

dent tries to adhere to. Through the use of proper purchasing, labor management and resource management most years' budgets should be met. In the years disasters take place, or unexpected circumstances, then it is important the GM be informed monthly of any variances and also if the board needs to make overall adjustments due to down revenues.

Loyalty is not something that you can turn on or off. You are either loyal or you are not. Be honest and be supportive. It is very important to be there working alongside the GM not only when times are good but when they are bad as well. Be the go to guy that gets it done. When the superintendent is the guy you can count on and also the guy that has your backside covered it is the glue that holds the relationship together.

TIES THAT BIND. The happiest of superintendents are those people who love going to work each and every day. A major part of that

The benefits

Some of the benefits of a strong relationship have been discussed. But none is more important than having the general manager serve as an advocate for the golf course superintendent.

Each club has a different governance structure but most utilize the general manager as the conduit for information from department heads to the board of directors, finance committee, etc. Therefore the GM should be serving as an advocate and spokesperson to advance the needs of the greens department.

If the superintendent communicates effectively, is a team player, is loyal and runs his department with fiscal prudence then it is likely that the GM will carry the proper message to the leadership of the club to get the resources required to meet the goals and expectations of the club.

is liking the people you work with and who you work for.

We don't always get to choose who we work for but we all get to choose whether or not we want to make that relationship work. There are so many upsides for you, your career and the success of the facility to not want to work hard to make the superintendent and

general manager relationship work. Make it a priority each and every day and you won't be disappointed. **GCI**

Bruce Williams, CGCS, is principal for both Bruce Williams Golf Consulting and Executive Golf Search. He's GCI's senior contributing editor.

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Monroe Miller retired after 36 years as superintendent at Blackhawk CC in Madison, Wis. He is a recipient of the 2004 USGA Green Section Award, the 2009 GCSAA Col. John Morley DSA Award, and is the only superintendent in the Wisconsin Golf Hall of Fame. Reach him at groots@charter.net.

CLOSE CALLS

No one wants to face the consequences when a close call turns to disaster.

Sometimes, when I look back on my 40 years of work in golf course management, little beads of sweat break appear on my forehead. I had a lot of close calls and dodged bullets more times than I care to remember.

It is no wonder, really. I am descended from a long line of miners and farmers, two professions that rank among the most dangerous, and my status as a former farm kid provided me an awareness of just how dangerous work around machinery can be.

During my “invincible” teen years, I got my foot caught in a chain on a hay elevator and I was put out of commission for several weeks. I had ignored my father’s admonition, “Climb the ladder into the hay mow and under NO circumstances ride up the elevator.” He was right. Another time I was on crutches for 14 weeks after too casually walking alongside a milk cow too close the stanchion. She kicked me back 15 feet and broke my leg. It happened on a snow day when school buses couldn’t get through, so my parents got me to the doctor by dragging our car to town with a tractor!

Corn pickers, combines, balers and choppers all claimed victims, taking fingers and arms and sometimes lives. Farm equipment operated from PTO shafts took their toll, often choking victims with their own clothing. Back then, most tractors were “tricycle” types – imagine a triplex greens-mower turned 180 degrees. These tractors were easily tipped over, often killing the operator. Too often, riding on a fender, standing on the hitch or even straddling the hook of a tractor resulted in these passengers falling off and suffering injury or worse.

Our parents lectured us constantly about being careful. The only time I ever heard a cross word between my dad and my grandfather happened

when Gramps administered a severe chewing out to my dad over a safety issue. My dad took his medicine in silence because he knew he deserved a tongue-lashing. The current owner of that farm I grew up on, twice removed, suffered the death of a child this summer when the youngster

tricksters were totaled in accidents at night. I worried about them moving 808 Rain Bird sprinklers during a rain and lightning storm. Too often, they took too long to get off the course. I made many trips back to the course at night to make sure these guys were OK.

“Early on, my primary concern about safety revolved around night water watermen.”

fell from an ATV towing a piece of mowing machinery. The whole town mourned his death.

We were reminded of the dangers of mining because my great uncle was killed in a lead mine not 25 miles from our home. He got caught under a rockslide and didn’t have a chance.

Needless to say, when I became a superintendent, one of the things I worried about most was safety – my own, but especially that of my mostly young employees. I had seen too many farm accidents to feel otherwise.

