the fairways has been initiated and sand traps are being added. Plans include rebuilding four to six greens per year and installing a completely new irrigation system. Instead of cutting back, Novak has increased the mowing frequency, expanded his herbicide and fungicide programs and is starting a sod nursery on the course. Has someone forgotten to tell him municipal courses can't afford such improvements? When will he have to face reality?

The reality is golf is the largest revenue producer in the Los Angeles Park System. The reality is a foursome tees off every six minutes on Rancho Park and tee times are booked solid from 5 a.m. to 1:30 p.m. every day. An average of five tournaments are played on the course each week. Golfers, noticing the improvements, are starting to call Rancho Park—Hillcrest West. The crew hears all kinds of "attaboys" from golfers every day. It may be a public course but to these golfers it feels like a private golf club.

The Los Angeles Park Department has 13 municipal golf courses in three regions. Together they generate $6 million is use fees each year. General manager James Hadaway saw golf as one of the best ways to increase park system revenues. To protect the golf courses from a restricted tax base, Hadaway decided part of each golfer's greens fee should be earmarked for capital improvements and returned to the courses. He saw this not as a gift, but as an investment to increase rounds played.

Ken Novak runs an aggressive rebuilding program at Rancho Park without closing the course to play.

Rancho Park now has $50,000 more per year as a result and is using it frugally to renovate greens and tees. Where a private course might spend $50,000 to rebuild two greens, Novak builds between four and six. The trick is a combination of group purchasing and labor from court referrals and welfare. When 13 courses buy as a group, and then only through a bid process, the savings are substantial. Novak uses every trick in the book to stretch his $125,000 budget and he also targets each dollar to go where golfers will notice it the most.

The courses take advantage of people who must perform public service for court offenses or as part of California's Work Fair program. This important group of workers help the city save money by their efforts. Three of them liked working at Rancho Park so much they studied, took the required written and oral exams, and were later hired for the course crew.

The Los Angeles Open is a premeire golf event. Eighteen times the course had been chosen for the site of the tournament. The course, rated a par 71.2, was no pushover. Arnold Palmer took a 12 on the 17th hole during one LA Open and a plaque on the tee reminds both golfers and Palmer of that day.

Regional golf director Steve Ball knew the history of Rancho Park since he had been the superintendent there before Novak. Both knew Rancho Park could attract more golfers and increase revenues for the city if the course was carefully renovated.

When the decision was made to renovate the course regular golfers were asked what they liked and didn't like about the course. Novak says the golfers strongly voiced their concern over any major changes in the course. "Rancho Park golfers are very attached to this course and speak out as if it is a private course and they are the members. They wanted to make sure we didn't break the rich tradition of the course by mas-

continued on page 22

Cart paths were installed three years ago to control turf damage by carts.

Fighting the Muni Blues
continued from page 21

sive reconstruction. That tradition is firmly fixed in their minds when they play the course and adds to the challenge. They wanted the greens just like they were and no trees removed."

The problem would be helping the course withstand the tremendous traffic it already had in addition to the wear caused by more golfers.

Novak first focused on cart paths and greens. "Out of 400 rounds per day, more than 100 use carts," he states. "Cart traffic was causing severe damage which forced us to resod certain areas every spring. Three years ago cart paths were added to the worst areas but we still have some problem spots.

"Our biggest concern was the old clay greens. They would get light spots which looked like chemical spills. They turned out to be the result of severe compaction. During the summer we have a crew which hand waters the greens in the afternoons to keep the *Poa* from wilting. This, combined with the large number of rounds and the clay soil, caused the compaction problem. We knew we had to convert the greens to United States Golf Association (USGA) specifications if they were to survive the wear. We also identified the need for double greens on three holes."

"Compaction is such a problem that we are forced to close the course when it rains," Novak revealed. "It has been closed 15 days this year due to rain. Fortunately, the rainouts are rarely a problem after April."

Twelve years as an irrigation repairer and three years as a golf course superintendent with the Parks Department had acquainted Novak with golf course construction. He knew the new greens had to have the same shape, contour and roll as the old greens.

But first, the alternate greens had to be built. Novak chose Tifgreen bermudagrass sod from Pacific Sod for the sand-based substitutes and in just over six weeks he was able to take the old greens out of play. He surveyed the old greens every five feet so the surface could be duplicated exactly. Within two weeks the old clay was removed, new drain lines installed and the area staked every five feet to match the readings taken previously. Court referral labor under close supervision then used wheelbarrows and rakes to install a bottom layer of washed stone, a middle layer of washed sand and a top layer consisting of 70 percent sand (20-30 mesh), 20 percent composted redwood and 10 percent perlite. "It's very important that the lower layers have the same roll as the surface," Novak points out.

