larly with the large sized single blade machines. This problem **can** be effectively solved by shielding, so it seems unnecessary to accept this standard.

Stability Hazards

Regarding stability hazards, Consumer's Union is suggesting the following standards:

* a riding mower shall not tip on a 30-degree slope or the steepest slope it is able to climb, whichever is greater;

* a riding mower shall emit a continuous audible warning sound when the mower is tilted to an angle five degrees from the limits of stability;

* a red flashing warning light will turn on to warn hard-of-hearing operators that the mower is tilted to an angle five degrees from the limits of stability;

* a power lawn mower shall have an interlock to stop the engine and halt the blade in the event of tipping beyond the limits of stability. This interlock shall function when any pair of wheels leaves the ground.

If you have ever been involved with servicing interlocks, you will realize that everything outlined above will require electronic circuitry far beyond our ability to trouble shoot in case of failure. It is frankly admitted by the engineering group studying the proposed interlock that individual wheel sensors with the programmable sequencing required to accomplish this interlock system are far beyond their abilities to design, and will require a minicomputer on the unit to accomplish the specified results.

Other Proposed Standards

Another proposed standard would require a riding mower to have a weight sensitive control in the seat which would cause the engine to stall when shifted to forward or reverse unless the control is actuated by a weight of 65 pounds or more on the seat. The purpose is to protect children "who have been know to go joy riding" and is a substitute for mother's supervision. This standard would require an anvil on the seat to negate the effect of the interlock when the mower is in the service shop for engine work.

To reduce fire hazards, it is proposed that the fuel cap remain locked and incapable of being removed until engine and exhaust temperatures are below 250 degrees F., and the cap be provided with an interlock to stop the engine when the cap is removed. Here's another program for the mini-computer.

Burn hazard proposals specify that any surface used for lifting, holding or carrying shall not attain a temperature higher than 105 degrees F. Any other surfaces (including the muffler) that may be contacted casually in normal use, or that may be contacted accidentally by the user or bystander shall not attain a temperature higher than 131 degrees F. This standard should not be difficult to comply with in Siberia in the winter, but try it in the Phoenix desert area where there were more than 100 days of 100-degree or higher temperatures last summer.

The proposals covering braking hazards are so broad and so many brakes are required that it is doubtful if you could ever get the mower going in the first place.

Unanswered Questions

The obvious question going through your mind is "How does all of this affect me as a professional in the turf and ground maintenance field?"

In November, 1974, I attended a meeting of the special OPEI Engineering Forum on Lawn Mower Standards as an observer. Represented at the meeting were the OPEI, Consumer's Union, CPSC and engineering representatives of major mowing equipment manufacturers. I was the only distributor or end user of the products under discussion in attendance.

Prior to the meeting, I was under the impression that safety standards were being discussed to be incorporated into the typical homeowner rotary mower, whether riding or walking. As the proceedings unfolded, it became apparent that most of the people in attendance were of the same opinion, with the exception of the Consumer's Union and the CPSC representatives.

In order to clear up the scope of the standards, I proposed two questions to the Consumer's Union: 1) Do you make any distinction for your proposals between homeowner and commercial or professional equipment? 2) Do you make any distinction between rotary and reel type mowing equipment?

No attempt was made to answer either question, and the CPSC representative also declined to answer.

The attorney for the OPEI repeated the question to the CPSC representative who again declined to answer. At this point he attempted to answer the first question by giving the following example. If a piece of equipment is used in the maintenance of schoolgrounds, then it involves the children's safety, and if it involves the children's safety, it probably will be interpreted as within the realm of the CPSC. This approach leads us to parks, golf courses and to the ultimate conclusion that all rotary mowers will be covered. The question pertaining to reel versus rotary equipment was resolved in the same manner by saying that if a stability standard is developed, it will be applied by the CPSC across the board to all equipment.

What I am saying should not be construed in anyway as indicative that the OPEI, the equipment manufacturers, or any of us in the power equipment industry are opposing any measures which will make our products safer to use. We welcome any performance standards that will make our equipment cut grass better, cut grass safely and cut grass at a reasonable cost.

