Sports Turf Manager

for safe, natural sports turf

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Field Day Coverage

Thanks to generous sponsors and exhibitors and loyal participants, STA's Annual Field Day September 11 at Chinguacousy Park, Brampton, was another great success. See pages 11-15 for a photo gallery showcasing the popular event.

The Saturated Hydraulic Conductivity of Sand Root Zones

ARE THEY REALISTIC OR OVER-DESIGNED? DR. R.W. SHEARD, PH.D., P.AG.

In 1993, the original guidelines of the saturated hydraulic conductivity rate for sand used in constructing sports fields was set at 15 to 60 cm/hour by the USGA Greens Section. In 2004, the rate was changed to a single value of 15 cm/hr In 2007, Dr. Stephen Baker, writing in the *Turfgrass Bulletin* of the Bingley Sports Turf Research Institute, noted that the guidelines were set to cover a wide range of climatic conditions in the United States, ranging from the desert of Arizona to the hurricane regions of Florida. He suggested Canada, the northern US states and the UK, all with an intermediate rainfall intensity, should require a lesser rate. Under UK conditions, greens having a hydraulic conductivity as low as 3 cm/hr have proven satisfactory. In writing the recently released *Athletic Field Construction Manual,* the STA chose a rate of 10 cm/hr.

One objective of a relatively high hydraulic conductivity is to transmit excess water from the root zone as rapidly as possible and return the soil to its maximum aeration (non-capillary) porosity so that the roots will have an adequate oxygen supply. The higher the saturated conductivity, the more rapidly oxygen will return to the root zone. A saturated condition for an hour can certainly be tolerated by the root system without damage. In a study conducted at the Guelph Turfgrass Institute on a USGA specification root zone, irrigation was applied until water flowed freely from the drainage system. Using computer analysis of sensitive electronic measurements of water in the profile, it was shown that within 1.5 hours a significant portion of the aeration porosity was free of water. Removal of excess water was complete within 24 hours. How long would the rain delay be? Less than an hour!

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Saturated Hydraulic Conductivity of Sand Based Root Zones *cont.*

From the front cover. Under Ontario conditions, the highest daily rainfall ever recorded occurred on October 15, 1954, during Hurricane Hazel when 18.29 cm fell over a 24 hour period. The previous rain that approached this amount per day was in 1887. During the 1954 rain, a once-in-a-hundred year storm, the maximum intensity of rainfall was 5.2 cm/hour which is easily accommodated by the USGA rate

of 15 cm/hr. During intense summer storms, which are very localized, 10 cm of rain may fall in 15 minutes on an individual field but the frequency of such storms is less than one per summer. Most rainfall is at a rate of 0.5 cm/hr or less. Should we design a root zone with sand which has a hydraulic conductivity of 10 cm/hr? There is a price to pay for designing a root zone to accommodate this infrequent occurrence of an intense rain. That price is the cost of water.

The facts of water movement in soil show that the higher the saturated conductivity of the root zone mix, the lower the amount of available water the root zone will retain. Thus more frequent irrigation will be required and less of the natural rainfall on the soil will be utilized as much of it will be lost by drainage. This loss through drainage is a waste of a valuable commodity.

If a saving of 25% can be achieved using a finer sand which will have a lower hydraulic conductivity but which will result in the root zone holding more plant available water, it will save 2,480 cubic metres of water with a value of $4,340 per season on one soccer field.

With today's emphasis on more efficient use of water, there is a great and immediate need for research in the relationship between particle size distribution of sand, saturated hydraulic conductivity and aeration porosity in sand based root zones. This research must include the time required for a return to full aeration porosity on both an hourly basis and on a daily basis. Studies at Bingley Sports Turf Research Institute have shown a significant decline in the hydraulic conductivity as a field matures, particularly those using organic amendments, or as the active and decaying root system develops. Therefore the project must extend over several years.

The studies must be done in the field. The technology is available. Where is the money for the research?

Examine this scenario. If using finer sand will result in a lower hydraulic conductivity and result in the root zone holding more plant available water – and savings of $4,340 per season on one soccer field – more research must be done in this field.

FYI

New Online Forum Available

The Professional Lawn Care Association of Ontario has added a new online forum to its website www.plcao.on.ca .STA members are invited to take advantage of this opportunity to initiate discussion, post questions and look for answers on a variety of turf-related topics.

NEW MEMBERS

WELCOME TO THE STA!

Urban Turf Ltd., St. John's NL
Jim Floyd

Town of Oakville, ON
Stephen Booth

Nutrite, Kitchener, ON
Paul Proulx

Dol Turf Restoration Ltd.
Bond Head, ON
Andrea Wallis

Town of Midland, ON
Dave Hamelin

Town of Newmarket, ON
Jeff Bond & Derek Walsom

Township of Centre Wellington
Fergus, ON
Andy Goldie, Dan Reeves & Matt Tucker

City of Kingston, ON
Mark Fluhrer

Appleby College, Oakville, ON
Ken Rivers

City of Mississauga, ON
Chris Katotikidis, Anthony Alfano, Rob D'Ovidio, Wayne Graham, Jane Maffrett, Cliff Towers, Mark Trudelle, David Warden & Andy Wickens