get pest for control and/or ingestion.

Once inside the body cavity of a grub, a nematode discharges a bacteria that infects the host. This results in the pest's death, normally within 48 hours. The nematode then begin to colonize the dead host. This process includes mating, feeding, and eventually the release of a new generation of juveniles armed to begin the process anew.

Nematodes or Chemicals?

The control of turf pests is difficult, but chemical controls are not the only choice. Chemicals are effective, but must be weighed against the costs to the environment, worker safety, user safety, and the ever-increasing pressure in most communities to reduce overall chemical use.

Nematodes offer the advantage of public and worker safety and have no known negative effects on the environment. Currently, no Environmental Protection Agency registration is required for their use. They are easily applied with standard spray equipment. In addition, they can reproduce, thus having the potential to recycle in the environment. Ideally, if the pest population rises, so too will the nematode counts and, conversely, as the pest population drops so will the nematode count.

Dr. Kays describes the application of beneficial nematodes by stating that those who apply them are simply "augmenting naturally occurring nematodes in most soils." Although the cost of beneficial nematode application may be higher than with traditional pesticides, their advantages can easily be justified by the increased environmental safety.

Case Study

In the late summer of 1990, a severe infestation of white grubs was identified at the UC Davis baseball and soccer complex. In a traditional pest management fashion, several different pesticides were used to control the pests with varying degrees of success. None of the treatments resulted in full control, nor did we expect them to.

In the summer of 1991, a unique partnership was forged with the nematology department on campus. The understanding resulted in the grounds maintenance division agreeing not to utilize any more chemical pesticides. In exchange, nematology would assist in controlling grubs with beneficial nematodes. At the same time, we would both observe our results and perform research on new nematode strains.

The complete and total elimination of all pests is not, and should not be, the goal of any turf and landscape manager.

In the late summer of 1991, the first experimental application of *Steinernema glaseri* nematodes was made at the rate of one-half billion per acre. This application augmented a small existing population of *Heterorhabditis* nematodes that was present in the native soil.

Almost immediately, creamy colored dead grubs were located, signaling infection by the nematodes had occurred. Occasionally, a bright red grub was

continued on page 12

Grubs Vs. Nematodes

continued from page 11

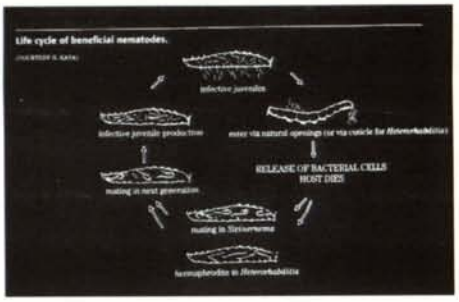
located, signaling it had been infected by the naturally occurring *Heterorhabditis* nematode.

This control technique, now beginning its third year, has proven very successful but is still under evaluation. As of yet, the *Steinernema glaseri* nematodes are unavailable to the general public. Currently, other species of nematodes are commercially available.

Keys to the trial's success included careful monitoring of the grub populations, proper timing of the application, and proper application techniques that require moist soil, cool air temperatures, minimal sunlight and post-application irrigation.

Dr. Kays also emphasizes the importance of timing the application. "Fall treatment is the most critical," he asserts. Fall soil temperatures are generally above 60°F and far more conducive to nematode activity — and thus pest control success. This is particularly true in colder climatic zones.

Our trial program will continue this summer and fall as we begin to identify any activity or damage.



Nematode life cycle. Photo courtesy: H. Kaya.

After two years of full field application, we anticipate that only spot treatment of any significantly affected areas will be required. According to Dr. Kays, the experimental *Steinernema glaseri* nematode is proving to be much more effective on masked chafers (white grubs) than any of the other commercially available nematodes. Most importantly, this strategy appears to be holding the pest population at an acceptable level without the application of any broad-spectrum insecticides.

Not a Cure-All

Beneficial nematodes are by no means the answer to all turf and landscape pest problems, but they are an alternative that should be considered. Their advantages are significant and can provide control for many pests. It is hoped that the success of this work and the accompanying data can improve the chances that a beneficial nematode aimed at white grubs will be widely available in the near future.

The complete and total elimination of all pests is not, and should not be, the goal of any turf and landscape manager. The goal should be to manage the pests at an acceptable level that maintains the natural balance of the environment as much as possible, while achieving the desired turf and landscape appearance.

