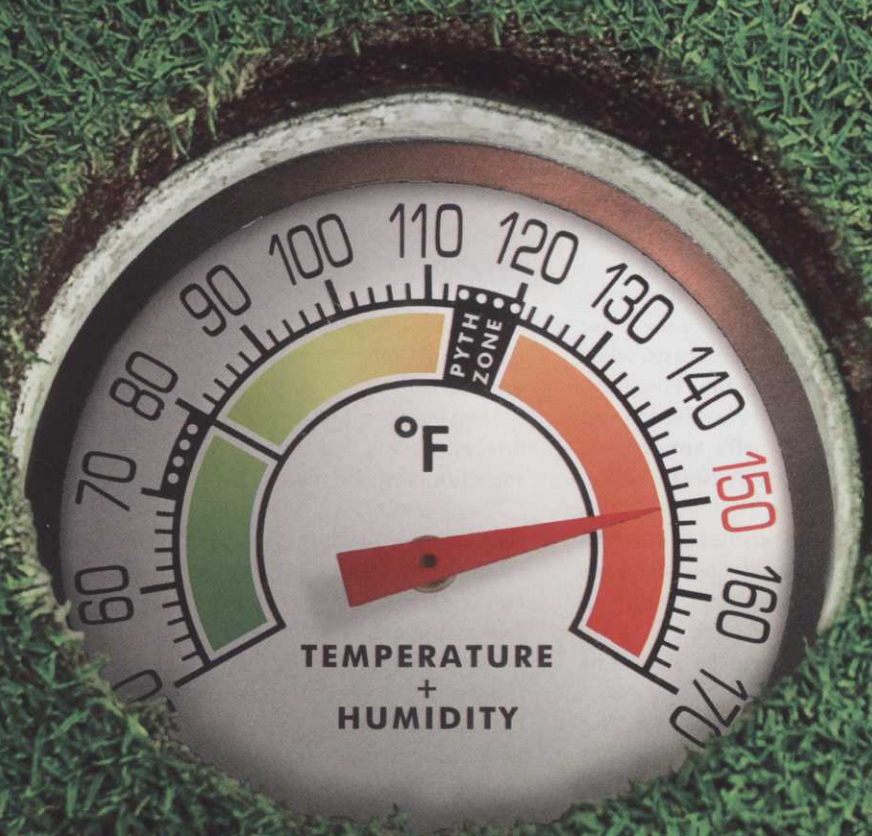


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BECOME A JUNIOR FORECASTER

by Richard Skelly

Weather modeling can help you better manage disease outbreaks.

Many superintendents would argue, managing disease outbreaks due to weather is like managing people. Both are unpredictable and one must be reactive instead of proactive.

But by keeping a close eye on weather patterns and forecasts and weather and turf-related websites offered by research institutions around the country, superintendents can plan for and avoid outbreaks of the most common turf diseases. The majority of these tend to be fungus, which depends on moisture for survival.

Dr. Rick Latin at Purdue University in Indiana runs Turfcast, a website that helps turf managers in the lower Midwest keep a better eye on long-range forecasts, while Dr. Art DeGaetano at Cornell University runs Fore Cast, a website for superintendents and others involved in turf care around the Northeast, out of Cornell's Atmospheric Sciences and Turf Team at the university's Northeast Regional Climate Center.

Similar websites likely exist at universities in other regions of the country, but the experts urged superintendents to take a multi-pronged approach to managing outbreaks of dollar spot, brown patch and pythium blight.

How can superintendents better manage disease by closely monitoring weather forecasts?

"It's difficult to give you a short answer," says Latin. "But these pathogenic fungi are active under certain types of environmental regimes," says Latin. "We can define those based on temperature and moisture."

The pathogen must be active and growing or there's no sense in applying fungicide, so one has to wait for the fungus to start growing before it can be killed quickly, he notes.

"The idea with the website is to identify those periods when the pathogens are growing," Latin says. "Then we

can schedule those fungicides most effectively and we can get more efficient control,"

The fungus doesn't respond to the calendar, but it does respond to temperature and moisture. In Indiana in March, 2012, Latin says temperatures were well above 80 degrees for seven to 10 days, but in March of this year, temperatures never got above 40 degrees for the entire month. So the dollar spot pathogen was active in March 2012 but dormant in March this year.

