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Timing, temperature are the keys to winning this war of attrition against *Poa*.

# • The invas

By David McPherson

**T**hink of *Poa annua* as that annoying uncle who comes to visit unexpectedly once per year: you know he's coming. You can prepare for his arrival with distractions to hopefully minimize his stay. He's familiar, yet he's still hard to figure out.

Fighting *Poa annua* (commonly referred to as annual bluegrass) on putting greens – where it's perennially an unwanted guest – is a battle many superintendents face each spring. *Poa* adapts faster in cool-season climates. Once this turf variety invades a club's greens, it is difficult to get rid of. For the best success, superintendents can attack this unwanted intruder in the early spring before it germinates by spraying its seedheads with Plant Growth Regulators (PGRs). This inhibits, and limits, *Poa's* production before it reaches the surface and spreads.

Sean McCue can relate to this perennial pest. The superintendent at the Country Club

at Castle Pines in Colorado for the past 16 years says trying to prevent *Poa annua* from further encroaching into his putting surfaces is one of his biggest maintenance challenges. Castle Pines' greens are made up of a 25-year-old Penncross bentgrass variety, which at 70 percent, is the dominant strain of turf; *Poa* makes up the remaining 30 percent.

Castle Pines' members, who are privileged to play this Jack Nicklaus design near Denver, are very active. According to McCue, they play, on average, 26,000 rounds in an eight-month season. And, like all private golf club members, they expect the highest level of conditioning.

Over the years, superintendents have used different formulations of Embark (now known as Embark Turf and Ornamental) to inhibit *Poa* seedhead production. More recently, many superintendents have used the combination of Primo MAXX and Proxy with good results. For McCue, a combina-

tion of PGRs is the best way to keep *Poa* at bay and to improve the overall playability of greens. Throughout his career, the superintendent has relied on a variety of products.

"These products have ranged from pre- and post-emergent herbicides and an extensive use of PGRs such as TGR, Primo, Embark, Cutless and Proxy, all with varying degrees of success," McCue says.

Regardless of the product he uses, McCue says proper timing of the applications is the key to successful *Poa* suppression. While many superintendents rely on, and have achieved great results by using growing degree days (see "Growing Degree Days (GDD) for *Poa annua* suppression") to time their applications, McCue subscribes to a different maintenance model; this illustrates that, yet again, there is no single scientific



# sion





## Growing Degree Days (GDD) for *Poa annua* suppression

**A**ron Hathaway worked as an assistant with Ron Calhoun at Michigan State University for more than a dozen years. For four of those years (2003-2006), Hathaway was involved in a project to calculate the best temperatures to apply particular PGRs to suppress *Poa annua* on putting greens. Calhoun came up with the idea to use GDD for seedhead suppression PGR timing.

"I sprayed Embark and Primo/Proxy twice per week from early March until the major seedhead flush was finished in June on an annual bluegrass fairway," Hathaway explains. "We then fit the best GDD model to each of the best timings for each of the four years. This way, a best timing for seedhead suppression and fastest injury recovery was not based on a calendar date, but was based on the weather in any given area during any given year."

Today, while Hathaway no longer works directly with Calhoun, he continues to do extensive research on annual bluegrass control in creeping bentgrass fairways and greens with PGRs at Michigan State University.

"We know PGRs such as Primo/Proxy, Trimmit, and Cutless are metabolized by the turf plants more quickly when temperatures increase during the summer," he comments. "Therefore, we recommend increasing rates or lowering rates as temperatures increase or decrease, respectively. We would like to be able to track GDDs in relationship with our PGR applications, whether they are used for green speed regulation or *Poa* suppression."

"We could then use the science of GDDs to improve the efficacy of our PGR treatments and save money by regulating the rates at which we apply them," he adds. "This becomes especially necessary as we recommend PGR programs throughout the growing season in which we are applying PGRs every 14 days. Already, many superintendents are applying Primo/Proxy on a very regular basis."

solution in the battle against unwanted turf species.

