Excessive Winter Crown Dehydration Affects Creeping Bentgrass Cold Hardiness
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Darrell J. Michael and William C. Kreuser

- A field study was conducted during the winter of 2014-2015 to evaluate the effectiveness of commonly used desiccation prevention treatments. It is being replicated during the winter of 2015-2016.
- Heavy sand topdressing and covers provided a physical protective barrier from the environment which reduced desiccation, sustained crown moisture content, and accelerated spring green-up.
- The relationship between crown moisture and cold hardiness is currently being evaluated in a winter desiccation growth chamber.

The winters of '13-14' and '14-'15 proved to be difficult winters for turf managers throughout much of the northern Great Plains region. Snow events were infrequent and vastly increased desiccation injury on high value turfgrass. The objective of this study was to evaluate the effectiveness of commonly used desiccation prevention treatments.

The study was replicated in Mead, Kearney, Mullen and Gering, NE (Fig. 1) as well as Sioux Falls, SD to maximize the potential for winter desiccation. Impermeable tarps were temporarily used to withhold precipitation at the Mead site to increase the likelihood of desiccation. The Kearney site received negligible snowfall and was subjected to desiccating conditions. Mullen received light-frequent winter irrigation while Gering and Sioux Falls sites sustained winter-long snow cover. Treatments included fall topdressing, GreenJacket™ permeable and impermeable covers (GreenJacket, Genoa City, WI), antitranspirant (Transfilm™ PBI-Gordon Corporation, Kansas City, MO), turf colorant (Foursome™ Quali-Pro, Pasadena, TX), horticultural spray oil (Civitas™ Petro-Canada, Mississauga, ON, CA), and wetting agent (Tournament Ready™ KALO, Overland Park, KS).

Crown moisture content (CMC) and electrolyte leakage (EL) were measured monthly from December to March at the Mead site. Crown moisture content was measured before visible green-up on 13 March at the other sites. Visual turf quality (TQ) was collected weekly to evaluate spring regrowth in the field at Mead and every other day in the greenhouse from a sample collected on 13 March from the other sites.

Sand topdressing and both covers were the best performing treatments at Mead and Kearney during March with CMC's staying above 0.51 g H_2O g^{-1} fresh weight (Fig. 2, Fig. 4). Collectively, sprayable treatments yielded less consistent results and rarely provided benefit. Treatments that sustained CMC levels throughout the winter had a higher TQ in the spring and recovered faster at Mead and Kearney (Fig. 3, Fig. 5). Crown moisture contents at Mullen and Gering were not statistically different across treatments with CMC's greater than 0.50 g H_2O g^{-1} fresh weight. Sand topdressing significantly reduced electrolyte leakage compared to other sprayable treatments and the untreated control. Cate-Nelson analysis found that a critical crown moisture value of 0.51 g H_2O g^{-1} fresh weight was necessary to achieve a TQ which would allow for the turf to recover in the spring. The growth chamber research is ongoing with expected results this spring.

Figure 1. Plot space at the Gering site. The plot space location was selected in an area that typically expereinces winter desiccation.

