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Double-Edged Sword

Growth regulators can conceivably help Poa annua get through the summer while reducing its spread by seed.

By Jeff Hagman

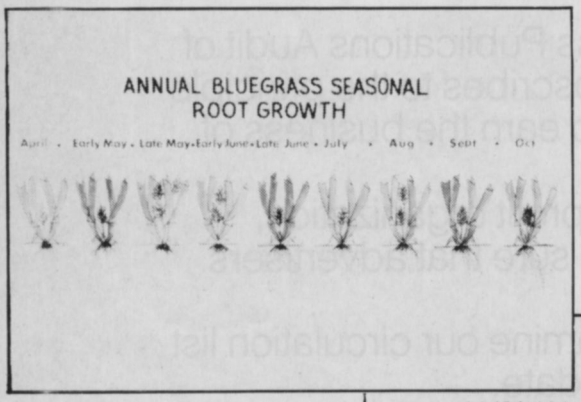
"From the golfer's standpoint, *Poa annua* is like the girl with the curl in her hair," says Dr. Thomas Watschke, professor of turfgrass science at Pennsylvania State University. "When its right, *Poa* is beautiful—it can be mowed close. And because of its density and uniformity, it makes a great fairway surface.

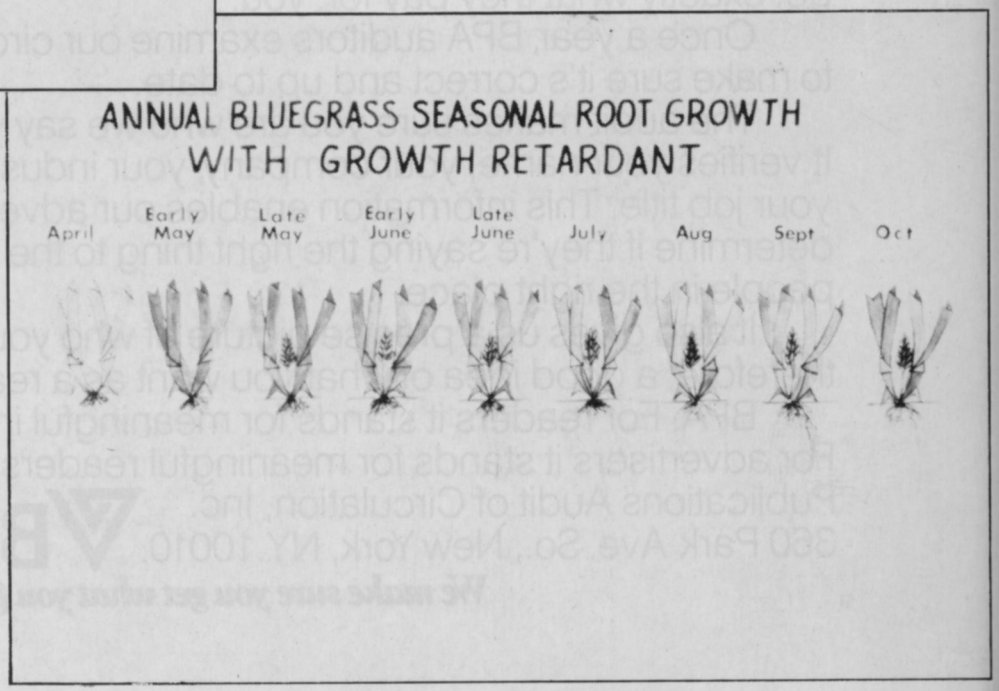
"But when it's wrong, *Poa* can be awful. Golf course superintendents are faced with turf that doesn't mow well, because it produces stiff seedheads which are tracked everywhere to cause sanitation problems, turning fairways a pale oyster-white or yellow rather than green."

Now the development of plant growth regulators (PGRs) by firms like 3M and Eli Lilly Company threatens to end that love-hate relationship between golf course managers and the light green, shallow-rooted *Poa annua* that populates an estimated 90 percent of American golf course fairways.

