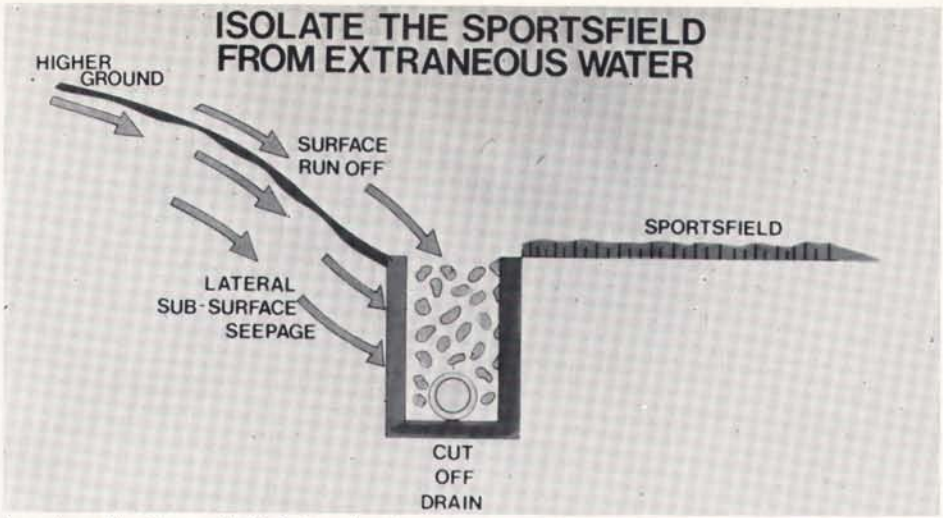


trenches, like the wash cloth hanging down, use gravity to move the water downward in the trench. Sand at the top of the trench becomes drier than the adjacent sand topdressing. The drier sand uses capillary attraction to draw water like a blotter from the topdressing to the trenches. The sand in the trenches also draws water from the surrounding saturated soil.

The area impacted by the blotting action of the sand is proportional to the depth of the trench. Deepening a trench increases the pull of gravity (hydraulic head) increasing the effectiveness of drying the sand in the trench. Therefore the trenches should be as deep as convenient.

The closer together the trenches are, the faster the field will dry and the more uniform surface moisture will be. Experience has taught us the depth of the topdressing depends primarily on the spacing of the trenches. Our standard design uses one inch of sand topdressing.

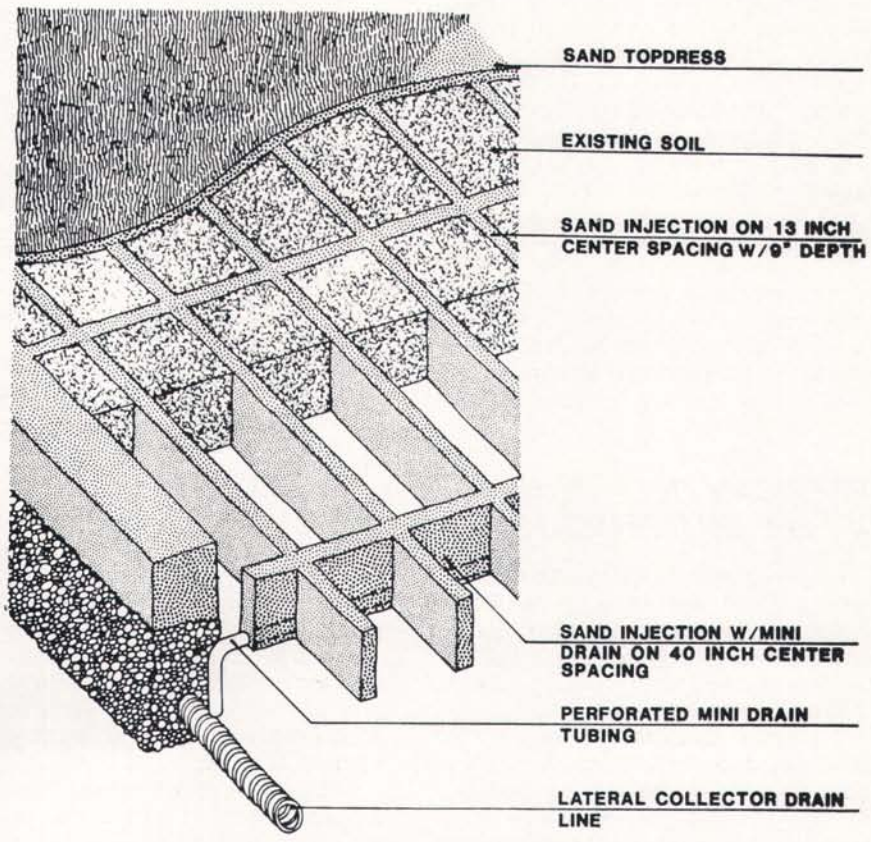
To keep disturbance of existing turf to a minimum, a narrow trench is preferable to a wider, conventional trench. This required development of equipment to cut a narrow trench. At the same time, it was decided to incorporate a pipe installer and automatic sand backfiller with the trencher. With this equipment, our company digs trenches 3/4-inch wide, nine inches deep. A Mini-Drain pipe is installed into the trench perforated-side-up. The narrow trench is simultaneously backfilled to the surface with sand.

