

Aim for better weed control.



Will Heintz, superintendent at Pound Ridge Golf Club, says one has to have the right frame of mind when dealing with government regulations. Photo: Jim Krajicek

pockets, opt for sodding large parts of the golf course, an ideal method for establishing thick grass quickly, especially on rough areas around raised greens, around bunkers and on areas off fairways with severe slopes. Laying down sod was the choice for the developers of Bull's Bridge Golf Club, a 4-year-old layout in the hill country of Kent in northwest Connecticut that has an elevation change of 400 feet through the course.

"We sodded roughly 60 acres for erosion control, and it worked out wonderfully," says Rob Giampietro, superintendent at Bull's Bridge. "When you compare sodding to hydroseeding, it cost about 50 percent more. But you get quick results and immediate erosion protection. When there was discussion of installing a practice range, I recommended sod. We brought in 24 truck loads and sodded six acres in early May two years ago, and we were able to use it a few weeks later."

DURING CONSTRUCTION

To prevent erosion during construction, builders incorporate drainage or silt ponds that act as catch basins for stormwater and sediment that otherwise would run into fragile environmental areas or onto adjoining property. Many times the ponds are dismantled when the course is completed, but some superintendents might opt to leave the catch basins intact to act as fall-backs during heavy rains that could damage the course and contaminate nearby sensitive areas with sediment.

"You can leave these basins or small silt ponds up after the course is complete," Clute says. "But superintendents have to realize they must clean them out periodically to remove the silt, otherwise the area will grow in with vegetation while the water is still trying to get in."

The use of hay bales and plastic fencing to control erosion during construction are simple yet effective ways to manage rainwater flow and prevent damage to a course, especially when working around creeks, ponds and lakes.

"Our second hole has a 110-foot drop from tee to green, and we struggled with that for several years, using hundreds of hay bales," Giampietro says. "We had a silt fence every 20 feet and just had to keep working at it. One thing I've noticed is that having curbing on cart paths helps channel water downhill and into drainage areas and catch basins. You can make all the plans you want, but you can't anticipate Mother Nature's fury all the time." **GCI**

place during heavy rainfalls. The latter sounds easier than it is. But there are ways to halt the ravages of Mother Nature.

One such method for attaining rapid turf growth is to hydroseed large fairway areas. When combined with protective, single-netted straw erosion control blankets, hydroseeding can result in quick and efficient grassing of many areas on a course. It's wise to staple the erosion control blankets down to ensure the surface it's protecting remains relatively undisturbed while vegetation becomes established.

Tim Anderson, superintendent at Naperville Country Club in Illinois, worked with this type of blankets before the course reopened in the fall of 2007.

"After we seeded the first few of holes, we tended to have washouts after heavy rain events," Anderson says. "We used blankets to stabilize some areas of the course that were most susceptible to washouts, and they held up well. We were going to use perhaps one semi load of blankets but wound up using five semi loads at \$17,000 apiece. We treated the blankets as a builder's insurance policy. It was an expense we hadn't planned for, but it helped us get the course reopened on schedule."

Some developers, especially those with deep



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BY SCOTT MCELROY, PH.D.

Out in the cold

Additives may be the answer to improving herbicide performance

Herbicides have numerous hurdles to overcome to be effective.

First, they must be applied in a correct manner according to label recommendations – and with the correct additives.

Next, herbicides have to be applied in a timely manner when the target weed is most susceptible.

Then, after herbicides contact the leaf surface, they must remain there for absorption to occur or move at the desirable rate

through the soil to be absorbed by the roots. Low humidity, dry conditions or rain soon after an application can decrease weed control by decreasing the absorption of the herbicide. Once absorbed, the herbicide must translocate or move to the active site within the plant and potentially move throughout the entire plant. Plants under certain environmental stress can have decreased functionality in the vascular system, thus decreasing translocation.

Lastly, an herbicide must remain in its ac-

tive form within the plant until the weed is controlled. Throughout time, the herbicide can be degraded or metabolized within the plant, thus deactivating it.

With the obstacles herbicides must overcome, it's a marvel they work at all.

ERRATIC WEATHER IS THE NORM

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Research

weather influences everything, even public policy. So, we shouldn't be surprised by the effect erratic weather is having on golf course management, particularly weed control.