In the mid-1960's, the increase of automatic irrigation systems and the EPA and OSHA restrictions on lead and calcium arsenates combined to establish *Poa annua* as—in the words of Purdue University agronomist Dr. Ray Freeborg—"a turfgrass by default."

"Before the development of PGRs," explains Watschke, a member of the GCSAA Educational Advisory Committee, "the battle lines were simply drawn. Some golf superintendents said, "I'll accept *Poa annua*, buy an automatic irrigation system, and get more money for my fungicide budget." Or superintend-





Seedhead production *is at the expense of root development in Poa annua. Growth regulators can reduce the bad characteristics of Poa and reduce mowing frequency.*

ents could treat *Poa* as a weed, saying, "Kill it with calcium arsenate and overseed with competitive species."

But PGRs offer what Watschke calls "a double-edged sword," a philosophic and agronomic alternative to pre-emergent root inhibitors like Betasan (Bensulide), DCPA (Dacthal), Benefin, or total soil sterilants like methyl bromide.

"With the new PGRs," says Watschke, "you can improve *Poa annua's* ability to survive. But timed differently, PGRs can be used to help convert a stand of *Poa* to other species." For the last three years, research into the PGR's potential to both promote *Poa annua* root growth and suppress seedhead production has accelerated at universities like Michigan State, Pennsylvania State and Purdue, as well as at golf courses in Ohio, Indiana and New Jersey. If the PGRs succeed in avoiding *Poa annua* brown-out during times of heat or moisture stress, the products could turn what Purdue researchers condemn as "failure grass" into an example of what Dr. Watschke calls "a hot issue—the manipulation of plant growth as a management tool for our advantage."

Most promising for golf course applications is the PGR's ability to shift the utilization of photosynthate stored in *Poa annua* away from seedhead production. Instead, the photosynthate is used or stored in parts of the plant where it could conceivably make it more stress tolerant in the summer. "When golfers end up with their golfballs lying in a bunch of seedheads," says Watschke, "it doesn't offer them a proper shot. In addition, many people have tremendous allergy problems with seedhead-filled *Poa*. I've seen black golf shoes end up yellow. When you're talking 160 seeds produced by one plant, that's a significant pollen load.

"Golf course superintendents can't do much about a plant's metabolic potential. But once it gets its metabolic act together, we can shut it down. And then, with deeper root growth, the *Poa annua* proceeds through the summer stress season morphologically better suited to handle it because of its improved top-to-root ratio."

In late-March, 1983, 3M received EPA approval for use of Embark PGR for *Poa annua* seedhead suppression on fairways using a ½-pint per acre rate. Introduced in 1978 for public works and highway maintenance mowing reduction, Embark (mefluidide) has been tested by Michigan State University turf pathologist Dr. Joe Vargas, Watschke, and Freeborg.

One example of PGRs utility in converting a course from *Poa annua* to a competing species like creeping bentgrass is the work of Frank Dobie, 18-year veteran general manager and superintendent for Sharon Center, Ohio's Sharon Golf Club. Dobie currently uses EMBARK PGR across 22 acres of *Poa annua* on the fairways of his 18-hole course. Over the last 14 years, the Sharon Club's turf has evolved from a predominantly Merion blue-grass stand in 1966 to one with almost 90% *Poa annua* by 1980. Dobie is determined to use the PGR as part of his five-year conversion program to Penneagle creeping bent. But Dobie is realistic. "If we get 50 percent Penneagle here in five years, I'll be thrilled to death."

"If we get 50 percent Penneagle here in five years, I'll be thrilled." Dobie.

Beginning in the Spring of 1981, Dobie sprayed PGR at the recommended rate of a quarter-pound active per acre on all 22-acres of his fairway using a 300-gallon boom sprayer. He followed that with an overseeding of Penneagle creeping bent. Dobie applied the PGR slightly after greenup, keeping the material off the roughs to avoid retardation of the bluegrass there. "The result," claims Dobie, "was very good. The PGR did inhibit *Poa annua* growth on the fairways. By the end of May 1981, the two-weeks of discoloration had ended. The Penneagle was up into the two-leaf stage and by June 1, the fairways looked gorgeous in color and texture. *Poa* still predominates, but we now have more than 5-10 percent bentgrass."

