Changes can include:

- Reducing nitrogen fertilizer, which accelerates organic matter production.
- Aerating more often.
- Diluting organic matter with sand.

When following a guideline of a certain percentage of organic matter in the soil – 3 to 4 percent, for example – superintendents should make sure they're measuring profiles of the same depth and measure organic matter by weight, not volume, Moore says. Too much organic matter holds too much water in the top of the root zone, creating an environment ripe for disease.

Some organic matter is needed between the root zone and crown of the plant. Part of the grow-in process is to accumulate organic matter near the top of the profile. Without this cushion, traffic would cause excessive wear on the turf. However, once the plant is in the ground for a while, it might begin to produce so much organic matter there's no need to add more, Moore says. On mature greens, too little organic matter isn't a problem the Green Section typically sees.

"If you look in a superintendent's maintenance building, you'll find several tools for removing organic matter but nothing that adds it," Moore says.

SIZE MATTERS

Another issue with topdressing is the size of sand particles. When buying topdressing sand, superintendents need to know which size to buy, Moore says. Some superintendents buy sand that's finer than the sand used to build the green. The finer-particle sand is desirable because it moves down in the profile easier and doesn't damage mower reels. However, the downside to this strategy is the finer sand holds more water than the courser sand used to build the green, allowing too much water in the top of the profile. This could cause problems down the road, in some cases after a superintendent leaves and a new one arrives.

MATERIAL

Scott Anderson, greens superintendent at Huntingdon Valley Country Club in Pennsylvania, topdresses bentgrass/*Poa annua* greens differently than most superintendents. He avoids pure sand topdressing.

The topdressing Anderson uses is a mix of sand (80 percent) and mushroom soil (20 percent), which has been screened and baked. (These mushrooms grow on horse manure, and after the mushrooms pull all of the nutrients out of the manure, they're ground, baked and screened.) The mushroom soil still has organic matter in it, which stimulates growth. Anderson estimates that when he topdresses he receives about an 1/8 of a pound of nitrogen a year in an organic form.

Anderson pays about $60 a ton for the topdressing – compared to $40 a ton for straight

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sand. Because of the topdressing Anderson uses, he is also able to use less water than other superintendents in the area, he says. He uses 7 million gallons of water between April and October on 27 holes.

Anderson keeps the soil as dry as possible, and the grass actually goes dormant on greens, browning out. Even the *Poa* goes off color and doesn't die. Often he will apply a wetting agent in anticipation of rain to rewet the soil.

"The browning out will scare anybody because they think it's death," he says. "I'm promoting the plant's natural ability to defend itself. Everyone is doing what the USGA recommends. They've seen this, but they don't seem to be promoting it. The soil first approach works well here."

At Pecan Plantation Country Club in Granbury, Texas, golf course superintendent Michael Underwood, who maintains 328 bermudagrass fairways and Tifdwarf greens with a $575,000 budget, topdresses with an 80/20 sand/peat mix, which costs $35 a ton. He's been using that mix for two years. Before that, he was using straight sand but wasn't getting enough moisture retention, and isolated dry spots were problematic.

To increase the disease suppression for take-all patch, bermuda decline, spring dead spot and curvularia, Underwood adds acid to the peat. He says organic matter helps with disease suppression – this based on research conducted by Phil Colbaugh, Ph.D., a turfgrass pathologist (colbaugh-turf.com).

"Some guys topdress with solid peat, but the USGA isn't keen on that," he says. "It's easier to grow grass with a mix than straight sand. It's easier to do a grow-in and build the roots when you have that mix. Straight-sand greens aren't as healthy."

Underwood used to use straight sand on the courses he maintained before coming to Pecan.

"In this area, I'm one of few who are topdressing with sand/peat mix," he says. "If you build a green with 80/20 sand/peat mix, why wouldn't you use the same mixture as the soil profile when topdressing?

