



Liquid assets

*Liquid nutrients
can offer flexibility,
precision and ease of
use with irrigation.*

Donna Harter Raab

Superintendents, groundskeepers and university turf specialists looking for uniform coverage, better color and more even growth are looking increasingly at liquid nutrients.

While some turf managers and researchers are unsure that liquids are always better in comparison with granular fertilizers, some say that when used in conjunction with an irrigation or watering system, liquid nutrients can save significant time and labor while producing healthy fairways and greens.

On the course

Bill Bedford III, an eight-year member of GCSAA and superintendent at La Cantera Golf Club in San Antonio, Texas, says liquid fertilizers are a valuable tool in his turf-care arsenal. "In our part of the country we have to be very precise with the fertilizers we're putting down," he says. "Liquids give us the flexibility and precision we need to maintain our turf in tournament-quality condition for public play and the PGA Tour's Texas Open, plus they work hand-in-hand with our irrigation system."

In its third year of operation after being voted the "best new public golf course of 1995" by *Golf Digest*, La Cantera benefits from a computerized irrigation system directly linked to an on-site weather station. From this link, Bedford can gather data such as wind direction, wind speed, relative humidity and heat index. He then uses this data to calculate the amount of evapotranspiration (ET) that has taken place and figure out how much moisture needs to be put back into the turf. Using this data in combination with routine soil tests and tissue analysis, Bedford says he can easily determine what nutrients are needed, where they are needed and how much is needed.

Bedford then applies needed amounts of liquid nitrogen and potassium to turf through his fertigation system. "This lets us apply fertilizers in the safest way possible, and it's also more economical," he says. "We use a slow-release liquid nitrogen product to help keep our plants healthy without producing rapid growth and large amounts of grass clippings. And, since it's easily added to our fertigation system, we can spoon-feed it and put on just what a plant can take up at one time, so there's no leaching or runoff. I think this is the most environmentally friendly way to feed turf."

Bedford says he also uses a liquid potassium thiosulfate product in his fertigation system and in spray applications. "Potassium thiosulfate helps keep each plant crisper and healthier, and the leaf blades stand up more so we get a better putting surface," he explains. "I often alternate my tanks. One day I'll apply slow-release nitrogen and the next day I'll run a tank of potassium thiosulfate. Both liquid fertilizers are valuable tools to help turf perform to its fullest potential for a great golf experience, while also letting us be environmentally conscious."

Managed by Buddy Cook Golf Inc., La Cantera was a Mid-Continent winner in GCSAA's 1996 Environmental Steward Awards.

Joe Bornkessel, superintendent at Desert Springs Golf Club in Phoenix, and an eight-year GCSAA member, is another believer in liquid nutrients. He

has used liquid potassium thiosulfate coursewide in his irrigation control system every night, he says.

"Potassium helps the turf tolerate heat and traffic and generally helps it recover from stress, while thiosulfate helps keep soil pH within an acceptable range," he says.

Bornkessel, who formerly was superintendent at Hillcrest Golf Club near Phoenix, routinely did soil tests and tissue analysis on that course's 160 acres. He found frequent application of potassium thiosulfate to be vital to his turf maintenance.

Depending on weather conditions, the ET rate and the amount of irrigation water going out, Bornkessel says he used an average of 400 gallons a month when he was at Hillcrest. A liquid formulation, he says, "saves us a lot of manpower and equipment expense."

Off the course

Agronomic consultant John Clapp, Ph.D., agrees that liquid fertilizers have benefits. Based in North Carolina, Clapp works with fertilizer distributors and university researchers to help determine and promote good fertility practices on numerous crops and ornamentals, including turf.

"A good fertility program is always helpful in maintaining good growth on turf and in alleviating disease pressure that might build up on unhealthy turf," Clapp says. "When you have a product

such as a liquid fertilizer that is efficient and convenient to use, it's more likely to be utilized in an ongoing turf management program."

To provide nitrogen, which is considered a primary nutrient for turf, Clapp frequently recommends a slow-release liquid nitrogen product. "Slow-release nitrogen helps prevent leaching problems that sometimes occur with urea and nitrate sources," he says. "When nitrogen is mineralized and converted from its stable form into nitrates, it can leach out of the root system without being picked up by the grass. With a slow-release form, it takes longer for that mineralization to take place, so the grass has a better chance of utilizing available nitrogen."

