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WATER HOG

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Sports Turf Nutrition

continued from page 30

zones and according to the amount of play on the turf.

Kentucky bluegrass requires more nitrogen than perennial ryegrass, tall fescue, St. Augustinegrass or zoysiagrass. Kentucky bluegrass on high use fields and fairways may need as much as a pound or more per month, while the other turfgrasses perform well on between half and one pound per month. Annual bluegrass also does well on soils with moderate to high fertility.

Maintenance programs with low fertilizer budgets can possibly get by with bahiagrass, centipedegrass, red fescue and possibly tall fescue. The newer, turf-type tall fescues however, require more nitrogen than the forage types such as Alta and K-31.

The higher the sand content of the root zone the more frequently fertilizers will need to be applied. A high portion of fertilizer applied to sandy root zones should be slow-release.

The manager of a cool-season turf sports field on a tight budget should make every effort to apply no less than three pounds of nitrogen per year. This can be divided into three applications, the most important being in the fall at the end of the football season. Applications in spring and late summer should also be made.

Golf course superintendents in the North should add a fourth application of fertilizer

in the early spring for fairways of Kentucky bluegrass and/or perennial ryegrass. Bentgrass fairways would possibly require a fifth application. Monthly fertilization is advised for bentgrass greens during the playing season.

Managers of athletic fields of common bermudagrass, centipedegrass or bahiagrass should fertilize no less than twice per year and preferably three times. If the turf is hybrid bermudagrass, try to make four applications, but avoid late winter or early spring. If the bermudagrass is overseeded in the fall, do not fertilize for a month prior to overseeding. You want to slow the bermuda down so it will not compete with the annual or perennial ryegrass.

Golf course superintendents with hybrid bermudagrass fairways and greens should be on a monthly program from late spring to a month prior to overseeding. The fertilization program then continues for the ryegrass. Southern superintendents with bentgrass greens need to be extremely cautious about fertilizing these greens during the summer and follow a preventative disease control program.

With the extremely high use of golf courses and sports fields today, fertilizer requirements are increasing. There is no such thing as permanent, low-fertility sports turf. Poorly-fed turf will require annual renovation at a cost much higher than a properly scheduled fertilizer program. Fortunately,

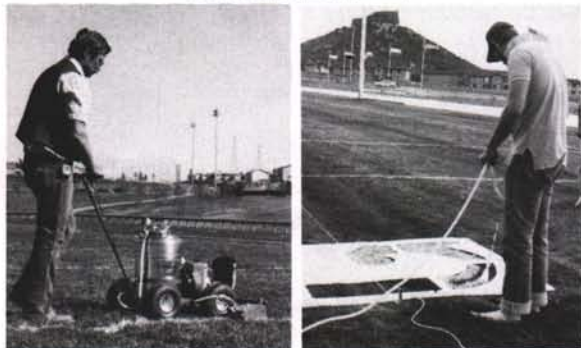
there are excellent slow-release fertilizers which help reduce the number of fertilizer applications. They will reduce the labor to apply fertilizers, but not the cost of the fertilizers themselves.

In a way, fertilization is like irrigation. You must first make a commitment to quality turfgrass. Once that commitment is made it has to be followed up with continuing maintenance and support. You paid for the hardware, now you have to pay for the water and keep the system performing at its designed capacity.

Realistically, to provide quality sports turf you must make a commitment to quality turfgrasses which have moderately high fertility requirements. To invest in quality sod or seed and then deny the turf the nutrients it needs to withstand sports is a complete waste. Fertilizer is not an area for budget cuts. If you have to cut the fertilizer budget, you might as well write off the field or fairway.

Finally, the home lawn expert does not understand the additional fertilizer requirements of sports turf. Utility and lawn turf have entirely different needs. Sports turf must be kept on a much more sophisticated diet than utility and lawn turf. That diet has been standard on golf courses for years, but lacking on sports fields. There is little difference between the two as far as the nutrient needs of the turf if it is to provide a permanent cover under heavy use. ●

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KANSAS SHOW FEATURES SPORTS TURF WORKSHOP

The Kansas Turfgrass Conference will feature a full-day sports turf management workshop for the first time in the history of the event. The sports turf session will take place on November 2, the first day of the three-day conference to be held at the Ramada Inn in Wichita, KS.