"A lot of people topdress with straight sand and don't consider anything else," he adds. "The USGA doesn't recommend the peat. I was leery of peat because one of the courses I worked at before had a bad organic matter layer. The organic matter will breakdown. It's like good carbs/bad carbs. As long as you're putting good organics into the soil, it's OK."

At the 18-hole, Donald Ross-designed White Bear Yacht Club in White Bear Lake, Minn., John Steiner, CGCS, who maintains *Poa annua*/bentgrass greens with an $800,000 maintenance budget, uses straight fine-building sand when topdressing.

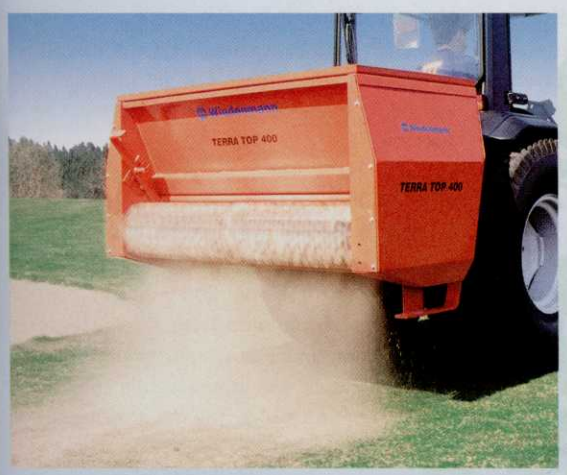
"Why add organic matter when you have some already in the profile?" he asks. "There's enough."

AMOUNT

Dusting – applying a light amount of sand frequently so one doesn't have to drag the sand into the profile – is another topdressing method.

"With dusting, you can water it in that night, and the next morning, golfers don't even know you topdressed," Moore says. "Frequent dusting is very helpful in preventing organic layers.

"When you look at a soil profile of a green of those people who don't topdress enough, you can count the layers in the profile like rings on a tree," Moore adds. "It's the absolute worst thing



Finer-particle sand is desirable because it moves down in the profile easier and doesn't damage mower reels. However, the downside to this strategy is that finer sand holds more water than the courser sand most likely used to build a green, allowing too much water in the top of the profile. Photo: Wiedenmann

you can do."

Steiner doesn't dust because he doesn't think it does any good.

"To put down enough topdressing to do any good, we'll lose speed for five days," he says. "If I topdressed more, I'd have dull mowers."

Steiner doesn't know exactly the amount of topdressing he uses because he applies by feel. But he puts down a modest amount, which he sweeps in with a broom. He can't water it in because there's too much.

Underwood applies light applications of topdressing that just cover the surface, so it takes one drag to get it in. His heavy topdressing applications equal 0.5 tons on three acres of greens, or 0.4 tons per 1,000 square feet.

The topdressing Anderson uses is the consistency of sugar, and he spreads it with a hand-spreader so there are no problems with the mowers. He applies it in three to four directions and doesn't have to brush it in. He usually applies about 0.5 ton for 5,000 square feet.

FREQUENCY

Anderson topdresses the greens at Huntingdon Valley four times a year. The first thing he does in the spring is topdress with purchased material to protect the crowns going into the summer heat.

"I'd never do that with straight sand because you'd cook the roots," he says. "Try growing grass on beach sand."

Anderson uses a hand spreader twice a year. The other two times he pulls quad tines and drags them around, knocking off the soil.

Anderson says he doesn't get a thatchy buildup because a lot of organic matter assists in its natural degradation.

"Sand doesn't have the organisms in it; it's more sterile," he says. "It doesn't have capacity to host organisms that break down thatch so you get a build up of organic matter, so you need to keep adding sand or keep pulling it out.

"My approach is less common," he adds. "The few people I know who do this worked for me. I can't see people learning about this in school and doing it because it would scare them."

Anderson monitors the amount of thatch or puffiness so there's no need to topdress more than he does, he says. He manages growth by controlling moisture and fertility and by using PGRs. However, if there's an event at Huntingdon Valley, such as the Pennsylvania State Amateur, Anderson will topdress in advance of it. Topdressing basically protects the crown against scalping.