The greens were then seeded with Penncross bentgrass, fertilized and carefully irrigated. "Regular golfers observe the bentgrass greens coming to life and anxiously look forward to playing them after they are given three months to mature. In fact, golfers see everything we do since the course opens in the morning (5 a.m.) before we can start our equipment." A local ordinance restricts Novak from using equipment before 7 a.m.

Novak checks every green three times a day. "We have to do things a little differently with our greens due to the intense traffic," says Novak. "We intentionally let the thatch on the old greens stay between 1/4 and 3/8 inch thick. We aerify them every six weeks, break up the cores and drag them back in. In November, the old greens are double aerified, sand topdressed and overseeded with Pennway at one half pound per 1,000 sq. ft. The new bentgrass greens are overseeded with Penncross and the Tifway alternate greens with *Poa trivialis*." "We follow an intensive Scotts' preventative disease program in addition to preemergence weed control for *Poa annua* and postemergence weed control. I've been using applications of iron recently on greens and tees with good results."

Novak has tried Kerb on the kikuyu fairways to get rid of the annual bluegrass and is exploring applications of Embark growth regulator for the same reason. Tees and fairways are aerified and dragged four times each year. Stolons brought up by the aerifiers are collected and planted in thin areas.

Out of Novak's crew of 15 full-time and five part-time men and women, three specialize in mowing. Greens are mowed daily at 3/16-inch, except in the summer when they are mowed at 7/32-inch, with Jacobsen Greens King triplex mowers. "They used to be mowed every other day and the fairways every three or four days," says Novak. "Golfers have noticed the difference in the course since we started daily mowing." The kikuyu tees are mowed at 3/8-inch with the triplex mowers and fairways at 5/8-inch with a Toro eleven-bladed, seven-reel gang, also on a daily basis. Roughs are kept at 1½ inch.

Certain areas along the cart paths still have to be resodded each year.

Rancho Park crew topdresses a new bentgrass green, one of three installed this past winter.

The low nutrition needs of the kikuyugrass let Novak concentrate his fertilization efforts on the greens and tees. Whereas the fairways and tees require only one pound of nitrogen per 1,000 sq. ft. per year, the greens are fertilized weekly, a rate Novak calls lean. Both liquid and granular fertilizers are used, including ammonium sulfate, urea and Scotts Heavy Duty Golf Fertilizer. In this way he applies one pound of nitrogen per month per 1,000 sq. ft. to the greens. He includes penetrants with each application of liquid fertilizer. To bring the bermudagrass alternate tees out of dormancy in the spring he applies iron and Gro-Power organic fertilizer. Novak is considering fertigation for the planned irrigation system as a convenient way to apply supplemental fertilizer to the greens.

"I take part of my crew with me to local night courses on turf care taught by Cal Poly University so they have a better understanding of what we are doing," says Novak. "They know they don't have to go and they also know they work harder than a lot of other people in the park department. If they don't care about what they are doing, the golfers will notice and stop caring. Public relations is the most important thing they can learn. They can't always wait for golfers to finish putts or tee off. They have too much to do. If a golfer complains they must answer in a way that enlists his support in the maintenance program. The golfer can tell if it's just a job or the crew really cares."

"We have a goal to motivate us," says Novak. "Within three to five years we want Rancho Park to be equal to most PGA Tour courses. We want the professionals to ask to come back here for the Los Angeles Open or other tour events. It keeps the tradition alive and makes the crew and the golfers committed to the course."

Novak's spirit is catching. This month, the Parks Department gave him another course to breathe life into, the Armand Hammer Golf Course five miles away. The 18-hole pitch-and-putt course used to carry 200 rounds per day and is now down to 20. A grant from the Armond Hammer Foundation has been increased to help Novak incorporate the techniques used at Rancho Park at the Armand Hammer course. After all, if he can make one course withstand 138,000 rounds per year, what's another 70,000? ▶

FREAM GROUP DESIGNS FOUR INTERNATIONAL COURSES

Ancient dwellings from the days of Caesar were uncovered as Ron Fream and Associates saw its design take shape for an 18-hole desert course in Monastir, Tunisia.

