mouth part, sometimes an inch long after extrusion, extends from the ground pearl to a grass root. The insect, after hatching from an egg and while in a crawling stage, attaches itself to the root and forms the ground pearl. While in this stage, the insect appears to be protected from changes in environment and most of the common insecticides. One species which belongs to this group of insects has been reported to have lived in a dry room without food for seventeen years.

The ground-pearl stage may be observed in areas where the insect occurs. The size of the pearls varies from that of a match head down to one which can be seen barely with the eyes. Their color is usually yellowish-white, with a pearly luster. If soil to a depth of six inches is removed with a clump of turf, and an examination is made, the largest ground pearls are found by crumbling the soil between the fingers. Ground pearls can be seen more easily, however, if the soil is allowed to dry and then is spread thinly over a flat surface. A survey of infested areas at Tifton, Ga., revealed that as many as one and one-half million pearls may exist in an area of 1,000 square feet and to a soil depth of one foot.

Preliminary tests of most of the common insecticides have not been successful in controlling the insect. Work is continuing, however, with the hope of finding a material or a method of control. If possible, individuals purchasing turf grasses for vegetative planting should be certain that the original source of material is free of ground pearls. At Tifton, Georgia, the insect has damaged turf grasses of bermuda, carpet, centipede and St. Augustine. Injury to infested areas may be decreased if ample water and fertilizer are applied throughout the growing season.

COMING EVENTS

Sept. 8-9:	**Turf Field Day, Pennsylvania State College, State College, Pa., H. B. Musser. (Starts at noon September 8 and ends at noon September 9.)**
Sept. 23:	**Turf Field Day, New York-Connecticut Turf Improvement Association, Ryewood Country Club, Rye, N. Y. Ted Joswick.**
Oct. 21-22:	**Fourth annual Central Plains Turf Foundation Turf Conference, Manhattan, Kan. William F. Pickett.**
Nov. 16-20:	**American Society of Agronomy Meetings, Dallas Texas. L. G. Monthey.**

SCALE ATTACKS BERMUDAGRASS PUTTING GREENS

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Bermudagrass putting greens in South Texas have suffered severely from infestations of scale insects during the summer months in recent years. Rhodesgrass scale, *Antonina graminis* (Mask.) and Ruth's scale *Odonapis ruthae* Kot. are the insects responsible for the damage.

An accompanying article by B. P. Robinson and L. W. Morgan, of Tifton, Ga., describes turf injury by ground pearl. While ground pearls and the insects described above belong to the same family (Coccidae), they belong to different genera. Rhodesgrass and Ruth's scale appear to attach themselves securely to the nodes of the grass and are usually detected by pulling back the leaf sheath with the blade of a pocket knife.

Adults of these insects have small dark bodies which are covered by a soft, white, cottony scale. They attach themselves to the nodes of the Bermudagrass rhizomes and stolons and suck sap from the plant. Growth of the grass is retarded. As injury progresses, the turf becomes thinner and many dead, discolored leaves appear. In some cases turf actually may be killed. Sometimes relatively small spots

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

By MARVIN H. FERGUSON

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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