Drains are normally placed on 40-inch centers. Crossing sand slits without drain pipe can be added on 13-inch centers to further improve drainage.

The drainage system is completed by topdressing four times with 1/4-inch of sand for a total of one inch. A drop of water falling midway between sand slits has to travel less than seven inches to reach a drainage trench.

Installations of our system can be seen at the Orange Bowl in Miami, FL; the Atlanta Country Club, Atlanta, GA; the Houston Astros spring training center in Kissimmee, FL, and Cominsky Park in Chicago, IL. We are currently installing a system on a golf course in Memphis, TN, with the goal of eighteen holes in eighteen days.

The installation of a Cambridge drainage system has little effect on subsequent maintenance. The only change would be topdressing the field each year with 1/4-inch of the same sand used in the slits.



SAND INJECTION & DRAINLINE CUTAWAY

Gravity and capillary attraction really determine how much water is removed from sports turf, not the size of drain pipe.

During irrigation, the topsoil absorbs water from the sand topdressing and the soil lining the nine-inch-deep trenches. All excess water is removed by the Mini-Drains. Surface runoff and puddling are eliminated so fertilizers and chemicals stay in place.

Soil has greater capillary attraction than sand so the sand in the trenches acts as a reservoir for moisture after irrigation. If the field has been watered recently and the turf over the trenches appears darker than the surrounding turf, an application of fertilizer is needed.

Since wet sand holds together better than dry sand, we recommend irrigating with 1/4-inch of water on game days. This will provide firmer footing and the best playing conditions. ▶

EDITOR'S NOTE: John Moreland is president, Cambridge Soil Services of America, Inc., Glencoe, AL.

STMA LAUNCHES MIDWEST SPORTS TURF INSTITUTE

The Sports Turf Managers' Association hopes to attract professional turf managers from all across the Midwest to its first Midwest Sports Turf Institute, June 26, at the College of DuPage in Glen Ellyn, IL.

The show is being modeled after the successful Sports Turf Institute held for the past three years at California Polytechnic University in Pomona, CA. That event combines a half-day of seminars on field construction and care with an afternoon trade show. More than 400 turf managers from six states attended the Cal Poly event this year.

STMA executive director Kent Kurtz says the Midwest Institute will include a "hands-on" demonstration of baseball infield preparation in addition to the seminars, show and lunch. "The idea is to gather the best speakers on athletic field care and make them available for everyone involved in sports turf management to hear, from the school superintendent to the mower operator," says Kurtz. "Many people responsible for sports turf just haven't seen the techniques, machinery and products that can make a huge difference in the condition of their fields. At the Institute they can see demonstrations and speak with other field managers about common problems."

The College of DuPage fields will be used for demonstration and an outdoor equipment show. Manufacturers and area turf supply dealers will be able to show their equipment in use on athletic fields instead of in a showroom or exhibit hall.

The cost for the one-day event will be $35 or less says Kurtz. Interested sports turf managers can contact Susan Benson, manager of the Business and Technical Institute, College of DuPage, (312) 858-2800, ext. 2196, or Kent Kurtz, 1458 N. Euclid Ave., Ontario, CA 91764, (714) 869-2176.

TORO INVESTS IN OLATHE MANUFACTURING

Olathe, a privately-held manufacturer of sports turf maintenance equipment in Olathe, KS, has sold a minority interest to The Toro Company. Steve Rogers, president of Olathe, said under the agreement his company will develop and produce accessories for Toro products and Toro will provide marketing and distribution support for Olathe.

Kendrick Melrose, Toro president, said, "In reviewing business opportunities in the turf maintenance areas, Olathe was the perfect match. Olathe produces a full line of turf care equipment accessories that will complement and round out our product line. The joint arrangement will enable us to focus our engineering design efforts on major development products in addition to unique attachments for the commercial product line."

