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e're talking the basics here, as in rudimentary, elementary and fundamentally. The key to keeping roots in greens healthy and able to withstand a sweltering summer has more to do with utilizing the essentials of turfgrass management than some far-out agronomic alchemy. Several agronomists with the United States Golf Association (USGA) are as sure as Sherlock Holmes about that.

"I don't think there are any secrets here," says Patrick Gross, director of the USGA Green Section's Southwest region. "Although superintendents are fascinated with the myriad of new products, agronomy 101 will be the most important factor to help them grow healthy roots."

Says Keith Happ, senior agronomist for the Green Section's Mid-Atlantic region: "There aren't any magical cures out there ... no matter how many guys try to find that wonder drug in a bottle. It goes back to the basics. The research is pretty clear on what works best."

The basics, says James Skorulski, senior agronomist for the Green Section's Northeast region, mean the need to get smarter with cultivation practices. For some superintendents that could indicate a return to doing things from which they've gotten away.

The time to achieve healthy root growth is now, says Charles "Bud" White, senior agronomist for the Green Section's Mid-Continent region. White advises superintendents in the area he serves — including Texas, New Mexico and Oklahoma — that they should prepare in the spring for the worst summer growing conditions possible (read: stifling heat and humidity) in regard to maintaining healthy roots.

### **Poking holes**

Back to agronomy 101, which begins with the importance of air movement, Gross notes.

"Roots need air as much as they need water," he adds. "The diagram shown in every class about soil mentions that soil should have 25 percent water-filled pores, 25 percent air-filled pores and the remaining portion is the mineral content of the soil. Shallow rooting starts to develop when many of those air-filled pores are lost."

Aeration, of course, is vital to achieve proper



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To sustain **healthy root growth** in greens, superintendents are best off sticking to the essentials of turfgrass management, USGA agronomists say

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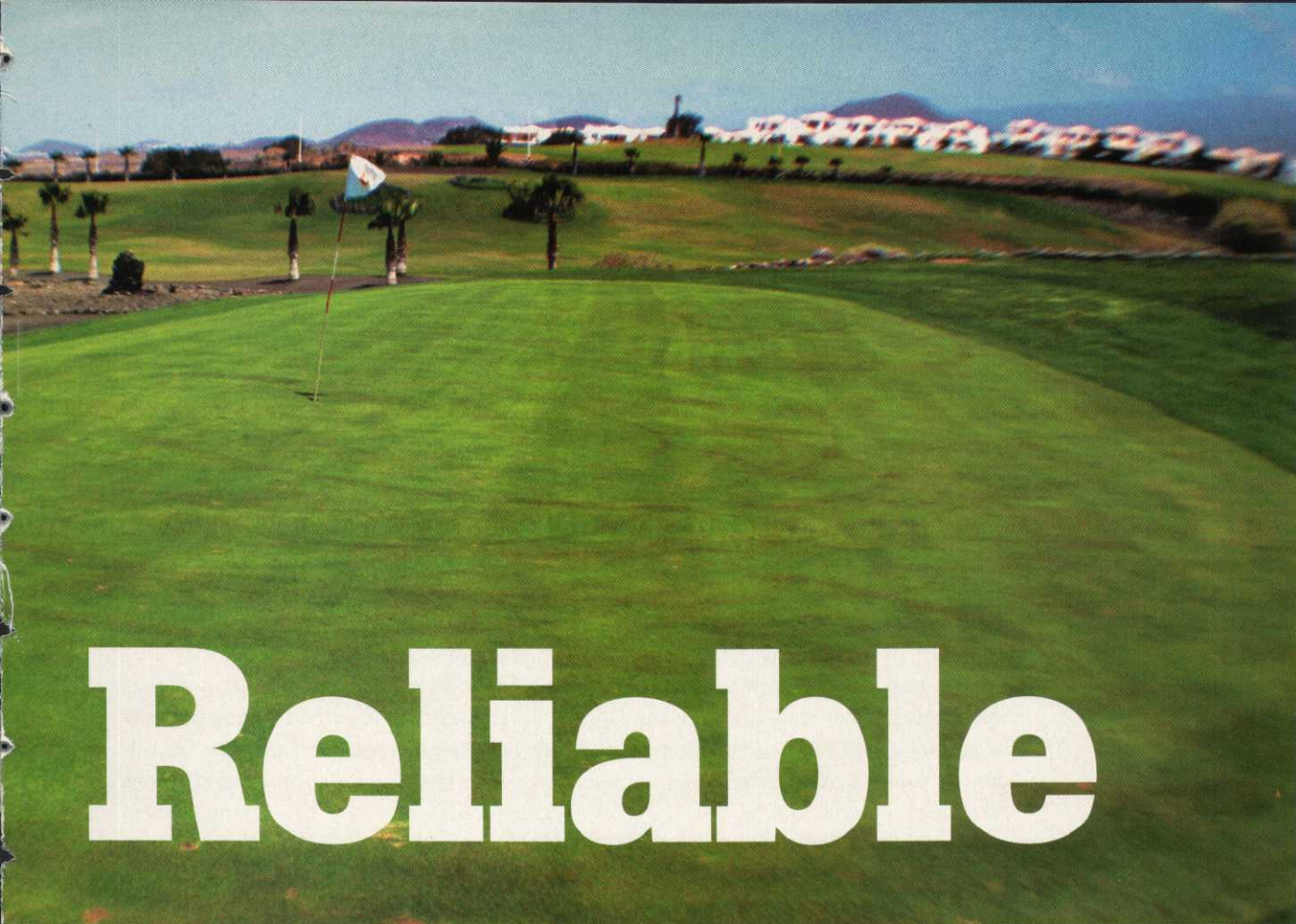


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# Reliable

air movement. Happ agrees that poking holes is one of the best ways to sustain healthy root growth. "No matter how hot it is, we know that superintendents will create or stimulate root growth if they aerify," he says.