The golf course architect is also building an 18-hole course along the coconut-studded coast of Tioman Island in Malaysia.

Ron Fream and his associates have been exploring terrain, ranging from the tropical rain forests of Borneo to the dry Mediterranean climate of Tunisia. They are currently working on the design and construction of four new golf courses. They've encountered spent artillery shells from World War II, mosaic floors from ancient dwellings and pottery possibly from Julius Caesar's legions as the earth was shaped for a course in the City of Monastir in Tunisia. They circumnavigated Viking gravesites when planning the fairways at a new course in Hassungared, Sweden. You wouldn't think from these stories that Fream's golf course architecture business is based in Santa Rosa, CA, but it is.

At Tioman Island, 30 miles off the East Coast of Peninsular Malaysia, construction has started on an 18-hole, 6,600 yard course which is to be part of a luxury "tropical hideaway" resort. The secluded site is one of aquamarine waters, deserted coral sand beaches, immense seaside boulders and towering groves of coconut palms, all next to steep mountains clad in lush tropical jungle. Five holes will play along the sea, among rock out-crops and through coconut-studded sand dunes. A 250-room hotel is being constructed amidst this tropical setting.

In the State of Brunei Darussalam, on the island of Borneo, construction is soon to begin on an 18-hole, par 72, championship-quality course to become part of the Sultan of Brunei's personal recreation facilities at the Royal Brunei Polo Club. This course plays among Casurina pine forests and sand dunes, along the South China Sea. The Sultan's new palace overlooks the new course.

The heavily wooded, undulating terrain of Hassungared, Sweden, is the fourth job the Fream Group has had in that country. The course, sprinkled with Viking gravesties in the rough, will be an 18-hole, 6,850 yard membership course.

Some of the greatest history is found in Tunisia where Fream has designed the first 18 holes of a 27-hole resort course located in groves of olive trees along the eroded cliffs of the Mediterranean Sea. The area was an encampment site for Julius Caesar's legions during his North African campaigns nearly 2,000 years ago. The only water for this course will have to be reclaimed from the adjacent sea at great expense.

The four new exotic courses bring Fream's international client list up to twelve and prove that golf course architecture is an international art, shared by all types of people in all parts of the world.

ROBERT TRENT JONES CELEBRATES 80TH BIRTHDAY

Robert Trent Jones, Sr., golf's most prolific and innovative golf course architect, will celebrate his 80th birthday on June 20, 1986. Jones has designed more than 450 golf courses in 34 countries for such notables as Lawrence Rockefeller, Lowell Thomas and President Eisenhower.

As he approaches his 80th birthday, he still works seven days a week and travels more than 300,000 miles a year overseeing projects and promoting new ventures.

NEW YORK TURF GROUP BOOSTS RESEARCH GIFT

The New York State Turfgrass Association (NYSTA) increased its annual donation of turf research funds to Cornell University in 1985 by 35 percent to more than $45,000. In addition, the group is helping fund construction of a turfgrass learning center at the State University of New York, Cobbleskill.

The gift to Cornell makes possible research in turfgrass cultivar evaluations, soil compaction studies, the effects of herbicides, control of turf diseases, soil fertility, wear tolerance and low maintenance turf. Part of the donation underwrites the costs of a graduate student at the University to assist Drs. Martin Petrovic and Norman Hummel. Other areas being researched are water use, drought tolerance and contaminated water through an Automated Rain Exclusion System for Turfgrass.