Larry Leuthold, conference chairman, said the workshop will cover drainage, wear, compaction and special maintenance techniques for sports turf. John Pair, of Kansas State University's Wichita research center, will report the results of wear/compaction studies on four different turfgrasses. Nick Christian from Iowa State University will focus his remarks on drainage systems for fields.

"Sports turf managers in Kansas work with four primary types of turfgrasses (tall fescue, bermudagrass, Kentucky bluegrass and ryegrass)," explains Leuthold. "Each has unique characteristics which require the attention of the turf manager. That's in addition to solving the challenges of heavy use, inadequate irrigation, poor drainage, compaction and wear. We decided a special workshop was needed to provide these answers to conference goers."

Interested turf managers should contact Leuthold at Kansas State University, Waters Hall, Manhattan, KS 66506, (913) 532-6173.

RHONE POULENC COMPLETES UNION CARBIDE MERGER



Dan Stahl

In some respects, Rhone Poulenc's purchase of Union Carbide Agricultural Products Company and its recently completed merger was harder on the buyer than on the seller. Completion of the merger in September was a relief to members of Rhone Poulenc's New Jersey headquarters who moved to North Carolina during the merger. Instead of cutting back, Rhone Poulenc expanded its Chipco marketing group and added the Union Carbide

specialists to the team.

Dan Stahl heads up the new Chipco team as business manager. In addition to the Chipco line Stahl used to market from New Jersey, he now has Sevin insecticide, Weedone DPC and DPC Amine herbicides, Rootone rooting hormone, Florel plant growth regulator and Temik pesticide. The experienced Union Carbide product specialist John Durfee and Andrew Seckinger have been named product managers for the Chipco Products Division which is based upon Rhone Poulenc's 26019 fungicide, Aliette fungicide, Mocap insecticide and Ronstar preemergence herbicide.

"The addition of several former Union Carbide products to the Chipco Specialty product line promises to increase the utility of the line to turf, landscape and ornamental managers," announced Dick Lehman, director of specialty sales for Rhone Poulenc. "Expanding labels and developing new use programs will play a vital role in our efforts to serve these markets."

Four field salesmen and four research and development specialists were added to the Chipco staff. "We feel that the initiation of a full-time product development staff and the increased number of field sales representatives servicing these markets will improve our ability to respond to the needs of turf and ornamental managers using Chipco products in their management programs," Stahl stated.

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MAINTENANCE EMPHASIZED AT PACIFIC PARK SCHOOL

There are only 35 openings left for the Pacific Southwest Maintenance Management School to be held October 18-23 at Harbor Town Resort in Ventura, CA. The school, sponsored by the National Recreation and Park Association and the California Park and Recreation Society, is a two-part program emphasizing maintenance.

Henry Agonia, director of parks and recreation for California, will kick off the week-long sessions. Agonia will stress the importance of maintenance management to parks and describe programs which can help park superintendents keep maintenance costs in line.

A faculty of park and recreation specialists and educators will guide the students through a full week of classwork. The first part of the program concentrates on maintenance management systems, worker safety, public liability, irrigation and turf management, maintenance trends, contract maintenance and recreation concepts. Students who took the first part last year and are returning for the second part this year will study employee management, training, incentives, discipline and evaluation. They will also cover administration, park lighting

concepts, park design and colors in the landscape.

Interested park managers should immediately contact Jane Adams, at the NRPA Pacific Region Office, 1600 Sacramento Inn Way, Suite 217, Sacramento, CA 95815, (916) 646-9050.

TEXAS A&M HOSTS SEMINAR ON IRON

A free, full-day workshop on iron and its role in turf fertilization will be held October 29, at the Texas A&M University Extension Center in Dallas. Extension Turfgrass Specialist Bill Knoop has designed the program to answer turf managers questions about this fertilizer component being utilized in an increasing number of turf management programs.

"Iron has become kind of an inigma to a lot of people," says Knoop. "They have seen how it improves the color of turf and how it can lower the amount of nitrogen needed in some cases. But they don't really know what the right rates are and which type of iron formulation is best for lawns or sports turf. We're going to cover iron from both plant and soil standpoints."

