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Control and Elimination of Noxious Weeds

Cooperative Extension South Dakota State University

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CONTROL AND ELIMINATION OF

noxious weeds

Cooperative Extension Service
South Dakota State University
Brookings, South Dakota
Control and Elimination of Noxious Weeds

By Lyle Derscheid, Extension Agronomist
Robert Parker, Extension Agronomist—Weeds

All of South Dakota’s noxious weeds are perennials. They spread by underground parts and by seeds. Field bindweed (creeping jenny) infests 1½ million acres on 26,000 farms; Canada thistle, 230,000 acres on 22,000 farms; perennial sowthistle, 225,000 acres on 11,750 farms; leafy spurge, 58,000 acres on 5,500 farms; hoary cress, 1,470 acres on 280 farms; Russian knapweed, 620 acres on 205 farms; horse nettle, 150 acres on 84 farms; and quackgrass, 163,000 acres on 13,000 farms.

Intensive studies have been conducted over a period of 10 years each for leafy spurge and field bindweed; eight years for Russian knapweed; and six years each for Canada thistle and perennial sowthistle to determine methods of controlling and eliminating these weeds. All of them can be eliminated while raising crops adapted to South Dakota. Detailed suggestions for the control of these weeds are given in separate publications.

Less time has been spent studying quackgrass, hoary cress, and horse nettle. Consequently, most of the suggestions offered in this publication are based on results obtained in neighboring states. Detailed suggestions for the control of quackgrass are given in a separate publication.

Use of cultivation, competitive crops, and spraying is suggested in numerous combinations. Cultivation should be performed with a field cultivator equipped with wide sweeps (12 to 60 inches) that are kept sharp and operated at a depth of 4 inches. For June spraying, spray small grain when in the 5-leaf stage of growth and spray corn between first and second cultivations. Always use an ester of 2, 4-D on leafy spurge, Russian knapweed, or hoary cress. Use an ester on field bindweed and thistles when growing conditions are hot and dry, but use an amine of 2, 4-D under good growing conditions. MCPA is as effective as 2, 4-D on thistles. Use nonvolatile formulations of 2, 4-D when spraying in shelterbelts or near gardens.

Consult the herbicide label for uses and restrictions that may be imposed on the herbicides listed herein.

CROPS CULTIVATION AND CHEMICALS*

FIELD BINDWEED

Reduce stands 75 to 90%

1) Intensive cultivation at two-week intervals June-July and three-week intervals August-October.
2) Small grain, ¾ lb. 2, 4-D June, cultivate stubble three or four times.
3) Cultivate three times, sundangrass in late June, harvest and cultivate in September.
4) Intensive cultivation June 1 to August 15, alfalfa and/or perennial grass.
5) Intensive cultivation June 1 to August 1, ¾ lb. of 2, 4-D September 1.

Reduce stands 10 to 25%

1) Small grain, ¾ lb. 2, 4-D in June, ¾ lb. 2, 4-D in stubble.
2) Corn or sorghum, ¾ lb. 2, 4-D after first cultivation, ¾ lb. after tasseling or heading.
3) Perennial grass, ¾ lb. 2, 4-D in June.
4) Good stand of alfalfa or alfalfa-grass mixture.
5) In shelterbelt, amitrole-T—6 lb. in 40 to 50 gallons of water. Direct spray away from trees.

Prevent spreading

1) Small grain, ½ to ½ lb. 2, 4-D in June.
2) Corn or sorghum, ¾ lb. 2, 4-D in June.
3) Perennial sod forming grass.

Prevent reinfestation

1) Small grain or corn, ½ to ½ lb. 2, 4-D in June.
2) Alfalfa or perennial grass crop.