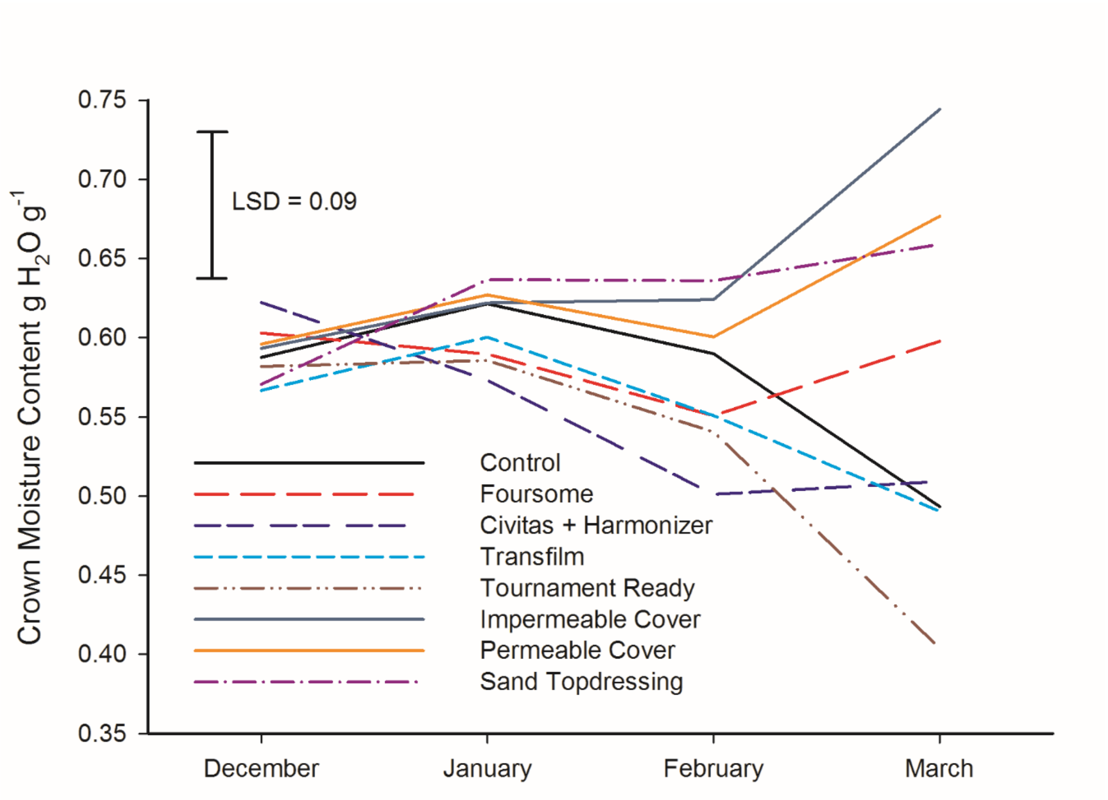

Figure 2. Crown moisture content monitored throughout the winter months at the John Seaton Anderson Turfgrass Research Center in Mead, NE.

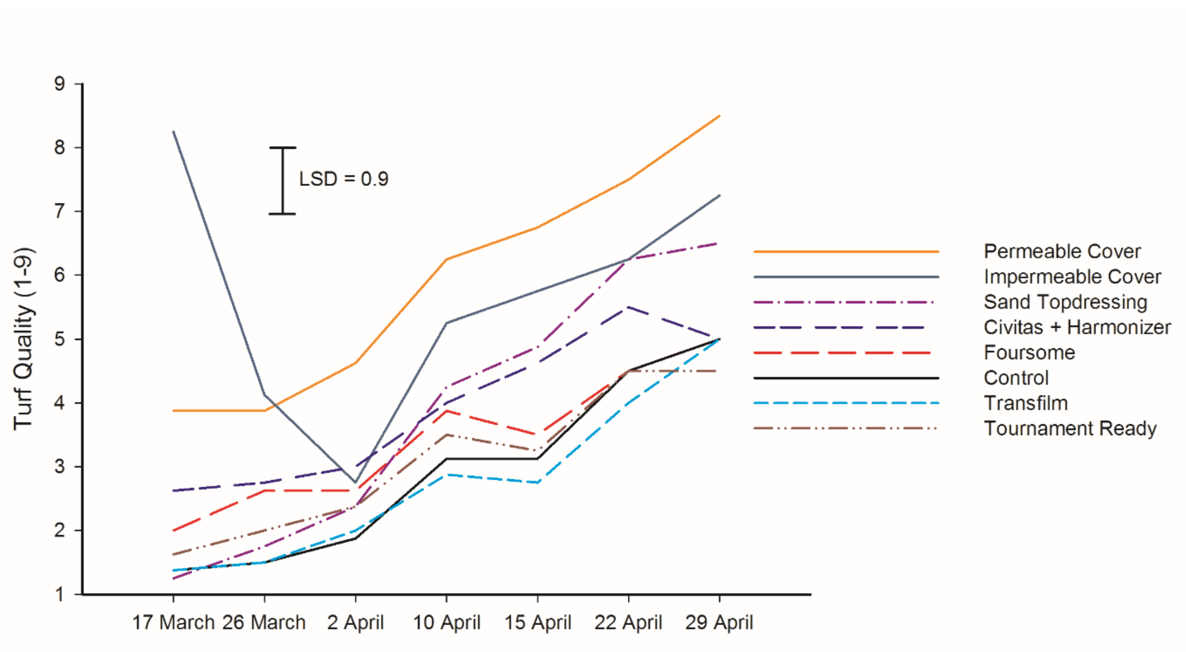

Figure 3. Turf quality at the John Seaton Anderson Turfgrass Research Center in Mead, NE. The sharp decline in turf quality for the impermeable cover is credited to premature regrowth in the spring and damage from -10°C night temperatures.

