

REPORT OF SOIL MODIFICATION RESEARCH
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INTRODUCTION

To begin this presentation I would like to take a moment and introduce myself to you since this is the first I have talked at this conference.

I was raised on a livestock/grain farm in North-central Indiana and after high school graduation I attended Purdue University, the Land Grant institution of Indiana. I began as an Agronomy major (the study of plants and soils and their relationships) and completed Bachelors and Masters degrees in 1976 and 1979, respectively. In 1979 my wife and I moved to Minnesota where I completed the requirements for a Ph.D. at the University of Minnesota in Soil Science in 1984. We then were given the opportunity to start a professional career at Michigan State University in 1984 where I have been devoting the largest portion of my time to undergraduate teaching and research in soil science. I have recently become involved with the Turfgrass program through a need derived by the increasing number of four-year Turfgrass Management Option students in the Department of Crop and Soil Science. Also, I have had an interest in Turfgrass Soil properties and management for a number of years and am now able to direct my energies in that direction. I hope to be involved with this industry for many years to come.

Through direct appropriation of funds to Michigan State University by the Michigan Turfgrass Foundation, the Hancock Turfgrass Research Center has undergone a significant expansion. I am reporting on the initiation of the soil modification research began during the summer of 1992. Without the financial support of the turfgrass industry this research would not be possible.

Three specific areas of soil modification were deemed important : athletic fields; USGA specification putting greens; and compacted subsoils simulating urban soil problems.

To study USGA putting greens, approximately a 15,000 ft² putting green was built to USGA specifications and turfgrass was established in the fall of 1992. To study the needs of irrigation on modified soils, an area was built that contains native soils, USGA specification putting greens, and soils containing 12 inches of a sand-based root zone mix. This area was also established in the fall of 1992 and will be ready for studies to begin in 1993.

The construction of the compacted subsoil area will be completed during the late spring/early summer of 1993 and will then be ready for turf establishment.

For the area dedicated to athletic field research, three levels of soil modification have been initiated. They include a relatively large plot of native soil and then an equal size plot of modified soil athletic fields. The modified soils include removing the top 12 inches of native soil and replacing it with a sand-based root zone mix and then because of a donation by Turfgrass Services Co., Inc, a 3600 ft² Prescription Athletic Turf (PAT) facility was installed. The PAT field installed at the Hancock Turfgrass Research Center is a self-contained system. A two-ply plastic sheet seals the PAT system from surrounding soils. Within this membrane a network of drain tiles are spaced evenly throughout the base of the field. These tiles are covered by a one foot root zone mixture. The upper 4 inches of the root zone is a 80 % sand and 20 % peat mix and the lower eight inches consists of 100 % sand. Lastly, and most importantly, the drainage tiles are connected to a series of pumps which may extract water when conditions are wet, or subsurface irrigate when conditions are too dry.

Establishment studies of the PAT are currently being evaluated. The experimental design is a 2x2x6 split-plot randomized complete block design. The study has two establishment methods (washed Kentucky Bluegrass sod and perennial Ryegrass from seed), two fiber treatments (with and without polypropylene fibers), and six differing nitrogen (urea, ibdu, lebanon (13-25-12), SC urea, Nutri-Plus, and Milorganite) treatments. The soil root zone, as mentioned previously, is quite high in sand (80%). Sands do not hold nutrients readily due to their low cation exchange capacity. The fertilizers being used were chosen to provide a mixture of readily available as well as slowly available nitrogen. In association with the nutrient studies, we will be investigating the establishment of turfgrass with the use of washed Kentucky Bluegrass sod verses establishment from seed with perennial ryegrass, with and without the inclusion of polypropylene fibers added to the soil surface for soil stability. Initial establishment took place during the fall of 1992 and data will continue to be collected spring of 1993.

Again, we would like to thank the turfgrass industry for your support. Soil modification research would not be possible without you.