



Better Turf for Better Golf

# TURF MANAGEMENT

from the USGA Green Section

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## MATTED GREENS CONTRIBUTE TO POORER GOLF

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Mat is the bane of a superintendent's existence, and yet the average golfer considers a cushion of mat to be an important constituent of putting quality.

The golfer wants a cushion to hold his shot; the superintendent wants turf that is easy as well as economical to maintain. A cushion of mat is not the answer from either standpoint.

Our topnotch golfers agree that a tightly mowed, firm (not overwatered) putting surface, free from "graininess," presents the ideal. To keep the green tight and free from grain, mat must be removed and discouraged. Deep rooting will provide the necessary "air cushion" to hold the shot.

It is only by thorough recognition of the problem that corrective and intelligent control measures can be undertaken.

### What is Mat

The dictionary states that "mat" is a thickly overgrown and entangled mass of vegetation. Considering it in this light, mat would be visible to the eye. Unfortunately, in turf, mat consists of an undecomposed mass of roots and stems hidden

underneath the visible green vegetation, usually between it and the soil surface. In some instances topdressing may unwisely have been used to cover this mat formation and layers may be found at several depths under the putting-green surface. It may vary in thickness from a negligible amount to several inches in depth.

Matted conditions can be found anywhere that grass putting greens are in use. Usually it is more prevalent in cool humid regions, although the excessive use of water, which nearly excludes oxygen, can cause tremendous accumulations even under near tropical conditions.

### How Does Mat Accumulate

Infrequent and high mowing, light traffic and the type of grass used all contribute to mat formation. However, according to the foremost turf authorities, the basic cause of formation is the slow decomposition of dead stems, stolons, leaves and roots.

### Why Is Mat Detrimental

The golfer is entitled to uniform putting conditions. Graininess, ball scars, slow putting, scuffing, foot printing and

slow healing cannot, therefore, be tolerated. All of these hindrances to enjoyable golf are directly or indirectly influenced by mat build-up. The golfer, further, is entitled to a reward for a properly made approach shot. A spongy cushion of mat will not hold a proper shot under dry conditions. When it is thoroughly saturated, such a green will hold even the poorest of shots, thus placing no reward on the accuracy and skill which is *pari* of the game.

From the superintendent's standpoint, heavy mat causes excessive gripes from golfers for these reasons and leads to a vicious cycle of overwatering to satisfy the players' complaints. Overwatering leads to further mat accumulation and a weak shallow-rooted turf, subject to the ravages of disease and weed infestation. Thus, a heavily matted turf becomes more and more costly to maintain. Additional fertilizer, fungicide and insecticide treatments are required, and the water bill continues to rise.

#### Mat Correction and Prevention

Mat removal and prevention is accomplished biologically and mechanically. Both methods are utilized on our finest golf courses. Bacteria are the key to biological decomposition. Raking, combing, aerating and close and frequent mowing are the keys to mechanical removal.

#### BIOLOGICAL REMOVAL:

Bacteria, which are minute single-celled organisms invisible to all but the high-power microscope, are the major biological agents responsible for the breakdown of this undecomposed mass of vegetation. Like all forms of life bacteria require certain foods and correct temperature, air and moisture relationships to keep happy and increasing. For multiply they must, because it is by virtue of mass (estimated to be 500 pounds in the root zone of an acre of ordinary farm land) and not their, to us, insignificant size that bacteria do the job of mat decomposition. As it is agreed that mat must be kept to a minimum on putting-green turf, the favorable conditions necessary for bacterial activity are listed

below. This list may be used by the superintendent as a check-off to encourage an abundant bacteria population:

1. *Organic Matter*: Most golf courses in the West are assured of an overabundance of organic matter. Bacteria use the carbon in organic matter as a source of energy.
2. *Oxygen*: One of the important results of aerating greens is to encourage aerobic bacteria. Aerobic bacteria are responsible for most of the breakdown and need air to form the simple compounds which are used by the turf plants. The turf also needs air before it can assimilate the moisture and nutrients necessary for growth.
3. *Water*: Moisture must be present. Unfortunately, most turf in the West is overwatered, and often so much water is used that air is nearly excluded. Humans also need water but drown if air is excluded. Turf grasses and bacteria, for these purposes, can be considered in the same vein as humans.
4. *Heat*: Optimum activity takes place when temperatures are between 70° and 100°F and begins at about 40°F. Activity stops at freezing, but the bacteria are not killed, only resting. Thus it is understandable that in colder climates organic matter accumulates rapidly, whereas along the equator it may be virtually non-existent.
5. *Lime*: Bacteria need calcium for growth and are unable to derive enough from acid soils. Optimum activity occurs when the soil is neutral or only slightly acid in reaction (pH 6.5 to 7.0). Acid putting-green soils from Monterey north along the West Coast to Vancouver are notorious for mat accumulation. Heavy rainfall and/or heavy watering has leached the soil of calcium. A simple soil test will determine the pH. Usually lime should be added every two to three years under acid conditions. Even in sunny Southern California and interior valleys,

where soils are normally thought to be alkaline, soil tests on putting greens have shown that the pH varies from 4.5 to above the neutral point. If the pH is below 6.0, lime should be added.

