

## FROM THE WORM'S EYE VIEW

# Topdressing

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**D**ID YOU EVER wonder what an earthworm might think about topdressing practices on our golf courses? If you haven't, then maybe it's time to take a closer look.

Topdressing for putting green maintenance is an almost universal practice; it is used to true up the putting surface and to help prevent thatch buildup. In recent years, topdressing programs have also been used to increase putting green speeds. If it is done with care and follows some simple guidelines, topdressing can also modify the basic structure of the green. This will improve water handling capacity and add to the life and health of the green and the turfgrass on it.

Topdressing practices are a major reason for the success or failure of new greens. With adequate basic construction and an informed superintendent, a new green can have a predictable life of 20 years or more. Without these fundamentals, the same green can be in serious trouble within a year.

Although topdressing is used widely, the how and why of its function are often misunderstood. We were not aware of the wide variance in practices until recently, when our laboratory developed a new technique for analyzing rates of field infiltration. The method involves using three-inch PVC pipe to take a profile of the green through the seedbed, intermediate layer, gravel, and into the subsoil beneath the green. The tube is submitted whole, tightly packed to prevent movement of the contents. After doing the infiltration test in the pipe, we cut it open to try to determine the reasons for its behavior.

In a startling number of cases, it is apparent that topdressing practices have created the problems we've found. There are cores that look like appetizing Viennese tortes, made up of many layers of differing sands and soils, and cores



*New superintendents and changes in topdressing programs are reflected in this profile.*

that have been dubiously blessed with every commercial topdressing of the past 15 years, one after another. We find poor greens topdressed with superb materials, and great greens smothered with the cheapest filler available. We have found we can count layers like the rings in a tree and determine when the course changed superintendents, when the budget crunch came, and the year of the big flood, blizzard, or drought. We also see greens that have been maintained to perfection, and are very successful regardless of their age. While it is possible to have problems with the best built and maintained greens, the problems are usually more manageable and involve less brinkmanship on the part of the superintendent to correct.

To understand why correct topdressing practices are so important, it is necessary to think about the growth patterns of turfgrass and to have a basic grasp of water movement in soils.

**WHERE DISTINCT** layers of materials exist in a profile, grass roots make little effort to grow through one layer and into the next. If the roots have as much as an inch of one material to grow in, however poor it is, they will not cross into another layer even though that layer may have optimum growth medium characteristics. We often see well-constructed seedbeds with an inch of a different but equally good topdressing. The turf can usually be peeled off like a throw rug at the interface, because the layers aren't bound together by a network of roots. Where shallow root systems exist, turfgrass is vulnerable to problems from many sources.

Not only do layers affect the root systems directly, but there is a further problem with water movement through textural barriers. To visualize this involves understanding the way a perched water table works. The perched water table, which is, incidentally, the basic principle upon which the USGA-recommended method of greens construction is based, affects all soils. Simply put, the original research demonstrated that water remains within one layer until that layer is saturated. Then it drains into the next, which again must be saturated before it can release excess water.

As layers of topdressing materials different from the basic green are built up, they create additional perched water tables and cause unpredictable consequences. Relatively small variations in soil content and particle distribution

can produce significant differences in the interaction of these materials.

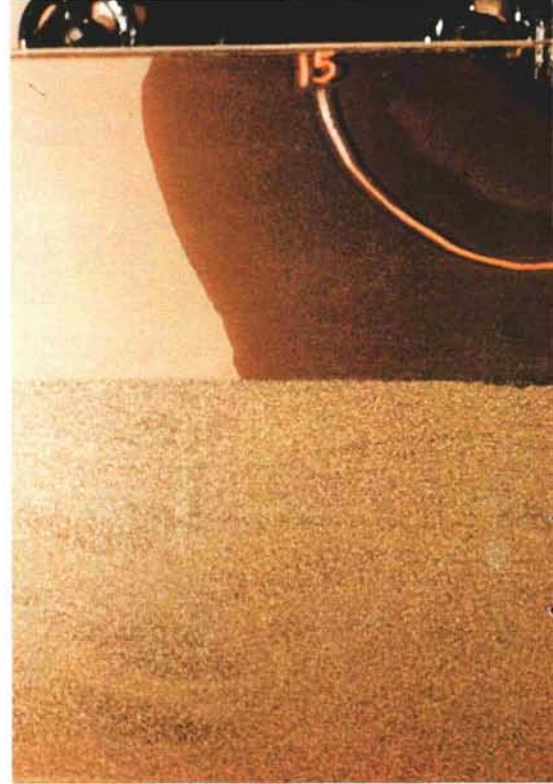
Once these principles become clear, choosing appropriate materials for topdressing becomes simpler.

