

CANADA THISTLE  
 PERENNIAL SOWTHISTLE  
 FIELD BINDWEED  
 LEAFY SPURGE  
 RUSSIAN KNAPWEED  
 HOARY CRESS

# Perennial Weed Control

Larry W. Mitich  
 Associate Professor  
 Extension Service

CIRCULAR A-194

REVISED MAY 1968

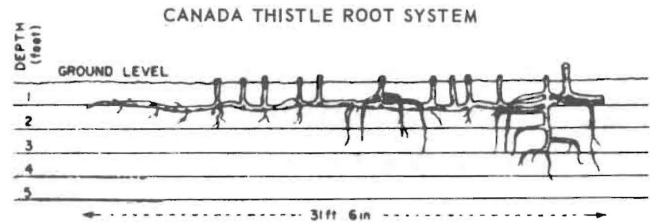
The most satisfactory method of controlling large stands of perennial weeds is by combining cultural and chemical weed control practices. Complete eradication is possible only by continued use of the best weed control practices and a thorough follow-up to eliminate stray plants and seedlings as they appear. Using soil sterilants is a practical way of eliminating small scattered stands of perennial weeds before they spread.

Rates of 2,4-D required for controlling perennial weeds cannot be applied in growing small grain crops underseeded to legumes without seriously injuring the legumes, especially sweetclover and alfalfa. If 2,4-D is planned for controlling perennial weeds in crops, grow the more tolerant cereals - rye, wheat and barley.

## CANADA THISTLE and PERENNIAL SOWTHISTLE

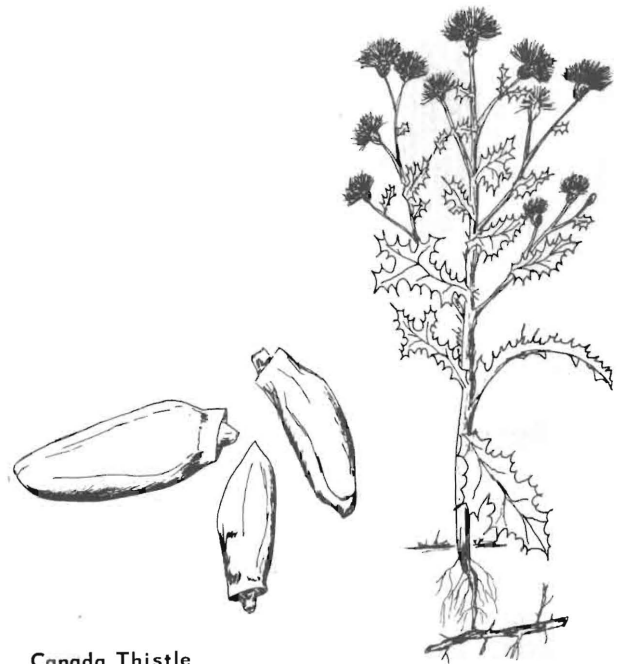
### Cultural Control Practices

1. Plow down the thistles just before freeze-up to weaken their growth. The following spring treat the small grain crop with 2,4-D or MCPA.
2. Plow or cultivate 4 to 6 inches deep early in the fall immediately after harvest. Cultivate again every 2 to 3 weeks after the thistle re-growth emerges; repeat as often as necessary and make a final cultivation just before freeze-up.
3. Cultivate every 2 to 3 weeks until about July 1 the following year. Then plant a smother crop such as sudangrass or millet. Immediately after harvesting the forage or seed, cultivate the thistles every 2 to 3 weeks until freeze-up.



One half of a root system arising from small cutting of lateral root.

4. Cultivate every 2 to 3 weeks until early September, then sow fall rye. After harvesting the rye crop the following season, repeat the cultivations until freeze-up.
5. Cultivate the thistles intensively for at least 3 months, then sow alfalfa, grass or an alfalfa-grass mixture for hay which will be harvested over a period of several years.



