topdressing you will need during the year, it takes 30 cubic yards of material to apply a 1/4-inch-thick layer over one acre. To apply the same layer on a 5,000 square foot green requires almost four cubic yards. A baseball field would need almost three yards for the infield and 30 yards for the outfield. A regulation football field would require nearly 40 yards.

Agnew points out that topdressing is most cost effective for the high-wear areas of sports fields. You may only need to topdress between the hash marks on a football field or the goal areas of soccer fields. This further strengthens the case for matching the topdressing to the field soil.



Core Harvester attachment for Cushman Turf-Truckster.

You don't want different soils within the same irrigation zone.

The most notable departure from matching soil with the topdressing is when a turf manager wants to amend an existing soil with sand. This is where many people get into trouble, says Agnew. "You can't sand topdress twice a year," he points out. "What you'll end up with is a layer of sand, a layer of thatch, a layer of sand, etc. A thatch layer can develop in a matter of weeks on top of the sand you put down. To keep up with the thatch, you need to aerate and lightly topdress on a three- to fourweek basis. This requires a major commitment on the part of the superintendent or sports turf manager."

The value of sand in preventing compaction and improving drainage is widely recognized. Agnew stresses, however, that any sand should be tested for size, as well as water- and nutrient-holding capability, before it is applied to turf areas. "I'd rather see turf managers use topdressings containing approximately 80 percent sand, ten percent soil, and ten percent peat than straight sand," he adds. "These provide some margin for error."

Properly selected sand topdressings can

be dragged into core holes following aeration to improve compaction resistance. Core aerators can remove anywhere from two to 15 percent of the old soil, depending upon the diameter and pattern of the tines. If this soil is replaced by dragging sand into the core holes, a small degree of amendment is possible. Repeated aerification and sand topdressing are necessary to achieve any significant improvement.

"Initially, you may not see much of an improvement," Agnew admits. "Once you start topdressing with sand, you have to continue on a regular basis to get the intended results. Remember, aerification is a necessary part of topdressing."

Turf managers and contractors are discovering that sand tends to settle into core holes following irrigation. As this occurs, topdressing may need to be reapplied to fill the holes to the surface. Once filled, the core holes do not collapse as they would without topdressing. These important pathways for air, moisture, and roots remain open to extend the benefit of aeration.

As pointed out in the June issue of Golf & SportsTURF, maintenance of sand-based

continued on page 22



Quality Built For Years of Rugged Work!

This big capacity spreader is the Ideal top dresser and has proven itself extremely popular with municipalities, school districts and golf courses.

Heavy duty construction throughout combined with quality features provide you with a unit you can count on for years of continuous use.

MULTI TURF Specialists Ltd. 6455 - 64th Street Delta, B.C. V4K 4E2

Tel: (604) 946-0446

Fax: (604) 946-5547



eliminates bothersome chains, sprockets, and drive mechanisms. Tow with most utility vehicles or tractors.

Call Your Nearby Olathe/Toro Dist. For Demo!

100 Industrial Parkway Industrial Airport, KS 66031 913-782-4396 FAX: 913-764-1473

Circle 126 on Postage Free Card

Aeration and Topdressing continued from page 21

rootzones is quite different from that of soil-based rootzones. Sand does not retain moisture or nutrients as well as clay or loam soils. Adjustments in maintenance and irrigation levels will be necessary as the sand portion of the soil increases. However, a gradual change to sand may be more manageable than switching from soil to sand by reconstruction.

"The cost of reconstruction being what it is, more and more golf courses, schools, and parks are willing to try renovation through aerification and topdressing," says Bill Stark, president of Turf Renovation, Inc., in Cortland, NY. Stark was formerly superintendent at Bellview Country Club in Cortland and started his business after realizing the potential for aeration services in his area. "Renovation requires a lot of material handling, specialized equipment, and labor. Since we have the equipment and staff, we are more efficient."

Stark has renovated more than 300 greens with a VertiDrain deep aerator. "We go over the green twice with solid tines, then pull 5/8-inch cores on a third pass and topdress," he explains. "The results have

saved our customers thousands of dollars." He also uses aerators made by Toro, Olathe, and Salsco (now Ransomes) and a turf conditioner by Yeager-Twose. "We match the equipment with the job to gain the greatest efficiency."