What we do not want is arbitrary standards similar to some of those which have been imposed on the automobile industry to protect drivers from their own foolishness, and which result in increased product cost beyond the benefits derived.

There are three elements of hazards in the grounds maintenance business with which we must contend: the product, the operator and the environment.

It is our job to recognize an unreasonably and inherently hazardous product and discontinue its use.

It is our job to train, train and retrain our operators and mechanics in safety.

It is our job to know the environmental limitations to the use of a piece of equipment and use it only in those areas where it is safe for the operator and safe for bystanders. Performance standards that are reasonable are not objectionable, but the design of the equipment must be left to the manufacturers. □

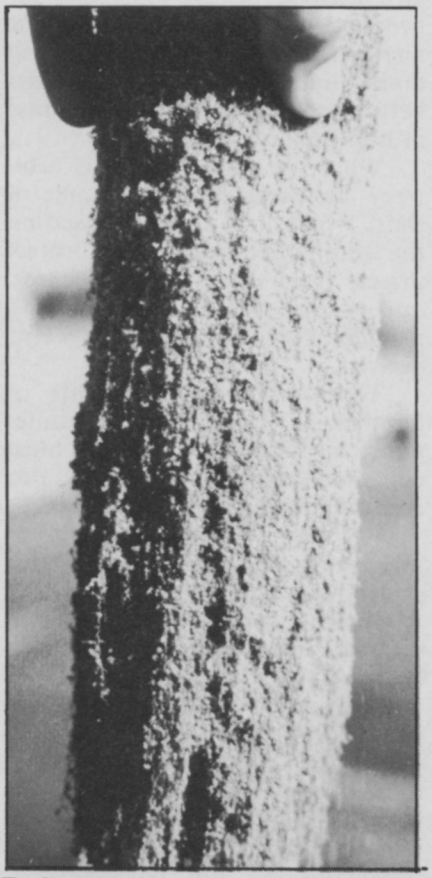
Turf Subirrigation — Technique of Tomorrow?

By JEFFREY V. KRANS
Turfgrass Extension Associate
Michigan State University

SUBIRRIGATION involves the application of water to the plant from beneath the surface. This method of irrigation supplies water for root uptake by capillary action and avoids wetting the soil surface.

Subirrigation has been shown to minimize soil compaction and reduce water usage resulting from excessive surface evaporation and runoff. The most common methods of subirrigation provide water from either: a) a constant or fluctuating water table, or b) perforated tile.

The constant or fluctuating water table system is employed by surrounding a localized area of soil with an impermeable barrier and maintaining a water table above the barrier at a desired level beneath the soil surface. This system requires that the distance between the soil surface and a level plane of the barrier be maintained constant for uniform water distribution.



Turfgrass root development was quite extensive on the subirrigation plots with a fluctuating water table.

The perforated tile method involves burial of plastic pipe or tile beneath the soil surface usually to a depth just below normal root penetration. This system supplies a specified amount of water to replenish the soil moisture reservoir, but at a very slow rate to minimize seepage loss below the root zone. Clogging of the tile and lack of uniform distribution are common problems.

The use of subirrigation has usually been limited to areas with naturally occuring high water tables. These areas are mostly in agricultural crops with the exception of some commercial sod production on organic soil. Few studies have been reported on the use of subirrigation for turf.

Early research was conducted at the University of Arizona using perforated plastic pipe.[1] They showed that subirrigation can be managed to provide good bermudagrass turf with water use similar to sprinkler irrigation.

The PURR-WICK root zone system has been developed and successfully used for irrigation of recreational turf in a temperate climate.[2]

A recent field study was conducted at the University of Arizona to evaluate the merits of subirrigation on high maintenance bentgrass turf during prolonged summer heat stress.[4] Some of the more important aspects of that work are presented herein.

Treatments included a conventional sprinkler irrigation system, subirrigation with a stable water table 12 inches below the soil surface, and subirrigation with a fluctuating water table. The fluctuating water table ranged between five (after subirrigation) and 20 inches (after depletion). Two artificial soils were used: a) a 52 percent sand, 24 percent loamite (a product formerly processed from wood by the Loamite Corporation, Santa Rosa, Calif.), and 24 percent sandy clay loam soil mixture; and b) an unamended washed mortar sand. Nitrogen was supplied by dissolving ammonium sulfate in the irrigation water before it was applied for each of the subirrigation methods.