"And the PGR eliminated *Poa annua* seedhead production for us by 90%," concludes Dobie, who predicts that a variety of cultural strategies will contribute to a doubling of his present bentgrass population to 10-20%. Dobie has instituted extensive aerification of his fairways from November to December with a Dedoes aerifier to expose the soil, pick-up the grass clippings to promote the spread of bentgrass, and planting of divots on the fairways with a soil and bentgrass seed mixture on a daily basis.

At Rivervale, New Jersey's 27-hole Edgewood Country Club, golf course superintendent Bill Gaydosh has experimented with PGRs for four years to convert his turf from *Poa annua* to bentgrass. "We've now got 60 percent bent in the fairways," says Gaydosh. "If we can reduce the seedheads from *Poa annua*, it'll be worth it for the aesthetic value alone."

When Gaydosh joined the Edgewood Country Club in 1975, the fairways were populated with almost 100 percent *Poa annua*. Gaydosh initiated an overseeding program with Seaside and Emerald creeping bent. "The *Poa* didn't hold up during the summer unless you used extensive maintenance practices like syringing, aerifying, and disease control."

Gaydosh initiated test plots of PGR in mid-November 1979, using a 16-ounce per acre rate on a single acre of fairway at Edgewood. "The results," Gaydosh remembers ruefully, "were drastic and yellowing, with a reduction of seedheads in the spring and dead *Poa* during the winter." But by 1981, Gaydosh was timing his trial of the eight ounce per acre rate in the spring, "right after green-up." He found the results "very encouraging—with little discoloration and almost no seedheads."

This year, Gaydosh is treating 10 acres of Edgewood fairway with

continued on page 54

Jeff Hagman is a marketing supervisor for 3M, Agricultural and Commercial Products Division, St. Paul, MN.

SWORD *from page 53*

the eight-ounce rate. "If it works as well as we expect," says Gaydosh, a graduate of the Rutgers turf program, "I expect to spray all 50 acres of fairway and 3 acres of tees with the PGR next year. We try to spray in the morning, when the dew is on the turf, using a 100- gallon John Bean sprayer and a Cushman cart. And the timing—just after green-up—is critical."

"Sprayers can be off by 25 to 50 percent. You need accuracy with PGRs." Morris.

"The window which golf course superintendents are dealing with here," agrees Tom Watschke, "is the time between green-up and seed emergence. That can be as little as two to five days. I'd suggest golf course superintendents become hands and knees diagnosticians, peeling back the sheath to witness the seedhead still in the boot. If you apply the PGR, you'll keep that seedhead inside."

With the *Poa* species so sensitive to temperature, the advisability of using a PGR may vary depending on the geographic location of a course. "In New York, Pennsylvania and Northern Ohio," says superintendent John Morris of Highland Golf and Country Club, "you get by fine with *Poa annua*. If I was a superintendent in Minnesota, I'd try to grow *Poa*. But here in Indianapolis, we have such a problem getting through the summer heat stress." As a result, Morris began experimenting with PGRs in the Spring of 1982 on six 1,000-meter plots. The Highland fairways currently support a 50% *Poa* population, and Morris is overseeding with Penncross bent. "That Fall 1982," says Morris, "we sprayed two EMBARK applications mixed with another growth retardant. And it burnt the living tar out of it. But we used a rate much higher than the recommended half-pint per acre rate." This year, Morris is returning with the PGR on a 1000-square-foot plot.

"The first thing a golf course superintendent should do," warns Tom Watschke, "is gain experience with a PGR. Don't use it immediately on all fairways. Use test plots, perhaps a practice fairway, to anticipate the response of your turf. And take areas which will give you the most information. Try a place with lots of developing seedheads in the *Poa* or turf that gives you the most problem in the summer with *Poa* loss due to drought."