And when I started, the experience of a freshly minted superintendent loomed large. He had been awarded a superintendent’s job almost immediately after graduation. The course was new, but the equipment wasn’t. The old dump truck box wouldn’t drop until you manually tripped the hydraulic cylinder. A high school age kid, who obviously should not have been operating that truck, tripped the cylinder but didn’t get out of the way fast enough. The box came down hard and killed him. It also killed the superintendent’s career and pretty much ruined his life for decades.

Early on, my primary concern about safety revolved around night watermen. In those early years, a Datsun pickup and two Cushman

I still shudder when thinking about how Michael Lee straddled a PTO shaft on a Royer soil shredder and fell. Fortunately, he wasn’t injured. I had a tractor and sprayer get away from me, just missing trees and features that could have tipped the rig over. No harm was done, but it was an incredibly close call. A weld on an end cap of a filter tube in our pump station broke while my assistant was in the building. He was smart and quick and shut the main breaker on the 440 V service. It was another disaster avoided.

My list of close calls could go on and on, and I suspect my superintendent colleagues could compose similar lists from their own experiences. We all worry about skin cancer, hearing loss, pesticide use, injury from flying golf balls, vehicle rollovers, cuts from reels and blades and scores of other things. Danger actually lurks everywhere on the links, and superintendents know it. The changes in safe equipment and products have been tremendous, and our awareness has increased similarly. We have been aided by OSHA (once you overcome their tendency toward minutia), state agencies, professional organizations like GCSAA and our university extension services. No one wants to face the consequences that can result when a close call turns to disaster. **GCI**



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When Times Are
Tough...



Foliar fertilizers are the stuff. So say researchers and manufacturers alike who praise the benefits of foliar nutrition. by Jason Stahl

You may not think of turf as ground-cover, but it is. Every square inch of the ground where it exists is covered with canopies, leaves, etc. This is precisely what makes it ideal for foliar fertilization.

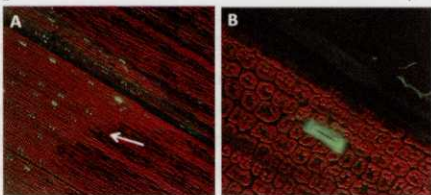
“Because it covers everything, anything we apply on the turf surface should be received on the surface or canopy,” says Haibo Liu, professor in the School of Agricultural, Forest and Environmental Sciences at Clemson University. “We have the resilience of the leaves, where the plants are not designed for some nutrient uptake due to having a barrier to protect against losing water or any penetration, but the plant can still get those nutrients, including all chemicals and pesticides.”

This is what a lot of Liu’s research has been focused on: penetration of the plant’s cuticle. If they could understand how different nutrients perform based on their penetration of the cuticle layer, they could determine which nutrients are the best to apply via foliar fertilization. After comparing nitrates, ammonia and urea, Liu’s research affirmed what others studies had: urea is a better form for foliar fertilizers.

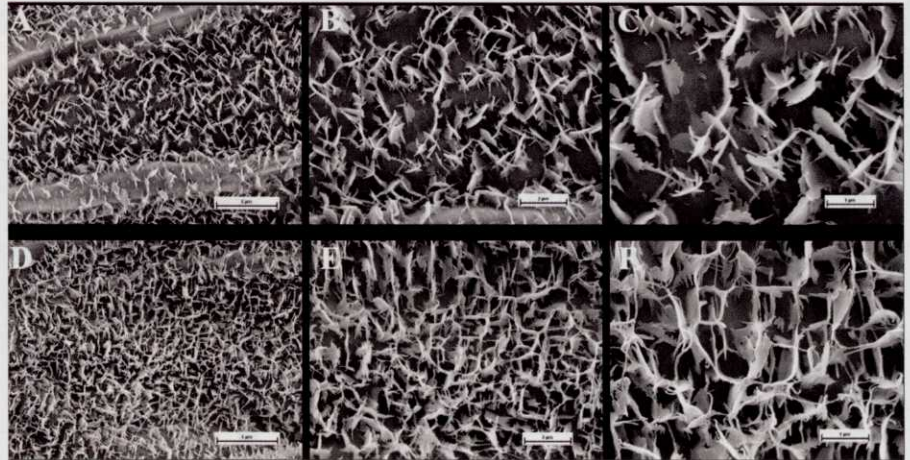
“You cannot rely heavily on ammonia or nitrates for foliar,” he says. “When we compared nitrogen, phosphorus and potassium, we found nitrogen penetrated the plant much more easily while phosphorus and potassium were more difficult – even though you could still apply it.”

