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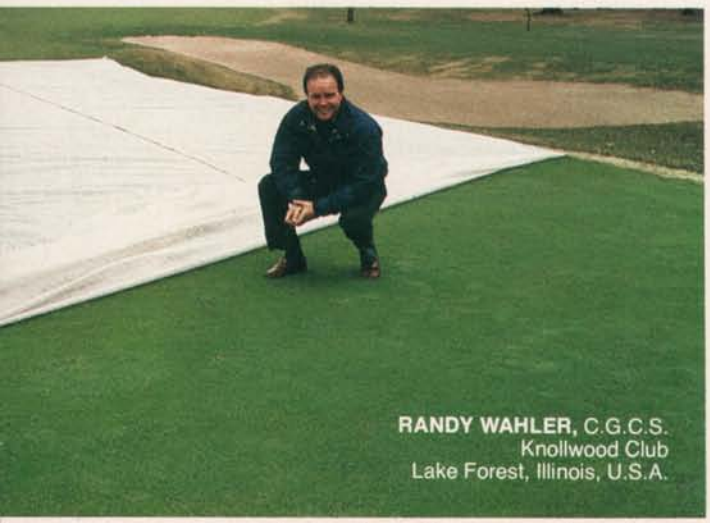
EVERGREEN

MULTI-PURPOSE TURF COVERS



RANDY WAHLER, C.G.C.S.
Knollwood Club
Lake Forest, Illinois, U.S.A.

fter aerating, reseeding and topdressing various areas on the golf course is past fall, we installed our Evergreen covers. The results were excellent! lood growth continued even during cold, dormant growing conditions. hese areas went from 60% coverage to nearly 100% in early spring. ealthy root development was well underway. The Evergreen covering ystem extended our growing season at least one month in the fall and pring while providing winter protection.

EATURES:

- Permits air and water circulation.
- Cover will not absorb water.
- Resists rot and mildew.
- Debris will not adhere to the cover.
- One-piece construction eliminates overlap marks and discoloration.

- Six (6) standard sizes: 12′ x 50′, 24′ x 50′, 48′ x 60′, 60′ x 90′, 72′ x 90′ and 84′ x 110′.
- Custom sizes available upon request.

Unique one-piece construction is easy to install.

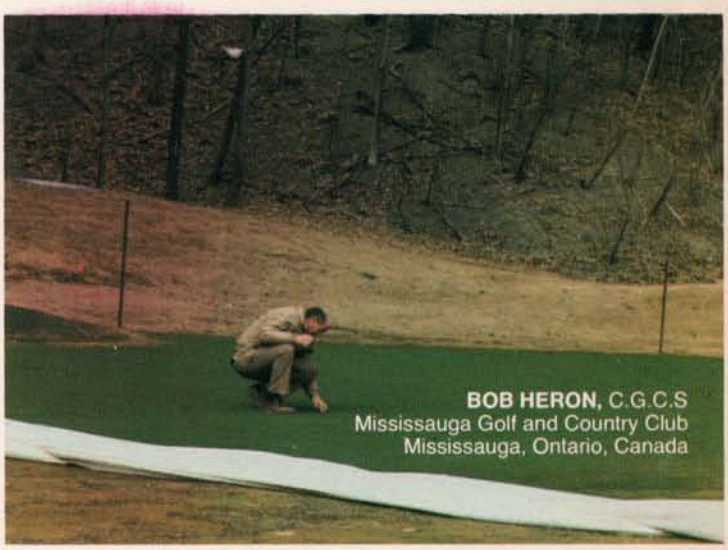
ENHANCED GERMINATION.
EVERGREEN *covers create a greenhouse effect stimulating more rapid growth than uncovered grasses.*

Acting as a soil blanket, ***EVERGREEN*** covers retain necessary heat for plant growth while the patented weave construction allows the cover to "breathe", minimizing the risk associated with excessively high temperatures.

Minimizes water requirements by retaining soil moisture near newly planted sprigs and seed at the soil surface.

CHRIS HAGUE, C.G.C.S.
Hazeltine National Golf Club
Minneapolis-St. Paul, Minnesota, U.S.A.

