

HOW TO IMPROVE POSTWAR TURF MAINTENANCE

By O. J. NOER

1. GREENS — There will be two installments of this article. The section on tees and fairways will appear in January 1946, GOLFDOM.

GOLF CLUBS everywhere have a re-conversion task and are busily engaged in formulating postwar plans. Turf is one of the problems uppermost in their minds. The maintenance program followed next year may affect turf conditions for a decade or more. So every step in the program should be scrutinized before a plan is adopted, both as to immediate results and also—as to any undesirable after-effects in the years to come. A bad putting surface can be transformed promptly into a perfect one by a heavy dressing of sand, but several years later the embedded layer of pure sand will seriously and adversely affect maintenance in hot weather. There are other effective ways to improve the putting quality without any bad after-effects.

Wartime maintenance was an arduous task principally because of the acute labor shortage. Inability to obtain new equipment and difficulty in securing adequate amounts of fertilizer, fungicides, etc. were added complications. The greens got first call for everything, which was quite right. The turf on them came through surprisingly well, but by the end of 1945 very few greens were as good as before the war. That also was only natural. At a very few clubs turf on the greens, tees, and fairways must be renovated, but in most cases the problem is simpler because marked deterioration did not occur.

Turf cannot be kept in first-class condition with a skeleton crew of workmen. Mowing greens two and three, or even four times a week is not enough. Those expecting to maintain an 18-hole golf course with 3 or 4 workmen are in

for a rude awakening. Power equipment and mechanical labor-saving devices will be stressed and used more than ever before because of high labor costs, but there is a limit to what they can do.

12-Month Jobs Needed

The practice of recruiting new labor crews at the start of each year is bad, and sometimes expensive. Itinerant workers are seldom reliable or efficient. Even good men require training and close supervision before they can be trusted to perform tasks such as watering greens, or applying fungicides and fertilizers. Some plan must be devised to retain key workmen on an all-year basis, or provide employment for them during the off-season. To do this will help insure efficient and economical turf maintenance.

Many greens have too much vegetation on them. It needs to be removed. This is true of greens at some of the best clubs that have never been bad before. The turf is a thick spongy layer containing a high proportion of buried stems. Mat formation is most pronounced on the vegetative bents, such as Washington and Metropolitan strains, probably because they make a dense, tight turf. A reduction in the number of times per week of mowing, and less frequent top-dressing are largely responsible, but the use of scalping rollers on the putting green mowers, and failure to brush or rake the turf were other causes.

Matted greens are unsatisfactory for putting. The surfaces footprint badly and more or less permanently on days of heavy play. They become rough from raised

stems, which are scuffed out by the cleats in golf shoes.

Matted Green Damage

Matting affects maintenance in several ways. It prevents ready entrance of air and water into the soil. Root systems are often shallow because there is no oxygen in the deeper soil. Oxygen is something every living thing must have. Animal life dies quickly when deprived of it. Plant roots can live somewhat longer, but die sooner or later unless there is air within the soil occupied by them. Many European houses have thatched roofs of straw or grass to keep the water out. Thatched turf has the same effect.

Troubles become acute and reach a climax in hot weather, but the source may have been established before when the deeper soil was allowed to get dry. Greens become hard, and the dry soil resists wetting. Grass may wilt by noon, or before, on hot windy days even though the green received water that morning. Unless a little water is applied promptly, wilting may become permanent. Then the grass in that spot will turn brown and die. The turf will become thin, and invasion by clover, poa annua, or crabgrass may occur. Brown patch and/or scald are other possibilities. Both are encouraged by hot weather and plentiful moisture.

The grass on watered greens may stay wet because the dry soil underneath resisted wetting. A plentiful supply of moisture promotes brown patch and scald, especially if the grass is soft and lush from heavy nitrogen feeding. Scald appears when the soil is waterlogged by overwatering or from continuous rains. The grass roots die for want of air, and death of the tops soon follows. The soil is then exposed to sunlight and becomes covered with a scum of algae. As it dries, the scum changes to a thin, black, skin-like covering and seals the soil. It must be removed by spiking or forking before turf can recover or seed germinate.

Dollar spot is often troublesome on matted greens and hard to prevent or control. Several greenkeepers have been puzzled because this disease would be very vicious on a particular green one season, and cause little or no trouble during the next year or two. Dollar spot was so bad and frequent during the first year that it destroyed much of the grass and eliminated the mat. Disease was less after that and the fungicide treatments prevented and controlled it. The organic debris underneath the surface of thatched greens remains moist, and this fosters growth of the dollar spot fungus. The organism is not affected by the fungicide because it stays above the fungus on the leaf blades near the surface. Deeply pit-

ted scars result and the fungicide is condemned as ineffective. Dollar spot is a cool weather disease. It can be curbed and prevented by proper cultural practices and fungicide treatments.

