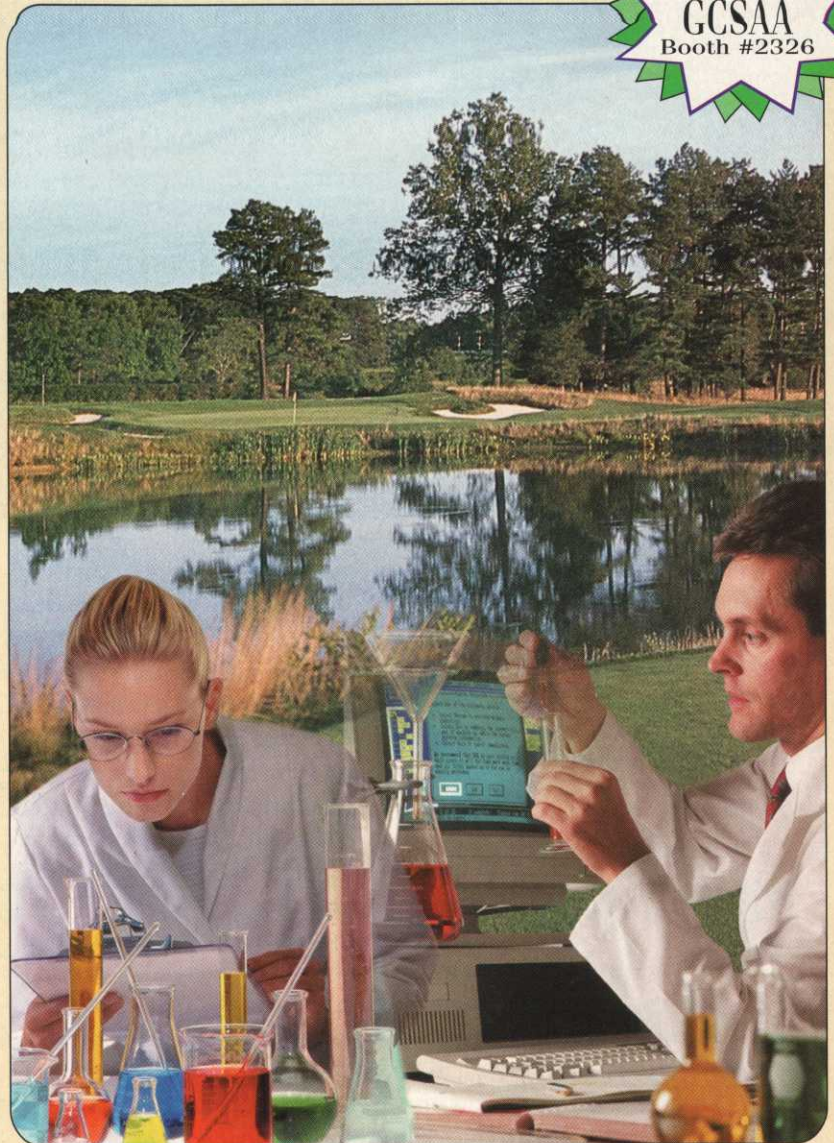


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Beechtree Golf Club, Aberdeen, Maryland - Hole #2, Par 3





At Austin (Texas) Golf Club, the L-93/Crenshaw blend requires superintendent Doug Petersan to apply only 3 pounds of nitrogen per year.

“[Golfers] want June-like conditions right through the year.”

JOHN LAPREY
SUPERINTENDENT
YORK (MAINE) GOLF
AND TENNIS CLUB

Continued from page 49

three baskets of clippings off a green, it needed fertilizer.”

In contrast, Petersan — now in his 40th season as a superintendent — grew in Austin (Texas) Golf Club that opened in 2001. With a 12-month growing season and greens that are an L-93/Crenshaw blend, his yearly application total is about 3 pounds. Petersan thinks the drop in rates coincided with the increase in green speed.

“As everybody became more acclimated to faster greens, (they) became more of a demand than a luxury,” he says. “You can’t have fast greens if you put a lot of fertilizer on them.”

