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TURF DISEASES AND THEIR CONTROL

by

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The turf of lawns and golf greens frequently may show brown or unhealthy areas of varied sizes, many different factors contributing to these troubles. Unhealthy turf conditions are classified as non-parasitic disorders, due to such causes as fertilizer burns, smothering by masses of clippings, drouth injury, urine of small animals, or tramping of grass while frozen; and parasitic diseases, due to attacks of various fungi which live in the soil or in humus, and under suitable conditions become parasitic upon the grass.

Non-parasitic Disorders

The remedy for troubles due to wrong use of fertilizers, lack of proper water supply, poor soil conditions, or rough usage of the turf is the correction of these unfavorable conditions and practices.

Parasitic Diseases

There are a number of distinct fungus diseases of turf grasses, some of which at first may not be distinguished easily from each other. Certain of these diseases are prevalent during the summer months, while others appear during the fall, winter or early spring. Among the more common of these diseases are "brownpatch," "dollarspot," and "spotblight," appearing during the warmer weather; "snowmold," a winter and early spring disease; and "Fairy ring" more or less in evidence throughout the year, especially in climates where the grass remains green during the winter months.

Brownpatch, or Large Brownpatch usually is evidenced by rather distinctly marked brown areas varying in diameter from one or two inches to three or more feet. Brownpatch is caused by a strain of the potato Rhizoctonia fungus. The fungus lives in the soil and, during warm, humid periods or mild, rainy weather may attack the grass above the ground, killing the leaves and causing brown, unsightly spots.

Dollarspot, or Small Brownpatch is similar to brown patch except that the spots usually are much smaller. Sometimes the spots are so numerous that they merge, thus producing larger, irregular areas of dead turf. Dollarspot is caused by another species of the Rhizoctonia fungus.

Spotblight in some stages may be confused with brownpatch. In the early morning it appears as a dark circular spot with a cottony growth of the fungus intertwined with the grass blades. During the day the dead grass dries out and turns a reddish-brown color. The spots seldom reach more than two inches in diameter, but may occur in groups, which appear more or less in streaks. Spotblight is caused by a fungus related to one of the damping-off fungi (Pythium).

Snowmold is so named because it usually occurs when snow is present or as it melts. It also may occur at any time during fall, winter or spring in the absence of snow, especially if there has been a snowfall earlier in the autumn, or following prolonged spells of frosty weather. Snowmold is recognized first as a cobwebby growth of fungus threads over patches of turf. It finally results in irregular or circular areas of grayish dead turf. In very late stages it may resemble brownpatch. The fungus which causes snowmold is related to some of the soil fungi which cause potato wilt and tuber rots (Fusarium).

Fairy Ring is due to fungi of the mushroom, toadstool, and puffball types. At certain seasons of the year these mushrooms appear in distinct rings in grassy plots. The grass immediately outside the ring is likely to be stimulated and become dark green, while just inside the ring of mushrooms there may be a zone of dead grass. As the ring increases year by year, wild grasses and weeds may grow inside the dead zone and become quite rank and green. Thus at seasons when no mushrooms are in evidence, the fairy rings still may be noticed as areas of rank green grass and of dead grass or bare ground. The mycelia (roots) of the fairy ring fungi live in the soil perennially.

#### Control of Turf Fungi

The fungous diseases of turf are rather difficult to control but the first prerequisite is to use the best cultural practices known to keep the turf in as healthy condition as possible. A great deal of experimentation has been conducted in the eastern part of the United States and it is claimed that the proper use of certain chemical fungicides will give a considerable degree of control. The measures recommended in this circular are adapted from the bulletins of the United States Golf Association, published at Washington, D. C., the Rhode Island Experiment Station Bulletin 245, and other sources.

Fungicidal treatments for brownpatch, dollarspot, spotblight and snowmold giving the best results when used on golf greens are those containing mercury as the toxic element. These include corrosive sublimate (mercuric chloride), calomel (mercurous chloride), mercuric oxide, and the organic mercury compounds, such as Semesan.

A mixture of corrosive sublimate and calomel has given the best all round results at the least expense. The former gives the quickest results, while the effects of the latter are extended over a longer period. The organic mercuries also give good control but may be more expensive than the corrosive sublimate and calomel.

Corrosive sublimate and calomel may be applied either as a spray, or mixed with sand, dry soil, compost, or fertilizer mixture and broadcast over the turf. These two may be mixed in the proportions of 1/3 corrosive sublimate and 2/3 calomel, or for severe, active cases the proportions may be equal.

Formula for Spray, Using Corrosive Sublimate-Calomel Mixture

2 oz. in 10 gallons of water - cover 500 sq. ft.  
4 oz. in 20 gallons of water - cover 1000 sq. ft.  
8 oz. in 40 gallons of water - cover 2000 sq. ft.  
16 oz. in 80 gallons of water - cover 4000 sq. ft.

Corrosive sublimate dissolves readily in warm water. If cold water must be used, the addition of salt will bring similar action. Calomel does not dissolve in water, so the spray must be stirred frequently to maintain complete mixture. Apply the spray evenly over the turf with a sprayer or sprinkling can. Since corrosive sublimate will attack metals, all metallic equipment should be washed after using. Even with this precaution preparations containing mercuric chloride will corrode metal. It is best to mix the spray materials in a wooden, glass or earthenware container.

Formula for Dry Application, Using Same Mixture as for Spray

4 to 5 ounces mixed in pailful of soil covers 1000 sq. ft.  
For 2000 sq. ft. double the 1000 square foot formula.  
For 3000 sq. ft. triple the 1000 square foot formula.

Apply the dry mixture by broadcasting over the turf. A wheelbarrow seeder has been found efficient in applying the dry mixture.

Applications may be repeated at two-week intervals as long as the disease shows activity.

During dry weather the turf should be sprinkled lightly after applying to wash the fungicides off the leaves, thus preventing burning. This generally is not necessary in rainy weather.

Control of Fairy Ring. -- This turf disease is difficult to eradicate once it gets a firm hold in the turf. One of the striking things in connection with this trouble is that the "roots" of the fairy ring fungi mat the soil together so thoroughly that it becomes impervious to water. Thus if any attempt were made to kill out the fungus by chemicals, it would be necessary first to open up the soil in the invaded area by punching it full of holes with some sharp-pointed instrument so that the chemical solutions could penetrate.

From time to time various writers have made suggestions for the control of this disease, but none of these recommended measures can be guaranteed to give complete success. Any of the following may be tried in an experimental way:

(1) Remove the infected soil to a depth of about 8 inches and replace with clean soil; then lay sod or reseed the area.

(2) After perforating the sod, apply bordeaux mixture 6-6-50, or copper sulphate solution at the rate of 1 pound to 8 gallons of water, immediately over and a little in advance (to the outside) of the ring.

(3) Try the same mercury treatment (mixture of corrosive sublimate and calomel) recommended above for brownpatch and snowmold after first punching the invaded soil full of holes. Apply enough of the solution to penetrate the soil thoroughly.

(4) Follow the same recommendation as in (3) next above except use some of the organic mercury compounds such as "Special Semesan". When using these proprietary materials follow the directions on the label.

(5) Drench the perforated soil with a solution of potassium sulfide (livers of sulfur) 1 ounce to 2 or 3 gallons of water. Make several applications at intervals of 2 weeks.

(6) Dig up the rings in hot, dry weather and expose the soil to sunshine.

\* \* CAUTION. -- SINCE MERCURY PREPARATIONS ARE POISONOUS, CARE SHOULD BE EXERCISED TO PREVENT ACCIDENTS FROM CARELESS USE OF THESE MATERIALS.