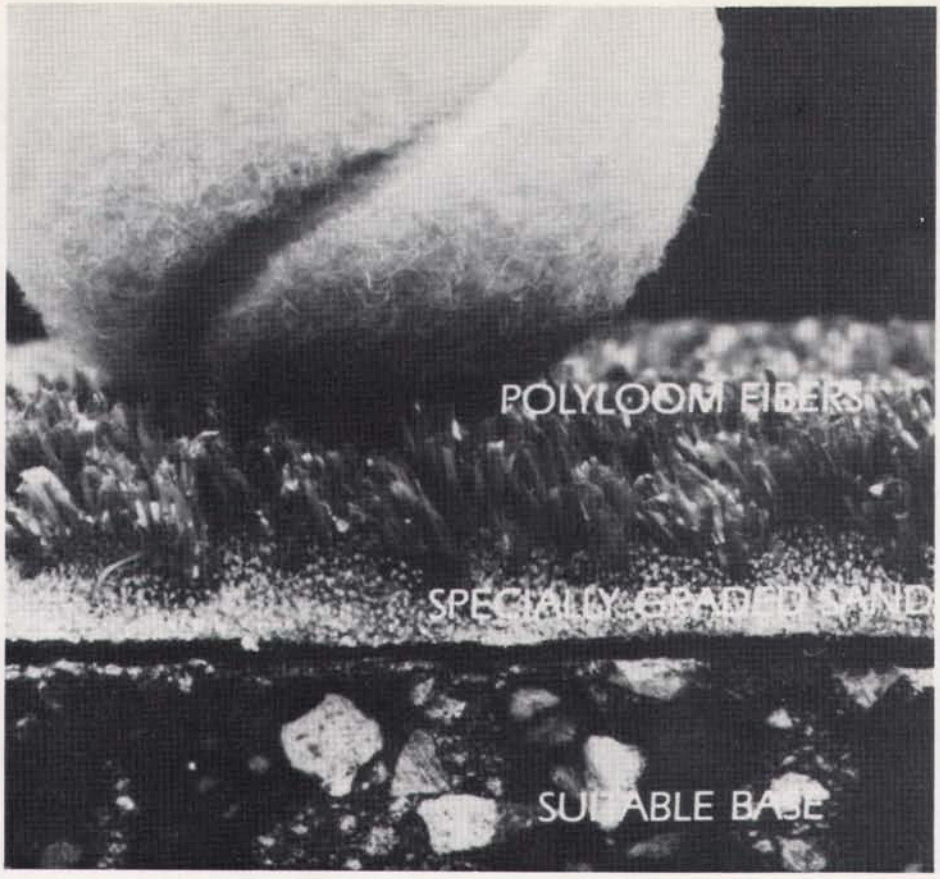
NYSTA Executive Director Ann Reilly says the funds were made available by gifts from members, local golf course superintendent associations, seed companies and chemical companies. Part of the NYSTA contribution was derived from a series of golf tournaments held throughout New York last fall.

JACK CANTU

Jack Cantu, owner of Wesco-Zaun, Sarasota, FL, passed away in April at the age of 58 after a long battle with cancer. He was formerly president of the Toro Company and vice president of O. M. Scotts Proturf Division. Five years ago he purchased Wesco-Zaun, one of the largest distributors of Toro commercial products in the country.

The always pleasant Cantu was diagnosed to have cancer more than a year ago said his son Ned. Cantu worked until the day he died and hoped he would live to see the company's new office building dedicated. The building will be dedicated this month.

Wesco-Zaun has branches in St. Petersburg and Fort Meyers. Cantu's wife Mary will take the company over, said Ned, and his sister will join it soon.



Developers of the Omnicourt have combined a grass-like carpet with sand topdressing to simulate the characteristics of natural turf tennis courts with reduced maintenance.

brushed daily to help the sand settle into the carpet. Any excess water flows through the carpet and pad and drains off the base.

Brushing keeps the fibers upright and not laying over the sand where they might wear prematurely. It also helps evenly distribute the sand in heavy play areas such as the service line. Sportec suggests brushing the courts every 80 hours of playing time and more often during hot weather. The Knoxville courts are brushed every morning during hot weather according to Jackson. No other maintenance is required since lines are permanently inlaid in the green carpet.

The night before Knoxville was to have its inaugural tournament on the new courts, there was a heavy rain and the director felt certain they'd have to cancel. Instead, the courts were playable the next morning and the tournament was a community success.

There are more than 3,000 Omnicourts at clubs, colleges, parks and municipalities from Switzerland to Sydney. The first courts were perfected in 1979.

It's clear that tennis offers the player a greater choice of surfaces than does any other sport. Local demand for a particular type of surface will determine which one is used in the future at individual locations.

While maintenance costs may be the greatest concern of budget-bound parks and schools in choosing their court surfaces, resorts and tennis clubs will be more concerned with giving their members and guests as wide a variety of court surface as possible.

Daytona Speedway For Safe, Quality Turf

The irrigation system that makes quality turf possible most of the year was designed mainly to control dust during the Daytona Supercross.

These four acres are maintained like a golf course fairway, even though few people walk or drive across it.

Compaction is not a problem for Dick Hahne. Neither is cleat damage or overuse. Hahne is in charge of some of the most important turf in sports, yet no team or player actually uses his turf—unless he's in trouble.