United Agri-Products is sponsoring a lunch barbeque for the event. Knoop is arranging eight or more workshops on fertilization,

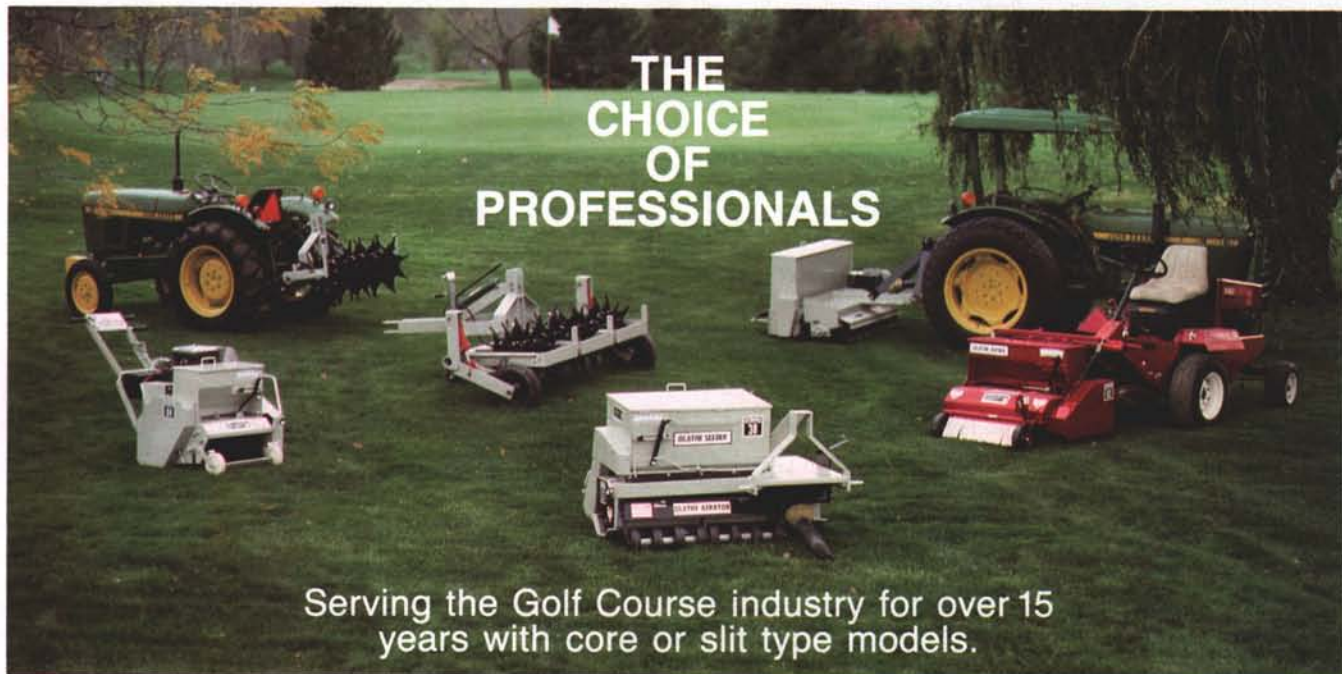
weed control and pest control in various cities throughout northern Texas for the next few months. "We are taking the workshop to the turf manager instead of expecting him to come to us," states Knoop. Those interested in the workshops can contact Knoop at 17360 Coit Rd., Dallas, TX 75252, 214-231-5362.

TOURNAMENT KICKS OFF DESERT TURF SHOW

The Southwest Golf Course Superintendents Association is providing turf managers from across the Southwest with the opportunity to play the new Painted Desert Golf Course in Las Vegas, NV, the day before the Desert Turf Conference, December 17, 18. Proceeds from the Desert Turfgrass Tournament will be used to fund research into desert turfgrass management.

The new target course is operated by American Golf Corporation. Tournament enrollment is \$50 and includes a cart and greens fees. Prizes will be awarded by suppliers and supporters of the desert turf industry. For more information about the tournament and the two-day conference and show, contact Bob Morris, Nevada Cooperative Extension, 953 East Sahara, ST&P Building, Las Vegas, NV 89104, (702) 731-3130.