The one downside to Anderson's topdressing method is that when the greens get wet, they stay wet for three to four days. The percolation rate is 0.2 to 0.4. The deep tine aeration improves that, he says.

"I take this approach because I've got push-up greens," he says. "If I had USGA straight-sand greens, I'd have a different approach. When you have an organic approach, the organisms create porosity and channels naturally. It's what we do, but it's generally not promoted as an option."

At Pecan Plantation, Underwood topdresses the push-up greens, which have sand caps on them, heavily twice a year and lightly every two to three weeks.

Steiner topdresses about three times a year, including May and September when he aerifies.

"I'd like to topdress every month, but I don't in June and August," Steiner says. "If it's hot, I don't. I never topdress in July.

"Topdressing isn't a priority," he adds. "I've never been on a strict schedule. We use rollers a lot, which keeps the greens smooth."

GRASS TYPE

Grass varieties also affect topdressing. The new bentgrasses and the ultradwarf bermudagrasses generate a lot of thatch so superintendents need to keep up with their topdressing, aerating and verticutting, Moore says.

Steiner's *Poa* greens don't produce a lot of thatch, and the turf is upright. He says if he had L-93, A-1 or A-4 bentgrass greens, he'd be more concerned about thatch and topdressing.

"There's a high percentage of *Poa* on the greens, so topdressing isn't imperative," he says. "I'm sure people would debate me to death about that though. Topdressing is a good thing, especially with bentgrass. For me, the negatives outweigh the positives. I'm getting away with not doing it often. A lot of people don't agree with me."

WHAT TO DO

So what is the best way to topdress? It depends on the needs of the green and the demands of the golfers. Moore's opinion is clearer.

"Of the people who have a reputation for great greens, more are topdressing heavily at least twice each year after aeration and dusting every 14 to 28 days during the growing season to prevent layering," he says. **GCI**

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WEED WARS

Superintendents look for ways to make herbicides more effective and affordable

By Steve and Suz Trusty

Superintendents agree healthy turf is the best weed control. Accordingly, they focus on developing and maintaining a dense, deep-rooted stand of thriving turf. Well aware of the environmental impact of all their turf management practices, they work hard to minimize chemical applications by following integrated pest management procedures, monitoring conditions, setting action levels and defining target areas for application.

Though weather conditions have the greatest impact on herbicide use, economic factors also play a role. Superintendents are becoming savvy managers of their budgets, so product overuse is seldom an issue. But the pressures of the economy, including the dramatic increase of gas prices, are forcing superintendents to monitor their budget allocations more closely to make essential applications.

Disease control, preventive or curative, is usually a measure to save turf. Yet, although weed infestations might jeopardize turf quality, impact playability and appear unsightly, they rarely threaten the turf's viability. Where and when weeds appear determines the type of control used.

ON THE SPOT

Each golf course is a patchwork of microclimates, challenging superintendents to adjust their practices to meet the specific needs of each setting amid ever-changing weather conditions. Superintendents follow the research, check out new product introductions and network with their peers to develop weed-control strategies that fit their needs.

Golf course superintendent Kurt Hellenga deals with many microclimates at Lakeview Golf Club in Harrisonburg, Va. The 36-hole public facility is split into playable 9-hole segments. Hellenga maintains about 305 acres, including 5.1 acres of Penncross and *Poa annua* greens and about 4 acres of bentgrass, *Poa annua* and perennial ryegrass tees.

