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Control and Elimination of Quackgrass

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Cooperative Extension Service

Control and Elimination of

Quackgrass

Quackgrass

Quackgrass¹ is one of the most widely spread of the eight noxious weeds in South Dakota. It is particularly wide spread in northern counties, but is found in all parts of the state. It has been reported on over 150,000 acres of over 11,000 farms in South Dakota and the reports do not include some 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 brome-grass 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 illustrated in figure 1.

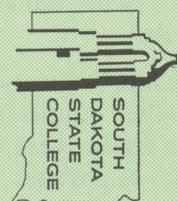
¹*Agropyron repens L.*

By Lyle A. Derscheid, Professor of Agronomy, Keith E. Wallace, Extension Weed Specialist and Wilford H. Wallace, Instructor in Agronomy

Quackgrass

Control and Elimination of

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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. Every 3 weeks with a one-way disk or duckfoot cultivator to reduce root reserves has been quite successful. 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.

SPECIAL CROPPING

The three cropping systems presented here have practical use in areas unsuited to long periods of intensive cultivation.

Plan One. During 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.

In wet years, the buckwheat is the best known summer crop for quackgrass control.

Resume original cropping system the second year. Pick up stray plants.

CULTIVATION, CROPS, CHEMICALS

The following chemicals, all recommended for eliminating quackgrass, are expensive and prevent the use of treated land for a season. As a consequence, it is seldom practical to rely on chemicals alone for controlling large infestations.

Dalapon* is sold as a powder to be dissolved in water and applied as 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% of the weeds. Dalapon is more readily absorbed by plant tops than by roots.

Early spring application of dalapon when little or no leaf growth is present will control but not eliminate quackgrass. Apply 4 pounds acid equivalent (5½ lbs. of 85% sodium salt) per acre in 10 to 20 gallons of water. This treatment can be made during late April or early May.

Plow after a good rain has leached the chemical into the soil. Potatoes or sugar beets can be planted soon after plowing. However, residual effect of the chemical in the soil may injure corn or peas planted less than 4 weeks after the date of spraying. Planting of corn should be delayed 5 weeks under dry conditions and planting of all beans should always be delayed 5 weeks or longer.

Late spring application of dalapon when 4 to 8 inches of leaf growth is present is effective for eliminating 90 to 95% of the weeds. Apply 6 pounds acid equivalent (8 lbs. of 85% sodium salt) per acre. Plow 7 to 10 days later. Use a cultivated crop, smother crop or clean tillage to secure higher percentage kill of the quackgrass. However, planting of a crop must be delayed several weeks as the residual effect of the chemical affects crops the same as when applied during early spring.

Fall applications of dalapon are also effective. Mow and remove the current year's growth. When regrowth is 4 to 8 inches tall, spray with 10 pounds acid equivalent (12½ pounds of 85% sodium salt) of dalapon per acre. Spray before frost has injured leaf growth. Plow 7 to 10 days later. This system should kill 90 to 95% of the weeds. Crops sown the following year are not affected.

A single application of dalapon at the rate of 10 pounds per acre in early spring gives seasonal control for areas that cannot be cultivated. Retreatment will be necessary to achieve elimination. Two applications of

5 pounds per acre applied 6 weeks apart is equally effective on quackgrass and less injurious to trees. This treatment can be used safely under fruit trees that are old enough to bear fruit.

TCA* is more effective when applied to rhizomes during the fall of the year. It is sold as a powder or granules to be dissolved in water and applied as a spray. It is absorbed by plant roots. It seldom kills more than 90-95% of the weeds. Plow shallowly to get a maximum number of rhizomes on the surface of the soil. Spray immediately with 20 pounds of TCA acid equivalent (25 pounds of 90% sodium salt) per acre. Residual effect may injure some crops seeded the next spring. Potatoes, flax, sugar beets, alfalfa, birdsfoot trefoil, and oats are seldom injured; but corn, soybeans, and red clover may be severely injured. Barley and wheat are intermediate in sensitivity.

On undisturbed sod use 100 pounds of TCA acid equivalent (125 pounds of 90% sodium salt) per acre ($\frac{3}{4}$ lb. of sodium salt per square rod) during the late summer or early fall to get similar results.

Atrazine and **simazine*** are formulated as wettable powders to be applied as sprays or as granules to be applied dry. The granules have not been tested ex-

tensively for use on quackgrass. Both chemicals are used in the same way.