"Over the past few years we have tested a variety of materials designed to protect our greens throughout the winter. In late fall we installed 18 Evergreen one-piece covers. Installation and removal was easy and took less than one day. Our covers can now be re-used for years to come. This unique Evergreen covering system is exactly what I was looking for and I recommend them as a positive management technique."



BOB HERON, C.G.C.S
Mississauga Golf and Country Club
Mississauga, Ontario, Canada

"Evergreen one-piece covering systems not only protected our greens from desiccation throughout the past two harsh winters, they also created a greenhouse effect stimulating more rapid growth and enhanced healthy root development in early spring compared to uncovered grasses."

APPLICATION PROVEN BY GOLF COURSE SUPERINTENDENTS AND TURF MANAGERS THROUGHOUT NORTH AMERICA AND EUROPE

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Fall Renovation

continued from page 30

The trick is to maintain this reservoir without creating a waterlogged condition. That is why adequate drainage, a good irrigation system, and wetting agents are so important. Seeding will require surface moisture at all times. However, overwatering to keep the seed moist will waterlog the root zone and hamper root development. Frequent, light syringing will keep the seed moist without overwetting the soil below. The reservoir can be replenished if necessary by infrequent, longer cycles.

One factor that contributes to waterlogged soils is the extended germination period of most cool-season grasses. While perennial ryegrasses typically germinate within seven to ten days, Kentucky bluegrasses and tall fescues can take a month or longer. That means frequent irrigation must take place for a large portion of the busy fall playing season. This can encourage surface compaction and turf damage.

Three techniques can shorten this critical wet period. The first and most entailed is pregermination. This involves soaking the seed in water-filled containers to force it to germinate before it is sown.

Significant advances have been made in pregermination recently. California Polytechnic Institute in Pomona; Liquid Sod Inc. in Brighton, MI; and Northrup King in Minneapolis, MN, have been working to perfect this process. High germination rates for ryegrass, bentgrass, Kentucky bluegrass and even wildflowers have been achieved.

Pregermination was first tried by stadium groundskeepers to repair damaged football fields with perennial ryegrass between games. Harry Gill at Milwaukee County Stadium, Barney Barron at Candlestick Park, and George Toma at Arrowhead Stadium each developed methods to germinate seed before it was applied. Barron mixed seed with sand and calcined clay. This mix was wet down, placed in mounds, and rewet daily. Gill mixed seed with Milorganite in much the same way. Toma chose to soak the seed alone in drums, changing the water daily. Following germination offsite, the seed, sometimes mixed with a spreading agent, was sown on the field. Within two weeks, the seedlings were rooted and filling in thin spots.

Cal Poly, Northrup King, and most recently, Liquid Sod have improved pregermination methods. By experimenting, they found that by changing the water, adding air during the soaking process, and controlling the temperature of the seed, germination rates could be increased.

Dr. William Levengood, a retired University of Michigan biophysicist consulting for Liquid Sod, has been able to clarify a number of problems with pregermination. "The important thing to understand is what goes on inside the seed during germination," he explains.

"By measuring the physiological response of the seed to temperature, oxygen and other factors over time, the pregermination process can be adjusted to reduce stress and increase germination. Seed generates heat as it germinates, especially when the seed is gathered together in in a bag, tank or pile. That heat, if not controlled, stresses the seed and reduces it potential to germinate."

Jesse Johnson, vice president of the company, has uncovered other factors which contribute to the success of pregermination. "For one thing, you can use less seed," he states. "Once seed has germinated, there is no reason to apply extra seed. It also costs less to treat seed with fungicides (Apron) during pregermination than to apply the same fungicide to the ground afterwards." Johnson noted that the company has seen positive results from staining the seed with Bovamura. Finally, he states that wetting agents are helpful if used only during the first soaking.

Pregermination bags by Liquid Sod aerate and control the temperature of the seed as it germinates.

The second method of cutting down the time it takes to establish turf is "seed priming." The advantage of seed priming is that the treated seed can be marketed or shipped like untreated seed. Priming begins the germination process and then stops it just before emergence of shoots. When the seed is sown, it has a head start, allowing tall fescues and Kentucky bluegrasses to complete germination in seven to ten days, just like perennial ryegrass.