David Bouck, president of Golf Course Services in Hudson, FL, is another former superintendent who has built a business on aeration and topdressing. "During the busy season, superintendents can't afford to disrupt play in the daytime for aeration," Bouck points out. "We can get on the course in the evening and renovate greens and tees without disrupting play. We use lights if necessary. By the following morning, the course can open as usual, without missing a round."

Toro has taken a different tack to reduce the disturbance created by aeration. It has developed an aerator that uses jets of highvelocity water to slice through subsurface soil without disturbing the playing surface. The HydroJect 3000 has 11 nozzles spaced three inches apart. Blasts of water create channels in the soil between four and inches deep. They also fracture and lift the soil so roots can penetrate more deeply into the rootzone.

Research by Dr. Jeff Nus at Kansas State

Announcing THE EAGLE IRRIGATION PRODUCT LINE The EAGLE Universal 2-Piece Sprinkler Housing The EAGLE

-0L

PATENT APPLIED FOR Made to hold all Rain Bird 4-hole, 8-hole, S.A.M. bearing guides and Weather-matic K70 Series. Easy to service. Won't rust, stainless steel inserts to attach sprinklers. Also available, the EAGLE Check Valve.

FITS MOST RAIN BIRD HOUSINGS.

The lid with The Memory. Will return to its original shape if bent. Stainless steel center, soft coating for sports field applications. Made to fit both EAGLE and Rain Bird 21-51, 27-47 metal or plastic housing.



For Ordering Information (800) 522-8558 CATALOG AVAILABLE

SPORTS TURF COATINGS



You have seen Mautz 8-30 for many years on Super Bowls, Pro Bowls, numerous NFL stadiums and universities. Now available world-wide from **MISSOURI PAINT SUPPLY**.

WILL NOT HARM GRASS!! BRIGHTEST WHITES AND SHARPEST MATCHES TO TEAM COLORS.

EXPERT SALES & SERVICE OF WARREN'S BENCH TARPS AND COVERS.

- * National, International Sales
- * Complete line of natural and artificial turf paints.
- * Spray equipment & accessories.
- * Member of STMA.

Contact Larry or Jack

MISSOURI PAINT SUPPLY

5818 Troost, Kansas City, Missouri 64110 (816) 333-1272 * Outside Missouri call (800) 426-0774



Core Pulverizer by Olathe Mfg. Co.

University has shown that vibratory plows and colter blades can also provide substantial improvement in soil aeration and structure. He discovered this when testing machines designed to inject synthetic polymers below the turf surface. "Our choice of methods to cultivate turf rootzones from the surface may grow in the coming years," Nus admits.

As the results of recent research projects start to surface, the indications are that topdressing should be done in conjunction with aeration. Both need to be carried out relatively frequently in high-traffic turf areas to provide a significant and lasting effect.

Diagnostic equipment can now measure the effectiveness of aeration and topdressing. As a result, turf managers know how often they need to cultivate their rootzones and can better manage the disturbance such practices produce. \mathcal{D}



Pulverize plugs and topdress after aeration in one pass. Outfront attachment for Toro GM300 features 60" swath. Call Your Nearby Olathe/Toro Dist. For Demo!

100 Industrial Parkway Industrial Airport, KS 66031 **913-782-4396** FAX: 913-764-1473

Circle 136 on Postage Free Card



TERRA TOPPER

Lease \$204.00 Per Month * All Hydraulic Driven * Spreads up to 21 feet * Adjust Spinners to any speed * Can Spread Full Width or to Either Side * Light Dusting to Heavy Application



TERRA BRUSH Lease \$48.00 Per Month * Brush Top Dressing into greens fast and efficiently. * With the Supersoft Brush it will produce excellent results! * Ideal for cart paths.

 * Excellent for windrowing cores after aerating.
* Ask for a demonstration.