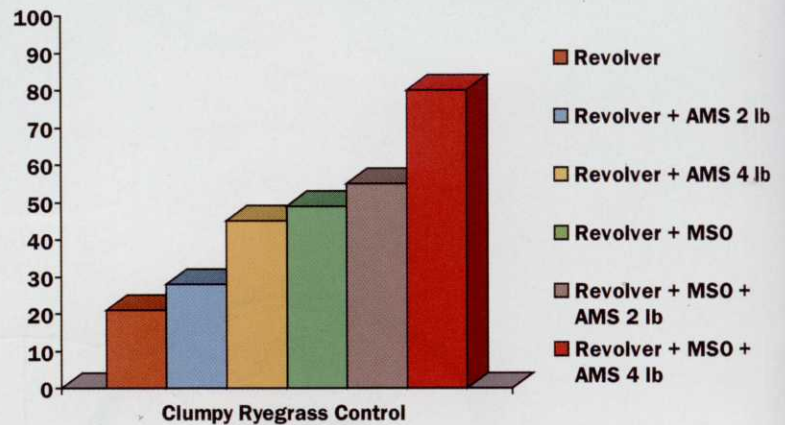
Consider this: In 1970, the average temperature in Illinois in January was 18.2 F. In 2006, it was 37.9 F, according to the NOAA Satellite and Information Service. This isn't an example of global warming. It's an example of how temperatures can fluctuate throughout time, and from year to year.

These temperature fluctuations confound our ability to predict things such as turfgrass dormancy, weed germination, disease occurrence and insect activity. To combat this, it's often beneficial to implement management practices that are more robust under abnormal environmental conditions.

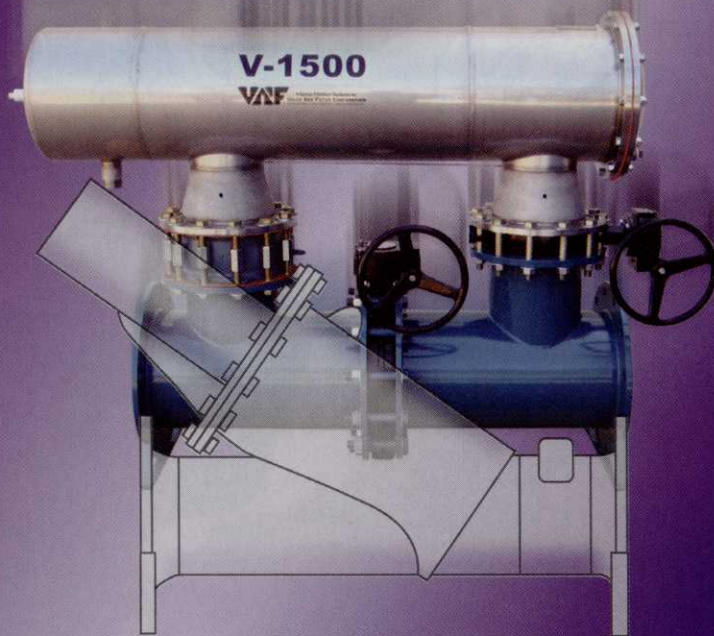
EFFECTS OF LOW TEMPERATURE

Herbicide efficacy can vary with differing environmental conditions. Sulfonyleurea herbicides, such as foramsulfuron (Revolver herbicide) can be negatively affected by low temperature conditions. When this herbicide is applied at temperatures consistently less than 55 F to 60 F, weeds such as clumpy perennial ryegrass (*Lolium perenne*) and clumpy tall

Table 1. Percent control of clumpy perennial ryegrass applied with Revolver herbicide and several additives. Final ratings were taken after 69 days.



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Clumpy perennial ryegrass treated with Revolver plus 4 pounds of ammonium sulfate plus 1 percent methylated seed oil.



Clumpy perennial ryegrass treated with Revolver plus 4 pounds of ammonium sulfate per acre.



Clumpy perennial ryegrass treated with Revolver plus 1 percent volume to volume methylated seed oil.

fescue (*Schedonorus phoenix*) aren't completely controlled. Both species can become chlorotic when treated with Revolver under low temperature conditions, but after three to four weeks, injury subsides and weeds recover. Unexpected low temperature swings in the spring or fall could potentially induce decreased activity in sulfonylurea herbicides.

It's not completely understood why the effectiveness of sulfonylurea herbicides is less under relative cold weather conditions. The most popular theory focuses on the metabolism of the herbicide. During these periods of relative cold temperatures, plants are growing more slowly. Sulfonylurea herbicides are effective because they block production of essential amino acids. Because the plant is growing slowly under low-temperature conditions, the plant doesn't need essential amino acids. The plant is in a state of hibernation for lack of a better term.

Under normal conditions, the plant would be growing and would starve to death as it continues to grow. As the plant stagnates in growth, other metabolic processes slowly degrade, or metabolize, the herbicide to a less active form.

