# TOPDRESSING: CHANGING MANAGEMENT APPROACHES

R. C. Shearman
Department of Horticulture
University of Nebraska, Lincoln, NE

Golf course superintendents have used topdressing as a standard cultural practice in their management systems. The potential benefits of topdressing include: 1) thatch control, 2) smoothing and leveling, 3) soil modification, 4) winter protection, and 5) vegetative establishment. Superintendents have been intent upon taking advantage of these benefits in their cultural systems. There has been a trend toward replacing traditional topdressing programs with light, frequent sand topdressing (LFST). The trend toward light, frequent sand topdressing has continued over the past 8 to 10 years. Superintendents have used this approach to modify root zones and to develop firm, true putting surfaces.

Light, frequent sand topdressing applications are made at a rate of 0.1 cu yd and application frequency is based on the growth rate of the turfgrass plant. In many cases application frequency can be every two weeks when creeping bentgrasses are slowed. Good sand sources are critical to effective LFST programs. Good sand sources should have particle size distribution in the medium to fine range (i.e., $\leq$ 1.0 mm to $\geq$ 0.10 mm). Silica sands are preferred to calcareous sources. In some areas sand sources that are high in free calcium carbonate (calcareous sands) are the only sources available. In these instances selection should be made primarily on particle size distribution and appropriate adjustments in nutritional programs made to offset the calcareous problems.

Superintendents have observed firmer putting surfaces with higher stimpmeter readings when comparing LFST to traditional topdressing. However, problems with LFST have also been observed, including various nutrient deficiencies, localized dry spots, black layer, and increased disease incidence. Some of these problems relate to not changing managment approaches as the sand layer develops in the turfgrass root zone. Other problems may occur on a short-term basis, during the early stages of starting the LFST program. In either case superintendents need to make appropriate changes in their cultural programs to avoid turfgrass injury and loss of desirable playing conditions.

Sand media have low nutrient holding capacity, low cation exchange capacity (CEC), low water holding capacity, good infiltration rates, good percolation rates and good aeration due to high numbers of large pore spaces. The low CEC means that cations like calcium, magnesium and potassium will be in low supply. The high infiltraton and percolation rates, and low water retention capacity of sands means that mobile nutrients, like nitrogen and potassium, are more likely to be leached from the turfgrass root zone. Nitrogen and potassium are often deficient in sand media. Phosphorus deficiency may also occur, particularly in calcareous sands. These characteristics of sand root zones mean that the superintendent must make adjustments in cultural practices as the root zone is modified and during the growing season as rooting characteristic change.

Soil sampling for test analysis may also present a problem, particularly in the early stages of the LFST program. During spring and prior to supraoptimal temperature stress, turfgrass rooting may occur in two portions of the rooting zone (i.e., sand layer and the underlying soil or original root zone mixture). Later in the summer as high temperatures stress root growth conditions, turfgrass stress could be compounded by nutritional deficiencies, relating to a restricted root system and the reduced nutrient supplying capacity of the sand. Calcareous sands often have alkaline pH which may warrant modificaiton by addition of elemental sulfur to reduce the pH. In other cases, black layer problems have been associated with the addition of elemental sulfur. These associations must be accompanied by anaerobic soil conditions and the presence of heavy metals, like zinc, manganese, and iron. Adjusting irrigation and core cultivation practices are needed to alleviate the anaerobic conditions.

In LSFT programs, superintendents have experienced the need to adjust their turfgrasss nutritional levels. For example, as the sand layer develops it is often necessary to increase nitrogen and potassium rates to maintain desired playing conditions. Nitrogen ranges of 3 to 6 lbs/1000 sq ft/season are not uncommon, depending upon sand source and irrigation requirements. Potassium levels of 3 to 6 lbs/1000 sq ft/season are also preferred. For stress tolerance, nitrogen and potassium should be supplied in a 1 to 1 ratio. Phosphorus and other essential nutrients should be supplied according to soil test recommendation. Fertilizer programs should meter on available nutrients rather than supply them in infrequent, heavy applications. LFST programs require spoon feeding approaches for best nutritional results.

Mowing practices are similar for turfs receiving traditional topdressing or LFST. Wear patterns associated with cleanup rounds are often more evident on sand media. This condition can be alleviated by adjusting mowing patterns, switching to walk-behind mowers, and increasing potassium nutrition. Mower injury is accentuated when LFST rates exceed the growth rate and sand particles are evident in the grass canopy. Adjusting the application frequency and rate of application can be used to minimize this problem.

Irrigation program adjustment is critical to successful management under LFST programs. Irrigation should be adjusted to meet the ET of the turf. Use of added potassium nutrition is helpful to avoid drought stress, enhance rooting, and reduce water use. Syringing should be used to alleviate midday stress. However, syringing should be practiced only during conditions of high evaporative demand. Irrigation frequency must be based on the ET demand and the effective turfgrass root systems. Manage irrigation to avoid over watering and the potential development of anaerobic conditions that may restrict turfgrass growth and enhance black layer development. It is very easy to develop layers of sand and organic matter, if LFST applications are not properly managed. It is very easy to develop undesirable perched water zones in and around the crown of the turfgrass plant with LFST, particularly in its early stages of use or if intermittent organic matter/sand layering occurs. Studies have demonstrated that diseases, such as pythium blight and brown patch are more active under these conditions. These studies have also demonstrated a beneficial reduction in these diseases when LFST programs receive surfactant and core cultivation treatments as a part of the management system.

Core cultivation, slicing and spiking are important tools in LFST programs. These cultivation practices are useful in reducing localized dry spots and potentially detrimental organic matter/sand layering problems. A minimum of two core cultivations should be included in each season. LFST does not eliminate the need for soil cultivation. Combining core cultivation with surfactant treatments reduces localized dry spot problems, reduces turfgrass ET, and potential perched water around the turfgrass crowns.

Superintendents need to treat sand media with greater care, since the tolerance to error or buffering capacity of sands is less than that of heavier, clay soils. Pesticide applications on sands may have greater influence on the microbe populations than in soil. Sands may have high microbial activity, but a narrow population base. In these situations, pesticide applications may have dramatic effects on non-target species or antagonistic organisms that may be needed to keep undesirable microbe populations in check. Use pesticides judiciously on sands. Allow them to have time to work. Follow the label completely.

There are many benefits that may be obtained from LFST programs. Most superintendents are aware that they must adjust their management approaches as they progress with their topdressing program. Most of these adjustments or changes are purely the use of common sense and truly being on top of the situation.