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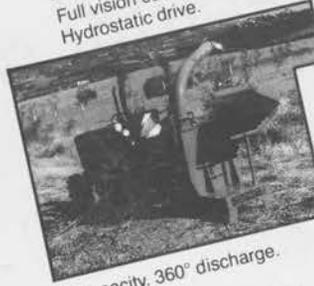
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PREPARING FOR TURF STRESSES IN 1989

By James M. Latham, Director
Great Lakes Region
USGA Green Section

Golf course superintendents must have more opportunities to learn than anyone in golf or in the turfgrass industry as a whole, and rightly so because there are so many facets of the game which demand their attention. In the gentler days, greens were everything as long as a golfer could drive a peg into the tee and the fairways were cut once or twice a week. Those days are gone forever and some Turf Advisory Service visits today are more involved in bunker quality than putting quality. What a fine compliment to those superintendents' turf managing abilities.

Even so, we still do not know how to grow quality grass without leaves. Ultra close mowing does a great job of defoliation which reduces the photosynthetic potential of the turf. It is necessary, then, to determine the minimum TRUE mowing for the turf species and cultivar involved. Some cultivars were selected under a quarter-inch height of cut. Bench settings are the published part of the story and vary from machine to machine. The only gauge we have is the consistent trueness of line and the drag on a ball as it rolls after being struck.

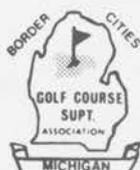
Putting consistency is greatly enhanced by light and frequent topdressing, the control of fertility and good water management. Fertility control should be

the most easily managed factor. We have the information on nitrogen patterns of most sources and should be able to plan accordingly. Every nitrogen component of blended fertilizer must be taken into account when programming applications through the growing season, since their conversion to nitrates may depend on soil temperature, soil moisture and soil air (the source of oxygen needed for the conversion of ammoniates to nitrates).

Vargas has pointed out the depletion of soil after sulfur application to near-anaerobic soils. Its conversion to sulfate depletes the soil oxygen further and then anaerobic bacteria convert the sulfates to sulfides which results in the formation of black layer. He suggests the application of nitrates as a source of oxygen for the anaerobic bacteria. This nitrogen, of course, will be lost as a gas through the process of denitrification under anaerobic conditions. Would not the same oxygen demand occur during the nitrification of ammonium in the soil?

The point here is a constant need for a supply of oxygen in the soil for these and other biological processes in the soil. This is a reason why high sand content greens performed so well last summer. Water

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"A PATCH OF GREEN"

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FACT FINDING NOT FAULT FINDING

President George Bush has been emphatic in challenging his newly appointed environmental leaders to "chart a course of environmental activism." Bush indicated recently that he was not only interested in pressing civil suits, but that criminal prosecutions would be a part of his drive to clean up the environment.

Every industry must carefully analyze its practices to assure strict adherence to guidelines and demonstrate "moral" responsibility in protecting workers and the environment.

Golf course superintendents, as a group, have long recognized the seriousness of the health and environmental issues associated with modern golf course operations. The Golf Course Superintendents Association of America, however, has recognized the need to take aggressive measures to stay ahead of the wave of environmental concern.

With that in mind, GCSAA recently introduced a member benefit program with Hall-Kimbrell Environmental Services, Inc., one of the nation's leading environmental engineering and analytical firms, to help superintendents respond. The GCSAA-Hall-Kimbrell Environmental Compliance Assistance Program provides golf course superintendents a means to identify areas of operations affected by environmental regulations and identify changes that should be implemented to achieve compliance.

"This is an important program for every golf course in America because no course can afford not to assess every area of its operations," said Dennis D. Lyon, CGCS, GCSAA president. "Our main goal is for superintendents to develop a high degree of industry involvement — but there's also a very real payoff in dollars that superintendents will realize in improved management efficiency and reduced liability exposure." Lyon added that one fine or incident would vastly overshadow the nominal cost of the self audit.

The self-audit package gives superintendents a unique opportunity to act on their own. If a regulatory agency was to evaluate the same issues, violations would be reported and dealt with through legal channels. The self audit allows superintendents to evaluate their practices on their own and make modifications accordingly.

The Hall-Kimbrell/GCSAA Self-Audit Package consists of a 30-minute videotape program that outlines eight common areas of regulation and the regulatory self audit. The self audit is a book containing more than 500 questions that allows the superintendent to easily and concisely report his practices in an answer booklet.

Completion of the self audit generally requires about eight hours of a superintendent's time. Most have found it better to split the time over a week or so rather than attempt to move through it from start to finish in one session.

The answer booklet is forwarded to Hall-Kimbrell, where it is scanned by a computer to summarize and sort the data provided by the superintendent.

Hall-Kimbrell scientists and environmental experts then review the data and compile a detailed report on the course's practices and how well they meet the applicable regulations. The report also contains concise overviews of regulations, phone numbers and addresses for federal and state agencies that issue and enforce the regulations and information on state programs that vary significantly from federal requirements.

The response report not only tells superintendents if they are in compliance, it also helps them evaluate procedures and management practices.

The self audit is not a fault-finding tool, but rather a fact-finding tool, explains Hall-Kimbrell Project Manager Steve Wharton. "People may have a natural tendency to provide what they expect are the 'desired responses' rather than the honest answers. The value of the package is in the superintendent's review of the resulting reports based on actual situations."

The self-audit and regulatory compliance efforts are not a "one-shot" effort. Existing regulations are often mentioned and stress periodic review of management practices as new regulations continue to be introduced.

One of GCSAA's considerations in selecting Hall-Kimbrell was the firm's commitment to an ongoing effort. The self audit serves as a prerequisite for follow-up services that include annual update procedures. By periodically updating the audit, it becomes a dynamic management tool for continual evaluation of practices, taking into account new products, regulations and training requirements.

The entire program and its follow-up mechanisms are designed to help superintendents become better managers. For more information or details on ordering the self-audit package, contact the GCSAA Membership Department.

SITES OF FUTURE GCSAA

1992 - New Orleans	1995 - San Francisco
1993 - Atlanta	1996 - Open
1994 - Houston	1997 - Las Vegas

JULY 25 - 1989 Midwest Regional Field Day, Purdue Agronomy Farm, contact Barb Meyer (313) 494-7221
NOVEMBER 28-30 - Turfgrass and Ornamental Chemical Seminar, Purdue University, Contact Barb Meyer (317) 494-7221.



Finding: Pesticides used on golf courses are not a threat to human health. The best available scientific evidence demonstrates that these pesticides are both safe and effective, especially when used by trained professionals such as golf course superintendents.

Golf course superintendents have specific health and economic incentives to use chemicals appropriately. More than any other members of a community, applicators are exposed to the chemicals they use. Safety and cost considerations ensure pesticide use will occur only as necessary.

Overall Safety: Of the 150 acres which comprise a typical golf course, only about six acres (greens and tees) are regularly treated with pesticides.¹ Fairways comprise an additional 30 acres, and are usually treated on a seasonal basis or as necessary, in the case of severe pest damage.

