HOLE NOTES

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FROM YOUR PRESIDENT'S DESK

Minnesota PGA Inducts Dr. James Watson Into Minnesota Hall of Fame

This month I was honored to be invited to play in the Minnesota Section of the PGA's Hall of Fame Classic Tournament. The Minnesota PGA inducted Dr. James Watson, Bill Kidd and Gene Hansen.

Jim Nicol, CGCS, gave a great introduction of Dr. Watson while listing his many accomplishments over the last 30 years. Including his career as head agronomist for The Toro Company. By Dr. Watson being inducted into the Hall of Fame, he helps give credibility to the science of the turfgrass industry and the importance of every golf course superintendent in the management of turf. Thank you Dr. Watson for your contributions to the turf industry.

I also would like to thank the Minnesota PGA for inviting me to be a part of its ceremony and the great honor given to Dr. Watson.

* * * *

John Queensland and his committee did a fine job in organizing the scholarship recipients for 1999. There were two MGCSA Legacy Scholarships and one Garske scholarship awarded. The Turf Scholarships will be given out in the near future. John did his usual best in preparing the Scholarship Scramble tournament, which was a success by bringing in about $5,000 in revenue.

We would also like to thank Steve Schumacher and the people at Izaty's for hosting the yearly event.

* * * *

Our next month's meeting will be at Heritage Links Golf Club in Lakeville. Be sure to get some practice rounds in before this meeting because this is the Superintendents' Championship. Hope to see you there!

— Thomas Fischer, CGCS
MGCSA President

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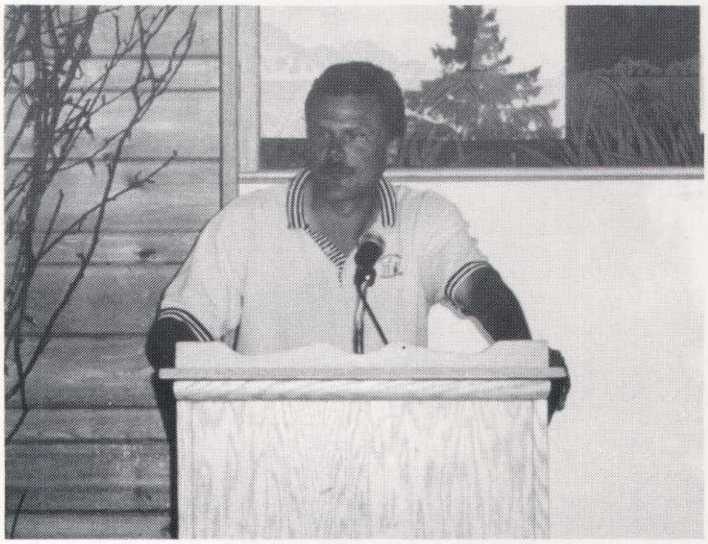

STEVE SCHUMACHER
Host Superintendent at the Scholarship Scramble at Izaty's.

Dr. James R. Watson Elected To Minnesota PGA/MGA Hall of Fame

Dr. James R. Watson, vice-president and agronomist with the Toro Company, has been elected to the 1999 PGA/MGA Hall of Fame.

For more than 50 years Dr. Watson, nominated by MGCSA past president James J. Nicol, CGCS, has distinguished himself nationally and internationally in a variety of golf-related endeavors, primarily in turf management and research.

Also elected this year were Bill Kidd, longtime Interlachen Country Club golf pro, and Gene Hansen, a stellar golfer back in the '60s.

During his extensive career, Dr. Watson won several national awards while conducting research on turfgrass, fertilization practices, irrigation, compaction effects on fairway turf, snowmold prevention and winter protection of turfgrasses. He also has authored more than 400 articles on turfgrass care and management, water conservation and cultural practices.

With The Toro Company in Minnesota, his work has encompassed the areas of equipment development and evaluation, customer relations and agronomic consultation. A frequent lecturer at national and international conferences, he is recognized as a leading exponent of the critical need to conserve water and utilize waste waters.

The commendations he has received give testimony to his prowess. They include the 1978 USGA Green Section Award for distinguished service to golf through his work with turfgrass, the 1983 Distinguished Service Award by the Golf Course Superintendents Association of America, the 1989 Distinguished Service Award by the Minnesota Golf Course Superintendents' Association, the 1994 Donald Ross Award by the Golf Architects Society of America and the 1995 Old Tom Morris Award, the highest honor of the Golf Course Superintendents Association of America.

He also has served on the Board of the Freshwater Foundation in Mound, Minn., as president of the International Turfgrass Society which he helped organize in 1979, the USGA's Research Committee and as adjunct professor in the Department of Horticultural Science and Landscape Architecture at the University of Minnesota.

"Of particular import is the manner in which he has enhanced communication between the business community and the research and academic arenas of the turfgrass industry," said Nicol. "His unique perspective has allowed these diverse elements to gain greater understanding of the roles and challenges of each segment.

"Thanks considerably to his efforts, today's golf course superintendents constantly are improving playing conditions for the betterment of the game for all concerned," added Nicol.