"Phenological indicators work best for me," McCue explains. "Our weather patterns in Colorado in the spring are unpredictable and unstable with huge temperature swings from day to day. That's why I find growing degree days extremely inaccurate. If I were to follow this philosophy, I would miss my application window by a month or more. For me, the key is Forsythia bloom. I have found the timing of this has always been right on the money for our applications."

A little further east, Eddie Roach, superintendent at the Jimmie Austin University of Oklahoma Golf Club, finds GDD a useful tool. At this semi-private course, he uses GDD to determine when to apply PGRs to suppress *Poa*'s seedhead development on his Pennncross greens. In the past, while he's used Primo, his preferred inputs are Trimmit and Legacy.

"The PGR program we use is pretty good," he says. "*Poa* still pops up, but we also control it well by using general maintenance practices such as aggressive verticutting and top dressing, and core aeration to promote a good growing environment for the bentgrass."

Embark Turf and Ornamental is one of the most common PGRs to combat *Poa annua* on putting greens. Gary Custis, certified professional agronomist and manager of field research and technical services at PBI Gordon, explains that the product prevents the seedhead from forming – stopping it right in the crown area of the plant. Like all PGRs, getting the timing right is critical. Most superintendents will do two applications, depending on the seed head development. "Once you miss it, you've missed it," he says.

No matter what PGR combination you use, or when you spray them, when it comes to battling *Poa* on greens, superintendents must prepare for a never-ending fight. Even the academics admit that what makes keeping *Poa* at bay so challenging is its aggressiveness. And, once it presents itself, it is much harder to get rid of.

"It's one that, in all likelihood, will not be won," says McCue. "You will need to do all that you can from an economical and physical standpoint to keep the *Poa* under control. This can be accomplished by sound agronomic practices that do not favor tipping the scale in the direction of the *Poa*. These include proper fertility, irrigation practices, timing of aerification, mowing heights and the use of PGRs and herbicides as an overall management strategy."

"The superintendent's best friend against *Poa annua* invasion is to follow the Turf 101 principle of MTDT – Maintain Thick Dense Turf. This gives you the best chance of winning the war," he says. **GCI**

*David McPherson is a Toronto-based freelance writer and frequent GCI contributor.*

## Web resources

For more information on Michigan State University's research, see [gdctracker.net](http://gdctracker.net).

<http://turf.unl.edu/ResearchReports/GreensPoacontrolNov2011.pdf>

The USGA is partially funding a three-year research study at the University of Nebraska that is currently being done cooperatively with Purdue University and Michigan State University; the study is trying to find new and effective ways to control annual bluegrass on putting greens. This is a three-year study that will conclude after the spring observation in 2013.



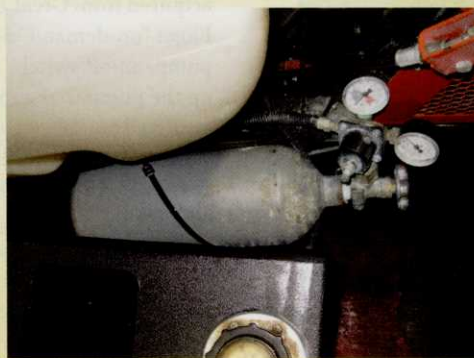


## Travels With Terry

Globetrotting consulting agronomist Terry Buchen visits many golf courses annually with his digital camera in hand. He shares 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.

## UNIQUE DYE MARKING SYSTEM

The multi-talented team of Bill Larson, CGCS, Ryan Browning and Erik Tolzmann, assistant superintendents, and Mike Romundstad, golf course mechanic, at the Town & Country Club in Saint Paul, Minn., have devised a very efficient and unique dye marking system for their 1992 SmithCo 100-gallon green and tee sprayer booms. A 5-gallon soda fountain dispensing tank – obtained free from the clubhouse – has 3 ounces of Becker Underwood Turf Mark Dye added that is mixed together during transport. A CO2 tank, filled at Praxaire for less than \$10, is filled with 160 pounds providing 3-5 psi pressure to the two small ball valves located on either side of the steering wheel that control the dye to each respective spray boom. A ¼-inch diameter flexible plastic hose runs from the ball valves to the end of each boom and then ¼-inch flexible rubber fuel line hoses are used for the Tee-Jet flat spray nozzles hanging on the boom ends. The nozzles are turned sideways so a very narrow spray line can be turned on and off creating a dashed line or a solid spray line. Material cost was about \$75 and it took about three hours to install.



