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Leafy Spurge Control

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LEAFY SPURGE (Euphorbia esula L.) is a widely established weed in North Dakota, infesting approximately 500,000 acres of land. It is a long-lived perennial plant, native to Europe and Asia, that was introduced into the United States in 1827. It was discovered in North Dakota in 1909, growing along a street in Fargo.

Leafy spurge infestations are common in rangeland areas of western North Dakota.

Leafy spurge is one of the state's most persistent, noxious weeds because of its extensive root system and its manner of spreading, both by roots and bursting seed pods that scatter the seeds up to 15 feet from the parent plant.

The weed has a remarkable capacity for vegetative reproduction. Within 7 to 10 days after emergence from seed, the seedlings are capable of vegetative reproduction. The seedlings develop throughout the growing season but do not flower during the first year. Plants originating from roots begin growth in late April, making it one of the first plants up in the spring. Its early and rapid growth gives it an advantage over crop and pasture plants.

In sandy soils, density of the patches may reach more than 200 shoots per square yard and as many as 1,000 per square yard in heavy clay soil. Patches of leafy spurge usually spread vegetatively from one to three feet per year.

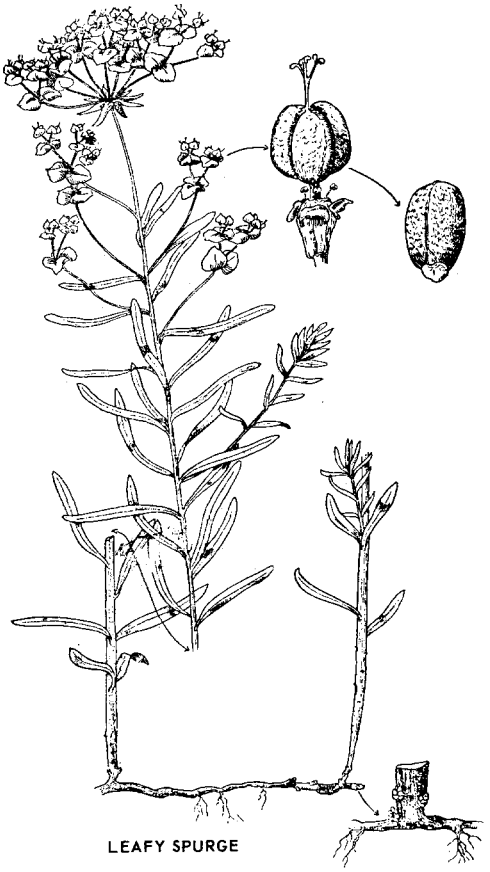
Leafy spurge normally grows from two to three feet tall from a somewhat woody base. Its main upright stem branches profusely, giving the plant a clump-like appearance. It bears numerous, linear-shaped leaves of a characteristic bluish-green color. All parts of the plant contain a milky juice.

This weed begins blooming in late May and early June, producing a flat-topped cluster of small yellowish-green, petal-like structures that bear the true flowers. At a distance, leafy spurge resembles goldenrod but is a more greenish yellow. Seed pods contain three gray, oblong and smooth seeds. An average of 140 seeds is produced per stem and seeds may remain alive in the soil from 5 to 10 years. Spurge commonly forms dense patches which crowd out other plants by shading and competition for moisture and nutrients.

Most leafy spurge is found growing along roadsides, in pastures, in tree rows and in waste areas. Occasionally, some of it becomes established in cultivated areas. In the fall many of the leaves turn a yellowish or reddish-orange color.

Leafy spurge is persistent and is difficult to eradicate. Roots scattered in the field by cultivation produce new plants in addition to those established by roots and seeds. Pieces of roots as small as 1/2 inch long and 1/8 inch in diameter will produce new shoots that grow rapidly. Small or large pieces of roots will withstand up to two or three hours of drying in the hot sun before they are killed.

The well developed food storage system enables leafy spurge to live over long periods, enabling it to withstand cultivation better than many other perennial weeds. Control requires a well planned program with careful follow-through.



A leafy spurge plant in bloom. Shown in detail are vegetative buds on the roots, a seed pod (capsule) and a seed.

