

TOPDRESSING OVERVIEW

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For the purposes of this paper, topdressing will be defined as the distribution of a thin layer of selected soil or prepared soil mix onto a turfgrass area. Historically, there is very little reference to the practice of topdressing in the early literature. For example, a variation was briefly introduced in the book Turf for Golf Courses by Drs. Piper and Oakley published in 1917. They suggested the practice of "sanding" for clay soil greens. In this case the sand is to be applied at a rate of 1/4 inch course sand per year. In addition, mention was made of "humus topdressing" using decomposed manure applied in late fall for the purpose of winter protection.

In 1950 Dr. H. B. Musser published a book devoted primarily to golf course maintenance entitled Turf Management. Again, the coverage of topdressing was rather limited. However, he did mention the possibility of relatively frequent topdressing. Specifically it involved applications made at 10 to 14 day intervals using rates as low as 0.2 cubic yard per 1000 sq ft. Musser suggested that this frequent topdressing technique could be used to build up an improved layer of soil for root growth.

In recent years Drs. John Madison and William Davis of the University of California at Davis have advocated the use of a frequent, light topdressing program on putting greens. They stress the importance of using the correct sand size distribution. The program involves an application of topdressing at 3 to 4 week intervals with approximately 1/28 inch of sand added per topdressing.

Benefits of Topdressing

It would seem appropriate at this point to review the effects of topdressing on putting greens. There are some very specific benefits from topdressing.

1. Some topdressing mixes are a potential source of nutrients including nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, and iron. A rapid greening is not uncommon soon after topdressing a green.
2. Properly composted topdressing is a good source of such beneficial soil organisms as fungi, actinomycetes, microorganisms, and nematodes. These organisms can make a significant contribution in enhancing the physical properties of the soil through their role in organic matter decomposition and can also be significant in thatch and mat decomposition.
3. Topdressing provides an improved surface root zone soil texture, assuming the proper soil particle size distribution is used. This is critical in terms of the sand component applied to fine textured, compacted greens. The speed with which the benefits are achieved depends upon the frequency of topdressing and the amount of material applied annually.

Potential Topdressing Problems

It is equally important to recognize certain potentially negative aspects to topdressing. The golf course superintendent should be alert for these potential problems and make the appropriate corrections where needed. The four major problem areas of concern are as follows:

1. Topdressing soil is a potential source of weed seeds and vegetative propagules. It is important to evaluate this situation in relation to the soil

mix being considered. Fumigation of the soil mix may be necessary to prevent the introduction of undesirable, difficult to control weeds.

2. Topdressing soil can serve as a source of organisms which are parasitic on turfgrasses. Included are disease causing fungi, parasitic nematodes, viruses, and insect pests. It is important to determine whether any potentially undesirable, parasitic organisms are present. As with the weeds, appropriate fumigation steps should be followed to eliminate potential problems before the topdressing is applied.
3. Certain topdressing soil mixes may possess adverse chemical properties such as an extreme pH level, salinity, or a high sodium content. It is preferable to select components for the root zone mix which do not possess any of these undesirable chemical properties. However, if there are no alternatives, steps should be taken during topdressing preparation to correct any extremes in pH, leach out any objectionable levels of salinity, including the addition of a sulphur material to replace undesirable sodium levels.
4. Use of a poor quality topdressing soil mix in terms of the particle size distribution or applications under the improper conditions can lead to an objectionable physical soil layering problem which will seriously disrupt water and air movement. It is very important to select the proper types and relative amounts of root zone mix components to ensure that adverse soil layering does not occur. In addition, heavy applications of topdressing over a relatively thick thatch layer can create serious long term problems as well.

Topdressing Concepts

Certain basic concepts for proper use of topdressing have evolved through research and field experience. The basic points include the following:

1. Topdressing should not be used as a routine cultural practice but only as needed to correct a problem.
2. It is important to avoid soil layering by using a topdressing soil mix comparable to the underlying root system, assuming this soil has the proper physical characteristics.
3. The soil used should be free of objectionable weed seeds, vegetative propagules, insects, nematodes, and disease causing pathogens.
4. The soil mix should be shredded, screened to remove stones, thoroughly mixed, and composted for 12 months to regenerate the beneficial soil flora and fauna.

Reasons for Topdressing

The primary reasons for topdressing are: (a) surface smoothing, (b) thatch control, (c) surface soil root zone improvement, (d) increasing the putting speed, (e) covering stolons or sprigs during vegetative planting, and (f) winter protection, especially desiccation. The main concerns in this discussion will be the first three reasons.