So can one be proactive rather than reactive when it comes to something as fickle as the weather?

"Maybe we can improve our ability to forecast the weather, and if that's the case, supers can respond to that," Latin says.

"Supers can look at what's ahead and, knowing how much they've sprayed already, they'll know what to do. What we do at Turfcast is narrow that gray area between disease forecasting and scheduling application of fungicides," he adds. "There's a bit more certainty about a risk outbreak if you apply these models we have in Turfcast."

DeGaetano studied meteorology at New Jersey's Cook College at Rutgers University but for the last 15 years has been part of Cornell University's Turf Team, studying the relationship between weather and disease outbreaks.

"People use our site for any number of things," DeGaetano says. "One is irrigation: We have tools on the site that say should you be watering and how much water has evaporated from the turf and we also tie things to the forecast. If the



DISEASE MANAGEMENT

forecast is for a good chance of rain, you may wish to hedge your bets there. We've done the same type of thing for different diseases and weed control." De-Gaetano notes that one model that gets quite a bit of use early in the season is the application for dandelions.

"You could be wasting your money throwing herbicide down on dandelions. By waiting until a later part of the season, you can get 80 or 90 or 100 percent kill on the dandelions," he says.

Golf course supers and others in the turf care industry tend to do things by calendar.

"If it's April 15, I need to do this,' and that might be OK under average weather conditions, but that time to do something could change by weeks, whether it's hot or cold or warm," he says.



<< Sensitive data

Anticipating disease pressure doesn't stop with weather forecasting. For the whole picture, superintendents need to consider soil condition data as well, says Carmen Magro, vice president and agronomist at Stevens Water Monitoring Services.

Stevens has an electronic handheld probe unit – the POGO – that features the company-patented sensor on the end that measures soil moisture, temperature and salinity (otherwise known as conductivity). The addition of these variables provides the superintendent with a mountain of data. In addition, the POGO sticks are also GPS and Wi-Fi enabled, so it logs the position of every reading it takes.

"It just got developed last year, but demand has been so high, we're now shipping it across the world. As soon as somebody hears about it, it seems, they want one."

Superintendents can use all this soil condition data in conjunction with temperature forecasts to predict turf decline, disease outbreaks, insect outbreaks and other potentially perilous conditions.

"The PGA has used moisture-only sensors for years now, and what they're realizing is it's not giving them the whole picture," Magro says. "What our POGOs now allow you to do is have [measurements] done much more efficiently and accurately by having reference points installed in the ground to monitor these things.

"You can send someone out every morning and take 10 or 15 samples per green, it takes you less than two minutes per green and you instantly know if you need to irrigate more or less, or if there is a developing salt problem that needs attention among other analyzed indications. It is also easy to determine if an apparent stress is a water-related problem at all."

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Website: <http://www.agriculture.purdue.edu/turfcast>

Turfcast is an informational resource that provides a daily summary of risk for several turfgrass diseases. The risk assessments for Turfcast are based on empirical models that relate the prevalence of certain weather conditions with disease outbreaks.

Select a Turfcast Station: **IN 1165** Model: **1**

Disease Risk Indicator Key

Turf Disease Risk Indicators for 06-Oct-2013

Low Risk	Moderate Risk	Pythium Blight	Low Risk	High Risk
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Disease Risk

The weekly summary provides the risk assessment values for weather conditions that occurred at the indicated weather station location. The data can be used with other information to make management decisions such as timing of fungicide applications. The models have not been separately tested in Indiana. They tend to be very conservative in nature, i.e., they are likely to predict disease outbreaks more often than they actually occur.

We at Purdue are conducting research to improve upon our ability to provide Turfcast disease advisories.

Weekly Risk Assessment Index

Disease Model	06-Oct-13	05-Oct-13	04-Oct-13	03-Oct-13	02-Oct-13	01-Oct-13	30-Sep-13
Brown Patch	Moderate	Moderate	Moderate	Moderate	High	Moderate	Moderate
Pythium Blight	Low	Low	Low	Low	Low	Low	Low
Dollar Spot	High	High	Moderate	High	High	High	High

Degree Day Counter
For 06-Oct-2013
Base: 50
Today's DD: 14.0
Cumulative DD: 3288
Count from March 1, 2013

<< Check it out...