Olathe was founded in 1971 by Buck Rogers, chairman, and Steve Rogers. It currently produces commercial seeders, spreaders, chippers, aerators, debris removal equipment, and mower accessories. Before the agreement, Olathe supplied accessories to Toro.

Melrose says a majority of Toro's distributors carry Olathe products and Toro expects more of them to take on the Olathe line. Toro plans to undertake export distribution for Olathe and offer a financing program to back up the products.

AMERICAN GOLF CLUB OFFERS ENTICEMENTS

In just two years, American Golf Corporation's "Club" has grown to more than 15,000 members in nine states, largely by a program of membership incentives. The 1986 incentive package is enough to make nearly any duffer join.

The original concept was American Golf Club members were permitted special privileges at any of the company's 40 plus golf courses across the west. You might be out of town, but you could get preferred starting times at a local course if it was operated by American Golf Corp. It was like being a member at many clubs at the same time for a single membership fee.

That incentive package has grown proportionately to American Golf's acquisition of golf courses. For this year, a $55 membership fee will provide the following:

—28 free introductory rounds of golf and discount green fees at designated American Golf public courses.

—A USGA-approved computerized handicap service.

—A $20 gift certificate for merchandise at pro shops and a golf cap.

—Reserved weekend starting times and weekday and weekend tournaments.

—Special tournaments at courses such as Pebble Beach, Spyglass Hill, Riviera, Pasatiempo, Sahara, Yorba Linda and others.

—A newsletter and special golf vacation packages to Hawaii, Scotland, Spain and other exotic locations.

Bill Brown, vice president of marketing for American Golf Corp., adds that AGC chapters are being organized to plan local tournaments and other activities. "This gives golfers the opportunity to schedule the types of tournaments and activities they want at the course level," Brown states.

American Golf operates courses in California, Arizona, Nevada, Florida, New York, North Carolina, Ohio, Texas and Virginia. It is based in El Segundo, CA.

GOLF COURSE BOOM EXPECTED TO CONTINUE

Golf course construction and remodeling, which accelerated rapidly during 1985, will continue to increase this year according to John Watson, president of the American Society of Golf Course Architects.

Watson says pent-up demand and lower interest rates have created conditions right for the expansion of the game. He indicated some projects have been delayed for the past five years waiting for interest rates to drop, especially at resorts, municipalities and real estate developments.

"The momentum will continue for the next few years," Watson states. The trend of remodeling older courses will not only continue, Watson said, but will accelerate in 1986. "Courses built more than 25 years ago are outmoded in most cases. Today's high-performance golf clubs and balls enable the better golfers, for whom the hazards were designed, to avoid them and score too well. These hazards are also causing poorer golfers to score higher than they should. Therefore, golf course architects are developing master plans to phase in new tees and greens, reposition bunkers, and add water retention ponds for both aesthetic and preservation purposes."

The game is attracting more seniors, especially in the Sun Belt, Watson reveals. More executive courses are being built in the Sun Belt to accommodate players who are no longer able to hit the long ball. Shorter courses are also needed for the increasing number of women and junior golfers.

PGA WEST REDEFINES COURSE MAINTENANCE

The Stadium Course at PGA West in La Quinta, CA, was designed by Pete Dye and features an island green like its sister courses in Florida. Turf students from Cal Poly Pomona get a personal look at the bentgrass green during a recent tour.

Pete Dye is changing golf course design and maintenance like Walt Disney changed amusement parks. Dye's design of the first PGA West course in La Quinta, CA, is enough to cause any golf course superintendent many sleepless nights. The once-flat desert land has been converted by Landmark Land Company, Sunrise Company and the PGA Tour into a severely rolling Stadium Course that challenges the best maintenance procedures.

Golfers who hit into this trap on PGA West's Stadium Course face a 20-foot high chip to the green.

Mark Snyder, superintendent of the Stadium Course, is not the Lee Iaccoca type you might think such a challenge would require. Snyder, a graduate of Michigan State University's turf program, has six years experience working on desert courses in Phoenix, AZ, and the Palm Desert area. The blond, well-dressed Snyder might be confused for a golf professional.

But, instead of thinking about golf shots, Snyder's mind is filled with visions of 20-foot-high banks around bunkers, trimming around thousands of boulders placed all over the course and the roller-coaster fairways. "I have much more respect for Weedeaters and Flymos," says Snyder. "On an average day, we'll have two men on the course with Weedeaters and five with Flymos. We hope to reduce the hand work on mounds and slopes by using growth regulators on the bermudagrass."

Dye incorporated a wide variety of blooming desert plants in bunches throughout the course. These plants survive on one inch of water per month. Surrounding the desert plantings and trees are 114 acres of bermudagrass. Desert plants, trees and turf are irrigated by a Rain Bird Maxi III system with 3,000 heads and 105 controllers. Snyder uses fertigation and three irrigation cycles of four minutes each at night during the season to supplement daytime maintenance.

