

of injured grass appear on a putting green while in other cases the entire putting green may be affected.

The general vigor of the putting-green turf appears to have a decided effect upon the extent of the injury caused by the scale insects. Heavily fertilized bermudagrass has been observed to escape serious injury even though the turf was very heavily infested. In most cases where injury is very extensive, the turf has been observed to be suffering from a lack of fertility.

B. H. Richardson and Paul Riherd, entomologists for the Texas Agricultural Experiment Station, working independently, have reported that Parathion is a good insecticide for controlling these insects. Many other insecticides were used in their experiments, but neither man reported successful control with any material other than Parathion. The effective rate appeared to be 2 pounds of Parathion per acre in 360 gallons of water. A wetting agent was employed and grass was irrigated by a sprinkler system immediately after the application of the insecticide.



Bermudagrass under attack by Rhodesgrass Scale.

Rhodesgrass scale has been found on 74 species of grass in 63 Texas counties. It was first discovered on Rhodesgrass near Kingsville in 1942. Hence the name Rhodesgrass scale. In the eleven years since its discovery it has been reported over a rather extensive area. In 1953, infested turf was found as far north as Dallas. This insect is one of the most serious pests affecting bermudagrass turf. It warrants intensive study and vigilance in preventing its spread to areas which have not yet been invaded.

## BE SURE YOUR NEW SEEDING PRODUCES TURF

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"Seek to know *why*; then *how* and *what* will reveal themselves."

September is the month when golf-course superintendents over much of the country are planting seeds. They may be establishing new turf, or they may be renovating old stands. Many of the seedings will accomplish their purpose, but many will fail.

Why do so many seedings fail?

There are numerous reasons. A consideration of the needs of the germinating seed and of the very young seedling will provide an insight into the reasons underlying success or failure.

Good seed is important. A sufficient quantity of seed for a good turf cover is required. This topic was ably discussed

by A. M. Radko in the July issue of the USGA JOURNAL.

A healthy, live seed requires several conditions for germination. It requires air (oxygen). Wet, poorly drained soils into which seeds are sometimes planted may exclude air and seeds may fail to germinate under these conditions.

While very wet soils are detrimental to seed germination, because they contain insufficient air, the seed does require a plentiful supply of moisture for germination. Water is taken into the seed, causing the seed to swell. The swelling endosperm breaks open the seedcoat, and the young plant comes into contact with the soil and begins to form roots. Water intake into the germinating seed is also accomplished by enzyme activity which

permits the stored food products within the seed to be used in getting the seedling off to a vigorous start.

A favorable temperature is also necessary for germination. Cold soils do not provide proper conditions. Many chemical reactions take place within a germinating seed, and the speed of a chemical reaction is affected greatly by temperature. Thus, a very late fall seeding is susceptible to slow germination and slow growth because the seed's chemical reactions are being slowed down.

When the grass seed has germinated and the very young seedling has begun growth, it is still subject to many hazards. Drying out, freezing, heaving and wind may cause injury. Insects and diseases may kill off young grass plants. Weed competition may be a problem. Erosion uproots some seedlings and deposits soil on others.

Fortunately, many of the accidents which may befall a new seeding can be prevented. The wise superintendent will foresee the dangers and will forestall them.

Good seedbed preparation comes first. Whether seeds are to be planted in new ground or into established turf, they need enough loose soil to cover them lightly. A light covering of soil keeps them from drying out. It gives the tiny, newly formed roots something in which to take hold. In new ground, many methods are available for loosening soil. In established turf, providing loose soil is a greater prob-

lem. Turf cultivating equipment is useful for accomplishing this purpose. Small pockets are formed which hold moisture and provide protection for seeds and young seedlings. The cores of soil brought to the surface may be broken up to provide sufficient coverage for those seeds which do not drop into the protective pockets.

In many cases weeds which exist on an area to be seeded are killed out by the operation involved in the preparation of a seedbed. Sometimes chemical methods must also be brought into use. Whatever the case may be, existing weeds should be eliminated so that they do not compete with the young seedlings for light, moisture, and plant food.

Insects and diseases sometimes damage young stands of turf. In warm, humid weather "damping-off" fungi are likely to be active. Sometimes dollar-spot causes considerable damage. Tersan is quite effective against some of the "damping-off" organisms, and cadmium fungicides may be used to control dollarspot. Insects are not so likely to damage young turf, but sometimes such pests as army worms and sod webworms may cause trouble. Chlor-dane is a good insecticide for most purposes. Relatively few turf-damaging insects escape its effects.

