

# Water's true impact on your sports turf

## And what it all means for decision making

**Editor's note:** Carmen Magro is vice president of agronomy for UgMO Technologies. He has a degree in turfgrass science from Penn State and was superintendent of Bidermann Golf Club, Wilmington, DE from 2000-04 before becoming an instructor in Penn State's turfgrass program. He later worked for Floratine and Advanced Sensor Technologies.

**T**HAT HAS BEEN SAID more than once that you cannot manage what you don't see. Then someone needs to explain to me how we as turf managers have been finding a way to do just that for a long time. But have we really managed to the best of our ability? Having been a golf course superintendent and instructor in turfgrass management for golf and sports turf students alike, I have experienced times when I wondered if I was making the right decision when it comes to irrigation practices and water movement through my turf system.

In my 20th year in this business now, having seen millions of data points collected from various soils around the world in real time, I've learned what water truly does in the soil and in our turf systems. More importantly, I've learned from sports turf managers how a simple assumption and decision on water use can make or break a

game, a season or even a career.

For the past few years I have served as the VP of Agronomy for UgMO Technologies, a company who specializes in monitoring soil conditions in sports turf, golf, agriculture, residential and commercial landscapes and environmental systems. Through multiple recorded cycles of water in sandy to clay soil types, dry to humid climates, sunny to shady conditions and every other changing variable that you understand far too well, I've learned what water truly does before, during and after an irrigation cycle is initiated. For sports turf users, the question as to whether or not we can gain more information to make better decisions has certainly been answered with a resounding yes when it comes to soil monitoring. Currently, UgMO has recorded millions of data points making it likely the largest real time soil data base in the world as its patented wireless

technology allows for sensors to be placed anywhere desired.

Take the skin of a baseball field. Using UgMO in its earliest phase, Eric Hansen of the Los Angeles Dodgers learned quickly that turning off the water completely when the team was out of town was not doing him the best justice for maintaining his skin most effectively. He explained to me that, "I learned how the lower profile in the skin became so dry during the away stands that it took me much more water (and time) to get the skin to the optimum moisture I wanted for the next home stand. I found it much easier on us to maintain better conditions by maintaining a consistent moisture level throughout the skin at moderate levels even during away stands while the overall water use had no significant change."

I certainly understand the need for optimum conditions. Matt Shaffer, superintend-



ent of historic Merion Golf Club, Ardmore, PA says, "I don't manage my course for health; I manage it for playability. Ironically, doing what is best for playability is what is best for water use as far as doing the right thing and being environmentally conscious."

Matt used the sensor system to dry his fairways to a level and keep it there for an extended period of time that resulted in a significant reduction in pesticide use as he simply took the disease pathogen facilitator (water) out of the equation by understanding what his moisture levels were throughout the soil profile.

### SCIENCE AGREES

Science agrees with both of these gentlemen. But it is important to highlight one point that is consistent throughout the world of turf management. Those managers that seek information AND use that information to make better decisions are the leaders of the industry and are predominantly more successful than those that ignore information that helps them make better deci-

sions. Even in areas where resources such as pesticides are absent, turf managers that pay attention to the always changing environment in the turf system succeed at developing those playability conditions that are sought after day after day.

Science tells us that if we allow a soil to get too dry it repels water due to hydrophobic reactions. On the flip side, if we allow the soil to remain too wet, water again is repelled but in a way that causes surface ponding and runoff as well as quickly deteriorated conditions from the wear and tear of play and maintenance. In addition, a sandy soil with an immature turf (less than 6 years) has quite a different reaction to soil than the same soil with mature turf on it due to the significant qualities of organic matter.

Much focus is on organic matter and how much is too much. After sensing many soils and conditions, what is true is that organic matter nearly has no limits if it is consistent throughout the soil profile. It is particularly when we have a high level of organic matter condensed into a very small region where it

gets compacted and restricts water movement that we really see problems develop. In addition, we lose the control of water through the profile in situations like this.