According to Dr. Richard Cooper, a turfgrass specialist at the University of Massachusetts, "There is no evidence that turf pesticides pose chronic risks to the public."² In fact, the background level of natural carcinogens in food, radon gas and even cosmic rays is a much more significant public health risk.

Dr. Bruce Ames, chairman of the Department of Biochemistry at the University of California-Berkeley, finds that average daily consumption of peanut butter or raw mushrooms, for instance, poses cancer risks 75 to 200 times greater than the potential hazards of even banned pesticides like EDB.³

Water Quality: Pesticides used on golf courses do not leach into groundwater supplies. Dr. Stuart Z. Cohen, a pesticide residue chemist and former Ground Water Team leader at the Environmental Protection Agency (EPA), notes that pesticides typically used on golf courses do not have the undesirable characteristics of high persistence, high toxicity or high mobility.⁴ Results from an ongoing EPA-funded study being undertaken at Cape Cod in Massachusetts demonstrate that golf courses and clean groundwater do coexist. This is particularly good news because the Cape Cod sample with its shallow groundwater, sandy soils and high recharge rate serves as a "worst case" estimate of potential pollution.⁵

The "thatch layer" unique to turfgrass cover provides an additional and effective barrier against groundwater contamination. Dr. Harry Niemczyk of Ohio State University has found that in addition to accelerating the biodegradation of some chemicals, thatch intercepts up to 99% of recovered pesticide residues in turf.⁶

Finally, because turfgrass prevents soil erosion, golf course actually decrease environmental damage resulting from sedimentation and stormwater runoff.

CONTINUED PAGE 15

FINDING: Golf courses have traditionally served as sanctuaries for many forms of animal life. While wildlife can pose problems for golfers and golf course developers, with proper monitoring and planning, golf courses and "nature's own" can coexist comfortably side by side.

WILDLIFE AND THE GOLF COURSE: Bird watchers have long known that golf courses are especially attractive to many varieties of birds. In the 1920's, the National Association of Audubon Societies published the pamphlet "Golf Clubs as Bird Sanctuaries."¹ More recently, Dr. Ron Kendall, director of the Institute of Toxicology at the Huxley College of Environmental Studies in Bellingham, Washington, noted golf courses "happen to be excellent bird sanctuaries with their variety of terrain and foliage and their water."² Golf courses have often provided bird houses in order to attract species that will serve as an environmentally safe form of pest control.³

Nevertheless, birds and other animals such as skunks, raccoons, deer, elk, and even alligators can pose a variety of problems for golf course customers and employees. These range from simple nuisances such as goose droppings on greens to more serious threats such as infestation with Lyme disease and rabies.

Fortunately, a variety of measures are available that can control such problems without harming the animals in any way. As Jeffrey Marley, a professional authority on wildlife control, explains: "to prevent damage, wildlife must be controlled with devices and techniques that are biologically, environmentally and economically valid, effective and practical. Control measures must be within the law."⁴ Such methods include aversion and diversion techniques, including the use of bad-tasting food and noisemakers. For big game such as elk, natural areas can be left in the development of the course to attract them. Marley concludes that control of wildlife is simply a matter of good environmental management — "the golf course superintendent's forte."⁵

WILDLIFE AND GOLF COURSE DEVELOPMENT: A different kind of problem occurs in golf course development as the developer encroaches on what used to be a natural habitat. But golf courses, especially when compared to other kinds of development, are uniquely suited to cope with this difficulty. Since developers wish to take advantage of the natural beauty of the terrain, they have an incentive to preserve animal habitats. The experience of golf course development in the desert bears this out. The Del E. Webb Corp. halted construction of a golf course in Tuscon, Arizona for 55 days until baby hawks in a nest near a fairway were ready to fly.⁶

CONTINUED PAGE 24



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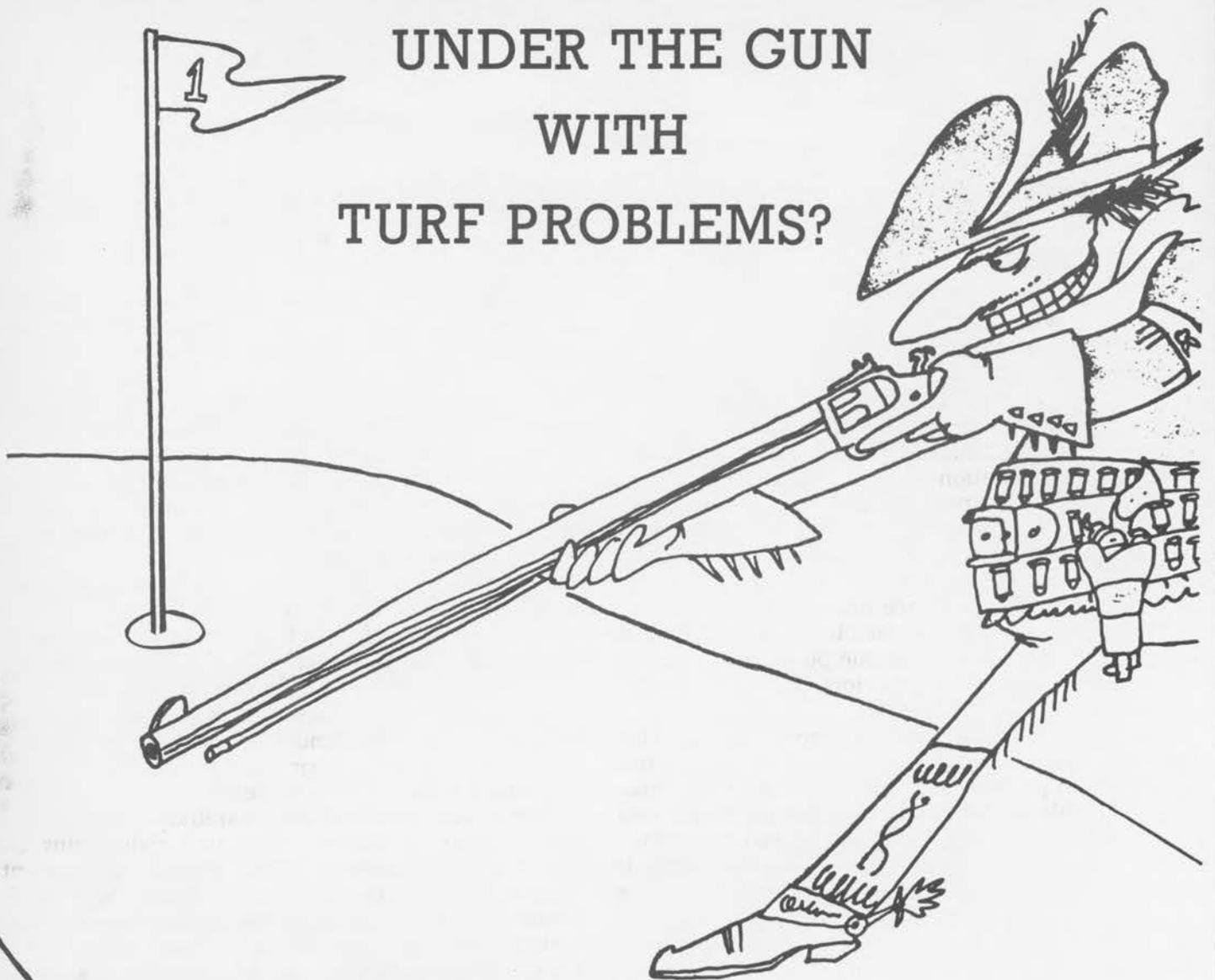
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Judith Ferguson Gockel
Agri-Systems of Texas, Inc.