CONTROL FOR LARGE AREAS

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 or oil soluble amine at 1 pound per acre are required annually for three or four years to control spurge. Make applications at the early bloom stage both spring and fall.

2. On non-cropland, applications of 1 pound per acre of 2,4-D low volatile ester or oil soluble amine applied both spring and fall at the bud to early bloom stage will reduce stands of leafy spurge if treatments are repeated for three or four years.

3. On hilly or stony pasture, apply 1 pound per acre of 2,4-D low volatile ester or oil soluble amine during bud stage. Repeat application when regrowth is four inches tall. A spring application of 50 pounds per acre 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. Tordon 22K (picloram) is cleared for use in North Dakota on pastures and rangeland. Dairy cattle cannot be grazed on Tordon treated pastures but there are no restrictions for other classes of livestock. Consult the label for complete details. A single 2 pound (1 gallon) per acre application made to actively growing leafy spurge will give up to 100 per cent control. Lower rates of Tordon 22K, 1/4 to 1/2 pound per acre, applied once or twice a year for two or three years will give similar results. Do not use Tordon 22K near trees or desirable broadleaf vegetation. Careful application is necessary to prevent spray drift. Tordon also is available in granular form which is not cleared for use on pastures or cropland.

5. Banvel (dicamba) is cleared for use on pastures and rangeland at rates up to 8 pounds per acre. The waiting period for grazing varies from 21 to 60 days depending on the rate applied. Check label for details before using. Mixtures of 1 pound of Banvel plus 2 pounds of 2,4-D per acre applied once or twice a year give reasonably good control but not eradication. Banvel is absorbed by the leaves and roots and translocated throughout the plant. Apply to the foliage when the spurge is growing actively.

6. Sheep have been used to control large areas of leafy spurge. In early spring allow sheep to graze the spurge closely. The degree of control depends upon the intensity of grazing and the use of a good follow-up practice. Grazing leafy spurge does not harm sheep, although they may make smaller gains than if grazing better quality forage.

Control in Growing Grain Crop

Applying 1/2 pound per acre 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 low volatile ester or oil soluble amine formulations of 2,4-D are the most effective. Spraying in small grain crops should be combined with some cultural practice.

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 low volatile ester or oil soluble amine	1/2	
Oats	MCPA	1/2	Early boot
	2,4-D amine	1/3	
Flax	MCPA	1/3	Before flower buds develop
	2,4-D amine	1/4	
Rye	2,4-D amine	3/4	Early jointing
	2,4-D low volatile ester or oil soluble amine	1/2	

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

Control Practices for Cropland

1. Two years of continuous cultivation four inches deep with a duckfoot cultivator, until freeze-up, each time growth is four inches tall, usually will eliminate leafy spurge. However, such intense cultivation 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. A good time to start control operations is in the fall, immediately after small grain harvest. Plow or duckfoot-cultivate four to six inches deep and then cultivate as described in paragraph one until freeze-up. Several alternative follow-up practices the next year are:

   (a) Duckfoot-cultivate each time a four-inch regrowth of the spurge occurs. Do this for one full growing season 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.

   (b) Duckfoot-cultivate the next spring (each time a four-inch regrowth occurs) until late June and plant sudangrass as a smother crop. When the sudangrass is harvested, cultivate until freeze-up. Repeating this operation a second season results in good spurge control.

   (c) When the leafy spurge has started active growth the following spring, apply 1 pound per acre of 2,4-D low volatile ester. Fallow the field the remainder of the season, using a duckfoot cultivator until freeze-up each time a four-inch regrowth occurs. This practice may give good control in one season. The next season sow small grains or make a late planting of sudangrass, depending on the degree of control obtained the previous year.

   (d) Duckfoot-cultivate each time a four-inch regrowth occurs until early September. Sow fall rye and repeat cultivation after rye harvest the next year until time to sow rye again. Applying 1/2 to 3/4 pound per acre of 2,4-D low volatile ester or oil soluble amine to the rye crop may increase spurge control. Several years of this practice generally are required for complete elimination of the weed.