Adds Norm Axe, head of the chemicals and fertilizer division of Detroit's Lawn Equipment Company: "We recommend golf course superintendents recalibrate their spray equipment so they know what they're putting down. You've got some latitude in spraying dandelions. But you need *accuracy* with a PGR. Some sprayers can be off by as much as 25 to 50 percent."

"Nothing will tell on you like a PGR," agrees Watschke. "Many golf course superintendents will say its the first time they could get a handle on how precisely their spray operations perform."

"Put your best spray applicators on the job," says Sharon's Frank Dobie. "We use white foam markers to avoid overlapping. Because where ground crews skip or overlap, or where spray nozzles are plugged up, that will be evident."

Prices for commercially-available PGRs vary; 3M's EMBARK averages $140 per gallon. Edgewood's Bill Gaydosh calls that, "a little expensive for me to use, but worth it. My PGR costs per acre is $9.00.

"Research continues on the effects of PGRs on seedhead production and *Poa annua* control.

"There's definitely money to be saved with the use of PGRs," says Watschke. "Properly timed, a golf course manager trying to improve the quality of the *Poa annua* will find the plant has less disease and hence you apply less fungicide. It's also more drought-resistant so you can reduce your irrigation requirements, and causes less wear on mowing equipment due to seedheads. And the PGRs harbor an additional benefit. "Our May mowings dropped form the usual 14 times to five times," says Dobie.

Research continues on the effects of PGRs on seedhead production and *Poa annua* control. The Eli Lilly Company has an experimental permit for Cutless (EL-500) a growth regulator featuring minimal discoloration.

Yet most critical PGR research may still spring from testing by golf course superintendents. Both Meridian Hills in Indianapolis and the Crooked Stick Golf Club in Carmel, Indiana, are experimenting with a variety of PGRs for use in converting fairways from 50% *Poa annua* to bentgrass.

University turf researcher Watschke welcomes that hands-on evaluation. "The more we can encourage golf course superintendents to carefully evaluate new products on their courses, the more widespread will be the acceptance of PGRs. That means improved playing conditions for golfers. "And then, I can retire." **WTT**

FIELDS *from page 34*

for cool season turfgrasses.

1. Fertilization

In late summer (August, September) apply a complete fertilizer such as 6-24-24 or 12-12-12 (around 2 lbs/1000 sq. ft. of P_2O_5 and K_2)); in late fall (Nov.-after last mowing), apply nitrogen such as NH_4NO_3 at a rate of 1½ lbs N/1000 sq. ft; in spring apply a slow release nitrogen such as IBDU at a rate of 1½ to 2 lbs of N/1000 sq. ft. in early May; smaller amounts of nitrogen and iron to keep color and growth in summer, especially if heavily used and irrigated. Lime is applied according to the soil test, however, if thatch is a problem, 20 - 30 lbs. of lime/1000 sq. ft. should be used annually.

2. Mowing

In spring, mowing should be at least two times a week (remove only ⅓ to ¼ of leaf area) at about one and one-half inches for Kentucky bluegrass and perennial ryegrass and two to two and one-half inches for tall fescue. During summer if not heavily used, mowing heights can be raised one-half inch and mowing can be less frequent.

3. Cultivation

This includes coring (aerifying) to relieve compaction and allow better water infiltration, verticutting, especially if reseeding or removing thatch, and todressing to smooth surface and help in thatch decomposition. Reseeding is a renovation and cultivation operation and coring prior to seeding followed by verticutting or just verticutting helps to move seed into the soil.

4. Pest Control

The major pests are probably weeds. Preemergence herbicides such as DCPA (Dacthal) or bensulide (Betasan) are used for crabgrass and goosegrass control and must be put down in March. A second application is recommended in about five to six weeks. Broadleaf weeds such as dandelion, plantain and even the narrow-leaved wild garlic can be controlled with 2,4-D/dicamba or Trimec in spring or fall. A considerable increase in yellow nutsedge will probably occur with frequent watering of the infield. Although MSMA or DSMA has been used in the past (also for postemergence crabgrass control), the herbicide bentazon (Basagran) is now recommended for nutsedge.