Access Purdue University's website by entering bit.ly/1aZrle6 into your browser. The Turfcast site offers a wealth of data for superintendents in the lower Midwest to access and use in planning their applications of fungicides, insecticides and herbicides. Dr. Rick Latin and his associates at Purdue maintain the website and update it several times daily. It offers a daily summary of risk for dollar spot, pythium blight and brown patch.

"We use a variety of algorithms to assess the daily threat, and when threats accumulate over time, the site signals a high risk of disease outbreak," says Latin.

To access Cornell's Fore Cast, enter bit.ly/15cuqPY into your browser.

With Cornell's Fore Cast site, Dr. Art DeGaetano says: "The idea here is as a super you want to follow the weather but you don't want to have to crunch numbers. That's what our website is for. We take that data and translate it into the information a superintendent needs to help them make decisions about how much or whether to apply irrigation, fungicide or insecticide."

With Cornell's Fore Cast, Northeast superintendents have more flexibility in their disease management program. Knowing when disease pressure could hit allows superintendents to be selective with applications.

"Instead of saying I have to put down fungicide every seven to 10 days, now, I can see a period of time where risk is go-

ing to be very high, so I might want to apply it sooner," says DeGaetano. "Or if risk is going to be delayed for a few weeks, you might want to forgo an application."

Superintendents always want to be aware of the weather and how it affects the turf, DeGaetano says.

"We had a period in July, in

the 15 years I've been doing this, where disease was just off the charts, and we saw that in the models and we saw that in the reports we were getting from around the region," DeGaetano says.

"It's not only heat, but it's heat and humidity that are the two most important factors, and this summer was filled with far more

weather extremes," he says.

In the meantime, Latin at Purdue says it's his understanding that at some point in the near future there's going to be a big improvement in forecasting methods for dollar spot. **GCI**

Richard J. Skelly is a New Jersey-based writer and frequent GCI contributor.

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Water features

How well do you know your irrigation software? Here are some often overlooked features that can boost your efficiency. by Rob Thomas

Today's water management software comes loaded with myriad bells and whistles. But are superintendents leaving important cards on the table by overlooking some potentially useful applications?

Randy Mills, product manager, golf controls at Hunter Industries, says ET-based irrigation – with EvapoTranspiration being supplied by a weather station – and pick lists as a couple prime examples of technology not being utilized to its fullest.

“Weather stations are popular and watering by water depth is popular, but most people want to look at the weather station ET, then use their own number,” Mills says. “When properly configured, it is possible to allow an irrigation system to almost totally manage itself with the superintendent just confirming the value.”

The superintendent would probably need to make adjustments in some cases where ET is not the overriding factor in determining runtimes, Mills adds.

As for best using pick lists – a table containing a display of common runtime or ET adjustments – Mills considers this a time-saving feature in the software. After assigning entries to groups of stations, superintendents only need to change one number to apply a change to specific groups.

