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CAN GOLF SAVE THE PLANET?

If courses correct their carbon footprints, could the momentum impact global climate change? By Mike Zawacki

Golf courses have a bad rap. The average Joe drives by the pristine fairways and well-manicured greens of his local country club or municipal course and sees only a consumer of resources and a monument to an elitist culture.

But this could change when word gets out that golf courses could play a role in saving the planet.

OK, maybe “save the planet” is a bit extreme, but the culmination of extensive industry-based turf research, the rise in carbon aggregating consulting services, coupled with a cultural shift toward sustainability together support a movement that places the local 18-hole course, with some tweaks and modifications to its maintenance and operational philosophies, as an organic vehicle to sequester carbon, the alleged chief villain of climate change phenomena. More importantly, course superintendents will play a key role as change agents in this conversion process, not only driving change as environment stewards and turfgrass experts, but as promoters of the newly evolved, modern carbon-negative golf course.

On a golf course, carbon sequestration is the process of capturing and long-term storage of carbon in tree trunks and in the soil by turfgrass. Until recently the chief discussion of carbon sequestration has been global-centric and focused on curbing the burning of fossil fuels, halting rainforest depletion and planting fallow farm fields

with tall-grass crops that not only capture carbon, but also serves as a component in the production of alternative fuels.

However, only recently has this discussion focused on golf courses as purveyors of a finely manicured, carbon-sequestering crop – turfgrass.

The data for golf’s role as a carbon sequesterer are compelling. Research conducted by The Colorado Carbon Project, a collaborative effort among Colorado State University, the USDA and the Rocky Mountain Golf Course Superintendents Association and other entities, suggests that if the average fairway is 1.7 acres, then a single fairway will sequester .75 tons of carbon per year, which is equivalent of driving 6,500 miles with the average car. In addition, putting greens have the potential to sequester .40 tons of carbon per acre per year.

“We’ve found out that the turfgrass on golf courses, because it’s so well-managed, typically takes in more gas than it emits – it’s a net sequester, so to speak,” says Bill Crispin, cofounder of Golfpreserves, whose consulting firm works closely with The Colorado Carbon Project. Historically, the golf industry has extensively documented the management of turfgrass, and it’s these data that are driving golf’s role as a carbon sequesterer. “In the carbon debate, we’re saying that turfgrass is more important than just providing green color on a golf course,” he adds.

Consider the potential in golf’s green footprint to

THE CARBON-ZERO COURSE

To get to sustainability, golf courses will need to look different. And to do so, the modern course will need to take a cue from its past.

Perhaps courses like St. Andrews will dictate the standard for how the future golf course should be modeled.

“Look at the true links land philosophy of how a course can be managed, or should be managed, say Andrew Staples, president of the Phoenix-based Golf Resource Group. “You walk through the Old Course at St. Andrews and it looks like a goat ranch. But one will never argue how great that course plays regardless of the time of year or how much rainfall has taken place.”

Staples argues that the course of the future needs to adapt to the time of year and what the weather provides. It'll be a return of the golf course back into a more dynamic living organism with more native areas and other areas going off color at various times of the year, instead of the exact same made-for-TV product year round, he says.

If this philosophy is adopted by the industry, then it relieves the pressure on the superintendent to maintain a certain aesthetic. Instead, he will have the freedom to pursue what he does best.

This doesn't mean it will be an easy transition and it'll take time to change attitudes, Staples concedes. “We're not there yet,” he says. “But the golf course of the future will have more of an awareness of the environmental role it plays and players will acknowledge that and understand, maybe even embrace it.”



CHANGE DRIVER

While environmental and financial reasons are forces contributing to the reduction of golf's carbon footprint, another is on the horizon – legislative.

Until the last few years, energy was so darn cheap that no one thought twice about its consumption. It's similar to how no one worried about water usage until drought and water restriction became headline news across the nation.

Attitudes toward golf's carbon footprint are following that same trend, and it's a trend superintendents, managers and owners must take seriously before they're forced to make changes.

"The various climate change bills on Capitol Hill only go down to 25,000 tons of carbon per year, which involves big manufacturing mills, power plants, that sort of thing," says Stuart Cohen, an environmental scientist and founder of Environmental and Turf Services, an interdisciplinary consulting firm whose area of expertise includes the turf and golf course market. "In comparison, a golf course may emit only 150 to 300 tons [of carbon] per year, so right now it doesn't apply to them.