In 1965, Petersan lowered the height of cut on the greens to one-quarter inch at Pioneer, causing an uproar with other superintendents in the area. “Everybody thought I was crazy, and that I was going to kill everything,” he says.

Almost coinciding with the drop in rates was the change in the means of application. David Sexton, superintendent at Meadow Club in Fairfax, Calif., says it has virtually eliminated one big problem.

For 22 years, Sexton has been superintendent at the Meadow Club, Alister MacKenzie’s first design in the United States. He remembers when an incorrect application of a granular product would leave putting surfaces

covered in green spots. Even when the Cyclone spreader came along, there were still problems trying to keep the nitrogen levels uniform throughout. “There were green strips that showed up and areas that got missed,” he says.

With the current application rates so low and the means of dispersion in liquid form, problems occur far less. “Even if you overlap, the consequences are hardly noticeable,” he says.

Maybe the most radical change in the past 10 years is the acceptance of fertigation. Petersan opted for fertigation during the growth of his zoysia-sprigged fairways at Austin. Fertigation, which is becoming more and more popular, allowed Petersan to correct pH problems with his water source when establishing his turf. But Petersan uses his fertigation system only rarely now.

“I don’t use it now for maintenance-type fertilizer applications,” he says. “[I’ll use it] maybe to put down nitrogen for an event to green things up.”

All the refinements in nitrogen application have led to one big problem — unfair expectations from golfers.

“They want June-like conditions right through the year,” Laprey says. “That might help us if golf was televised in black and white.”

Pioppi is a Golfdom contributing editor based in Middletown, Conn.

FRESH

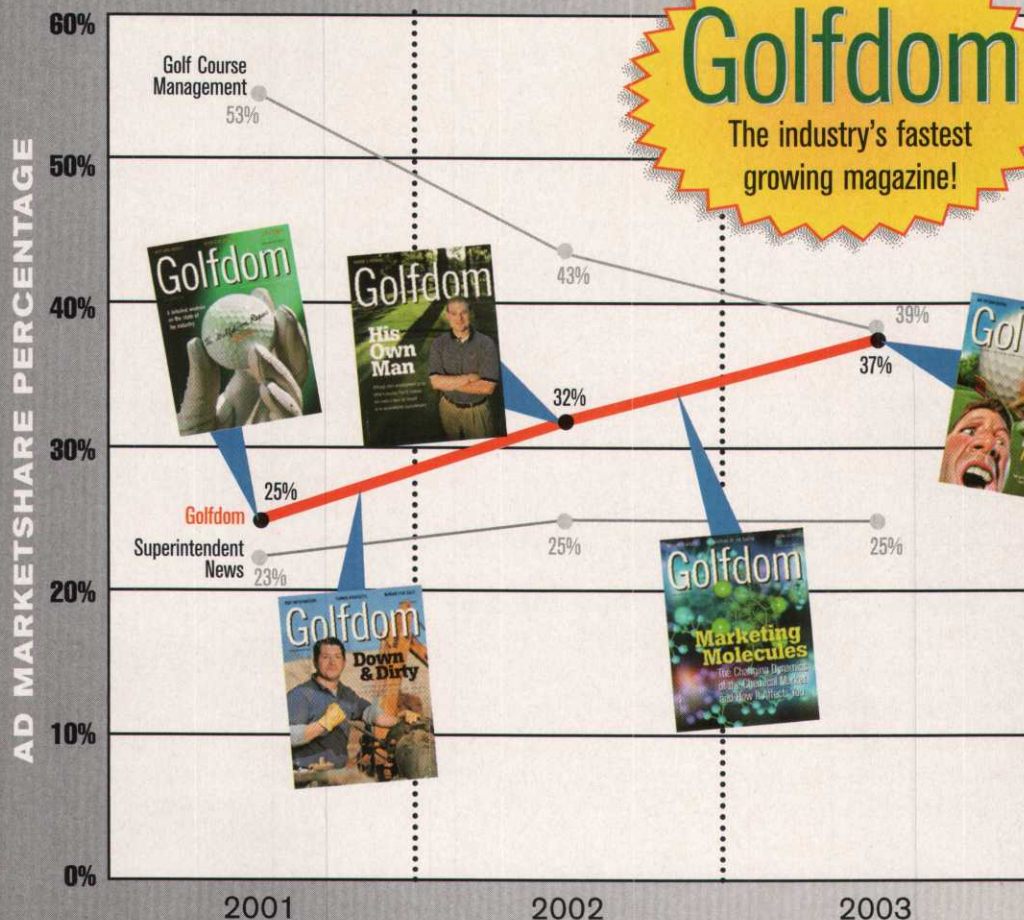
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Professors on Plant Nutrition

