROPS

Crop	Chemical	Rate per acre (lbs.)	Latest stage for safe applications
Wheat or Barley	2,4-D amine	$\frac{3}{4}$	early boot
	2,4-D ester	$\frac{1}{2}$	early boot
Oats	2,4-D amine	$\frac{1}{2}$	early boot
	MCP	$\frac{1}{2}$	
Flax	2,4-D amine	$\frac{1}{4}$	early bud
	MCP	$\frac{1}{4}$	
Rye	2,4-D amine	$\frac{3}{4}$	early jointing
	2,4-D ester	$\frac{1}{2}$	

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.

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) for a period of 2 years, will usually eliminate creeping jenny. Soil erosion may be a problem to guard against.

2. Plowing or cultivating 4 to 6 inches deep just before freeze-up sets the plants back and gives early-sown spring grain crops a better competitive chance. This practice, followed with an application of 2,4-D in the growing crop, usually gives effective control, but not eradication.
3. Can be controlled over a 2 to 4 year period by repeated cultivations and use of smother crops. Use a duckfoot cultivator. Cultivate about 4 inches deep to cut off all plants. Repeat 8 to 10 days after each emergence.

Start the first cultivation in early fall as soon as the crop is harvested and continue through the next year and the following spring until late June. After the plants have been weakened by cultivation, a smother crop of sudangrass, millet or buckwheat may be planted to reduce erosion and give you some return from the land. Cultivate again as soon as the smother crop is removed.

4. On fallow land, control is possible by cultivating in the spring and applying $\frac{1}{2}$ to $\frac{3}{4}$ pound of 2,4-D per acre after allowing the jenny to come into the bud or early bloom stage.
5. Duckfoot cultivate one season until fall and plant grass. The next year, spray with $\frac{3}{4}$ to 1 pound 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. The next year spray rye with $\frac{1}{2}$ to $\frac{3}{4}$ pound of 2,4-D and continue cultivation after harvest. Several years are generally required to give control.

Control in Growing Grain

Under most conditions applying 2,4-D in growing grain will control top growth and prevent seed formation. Apply as much chemical per acre as the grain crop will tolerate. Apply as near to bud stage of the creeping jenny as possible without spraying during the sensitive stage of the grain crop. See table I.

Active fall regrowth can be treated with up to 1 pound 2,4-D per acre. However, frequent fall cultivation usually is more practical under dry conditions.

To be the most effective in eradication, combine the use of 2,4-D in a growing crop with tillage practices suggested under cultural control.

Control in Grassland

Apply 2,4-D at $\frac{3}{4}$ to 1 pound per acre in the bud to early bloom stage. One treatment per year is enough, but retreating for 3 to 5 years is usually necessary to thin out or eradicate the jenny.

Control of Small Patches

1. Soil sterilants as suggested in table II can be used to control small patches of jenny in either cropland or non-cropland.
2. Benzoic (TBA) looks promising. Apply 10 to 20 pounds of acid per acre at pre-bud stage in 30 to 50 gallons of water to wet foliage. During the fallow year patches show up well and this may be a good time to spray them. There will likely be residual effect on next year's planted crop.

LEAFY SPURGE

Cultural Control Practices

1. Two years of continuous cultivation 4 inches deep, with a duckfoot cultivator, each time growth is 4 inches tall until freeze-up will usually eliminate leafy spurge, but is conducive to soil erosion.
2. In the fall after harvest plow 4 to 6 inches deep and cultivate as above until freeze-up. Several follow-up alternatives are possible.
 - (a) Duckfoot cultivate for 1 full year and until late June the second year, then plant sudangrass as a smother crop. Cultivate again, after the sudangrass is harvested, until freeze-up. This practice has given good control.
 - (b) Duckfoot cultivate until late June and plant sudangrass as a smother crop. As soon as the sudangrass is harvested, cultivate until freeze-up. Repeating this operation a second season has given a high percentage of elimination.
 - (c) Apply 1 pound of 2,4-D ester per acre the next spring after the spurge has started to grow actively; Duckfoot cultivate each time 4-inch regrowth occurs, until freeze-up.
 - (d) Duckfoot cultivate until early September, seed fall rye and repeat cultivation after rye harvest until time to seed rye again. Applying $\frac{1}{2}$ to $\frac{3}{4}$ pound of 2,4-D in growing rye may increase effectiveness. Several years are generally required for complete elimination of the weed.
 - (e) Duckfoot cultivate for one complete season. Seed wheat or barley the second year and apply $\frac{1}{2}$ pound of 2,4-D ester per acre before the sensitive stage of the crop. See table I. Plow after harvest and cultivate intensively until freeze-up. If the second year program is repeated 4 to 5 years, the spurge can be controlled.
 - (f) Duckfoot cultivate until fall and plant bromegrass. The next year spray with 1 pound of 2,4-D ester both spring and fall. A second year of spraying usually will finish off a high percentage of the spurge.

Control in Growing Grain Crop

Top growth can be retarded and seed setting usually prevented with $\frac{1}{2}$ pound of 2,4-D. Apply as late as is possible without injury to the crop. See table I. The ester formulation is the most effective. Spraying in small grain crops should be combined with cultural practices listed.

Control in Grassland

1. Where a full season of cultivation does not precede the seeding of perennial grass, two applications of 2,4-D ester at 1 pound per acre each year will be needed for 3 or 4 years to control spurge.
2. On non-cropland, several repeat applications of 1 to 2 pounds of 2,4-D ester per acre applied at pre-bud stage will thin out stands of leafy spurge in 3 or 4 years.
3. On rough or stony pasture, apply 2 pounds of 2,4-D ester per acre at bud stage. Retreat when regrowth is 4 to 6 inches tall. A spring application of 50 pounds per acre of nitrogen to stimulate grass growth is desirable. The treated areas may be grazed moderately. Weeds are controlled but several years are required to decrease the stand materially.
4. Large areas of leafy spurge can be controlled by pasturing with sheep. Turn the sheep into the pasture in early spring and allow them to graze the pasture closely. The degree of control depends on the intensity of grazing and the use of other follow-up practices. Grazing leafy spurge does not harm the sheep.

