FERTILIZER TREATMENT EFFECTS ON YELLOW ANNUAL BLUEGRASS

In late August areas of the annual bluegrass fairway plots at the Hancock Turf Research Center developed a condition often observed in Michigan: random plants in the turf growing faster than adjacent plots which developed distinctly yellow leaves. In an attempt to document nutritional responses of the grass in this condition, the treatments outlined in Table 8 were applied August 30, 1985. Plot size was 4 feet by 6 feet. All treatments were applied foliarly except for the 0-46-0 (superphosphate). Five days later turf quality ratings taken indicated that the ferrous sulfate ($FeSO_4$) treatment gave the only significant response compared to the untreated check. By September 23 this difference had dissipated as would be expected. The response to foliarly applied iron will usually disappear within a week depending on growth rate and growing conditions. There was some discoloration caused by certain of the treatments, most noticeably from manganese sulfate. The cause of the etiolated growth of the annual bluegrass is not clear at this time, but it appears that the yellowing can be masked with foliar application of iron.

WETTING AGENT EFFECT ON TURFGRASSES

Wetting agent treatments outlined in Table 9 were applied to a Penncross creeping bentgrass green growing on a modified loamy sand soil. Two irrigation programs were utilized: low (approximately 1/3 inch of water per week) applied: and moderate (2/3 inch per week). The objective was to determine the effect of wetting agent treatments on development of localized dry spots. Subsequent to treatment rainfall patterns prevent any development of localized dry spots so no treatment effects appeared. As observed in past years, turf discoloration caused by wetting agent phytotoxicity resulted from some treatments as these treatments were not watered in. Lescowet and Aqua-Gro exhibited the greatest phytotoxicity. Peneturf also caused some injury. Based on past observations on plots, watering the area after application would have resulted in no injury. Further, the rates of wetting agents applied in this study were very high for application at this time of year. Judicious application of wetting agents available at present should be safe for turf if watered in appropriately.

A study of wetting agent responses was also established on tees at the Crystal Mountain Golf Resort. No differences in response were observed and no localized dry spots developed.

COMPARISON OF SEVERAL AERIFIERS ON GENERAL TURFS

In the fall of 1985 several different aerifiers were used on perennial ryegrass turfs growing on two different sites, a soil with limited topsoil but in a "normal" state of compaction while the second site was a heavily compacted, predominantly subsoil loam. The aerifiers evaluated were: 1) a Dedoes walk behind with a "standard" tine spacing or with part of the tines removed creating a diamond spacing (7 inches by 8 inches); 2) a Ryan's Ride-Aire; 3) an Aer-Way aerifier which has triangular-shaped tines and 4) the Verti-Drain aerifier. The Verti-Drain aerifier has both solid (deep) and hollow tines and has two different speeds resulting in holes 4 inches apart linearly or 2.5 inches apart.

Data on the depth of penetration of the various tines are given in Table 10. With many aerifiers the weight needed to penetrate soil effectively varies with the unit and soil condition. In dry and highly compacted soils some units do not penetrate well. Although the data have not been analyzed statistically, the depth of penetration was not dramatically reduced on the more compacted sites for the aerifiers utilized. By removing some of the tines from the Dedoes unit the depth of penetration was increased slightly on both sites (2.0 vs 2.8 inches on the "normal" soil and 1.8 vs 2.7 inches on the "compacted" site). When greater penetration is desired an alternative is to selectively remove some of the tines, more weight or wait until the soil has a higher moisture content. Of course, aerifying should not normally be practiced when the soil is very wet.

The Ride-Aire does not penetrate as deeply as other units as might be expected. The Aer-Way unit leaves a hole that is triangular in shape. Average figures were 5.0 inches deep by 6.9 inches long. The width was 1/4 to 3/8 inch wide. The Verti-Drain is a much larger unit which makes a deeper hole (9 inches average with the solid tines) on the "normal" site compared to other units. On the "compacted" site the average depth was reduced to 8.5 inches with the 4 inch linear spacing between holes. When the hollow tines were utilized the average depth was 6.2 inches with the 4 inch linear spacing on "normal" soil and reduced to 5.9 inches on "compacted" soil.

