Late Fall Sand Topdressing: Water Retention And Influences on Winter Injury

Mid-year Report — May 1999
GCSAA/MGCSA Cooperative Research Project

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Purpose

The objectives of this research project are to determine (1) if sands commonly used for topdressing golf greens in the North Central region of the United States vary significantly in their water retention characteristics, (2) if heavy rates of topdressing just prior to winter are likely to increase winter damage, and (3) if brushing sand into greens following late fall sand topdressing affects winter survival of the turf.

Location of Project

The laboratory experiments are being conducted at the University of Wisconsin-River Falls. Field plots are being applied on practice greens at River Falls Golf Club, River Falls, Wis.; Indian Hills Golf Club, Stillwater, Minn., and St. Croix National Golf Club, Somerset, Wis.

Rationale/Purpose

Topdressing golf greens just prior to winter has been recommended for many years as a method of reducing winter desiccation. This research was initiated as a result of several incidents of winter damage on golf greens in Minnesota which seemed to be associated with late fall topdressing practices. Suggestions of the causes led to considerable speculation but inadequate answers. The research was begun in the summer of 1997. Field plots were established at three golf courses in November 1997 and 1998 and data from the first and second winters are now available.

Methods

Seven sands, five sand/peat mixtures and four sand/amendment mixtures (other than peat) were selected for laboratory physical and water retention analysis. Analyses included particle size, pH, organic matter content, water retained at several potential energy levels and saturated hydraulic conductivity. Experiments are yet to be conducted to assess water retention in thin layers of sand placed over a typical root-zone soil mixture.

Field plots were established on one golf green at each of three courses. The treatments consisted of a topdressing layer applied in late fall after winter disease fungicides had been applied. Treatments consisted of the following:

- A control plot with no topdressing applied,
- Four sand or mixes: (1) uniform, silica sand, (2) 85/15 by volume silica sand/peat, (3) mortar sand and (4) 85/15 by volume mortar sand/peat,
- Two topdressing depths: (1) 2.4 mm or 0.09 inches and (2) 4.8 mm or 0.18 inches,
- Brushed vs. unbrushed treatment: topdressed material was brushed into the turf following topdressing for the brushed plots or left without brushing for the unbrushed plots.

At each location turf and soil parameters were meas-

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ured in the early spring as soon as growth was clearly evident to determine the effect of topdressing on winter survival, early spring color, turf temperatures and soil moisture.

Results

This report will focus on the results of the second-year field plots which were applied in early November 1998 with results of the overwintering being recorded in March and April 1999. The winter was a very unusual one. Topdressing was applied to the plots at River Falls Golf Club on November 4, at St. Croix National on November 5 and Indian Hills on November 6. Topdressing was brushed in on November 7, 1998 at all three courses for those plots receiving that treatment. Although temperatures were in the mid- to low thirties (°F) when topdressing was applied, November temperatures were above normal and many golf courses stayed open through the middle of December.

The first significant snow of the season occurred on December 17, 1998, and plots remained snow-covered through January. After initially warm temperatures in early February we received a heavy, freezing rain, followed by snow during the second week in February. Snow melted off the entire plot area at River Falls Golf Club by March 8, 1999. On March 8, we received approximately 12 inches of snow. This snow gradually melted off and by March 18, 1999, the plots at River Falls and St. Croix National had a small amount of snow remaining on the plot areas but were mostly clear. At Indian Hills the plots were still almost entirely covered with snow or ice. Though ice on the plot area was minimal, approximately four inches of ice covered portions of the green and crew members were in the process of breaking up the ice and removing it. As soon as the snow melted off the plot areas, differences in color were evident on the plot areas. Color ratings and surface temperatures were measured on March 26-27, April 2-3 and April 8, 1999. By the middle of April differences between plots were disappearing and were almost entirely gone by the end of April. Tables 1, 2 and 3 show a summary of the data from measurements on April 2 and 3.

Similar to results of last year, plots topdressed with mortar sand or mortar sand/peat mixtures were quicker to green up in the spring than either control plots which received no topdressing or plots topdressed with the silica sand. Plots topdressed with silica sand/peat were intermediate in rate of spring green-up. Control plots came out of winter much browner in color and were slow to resume active growth in the spring compared to most topdressed-plots. Late fall topdressing does appear to offer some protection from winter desiccation. Our opinion is that the color of the silica sand was the responsible factor, keeping those plots cooler and slowing recovery from winter dormancy, as compared to the darker-colored mortar sand-topdressed plots.

The only damage to plots was several small areas on plots at Indian Hills Golf Club. One area was in an area where surface water clearly remained after the snow and ice had melted off and appeared unrelated to topdressing treatments. Another area was at the ends of two plots receiving heavy topdressing treatments (0.18-inch depth) and seemed to be related to topdressing treatments. Although only a very small part of the plot area was damaged, the heavy topdressing contributed to damage and slow spring recovery. Similar results occurred at River Falls last winter when heavy topdressing contributed to damage and slow recovery in the most poorly-drained areas of some plots. In addition to these areas in which heavy topdressing appeared to contribute to winter damage, growth in general on heavily-topdressed plots was not as dense initially as plots receiving a light layer of topdressing (0.09-inch depth). This was true in both 1998 and 1999.