5. Infield Maintenance and Traffic Control.

Even if partial or totally automatic irrigation is not available, one must wet down the skinned area shortly before a game. This light watering to keep down dust does not suffice for maintaining a good infield grass. Either a hose-end sprinkler or crawler can be used for infield grass. After play, the skinned area should be dragged and leveled towards the infield to avoid buildup of material along the inner edge of the outfield which prevents water from running off the skinned area and also makes the ball take unexpected bounces.

Controlling traffic or using the field when too wet are difficult to prevent. A second practice field and batting cages are very helpful. Practicing in the outfield helps save the infield. Obviously agreement between coach and maintenance men is most helpful. The other problem is getting in the cultivation, reseeding or renovation when needed since play is from early March to November. Reseeding is best done in late August or September, but players are still practicing. Since sodding can be later in the fall or even in mid-summer, it often wins out over reseeding. Cultivation of cool season turfgrasses should be in April or May—one must get it in between home games, and even then, those players not on the traveling squad stay home and practice. A calendar with home games coordinated with maintenance or renovation practices should be prepared.

This article is obviously written from the perspective of a turfgrass instructor and researcher, but its intention is to provide the players and coaches with the best playing conditions possible. Please check on the many university and trade journal publications available for more information, especially as it relates to your particular climate and playing needs. **WTT**

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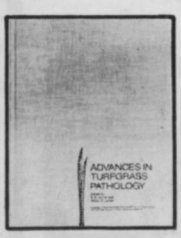

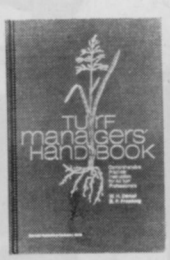

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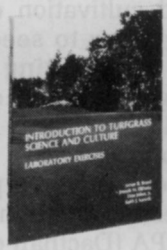

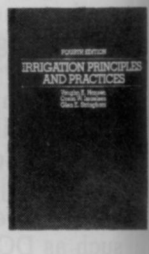

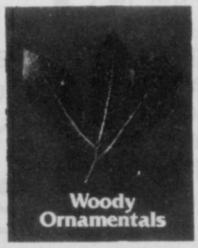

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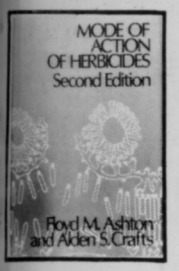

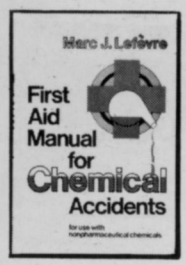

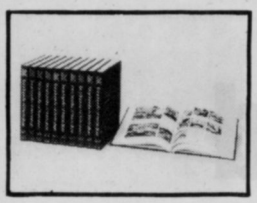

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WTT 63

Worn Out And Overplayed

Sports turf managers are starting to convince others of the needs of natural turf for safe recreation.

By Bruce F. Shank, executive editor

Three or more years of budget cuts have left many park and school fields worn out while new professional sports leagues have placed pressure on stadium managers. Both levels of sports turf need attention to provide safe and wear tolerant fields in the future.

The problem at the park and school level is to convince purchasing directors and councilmen that continued neglect will result in unsafe fields. The problem at the professional level is to develop the technology to enable fields to recover within hours instead of days.