Color, Growth and Root Development

In general, turfgrass growth on subirrigation using a fluctuating water table was similar to sprinkler irrigated plots and superior to turf produced under subirrigation with a stable water table. Turf color, as measured by chlorophyll content, was noticeably darker green on sprinkler irrigation treatments compared with both methods of subirrigation treatments. Root growth and development was measured at the end of the summer and revealed that subirrigation treatments with a fluctuating water table had the greatest amount of root development; subirrigation with a stable water table produced less root development; and sprinkler irrigation had the poorest root development.

Overall, the summer evaluations indicated that the major contribution of subirrigation and fertilization were that root development was noticeably greater and the turf did not require periodic syringing on hot windy days. The major disadvantage associated with subirrigation and fertilization practice was a lighter green turf, especially on subirrigation treatments with a stable water table. Salt accumulation on subirrigation treatments did not build up to detrimental levels. Overall, the sand and mix showed similar growth and color characteristics. Root development, however, was significantly greater on the sand than mix.

Nitrogen Fertilization

Turfgrass color on subirrigated treatments showed typical symptoms of nitrogen deficiency. Tissue analysis of leaf material revealed nitrogen content on subirrigation treatments significantly lower than sprinkler irrigated plots. These lower nitrogen levels on subirrigation treatments were comparable to tissue nitrogen levels of sprinkler irrigated bentgrass at the onset of nitrogen deficiency under similar temperatures.[3]

(continued on page 48)

Tree Wounds and Decay

A Talk With The Expert

By WALTER E. MONEY, Guardian Tree Experts

Recently, members of the Maryland Arborist Association visited Dr. Alex Shigo, plant pathologist with the U.S. Forest Service, at the Northeastern Forest Experiment Station in Durham, N.H. In two successive one and one-half day seminars, the arborists were able to go into a detailed study of the decay process associated with wounding in trees.

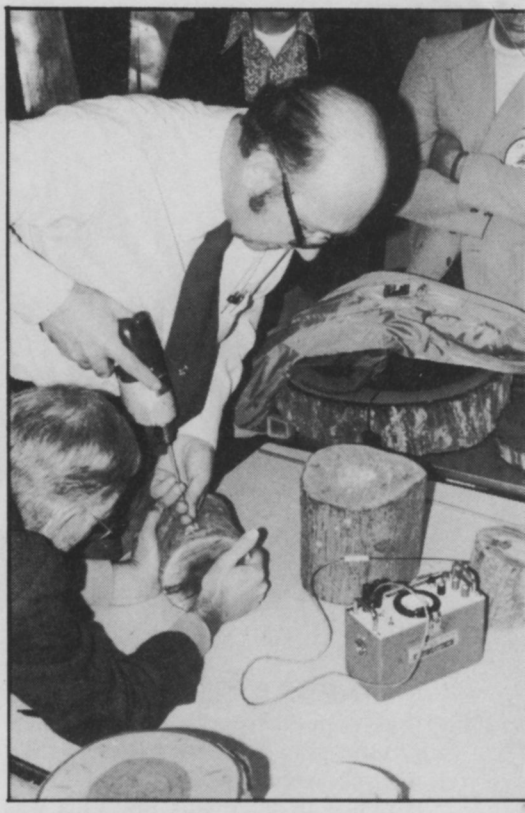
Shigo used a host of specimens that he has collected over the years to punctuate his explanations that wounds are the number one problem of trees — even Dutch elm disease begins with a wound by the feeding of the elm bark beetle — and that trees attempt to compartmentalize or seal off a wound and heal themselves over a period of time. His detailed descriptions that proper pruning and fertilizing are several of the key ingredients in this healing process were the dollars and cents ideas that the tree experts were able to take home with them.

Dr. Alex Shigo explains to Walt Money of Guardian Tree Experts why proper pruning of old stubs is so critical in the healing process of trees.