While Hellenga lists *Poa annua* as part of his turf mix, he considers it the most difficult weed he tries to control. He uses Trimmit – a PGR that provides seed-head suppression while acting as an herbicide on annual bluegrass – on the tees and greens

Hellenga says he's had good results using Barricade (prodiamine) for spring preemergent control of crabgrass, goosegrass and dallisgrass on tees and fairways. Dandelions and clover are the main broadleaf weeds he controls. He uses Confront (triclopyr and clopyralid) for control, adjusting the timing for weather conditions and

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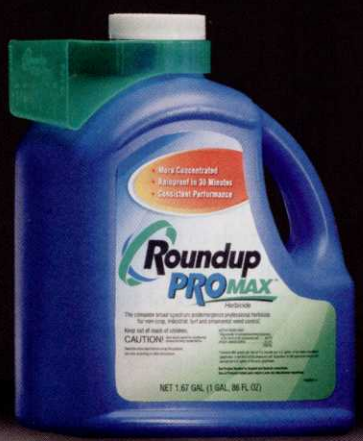

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Spot treatment is most effective for individual weeds or small groups of weeds. Photo: Steve Trusty

targeting only the high visibility areas for treatment. Any grassy weed breakthrough generally hits in late July. He spot treats with MSMA, or uses a combination of 2,4-D with MSMA or MCPP to control broadleaf weeds, too.

Fitting weed control into the budget is a factor for Jamestown Golf Course in Rhode Island. The nine-hole municipal facility just added preemergent controls to its program two years ago, says assistant manager Jon Mistowski. Jamestown's greens are a mix of bentgrass and *Poa annua*, and the tees and fairways are a combination of Kentucky bluegrass and perennial ryegrass. Fescues are in the rough.

Mistowski uses Barricade for crabgrass control, applying it in May mostly to the tee surfaces, targeted trouble spots on the fairways and the approaches. He spot-treats clover in June, applying Trimec (2,4-D, MCPP and dicamba) with a backpack sprayer. He hits the outbreaks, mostly within the tee boxes and approaches in areas totaling about 100,000 square feet. He also uses glyphosate for spot applications of weeds that pop up in bunkers or the parking lot.

Head grounds superintendent Jeff Pint maintains about 108 acres of bentgrass, annual bluegrass and Kentucky bluegrass at New Prague Golf Club, an 18-hole public facility in Minnesota. The area, like much of the upper Midwest, is cool and rainy in the spring.

Those needing preemergent controls struggled to find an application window. Many that made early applications were finding weed breakthrough by early June, but Pint has managed to crowd out the grassy weeds with dense turf.

"We haven't needed a preemergent application for several years," he says.

Clover and dandelions are the most problematic weeds at New Prague and used to be controlled with Millennium Ultra (2,4-D, clopyralid and dicamba). Pint made the first application in mid-May, working in the high-profile spots first, then covering as much of the affected area as possible by mid-June.

"With the boom sprayer, we could usually hit about one-third of the tees, roughs and fairways each year," he says. "This year, we've had no application window during that time frame."

While Pint achieved fairly good control at the recommended rate, the Millennium Ultra applications stunted the *Poa*, and it has struggled to recover.

"A sales rep suggested an alternative that we switched to in 2006," he says. "We're now adding straight dicamba to the tank at a low rate when we make our growth regulator applications."

Pint starts mid-May, weather permitting, and keeps repeating at three week intervals until the weather gets too hot around July. Then he starts back again in the fall. The first application knocks down the weeds that have emerged, and the application three weeks later takes them out.

SOUTHERN HOSPITALITY

Weed challenges in warm-season turfgrass are different from those in cool-season turf. At the private Shady Oaks Country Club in Fort Worth, Texas, Brent Doolittle, CGCS, manages GenTiff bermudagrass – an unmarketed experimental variety that performs much like Tifway 419 – on tees, fairways and roughs.

"We usually apply a granular fertilizer with Team Pro (benefin and trifluralin) preemergent in the fall for crabgrass, goosegrass, *Poa annua* and Shepherd's Purse," Doolittle says. "We can use spot applications of Roundup on the dormant bermuda to get anything that escapes. We have little weed pressure in the middle of the fairways, but the bermuda struggles along the edges because of the shade. We apply Ronstar (oxadiazon) there, usually in February."

Doolittle and his staff have used Gallery (isoxaben) in areas where they've had a severe outbreak of Shepherd's Purse but generally just spot treat them with 2,4-D using a backpack sprayer. Nutgrass is the worst weed problem.