The UgMO ProHome system that is being used across the country in residential and commercial landscapes as well as ball parks, will not allow irrigation to take place and will even adjust it appropriately to maintain the optimum level of moisture in the soil. This is not something that everyone is willing to give up...that is, the control of their water. Don't worry, we've heard that over and over and ultimately, it is the information that comes from the UgMO monitoring that allows the turf manager to make decisions he or she is most comfortable with making.

So how does the system truly work and is it worth looking into as a resource for your operation? The later is a question only you can answer. However, the use of the system is simple. First it is important to understand some simple characteristics of water and soil physics. Remember from turf school that

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water has a very strong bond to itself. In addition, the smaller the particles in the soil the more attractive the water to soil bonds are. That is why soils with high organic matter contents have a larger affinity for water than soils with limited organic matter as OM consists of smaller particles than anything else that makes up the physical structure of soil.

Finally, water in the upper profile and its movement depends on the amount of moisture in the lower profile. If water is present up top but not down bottom, it will take cultural practices in most situations to make a change as there is something holding that water up (OM, hard layer, sod layer, etc). Many of you use wetting agents when this is the case. We've learned from managers like you who have installed sensors to monitor water movement throughout the profile that all wetting agents are certainly not created equal (a topic for another article).

On the flip side if we have a lot of water in the lower profile and not much in the upper, this is typically conducive for strong root growth assuming the water is not backed up due to a drain clog or there is no layer dividing the two regions. But what we have learned is that there most certainly is a region of moisture that is best for turf quality to be at its finest at the surface and it is typically when there is slightly moist to dry conditions in the upper two-thirds of the root system to slightly moist to moderately moist in the lower profile. In addition, the depth of measurement varies from site to site and can only be identified when the sensors are installed.

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Kenny Pauley maintains the football field at the University of Georgia and says, "UgMO has allowed me to understand what my optimum game day conditions are. I didn't use the system to tell me what those conditions are...I prepared them and then used the measurements to know what the conditions are for my field. With that information I can now understand days before a game, depending on the forecast and other influential events what I need to do to get those conditions back. Do I need to get water deep or shallow, uncovered or covered...whatever it takes to get the conditions I need for the best playability."

Pauley is expanding his use of the sensors throughout many areas of the campus as he is finding the information more and more useful.

### DODGER STADIUM

In the early use of the system at Dodgers Stadium, Eric Hansen found that the park was not initially set up to monitor every gallon used on the field since much of the water was shared outside of the stadium and other areas. Interestingly, the goals of Eric are similar to that of the others...they are managing for the best playability. While saving water is important, they are not operating to save water but simply to use it most efficiently to manage the property in the environmentally conscious way while providing the conditions necessary for the game. I worked closely with Eric to achieve his goal of finding how low he can actually go on his moisture levels before he had too little water in the soil. He learned that there is a limit. More importantly he learned that reaching that limit is not a good idea but maintaining at a level slightly above it is wonderful. As a result of crossing the limit, his bermudagrass was set back and took a lot of attention, time and water to bring back. Other areas that were maintained at or above that threshold held up quite well throughout the season.

What all of the users of UgMO's soil monitoring system will tell you is in agreement with our agronomic philosophy...that is, UgMO doesn't tell you what to do. While even with the ProHome system mentioned above where it makes irrigation decisions daily based on changing soil conditions, even that system has intelligence in it that is science based with regard to how water moves through each and every soil...and how every soil is truly different. But for turf managers, particularly in sports where the camaraderie is strong, sharing information seems limitless and without hesitation. Learning from each other and seeking every piece of knowledge that can help make better decisions is more of a reality than ever with the ability to see wirelessly into the soil whenever or wherever one wants to.

In the chart on page 14, notice the upper moisture (red) dried down significantly to a point the mimicked a large decline in moisture in the lower profile. In this situation which is the opposite of what is best for strong plant growth, it becomes very difficult to rewet the entire profile and get the conditions conducive for high surface performance. The green band called the UgMO Zone on the user interface which is accessible from any internet connection indicates the target moisture level. This level is user defined and identified through the experience of the field manager and the association of recorded values with condition observations. Managing moisture to these targets allows for consistent conditions, a reduction in overuse of water and the predictability of how the turf will perform on game day. ■