Secondly, the organic matter in that layer tends to reduce the weight of the soil sample. Thus the K soil tests would read higher than in the underlying soil since most soil testing labs use a volume sampling procedure rather than taking a sample based on weight. In the underlying 0–3 inch soil depth, the soil K tests tended to be higher in plots treated with the 60:20:20 mix than in sand topdressed plots, but differences were generally small. Perhaps K present in the soil mix (60:20:20) contributed to these higher soil K tests.

The soil Ca tests in the topdressed/thatch layer pointed out the additional cation exchange capacity in the soil–based (60:20:20) topdressed plots with much higher soil Ca tests than in sand topdressed plots. This was evident in both K treated plots and those receiving no K. A similar response was observed for soil Mg tests.

LONG TERM CULTIVATION STUDIES

The effect of long term cultivation treatments on a Ram I Kentucky bluegrass turf at the Hancock Turfgrass Research Center was established in 1987. Cultivation treatments are shown in Table 13. The Toro treatment is a Toro greens aerifier with 1/2 inch tines, applied once per year in the fall (1X), spring and fall (2X) or spring, summer and fall (3X). The Core Master Full treatment utilizes 1/2 inch tines to a full depth (approximately 3 inches) while the Core Master Shallow treatment is set to penetrate only 1 inch. The Core Master was used for this particular treatment to simulate the effect of an aerifier which does not penetrate deeply into the soil as is the case for some relatively ineffective aerifiers. The use of the Core Master unit for this treatment should not be construed as an indication this aerifier will not penetrate adequately into the soil. The flexibility of being able to vary the depth of penetration of aerifier tines could be a distinct advantage under some turf conditions. The Verti–Drain was used with hollow and solid tines. Soil and thatch samples were taken from these plots in September, 1992 for evaluation of the amount of thatch found.

Data in Table 13 point out that there was no difference in the thickness of thatch found among any of the treatments. It was apparent that the plots which had significant amounts of soil brought to the surface by aerification had the soil mixed rather uniformly with the thatch layer, but the thickness of the layer of thatch or thatch and soil was not different among treatments. Further, there was no difference in the weight of organic matter found in plugs taken from these plots (Table 13), regardless of treatment. It is thus clear that cultivation and returning the soil cores to the turf has not influenced the amount of organic matter found in the thatch layer. Either thatch degradation is not taking place in spite of mixing soil with the thatch layer or the rate of thatch development is equal to the rate of thatch degradation. This is in opposition to the generally held theory that cultivation enhances thatch degradation. A more proper terminology may be thatch control, a situation where mixing soil from the cultivation cores is mixed with the thatch layer. This keeps the thatch under control and provides a more uniform rooting medium in contrast to the solid thatch layer observed on the check plots or those which receive only very shallow cultivation in this study. Because of the presence of so many stones in this plot area, evaluation of soil compaction and pore size distribution could not be carried out as planned.

RAM 1 CULTIVATION STUDY 1992 RESULTS Initiated September 2, 1987.		
TREATMENT	DEPTH OF THATCH in centimeters	ORGANIC MATTER WEIGHT in grams
TORO 1X	3.5 a	4.6 a
TORO 2X	3.3 a	4.7 a
TORO 3X	3.2 a	4.8 a
CORE MASTER FULL	3.4 a	5.2 a
CORE MASTER SHALLOW	3.4 a	5.2 a
VERTI DRAIN HOLLOW	3.2 a	4.8 a
VERTI DRAIN SOLID	3.4 a	5.4 a
CHECK	3.5 a	5.4 a
Means followed by the same letter are not significantly different at the 5% level using the LSD mean separation test.		

WETTING AGENT STUDIES

In 1991, we had a study on the effect of wetting agents on water use rates of bentgrass turf. There was some indication that wetting agent influenced the water use rate. A new study was initiated during summer, 1992. Wetting agents applied included Hydro Wet and Real Kleen at 8 and 16 ounces per 1000 sq. ft. on August 18. No differences in water use rate of the bentgrass was observed in during a period from August 20 through September 4.

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HYDROJECT CULTIVATION AND INJECTION RESEARCH

While the ongoing research with the HydroJect is not supported by the Michigan Turfgrass Foundation, a brief report may be of interest to some members. Three studies will be reported here. The first was to evaluate the effect of HydroJect treatments on soil and turf conditions in Beal Gardens on campus. The Beal Gardens receive intensive traffic throughout the growing season and often have weak turf at the end of the summer. Two areas were studied: a native loam flood plain soil and the same soil modified by mixing in sand. The following treatments were applied every two weeks from the end of June to the end of August: 1 pass with the HydroJect; 2 passes; and an untreated check. There was no difference in turf quality ratings on the plots during the course of this study. However, the depth of holes from treatments was consistently deeper (40% in the native loam and over 60% in the modified soil) on plots receiving 2 passes compared to one. The holes in the native loam soil were about 40% deeper than in the sand modified soil, a result of the greater soil strength contributed by the sand grains. Surface hardness measurements taken with the Clegg impact tester showed that the treated plots had a consistently softer surface than the check. This is generally consistent with observations on other research plots evaluating the effects of the use of the HydroJect.