Other theories exist concerning the decrease in control. A decrease of absorption of the herbicide or movement of the herbicide through the plant also could potentially occur during these conditions. A similar sulfonylurea herbicide, nicosulfuron, has been reported to be absorbed

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more by quackgrass (*Elytrigia repens*) and moves throughout the plants more under higher temperatures (Bruce et al., 1996).

OVERCOMING LOW TEMPERATURE

Recent research at the University of Tennessee identified potential additives to overcome the decreased control that occurs when Revolver is applied during low-temperature conditions. Research was conducted to evaluate the use of ammonium sulfate and methylated seed oil to improve control of clumpy perennial ryegrass.

Revolver was applied at 0.4 fluid ounces per 1,000 square feet with and without additives. Additive treatments tank-mixed with Revolver included 2 and 4 pounds of ammonium sulfate per acre, 1 percent volume to volume methylated seed oil, 2 pounds ammonium sulfate plus 1 percent methylated seed oil, and 4 pounds ammonium sulfate plus 1 percent methylated seed oil. Treatments were applied Feb. 23, 2006,

in Knoxville, Tenn. Final ratings were taken 69 days after treatment on May 3.

Clumpy ryegrass control with Revolver applied with no additives was 20 percent at the final rating. All additives except ammonium sulfate at 2 pounds per acre provided a statistically higher level of clumpy ryegrass control over Revolver applied alone (Table 1). The additives ammonium sulfate at 4 pounds per acre, methylated seed oil, or ammonium sulfate at 2 pounds per acre plus methylated seed oil increased clumpy ryegrass control to 45 to 55 percent. The greatest increase in clumpy ryegrass control was observed with ammonium sulfate at 4 pounds per acre plus methylated seed oil, which increased control to 80 percent.

Others have reported similar results with enhancement of certain herbicides with additives. Absorption, translocation and accumulation of nicosulfuron are known to increase when treatments are made with ammonium

sulfate or petroleum oil adjuvants (Bruce et al., 1996). Similar results have been reported with glyphosate (Roundup) when applied with crop oil or organosilicone surfactants (Collins and Helling, 2002).

A WORD OF CAUTION

Additives that aid an herbicide to overcome adverse environmental conditions aren't the same as additives that enhance the performance of a herbicide under normal conditions. Many additives claim to increase the efficacy of some herbicides to the point where one could reduce the rate of the herbicide. Research cited here doesn't support the decrease of an herbicide rate with the addition of any additive. Rather, this research potentially supports the use of additives that enhance absorption or translocation of an herbicide, or decrease the metabolism of an herbicide within the plant when applications are made under negative environmental conditions.

FINAL THOUGHTS

In the area of golf course management, environmental conditions influence everything a superintendent does. Applying herbicides and other pesticides is no different. While ammonium sulfate and methylated seed oil can help Revolver improve effectiveness in low temperature conditions, one should be cautious of egregious product claims to enhance products beyond the claims of the manufacturer. And in all cases, avoid making applications of any postemergent herbicide when temperatures are below 40 F. **GCI**

Scott McElroy is an assistant professor of turfgrass and vegetation management at Auburn University. He's associate editor for *Agronomy Journal*, a peer-reviewed journal published by the Agronomy Society of America. Previously, McElroy was an assistant professor at the University of Tennessee.

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IMPACT ON THE BUSINESS

The early bird

A fall preemergent herbicide application saves time in preparation for a busy spring

By John Walsh

Like most golf course superintendents, Tom Breiner is busy in the spring. Because he has a lot on his plate during that time of year, Breiner spreads out certain tasks. One of those is a preemergent herbicide application.

Instead of applying Barricade (proflumicarb) in the spring, Breiner applies the product in the fall, specifically late November.

"That will give us season-long control for the following year," says the golf course superintendent of the private, 54-hole Fiddler's Elbow in Bedminster, N.J. "Applying Barricade in the fall takes pressure off of us in late April when we're busy with other things."

Breiner applies the herbicide in a granular form combined with fertilizer at a rate of 0.75 pounds of active ingredient per acre. If he were to apply the herbicide in the spring, the rate would be less – 0.55 pounds of active ingredient per acre.

"It's not that much more costly to apply it in the fall," he says.

Breiner says he can apply Barricade in fall because the herbicide breaks down by microbial activity, and in cold weather, there's little to no microbial activity. The herbicide isn't mobile, and it doesn't leach; rather, it binds to clay colloids in the soil.

"I've been doing this successfully since 1994," he says.

Barricade also has a desired effect on *Poa annua*, but that's not why Breiner uses it.