**NEW GREENS** should be topdressed initially with the same mixture of materials they were built with. Thus, in building a new green, plan during construction to set aside a supply of construction material adequate to topdress for at least two years. It is prudent to make sure the supplier will have the identical sand available in the future, and keep a supply of the organic material used in construction for an indefinite period.

After a period of time, which will vary greatly in individual cases, the roots will begin to provide enough organic material to meet their own needs for retaining water and for cushioning from the abrasion of heavy traffic. Because this is a gradual process, only by observing the root zones regularly can you know when you reach the point for a gradual cutback in the organic component. This is done best by looking at the root systems regularly. A cup cutter is a good tool to use for this examination. Go to an average area on the green and cut the deepest cup possible. Carefully extract the plug from the cut and look at the roots. In an ideal situation, the material around the roots is very similar to that below, and the roots themselves are plentiful and have a plump, healthy look. There should be no compacted area developing, nor any indication of unusual moisture retention. The topdressing program is ideal if these criteria are met.

If the top two to three inches of the core are hard and the root system scanty and weak, the organic component is very likely inadequate, and there may be an excess of silt and clay. It will be necessary to use aerification with core removal, and topdress with a clean sand of a similar type combined with about 10 percent organic material to correct this development. If the soil is becoming spongy, the organic material should be cut back gradually over several topdressings until pure sand is being used.

**THE SAME** technique should be used for problem analysis on older greens. It is an excellent means for determining the history of the green; an informed superintendent can often see what he is dealing with more quickly through this method than with any other single tool at his disposal.



A variety of conditions may be discovered in an older green. There may be layering from multiple topdressings. This condition can be relieved to some extent by aerifying several times, removing cores, and topdressing each time with a clean sand in the medium to fine size range. This technique will be helpful if the layer is less than three inches deep.

Problems may appear in the form of a spongy upper layer, perhaps resulting from on-site mixing during construction, which has left excessive quantities of organic material in the upper portion of the green. This is more difficult to correct, although the same basic technique may be tried. It is sometimes necessary to remove the sod and remix the seedbed before real gains can be made.

The upper layer may be hard and compacted, indicating an excess of silt and clay in the topdressing material, often in combination with very fine sand. Here again a very clean medium to fine sand may be employed in conjunction with aerification. It can be helpful to add up to 10 percent peatmoss in this instance.

Beyond the top three inches or so, it is almost impossible to make significant changes in the green's behavior using topdressing modifications. New technologies developing in some areas may make it possible to modify most of the seedbed. Time and experience will give



(Far left and left) The fact that water does not readily move from a silty loam into a layer of sand may help to explain why this green has drainage problems. It has been top-dressed with a material that contains more silt than the original construction topmix.

(Below) The profile of a green, using 3-inch PVC pipe, shows how the green was built and gives a history of its maintenance.

**TABLE 1**  
**Characteristics of Soil Separates**

Name	Diameter*	No. of Particles per Gram
Very coarse sand	2.00-1.00 mm	90
Coarse sand	1.00-0.50 mm	722
Medium sand	0.50-0.25 mm	5,777
Fine sand	0.25-0.10 mm	46,213
Very fine sand	0.10-0.05 mm	722,074
Silt	0.05-0.002 mm	5,776,674
Clay	below 0.002 mm	90,260,853,860

\*As established by the USDA



us a better idea of their long-term effectiveness.

**A**CURRENT trend, which has caused many problems, is the building up of a sand layer on top of greens that are basically soil in order to improve putting speed. While it is possible to modify the greens in this manner, it should be done gradually over a couple of years rather than in an abrupt changeover. The modifying sand should be selected and mixed into the existing topdressing in a ratio of about 25 percent of volume. This material should be used several times and then further divided into a 50-50 proportion for several more topdress-

ings. Continue increasing the quantity of sand in the topdressing until roughly a two-inch transition layer has been built up. This slower procedure usually allows the soil and sand to blend well enough for water to be moved as if there were no change. The infiltration rate will be that of the soil portion of the green, of course. Regular aeration should be done throughout the transition period, and cores should be removed each time.

If the original material of which a good green is built becomes unavailable for topdressing purposes, it is crucial to locate the closest possible substitute. This can be done by taking the particle

analysis of the original sand to area sand suppliers to seek a match. Fortunately, similar sands are often available from the same area. Locating a close substitute will allow a continuing successful topdressing program.

Regular examinations of the seedbed using this core sampling technique are helpful in becoming aware of problems before they develop into serious conditions. Success or failure often takes place on the worm's eye level.

Topdressing is more than a filler. It plays an active part in keeping good greens good, golfers happy, costs down, and aggravations to a manageable level. These are goals well worth pursuing.