A sheet of laboratory values without an interpreter can be as obscure as the Greek alphabet; it has meaning, but requires more information to use effectively.

A lab report is a prediction of the conditions you will have to live with on your golf course. Each of the values, and their meaning in combination, provides a picture of future greens behaviors. Intelligent anticipation of known potentials can be the difference in success and failure over the long term.

There are five basic values which are used as criteria for the recommendation of a seedbed mixture. These values are capillary pore space, non-capillary pore space, plus total pore space, which is determined by combining the two, water retention, bulk density, and infiltration/percolation/permeability.

Any soil structure has three basic parts: soil solids, water, and air. The ratio of each to the others is what is being reported. How these components interact as ratios, and the varying behaviors observed, permit prediction.

The first value is capillary pore space. This comprises the water film which surrounds and connects each particle in a soil structure. This water is not available to the plant, and cannot be mowed downward by gravity, due to offsetting surface tension which holds it in place. If a given sand is quite fine, with a substantial soil component, the value for capillary pore space would be quite high. A coarse, clean sand would have very low capillary pore space, since there is much less surface area present to hold a film.

Capillary pore space can be affected by several things. Altitude acts to increase it; there is less atmospheric pressure acting on the water film, so it would be thicker around each particle. If you have a course with elevations above 4000 feet, this may have a bearing on certain problems. If you use a wetting agent, you decrease the surface tension, and so lower

the capillary pore space by making the film thinner around each particle. The usual numerical ranges considered acceptable for this value are from 15% to 24%.

Non-capillary pore space is the amount of air space between the solids, with their capillary water film; the free water which moves into these pores provides usable water for the plant, as well as being an air source for plant roots when the structure is drained. This value is acceptable in ranges from 16 to 25% of a good greens mixture.

In a soil mixture, the values of capillary and non-capillary pore space offset each other. While this is not invariable, generally a mix that has high values in one type of pore space will have low values in the other. Many of the better mixes have a fairly balanced ratio of pore space types.

The two values are added to obtain total pore space. This usually ranges between 35% total pore space to 45% total pore space in a mix of materials for a green. The pattern of these values gives us part of the picture necessary to decide what will be a good mix, and what will be a poor one.

The next value to be considered is water retention. Water retention differs from capillary pore space in that we are measuring both that value plus the absorbency of (primarily) the organic component. This is a very important consideration; high water retentions can promote fungal disease, weaken root systems, and be a forerunner of black layer conditions. Water retentions which are too low mean droughty conditions, and an excessive need for water. The overall ranges for water retention are between 11.5% and 18% although few Southern or Western courses should consider ranges over about 15% total water retention, unless unusual conditions dictate the necessity.

Bulk density is the weight of a known volume of

CONTINUED PAGE 23

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Superintendents Vary On Support For New Mechanic 'Peer Groups'

by Larry Kieffer

A couple of weeks ago, we reported on golf course mechanics in Florida and Illinois who are forming professional associations — peer support groups, if you will — to help them keep up with the ever-increasing complexity of turf maintenance equipment.

In the process of gathering information for that short story, three observations came sharply into focus:

1. The turf equipment industry needs to develop basic standards that can be translated easily into short courses in turf equipment maintenance at vocational and technical schools around the nation.

2. A nationally recognized certification program is needed to identify highly skilled turf equipment mechanics or, as many now prefer to be called, service technicians.

3. Some golf course superintendents, with memories so short that they have forgotten their own roots, may actually impede progress toward achieving items one and two.

Virtually every mechanic I talked to — unless he had been through the one-year programs at either Lake City (Fla.) Community College or Horry-Georgetown (S.C.) Technical College — bemoaned the non-availability of specific training on turf equipment.

"I was a mechanic in the Air Force before I got my job here," said John Porter, mechanic at Port Charlotte (Fla.) Country Club. "I had never been on a golf course before. I didn't know anything about the equipment and there wasn't anybody at the vo-tech school who could help me. If mechanics at nearby courses hadn't been so helpful, I don't know what I would have done."

Porter, who is now secretary of Southwest Florida's Turf Equipment Service Technicians' Association, or TESTA, says this year he will be able to attend one of the short schools run by Toro or Jacobsen "because we have a new superintendent who wants me to. In fact, he told me, 'You will go.'"

"The day of the shade tree mechanic on the golf course is over. . . if indeed it ever existed," says Bruce Williams, superintendent of Bob O'Link Golf Club near Chicago. "We're not dealing with simple machines. Today's turf equipment uses very advanced hydraulics, big diesels. . . a greensmower costs as much as a luxury car and is just as complex. You need a competent, trained technician to take care of it."

Most mechanics coming onto golf courses today are well trained on gasoline engines; many also have training in diesel engines and a few are familiar with hydraulics. But almost none have any experience with reels and bedknives. The term "backlapping" has no meaning to the novice golf course mechanic. . . even if he was qualified to work on the Air Force's

most complex missiles.

"The precision with which a mechanic adjusts his machines is a major factor in determining the quality of the putting surface." Williams says. "We used to measure cutting height in eighths of an inch. Now we have it calibrated in thousandths!"

That kind of training should be available in local vo-tech schools. The industry, led by manufacturers and the technical schools, must start developing standards and training teachers.

And if training is important, certification is even more so. It's not enough for the local vo-tech school to have "a good reputation."

In the first place, while the mechanic might come from the local area, the odds are increasing every day that the superintendent does not. As the superintendent's image as a manager increases, so does his mobility. His key technicians — mechanic, irrigation specialist, chemical technician — must have credentials that are valid from one end of the country to the other.

In the second place, not all mechanics need formal training, particularly those fortunate enough to apprentice under an old pro. A universally recognized means of evaluating and certifying their skills would increase job security and promote career advancement for the craft's top practitioners.

Standardized training and certification could best be achieved through some kind of national trade organization, right now a long-range goal of a few farsighted mechanics and instructors in Florida, the Carolinas and Illinois. Perhaps "dream" would be a better word than "goal."

"We want to take this one step at a time," says B.J. Cannon, instructor of mechanics at Lake City Community College. Cannon colleague Jim Lones and senior instructor Ed Combest are helping North Florida mechanics form a local association. If they are successful, that will give Florida three such organizations (the other two are in Southwest Florida). Similar ones exist in Chicago and in Myrtle Beach, S.C.