"California, though, passed a bill [HB 32] in 2006 that is slowly being phased in and over the next year or two it may begin to have an impact on golf courses," he adds. "California typically is ahead of EPA efforts, so there may be regulatory drivers for golf courses to look at their total emissions, their total sequestration and their net sequestration in the near future."

ONLINE EXTRA

For more on the process of evaluating your course's carbon footprint, check out the March Online Extras.



influence or negate its carbon footprint and you begin to see a bigger picture. If you put all the U.S. courses together it would equal about 4,000 square miles, or take up space approximately the size of Connecticut.

Cultivating the average course's turf to serve as a carbon sequester is compelling, but the positive, though, is offset by the fact that the use of petroleum-based products and inefficient electrical practices makes the average nowhere near operating at carbon negative.

However, proponents argue that if operational and cultural changes could be made in these areas, then the impact on golf's role as a positive force in the carbon debate could be significant. For example, according to research cited by GCSAA's director of research, Clark Throssell, while the average 18-hole facility uses nearly 243,000 Kwh of electricity, less than 5 percent of golf facilities purchase green electricity. Likewise, only 6 percent of 18-hole golf facilities have a written energy conservation plan, and 15 percent have conducted an energy audit since 2004, according to Throssell's data.

"If a course can use less water and pump less, then you're using less electricity," Crispin says. "What we're all talking about is that all of these issues are connected in the discussion about carbon sequestration. All of these issues come to bear on a highly managed piece of property like a golf course."

FOLLOW THE MONEY.

Those involved in this discussion believe the industry needs to generate and disseminate information that shows the local course is a good partner in the community and that the industry is learning what it needs to do regarding sustainability and is going out and doing it.

"You talk to people in the industry about this topic and 100 percent of the people believe it's important, but 10 percent or less are really doing something about it, says Andrew Staples, president of Phoenix-based Golf Resource Group, who helped develop Carbonsave, a program that quantifies carbon-emission reduction via energy-use reduction as well as carbon sequestration.

But this makes sense for the golf industry because, ultimately, the issue of carbon use and sequestration – from the private facil-

ity to the municipal course – comes down to dollars and cents. While it's altruistic for a superintendent to pitch to his green committee, "Let's do this for the environment!" it's more realistic that a strong financial case will more readily loosen budgetary purse strings to fund capital improvements. "The approach I've always recommended to superintendents is that this is a financial decision," Staples says. "Taking on the carbon sequestering component is just a natural progression of reducing your facility's energy costs. It's a natural add on, but it's not the driving force."

Regardless of where individual beliefs lie in the climate-change debate, sustainability and carbon sequestration makes financial sense for golf courses because it forces resource efficiency.

"No question, there is controversy about global warming and the degree humans play a part in this issue," says Stuart Cohen, an environmental scientist and founder of Environmental and Turf Services, an interdisciplinary consulting firm whose area of expertise includes the turf and golf course market. Cohen also partnered with Staples on the creation of the Carbonsave program. "But whatever we do to reduce carbon emissions will reduce our ecological footprint and our dependence on foreign oil, which are two issues many of us are in favor of. And this is where a lot of people begin to see the light, because golf courses can save themselves money, and in some cases a lot of money.

It's not like golf courses are coal-fired power plants or the U.S. truck fleet, which are the two top contributors to carbon in the atmosphere. So by themselves, golf course may not have a direct impact in reversing climate change, however, their indirect impact on this issue could be significant.

"Golf courses touch on so many different things – electric power use, pesticide and fertilizer use, water usage and irrigation efficiency all the way to how a course manages its club house and maintenance facility," Cohen says. "If the industry starts down this path, then courses could be role models."

Change is happening. For example, Nevada's Edgewood Tahoe Golf Course reduced its CO₂ emissions by more than 75 tons by cutting its electrical use by about 11

percent – a roughly \$12,000 annual savings, according to a recent news report.

Stuart and Cohen estimate courses utilizing some sort of energy or carbon auditing program could realize as much as \$20,000 per year in savings. Industrywide, they estimate U.S. courses could save upward of \$400 million per year.

Likewise, Throssell cites energy research that suggests an energy audit could lead to a 30-percent savings in energy costs for the average golf facility.

