TIMELY TURF TOPICS

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SOIL AERATION IMPROVES UTILIZATION OF FERTILIZERS

SOIL COMPACTION: There is an extreme possibility that serious trouble will develop this year on many fairways throughout the country due to the heavy rainfall that has been prevalent. This condition has created a hardship on the Superintendent in that he has been unable to mow as frequently as has been necessary and, when mowing has been accomplished, serious soil compaction has resulted. There is a likelihood because of this increased soil compaction that *Poa annua* will increase on these fairways due to its habit of growth and of being able to thrive on heavy soils. In this connection, attention is invited to the article on *Poa annua* which appeared in the August-September 1946 number of TIMELY TURF TOPICS. Very restricted root systems can be expected where this condition exists and every effort should be made to aerate the soils of your fairways before the hot days of summer approach. There is a possibility also that if a hot, dry season occurs in the early days of summer many of the grasses existing on these fairways will be killed or severely damaged.

Once these heavily compacted soils become dry, water penetration will almost be impossible and serious surface runoff will result. This will also encourage shallow rooting systems and thus increase the susceptibility of the grass to drought. Aeration of the turf in one form or another will loosen its compacted condition and permit better penetration and utilization of normal rainfall.

This condition also will be prevalent on restricted areas such as tees and putting greens because of the heavy concentration of foot traffic. Aeration and cultivation of these areas is essential in order to afford deeper root penetration. In view of the fact that these areas are limited in size more intensive methods can be used, as described in our January 1947 number of TIMELY TURF TOPICS.

Careful use of irrigation systems will be essential this summer to encourage deeper root systems.

SUPERIOR PUTTING GREEN GRASSES: Large-scale plantings of a mixture of Arlington, Congressional, and Collins bents in many sections of the country have proved the merits of such a mixture. These plantings have been under observation for a sufficiently long period of time to warrant making general recommendations for their use as a mixture. The advantages of each grass are outlined as follows:

Arlington	- heat-drought-disease tolerant. It has heavy wear resistance.
Congressional	- has a desirable color and texture; starts growth sooner in the spring; is more upright in growth, eliminating the tendency of the Arlington bent to produce a swirl, especially when cut higher than 3/16 inch.
Collins	- upright grower, eliminating the swirl of the Arlington and adds a third factor (as yet undetermined but thought to be apparently beneficial). It also affords a safety factor in that there are three strains instead of two.

So far as color and texture are concerned, these three grasses blend together nicely.

COPPER SPOT ON TURF GRASSES

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The fungus, *Gleocercospora sorghi*, that causes copper spot of turf grasses was observed first on Sudan grass at Arlington Farm, Virginia, in 1939. Later it was found on sorghum in Louisiana, and since then it has been found on sugar cane, corn, cattail millet, two species of *Panicum*, redtop and certain of the bent strains used for greens.

The fungus produces coppery-red spots on turf about the size of those caused by the dollarspot fungus, but if conditions are favorable the fungus may spread, causing the spots to coalesce, producing dead areas a foot or more in diameter. Whereas the "dollar spots" are more straw-color without grayish, smoky borders, the "copper spots" are a reddish-brown or coppery-red color, often with a dark margin or smoke ring surrounding the affected spot. Another contrast in the appearance of the two diseases is that the dollarspot fungus usually kills all the grass leaves in the affected spot, while the copper spot fungus does not, so that there are always a few to many green grass leaves showing in the "copper spot", depending somewhat, of course, upon the severity of the infection. If the spread of the fungus is stopped by proper management soon enough - that is, before all plants in a diseased spot are killed - the affected area will soon recover, but if the fungus remains active four to five days, all the grass in diseased spots will be killed and it will take much longer to obliterate the injury.

To positively determine the cause of copper spot, one should look very carefully for the small pinkish-orange, usually conical, fruiting bodies of the fungus which are attached to the infected leaves. These fruiting bodies are usually from about $\frac{1}{2}$ to $1\frac{1}{2}$ times the size of an ordinary pinhead. These conical bodies are made up of hundreds of spores (seeds) that serve to disperse and propagate the fungus. Heavy, dashing rains coming after the fruiting bodies are formed should be able to loosen the spores and even the spore masses so that the fungus could spread rapidly over wide areas. The fungus probably lives from year to year by several methods: (1) as mycelium (fungus threads) in the soil; (2) as modified thick-walled fungus threads; and (3) as small, black sclerotia (compact masses of fungus threads) in dead and decaying grass leaves. With these various means of living over from year to year, the disease is likely to be observed wherever favorable weather conditions for the growth of the fungus occur.

Since the fungus was first found on grasses growing in the warmer, more humid South and southeastern regions of the United States, it was thought that the fungus would probably be confined to grasses of these regions. However, C. C. Wernham has found this fungus in Pennsylvania, and H. L. Keil has reported it from Rhode Island. Wernham observed the disease developing on turf in temperatures ranging from 65° to 85° F. Here in Washington the writer has observed the disease on greens of several golf courses, but only after several days of or during warm, humid, muggy or sultry weather.