"But there's no doubt that a statewide organization would be a natural step," Cannon adds. "There are a lot of things that we could do if we could speak to the manufacturers with a united voice. It would make it easier for us to tell them what's good and what's bad about their equipment."

And if a statewide organization is next, can a national one be around the corner?

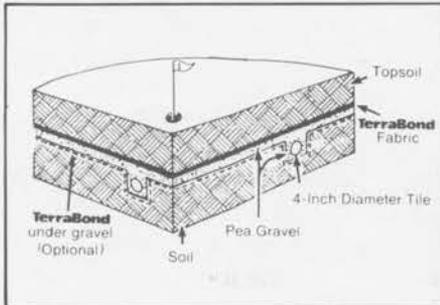
"Wow! That's a lot to comprehend," says Tino Martinez, chief mechanic and shop foreman at Royal Poinciana Golf Club in Naples, Florida. Martinez, a former Air Force missile mechanic, helped found the Southwest Florida TESTA in 1971 and saw it sputter

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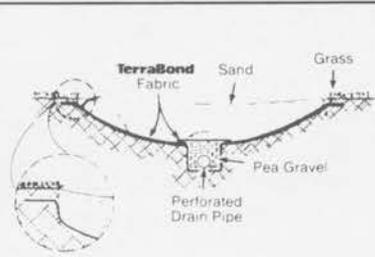
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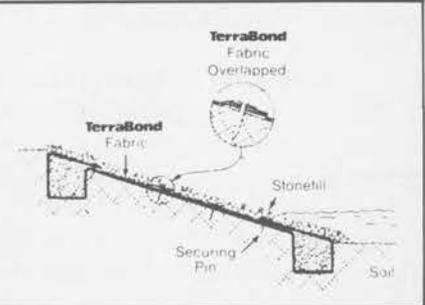
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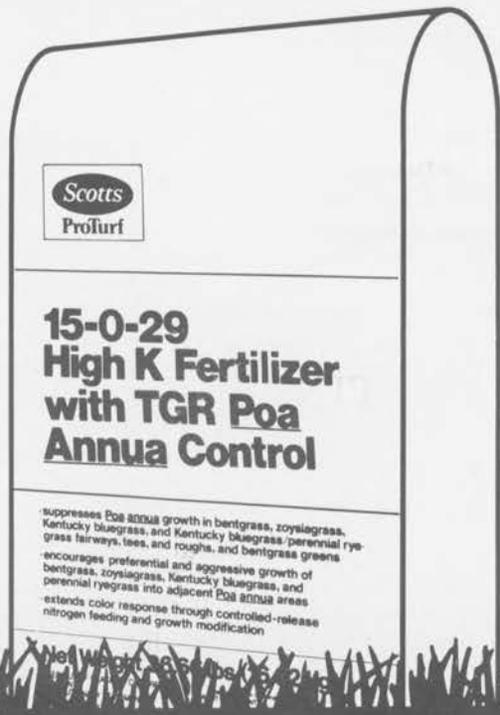
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PRESIDENT'S MESSAGE

With the 1989 golf season well on its way, I don't think any of us are looking forward to having the same type of summer we had last year.

We have started the season off on a good note. On May 1 we had the Special Olympics meeting at Arbor Hills Country Club in Jackson. Thanks to Supt. Jim Eccleton, the chairman and host of the Special Olympics, we were able to donate \$4,000.00 to the

Michigan Special Olympics.

On May 7 the meeting at Tam-O-Shanter, hosted by Mike Bay. At this meeting we heard guest speaker Tom Jones from the GCSAA. We learned more about the importance of keeping ourselves and clubs up to date on the environment problems that may affect us.

We need to learn all we can about the new environmental laws so we can keep ourselves and our clubs updated on the costs and procedures.

Remember if anyone needs the tape from Hall-Kimbrell to take to their greens committee meetings please contact me.

Sincerely,
Charlie Gaige
President MBCGCSA

DISTINGUISHED SERVICE AWARD 1989 TO ANDY BERTONI

Presented by Ted Woehrlé at the annual joint meeting of the Golf Association of Michigan and the Michigan and Border Cities Golf Course Superintendent Association, at the Detroit Golf Club, Michigan on the 25th of March, 1989.

It is my pleasure this year to present the Michigan and Border Cities Golf Course Superintendents Association "Distinguished Service Award". This award was reinstated a few years ago to recognize Superintendents who have contributed significantly over the years to our local association and to golf.

Too often, certain individuals have served an association and have never been recognized for their efforts. This award is our way of honoring a member for notable and distinguished service.

We feel that there are three criteria that this individual must meet. First, an individual must have had a significant influence upon our association; secondly, he or she must have benefitted the profession of the golf course superintendent; and, finally, this person must have aided in the development and enjoyment of the game of golf.

This years' recipient more than meets these criteria and surpasses them to a degree which few other superintendents could match. Our recipient has always been interested in advancing and promoting the arts and sciences of turfgrass management. He is the link joining our humble beginning as Greenkeepers to the present exciting profession of Golf Course Superintendency.

Andy Bertoni is known throughout the superintendent's national and local community not only for his professionalism, but especially for his ability to add a touch of humor to any situation. Andy was born in Genoa, Italy, and came to the United States as an infant. He has lived in Michigan ever since.

Andy was introduced to the world of golf when he worked as a caddy at Barton Hills C.C., Ann Arbor,

Michigan. While attending Notre Dame, he worked for a construction crew on a golf course. In 1945 Andy accepted a golf course superintendent position at Barton Hills, the same club where he had caddied years before. In 1952, he moved to the Meadowbrook C.C., Northville, Michigan where, as a superintendent, he hosted the Motor City Open on numerous



Andy Bertoni, (R) receiving the 1989 Distinguished Service Award from Ted Woehrlé, at the Annual GAM and Border Cities GCSA.

occasions, and the PGA Championship in 1955 when it was still being played as match play (where Ford beat Middlecopf 4 and 3). Andy and Meadowbrook were known for their great tournament-conditioned golf course. Players and officials always appreciated the efforts of Andy and his crew.

While he was at Meadowbrook, he was part of the greatest management team in history. The pro at the time was Chick Harbert and the Manager was Gene

CONTINUED PAGE 16

ANOTHER GREAT QUOTE ABOUT CENTURY GOLF TEAM!

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Dr. Thomas Watschke, a turfgrass specialist at the Pennsylvania State University, notes that thick, healthy turf reduces runoff to virtually meaningless levels.⁷

Compared with other patterns of land use, such as farming or even residential areas, golf courses can actually reduce total pollution loads to the environment.⁸

Education and Labeling: In addition to the training required under federal and state laws, GCSAA sponsors an extensive education program to assure that professional golf course superintendents are well trained in safe pesticide application techniques. Experts have long noted that such training programs are useful to assure safe and effective results when using chemicals. Golf course superintendents are trained chemical applicators and know how to utilize pesticides safely.

