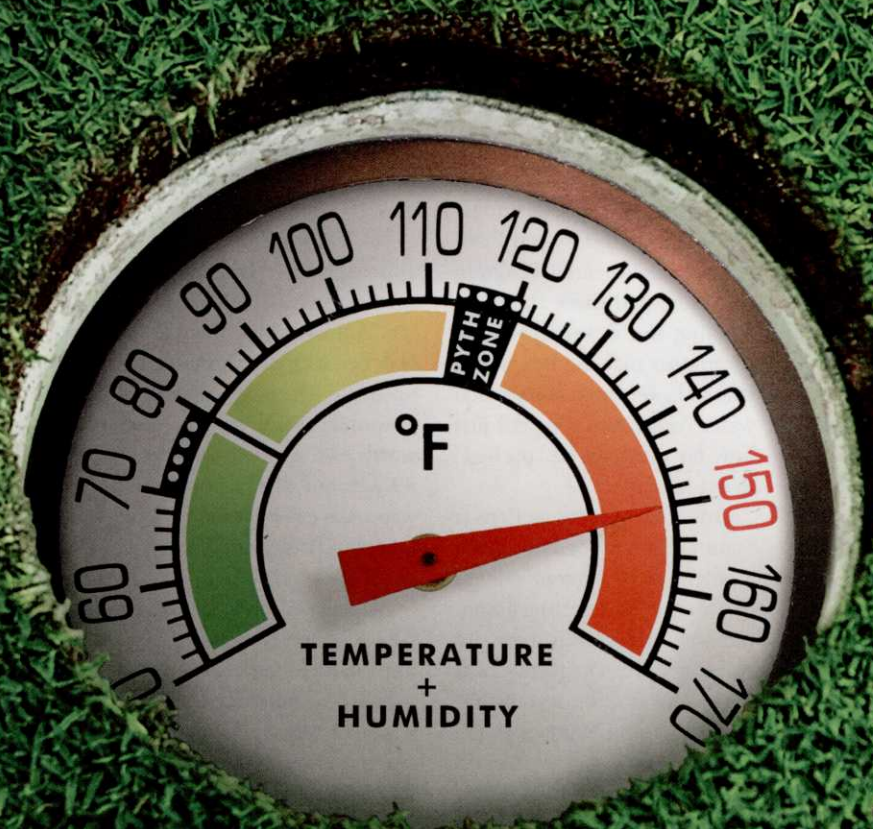


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JEFF NUS, PH.D

## Thirsty but green

A Kansas State University study explores the minimum amount of water needed for Kentucky bluegrasses to survive while remaining green between irrigation cycles.

In most of the United States, watering the golf course is an important responsibility of the superintendent. It is equally important for golfers and course officials to understand that water availability, usage, and cost are major issues facing the golf course industry. Water impacts nearly every aspect of managing golf course turf, such as color, mowing operations, traffic control, disease development, and playability. In addition, a significant amount of the golf course maintenance budget is directly related to water — maintaining the irrigation system, energy costs to pump water, costs for using and storing water, and on and on.

### Editor's note

This article first appeared in the July 6 edition of the Green Section Record. Reprinted with permission. Enter [bit.ly/Nj6uHk](http://bit.ly/Nj6uHk) into your web browser to read the article in its original format.

For nearly three decades, the USGA Turfgrass and Environmental Research Program has addressed these issues by funding the development of turfgrasses that use less water, studies to determine how much water turfgrasses use, and just how far they can be “pushed” to use less.

One such project at Kansas State University demonstrated a potential 30 percent savings in water when selecting a Kentucky bluegrass cultivar for golf course roughs. The researchers compared water use requirements among 28 Kentucky bluegrass cultivars and two hybrid bluegrasses (Kentucky bluegrass X Texas bluegrass) that were maintained under wilt-based irrigation. Water was applied when an individual cultivar plot started to wilt. In that way, each cultivar was maintained under far less than ideal moisture conditions in an effort to find the minimum

amount of water needed to have acceptable turf. The cultivar received one inch of water

when visual symptoms of wilt appeared, rather than applying daily amounts of water to replace moisture lost from the leaf and soil surfaces.

“Deficit irrigation consumes less water than the turf would normally use under well-watered conditions. Although our irrigation strategies in this study often resulted in deficit irrigation, we didn’t monitor the level of deficit during the study,” Dr. Fry says. “We took the approach superintendents would often use, which is to apply about an inch of water when wilt first appears. It’s practical and could be used with cultivars of other grasses.”

