

tions if we didn't see any significant results. I'm willing to try something new if its not too expensive, hoping to see some benefit, but after reading Dr. Elliot's report on testing being done on biologicals, I go back to the basics and with a little help from Mother Nature everything comes back.

IPM Considerations

IPM is always taken into consideration no matter what we are applying. All big tractor applications of fertilizer maintain a setback or buffer zone along the water hazards. We fill in with walking spreaders or sprayer for better control. Additionally we apply Primo and iron along the lakes and canals to keep flymow work to a minimum so less fertilizer is needed.

We select our fertilizer blends to keep the amount of quick-release nutrients to a minimum to avoid any runoff problems from an unexpected downpour. We allow our last fertilizer application on our tees and greens to run out and we make a "spoon feeding" liquid application to hold color until the next granular application kicks in.

Soil tests are done once a year on six greens, tees and fairways and on any problem areas. Tissue testing is done periodically on any greens where the products do not appear to be working and the turf remains weak.

Summary

Winter Pines is a public golf course which is open 365 days a year from sunup to sundown. We try to work around our players as much as possible. Most of our morning players are regulars so they understand what we are doing when we might have to hold them up to water something in.

Every year we evaluate all the fertilizer products we use and we stick with what has given us the biggest bang for our bucks. New products come out every year and we will try some to see how they perform for us. All in all, how our turf looks and responds to what we do is the bottom line.

BY JOE ONDO, CGCS

The Nitrate Truth Shall Set You Free

I am preaching to the choir when I say that golf courses are good for the environment. We have known for years that turf is a filter for pollutants and loose sediments (dust) even though in some instances chemicals must be ap-

plied to support its growth. If it were not for turf, many of our waterways would be environmental hazards.

The USGA remains the largest supporter of turfgrass research. To date, we have funded over \$20 million in research and will continue to provide this support into the next millennium. Protecting the environment is the major goal of our funding by producing improved turfgrass

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varieties, supporting the Audubon Cooperative Sanctuary Program and creating the Wildlife Links Program (visit www.usga.org/green/turfgrass/ to learn more about each of these).

Fertilization is a key factor to producing quality turfgrass. Turfgrass requires nitrate for growth; however, excessive nitrate in the environment is harmful. Nitrates pollute water sources and are a potential human health threat causing the condition known as "blue baby syndrome" in infants.

Through the years, research has shown that much of the nitrate is a byproduct of other industries like agriculture. Even so, golf courses are still popular targets of attack from environmental advocates.

Ignorance is bliss for some individuals but the USGA feels that it is best to learn as much as possible about the fate of chemicals applied to golf courses. A series of studies funded by the USGA was conducted throughout the previous decade in order to determine the environmental fate of fertilizers and pesticides.

These studies are too numerous to list but some of the findings from these studies include:

- Nitrate leaching was negligible (<0.2%) in a bluegrass rough at a depth of 4 feet and the concentration was at least 10 times below EPA standards for drinking water (Michigan State University).

- When turf was maintained under a high level of management, nitrate leaching from a tall fescue rough and bermudagrass fairway was very low. A total of 1% or less of the applied nitrogen

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was lost in leachate (University of Nevada).

- A bermudagrass fairway and a bentgrass putting green utilized most of the nitrogen applied — even with over irrigation. Under the conditions of the study (biweekly applications of urea and sulfur-coated urea), little nitrate leaching (1%) was recorded (University of California).

- More leaching occurred in a newly planted bentgrass fairway than in a mature established turf but did not exceed EPA drinking water standards (Cornell University).

- Irrigation had to be doubled (6-inches/hr.) in ryegrass and bentgrass fairways in order to produce any runoff. All nitrogen and phosphorous concentrations in the runoff were less than EPA drinking standards (Penn State University).

- Addition of organic matter to a sand

rootzone mix proved to be the most important factor for reducing nitrogen leaching. Spoon feeding every 14 days significantly reduced nitrogen leaching from young greens compared to 28 days.

As putting greens matured, nitrogen fertilization rate was the most important factor affecting leaching. Light applications of slow-release sources on a frequent interval provided excellent protection from nitrate leaching (Washington State University).

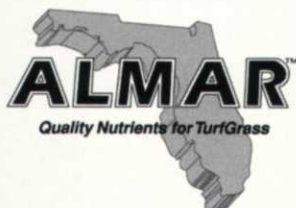
- Bermudagrass buffer strips are an effective means for decreasing the amount of nutrient and pesticide runoff that reach bodies of water. Longer strips (8 to 16 feet) and increased mowing heights (3-inches) are more effective than shorter strips (4 feet) and mowing heights (0.5 to 1.5-inches) (Oklahoma State University).

- At downstream sites of golf courses, nitrate concentrations were lower than upstream sites. Also, an overall increase in the number of invertebrates occurred downstream of two golf courses (University of Maryland).

In addition to the benefits of turfgrass, some of the information also pointed out the negative effects of poor management.

Applying more soluble nitrogen (>0.5 N per 1000 sq. ft.) than the turf can utilize at any one time leads to nitrogen loss. Also, applying fertilizer just prior to a major rainfall or irrigation cycle (7-inches/hour) may lead to runoff.

Immature root systems are also much more inefficient at utilizing nitrogen as compared to mature, dense roots, and



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great care should be given to not applying too much fertility to newly establishing turf sites.

Once the facts are known, informed decisions about fertilization can be made. There is freedom in knowing the truth, and the USGA will continue to fund necessary research for providing the best playing conditions while also protecting the environment.

BY TODD LOWE
USGA Agronomist

The Legacy Club's Fertility Program

John Kopack, superintendent of The Legacy Club at Alaqua Lakes shares his fertility program with *The Florida Green*. The Legacy Club was only the third public course to be built as an Audubon Sanctuary Signature Course.

Kopack says, "We maintain 30-foot unfertilized bahiagrass and cordgrass

buffers around the lakes to ensure there is no runoff into the water bodies. Additionally, our irrigation system is designed so that no sprinklers throw water into lakes, wetlands or other natural areas. We also store all the storm water runoff from the development: it moves through staging ponds to the irrigation lake and is then recycled onto the course."

"We do soil testing three times a year. I check four greens, tees and fairways each time and I keep three greens as permanent control sites and vary the other three choices for each test. I personally do the tee and fairway granular fertilizer applications with a two-ton capacity Lely spreader pulled by a tractor. On our greens we cut the rate in half and go two directions with Lesco rotary spreaders."

Greens Program

Granular — six applications a year of 12-2-12 with 50% sulfur coated urea.

Liquid — Sprayboom applied 2 times

a month in the cool season with Peters 20-20-20 at 1/4 lb. of nitrogen per 1,000 sq. ft. We also include soluble iron in with our fungicide applications in the winter time. Coronas 12-0-0 or 15-0-0.

Tees and Fairways Program

Granular — two applications a year spring and fall. Usually a 15-5-15 blend with 70% slow release nitrogen.

Fertigation Program

Warm season — 2-3 applications of 11-0-8 with 50% slow release N. Each application takes 5-7 days with meter set at 30%.

Cool season — 2 applications of 20-0-0 with a unit of iron. These are usually made prior to our member-guest and invitational tournaments for special event green up.

Special — We apply a 0-34-0 that comes in a mini bulk container during our overseeding process to help the new seedlings get rooted.



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