Breiner spends about \$425,000 a year on inputs (fertilizer, pesticides and lime). Herbicides are the least costly in that group at less than \$30,000. He applies preemergent herbicides on tees, fairways and the rough but applies postemergent herbicides only on the rough.

Eighteen years ago, Breiner worked with a consultant to improve the soil in the fairways. At the time, he was using dicamba to control white clover. But over time, with the use of lime, fertility and a soil-balancing program, the need for a postemergent herbicide in the fairways ceased.

"Just dandelions will pop up here and there," he says. "At most, we'll hit weeds in the fairways with an herbicide in a spray can."

The pressure for crabgrass is strong at Fiddler's Elbow, Breiner says, adding that if he misses a spot treatment or neglects to apply a preemergent, crabgrass will appear. In addition to crabgrass, Breiner controls many broadleaf weeds, including white clover, dandelions and oxalis.

On the 90 acres of creeping bentgrass

fairways, Breiner has been rotating Barricade and Drive (quinclorac) every other year.

"Barricade is very strong, and there is a concern about high amounts of it in the soil, but I haven't seen problems," he says. "I'm just being precautionary."

Drive has a 45-day residual postemergent effect. It also controls white clover. Breiner also uses Gallery (isoxaben), a preemergent for broadleaf weeds, regularly in weed-prone areas.

Breiner uses various products, such as 2,4-D, dicamba and triclopyr, for postemergent applications. He uses amine formulations of postemergent herbicides from early to late fall and then switches to ester formulations of the same product because amine formulations need warmer soil temperatures to work, and ester formulations

are less temperature dependent.

Yellow nutsedge is a problem weed for Breiner. He has been using SedgeHammer (halosulfuron methyl) and recently observed good results using Dismiss (sulfentrazone).

Additionally, Breiner plans to test various herbicides. For example, he'll work with Dimension (dithiopyr) – the only herbicide he knows much about for use on greens – on two greens that aren't in play where crabgrass is emerging. He's also experimenting with Quicksilver (carfentrazone), a fast-acting product with a low use rate that can be used in conjunction with a Trimec (2,4-D) formulation.

Breiner also plans to test Tenacity (mesotrione), which removes undesirable bentgrass out of bluegrass rough. **GCI**

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BY MARISA PALMIERI

Spreading it out

The ability to purchase a new irrigation control system over three years was the key to Southern Hills' upgrade

For Russ Myers, CGCS, when it comes to irrigation software, it's all about flexibility. The golf course superintendent at the private, 27-hole Southern Hills Country Club in Tulsa, Okla., is in the midst of a three-year transition to a new irrigation control system.

"The key to any new irrigation system, for me, is flexibility," says Myers, who selected the

Toro Network VP Satellite, which is backward compatible with the facility's 15-year-old Network 8000 series.

For Southern Hills, "flexible" means retaining parts of the old control system while spanning the upgrade over several years, having the ability to operate the system various ways and relying on manufacturer support.

FROM OLD TO NEW

Myers was able to stretch Southern Hills' irrigation control system upgrade over three years thanks to the systems' ability to interface with each other. This was critical to Myers' decision to use the Network VP because his reason for upgrading wasn't that the old system was ineffective. He didn't necessarily need to



The greatest benefit of Southern Hills' new Network VP irrigation system is the fact it's backward compatible to the facility's 15-year-old Network 8000 system, according to Russ Myers, CGCS. Photo: Southern Hills



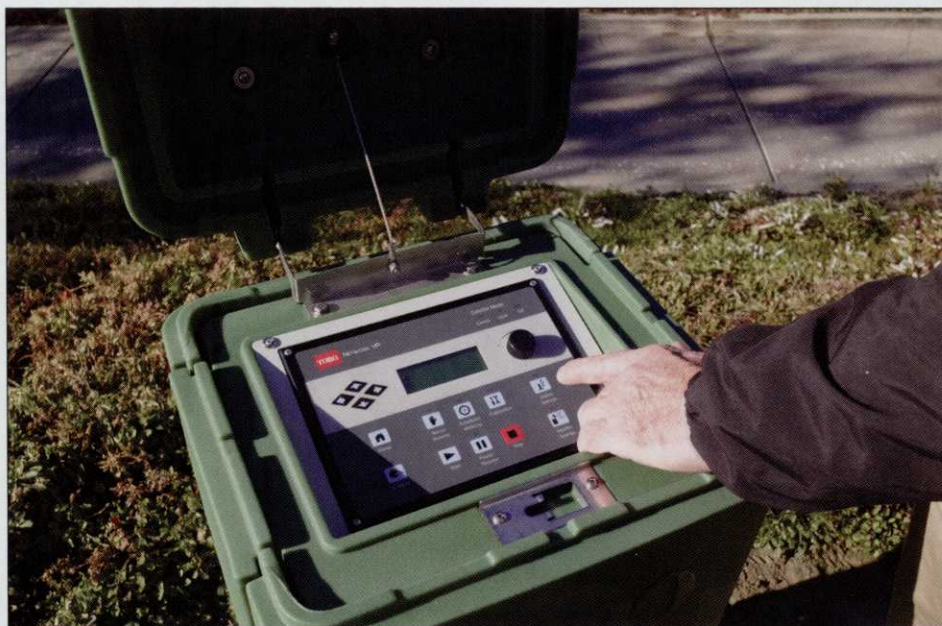
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With a new system, irrigation maintenance costs at Southern Hills will be cut in half. Photo: Toro