CANADA THISTLE AND PERENNIAL SOWTHISTLE

Reduce stands 75 to 90%

1) Intensive cultivation, three-week intervals June-July and four-week intervals August-September.
2) Small grain, ¾ lb. 2, 4-D June, cultivate stubble three or four times.
3) Small grain, ¾ lb. 2, 4-D June, plow stubble early, ¾ lb. 2, 4-D September.
4) Small grain, ¾ lb. 2, 4-D June, plow October 15.
5) No crop, mow in June, amitrole-T—4 lb. in 40 to 50 gallons of water when Canada thistle is 6 to 8 inches tall. In shelterbelt use 6 lb. and direct spray away from trees.
6) Cultivate three times, sundangrass late June, harvest and cultivate September.
7) Intensive cultivation June 1 to August 15, alfalfa and/or perennial grass.

Reduce stands 10 to 50%

1) Small grain, ¾ lb. 2, 4-D June, ¾ lb. in stubble.
2) Corn or sorghum, ¾ lb. 2, 4-D after first cultivation, ¾ lb. after tasseling or heading.
3) Perennial grass, ¾ lb. 2, 4-D June, ¾ lb. 2, 4-D late August.
4) Good stand of alfalfa or alfalfa-grass mixture.

*Treatment rates of chemicals are in pounds acid equivalent or active ingredient per acre.
Prevent spreading by roots
1) Small grain, $\frac{1}{2}$ to $\frac{1}{2}$ lb. 2, 4-D in June.
2) Corn or sorghum, $\frac{1}{4}$ lb. 2, 4-D in June.
3) Perennial sod forming grass.

Prevent seed production
1) Mow before flowers have been open seven days.
2) Spray with $\frac{1}{2}$ to $\frac{1}{2}$ lb. 2, 4-D in June.

Prevent reinfestation
1) Small grain or corn, $\frac{1}{2}$ to $\frac{1}{2}$ lb. 2, 4-D in June.
2) Alfalfa or perennial grass crop.

LEAFY SPURGE
Reduce stands 75 to 90%
1) Intensive cultivation at two-week intervals May-July and three-week intervals August-October.
2) Cultivate three times, sudangrass late June, harvest and cultivate in September.
3) Intensive cultivation May 15 to August 15, alfalfa and/or perennial grass.
4) Heavy grazing with sheep.
5) Fifty lb. 2, 4-D amine after October 15.

Reduce stands 10 to 20%
1) Small grain, 1 lb. 2, 4-D ester in June, cultivate stubble four times.
2) Perennial grass, $1\frac{1}{2}$ lb. 2, 4-D ester, early June, $1\frac{1}{2}$ lb. late August.
3) In shelterbelt, amitrole-T—6 lb. in 40 to 50 gallons of water. Direct spray away from trees.

Prevent spreading
1) Small grain, $\frac{1}{2}$ lb. 2, 4-D ester in June, 1 lb. 2, 4-D ester in stubble.
2) Corn or sorghum, $\frac{1}{2}$ lb. 2, 4-D ester after first cultivation, 1 lb. after tasseling or heading.
3) Good stand of alfalfa or alfalfa-grass mixture.
4) Perennial grass, 1 lb. 2, 4-D ester in June.

Prevent reinfestation
1) Small grain or corn, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D ester in June.
2) Alfalfa or sweet clover crop.

RUSSIAN Knapweed
Reduce stands 75 to 90%
1) Intensive cultivation at two-week intervals May-July and three-week intervals August-October.
2) One and one-half lb. 2, 4-D ester August, cultivate three times in spring, sudangrass late June, harvest and cultivate in September.
3) Intensive cultivation mid-May to mid-August, alfalfa and/or perennial grass.
4) Fifty lb. 2, 4-D amine after October 15.

Reduce stands 10 to 20%
1) Small grain, $\frac{1}{2}$ to 1 lb. 2, 4-D ester late May or early June, cultivate stubble three times.

Prevent spreading
1) Small grain, $\frac{1}{2}$ lb. 2, 4-D ester, cultivate stubble three or four times.
2) Perennial grass, $1\frac{1}{2}$ lb. 2, 4-D ester in June.