Given this finding, Liu said courses that use more potassium than nitrogen on greens cannot rely on foliar applications and instead would have to do granular fertilizing.

“The reason is because the high rate of potassium would burn the turf,” Liu says.



Bentgrass at 10X mag. (A) Fluoresce in the solution collecting around the stomates on half of the leaf. At 60x (B) fluorescent solution accumulated at a stomata and the guard cells.



Scanning electron micrographs of creeping bentgrass cuticle layer under 100 percent ET and 50 percent ET irrigation regimes.

“Phosphorus is comprised of larger molecules, so it doesn’t penetrate the cuticle layer like urea. Therefore, the efficiency of phosphorus is not as great as other elements. There are 14 elements for plant nutrition, and we are just beginning our studies into all of them.”

But foliar fertilization offers more benefits than just direct-to-leaf contact. It also allows you to reduce the total amount of fertilizer applied. According to Liu, granular’s efficiency is not even close to foliar’s.

“If you apply granular fertilizer, it must get into the soil, dissolve and then the plant will get it,” says Liu. “With any type of fertilizer, you typically don’t get more than 50 percent efficiency, and a lot of times you get lower. With granular, you can get leach out or runoff, but with foliar you avoid these things.”

Foliar also cannot be applied heavily or they could burn and kill the turf, Liu says. This restriction is a good thing, though, as it prevents you from “overdoing” it and promotes a strong feeding strategy beneficial to plants.

Finally, because foliar are liquid, you can mix them with other things easily to expand their use. For example, it’s common to mix them with plant growth regulators. You can even mix them with pesticides, although most researchers do not recommend that.

While foliar have many benefits, it’s not to say that granulars don’t. For instance, Liu says there are tremendous labor savings when you

can apply 1 lb. or even ½ lb. of slow-release nitrogen per 1,000 square feet and have it work over the next few weeks. You can’t do that with foliar because the plant will use them as soon as you apply them.

“But we recommend a spoon-feeding strategy, which is nice for turfgrass because we’re not shooting for yields but performance and color, which is beneficial,” Liu says.

The fact that the plant uses foliar as soon as they’re applied plays into when superintendents should apply them. According to Liu, foliar must be applied when the plant is able to use them, particularly in stressful times during the growing season.

“Right now, though, it’s getting a little colder, and you still need to do some late fertilization, but foliar are not as good for this as controlled release,” he says. “You would rather have that fertilizer stay in the soil and have more control time and release to the plants when they need it.”

Courses with bentgrass greens will use 100 percent foliar in summer because granulars would burn the turf under the summer stress no matter how little you apply. On the opposite end of the spectrum is wet conditions where there is a lot of water and washout, leaching and runoff. Under these conditions, turfgrass will have a weak root system and therefore uptake will not be great, so the best way to correct that is through foliar.

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"So either in dry situations or wet situations, foliar fertilization is the best way to improve the turf," says Liu. Foliars benefit the Transition Zone most because it has both warm- and cool-season turf. Warm-season turf, he admits, is a little tougher and thus can handle granular better. And, when the air turns cold, it's best to put slow release on cool-season turf.

"But it doesn't matter where you are because even Minnesota in summer can get very hot and stress the turf, so foliars could help there too," says Liu.

Jake Straub of Performance Nutrition echoes Liu's observations when he says the upside to foliars is the fact that they're taken up very quickly by the leaf.

"Whenever you have the ability to put foliar out, you're going to take some of the highs and lows of granular fertilization applications out of play," he says. "It helps give you a nice even keel from the nutri-

tional side."

Supers looking to get nitrogen to their turfgrass can spoon-feed foliars in small doses, Straub says, so the plant doesn't get a big slug, grow like crazy and slow down greens or make fairways and tees out of control. Then, staff is running around trying to get everything mowed.

"That's where foliar nutrition is really important," says Straub. "You can tweak your program so you get nice, consistent growth and color out of all your turf."

Straub emphasizes the importance of understanding what you're trying to get out of the foliar product.

"Sometimes guys put out a product and think they will see one thing and, in fact, they don't," he says. "You have to understand why you're putting it down, so you need to know if it will go directly in the plant and will I see a response in a day or two or is this something that will take a little longer to act?"