Editor's note: Bob Milano is grounds operations manager, UC Davis Physical Plant, and a board member of the national Sports Turf Managers Association. He would like to acknowledge and thank Dr. Harry Kays of UC Davis and his staff, including Tom Burlando, Graham Thurston and Gregory Wood, as well as Mark Lucas and Dennis Yates of the UC Davis grounds divisions. All have contributed greatly to the project and its continued success. ❑

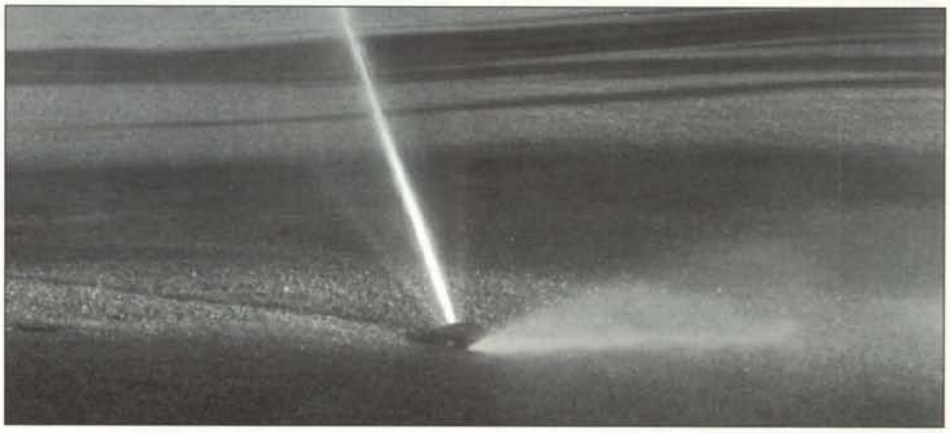
CHEMICAL LOG

Battling Poa Annua With IPM

Turf managers fighting the prolific seed producer, *Poa annua*, which plagues playing fields each winter and spring, can conquer this grassy weed with an integrated pest management approach. IPM is a philosophy of weed, insect and disease management proven in years of practice, especially on golf courses.

To meet the goal of managing pests while balancing costs, benefits, public health and environmental quality, turf managers must:

1. Gather technical information on the pest, in this case *Poa annua*.
2. Consider all control options.



Proper irrigation timing is integral to IPM of *Poa anua*.

The Technicalities

Poa annua, or annual bluegrass, flourishes in closely mowed areas. In the South, *Poa annua* is a cool season invader of dormant warm season grass stands and overseedings of cool season species such as ryegrass, bentgrass, and *Poa trivialis*.

Poa annua flourishes and becomes highly competitive because it's a cool season species that germinates and begins active growth in the fall, when warm season grass stands of bermudagrass are beginning to enter winter dormancy. This is also a critical time for the establishment of cool season grass overseedings, which tend to be less competitive during the germination phase. This critical life-cycle link must be understood to develop an appropriate IPM plan for *Poa* management.

Moist soil conditions, as well as cool temperatures, promote germination and growth of *Poa*. This gives the grassy weed a strong advantage over desirable warm season turfgrass from fall through spring. Seeds continue to germinate as long as temperatures are cool.

Poa begins to emerge in early fall. The specific date depends on location and weather conditions. It generally germinates when night temperatures are in the 60s and daytime temperatures are below 85 degrees F.

Seedheads are initiated in late fall and winter, but seedhead development is greatest in spring and early summer. Until seedheads appear, *Poa* isn't a highly visible nuisance. After seedhead development, however, the turf takes on a yellowish-white, uneven appearance.

By late spring, on closely mowed and irrigated turf, *Poa* can dominate desirable turf stands. However, through a combination of cultural, mechanical and chemical control methods, turf managers can reduce and even control *Poa* populations.

Cultural Control

Cultural practices designed to discourage *Poa* growth and favor the growth of perennial turfgrass species include the following:

- Water deeply and infrequently. Use irrigation to meet the physiological needs of the perennial species in the turfgrass population.
- In a dormant stand of bermudagrass, fertilize the established overseeding to maintain a highly competitive and dense turf.
- Practice good soil management to improve internal drainage and soil aeration.
- Avoid disturbance of the turfgrass during primary *Poa* germination periods.

Mechanical Control

The use of lightweight equipment results in a significant reduction in compacted soil. Reducing compaction speeds the up drying of soils and reduces the competitive advantage of *Poa* over desirable turfgrasses.

Populations of *Poa* are also greatly reduced by increased mowing heights. Problems with this weed aren't as persistent on golf course roughs, lawns, parks, and other areas maintained at greater mowing heights with less irrigation.

Chemical Control

Cultural and mechanical practices alone usually won't control *Poa*. It's important to remember that the soil in most irrigated turf situations has immense quantities of *Poa* seed just waiting for an opportunity to germinate. For best control, use pre-emergent herbicides that have proven effective in preventing new crops of seed from germinating.

A single fall application of Team™, Surflan™, or XL™ herbicide prior to seed germination offers effective, season-long *Poa* control. In the south, Rubigan™ fungicide used at high rates can also be used effectively to prevent or reduce *Poa* in overseeded bermudagrass greens, tees, and other perennial turfgrass areas.