Pesticides used on golf courses, like all pesticides, are regulated by the federal government. The EPA keeps a watchful eye on pesticide developments. Industry analysts note that "only the safest, most effective and marketable ones survive."¹⁰

In GCSAA training programs, turfgrass and pesticide specialists stress the importance of following the instructions provided on every chemical's label to assure safe use. Adherence to the directions provided by the manufacturer assures achievement of the best results and virtually risk-free pesticide application.¹¹

2, 4-D as a Case Study: Based on over 40,000 scientific studies on the safety and effectiveness of 2,4-D (which makes it one of the most thoroughly researched chemicals ever) and more than 40 years of use in the real world, it has been proven that 2,4-D does "not pose an imminent hazard or unreasonable adverse effect when used as directed on product labels."¹²

Experts agree that 2, 4-D is extremely safe. Yet, occasional reports create adverse publicity. For instance, many sources seized on the reports of a University of Kansas and National Cancer Institute telephone survey that linked 2, 4-D to non-Hodgkins lymphoma (NHL).

However, few published the scientific reviews of the study by noted experts. For example, Dr. Brian MacMahon, professor and chairman of the Department of Epidemiology of the Harvard School of Public Health, stated that "The weight of evidence does not support the conclusion that there is an association between exposure to 2, 4-D and NHL."¹³

The EPA has decided not to initiate any special review of 2, 4-D, and a large body of scientific evidence supports safe use of the chemical. Dr. Donald Morgan of the University of Iowa's College of Medicine does not "believe 2, 4-D is a likely cause of lymphoma, soft tissue sarcoma or other cancer."¹⁴ The latest scientific evidence gives 2, 4-D a clean bill of health. A recently released Candian study found "no evidence of increased mortality risk associated with long-term exposure of 15 years or more" to 2, 4-D.¹⁵

A plethora of experts and studies could be cited to demonstrate the safety of 2, 4-D. In short, it is one of the safest pesticides known to man. Golf course superintendents use 2, 4-D with confidence because of its overall safety record and effectiveness.

Conclusion: Golf course superintendents are trained professionals who carefully use the safest available chemicals as needed to do their jobs. Turfgrass pesticides are generally safe and compatible with a sound environment.

The risks associated with golf course use of chemicals are negligible. The corresponding benefits in soil stabilization, water management, aesthetic value and recreational use greatly offset such risks. Negative reports about safety are typically overblown.

GCSAA education programs provide superintendents with valuable information and training about the safe use of turf pesticides. All these factors combined ensure that golf course are very compatible with a clean environment.

1. Anne Leslie, U.S. Environmental Protection Agency, "Do Golf Course Links Post Hazard to Waters? Study May Find Out," *Sunday Star News* (Wilmington, NC), August 9, 1987, p. 9A.

2. Richard J. Cooper, reprinted from the *Proceedings of the 38th Canadian Turfgrass Conference*, St. John, New Brunswick, Canada, March 8-11, 1987, p. 37.

3. Bruce N. Ames, Renae Magnaw and Loue Swirsky Gold, "Ranking Possible Carcinogenic Hazards," *Science*, April 17, 1987.

4. Letter from Stuart Z. Cohen, May 13, 1987, p. 1.

5. Richard Holmes, "Golf Course Pesticide Study Near Finish," *Cape Cod Times*, June 11, 1987.

6. H.D. Niemczyk and H.R. Krueger, "Persistence and Mobility of Izasofos in Turfgrass Thatch and Soil," *Journal of Economic Entomology*, August 1987, pp. 950-52; "Evidence of Enhanced Degradation of Isufenphos in Turfgrass Thatch and Soil," *Journal of Economic Entomology*, August 1987, pp. 880-82.

7. George Weigel, "Healthy Lawn Reduces Pesticide Runoff to Next to Nothing," *Harrisburg Patriot*, July 1, 1986.

8. Cohen, letter, p. 1; Dr. Larry A. Roesner, "Quality of Urban Runoff" in *Urban Stormwater Hydrology*, ed. David F. Kibler (Washington, DC: American Geophysical Union, 1982), p. 168.

9. J.V. Osmun and G.T. Weekman, "Pesticide Applicator Training and Certification as a Factor in the Management of Pesticides," *Pesticide Management and Insecticide Resistance*, ed. by David L. Watson and A.W.A. Brown (Academic Press, 1977), pp. 497-502.

10. "Bringing a New Pesticide to Today's Market," *Golf Course Management*, June 1987, p. 66. Adapted from material provided by Iola Associated, Inc.

11. E.R. DeOng, et al, *Insect, Disease and Weed Control* (New York: Chemical Publishing Co., 1972), p. 90.

12. Dr. Wendell R. Mullison, "The Industry Task Force on 2, 4-D," *Greenmaster*, June 1987, pp. 29-30.

13. "EPA Reviews Question 2, 4-D—Cancer Link," *Lawn Care Industry*, January 1987, p. 12.

14. *Lawn Care Industry*, January 1987, p. 12.

15. "Report: EPA Softening on 2, 4-D," *Lawn Care Industry*, March 1987, p. 42.

ANDY BERTONI, CONT.

Rawlings. Meadowbrook became the golf capital of the private club circuit in the district for many years.

Andy stayed at Meadowbrook C.C. for 17 years until 1969 when he accepted a position at Holly Green Golf Club in Holly, Michigan. In 1972, he accepted a job with the W.A. Cleary Corp., a chemical supply house for golf courses. Traveling across the nation, representing Cleary Products, he was able to continue his mission of promoting the golf course superintendent. He convinced an awful lot of people of the importance of the golf course superintendent. He was always encouraging the weary superintendents that were trying to make a meaningful profession out of greenkeeping.

He has always been very active in both the local and national associations. He has served as director, secretary-treasurer, vice-president and president of the Michigan and Border Cities GCSA and was a member of the Golf Association of Michigan Green Committee. You may not know it, but it was Andy's idea to start the drive to solicit money from the clubs for turf grass research. He was made an honorary member of the Canadian GCSA and served on the USGA Green Section Committee, and received the 1986 Distinguished Service Award of GCSAA.

Andy served as a director of GCSAA on two separate occasions. While a director, he chaired the Public Relations Committee and the all important Scholarship and Research Committee, which was a new committee. Through his efforts, the first scholarships were awarded and the first money for research was

given to deserving graduate students. This was a time in our history when turf grass management was first offered in colleges. Many of you in this room today owe your position as you know it, to this man who had the foresight and courage to fight for his profession. He helped to build and foster it into a great and respected vocation. He has made our profession an institution. Emerson once wrote that "an institution is the lengthened shadow of one man" - and Andy is that man - we all walk in the shadow of Andy Bertoni. Andy has a son, Jimmy, who is a golf course superintendent at Coto De Caza in El Toro, California.