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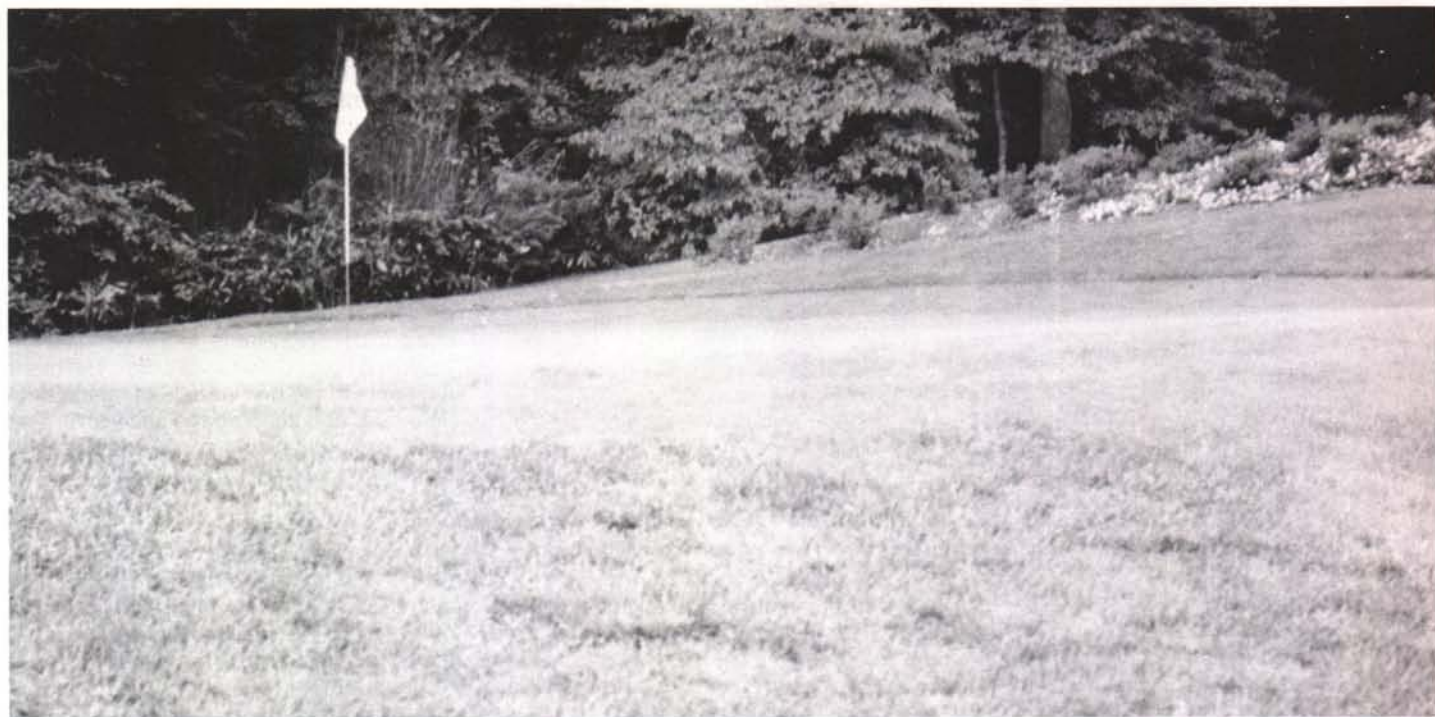
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The approach to this green at the Biltmore Forest Country Club would get torn up easily before Don Burns installed a mat below the surface.

Fiber Technology: Protecting the Old With the New

Despite all the attention paid today to the newer "Tour" courses, the historic golf courses that were constructed prior to the Great Depression remain the foundation of the industry. Golf course architects and superintendents still speak with reverence of early architects such as Alister Mackenzie, Charles Blair Macdonald, Walter Travis, Charles Hugh Alison, Willie Dunn and Donald Ross. Their designs are held in as great esteem today as they were more than 50 years ago.

Many of these courses have been partially reconstructed to help them withstand the ever-growing traffic brought about by the post-War boom in golf that continues today. When these courses were carved out of virgin forests and native soils, little consideration was given to compaction, drainage or irrigation. As the golf industry progresses, the golf course superintendents of these courses must try to preserve the historic nature of their courses while protecting them from today's levels of play.

Don Burns, superintendent of the Biltmore Forest Country Club near Asheville, NC, faces this challenge continuously. Donald Ross designed the course which opened in 1922 to the standards of his day. Since 1975, it has been Burns' responsibility to keep the course up to today's standards. "Golf is a difficult game for anyone to master and our members don't want to be frustrated

further by worn-out fairways and soggy areas resulting from poor drainage. They've seen how well-drained greens are playable shortly after it stops raining. They wonder why other areas of the course would stay soggy for days, especially low spots near cart paths and bridges. With the amount of play the course gets, it was hard to keep turf alive in these critical locations."