The bottom line is: When it comes to fighting *Poa annua*, an IPM program that incorporates cultural and mechanical practices, along with the right chemistry, is the best approach. ❑

Technical credit: DowElanco, all products trademark DowElanco.

STMA Profile:

The Turfcon Team

By Bob Tracinski

In the future, a mere push of a button could transform the areas of major domed stadiums from natural sports fields to sturdy concrete for rock concerts, or smooth ice for hockey. The turf will be transported to a spacing-saving holding space, such as the top on an office complex, and its health preserved under greenhouse conditions if necessary, until another push of a button ushers its return.

That future may not be far away. The Greenway Group of Horsham, PA, has a patent pending for this concept, aptly named the "Stadium of the Future."

Roots of the Future

Tracking the path to this innovative concept leads back to the roots of development of today's turf industry.

As a boy walking barefoot on the differing grounds of his family's farm, Henry W. Indyk wondered why some soils felt soft and soothing, while others felt hard and grating; why on the same day some were hot and some were cold. His curiosity lead him to a bachelor's degree in plant science, with a major in soils, at Rutgers College of Agriculture in 1950 and master's and Ph.D. degrees in agronomy with emphasis on soils from Pennsylvania State University.

Dr. Indyk then advanced into a five-year stint in agronomic research in the University of Delware's Department of Agronomy. From there he returned to Rutgers University, spending one year as an extension specialist in pasture management. He later moved into the turfgrass field, succeeding Dr. Richard Skogley, the university's first extension specialist in turf. At that point, there was only one person in turf research at Rutgers.

Indyk's responsibilities for nearly 31 years as extension specialist reached to all areas of turfgrass management — home lawns, industrial, commercial, schools, public grounds, golf and sports. Throughout this time, he delved into the study and deeper understanding of soils, the growing medium of any crop—always intrigued by "what made them tick."

Initially, the top turf programs in the United States belonged to Rutgers University, the University of Rhode Island, Penn State University, and Cornell. Although these schools and their turfgrass specialists were pioneering a young field, there was little general interest in turfgrasses.

Dr. Henry Indyk and Dr. Richard Caton (from left) display a model of the "Stadium of the Future" at the 1993 STMA Conference and Exhibition. Photo by Steve Trusty.

At that time, Dr. Indyk was just beginning to realize how important his soils background would become in the field. As his work progressed, it became apparent to him that one of the biggest limitations in turfgrass development and maintenance was a lack of understanding about soils.

With the wide-ranging scope of an extension specialist position, it's essential to maximize time to best meet the needs of all served. Dr. Indyk developed working relationships with members of the turfgrass industry and was instrumental in the organization and development of such groups as the New Jersey Sod Association, the New Jersey Turfgrass Association, the New Jersey Turfgrass Expo, the Irrigation Association, and the Cemetery Association. For 13 years, he served as executive director of the Golf Course Superintendents Association of New Jersey. His reach extended to the national level, including work with the American Sod Producers Association, the Landscape Industry Advisory Council, and the Musser Turfgrass Association.

Naturally, he didn't neglect his other responsibilities either, working with the demanding homeowner segment by lecturing, organizing and participating in meetings, formulating recommendations and developing literature to feed its growing needs.

Indyk also worked to bridge the gap between practical and research-oriented programs at Rutgers. First, he encouraged an outstanding student to concentrate on the turfgrass area. Then he persuaded the administration to create a new research position in which Dr. Reed Funk has made a tremendous impact on the turfgrass industry.

Early on, Indyk perceived the area of athletic fields to have some of the greatest needs; but in the beginning, advances in sports turf were difficult. The few individuals attending the early meetings on athletic field development and maintenance had extremely limited funds and little power to generate the changes needed. Only in the last five to eight years has interest grown to high levels. Indyk attributes this to the growing popularity of sports at both the participant and spectator levels, as well as the increased concern about field safety. That safety concerns may be driven by litigation is a sign of the times, yet even today many fields are in need of major help.

Indyk sees the development of the Sports Turf Managers Association as an outgrowth of the response to the interest and demand for better, safer fields. He also notes the expansion of sports turf interest within the local levels of organizations. Nearly every state's turfgrass conference now offers sessions on athletic fields, which reflects the industry's response to their needs.

Beyond the University

Dr. Indyk retired from his Rutgers extension position on July 1, 1990, but he didn't slow down. As the turfgrass agronomist for Turfcon, the professional consultation branch of The Greenway Group, he continues his outreach in the turfgrass field.

Though Indyk's expertise has advanced many projects, there are a few that bring an added twinkle to his eye, like the work in process at the new Rutgers Stadium, the natural turf fields of the Philadelphia Eagles and New York Giants, and the turfgrass race track of Monmouth Park, NJ. He calls working

as a consultant on the Los Angeles Coliseum, in preparation for the 1984 Olympics, with the installation of the HyPlay system in cooperation with Richard Jenks from Oregon, "an interesting, successful experience, one in which I take pride."