Canada Thistle

CASE  
 S  
 544.3  
 N9  
 A8X  
 no. 194

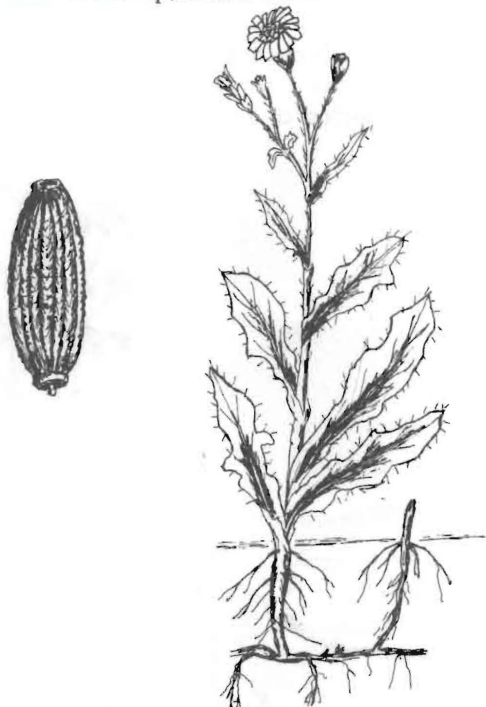
### Control in Growing Grain Crop

Herbicides weaken weeds, preventing them from going to seed in growing grain crops. MCPA is equally as effective as 2,4-D on Canada thistle, but 2,4-D gives better control of sowthistle. Use MCPA to suppress thistles in oats and flax. However, these crops do not tolerate rates of MCPA necessary to give adequate thistle control. Sowthistle is easier to control than Canada thistle, especially if ester formulations of 2,4-D are used.

When treating thistles in a growing crop, apply the maximum rate of chemical the crop will tolerate. See table 1. Apply the chemicals as near to the bud stage of the thistle as possible without spraying during the sensitive stage of the grain crop.

Follow chemical treatment in the growing crop with an after-harvest cultural operation, listed below 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 after thistles are up treat with  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D low volatile ester or MCPA ester.
3. Treat thistle rosettes in the stubble with  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D L.V. ester or MCPA ester and plow 2 weeks after application.

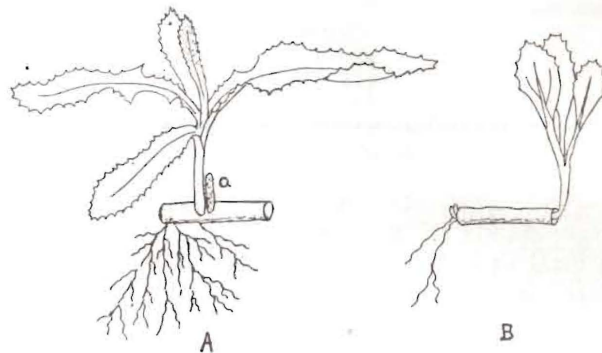


Perennial Sowthistle

4. Use chemical only during rosette stage of growth, applying  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D L.V. ester or MCPA ester.

### Control in Grassland

Two applications of 2,4-D low volatile ester at 1 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 of growth and retreat one or more times later in the summer and/or early fall. Rates higher than 1 lb/A are unnecessary.



SOWTHISTLE GROWS QUICKLY FROM PIECES OF ROOTS. Plant "A" is 20 days old from a one-inch piece of root and plant "B" is weaker and would be more easily killed.

TABLE I. 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	$\frac{3}{4}$	early boot
	2,4-D L.V. ester	$\frac{1}{2}$	early boot
Oats	2,4-D amine	$\frac{1}{3}$	early boot
	MCPA	$\frac{1}{2}$	
Flax	2,4-D amine	$\frac{1}{4}$	before buds develop
	MCPA	$\frac{1}{3}$	
Rye	2,4-D amine	$\frac{3}{4}$	early jointing
	2,4-D L.V. ester	$\frac{1}{2}$	

Use of higher rates is likely to injure the crop severely but may be worthwhile, particularly in small areas, to obtain necessary weed control.

