THE SOUTH FLORIDA GREEN

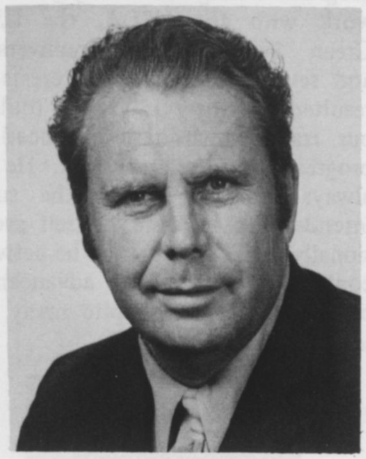
Vol. 2 APRIL, 1975 No. 3

The Official Bulletin of the South Florida Golf Course Superintendents Association

CONTENTS

ON OUR COVER

Looking across #9 & #18 Fairways at the beautiful Biltmore Golf Course



President's Message

It has been an honor and a privilege to serve as President of the South Florida Superintendents Association for the past two years.

My special thanks to the Officers and Directors for their hard work and dedication, which has been largely responsible for the steady increase in attendance and growth of the organization.

To the staff of the Fort Lauderdale Research Station for their willingness to share their knowledge and their facilities for organizational activities, I extend our deepest appreciation.

It was announced at the 46th Annual GCSAA Conference that the Golf Course Superintendent is beginning to receive more recognition for his contribution, and high standards to the game of golf. If we continue to make the progress we have in the past, our work will be recognized as the profession it is so, for all of us, I wish full steam ahead.

FROM THE NATIONAL. . . .

GCSAA DISTINGUISHED SERVICE AWARDS

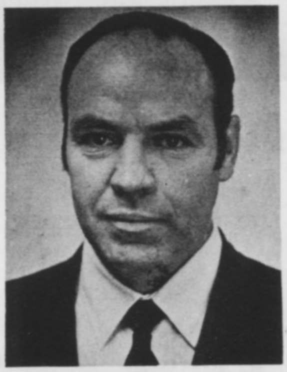
Individuals meeting the requirements for the Distinguished Service Award from the GCSAA must have made an outstanding contribution towards the advancement of the profession which can be judged significant on a national or international basis.

Three men met these qualifications this year and were made the recipients of this Award at the GCSAA Conference and Show at New Orleans, Louisiana. They are: Dr. William H. Daniel, Raymond H. Gerber and Dr. Fred V. Grau. Their citations follow:

Dr. William Daniel was selected for his contribution through education and extension work in the golf turf industry. Dr. Daniel has helped to educate many turf students who subsequently became superintendents or who have contributed to the education of superintendents. He has inspired many young men as a result of his close personal contact with his students. He has always been a willing participant on programs on the local, state, regional or national level. He has always made himself available to answer calls for help from superintendents who may find themselves in difficult situations. He has authored many articles and papers as well as contributing many new innovations to the field of golf turf management.

Mr. Raymond Gerber was selected in a general category of contribution to the profession. He has spent many years as a golf course superintendent, is a Past President of GCSAA, and has served in offices in local chapters and turf foundations. He continues to remain interested in our profession and to be an active participant in its affairs even after he has retired.

Dr. Fred V. Grau was selected for his contribution through his promotion and participation in research programs dating back many years. His work with the USDA, the USGA Green Section, various universities and several commercial interests has resulted in many improved tools of our trade which have enhanced the progress of our profession. He has always tried to inspire the superintendent to improve himself professionally. He continues to be active in contributing toward the advancement of our profession despite many personal adversities.



Palmer Maples, Jr., CGCS

NEW GCSAA PRESIDENT

Palmer Maples, Jr. was elected president of the Golf Course Superintendents Association of America at the Annual Membership Meeting, February 19 in New Orleans, La.

President Maples is the golf course superintendent of the Standard Club of Atlanta, Ga. He resides in Decatur, Ga. with his wife and six children and where he is an elder and deacon of the Rehoboth Presbyterian Church. President Maples was first elected to the Executive Committee as a Director in 1970. He served as Secretary-Treasurer in 1973 and was elected Vice-President in 1974 at the Conference in Anaheim, California.

