

BERMUDA GRASS SEED

The necessity for reseeding large areas of Bermuda grass turf on Southern golf courses this spring raised several questions as to the relative speed of germination of the ordinary Bermuda grass seed as compared with seed from which the hulls have been removed. It has been claimed that the ordinary seed is as much as three or four weeks slower in germinating than is the dehulled seed of Bermuda grass. Such differences would be of much importance in reseeding Bermuda turf.

In order to ascertain how much quicker the dehulled seed would germinate, a test was conducted in a greenhouse in April under favorable growing conditions. Part of a lot of good Bermuda seed was dehulled mechanically. Equal weights from each kind of seed were carefully weighed in duplicate and planted in boxes of soil. Plantings were all made on April 8 and by April 16 a large number of seedlings were showing. On this and each succeeding day until April 28 the seedlings were removed and counted.

It was found that approximately 50 per cent. more seedlings came up from the samples of dehulled seed than from the samples of the ordinary seed during the period of 20 days that the count was continued (887 and 885 for the two boxes of dehulled as against 623 and 611 for ordinary seed).

Seventy-eight per cent. of the seedlings from dehulled seed appeared during the first 8 days, as compared with 46 per cent. from the ordinary seed. However, from the common seed 77 per cent. of the seedlings appeared during the first 10 days.

From this particular test with a representative sample of good seed planted under favorable germinating conditions, it would appear that the dehulled (hulled) seed is two days quicker than the ordinary (unhulled) seed of Bermuda grass. This under special conditions may be an important difference. Since three-fourths of the ordinary seeds that germinated were up in 10 days, the difference in speed of germination due to presence or absence of hulls is not a matter of general importance. In cooler, less favorable conditions the difference no doubt would be somewhat greater.

Although the dehulled seed does not germinate much more rapidly under favorable conditions than does the ordinary Bermuda grass seed, it has other advantages which justify a somewhat increased price. A much larger number of seedlings is obtained from each pound of seed and also there are likely to be fewer weed seeds in a good grade of dehulled seed than similar grades of ordinary seed.

CUTWORMS AND ARMY WORMS

Cutworms are naked caterpillars, the larvae of night-flying winged moths or "millers." They frequently appear in greens during warm weather to cut off small areas of grass each night, making a blemished and unsightly putting surface. Usually the cutworm hides during the day in a burrow which may be marked at either end by the closely-cut almost scalped patches.

Army worms are similar to cutworms in appearance and habits except that occasionally under favorable conditions they reproduce in enormous numbers and migrate as a veritable army, eating or destroying relatively all low-lying vegetation in their path. The measures given for the control of cutworms apply to the army worm as well. For a more complete account of this pest see pages 166-169 of the Bulletin of the United States Golf Association Green Section, Vol. IV (1924).

The adult cutworm moths have dark forewings which expand from one to two inches and are variously marked with darker or lighter spots and narrow bands. The wings are folded over the back when at rest. Like the larvae, they feed at night, sipping the nectar from flowers, and may be noticed during the day as they fly out of reach and settle again on greens or other turf. The females prefer to lay their eggs on grass land. The young larvae which hatch in late summer feed upon the plant roots until frost, when they burrow deeper to hibernate until spring.

The larvae are voracious feeders. They become full grown by late spring or early summer and are then $1\frac{1}{2}$ to 2 inches long, of a dull brown or gray color and more or less marked with stripes and oblique dashes along the back, depending upon the species. The larvae change to moths (pupate) by midsummer in the Central and Northern states and earlier farther south. There is usually only one generation in the North and commonly two and sometimes three in the South.

Control: There are two methods of controlling cutworms; (1) poisoning the vegetation they are feeding upon, and (2) applying poison bait.

The more nearly certain, immediate control is obtained by coating the grass blades with arsenate of lead, using $1\frac{1}{2}$ to 2 pounds to each 1,000 square feet. It may be applied as a spray or may be mixed with approximately 4 quarts of screened and dried sand for 1,000 square feet. The arsenate of lead is dusted on the leaves, as the sand falls through the turf, in quantities sufficient to poison the worms. This quantity of sand may be spread rapidly with a wheelbarrow seeder. The arsenate of lead is a more expensive method than the poison bait but it remains in the turf, where it continues to act as a control for earthworms or grubs.

The standard formula for poison bait is as follows:

Wheat bran	50 pounds
Paris green or white arsenic	2 pounds
Cheap molasses	2 quarts
Water	2 to 4 gallons or more as needed.

Mix the dry bran and poison. Dilute the molasses with some water and mix it with the poisoned bran. Add sufficient water to make a moist, crumbly mixture. Middlings or alfalfa meal may be substituted for the bran. The bait is more potent if allowed to stand several hours after mixing. Scatter just before nightfall at the rate of approximately 3 pounds to 1,000 square feet. This treatment may be repeated as needed.

The poison bait provides a rapid and inexpensive method for controlling these pests. It may be used on putting greens as well as approaches and fairways. By scattering poison bait early in the season on the turf surrounding the putting greens, much damage from cutworms may be avoided, since these worms frequently migrate to the putting greens from drier turf at considerable distance from the greens.

Caution: Arsenate of lead, Paris green and white arsenic are serious poisons that should not be inhaled during mixing or spreading and should be thoroughly washed from the hands. Unless the bait is lightly and evenly spread it may cause injury to greens due to an excess of arsenic in the larger lumps. Birds are apt to be poisoned by the lumps also.

CONTROLLING CLOVER

Due to unusually wet and cold weather this spring in certain sections clover has become particularly troublesome on golf courses. Until a specific chemical treatment has been perfected, the control of clover must depend very largely upon skillful fertilization.

White clover, like other legumes, usually obtains a large quantity of the nitrogen required for growth from the air in the soil through the activity of bacteria living within swollen growths (nodules) on the roots. Grasses are incapable of obtaining nitrogen in this way and must depend upon the supply available in the soil.

A relatively permanent control depends upon the supplying of enough nitrogen so that the grasses may compete against the clover on better than equal terms. It is important also that plenty of nitrogen be available early in the season. This may involve the application of mineral fertilizer, since organic fertilizers break down slowly in cool weather.

Grasses particularly when closely clipped are limited to a relatively shallow layer of soil, while the clover may absorb water and plant food from a much deeper layer. Grasses are thus placed at a disadvantage during periods when the reserve moisture becomes depleted in the upper layers.

Moderate amounts of phosphorus, potash and lime are probably more nearly sufficient for the grass than for the clover.

It has been observed that dense growing grasses such as velvet and creeping bent are less invaded than colonial bent or seaside bent. Bent or red fescue fairways have less than Kentucky bluegrass turf where these are all successfully grown.

Hard-packed turf usually has more clover than areas receiving less compaction. Any method of correction, whether that of distributing the trampling more evenly or opening up the turf by spiking or forking, should promote a more favorable competition of the grass with the clover. Incorporating organic matter in soil and providing good drainage are other factors in this connection.