Control of Small Patches

1. Soil sterilants and other chemicals suggested in table II can be used to control leafy spurge.
2. A heavy application of 2,4-D will give good control. Apply 40 pounds of 2,4-D acid per acre in the fall after September 20. Seedlings and regrowth occurring in following years can be eliminated by applying $\frac{1}{2}$ to 1 pound of 2,4-D per acre.

RUSSIAN KNAPWEED

Cultural Control Practices

1. Two years of intensive cultivation at 2-week intervals with a duckfoot cultivator will eliminate Russian knapweed. However, this practice is conducive to soil erosion.
2. Fall cultivation at 2 week intervals immediately after harvest until freeze-up offers several opportunities for follow-up the next season:
 - (a) Duckfoot cultivate at 2-week intervals, early spring until early September, and plant rye. Apply $\frac{1}{2}$ to $\frac{3}{4}$ pound per acre of 2,4-D ester in the growing rye the next summer and 1 pound per acre

in the stubble shortly after harvest, followed in 2 weeks by plowing and reseeding to rye. Three such rye crop treatments should give a high percentage of elimination. The fall treatment is more effective than the summer treatment.

- (b) Same as (a) above, except during either the last 1 or 2 years cultivate until late June and plant sudangrass as a smother crop, followed by cultivation until freeze-up after harvesting of the sudan forage.
- (c) Duckfoot cultivate at 2-week intervals until early fall and seed brome grass. Spray the brome grass with 1-½ pounds per acre of 2,4-D ester in both spring and fall for 2 or 3 years. The fall application is the more effective.

Control in Growing Grain Crop

Applying ½ to ¾ pound of 2,4-D ester prevents seed formation. Apply as late as is possible without injury to crop. See table I. Where fall weed growth permits, apply 1 to 1-½ pounds 2,4-D ester in stubble after harvest and follow in 2 weeks with plowing. Cultivate until freeze-up.

Control in Grassland

Two applications of 2,4-D ester at 1 to 2 pounds per acre, applied just before the weed blooms and again in the fall when considerable regrowth occurs, will prevent seed production and reduce the stand to some extent. Satisfactory control is seldom obtained without the use of previous cultural treatments.

Small Patches

1. Soil sterilants recommended in table II are effective in eliminating small patches.

PERENNIAL PEPPERGRASS

Cultural Control Practices

- Intensive cultivation for 2 years each time growth reaches 3 to 4 inches will eliminate this weed, but is conducive to soil erosion.
- One year of intensive cultivation keeps the weed in check so as to permit growing a crop the next year, but this is not likely to eliminate the weed. Fair to good control may be obtained by applying 2,4-D at ½ to ¾ pound per acre during the crop growing season. See table I.
- A combination of fallow and smother crops, with tillage each year before and after the smother crop, is also a successful means of eliminating this weed. Follow practice as outlined for Russian knapweed.
- Treat rosettes in the fall with 1 to 2 pounds 2,4-D per acre, followed by clean tillage until fall the next season, and seed to grass. The next season, apply 2,4-D at 1 pound per acre in bud stage and 1 to 2 pounds per acre in fall rosette stage, and continue treatments as needed to obtain control.

Control in Growing Crop

Applying 2,4-D at ½ to ¾ pound per acre will control the top growth of perennial peppergrass when applied at or near the bud stage. Apply as late as is possible without injury to the crop. See table I. When moisture permits growth of fall rosettes, treat with 1 to 2 pounds of 2,4-D per acre. This combination of two treatments per year should give almost complete elimination after 2 or 3 seasons. Tillage in alternate seasons with the above treatment also is effective.

Control in Grassland

Treating with 1 pound of 2,4-D per acre in the bud stage, followed with treatment of 1 to 2 pounds 2,4-D per acre in the fall rosette stage, should give nearly complete control after 2 or more seasons.

Control of Small Patches

Soil sterilants as suggested in table II are effective in the elimination of small patches.

TABLE II SOIL STERILANTS AND OTHER CHEMICALS FOR CONTROL OF SMALL PATCHES OF PERENNIAL WEEDS

	Per square rod			Other chemicals
	Borax	Chlorate borax mixture	Sodium chlorate	
Creeping jenny	15 lbs.		5 lbs.	Benzoic (TBA)* 10-20 lbs/A
Leafy spurge	15 lbs.		5 lbs.	Ammate - 1 lb. per sq. rod 2,4-D, 40 lbs. /A*
Canada thistle			5 lbs.	Amino Triazole* 4-6 lbs/A
Perennial sowthistle			5 lbs.	
Perennial peppergrass		8 lbs.	5 lbs.	
Russian knapweed		8 lbs.	5 lbs.	

* Active ingredient - other chemicals based on product

Borax - Borascu, Polybor and Chlorax give soil sterility for several years. Apply September to freeze-up. Treat any regrowth annually.

Chlorate borax - Gives soil sterility for 3 or 4 years. Apply September to freeze-up. Treat regrowth as needed.

Sodium chlorate - Apply dry, September till freeze-up. Gives soil sterility for several years.

Ammate - Apply as a spray in early bud stage. Add a good wetting agent.

Amino triazole - Apply at pre-bud stage in 30 to 50 gallons of water per acre.

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

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