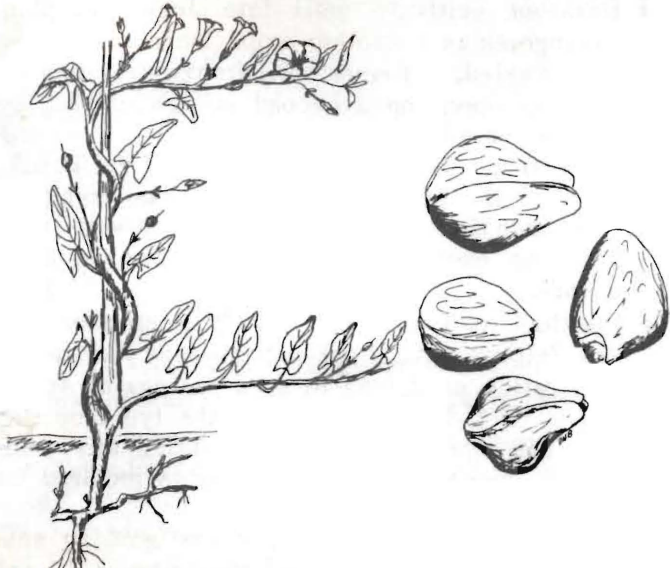
### Control of Small Patches

1. Use soil sterilants or other chemicals as suggested in table 2 to eradicate small areas of thistle in either crop or non-crop land.
2. Amitrole and Amitrole-T give good control of Canada thistle at the rate of 4 pounds of chemical in 30 gallons of water per acre. Treat just before the bud stage for best results, but when this is not possible, mow the thistles and spray the regrowth at the 4 lb/A rate. Further treatment may be necessary the following year.

# FIELD BINDWEED (CREEPING JENNY)

## Cultural Control Practices

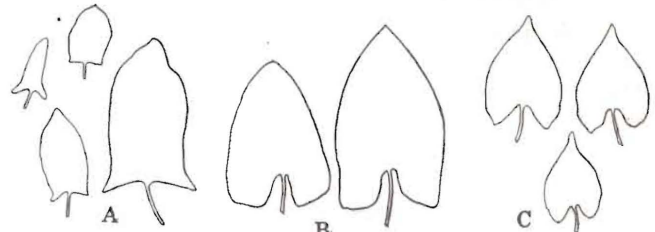
1. Two years of intensive cultivation 4 inches deep, each time regrowth is 4 inches tall (every 2 to 4 weeks), usually eliminates field bindweed. Soil erosion may become a serious problem with this procedure.
2. Plow or cultivate 4 to 6 inches deep just before freeze-up. This retards the bindweed and gives early-sown spring grain crops a better chance to compete with it. This practice, followed by an application of 2,4-D in the growing crop, usually controls but does not eradicate bindweed.
3. Repeat the cultivations for 2 to 4 years and plant a smother crop to control bindweed. Use a duckfoot cultivator to cut off all plants about 4 inches deep. Repeat this operation 8 to 10 days after each emergence of the bindweed shoots. Make the first cultivation immediately after harvest. Continue cultivating through the next year and the following spring until late June. Such cultivations will weaken the bindweed plants. A smother crop of sudangrass, millet or buckwheat will weaken the bindweed further, in addition to reducing erosion and providing a return from the land. Cultivate again as soon as the smother crop is removed.



Field Bindweed

4. Controlling bindweed on fallow is possible by cultivating in the spring and applying  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D L.V. ester after the plants have reached the bud or early bloom stage.

5. Duckfoot cultivate during one growing season until fall and plant grass. The following year, spray the grass with  $\frac{3}{4}$  to 1 lb/A of 2,4-D L.V. ester during bud to early bloom stage of the bindweed. Continue treating each year until satisfactory control is obtained.
6. Duckfoot cultivate until early September and sow fall rye. The following year treat the rye crop with  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D L.V. ester and continue cultivating after harvest. This procedure usually must be repeated for several years to give satisfactory bindweed control.



LEAVES OF BINDWEEDS AND WILD BUCKWHEAT

- A. FIELD BINDWEED: leaves from different plants showing variation in size and shape, but mostly straight across at the base.
- B. LARGE BINDWEED: leaves more triangular with broad spreading lobes at base.
- C. WILD BUCKWHEAT: leaves much more narrowed toward the tip and somewhat sharper at the base.

