Control and Elimination of Quackgrass

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Control and Elimination of QUACKGRASS

Figure 1. A mature quackgrass plant with a young plant growing from the same rhizome
Control and Elimination of

QUACKGRASS

By LYLE A. DERSCHEID, extension agronomist, and LEON J. WRAGE, extension weed specialist

Quackgrass is one of the most widely spread of the eight noxious weeds in South Dakota. It is particularly prevalent in northern counties, but is found in all parts of the state. It has been reported on over 193,000 acres on more than 13,000 South Dakota farms, but these reports do not include all rangeland infestations.

Quackgrass is a perennial grass that spreads by seeds and underground stems (rhizomes). It produces a great quantity of viable seed, which may retain its ability to germinate for at least 4 years in storage or in the soil. Quackgrass seeds cannot be removed from seed of many of our common grasses, especially bromegrass or wheatgrasses. If at all possible, sow only certified grass seed. Seeds of other crops must be cleaned with extreme care.

Screenings or forage infested with quackgrass seed often serve to spread the seed to new areas. Manure or mud on implement wheels or on the feet of animals, and improperly cleaned seeding or threshing equipment can also spread quackgrass seeds to a new location.

The rhizomes spread laterally in the upper 3 to 6 inches of soil. They are capable of producing new plants at each node (joint) and may grow through the soil for considerable distances, producing new shoots at frequent intervals, eventually forming a dense sod. Pieces of rhizomes may be carried on the plow or other tillage implements such as the field cultivator, or in mud on implement wheels, and thus spread the weed to uninfested areas.

Quackgrass is frequently confused with other grasses. Some ways of distinguishing it from several other grasses are summarized in Table 1. and are illustrated in Figures 2 and 3.

1Agropyron repens L.

Combinations of cultivations, croppings, and chemicals can reduce the new stand of quackgrass by 90 per cent or more in one year.

INTENSIVE CULTIVATION

Cultivation is used primarily for starving other weeds. However, for quackgrass, it may be used for starving the plant by reducing root reserves, drying the rhizomes and top growth so that they die, and occasionally, exposing rhizomes to freezing.

Root reserves can be reduced throughout the growing season, but dry weather (summer) is necessary for drying the rhizomes and cold weather (fall) is needed for freezing. Root reserves are depleted more rapidly if the weed is growing on fertile soil or has received an application of nitrogen. Likewise, heavy grazing for a year prior to cultivation will aid in eliminating the weed.

Spring. Cultivation is aimed at reducing the root reserves. Cultivate it whenever leaves become 2-3 inches long (about every 3 weeks). A sharp one-way disk operated at a depth of 2 or 3 inches is the preferred implement. On unplowed sod use it once lengthwise and once crosswise for the first operation. If a one-way is not available, plow shallowly and disk to cut up the sod. Use a disk harrow for later operations. A duckfoot field cultivator is a satisfactory implement when trash does not prevent its use, but it may carry rhizomes from one area to another.

Summer. Cultivate every 3 weeks with a one-way disk or duckfoot cultivator to reduce root reserves. In dry seasons, a heavy duty spring-toothed field cultivator may be used to aid in reducing root reserves and to lift rhizomes to the surface of the soil where they will dry in 4 or 5 days of dry weather. Weekly cultivations with a spring-toothed harrow are needed to
bring to the surface all the rhizome fragments that have been buried. Quackgrass fragments enclosed in clods, partially covered with soil, or anchored to the soil are not likely to be dried enough to be killed.

**Late Fall.** Cultivation will aid in the freezing of rhizomes when temperatures are below 20 degrees F. In order to freeze them it is essential to expose as many rhizomes as possible. The last cultivation should be a deep cultivation or plowing and leave the surface rough. It will aid in preventing erosion and may result in additional kill by freezing.

An entire season of cultivation is generally required to eliminate quackgrass. However, early spring cultivation followed by a crosscultivated crop of corn reduces the stand and holds the weed in check. Allow the quackgrass to start its growth and plow deeply. The plant is buried deeply. Reappearance is delayed and root reserves reduced because it must produce a long shoot to reach the surface. Either cultivate deeply before planting the crop or plant immediately after plowing.

After-Small-Grain-Harvest cultivation during late summer and fall reduces quackgrass stands, especially during dry years and when freezing has been effective.

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**Safety First**

Read and follow all label directions and precautions. Federal regulations and label directions concerning the uses of chemicals are subject to change.

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**Cultivation, Crops, and Chemicals**

The following chemicals are recommended for quackgrass control in conjunction with specific crops and tillage operations. Although their cost is relatively high, they will give 90 per cent elimination of the weed in one season.

