Dale Sandin remembers well the sleepless night of Jan. 22. The grounds and turf manager of the Orange Bowl in Miami listened to the rain pelting down and could only think of his field—the site of the New York Jets-Miami Dolphins playoff game the following day. For three days prior to that, the rain hadn't let up and curtailed the kind of field preparation Sandin usually did before a major game.

"I had scheduled my crew to come in at 5 a.m. the next morning to start getting the field ready as best we could," said Sandin. "When I arrived, water was standing on the entire field at least an inch to an inch-and-a-half deep."

Not even the field's Prescription Athletic Turf pumps, which had been running all night, could keep up with the rain.

At noon the day of the game, the rain stopped and play began at 1 p.m.

"The field was very muddy, but we kept the pumps going and by halftime it had improved considerably," Sandin said. "I went out to inspect the damage thinking I'd find six to eight inch holes in the playing surface, but surprisingly, it was only chewed about an inch to and inch and a half. We still had firm footing underneath. I credit most of it to our PAT system."

While the weather is probably the most unpredictable element Sandin works with on his field, it is certainly not the only concern on a field that is used for 35 events during the football season, 10 events during the off season, pro, college and high school football games, rock concerts, religious functions and special attractions. The Orange Bowl turf every year hosts the Orange Bowl Classic and Orange Blossom Classic and some years the Super Bowl. It was turned into a boxing arena for the Alexis Arguello prize fight, hosted the likes of Jimmy Buffet and endured the pounding hooves of the University of Colorado's mascot—a buffalo.

With all of these varied uses, Sandin takes pride in his stadium as not only offering excellent playability, but also as a public relations tool for the city of Miami.

"When people see this stadium on national TV, they see a good side of Miami, one that works, and I'm proud of that," Sandin said.

The Orange Bowl is only one of three pro stadiums to have installed a PAT system, developed by Dr. W.H. "Bill" Daniel, professor of Agronomy at Purdue University. Only Kennedy Stadium, home to the Washington Redskins and the Denver Bronco's Mile High Stadium, sport the system that provides for removal, conservation and addition of water to the field through pumps attached to drain lines which draw the excess water away from the playing surface. Sandin describes it as a "bathtub effect"—the plastic liner underneath the field holding the sand, drainage pipes, soil and turf. The Orange Bowl's system was installed in 1976 after Astro Turf that was laid in 1970 was removed.

"When people see this stadium on national TV, they see a good side of Miami, one that works and I'm proud of that."
—Sandin

Sandin said he uses his Rainbird overhead sprinkling system the majority of the time, but sometimes needs to irrigate near a playing date.

"Then we use the PAT system," he says. "I've found it helps control disease because the soil drains well."

Another reason Sandin sings the praises of the PAT system is because of the Miami-area weather.

"Last year we had a drought," he explained. "We couldn't irrigate the field. With the PAT system, we held a reserve of water under the field at a level we predetermined. It can be a lifesaver."

The sideline and goal post areas are not in the PAT system.

The 2½-acre Orange Bowl is sodded with a 419 Tifway bermudagrass grown in sandy-type soil, similar to the soil mixture on the field.

"The ideal way if you have the time is to vegetatively plant the field using sprigs," Sandin said. "that way you're not contaminating the soil with a nursery soil. I've found Tifway to be aggressive and hardy in this climate. It's also very available."

Sandin's irrigation schedule depends on the weather. In the summer he irrigates more. Around April he is trying to discourage his overseeded ryegrass and lets the field dry out more. Sandin uses Derby ryegrass as his overseed from November on. He says the Ph.D blend of Derby, Regal and Elka gives him good results.

His main reason for overseeding is cosmetic.

"With national television here quite often, I have to keep the field looking good. When the bermuda wears down the roots are left, but the top blade is destroyed. We need to beautify it a little bit. It also protects the root system of the bermuda. Ideally, I would like to overseed and then keep traffic off. But, on a field like this, of course that's impossible. I can't put up a temporary playing field in the parking lot."

To give him more turnaround time, for the past two years Sandin has been pregerminating his seed and finds by doing that it gives him as much as four days lead time on the grass.

"If you seed on a Sunday or Monday, the grass usually pops through the next Saturday or Sunday and that's usually right around game time. The grass gets ripped out immediately. When I pregerminate, the shoots are coming up in about three days.

To pregerminate, Sandin soaks his seed in water for about 36 hours changing the water every eight to 12 hours. The seed is then spread on the concrete concourse and approximately 500 to 1200 pounds of calcined clay in the form of Terra-

continued on next page

green or Turface are added. Sandin says this absorbs water quickly and acts as a carrier.

"We can spread the seed on the field within two hours."

A little crowsfeet which is discouraged with MSMA is about the only weed problem Sandin has to contend with. Disease problems are more of a concern.