The program Straub sees, at least

Foliars: Not Just For Fertilization

From a post-emergent perspective, foliar herbicides do a great job of controlling weeds.

"Foliar products give better coverage and efficacy because you get more of the active ingredient to the intended target," says Brian Thompson, strategic account manager with BASF.

Fall, Thompson says, is an ideal time for applications of post-emergent herbicides because many weed plants are metabolizing and storing carbohydrates in preparation for winter. Thus, the active ingredients in these herbicides get easily translocated, resulting in higher rates of efficacy.

Spring is also a good time to apply, says Thompson, but superintendents should be mindful of the products they're using, the active ingredients and the biology of the weed species they're going after.

"Since crabgrass is a summer annual weed, those applications are most effective from a post-emergent standpoint at a juvenile state, which could be anywhere from May through July depending on geography," Thompson says. "But many applications targeting perennial weeds, whether dandelion or broadleaf clover, are best made in the fall because the herbicide gets more readily translocated in the plant. The key thing here is understanding the weed species you're going after, its biology and growth cycle, and the chemistry that best fits that growth cycle."

When it comes down to technique, it pays to consider the product you're using. For example, Drive XLR8 for post-emergent control of crabgrass is best used with a methylated seed oil.

"This additive in the spray tank helps quinclorac, the active ingredient in Drive, become more readily available to the plant and hastens its uptake," says Thompson, adding that other herbicides' efficacy can also be improved with the addition of methylated seed oil, non-ionic surfactants or fertilizers.

A new product, Pylex, has a unique mode of action that controls warm-season grasses in a cool season turf environment. Launched last summer, Thompson says it has performed well in a research setting as well as with customers in taking Bermuda out of cool-season turf and providing post-emergent control of goosegrass.

on warm-season grasses in the North Mid-Atlantic region, is applications of granular in spring and fall and foliar in the summer. When it comes to spraying greens, crews are doing every seven days or every 10 to 14 days, whether it be a micronutrient or end source.

"They'll do granular fertilizer till it gets hot out and sometimes the release can get away from them, and that's when foliar nutrition becomes more of a pinpoint method," Straub says.

The most important thing is

understanding the foliar product you're applying and the desired effect you're trying to achieve.

"What technologies are being used to deliver a particular nutrient into the plant in the most effective way possible? That's something everyone in the industry needs to educate themselves on. In the long run, it benefits everybody," Straub says. **GCI**

Jason Stahl is a Cleveland-based writer and frequent GCI contributor.



For more info

Seeking out some more information on foliar feeding and turfgrass? Enter the following links into your web browser and access recent USGA Green Section research on this topic.

Foliar Nutrient Uptake by Cool-Season and Warm-Season Turfgrasses:

University of Arkansas research lends insight into understanding turfgrass foliar feeding. bit.ly/1a2Ris0

Soil Fertility And Turfgrass Nutrition 101: Some important concepts you might have missed in or outside of the classroom. bit.ly/1bQ3Wbo

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ALUMNI UPDATE

The presentations were condensed and to the point. We had a short period of time, so it had to be specific. They did such a good job putting it all together; all the Wake Forest University professors were great.

The sessions on negotiation and conflict management were interesting and insightful, particularly the information about staff development. I've been implementing some of the learning tools for my staff and myself; particularly the four-step process: directing, coaching, supporting and delegating.

I've talked to friends and colleagues in the industry and urged them to participate. You get so much out of it beside the curriculum; the staff and other superintendents you meet give you a terrific networking opportunity.



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Brian Vinchesi, the 2009 EPA WaterSense Irrigation Partner of the Year, is president of Irrigation Consulting Inc., a golf course irrigation design and consulting firm headquartered in Pepperell, Mass., that designs irrigation systems throughout the world. He can be reached at bvinchesi@irrigationconsulting.com or 978/433-8972.

WHAT WERE THEY THINKING?

Getting to the bottom of a unique installation.

I was sent the picture to the right and after my “Oh my God!” reaction, I figured a review of its hydraulics is in order. First, a few comments on the picture:

- Obviously there was no pipe on the truck or in the parts room, but there were lots of swing joints;
- The course has a high budget as swing joints are more expensive than pipe;
- Pressure is high as friction loss is not a concern; and
- Whoever installed the sprinkler had lots of time on their hands to complete the work and thread all the swing joints together.