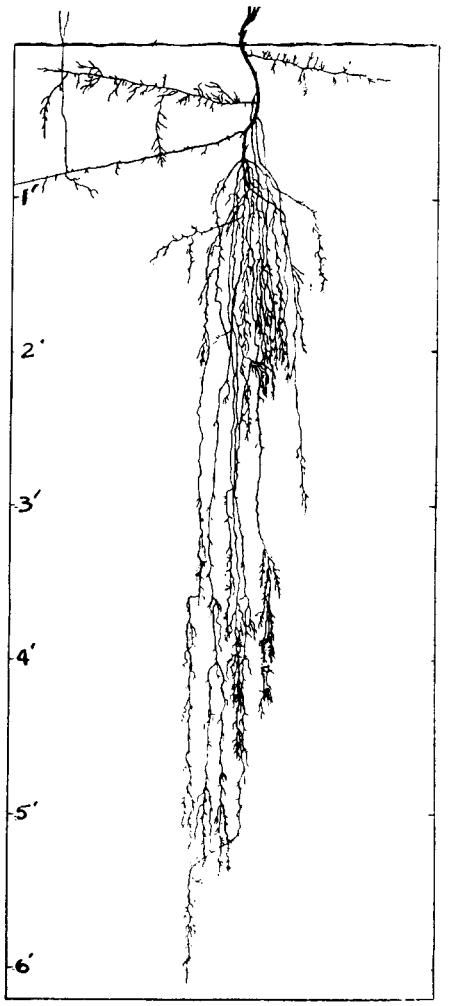
   (e) Duckfoot-cultivate whenever four-inch regrowth occurs for one complete season. Sow wheat or barley the second year and apply 1/2 pound per acre of 2,4-D low volatile ester or oil soluble amine just prior to the boot stage of the crop. Plow immediately after harvest and cultivate intensively until freeze-up. Repeating the second year program for four to five years will control spurge.

   (f) Duckfoot-cultivate each time four-inch regrowth occurs until midsummer and plant bromegrass, crested wheatgrass or other adapted perennial grasses in early August. The following year spray with 1 pound per acre of 2,4-D low volatile ester or oil soluble amine both spring and fall at the early bud stage. Two treatments per year are important. A single treatment will accomplish little toward elimination of the weed. A second year of spraying usually will eliminate a high percentage of the spurge.

CONTROL FOR SMALL AREAS

Soil Sterilants

When leafy spurge is still confined to small, well-defined areas, certain highly active selective herbicides, such as Tordon or Banvel, or non-selective chemicals commonly called soil sterilants, can be applied to eradicate the patch before it spreads. At high rates, Tordon and Banvel may stunt certain grasses but will not kill them. Soil sterilants, on the other hand, are non-selective and kill all vegetation in the treated area. Regardless of the chemical used, treat an extra 10 to 15 feet around patches to make sure all roots are affected. A careful follow-up program is necessary for several years. Treat again as often as necessary to kill plants that may have been missed and seedlings that may have become established. Many attempts to control leafy spurge have failed because follow-up practices were not employed.



Drawing of a root system of a mature leafy spurge plant growing in Fargo clay soil. Note prominent buds on horizontal root. Buds were found on vertical roots to a depth of 40 inches.

The non-selective soil sterilants and Tordon are not cleared for use on cropland. Also rates of Banvel higher than 2 pounds per acre cannot be used on cropland. Read the label carefully before applying such herbicides to cropland.

When a soil sterilant is planned as a fall treatment, 2,4-D can be used earlier in the growing season to prevent seed formation and to control any seedlings that start in years following treatment.

READ THE MANUFACTURER'S LABEL AND CAREFULLY FOLLOW INSTRUCTIONS AND CAUTIONS WHEN USING ANY HERBICIDE.

Ammate X (AMS)

Ammate X is a yellow, granular material that acts as both a contact and translocated herbicide. Because of its nitrogen and sulfur content, it may have a fertilizing effect after breakdown in the soil. Apply as a spray with a spreader-sticker at the rate of 1/2 to 1 pound per square rod. Make application during the bud stage and retreat with 2,4-D when seedlings appear. Ammate X is safe to use in trees provided the chemical does not come in direct contact with them. Effective control has been obtained in trees by applying 1 pound per square rod. Some retreatment may be required the following year. A liquid form of AMS is available.