Clapp says slow-release nitrogen also helps produce a more even growth pattern. "With a slow-release product, you don't get that tremendous surge of growth right after application. And since the nitrogen continues to be released over a period of time, you can extend the intervals between applications."

Recent studies conducted by turf specialist Charles Mancino, Ph.D., at Penn State University, compare growth and color responses from various nitrogen sources and forms. "We anticipated that a good nitrogen source would be one that generated good color response over a long period of time, but not a lot of clippings," Mancino says. "Using creeping bentgrass and Kentucky bluegrass in our tests, we made two applications each year of the designated nitrogen products, including Gro-Mor, N-Sure, Poly-S, Polyon, Nutralene, ESN mini-prill, NatureSafe and various types of urea."

"In general," he says, "liquid fertilizers performed as well as 'prilled' or granular materials, and turf color response usually lasted about nine weeks. None of the liquid sources caused burn problems, even at the aggressive rate of 1.5 pounds of nitrogen per 1,000 square feet. However, urea and one other prilled material caused burn problems. Granular and prilled materials also seemed to cause dark green speckling around the spot where a prill landed, while liquid forms of nitrogen did not exhibit such symptoms."

When selecting a fertilizer product — liquid or otherwise — Mancino says it's



Photo courtesy of Legacy Golf Irrigation

Many superintendents see liquid nutrients, delivered by a fertigation system, as a way to increase coverage.



A computerized irrigation system directly linked to an on-site weather station helps Bill Bedford, superintendent of La Cantera GC in San Antonio, determine where and when liquid nutrients are needed.

important to select one that will encourage enough growth from the turf to allow it to recover from injury. "If turf doesn't grow, it's going to get worn out," he says. "But on the other hand, you don't want to be mowing like crazy. With urea, you often get an immediate flush of growth that lasts about four weeks, then the color begins to drop off and you need to make another application. But a slow-release nitrogen product can give you a more even growth period that lasts around nine weeks or so. This type of continued feeding helps keep turf healthy over a longer period of time."

The fertilizer tournament

So, which form of fertilizer is really better — liquid or granular? There are probably as many opinions on this as there are types and brands of fertilizers.

• John Clapp, Ph.D., agronomic consultant in North Carolina: "There's no comparison. I think liquids are much more efficient in providing complete coverage as opposed to granulars, which often exhibit spotty growth patterns. And, when you use liquids in conjunction with an irrigation system, you just

can't beat them."

• Tom Samples, Ph.D., Extension turfgrass specialist at the University of Tennessee - Knoxville: "I'm not sure liquids are better in all applications. I do believe there is an opportunity for liquid application as well as granular. But it's up to the superintendent to use regular soil testing and tissue analysis to determine whether to target nutrient application at plant tissue or to both plant tissue and soil. Superintendents would also benefit from learning as much as possible about all nutrient products — both liquid and granular. Then, based on their expected results and cost benefits, they can select the best fertilizer for their particular needs."

• Charles Mancino, Ph.D., Penn State University: "I think a liquid application is going to give a more uniform result, especially if you're dealing with a turf showing nitrogen deficiency. If you put prills down, they're going to fertilize right where they land, and you're going to get spotty turf until you've finally made enough applications to deliver nitrogen to all the turf. When you spray a liquid or apply it through fertigation, you're more likely to cover all the turf every time."

• Joe Bornkessel, superintendent at Desert Springs: "I like the convenience of liquid fertilizers. And since we can apply the liquid directly through our fertigation system, the public and our golfers . . . don't see it being applied, and there's no little pellets lying around afterward. I think that's a definite benefit."

• Bill Bedford, superintendent at La Cantera Golf Club: "With a liquid, the visibility of applying fertilizers on a golf course is basically nonexistent. In the past, golf courses have been branded as bad guys. But the truth is we're as environmentally conscious as anyone else, if not more so. By using liquids in our fertigation system, we can apply them at night. And liquids save us money, too. To apply a granular fertilizer to our 200 acres of turf, I would use four men at about 10 hours each during public golf time. Compare that 40 hours to the 20 minutes I now spend simply filling up my batch tanks and calibrating my injectors. There's just no comparison."

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