Jacklin Seed plans to have treated seed available within two years, says Gayle Jacklin Ward. "We will be using primed seed first to plant some of our production fields," she states. "The crop comes up faster, lengthens our planting time, and gives us cleaner fields. Because Kentucky bluegrass spreads, it has an important advantage in golf and sports turf over non-spreading turfgrasses. By cutting germination down to a week, turf managers can use it more effectively for overseeding and reseeding."

Turf Merchants has announced it will have primed seed of Bonzai dwarf tall fes-

cue this fall. The company is using the same priming process as Chemlawn Corporation, one of the nation's largest lawn service companies. "We've found that by using primed seed in our production fields, tall fescue is more mature by winter," reports Steve Tubbs with Turf Merchants. "As a result, we get full seed production the first spring, instead of the second year."

The third time-saving technology is seed coating. By coating seed with nutrients, moisture control agents, and/or fungicides, a higher and faster rate of germination is obtained. Celpril, a company which offers the coating process to seed companies, says turf managers can use half as much coated seed as uncoated. The company also claims time savings of nearly 50 percent with some turfgrasses. Furthermore, the seed can be bagged, shipped, and stored like uncoated seed.

Mechanical methods of improving seed germination are also useful to the manager of a busy sports complex. Shallow aeration, with either hollow or solid tines, provides a protected environment for seed and developing seedlings. Roots flourish in these core holes. Obviously, a tight pattern will provide the most protection. Light topdressing after aeration also offers important traffic and moisture protection for seedlings.

Application of activated charcoal, dark-colored organic fertilizers, or dyes can speed germination by warming the soil surface. These dark materials absorb and retain heat from sunlight during the day. This may be important later in the fall, when nighttime temperatures drop below 50 degrees F.

Covers are also useful for keeping soil temperatures up during the fall. Some turf managers cover fields or greens at night to trap daytime heat and insulate the turf from cold nights. A number of manufacturers make tarps with one dark side and one light or reflective side. The light side is intended for rain protection during the growing season, while the dark side can be used to warm the turf in the fall and winter. The value of these covers has increased as football extends further into the fall and baseball starts earlier each spring.

Translucent covers have the advantage that they can be left on turf areas both day and night. They allow sunlight to reach the turf and trap heat when temperatures fall. Dr. John Roberts, associate professor of plant science at the University of New Hampshire, has found that these covers can increase soil temperatures by as much as 15 degrees F. Reemay, Hinsperger Poly Industries, DuPont, and Warren's Specialty Products manufacture covers of this type. They are not solid. They are spun-bonded, needle-punched, or woven to allow movement of moisture and air through the cover.

Some northern golf course superintendents have left the covers on greens all winter to achieve spring greenup of bentgrasses up to three weeks early. The extra protection can also reduce winterkill and desiccation.

Any method of extending the growing season in the fall enables cool-season turfgrasses to mature more rapidly. The more mature they are in the spring, the more resilient they will be. Every week gained in the fall adds to root development and food storage. These are vital to turfgrass hardiness and resilience the following year.

Sports turf managers and golf course superintendents are learning to make every second count during the fall, when the biological clock of turfgrasses favors renovation. By assisting natural processes with new management techniques, you can gain as much as a month in the fall and two or more weeks in the spring. This not only allows longer and safer use of natural turf surfaces, it gives turfgrass more time to recover from wear, regenerate its natural defenses, and achieve its full potential.

Just as in medicine, you can apply intensive care to keep a sick patient alive. . .or you can implement a program of preventive medicine to let the patient's natural defenses avoid a critical situation. You are the doctor. You can spend the year in the emergency ward, or you can invest in techniques which avoid disaster. Renovation in the fall is the best medicine for golf and sports turf.

CHALKBOARD

TIPS FROM THE PROS

Late Season Nutrient Utilization by Warm Season Turfgrasses

By C.H. Peacock and J.M. DiPaola

The ideal nutritional strategy for turfgrasses is to sustain enough growth to match turf wear, while maintaining a favorable root to shoot ratio. This is best obtained by stabilizing the nutritional balance within the plant.