The industry has lauded Dr. Indyk's contributions. Awards he's received include: the Rutgers Unversity Presidential Citation, the New Jersey Turfgrass Hall of Fame Award, the Golf Course Superintendents Association of New Jersey's Distinguished Service Award, the National Irrigation Association's Man of the Year Award, and most recently the 1993 STMA President's Award.

Caton's Path

On a different path, but one that would eventually meet with Indyk's, an eager young student, a four-sport letterman in high school, entered Bloomsburg State Teachers College (now Bloomsburg University) on a football scholarship. After "wrecking a knee" in football, Richard G. Caton switched his athletic emphasis to track, completed his bachelor's degree in secondary school education and social studies, and moved to Woodbury, NJ, to teach and coach. His expertise and enthusiasm in that position were rewarded when he was honored with the Princeton Prize for Distinguished Service to the Secondary School System. The prize includes a cash reward and the presentation of books to the school library.

True to his calling, Caton used the funds to work toward his master's degree in education, administration and superintendency at Rutgers University. He advanced from a teaching position to assistant superintendent of the Woodbury school system during his 16 years there.

At that point, Caton took a sabbatical for a year of residency at Temple University to pursue his doctoral degree. A graduate fellowship helped ease the financial burden of the move.

He completed his doctoral degree within two years, but even before that he attained the superintendent position at Wardentown, NJ. He later moved on to superintendent positions at Maple Shade and then Buena, NJ.

After 30 years of service, Dr. Caton retired in 1986. During that period, his continuing dedication to his work made a significant impact on the statewide scholastic community. His peers chose him as the recipient of the New Jersey Association of School Administrators Distinguised Service Award.

Teaming Up

With his strong athletic background, coaching experience, and continued responsibility to student athletes, Caton had long held concern for athletic field conditions. While superintendent at Maple Shade, he hired The Greenway Group to help with a field problem. He was so impressed with the job they did and their professionalism that he recommended their services to fellow superintendents whose sports fields were in bad shape.

Shortly after Caton retired, The Greenway Group made him an offer he couldn't refuse. "They said my experience 'gained by osmosis' would complement their program," he recalls. "November 1, 1993, marked the first day of my eighth year with the company."

Initially, Caton concentrated on sales and marketing, with 90 percent of his time spent on school districts. His work increased the size and profitability of the company. About four years ago, he says, "It dawned on me that a lot of people were profiting from selling information, and dispensing information was a major part of our work. I convinced company leadership that a division solely offer-

continued on page 19

Allocating Sports Field Maintenance Costs

By Joe Ardolino

"If people didn't have to use athletic fields so often, we could keep them in the kind of shape they want."

"If teams canceled practices and games on rainy days, we could keep fields playable for days with good weather."

"If field users had to pay for the damage they cause, they couldn't afford to do what they do."

These and other "Yogi Berra-like" outcries are often uttered by those responsible for the care and maintenance of sports fields. Physical plant directors, turf managers and groundskeepers all wish the end users would take more responsibility in helping make fields better and safer.

Yet the reality is that sport turf exists for sports and the athletes who play them, and sports and sports-related activities receive high levels of wear and tear. With today's emphasis in sports of more participation for athletes of all ages and abilities, the demand for sports fields continues to boom. Those who schedule athletic activities probably have a better chance of booking an event in a gymnasium than on an athletic field.

Increased demand for field time is only one of the challenges facing today's sport turf manager. Real estate for expansion is often limited or extremely expensive, particularly in densely populated areas where demand is often the greatest, and new field construction can be costly. Operational staffs and budgets are being slashed. To believe that staff, budgets, and resources will increase with demand is unrealistic.

Many sports turf managers contend that this is "business as usual." Even during the boom of the 1980s, when new facilities were constructed and money was more readily available, the only significant growth affecting sports turf managers came in the use and wear of the fields.

So, after exhausting all ways and means of improving athletic fields, frustrated sports turf managers often turn to the end users. "Take more responsibility!" they plead.

It is true that field users could become responsible about the ways in which a field can be used, specific to activities, without doing unnecessary damage. Intelligent field use practices can and do make a difference. However, this alone won't significantly help sports turf managers maintain fields at optimum levels.

Establishing Responsibility

The major responsibility that most sports turf managers are trying to define is fiscal. What does it take, fiscally, to maintain a certain field for certain uses? Exactly how much financial support will it take from each field user to maintain and, when necessary, repair or establish safe, playable fields?

Asking users to take fiscal responsibility is not a new concept. Users of other kinds of athletic facilities pay user fees to help offset the capital debt on the facility or to defray maintenance costs. Users accept and pay these fees because they have been educated to understand the value of the facility. However, when sports turf managers ask users to pay "field user fees," users often resist.