DEEP TINE SPIKING

* 4" to 6" Deep * An ideal summer supplement to aerating

- * Excellent on high traffic
- areas * Spiking Blade will fit on any Terra Aerator in the
- field. * Fast: 1-1/2 acres per hour * Pattern: 3-1/2" x 4-1/2" spacing.

IF YOU DO NOT HAVE A DISTRIBUTOR IN YOUR AREA, PLEASE CONTACT US AT:

Terracare Products Company, Inc. P.O. Box 248 * Pardeeville, WI 53954 * TEL: 608/429-3402 * FAX: 608/429-2889

SCOTT AND SANDOZ TO DEVELOP BIOLOGICAL PESTICIDES

Sandoz Crop Protection, a producer of biological insecticides for agricultural uses, and the O.M. Scott & Sons Company, a marketer of products for home lawns and gardens, have agreed to develop and market a natural line of products for home gardens and lawn care in the United States and Canada. The first products from this alliance are expected to be introduced in 1991.

Under the agreement, Sandoz research and development will provide biological products to Scott for inclusion in a newly developed natural product line. This line will initially include biological insecticides, and may eventually include products based on naturally occurring insect viruses, bacteria, protozoa, and natural plant extracts to control lawn and garden pests.

Sandoz presently sells a number of biological products to farmers to control caterpillars and Colorado potato beetles in fruit and vegetable crops. Another product is widely used to combat gypsy moth infestations across North America.

"Increasing public awareness about the

environment has created a demand for such a natural line of products for home gardeners," says Tadd C. Seitz, Scott president and CEO. "With the technical capabilities and experience that Sandoz has in producing natural crop protection materials for North American farmers, we believe that they are the ideal company to provide research and development for our biological products."

The new enterprise will be jointly administered by a management committee and a business development committee containing equal numbers of representatives from each company. Each firm will chair one committee.

TORO TO CONSOLIDATE WHEEL HORSE ADMINISTRATION

The Toro Company will consolidate its South Bend, IN, Wheel Horse administrative functions into its Bloomington, IN, headquarters. Wheel Horse is a lawn and garden equipment manufacturer, purchased by Toro in 1986.

The move will result in the transfer of 50 employees. Fifty positions have been eliminated. "With our commitment to better serve our customers and our organization and remain a contender in our competitive business, it's imperative that we deploy our assets and resources in the most efficient and cost-effective way possible," explained David H. Morris, president of Toro. "When it became apparent that we had an opportunity to integrate our organizations to better support our businesses worldwide and eliminate costly duplication in our administrative functions, it made sense to do so."Morris said the move to corporate headquarters will take place during the next six months. He noted that key South Bend employees will be offered relocation in Minnesota, although he didn't know how many. Dislocated employees will be offered severance packages and assistance in finding new employment.

"Toro deeply regrets the loss of jobs that will occur as the result of this consolidation, and any impact this may have on the community," said Morris. "Our 300-person manufacturing operation will remain in South Bend and we look forward to a long and meaningful partnership with the community."



Universities are known for their tight control over spending, especially when it comes to campus turf and landscaping. Grants typically pay for planning and construction of new facilities. Our institutions of higher education then bear the long-term burden of maintenance.

Turf product salesmen will tell you it's tougher to sell to a university than a golf course or park. Every expense must be carefully justified before it is included as part of an overall physical plant budget. And, if the athletic department contributes to the grounds budget, the money is often tagged for specific needs agreed upon by the athletic director.

Even universities with huge endowments and powerful athletic programs operate in this frugal manner. The University of Southern California in Los Angeles, a frequent participant in the Rose Bowl, is no exception. The 101-year-old institution located in urban Los Angeles is facing a water crisis of growing proportions. As one of the largest users of water in the city, USC must also take a leadership role in conservation.

Rather than undertake a massive overhaul of its extensive irrigation system for the 27 acres of turf on the campus, the university chose to upgrade it gradually. They began by creating an irrigation department in 1983 and hired Jim Peralta to run it. Peralta had helped pioneer advanced irrigation control systems as the irrigation specialist at California State Polytechnic University in Pomona during the late '70s and early '80s.