Over the past 30 years, broad ranges of fertilizer needs have been established for the more common turfgrass species. These fertilization programs are based on maintenance situations under "average" climatic conditions. However, seldom do environmental conditions approximate an "average" based upon weather data accumulated over a number of years.

Fertilization practices are now being recommended which make use of current knowledge about preconditioning the plant for stress situations. An example in the "upper southern" U.S. is late season fertilization. This describes the period in the fall from early September to November. During this period a number of factors influence cultural practices, especially fertilization, They include environmental influences, plant growth patterns, seasonal stress and turf use.

Environmental influences are not controlled by the turf manager. However, a knowledge of the plant's response to these influences can be the difference between sustaining growth versus decreasing plant vigor.

During the fall, there is a decrease in photosynthetic irradiance as both daylength and sunlight intensity decline. This is accompanied by a lowering of air and soil temperatures. There are also changes in precipitation patterns. Although the turf is using less water than during the summer, there is still a substantial irrigation requirement.

Growth of warm-season grasses starts to decline once the temperature drops below 78 degrees F. Other physiological changes include increased storage of food, particularly in the lateral stems. Even though low temperatures may cause complete discoloration and cessation of topgrowth, root growth may continue for about 30 days.

Environmental stress during the fall can affect warm-season grasses in several ways. Chilling injury is most common and is often seen as loss of topgrowth. It occurs when soil temperatures range from 50 to 55 degrees F. Higher nitrogen rates prior to reaching this temperature can delay or mask chilling injury. However, higher nitrogen rates can be detrimental to overall low temperature hardiness.

Direct low temperature kill can take place when plants are exposed to temperatures below 27 degrees F. Studies from several southern states have demonstrated that increased nitrogen levels resulted in greater low temperature kill during winter months. This could have been caused by the effect of nitrogen on physiological processes and/or thatch accumulation caused by increased biomass production. However, these same studies established that increased nitrogen rates *when combined with increased potassium* lessen low temperature injury.

Proper nutrition may also improve the plant's ability to prevent winter desiccation. Low relative humidity and reduced precipitation can severely damage the warm-season grasses literally by drying them out. More winter injury is observed with increased nitrogen or decreased potassium prior to the dormant winter period.

The primary consideration for warm-season grasses during the fall should be physiological hardening for maximum cold tolerance (winter survival). Nitrogen application may improve fall color retention and be desirable from an aesthetics viewpoint, but the effects of increased nitrogen levels may be too detrimental to take the risk. Since the fall is a period of decreased nutrient uptake, there is also an increased potential of nitrate leaching.

Potassium fertilization, while having little to no visual effect, dramatically improves cold tolerance. Yet the long term effects of increased potassium levels are unknown.

There is some indication that phosphorus nutrition during the late season can lower cold tolerance, but research indicates that the the balance between phosphorus and potassium is more critical than absolute amounts. For example, research carried out at North Carolina State University in the early 1970s found that bermudagrass with a 4-1-6 (N-P-K) in the tissue was the most cold tolerant. Other investigations with St. Augustinegrass have found a high P:K ratio resulted in increased winter injury.

Nutritional guidelines should also be based upon turf use. If the turf is going to be overseeded for winter use, the base grass should not receive any fertilization for at least 30 days prior to overseeding. The rationale is to avoid stimulating growth of the warm-season turf to lessen its competitive edge. Wait until two weeks after seedling emergence before fertilizing. Then apply no more than 1/2 pound of nitrogen per 1,000 square feet. There is enough nutritional carry-over from the seed and fertilizer remaining in the soil for the overseeded turfgrass. Withholding additional nitrogen allows time for the warm-season turf to harden and slow its growth.

In summary, apply the following strategy. Avoid aggressive fertilization of warm-season turfgrasses during the summer months. Maintain sustained growth with a well-balanced nutritional program.