**Atrazine** is formulated as wettable powder to be applied as a spray. Application of atrazine on cropland is one of the best chemical methods of controlling quackgrass; however, small grains, forage crops or soybeans may be damaged by chemical residue if these crops are seeded the second spring after application of this herbicide. Atrazine applications for quackgrass control are best when applied in 20 gallons of water per acre.

There are five ways to use atrazine. In most cases atrazine does not give 100 per cent elimination, and fallow operations or cultivation of corn kills the stragglers.

1. On cropland with normal amount of crop residue, apply 4 pounds active ingredient (5 pounds of AAtrex 80W product) per acre in the fall between September 15 and November 1. Plow in late fall or the next spring (1 to 3 weeks after treatment). Plant corn and cultivate or fallow for a season.

2. On cropland with normal amount of crop residue, apply 4 pounds active ingredient (5 pounds of AAtrex 80W product) per acre in the spring. Plow treated area 1 to 3 weeks after treatment. Plant corn and cultivate or fallow for a season.

3. On cropland with normal amount of crop residue, apply 2 pounds active ingredient (2½ pounds of AAtrex 80W product) per acre between September 15 and May 1. Plow in late fall or the next spring (1 to 3 weeks after treatment). Prepare soil, plant corn and apply 2 pounds active ingredient (2½ pounds of AAtrex 80W product) before quackgrass is 1½ inches tall. Cultivate the corn.

4. On cropland with heavy residue, plow during late summer. Treat regrowth with 4 pounds active ingredient (5 pounds of AAtrex 80W product) in the fall or spring. Disk treated area 1 to 3 weeks after treatment. Plant corn and cultivate or fallow for a season.

**Dalapon** is sold as a powder, under the tradename "Dowpon," to be dissolved in water and applied as a spray. It is more effective when used in conjunction with tillage operations than when used alone. You cannot expect to kill more than 90 or 95 per cent of the weeds. Dalapon is more readily absorbed by plant tops than by roots. Use enough water to dissolve the dalapon and give good coverage.

There are two ways to use dalapon. Both require the use of cultivation in row crops to kill the plants not eliminated by the herbicide.

1. For spring treatments apply 6 pounds acid equivalent of dalapon (8 pounds of "Dowpon" product) per acre when quackgrass is 4 to 8 inches tall. Plow treated area 7 to 10 days later. Disk treated areas several times after plowing. Plant a crop 4 to 6 weeks after spraying or fallow for a season. Crops that can be planted include corn and soybeans. Row crops can be cultivated allowing control of quackgrass regrowth if any is present. Early maturing varieties or hybrids may need to be planted because of delayed planting.

2. For fall treatment, mow to remove top growth during August. Treat regrowth with 10 pounds acid equivalent of dalapon (12½ pounds of "Dowpon" product) per acre (at least one
week before the first killing frost is expected) when quackgrass is 4 to 8 inches high. Plow during late fall or the next spring (not less than 7 days after spraying). Plant corn and cultivate or fallow for a season.

**NONCROPLAND AREAS**

Residue tolerances for these herbicides used in this way have not been established. Therefore food or feed should not be harvested or grazed from treated areas.

1. Apply 8 pounds active ingredient of atrazine or simazine (10 pounds of "AAtrex" or "Princep" wettable powder) per acre between September 15 and the first snowfall.

2. Apply 4 pounds of amitrole-T (2 gallons of "Ami­trol-T" or "Cytrol" liquid) per acre in 40 to 50 gallons of spray solution. Apply amitrole-T during the spring when quackgrass is 4 to 8 inches tall. Amitrole-T contains ammonium thiocyanate in addition to amitrole. It is superior to amitrole alone for perennial weed control. In most cases amitrole-T does not give 100% elimination without follow-up cultivation.

In addition to these herbicides, several soil sterilant type chemicals may be used in noncropland areas. Those containing residual chemicals that remain near the soil surface will be most effective.

**SHELTERBELTS**

Spray simazine (tradename "Princep") in one fall application or make a split application in the fall and spring. Use a mixture of amitrole (tradename "Amino Triazol" or "Weedazol") or amitrole-T (tradename "Amitrol-T" or "Cytrol") with simazine in the spring.

Apply simazine at the rate of 4 pounds active ingredient per acre in the fall (5 pounds wettable powder). This is approximately 2 level tablespoons of wettable powder for square rod.

For split applications, use 2 pounds active ingredient of simazine (2½ pounds wettable powder) in the fall and again in the spring after quackgrass begins growth. This is approximately 2 level tablespoons of wettable powder per square rod.

