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Conserving water with Purr-Wick

by Ron Morris

As is becoming very apparent, water is a precious commodity that needs to be used efficiently. Water needs to be applied with thorough knowledge of where it's going, that it is going to be utilized by the plant, and that none of it is going to be wasted.

Purr-Wick, a concept of building a green for total management, seems a likely answer.

Don Parsons, superintendent at Knollwood Golf Course in California thinks that it is the answer to a superintendent's greens headaches. Don has done a lot of record keeping with the one Purr-Wick green

Height of dividers key to efficiency

When Purr-Wick was conceived in 1968, the internal dividers were patterned after dikes in rice paddies. It started with four inches, then six inches, then eight and up to 14. "There were some problems that couldn't be explained," according to Dr. W. H. Daniel, turf specialist at Purdue University and one of the designers, "but we assumed that some barriers had holes in them. Thanks to questions from users, we have realized that it's a matter of the water siphoning over the vertical barriers through the sand."

When water is held at very low tensions it readily moves through the small capillaries created by the compacted sand. It siphons over the barriers much faster than was earlier thought. The end result is that the lowest outlet tends to be a spring, while the outlets of the upper levels show no reserve a few hours after rain, according to Daniel.

Since 1974, he has suggested higher internal dividers. He Now says "Build the dividers as high as practical."

On existing greens with lower dividers installed, it is strongly recommended that as soon as practical, the ends of the existing dividers be located and their entire distance be exposed. Place a putty or asphalt caulk along one side near the top of the installed divider and insert a strip of plastic sufficient to extend from along the divider up to the surface. Then backfill with the sand, replace the sod and topdress as needed.

"The target," emphasizes Daniel, "is to more completely isolate the compartments so that siphoning through the fine sand pores is minimized and the full potential of Purr-Wicks is realized."

that has been installed on his course and has compared it to a conventionally constructed green that is located near the Purr-Wick. According to Parsons, "It is a water conservation system that allows us to conserve and redistribute the water like no other system currently available to us."

Parsons, speaking at the 15th Annual Turfgrass Sprinkler Irrigation Conference at Lake Arrowhead in California said, "With a Purr-Wick, you have a constant moisture level within the system. There is a definite relationship between drying out or the lack of water in the system and the roots. This happens to us most generally in the summer. We allow an area to dry out, the root systems shorten up, and consequently from then on you're watering to that short root."

Purr-Wick, with its constant water table and moisture conditions in the growing media, prevents this. Roots are not lost to the dry areas because there are none.

Purr-Wick stands for Plastic Under-Root Reservoir system, with a wick action. The sand in a Purr-Wick system acts as a wick for water much the same as the wick in an oil lamp draws the oil upwards. Sand is

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"With a Purr-Wick, you have a constant moisture level within the system."

Top left, sod is removed. Top right, barrier, eight inches below surface is exposed. Lower left, plastic attached to original barrier is brought to surface. Lower right, sand is replaced and tamped for replacement of sod.

PURR-WICK

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the secret. And the larger the particle size of the sand, the less wick action it has. "Medium to small particle size with uniform distribution — that is what we're looking for," says Parsons. The entire system is enclosed by plastic which allows for zero tension with irrigation and constant redistribution of the water within the system. This graphically points toward a constant moisture level within the system.

In Indiana, where the system was designed, Dr. William H. Daniel, turf specialist, Purdue University, was seeing irrigation frequencies of only four times per year for Purr-Wick, while a normal green would require over 40. While not quite the case in California where the rainfall is not as great, Parsons, from his comparison, believes that Purr-Wick does require considerable less irrigation than a normal system. Why?

"You have total control over the water that you do put on."

"With the ordinary open drain we put on one drop for the root tip, one drop for distribution and one for drainage. We may lose two of those out the open drain. With Purr-Wick you can put on one for the root and two others may go down through the profile, but they'll hit this plastic impermeable membrane and wick back up, so that you have total control over the water that you do put on."

About 2-300 feet away from the Purr-Wick at Knollwood there is a conventionally constructed green composed of 60 percent sand and 40 percent organic matter. Both greens are irrigated with the same type of system. Parsons kept track of the number of times both greens were irrigated each month and the number of minutes of irrigation and calculated that down into gallons of water per thousand square feet.

In May, 1976, the conventional green used about 79 gallons a day and was irrigated 20 times. The Purr-Wick used 43 gallons per day and was irrigated eight times, a 47 percent water savings.