The following officers were also elected at the 1975 Membership Meeting in New Orleans: Vice-President Richard W. Malpass and Directors George W. Cleaver, Louis D. Haines and Gordon Witteveen.

HOOKS AND SLICES

Two guys were walking down Collins Ave. on Miami Beach when a Seagull swooped down and made a deposit on one of the guy's hat. "Don't move," said his friend, "I'll get some toilet paper." The guy with the hat says, "Don't bother. He's miles away by now."

RECOMMENDED READING

A new, well illustrated book titled "How to Have a Beautiful Lawn" by Dr. James Beard is available from Intentec Publishing Corp., Kansas City, Mo.

From the Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402:

(A) Bulletin 41C titled "The Audible Landscape: A Manual for Highway Noise and Land Use" which deals with noise reduction techniques. Price $1.55.

(B) Bulletin 57C titled "Selecting and Using Electric Motors." A good book in any Superintendent's library. Price 85¢.

(C) Bulletin 114C titled "Managing Correspondence: Plain Letters." An excellent guide to good letter writing. Price 95¢.

CAN YOU TOP THIS?. . .

A golf course in New York.

Answer on page

Theory and Experimentation for Turf Irrigation from Multiple Subsurface Point Sources[1]

G. H. Snyder, E. O. Burt, J. S. Rogers and K. L. Campbell[2]

ABSTRACT

Subsurface irrigation of turfgrasses minimizes conflicts between turf users and irrigation water and equipment. It reduces pump, power and pipe size requirements. However, subsurface irrigation systems inherently provide a non-uniform distribution of moisture and dissolved minerals. Theoretically, lateral water movement from underground emitters will be enhanced as the clay and organic matter content of the soil increases, and as the water emission rate increases. A region of turgid 'Tifgreen' bermudagrass turf (*Cynodon*, sp.) on Pompano fine sand developed approximately 30 cm (12 inches) either side of subsurface irrigation lines containing multiple water emitting points, suggesting that a maximum line spacing of 60 cm (2 feet) would be acceptable. Incorporation of pine bark mulch or clay into the top 15 cm (six inches) while increasing the amount of water held in the surface, did not significantly improve the appearance of the turf or affect the size of the region of turgid turf. Several observations were made indicating nonuniform moisture and nutrient distribution laterally from water emitters.

Additional Index Words: Subsurface irrigation, Subirrigation, Drip irrigation.

In response to increasing interest in subsurface irrigation systems for turfgrass, and the general lack of information on which potential users can base purchasing and usage decisions, this paper has been prepared with three objectives in mind: 1) to enumerate the pros and cons of turf subsurface irrigation, 2) to discuss pertinent principles of water movement in soils as a basis for understanding subsurface irrigation, and 3) to present preliminary observations and experimental data obtained from a turfgrass installation of a subsurface irrigation system at the Agricultural Research Center in Ft. Lauderdale.

Drip or trickle irrigation has been widely publicized and discussed elsewhere (1). The term subsurface irrigation, as referred to by Davis and Nelson (5), implies underground placement of drip irrigation systems and will be used here in this context. It should be distinguished from subirrigation, which requires raising the water table to wet the root zone.

A few types of subsurface irrigation systems have been designed for turfgrasses, and others may offer possibilities for this usage. Most of these systems are based on the principle of creating multiple subsurface points of water emission. In some cases emitters are attached to conventional flexible plastic pipe, which is easily installed in existing turf by pulling it underground with a chisel and mole mounted on a garden tractor or modified sod cutter. Damage to existing turf is minimal and temporary. In other cases, specially designed pipe containing water emitting orifices is similarly installed. Porous pipes which act as subsurface line sources of water emission are also available.