If nitrogen is applied for fall color retention during the late season, limit application rates to no more than 0.5 pounds of nitrogen per 1,000 square feet no later than October 15 (for North Carolina). Also consider an equivalent potassium rate at the same time.

Adjust the fertilization program if the turf is to be overseeded for winter. Finally, do not apply fertilizer in the late season on bahiagrass and centipedegrass.

Editor's Note: Drs. Peacock and DiPaola are turf specialists at North Carolina State University, Raleigh.

CHECK POTASSIUM LEVELS

Don't let soil potassium levels go unchecked until spring, says the turf team at North Carolina State University. Potassium improves the winter hardiness of turfgrass plants. If soil potassium levels were marginal during the previous spring, apply two pounds per thousand square feet of potassium sulfate without nitrogen to bermudagrass or a 4-1-2 complete fertilizer (one pound of nitrogen per thousand square feet) to tall fescue or Kentucky bluegrass.

Other steps you can take to reduce winter kill are raising cutting height on mowers and avoiding unnecessary irrigation. Do continue to mow at the higher height when necessary. The one-third rule still applies. For example, cut two-inch-high turf when it reaches three inches. Typical winter heights are two-and-one-half inches for Kentucky bluegrass, three to four inches for tall fescue and one to one-and-one-half inches for bermudagrass.

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E-Z-GO CELEBRATES 35TH BIRTHDAY

E-Z-GO Textron, the oldest and largest golf car and utility vehicle manufacturer, recently celebrated its 35th birthday. B.F. Dolan, co-founder of the company and chairman and CEO of Textron, Inc., was the Guest of Honor at a ceremony marking the occasion.

Dolan founded E-Z-GO in June, 1954, with his brother Billy. What began as a small, one-room machine shop, today is housed on a 40-acre site with almost 500,000 square feet under roof, and employs more than a 1,000 people, was acquired by Textron in 1960.

E-Z-Go is a leading golf car manufacturer and a major producer of utility vehicles for turf, industrial and commercial markets. The company also manufactures a line of vehicles for the private golf car market.

H.V. CARTER NAMED RAN BIRD DISTRIBUTOR

H.V. Carter Company, Inc., has been named exclusive distributor for Rain Bird, Inc.'s, line of golf course irrigation products for the Northern California coastal region.

In operation for 71 years, H.V. Carter Company is a full-service supplier of Jacobsen and many other makes of turf equipment for golf courses, commercial and light commercial products.

The Irrigation Division, with Thomas C. Jackson as manager, will be responsible for the Western Coastal portion of California, from the Monterey area to the Oregon border. It will also furnish timely and thorough in-house repairs for golf course irrigation equipment.

JACOBS CHANGES NAME TO REFLECT GOLF FUTURE

As a reflection of the future plans and objectives of a golf management and consulting firm, the name "Greenvisions" has been selected as the corporate name for the company that is the successor to the managment contracts of John Jacobs Golf Management Company. The firm was recently purchased by Ram Thukkaram, a private businessman based in Illinois.

Thukkaram is chairman and CEO of a privately-owned company with holdings that include Ganton Technologies, Inc., a high-technology metal working and engineering firm whose seven divisions presently account for more than $100 million in yearly sales. Thukkaram will be chairman and CEO of the company. Ganton Technologies' vice president for investments and acquisitions, Kevin Connelly, will serve as group vice president.

"We are committed to the high quality of management services established by international golf professional John Jacobs," said Tim Miles, one of the founders of the firm, who is now vice president and chief operating officer of Greenvisions. "But our vision of the future is one of greatly expanded operations."

Miles assured all of the firm's current clients that the operations will continue without interupptions.

"In addition to providing the same high quality of management our clients have come to expect of us," he said, "the new association will enable us to enhance our services and further expand our operation."

DYE, DUNLOP FORM PARTNERSHIP FOR JAPAN

Dye Designs, Inc., headquartered in Denver, CO has formed a partnership with Dunlop Japan Limited. Perry O. Dye, president of Dye Designs, Inc. and Shizuo Katsurada, president of Dunlop Japan, Limited, have agreed to a contract of capital and service between the two companies. The agreement states that Dye Designs, Inc. will allow Dunlop Japan to be its exclusive agent in the country of Japan.