Dr. Fry explains that this approach of irrigating in response to visual wilt saves water. “Across cultivars, our range of deficit irrigation levels ended up being 46 to 89 percent of evapotranspiration. In other words, we applied only 46 to 89 percent of the amount of water the cultivars would have received under well-watered conditions.”

Dr. Steve Keeley, a co-investigator on the study, says, “It is important for superintendents to know the difference between water use rate and irrigation requirement, as well as how long the turf cultivars on their golf courses can go between irrigation cycles. Previous research has shown slight differences among cultivars in their water use rates. However, there is a difference between water use rate, which is typically measured under non-limiting moisture conditions, and irrigation requirement, which is not.

“This research shows some pretty dramatic differences in

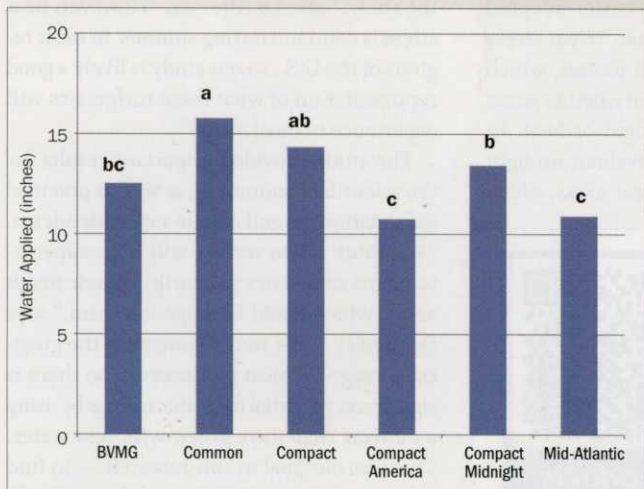
irrigation requirement. Knowledge of these cultivar differences is critical for making cultivar selection decisions, and superintendents certainly should be familiar with the capabilities of each grass on their golf courses in order to irrigate efficiently. That is, superintendents need to have a feel for how long each grass can go between irrigations,” explains Dr. Keeley.

It would seem logical that turfgrasses with low water use rates also would have greater drought resistance. However, Dr. Dale Bremer, project leader, cautions that this is not always the case, because there are several factors determining drought resistance, which refers to the ability of turfgrasses to survive extended dry periods.

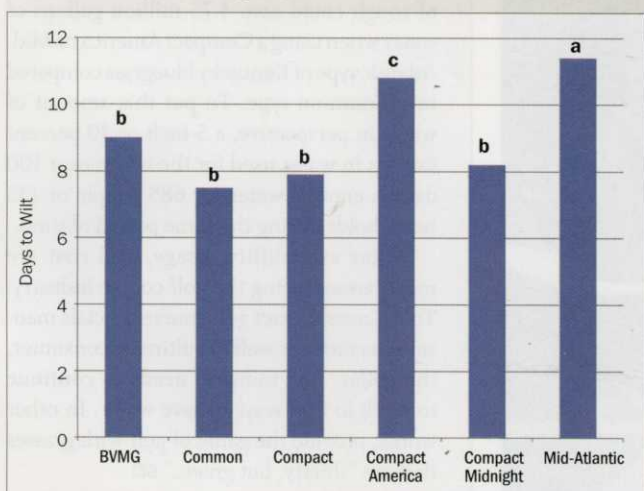
“There is not necessarily a strong connection between water use rates and drought resistance,” says Dr. Bremer. “Turfgrass A may have higher water use rates than Turfgrass B, but if Turfgrass A also has deeper roots, it may be equally or even more resistant to drought than Turfgrass B. The deeper root system of Turfgrass A has greater ability to absorb soil moisture for a longer period between irrigations than Turfgrass B.”

Dr. Fry points out that it is essential for superintendents to have a good idea of the rooting depth of their turf in order to irrigate efficiently. “A good superintendent will have an idea of how deep the majority of roots are across all playing areas. Knowing rooting depth helps the superintendent determine how deep the soil should be wetted during irrigation to impact the majority of the roots.