make an upgrade, but because of increasing costs to maintain the old system, the facility's long-range capital investment plan and the ability to make a smooth multiyear transition, he felt it was the right time.

"The Network 8000 is working fine for us, we just have a few satellites with more age on them than others," he says.

Because of this, Myers made the call not to upgrade the entire control system – with a \$120,000 price tag – all in one year.

"It makes no sense to put that kind of capital investment into one year when you can spread it out over three," he says. "But if the new Network VP wasn't going to interact with the old Network 8000, then we would have had to change it all in one year."

Having to change the whole system in one year would have been a difficult call for Myers to make, he says, because such a big one-time investment could hinder projects in the pipeline from receiving approval by the board of directors. A three-year plan is easier for the board to swallow and allows Myers to push other capital projects through concurrently.

"If I had to spend \$120,000 this year on irrigation, something else might have gotten postponed," he says. "We need flexibility in our ability to water but also in our ability to get projects moving. When you have a bunker renovation in one hand and an irrigation transition in the other, and you have to do

them both full bore, one of them is going to have to take a back seat. But because of the interchangeability Toro included in the software, we have the ability to get started on the irrigation system and benefit from it sooner."

COST CUTTING

One of the new system's main benefits is a maintenance cost reduction.

"We've only had this software for 15 years, and we could continue to use the system we have, but we can upgrade and reduce maintenance costs and stay ahead of the curve," Myers says.

Myers estimates Southern Hills spends \$18,000 a year – out of a \$2 million to \$2.5 million annual maintenance budget – on irrigation system maintenance costs and attributes about half of that to the aging satellites that are part of the central control system. Next year, after the upgrade is complete, he expects to eliminate the satellite repairs and reduce overall irrigation maintenance costs to about \$8,000 or \$9,000.

Additionally, maintenance costs will shrink because the new system requires fewer satellites, thus, there will be fewer mechanical failures requiring maintenance.

The old Network 8000 system required about two satellites per hole plus units for practice areas. There will be 46 satellites serving the facility's 300 acres after the transition to the Network VP system. Though it's difficult

to calculate a return on investment for an irrigation control system because savings come from a number of areas, including reduced maintenance costs and increased efficiency, Myers expects the ROI will spread out over the system's lifespan, which is about 15 years.

ANYWHERE, ANYTIME

Another aspect of the Network VP system that sold Myers is the flexibility of running it.

"I can do it by standing at the satellite and running it, using the wireless radio or from my home computer," he says. "For me, the more flexibility there is the better off we are. In our climate, it can get to 105 degrees in the summer, and we can't afford to miss a night cycle because our irrigation software isn't functional. Having the flexibility to go to the individual satellites and bypass the central if we need to is key."

Because irrigation software is so advanced – typically offering more features than most superintendents take advantage of – simplicity and ease of use were important factors in Myers' decision to choose the system.

"When I want to turn on a specific head at one location over 300 acres of property, at the very least, I should be able to find that head and turn it on," he says. "To me, it's about whether I can sit down a guy who doesn't work with that central software daily and have him figure out how to run it easily and not have to make five phone calls to figure it out."

On the other hand, if one of Myers' crew members needs to make a phone call, he knows who to contact. Southern Hills' maintenance staff includes 33 year-round and about 17 peak-season employees.

"The biggest thing is Toro's national support network, where, if I have any problems or a failure, I can have anyone on my staff call or I can call and be back online within 24 hours," Myers says. **GCI**

More online



➤ For advice about purchasing central control systems from superintendent Brian Lentz at Lakewood Ranch Golf & Country Club in Sarasota, Fla., visit golfcourseindustry.com, scroll to the bottom of the home page and click on the November issue's online extras.