

## VERTI-GROOVE AERATION DRAINAGE

David Legg  
Ransomes, Johnson Creek, WI

The Ransomes Verti-Groove was developed by Tom Mascaro and Ransomes after Tom was invited to look at problems that were arising with the drainage system at the Orange Bowl in Florida.

The Orange Bowl has a P.A.T. System, which means that it is all sand, 16 inches deep with the top 6" modified with peat and soil.

The percolation rate when it was new was seven inches per hour. Over a period of five years, water infiltration became less and less, until it reached only an inch and a half and less in 1983.

Dale Sandin, Sports Turf Manager, found that there were many roots in the soil profile, but they were dead. They were like a sponge holding water so that aerobic decomposition could not take place.

Dale planned to drill holes with an electric drill to remove some of the dead roots to improve decomposition. The Verti-Groove was designed to do this job faster and more efficiently.

The Verti-Groove proved to be successful using two slicing knives, spaced 1/2 inch apart. The sod and soil can be cut to a depth of 6". A small lifting plow between the two blades lifts the cut soil profile to the surface where it can be completely removed or left to dry out and then drag matted back in.

The first prototype made for the Orange Bowl was used on the field in 1983. It was grooved twice in the spring, twice over. It was estimated that approximately 40 tons of soil per acre were removed by each Verti-Groove operation. The field was again done three times in 1984 and 1985 and twice in 1986. Each time twice over for a total of 20 times. The field drains well now and has a deep root system.

Palmaire, Inc. had a problem of drainage on their 18th green on the Sabals Course. The problem was in the first four inches, which had a great deal of thatch. There were also indications of a compacting layer at 2 1/2" and 3" depth. The turf was weak and algae was a problem. Soil below the four inch level was porous and drained well.

The green was Verti-Grooved in two directions with an experimental machine which was mounted on the three point lift of a tractor. Cutting blades were mounted on a special holder that produced a 1/4" cut in the turf. The average depth was five inches. Two weeks prior to work being carried out, the green was fertilized. The green was then verti-grooved in two directions, leaving the corners for check plots. The cores were then removed. The best way was found to be with a flat spade or a snow shovel. The sandtrap plow bogged down.

The green was fertilized again, topdressed and then spiked seven times in different directions. Surface spiking helps to partially close the tops

of the grooves, much like repairing a ball mark. Subsequent soil samples showed roots down at the 6" level. Green strips appeared where the soil had been extracted. The darker green stripes spread at the rate of about an inch per week and came together in about six weeks.

Randy Smith of the Nakoma Golf Club in Madison, Wisconsin, saw our machine on a demonstration and asked if it could be tested on his problem green. Poor drainage had plagued this green, causing standing water and ice to thin and kill the turfgrass in several places. The green is usually the factor for the opening date in the spring or the opening hour following a storm.

Randy sliced approximately 3000 linear feet. The grooves were cut with four passes of three slits at one foot spacings in the north/south direction, and six passes of three slits at one foot spacings east to west direction were determined according to the natural drainage of the green.

1/2" slicing blades were used and set to go as deep as possible. Penetration was between 4 1/2" to 5 1/2" deep. These slices were removed after each pass so the tractor wheels would not run over them. The trenches were immediately backfilled with sand. NOTE: Dry sand should be used as it is much easier to fill in the grooves. shovels were used to specifically place the sand over the trenches and a 6" board was used to scrape in and pack down the sand into the groove.

Once the grooves were completed, they spiked the green with a hand spiker and overseeded with 1/3 pound Penncross per 1000 square feet. The entire green was then topdressed and rolled.

The operation was carried out late in the fall and there were concerns about opening up the ground at that time. Randy feels that because of freezing and thawing, the green may need rolling again in the spring. A Warrens Terra shield cover is being used to protect the green from desiccation over the winter period.

The development of a new product requires new techniques. Superintendents and Turfgrass Managers are very much a part of our Research Team. New techniques develop with each new user of a machine like the Verti-Groove. Ransomes does not see this unit competing with anyone. It's another tool in the arsenal to help produce better turf.