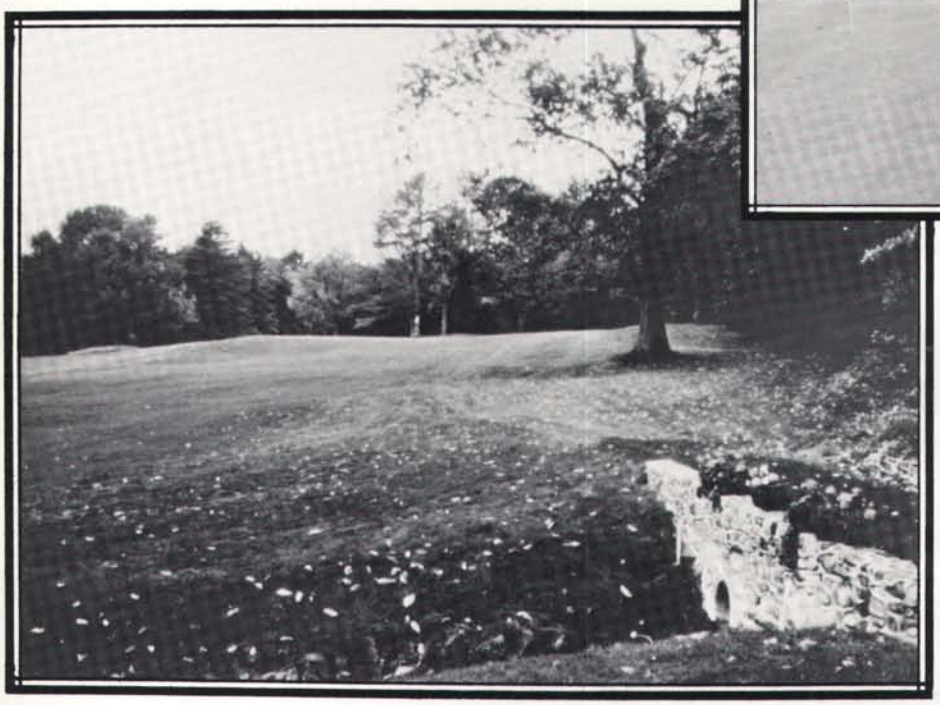
The Stadium Course also has an island green made famous by other PGA courses in Florida. "The single access to the green makes it tough to spread out the wear on the bentgrass," says the 30-year-old superintendent. "More than 15 acres of bunkers have to be kept in shape continuously and we have more than 22 acres of lakes to trim around." To accomplish all this, Snyder has one foreman, two mechanics, three irrigation specialists and 20 other workers on his crew. His budget is an impressive $900,000 including salaries.

Like all desert superintendents, Snyder manages overseeded perennial ryegrass in the winter busy season and bermudagrass in the summer. He is part of a trend in the desert using bentgrass on his greens instead of bermudagrass.

The PGA West complex will sprout an Arnold Palmer designed course this coming October. Jack Nicklaus has started design work on a third course and Dye will return for a fourth course on the site. The four PGA West courses will bring the number of courses in the area to more than 70.

Dennis Orsborn, vice president of golf operations for the Sunrise Company, which is building the homes and shopping area for PGA West, says, "All these courses are in an area five miles wide and ten miles long. The busy season starts with a bang on October 1 every year, but summer business has been increasing. This area from the standpoint of maintenance really is a Disneyland. You have to see it to believe it."

New Hampshire Superintendent Solves Summerkill Mystery



Shaded areas (top) were favored summer after summer by the mysterious nematodes.

Most of the year the bentgrass greens (left) appeared normal to golfers playing the course nestled into the mountains.

Bentgrass can fool the best superintendents. You can never drop your guard to this cool-season midget.

Roland White, superintendent at Bald Peak Colony Club in Melvin Village, NH, noticed that every summer patches of his bentgrass greens, collars and fairways mysteriously yellowed, turned brown and then died. It happened in the same areas every year no matter what he did to prevent it.

"Between the second week of July and the third week of August, the bent was gone," White said. "Once you got through this period, you'd see some recovery. In fact, the problem was entirely masked in the spring." Hidden behind a forest of giant white pines, Bald Peak Colony Club rests on the northern shores of Lake Winnipesaukee, a lake seen in the movie, "On Golden Pond." The White Mountains form the horizon for the club.