Prevent reinfestation
1) Small grain, $\frac{1}{2}$ to $\frac{1}{2}$ lb. 2, 4-D ester June.
2) Corn, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D ester after first cultivation.

QUACKGRASS
Reduce stands 90%
1) Four lbs. atrazine in September or October or early April, plow in late fall or in May (at least three weeks after application), plant corn, and cultivate.
2) Two lbs. atrazine between September 15 and May 1. Plow in late fall or May (at least three weeks after application), plant corn, apply 2 lbs. atrazine within two weeks after planting corn, cultivate.
3) Four lbs. amitrole-T in 40 to 50 gallons of water before quack heads, plow two or three weeks later.
4) Eight lbs. atrazine on noncropland.
5) Intensive cultivation with duckfoot or one-way disk every three weeks during dry year.
6) Six lbs. dalapon when quack is 4 to 6 inches tall, plow 10-days later, cultivate. Crop can be planted in four to six weeks.
7) Mow in August, 10 lbs. dalapon when regrowth 4 to 8 inches tall, plow 10 days later.
8) Plow shallow in September, 20 lbs. TCA immediately.
9) In established shelterbelts, use 6 lbs. simazine and 2 lbs. amitrole-T in at least 50 gallons of water.

HOARY CRESS
Reduce stands 75 to 90%
1) Perennial grass, 2 lbs. 2, 4-D May, 2 lb. September.
2) Ten lb. 2, 4-D amine early spring or after October 15.

Reduce stands 10 to 20%
1) Small grain, $\frac{1}{2}$ to 1 lb. 2, 4-D ester late May or early June, cultivate stubble three times.

Prevent reinfestation
1) Crop, $\frac{1}{2}$ lb. 2, 4-D ester.
2) Good crop of perennial grass.
HORSE NETTLE
Reduce stands
1) Two lbs 2,4,5-T ester before weed starts to bud.

BUR RAGWEED
Reduce stands 75 to 90%
1) Two lbs. 2, 4-D ester in oil during June.

CALIBRATION OF EQUIPMENT
(Field and Band Sprayers and Granule Band Applicators — see fact sheet entitled “Checking Weed Sprayers”).

FERTILIZER OR CART TYPE SPREADER
(For Treating Small Patches)
1. Divide the number of square feet in a square rod (273) by width of spreader swath.
   Example: If the spreader swath is 3 feet wide, divide 273 by 3. The answer is 91. This is the number of feet the spreader will have to travel in order to cover a square rod.

2. Measure the circumference of the wheel with a string. Suppose the circumference is 5 feet.

3. Determine the number of revolutions the wheel will make in order to cover a square rod. Divide the distance that spreader must travel (91 feet in No. 1) by the circumference of the wheel (5 feet in No. 2), 91 ÷ 5 = 18.2. The wheel must turn 18 1/5 times in order to cover a square rod.

4. Fill spreader with chemical, put container under spreader to catch chemical, jack up wheels and turn wheels the number of times required to cover a square rod (18 1/5 times in No. 3). Weigh the chemical that was discharged by spreader. If necessary, adjust spreader, turn wheel and weigh chemical. Repeat this process until the desired amount of chemical is discharged.

CHESTBROADCAST SPREADER
(For Treating Small Patches)
1. Same as for fertilizer spreader. Divide 273 by width of swath. Suppose the swath is 6 feet. 273 ÷ 6 = 45 1/2.

2. Weigh amount of chemical put into hopper.

3. Walk 45 1/2 feet while cranking spreader.

4. Weigh amount of chemical left in the hopper. The difference between this weight and the weight of the amount put in hopper (No. 2) is the amount spread.

5. Adjust spreader and repeat steps 2, 3 and 4 until the desired amount of chemical has been spread.

HAND SPRAYER
(For Treating Small Patches)
1. Mark out a square rod plot (16 1/2 feet by 16 1/2 feet) and spray with hand sprayer at a slow walking speed, so good saturation and penetration will be accomplished.