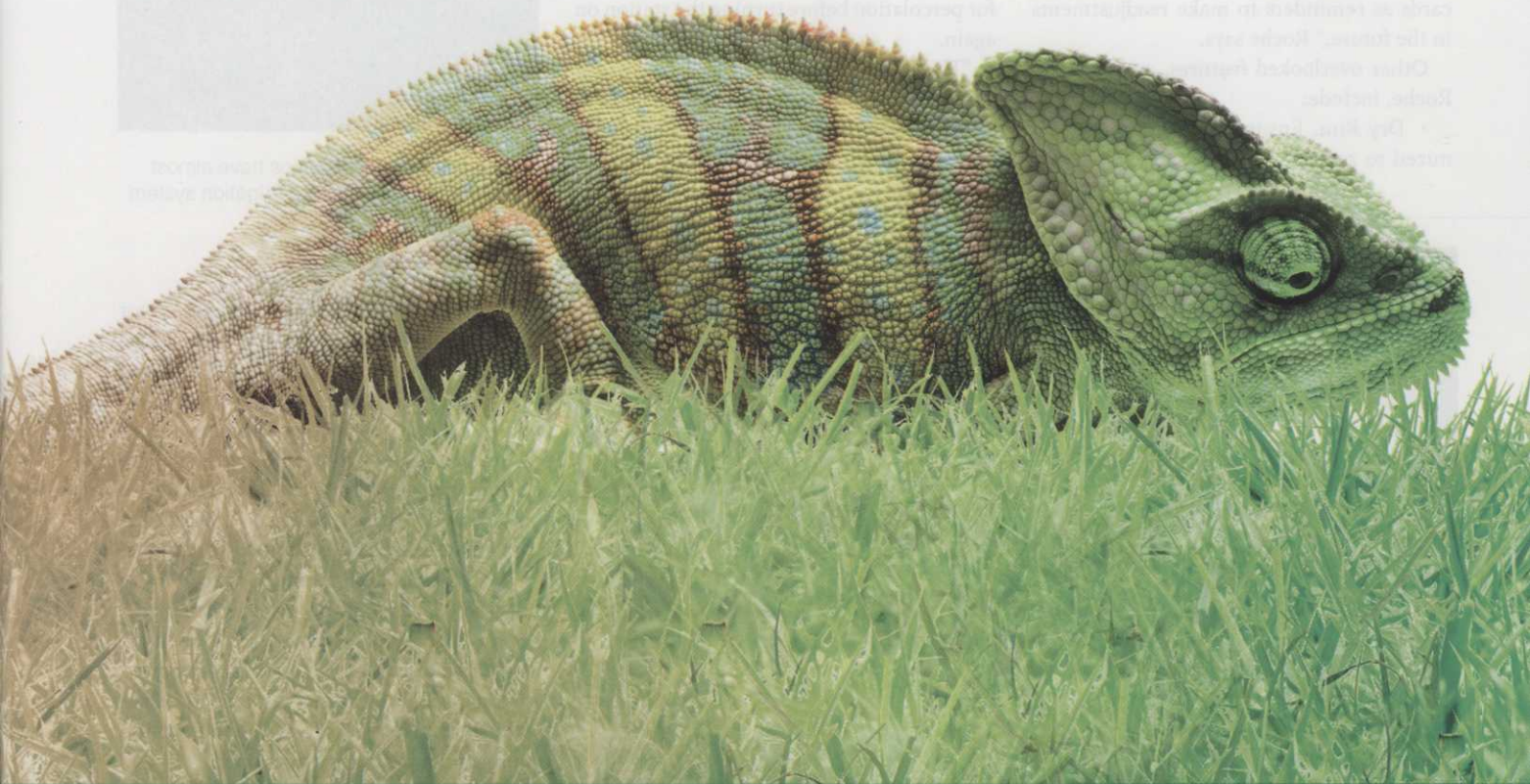
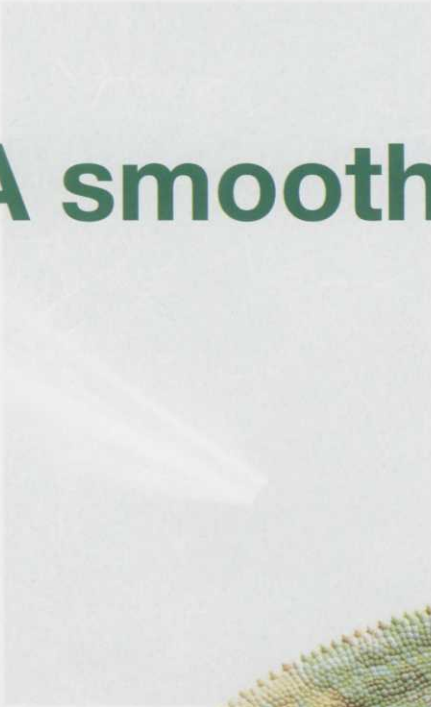
For example: Wind causes increased evaporation, therefore, moisture in that area is depleted more quickly than other areas, which is the same as saying the ET is higher. If a course has traditionally windy areas, a pick list value called “WINDY” can be created. Any sprinkler tagged as WINDY will automatically run 10 percent longer (110 percent) than the weather station says.