It's the part of New Hampshire where Bostonians and New Yorkers flee to ski, fish and climb mountains in addition to playing golf. The mountains and the wilderness lure them by the busload in both winter and summer. Nearby, White National Forest is teeming with deer, moose, fox, racoon, squirrel, rabbit, mink and black bear. There's also an abundance of grouse, woodcock, pheasant and duck in the area. Many varieties of game fish inhabit the cool, fresh water lakes carved out of the mountains by the last glacier.

In Melvin Village, the average summer temperature is 70 degrees, an ideal climate for growing lush green bentgrass for golf. It's a part of the country with no history of severe problems with insects or disease. The summer kill was baffling. All soil tests came out normal. For years the troubled areas received several types of fungicides and insecticides with no change in the condition of the turf.

"It looked like *Poa* going out. A wilt condition of some sort. The worst areas were the greens and tees that were under trees. The greenhouse effect produced by the trees reduces the air movement and causes the humidity to rise. I could draw a chalk line around these areas before they went out, yet nothing I did saved them."

Night after night White studied the soil and the floundering bentgrass under his microscope searching for a clue. He compared what he saw through the lens with photographs of disease and insect damage in turf magazines and books.

What he found didn't make sense—nematodes. Everything he read said nematodes didn't damage turf in the Northeast. Yet, there they were, clustered around the root system of the grass.

While White could see the parasites, he couldn't tell which type of nematodes they were. He sent samples to the laboratory at Cornell University in Ithaca, NY. The results showed four different types of nematodes in the samples he sent; ring, lance, stunt and needle longidorous nematodes.

White started to read all he could about nematodes. He found they destroy healthy grass by attaching themselves to the root tissues and sucking out juices and nutrients. The weakened grass plants grow less, turn yellow and suffer drought stress before other plants.

The laboratory results included a recommendation of an application of nematicide (Nemacur Turf and Ornamental Nematicide produced by Mobay). White contacted Dr. Greg Pagano, Mobay's northeast regional specialist for advice on how to safely and effectively apply the product.

To insure there would be no runoff of the nematicide, White aerated all of the greens and collected the cores before making the application. He then made two passes across the problem areas at half the label rate. To water the pesticide into the root-zone without puddling, he irrigated for ten minutes, waited a few hours and irrigated for another 15 minutes. Finally, he top-dressed each green with one-third cubic yard of sand to keep the coring holes open for further watering.

The course was opened for play the following day after the turf was dry. The problem spots started to become noticeably greener. Core samples showed the roots in theses areas were growing deeper than White had seen in a number of years. The bentgrass greens, collars and fairways returned to their naturally smooth and low growing character.

"I think we'll be able to stretch our fungicide program out by several days, cut our watering rates and our fertilization rates," said White. "We'll be keeping a close eye on everything over the next few years to actually measure the change."

Why the sudden rise in nematode populations and damage in the Northeast? White has his own theory. "First, I think nematode samples have been taken on an irregular basis in the Northeast and damage can be easily confused with drought stress.

"Secondly, I think it has something to do with the chlordane insecticides and the mercury fungicides starting to clear out of the soil. Older courses, like 60-year-old Bald Peak, were treated with these long lasting chemicals for years. I think that held back problems. Now we're seeing grub, cutworm and other insect problems that weren't an issue in the past. I think nematodes can be placed in that category."

White's opinion is valued in New England. His course is part of a study being conducted by Dr. Stanley Swier of the University of New Hampshire and Drs. Pat Vittum and Robert Wick of the University of Massachusetts. They also want to know why nematode damage is suddenly showing up and how often must nematicide be applied to keep populations below damaging levels?

The doctors' trust is well placed in White. He's a tireless student of turf management. He attends all the major turf seminars, he reads most of the journals and books when they come out. How many superintendents have a microscope which they use regularly to check plant samples?

White is the second generation of superintendents in his family. Both his father and uncle managed the turf at Lake Placid, NY, all their working lives. White grew up on the course at Lake Placid.

At Bald Peak, White's wife and six children all pitch in with the duties. One of his sons plans to follow in White's footsteps at Bald Peak. What keeps generation after generation of Whites on the golf course? "It's a great way to bring up a family. Life is more relaxed. Ninety percent of the people in the city never have a chance to feed the birds or squirrels. It never gets boring watching the seasons change here. The light shadows on the mountains vary every hour. At night we share what we saw during the day with each other. I think most people would love to spend their day the way we do at Bald Peak." ►

CHALKBOARD

TIPS FROM THE PROS

Tall Fescue Management

Tall fescue is one of the most widely used turfgrasses for athletic fields in this country. It is the backbone of sports turf in the transition zone and is being used further south each year. Low water, fertilizer and pesticide requirements plus tolerance to a wide range of soils make it one of the least expensive turfgrasses from a maintenance standpoint.

