

# CHALKBOARD

## TIPS FROM THE PROS

### Deep Cultivation Restores Infiltration and Aeration

By Tom Mascaro

As a turf consultant in Miami, FL, and one of the inventors of the turf aerifier, I periodically receive phone calls from Dale Sandin, grounds manager for the Orange Bowl. During one of our conversations, Sandin asked, "How far apart would you suggest we drill holes in the turf?" The water infiltration rate of the Orange Bowl field had dropped from seven inches per hour to less than one and one-half. The problem was compaction in the top six inches of the field.

In my opinion, the P.A.T. System field in the Orange Bowl is certainly one of the best systems for intensive-use sports fields. Briefly, the P.A.T. System, developed by Dr. William Daniel, professor emeritus from Purdue University, is a lined reservoir the size of the field. It has two or three vacuum pumps connected to a drainage system. The entire reservoir is filled with sand, with a small percentage of soil and peat mixed into



The Verti-Groove cuts and removes narrow, six-inch-deep slices of soil. These slices are removed or broken up with a drag.

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the top six inches. It is then seeded, sprigged or sodded.

The Orange Bowl and its P.A.T. system have worked flawlessly for more than ten years, being used for more than 30 events per year, ranging from rock concerts to tractor pulls to the Orange Bowl game. (See story in September **sportsTURF**.)

The reason Dale wanted to drill holes in the turf was to try to improve water filtration and aeration. His surface aerators were not doing the job deeply enough. In fact, research has indicated that aerator tines can actually cause compaction at the bottom of the core holes if the coring depth is always kept the same. Regular aeration is part of Dale's maintenance program since its benefits clearly outweigh any potential compaction problems.

Roots grow prolifically in the peat and topsoil mixed into the top six inches of sand. However, roots die off and are replaced by new ones. In soils saturated with water, old roots do not decompose properly. Instead, they accumulate and act like a sponge. Compacted subsurface soil layers that reduce drainage set up a chain reaction that becomes progressively worse. This root-bound condition also occurs on many "sand only" golf greens.

I called Dr. Joe Duich, a recognized turf expert at Pennsylvania State University, for his thoughts on the matter. He offered two solutions. The first was to drill holes six inches deep, four inches apart with a hand drill. While such a practice might be moderately impractical for a golf green, Duich realized it was highly impractical for a football field. His second answer was to try a deep aerifier that I had experimented with years before.

First, the device had to be built. It consists of two slicing components that remove a slice of soil six inches deep. The slices are one-half-inch wide and can be spaced one or two feet apart.

While the deep aerifier was being constructed, Dale took an opportunity to have the field sand-injected. This procedure opens a slot in the soil, without removing soil, and injects sand into the void to form a drainage channel. A patented machine developed in England injects sand almost nine inches deep in rows 20 inches apart. The sand-injection process reopened the top six inches of soil with the sand below.

When the deep aerifier was completed, we named it the "Verti-Groove." In 1984, Dale used the Verti-Groove to open up the soil in two directions. We estimated that 20 tons of soil and old roots were brought to the surface. The process was repeated three times in 1985 in March, April and May. Removing root-bound soils down to the six-inch level opened up the soil to the air so old roots could decay properly. Conventional surface aeration was continued as before.

The soil profile of the Orange Bowl has improved dramatically. Thin thatch layers, sandwiched between applications of top-dressing, have been eliminated. The top-

dressing serves to smooth the surface, an important factor in sports fields. With each topdressing a small amount of thatch is covered up and potential problems with layering can be avoided with both surface and deep aeration.

Ransomes distributors are taking delivery of the first Verti-Groove units this winter. There are no moving parts. It is not intended to replace surface aeration, but when used in conjunction with them, it can correct subsurface compaction caused by surface aerifier tines.

Another problem Dale and I have been looking at very closely is airborne soil pol-

lution. We have known for years that a great deal of fine particles suspended in the air settle on turf as fallout. These pollutants, especially in metropolitan areas, consist of extremely fine particles of mineral and organic matter. Greasy substances, probably derived from jet fuels and automobiles, are also present. Dew or water falling on the turf washes the particles into the soil, where they clog pore spaces.

The full effects of airborne soil pollution are not understood and research is needed, especially for urban stadium fields. For now, a combination of surface and deep aeration can keep the problem under control.



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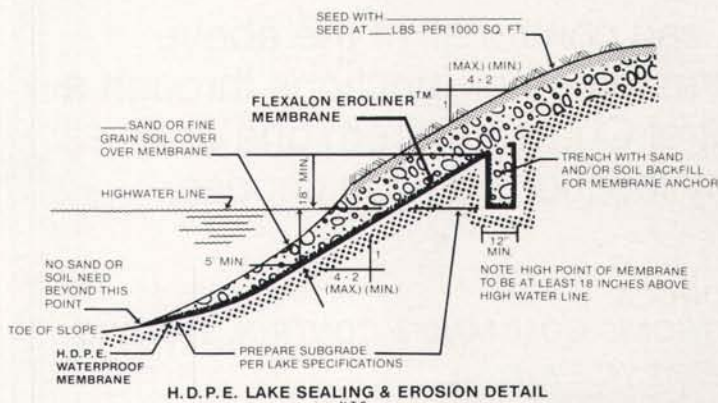
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