Late Fall Sand Topdressing

Water Retention and Influences on Winter Injury

MID-YEAR REPORT FOR THE GCSAA/MGCSA COOPERATIVE RESEARCH PROJECT

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Purpose

The objectives of this research project are to determine (1) if sands sommonly used for topdressing golf greens in the North Central region of the United States vary signifcantly in their water retention characteristics, (2) if heavy rates of topdressing just prior to winter are likely to increase winter damage, (3) if brushing sand into greens following late fall sand topdressing affects winter survival of the turf, and (4) to doccument climatic conditions at the time of late fall topdressing which may affect winter survival.

Location of Project

The laboratory and greenhouse experiments are being conducted at the University of Wisconsin-River Falls. Field plots were 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 dessiccation. 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 and only some of the laboratory measurements have been completed. Field plots were established at three golf courses in November 1997 and data from the first winter are now available.

Methods

Seven sands, five sand/peat mixtures and four sand/amendment mixtures (other than peat) have been selected for laboratory physical and water retention analysis. Analyses will include particle size, pH, organic matter content, water retained at several potential energy levels, and saturated hydraulic conductivity. Greenhouse experiments will 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 mortar sand/peat.
- Two topdressing depths: 1) 2.4 mm or 0.09 inches and 2) 4.8 mm or 9.18 inches.
- Brushed vs. unbrushed treatment: topdressed material will be brushed into the turf following topdressing for the brushed plots or left without brushing for the unbrushed plots. The brushed vs. unbrushed treatment was only accomplished at one golf course this past winter, as the plots at the other two courses received snow before the brushing could take place.

At each location turf and soil parameters were measured 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 first-year field plots which were applied in early November 1997 with results of the overwintering being recorded in March and April 1998. The winter was a very unusual one indeed. Temperatures during December, January and February were much warmer than usual and snowfall was considerably below normal. Topdressing was applied to the plots

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Topdressing Results:

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at River Falls Golf Club on November 7, 1997 with half the plots being brushed in on November 8. Figure 1 shows the plots after topdressing at River Falls. Plots at Indian Hills Golf Club were topdressed on November 10, 1997 and at St. Croix National Golf Club on November 11, 1997. We received snow on November 11 and although it melted off the plots at St. Croix National, the plots did not dry out sufficiently to brush in the topdressing at St. Croix National or at Indian Hills.

Figure 1. Topdressed plots at River Falls.

The plots remained snow-covered through most of November, but melted off at River Falls and St. Croix National in early December. It was evident that topdressed sands were influencing the rate of snow melt, with the plots topdressed with mortar sand or mortar/sand peat melting faster than the silica or silica sand/peat topdressed plots or the control plots *(See Figure 2 as an example).* We assume it was related to the darker color of the mortar sand as compared to the white silica sand.

We received very little snow until near the end of December, at which time signifcant snowfall occurred and the plots remained snow-covered until late in February. On February 21 it rained lightly and the snow had completely left the plots at River Falls Golf Club *(Figure 3).* Plots at St. Croix National and Indian Hills were still snow-covered but melted off within seven days.

By March 28 the turf had begun to grow and obvious differences between the color on plots were evident *(Figure 4).* It was decided that this was the appropriate time to take color, temperature and soil moisture measurements. The results shown in Tables 1, 2 and 3 were measured at the three locations on March 28. The plots were minimal and by April 28 could not be seen.

In addition to the results reported in the tables and shown in the figures, significant damage was seen on a portion of some plots at River Falls, on plot overlap areas at St. Croix National, and throughout the entire plot area at Indian Hills.

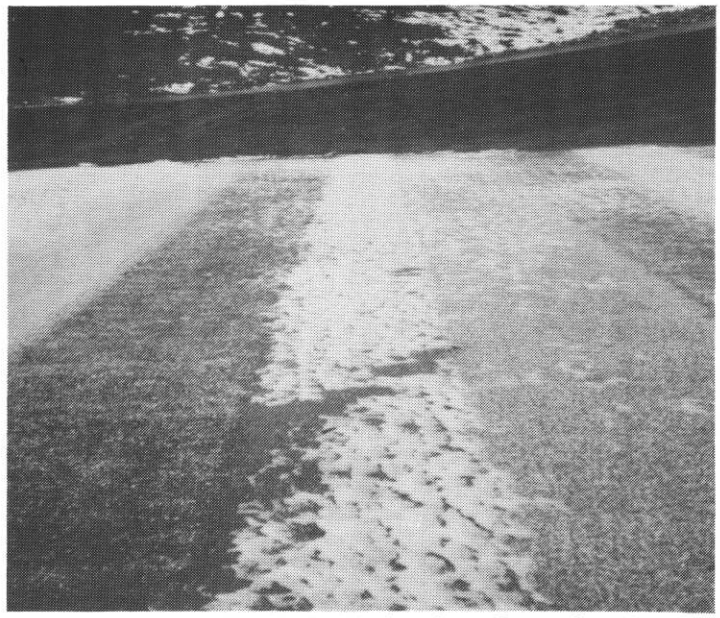

Figure 2. Plots at St. Croix National on December 2, 1997 showing snow melted off plots with darker-colored topdressed sand.

