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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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?

"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."

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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. □