2. If 1 gallon is used to treat this square rod, then mix enough chemical for 1 square rod with each gallon of water and always spray at same walking speed. A slow steady pace is suggested.
SMALL PATCH CONTROL

SEMISELECTIVE HERBICIDES

Numerous chemicals are effective for eliminating patches (weed nurseries) with one treatment applied to the patch and a band 6 or 8 feet wide around the outside of the patch. It kills plants in the patch and roots that extend beyond the patch. Seedling growth may appear after two or three years. These young plants can be eliminated with 2, 4-D application. Many new semiselective chemicals do not permanently injure perennial grasses, but will prevent crop growth for two or more years.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Field Bindweed</th>
<th>Thistle</th>
<th>Leafy Spurge</th>
<th>Russian Knapweed</th>
<th>Hoary Cress</th>
<th>Horse Nettle</th>
<th>Bur Ragweed</th>
<th>Cost in Dollars*</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMS (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1.04-1.82</td>
</tr>
<tr>
<td>2,3,6-TBA (2)</td>
<td>¾ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>0.32-0.44</td>
</tr>
<tr>
<td>Fenac (3)</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td>½ pt.</td>
<td></td>
<td></td>
<td></td>
<td>0.59</td>
</tr>
<tr>
<td>Dicamba (4)</td>
<td>2 fl. oz.</td>
<td>2 fl. oz.</td>
<td>2 fl. oz.</td>
<td>2 fl. oz.</td>
<td></td>
<td></td>
<td></td>
<td>0.46</td>
</tr>
<tr>
<td>Picloram-2,4-D mixture (5)</td>
<td>1.2 fl. oz.</td>
<td>1.2 fl. oz.</td>
<td>1.6 fl. oz.</td>
<td>1.2 fl. oz.</td>
<td></td>
<td></td>
<td>1.2 fl. oz.</td>
<td>0.23-0.31</td>
</tr>
<tr>
<td>Borate-Picloram mixture (6)</td>
<td>¾ lb.</td>
<td>¾ lb.</td>
<td>1 lb.</td>
<td>¾ lb.</td>
<td></td>
<td></td>
<td>¾ lb.</td>
<td>0.47 0.62</td>
</tr>
</tbody>
</table>

*Approximate retail cost of chemical for 1 square rod at lower rates for areas 10 to 15 square rods in size. Cost decreases for larger areas and varies somewhat with local situations.

(1) Brand name “AMMA TE X”
(2) Brand names “TRYSBEN 200” and “BENZAC 1281” (approved for use on non-cropland only)
(3) Brand name “FENAC” (approved for use on non-cropland only)
(4) Brand name “BANVEL” (approved for use on non-cropland only)
(5) Brand name “TORDON 212” (approved for use on non-cropland only)
(6) Brand names “TORDON BEADS” and “BOROLIN” (approved for use on non-cropland only)

AMOUNTS OF PRODUCT NEEDED FOR SPRAYING PATCHES OF NOXIOUS WEEDS WITH A HAND SPRAYER

The foregoing table indicates how much chemical to use when applying chemicals to noxious weed patches. The following table may be helpful when applying 2,4-D, 2,4,5-T, amitrole or amitrole-T, atrazine, or other herbicides to small patches of noxious weeds with a hand sprayer.

