

From a distance the turf appeared uninjured but a close examination revealed the injury. The length of the color improvement from the treatments depended on the environmental conditions at the time of application and the growth rate of the grass following treatment. When the turf was actively growing the color dissipated in 2 to 3 days. When the turf was growing slowly the color influence was longer.

Table 6. Ferrous sulfate effects on putting green bentgrass. Ferrous sulfate was applied at 2 week intervals at East Lansing beginning July 3, 1975. Averages for 10 weeks.

<u>Ferrous sulfate rate</u> oz/1000 sq ft	<u>Visual color rating</u> (1=best; 10=poor)	<u>Injury rating</u> (1=none; 10=severe)
0	6.0	1.0
3	3.1	1.3
6	2.0	1.9
12	1.2	2.8

The rate of recovery from injury followed the same pattern. The use of ferrous sulfate to improve turf color is useful as a means of reducing nitrogen needs somewhat, especially during key stress periods. But care should be taken to prevent injury to the turf. Rates of 1-3 ounces per 1000 square feet are suggested with repeat applications as needed. Injury will tend to be more severe during stress periods.

On heavily irrigated sands such as are often found on greens, potassium needs may be higher than are called for by standard recommendations which are based on soil tests. At Traverse City rates of up to 6 pounds K_2O have been applied annually per 1000 square feet. The soil tests at Traverse City on the untreated plots were about 100 pounds per acre (see Table 7). At that level the recommendations would be 2 to 3 pounds K_2O per 1000 square feet. We would like to maintain potassium soil tests of 250 pounds per acre or higher for good turf. Even with the 6 pound treatment (divided equally into spring and fall applications) the potassium soil test levels were not above 200 pounds per acre. This points out the need to apply potash regularly on such soils where there is very little cation exchange capacity to hold the potassium cations in the soil. Under conditions of reduced irrigation rates and soils with more clay the loss of potassium by leaching is much lower. The use of potassium sulfate (K_2SO_4) resulted in somewhat higher soil potassium tests than did potassium chloride (KCl or muriate of potash). There was little difference in the visual quality of the turf regardless of potassium carrier.

The soil mix plots for greens at East Lansing on which Cohansey bentgrass was established in the early 1960's have developed a resistant strain of dollar spot. The plots were not sprayed for control of the dollar spot so the disease would become extensive enough for Joe Vargas to evaluate fungicide programs for control of the disease. One half of each of the soil mix plots is compacted with a roller compacter which we have developed. There are golf shoes on the roller drum. As a

result of the traffic the dollar spot development in early July was increased from 18% of the turf area infected on the uncompacted side to 54% on the compacted side. Apparently the golf shoes carried the inoculum from plot to plot.

Results of the use of wetting agents to rewet a hydrophobic sand at Boyne Highlands near Petoskey were consistent in 1975 with earlier studies. Coring treatments gave only short term improvement of turf. Hydro-Wet and Aqua-Gro proved the only consistently effective wetting agents among the nine which were applied in these studies. Hydro-Wet was somewhat more effective than Aqua-Gro under the conditions. The higher rates (32 ounces per 1000 square feet) gave longer improvement than 16 ounces from a one time application. In two years the effects of the wetting agent treatments have nearly dissipated. Repeat applications appear necessary to prevent the hydrophobic soil condition from redeveloping. Frequency and rate of reapplication will vary with the wetting agent, soil, and the degree to which the hydrophobic condition has developed. When the hydrophobic condition has become severe the rate of application of wetting agent may need to be higher, multiple treatments may be necessary and rate of turf improvement may be much slower than when treatments are applied at the first sign of a localized dry spot.

There is concern for the possibility of phytotoxicity to the grass from the use of wetting agents. No injury has been observed on the plots at Boyne Highlands even at rates up to 32 ounces per 1000 square feet. Injury has often been observed, however, even at lower rates of application, on turf. In a phytotoxicity study initiated at East Lansing in 1975 Aqua-Gro proved slightly more injurious than Hydro-Wet at comparable rates of application. But Aqua-Gro provided a day or two longer effect on suppression of dew formation on bentgrass than did Hydro-Wet. The use of more water when applying the wetting agents reduced the degree of injury observed as well. Watering the wetting agent into the turf after application will also reduce the potential for injury.

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