Designers are concerned with two things, friction loss and velocity. The sprinkler is most likely a 1-1/2 inch inlet, so all the swing joints can be assumed to be 1-1/2 inches, too. The average flow on a 1-1/2 inch golf sprinkler at 80 psi is about 38 gpm. We don't know the inside diameter of a swing joint, but we will go with 1.5 inches, which is being generous. Doing the math, the velocity through the swing joint would be 6.9 feet per second (fps). Velocities in PVC pipe are supposed to be limited to 5 fps, but a 1-1/2 inch sprinkler on a single swing joint is common at that velocity on most course irrigation systems. It is also for an 18-inch swing joint. This swing joint is somewhat longer – hard to say but looks like 6 to 7 feet at a minimum in a straight line, not including the elbows. The higher velocity at the longer length as well as the turns will make the water very turbulent and add to the water hammer potential when it's turned on and off.

The friction loss in a 1-1/2 inch, Class 315 pipe at 38 gpm is 3.67 psi per 100 feet. So at 7 feet that would be a friction loss of only 0.26 psi. That's not very much, but that assumes there are no turns. The Rain Bird website – it's a Rain Bird sprinkler and the color makes me think Rain Bird swing joints – says about 0.5 psi friction loss through their 1-1/2-inch swing joint. A normal swing joint has three turns; this one looks to have 25 turns, just a few more than necessary. So the friction loss through this mess is at least 4 psi, but given the configuration I am sure it is more like 10 to 15 psi.

When they calculate system hydraulics, most designers do their analysis through the mainline pipe and maybe the lateral piping. They would use a number of 1 or 2 psi for the swing-joint friction loss. So for a sprinkler operating at 80 psi they might assume a minimum pressure of 82 or 83 psi at the sprinkler base or because valve-in-head sprinklers are pressure-regulating more likely 92 or 93 psi. Remember, valve-in-head sprinklers require a minimum 10 psi difference in pressure for the sprinkler to regulate. In this case, with the excessive friction losses, the sprinkler is most likely not receiving the intended pressure and it may not be receiving the intended flow.

The picture makes you wonder if there if this is the only one, or are there more. Was this the original installation or a repair? If it was the original installation, then it is probably not alone. If that's the case, I would hate to see what else might be in the ground. If it was a repair, it is hopefully a one-time expensive occurrence.

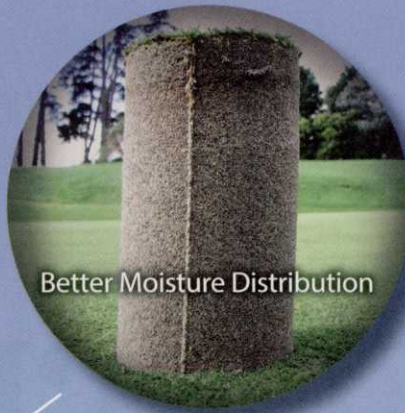


So let's look at the installation aspects of this configuration. My first question is – why? What would make someone think of doing this let alone do it? Followed by; who is supervising the work? On golf course irrigation systems hydraulics are extremely important and their analysis quite detailed. The person who installed this elongated swing joint either had no idea how it would affect the sprinklers' operation or didn't care. It may have been done to get the sprinkler out from under a cart path, but that's no excuse.

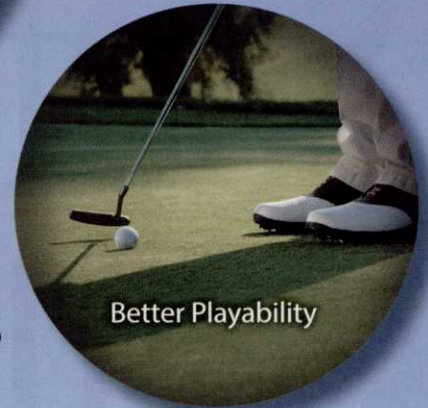
Sprinklers are sensitive to pressure issues which affect both the distance of throw and the flow and therefore the uniformity. It's important staff and installer crews are educated on how their actions can affect the operation of the overall irrigation system and the individual sprinklers.

It's amazing what you see people do in the irrigation business, and this picture is proof. I'd say nothing surprises me anymore, but as long as there are systems being installed there will still be stupid things done to them. **GCI**

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Southern Discomfort

Sustained warmer weather provides some unique challenges for southern turfheads. by Rob Thomas



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