6. *Nitrogen*: On a par with water misuse and acid conditions, nitrogen is a most important factor in encouraging bacterial activity. Nitrogen is the meat and potatoes to bacteria because it is a building block in their structure. Thus, with plenty of organic matter and the other conditions being favorable, bacteria will remove nitrogen from the soil to satisfy their needs. This will stunt the turf's growth unless sufficient additional nitrogen is added to satisfy both the grass and the bacteria. Fortunately, the addition of nitrogen presents no problem, and the color, slow growth or sparseness of the turf will indicate the need.

#### MECHANICAL REMOVAL:

1. *Mowing*: Close and frequent (six to seven times per week) mowing will discourage mat formation. Unfortunately, the practice has been to mow greens only two or three times a week. In order to get by with twice-weekly mowing, the superintendent doesn't use enough nitrogen fertilizer. This is not the superintendent's fault; he is limited by the confines of his budget. Still, it is difficult to understand why infrequent mowing is tolerated at the average club. The average golfer (the one who pays the bills) may use 99 or more strokes in playing 18

holes of golf. From tee to green he is in every possible type of trouble, from the deep woods to the sand traps. He may never be on the fairway but on the green he is the equal of all the Sneads and Hogans combined. Therefore, this average golfer is entitled to the best possible putting-green turf. This turf should ideally be free from grain and mat and as tight and true as the living-room rug where he often practices.

2. *Height of Cut*: The height setting is intended to imply the length of the grass above the soil surface after it has been mowed. In practice, this setting is the distance of the bed knife from a flat surface such as the barn floor. Thus the mowers may be set for a 3/16-inch cut, and, under conditions of a 4-inch mat build-up, will be mowing at more than 4 inches! Championship turf is mowed at 3/16 inch to 1/4 inch above the soil surface.
3. *Raking*: When mat has accumulated, it is necessary to remove it by thorough raking. Early spring is the best season of the year for this type of renovation because the turf recovers rapidly. Many superintendents also rake in the fall when bentgrass is growing vigorously. Under heavy mat accumulation, it is sound management practice to rake both spring and fall. The object is to remove the mass of undecomposed stems and roots. When the job is done properly, it will seem drastic to the layman. The green should be raked and mowed in several directions to remove this trash. In fact, after the operation is finished, the green will no longer be green in color but may be decidedly brown. This off-color is temporary in nature, and a good bentgrass will thrive on such treatment. Raking must always be done before topdressing is applied. The unforgivable sin is to topdress without making contact with the existing soil. Burying a mat of grass will result in a layer of organic matter

#### TURF MANAGEMENT

Worth-while discussions of the problems confronting Green Committee Chairmen are contained in *TURF MANAGEMENT*, a book sponsored by the United States Golf Association. This volume was edited by H. Burton Musser and published by the McGraw-Hill Book Co., Inc.

It is available through the USGA, 40 East 38th Street, New York 16, N. Y.; the USGA Green Section, Room 331, Administration Building, Plant Industry Station, Beltsville, Md., and bookstores generally. The price is \$7.

which interferes with root penetration because it limits the natural movement of water. Power greens renovators are now being sold for the purpose of removing mat. Probably the most successful tool for this purpose is the old Del Monte rake mounted on power equipment. Even the common garden rake, with sharply filed teeth, will do a creditable job in the hands of a workman with a strong back.

4. *Brushing and Combing*: The use of brushes or combs mounted on the green mowers will tend to discourage mat formation and should be used during periods of vigorous growth. However, they will not, as is thought by some, eliminate the problem.
5. *Aerating*: The use of aerating machines, available in a wide range of makes and sizes, to cultivate the soil under an existing turf is so well established that its value hardly bears repeating. It has been established that bacteria require oxygen, moisture and nutrients to break down mat. Also, one commonly observes that under conditions of heavy thatching on sloping greens, much of the fertilizer and water applied runs off the surface and is wasted. Aerating machines are essential tools to correct these problems and most golf courses rightly consider them to be as necessary as the mowers. Aerating naturally ties in with raking, top-dressing if needed, fertilization and lime to correct acidity.

6. *Drainage*: Good drainage is paramount if success is to be obtained in combatting mat. Standing water and slow percolation of water will nullify results of the management factors previously discussed. When soils are saturated, air is nearly excluded and organic build-up is bound to occur. This condition is typical in swamps where undecayed vegetation may be several feet deep. Under-drainage and a uniform, layerless soil mixture are the answers to good sub-surface and internal drainage.

### Conclusion

How can the individual club know whether or not this insidious problem of mat belongs to them or is related only to the fellow down the road?

You can't see it from the surface, but you can feel it under foot and the superintendent can always tell by the simple process of cutting out a plug of turf.

The age of the green doesn't mean very much. The writer has seen one and a half inches of mat on a green only one year old! Still, mat might be likened to old age in that it creeps up gradually over a period of years. Unlike old age it can be corrected and prevented before deterioration of turf and playing conditions occur. Therefore, periodic checks should be made. Certainly, if the mat is more than one half inch in depth, it would be worthwhile to drag this article out of the file, assemble your fighting legions, and fire both barrels at "public putting enemy number one."

## BENTGRASS GREENS FOR THE SOUTH

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Our experiences with bentgrass greens at the Richland Golf Club, in Nashville, Tenn., indicates that bentgrass greens can be grown and maintained throughout the entire year in the South. Here at Richland we have had one bent green for four

years and we constructed a new practice green with bentgrass during the fall of 1951.

Since we have been growing bent, we have had temperatures as low as 15° below zero and as high as 107°. For ten months out of the year the bent greens have been trouble-free. Only during July