SUBSURFACE IRRIGATION FOR TURFGRASSES

Some advantages of turf subsurface irrigation as compared to conventional overhead sprinkler systems are self evident. With subsurface irrigation the turf area can be used while being irrigated. Recreational equipment (chairs, tables, lawn games, playground equipment) and nearby parked cars, buildings and windows will not be water soaked. There are no above ground sprinkler heads to be damaged by pedestrians, lawn mowers and vandals. In most cases the system is designed to operate at very low pressures. This reduces the pump and power requirements and pipe size. Irrigation will be unaffected by wind. Other advantages frequently cited but not well documented or substantiated by research in many localities are: (a) lower water usage, (b) deeper root systems, and (c) lower disease incidence.

Certain disadvantages are evident also. The system can not be used to "wash in" surface applied fertilizers and pesticides, as is required for effective use of many of these materials. It is unlikely that certain fertilizer materials or pesticides can be evenly distributed laterally from the subsurface emitters when injected into the irrigation system, whereas uniform distribution is far more feasible with an overhead system.

More water outlets must be maintained and monitored since many more emitters than sprinkler heads are required for a given area. Also, their underground location makes them harder to locate and service. Overhead sprinklers generally are designed to overlap completely, so that if one head fails, most of the area it covers is irrigated partially by an adjacent head. Subsurface irrigation systems require many emitters and generally are designed with little or no overlap. Thus when one emitter fails, the turf served by that emitter suffers noticeably. The importance of these considerations will, of course, depend on the reliability of the particular system.

Since the emitters have very small orifices and operate at very low pressures, problems of clogging due to particulate matter in the irrigation water and due to sludge formation or other deposits within the irrigation lines and orifices are magnified. Because of the low pressures involved, variations in land elevations may pose a greater obstacle to acceptable pressure distribution across a subsurface irrigation system than to a high pressure overhead system.

[1]Contribution from Agricultural Research Centers, University of Florida, in cooperation with the U.S. Department of Agriculture, Agricultural Research Service. University of Florida Agricultural Experiment Stations Journal Series No. 5306.

[2]Associate Professor, Agricultural Research and Education Center, Belle Glade, Fla. 33430; Professor, Agricultural Research Center, Ft. Lauderdale, Fla. 33314; Agricultural Engineer, U.S. Department of Agriculture, Agricultural Research Service, Gainesville, Fla. 32611; and Assistant Professor, University of Florida, Agricultural Engineering Department, Gainesville, Fla. 32611, respectively.

The systems are difficult to install among numerous trees, plantings, buildings, etc., since subsurface irrigation pipes must be spaced far more densely than the lines for overhead systems. Finally, as with any new development, subsurface irrigation systems have not been as widely tested and as extensively refined as conventional sprinkler irrigation systems.

THEORETICAL ANALYSIS OF SUBSURFACE IRRIGATION PARAMETERS

Most emitter types are designed to supply water from a point source below the soil surface. However, in some cases water is emitted along the entire length of a porous pipe, i.e. from a line source.

Philip (13) and Raats (14, 15) have presented solutions for the flow equations of infiltration from point sources, line sources, and cavities located both at and beneath the surface. In the development of these solutions, necessary assumptions were made to linearize the partial differential equations for flow in two and three dimensions. However, the only solutions given are for steady infiltration, i.e., as time approaches infinity. In the case of multiple subsurface irrigation of turf there is more interest in the transient solution of the flow equations, i.e., water flow near time equal to zero. This is much more difficult than the steady state case. In some cases computer simulations have been used rather than direct mathematical solutions.

Many researchers have assumed deep homogeneous soil profiles without shallow water tables. In north and west Florida sands the deep profile conditions may be approached, but in the flatwood areas a shallow water table in heterogeneous soils is present.

Thus, in spite of the mathematical theory which has been developed for predicting water movement in soils from point and line sources, caution should be used in drawing conclusions and in extending theory to conditions for which it was not specifically designed.

Forces affecting water movement—Several investigators have presented theoretical analyses of water infiltration from point sources and from small spherical cavities in an attempt to determine the relative effects of capillary and gravitational forces. If gravitational forces were absent and only capillary forces were acting, water from a point source would move equally in all directions. Philip (12) has shown that in deep soils (no shallow water table) the gravitational forces greatly distort the flow pattern even in fine textured soils. The coarser the texture, the greater the vertical distortion due to gravity.