Burns saw the problem as more than poor drainage. Compaction caused by cart and golfer traffic was also to blame. He wanted to correct both problems at the same time to keep disruption of play to a minimum.

He had recently used a product to reduce dampness in the pro shop which is in the basement of the clubhouse. Water in the soil against the foundation walls seeped into the concrete block. One of the members of the club, Palmer Skoglund Jr., urged Burns to use one of his company's products called Enkadrain. Skoglund is director of BASF's Geomatrix Systems. "I was skeptical at first," Burns recalls. "After all, it wasn't a water barrier. Water flowed right through the plastic mat covered on one side with a filter fabric. How was this going to stop water?"

He found out how when the material was placed against the foundation of the clubhouse with the fabric side out and then back-filled with soil. The Enkadrain created a void between the fabric and the foundation. Water

simply trickled down the matting to the drain lines alongside the footers. Water ran off the wall instead of being sucked into it like a sponge.

Skoglund explained to Burns how the mat without the filter fabric could be used on banks to control erosion. By enclosing the mat completely in fabric it acts like a perforated drainage pipe. The mat looks like a blanket of heavy filaments, thicker than fishing line but thinner than the line on a weedeater, fused together so that 90 percent of the space it takes up is open to air, water or soil. When buried in the soil, the mat acts like an anchor for plant roots. The plants stay put and their roots extend out to stabilize the soil. The mat also absorbs some of the weight of people or vehicles crossing turf grown on top of it.

Burns first tried the mat on hole number eight. "Most players approach this hole from the path on the right side of the green," explains Burns. "In the summer, that area used to turn to solid dirt and when it rained the players would slide and tear up the whole area. Normally, we would strip the sod off, loosen the soil, level it, aerify it and resod it every year. Since no golfer likes to play around ground under repair, I wanted to put an end to this problem. After we stripped the sod for the last time, we buried the mat about two inches below the surface, filled it in with soil, leveled it, and resodded. This

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Enkadrain H was installed on top of drain tile in trenches across the seventeenth fairway.

Sports Turf Nutrition

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time the sod rooted into the mat. When it rained, players spikes did not rip up the turf."

Burns also had a problem on walkways to the greens on the number three and number 14 holes. "There's just one way to reach these greens and all the traffic is concentrated in the narrow walkways," he says. "Anything other than grass would interfere with the look and play of the hole. I wanted to give turf one last try before giving up."

Again, Enkammat was installed below the sod. "Grass has held up on the walkways now for four years," Burns remarks. "It doesn't pack down, instead it bounces back and doesn't wear out like in the past."

Once the material had solved two of Burns biggest problems, he started to experiment with other areas. He had a continuous problem with the steep banks of a pond on the number three hole. Golfers were constantly hitting into the attractive water hazard. In the process of retrieving their balls,

they would tear up the turf on the banks. "You can't resod an area like that since it is going to get torn up no matter what you do," remarks Burns. "All you can do is keep seeding it and hope the seed germinates fast enough to keep up with the damage from players or heavy spring rains."

This time instead of burying the mat, he placed it on the surface of the bank and seeded into it. The tall fescue, which usually took two weeks to germinate, started popping up after a week. While inspecting the site one evening, Burns put his hand on the bank and noticed it was still warm. The black filaments in the mat were holding the daytime heat and keeping the soil warm. The seed was germinating quickly because the soil stayed warmer longer on cool spring days.

Burns was also surprised that none of the members complained about getting tangled up in the mat while retrieving their ball. He also discovered that golfers trying to play off the bank did not tear up the slope as they had before. The grass has grown right through the mat. "Of course, we trim this area with weedeaters, not mowers."

Burns moved from the pond bank to slopes around the practice tee and along a creek running through the course. In both cases rains would wash out rivulets that had to be filled in regularly. This time the mat was buried below the surface and the area was reseeded.

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After irrigation and rain had failed to erode the banks, Burns decided to try one more experiment. These large slopes had always been cut with walk-behind trim mowers because they were too bumpy for a riding mower. Today the mowing crew can go right up to the edge of the creek and all the way up the slope of the practice tee without stopping.

The once-skeptical Burns now felt he might have the answer to his soggy, compacted areas if the mat could be enclosed in filter fabric. He approached Skoglund about the idea and together they selected the seventeenth fairway as a test site. The fairway contains a low, flat area near the creek that is partly shaded by 50-foot-tall hardwoods. The area remained wet even during long, dry spells.