“From a business side, everyone is looking to conserve resources and dollars,” says Crispin, whose firm facilitates the assessment, quantification and confirmation of sequestered carbon for golf courses and creates financial instruments from the sale of carbon credit to drive revenue, a portion of which is reinvested into turf research. It’s a savvy business move since, in the wake of pending carbon emissions legislation (Change Driver, page 24), the price of U.S. carbon credits is expected to increase from about \$5 per ton to as much as \$50 per ton.

SAVING THE PLANET.

When you ask those around the carbon sequestering debate whether golf can save the planet, they tend to steer the discussion away from such an abrupt message.

“It’s not because that message isn’t there,” says Golfpreserve’s Crispin. “We just don’t want to alienate anyone who takes an affront

to such a very bold statement.”

However, Staples believes the industry’s ability to serve as a role model is within its grasp.

“Very rarely does an opportunity come around where you can, in five to 10 years, change an industry’s reputation,” he says. “Golf can use this topic and say, ‘We know how we’ve been perceived in the past, but this is how we’re going to be looked at in the future.’”

And why does it have to end with golf courses, asks Noble Hendrix, a Golfpreserves co-founder.

“What if we got all of the equipment manufacturers on board,” he says. “How about the club and ball manufacturers and the other countless suppliers to the player? What would happen if we got Nike on board? Then, I think you’d begin to see substantial change.”

Doubters, though, point to in the industry’s inability to stay rallied behind a single cause, and many point to previous failures to continue the momentum of past issues very far after the initial call to action.

But when you look at the momentum being created at facilities in states such as Colorado, Florida and California, you begin to see it is possible generate enough enthusiasm for a segment of the industry to rally behind a single cause. “It’s important for golf to have an active role in the carbon discussion,” Hendrix says. “And I think it’s within our grasp to follow through on this.” **GCI**

SUPERINTENDENT AS CHANGE AGENT

As a golf course reduces its carbon footprint, the superintendent will play a vital role in communicating this image makeover to his community.

Superintendents need to develop or engage in educational outreach programs to spread the message of how their courses are not only active as good environmental stewards, but they are having a positive impact in the overall carbon debate.

For example, Stuart Cohen, an environmental scientist and founder of Environmental and Turf Services, suggests superintendents reach out to state and local officials several times a year to educate them about the positive actions taken at their courses as well as throughout the industry. He also advocates working with local high school biology departments about the course’s role in habitat preservation and rehabilitation. Lastly, he adds superintendents can engage in annual educational seminars at their courses about water and energy conservation and measures taken to meet efficiency standards.

“If golf courses, as an industry, begin to make a big push for this and they’re able to attract media publicity, then they can serve as role models for everyone else,” Cohen says.

SMALLER CARBON FOOTPRINT

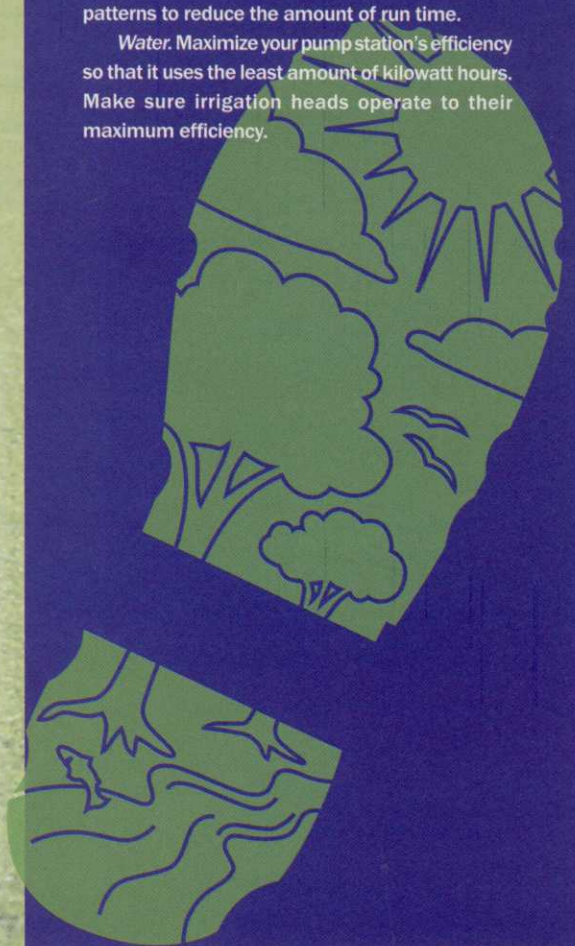
While a course’s pump station and clubhouse are responsible for the bulk of its energy use, overhauling those facilities would often require a significant, and impractical, capital investments. However, experts suggest some more attainable carbon-reducing measures a golf course can pursue.