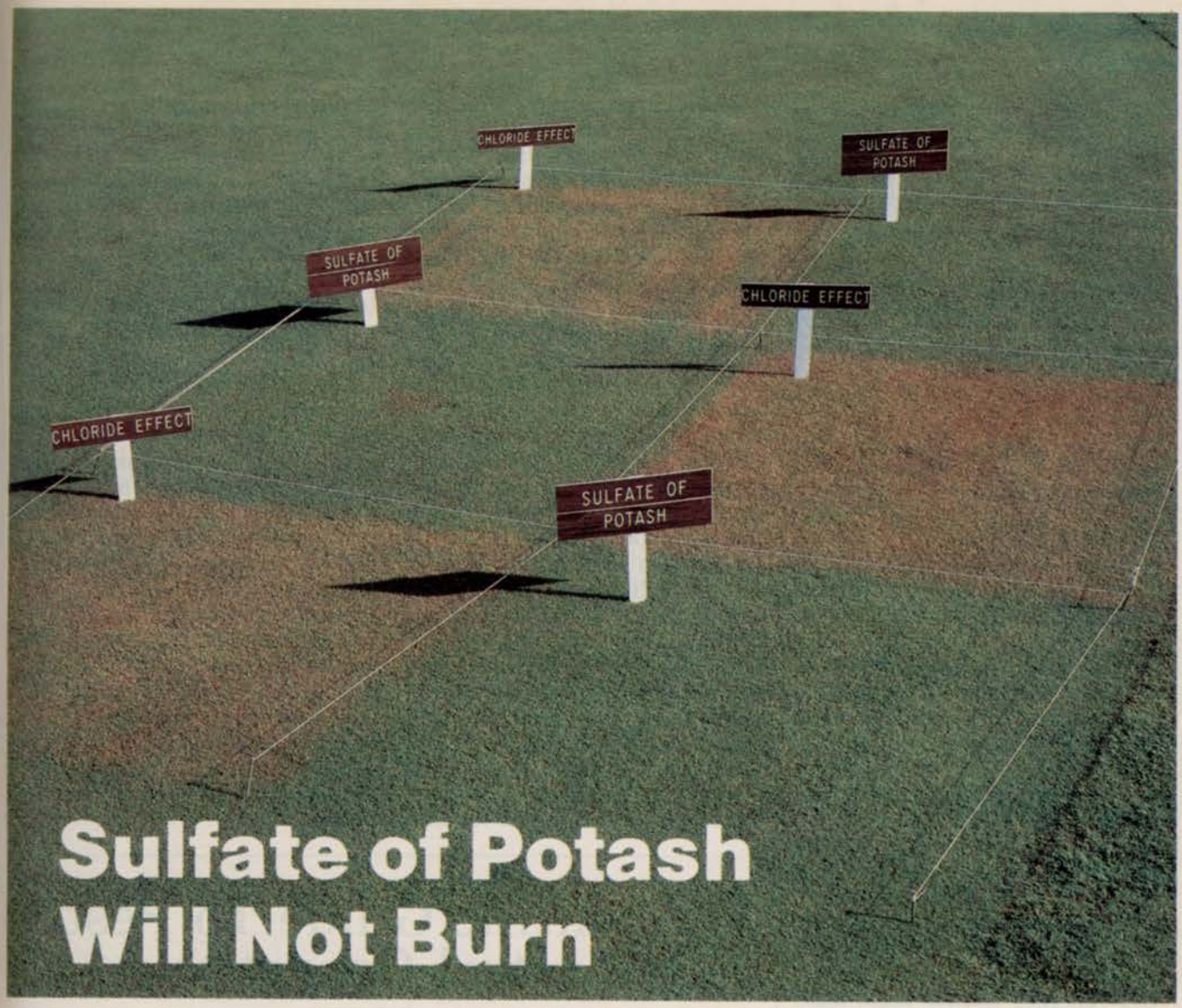
Professional stadia have become multi-function facilities, hosting two or more sports teams in the same season as well as concert events. Stadium operation is often a function of city or county government. However, stadium turf management budgets tend not to be a problem. Artificial surfaces exceed the cost of natural turf. The asphalt base and carpet can cost $1 million or more to install. Top-of-the-line natural turf systems for professional stadia are therefore affordable to stadium management.

While some pay $1 million to construct one athletic field, others feel fortunate to spend $4,000 to renovate a worn out high school football field. "Budget cuts have caused schools and parks to neglect fields the past two or three years," says Roy Zehren, owner of Natural Athletic Turf Inc., Mequon, WI. "Before you can sell construction or renovation of a field you need to explain maintenance. Often the people responsible for the field just don't know how to maintain it. Depending upon their needs and budget, we can renovate a worn out, weed infested field for as little as $4,500. Reconstruction might easily cost $30,000 or more to change grade, rootzone, and sod."