“The power of the pick list is that you may eventually have 30, 50 or more sprinklers identified as being in windy areas,” Mills explains. “If you decided 110 percent was too low and you wanted to increase the setting to 120 percent, it would take a long time to make the same change to 50 sprinklers. Instead, because the pick list was used, only the pick list value needs to be changed and instantly, all sprinklers identified as ‘windy’ will run 20 percent longer.”

“Allowing your weather stations to have almost complete control over your irrigation system also saves time, but perhaps more importantly, it gives the superintendent extremely fine control over how wet or dry he keeps the course,” he adds. “Once the system is ‘tuned’ to the weather station, you can dry the course out by changing one or maybe a couple of numbers. When you want it a little wetter, the same thing is true.”

Paul Roche, national sales manager for golf at Rain Bird, points to “Temporary Station Adjust” as a key feature often overlooked in central controls. This allows a su-

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“We don’t see these [underutilized] functions becoming obsolete at all. These features have been asked for by irrigation system managers and adds to software at their request. We routinely see irrigation system managers **rediscover software functions** and incorporate them into their daily routines.”

– Paul Roche, Rain Bird

perintendent to identify areas and sprinklers that either require a little more or a little less water and adjust an irrigation program (runtime/application rate) for a predetermined period of time before defaulting back to their regular run time/application rate.

“Without this feature, adjustments were typically made on post-it notes and index cards as reminders to make readjustments in the future,” Roche says.

Other overlooked features, according to Roche, include:

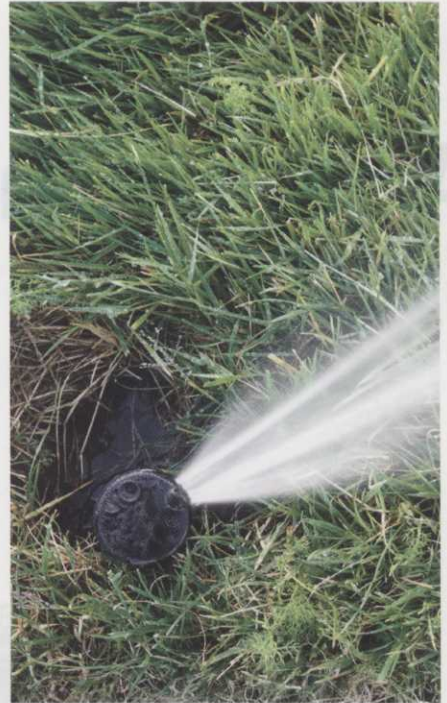
- Dry Run. Ensures the system is optimized to reduce pump station cycling and

maximizes flow management;

- Pump station profiling. Setting maximum flow limits throughout the day to stay within utility company Demand Charge restrictions; and

- Cycle-Soak. Allows a superintendent to set the maximum runtime/application rate on an area, then wait a period of time for percolation before turning the station on again.

“This is ideal for sloped areas or heavy soils where runoff may occur, or on areas that sod or seed is being established, and the irrigation system manager wants to continually wet an



Letting your weather stations have almost complete control over your irrigation system will save you time.

area,” he says.

Lack of time and hectic schedules factor in many functions being overlooked, Roche says. The need to keep software updated when renewing central control system service plans also plays a role, he adds.

Mills stresses education, refuting the notion that allowing a weather station to automatically update sprinkler runtimes is underused because it is simply not trusted.

“I believe the real reason this capability is not used is because it is not well understood,” he says. “Weather stations and ET are both well understood, but what actually happens to turn an ET value into a runtime and especially, how to ‘tune’ your system in to match your golf course is not understood.

“Pick lists are not used because they are not well understood,” Mills adds “They are not prominent enough in the software and we have not done a good enough job training people to use the feature.”

The use of pick lists are something that needs to be better emphasized when people are trained on the software, according to Mills, while an intermediate step is missing with weather stations/ET.

“Most superintendents water based on straight minutes of runtime,” he says. “After years of seeing the weather, picking runtimes and seeing the result, they become very good

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