Lighting. By far the easiest issue to address. Convert to energy-saving cfl bulbs and fixtures. Install motion-activated switches in restrooms or infrequently occupied places. Reassess the facility’s lighting philosophy, especially at the clubhouse.

Materials. Make smarter purchasing practices to reduce the number of deliveries throughout the year, or buy from distributors located closer to the facility.

Fuel. Outside of converting to alternative-fuel equipment, reconsider usage and mowing patterns to reduce the amount of run time.

Water. Maximize your pump station’s efficiency so that it uses the least amount of kilowatt hours. Make sure irrigation heads operate to their maximum efficiency.



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The Golf Club at Ballantyne - Charlotte, NC
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Bay Hill Golf Club - Orlando, FL
-Replaced Tifeagle ultradwarf with EMERALD
-Site of Arnold Palmer Invitational

Beechwood Country Club - Ahoskie, NC
-No-Till conversion from Bentgrass to CHAMPION

Bermuda Run CC - Bermuda Run, NC
-No-Till conversion from Bentgrass to CHAMPION

Big Oaks Golf Club - Slatillo, MS
-No-Till conversion from Bentgrass to CHAMPION

Bloomington Golfers Club - Valrico, FL
-No-Till conversion from Tifdwarf to CHAMPION

Blue Heron Golf Club - Sandy Springs, GA
-No-Till conversion from Bentgrass to CHAMPION

Brookstone Golf & CC - Acworth, GA
-No-Till conversion from Bentgrass to CHAMPION

Calusa Lakes Golf Club - Nokomis, FL
-No-Till conversion from Tifdwarf to CHAMPION

Covington Country Club - Covington, TN
-Greens sodded with EMERALD

Eagle Watch Golf Course - Woodstock, GA
-No-Till conversion from Bentgrass to CHAMPION

Falcon's Lair Golf Course - Walhalla, SC
-Greens renovation, planted CHAMPION

Hawk's Point Golf Club - Vidalia, GA
-Complete renovation, planted CHAMPION

Hole In The Wall Golf Club - Naples, FL
-Complete course renovation, greens replanted
with CHAMPION (previously planted 1998)

Holly Ridge Golf Links - Archdale, NC
-No-Till conversion from Bentgrass to CHAMPION

Hyland Hills Golf Club - Southern Pines, NC
-No-Till conversion from Bentgrass to CHAMPION

Jacksonville Beach GC - Jacksonville Beach, FL
-Greens renovation using EMERALD

Kiva Dunes Golf Club - Gulf Shores, AL
-No-Till conversion from Tifdwarf to CHAMPION

La Cita Golf & Country Club - Titusville, FL
-No-Till conversion from Tifdwarf to CHAMPION

Mirimichi Lakes Golf Course - Millington, TN
-Complete course renovation, greens replanted
with CHAMPION (previously planted 1999)

Montgomery Bell State Park GC - Burns, TN
-No-Till conversion from Bentgrass to CHAMPION

North Hills Country Club - Sherwood, AR
-No-Till conversion from Bentgrass to CHAMPION

Ocala Golf Club - Ocala, FL
-Greens renovation using EMERALD

Old Waverly Golf Club - West Point, MS
-No-Till conversion from Bentgrass to CHAMPION

Orangeburg Country Club - Orangeburg, SC
-Complete course renovation, greens replanted
with CHAMPION (previously planted 1997)

Pecan Grove Plantation - Richmond, TX
-Greens renovation using EMERALD

Pelican's Nest - Bonita Springs, FL
-Gator Course greens renovation, greens replanted
with CHAMPION (previously planted 2001)

PGA National - Palm Beach Gardens, FL
-Squire Course greens renovation using EMERALD

Pine Forest Country Club - Houston, TX
-Greens renovation using EMERALD

Pleasant Valley Country Club - Little Rock, AR
-No-Till conversion from Bentgrass to CHAMPION

Rebsamen Park Golf Course - Little Rock, AR
-No-Till conversion from Bentgrass to CHAMPION

Sandridge Golf Club - Vero Beach, FL
-No-Till conversion from Tifdwarf to CHAMPION