Throughout the discussions, Shigo was able to logically, and with strong evidence, shoot holes into some of the "sacred cow" ideas that have come down to tree men over the years, such as: a second growth stump sucker is not supposed to be trusted to become a structurally sound, mature tree. However, under certain circumstances, this tree should be as safe as a tree grown from seed. Also, that it probably would hinder rather than help a tree to flush cut the heal callous of an old stub that had almost healed and thereby break the natural barriers that the tree has set up to control decay.

The need for proper pruning was emphasized in that poor pruning and jagged stubs act as a "wick" to carry infection to the center of the tree, and that judicious pruning and feeding can be analogous to "immunization" shots to help a tree better withstand more severe shocks to it system, such as wind and ice breakage.

The one- to two-hour programs that Shigo has presented on this subject around the country have not been long enough to go into what many professional arborists consider to be some of the most exciting information to hit their industry in many years. For this reason, the "mountains went to Mohammed" in New Hampshire for a more detailed program. Of particular benefit to men who make their livelihood from the care of shade trees were the ideas that they took home to use in formulating more logical sales presentations to tree owners.



Ed Hogarth steadies a tree section as Alex Shigo drills a small hole in preparation for a demonstration of the "Shigometer," an electrical probe that can measure the advance of decay in a living tree.

In a day when we are more aware than ever of government programs and spending, it is refreshing to know that the Forest Service is an agency that returns more revenue to the treasury by the management of our forests than it spends to maintain itself. Many more questions remain to be answered, but we are sure that with gifted researchers such as Shigo, and with the positive attitude displayed by the Forest Service, we are on the way. □

Corrosion On a PVC Irrigation System

By DR. L. W. GLEEKMAN, Materials and Corrosion Engineering Services, Southfield, Mich.

A two and one-half inch ips male thread-to-tubing nipple.

ONE WOULD ordinarily think that copper fittings on an underground plastic piping system would not corrode; there is much experience to back this up. This was not the situation, however, in an automatic sprinkler system installed several years ago in the community center of a major city in Michigan where an abnormal situation resulted in leaking at the copper fittings.

The installation involved copper fittings in conjunction with automatic brass valves and plastic piping on the main and lateral runs. Back flow prevention was provided consisting of line size vacuum breakers on the discharge side of each zone control valve.

The underground specifications called for sizes two-inch and smaller being flexible, non-toxic plastic pipe made from 100 percent virgin polyethylene with a minimum 80 psi working pressure. All stainless steel clamps were to be used to secure the joints. Joints one inch to one and one-half inches and larger were to be double-clamped. All plastic pipe was to be continuously and permanently marked with the manufacturer's name, material, size and schedule or type; pipe conformed to PE 2306-Irrigation pipe. Sizes two and one-half inches and larger were to be virgin high-impact polyvinylchloride pipe with a minimum 125 psi test; pipe was to conform to ASTM C-178-60T. Pipe fittings were to be either copper pipe with wrought solder fittings or flexible polyethelene fittings on automatic drain and underground branch line only. PVC solvent weld fittings were also allowed.

Other details of the manual valves, remote control valves, automatic controllers, valve boxes, drains, and so on, are not germane to the ensuing problem.

At the time the investigation started, the system was approximately a year old, and was buried in soil not considered overly aggressive. However, in a short period of operation, leakage was found at several of the copper fittings on the underground systems. City officials and others involved in the problem immediately began to look for such things as electrolysis, stray currents from nearby radio transmitters or unusual soil conditions. The water used for sprinkling was city water.

When the investigation of the cause of corrosion started, three threaded copper adaptor pieces were received. The pieces may be described as follows:

- Small piece, two and one-half inch ips male thread-to-tubing nipple with a short length of two and one-half inch copper tubing attached by a soldered joint.
- Medium piece, two two-inch ips male thread-to-tubing nipples joined together to a short length of two inch copper tubing by soldered joints.
- Large piece, two-inch ips male thread-to-tubing nipple soldered to a piece of two-inch tubing, in turn soldered to a two-inch to one and one-half inch reducing bushing, soldered to a piece of one and one-half inch tubing.

The small piece showed attack at only one area in the threads; this was located three threads back and was slightly oval in shape. Sand was present in the threads on most of the piece, indicating that no more than three threads had been properly engaged.