"When I joined USC, two employees had been taken from the grounds shop and assigned to the plumbing shop to do irrigation maintenance and repair," Peralta reflects. "Any type of controller or valve problems were given to outside contractors. Contractors were also hired to install the irrigation during new campus construction. The resulting system was a patchwork of different types of heads, valves and controllers."

The two men and Peralta became USC's first irrigation department, which today has grown to six. "The first thing I did was look at the whole system to document each part with as-builts and an inventory" he says. "You could tell just by looking at the stock of repair parts that the system needed to be standardized. To make matters more confusing, we had a combination of hydraulic and electric controllers. The old hydraulic systems were much harder to maintain."

"We've had to redesign a lot of the areas because the original systems weren't engi-



Jim Peralta, head of the irrigation department at USC, adjusts satellite for drip system.

Irrigation Department Restores Control at USC

neered properly and they were very inefficient. Line sizing and system dynamics were not taken into consideration. Maybe six large impacts were running off a 1-1/4 inch line throwing over sidewalks in order to cover a large area. They weren't concerned about staying within the boundaries of the landscaping. Systems were just patched together when new landscaping was installed."

Peralta began to standardize the irrigation components on campus, replace old hydraulic and ten-station controllers with expandable electric controllers, reconfigure the heads and valves, and explore remote control. "It has been a slow progression," he admits.

All heads except those on the athletic fields operated at the pressure supplied by the city mains, about 65 psi. The systems for Howard Jones Field (football), Dedeaux Field (baseball), Cromwell Field (track and field), and the intramural fields have booster pumps.

Paralta started to replace old impact rotors around buildings with adjustable, low-gallonage stream and spray heads and to add drip to many of the plant beds. Zones were changed to match site conditions and pressure and flow requirements. Old valves were replaced with pressure-regulating versions in addition to flow meters. "We now have a fairly accurate record of the output and flow rate of each station," he says.

The next step was to reduce the number of controllers on campus from an unwieldy 65 to around 40. Peralta then hoped to link the field controllers (satellites) to a central computer. To do this he had to select controllers that could be connected to a central in the future and still fit into his budget. Until all controllers were set up with the central computer, he wanted his crew to be able to operate them by radio remote control for testing.

Scheduling is also a big problem on campus. Peralta can't always irrigate when he'd like to because he has to work around so many campus activities. To change a program for a special activity, and then change it back, is very time consuming. A central computer would enable him to make these changes from his desk in the office or from a terminal at his home.

After exploring his options, Peralta decided to begin the conversion using Valcon hardware and software. One or two controllers at a time were replaced with V3 satellites. Forty new satellites have now been installed. Each operates as a stand-alone controller until it can be tied into the central computer through phone lines. In the meantime, Peralta started using the computer to record data on all the separate systems on the campus.

continued on page 29

CHALKBOARD

BIOSTIMULANTS BENEFIT TURF MANAGEMENT

Biostimulants can have a significant and beneficial effect on turfgrass when combined with sound management practices, according to research underway at several U.S. universities. Ongoing studies indicate that these compounds improve root growth, provide better resistance to certain stresses, and possibly reduce nitrogen rates due to improved fertilizer efficiency.

As their name would imply, biostimulants are products which improve and accelerate plant growth. Some are completely natural, with no added chemicals or hormones. Others contain synthetic hormones, chemicals, and other ingredients.

A number of turf managers are now using these products to protect new plantings and for faster establishment of sod installation and overseeding. They reduce loss due to transplant shock and environmental stress.

Dr. R.E. Schmidt, professor of agronomy and a turf ecology and physiology specialist at Virginia Polytechnic Institute, Blacksburg, VA, says research indicates that biostimulant compounds work consistently well in a number of applications, particularly sod production. "We know we can stimulate growth, especially of roots, with some of these materials," he explains. "We also get tillering and initiating of buds."

Based on experiments with bluegrass, bentgrass, and tall fescue, Schmidt believes that biostimulants can be used to speed up production and transplanting of sod by enabling roots to knit more quickly into the soil. He says it might be possible for roots to become established in a week, as opposed to the usual two or three.