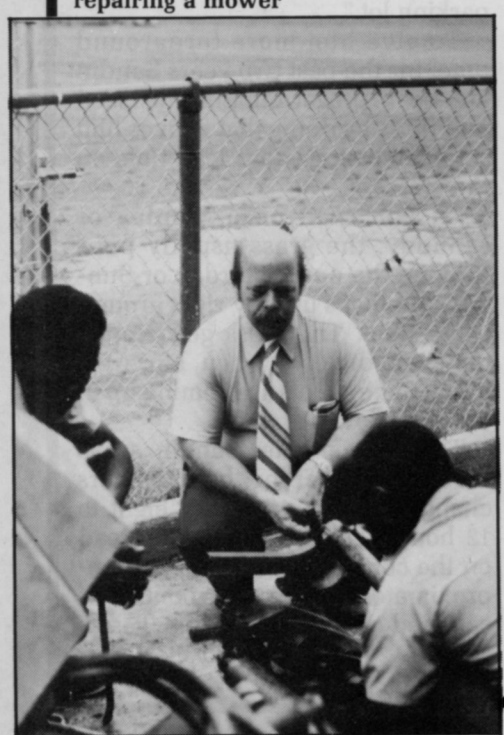
"During the fall, we have a *Pythium* problem. I've been using Koban or Tersan SP. We also use Fore and Daconil as broad spectrum fungicides. We've had some algae problems, but the Fore has nipped that, too. My maintenance program seems to have prevented a lot of disease as well as weed problems."

Nemacur is used once a year to take care of nematodes. Diazinon, Sevin and Baygon are used as needed. Mole crickets are a problem, but Sandin says they are maintained through the regular spraying program.

Chinch bugs and sod webworms are controlled the same way. Sandin says he changes chemicals to eliminate some resistance-type problems.

Sandin uses about 30 pounds of nitrogen a year.

Sandin offers suggestions to workers repairing a mower



"That probably sounds like a lot, but this field tends to require it. It's sandy and drains well. When we use the pump system, it tends to suck out the nitrogen quicker. I've used sulphur coated urea and urea formaldehyde but supplement it with an 18-4-8 complete fertilizer."

The field's fertilizer needs are determined by soil tests two or three times a year. Since Sandin works for the City of Miami, all of his purchasing must be done through the city's purchasing department. Because this can be a slow process, Sandin finds himself having to plan ahead to make sure he has what he needs when he needs it.

"It's not the best, but you learn to work within the system," he says.

Sandin aerifies during the spring and summer and verticuts very frequently (about once a month) to keep the ground loose. During the football season, he can't do it as often. He says he prefers to use the spiking method because it leaves less spots torn up.

Pre-game preparation entails mowing the field three times a week. Sandin starts the season at a ⅝ inch mowing height and graduates up to plus or minus an inch, but never higher than 1 ⅛ inches. Lines are painted. Bench marks are made on each line. A string is stretched to each mark to mark the line. The spray painting is done with a spray gun and templates (a guide for the paint) at exactly a four inch width (an eight inch width is used for the goal line).

"Using templates is a time-consuming task that takes more labor, but what we end up with is sharp, straight lines. We get no complaints from officials, and in pro games, that's very important."

Sandin says the template also helps inexperienced line-painters do a good job.

Next, any decorations are painted on the field such as the Dolphin's helmet or in the case of the Orange Bowl, the King Orange insignia. Goal post adjustments are made depending on whether the game is college or pro.

"We curtail overhead watering 24 to 30 hours prior to any game," Sandin said.

Painting the field takes one to one-and-a-half days and up to two days for decorating, as in the case of the Orange Bowl or Super Bowl. Sandin said NFL consultant George Toma comes in to offer whatever help or advice he can.

"I look at him as a friend," Sandin says. "I can use all the good help I can get."

And after the game? The answer is simple. Prepare for the next game or event.

"We get a lot of debris that blows down from the stands that has to be picked up. We re-sod the dug-up area which is usually not extensive, but it can be. Every game is different as far as field damage depending on the team and weather."

Sandin aerifies during the spring and summer and verticuts about once a month to keep the ground loose.

If it is during an overseeding period, the overseeding continues along with the mowing.

"Sometimes we have back to back games with a college game on Saturday and a pro game on Sunday. In that case, the crew comes in around midnight and works all night retouching lines, repairing sod and cleaning up. Sometimes we use a colorant or dye to get the turf to match and have an even tone, however we don't do this as general practice."

Sometimes the field requires rolling to smooth down the kicked up areas, however, Sandin says the field generally does not tear up because of the PAT system.