Water emission rates—Bresler et al. (3) and Brant et al. (2) have presented both theoretical and experimental results for infiltration from trickle sources located at the soil surface. The analyses are for transient flow and offer some clues to the problem. Their analyses show that increasing the trickle rate increases the horizontal movement and reduces the vertical movement for a given amount of water applied (Fig. 1).

Emitter spacing and depth—Horizontal spacing of emitters will depend upon soil texture, emitter flow rate, and percentage of area to be wetted (10). Fine textured soils will require fewer emitters per unit of surface area than coarse textured soils and a given volume of water applied will be retained at shallower

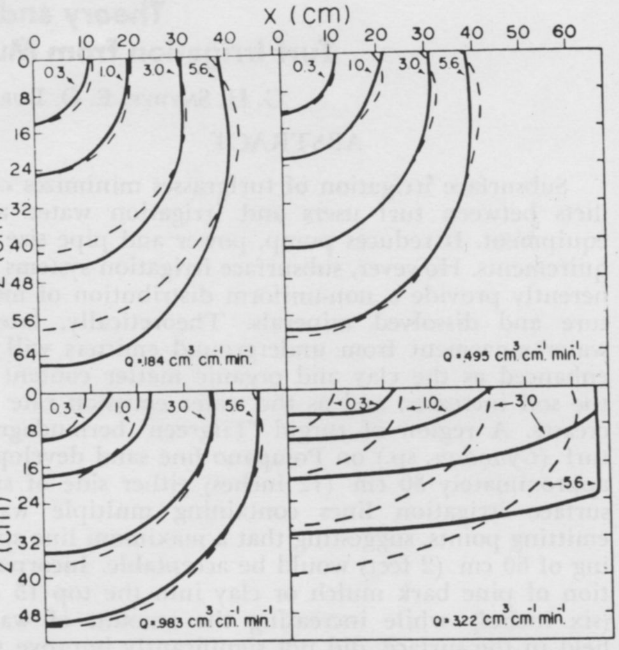


Fig. 1.—Computed wetting front position (solid lines) as compared with the observed one (dashed lines) for water applied from a trickle source at the surface at four trickle discharge rates (Q); 0.184, 0.495, 0.983 and 3.22 $cm^3cm^{-1}min^{-1}$. The numbers labeling the lines indicate cumulative infiltration water (cm^3). X and Z are space coordinates. Taken from Bresler et al. (3).

depth in the fine textured soil. Higher emitter flow rates will result in a larger horizontal spread of water in the soil, thereby increasing the emitter spacing. Supplying water to a smaller percentage of the crop area would also increase emitter spacing. Claims for much reduced water consumption by subsurface irrigation are often based on situations where only a small portion of the crop area is actually irrigated, such as immediately adjacent to trees in an orchard. Naturally water savings thus obtained are not applicable to turf areas, since the entire turf area is uniformly cropped.

Hiler and Bhuiyan (9) used a computer simulation of transient water flow from subsurface point sources to show that the most shallow emitter placement possible gives the best distribution of water in the root zone. For sandy soils in Florida it appears that the emitters should be located just deep enough to be undamaged by aerifiers, cup cutters, etc. Very little water moves upward in sands from a source, so the wetted area above the source is smaller than that below the source.

Soil heterogeneity—A shallow impermeable layer will limit the downward movement of water and enhance horizontal movement, especially when large amounts of water are applied in a short time. This principle has been demonstrated for turfgrasses by Daniel (4).

