

The **Right** **Stuff**

BY JOHN WALSH, CONTRIBUTING EDITOR

Soil conditions, turf type and location are a few factors that determine a proper-functioning fertility program

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F THE THREE MOST significant aspects of managing turfgrass — mowing, irrigation and fertility —

superintendents have the most control over the latter. They concede mowing control to members and irrigation control to Mother Nature.

But more control doesn't necessarily make fertility easier. If not done properly, it'll cause pest problems. Fertility also affects other cultural practices.

"You won't get the most out of other cultural practices if the fertility isn't right," says Mike Richardson, Ph.D., professor of turfgrass management and physiology in the department of horticulture at the University of Arkansas in Fayetteville.

And because of member expectations, Charles Peacock, Ph.D., professor and extension turfgrass specialist in the department of crop science at North Carolina State University in Raleigh, is concerned superintendents are keeping turf a little too lean.

"I understand trying to limit inputs because of the environment and budget constraints, but you can't starve turf during critical times," Peacock says. "There has to be a balance between being too lean and overfeeding. Superintendents need to make sure the plant gets what it needs."

"The vast majority of superintendents

are malnourishing greens in pursuit of ball-roll distance," says Cale Bigelow, Ph.D., associate professor of agronomy at Purdue University in West Lafayette, Ind.

"Superintendents tend to starve putting greens for speed," says Frank Rossi, Ph.D., associate professor of turfgrass science in the department of horticulture at Cornell University in Ithaca, N.Y. "That's where you get into trouble."

And turf needs, which are affected by weather, vary annually.

"You don't need the same amount of nitrogen every year," Peacock says. "There's often a 2x range based on climate conditions. No year is exactly on average."

With more aggressive fertility comes more aggressive mowing and potential thatch issues. Presently, many superintendents are thinking about using more plant growth regulators instead of using lower fertility rates to control growth.

"Once you lower fertilizer rates (and the turf gets damaged), it takes longer to bring back the turf," Bigelow says. "So ensuring the turf is actively growing will benefit overall performance."

To get the most out of a fertility program, superintendents usually consider three big macrofactors: geographic location, soil conditions and type of facility. Even so, it all comes down to nutrients.

I've got needs

Turfgrass plants need 16 essential nutrients, three of which come from air and water and the rest from soil. So a balanced nutritional program is most important, fundamentally, because no element can substitute for another. Superintendents need to focus on nitrogen, an essential macronutrient, and iron for color, Rossi says.

"There's a need for the others, but I can't find too many reasonable people who say we're underapplying other nutrients," Rossi says. "Other than nitro-

gen, we don't have soil tests that say how much other nutrients we should add. I don't think there's a justification for a lot of the fertility that's done."

Others question the quantity of other nutrients.

"Calcium is overused and over-sprayed," Richardson says. "It can't be translocated down into the plant. Superintendents should know how all the different nutrients move into the plant."

On fairways and tees, the range of nitrogen per year is 3 to 4 pounds. On bentgrass greens, that range can go from as low as 1 pound up to 10, Bigelow says.

"Ten pounds was not uncommon 15 years ago," he says. "Four pounds is more appropriate nowadays."

Richardson says 99 percent of superintendents use historical data to determine the nitrogen needs of a plant.

"Some day, units of nitrogen will be applied based on the months of growth," he says.

Soil's importance

Any fertility program should be based on soil type, which will dictate the nutrient-holding capacity of a fertility system. A sound soil-testing program provides a historical perspective to see what's been done to help provide a baseline to start.

"Some superintendents don't use soil testing programs properly to see how fertility is changing the soil," Richardson says. "Superintendents need to ask themselves, 'Is what I'm doing increasing, decreasing or saving the nutrients in the soil.'"

Every year is different. One year 25 inches of rain might fall; the next year there could be 50 inches. Some nutrients could leach through the soil.

"It's good for superintendents to look back at the year and determine what conditions forced them to change nutrition," Richardson says. "It's always critical to

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— CALE BIGELOW

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add needed fertility based on soils.”