When to Top-dress

At first thought a heavy top-dressing would seem like the best way to eliminate the mat of surplus grass. It will not work in practice, because the top-dressing will not make contact with the soil below. The buried stems and leaves will remain intact for several years or longer and cause trouble. The mat creates a spongy surface, which is objectionable to the golfers, and prevents deep rooting. Top-dressing should not be used until the mat has been eliminated by raking or brushing, followed by close cutting. Severe raking can be done in early spring, preferably before growth starts, or in the fall, provided there is time for the grass to recover before winter. At any other time the removal must be more gradual and accomplished by light brushing or combing.

When there are alternate layers of top-dressing and buried vegetation, forking or deep spiking with a single unit of a fairway spiker is necessary in addition to removal of the surface mat. An application of lime afterwards is advisable if the soil is acid. The spiking or forking will admit air and encourage deeper root growth. The lime will promote activity of the bacteria responsible for the decay of organic matter.

Some putting green mowers are equipped with brushes or combs. Very little is accomplished when they are used ahead of a scalping roller. As a matter of fact, there would be less thatching if side casters were used regularly, rather than scalping rollers.

Opinions differ regarding height of cut. Reasonably close cutting is advisable. Too close cutting of the creeping bents, which make a tight compact turf, is almost impossible. Keating at Des Moines has good turf of Metropolitan bent that has stayed that way for years. He cuts at $\frac{1}{4}$ inch, but raises to $\frac{5}{16}$ inch for brief periods of a week or so during the hot weather. This variation is enough to keep the grass healthy and not develop an excessive mat.

Top-dressing Composition

The texture or physical condition of the top-dressing is more important than its plant food content. Some mixtures have too much clay in them, and others are too sandy. The content of organic matter also varies between the extremes of too little and too much. A medium sandy loam, containing 20 to 30 percent organic matter by volume is best. A mixture of equal parts of soil, sand, and

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Postwar Maintenance

(Continued from Page 16)

humus is all right if the soil is not too heavy, and the sand is coarse and sharp. Otherwise one part of soil, two of sand, and one of humus may be better. The necessity for careful choice of sand is not often realized. The tendency is to select and accept sand that is too uniform and too fine in particle size. There should be a high proportion of coarse particles and very few fine.

The old practice of using composted manure as the source of organic matter in top-dressing mixtures is becoming a thing of the past. Fresh manure is about 75 percent water, and most of its organic matter disappears rapidly in the soil, so the actual amount provided is less than is commonly supposed. Manure is hard to get and composting is costly, so the trend is toward substitutes, such as peat. This is sound, provided the fertilizer program is modified to furnish the amounts of nitrogen and potash formerly provided by the manure. At least a part of the nitrogen should come from natural organic sources because that is the kind of nitrogen in manure.

Straight materials such as sand, peat, or clay should not be used on established greens. They form layers and cause trouble in hot weather when they reach depths of one-half to several inches. Soil texture should be uniform throughout the depth occupied by roots and preferably deeper.

Very little top-dressing has been used during the war. Some clubs expect to resume top-dressing every four or five weeks, and others intend to apply it not more than two or three times a season. Frequent top-dressing helps overcome mat formation. The top-dressing makes contact with the soil so it is built-up at the same rate as the mat. The same result is accomplished by proper cutting along with occasional brushing or combing. The brushes or combs can be attached to the putting green mower.

Watch Your Watering

The use of water is the most important single factor in greens maintenance. This is not generally understood. Fertilizer and fungicides are blamed for damage which was caused by water. The truth of this axiom has been demonstrated many times during the war. Lads of high school age and other inexperienced help did not know how to water and did not care to learn. Grass was lost around the outside edge of the closely clipped putting surface because the adjoining slopes and banks were not kept moist. Localized dry spots appeared in the greens and escaped notice or were ignored. Then spots became hard under foot. When the grass started to wilt, the unmistakable metallic deep blue color and permanent footprinting were not recognized as a warning of impending trouble. Before long leaf blades started to die and turn brown. The turf became thin or disappeared altogether. Algae developed, if the surface became

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sopping wet; otherwise clover, crab grass, or poa annua appeared.

Dry spots cannot be corrected in the summertime with a spike roller followed by sprinkling. The spots or areas must be forked deeply and drenched with water several times to restore soil moisture. Then they will take water in the normal manner. Another method is to use a tree sub-irrigator.

Opinions differ about when to water and the amount to use. The time of day is immaterial when overwatering is practiced, but there is evidence to support early morning as the best time to water greens. Water used then actually dries the grass by destroying the droplets of dew. Uniform coverage is more easily obtained because workmen can see what they are doing. Thorough watering at less frequent intervals is the usual recommendation, instead of frequent light sprinkling. This is sound advice when grass roots are extensive and deep.