"Because the soil is heavy clay and the old tile was installed on a very slight grade, the drains were always getting clogged," he explains. "The trees block out the sun most of the day, so without drainage the fairway stayed waterlogged. We needed a way to keep clay out of the drain lines."

The traditional solution would have been to dig six inch trenches and install four-inch perforated pipe in gravel-filled trenches. All the soil from the trenches would have to be hauled off site. Perforated drain pipe wrapped in filter fabric was available and Burns intended to use it. But he also wanted some way to keep the gravel above the drains from clogging with clay.

Those early architects would shudder today to see the number of rounds played on their courses. But they would also be amazed at the high quality of the courses.

He started out the conventional way by digging a series of trenches, six inches wide and 18 inches deep, across the fairway to the creek. He placed gravel in the bottom of these and then inserted the wrapped drain pipe. Instead of filling the trenches up with gravel, he first inserted long strips of Enkdrain H, the mat wrapped in filter fabric, on top of the other drain pipe extending upwards to within two inches of the surface. Finally, soil was placed around both the drain pipe and the Enkdrain H to the surface.

"We could have installed just the pipe or the Enkdrain," said Burns, "but I wanted to make sure that the fairway water problem was fixed and we wouldn't have to inconvenience the golfers again for a long time. I'm happy to report that since spending a few extra dollars on Enkdrain three years ago we have not had a single complaint about the seventeenth fairway."

"Most superintendents face similar difficulties with drainage in heavy soils," Burns continues. "I see more and more superintendents getting involved with geotextile products. They are lightweight, easy to handle and can be put down quickly with minimal disruption of play. That's important to our club members."

They are also important in preserving the condition and reputation of golf courses that were built before these products were available to help superintendents protect them under today's higher standards and greatly increased play. When Donald Ross designed the Biltmore Forest course in 1922, he was setting new standards for the game of golf. But he was working with limitations set by nature. Not until recently has technology been able to correct some of these limitations.

This new technology is enabling the historic courses, which are the foundation of the golf industry, to withstand the pressures brought about by the popularity of the sport. Those early architects would shudder today to see the amount of rounds played on their courses. But, they would also be amazed at the consistently high quality of courses throughout the year. ☉

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More than two acres of Tifway sod was installed in May. Note the tarp storage area beneath the stands.

Robbie's Law
continued from page 21

current soil moisture levels. All or part of the suction can be directed at three different field zones. During a game the pumps can be used to pull excess rainfall off the center third of the field if necessary. "You can see the water get sucked down into the ground when the suction system is on," says Kuykendahl with amazement. "After one downpour we had standing water on the field. In less than 30 minutes the field was dry enough to play on without ripping up turf."

From late spring to the beginning of the football season in August the field moisture level is set between 30 and 50 percent. It is increased to 60 percent during the season. The field is covered with the tarp if it rains on a game day. Water running off the tarp to the sides of the field is picked up by the suction system. Once the tarp is removed for the game, the field can withstand rain up to four inches per hour without affecting the game.

The field is aerated and topdressed with sand as needed to maintain specified infiltration and percolation rates. A program of monthly light verticutting is augmented

once a year with heavy verticutting.

Nutrient levels in both the turf and the root zone are checked frequently. Daniel has asked Kuykendahl to keep soil test results in the medium to high ranges at all times and tissue analysis results above 3 percent nitrogen, 0.5 percent phosphorus, 2.5 percent potassium and 300 parts per million of iron. Kuykendahl uses granular fertilizers (24-4-12) containing at least 50 percent slow release nitrogen as the primary source of nutrition. He keeps records of all fertilizer and pesticide applications.

One hidden benefit of the PAT system is prevention of salt water intrusion from below the field. The final grade of the field is normally seven feet above the water level in Snake Canal. Saltwater does enter the channel during severe storms. The sealed bottom of the PAT system would stop any salty overflow from the channel from reaching the field soil.

While the stadium was built for the Dolphins, it is also the only full-size, natural field for international soccer in the country. HOK also took professional baseball into consideration. By removing one semi-permanent section of seats, a baseball layout is revealed. HOK went so far as to include an extra locker room beneath the stands for a future baseball team.