<table>
<thead>
<tr>
<th>Treatment rate per acre in lbs. acid equiv. or active ingredient</th>
<th>Product to treat 1 square rod if the product contains the following amounts of acid equivalent or active ingredient.*</th>
<th>Liquids</th>
<th>Powders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lbs. /gal.</td>
<td>3 lbs. /gal.</td>
<td>4 lbs. /gal.</td>
<td>6 lbs. /gal.</td>
</tr>
<tr>
<td>½</td>
<td>1½ tsp.</td>
<td>1 tsp.</td>
<td>½ tsp.</td>
</tr>
<tr>
<td>¾</td>
<td>2 tsp.</td>
<td>1½ tsp.</td>
<td>1 tsp.</td>
</tr>
<tr>
<td>1</td>
<td>2½ tsp.</td>
<td>1¾ tsp.</td>
<td>1½ tsp.</td>
</tr>
<tr>
<td>1½</td>
<td>4 tsp.</td>
<td>2½ tsp.</td>
<td>1¾ tsp.</td>
</tr>
<tr>
<td>2</td>
<td>5½ tsp.</td>
<td>3½ tsp.</td>
<td>2½ tsp.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*—teaspoonsful
tbsp.—tablespoonsful
Small patch treatments are based on rates of application by square rods. Not all patches of noxious weeds are perfect square rod plots. Also more area is treated than indicated by the patch because of roots extending out from the top growth area. The following table may help in figuring the area to treat and the amount of chemical to apply to that area. Granted all patches are not perfect circles in area but are usually more circular than rectangular. The following formula was used for determining the area of circular patches noted in the table:

\[
\text{Area to be treated} = \frac{r^2 \pi}{\text{sq. ft./sq. rd.}} = \frac{r^2 \times 3.1416}{272.25}
\]