Larry Leuthold, extension horticulturist at Kansas State University, has worked closely with athletic field managers in his state. Tall fescue is used on more football fields in Kansas than any other turfgrass so Leuthold has become an expert on tall fescue management for sports fields.

One reason for the growing popularity of tall fescue is the great improvement made by turf breeders. Old pasture-type tall fescues such as K-31, Alta and Fawn, are being replaced by new varieties with finer leaves and darker color. Some of these are Apache, Bonanza, Brookston, Falcon, Galway, Houndog, Jaguar, Mustang, Olympic and Rebel. Seed growers are expanding their production of these varieties as fast as possible to meet the tremendous demand.

Tall fescue will tolerate soils with a pH range of 4.7-8.5 so it is seldom necessary to adjust the pH says Leuthold. Rarely are micronutrients, such as iron and zinc, required since the plants have deep root systems that extract soil nutrients efficiently.

Nitrogen is the most important fertilizer element for tall fescue, Leuthold points out. Tall fescue fields need regular applications of nitrogen and only a small amount of phosphorus and a moderate amount of potassium. A common mistake in fertilizing most turfgrasses is to use a balanced fertilizer such as 10-10-10. Established turfgrasses use nutrients in approximately a 4-1-2 ratio (nitrogen-phosphorus-potassium).

Phosphorus, potassium or lime should be applied only if soil tests indicate they are needed. Often, the phosphorus and potassium level in the soil for established tall fescue is adequate or even excessive.

The amount of nitrogen that is applied should be based on the level of maintenance (especially mowing and watering), budget, use, available labor and quality expectation. Applying half the fertilizer in one direction and half at a right angle to the first will minimize skipping and streaking.

Leuthold recommends three to four applications of nitrogen per year for tall fescue. Timed around football season, the first application of soluble nitrogen (1 lb./1,000 sq. ft.) should be made a week to ten days prior to the first football game. In November, after the last regular game is played, a second application should be made at the same rate. Leuthold recommends an application of insoluble nitrogen (1 lb./1,000 sq. ft.) in early May and possibly a fourth application in June if nitrogen is depleted by heavy irrigation or rainfall.

Three pounds of nitrogen per 1,000 square feet per year is not much compared to the fertilizer needs of bentgrasses and Kentucky bluegrasses. The result is a dense, healthy stand of turf which resists weed encroachment and damage by players.

Leuthold believes mowing is too often neglected, especially during the off-season. Letting the grass grow tall and mowing it down to a stubble results in a thin stand of stemmy turf that is easily invaded by weeds. Frequent mowing at the right height with a sharp blade is one of the most important factors in having high quality turf.

Leuthold says never mow tall fescue shorter than two inches and mow frequently enough so that no more than a third of the turf height is cut at one time. He suggests a mowing height of 2½ inches in the spring, 3½ inches in the summer and 2½ inches in the fall. Tall fescue grows fastest in the spring, slows during the summer and grows moderately fast in the fall. Mowing schedules should be adjusted for each season.

Removing the clippings is not necessary if proper mowing frequency is maintained. Clippings return much of the fertilizer and nutrients back to the soil and do not contribute to thatch.

Keeping mower blades sharp is important since tall fescue has a fibrous leaf. Dull blades cause frayed white tips which are especially noticeable in hot weather. Blades should be checked for sharpness before mowing the athletic fields.

Overwatering is a bigger problem with tall fescue turf than underwatering. Unnecessary frequent irrigation causes shallow rooting, encourages compaction and can lead to insect and disease problems. Quality tall fescue turf should be thoroughly watered once a week during hot, dry weather and perhaps twice a week during extended drought periods.

It takes about 35,000 gallons of water to properly irrigate a football field one time. The turf establishes its water dependency based upon the way it is irrigated early in the spring. Wait as long as possible in the spring before watering. This will help keep the turf roots deep in the soil and improve its ability to withstand drought later in the year. A higher mowing height also encourages deeper rooting.

During the off-season, do not water until wilt symptoms are seen. The best time to irrigate is in the early morning. Also, try not to irrigate within 24 to 48 hours of a game. When a field receives fairly constant use, water immediately after the last game of the day. Avoid soggy conditions during play since this will greatly increase compaction. Dry spots can be treated with wetting agents and/or aerified.

Under normal conditions, a tall fescue athletic field should be aerated twice a year, immediately after the last game in the fall and early in the spring. Severely compacted fields may need additional aeration, but avoid aeration during the playing season and especially before games.