The medium piece showed the largest amount of attack. There was a large section chewed out of the threads on one end with the adjacent threads attached. The octagonal shanks of the fitting were worn smooth right down to the solder in one area. The other threaded end was perfect, with the first four threads clean and shiny showing full engagement; the remaining six threads had a visible trace of a blue compound plus very definite grains of sand in many of these threads. On the attached end, from the color of the threads and the location of the sand in the threads, it was very evident that no more than two threads had been fully engaged.

The large piece had been coated after removal with a blue PVC joints cement over a large part of the threads. Thus, the presence of sand and gradations in color would not be clearly differentiated. However, the location of attack was, at one

(continued)

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CORROSION *(from page 24)*

point, in the threaded portions of the nipples.

Metallurgical examination was carried out by removing sections from both small and large pieces. The microstructure was normal for drawn copper fittings with no signs of metallurgical contaminants such as copper oxide. The structure of the attacked areas was the same as the unattacked. There was no sign of pitting, stress corrosion, intergranular corrosion attack, and so on. Chemical analyses were not run since metallographic examinations showed no abnormal phases nor were specifications on the copper fittings spelled out to allow any comparison.

Examination at low magnifications (three to 15 times) clearly showed the nature of the attack. The medium piece showed the greatest attack and the clearest differentiation of the mechanism. The maximum attack in the threads started at the inner end of the thread and progressed back six threads at one location. The attack was characterized by overlapping shallow depressions in both the root and the top of the threads as well as along the sides of the thread. There was a definite clockwise orientation to the attack in the direction of the right-hand thread. This was characteristic of the attack on all threaded joints. Downstream of the attack area there was no attack. The hole in the medium piece, which was elongated transversely to the length of the tubing and nipples, was in direct line with the eroded portion of the shank of the two nipples.

There was no sign of attack on the interior of the tubing or fitting and the hole clearly proceeded from the inside outward. The surface of the tubing and the nipples showed an exceptionally smooth wear pattern and with no grooves or scratch marks. Obviously, the copper wall of the tubing had been worn by external erosion of escaping water to the point where it could no longer withstand the internal pressure; the tubing then ruptured.

Dr. Mars Fontana of The Ohio State University, the senior author of "Corrosion Engineering" (McGraw Hill, 1967), lists eight forms of corrosion and the factors causing each type of corrosion on copper. Two additional types of corrosion have been added since they are corrosion caused by environmental conditions.

Examination of the pieces and description of the corrosion allows the conclusion to be drawn that the corrosion was NOT:

1. Uniform—The attack would not have been uniquely located in just a part of the threads if the soil were corrosive and would have been found inside the tubing if the water were corrosive.

2) Galvanic—So far as is known, copper nipples were not in contact with cast iron or passive stainless steel or graphite; in addition, attack would have appeared entirely around the threads.

3) Crevice—Again, the attack would have appeared entirely around the threads in all crevice areas and not just a small area.

4) Fitting—The attack would have been more evenly spread over the threaded area without the unique orientation found.

5) Intergranular—No attack was seen at grain boundaries on metallurgical examination.

6) Selective leaching—No such attack was seen on metallurgical examination nor was there a second element present in the copper for such an attack.

7) Stress—Metallurgical examinations showed no stress corrosion cracking (the pieces were in the annealed condition).

8) Soil—Attack would have been on the exterior of the copper pieces and not uniquely in the threads.

9) Stray current—Attack would have been localized on certain portions of the exterior and not in the threads.

The corrosion of the copper fittings is traced to cavitation corrosion in the threads, followed by erosion-corrosion of the exterior of the shank of the two nipples and the tubing joining the nipples ("medium" piece).

The fact that sand and blue "thread cement" were still visible on all but the first two or three starting threads of the nipples establishes that there were insufficient threads in contact. The on-off operation of the sprinkler system with the fluctuating pressure from zero to full line would then cause cavitation to progress along a path of seepage of water to the exterior. This would account for the clockwise orientation of the attack and the roughened appearance of the attack.

(continued on page 50)

This is the medium piece — a two inch ips male thread-to-tubing nipples joined together to a short length of two inch copper tubing by soldered joints.