1999 PGA/MGA HALL OF FAME INDUCTEES
Gene Hansen, Dr. James Watson and Bill Kidd.

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Subsurface Drainage of Modern Putting Greens

There's a Lot Going On Below the Surface

By GUY PRETTYMAN and ED McCOY, Ph.D.
USGA Green Section

Subsurface drainage involves both intensity and capacity attributes. Intensity of subsurface drainage refers to how rapidly a root zone drains. Capacity, on the other hand, refers to the extent of excess (gravitational) water removal from the root zone. Consequently, discussions of putting green drainage often become confused since the expression *improved drainage* can imply improved drainage capacity, or both. This confusion most often occurs with modern, high sand content greens where subsurface drainage performance is emphasized.

The two most prevalent modern putting green construction methods are the California Method (Davis et at., 1990) and the USGA (USGA Green Section staff, 1993) green construction technique. The principal differences between these two construction methods are a higher recommended root zone permeability in a California (CA) green (relative to a USGA green) and the presence of a gravel blanket in a USGA green. With all other factors being equal, a higher root zone permeability should lead to higher drainage rates, and for most sandy root zones, a drier soil profile. Correspondingly, the gravel blanket should help drainage water move rapidly to drain pipes, but it also is shown to increase water retention in the root zone (reviewed by Hummel, 1993; Taylor, 1993). The key to comparing subsurface drainage in California and USGA greens is understanding the interaction between root zone permeability and the presence of a gravel blanket.

Also, the natural contours or slopes that exist on putting greens may influence both the intensity and capacity of subsurface drainage. Even though these slopes are typically slight, they do represent a driving force for lateral, downslope water movement within the greens profile. The supposition here is that soil water retained in the profile after initial drainage may migrate downslope to yield spatially non-uniform soil moistures across a green. To our knowledge, however, no previously reported research on greens drainage has examined green slope effects.

This article reports research findings to address modern putting green drainage issues. The green construction methods under investigation are the USGA and California specifications. Other factors investigated include the effect of green slope on water drainage and redistribution.

The Research Approach

This study employed four green construction approaches consisting of:

1. A California-style soil profile containing a 9:1 sand:sphagnum root zone.
2. A California-style profile containing a 6:2:2 sand—biosolids compost:topsoil root zone.
3. A USGA layered profile (no intermediate layer) containing the 9:1 sand:sphagnum mix.
4. A USGA layered profile (no intermediate layer) containing the 6:2:2 sand:compost:topsoil mix.

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Modern Putting Greens—

(Continued from Page 7)

Based upon independent testing by an accredited laboratory, both root zone mixes met the particle size and performance criteria for a USGA root zone. Additionally, the sand:spagnum mix, although not entirely pure sand, met the recently proposed performance criteria of a California root zone (Hummel, 1998). The sand:sphagnum root zone had a permeability of 20.8 in.hr.^{1} and is referred to as the high-permeability mix, while the sand: compost: topsoil blend had a permeability of 12.6 in. hr.^{1} and is referred to as the low-permeability mix. Gravel selection for the drainage blanket of the USGA profiles and for the drain line trenches of the California profiles were based on the particle sizes of the respective root zones corresponding to USGA specifications for two-tier greens construction (USGA Green Section staff, 1993). The four treatments were replicated three times for a total of 12 experimental greens. At the time of the study, the greens contained a 15-month-old Penncross creeping bentgrass turf maintained at a mowing height of 3/16 inch.

The greens were built above ground in 4 ft. by 24 ft. wooden boxes supported by a legged, metal framework. Six-inch-wide by 8-inch-deep drain line trenches extended below the profiles, with each containing an outlet. The drain line trenches (perpendicular to the long axis) were constructed into each green at 2 ft., 12 ft., 17 ft. and 22 ft. from the downslope end. PVC pipes were connected to the outlet of each drain line trench, with each fitted with a valve for selective closure. The present study was conducted with only the 2 ft. and 17 ft. drain lines open, effectively yielding a drain spacing of 15 ft. The 12 research greens were placed in a randomized complete block design on an 80 ft. by 28 ft. concrete pad. This allowed adjustment of the green slope by jacking and blocking the metal legs. Green slopes used in this study were 0%, 2% and 4%.

The root zones of each experimental green were instrumented with soil moisture probes at three depths (3 in., 6 in., and 9 in.) and five locations (2 ft., 7 ft., 12 ft., 17 ft. and 22 ft. from the downslope end of the green) for a total of 15 positions per green. The probes were connected to a measurment system that allowed frequent monitoring of soil moistures. Additionally, tipping bucket rain gauges were connected to the drainage outflow pipe of the furthest downslope drain line to monitor drainage outflow rate.

This experimental setup was used to monitor water drainage and redistribution within the root zone as influenced by green construction method, green slope and rainfall rate. The overall study was conducted as a series of 18 experimental runs. During an experimental run, individual greens were configured to a predetermined slope of 0%, 2% or 4%. Additionally, each green received rainfall from an overhead rain simulator set to deliver either a high

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