As might be expected the deeper and larger tines remove more soil when using hollow tines. The closer spacing of the Dedoes "standard" setup removes more soil, but doesn't go as deep compared to the less intense "diamond" spacing. These figures are based on dry weights of soil cores removed from a 4 square foot area and represents an average of 4 areas sampled for each treatment. The Ride-Aire removed the least soil among the units studied and the Verti-Drain removed the greatest amount at the 2.5 inch linear spacing as would be expected.

These observations are based on physical measurements only. No data were taken with regard to rooting responses, turf quality or effects on soil properties, partly because the treatments were applied late in the season when equipment was available. Determination of which unit(s) is most effective would depend on the depth of penetration desired; whether soil cores need to be removed from the site or deposited back into the thatch; cost of the equipment; speed of operation; durability of the equipment and soil conditions, among other factors.

EFFECT OF SAND AID AND TOPDRESSING PROGRAM ON A PENNCROSS CREEPING BENTGRASS GREEN

A long term study was initiated in May, 1985 at the Hancock Turfgrass Research Center to evaluate the effects of the use of Sand Aid as an amendment in topdressing and core cultivation programs for putting greens. The treatments outlined in Tables 11 and 12 were applied to a Purr-Wick green (dune sand) and on a "USGA~ green, respectively. A third study was conducted on a green growing on fine sandy loam soil with treatments 1) 15 pounds Sand Aid after coring; 2) 30 pounds Sand Aid after coring; and 3) coring only. Coring treatments were applied in May, June and September on all cored plots using a Ryan's Green Aire with 1/2 inch hollow tines. Plot size was 4 feet by

Table 10. Depth of aerifier tine penetration on loam soil. Perennial ryegrass turf. October, 1985. Hancock Turfgrass Research Center. Averages for a minimum of 24 measurements.

Aerifier	Depth, inches "Normal" Soil	Depth, inches "Compacted" Soil	Soil wt, gms 4 sq. ft.
Dedues - standard spacing	2.0	1.8	418
- diamond spacing	2.8	2.7	643
Ryan Ride Aire	1.8	1.5	270
Air Way	5.0	---	---
Verti Drain - 4" solid	9.0	8.5	---
2.5" solid	8.9	---	---
4" hollow	6.2	5.9	---
2.5" hollow	6.1	---	1647

Table 11. Effect of Sand-Aid and Topdressing treatment on quality of Penncross creeping bentgrass turf grown on a Purwick green (dune sand). Treatments initiated May 23, 1985. Hancock Turfgrass Research Center. Averages for 3 replications.

Treatment			Turf Quality Ratings (9=darkest green)				
Sand Aid	Auxiliary	Frequency	May 25	July 30	Sep 8	Sep 22	Sep 28
30 lbs/M	After coring	May, June, Sept	7.0 b	7.3 ac	8.3 a	8.0 a	8.0 a
15 lbs/M	Ater coring	May, June, Sept	7.0 b	7.2 bc	7.7 ab	7.8 a	7.8 ab
None	Coring only	May, June, Sept	6.0 c	7.0 c	7.8 ab	7.8 a	7.8 ab
5% volume	Sand T.D.	every 3 weeks	8.0 a	7.8 ab	7.5 b	7.7 a	7.5 bc
10% volume	Sand T.D.	every 3 weeks	7.0 b	7.5 ac	7.5 b	7.8 a	7.5 bc
None	Sand T.D.	every 3 weeks	7.0 b	8.0 a	7.2 b	6.5 b	7.2 c
None	None	----	7.0 b	7.5 ac	7.5 b	7.0 ab	7.5 bc