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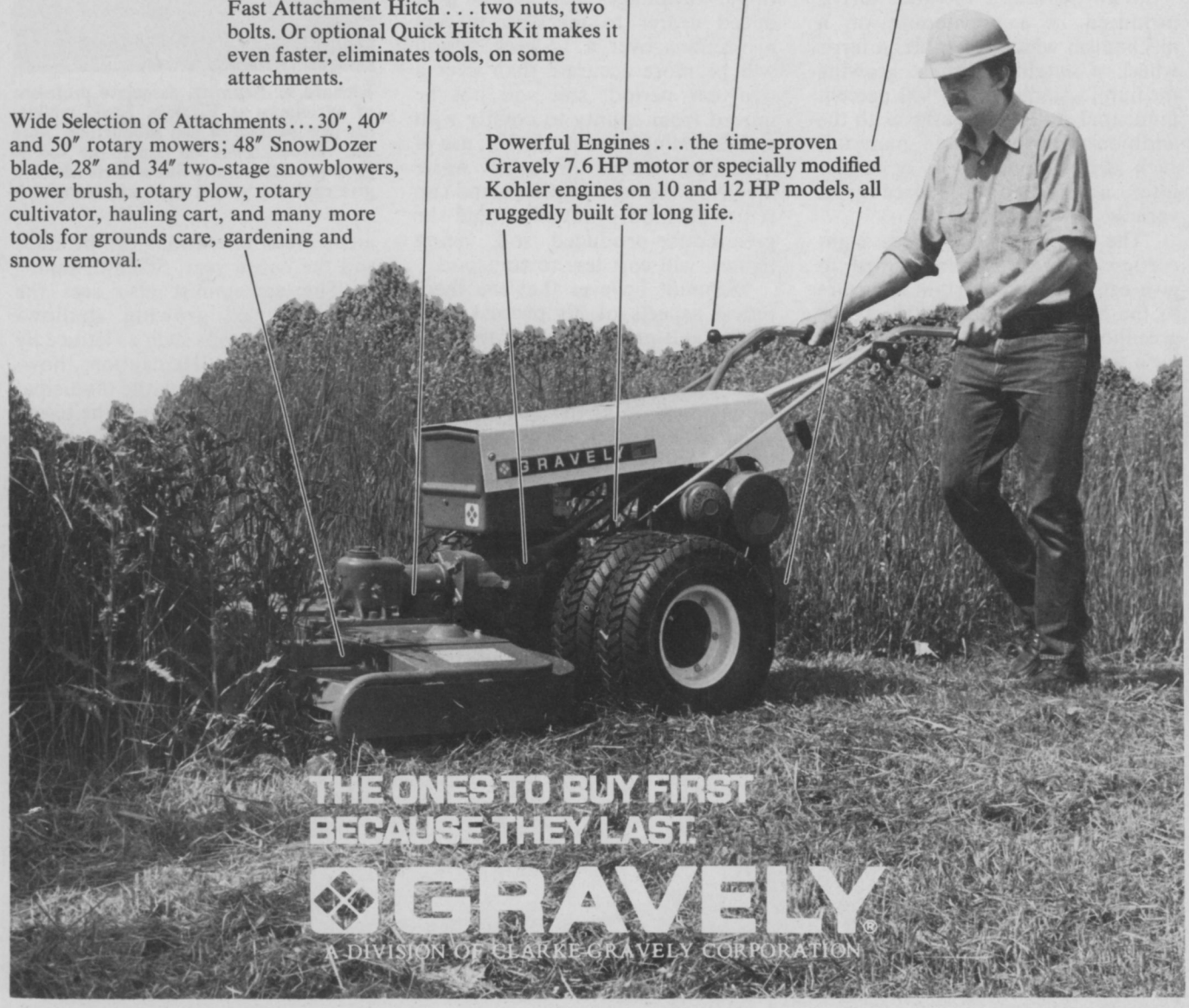

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'Ferris Wheel' Sod Production Could Revolutionize the Industry

A NEW METHOD of sod production which could conceivably revolutionize the industry has been developed by Richard E. Schmidt, associate professor of agronomy at Virginia Polytechnic Institute and State University.