In June, 1976, there were two weeks of 100 degree weather with a high of 114, and there was still an eight percent savings with the Purr-Wick. "But we did an awful lot of watering just to stay alive during that particular month," Parsons added.

September was probably one of the better examples of water conservation. They had a four-inch rain early that month and consequently only watered the Purr-Wick four times. Parsons ended up with a 63 percent water savings for that month. "We are seeing it stay in the neighborhood of half the irrigations and half the water use through the normal months, unless it's extremely hot or there is rain."

In the five months that he kept total and complete records, Purr-Wick saved an average of 42 percent or 57 gallons a day per thousand square feet. That would be in the neighborhood of 200,000 gallons a year. Project that for 18 greens and two putting greens and there is a potential savings of 4 million gallons per year.

One of the idiosyncracies of the Purr-Wick system in the west, Parson believes, is interrupting the capillarity when you cut a cup. Because there are so many days between irrigations, the area around the cup tends to dry out. What happens then is that someone must carry a bottle of water or a hose and wet around the cup area, restarting the capillarity thereby eliminating the problem. "It isn't that much of a problem," according to Parsons. If you don't water the area for at least three or four days, it will tend to be a problem, but really doesn't need to be."

Parsons doesn't see salt accumulation as a problem with Purr-Wick. On a soil test of his Purr-Wick that had been going on for about 18 months, the ECE was .6. If it is a problem, he says, you just pull the plug, you have a sand green, and you can flush it."

Probably the only real cost difference between a Purr-Wick and a conventional green is the cost for the plastic and the barriers, each at about five cents a foot. One big factor is the source of the sand. Parsons cited one course that built 18 greens and two putting greens and were given the sand just to get it out of the way. However, sand in California is hard to come by. "It's just not available," he said. □

Our 1977 WT&T awards committee

We are pleased to announce the advisory committee who will assist us in the selection of the first winners of the WEEDS TREES & TURF Outstanding Achievement Awards. Committee members include: Dr. Ray Freeborg, Purdue University; Dr. David Martin, Ohio State University; Dr. Henry Indyk, Rutgers University; and Dr. Fred Grau, Grasslyn, Inc.

There will be three award categories this year — grounds manager, grower/producer, and researcher/educator. We are looking to those individuals who have made a significant contribution to the Green Industries in the past year, individuals who are not the usual award winners, but who, through their initiative and leadership, may very well be in the next few years. With the help of these eminent leaders of the Green Industries, we shall undertake this difficult selection this month.

Dr. Freeborg

Dr. Ray P. Freeborg is a research agronomist at Purdue University with responsibilities in research, teaching and extension.

He is a member of the American Society of Agronomy, the Crop Science Society of America and the Weed Science Society of America. He has also been elected a member of Sigma Xi honorary society.

Dr. Freeborg served as sales manager for Links Nursery, responsible for sales and distribution. He was also associated with Mr. Linkogel in design, construction and management of golf courses.

As a research associate at Missouri Botanical Garden, Dr. Freeborg was responsible for the turf program and adult education there.

He was executive director of the St. Louis Turf Research Foundation and received their award for outstanding research. He consulted with Civic Center Redevelopment Corporation on Busch Memorial Stadium and served three additional years as consultant on maintenance of the field.

Dr. Freeborg has served as consultant to several lawn care firms and is currently consulting for E-Z Lawn in Richmond, Ind.

He holds a MSA from Washington University in St. Louis, and a Ph.D. from Purdue University.