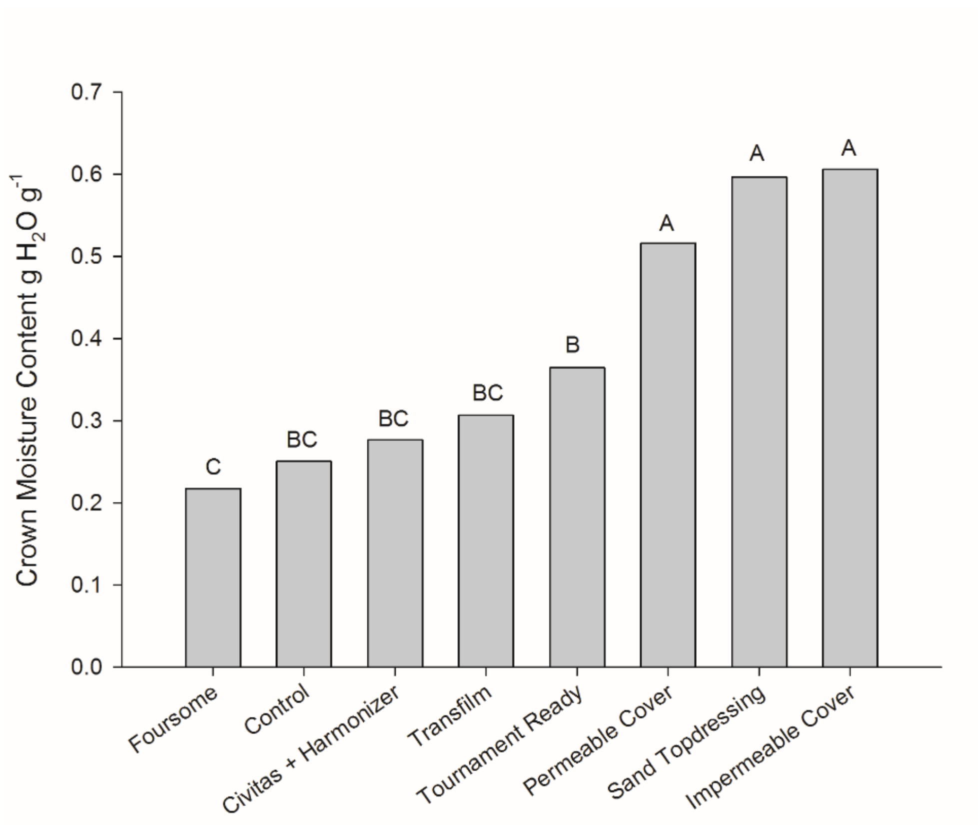

Figure 4. Crown moisture content on 14 March, 2015 at the Kearney, NE site. Different letters above treatment means denote significant difference.

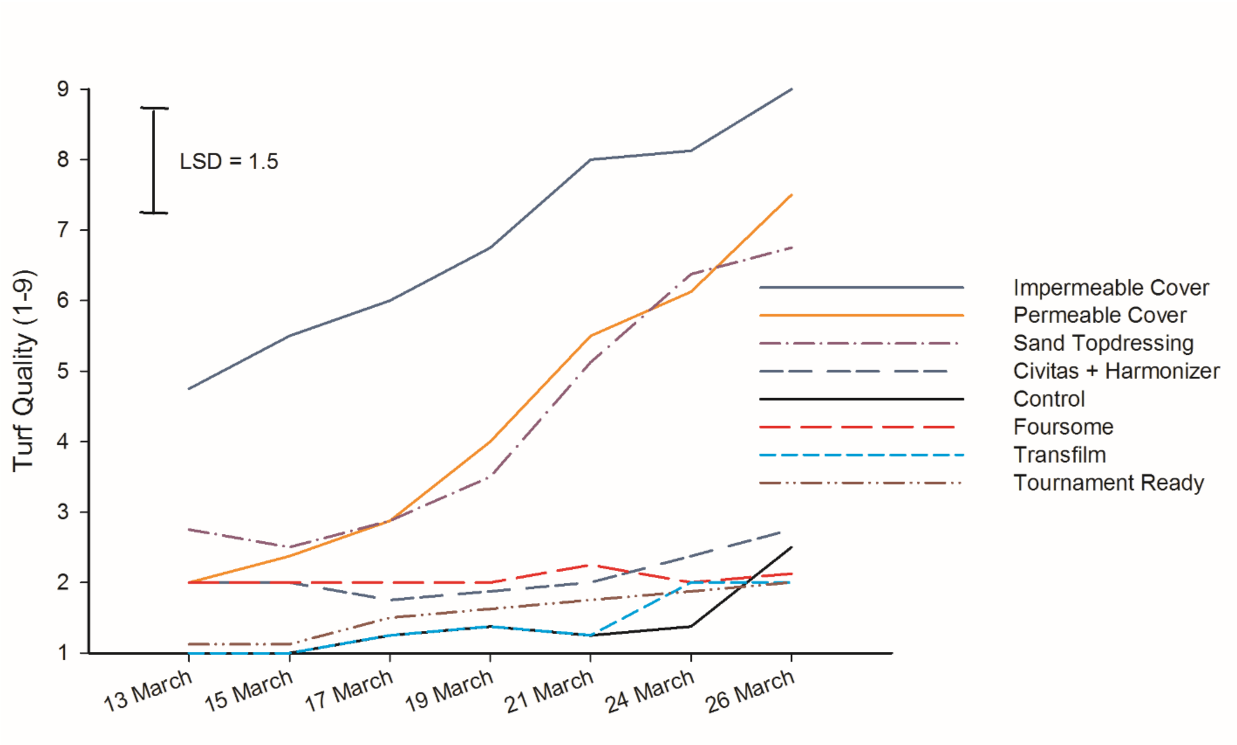

Figure 5. Turf quality at the Kearney, NE site. Field ratings were taken on 13 March, and a sample was removed and placed in the greenhouse to evaluate recovery.