A coarse textured layer beneath a finer textured layer will also limit downward movement of water, but only during initial stages of water application. After sufficient water is applied to wet the coarse textured material, the layer will have little effect on the water distribution (7). In all cases of fine-over-coarse layers, the emitters should be placed in the finer textured layers

EXPERIMENTAL WORK

METHODS AND MATERIALS

Plots of Pompano fine sand approximately 3 m (10 feet) square separated by 1 m (three foot) alleyways were amended with finely ground clay[3] at rates of 1, 3 and 5% by air-dry weight or with shredded pine bark mulch[4] at rates of 2, 5, 10 and 20% by volume in August, 1968, at the Agricultural Research Center, Ft. Lauderdale. The amendments were incorporated by rototilling to approximately 15 cm (six inches). Check plots with and without rototilling were also included. There were four replications in a randomized complete block design. The overall plot area measured 22.9 by 30.8 m (75 by 101 feet).

In September, 1971, subsurface irrigation lines[5] with emitters on 61-cm (two-foot) centers were pulled through the plots at a depth of 10 cm (four inches), spaced 51 cm (20 inches) on either side of the plot centerlines, in the direction of the shorter overall plot area dimension (22.9 m, or 75 feet). They were connected to the irrigation water source (a small isolated pond) through a manifold system along one of the 30.8 m (101 foot) sides. It was assumed that the spacing would be too great to impart an even appearance to the Tifgreen bermudagrass turf over these plots. Thus, a band of green, turgid turf would develop over the irrigation lines during dry periods, and the turf would wilt beyond the wetted zone. The width of this wetted zone, as gaged by turf appearance, would be used to estimate the approximate distance at which the pipelines could be spaced to minimize uneveness in turf appearance.

The irrigation pipes were removed during January, 1973, because considerable variation in water flow among emitters was suspected, and replaced with pipe having a slightly modified emitter design[6]. A 75 micron water filter was installed at this time. The area was fumigated with methyl bromide and sprigged with Tifgreen bermudagrass in February, 1973. Overhead irrigation was used for about one month while the sprigs were becoming established.

The subsurface irrigation systems were operated three times each week during dry periods. The initial system was operated at approximately 10.6 l (2.8 gal.)/hr./emitter, and enough water was applied each irrigation to supply 2.54 cm (one inch) of water over the 3-meter (10-foot) square plot areas. The second installation was operated at 6.8 l (1.8 gal.)/hr./emitter, at a rate of 1.5 cm (0.6 inches) per application.

Observations were made on the width of the bands of turgid turf over irrigation lines during periods without significant precipitation. In addition, plots were visually rated on a 1 to 10 scale for uniformity of turf appearance over the plot area. Ratings were subjected to analysis of variance (16). On one occasion soil moisture was determined gravimetrically in 0-15 cm (0-6 inch) samples taken at 0, 25, and 51 cm (0, 10, 20 inch) laterally from the irrigation lines in all replications of selected treatments 24 hours after an irrigation with the first installation. Other soil samples taken during the course of the study were chemically analyzed by conventional means. Various other visual observations were made, as discussed below. Relative plot elevations were recorded. Linear regression analysis (16) was used to test for a relationship between plot ratings and relative plot elevation. The turf was mowed weekly to 1.9 cm (3/4 inch) and conventionally maintained as a lawn.

RESULTS AND DISCUSSION

For both installations the turfgrass generally appeared green and turgid approximately 30 cm (12 inches) either side of the irrigation lines, suggesting that a pipe spacing of 60 cm (two feet) would be the maximum acceptable. Soil amendments did not consistently affect the trend for turgid turf band width during the course of the experiment or give any significant differences in plot ratings. However, certain plots, including checks, consistently had wider bands of turgid turf, suggesting either non-uniformity of water emission or unrecognized soil conditions. For both installations there was less than 0.035 kg/cm² (1/2 psi) pressure drop down the 22.9 m (75 foot) length of the irrigation lines (the low end averaging about 0.14 kg/cm² or 2 psi), but lateral water movement as gaged by turf appearance was reduced considerably near the low pressure end of certain lines. This was particularly true in a region of the plot area which increased in elevation 5-10 cm (2-4 inches) in 9 m (30 feet) in the direction of the lower pressure end of the line. However, regression analyses showed no significant linear relationship between plot rating and plot elevation when all plots were considered.