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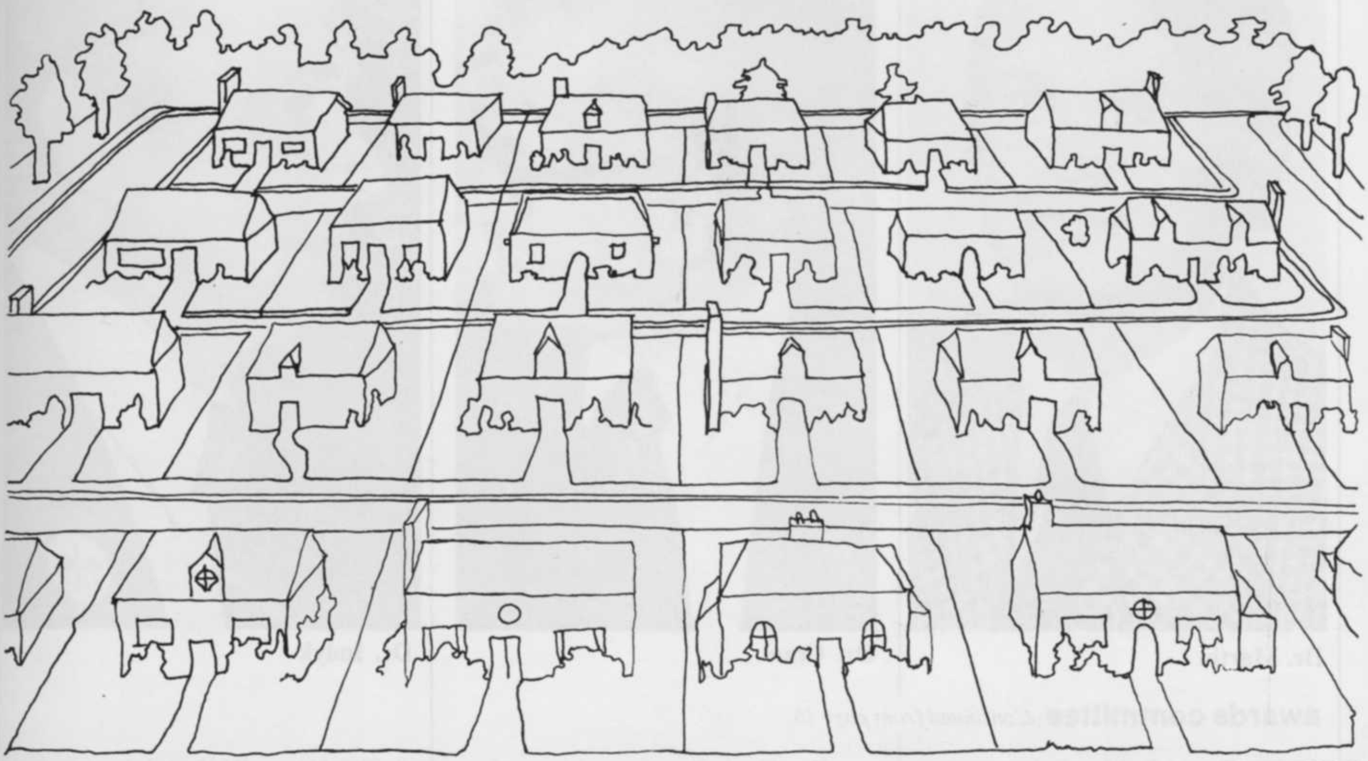

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Dr. Martin

Dr. Grau

Dr. Indyk

awards committee *Continued from page 16*

Dr. David P. Martin is an extension agronomist and assistant professor at Ohio State University. He is a member of the American Society of Agronomy and the International Turfgrass Society. He is executive secretary of the Ohio Turfgrass Foundation, chairman of the NCR-10 Turfgrass Research Committee (a committee of research personnel from the North Central region states) and secretary of the turfgrass division of the Crop Science Society of America.

Dr. Martin is co-author of TURFGRASS BIBLIOGRAPHY, a reference work cataloging over 16,500 turf references. He is also co-author of more than 30 technical, semi-technical and popular articles and bulletins. He has presented three papers at the annual meetings of the American Society of Agronomy.

Before coming to Ohio State University, Dr. Martin was turfgrass specialist and research associate at Michigan State University.

Dr. Martin did research for his Master of Science degree in thatch characterization and control and researched carbohydrate status in relation to growth cessation of cool season turfgrass at supraotimal temperatures for his Ph.D., both at Michigan State.

Dr. Fred Grau, president of Grasslyn, Inc., is a lifetime member and fellow of the American Society of Agronomy, the American Association for the Advancement of Science, and the Soil Science Society of America. He is executive director, emeritus, of the Pennsylvania Turfgrass Council, having held that position for 10 years before retiring.

Dr. Grau has received GCSAA's award twice and received the USGA award in 1969 while in Viet Nam consulting. He also helped to establish the Musser Foundation in that year and now serves as its president.

Dr. Grau, who was named director of the USGA Green Section in 1945, left to enter the commercial field in 1953. In 1965 he began to devote full time to the development of Penngift Crownvetch, which is said to be a living memorial to him.

In 1950, Dr. Grau helped develop and release Meyer zoysiagrass and Merion Kentucky bluegrass.

Dr. Grau helped write the 1948 USDA yearbook "Grass". In 1946 he aided in establishing the Turf Section in the American Society of Agronomy and helped set up turf conferences and research at several land grant colleges.

Dr. Grau received his Ph.D. from the University of Maryland.

Dr. Henry W. Indyk is an extension specialist in turfgrass management at the College of Agriculture and Environmental Science, Rutgers University.