Under traditional sod production methods, land is prepared and seeded to the desired turf varieties. It takes two years before a marketable turf is produced.

With Schmidt's method, turf is produced in a greenhouse on a mechanism which resembles a ferris wheel. Containers of a growing medium, usually either 100 percent municipal sludge, or sludge with the addition of other waste materials such as hog hair, fly ash, or broiler litter, are seeded to desired grass varieties.

The ferris wheel rotates eight carriers through a cycle timed to give each carrier a certain exposure to the best lighting available in the greenhouse. The device is operated by a time clock and the rotation is continued throughout the day and stopped at night. Watering is done automatically by a solenoid controlled by the time clock.

Schmidt figures conservatively that his method will produce sod 25-fold over the present conventional method. With his apparatus, he can produce four crops of sod per year and can stack them via his ferris wheel to give a multiple of four over a single flat area in the greenhouse. Then, it should be remembered that these figures are for one year's production versus the two years for conventional production methods.

In addition to more efficiency of production, Schmidt lists these additional advantages: sod can be produced nearer to markets; market projections over a 12-week period will be more accurate than over a two-year period; soil will not be moved from county to county with sod, lessening weed problems; use of municipal sludge or other waste materials means that prime land can return to food production; and the greenhouse-produced sod, being lighter, will cost less to transport.

Schmidt believes that the theoretical aspects of his process have proven out and now risk capital of about $60,000 is needed to build a pilot operation to prove the commercial aspects of the system.

If the system performs as he believes it will, it would be possible for a sod producer to have small operations near large metropolitan areas. Such operations can produce sod the entire year, Schmidt said.

The agronomist also sees the possibility of growing shallow-rooted food crops such as lettuce by his new method. He cautions, however, that in this case, the municipal sludge used would have to be tested against the presence of heavy metals or other harmful ingredients.

A patent is pending on the new products, Schmidt said.

Richard E. Schmidt, associate professor of agronomy at Virginia Tech, exhibits his new method of sod production. Note the various levels on which the sod is grown, which revolve like a ferris wheel to give each the proper light exposure.

Northern California Turfgrass Council's new president, Grady L. Simril (right) of East Bay Regional Park District, accepts a certificate of merit from outgoing president, Paul J. Albright, Jr., of Berger & Plate.

Turfgrass Council Elects Officers

Grady L. Simril, horticultural specialist with the East Bay Regional Park District in Oakland, Calif., is the new president of the Northern California Turfgrass Council, succeeding Paul J. Albright, Jr. of Berger & Plate seed company in San Francisco.

The Council consists of some 325 members in Washington, Oregon and northern California, including commercial suppliers, landscape contractors and architects, horticulturalists, and administrators of city and county parks, golf courses and campuses.

Other officers are: G. S. Sandhu, first vice president; Phil Wyatt, second vice president; and Richard Perona, secretary-treasurer.

The Board of Directors of the Council includes Albright, John Deming, John Dovic, William Patterson and Richard Harrison.

People on the Move

Christopher Senske, elected vice president of Weed And Pest Control, Inc., Spokane, Wash.

* * *

John Y. Morris, promoted to residential-commercial marketing manager for The Toro Company's Irrigation Div.; **Michael H. Small,** promoted to regional sales manager for the western states for the Div.; and **Ken Larson,** appointed group director of manufacturing for Toro's Outdoor Power Equipment Group.

* * *

James Yowell, appointed division manager for The Bishop Company's Country Club brand of turf fertilizers. Bishop Co. is a division of Lebanon Chemical Co.

* * *

The Agricultural Div. (formerly known as Chipman Div.) of Rhodia Inc. announced the following appointments: **John B. Clapp, Jr.,** vice president and general manager of the Div., appointed vice president, Agricultural and Animal Health. **Dr. Louie T. Hargett,** former director of Product Development, named general manager of the Div.

* * *

Norman Rivkees, appointed group vice president, sales, for Melnor Turf Irrigation, a subsidiary of Melnor Industries.