## Control in Growing Grain

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

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

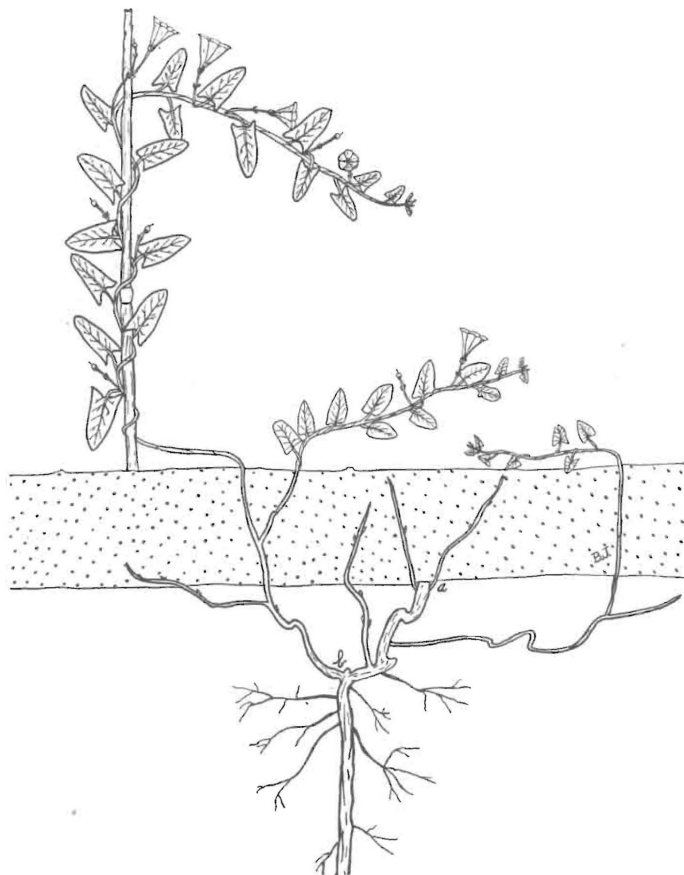
For maximum bindweed control, combine 2,4-D application in the growing crop with some tillage practice suggested under cultural control.

## Control in Grassland

Apply 2,4-D L.V. ester at  $\frac{3}{4}$  to 1 lb/A in the bud to early bloom stage. One treatment per year is sufficient. Retreating annually for 3 to 5 years usually is necessary to thin or eradicate the bindweed stand.

## Control of Small Patches

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



#### GROWTH HABITS OF FIELD BINDWEED

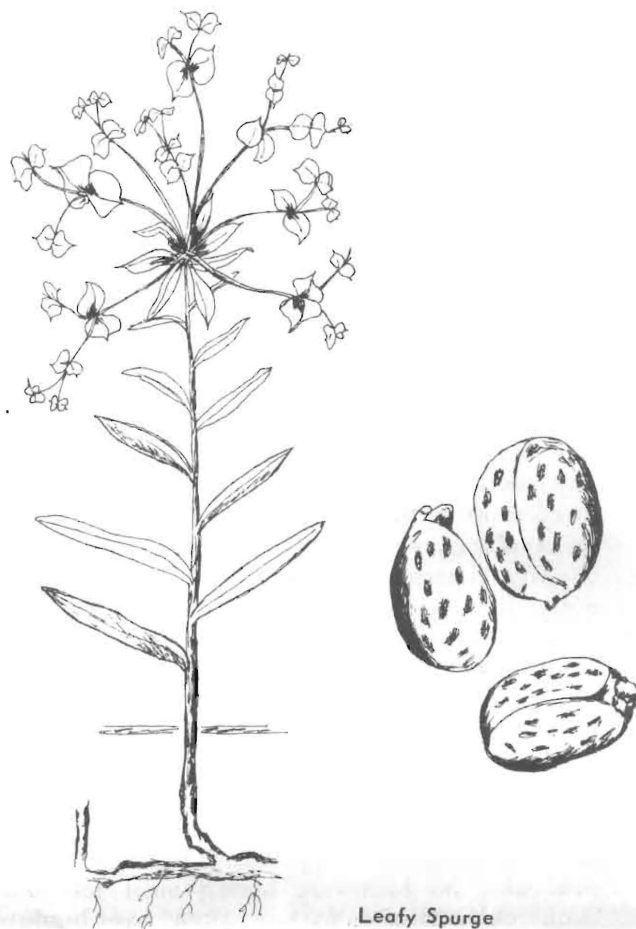
New shoots from old roots cut off by the plow at (a), also at new shoots coming from below the plow line (b).