Soil tests should be conducted at least once a year or twice a year for greens, Richardson says. “In Florida, for example, I’d sample more frequently because the growing season is 12 months,” he adds.

Soil tests can save superintendents money in tight economic times. “If you don’t need something, don’t put it down,” Richardson says. “Before, it used to be, ‘Well, I’ll put it down anyway just to be on the safe side.’”

For sand-based greens, there’s no need to test the soil for nutrients because there’s no buffering or holding capacity in those sand systems, Rossi says.

“In soil-based systems, we’re finding we’re overestimating the need for nutrients, i.e., phosphorus,” he says. “Now it’s 20 pounds per acre. It was 40 pounds per acre five years ago.”

Soil tests, which aren’t expensive, are a necessity because without them superintendents are just guessing. “Sometimes superintendents don’t follow through after the test,” Peacock says. “They need to follow the recommendations closely.”

Generally, sandy soils tend to lack iron and manganese. With highly reactive soils (heavy clay soils with high aluminum), superintendents have to keep up with pH levels to prevent aluminum from becoming toxic to root systems, Peacock says.

Before implementing a fertility program, a soil test needs to be conducted because superintendents need to get an idea of what the soil is like and nutrient availability. Is there a potential pH problem? Could there be problems with aluminum toxicity or nutrient availability? Are soil amendments needed?

For example, soil in the rural Midwest is generally uniform if it hasn’t moved, says Rich Gaussoin, Ph.D., professor and extension turfgrass specialist in weed science at the University of Nebraska-Lincoln. On newer golf

courses, where a lot of soil has been moved for mounding, the soil isn’t uniform because the subsoil was brought to the surface. In cases like these, the pH level can range from 5.5 to 9.

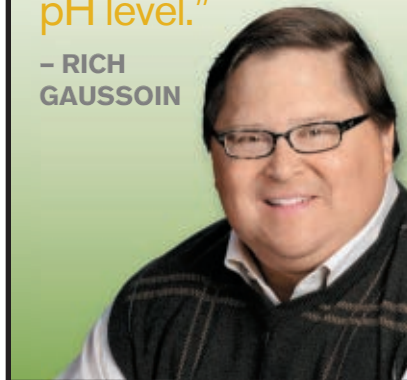
“Did the location have deep soil or shallow soil when building the course?” Gaussoin asks. “When you bring it all to the surface and get grass growing, the grass tempers the soil. Generally, soil is only a problem during grow-in and three to four years after that. The plant, through the addition of organic matter, often buffers a problematic pH level.”

Different needs

Obviously, geographic differences — arid or cool, wet areas, for example — will affect fertility programs, too, as well as the intended use of the area: greens, tees, fairways, rough and the clubhouse lawn.

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— RICH GAUSSOIN



“Superintendents look for places to reduce fertility,” Bigelow says. “Maybe they won’t fertilize an entire fairway each time, and just fertilize landing areas.”

Because greens are the most noticed piece of real estate, most fertility tweaking is done there, Gaussoin says, adding there’s less fertility tweaking in fairways unless problems arise.

“It’s not that big of an expense to spend money on foliar products for greens,” he says. (See sidebar about liquid vs. granular products.) “The tweaking on greens isn’t with N-P-K, the macronutrients — it’s the micronutrients. It’s all about timing and shifting to a different program during stressful summer conditions where foliar products provide not only nutritional value but have documented stress relief if the products contain constituents such as amino acids and cytokinins.”

Rough areas, where inputs are decreasing, are often left alone. In some cases, more attention is being paid to tees than fairways. Some superintendents are treating tees with foliar products, and others are using a modified form of liquid on fairways and greens.

“Because of the economy, superintendents are carefully looking at fertility programs, sticking with protecting greens and green surrounds and cutting back in the rough,” Bigelow says.

Additionally, some superintendents are being more precise with nitrogen applications — going out more frequently at lower amounts — on fairways and tees.

Cost and timing

There are times when missed opportunities are almost impossible to correct, Peacock says, citing construction as the most important time to fertilize.