Summary of Significant Findings to Date

(1) Topdressing of golf greens in late fall, particularly with darker-colored sands or sand/peat mixtures, can lead to earlier spring growth and better color on golf greens. This enhanced color lasts for three to five weeks after spring growth begins.

(2) Although in some cases heavy fall topdressing (0.18-inch depth) led to very early spring growth and excellent color, in some cases the turf was damaged and did

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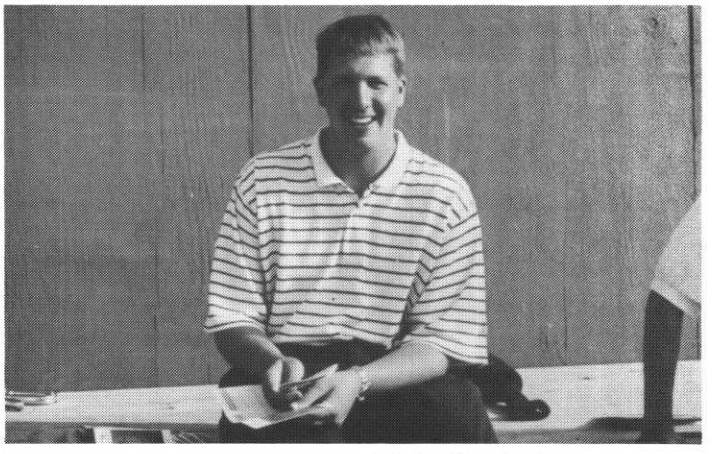
JOHN QUEENSLAND, MGCSA Scholarship Chairman, addresses the crowd at the Scholarship Scramble.



Izaty's Golf Pro Rich Oberfeld

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not recover from winter for several months. The damage seemed to occur in poorly-drained areas of plots. Sand type appeared less important than the depth of application. Based on results so far it would appear unwise to topdress heavier than 0.09 inches in the late fall. Even at this rate, overlap areas may be susceptible to damage.

Table 1
Color ratings and surface temperatures for plots at River Falls Golf Club on April 2, 1999

Treatment	Color Rating*	Surface Temperature (deg F)
Control - no topdressing	4.0 c**	55.0 abc**
Silica sand at 0.09-inch depth	4.8 bc	53.6 c
Silica sand at 0.18-inch depth	5.0 bc	51.7 d
Silica sand/peat at 0.09-inch depth	6.0 ab	54.2 bc
Silica sand/peat at 0.18-inch depth	5.0 bc	53.7 c
Mortar sand at 0.09-inch depth	7.0 a	54.9 abc
Mortar sand at 0.18-inch depth	6.8 a	55.8 a
Mortar sand/peat at 0.09-inch depth	6.8 a	54.7 abc
Mortar sand/peat at 0.18-inch depth	6.5 a	55.6 ab

Table 2
Color ratings and surface temperatures at St. Croix National Golf Club on April 3, 1999

Treatment	Color Rating*	Surface Temperature (deg F)
Control - no topdressing	5.0 d**	47.8 a**
Silica sand at 0.09-inch depth	6.0 cd	48.6 a
Silica sand at 0.18-inch depth	5.0 d	47.6 a
Silica sand/peat at 0.09-inch depth	6.5 bc	48.5 a
Silica sand/peat at 0.18-inch depth	7.0 abc	48.4 a
Mortar sand at 0.09-inch depth	7.0 abc	48.5 a
Mortar sand at 0.18-inch depth	7.5 ab	48.2 a
Mortar sand/peat at 0.09-inch depth	8.0 a	48.4 a
Mortar sand/peat at 0.18-inch depth	8.0 a	48.6 a

Table 3
Color ratings and surface temperatures at Indian Hills Golf Club on April 3, 1999. Statistics were not done on the results at Indian Hills due to the fact that heavily-topdressed plots were not duplicated at this course.

Treatment	Color Rating	Surface Temperature (deg F)
Control - no topdressing	4.0	43.1
Silica sand at 0.09-inch depth	4.5	43.1
Silica sand at 0.18-inch depth	5.0	43.0
Silica sand/peat at 0.09-inch depth	4.8	43.3
Silica sand/peat at 0.18-inch depth	5.5	44.2
Mortar sand at 0.09-inch depth	5.8	44.1
Mortar sand at 0.18-inch depth	5.0	43.6
Mortar sand/peat at 0.09-inch depth	5.5	43.8
Mortar sand/peat at 0.18-inch depth	6.0	43.3

* Color rating scale 1 - 9: 1 = brown, 4 = light, yellowish green, 7 = moderately dark green, 9 = very dark green.
** Numbers within columns followed by the same letter are not significantly different using Tukey's HSD test at 5% probability for sepration of means.