

THE GOLF COURSE

A MONTHLY BULLETIN DEVOTED TO THE DISCUSSION OF MODERN METHODS AS APPLIED TO GOLF COURSE CONSTRUCTION AND UPKEEP

Grass Diseases and Parasites

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The first installment of a lecture to the English Greenkeepers' Association by Mr. Baldwin Pugh, of the firm of Messrs. James Carter & Co.

I THINK that I owe you some apology for choosing as my subject the diseases and parasites of grass, when I am addressing an audience that is responsible for some of the finest turf in the world; and it may seem rather unnecessary that I should talk of grass diseases which seldom affect the splendid greens which the majority of you have under your charge, but grasses do suffer from so many diseases from time to time that they should at least be known, and their treatment understood, and it is for this reason that I wish to describe some of the different complaints that grasses suffer from, and which have been brought under my firm's notice from time to time. I do not wish you to be frightened for the welfare of your greens when I say that there are nearly a hundred odd diseases which affect grasses; for fortunately the majority of these diseases only attack the grass when it is in the flowering stage, so that only a few diseases will be found on turf such as exists on a well-managed golf course.

As you are, of course, all aware, turf is composed of a collection of different species of grasses, such as the *Poas*,

Festucas, *Airas*, *Agrostides*, etc., and each of these species is liable to different diseases. We thus find that certain parasitic fungi are generally found on a particular sort of turf, and it depends whether the turf contains a larger or smaller proportion of, say, *Poa* grasses as to whether it is badly attacked or not. For instance, the *Isaria* parasite, to which I will refer later on, is mostly found on what I may term a *fescue* turf.

There is, accordingly, a considerable variation in the effects of any particular disease when it breaks out in the turf. Some districts or counties appear to escape the attacks, whilst elsewhere the grass may be affected by various diseases or epidemics not noticed in other parts of the country. Many of you have possibly noticed how grass that has been growing strongly for some time will suddenly turn yellow and apparently die off, forming thin or bare patches. Whilst this may appear to be caused by some fault of soil or treatment, it is more often due to the rapid spread of a fungoid parasite, attacking the tissue of the grass in the same manner as mildew will break out on *chrysanthemum* leaves. In most

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is very necessary if good results are to be obtained.

Hyacinths are included in the list of the most prominent and popular Spring flowers—they being valuable both for indoor and outdoor cultivation. When planting these, one should remember to avoid all heavy, stiff or binding soils—and no stimulating fertilizers or chemical manures are necessary for their proper development. All they require is a well prepared light or sandy soil, free from stones and gravel and for planting, select a day that is dry and warm. Plant the bulbs six inches deep and about eight inches apart—after which add a good covering of leaves or litter on the surface of the bed. This will protect the bulbs against early freezing and also the mechanical action of alternate freezing and thawing during the Winter. In Spring, as the days become warmer, this covering can be gradually removed. Outdoor planting of Hyacinths should be completed by November 1st.

Narcissus or Daffodils (all the hardy varieties of this class) should be planted from five to six inches deep and about four to six inches apart according to the size of the bulb. They grow and give satisfactory results in almost any ordinary garden soil, but prefer a medium well drained soil and a situation affording slight shade. For naturalizing along the edge of shubbery borders or on grassy slopes or banks of woods, they are unequalled, and when planted for this purpose, they should not be disturbed for three or four years, or until they show signs of deterioration. They can then be dug up and re-set. September or October is the most satisfactory time of the year to accomplish this work. When planted in the flower garden or borders, they require a covering of leaves or litter to protect them against early frosts and the mechanical action of freezing and thawing during the Winter, and in the Spring, when the days get warm, this covering can be gradually removed.

Tulips like Narcissi are hardy, of easy culture, and not too particular in

the matter of soil. All they require is a good medium soil that will not become too wet or heavy. Best results are obtained from Tulips by planting them in masses or groups—and the varieties can be arranged, so that when in bloom, the colors will blend and harmonize, making a grand and brilliant display surpassing almost every other group of flowers both in color and effectiveness. In preparing beds for Tulips, care should be taken to grade them so they will be high in the center with a gradual slope toward the edge. This is very necessary in order to prevent water from lodging on the surface of the beds, which is almost sure to destroy the bulbs if allowed to remain there during the Winter or early Spring months. Tulip bulbs should be planted four or five inches deep and about five or six inches apart—and when planting is completed a covering of leaves or litter to a depth of six or eight inches should be spread over the surface to protect the bulbs against early freezing and the mechanical action of freezing and thawing during the Winter. As Spring advances and the days become warmer, this covering can be gradually removed.