“You need lime and phosphorus,” he says. “It takes years to correct those deficiencies with surface applications because they’re slow to react when applied that way. Still, some people get it

Liquid or Granular?

Determine the goal of fertilizer use before choosing its form

Liquid or granular — which one is used and why? Many superintendents use both types of fertilizer, and some superintendents are switching to an all-liquid program. But no matter the form of nutrients, the bottom line is creating an environment for good uptake.

Charles Peacock, Ph.D., knows superintendents who have an entirely foliar fertility program, yet the professor and extension turfgrass specialist in the department of crop science at North Carolina State University knows superintendents who are perfectly happy with their granular program that includes supplemental liquid fertilizer.

For superintendents using liquid fertilizer in combination with other products, they need to make sure everything is compatible, says Rich Gaussoin, Ph.D., professor and extension turfgrass specialist in weed science at the University of Nebraska-Lincoln. He encourages superintendents to test their irrigation water to determine the pH level because

wrong. You want to get those nutrients in then so the roots can grow.”

Cost affects timing. “Fertilizer was never an issue before because it was cheap,” Richardson says. “Now, superintendents want to save money, so they’re asking more questions about getting good conditions with less fertilizer. Timing is more important, and slow-release products are attractive in the rough and fairways.”

Additionally, Europeans are measuring the nutritional demands of turf by conducting research about demand-driven fertilization, in which superintendents apply different levels of nitrogen and at different growth stages.

Turf type

Turf type is yet another factor for fertility. For example, perennial ryegrass, usually in fairways, needs more fertilizer than other cool-season turfgrasses, Gaussoin says. With spreading grasses on greens, such as bermudagrass and creeping bentgrass, superintendents should be careful with nitrogen because

some products need a buffering agent.

There are more biologically active products coming to market, too.

“Most foliar products have things like elicitors, phosphites, amino acids and cytokinins in them that are beyond fertility, and get superintendents through the summer,” Gaussoin says. “It’s way beyond nutrition.”

In the South, liquid applications on fairways are occurring mostly at high-end clubs with zoysiagrass, says Mike Richardson, Ph.D., professor of turfgrass management and physiology in the department of horticulture at the University of Arkansas in Fayetteville. Superintendents are adding iron to get color.

“More are using foliar fertilizers on fairways and tees than I thought,” Richardson says, citing a survey his department conducted. “It’s done to give the turf a pop before a big event.”

Still, Richardson preaches to superintendents that they need to think why they’re putting down a foliar fertilizer and what products they use. — *John Walsh*



too much of it results in thatch, which can compromise play.

“In my region, the cool-humid region, superintendents frequently apply nitrogen to try and stay ahead of dollar spot,” Bigelow says. “You can reduce the severity of this disease with a sound fertility that promotes rapid recovery.”

Warm-season turf, bermudagrass especially, needs more nutrients than cool-season turf, Richardson says. Cool-season turf on greens typically receives 1.25 pounds to 1.5 pounds of nitrogen per active growing month, usually five months. Fairways and tees usually receive 5 to 8 pounds of nitrogen annually. Zoysiagrass requires lower fertility. On greens, 1 to 2 pounds of nitrogen per 1,000 square feet is normal for a whole season. Too much fertilizer can cause disease problems, he says.

The amount of fertilizer needed depends on geographic location, the soil type and management approach.

All natural

Naturally organic and biosolid products are gaining popularity, especially in the Northeast, Bigelow says.

A turf plant doesn’t care what form of nitrogen, potassium and phosphorus it’s given — it will take it up as an ion, Peacock says. In organic fertilizer, nitrogen is in a more complex form that needs to be broken down, a process (composting) that needs to happen before a plant can uptake nitrogen. Because it depends on microbiological activity to break down nitrogen and other nutrients, it needs soil temperatures of 60 F and higher to work. Conventional fertilizer works in any soil temperature.

Ultimately, superintendents need to understand the growth patterns of the turf they manage.

“It’s not what you use, it’s how you use it and when,” Peacock says. “You need to match what the turf requires with how you groom it for a particular use.” ■

Walsh is a contributing editor to Golfdom.