Tall fescue football fields should be renovated immediately after the last game in the fall. This includes filling in low spots, core aerating, fertilizing, reseeding and watering. Aerate the field three or more times before fertilizing and reseeding.

Reseeding may only be necessary in the center of the field. Although seed can be broadcast and watered in, the best way is to use a seed drill. For best results, seed in the fall immediately after aeration. Seeding in the late spring requires an excessive amount of water which leads to other problems. Early spring seeding can be successful but timing is critical. You need to get the seedlings established before weeds do and before temperatures get hot.

It is important to remember the only crabgrass preventer that can be used in newly-seeded areas is siduron. Also, 2,4-D and other broadleaf weed killers should not be used within one month before seeding and until the grass has been mowed at least three times after germinating. The exception is bromoxynil, which can be used on seedling grass, but it must be applied to broadleaf weeds while they are young and small.

The Right Sand

Sand is undoubtedly one of the major solutions to poorly-drained and compacted athletic turf. But sand can make matters worse in many cases unless it is properly incorporated into the rootzone and it is the right size.

Research performed at Pennsylvania State University indicates that 80 percent of sand used in soil modification should have a particle size in the range of 0.5 and 1.0 mm. Furthermore, 95 percent of the sand should range from 0.5 to 2.0 mm. Problems can results if more than five percent of the sand is smaller than 0.5 mm.

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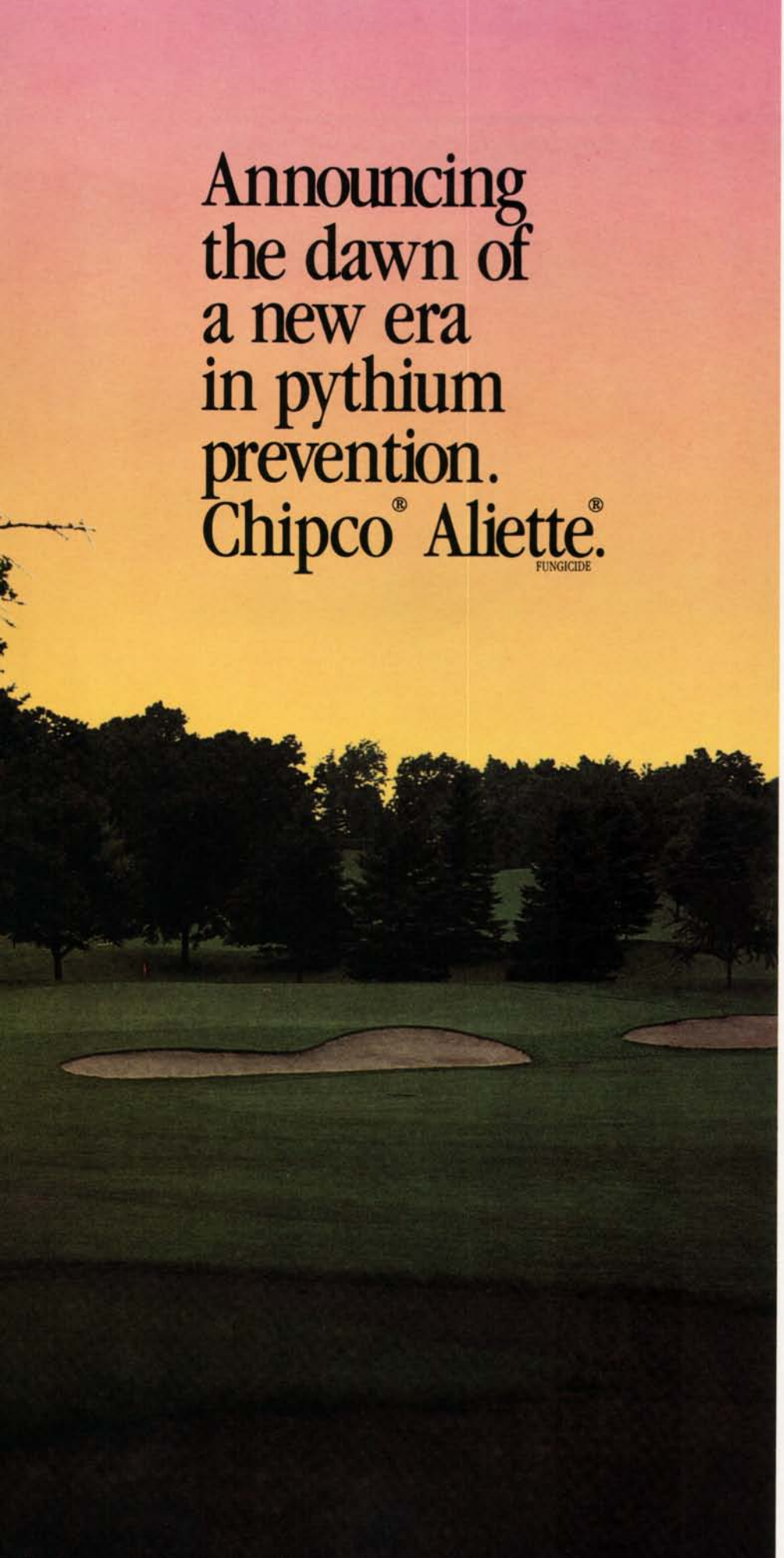