Apply 4 pounds of active ingredient (5 lbs. of 80% wettable powder) per acre during the fall. Plow the following spring and plant corn. Cultivate the corn if needed. Residual effect of simazine generally injures small grain seeded the year after corn, and atrazine frequently causes injury. Spring applications of either chemical are less satisfactory because they act too slowly. They do not kill the quackgrass until July which is too late to help the corn crop.

Little is known about the effectiveness of either chemical used in any other manner. However, it has been used at lower rates following treatment with amitrole. This system is discussed below.

Amitrole* is a powder to be dissolved in water and applied as a spray. A mixture of amitrole and ammonium thiocyanate is a liquid sold under the trade name Amitrol-T. Both are effective for controlling and eliminating quackgrass. They are handled much the same as dalapon, however, they seldom leave a residue in the soil that is injurious to a crop.

*Dalapon—2,2 dichloropropionic acid, TCA-trichloroacetic acid;
Atrazine—2-chloro-4-ethylamino-6-isopropylamino-s-triazine;
Simazine—2-chloro-4,6-bis-(ethyl-amino)-s-triazine;
Amitrole—3-amino-1,2,4-triazole

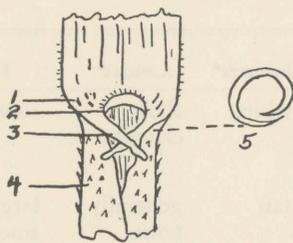
Summary of Vegetative Characters by Which Quackgrass Can Be Distinguished from Several Other Grasses

Grass	Growth Habit	Leaf blade*	Leaf sheath*	Rhizomes*	Auricles*	Ligule*
Quackgrass.....	sod-forming	flat, smooth hairy at base	hairy, split, overlapping	white	short, clawlike	short
Bromegrass.....	sod-forming	flat, smooth	smooth, continuous	tan	generally none	large, smooth
Western Wheatgrass.....	sod-forming	rolled, rigid, rough upper surface; saw-toothed edges	smooth, split	tan	long, colored	minute, smooth
Slender Wheatgrass.....	bunch-type	flat, smooth	smooth, split	none	none	minute, hairy
Ryegrass.....	bunch-type	flat, smooth	smooth, split	none	short	very short, membranous

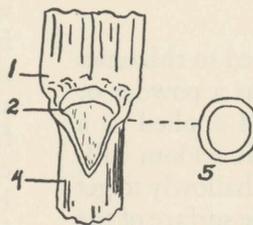
*For location of these plant parts, see illustration.



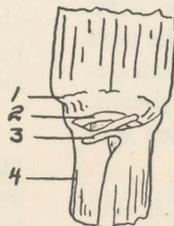
Mature Quackgrass



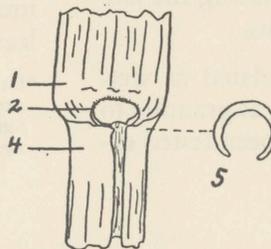
Quackgrass



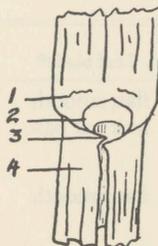
Bromegrass



Western Wheatgrass



Slender Wheatgrass



Perennial Ryegrass

A mature quackgrass plant, with a young plant growing from the same rhizome. The detailed drawings of the 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) the cross-section of the leaf sheath.

Apply amitrole at the rate of 4 pounds active ingredient (8 pounds of 50% material) per acre in 20 gallons of water during the spring when quackgrass is 4 to 8 inches tall. Plow 10 to 14 days later and plant a crop. Better control is obtained if the crop is seeded immediately. A cultivated crop, smother crop or clean tillage aids in eliminating the weed. "Amitrol-T" can be used in the same way at a rate of 2 pounds active ingredient (1 gallon) per acre.

After quackgrass has been treated with amitrole and plowed, an application of atrazine or simazine kills annual weeds and weakened quackgrass sprouts. Apply 2½ pounds active ingredient (3⅛ pounds 80% wettable powder) of either atrazine or simazine per acre when planting corn or immediately afterwards. Corn is the only crop that will not be damaged by these chemicals.

COST OF CHEMICALS

The cost of these chemicals varies somewhat from year to year. However, the approximate cost of a pound of active ingredient is as follows: dalapon—\$1.60, TCA—55 cents, amitrole—\$4.50, "Amitrol-T"—\$5, simazine or atrazine sprays—\$4, and simazine or atrazine granules—\$4.45. Cost per acre will vary with the amount of chemical used. Amount of chemical needed will depend on method used or time of application.