"Joe Robbie Stadium combines nearly every advantage a stadium can have today at a reasonable price," says HOK's Wellner. "As more stadiums are built with private financing, value and flexibility are essential. While the advantages of single-use stadiums are clear, we have to be realistic about the importance of other events." This fall the stadium will host two shows in addition to the Dolphins ten home games. No one would state if Dade County placed restrictions on the development and use of Robbie Stadium and the 460 acres it occupies.

The success of the stadium is best illustrated by season ticket sales and skybox and club seat leases. Wellner's greatest concern was over the amount of club seats. "We just didn't know how many to include. We decided to go with 10,000 club seats and I'm happy to say more than 8,000 of these were taken by the first exhibition game." Furthermore, 146 of the 210 skyboxes are also taken. On top of that, the Dolphins have sold 53,000 season tickets for regular seats. That means less than 10,000 out of 73,000 seats are available for game day sale.

"Everybody wanted to see Joe Robbie succeed," points out STN's Bill Wilson. "Suppliers never dragged their feet or got sloppy with deadlines. Everybody was amazed with how smoothly things went. The stadium people made all the changes we asked for without a fight. It was a great experience."

"Part of our agreement with the stadium is a two-year follow-up program to make sure the field and the turf reach maturity without a hitch," explains PAT's Daniel. "So far, it looks like some of Joe Robbie's success has rubbed off on all of us. I think he has set a standard for other stadiums to follow in the future." ☺

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MAGAZINE PREDICTS CITIES FOR NFL EXPANSION

Even though the National Football League has yet to form a committee to select sites for expansion franchises, *Sport Magazine* predicted in a September issue that Memphis, TN, Phoenix, AZ, Baltimore, MD, and Oakland, CA, will have NFL franchises within the next five years.

The National Football League's official position is that no decisions have been made nor will be made until a committee is formed for that purpose. The magazine did not reveal who made the prediction.

Fred Smith, chairman of Memphis-based Federal Express Corp., has formed Mid-America Football to help that city secure an NFL franchise. Smith played a major role in the recent expansion and modernization of the Liberty Bowl. The NFL scheduled a pre-season game between the St. Louis Cardinals and the Kansas City Chiefs this season at the Bowl. The Cardinals also held a two-week training camp in the Memphis area this summer.

Phoenix is preparing to break ground on a \$150 million stadium. The Phoenix Stadium Development Group, headed by Martin Stone, owner of the Phoenix Firebirds, is seeking both NFL and Major League Baseball franchises for the city. A site in downtown Phoenix has been selected for

the combination stadium, shopping and condominium project.

Baltimore, which lost the Colts to Indianapolis, is considering construction of a twin stadium complex near the Inner Harbor to host an NFL franchise and the Orioles. The city has experienced a revival since the development of its Harbor area. Meanwhile, the Oakland/Alameda County Coliseum board of directors has commissioned HOK Sports Facilities Architects to redesign the coliseum to add more skyboxes and expand seating to 65,000 to attract a NFL franchise. HOK has also been instructed to redesign the concession areas, team rooms, training facilities, lighting, advertising displays and scoreboards.

St. Louis County is fighting the city of St. Louis over the football Cardinals. William Bidwell, owner of the Cardinals is tempted to build a stadium in a western suburb with the help of the County. St. Louis County Executive Gene McNary is encouraging Bidwell to build a 70,000-seat domed stadium in Maryland Heights. The Cardinals have been playing in Busch Stadium in downtown St. Louis. The stadium, owned by the Busch family, is the second smallest stadium in the NFL having only 53,000 seats for football. The Houston Astrodome is the smallest with only 50,000 seats.

Jacksonville, FL, with its 82,000-seat Gator Bowl is ready for any disgruntled NFL owner. The city was one of the few success sto-

ries of the United States Football League averaging 48,000 fans per game for the Jacksonville Bulls. City officials are dangling a \$25 million package of stadium improvements to lure a franchise.

A group in Sacramento, CA, is also pushing hard for a NFL franchise. The group organized a demonstration at Oakland/Alameda Coliseum during an Oakland Athletic's game in August. More than 21,000 Sacramento residents attended the game to display their support for a baseball or football franchise in their city. The group has already obtained \$40 million in private financing for a stadium before securing any type of professional team.

AMERICAN GOLF ENTERS MIDWEST

American Golf Corp., which owns or manages more than 90 private and public golf courses primarily on the East and West Coasts, has made its move into the Midwest by taking over management of three nine-hole golf courses surrounding Royals Stadium in Kansas City, MO, and two public courses located in St. Louis.