Sea Trail - Byrd Course - Sunset Beach, NC
-No-Till conversion from Bentgrass to CHAMPION

Seminole Golf Club - Juno Beach, FL
-No-Till conversion from Tifeagle to CHAMPION

Sequoyah State Park Golf Course - Hulbert, OK
-No-Till conversion from Bentgrass to CHAMPION

Shreveport Country Club - Shreveport, LA
-No-Till conversion from Bentgrass to CHAMPION

Spring Hill College Golf Course - Mobile, AL
-No-Till conversion from Tifdwarf to CHAMPION

St. Petersburg Country Club - St. Petersburg, FL
-No-Till conversion from Tifdwarf to CHAMPION

Stillwater Golf Course - Arrington, TN
-New Construction, CHAMPION greens

The Claw at USF - Tampa, FL
-Greens renovation using CHAMPION

The Tennessean Golf Club - Springville, TN
-No-Till conversion from Bentgrass to CHAMPION

TPC Prestancia - Club Course - Sarasota, FL
-No-Till conversion from Tifdwarf to CHAMPION

TPC San Antonio - Oaks - San Antonio, TX
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A GOOD COOLING

The methods to superintendents' syringing madness.

By David McPherson

Superintendents define syringing in different ways – including a quick misting with the irrigation system, a deeper hose watering or using equipment such as the MobileMist, pictured here.



KEVIN HUTCHINS

Think back to when you were a kid: The summer sun was sweltering down, sweat dripped from the end of your nose and all you craved besides a Popsicle was a misting of water to cool you down. Plants, just like humans, sometimes need a good cooling. When your turf's canopy gets too hot, a wee bit of water is sometimes all it needs.

We're talking about syringing – the technique superintendents use to add moisture to their greens and to cool the turf down and prevent dry wilt that leads to loss of turf if not controlled. It's also done to keep greens uniform.

Syringing is most often done when greens are under

stress from high heat and windy conditions. The plant starts to wilt and some light watering is necessary. The key word is light. Most in the profession agree that hand watering is not syringing. That said, not all keepers of the green agree on a universal definition for syringing.

CREATING UNIFORMITY

For Andy Short, superintendent at Cherry Blossom Golf Club in Georgetown, Ky., the ultimate goal of syringing is uniformity. He says every green should react the same in regard to how an approach shot releases and how the ball rolls from a putt.

Tourney syringing

When it comes to a professional tournament, superintendents are often pressured to keep the greens dry and firm. This is something Scott Ebers, superintendent at Colonial Country Club in Fort Worth, Texas, is familiar with. Each May, his course hosts the PGA Tour's Crowne Plaza Invitational.

The first thing he observes about syringing is that there is no universally held definition of what it is.

"Some people might consider syringing a very fast, up in the air misting of the green in 15 seconds," he says. "Other people would consider the MobileMisting a light syringe and then others think a couple minutes of watering the entire green – starting on one side and going across the entire green is syringing."

Ebers is not a big fan of syringing in the theoretical sense of cooling the plant by putting water on the top.

"I don't think that is very successful," he says. "I am a huge fan of fans. I think they cool the canopy far better than syringing. What my guys do in the summer is syringing – misting the top. They water dry spots. They get on there and look for wilt. If it's dry, they water deeply; they puddle it up on that spot and drive the water into the root system. They will put the nozzle down. I don't ever put the nozzle up and give it a really good shot of water. I just hit spots to get water where it needs it."

During the PGA event, Ebers says he has guys who jump in with hoses down and water spots. This year will be his sixth tournament.

"Three years we have gone in at certain times and hit spots in play during the tournament," he says. "We also try to get the greens to perk so well that when we go in there it's not a wet surface when the players get to it."

Tim Moraghan, principal at Aspire Golf Consulting and former director of championship agronomy for the USGA, says when he was a superintendent, syringing was done to close the cells on the plant to keep the evapotranspiration to a minimum at high temperatures. Moraghan believes hand watering is a lost art.

"Today, you have moisture sensors and hand-held digital units that give you an idea of moisture content in the soil, so it's a little easier, but it still takes time to learn how to do the process," he explains.

All the years Moraghan and his crew syringed greens during U.S. Open play, he says it was mainly due to stress because of heat more than anything else.