Supporting letters for Andy said such things as "The mark of a true professional is the ability and willingness to share one's time, energy and talents with one's peers - Mr. Bertoni has done that since 1945." Another letter said "He would assist anyone - at times at his own expense. His heart is larger than he is and he gives of himself with expertise and wonderful wit to cheer you along." "He is a knowledgeable, experienced individual who cares for the younger people in our profession and encourages them to greater heights of achievement. He is someone who has an intense interest in another human being's career and helps that person in every way he can. . . a kind man who gently helped all of us up the ladder."

He has always shown a genuine interest in people. He has many friends because he is a friend.

We can all point with pride to the work of this man. May I present Andy Bertoni - this year's recipient of the Distinguished Service Award.

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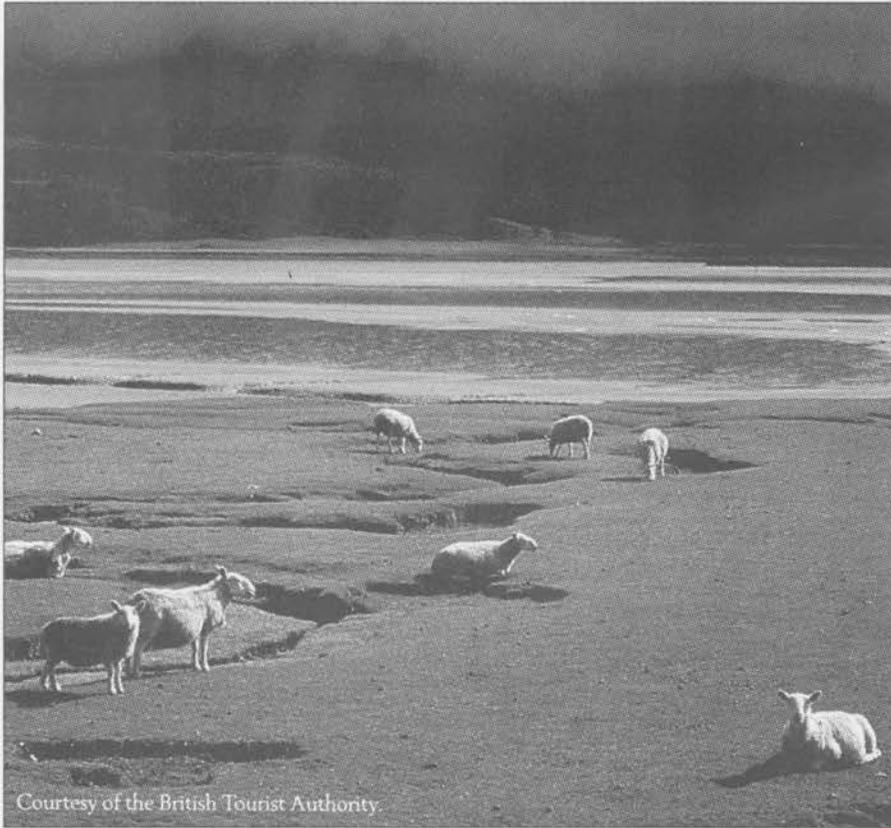


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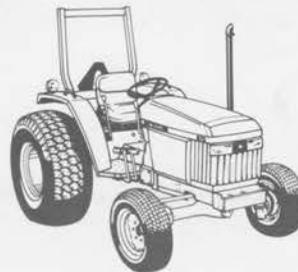
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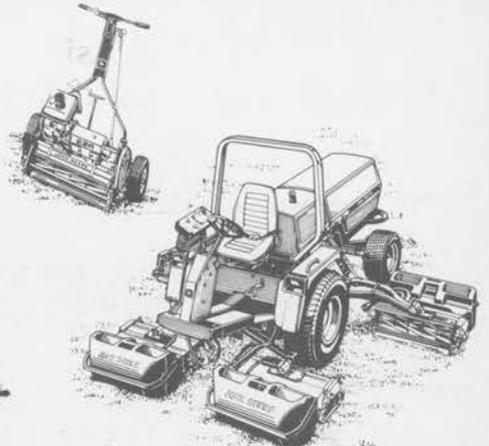


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PEER GROUPS, CONT.

for a decade before it finally sprang to life in 1981.

The organization now has 41 members meeting once a month for a light meal (provided free by the host golf course) and a seminar, usually conducted by a manufacturer's representative.

One thing that has led to TESTA's vitality is that membership is not restricted to golf course mechanics.

"We have men from landscaping companies, the county parks department, service reps and even an instructor at the local vo-tech school," Martinez said.

He added that local superintendents have encouraged their mechanics to take part in TESTA activities giving them time "on the clock" to attend meetings. ("We don't allow any alcoholic beverages or horsing around," Martinez says, conscious of the concerns some superintendents might have.)

"In fact, one superintendent came to me and asked me how he could possibly persuade his mechanic to come to our meetings."

Not all superintendents are so supportive, however. In fact a few have tried to discourage participation.

"Frankly, I think it's a misguided fear of something that might develop into a union kind of thing," said a superintendent who asked not to be identified.

Those superintendents should remember that less than two decades ago, their predecessors were still struggling to gain professional recognition for own organization. It would seem that a national GCMA or TESTA is no more likely to become a union than was the GCSAA.

"I think the idea (of a national mechanics' organization) is very good," said Williams, the Chicago superintendent. "The more education they get, the better off we are. These guys are pretty sharp and it's important that they form a group amongst their peers."

From **GOLF WEEK**,
October 22, 1988

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to risk loss
To live is to risk dying
To hope is to risk despair
To try at all is to risk failure
But to risk we must
Because the greatest hazard in life is to risk nothing
The man, the woman, who risks nothing
does nothing
has nothing
is nothing

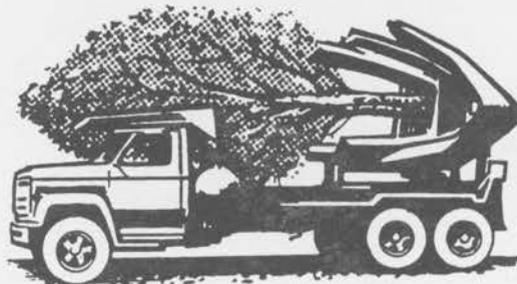
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In the beginning
 There was Earth, beautiful and wild;
 And then man came to dwell.
 At first, he lived like other animals
 Feeding himself on creatures and plants
 around him.
 And this was called **in balance with nature**.
 Soon man multiplied.
 He grew tired of ceaseless hunting for food;
 He built homes and villages.
 Wild plants and animals were domesticated.
 Some men became farmers so that others might
 become Industrialists, Artists or Doctors.
 And this was called Society.
 Man and Society progressed.
 With his God-given ingenuity, man learned to feed,
 clothe, protect, and transport himself more
 efficiently so he might enjoy Life.
 He built cars, houses on top each other, and nylon.
 And life became more enjoyable.
 The men called Farmers became efficient.
 A single farmer grew food for 28 Industrialists,
 Artists, and Doctors.
 And Writers, Engineers, and Teachers as well.
 To protect his crops and animals, the Farmer
 produced substances to repel or destroy Insects,
 Diseases, and Weeds.
 These were called Pesticides.
 Similar substances were made by Doctors to
 protect Humans.
 These were called Medicine.
 The Age of Science had arrived and with it came
 better diet and longer, happier lives for more