**Terry Buchen**, CGCS, MG, is president of Golf Agronomy International. He's a 41-year, life member of the GCSAA. He can be reached at 757-561-7777 or [terrybuchen@earthlink.net](mailto:terrybuchen@earthlink.net).



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## WATER WAGON

The Lyman Orchards Golf Club in Middlefield, Conn., is a 45-hole facility covering 850 acres with elevation changes of 350 feet. This great idea is used to fill a dozen 10-gallon water coolers distributed throughout all of the courses. A 120-gallon potable drinking water tank, with tie-down straps to hold the tank onto the trailer, was purchased from a local golf course supply house. It was mounted to an old utility trailer that was modified with 2-inch square metal tubing "beefed-up" with metal rebar for the hitch and support under the tank, metal unpainted fenders acquired from Great Plains, an electric Flojet "on-demand" 5-gpm RV water pump, on/off switch, alligator clips to hook up the pump to the tow vehicle's battery, sanitized potable water hose with gate valve and metal nozzle. The rangers clean the water coolers each night and fill them with ice each morning. The course set-up crew member tows the water wagon and fills the water coolers as they go staying ahead of play. This idea saves three labor hours per day compared with bringing the coolers into the shop, cleaning them and taking them back out. The water wagon tank is cleaned daily with a mild bleach solution and stored in a dedicated clean area. The pump and water tank cost about \$125 and it took two hours to build. Mark Pelkey, superintendent, Senad Begovic, equipment tech, designed and built it. Matt Fauerbach is the director of agronomy, northeast region, for Billy Casper Golf. **GCI**

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**A** variety of new herbicides offering broadleaf weed control have hit the market recently, most geared at providing more control with less usage.

The trend for golf turf seems to be with “combo” products that consist of a combination of three well-known products for broader control of a greater variety of weeds. PBI/Gordon Corp. claims they started the trend with the three-way Trimac product, of which there are many copies now, says PBI/Gordon product sales specialist Jim Goodrich.

“There are still two-way combos out there, and I think the reason is because it cuts down the cost a little to superintendents, but they’re leaving out a third kind of weed they could target,” says Goodrich.

Goodrich characterizes the three-way market as highly competitive, even more so now after a company typically known for

its fungicides and insecticides introduced another three-way product to the market last year. PBI/Gordon recently released Katana, T-Zone and Q4 Plus.

Katana, with the active ingredient flazasulfuron, is a warm-season sulfonylurea herbicide that offers postemergence control of kyllinga, sedges and broadleaf weeds, as well as many grassy weeds. Goodrich says it falls in the same category as Monument, Revolver or SedgeHammer and also acts as an inhibitor.

“After application, the plant will stop functioning as it stops producing enzymes and then slowly dies,” he says. “What makes it unique is it works more quickly in cooler temperatures, especially soil temperatures in which a lot of products don’t respond.”

The soil temperature Goodrich refers to is below 65 degrees, but he says Katana, unlike

other products, even exhibits good control when the soil temperature gets as low as 50 degrees.

T-Zone offers broadleaf weed control in cool-season turfgrasses. It contains four active ingredients, including triclopyr which Goodrich says is a proven ingredient for hard-to-control weeds such as wild violet, ground ivy, clover and black medic. One ingredient, sulfentrazone, offers suppression of yellow nutsedge.

Q4 Plus, a four-way product like T-Zone, is actually a re-release of Q4, says Goodrich. The difference is that PBI/Gordon increased the quinclorac load, which Goodrich says is the active ingredient in competing products such as Drive and Accelerate. In Q4, the amount of quinclorac was at ½ lb. per acre, but in Q4

## THE USUAL SUSPECTS

A variety of new herbicides are taking broadleaf weed control to the next level.

By Jason Stahl



1

Doveweed



Buttonweed

2



3

Ground ivy



4

Kyllinga



Wild violet

5



6

Clover



# TIME SCENE DO NOT CROSS CR

Plus, it's at ¾ lb. per acre.