"This would reduce irrigation necessity, because water would not be as critical for as long after transplanting," Schmidt explains. "For sod producers in areas dependent solely on rainfall, this benefit would be particularly useful."

The turf specialist adds that production of bentgrass sod for putting greens is increasing in the U.S. He reports that there is an increasing demand on sod producers to treat these products with biostimulants before shipping to this market. "Some golf courses are now able to sod their greens and have them putted on in a few weeks' time when biostimulants are used," says Schmidt.

A biostimulant compound he is currently examining contains different formulations of humic acids derived from peat moss, kelp extracts, micronutrients, coenzymes, chelating agents, and other natural soil chemicals. This formulation is sold under the trade name of Roots Root Growth Enhancer.

At rates ranging from a one- to two-percent solution, the product can be applied during seeding, after germination in the two-leaf stage, or in general applications three or four times a year at four- to sixweek intervals. It can be mixed with liquid fertilizers and herbicides.

Because Virginia Tech is located in a transition zone, its researchers are studying both warm- and cool-season grasses. Applications of biostimulants and iron, for example, are being investigated on bermudagrass. According to Schmidt, this combination seems to help fight cold stress.

"We're at an elevation of 2,100 feet, and many times our bermudagrass plots are seriously affected by the cold," he explains. "Last October, bermudagrass treated with a biostimulant and iron stayed green after several frosts. There was no comparison between the bermuda that was treated and the bermuda that wasn't. The untreated turf succumbed to the frost."

Schmidt says that helping turf hold up to chilling temperatures is perhaps the greatest benefit of applying a biostimulant in combination with iron. "The correlation in survivability of turf is pretty high where iron and biostimulant are applied in tandem," he stresses.

Widespread use of biostimulant compounds may someday help turf managers cope with the problems of groundwater contamination, particularly from nitrates. "We're talking about biostimulant application rates measured in grams as opposed to hundreds of pounds of fertilizer," says Schmidt. However, he is quick to point out that biostimulants would never be substituted for an essential plant nutrient such as nitrogen. "It's conceivable that you'd use the two together and cut the nitrogen rates, because nitrogen efficiency would be greatly increased," he explains.

Dr. Michael Goatley, assistant professor at Mississippi State University in Starkville, is also researching the effectiveness of biostimulants on warm-season grasses such as bermudagrass, St. Augustine, and zoysiagrass.

"With warm-season grasses, we see most response to biostimulants under stress conditions," Goatley says. "The most measurable response of turf grown under suitable moisture and fertility conditions occurs when biostimulant is applied in late September or early October, when turf begins to prepare for winter dormancy."

In this situation, Goatley is seeing more enhanced root development late in the growing season. This could result in better carbohydrate storage and preparation of plants for winter. There is also evidence that biostimulants could enhance spring green-up as temperatures warm and spring dormancy breaks.

According to Goatley, turf managers, especially in the South, can get into trouble in the spring with early, heavy nitrogen applications designed to stimulate growth and green the turf. "The lush growth of turf following early-season nitrogen application is very susceptible to injury from late frosts," he explains. "If a frost occurs, the turf will again have to expend a lot of stored energy reserves toward development of a new canopy."

While the detrimental effects of an insufficient root system might not be initially apparent, Goatley warns that turf will be more susceptible to moisture and heat stress during the summer months.

Both Goatley and Schmidt stress that many unanswered questions remain concerning biostimulants and where these compounds might fit best in commercial situations. Future research will be focused in this direction.

Irrigation Department continued from page 25

Even though only 14 of the school's 41 controllers have been tied into the central, Peralta has gained a grasp on the water he is using on the rest of the campus. As long as every component is maintained to specifications and checked frequently, he can predict his water usage. Eventually, flow meters will be installed on all primary valves for each area. This will give him the ability to compare his computer projection to what is actually being used. Another objective is to install pressure transducers, that will shut a station down when a pipe breaks, and moisture sensors.

Utilizing his staff efficiently is one of Peralta's biggest goals. He was one of the first irrigation specialists in the area to use remote control radio to operate satellites in the field. Instead of installing receivers on each satellite, he put permanent connectors on them. The crew has four receivers and four hand-held transmitters. After plugging a receiver into the satellite, one person can test each station as he walks the area by using the transmitter.