Hahne is track superintendent at Daytona Speedway in Daytona Beach, FL. The former golf course superintendent from Ohio still has the same goal he has always had—quality turf year round—but for new reasons. The first is the safety of the drivers of race cars hurtling around the two-and-one-half mile track at 200 mph. The second is the appearance of the overall speedway to millions of television viewers twice a year during the Daytona 500 and the Firecracker 400.

Hahn is only the second track director Daytona Speedway has had in the 30 years since 'Red' Pugh built it for the France family. He is responsible for more than 500 acres of turf surrounding the track, but it's the four acres inside the track that is special. Known as "the football field" by those working at Daytona because it once served that purpose for Bethune-Cookman College, the infield has been converted from a low-maintenance bahiagrass field into a showcase for quality turf.

Today, the football field is Tifway bermudagrass overseeded in the fall with perennial ryegrass just as a golf fairway would be. The vast improvement was made possible by a new Toro automatic irrigation system drawing water from a 43-acre lake on the Speedway grounds. "There was no way we could maintain quality turf without irrigation," states Hahne. The four acres are carefully groomed with a Jacobsen five-gang reel lift unit pulled by a Ford Tractor (Ford is the official tractor of Daytona). Hahne's crew follows a program of broadleaf weed control the same as a golf course.

The most surprising thing is not that the field is maintained solely for appearance and safety, it is that right after the Daytona 500 in February the field is completely destroyed in preparation for the Daytona Supercross, a major televised motocross event. Oddly enough, the irrigation system that makes quality turf possible the re-

Joins The Race

Dick Hahne manages some of the most visible turf in sports.

Dick Hahne is in charge of some of the most important turf in sports, yet no team or player actually uses his turf—unless he's in trouble.

mainder of the year was designed by motocross course designer Gary Bailey mainly to control the dust during the Supercross. Each sprinkler head is strategically located to wet down the 1,000 tons of sand, limestone and crushed shells brought in for the event. Bailey designed the system so it could be turned on before, during or after races without interrupting them. He was opposed to water trucks driving across the course in between races.

"Dust is a serious problem for motocross," says Hahne. "I knew the Toro people from my superintendent days and put them together with Bailey to design the system for Daytona. This way we were able to get a system that could control the dust and remain useful the rest of the year for the football field."

"The other aspect of the irrigation system designed specifically for the speedway is each of the 65 heads were installed one-half inch below grade with swing joints so they would not puncture a tire of a car sliding out of control across the infield," Hahne points out. "And, that's exactly what happened after the system was installed. A race car veered onto the infield and slid across a sprinkler head without damaging it or the car."

Following the Supercross, Hahne has three months to get the field back in shape for the Firecracker 400. In April all the limerock is removed from the field and and spread on roads and parking lots at the speedway. Then the infield is graded for proper drainage, a seedbed prepared and fertilized and sprigged with Tifway. By July the bermudagrass is a shining green backdrop for the race.

Between July and February, the track is used to test tires and new cars. In preparation for the Daytona 500 held in February, Hahne overseeds the entire infield with a perennial ryegrass tee mix in November. "The infield is the most visible in racing," Hahne claims. "Quality turf goes along with quality events. John Riddle, the general manager, and the France family clearly want these races and the speedway to represent quality."

REBOUND

LETTERS FROM READERS

CORRECTION

In the Chalkboard page in the January/February issue, we reported incorrectly that 10 ounces per 1,000 square feet of PBI Gordon's Ferramec was applied to the Rose Bowl the day before the game. The total amount applied was five ounces, applied twice at half rate. Ten ounces would be excessive and cause discoloration of the turf.

I concur 100 percent with your comment on "The Need for Demonstration Fields" expressed in the March 1986 issue of **sportsTURF.**

We have repeatedly watched the selling power of getting one good field in a competitive football league lead to several good fields. People generally have to see a product before they will buy it.

In this regard, any publicity you can give us for our planned June 18 Wakefield Test Demonstration will be greatly appreciated. It should attract many athletic field managers in the Mid-Atlantic region.

Keep up the good work you are doing with **sportsTURF** magazine.

J. R. Hall, III, extension agronomist
Virginia Cooperative Extension Service
Blacksburg, VA

* * *

Congratulations on your excellent publication **sportsTURF**! When my first issue arrived some months ago, I first thought, "Great, another useless trade magazine to help fill up my garbage can."

How wrong I was. I've found it to be both useful and interesting, without even considering that two of your contributing editors, Ron Garl and Steve Batten, are both good friends of mine.