Academics discuss everything from testing to frequency and formulations

By Peter Blais

Today's superintendents can select from a wide menu of plant-nutrition choices when deciding what will yield the healthiest turf. Still, course managers need to consider some basic

concepts before placing their turf-growing orders, such as:

- the major steps to follow and nutritional products needed;
- cultural practices that affect plant nutrition;
- factors determining how often to fertilize; and
- the various fertilizer formulations available for different purposes.

To sift through the major items superintendents need to digest when it comes to plant nutrition, *Golfdom* sought the opinions of four academics from across the country: Joseph Heckman, soil-fertility specialist at New Jersey's Rutgers University; Karl Danneberger, professor at The Ohio State University's Department of Horticulture and Crop Science and *Golfdom's* chief science editor; Richard

White, professor of turfgrass physiology and management at Texas A&M University; and Kent Kurtz, professor at California State Polytechnic University Pomona's Horticulture/Plant and Soil Science Department.


Testing

One of the first things most turf experts recommend is a soil test. These should be done routinely to provide a basis for the application of all nutrients except nitrogen. Appropriate nitrogen application levels can be determined by tissue analysis, experience or extension service recommendations, White says.

Kurtz believes soil tests in his region are best conducted in winter when things are slow but superintendents are still trying to keep turf healthy.

"Find out which nutrients are deficient," he recommends. "Don't worry about the ones in good quantity, but address the others. You don't have to test all 18 greens. If you have three or four that are typically a problem, test those and then test some of the better greens."

Continued on page 58



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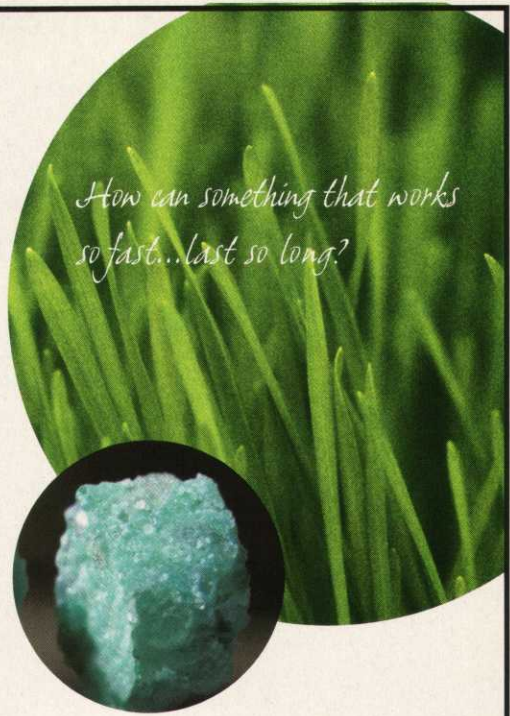
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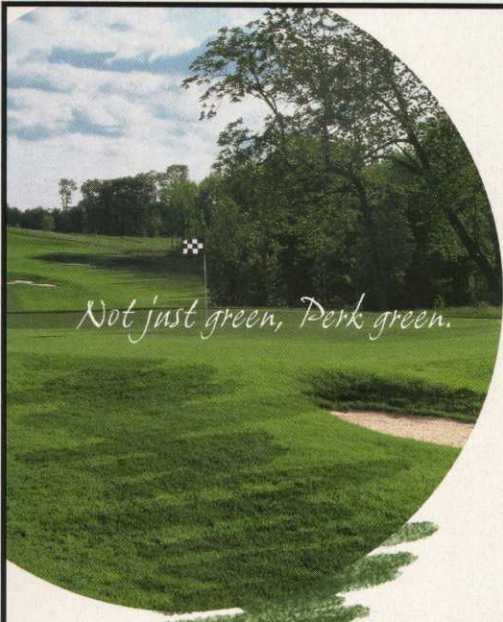
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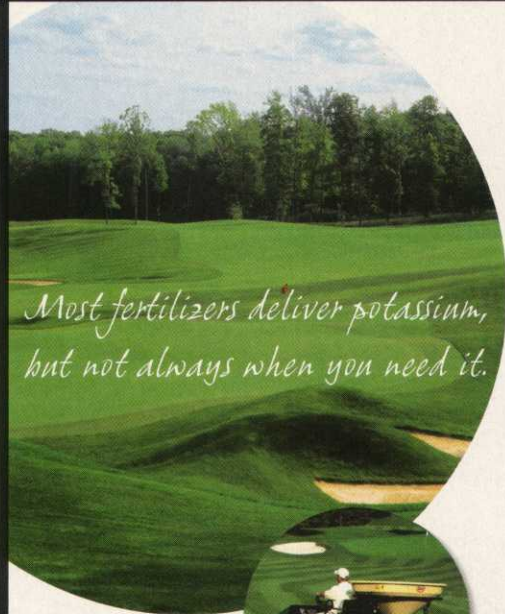