In the spring, if quackgrass has started to grow, mix amitrole at the rate of 4 pounds active ingredient (8 pound soluble powder) per acre or amitrole-T at the rate of 2 pounds active ingredient (1 gallon liquid) per acre with simazine at 4 pounds active ingredient (5 pounds wettable powder) per acre. The correct amount of product for a one square rod of area is approximately 2 level tablespoons of amitrole or 1½ tablespoons of amitrole-T mixed with 2 level tablespoons of simazine.

Apply the spray to the base of the trees. Do not allow spray to contact the trees. Amitrole and amitrole-T are registered for use in noncropland areas only. Food or feed should not be harvested or grazed from treated areas.

**COST OF CHEMICALS**

The cost of these chemicals varies from year to year. However, the approximate cost of a pound of active ingredient for the before-mentioned chemicals is as follows: dalapon $1.60; amitrole-T $5.00; atrazine $3.20; and simazine $3.55.

**SPECIAL CROPPING**

The three cropping systems presented here have practical use in areas unsuited to long periods of intensive cultivation. These practices reduce stands but much slower than the chemical treatments listed before.

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*Complete chemical names for herbicides used for quackgrass control are dalapon—2,2 dichloropropionic acid; atrazine, 2,2 chloro-4-ethylamino-6-isopropylamino-s-triazine; simazine—2-chloro-4,6-bis-(ethyl-amino)-s-triazine; amitrole-T—3-amin-1,2,4-triazole plus ammonium thiocyanate.

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**Summary of Vegetative Characters by Which Quackgrass Can Be Distinguished from Several Other Grasses**

<table>
<thead>
<tr>
<th>Grass</th>
<th>Growth Habit</th>
<th>Leaf blade*</th>
<th>Leaf sheath*</th>
<th>Rhizomes*</th>
<th>Auricles*</th>
<th>Ligule*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quackgrass</td>
<td>sod-forming</td>
<td>flat, smooth</td>
<td>hairy at base</td>
<td>white</td>
<td>short</td>
<td>short</td>
</tr>
<tr>
<td>Brimegrass</td>
<td>sod-forming</td>
<td>flat, smooth</td>
<td>hairy, split, overlapping</td>
<td>tan</td>
<td>generally none</td>
<td>large, smooth</td>
</tr>
<tr>
<td>Western Wheatgrass</td>
<td>sod-forming</td>
<td>rolled, rigid, rough upper surface; saw-toothed edges</td>
<td>smooth, continuous</td>
<td>tan</td>
<td>long, colored</td>
<td>minute, smooth</td>
</tr>
<tr>
<td>Slender Wheatgrass</td>
<td>bunch-type</td>
<td>flat, smooth</td>
<td>smooth, split</td>
<td>none</td>
<td>none</td>
<td>minute, hairy</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>bunch-type</td>
<td>flat, smooth</td>
<td>smooth, split</td>
<td>none</td>
<td>short</td>
<td>very short, membranous</td>
</tr>
</tbody>
</table>

*For location of these plant parts, see illustration.
Plan One. The first year plant small grain underseeded with sweet clover. Plow under for green manure the following year. Plow 5 inches deep and cultivate extensively until fall. The third year, plant a row crop and do a thorough job of cultivating. Pick up stray plants.

Plan Two. Plant small grain and seed it to sweet clover. The next year cut the clover for hay. Plow 5 inches deep immediately after cutting the hay. Follow an extensive cultivation program until Sept. 10-20, when rye should be seeded at 2 bushels per acre.

The third year combine the rye crop and plow to a depth of 5 inches immediately after harvest. Cultivate extensively until fall. Finally plant to a row crop the fourth year and do a good job of cultivating. Clean up stray plants.

Plan Three. This method is especially effective when the spring of the first year is dry. Cultivate extensively the first year from the time the quackgrass reaches a height of 2 inches until June 15 or July 1. Drill in German millet, proso millet, or buckwheat where it is adapted. Cut the German millet for hay, but harvest the proso millet or buckwheat for seed.

Figure 3. Portions of spikes of quackgrass and perennial ryegrass: A) side-view of quackgrass showing how flat side of spikelet is attached to the rachis; B) a view of the same spike of quackgrass after it was turned one-fourth turn; and C) ryegrass spike viewed from same angle as in B, showing that the narrow edge of spikelet is attached to the rachis.

Figure 2. Detailed drawings of young leaves of Quackgrass, Bromegrass, Western wheatgrass, Slender wheatgrass, and Perennial ryegrass, show the difference in: 1) base of the leaf blade; 2) ligule; 3) auricles; 4) leaf sheath; and 5) cross-section of the leaf sheath.