The boundary between turgid and wilted turf was generally sharp. However, soil moisture over a 0-15 cm (0-6 inch) depth decreased approximately lineraly with lateral distance from the emitters and was greater in plots receiving the higher rates of clay and pine bark (Fig. 2). Where emitters failed to supply water normally, the turf above the emitters wilted. In a very few cases emitters put out abnormally high amounts of water and free water came to the soil surface. In these cases new emitters were spliced into the line.

TABLE 1.—SOIL PH AND NH_4OAc PH 4.8 EXTRACTABLE CA IN 0-15 CM SOIL SAMPLES, WITHIN THE IRRIGATED REGION, ADJACENT TO AND AWAY FROM UNDERGROUND WATER EMITTERS.

SAMPLE LOCATION	pH	Ca (kg/ha)
OVER EMITTER	6.9	1316
AWAY FROM EMITTER	6.0	918
SIGNIFICANCE	**	**

**Differences within columns are significant at the .01 level.

Yellow patches of turf appeared over each emitter after the system was used for several months. This could have been due to insufficient aeration in this

[3]VMP-3000 Emathlite clay. Mid-Florida Mining Company, Box 68, Lowell Florida 32663. (Trade and company names are used in this publication solely to provide specific information. Such use of trade names does not constitute an endorsement by the University of Florida or the U.S. Department of Agriculture over other products not mentioned).

[4]Greenlife Pine Bark Mulch, Greenlife Products Company, West Point, Virginia 23181.

[5]Fas-Gro Products, DeHaven Associates, Inc., Worthern Bank Bldg., Little Rock, Arkansas.

[6]Nelco, Inc., 2400 Campbell Road, Bldg. D, Houston, Texas 77055.

moist zone, disease, nutrient depletion in this region of maximum growth and water movement, or localized high soil pH and Ca accumulation because the water source was a pond cut into Miami oolite limestone bedrock (a common water source in this area). A trend for the latter was confirmed by a comparative analysis of soil samples taken in the region of the yellowed turf and away from this area (Table 1). The soil pH and Ca values do not appear sufficiently high to account for the yellowing. But since the soil samples represent an average over a 15 cm (six inch) depth, pH and Ca may have been locally higher at certain depths. In any event, the data clearly show a trend for Ca accumulation in the region of the emitters. By inference, it would be reasonable to assume that fertilization through the subsurface irrigation system would probably cause localized concentrations of nutrients which would be undesirable for turfgrass. Goldberg et al. (8) have documented this well for drip irrigation systems. It might be desirable to apply some N through the system to replace that carried away from the emitter region by the irrigation water. Less mobile nutrients could be conventionally applied evenly across the soil surface, using either rainfall or overhead irrigation to move the fertilizer into the soil.

In the early morning during periods when the system was in use, the buried emitter lines could be easily located by observing droplets of water on grass leaves located over the lines. This water apparently guttated from the grass growing in the regions of maximum moisture availability. This observation, along with the data of Fig. 2, illustrates the non-uniformity of the water distribution laterally from the emitter lines.

No reduction in the emitter flow rates was observed during the course of this study, which suggests that

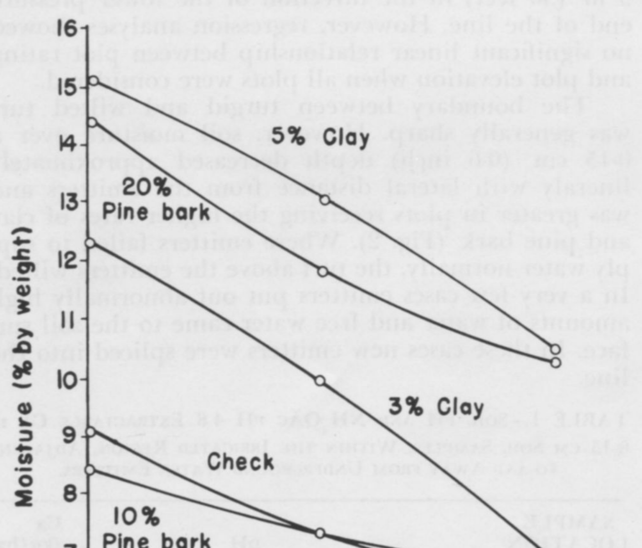


Fig. 2.—Soil moisture in 0-15 cm (0-6 inch) samples as a function of distance from subirrigation lines in Pomano fine sand with various soil amendments.