The turf should be firm and the soil near the surface should be moist, but not so wet that water can be squeezed from it in quantity several hours after watering is stopped. Water should be absorbed quickly and not stand as pools in low spots for any length of time. A mushy or muddy surface is evidence that something is wrong with the soil below.

Usually it is too dry and refuses to absorb water or permit its downward movement. The aim in hot weather should be to keep the soil a trifle on the dry side, rather than too wet, because a plentiful supply of water tends to make the grass soft.

When root systems are shallow, infrequent watering is bad practice. On hot windy days it may be necessary to water lightly several times a day to keep the surface soil barely moist. Otherwise grass will wilt badly and may die.

Tree Roots Damage Greens

The turf on many greens is bad because of tree roots in the green. This often occurs on greens located in low spots and surrounded by trees. Willows, elms, poplars, maples, cottonwood, birch, etc. are especially bad. Pocketed greens are hard to maintain at best. If there are tree roots in them, the surface becomes very hard in hot weather, the turf may be very thin and the surface covered with algae. The soil underneath such areas should be examined this fall for tree roots. If they are present, a trench should be dug between the tree and the green deep enough to sever feeder roots. A barrier of sheet metal, or several layers of thick tarpaper, should be placed against the wall of the trench before the soil is replaced. This will prevent new



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roots from getting into the green for a few years at least.

Fertilization of greens is important because it influences leafiness of the grass and affects the amount and severity of disease. Fertilization and the use of lime will be discussed in detail in a separate article, so only the basic principles will be pointed out here.

The use of phosphate and potash is more important on greens than on fairways because both are removed in the clippings, and growth is maintained by constant watering. Grass clippings contain almost as much potash as nitrogen, so if manure compost is not used, or top-dressings are fewer than before, it may be wise to increase the quantity of potash used as fertilizer.

In trials at Milwaukee during the past several years, an application of 0-9-27 at 15 to 20 pounds per 1,000 square feet in spring and again in the fall produced good results, and appeared to provide ample potash and enough phosphoric acid when Milorganite was used as the source of nitrogen. At the 20 pound rate greens received 1.8 pounds phosphoric acid and 5.4 pounds potash per 1,000 square feet in the early spring and again during the last half of August or the first half of September. The Milorganite used during the season provided additional phosphoric acid, which amounted to 3½ pounds per 1,000 square feet. By using the phosphate-potash mixture in spring and fall, interim feeding became a matter of furnishing nitrogen.

Disease Control by Feeding

Dollar spot is encouraged by too little as well as too much nitrogen. Brown patch is aggravated by plentiful nitrogen and water because they make the leaf blades soft and lush. Brown patch is a hot weather disease, whereas dollar spot develops in cooler weather. Dollar spot is the principal disease all season in northern regions. Farther south dollar spot is troublesome in spring and fall, but rarely occurs in the hot summer months. That is the brown patch season.

Enough nitrogen should be used to hold dollar spot in check. That means more generous feeding with nitrogen in northern regions all season. Farther south it might be better to use enough nitrogen in spring to check dollar spot, and have grass show slight nitrogen hunger in hot weather when brown patch is bad. Toward fall the rate should be increased before dollar spot becomes bad.

There has been little ammonium sulphate available as such. It should be more plentiful, and ammonium nitrate may become available. The latter is a good source of soluble nitrogen and contains about 32 percent, so the rate of applica-

tion should be approximately one-third less than was used for sulphate.

Greens should be checked this fall or early next spring for acidity and lime used if the soil is more than slightly acid. An application of lime will help speed the decay of surplus grass in greens that are acid. A finely ground dolomite containing 20 to 30 percent of magnesium should be used, where lime is needed, if soil tests show the supply of available magnesium to be low.

Here's Golf Course Work

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mean a new development; that of first-class 9-hole clubs on outskirts of metropolitan areas.

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It's absolutely certain that there won't be enough course maintenance equipment manufactured in most lines to meet the 1946 demand. Clubs that continue to stall about making up their minds on what they'll need probably won't get their orders filled until late next season unless there's an immediate improvement in the labor situation and a lot of efficient work in making up for the backlog on orders.

Another thing's sure for most clubs in metropolitan districts and that's a balancing of greensmen's pay with that of inside men. Dishwashers, pantrymen, and other unskilled house workers at N. Y. metropolitan district clubs get much higher wages than course workers, and the inside men get their meals and share of Christmas tips.

Readjustment of greenkeepers' and greensmen's salaries to a basis in balance with that of other club employees is something club officials had better be considering.

Gus Novotny, MacGregor's New S. E. Man



Gus Novotny

Henry P. Cowen, president, MacGregor Golf Inc., has appointed Gus Novotny to represent the firm in the southeastern territory. His headquarters will be Atlanta. His territory will include N. C., S. C., Ga., Ala., and Miss. Novotny, as a student at the University of Illinois, was finalist in the national intercollegiate. Since then, he has won many sectional tournaments. Gus has been an equipment salesman for the past 15 years.