Sandin works on a $200,000 budget, including salaries. He has a crew of from eight to 12 including two "lead people," Larry Brod and Bill Campbell. He used to have 35 workers thanks to a Comprehensive Employment and Training Act grant, but since the funds have

Continued on page 44

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ORANGE BOWL *from page 42*

Workers mark lines on the field using templates.

been curtailed, his staff has greatly diminished. During the season or for special events, he can hire people on an hourly basis.

As grounds and turf manager for the City of Miami, Sandin is also responsible for Miami Stadium which seats 10,000 and is used as the Baltimore Orioles training facility and Marine Stadium, a 6,500 seat water stadium made on an inlet of the Bay of Biscayne. His equipment as well as staff is rotated between the three stadiums. Sandin reports directly to the stadium administrator, Walter Golby.

The equipment inventory includes a Toro Turf-Pro 84 mower, three gang mowers, two Massey-Ferguson tractors, a Lely fertilizer spreader, a Jacobsen verticut and aerifier and Jacobsen tractor-mounted verticut and sweeper, two Kut-Kwicks for the parking lots, two Ford flail mowers, two Cushmans and two Toro Trucksters. Sandin's sprayer is mounted on a Toro Truckster. The stadium uses a Meter-matic topdressing machine, a Lindig soil shredder, two paint spray units (a 35 gallon and a 15 gallon), two Giant Vac vacuums, a few leaf blowers and string weed eaters and edgers.

Sandin, a former golf course superintendent, sees many similarities—and differences—between maintaining a golf course and a sports complex.

"The biggest difference I see is that if the weather is inclement, a golf course superintendent can close his course or at least limit cart traffic in certain areas. Here, the game goes on rain or shine and the field has to be able to withstand it."

Sandin, 39, graduated from the Stockbridge School of Agriculture at the University of Massachusetts with an Associates degree in Turf Management. After graduation, he worked at several country clubs in the northeastern part of the country gaining experience prior to taking a job at Tacoa Country Club in Westfield, MA. He then worked for Zikorus Construction Co. in Connecticut in golf course construction. From there, Sandin went to the Redding Country Club in Redding, CT, where he was superintendent for five years. Prior to coming to the Orange Bowl in 1976, Sandin was the golf course superintendent for two years at Lake Arrowhead Country Club in Canton, GA.

Sandin says he doesn't look at the similarities between the two jobs.

"It's all a matter of maintaining turf," he says. "I have different problems now. My turf is more intensively used than any golf course in the country. The hardest thing for me to accept about this job is the damage the turf must endure."

His varied experience in the field and recognition of a need for more research have been the catalysts for Sandin to get involved in his profession.

A couple of years ago he was having problems in keeping the lines on the field from being depressed due to band traffic.

"Enkamat was just coming out on the market," he says now. "We installed it on the lines and it helped at the time."

Because the percolation area of the PAT system has slowed, Sandin will be putting sand slits in the field by the Cambridge injection system. This, he hopes, will allow the water to percolate better. Sooner or later, he says, the PAT system will need to be redone. By adding the sand, it should last another five to eight years.

Sandin is also working with a Miami designer to come up with a machine that will aerify the entire top soil surface profile no matter what depth.

The Orange Bowl is also bidding to host the World Cup Soccer match in 1986. The field will have to be widened 10 or 15 feet, players' benches will have to be removed along with the area's artificial turf. The PAT system would also have to be enlarged.

"In this business, you sometimes have to put your foot forward and be the first one to try something new or innovative," he says.

And what challenges face the people who maintain sports complexes? In Sandin's opinion, the challenge is simple—to keep your turf in as good a shape as possible.

"We'll need to do whatever it takes," he explains. "Turf managers in the future will need to be open to everything. We will need to try worker ideas, be aware of chemicals on the market and the safeguards that protect the applicators as well as the players. We will need to not be afraid of being innovative." **WTT**

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FORD TRACTORS

Circle No. 140 on Reader Inquiry Card

Growth Regulators

Research is paying off. Growth regulators reduce mowing frequency and suppress seedhead formation on weeds.

By R.P. Freeborg, Ph.D.

Discoloration by growth regulators is the result of slower growing new foliage not covering up naturally dying older foliage.

At Purdue University we began examining growth regulator compounds in the late 1960's to early 70's. At first, the initial objective was to find a growth regulator that would either eliminate or reduce the frequency of the mowing required, thus reducing fuel and labor costs and equipment depreciation. So far, we have not found a compound that can satisfactorily eliminate mowing entirely. Our efforts have more recently been directed at finding a growth regulator that will reduce the mowing frequency requirement to perhaps every third or fourth week within a three month period. The mowing would be in the nature of a trim to improve the appearance of the turf, giving it a better character, color, and uniformity.