Dr. Indyk is a member of the American Society of Agronomy, the Northeast Weed Science Society and the New Jersey Turfgrass Association.

Dr. Indyk currently serves as executive director of the Golf Course Superintendents Association of New Jersey and advisor to the executive committee of the New Jersey Turfgrass Association. He organized the Cultivated Sod Association of New Jersey and has served as its secretary since then.

Dr. Indyk initiated the Sod Certification Program in New Jersey, the first of its kind in the U.S. He was instrumental in organizing the New Jersey Turfgrass Expo and has served as general chairman since its inception in 1974.

He also served as a member of the Board of Directors of the Musser International Turfgrass Foundation and as guest editor of Brooklyn Botanic Garden Lawn Handbook and chief consultant of Time-Life book on Lawns and Ground Covers.

Dr. Indyk holds a Master's degree and Ph.D. in agronomy from Pennsylvania State University.

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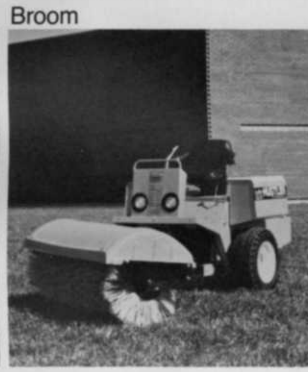
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Space-age technology for irrigation controls

Solid state technology, which has revolutionized communications, aerospace, finance, medicine and a host of other fields, has effected a major breakthrough in irrigation system controllers. For the first time, a controller, developed by Rockwell International for Johns-Manville, utilizes a microprocessor for regulating a wide range of irrigation processes and a calculator-type keyboard that, with a human input/output interface, feeds instructions, changes and programming to the controller. Also included is a digital display that indicates at a glance the time of day, the type of sequence, which station is operating, the time remaining and many other functions. The controller was deliberately designed with a "mushroom"-like appearance so that it blends with the environment in which it is utilized.

The solid state design of the Model KCS (Keyboard Controller Series) offers several important advantages over comparable electromechanical units. For example, reliability is better because less circuitry is needed, a feature that reduces the possibility of malfunctions. Due to the fact that the controller has one basic component, the microprocessor, instead of the multiple number of parts required in an electromechanical model, dependability is further enhanced.

Flexibility is another benefit offered by the controller. Despite its relatively small size, the transistorized microprocessor has the capacity for servicing up to 24 stations with a diverse number of functions. To illustrate, starting can be programmed in various ways — automatic, manual and even manual starting of a single station on a one-time basis.

Accuracy also is upgraded. The solid state design assures a station timing accuracy of ± .01 of a second. Water conservation is improved because the precise timing allows the operator to put down the exact amount of water required. For the same circumstances, the accuracy of electromechanical units can vary by as much as 20 percent.

Although station timing settings are normally regulated in minutes, the controller has the capability of switching to hour station times with the implementation of a toggle switch. Also, the time base is automatically compensated for the appropriate electrical frequency — 60 Hertz for domestic use, or 50 Hertz for foreign applications.

The microprocessor can handle four, 14-day schedules. Each station has the ability to operate with any one of the schedules. In this way, lawns and shrubs, as well as greens, tees and fairways, can be watered on completely different programs on the same or different days on the same controller.

Other programs that can be accommodated by the versatile controller include:

Skip Days — the irrigation cycle can be skipped from one to nine days, an ideal situation during rainy weather when irrigation is not necessary. The KCS will automatically resume the proper sequence at the conclusion of the skip period. The controller can be used in conjunction with a rain gauge whith tells how much rain has fallen, daily or year to date, to determine if irrigation is warranted.

Automatic Syringe — for cooling and disease control, a syringe cycle, with variable time, can be started independently of the normal irrigation program for all or preselected stations.

Multiple Repeat — the number of repeats after initial irrigation can be set from one through nine. A delay between repeats of up to 99 minutes can be selected when a single station is repeating. The number of repeats are common to all stations programmed for this cycle. This feature prevents run-off on steep slopes.

Other keyboard entries permit the controller to . . .

manually operate a station from .1 minutes to 99 minutes. This manual mode may interrupt a current sequence which shall resume without a time loss to the stations interrupted.

manually start or stop any sequence that would include all stations whether they are scheduled for that day or not.

manually start a sequence that would include stations scheduled for that day only.

recycle, on a continuing basis, the current or next start sequence — an important feature for grass seed germination periods.

calculate the total time for any irrigation sequence of any day including repeat time. This helps irrigation cycle scheduling so that it doesn't interfere with other activities. □