2. Recommended chemicals include Tordon 212, Banvel, Trysben 200 and Benzabor. Apply Trysben 200 at 10 to 15 lb/A in 30 to 50 gallons of water at the pre-bud stage. Benzabor applied dry at 1 to 1½ lb/sq. rod in late fall or early spring gives long soil sterility. A good time to spray is during the fallow year when patches of bindweed become evident. Residual effect of several of the chemicals on the following year's crop is likely.

## LEAFY SPURGE

#### Cultural Control Practices

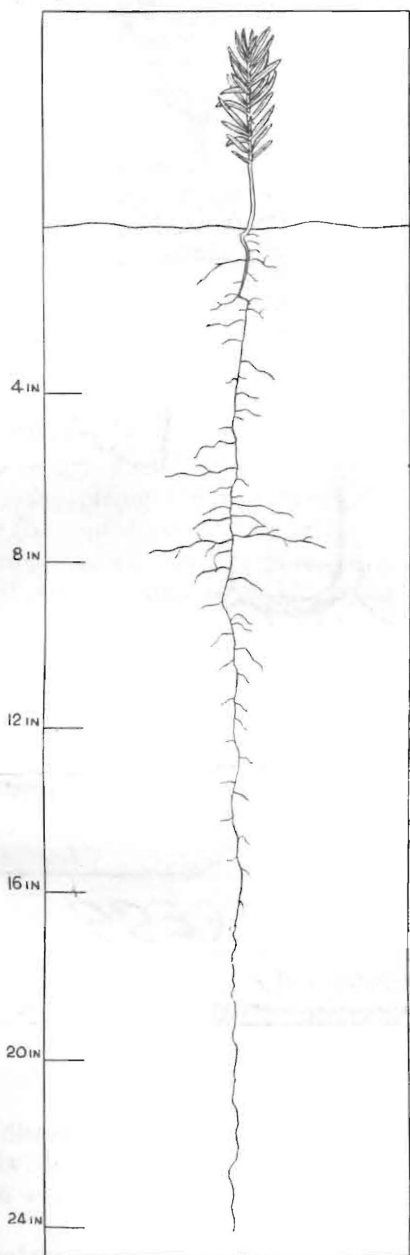
1. Two years of continuous cultivation 4 inches deep with a duckfoot cultivator, until freeze-up, each time growth is 4 inches tall, usually will eliminate leafy spurge. However, this practice is conducive to soil erosion. (A duckfoot field cultivator is one of the few implements that will cut the heavy, tough roots of leafy spurge.)
2. Plow 4 to 6 inches deep after harvest and cultivate as described in paragraph 1 until freeze-up. Several follow-up alternatives are possible.



Leafy Spurge

- Duckfoot cultivate for one full growing season and until late June the second year, then plant sudangrass as a smother crop. After the 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.
- Plow in the fall and apply 1 lb/A of 2,4-D L.V. ester in the spring when spurge has begun active growth. Then duckfoot cultivate until freeze-up each time 4 inches of new regrowth occurs.
- Duckfoot cultivate until early September and sow fall rye. After harvest the next year repeat cultivation until time to seed rye again. Applying ½ to ¾ lb/A of 2,4-D to the rye crop may increase spurge control. Repeating this practice for several years generally is required for complete elimination of spurge.
- Duckfoot cultivate for one entire growing season. Plant wheat or barley the second year and apply ½ 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 bromegrass. The following year apply 1 lb/A of 2,4-D L.V. ester both in the spring and fall. Treating again the second year usually will control most of the spurge.

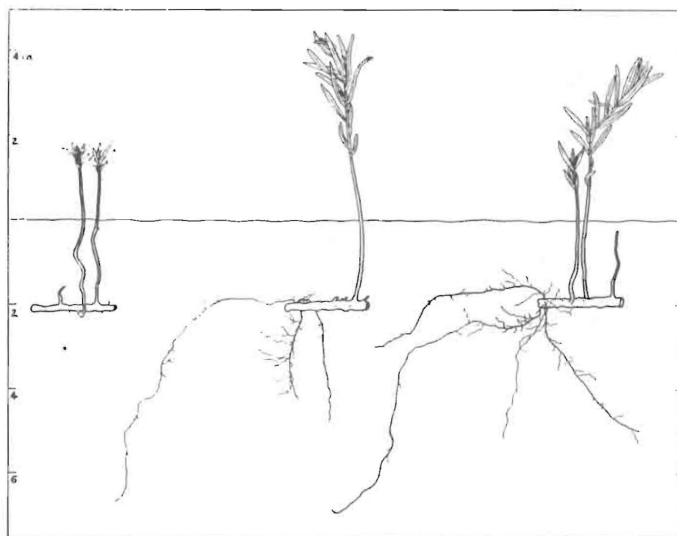


**ROOT SYSTEM OF SEEDLING**

Drawing was made of a plant growing in Fargo clay soil.