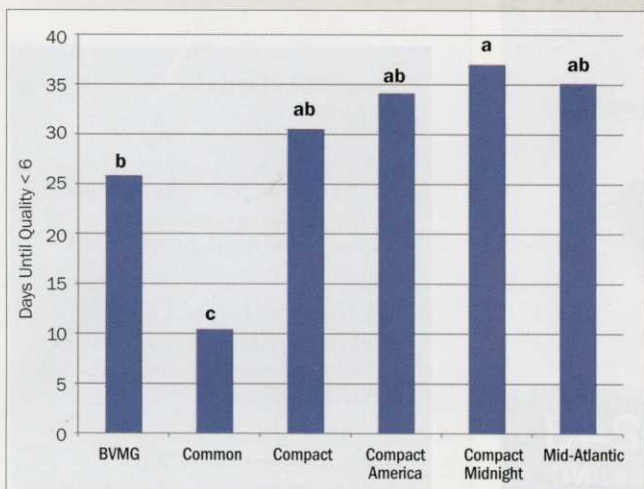
**Figure 1.** Water Applied Groups



**Figure 2.** Days to wilt groups



**Figure 3.** Days till less than 6 groups



“In turfgrasses, rooting is one of the primary means that grasses have to resist drought. In the Midwest, grasses that root deeply and extensively are able to avoid drought when the soil surface begins to dry down,” Dr. Fry explains. “Those cultivars that can go the longest between irrigations before exhibiting wilt are the ones with the most extensive root systems.”

Kentucky bluegrasses can be categorized by type, and the 28 Kentucky bluegrass cultivars and the two bluegrass hybrids used in this research study are listed by type in Table 1. To save water, it would be helpful if a particular type of Kentucky bluegrass outperformed the others under moisture-limiting conditions. This study determined the average water use rates and turf quality of the different Kentucky bluegrass types during the summer in Kansas.

“For our study, we generally selected cultivars that were best performers, in regards to visual quality, from the 2001 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Trial. The Common types (Ken-blue, Park, and Wellington) were the exceptions, because they weren’t best performers in nationwide studies by NTEP or in our study, even under well-watered conditions,” says Dr. Bremer.

“In general, visual quality averaged over the study was similar among the cultivars with the exception of the Common types, which were lower. Cultivars in the Compact Midnight (Award, Blue Velvet, Midnight, Midnight II, and Nu Destiny) group tended to have equal or higher turf quality than cultivars in the Compact America (Apollo, Bedazzled, Kingfisher, Langara, and Unique) and Mid-

### Acknowledgement

This research project was co-funded by USGA, Turfgrass Producers International, and the Kansas Turfgrass Foundation.

Atlantic (Cabernet, Eagleton, and Preakness) types, but they also received more water.” (See Figures 1-3).

Are there differences in growth characteristics between Kentucky bluegrass types that may help to explain differences in water use rates? Dr. Keeley notes, “We didn’t specifically look at morphological characteristics in this research, but we do know some things about them. For example, the Mid-Atlantic types, which did well as a group in this study, have deep, extensive root and rhizome systems.

“Physiological differences may provide better clues in some cases. For example, the Common types are known to respond to drought by going dormant more quickly than other groups. While that can be a good mechanism to survive drought, it can lead to a higher irrigation requirement if you are trying to keep them green, as we were,” explains Dr. Keeley. “The Compact America types are another good example of how physiological characteristics may play an important role. Previous research has shown this group to be more heat tolerant than other groups, and heat tolerance probably contributed to their lower irrigation requirement as a group.”

This study provided important insight into the performance of Kentucky bluegrass cultivars under moisture-limited conditions, but Dr. Keeley cautions that these results may

# Research

not be applicable to other turfgrass species. "I would not expect to find such dramatic differences in most other cool-season turfgrass species. Kentucky bluegrass is particularly diverse. That is one of the things that makes it an interesting species to work with."

Dr. Bremer also cautions that the results of the study could have been different if it was

conducted in areas of the country where Kentucky bluegrasses are better adapted than the hot transition zone. "Heat stress was a factor in our study in Kansas, which made it difficult to determine whether stress symptoms were from drought or heat. In cooler climates, one could evaluate drought effects alone, without the heat stress, which

could certainly have changed the outcome of the study," says Dr. Bremer. "However, heat stress is common during summer in most regions of the U.S., so our study is likely a good representation of what these turfgrasses will experience in most areas."

The study provided important results for the scientific community, as well as practical information for golf course superintendents. "We think these results will help superintendents save water primarily in their rough areas, which could be huge for them," says Dr. Keeley. "The rough comprises the greatest acreage on most golf courses, so there is significant potential for water savings by using a cultivar that stays green with less water. That was our goal in this research — to find cultivars that stayed green with less water."

For example, a golf course with 35 acres of rough could save 4.75 million gallons of water when using a Compact America or Mid-Atlantic type of Kentucky bluegrass compared to a Common type. To put this amount of water in perspective, a 5-inch or 30 percent savings in water used for the rough over 100 days is enough water for 685 people or 135 households during the same period of time.