The Royal Meadows courses in Kansas City and two courses located in Forest Park in St. Louis, the nine-hole Eisenhower Golf Course and the 18-hole Forest Park Golf Course, will be operated by the Santa Monica-based company.

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CHALKBOARD

TIPS FROM THE PROS

TURF GROWTH REGULATORS GIVE NEW DIMENSION TO POA ANNUA CONTROL

Developing a reliable and consistent plant growth regulator for turf has stumped chemical manufacturers for more than 30 years. What turf manager would pass up buying a chemical that reduces mowing while retaining the appearance and usefulness of the turf? The manufacturer that developed such a chemical first would reap a huge reward.

Try as they might, every time they find a promising chemical two stumbling blocks got in their way, discoloration of treated turf and the large variation in sensitivity among turfgrasses to the chemicals. Both have made their use on quality turf complicated.

Chemical manufacturers have not given up. They are taking some of the complicated characteristics of growth regulators and putting them to constructive use. Monsanto has targeted its Limit for use on types of utility turf where minor temporary discoloration is acceptable and where turfgrass types react in a uniform way. But, most of the attention is being paid to turf growth regulators (TGRs) which help control annual bluegrass (*Poa annua*). Embark from PBI Gordon has been useful in reducing the amount of seed produced by the persistent weed. Cutless from Elanco and TGR-Poa Annua Control from Scotts have shown promising results in holding back annual bluegrass growth so that desirable grasses growing at a faster pace can crowd it out.

For example, annual bluegrass is very sensitive to paclobutrazol, the active ingredient in Scotts TGR. By figuring out the rate of this chemical that stunts annual bluegrass more than quality turfgrasses such as bentgrass, Kentucky bluegrass and perennial ryegrass, the company has come up with an effective method of selectively encouraging desirable grasses to overtake this stubborn weed. At label rates the chemical slows the poa down to a crawl and turns it yellow. At the same time it alters the growth habit of desirable grasses in a way that enhances their color and density. One application gives the other grasses a growth advantage for five to ten weeks. At the end of this period the grasses resume their normal growth rates.

As Scotts points out, there are a number of important items to consider when using its turf growth regulator. Since the product is root absorbed, it works better on turfgrasses with well-established root systems and in some soils better than others. The active ingredient can become bound to organic matter in the soil or thatch. It takes



After an application of TGR, the bentgrass continues to spread while the annual bluegrass turns yellow and stops growing.

less of the material to control annual bluegrass in sandy soils than in clay/loam soils. Watering in within 48 hours of application is very important to the success of the product.

Since the product does discolor the poa, the company urges caution in applying the material to turfgrass that contains a high percentage of the weed. It also suggests using the product only on areas that are currently maintained to encourage growth. This includes proper irrigation, fertilization and pest control. The product should be used with other effective methods of poa control, such as preemergence herbicides, clipping removal and lightweight mowing.

The growth regulator should not be ap-

plied within two weeks before or six weeks after overseeding. It should also not be used during periods when turf is recovering from winter, drought, disease or insect damage or from mechanical procedures such as aeration. At the present time the label does not provide for applications to greens or athletic fields.

Obviously, this new tool is not for use by amateurs. Anytime you alter natural growth patterns you create new challenges. However, the effectiveness of these materials is impressive as is the resulting dark green color imparted to desirable turf by the new TGRs. There is a good chance these products will become a growing part in annual bluegrass control programs.

SEEDING, MULCHING AND FERTILIZING IN ONE OPERATION

Hydraulic seeders, once used just for seeding the vast slopes along highways and the large rolling lawns around construction sites, are finding their way onto golf courses, race tracks and parks.

Instead of pumping out streams of mulch and fertilizer combined with pasture-type turfgrasses for a quick, low-maintenance cover, today hydraulic seeders are being used, to a growing degree, for fine turf areas. They have been used to sow bentgrass on greens and fairways, to overseed warm-

season turf with perennial ryegrass and to reseed common bermudagrass fields. Parks are using them to plant low maintenance areas with wildflowers in addition to reseeding worn out playing fields with turf-type tall fescues, Kentucky bluegrass, perennial ryegrass and common bermudagrass. Golf course superintendents, university grounds superintendents and park superintendents call in the hydroseeder to restore turf along roads, cart paths, and walkways.

While spraying seed with a fire hose may