#### Control in Growing Grain Crop

Applying  $\frac{1}{2}$  lb/A of 2,4-D low volatile ester usually retards top growth of the spurge, preventing seed formation. Apply the 2,4-D as late as possible without injuring the crop. See table 1. The low volatile ester formulation of 2,4-D is the most effective of the 2,4-D's. Spraying in small



**LEAFY SPURGE PLANTS, 1 MONTH OLD**  
Plants from 2-inch pieces of roots.

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 low volatile ester at 1 lb/A are required annually for 3 or 4 years to control spurge.
2. On non-crop land, several repeated applications of 1 to 2 lb/A of 2,4-D low volatile ester applied at pre-bud stage will reduce stands of leafy spurge in 4 or 5 years.
3. On hilly or stony pastures, apply 2 lb/A of 2,4-D low volatile ester during bud stage. Treat again when regrowth is 4 to 6 inches tall. Apply 50 lb/A of nitrogen in the spring to stimulate growth of the grasses. Treated areas may be grazed moderately. Spurge will be controlled but several years of treatment are required to decrease the stand materially.
4. Sheep have been used to control large areas of leafy spurge. Turn sheep into the pasture in early spring and allow them to graze the spurge closely. The degree of control depends upon the intensity of grazing and use of a good follow-up practice. Sheep are not harmed by grazing leafy spurge.

#### Control of Small Patches

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

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

## RUSSIAN KNAPWEED

### Cultural Control Practices

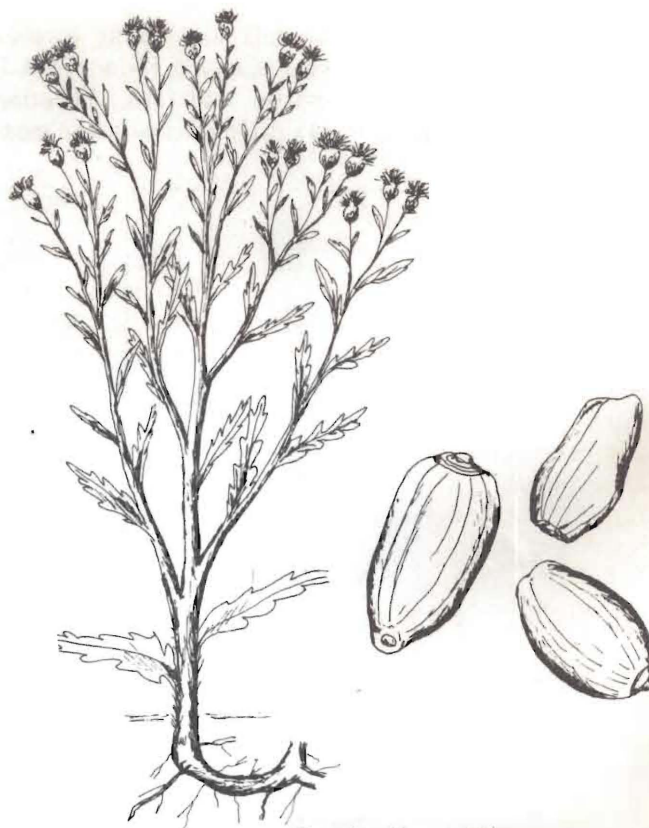
1. Two years of intensive duckfoot cultivation at 2-week intervals will eliminate Russian knapweed. This practice, however, may cause soil erosion.
2. Cultivation at 2-week intervals immediately after harvest and until freeze-up offers several opportunities for follow-up practices the next season.
- Duckfoot cultivate at 2-week intervals from early spring until early September and plant rye. Apply  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D low volatile ester in the growing rye the next summer and 1 lb/A in the stubble immediately after harvest, followed after 2 weeks by plowing and reseed-ing to rye. Practicing this for 3 years generally controls 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 after harvest cultivate until freeze-up.
- Duckfoot cultivate at 2-week intervals from spring until early fall and seed bromegrass. Spray bromegrass with  $1\frac{1}{2}$  lb/A of 2,4-D low volatile ester both spring and fall for 2 or 3 years; fall application is more effective.