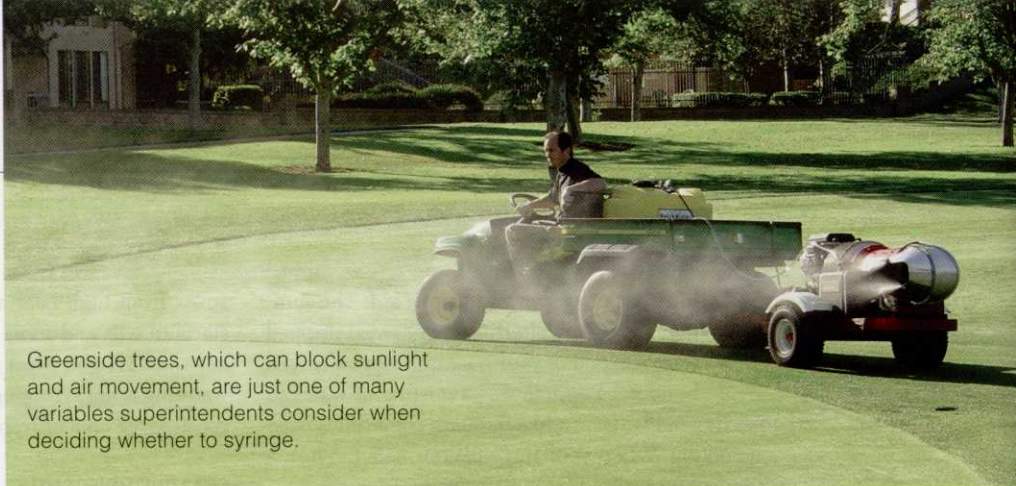
"There was not enough water put down to affect the firmness of the greens or to soften it up," he says. "I remember my first U.S. Open in 1987. The 18th green at The Olympic Club had a 7.5 percent slope, back to front, and the balls were running off the front. We syringed between groups just to keep the grass a little puffier and keep that speed down a little bit – that was a rare occasion, though. At Shinnecock in 2004, syringing was done strictly because of the wind because it was so hot and dry."

When to syringe during a big event comes down to a judgement call based on experience, says Moraghan.

"You need sufficient people to do the work," he explains. "One event, we had six groups of two – 12 syringers out there doing one or two greens apiece all afternoon, so the competition stayed the same for everybody. You need a hose man and somebody putting the hose into the snap valve. You need to coordinate with rules officials and get a feel of when to jump in or out between groups. Every green is different, every golf course is different, and you try not to get into the way. You could write a book on how to do it correctly." GCI

“A major factor in how that ball reacts is moisture level,” Short explains. “The expectation level of the club or board will determine what’s the acceptable amount of moisture to apply to the greens. Some clubs prefer ‘firm and fast,’ while others are happier being able to control and hold their shots into the green.”

Cherry Blossom is a semiprivate club with most traffic coming from public players; Short



Greenside trees, which can block sunlight and air movement, are just one of many variables superintendents consider when deciding whether to syringe.

says it’s important that the greens are at a “comfortable” level so that players of all abilities can enjoy their round and move through the course in a reasonable time frame. After establishing what the acceptable level of moisture is, Short uses a combination of sight and feel to determine when and how much water to put down.

“For those of us who don’t have moisture sensors, visual cues are the first clues to areas that may need more water,” he explains. “Whether it’s actually seeing the plant change color, or seeing your footprints, wilt is the first sign that the plant needs water. The severity of wilt and environmental conditions will determine how much water is put down. I use a soil probe to see/feel how deep and how much moisture is in the soil. I remove the soil from the probe and place it in my hand and make a fist. If the soil clumps and stays together I don’t apply any water to that area. Conversely, if the particles don’t bind together and fall apart, that area is in need of water.”

Another – quicker – method Short uses to check moisture is with a knife. “I will go to different areas of the green and punch my knife into the soil and if the blade has soil particles stuck to it, there’s moisture in the soil.”

DETERMINING FREQUENCY

Short says determining how often to syringe greens is based on weather conditions and how the turf reacts to them.

“Temperature, wind, humidity, type of turfgrass, soil type and thatch levels all play an important role in the level of moisture available to the plant,” he says. “All must be considered when deciding whether or not to syringe and how much water to put down.

“Each green is checked because not every green is exposed to the same conditions or has the same contours,” he adds. “Trees that are next to greens become a huge variable when it comes to syringing. Trees can block sunlight and air movement, restricting evapotranspiration levels. Depending on the size of the tree and its proximity to the green, the root

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