Surface Smoothing

Smoothing by means of topdressing is done at applications sufficient to correct an irregular surface which interferes with proper ball roll. The common causes of surface irregularities are ball marking where players fail to take proper repair precautions, disruptions caused by coring or slicing when cultivating greens, and footprinting during extremely wet periods on imperfectly drained

greens. When any of these types of surface irregularity problems occur, a top-dressing application for the purpose of smoothing is in order.

Thatch Control

A second reason for topdressing is to stimulate biological thatch control. There are a number of possible options or combinations of cultural practices which can be utilized for thatch control on putting greens. One practice is to apply topdressing in relation to the rate of thatch-vegetation accumulation, to avoid an excessive buildup of undesirable thatch, and maintain an acceptable level of mat. A more favorable microenvironment for biological thatch decomposition is created.

Other alternatives for the cultural control of thatch include: close daily mowing; a modest, controlled rate of nitrogen fertilization which avoids excessive shoot growth; light vertical mowings as needed to remove excessive shoot growth, which is quite easy with the modern vertical mowing units on triplex greenmowers; and providing a favorable environment to ensure an active fungi, actinomycetes, nematode, and microorganism population for biological thatch and mat decomposition. The specific environmental conditions include a pH of 6.0 to 7.0 achieved by lime or sulfur applications, good soil aeration obtained through cultivation by coring or slicing, and a moist but not excessively wet surface zone.

There are many putting green environments on golf courses around North America where adequate thatch control can be achieved through a combination of the latter cultural practices without topdressing. On the other hand, there are also many situations where topdressing is needed for adequate thatch control. In this case, the main question is the frequency and rate of application that must be utilized. The light-frequent topdressing approach has potential for these types of situations.

Surface Root Zone Improvement

The third major concern involves correcting unfavorable soil conditions on putting greens. The problem typically consists of a compacted, fine textured soil originally created by improper root zone construction. There are three main options available in this regard.

One option is complete root zone modification including drain lines. This is by far the preferred option if budgets permit. Although the initial cost may be relatively high, this must be evaluated against the more costly long term maintenance aspects of the other alternatives. There are golf courses where such a program cannot be undertaken. Thus, another alternative must be sought. In doing this, it must be established that the best long term solution from a performance and cost standpoint is not complete root zone modification.

A second alternative is partial root zone modification including an initial coring followed by continuous, frequent topdressing as advocated by Madison and Davis. These workers have demonstrated this to be a viable alternative that is effective under California conditions. Adequate data is not available to establish just how widely applicable this approach is to the diversity of soil and climatic conditions found throughout North America. Light and frequent topdressing has potential as an attractive, low cost alternative to complete root zone modification where the existing greens have a serious soil compaction and/or thatch problem. The high frequency of topdressing permits a more favorable surface root zone to be developed as rapidly as possible.

The third alternative involves a corrective program of extensive coring, slicing, and/or spiking. It should be recognized that cultivation is a very

disruptive practice and is quite objectionable to golfers. In addition, the degree to which cultivation actually alleviates the compaction problem is quite limited compared to the other two alternatives.

Summary

Unfortunately many individuals have viewed the light-frequent topdressing approach as one which is distinctly different and in conflict with the topdressing practices now in use. From this discussion it is evident that the two current topdressing approaches are in fact compatible. If the existing cultural program on greens does not involve any extensive topdressing and good putting surfaces with quality root zones are being maintained, then there is no justification for initiating a light-frequent topdressing program. This is especially true if added costs are involved. However, on those greens having an existing soil compaction and/or thatch problem which is recurring regardless of the particular cultivation and cultural practices employed, then an alternate solution must be sought. The alternative approach of light, frequent topdressings using the proper sand particle size distribution is promising if monies are not available for complete root zone modification of the greens. It is only a matter of time before this approach will be examined on a trial basis around the rest of the United States to determine how widely applicable and effective the approach will be in putting green maintenance.

DEPTH OF SOIL RESULTING FROM EIGHT RATES OF TOPDRESSING WHEN APPLIED UNIFORMLY OVER A 1,000 SQUARE FOOT AREA.

Soil Volume (cubic yard)	Topdressing Depth	
	(inch)	(MM)
0.05	0.015	0.4
0.1	0.03	0.8
0.2	0.07	1.6
0.3	0.09	2.4

0.4	0.13	3.3
0.6	0.19	4.9
0.8	0.26	6.6
1.0	0.32	8.2