Some organizations have instituted field user fees to offset cost or improve maintenance, and this trend is likely to continue. Athletic fields should be considered as important as other facilities. I advocate field use fees if they can be levied successfully to the extent that they make a positive impact on field conditions.

If a field use fee is to be levied, the sports turf manager must be able to show how the levies will be allocated among users and what the fees will accomplish. Taking the total cost of annual maintenance and presenting it to field users conveys the complete picture only in cases where the field is used for one sport. However, in most situations today, fields have multiple uses and multiple users.

We cannot arbitrarily decide the amount or types of fees users should pay. The fee structure must be developed methodically, logically and fairly. Use must be analyzed and an equitable share for all users must be established. Without a logical means of use measurement, user fee programs will unlikely be implemented.

Field use measurement tools must measure:

- Who uses the field.
- Frequency of use.
- Length of use.
- Intensity level during that use.

Towson State University in Maryland developed just such a tool. Their utilization analysis tools identify, by user, the following for each field: the total number of days the field is used, the total number of field hours of usage, the level of intensity, and the repair "units."

The days and hours of usage were derived for each user's annual schedules. The level of intensity — high, medium and low — corresponded respectively to the numbers 3, 2 and 1. High indicates heavy usage with frequent and/or probable damage needing intensive repairs. Medium indicates moderate usage with an expected level of field repairs needed. Low indicates low levels of wear and tear with little or no damage and minimal repairs needed. The number of hours multiplied by the intensity level determines Repair Units (RU) per field, per user. The variable not measured is inclement weather conditions. Low-intensity usage when a field is in poor condition because of weather can result in severe damage and the need for substantial repairs.

In an effort to formulate an equitable share of field maintenance responsibility among users, the following calculations can be used against statistical information and can help determine cost centers.

The Total Cost of Maintenance (TCM) divided by the Total Number of Repair Units (TNRU) of all users provides the Repair Unit Value (RUV). The Repair Unit Value (RUV) multiplied by the Users Repair Units (URU) will identify the cost per user.

This system of evaluation helps users see the impacts their activities have on field quality, and how those impacts fit into the total maintenance picture. Once presented with the facts, users are more likely to accept their fiscal responsibility. ❑

Editor's note: Joe Ardolino was an assistant athletic director of Towson State University in Towson, MD, and a board member of the national Sports Turf Manager's Association. He gave an in-depth presentation on this topic at the STMA's Annual Conference and Exhibition, held November 6-9, 1993, at Camden Yards in Baltimore, MD.

PRODUCT SHOWCASE

Marking Machine

The Jaydee Model 5000 is a fully featured, self-propelled, professional line marking machine. The engine powers a piston pump, providing mechanical agitation, and powers both rear wheels - it tracks a straight line under its own power. The constant 2-mph speed results in uniform line width & brightness as well as predictable marking material consumption.

Jaydee Equipment Company
202 East Joliet Highway, Box 278, New Lenox, Il 60451-0278. (815)485-6146

Circle **108** on Postage Free Card

Subsurface Drainage

The PDS/LunDrain System reduces the cost, time and labor to install a drainage system. This high-tech system is a longer lasting and more effective alternative to conventional, french drain, and trench drain systems. PDS/LunDrain prefabricated drain systems create a "void space" beneath the surface by providing a cuspated plastic core wrapped with a tough geotextile. The geotextile prevents soils from entering the core while allowing water to enter freely. Water inside the core moves laterally to an outlet, sump, or auxiliary drainage system.

PDS/LunDrain Co., Commercial/Turf Division
P.O. Box 411007, Charlotte, NC 28241
(800) 277-5343, Fax (704) 588-7688

Circle **109** on Postage Free Card

Solve Drainage Problems

SIX EASY STEPS

REMOVE PORTS AS NEEDED

SLIDE PANELS TOGETHER

SET TOP COVER IN PLACE

INSTALL PIPE OR SURFACE DRAIN

INSTALL STONE OR LANDSCAPE FABRIC

BURY TO 8 INCHES DEEP - MINIMUM

The Flo-Well® plastic drywell/catch basin (known as the 'Legos' of water management), is a simple, rugged, lightweight below-ground leaching and storage system.

– Each 50 gallon drywell unit weighs only 23 lbs and assembles from 3 interlocking side panels + cover.

– Units can be stacked or interconncected to leach, transfer to store varying amounts of water.

– Can support H-10 load rating.

– Ideal to control surface water to prevent non-point source pollution.

FLO-WELL® SYSTEMS
Available Nationwide - Call 800-356-9935

Circle **110** on Postage Free Card

Water Reels

Kifco has introduced two models to their popular line of Water-Reels. The new B110 and B180 extend the product line to ensure there is a Water-Reel to fit your needs. Machines are compact, easy to use, operate unattended, and shut off automatically. They are suitable for all types of sports turf and are easily transported from one area to another. Water-Reels combine outstanding features that come from more than 25 years of traveling sprinkler engineering.