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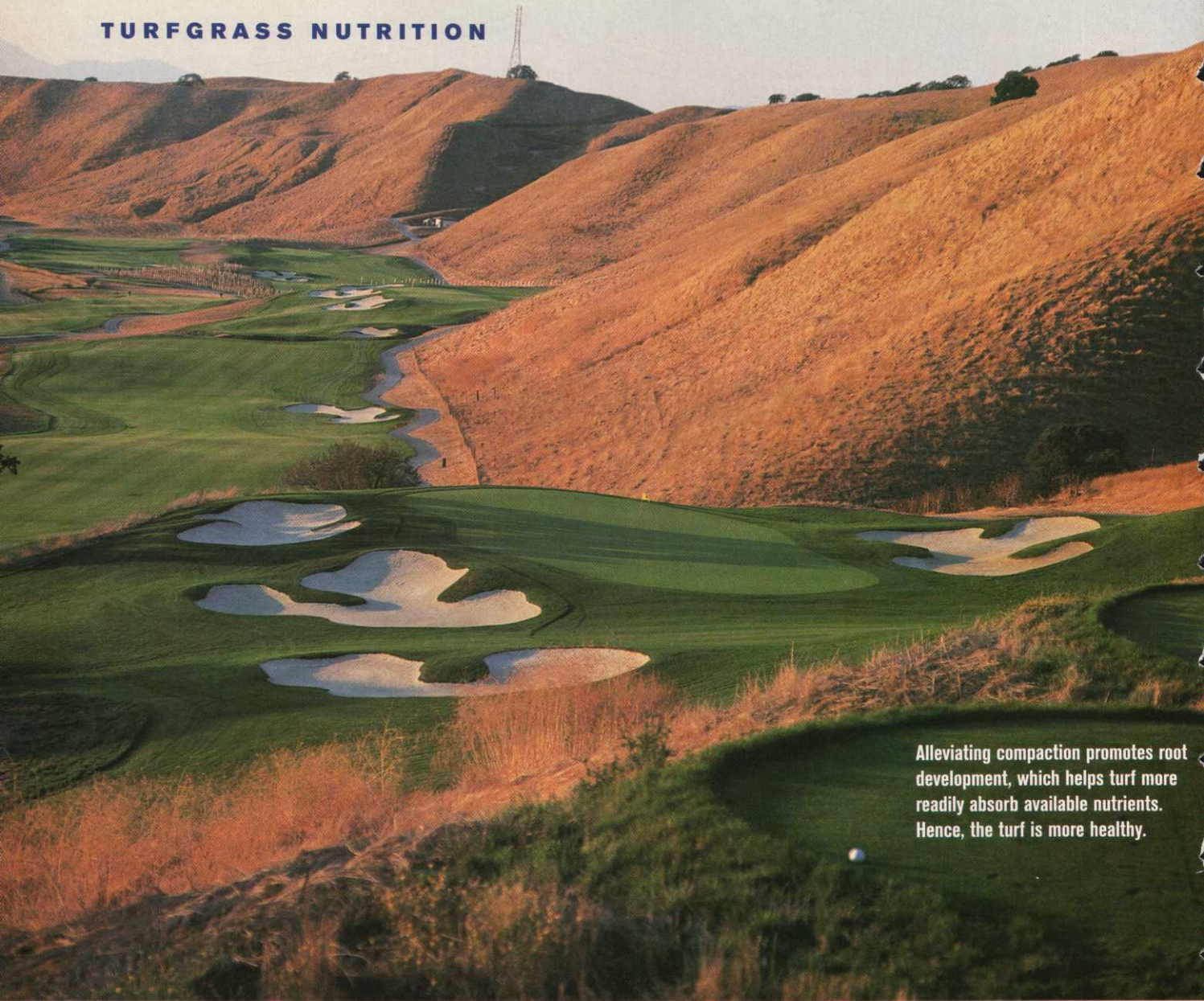