The latest issue was especially significant to me. I am soon to be involved in the construction and subsequent maintenance of a professional baseball facility in Buffalo, NY.

I look forward to my new challenge and appreciate my employer's confidence in my abilities, but I welcome assistance to produce the results that are expected and deserved.

Mark Jerrell, CGCS
Palm Beach National Golf and Country Club
Lake Worth, FL

* * *

I think you have the start of a good magazine. Keep up the good work.

Adolph Bertucci, Superintendent
Lake Shore Country Club, Glencoe, IL

Congratulations on the publication of your turf magazine. Being a sales representative in the turf industry, I find the articles in your magazine very interesting and packed with helpful information. I have shown your magazine to many of my customers who have commented enthusiastically toward **sportsTURF.**

Christopher Sammelwitz, Territory Manager
Mid-Atlantic Equipment Corp., Collegeville, PA

* * *

In some way **sportsTURF** needs to be identified more closely with the areas that appeal to the masses. Too often, there is too much emphasis on the "Rose Bowls," the rarefied atmosphere of the opulent country club, big money winners and the like. **sportsTURF**, the National Sports Turf Council, the Sports Turf Managers Association and other leaders must emphasize the 'commons' where the neighborhood meets after work and where the playing surface may not be Kansas City Royals quality, but it is available at low cost. The opulent installations have a challenge to help upgrade turf quality on the commons.

Turfgrass and agriculture are in a stress situation. Funds for extension are being cut which affects both turfgrass and agriculture. Farm values are depressed, crop prices are low and foreclosures threaten man. Opulence must be soft pedalled, leaving the limelight to the 'commons.'

NSTC seems to be in the right place at the right time to give voice to the trends and to coordinate sports activities for efficiency so that the common man is served.

Golf has an opportunity to render its image more palatable to the common man who uses the 'commons' for relaxation. Two methods have been suggested and both are being pursued to a limited extent.

1) Fund-raising events.
2) Endorsing volunteer participation by the turf-wise superintendent in Safer Sports Turf programs.

To date, the Musser International Turf Foundation, parent of NSTC, has sponsored fund-raising tournaments in five states and Canada. Two chapters of the GCSAA have endorsed voluntary assistance to extension turf specialists for upgrading public turfgrass playing surfaces. Others will follow.

It may be an act of providence that NSTC is in a position to accept tax-exempt donations and to use them effectively and efficiently to begin to meet the challenge of improving abused and neglected turf. The bigger challenge is selection of personnel broad enough to administer this multi-level program involving a number of disciplines.

The machine has been built, the gears mesh and the wheels have begun to turn. It will take money to keep the wheels from squeaking.

Fred V. Grau, President
Musser International Turfgrass Foundation
College Park, MD

* * *

Congratulations on your **sportsTURF** magazine. Looks like great things are ahead.

We at Myopia Hunt Club are involved with turf from golf to polo and are pleased to see the consolidation of turfgrass interests in your magazine. Good luck to you.

Henry J. Stelline, Superintendent
Myopia Hunt Club, South Hamilton, MA

* * *

I enjoyed Denne Goldstein's comments in the Jan/Feb issue, particularly the last three paragraphs concerning water. Water is the essential nutrient from which all other good cultural practices spring. The fact is there is more damage done to the vitality of our landscape plant materials from too much water than too little. After spending thousands of dollars on turf and plant materials, to kill them off by not managing irrigation properly, is akin to running the crankcase dry on your new $50,000 care.

In a recent conversation with an irrigation consultant, who was evaluating a golf course in a water-short area, he stated the course was using six acre feet of water per acre to irrigate (drown?) cool season turfgrass!

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William Pogue, President
Irrometer Company, Inc.
Riverside, CA