Drying out, freezing and heaving are caused by weather conditions. While man can do little about the weather, he can do much to counteract the effects of unfavorable weather. Mulching is a simple operation that can be the difference between success and failure. When seeds are sown in a thin established turf, the sparse vegetation acts as a living mulch. The movement of wind near the soil level is retarded, soil particles are not moved by the wind and evaporation of moisture from the soil is rapid. The vegetation shades the soil and keeps it cooler during the day; it acts as an insulating blanket and serves to keep the soil warmer during the night. Thus seeds and seedlings are protected against rapid drying and against rapid changes in temperature. On newly prepared areas a dead mulch can be made to perform the same function that living vegetation performs on spar-

#### TURF MANAGEMENT

The book "Turf Management," sponsored by the United States Golf Association and edited by Prof. H. B. Musser, is a complete and authoritative guide in the practical development of golf-course turfs.

This 354-page volume is available through USGA, 40 East 38th Street, New York 16, N. Y.; the USGA Green Section, Plant Industry Station, Beltsville, Md.; the USGA Green Section Western Office, Box 241, Davis, Cal.; the USGA Green Section Southwestern Office, Texas A. and M. College, College Station, Texas, or the McGraw-Hill Book Co., 330 West 42nd Street, New York 36, N. Y. The cost is \$7.

sely covered areas of established turf. A straw or leaf mulch, applied at the rate of approximately one ton of material per acre, will provide excellent insurance for the establishment of a new seeding. Mulching is a must on sloping areas. Only under the most fortunate weather conditions can turf from new seedings be established on slopes before heavy rains cause the formation of rivulets or gullies.

Grass seed is expensive, but good

establishment methods are relatively cheap. When dangers to germinating seeds and young seedlings are anticipated, ways can be found to escape them. Employment of measures to escape the dangers is much cheaper than failure. When one knows *why* his seeds germinate or fail and *why* they do or do not become established to provide a good stand of grass, he will know *what* to do and *how* to do it.

## PREPARING YOUR GREENS FOR WINTER PLAY

By JIM HAMNER

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Rye grass planted on bermuda greens offers an excellent putting surface during the dormant season of bermuda. By careful attention to the following factors, little difficulty should be had in developing good winter grass.

Soil tests for reaction should be near the neutral point. About two weeks before planting time, 15 to 20 pounds of 20 per cent superphosphate per 1,000 square feet should be applied to the greens to encourage root growth of the young seedlings. It is also advisable to put on 5 to 10 pounds of muriate of potash, provided grass clippings have been removed regularly during the bermuda season. At this time nitrogen should be low in the greens, and the bermuda, by its color, growth and so forth, should show definite need of nitrogen.

Rye grass is strictly a cool weather grass. It should not be planted until weather conditions are favorable. Around October 10, under normal conditions, is about the right time to begin seeding in this locality. Fungicides to control diseases in the rye should be put on just prior to seeding and should be used thereafter as needed. Rye grass is especially susceptible to dollar spot; Cadminate can be used safely and effectively both as a preventative and as a cure for dollar spot.

The bermuda should be cut the height of  $\frac{1}{4}$  inch at the seeding time. Severe raking destroys the base for the rye and breaks down the manufacturing plant of

the bermuda, which is certain to cause trouble later in the transition period.

For best results use 50 pounds of rye seed per 1,000 square feet in two plantings about two weeks apart. The seed should be thoroughly worked into the bermuda turf before top dressing with a mixture of course sand and soil. The top dressing should be low in nitrogen and humus; too much nitrogen and humus encourage "damping-off."

Careful use of water is very essential. The soil must be kept moist but not saturated with water. It is best to water lightly two or three times a day if necessary until the young seedlings are well rooted.

Mowing is also very important during the early growth of the rye. The mowers should be kept very sharp in order to make a clean cut. Dull mowers loosen or pull out many of the young plants. Rye, cut regularly at a height of  $\frac{1}{4}$  to  $\frac{5}{16}$  of an inch, will keep the bermuda under control until the bermuda ceases to grow.

Nitrogen in an organic form, such as Milorganite, should be applied at the rate of 25 pounds per thousand square feet when the rye has been up for about three weeks. This is an ideal source of nitrogen for it will not burn or discolor the young rye. The rate of growth and the color of the turf determine the need for additional nitrogen.

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