members of Society.
 Soon it came to pass
 That certain well-fed members of Society
 Dissapproved of the Farmer using Science.
 They spoke harshly of his techniques for feeding,
 protecting, and preserving plants and animals.
 They deplored his upsetting the Balance of Nature;
 They longed for the Good Old Days.
 And this had emotional appeal to the rest of Society.
 By this time Farmers had become so efficient,
 Society gave them a new title:
 Unimportant Minority.
 Because Society could not ever imagine a
 shortage of food.
 Laws were passed abolishing Pesticides,
 Fertilizers, and Food preservatives.
 Insects, Diseases, and Weeds flourished.
 Crops and animals died.
 Food became scarce.
 To survive, Industrialists, Artists and Doctors were
 forced to grow their own food.
 They were not very efficient.
 People and governments fought wars to gain
 more agricultural land.
 Millions of people were exterminated.
 The remaining few lived like animals.
 Feeding themselves on creatures and
 plants around them.
 And this was called **in balance with nature**.

From the Georgia Golf Course
 Superintendent's Association Newsletter
 Contributed by William I. Segars

ALONG THE LINE
 with Ruby Ingraham

"Friendship needs no symbol,
 Or vow to make it whole;
 It's just a sacred covenant
 That's locked within the soul;
 It knows no creed or station,
 Or thought of gain or fame,
 For what it does is sacred,
 And is done in Friendship's name."

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ANNUAL MICHIGAN SPECIAL OLYMPICS FUNDRAISER SUCCESSFUL

This year's Michigan Special Olympics fundraiser was held at Arbor Hills C.C. in Jackson, Michigan. The vendors and supply people stood tall on their toes as they donated their time to this most worthy cause. Without the golf course supply people this event would not be possible. The following list represents the companies that paid \$175.00 each to sponsor a golf tee. When you see any one of the representatives from these companies, please let them know that their effort in this yearly event does not go unnoticed. Their support helped raise \$4250.00 for the Michigan Special Olympics this year. The companies and individuals that contributed are as follows:

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The timing of this event may not be the most convenient for some superintendents — May 1 is a busy time of year for our business — of the 15 teams

that participated there were over 30 superintendents. This seems to be a fair amount but it can improve. If anyone has any feedback on how this event can be improved, please let me know. The date alone may be a factor in the participation of the golf course superintendent.

Again, I would to thank all of the above mentioned golf course supply people for their continued support of the annual Michigan Special Olympics fundraiser.

Thank You,
James P. Eccleton C.G.C.S.
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SOIL TEST, CONT.

material. A quart of feathers has a much lower bulk density than a quart of sand. By comparing this value to the others, we can tell why a mix may be causing problems. For instance, a mix with high capillary pore space and high water retention can have too much soil or other fines in it, or it can have too much peat. If there is too much soil, the bulk density will be high; if there is too much peat, the bulk density will be low. So this value provides a rapid means of determination of the nature of a mix. Interestingly enough, a very high and a very low bulk density will have approximately the same effect on the green, which a high degree of compaction, with a corresponding loss of turfgrass.

The final major value usually considered is permeability, or infiltration. This measures the volume of water which will move through a known volume of compacted material in a given time period. There have been specific, stated limits on infiltration until recently. The new re-issue of the USGA specifications has removed these limits, subject to the overall suitability of the mix.

This has been, and continues to be a hot controversy. What is right, what is wrong, who is right, who is wrong? Since the work we do is based on the USGA Green Section Specifications, we always test materials assuming the greens will be constructed this way; unless told otherwise.

If the USGA specifications are followed precisely, including the inclusion of the intermediate layer, which has just become mandatory, water only moves 12". It is stopped at that point by the perched water table effect. With appropriate overall values in a mix, permeability ranges are more complex than merely looking at a single number, and deciding that a greens mix is good or bad, on no other basis.

We have discussed the meaning of the values examined to create greens mixes. Now down to the real question: What do these values mean to you?

In general, in most of the region, you would seek mixes with 19 to 25% non-capillary pore space (small pore space). This balance of pore space would keep your water retentions below 15%, and your bulk densities between about 1.32 and 1.42 grams per cc. This set of values means that the summer heat, and the high humidities common to this area can be offset by having manipulated the soil structure to be pourous and relatively dry.

Every geographical region has its own peculiarities, and its own needs. The most common problem we see in this region is a difficulty in getting properly clean sand delivered to a job site. This seems to be a factor of some lack of understanding on the part of the suppliers, as well as the production methods common to the region.

Getting good green mixes in this part of the world often involves a careful monitoring of materials during delivery and construction. Doubling the quantity of silt in a selected sand, or picking up an additional 25 to 50% fines can create a disaster condition waiting to happen. What will usually happen is that water retention and bulk density will rise; in a summer like the one just past, this set of

GCSAA - WILDLIFE, CONT.

When course development in the Coachella Valley near Palm Springs, California threatened an endangered species of lizard, the government, developers, and environmentalists worked together to establish a wildlife preserve that would be compatible with course development.⁷ Obviously, with proper planning, golf course development need not threaten any endangered animals.

CONCLUSIONS: Golf courses are one of those rare kinds of development that can easily harmonize with the natural world, given proper planning and anticipation of potential problems. Golf courses serve as sanctuaries for animal life and need not employ harsh measures to keep wildlife from interfering with the game. Golf course developers respect the environment and can provide habitats to preserve the various species affected by the presence of the course.

1 National Association of Audubon Societies, Golf Clubs as Bird Sanctuaries (1929).

2 Jolee Edmonson, "Hazards of the Game", Audubon, Nov. 1987, pp. 25, 27.

3 "Working With Nature's Own To Achieve Insect Control", Golf Course Management, April 1987, p.28.

4 Jeffrey Marley, "Controlling Wildlife On And Around The Course", Golf Course Management, April 1987, p.14

5 Jeffrey Marley, p.26.

6 "We Don't Move Until The Baby Hawks Fly", Golf Course Management, Feb. 1987, p.145.

7 Dwight Holing, "Lizards and the Links", Audubon, Nov. 1987, p.39.

SOIL TEST, CONT.

characteristics can change a course with some problems into a desert.

A major reason for learning how these values affect the development of a new green is their predictive capability. Most greens will grow for about two years with relatively few problems, no matter how they are built. After that, the problems come thick and fast, and the effects indicated by the original tests begin to show themselves. Far too many greens are being rebuilt these days, because known potentials are not properly understood.

With a good selection of materials, and an understanding of the mechanics of good greens construction and function, it is possible to head off many agronomic problems before they start. As far as the cost is concerned, consider that the first USGA spec greens are thirty years old, and still going strong, while many greens built without good structure will have to be rebuilt within five years. That is about as good a return on an investment as anyone can expect; having this knowledge can make selling your club on good construction parameters much simpler.