"When I arrived here seven years ago, we were spot treating about 5 acres for it," Doolittle says. "This year, we'll probably treat about 20 acres. The preemergent program works so well we don't need the follow-up application of MSMA to keep the nutgrass in check. We use Monument (trifloxysulfuron-sodium) and Manage (halosulfuron-methyl), depending on where the nutgrass is located. Some seasons it takes two treatments to control it."

Mark Smith, golf course superintendent at The Quarry at La Quinta in California, maintains warm- and cool-season turf.

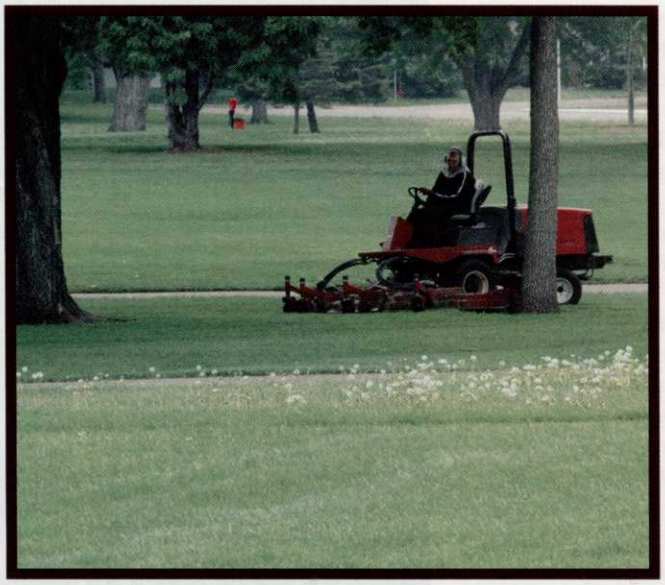
The hybrid bermudagrasses are overseeded with a blend of perennial ryegrasses. Greens are Tifdwarf bermudagrass, tees and fairways are Tifgreen, and the rough is Tifway 2.

Smith uses Barricade for preemergent crabgrass control and applies it in March, only covering the infested area, which is about two-thirds of the fairway.

Smith's two main broadleaf weed problems are cudweed and spotted spurge. Generally, the turf is thick enough to hold its own, but Smith spot treats as needed with Trimec or Speed Zone (2-ethylhexyl, dicamba, MCPP and carfentrazone-ethyl). He also uses Gallery and Ronstar in the 8 acres of dormant turf that aren't overseeded at different times of the year.

During overseeding, Smith uses a preemergent herbicide, either Ronstar or Surflan (oryza-

Large areas of weed infestation are better controlled with targeted broad-area herbicide applications. Photo: Steve Trusty



Dandelions pop up quickly when weather conditions delay mowing. Photo: Steve Trusty

lin), in the landscape beds that are within the turf area and along the bunkers to keep the perennial ryegrass seed from taking hold there.

Smith's most prevalent weed problem is *Poa annua*, and it's the most difficult to control. He had used Prograss (ethofumesate) for more than a decade, making two blanket applications a year, three weeks apart, covering the affected area. But the transition back to bermudagrass in the summer was slow, and the turf was weaker than desired.

"Although several factors might have contributed to that, we decided to eliminate the Prograss application and see if we'd get a better transition," he says. "My unscientific presumption was the cumulative applications might give us enough residual to skip a year and still get some control. Through early June, we had only a minor *Poa* problem that we managed with PGRs, Primo and Proxy together, for seed head suppression. I'll need more time to fully analyze the results."

PRODUCT PREFERENCE

Many of the newer herbicides are earning kudos from superintendents. Hellenga likes the results his crew has achieved with Confront. Doolittle is impressed with Monument to control sedges and TranXit (rimsulfuron) to control annual bluegrass for the occasional breakthroughs or missed areas of application when it's too late to use Roundup to control *Poa annua* and nutgrass in the bermudagrass.