

Can Water Containing High Bicarbonates Seal Off Your Soil?

By Brian Whitlark, agronomist, West Region

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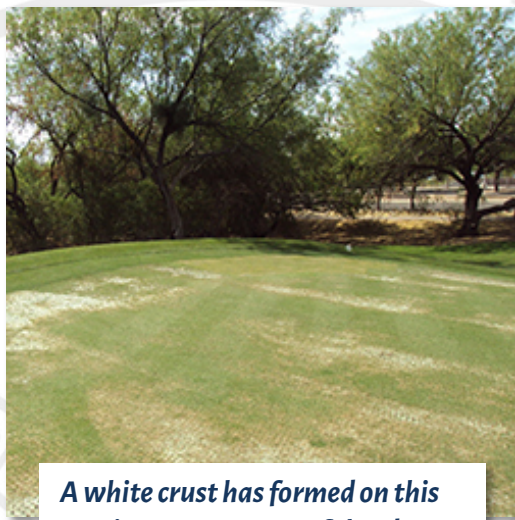
One concern that is muttered throughout the U.S. is the fear that high bicarbonates in irrigation water will seal off putting greens and render them impenetrable to water. A study, funded by the USGA, was initiated in 2011 by Glen Obear and Dr. Doug Soldat at the University of Wisconsin-Madison to determine if high-bicarbonate water negatively affects water infiltration rates. The research summary "[How Does Irrigation Water Quality Affect Soil Chemistry of Sand Based Rootzones?](#)" details the work by Obear and Soldat. Here are a few highlights from the research:



Sand grains treated with water containing more than 90,000 ppm bicarbonate turn white from precipitation, but water infiltration properties are not compromised.

- When pH is below 7.0, the soil contains very little bicarbonates and there is no danger of reduced infiltration rates.
- In alkaline soils, the presence of bicarbonates and carbonates was highly variable and NOT related to inputs from irrigation water. In other words, the level of bicarbonates in the irrigation water had no effect on soil bicarbonate levels.
- The white crust that forms when turf is thin is not caused by high-bicarbonate water. The white crust is carbonates and bicarbonates that have precipitated on the surface of algae.

- In a related greenhouse study, Glen Obear, then M.S. student at University of Wisconsin-Madison, treated sand with water containing 91,500 ppm bicarbonate. The objective was to precipitate bicarbonate at the sand surface and determine if the precipitates would bridge the sand grains. Even at extremely high concentrations, the bicarbonate did not seal off the soil.



A white crust has formed on this putting green on top of the algae that is growing as a result of thin turf due to shade and high traffic.

In summary, even at very high concentrations and in alkaline soils, bicarbonates and carbonates have no negative effects on water infiltration rates of putting green soils. As such, there is no need to acidify irrigation water solely for the purpose of reducing carbonates or bicarbonates. In instances where the sodium hazard AND bicarbonates are high, there may be a need to acidify irrigation water, but consult with a USGA agronomist and soil testing laboratory before purchasing acid-injection equipment.

Source: Brian Whitlark (bwhitlark@usga.org)

West Region Agronomists:

Patrick J. Gross, regional director – pgross@usga.org

Larry W. Gilhuly, agronomist – lgilhuly@usga.org

Brian S. Whitlark, agronomist – bwhitlark@usga.org

Blake Meentemeyer, agronomist – bmeentemeyer@usga.org

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