That said, aeration these days can be much more involved than just poking holes, Happ points out.

"We've got everything from water injection to sand injection to solid tines," he says. "We've got so many fantastic tools now to poke holes and keep air in the profile that [superintendents] have a chance to [create] a really strong foundation to grow grass."

These days, superintendents are able to aerify without disrupting the soil very much, Skorulski says, noting that he recommends deep quarter-inch pencil tines for such procedures.

Gross adds that many courses supplement spring and fall aeration treatments with less-invasive practices during the summer to keep the surface open for adequate air and water penetration. There are a variety of methods available for this purpose, including spiking and slicing, he notes.

Superintendents can't afford to aerify only in March and then wait until August to do it again, White stresses. But the fact that they're

hesitant to aerify more than once has more to do with (no surprise here) golfer pressure than anything, he adds. "A lot of times superintendents are scared to stir the water," he says.

However, if golfers are complaining, the course as a whole, including the people in the pro shop, needs to do a better job of communicating to golfers and members why aerifying is important, White says.

White advises superintendents in his area to aerify their courses' bentgrass greens twice — in mid-March and in early May. They should use small tines the second time around so the greens can heal in a few days.

To deal with the summer heat, White suggests spiking greens and aerifying with quad tines as needed, in addition to hand-watering the hot spots. White says superintendents in his area should begin spiking every few weeks in June and then weekly in July and August. "When you spike and then mow and roll, golfers will hardly notice," he says.

Topdressing goes hand in hand with aeration, Gross notes. When excessive organic matter develops at the ground's surface, water and air can't penetrate deeper into the soil, he says.

"The result is shallow roots," Gross adds.

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"This is precisely why core aeration and topdressing are frequently recommended."

Aeration and topdressing should be a high priority in the spring and fall to coincide with the growth cycle of the grass and the production of roots.

"Again, it's agronomy 101," Gross says.

Gross points out it's important to avoid changing topdressing sand, which could create layers in the surface of a green and lead to poor air and water movement.

**Water wisely**

In Idaho and surrounding states, where Matt Nelson is agronomist for the USGA's Northwest Region, water management is the most important aspect of sustaining healthy root growth. And, yes, it's extremely important in other areas of the country as well.

Nelson says it's crucial to irrigate to the depth of the rootzone throughout the season.

"It doesn't make a lot of sense for you to water regularly to a depth of 2 inches if your green's roots are 8 inches and vice versa," he adds.

It's important to water deeply about once a week when roots are deep, Nelson adds.

Regular watering is also important to rid the rootzone of salt, which could come from fertilizer.

"Even if it's not something you're really concerned about and you're not on a constant salt management program like you would be in areas like southwestern Utah, Nevada or Arizona, there may be enough salt in your water that can accumulate throughout the season in the rootzone to where it needs to be leached," Nelson says.

Nelson says surfactants and wetting agents can also help keep a uniform soil moisture in the profile and help maintain healthy roots.

Hand-watering plays a viable part in proper water management. Gross advises superintendents not to send the college kid in his third week on the job out to hand-water.

"Superintendents should have their best employees in charge of hand-watering, and these people should be properly trained in where and when to water as well as how much to apply," Gross says.

**Parting thoughts**

Happ says superintendents shouldn't back off from their cultural practices when turf

begins to grow aggressively. He says some superintendents stop fertilizing and aerifying then because they believe the turf is healthy enough.

"You hear the comment, 'I can't keep up with how fast the grass is growing,'" Happ says.

That said, they shouldn't stop trying to encourage root growth below the surface. "What goes on underground is what superintendents need to be watching," Happ adds.

Getting back to the basics, Skorulski says, could mean raising mowing heights to lessen the stress on roots that comes with cutting them at one-sixteenth of an inch.

"There are other ways to get a quality playing surface other than having to lower the height of cut substantially," says Skorulski, who recommends rolling greens and using plant growth regulators to make them run faster instead of mowing them shorter.

Nelson says it's vital for a superintendent to stick a soil probe in the ground to assess root structure. Yes, that's another basic management technique but one that can be overlooked in the whirlwind of the golf season.

It's one thing to have a chemical soil analysis to help superintendents evaluate the need for phosphorus and potassium in their fertility programs. It's another thing to follow through with the recommendations of the analysis, says Gross, noting that many superintendents don't.

"They need to make sure that phosphorous amounts are adequate, and that they are applying a good regimen of potash to turf," he adds.

Gross says gypsum, lime or other treatments may be necessary if superintendents have chemical problems with their course's water or soil.

"But the need for these treatments should be based on laboratory analysis — not what the guy down the street is using or what the salesman says [to use]," he adds.

The moral of this story: There's nothing wrong with trying something new to help maintain healthy roots, USGA agronomists will agree. But there's also nothing wrong with sticking with the tried-and-true cultural practices. It's not glamorous, but ...

"The basic way really works — and tremendously well," Happ says. ■