Fenac

Fenac is a translocated chemical available in liquid or granular form. Both forms are equally effective. Apply Fenac at 10 pounds per acre any time during the growing season. Rainfall after application is important for leaching the chemical into the root zone of the soil.

Tritac D

Effective applications of Tritac D may be made any time during the growing season and in the fall until freeze-up. Time applications so that seasonal rainfall can be expected to carry the chemical into the root zone of the soil and use 10 to 12 pounds per acre. Tritac D contains 2,4-D which provides quick foliage top kill and prevents seeding.

Benzabor (TBA-Sodium Borate Mixture)

Benzabor is a granular nonselective herbicide that contains borates and TBA. Apply at any time during the growing season at rates of 1 to 1 1/2 pounds per square rod. Benzabor is highly stable in the soil but requires about an inch of rainfall to make it active.

Trysben 200, Benzac 1281 (TBA)

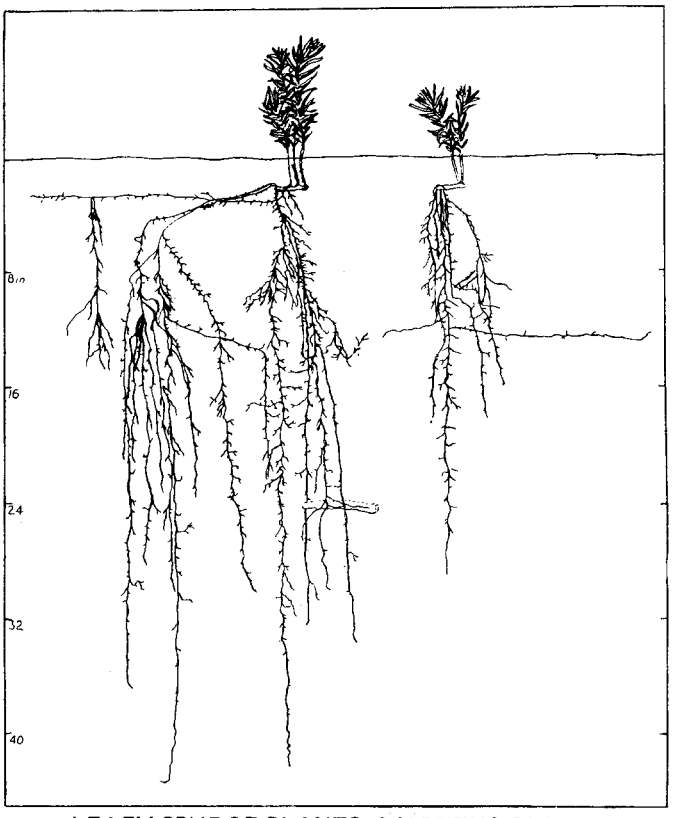
A liquid chemical, TBA is absorbed through both the roots and leaves. Apply at 20 pounds per acre after spurge appears in the spring but before too much growth has progressed. It is helpful to apply when moderate rainfall is expected. TBA has a residual effect of two or more years.

Other Compounds

Several additional soil sterilants containing mixtures of boron, sodium chlorate, 2,4-D and other chemicals are available commercially and may be used. Apply according to the label which gives the manufacturer's instructions for use.

How to Apply Soil Sterilants

Apply granular herbicides dry by hand or with a hand operated granular spreader. For small areas, a garden type pressure sprayer or garden sprinkling can may be used. A hand boom attached to a power sprayer is satisfactory for larger areas. Mow and remove top growth that might interfere with application of the chemical. An even coverage over the infested area is important with any method used.



LEAFY SPURGE PLANTS, 3 MONTHS OLD.
Drawing was made of plants that had grown from 2-inch pieces of roots.

PROTECT
Use Pesticides Safely
FOLLOW THE LABEL
U.S. DEPARTMENT OF AGRICULTURE

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