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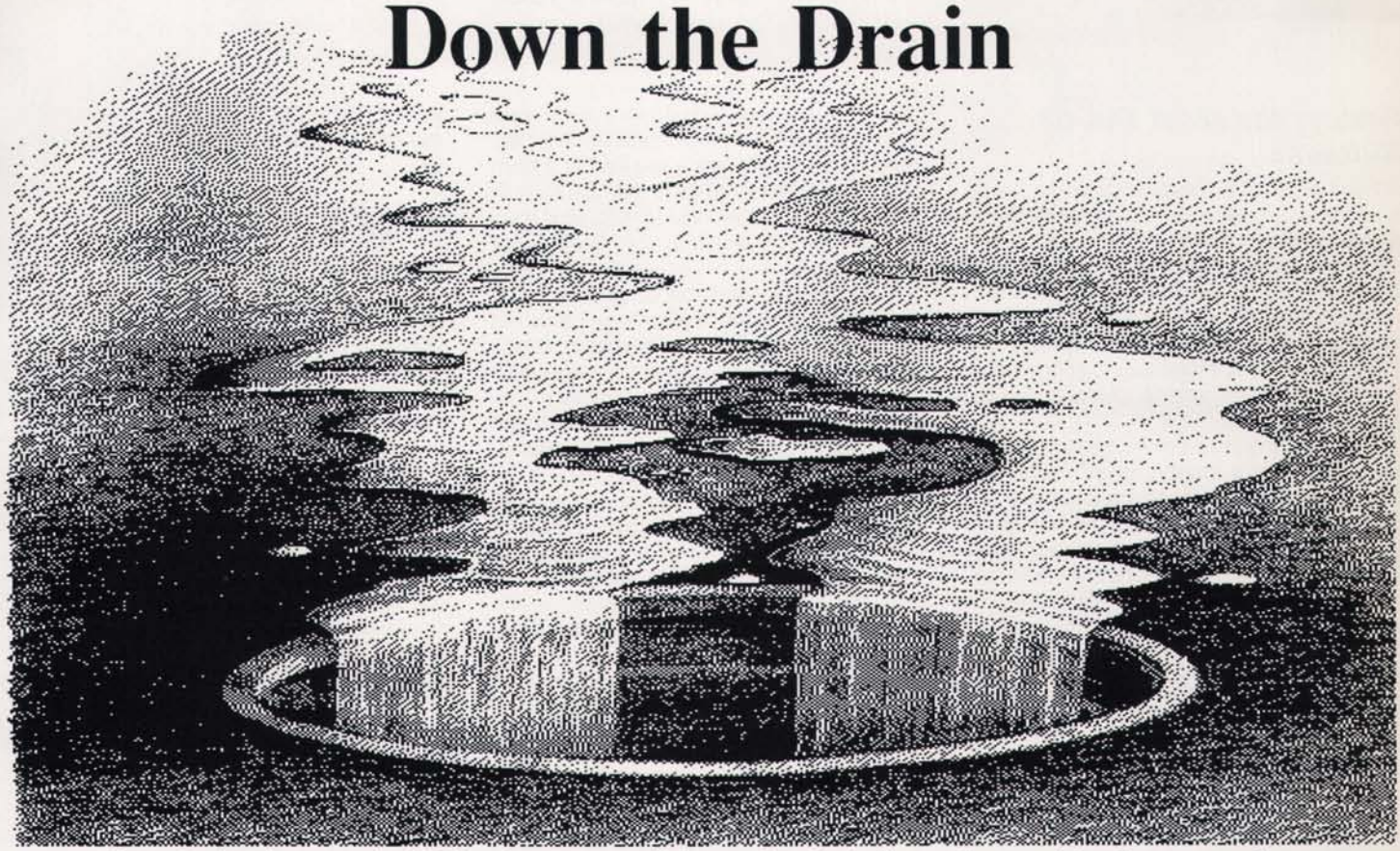

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CHALKBOARD

TIPS FROM THE PROS

Getting the Most Out of Nutrients

For more than 50 years fertilizer manufacturers and turf extension agents have been extolling the virtues of three fertilizer components—nitrogen, phosphorus and potassium. Only lately have the other ten nutrients required by plants started to receive an appropriate amount of consideration. They are calcium, magnesium, sulfur, iron, copper, zinc, manganese, chlorine, boron and molybdenum.

Dr. William Barone of R.G.B. Laboratories, Inc., says these other nutrients, although required in smaller quantities than the three primary nutrients, are as important to the turf. Barone says the nutritional status of the plant is dependent upon the most limiting nutrient in spite of abundant amounts of all the other nutrients. In other words, nutrients that are not utilized by a plant due to the shortage of another nutrient are wasted.

A classic example is iron chlorosis, characterized by interveinal yellowing in the new growth stages of the plant. If this condition persists, the plant's ability to synthesize chlorophyll is gradually curtailed, the plant loses pigmentation and begins to dieback. A deficiency in the micronutrient iron causes severe consequences even in the presence of abundant amounts of all the other essential nutrients.