"It also contains sulfentrazone, so you'll get broadleaf weeds as well as grassy weeds all in one shot," Goodrich says. "And unlike T-Zone, you'll get control, not just suppression, of yellow nutsedge."

Goodrich claims that Katana has gotten great reviews from superintendents, specifically regarding *Poa annua* control.

"Compared to other products, the use rate is much lower, which means you have less environmental impact but you still get excellent control," he says. "Normally, guys will go out to control *Poa* on warm-season turf, then have to come back with a separate broadleaf herbicide. But with this product, they can get it all in one shot."

Goodrich says that being environmentally sensitive is always a goal of PBI/Gordon, but the other benefit of less usage when it comes to Katana is that superintendents save roughly \$20 per acre per application.

T-Zone has also been getting raves, says Goodrich. A specialty herbicide that targets hard-to-control weeds, it's effective on weeds such as wild violet, which is difficult to kill because there are multiple layers of it. Typically, one would spray over the top and only hit the top layer and not achieve the entire killback desired. But T-Zone has been achieving better results, according to Goodrich.

"Still, you might have to come back with a second application depending on the infestation level of the wild violet," he says.

FMC Professional Solutions has launched two herbicides and changed the label on a third within the last few months.

The new Blindside, which offers postemergence control of a variety of broadleaf weeds, is a combination of two core active ingredients found in other products FMC offers: sulfentrazone and metsulfuron.

"These ingredients have unique properties, so we're adding them to other chemistries," says Adam Manwarren, FMC turf and ornamental product manager. "We don't just make a premix for the sake of making a premix. We try to do it if there are synergies we can outline and capitalize on."

Blindside, for use on warm-season turfgrass including St. Augustinegrass and also approved for Kentucky bluegrass and tall fescue, controls weeds such as dollarweed, doveweed, buttonweed, ground ivy, wild violet, sedges and clover.

"Metsulfuron by itself would do okay on some of those weeds but would take two to three weeks to have an effect," says Manwarren. "But put metsulfuron and sulfentrazone together and we see something within a couple days. That makes the club members happy when they see something happen sooner."

Manwarren says not only is Blindside fast acting, it will continually reduce the weed population the following year, allowing superintendents to go down the sustainability path. He used the example of applying Blindside to a 1,000-square-foot area of solid doveweed. The next year, he says supers might only see 80 percent (a rough guess, he explains, for the sake of the example) of the area covered in doveweed.

"The idea is if you treat an area and don't

have as much weed pressure the following year, you'll be applying fewer pounds of active ingredient the following year," says Manwarren. "Some people think it's because the active ingredient is hanging around in the soil, but actually it's that Blindside is controlling the reproductive structure of the plant."

Another thing superintendents like about Blindside, Manwarren says, is it's formulated as water-dispersible granules, so it's easy and convenient to measure. Supers also like its speed and control of doveweed, he says.

"They're raving about its control of doveweed, because that weed is very fast-growing and hard to control and there are not a whole lot of other products that are working well on it," says Manwarren.

FMC's SquareOne offers broadleaf weed and crabgrass control for newly seeded turf and consists of a combination of carfentrazone and quinclorac. The idea is to get rid of competing weeds so that the new turfgrass can get off to a healthy start.

"You can use it one day before seeding or seven days after emergence," says Manwarren. "With most herbicides, you have to wait four mowings or 30 days after emergence to treat, or at least one week before seeding. SquareOne really narrows that window of application."

Finally, FMC changed the label on Dismiss South, a combination of sulfentrazone and imazethapyr, to include control of dallisgrass.

"We had marketed it for control of purple nutsedge, but we discovered it had significant



7

Black medic



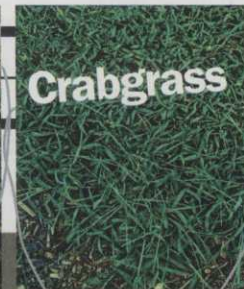
8

Chickweed



9

Dandelion



10

Crabgrass



11

Goosegrass



12

Dallisgrass

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# CRIME SCENE DO NOT CROSS



These two photos illustrate how Blindside controls buttonweed at 6.5 oz./acre. Photos were taken at the University of Tennessee 28 days after treatment.

