◀ **PLUGS MOWED** at 3/8"and pulled after 3½ months. Plugs were grown in the field with proper rates of fertilizer and irrigation applied. Left: Organic Humic Substance, APEX-10, applied at 3 ounces per 1000 square feet. Right: No APEX-10.

Healthy and safe turf begins at the rootzone

Editor's note: *Timothy Kwiat is the Director of Turf and Landscaping for Nature's Wonder, the manufacturer of APEX-10. He has more than 20 years in the golf industry including as a superintendent.*

YOU WOULDN'T BUILD A BEAUTIFULLY DESIGNED multi-million dollar house without a strong foundation and expect it to withstand a hurricane. So why would anyone expect their turf to be visually appealing and perform well without a healthy rootzone? By starting at the ground level, sports turf professionals will see improved turf performance and increased safety for athletes.

Healthy rootzones that support turf have been defined by the following criteria: well drained, compaction resistant, with free nutrient exchange. This free nutrient exchange is essential to allowing the soils to hold onto nutrients as well as release them to the plant.

But what creates the support structure for this exchange? Microbes. So, what if your rootzone isn't supporting your microbes and your microbes aren't supporting this nutrient exchange? How do you improve your turf health while dealing with the other challenges in the sports turf management arena?

There are new technologies on the market that focus on bio-stimulation to continue to build those microbial populations while maintaining proper levels of organic materials in a soil system. Having higher organic matter content in soils allows for additional food sources and attachment sites for microbes to thrive in the environment in which they live. These in turn create a healthier environment for root growth and plant growth.

Turf professionals deal with many rootzone types. Bringing each rootzone to its optimal performance to support the needs of each specific sport is where the challenges lie. You face many challenges when working toward building turf that looks good and supports the needs of athletes. Producing the type of turf that provides stable footing, cushion, and resilience specific to each sport is dependent on your program. While normal programs focus on nutrients, water, weed and pest control, many professionals are finding it harder and harder to manage the demands put on the turf with increased input restrictions. To overcome the challenges of creating the best rootzone while reducing inputs, turf managers must be creative in their approach.

SAND-BASED

Typical sports turf fields are made up of a combination of varying degrees of soil and root zone types. Some soils are composed of high sand content to create a well drained surface and the firmness that certain sports demand. These rootzones put all of the nutrient control in the hands of the professional simply due to the fact that they have very low cation exchange capacity or nutrient retention ability.

Modified sand-based rootzones have moved into professional venues and stadiums. In the professional sports arena, sand-based root zones give athletes the solid footing and cushion they need to play the desired game. The challenges are characterized by excessive nutrient leaching, low CEC, and low organic activity with very little microbial support capability. In addition, localized dry spot formation and potential algae buildup can become an issue. The importance of microbial populations in high sand content rootzones is to support nutrient and water retention. Beneficial organisms and plant roots have a symbiotic relationship. As microbial populations increase through bio-stimulation, the roots are fed the nutrition they need. The roots in turn feed the microbes the complex sugars that the roots put back into the soil.

NATIVE SOIL

Healthy native soil zones or push-up fields have longer water retention for better plant support, larger CEC capacity for nutrient retention, and more organic matter for microbial support. Native soil surfaces still sustain the functions that are needed to support sports, but like sand, it comes with the need for turf professionals to manage it properly. Larger microbial support in these systems is essential and builds porosity with increased drainage and capillary water movement. The increased porosity allows for better carbon dioxide gas

exchange and oxygenation of the soil.

Without these characteristics native soil rootzones have the potential to develop compaction which leads to nutrient binding, uneven moisture availability and restricted root penetration. When these issues plague native rootzones the system becomes over wet with lower wear tolerance. Compaction in the rootzone reduces the ability for the roots to grow freely slowing the nutrient release potential due to the physical properties and chemistry of the soil. This is when it becomes critical to support the soil biomass, as a more active microbial population improves soil flocculation.

IMPROVING ROOTZONES

When rootzones are unhealthy it can lead to increased plant stress, reduced plant growth rate, thicker thatch layers, localized dry spot, algae buildup, increased weed pressure and unstable footing for athletes. So, what is the best way to meet these challenges without breaking your back and your budget?

Historically turf managers have employed mechanical and chemical means of improving rootzone health. These include chemical and mechanical thatch removal, oxygenation by aeration (various sizes and depths), mechanical drainage improvement, and other various soil remediation techniques. While each of these enhancements works and provides the means necessary to address these issues, playing schedules, calendars and event schedules prohibit the frequency and tolerances for these practices to be done on regular intervals.

A true biostimulant provides a food source for the existing soil biomass, accelerating the natural growth of the microbial population. As proven in the university research, the organic humic substance also solubalizes and transports nutrients to the plant. Virginia Tech examined APEX-10's effectiveness in rootzone development on sports turf to improve playability and stable footing when limiting factors are present. It was found to increase the soil's ability for both the physical and chemical bonds of nutrients and water, allowing for more water and nutrient retention. Applying an organic humic substance with a high fulvic acid ratio per unit early in the season reduces the effect of the limiting factors in the rootzones and prepares turf for heat and summer stress. A second Virginia Tech University study showed that APEX-10's greater antioxidant activity improving photochemical efficiency, enabling sustained root growth and leaf function during drought conditions.

Furthermore, APEX-10 improves the recuperative capacity of turfgrasses following heavy play and traffic by providing consistent nutrient and water availability to the plant as found in a series of fertilizer and irrigation reduction studies by Rutgers University. The organic humic substance improves safety for the athlete by naturally degrading the thatch layer over time without creating spikes in growth due to excessive nutrient release. Chris Walsh, turf manager of the Akron Aeros, said, "We applied APEX-10 for the first time to our Kentucky blue/ryegrass minor league field after a considerable stressful stretch of games in August. We aerated, overseeded with rye grass and applied APEX-10. Within 7 days the turf had recovered and was looking and playing great just in time for our 2012 playoff run." ■