As the exclusive agent of Dye Designs, Inc., Dunlop Japan will develop golf course design, construction and management of new golf courses in Japan. They will also be involved in golf course remodeling, maintenance and management of existing golf courses in the country.

Dunlop Japan, a division of Sumitomo Rubber Industries, Ltd., entered the golf course business in 1987 with the supervision of overall planning for Aoki Isao Golf Club in Akashi, Japan. The union with Dye is expected to promote Dunlop as a key player in the further development of the golf course business in Japan.

Dye designs was established in 1984 by Perry O. Dye. The company is noted for international golf course design, including 25 projects in Japan. The newly formed Dye Designs International, Inc., offers clients a full range of golf-related services. The company is capable of taking a golf course from conception through construction, marketing and on to daily operations.

Perry Dye is the president of Golf Course Builders of America and is affiliated with the Golf Course Superintendents Association, The Irrigation Association, United States Golf Association, National Golf Foundation and the American Golf Association. In addition, he is the president of Colorado World of Golf, a non-profit organization to promote golf in the state of Colorado.

Pete Dye, Perry's father, is a golf course architect of international repute. His fame as a designer is most often linked to stadium golf.

ROOKIES

PRODUCT UPDATE

MULTI-PURPOSE VEHICLE

The Mighty Mits, a multi-purpose utility vehicle manufactured by Mitsubishi Motor Sales of America, Inc., has been designed to suit a variety of work situations. These include golf courses, parks and recreation facilities, groundskeeping, and maintenance applications.

The available styles include full-cab models equipped with either sidebars or doors, and Flo-Thru and tilt-bed models with two-wheel or four-wheel drive options. The unit has a payload capacity of up to 1,750 pounds, with a 12½-inch turning radius.

Other features include a three-cylinder, 30-hp, in-line water-cooled engine with balance shaft, and rack-and-pinion steering. Additional options include interchangeable sidebars with car-type door latches or full doors. Heaters and defrosters are also available.

MITSUBISHI MOTOR SALES OF AMERICA, INC.

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HARDY TURF MIXTURE

Rapid establishment and high natural resistance to insects and disease are two important qualities of Crusader, a mixture of perennial ryegrass and hard fescue from Seed Research of Oregon.

Both components, SR4000 perennial ryegrass and SR3000 hard fescue, have high levels of endophyte that provide resistance to billbugs, sod webworms, chinchbugs, and armyworms. Recent research indicates that endophyte may also repel certain harmful nematodes.

Crusader provides turf that will persist under adverse environmental conditions while allowing the sports turf manager to reduce pesticide applications.

SEED RESEARCH OF OREGON, INC.

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ROOKIES

PRODUCT UPDATE

GEAR-DRIVE SPRINKLER

The gear-driven, Turbo J2 from Weather-matic features an exclusive arc adjustment ring. Located on the nozzle riser, the arc adjust ring permits quick adjustment, even with the water turned on, of arc size from 40 to 360 degrees.

Designed for use on residential and commercial turf areas, the TJ2 comes with a set of nine field changable nozzles that match precipitation rates and adapt performance to site conditions. Additionally, the flow tube design permits lower pressure loss through the sprinkler and allows for optimum nozzle performance.

Features on the Turbo J2 include an impeller flow regulator, check valve, strainer, safety clutch and a rubber cover. An optional factory-installed vandal cover lock is also available.

"During intensive factory and field testing, the TJ2 has lived up to the higher performance standards we set for this sprinkler, and the in-field reports that are coming back to us are extremely enthusiastic," said Don Thompson, Weather-matic's marketing and sales director. "The TJ2 is a winner."

WEATHER-MATIC

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TRIPLEX MOWER

High-quality engineering, rugged, reliable construction, and top performance in a wide range of conditions make the Brouwer Triplex 376A Mower a tough competitor.

Designed with the professional in mind, the mower offers many new features and low-cost maintenance. It is ideal for schools, parks, golf courses, and landscape maintenance projects.

BROUWER TURF EQUIPMENT, LTD.

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