Water availability, usage, and cost are major issues facing the golf course industry. These costs impact golf course officials managing a course as well the ultimate consumer, the golfer. The industry needs to continue to work to find ways to save water. In other words, provide the game of golf with grasses that are "thirsty, but green." **GCI**

*Jeff Nus, Ph.D., is manager of Green Section Research, and is based in Lawrence, Kan.*

## Literature cited

[bit.ly/R3RUyt](http://bit.ly/R3RUyt)

Bonos, S. A., W. A. Meyer, and J. A. Murphy. 2000. Classification of Kentucky bluegrass genotypes grown as spaced plants. HortScience 35:910-913. (TGIF Record Number 67878)

Brooks Gould, A. (ed.) 2004. Rutgers Turfgrass Proc. New Jersey Turfgrass Expo. 7-9 Dec. 2004. New Jersey Turfgrass Assoc. Atlantic City, New Jersey.

"Water Use Statistics." American Water Works Association — Home Water Information Conservation. Web. 15 May 2012. [bit.ly/RGmbK8](http://bit.ly/RGmbK8)

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## Travels With **Terry**

Globetrotting consulting agronomist Terry Buchen visits many golf courses annually with his digital camera in hand. He will share helpful ideas relating to maintenance equipment from the golf course superintendents he visits – as well as a few ideas of his own – with timely photos and captions that explore the changing world of golf course management.

## SIDE SPINNER CONTROL SWITCH

**M**ulti-talented Eric Kulaas, equipment manager, at the Renaissance Vinoy Resort & Golf Club, St. Petersburg, Fla., found an inexpensive dual on/off light switch that costs less than \$10 in lieu of buying a \$100 replacement switch for their TurfCo WideSpin Topdresser. The dual switches control the conveyor belt or spinners individually with a simple flip of either switch. To keep the control switch dry from the elements, a zip-type plastic bag is used to make it waterproof. The labor time took less than an hour to complete.



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**M**att Shaffer, the director of golf course operations at the Merion Golf Club in Ardmore, Pa., site of the 2013 US Open Championship, has always been an innovator of golf course maintenance equipment who likes to “think out of the box.” Shaffer had a vision to produce a wide fairway roller – similar to a green’s roller – to remove the early morning dew off of the fairways, reduce the leaf wetness to reduce foliar diseases, breakdown organic matter, and raise the mowing height to use less water and still have great playing surfaces. Shaffer had a dinner meeting with Sal Rizzo, president, of Salsco Inc., and the rest is history. The Salsco Tranz-Former Fairway/Greens Roller’s went from research and development to production in eight months, with three to four months spent on the steering alone so that it will not tear the grass, because Salsco is a small manufacturer that can move quickly on R&D. The Tranz-Former has the same design concepts as a greens roller that follows the contours and smooths the surfaces. The rolling width is 10 feet, the transport width is 5 feet, 3 inches that fits easily over bridges, cart paths and through gates with a transport speed of 11 mph. The MSRP is \$35,000.



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**MORGAHAN** (continued from page 14)

tect the greens. The course will close around Labor Day to ensure healthy playing surfaces.

The captain made a number of summer visits, meeting with Tyrrell as well as Medinah's membership. He listened to what the members wanted to see. "Knowing how difficult the conditions have been, Davis checked in with me several times this summer," Tyrrell said. "He also advocated to the membership on behalf of the maintenance crew and stressed the need to be cautious under these rigorous circumstances." He added that Love was very supportive of all the superintendents in the Chicago district area, who, in turn, have prepped Love on what to expect of local weather and conditions this fall.

He also spent time with European captain José María Olazábal, and expects more European team members in the coming weeks.

The Ryder Cup is unlike any other professional tournament, a fact that influences how Tyrrell and his staff have to set-up and tend the course. Most obviously, the field is only 24 players and most matches never reach the 18th hole. Before the matches begin, the teams have four days of practice rounds, alternating morning and afternoon times so each squad gets a feel for how the course plays at different times of day. The first matches are on Friday, Sept. 28.

The days have been divided into three maintenance shifts: morning, midday, and evening. Play will commence at 7:20 a.m., which in Chicago in the fall means the crew will likely start and finish work in the dark. To deal with the long hours and allow his crews to work in natural light, Tyrrell created six teams of 16, each assigned to three holes. They will be responsible for complete maintenance on their holes - greens mowing, divot filling, bunker raking, rough cutting, Stimpmeter and firmness readings. Teams will be monitored by Tyrrell's three on-course supers and their assistants, with the final review conducted each day by Tyrrell, Love, the assistant captains, and Haigh who will sign off on the preparations before play starts.