Kifco, Inc., P.O. Box 290
600 S. Schrader Ave., Havana, IL 62644
(309) 543-4425 Fax (309) 543-4945
Circle **111** on Postage Free Card

continued from page 15

ing professional consultation would be a winner, if we could sign the best personnel in the industry. At that point, I heard Dr. Indyk speak at a Loft's Field Day, and was so impressed with his ability I told Greenway, 'I don't know what his status is or if he can be romanced to come to us, but we really need to try."

The two men form a solid team for Turfcon, with the agronomic soils and turf expertise of Dr. Indyk — whom Caton calls "the best anywhere at what he does" — and the procedural expertise of Caton — whom Indyk calls "a master of technical documentation and accuracy." Working together, they support each other, bringing a higher degree of effectiveness to the project as each concentrates on his area of expertise.

Naturally, two such strong personalities generate a bit of friction at times with, Indyk notes, a few "disagreements and arguments" along the way. Caton agrees, conceding that "Henry always wins."

Their professional philosophy centers on carefully analyzing the specific situation at hand. "Too many projects work on general specifications, but they must be site-specific," Indyk explains. "The site must be analyzed properly to determine what conditions exist and then the specifications developed for those conditions. In addition, the project must be monitored to ensure that the specifications are carried out correctly.

"Each project is different, with different problems to solve, different challenges, different people and different contracting firms," he adds.

Along with the Stadium of the Future concept, another important Greenway, which Indyk "co-invented," is the Integrated Turf Management System®. This modular, transportable turfing system transports synthetic fields or problem turf areas to mature, natural turf.

"Modules are linked together to place soil to soil, leaf to leaf, and root to root to yield a playing field free from joints and other surface obstructions," explains Indyk.

The primary motivation for I.T.M. development began in 1990 with the stipulation that only natural turf be used for the World Cup Soccer matches of 1994. I.T.M. is a means of rapid conversion of a domed stadium's synthetic field to natural turf.

I.T.M. was used at the U.S. Golf Tournament held in June, 1993 at the Balustral Golf Club in Springfield, NJ. After the practice tee was literally destroyed by three days of practice, the worn turf was replaced overnight for the start of the tournanment, and again for the last two days of the event, with highly successful results much appreciated by the players.

Caton recently spoke on professionalism at the 1993 STMA Conference and Exhibtion in Baltimore, MD. His Sunday seminar was the last of a long day — a time slot almost guaranteed to foster apathy, even among the most education-starved individuals. Yet as Caton spoke, the room was exquisitely silent; all eyes and ear attuned to the man and what he was saying. Of course, professionalism is a topic that comes easy to Caton — a subject in which both he and Indyk are fluent. It has always been the foundation for their seemingly different paths which, now merged, are producing a clear route for the future of sports turf. ❑

Editor's note: Bob Tracinski is the manager of public relations for the John Deere Company in Raleigh, NC, and public relations chairman for the Sports Turf Managers Association.

sportsTURF 1994 Product Source Book

Equipment

Aerators, Water 20
Aerators, Soil 20
Basepath Groomer 20
Blade Sharpeners 20
Blowers, Leaf/Litter 20
Chippers, Wood/Brush 20
Core Collectors, Pulverizers 20
Drags, Harrows 20
Edgers 20
Engines 20
Forklifts 20
Hose 20
Hydraulic Mulcher/Seeder 20
Injectors/Subsurface 20
Lighting 20
Marking/Painting Machines 21
Mowers, Flail 21
Mowers, Greens 21
Mowers, Reel 21
Motors, Rotary 21
Pipe Pullers 21
Play Structures 21
Posthole Diggers 21
Rakes, Landscape 21
Rockpickers 21
Rollers 21
Sand Trap Groomers 21
Scoreboards 21
Seating, Bleachers 21
Seeders 21
Snowblowers 21
Sod Cutters 21
Soil Mixer/Screener 21
Soil Testing Equipment 21
Sprayers 21
Spreaders 21
Sweepers/Vacuums 22
Topdressers 22
Tarp Roller 22
Tires 22
Tractors 22
Trailers 22
Trenchers 22
Trimmers/Brushcutters 22
Trucks 22
Turf Vehicles 22
Verticutters, Thatchers 22
Water Removal Machines 22

Chemicals

Anti-Wilt Agents 22
Aquatic Dyes 22
Aquatic Herbicides 22
Biostimulants 22
Fertilizers 22
Fumigants 22
Fungicides 22
Growth Regulators 22
Herbicides 22
Insecticides 22
Micronutrients 23
Nematocides 23
Spray Pattern Indicators 23
Wetting Agents/Soil Penetrants 23