### Control in Growing Grain Crop

Applying  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A of 2,4-D low volatile ester in the grain crop prevents knapweed from forming seeds. Apply the 2,4-D as late as possible without injuring the crop. See table 1. When fall knapweed growth occurs, apply 1 to  $1\frac{1}{2}$  lb/A of 2,4-D low volatile ester in the stubble after harvest and plow 2 weeks later. Then cultivate until freeze-up.

### Control in Grassland

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



Russian Knapweed

### Control of Small Patches

Soil sterilants and other chemicals suggested in table 2 are effective in eliminating small patches of knapweed.

## HOARY CRESS (PERENNIAL PEPPERGRASS)

### Cultural Control Practices

1. Intensive cultivation each time growth reaches 3 to 4 inches over a 2-year period will eliminate hoary cress, but this practice is conducive to soil erosion.
2. One year of intensive cultivation controls hoary cress, 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 low volatile ester at  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A to infested crops during the growing season. See table 1.
3. A combination of fallow and smother crops eliminates hoary cress. Cultivate annually both before and after the smother crop. Follow the cultural control practices as outlined for Russian knapweed.
4. Treat rosettes in the fall with 1 to 2 lb/A of 2,4-D low volatile ester, followed with 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  $\frac{1}{2}$  to  $\frac{3}{4}$  lb/A will control top growth of hoary cress when treated near or during bud stage. Treat as late as possible without injury to crop. See table 1. When moisture is available for growth in the fall, treat the rosettes with 1 to 2 lb/A of 2,4-D. Two chemical treatments per year should almost completely eliminate hoary cress after 2 or 3 seasons. Tillage in alternate seasons with 2,4-D application as previously described also is effective in controlling hoary cress.

#### Control in Grassland

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

#### Control of Small Patches

Eliminate small patches of hoary cress with soil sterilants or other chemicals as suggested in table 2.



Hoary Cress

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

Weed	Herbicide	Rate <sup>1/</sup>	Remarks
Field bindweed	Tordon 212	1 gal/A <sup>2/</sup>	Apply during active growth
	Benzabor	1 to 1½ lb/sq rd	Long time sterility
	TBA	10 to 20 lb/A	Apply during bud stage
	Banvel	6 to 8 lb/A	Apply during active growth
Leafy spurge	Ammate X	1 lb/sq rd	Use with a spreader sticker
	Amitrol-T	4 lb/A	Use in shelterbelts
	Tordon 212	1½ gal/A <sup>2/</sup>	Apply spring or fall
	2,4-D	40 lb/A	Apply after Sept. 20
	Banvel	8 to 10 lb/A	Apply during active growth
	Benzabor	1 to 1½ lb/sq rd	Long time sterility
Canada thistle	Casoron	6 lb/A	Apply in shelterbelts late fall or early spring
	Amitrol or Amitrol-T	4 lb/A	Apply pre-bud stage
	Banvel	5 to 10 lb/A	Apply during active growth
	Tordon 212	1 gal/A <sup>2/</sup>	Apply during active growth
Perennial sowthistle and Russian knapweed	TBA	10 to 20 lb/A	Apply during bud stage
	Tordon 212	1 gal/A <sup>2/</sup>	Apply during active growth
	Banvel	5 to 8 lb/A	Apply during active growth
	Benzabor	1½ lb/sq rd	Long time sterility
Hoary cress	TBA	10 to 20 lb/A	Apply during bud stage
	Benzabor	1½ lb/sq rd	Long time sterility

<sup>1/</sup> Active ingredient in lb/A or lb/sq rd except where noted.

<sup>2/</sup> Contains 1 lb Tordon and 2 lb 2,4-D per gallon. A granular formulation (Tordon Beads or Borolin) is available.

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 is contingent upon registration by the U.S. Department of Agriculture and/or establishment of residue tolerance where necessary by the Food and Drug Administration. Use each chemical only as recommended on the label of the container. Any person who uses any of the herbicides mentioned in this circular does so at his own risk.