Thrust into the limelight, Tyrrell is keeping it all in perspective: "My goals for the week are for my maintenance team to enjoy the experience and reap the rewards of their commitment and hard work ethic; for our membership to have a great experience given the resources they've committed to allow Medinah to host its first Ryder Cup; and last, but certainly not least, would be a win and to hoist the Cup for the home team." GCI

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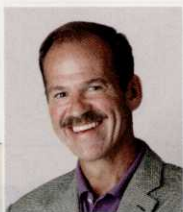


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## FOR STANLEY

The USGA used to run commercials touting the fact that it was all about people who “really, really loved golf.”

It’s a fitting epitaph, then, for Mr. Stanley J. Zontek because no one I know really, really loved golf more than Stan.

In hindsight, it occurs to me that I never played a round with Stan, but I doubt he was one of those rabid golfers who obsessed about putters or remembered every hole he’d played. I don’t think he “loved” golf that way. I know even though he could have had playing privileges at pretty much any Top 100 courses he wished, he joined a relatively modest little club near his home just to have a place to get away and enjoy a quiet nine.

The Stan I knew for 25 years truly loved The Game of Golf. He lived for the concept of fairness in the sport. He adored being part of every aspect of the process of preparing courses for play. He worshipped what the USGA is supposed to stand for even if he quietly shrugged his shoulders and sighed about the political crap that occasionally took place in Far Hills. His idols were people like Old Tom Morris and Alexander Radko and Fred Grau and Burt Musser. If you don’t know who those people are, shame on you.

He genuinely loved turfheads and appreciated the character and skill of good superintendents as much as anyone I’ve ever met. Science – real, practical, legitimate science – was his bedrock. You had to prove things to Stan. He abhorred snake oil and, although the USGA frowns on agronomists talking about specific products, he always made it clear with a frown or a shake of his big Polish head when he thought something was bogus. He had a finely honed B.S. detector.

Stan was, famously, the longest-tenured USGA staff member. I bugged him about his impending retirement constantly. He kept finding reasons not to give up the grinding life of a traveling agronomic wizard, even though he could have taken his pension, left the sometimes maddening Blue Blazer bureaucracy behind and made way more money as a consultant. That was simply not his style. The Green Section was his life – a “calling”

### The Stan I knew for 25 years truly loved The Game of Golf.

in the old sense of the word – and I’m not sure he could bring himself to visualize what it would be like to wake up and not put on that damned sport-coat and those beat up old black turf shoes and go try to solve a problem on a course for The Good of the Game.

He was an awesome storyteller. On too many occasions back in the day, we’d end up someplace cozy and boozy with a small group of hardcore turfies swapping war stories. One night at least a decade ago, a bunch of us sat in those great old white rocking chairs on the porch of Pinehurst’s Carolina Hotel smoking cigars and drinking warm brown liquor until the wee hours. Stan was...a bit overserved, as they say...and he was really digging into his memory banks and producing astounding stories about U.S. Open sites, Tour players, the White House putting green and personalities from around the business. Every 20 minutes or so, he’d glance over at me – Mr. Media – and ask, “You’re not writing any of this down, are you Pat?” I’d jokingly reply, “Everything’s on the record, pal.” We finally all got to bed

around 4 a.m. as I recall. At 5:30 a.m. my room phone starting ringing like hell and I answered to hear a panicked Stan: “You REALLY didn’t write any of that down, did you?!?!?”

Stan, I promised you that morning I wouldn’t rat you out and I’ll take that to my grave.

We did a book deal of sorts, he and I. We had a handshake understanding that when he finally did turn in his official red-and-blue rep tie and his staff money clip, we’d lock ourselves up someplace and write The Book, which I would ghostwrite for him. The man had seen so much, done so much and met so many people that it was only natural that he’d finally share these stories for posterity. It was not going to be an expose or a tell-all – he’d never publicly say a bad word about the USGA. Instead, it would have been a celebration of all the joy he derived from The Game and the overwhelming gratitude he felt for being allowed to be a part of it for his entire adult life.

Gratitude. That’s what Stan always talked about when we’d get to spend time together at a USGA regional event or GIS or a Musser Foundation meeting. He felt so lucky...so blessed...to have made a career out of something that brought him joy. He helped people bring golf courses to life. These beautiful, amazing, unique playing fields designed to provide happiness, recreation and competition to millions of people. He shook his head in amazement every time he talked about how thankful he was.

So, I can think of no better tribute to Stan that I – or I think anyone – can offer, than to express our gratitude for the time we had with him, for the lives he touched and for everything he did for The Love of the Game. We’ll really, really miss you, Stan. **GCI**



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