The work done with growth regulator compounds has uncovered other important areas outside the turf industry. These formulations can, for example, enhance the sucrose content of sugar cane as well as increase the nutritional value of forage crops. Some growth regulators have also been found to be capable of seedhead suppression which aids in weed control and reduction of weed competition. These discoveries have given rise to added incentive in the development of such compounds.

With some of the growth regulators we have examined we can inhibit a plant to almost any extent without complete kill. All the compounds we have tested will cause inhibition and reduction of growth. Some do so quite severely, but others will actually make a miniature plant that survives through almost any kind of environmental condition.

A compound that will be available in limited quantity this year is presently identified as EL500. It has proved to be a very good growth inhibitor. It enhances the color of the plant and promotes an improved root system. Our test plots have gone ninety days without mowing and without thinning or discoloration of the turf. This product will be marketed under an experimental use permit as "Cutless" from Elanco.

As we examine growth regulators we must also be concerned about what is happening to the plant under the surface of the soil. We need to know what the compound is doing to the tillers, rhizomes, and roots. To accomplish this we have established a greenhouse test wherein sprigs of bluegrass (all taken from one clone to eliminate variability) are planted and then treated with a growth regulator. Thirty days after treatment we harvest them, meas-

continued on page 48

Dr. Freeborg is a member of the agronomy teaching and research staff at Purdue University, West Lafayette, IN. He is one the primary experts on growth regulators in the country.

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Circle No. 214 on Reader Inquiry Card

Regulators *from page 46*

Dwarf grass plants are the result of Ethephon, which keeps all parts of the plant growing equally.

ure top growth, count rhizomes and tillers, and evaluate root development.

EL500 performed very well in this test. The plants treated with this product had dark green color, adequate inhibition, and an exceptionally healthy root system. Failure to inhibit seedhead development seems to be the only major drawback to EL500. The same is true of PP333, another promising compound which is not as yet as fully developed in the turfgrass industry. It is a product of ICI Americas.

A growth regulator that has interested us for some years is Ethephon, sold as Ethrel by Union Carbide. It is used in many agricultural areas to enhance ripening of fruit. One of its unique characteristics is that it tends to dwarf the plant moderately. Compared to other growth regulators it does not have the potential for as prolonged a period of inhibition, but it does keep all parts of the plant growing about equally. A major difficulty is the tendency toward species response, so that if you have a bluegrass, rye, fescue mix, you will find that each is inhibited at a different rate. This results in surface irregularities.

A more recent development in growth regulators has come from Monsanto, and is identified as MON4621 (wettable powder) or MON4623 (granule). It is a good growth inhibitor, it enhances turf color, and provides good seedhead inhibition. This compound will soon be available to the turf industry on a limited basis under an experimental use permit.

A problem that is associated with the use of growth regulators is in fact the result of their success as inhibitors. In a normal healthy turf new leaf growth continually masks or hides the older lower leaves as they senesce, or die. In an inhibited turf, natural senescence continues at a normal rate, and, if the plant is under stress, the rate will accelerate. The inhibited leaf growth cannot hide the dead foliage, and the result is a thin, discolored turf.

The previously mentioned difference in species response, and this appearance of senesced leaf tissue are problems to be overcome before we will have a good growth regulator on the market.

The ability of most growth regulators to suppress seedhead development has aroused interest in these compounds as a means of controlling a plant species and also reducing mowing requirements. The reduced development of the seed stalk eliminates the need for it to be mowed. Over a period of time by reduction of seed development, weeds like *Poa annua* can eventually be reduced until it becomes low enough to control what remains with a preemergent. With proper timing and use one can effect a potential reduction of new plants in the future. Unfortunately, the crucial time element is an obstacle to reliability of performance.

Two products currently available have the potential for seedhead suppression or selective suppression of annual grass growth. One of these is Embark, a compound that provides good prolonged growth inhibition. It also gives excellent seedhead suppression of *Poa annua* without severe inhibition of grass species in a stand of turf.

The other, and more recently available product, is marketed as Rubigan (EL222). It is a fungicide used for control of various turf diseases. In our early work with it we began to see that it inhibited *Poa annua* more than it inhibited the bluegrass. Further testing revealed that it will selectively suppress *Poa annua* and, over a period of time, with frequent use, it will tend to eliminate it in a stand of cool season grass. Rubigan, although it is not a seedhead inhibitor, has this special ability to influence *Poa annua*.

These two products represent to some degree where we stand today. We are not only considering growth regulators as a means of possibly reducing mowing frequency requirements and labor costs, but we are also seeing them as selective herbicides that will reduce the ability of one plant to grow where another remains aggressive, thus effecting a change in turf population. Not every compound fulfills both functions, but there is much promise in the concept of using them in combination with each other.

Seedhead suppression by growth regulators has added incentive to develop new compounds.

A problem that is associated with the use of growth regulators is in fact the result of their success as inhibitors. **WTT**

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