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Continued from page 54

Nutrients

Danneberger believes superintendents need to focus more on macronutrient levels of nutrients. These generally include nitrogen, phosphorus, potassium, calcium, magnesium and sulfur.

"The major elements are called macroelements for a reason," he says. "The plant needs them. Many of the disease problems on golf courses are because of low levels of nutrients."

On high-sand greens, superintendents should also look at the major microelements that need to be chelated, things like iron and manganese. "Some of the micropackages are valuable during summer stress on high-sand content greens," Danneberger says.

New sand greens often need more fertilizer,

because many of the products are leached out with water, Kurtz agrees. Superintendents compensate by applying extra water and fertilizer.

White suggests caution regarding indiscriminate applications of one particular macronutrient — phosphorus.

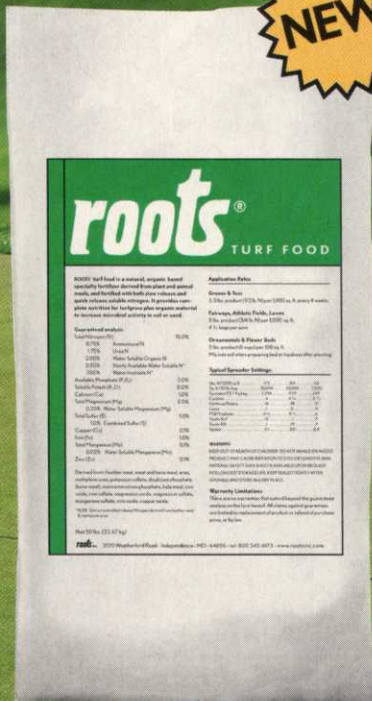
"If the soil test does not call for phosphorus applications, don't apply it," he warns. "It has a greater risk of environmental impact on surface waters. In sandy soils, there is the potential for movement into ground water."

One nutrient superintendents need to use more often is potassium, Kurtz says. Several products provide potassium and nitrogen while skipping phosphorus.

"Potassium nitrate is the one that comes to mind," Kurtz continues. "Some are soluble and are hot fertilizers, so [superintendents]

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Continued from page 58

have to be careful. But in the winter, it shouldn't be a problem if they put it down on dry grass and get it watered in right away."

Many fertilizers used in Southern California have micronutrient packages as part of the product. Iron, zinc and manganese are the most important ones [micronutrients], says Kurtz, who also recommends varying fertilizer types.

"It's like fighting a fungus problem," he says. "If you continually use the same fungicide, you build up a resistance. So you have to alternate things. We do the same thing with fertilizers."

