

Are Aerification and Topdressing Solving Your Golf Green Problems?

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It is the rare superintendent who would not rank aerification and topdressing as primary management practices in the maintenance of golf greens. But when we investigate the use of these practices, we commonly find they have become just a calendared operation. We often fail to completely analyze these practices and how they might truly be used to solve putting green problems.

Depending on how our greens were constructed, what has been their previous management, and how we program these two practices, we may achieve one or more of the following positive results:

1. Relieve surface compaction which can:
 - a. improve surface water infiltration;
 - b. improve the soil-water-plant relationship by:
 - (1) improving root depth;
 - (2) improving nutrient uptake;
 - (3) increasing turfgrass vigor;
 - (4) reducing potential for disease;
 - (5) removing excess thatch and,
 - (6) increasing rate of breakdown of organic matter.
2. These practices may also be used to:
 - (1) true up and smooth out the putting surface;
 - (2) produce a firmer faster putting surface, or
 - (3) change the surface growing media.

Aerification and topdressing should never just become an annual cookbook management operation. These practices in themselves don't make a golfer happy, they require expensive

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specialized equipment, and they are labor intensive. They are a high budget management practice, so we should be maximizing the benefit they can give us.

We first need to thoroughly analyze the profile of our greens to a minimum depth of 6 inches. Our typical aerification equipment with new tines will only penetrate the green surface to a depth of 3½ inches. We may or may not really be solving layering and/or compacted interfaces which are affecting the quality of the green. Even if we just have a shallow surface problem to solve (less than 3 inches), one or two aerifications per year would generally be too infrequent to make any real and lasting change. Assuming your aerifier produces 36 holes per square foot and you are using 5/8-inch tines, you would only be removing 7.5 percent of the surface media. Mathematically, you would have to aerate your green 13 times if aeration tines never hit a previous aerification hole. In practical field studies, it has been shown that a complete aerification and topdressing program eight times per year over a two-year period can completely change the surface media. This would be a very radical program for many golf courses, but it is far less costly and less disturbing to the golfer than completely rebuilding a green if such a program solved a basic green problem.

Complete analysis of your alternatives as to topdressing material also is essential to successful aerification and topdressing programs. If our greens were constructed with the "perfect mix", we would assume that this would continue to be our most

appropriate material for topdressing. In practice, most golf greens are topdressed with unamended sand. Obtaining the original mix may be difficult, and, as mature greens generally have excessive organic matter present, a mix may be unnecessary. The topdressing material must be dry to apply and work into the green surface, so most mixes are destroyed because the organic matter and sand tend to separate in layers.

Researches over the past 25 years plus field experience have narrowed the sand particle size range recommended for topdressing. While there are still differing opinions as to whether sands should be on the coarser or finer side, most would agree that the range should be between 1.00 mm and 0.10mm with less than 10 percent of the particles falling outside of this range.

Quite frequently we encounter the practice of using a uniform but very coarse sand to topdress because we have a green which has infiltration problems. The reasoning behind this practice is generally based on questionable assumptions. Let us look closely into this practice. A typical aerifier produces 36,000 holes per 1,000 square feet. These holes, assuming we use 5/8-inch tines and remove a 3-inch core, will hold 144 gallons of water. A 1/4-inch rainfall over 1,000 square feet equals 150 gallons of water. If internal drainage is good, we have opened a green's subsurface to its surface to accept water. If internal drainage is poor, the second 1/4 inch saturates the surface unless we have excellent surface drainage. But we can't just leave these holes open so we topdress heavily with sand.

Let's look at three equally available topdressing sands: (1) a very uniform and very coarse sand with a compacted infiltration rate of 589 inches/hour; (2) a very uniform medium to coarse sand with a compacted infiltration rate of 44 inches/hour (typical of sands used to make golf green mix); and (3) a very uniform medium to fine sand with a compacted infiltration rate of 31 inches/hour (typical of the sand used unamended). If we fill the 1,000 square feet of holes with sand they no longer will hold 144 gallons of water. Sand (1) holds 51.8 gallons, sand (2) holds 56.2 gallons, and sand (3) 53.2 gallons. Even in the short term there is no real advantage to using the very coarse sand.

What about the long term effect? If in time we continue to use this very coarse sand, we could develop a surface medium with a steep water and, therefore, very droughty, retention curve. But both the medium to coarse and medium to fine sands have very good water retention curves even though they have relatively high infiltration rates.

Getting through the buildup of surface problems of many greens may not be possible with conventional aerification equipment. Use of deeper penetrating equipment such as the deep-tine aerifier, the new coring machine or the new Verti-groove may be necessary. Poking holes and spreading sand merely because it is considered a "standard practice" is no basis for an aerification and topdressing program. Nor should your program be based on what your neighboring superintendent is doing. He may be just a cookbook superintendent who is always fighting major fires with a small garden hose. The problem solving professional superintendent thoroughly analyzes your green problems, sets up a program to solve these problems, and then maintains a management program to prevent them from redeveloping. One such program might be a light frequent topdressing program with the "right sand" plus aerification just frequent enough to maintain a balanced breakdown of organic matter.

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