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cases, however, when turf is growing strongly under good treatment and favorable weather, it will resist the attacks of disease, and comes up again healthy and smiling, so there is seldom any need to break one's heart or one's back in preventing it from becoming permanently destroyed or injured.

Newly sown grass more often suffers from attacks of disease than established turf, and the unfortunate seedsman often receives letters from purchasers of grass seeds containing some sarcastic remark about the seeds not coming up, when in fact the only fault is that the young grass plant has not formed sufficient root or strength to enable it to withstand an attack of autumn mildew caused by a spell of damp or foggy weather. Nearly all

our grass diseases and parasites may be roughly drafted into three main classes. These are—

(1) The mildews and microscopical fungoid diseases which attack and destroy the actual tissue, or live as parasites on the grass plants.

(2) Disease or weakening of the grass leaves or roots that originate through a poisonous or toxic condition of the soil, caused by fungoid growth in the soil itself.

(3) Parasitic plants which attach themselves to grass stems and roots by means of haustoria, and rob the plant of food material or strangle it.

The first division contains the various rusts, mildews, etc., and possibly does the most harm to the whole order of graminæ. The rusts and *Takeall* of wheat, the *Black Mould* of sugar cane, *Ergots* of rye grass are all fungoid disease. The second division is composed of those cases in which the grass is killed by the fast-growing slime fungus, *Fairy Rings*, etc., whilst the third division of plant parasites causes the partial or total destruction of grass by such plants as *Yellow Rattle*, *Dodder*, *Bastard*, *Toad Flax*, and other parasites.

Of the parasitic fungi belonging to the first division, the *Smut* group is the most injurious, not only to corn but to grasses as well. Those *Smut*s known as *Tillitias* will often do a lot of harm to a crop of meadow hay, especially in a dry windy summer. For golfers *Smut* may be said to have some advantage, as one variety (*Tillitias decipiens*) makes *Agrostis* much dwarfer in habit, and it is said that *Agrostis pumila* is nothing more than *Agrostis vulgaris* dwarfed by this particular *Smut* disease.

There is, however, another class of *Smut*, or rather a sub-genus of *Ustilago*, known as *Cintractia Patagonica*, which, it is believed, was introduced into this country some years ago by an American, with some infected *Brome* plants. This particular *Smut* attacks various *Brome* grasses, *Couch*, *Brachypodium*, etc., and appears to be spreading, ac-

ording to the latest reports.

Dilophospora Graminis is another comparatively rare fungoid pest that usually attacks corn. It is also found on the flower panicles of *Dogstail*, *Fescues*, *Triticums*, etc.

Still another disease of the *Smut* group is that known as *Takeall* in wheat, which is a bad fungoid disease in Australia and France in the case of wheat crops. It is also found to a lesser degree to attack *Couch* grass and *Bromes*. *Fusiporium Lolii* is a fairly common fungoid growth found on *Holcus*, *Lolium*, *Paspalum*, etc., in the vicinity of rivers and marshes, the grass blades being covered with reddish plush-like spots. The *Hemibasieii* are another group of *Smut* fungi which attack grasses and cereals, especially on clay soils.

The second installment of Mr. Baldwin Pugh's lecture will appear in the October issue of THE GOLF COURSE.

Greenkeeping Notes

After the fall seeding is done, the seed should be carefully covered to a depth of not exceeding one-quarter of an inch. Many grasses will not grow at all if covered deeper than this, and so the point necessitates careful attention. The best way to cover the seed is with a brush harrow. After the seed is covered with soil, go over the surface with a light roller. Roll first east and west and then north and south. A light roller is far superior to a heavy one, and the latter should under no circumstances be used. A two hundred-pound roller is heavy enough. Go over the ground several times rather than use a heavy machine. A light roller used in both directions several times will make the soil of a very even firmness all over the green. Careful rolling is sometimes the making of a green, and quite frequently careless rolling is responsible for poor and erratic germination of the seed. This will be noticed if any spots are missed by the roller, as they will be quite bare. If the surface of the green is equally firm in all parts, the germination of the seed will be very even over the entire area.