Irrigation

Backflow Preventers 23
Controllers 23
Drainage Pipe 23
Drip, Trickle, Low-Flow 23
Filters 23
Injectors 23
Irrigation, Other 23
Moisture Sensors 23
Pipe & Fittings 23
Pumping Systems 23
Repair Parts 23
Sprinkler Heads 23
Traveling Sprinklers 23
Valves 23

Materials and Supplies

Absorbents/Polymers 23
Artificial Turf Surfaces 23
Basepath/Infield Mixes 23
Covers, Rain/Snow 23
Covers, Traffic/Winter 23
Edging 24
Goals, Nets 24
Hydraulic Equip. & supplies 24
Landscape Fabric 24
Marking Flags 24
Paint Stencils 24
Paints, Marking Materials 24
Playground Surfaces 24
Sand/Soil Mixes 24
Soil Amendments 24
Soil Stabilizer 24
Tines for Aerators 24
Topdressing 24
Track Surface 24
Tree Root Barrier 24
Windscreens 24

Seed

Bentgrass 24
Common Bermudagrass 24
Fine Fescue 24
Hard Fescue 24
Kentucky Bluegrass 24
Overseeding Blends 24
Perennial Ryegrass 24
Seed Coating 25
Tall Fescue 25
Wildflowers 25

Sod 25

Alphabetical Listings 25

Equipment

AERATORS, WATER

AERATION INDUSTRIES, CHASKA, MN
AIRLAKE AERATION, LAKEVILLE, MN
AIR-O-LATOR, KANSAS CITY, MO
AQUAMASTER, KIEL, WI
AQUASCAPE TECHNOLOGIES, MINNEAPOLIS, MN
ECOPAK, SAN LUIS OBISPO, CA
KASCO MARINE, INC. LAKELAND, MN
LAKE AID SYSTEMS, BISMARK ND
OTTERBINE/BAREBO INC., EMMAUS, PA
RAIN JET DIV. HARDIE, LAGUNA NIGUEL, CA
R.C. SHEAFFERS COMPANY, SANDWICH, IL
TORO CO., MINNEAPOLIS, MN

AERATORS, SOIL

CLASSEN MANUFACTURING, NORFOLK, NE
EMREX INC., TUNKHANNOCK, PA
FELDMAN ENGR & MFG, SHEBOYGAN FLS, WI
FLOYD-MCKAY AEROFIER CO., DUNN NC
FUERST BROTHERS, INC., GIBSON CITY, IL
GREAT PLAINS MFG. INC., ASSARIA, KS
GREENCARE INTL., HUNTINGTON BEACH, CA
HOLLAND EQUIPMENT, ONTARIO, CANADA
JACOBSEN/TEXTRON, RACINE, WI
JOHN DEERE, MOLINE, IL
LESCO, ROCKY RIVER, OH
OLATHE MFG CO, INDUSTRIAL AIRPORT, KS
SISIS EQUIP LTD., MACCLESFIELD, ENGLAND
STEINER TURF EQUIPMENT, ORRVILLE, OH
TORO CO., MINNEAPOLIS, MN
TURF-TEC INTERNATIONAL, NORTH MIAMI, FL
VERTI-DRAIN USA, SCRANTON, PA
YEAGER-TWOSE, HILLSBORO, OR

BASEPATH GROOMER

BANNERMAN LTD., ONTARIO, CANADA
DIAMOND DEMON, ST. LOUIS, MO
FUERST BROTHERS, GIBSON CITY, IL
GANDY CO., OWATONNA, MN
GLENMAC-HARLEY DIV., JAMESTOWN, ND
JOHN DEERE, MOLINE, IL
KROMER CO., MOUND, MN
METROTURF INC., FARMINGTON, MN
SMITHCO INC., WAYNE, PA
TORO, CO., MINNEAPOLIS, MN
YORK RAKES, UNADILLA, NY

BLADE SHARPENERS

FOLEY UNITED, MINNEAPOLIS, MN
J.L.G & CO., GAHANNA, OH
MOWING MACHINE GRINDERS & REELS, ANDALUSIA, AL
NEARY MFG INC., ELK RIVER, MN
REELSHARP USA, DARIEN, CT

BLOWERS, LEAF/LITTER

AGRIMETAL, WICKHAM QUEBEC, CANADA
ATWATER STRONG, ATWATER, OH
BILLY GOAT INDUSTRIES, LEES SUMMIT, MO
BUNTON MFG CO, LOUISVILLE, KY
GIANT-VAC, S. WINDHAM, CT
GREEN MACHINE, LONG BEACH, CA
HOFFCO INC., RICHMOND, IN
JACOBSEN/TEXTRON, RACINE, WI
JOHN DEERE., MOLINE, IL
KUBOTA TRACTOR CORP., TORRANCE, CA
LESCO, ROCKY RIVER, OH
MARUYAMA U.S. INC., REDMOND, WA
OLATHE MFG CO., INDUSTRIAL AIRPORT, KS
PARKER SWEEPER, SPRINGFIELD, OH
RANSOMES AMERICA CORPORATION, LINCOLN, NE
SOLO INC., NEWPORT NEWS, VA
STEINER TURF EQUIPMENT, ORRVILLE, OH
STIHL INC., VIRGINIA BEACH, VA
TORO CO., MINNEAPOLIS, MN
VANDERMOLEN CORP., LIVINGSTON, NJ
WESTHEFFER CO., LAWRENCE, KS
D.E. WOLFE METAL FAB. CO., LOWER BURRELL, PA