By staying on top of maintenance and repairs, Peralta is reasonably assured that

there won't be major problems at night when the irrigation system is running. When all satellites are hooked up to the central, he will be able to see problems that occurred during the night on his computer screen. He will also be able to access that information and make any adjustments from the terminal at his home. If there is a problem he can't handle, Valcon can also call up the central to diagnose and correct problems.

"This university is like a small city," he says. "Managing irrigation around events and construction is a complicated task. An efficient irrigation system controlled by a computer is critical.

It took Peralta years to put all the pieces together, and he is always faced with changes and growth. But, he's almost there and he did it within the university's budget.

As Peralta has demonstrated, it is possible for universities to avoid a massive overhaul of their irrigation systems by creating an irrigation department to address the problems of water conservation and system performance on a consistent basis. It is an effective way for schools to control longterm maintenance costs and still have a well-landscaped campus and productive athletic facilities.



Stabilizer enables you to use natural hardscape materials such as limestone, stonedust, decomposed granite or chat for cart paths and tee approaches. It can also be used to stabilize sand trap bases to minimize sand contamination. Stabilizer is a natural glue that is non toxic and easy to use.

Available in the United States, Europe, Canada and Japan. Call for the distributor nearest you.

STABILIZER, INC.

4832 E. Indian School Phoenix, Arizona 85018 = USA 602-952-8009 = 1-800-336-2468 FAX 602-852-0718

- Circle 119 on Postage Free Card -



WEST COAST NETTING PO Box 728, Rancho Cucamonga, 714/987-4708 (800) 854-5741 (outside CA) FAX #714-944-7396

ROOKIES

HAND-HELD **REMOTE CONTROL**



The TRC Sidekick hand-held irrigation control unit works on any controller that operates 24 VAC valves. Its portable receiver plugs directly into permanent con-

PRODUCT UPDATE

troller connectors for maintenance operations. It remotely starts and stops systems to facilitate installation, inspection, repair, blowouts, aeration, and training. **REMOTE CONTROL TECHNOLOGY, INC.** Circle 145 on Postage Free Card

GEOTEXTILES

Anti-Wash/Geojute and DeKowe geotextiles hold seed and soil in place during vegetation establishment. They contain no synthetic nettings and are completely biodegradable.

Anti-Wash/Geojute matting is a rugged woven fabric that absorbs almost five times its weight in water. It is easy to apply over any soil surface. Seeding can be performed either before or after application. The matting biodegrades after one or two growing seasons.



DeKowe is woven with yarns spun from the fibers of coconut husks. The fabric is extremely strong and durable, and can be used to stabilize waterways and steep slopes until the vegetation is hardy. This geotextile will biodegrade in four to ten vears.

BELTON INDUSTRIES INC. Circle 144 on Postage Free Card





Now you can train your maintenance personnel to identify and correct hazardous conditions that may exist on your fields with this new VHS training program.

- Reduce player injuries Avoid potential lawsuits Save time and money Keep insurance costs down Train seasonal and full time personnel

This informative program covers the important aspects of preparing and maintaining the complete facility. From the inner playing surfaces, both skinned and turf, to the outlying fences,

lights, and bleachers, all the bases are covered. You'll also receive 24 pages of training support literature.

Make this convenient and reliable source for risk management part of your training solution.

Call TOLL FREE to place your order: 1(800) 443-8373 Or, call or write for our full color brochure



P.O. Box 1528 / Dept. A-2 Fair Oaks, CA 9562

Circle 117 on Postage Free Card

LandManager.

Grounds Care Management Software

Reduce Costs! Increase Quality!

For more information or a demonstration diskette, please contact National Computer Solutions @ (615) 337-4521 today!

Also available: Gardenview, a graphics-oriented software package for Landscape Design. Custom software design is our specialty.



Route 2, Box 139 Computer. Sweetwater, TN 37874-9507 Call (615) 337-4521 FAX (615) 337-4679