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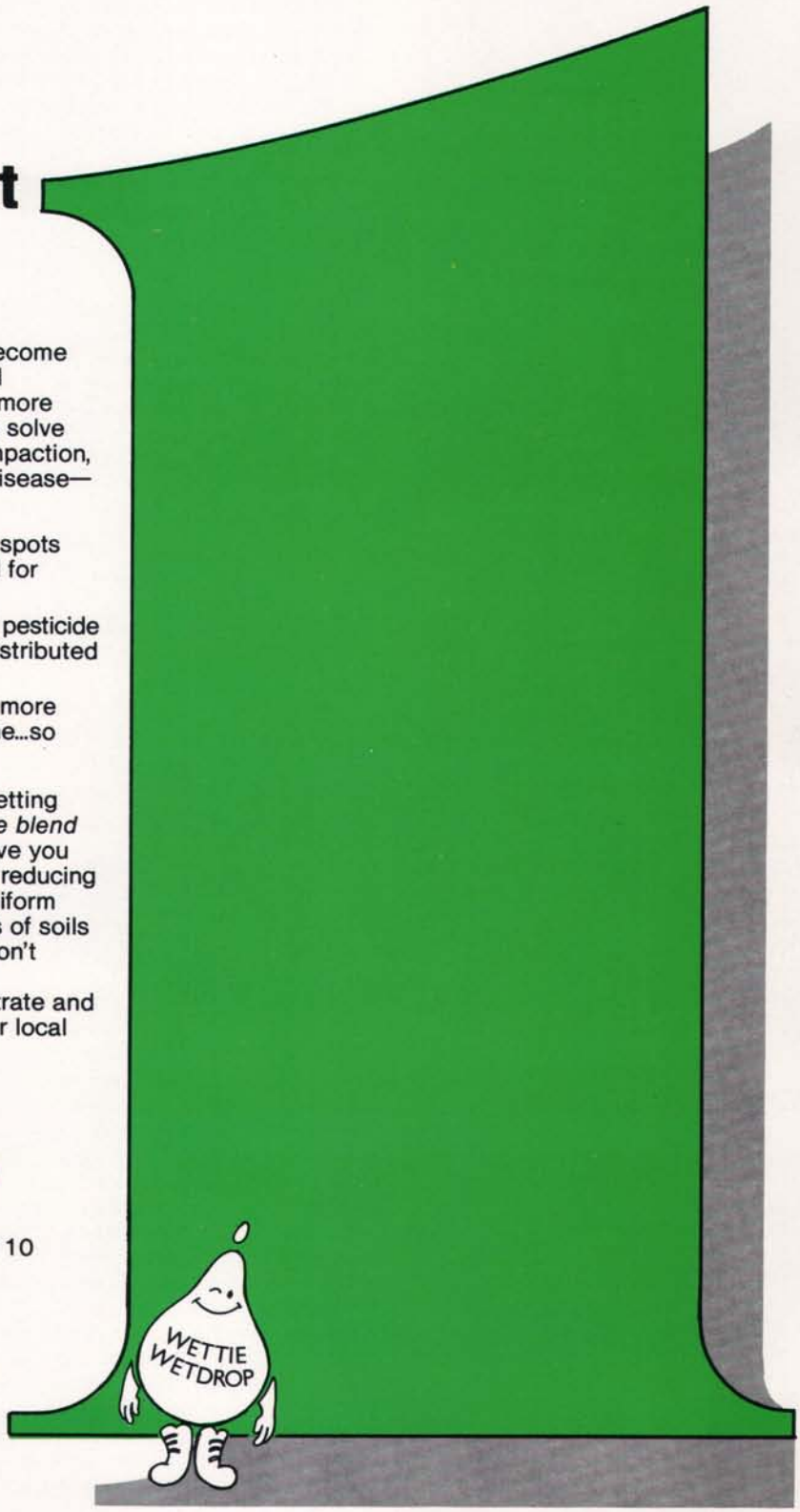

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