* * *

David J. Arenberg, appointed to the faculty of the University of Illinois' new school of Environmental Management, and will be in charge of the Horticulture Dept. Arenberg is a consultant to many governmental agencies and manufacturing firms and serves on the board of directors of Agro Chem, Inc. and other agencies and companies.

* * *

Frank J. Spalluzzi, appointed corporate director of Management Information Services, American Garden Products, Inc. (ASE).

* * *

Charles Johnson, appointed area salesman for the Delaware, Virginia and Maryland marketing area for Lofts Pedigreed Seed, Inc.

* * *

J. Nelson "Nels" Hoffman, appointed vice president of Sales and Marketing for R & G Sloane Manufacturing Co., a producer of plastic pipe and pipe fitting products.

* * *

Bill Howlett, joined the Lawnseed Dept. of Berger & Plate Co. He will be in charge of marketing and sales of seed and soil conditioner in southern California.

* * *

Roderick Macdonald, joined Thompson-Hayward Chemical Co. as field research and development representative.

* * *

Howard L. McPherson, appointed vice president, operations, Jacobsen Manufacturing Co., and will be responsible for manufacturing operations at all five of the company's plants.

Industry News and Newsmakers

James B. Beard, professor of turfgrass science with the Department of Crop and Soil Sciences, Michigan State University, has accepted a turfgrass research position at Texas A & M beginning June 1, 1975.

West Coast Derakane Plant Opened by Dow Chemical

Dow Chemical U.S.A. has opened its first West Coast plant for the production of Derakane brand vinyl ester resins.

The new plant is located at Dow's manufacturing site in Torrance, Calif. Built at a cost of more than $1 million, the new facility will improve Dow's ability to serve its customers in the expanding West Coast market for fiber glass reinforced plastic resins.

The new facility is Dow's second plant for manufacturing resins in the Derakane product family; the company's first Derakane resins plant opened in Freeport, Tex., in 1967.

The Derakane products are used in manufacturing absorption towers, process vessels, storage tanks, piping, hood scrubbers, ducts and exhaust stacks. Components made with the Derakane resins are used in industries nationwide, including chemical processing, fertilizer, food processing and mining.

EPA Grants Limited Use Registration To New Mosquito Control Pesticide

The Environmental Protection Agency has announced registration of a "first of a kind" mosquito control pesticide for limited use by public health officials and other trained mosquito abatement personnel.

The pesticide, trade-named Altosid SR-10 and chemical-named Methoprene, is a growth regulating chemical that prevents harmless mosquito juveniles from maturing into pesky adults. The mosquitoes are trapped by chemical action in their larval or pupal stages until they perish. Altosid is produced by the Zoecon Corp., Palo Alto, Calif.

Prior to registration, Zoecon field tested the material under EPA safeguards for the past two years in limited areas of 37 states ranging from New York to Hawaii.

The Altosid registration allows use against one category of mosquito — the "floodwater" variety — in flooded pastures or non-crop areas. Experience with the material, however, may warrant EPA's extending the registration to cover additional mosquito breeding areas. Altosid may be applied by either airplane or ground equipment.

The pesticide appears to offer certain environmental advantages over other EPA-approved mosquito control techniques. It is "specific" to the mosquito; that is, it kills mosquitoes but appears to pose less of a hazard than other mosquito pesticides to applicators, fish, birds and most other wildlife. In addition, Altosid is said to degrade quickly. Most of the material is gone within two weeks, less than half the time it takes other chemical mosquito controls to neutralize. The product also has a low application rate — three to four ounces per acre of water.

Dacthal Available But Tight According to Manufacturer

Diamond Shamrock announced that its Dacthal herbicide is available during 1975, but in short supply, and users should contact their dealer or supplier for material purchase information.

J. R. Wolf, product manager for

The Penn State Turfgrass Alumni Association recently presented a check for $1,400 to Dr. Joseph Duich to aid the turfgrass research program at Pennsylvania State University. From left are: Duich, professor of turfgrass science; G. M. Brennemen, superintendent of Sharon, Pa., country club; Dr. T. L. Watschke, assistant professor of turfgrass science; and Dr. D. V. Waddington, associate professor of soil science. The Association has contributed nearly $10,000 toward research in the past five years.