Texas A&M research: 4-day water cycle beats every day or two

By MARK LESLIE

COLLEGE STATION, Texas — Research by a graduate student at the Texas A&M campus here points out that golf course superintendents, even with sand-based greens, may want to consider watering only once every several days.

"I think some turfgrass managers have the misconception that on a well-drained green, overwatering or frequently watering is not bad," said Dr. Richard White, who oversaw the graduate research conducted by John Jordan during 1997 and 1998.

Jordan tested with nine varieties of bentgrass, watering one set of plots daily, another set every other day, and a third set every fourth day. He discovered that the best overall quality of the bentgrass always occurred when irrigating every fourth day.

White said that 1998 was one of the hottest years on record, and 1997 was even more difficult because of high humidity.

"The real killer in much of the South is high humidity as well as high temperatures," he said. "I'd rather grow bent at 100 to 105 degrees air temperature at 30- to 40-percent humidity (like it was in 1998) than at 90 to 95 degrees and 70- to 80-percent humidity (as it was in 1997)."

White said that while the greens watered every fourth day became dramatically harder over the four-day span, the turf was healthier.

Less water and moisture means less disease and fewer pests.

One major difference Jordan noted in 1997 was the amount of algae.

"Where we watered daily or every two days we had a lot of algae," White reported. "In the four-day irrigation we only had a smattering of algae. Even with Seaside, a very old and algae-susceptible variety, we only had 10 percent covered by algae."

Asked about the decision to use a four-day cycle, White said it was simply guesswork. But, he added, grass can remain healthy over a much longer period without water.

"Within a USGA [U.S. Golf Association] green, there could be 2-1/2 to 3 inches of available water in the 12-inch soil profile. If grass is using 1/4 inch a day, you're looking at a 12-day supply of water."

But that assumes the turf has a 12-inch root system, something not typically present in a frequently watered green, he added.

Indeed, Jordan found that from the first of June through August, the root systems in frequently watered plots decreased slightly, while those in the four-day treatment tripled and, in fact, had five times more roots.

Perhaps the most startling discovery came from a study in 1998 measuring the soil oxygen and CO2 levels.

"We teach — and I anticipated — that

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New regimen takes bentgrass into Deep South

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- Top dressing every three weeks.
- Light grooming and brushing every third week.
- Core aerifying twice a year, in early May and late September, removing the cores and top dressing with pure sand.
- Aerifying with solid tines every two to three weeks during the summer.
- Recognizing whatever you do impacts the environment the plant is growing in.

But the primary key is water, said Engelke, well-known for his bentgrass and zoysia breeding programs and as the developer of Crenshaw and Cato bentgrasses.

"There is a misconception that bentgrass needs to be watered continuously," he said. "Water actually develops an excellent environment for diseases. It causes poor microbial development; and attracts nematodes, which are aquatic animals.

"If we can manage the water, we can manage the root zone so that the grass will take care of itself," Engelke added. "With good root development, the plant will air-condition itself... Water moving through the plant will dissipate heat. Internally, the plant does this through evapotranspiration."

Indeed, in late December, three months after planting G-2 bentgrass over an existing sod layer, Ehrbar reported roots 6 to 7 inches deep. And, he said, he made only one fungicide application during the summer that he tested G-2, L-93 and Crenshaw bentgrasses before his final decision to plant.

"We found out that a drier soil profile is much less prone to disease than a water-soaked profile," Ehrbar said.

The four-day watering cycle was proven effective during research at College Station, Texas, where Iowa State graduate student John Jordan worked under Rexas A&M Associate Professor Dr. Richard White.

During 1997 and 1998 (the hottest summer on record in Texas), Jordan tested nine varieties of bentgrass, watering some plots every day, some every second day and others every fourth day.

Old Marsh Golf Club superintendent Steve Ehrbar, left, said the course designer, Pete Dye, has been supportive of the move to bentgrass.

"The best overall quality on all the varieties always occurred when we irrigated every fourth day," said White.

"Irrigation frequency," he said, "had a dramatic effect, particularly in '98 because John operated the system for a much longer period, starting in late May through early September. He found that between the first week in June and the end of August the root systems in the frequently watered plots actually decreased slightly. But in the four-day treatment, the root system actually tripled and had five times more roots than frequently watered plots."

Few roots in the frequently watered plots reached 6 inches, while some in the four-day cycle reached the gravel layer 12 inches down.