Apparently the commonly-used fungicides for the control of turf diseases, such as Calo-Clor, Tersan, and Spergon, will not control copper spot. Keil at the Rhode Island State College, through carefully-conducted experiments, has, however, shown that Puratized 177 (Phenyl amino cadmium dilactate complex) gave very satisfactory control of this disease. He used a 1:5,000 solution at the rate of 10 gallons to 1,000 square feet. Undoubtedly this chemical could be mixed also with some inert material so that it could be applied dry.

So far as the writer knows, Fungicide #531 (a complex calcium, zinc, copper, cadmium chromate compound) has not actually been used to control copper spot, but since it appears to be so promising in controlling other turf diseases, and because it also contains cadmium, this fungicide should be tried by greenkeepers if outbreaks of copper spot occur. This material should be used at 3 ounces to 1,000 square feet.

All greenkeepers should make an effort to select plant plugs from turf which appear to be free of diseases. These selections should then be increased in the nursery and used in greens for further testing. The wider use of disease-resistant strains certainly offers the most promising method of improving turf and of keeping down the cost of maintenance.

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CONTRIBUTIONS TO TURF RESEARCH: At a recent joint meeting of the Indiana Golf Association and the Indianapolis District Golf Association it was voted to contribute to the United States Golf Association Green Section for an indefinite period $500 a year for turf research in Indiana. This fund will be supplemented with funds from the Midwest Turf Research Foundation and the United States Golf Association to establish a Research Fellowship at Purdue University, West Lafayette, Indiana.

The Detroit District Golf Association voted $750 a year for an indefinite period to the USGA Green Section for turf research in Michigan. It is planned also to supplement this money with funds from the Midwest Research Turf Foundation and the USGA for a Research Fellowship at the Michigan State College, East Lansing, Michigan.

These two fellowships will be established as soon as practicable.

Approximately $6,500 will be made available in the near future to the USGA by the Tulsa Golfers' Fund for War Wounded, to be devoted to turf research in Oklahoma. Plans are being formulated for the expenditure of these funds in Oklahoma.

Through efforts of the District of Columbia Golf Association the Kenwood Golf and Country Club has donated $25 for turf research.

At the first annual Southeastern Turf Conference held at Tifton, Georgia, a telegram was received from T. R. Garlington and Robert T. Jones, Jr., to the effect that the Atlanta Athletic Club had approved the expenditure of $1,000 a year for an indefinite period, to support the regional program of Turf Research now in progress at Tifton. This brings the annual total of contributed funds to $2,060.

A number of other state and district golf associations have indicated that action is being considered by them for similar contributions to the USGA Green Section for research at their respective state experiment stations.

SOUTHEASTERN TURF PROBLEMS DISCUSSED AT TIFTON, GA., AND AT MIAMI, FLA.: Interest ran high among the 70 persons registered at Tifton and the 50 at Miami on such current topics as

1. Changeover from winter greens to summer greens: No two superintendents employ the same practice. Seeding rates of ryegrass vary from 10 pounds to 100 pounds to 1,000 square feet. From the discussion it was apparent that the least trouble during the spring conversion was experienced on those greens which had the best soil and the best drainage, as well as other factors which contributed to vigorous Bermuda turf with a sturdy deep root system.

2. Irrigation practices: There is an apparent tendency to water copiously at frequent intervals. This practice contributes to shallow-rooted, weak Bermuda turf, just as bentgrass greens are affected. Changes in irrigation methods must be accomplished gradually to avoid serious ill effects.

3. Fertilization practices: Two major factors must be considered in any fertilizer program: (a) the soil and its possible deficiencies, especially as regards trace ("minor") elements, and (b) the species of grass. Bermuda grass requires a high level of fertility to succeed. Centipede, carpet, Bahia and St. Augustine grasses produce satisfactory turf at much lower levels of fertility. Winter greens require low levels of nitrogen feeding at seeding time.

4. Mole cricket control: Poison baits and DDT have given measures of control but a completely satisfactory control on turfed areas remains to be discovered. This insect is probably the most serious pest of turf in the South.

5. Superior grasses: Hundreds of grasses are under test and observation at Tifton and at Belle Glade, Florida. Among the 100 strains of Bermuda in the Tifton Turf Gardens there are several that offer promise for superior greens, fairways, lawns, parks, cemeteries, roadsides, and airfields. Centipede grass was accorded a high place by several speakers as a superior grass for many turfed areas. Commercial supplies of seed of Centipede grass are closer to realization as a result of the work at Tifton.

6. Soil conditions: Compaction of fine sandy loams under heavy irrigation and traffic may be as great as that which is experienced on clay soils. Mechanical aeration offers considerable promise for relief but the dual approach of mechanical and physical improvements, by the addition of organic amendments, is considered sounder. Experiments in progress indicate that sawdust may be a satisfactory organic amendment.