TURFAX™

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JB COMMENTS - THE LIVING SOIL

Understanding the concepts of a living soil is important in the construction and culture of a turfgrass root zone ecosystem, in order to maximize turfgrass health and minimize disease and other stresses. A soil can be categorized into the physical, chemical, and biological components. The biological component includes a diversity of microorganisms, actinomycetes, fungi, worms, and insects. The physical and chemical components affect the types and quantities of organisms that compose the living biological root zone system.

High-sand root zones are becoming a necessity on intensively trafficked putting greens, sports fields, and similar areas. The construction is with washed sand and an organic matter source, with both usually lacking in the needed balance of biologically active organisms. There are a number of problems associated with high-sand root zones during the initial 3- to 5-year period that typically are associated with what is essentially a non-living root zone. They include the following:

Root Disease. A disease commonly associated with high-sand root zones is take-all patch (*Gaeumannomyces graminis* var. *avenae*) which is particularly active on roots of creeping bentgrass (*Agrostis stolonifera* var. *stolonifera*). The causal pathogen of this disease is very active on relatively non-living root zones (a) where a biological balance has not developed, and (b) where the antagonist organisms that affect and partially control this causal pathogen have not yet emerged. Typically, the severity of this disease gradually declines in high-sand root zones as the living biological ecosystem develops. This can range from 4 to 7 years, depending on the cultural strategies utilized.

Surface Organic Layer Problem. A properly constructed high-sand root zone is particularly favorable for turfgrass shoot and lateral stem growth. Unfortunately, an active population of decomposer organisms has not yet developed in this relatively non-living root zone medium. Consequently, there is the likelihood that a organic layer may build up on the surface of the high-sand root zone, particularly where excessively high nitrogen fertility rates are applied. It may be necessary to practice mechanical thatch removal techniques, along with a more controlled nitrogen nutritional program involving slow-release nitrogen sources, until a balanced living biological ecosystem develops. Then the rate of organic matter biomass accumulation and its allied rate of decomposition will stabilize.

Hydrophobic Problem. The basic cause of a hydrophobic soil problem involves soil basidiomycetes fungi which during the process of mycelial decomposition result in their residues forming organic coatings around the sand particles. The consequence is substantially increased surface tensions and typical hydrophobic soil symptoms. These basidiomycetes associated with hydrophobic soil conditions tend to be more active on sand root zones that are deficient in a balanced population of soil biological organisms.

Nitrogen Nutrient Availability. Newly constructed high-sand root zones tend to have a relatively high nutritional requirement for nitrogen. This problem is associated with the non-living soil condition. The turfgrass nitrogen requirement is lowered by as much as 50% when a balanced root zone biological population develops. The use of a slow-release nitrogen carrier during this early phase is important.

Fairy Rings. High-sand root zones constructed with an undecomposed organic matter source may exhibit extensive fairy ring development, especially in Europe during the initial 3 to 4 years. The basidiomycete fungi that cause fairy rings are particularly active on undecomposed organic matter. This fairy ring problem may be minimized by use of a well-decomposed organic matter source, especially if it is properly composted to contain a balance of living beneficial soil organisms. Also, the use of composted topdressing material containing a balanced range of beneficial soil organisms is probably beneficial. Unfortunately, research to fully understand the organisms involved and means of maximizing their use in root zone construction and topdressing has not yet been accomplished.

In Summary. These problems can be minimized by encouraging the rapid development of a living, biologically balanced root system.

UPCOMING INTERNATIONAL EVENT:

July 20 to 26, 1997. Eighth International Turfgrass Research Conference. The University of Sydney, Sydney, Australia.

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UPCOMING JB VISITATIONS:

Provided for Institute Affiliates who might wish to request a visitation when I'm nearby:

- Nov. 3 to 7 - Indianapolis, Indiana.
- Nov. 13 to 15 - Rochester, New York.
- Nov. 18 to 19 - Phoenix, Arizona.
- Dec. 3 to 6 - Providence, Rhode Island.
- Dec. 7 to 12 - New York, New York.

ISTI Chief Scientist: James B Beard
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The goal of the six issue per year TURFAX™ newsletter is to provide international turf specialists with a network for current information about turf. This newsletter is faxed to all Institute Affiliates that use the ISTI technical assistance services on an annual basis. Faxing is more costly, but ensures quick delivery to those outside the United States.

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