Does the turf appear less lush under his new regimen?

"For top growth, yes," Ehrbar said. "If we were applying more water than we needed, it would appear to look better. But you're only as good as your roots."

But White saw no reason these practices would not work elsewhere, so long as the greens are sand-based or U.S. Golf Association-type, not "push-up" greens.

Ehrbar is still determining exactly what he must do to maintain his bentgrass, saying his plan "is not black and white. Every course is unique and different and we're building [the program] as we go. It's day to day. We monitor the grass.

"But our feeling is, if we can get through the day without watering, we do it. By the same token, if it needs water we will water it. In the wintertime there are times we can go over three weeks without giving it any water. But when summer comes we're lucky to go three to four days because the heat is up, evapotranspiration is up and the plant is pumping more water."

Engelke attributes the success of this Deep South experiment partially to the grasses themselves.

"The new genetics give you the edge," he said. "Those three [L92 , Crenshaw and G2] are the most heat-tolerant bents of which we had sufficient seed. But these new varieties will grow at higher soil temperatures, and especially at soil temps that are at proper gas balance. You have to keep oxygen and CO2 in balance. If they get out of balance, that will impact the development of the plant. And that is influenced more by irrigation scheduling than anything."

It takes a special club to make the program work, said Ehrbar, adding: "The less play, the better off you are. And your members have to be supportive."

"It scares me to death," added Engelke, "that anybody thinks they can do this without understanding the agronomics. If you don't, you won't make it."

Dr. White agreed.

"This is not something to jump into one day," he said. "It takes planning and forethought. And the time to start this is not the middle of the summer. Start it when conditions are near optimum for growth of the plant."

Also, he said that if superintendents begin this regimen, they need to closely watch the greens, "particularly in a climate like ours where we might have low- and high-humidity days back to back, which can change things dramatically."

Survey reveals certified supers earn more, but all salaries are up

LAWRENCE, Kansas — A Golf Course Superintendents Association of America (GCSAA) analysis of member compensation and benefits indicates significant increases in both, due largely to job experience and education levels.

Two survey instruments, which did not vary notably, were distributed to GCSAA members in 1995 and again in 1998. Overall, the salaries for golf course superintendents increased 8 percent (from $49,269 to $53,205) during the three-year period.

Certified golf course superintendents (CGCS) with more than 20 years' experience commanded the most significant salary increase on average, at 17.9 percent (from $56,618 to $66,774). The certified designation recognizes the achievement of high standards of professionalism through education and experience. Those certified members, regardless of experience, gained 10.4 percent in compensation in the same time span. In total, certified superintendent salaries average 27 percent higher than those salaries of superintendents who are not certified. Fifty percent of all GCSAA members earn more than $50,000 annually, while 15 percent earn more the $75,000.

The median response to the 1998 survey profiles a superintendent with 10 years' experience gained at two different golf facilities, with 6.73 years at his/her current position. That compares with the 1995 survey of 12 years' experience with a current position average of seven years. As also observed in 1995, the average age of superintendents is 40 years old. In 1998, superintendents managed budgets and payroll of $500,000 (median national response) and averaged 15 direct reports.

"The marketplace is extremely responsive," said GCSAA Board of Director and Career Development Committee Chairman Tommy Witt. "What it is telling us is No. 1, a GCSAA golf course superintendent's value is increasing; and No. 2, employers recognize the merits of having a certified golf course superintendent managing the physical asset of a facility."

The salary survey also reveals that superintendents report to a variety of managers/employers. Leading the list is the general manager (26 percent), green committee (22 percent) and owner (19 percent). Those employers also display widespread support of GCSAA activities, with 96 percent paying association dues, 91 percent providing funds of seminar/trade show fees plus travel and 89 percent footing the bill for GCSAA superintendent chapter dues.

Less watering better for bent

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in frequent watering we'd see an elevation of CO2 and a reduction of oxygen. We did not," White said, "which particularly surprised me because we had an insignificant amount of root system at that depth.

"It flies in the face of things we have taught and believed. When we watered every fourth day [on plots with roots extended deeper than 6 inches], the next day we saw a decline in oxygen level. First, I think, because there was more water and a slowing diffusion level because we have thatch in that soil. Second, because there was a greater root mass and root activity below the 6-inch depth, and biological respiration is one of the things necessary to lower oxygen."

White said he feels the four-day water cycle "will help wherever you're growing bentgrass, particularly in the South and transition zone."