<table>
<thead>
<tr>
<th>Approx. diam. of nox. weed patch (ft.)</th>
<th>Approx. diam. of area to treat (ft.)</th>
<th>Sq. rds. in area to treat</th>
<th>AMS at 5 lbs./sq. rd.</th>
<th>TBA or Fenac at 1/2 pt./sq. rd.</th>
<th>TBA at 3/8 pt./sq. rd.</th>
<th>Picloram-2,4-D at 1.2 fl. oz./sq. rd.</th>
<th>TBA at 1.6 fl. oz./sq. rd.</th>
<th>Dicamba at 2 fl. oz./sq. rd.</th>
<th>Borate-Picloram 3/4 lb./sq. rd.</th>
<th>1 lb./sq. rd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>1.2</td>
<td>6 lbs.</td>
<td>10 fl. oz.</td>
<td>8 fl. oz.</td>
<td>1.5 fl. oz.</td>
<td>2 fl. oz.</td>
<td>2 1/2 fl. oz.</td>
<td>1 lb.</td>
<td>1 1/2 lbs.</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>2.6</td>
<td>13 lbs.</td>
<td>21 fl. oz.</td>
<td>1 pt.</td>
<td>3.2 fl. oz.</td>
<td>4 1/4 fl. oz.</td>
<td>5 1/2 fl. oz.</td>
<td>2 1/2 lbs.</td>
<td>2 1/2 lbs.</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
<td>4.6</td>
<td>23 lbs.</td>
<td>2 1/2 pt.</td>
<td>1 1/4 pt.</td>
<td>5.5 fl. oz.</td>
<td>7 1/4 fl. oz.</td>
<td>7 1/2 fl. oz.</td>
<td>3 1/2 lbs.</td>
<td>3 1/2 lbs.</td>
</tr>
<tr>
<td>40</td>
<td>50</td>
<td>7.2</td>
<td>36 lbs.</td>
<td>3 1/4 pt.</td>
<td>2 1/4 pt.</td>
<td>3/8 pt.</td>
<td>11 1/2 fl. oz.</td>
<td>16 1/2 fl. oz.</td>
<td>5 1/8 lbs.</td>
<td>5 1/8 lbs.</td>
</tr>
<tr>
<td>50</td>
<td>60</td>
<td>10.4</td>
<td>52 lbs.</td>
<td>5 1/4 pt.</td>
<td>3 pt.</td>
<td>5/8 pt.</td>
<td>21 1/2 fl. oz.</td>
<td>23 1/2 fl. oz.</td>
<td>7 3/4 lbs.</td>
<td>7 3/4 lbs.</td>
</tr>
<tr>
<td>60</td>
<td>70</td>
<td>14.2</td>
<td>71 lbs.</td>
<td>7 pt.</td>
<td>5 1/2 pt.</td>
<td>1 1/4 pt.</td>
<td>23 1/4 fl. oz.</td>
<td>25 1/4 fl. oz.</td>
<td>10 1/4 lbs.</td>
<td>10 1/4 lbs.</td>
</tr>
<tr>
<td>100</td>
<td>110</td>
<td>35.0</td>
<td>175 lbs.</td>
<td>8 3/4 qt.</td>
<td>6 3/4 qt.</td>
<td>1 1/2 qt.</td>
<td>3 1/2 pt.</td>
<td>3 1/2 pt.</td>
<td>20 1/2 lbs.</td>
<td>20 1/2 lbs.</td>
</tr>
<tr>
<td>120</td>
<td>130</td>
<td>49.0</td>
<td>245 lbs.</td>
<td>3 gal.</td>
<td>2 1/2 gal.</td>
<td>3/8 pt.</td>
<td>6 pt.</td>
<td>6 pt.</td>
<td>26 1/2 lbs.</td>
<td>26 1/2 lbs.</td>
</tr>
<tr>
<td>140</td>
<td>150</td>
<td>65.2</td>
<td>326 lbs.</td>
<td>4 gal.</td>
<td>3 gal.</td>
<td>1/2 pt.</td>
<td>6 1/2 pt.</td>
<td>6 1/2 pt.</td>
<td>31 1/2 lbs.</td>
<td>31 1/2 lbs.</td>
</tr>
<tr>
<td>160</td>
<td>170</td>
<td>83.8</td>
<td>419 lbs.</td>
<td>5 1/4 gal.</td>
<td>4 gal.</td>
<td>3/8 pt.</td>
<td>8 pt.</td>
<td>8 pt.</td>
<td>37 lbs.</td>
<td>37 lbs.</td>
</tr>
<tr>
<td>180</td>
<td>190</td>
<td>104.6</td>
<td>523 lbs.</td>
<td>6 1/2 gal.</td>
<td>5 gal.</td>
<td>1 gal.</td>
<td>5 1/2 qt.</td>
<td>5 1/2 qt.</td>
<td>44 lbs.</td>
<td>44 lbs.</td>
</tr>
<tr>
<td>200</td>
<td>210</td>
<td>127.8</td>
<td>639 lbs.</td>
<td>8 gal.</td>
<td>6 gal.</td>
<td>13/16 gal.</td>
<td>6 1/2 qt.</td>
<td>6 1/2 qt.</td>
<td>50 lbs.</td>
<td>50 lbs.</td>
</tr>
<tr>
<td>220</td>
<td>230</td>
<td>153.2</td>
<td>766 lbs.</td>
<td>9 3/4 gal.</td>
<td>7 1/4 gal.</td>
<td>1 1/2 gal.</td>
<td>7 1/2 qt.</td>
<td>7 1/2 qt.</td>
<td>56 lbs.</td>
<td>56 lbs.</td>
</tr>
<tr>
<td>240</td>
<td>250</td>
<td>181.2</td>
<td>906 lbs.</td>
<td>11 1/2 gal.</td>
<td>8 1/2 gal.</td>
<td>19/16 gal.</td>
<td>9 qt.</td>
<td>9 qt.</td>
<td>62 lbs.</td>
<td>62 lbs.</td>
</tr>
</tbody>
</table>

Example: A patch is 30 feet in diameter. Area to be treated is 40 feet in diameter. Radius is one-half of diameter (20).

\[
\frac{(20)^2 \times 3.1416}{272.25} = \frac{1256.64}{272.25} = 4.6 \text{ sq. rd.}
\]

To obtain the area of rectangular patches, add 10 feet to both the width and length of the patch and multiply to get the area in square feet; then divide by 272.25 for the area in square rods.

The area of either a circular or rectangular patch can then be multiplied by the rate of product applied per square rod to obtain the amount of chemical needed for the patch treatment. This has been done for the various circular patches in the following table. Areas from rectangular patches could be fitted into this table.
Use of a trade name does not imply endorsement of one product over another.

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