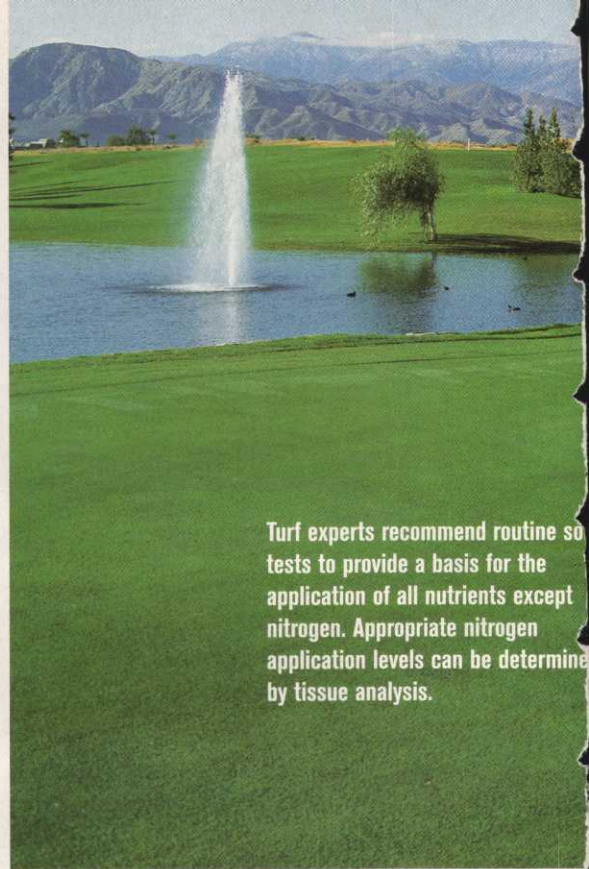
Kurtz also recommends keeping a close eye on the soil's pH. Some micronutrients are only available to plants when the pH is 6 or below. "With greens that are above 7, many times you have to use a product that is readily available, like iron. Some courses will actually use more iron applications because it keeps the turf green."

Kurtz notes that certain fertilizer products have different salt indexes. For example, ammonium nitrate and ammonium sulfate are fairly high in salt, while some organics are fairly low. Many slow-release fertilizers, like urea formaldehyde, are quite low with just a trace of salt.

"You don't want to put high-salt-index fertilizers on your greens in the summer unless you need them," he warns. "When you do the soil analysis, you should get the ECE [electrical conductivity] of the salts and the SAR [sodium absorption ratio]. If you have those results from the soil test, you ought to be able to manage those greens with materials that don't have high salts."

One of the benefits of a good soil-fertility program, Heckman says, is that it can minimize the need to use pesticides for take-all patch or summer-patch disease. "We have done a lot of work here looking at plant nutrition/disease interactions," he explains. "We can get pretty good control of summer patch by using ammonium nutrition. We can get good control of take-all disease with manganese fertilizer. Using nitrate nutrition on summer patch disease seems to exacerbate the problem."

Superintendents who use ammonium fertilizers, like ammonium sulfate, often worry about burn problems. "You can minimize the risk of burn with these fertilizers as long as you



Turf experts recommend routine soil tests to provide a basis for the application of all nutrients except nitrogen. Appropriate nitrogen application levels can be determined by tissue analysis.



"If the soil test does not call for phosphorus applications, don't apply it."

KARL DANNEBERGER,
DEPARTMENT OF
HORTICULTURE AND
CROP SCIENCE,
OHIO STATE UNIVERSITY

irrigate and water them in after you have applied them," Heckman says.

Ammonium nutrition also lowers pH rapidly. "If you don't follow up with a good liming program, you can have a problem with excessively low pH," Heckman notes. "Whenever you use ammonium in combination with a good liming program, you still get good control of summer patch disease. Too low pH runs the risk of aluminum toxicity and influencing the availability of other nutrients like phosphorus."

Take-all patch is controllable without the use of fungicides, the Rutgers instructor notes.

"You can get very good control using manganese fertilizer," Heckman explains. "You put on about 2 pounds per acre in April before the disease starts. It's best to use it every year if you know you have a problem with take-all patch."

Cultural practices

Certain cultural practices can help plants more readily absorb available nutrients. For example, alleviating compaction promotes root development, White says.

"Anything that can be done to improve root development will help the plant's ability to absorb nutrients," the Texas A&M professor says. "Avoiding heavy irrigation following the application of nutrients or timing nutrient application to avoid heavy rainfall will reduce the movement of those nutrients off site. That

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MIKE KLEMM