emitter clogging was not a problem during the relatively short time the systems were in operation. However, emitter orifice plugging is always a potential problem with subsurface irrigation systems. It is a matter to be considered carefully and delt with appropriately. Michell (11) has reported emitter orifice plugging due to external cementation of fine soil particles around the orifice. This should not be a problem in sandy soils. Neither Mitchell (11) nor Davis (6) consider root growth into subsurface irrigation emitter orifices a problem.

CONCLUSIONS

Since an objective of turfgrass culture is a uniform appearance, subsurface irrigation lines will have to be spaced exceedingly close, as compared to other crops, to achieve this objective. Based on the theoretical predictions and experimental results presented herein, it appears that turfgrass subsurface irrigation systems in sand soils should be installed with emitters spaced not over 60 cm (two feet) apart, or closer if practical to allow some overlap, and as close to the surface as is reasonable. The system should be operated at relatively high water emission rates of the duration necessary to wet the root zone (rather than as a continuous trickle) in order to maximize lateral water movement.

Subsurzface irrigation offers many advantages where turfgrass is intensively used, along with certain disadvantages which must be recognized. Some of these can be minimized through proper installation and use of the irrigation system.

Reprinted from Soil and Crop Science Society of Florida Proceedings, Volume 33, November 27, 28, and 29, 1973

CAN YOU TOP THIS?

Answer Vandalism

★★★★★★★★★★

HOOKS AND SLICES

A cowboy was galloping his horse across the plain when he came upon an Indian lying on the ground. He dismounted, approached the prostrate figure and asked, "Can I help you"?

The Indian said "Covered wagon--four oxen–white man driving–good lookin blonde woman in back holding baby."

"Fantastic", said the cowboy. "How utterly superb that you could foretell the coming of a wagon like that."

"Hell no," said the Indian, "they ran over me about an hour ago."

★★★★★★★★★★★★★

STRAIGHT SHOTS

GOLF MAINTENANCE– PAST, PRESENT AND FUTURE

By Tom Mascaro

Golf course maintenance evolved slowly in the early days of its beginning. As mechanical technology advanced, equipment to maintain turf began to appear. Horse drawn mowers were in use only 50 years ago. The Ford Model "T" was a significant factor in power for mechanization. Later the Fordson farm tractor, capable of pulling large gangs, opened the way towards efficient maintenance. Rubber tires replaced steel wheels. Small internal combustion engines as they evolved, were employed to propel and operate smaller mowers and other implements.

Today we have at our disposal many pieces of equipment that fill the needs of turfgrass maintenance efficiently.

This is not to say that we have reached utopia. Far from it. The evolution of turfgrass maintenance equipment is still proceeding. As the industry grows, more companies will seek this market with new and better machines. Costly hand labor will be replaced more and more with mechanization.

What does the future hold? Telltale signs are all around us. New metals and plastics will play a big role in our future. Closed circuit television, radio control, and remote guidance are already with us and unquestionably refined.

Fertilization, disease and weed control, insecticides, etc. will become an integral part of future irrigation systems. All of these materials can be applied with the push of a button.

The person that pushes the button must also keep pace with the evolution. Attending meetings, field days, and turfgrass conferences will help prepare all of us for the bright and easier future.

STRAIGHT SHOTS

If anybody comes around who claims he is from OSHA–the Labor Department's Occupational Safety and Health Administration–ask for his credentials to make sure he's for real. Phony inspectors are known to have turned up here and there in Georgia and Florida, and probably elsewhere.

The bogus inspectors are con men. One of their gambits is to demand on-the-spot payment of penalties for alleged violations of federal safety regulations.