"At the very least, we try to get the field managers on a program of aerification, topdressing with a sand and peat mix, overseeding with perennial ryegrass, and late fall fertilization with a slow-release product," says Zehren. "From there we can suggest a second fertilization in the beginning of August and weed control."

Zehren constructed the last Prescription Athletic Turf (PAT) field in 1979. "Some people are getting confused because of all the variations in field construction," says Zehren. Roughly half of Zehren's business is construction and renovation of golf courses. He has a

continued on page 60



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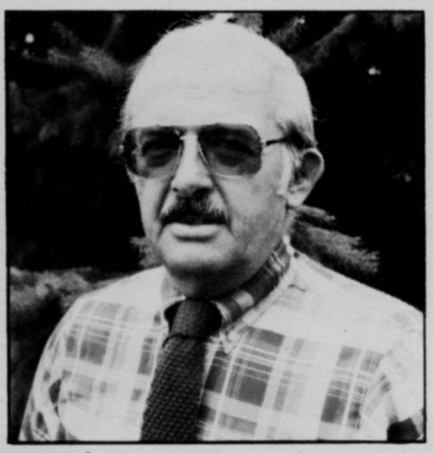

Roy Zehren

full-time staff of six.

Steve Wightman is responsible for the modified PAT field at Mile High Stadium in Denver. The field has underground heating, a sub-irrigation and drainage system, a two-layer rootzone of vermiculite and calcined clay over sand, A-34 Kentucky bluegrass sod grown in sandy loam, and a surface irrigation system. Still, Wightman is concerned about the wear and tear of a minor league baseball team using the field at the same time the Denver Gold football team does. The Orange Bowl in Miami, Jack Murphy Stadium in San Diego, and JFK Stadium in Washington, D.C. all face similar multi-team problems.

Harry Gill at Milwaukee Stadium and David Frey at Cleveland Stadium don't have the advantage of subsurface heating to melt snow and help new sod take root. This year Gill and Frey tried seeding the center field area damaged by football and building plastic greenhouses suspended by blowers. Both the management of the Brewers and the Indians were concerned about players slipping on sod which had not taken root by the season openers. Frey was pleased with the results the week before the Indian's home opener.

"The tarp greenhouse concept has excellent potential," Frey told *Weeds Trees & Turf*. "Footing is much better than sod according to the players. When you consider football season is three months longer and baseball one month sooner than before, you realize the problems facing northern stadia switching over from football to baseball. Grass is still the answer for outdoor stadia and an early seeding with perennial ryegrass and Kentucky bluegrass protected by a tarp is a good solution."

George Toma, field manager at the Kansas City Chiefs/Royals Complex and consultant to the National Football League, is experimenting with pregerminated seed. Toma belives he can gain two weeks by germinating the seed before applying it to the fields.

Meanwhile, park superintendents view the PAT system, tarp greenhouses, and pregerminated seed as practical as a ride in the Space Shuttle.

Wightman used to take care of the sports fields for the Denver Park District. With a staff of six, Wightman had to maintain 270 fields of all types. Mowing alone was a problem, not to mention overseeding, weed control, and aerifying. Maintenance levels had to be specified for fields, most receiving limited care.

Meeting basic turfgrass requirements alone is a problem for many schools and parks. Wear only complicates matters further.

The worn out fields will eventually get attention. "Sometimes things aren't done until a councilman's child gets injured," says Zehren. "If a park or school makes a commitment to renovating one or two fields per year it has made a major step forward. Once renovated, the schools and parks will make an effort to protect their investment with maintenance or face continual renovation. When purchasing directors and board members become aware of the needs of athletic fields, the people doing the work will have the supplies they need to at least cover the basics." **WTT**

While some pay $1 million to construct one field, others hope for $4,000 to renovate a worn-out field.