At River Falls, the damage was limited to one end of the plots in an area that appears more poorly-drained than the rest of the green. Damage occurred only on plots with the heavier topdressing treatments and was evident on the fol-

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Topdressing Results—

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lowing topdressing treatments in one block silica sand, silica sand/peat, and mortar sand/peat with slight damage to the mortar sand-treated plot. In the other block, there was only slight damage to the heavily-topdressed silica sand and silica sand/peat plots.

Figure 3. Snow had left plots at River Falls Golf Club by February 21, 1998.

At St. Croix National, plot widths were slightly less than the width of the topdressing machine; consequently there was some overlap areas on the edges of plots. Turf damage were limited to overlap areas on the edges of plots and was especially evident where the total sand topdressed was heavier than the 0.18 mm.

At Indian Hills there was turf damage evident throughout the plot area to the point where differences between topdressing treatments were inconsequential. Control plots had damage, though not as severe as topdressed plots. Green area outside the plot area (which received no topdressing) survived through the winter better than the turf on the topdressed plots. Thus, there was a negative impact of topdressing on this green regardless of the sand used or the depth of topdressing.

Since this was such an unusual winter and results varied between the golf courses, it is too early to suggest the results are conclusive and should guide recommendations on late fall topdressings. The results do show that late fall topdressing can affect rate of snow melt, rate of spring green-up, and do influence winter survival and that heavy rates of topdressing can prevent spring growth. Two more years of this project should be invaluable in suggesting the efficacy or danger of late fall topdressing treatments for winter dessication protection.

Figure 4. Plots at River Falls, March 28, 1998, showing differences in early spring green-up.

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Topdressing Results—

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Table 1

COLOR RATINGS and SURFACE TEMPERATURES
March 28, 1998
River Falls Golf Club
Temperatures were taken approximately 4:00 p.m.

Treatment	Color Rating*	Surface Temperature (°F)
Control — no topdressing	5.0a**	48.6a
Silica sand at 0.09-inch depth	6.0b	49.9a
Silica sand at 0.18-inch depth	6.0b	49.8a
Silica sand/peat at 0.09-inch depth	6.0b	50.2a
Silica sand/peat at 0.18-inch depth	7.0c	49.9a
Mortar sand at 0.09-inch depth	6.0b	48.9a
Mortar sand at 0.18-inch	7.0c	50.1a
Mortar sand/peat at 0.09-inch depth	6.5bc	50.0a
Mortar sand/peat at 0.18-inch depth	7.0c	49.6a

Table 2

COLOR RATINGS and SURFACE TEMPERATURES
March 28, 1998
St. Croix National Golf Club
Temperatures were taken approximately 2:30 p.m.

Treatment	Color Rating*	Surface Temperature (°F)
Control — no topdressing	6.0a**	59.8b
Silica sand at 0.09-inch depth	6.0a	57.5b
Silica sand at 0.18-inch depth	6.0a	52.4a
Silica sand/peat at 0.09-inch depth	6.5ab	59.1a
Silica sand/peat at 0.18-inch depth	7.0abc	57.2b
Mortar sand at 0.09-inch depth	7.5bc	58.8b
Mortar sand at 0.18-inch depth	8.0c	58.4b
Mortar sand/peat at 0.09-inch depth	8.0c	58.4b
Mortar sand/peat at 0.18-inch depth	8.0c	60.0b

Table 3

COLOR RATINGS and SURFACE TEMPERATURES
March 28, 1998
Indian Hills Golf Club
Temperatures were taken approximately 1:00 p.m. Color readings were difficult to determine due to limited growth of grass through the topdressing sand.

Treatment	Color Rating*	Surface Temperature (°F)
Control — no topdressing	5.0a**	61.4ab
Silica sand at 0.09-inch depth	6.0ab	59.6ab
Silica sand at 0.18-inch depth	6.0ab	56.7a
Silica sand/peat at 0.09-inch depth	7.0b	60.6ab
Silica sand/peat at 0.18-inch depth	6.0ab	58.4ab
Mortar sand at 0.09-inch depth	5.0a	61.0ab
Mortar sand at 0.18-inch depth	6.0ab	63.2b
Mortar sand/peat at 0.09-inch depth	6.5c	62.2ab
Mortar sand/peat at 0.18-inch depth	6.5c	63.4b

***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 separation of means.