Even when sufficient amounts of nutrients exist in the soil, Barone states numerous soil conditions can make them unavailable to plants. Any condition that causes a nutrient to lose its water solubility will cause a deficiency of that nutrient. For example, many micronutrients become less water soluble when the soil pH becomes more alkaline than 7.0. Excess phosphate in the soil and heavy clay soils tie-up iron, manganese, copper and zinc making them less available to plants.

One way to guard secondary nutrients and micronutrients from unfavorable soil conditions, says Barone, is to apply them in chelated form. A chelate (key-late) is a water soluble combination of a nutrient bonded to an organic molecule. The chelate protects the availability of the nutrient for plant uptake. When the organic molecule eventually breaks down the nutrient is released for use by the plant.

Iron chelates produce a longer lasting green-up response to well-maintained turf than iron sulfate, Barone states. "Most golf course superintendents will acknowledge that a spray application of iron sulfate generates a green-up which lasts 4-5 days, in contrast to 2-3 weeks for iron chelate," says Barone. The chelate holds the iron in a form which is not oxidized as is the iron form in iron sulfate. Oxidized iron is rust, an insoluble form of iron which is not available for plant uptake.

Problems with tank mix compatibility can also be avoided by using chelated micronutrients instead of inorganic forms says Barone. For example, he states, iron sulfate will precipitate immediately in the presence of liquid phosphate fertilizers and salts of most common herbicides. The resulting precipitate, iron phosphate, is quite insoluble even though it may remain in suspension in the tank under constant agitation. The nutritional value of both the iron and the phosphate will be greatly reduced.

In the case of herbicides (such as the amine salts of 2,4-D and MCPP, or the potassium salt of MCPP) Barone says iron in an unchelated form will cause an immediate precipitation reaction resulting in the loss of the iron nutrient and a significant portion of the weed-killing activity of the herbicide. Again, the insoluble precipitate can be sprayed under constant agitation, but its value is greatly reduced.

The Ten Other Nutrients

Calcium Magnesium
Sulfur Boron
Chlorine
Copper
Iron
Manganese
Molybdenum
Zinc

Barone warns, however, that many chelated mineral products cause a drop in the pH of the tank mix since they are acidic. Some pesticides may be affected by highly acidic or alkaline conditions. To prevent pH problems with pesticides, R.G.B. Laboratories' Agri-Plex chelated products have a unique buffering capacity which permits preparation of pesticide tank mix formulation having pH values in the vicinity of 7.0.

There are other types of nutrient complexes which protect the solubility of nutrients. Barone says the extent of protection by these lies somewhere in between chelates and standard inorganic forms. He contends that fully chelated mineral products provide the maximum benefit for maintaining nutrient availability and for preventing undesirable reaction with other chemicals in the tank mix.

Preventing Pythium

Although the first symptoms of Pythium disease on turf aren't evident until temperatures and humidity reach summer levels, within days it can wipe out many acres of quality turf. Research has now shown the time to start fighting this serious turf disease is before with a program of preventative fungicide applications.

After four years of extensive field tests, Dr. Houston Couch, professor of plant pathology at Virginia Tech, concludes, "There aren't many ways to control Pythium from a management standpoint. Sports turf managers are often locked in on what they can and cannot do. This is why the recommendation is to use a systemic fungicide on a preventative basis. A preventative program holds down the number of infected plants and this is important because Pythium can be present before any visible symptoms are seen. By preventing these symptoms from showing up, sports turf managers are assured of optimum control. It's to their advantage to start treatments as early as possible."

"Mid-July to mid-to-late fall is prime time for Pythium here," says Steve Durand, superintendent of the Tournament Players Club in Ponte Vedra Beach, FL. "This is when high temperatures and high humidity are optimum for Pythium." Durand has started following a preventative program based upon the systemic fungicide Subdue from Ciba Geigy.

Max Schultz, superintendent of St. Clair Country Club in Pittsburgh, PA, has been following a similar program of preventative Pythium control which he starts in mid-June. "This has helped tremendously in keeping Pythium under control."

Another advocate of Pythium prevention is Gary Hamm, superintendent of the Red Fox Country Club in Tryon, NC. "We can't afford a wait-and-see attitude toward disease control. We combine systemic control with aerification. We have found aerification helps prevent root rot and improves air and water movement in the soil. Systemic fungicide applications are made every three weeks before and during high stress periods. In between systemic applications we use a contact spray."

"If you can catch the disease with a preventative treatment, you'll save money in the long run," says Schultz.