The key to building good greens is primarily communication. The more information you can supply to your advisors, be they soil laboratory, agronomist, architect, construction company, or material supplier, the better your golf greens can be.



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STRESS IN 1989, CONT.

percolated through the profile readily, pulling air into the non-capillary pore spaces as they drained.

These are fine points, to be sure, but as long as we are dealing with defoliated turf we need all the help we can get. There are few black or white options. For instance, at what point does shade become a limiting factor? Or, how much wind movement is necessary across a putting surface for best moisture and heat dissipation?

It is now mandatory to exert maximum control on the controllables. Sand quality is easily determined by sieving and particle size distribution can be specified. This is a simple and direct situation. The success of straight, uniformly sized sand topdressing has been widely demonstrated since Madison proposed in 1974. Organic additives are another story, and are bothersome.

Peat bothers me because of the tremendous variation possible in the sources. The amount of detrimental non-organic material can vary widely within a very small area in a "mine". Clay, silt and very fine sand content can be amazingly high in peats that "look" and "feel" good. The only judge of quality is a rather detailed laboratory test. In construction, quality control is possible because purchases are in large, checkable lots. In year-to-year topdressing, though, some change is inevitable.

We cannot argue with the success that many superintendents have had with sand/peat topdressing even though an 80/20 mix is not 80/20 after the little peat balls are dragged or mowed off. (Perhaps that loss is beneficial.) Variability here is seldom checked, making straight sand topdressing more and more palatable.

Research projects and experiences during the 1988 season have clarified a few points for 1989 consumption:

1. Regardless of the weather conditions in May and June, Summer Patch treatments should begin when soil temperature at a 2" depth reaches 65°F. A second application should follow in a month. The Michigan State trials showed Rubigan, Bayleton and Banner to be very effective fungicides. Dr. Vargas feels that Banner may also be effective with slightly later applications.

2. Dr. Shearman at Nebraska believes that on days when it is evident that syringing will be needed, it should begin just before noon so that the water droplets on the turf will dissipate the heat via evaporation during the period when solar radiation is at its peak. This will reduce the amount of heat reaching the turf, thus minimizing heat buildup.

3. Relative humidity levels are extremely important as the temperatures rise and when the soil is adequately moist. Evaporative cooling is minimal when atmospheric moisture is high, so general irrigation may be more harmful than beneficial. Daytime hand watering (or just syringing) the high spots when needed is a better idea. Making wet soil even water has no cooling effect — it just reduces the soil oxygen supply. Even the most sophisticated

CONTINUED NEXT PAGE

STRESS IN 1989, CONT.

irrigation system is incapable of solving all the water problems on undulating terrain. That's when quality management shows its value.

In the future we must give more consideration to the grass plant as a whole and its interactions with the rest of the environment. The more that we reduce any factor limiting growth, the better the turf can withstand the cultural stresses which we inflict. That future is now.

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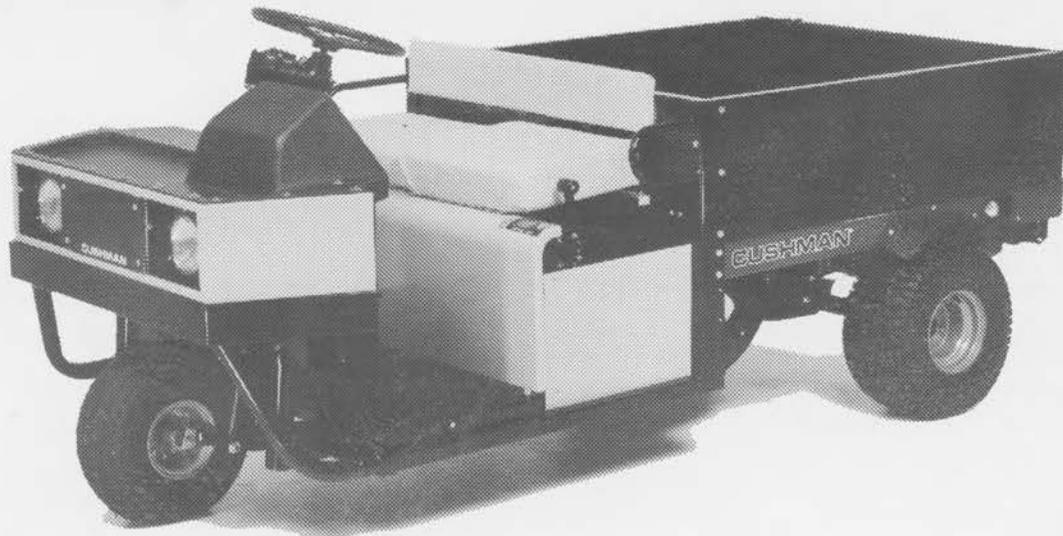


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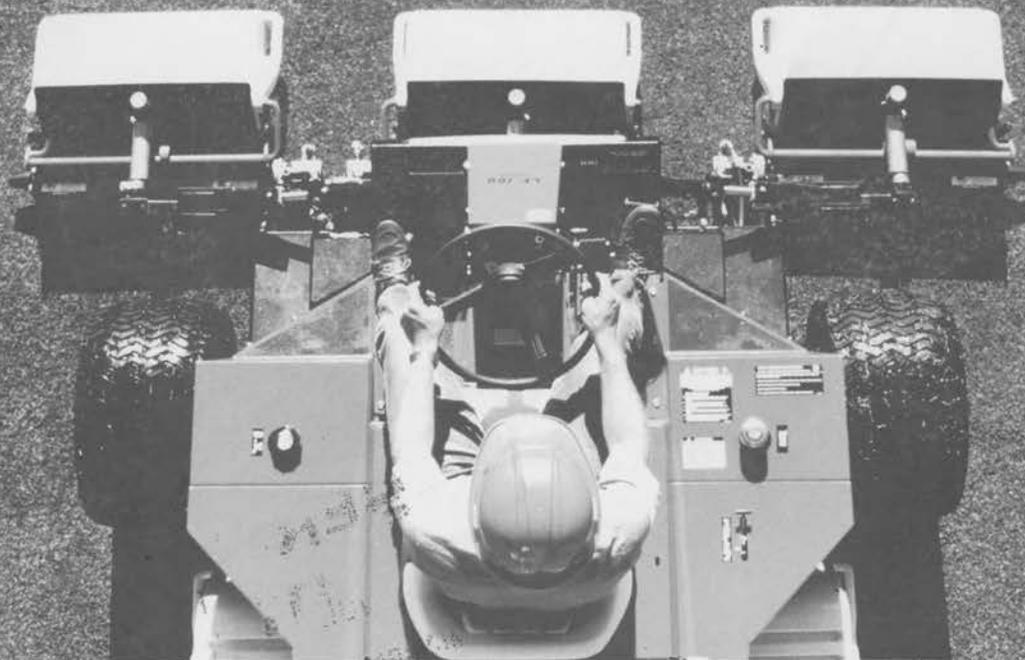
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