A smoother approach involves two of the con artists. One of them shows up alone, posing as an inspector. He asserts that safety rules are being violated which must be corrected by purchase of certain tools or equipment. An accomplice shows up a couple of days later to sell you--you guessed it—the very tools or equipment mentioned by the first phony.

Reprinted from
Progressive Farmer
April 1975

ON PESTICIDE CERTIFICATION

The Federal Government is requiring that each state must provide for certification of pesticide applicators. This is not news to anyone in the business of golf course maintenance but a review of the facts of the matter should be helpful in understanding some of the developments we will discuss here.

The enabling legislation for this requirement is the Federal Insecticide, Fungicide and Rodenticide Act of 1947 Public Law 92-516 (As amended by Congress in 1972). It specifies that each state will submit its program for certification of applicators before October 1975 so that

STRAIGHT SHOTS (cont'd)

applicants can be certified before October 1976–the deadline set to enact all provisions of the Act.

Briefly, the important provisions of the Act require that:

A) all pesticides are to be classified as either for **general** use or for **restricted** use.

B) restricted use pesticides will be available to **certified** applicators only.

C) to be certified an applicant must be knowledgeable in the following areas:

1. correct sotrage of pesticides;
2. calibration of equipment;
3. correct application rates;
4. identification of pests;
5. comprehension of labels;
6. container disposal;
7. environmental effect of pesticides;
8. safety procedures related to handling pesticides;
9. pesticides and their use in general; and
10. First Aid procedures.

D) Users of restricted pesticides are to be classified as either **Private** or **Commercial** Applicators. To be certified as a Private Applicator the applicant must be a farmer who will be applying pesticides to land he owns or leases and must prove competence in the use of pesticides by passing an examination. To be classified as a Commercial Applicator the applicant must be engaged **in the business** of applying pesticides and must prove competence in the category or categories to which he belongs. Competency again to be determined by passing an examination. The ten categories, based on occupation, are:

1. agricultural pest control;
2. forest pest control;
3. ornamental and turf pest control;
4. seed treatment;
5. aquatic pest control;
6. right-of-way pest control;
7. industrial, institutional, structural, and health-related pest control;
8. public health pest control;
9. regulatory pest control; and,
10. demonstration and research.

At a meeting of the Horticultural Spraymen's Association of Florida on April 26 at the Broward Agriculture Extension Service facility at Ft. Lauderdale Dr. John A. Mulrennan, Chief, Bureau of Entomology provided the following information and horseback (his term) opinions:

A) The Federal Administrator of the Act has not released a list of restricted pesticides.

B) There are presently five agencies in the State controlling and certifying pesticide applicators.

They are:

1. the Dept. of Health and Rehabilitative services;
2. the Dept. of Natural Resources;
3. the Dept. of Agriculture
4. the Dept. of Pollution Control; and
5. the Dept. of Mosquito Control

An inter agency committee composed of members of these departments and others was to have presented a program to the Governor on May 6 that would in turn be presented to the Federal Administrator of the Act.

C) The time table calls for approval and implementation of this program by January 1976 so that certification of applicants can be completed by October 1976.

D) The Act requires that the State must administer the provisions of the Act. This, then requires that Federal funds be provided for this purpose but the funding had not occurred at this date (April 26, 1975).

E) The Act has no "grandfather clause" but Florida has already been certifying in a good program and, as a result, he sees no likelihood of anyone being put out of business.

F) In connection with No. 5, "There will have to be some adjustments made to get the kinks out."

G) The process of preparing (educational programming) and testing applicants for certification will probably be the responsibility of State facilities such as the Broward Agriculture Extension Service.

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Our Turf Equipment does part of the job... We do the Rest!

Like a personality, there are many facets that contribute to the make-up of DeBra Turf and Industrial Equipment Company. Hand-picking a select group of people to form their service department, maintaining an up-to-date equipment inventory and being able to make good all of their claims and promises are only a part of it.

The entire corporate family demands peak performance from their machines...from themselves. It is this policy that has made DeBra a name to be trusted for Turf and Industrial Equipment in the state of Florida.

The Turf & Industrial Equipment People

DEBRA