CHIPPERS, WOOD/BRUSH

AMERIQUIP, LA VERNE, CA
ASPLUNDH MFG. DIV., CHALFONT, PA
BANDIT INDUSTRIES, INC., REMUS, MI
BEFCO INC., ROCKY MOUNT, NC
DOSKOCIL INC. INC., SAN BERNARDINO, CA
GRAVELY INT., CLEMMONS, NC
MORBARK INDUSTRIES INC., WINN, MI
OLATHE MFG CO, INDUSTRIAL AIRPORT, KS
VERMEER, PELLA, IA

CORE COLLECTORS

GREEN CARE INTERNATIONAL, HUNTINGTON BEACH, CA
OLATHE MFG CO, INDUSTRIAL AIRPORT, KS

DRAGS, HARROWS

BANNERMAN, GORDON LTD., ONTARIO, CANADA
FRANK D. SMITH & ASSOC., PALATINE, IL
FUERST BROTHERS, GIBSON CITY, IL
GOLD MEDAL REC. PROD., BLUE MOUNTAIN, AL
INGRAM MFG CO, DEL RIO, TX
KROMER CO., MOUND, MN
OLATHE MFG CO, INDUSTRIAL AIRPORT, KS
PARTAC PEAT CORP, GREAT MEADOWS, NJ
SMITHCO INC, WAYNE, PA

EDGERS

BUNTON CO, LOUISVILLE, KY
EXCEL INDUSTRIES, HESSTON, KS
GREEN MACHIINE, LONG BEACH, CA
JACOBSEN/TEXTRON, RACINE, WI
LITTLE WONDER, SOUTHAMPTON, PA
POULAN/WEED EATER, SHREVEPORT, LA
POWER TRIM, LA PALMA, CA
PRECISION SMALL ENGINE, POMPANO BEACH, FL
RANSOMES AMERICA CORPORATION, LINCOLN, NE
SHINDAIWA INC., TUALATIN, OR
SNAPPER POWER EQUIPMENT, MC DONOUGH, GA
STEINER TURF EQUIPMENT, ORRVILLE, OH
TORO CO., MINNEAPOLIS, MN
TRAIL MATE, INC., SARASOTA, FL
TURFCO, MINNEAPOLIS, MN
YAZOO MFG. CO., JACKSON, MS

ENGINES

BRIGGS AND STRATTON, MILWAUKEE, WI
HONDA POWER EQUIP. CO., LOS ANGELES, CA
KAWASAKI MOTOR CORP., GRAND RAPIDS, MI
KOHLER CO., KOHLER, WI
KUBOTA TRACTOR CORPORATION, TORRANCE, CA
ONAN, MINNEAPOLIS, MN
REPOWER SPECIALISTS, LTD., SCOTTSDALE, AZ
TECUMSEH PRODUCTS, GRAFTON, WI
YANMAR, BENSENVILLE, IL

FORKLIFTS

BROUWER TURF EQUIP LTD, ONTARIO, CANADA
CC BUCKET FORKS INC., ORANGE, CA
SPYDER INC., HOUSTON, TX
TELEDYNE PRINCETON, CANAL WINCHEST, OH

HOSE

BROYHILL COMPANY, DAKOTA CITY, NE
GREEN PRO SERVICES, HEMPSTEAD, NY
HANNAY, CLIFFORD & SON, WESTERLO, NY
H.D. HUDSON, CHICAGO, IL
PARKER TUBE, WESTLAKE, OH

HYDRAULIC MULCHER/SEEDER

BOWIE INDUSTRIES INC., BOWIE, TX
BROYHILL COMPANY, DAKOTA CITY, NE
EASY LAWN HYDRO SEEDING SYSTEMS, SEAFORD, DE
FINN CORP., FAIRFIELD, OH
GOOSSEN INDUSTRIES, BEATRICE, NE
HYDRO-TURF & ASSOC., GILBERTS, IL
REINCO, PLAINFIELD, NJ

INJECTOR/SUBSURFACE

GREENCARE INTERNATIONAL, HUNTINGTON BEACH, CA
OLATHE MFG., INDUSTRIAL AIRPORT, KS
RAINSAVER, WALLA WALLA, WA
TURF-TEC INTERNATIONAL, OAKLAND PARK, FL
TYE CO., LOCKNEY, TX
YEAGER-TWOSE, HILLSBORO, OR