Blindside on ground ivy at 6.5 oz./acre on the left, 8.0 oz./acre in the middle and a control at right. This was also taken at the University of Tennessee.

activity on dallasgrass," he says.

With all the combo products out there, which are essentially doing the same thing – eliminating the use of two or three products versus just one – superintendents have to sort out if the particular product is adding value for them.

"And that value would be increased weed spectrum, longer residual, easier mixing, speed and fewer pounds of active ingredient," Manwarren says.

Syngenta's new products are Tenacity, which offers preemergence and postemergence control of both broadleaf and grassy weeds in cool season turfgrass and bentgrass, and Monument, which offers postemergence activity on warm season turf.

"Tenacity can be applied at the time of seeding if you're renovating tees or areas of fairways," says Dean Mosdell, turf and ornamental western technical manager. "You can put it down and seed right into it or put it down after seeding for control of weeds that would compete with the new seeding."

Those weeds would include crabgrass, goosegrass, sedges, chickweed and winter annuals such as dandelion and clover. Mosdell is expecting Tenacity to be registered in California next year, although the product has

been available to the rest of the country for the last two years.

Monument, a sulfonylurea herbicide, only works on warm season turf and, according to Mosdell, has an entirely different mode of action, weed spectrum and turfgrass sensitivity than Tenacity. It controls sedges, green kyllinga, oxalis and various other grass and broadleaf species in Bermudagrass and zoysiagrass.

While some turf experts have called attention to the proliferation of combo products, Mosdell says he's seeing more and more individual products that target specific weeds like dallisgrass and goosegrass.

"These weeds are difficult to control, and maybe the two- or three-way combos left a couple weeds like these out of their control spectrum," says Mosdell.

Mosdell has also seen the effect of reduced budgets, which has led to reduced use of herbicides but also fertilizer, which he speculates might influence competition from weeds and lack of growth of turfgrass.

"From an herbicide perspective, [supers] might not be broadcasting as much anymore but spot treating areas that have gotten a little more weedy," he says.

Mosdell says superintendents have told him that Monument has been the best product they've

used for sedge and broadleaf weed control. With Tenacity, there has been surprise at how safe it has been to use when seeding ryegrass and Kentucky bluegrass, he says.

"When you start renovating an area, there's no competition and the weed seeds can out-compete the desirable plantings, especially considering how slow Kentucky bluegrass is," he says.

Also, Mosdell says Tenacity makes a solid tank-mixing partner. "Because of the synergistic response we see with some herbicides, [Tenacity] will pick up additional weeds, increasing its activity. Plus, [the mixing] takes away some of its whitening response – something built into it to show that it is actually working and infiltrating the susceptible species' leaves, shoots and roots."

One of Valent USA Corp.'s latest developments includes the recent registration of SureGuard for broadleaf and annual bluegrass control for dormant Bermudagrass. Its active ingredient is flumioxazin, and it has both preemergence and postemergence control of broadleaf weeds. Its real strength, says Jason Fausey, regional field development manager, is its long-lasting preemergence control on broadleaf weeds.

"But it is also rather unique in

its long-lasting postemergence control of winter annual broadleaf weeds such as chickweed, henbit, black medic and shepherd's purse," says Fausey. And that control is fast-acting, he says, within seven days, even under cool temperatures.

Fausey says this product fills a hole in the market left by other limited-use products that have been taken off the market.

"This product goes in the opposite direction of 3-in-1 products," says Fausey. "For the most part, it would control most weeds at the time you apply it. I think it's great in the summer when you use a 3-in-1 product just from the spectrum of control you get. But [SureGuard] has a single active ingredient and does a nice job of targeting specific weeds at a specific time of year."

Fausey has seen a declining number of courses due to what he says is the cost of overseeding with ryegrass in the winter months. But he believes that's where SureGuard can help.

"You can apply it in a dormant Bermudagrass area and maintain it weed-free and not worry about overseeding to maintain a nice, attractive look," he says. **GCI**

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