

2010 Wetting Agent Study Update

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Golf course superintendents mainly use wetting agents to combat localized dry spots and improve irrigation efficiency. Wetting agents work by reducing the surface tension of water; therefore, allowing water to be held by the soil and be taken up by the plant (Karnok et al, 2004). Research has demonstrated a reduction in soil wetting time and an increase in soil moisture uniformity from the application of wetting agents (Karcher et al, 2010).

Surfactants can be classified into four primary groups: anionic, cationic, nonionic, and amphoteric. Anionic and cationic surfactants generally treat the water. Most wetting agent products on the market are nonionic surfactants (Karnok et al, 2004). Block polymer nonionic surfactants. Treat both the water and the soil; therefore, these are the most common wetting agents used on golf courses. The strengths of block polymer nonionic surfactants include adhesion to soil particles, excellent re-wetting capabilities, and are safe to apply in a wide range of weather conditions. The downside of block polymer nonionic surfactants is they do not reduce the surface tension of water as well as anionic and nonionic surfactants (Kostka, 2005).

Objectives

The objectives of this research were to (1) evaluate soil moisture response to wetting agent applications, (2) determine if a reduction in localized dry spot occurred following wetting agent applications, and (3) evaluate the interaction of soil type,



Localized dry spot on a golf course green.

plant species and wetting agent applied.

Participating Sites and Superintendents

- Brackett's Crossing Country Club, Tom Proshok
- Burl Oaks Golf Club, Tom Natzel
- Dacotah Ridge Golf Course, Aaron Johnson
- Keller Golf Course, Paul Digneau
- La Crosse Country Club, Jack Tripp
- Medina Golf and Country Club, Erin McManus
- Midland Hills Country Club, Mike Manthey
- North Oaks Golf Club, Jack MacKenzie, CGCS
- Somerby Golf Club, Eric Counselman

- Somerset Country Club, James Bade
- The Minikahda Club, Jeff Johnson
- Les Bolstad University of Minnesota Golf Course, Brent Belanger

Testing Procedures

Soil moisture and GPS data were collected on three greens at each golf course prior to and after wetting agent application during July and August, 2010. In total, 37 greens were tested. Data was collected with a Spectrum Technologies FieldScout TDR 300 outfitted with 3 inch probes and a Garmin 72H GPS unit. Data was collected at a maximum of three days prior to and within five days after a wetting agent application. Data was processed using Dplot and Microsoft Excel.

What Did the Data Look Like

The images on the bottom of Page 23 are from an application of APSA 80. There was a significant reduction in soil moisture in the bottom center of the green and addition of water along the top left edge of the green from wetting agent application.

The images on the bottom of Page 24 are from an application of Revolution. There was a distinct dry spot on the top left side of the green that was reduced after wetting agent application. The wet areas were not eliminated from wetting agent application.

(Continued on Page 23)

PRODUCTS TESTED

Sites were encouraged to continue using products already in use.

Products	TriCure	Tournament Ready	Immerse GT	APSA 80h	Dispatch	Revolution
Manufacturer	Mitchell Products	Kalo, Inc.	AmegA Sciences	Amway	Aquatrols	Aquatrols
No. of courses using	2	1	1	2	1	5
Rate per 1000 sq ft	1 and 2 fl oz	6 fl oz	3 fl oz	0.11 and 2 fl oz	0.37 fl oz	6 fl oz
Active Ingredient	100% Block Polymer	100% Gluco Ether Block	100% Active Ingredient	80% Nonionic Surfactant	51% Gluco Ether Block Polymer	100% Modified Block Polymer

Wetting Agent-

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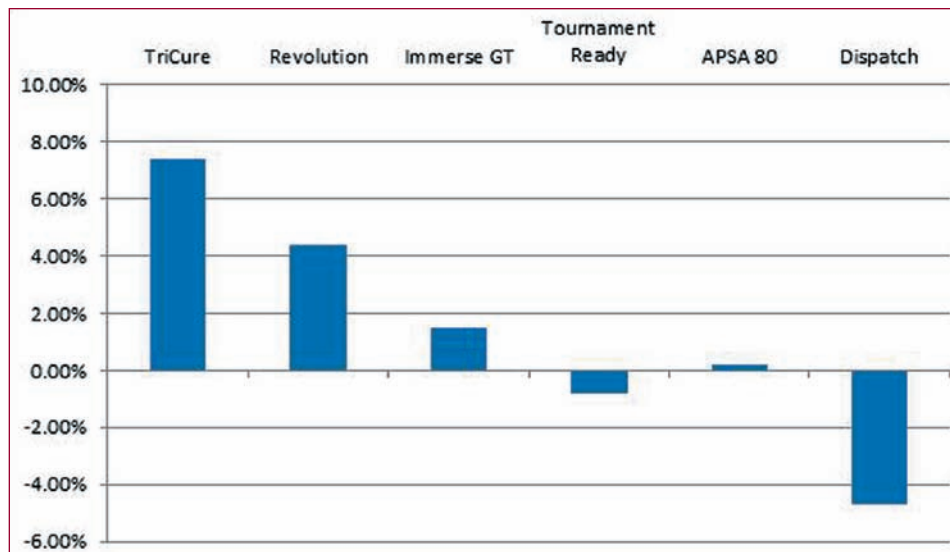
Results and Discussion

The average soil moisture on a green before treatment ranged from 10.7 to 35.9 percent with an average of 23 percent. Wetting agents with block polymer and modified block polymer active ingredients showed increased soil moisture, with an average increase of 4.7%. Immerse GT also showed increased soil moisture, which suggests that it belongs in the block polymer class of wetting agents. The gluco ether block polymer blend wetting agents decreased soil moisture, with an average decrease of 2.7%. The nonionic surfactant product demonstrated no real change in soil moisture levels between ratings.

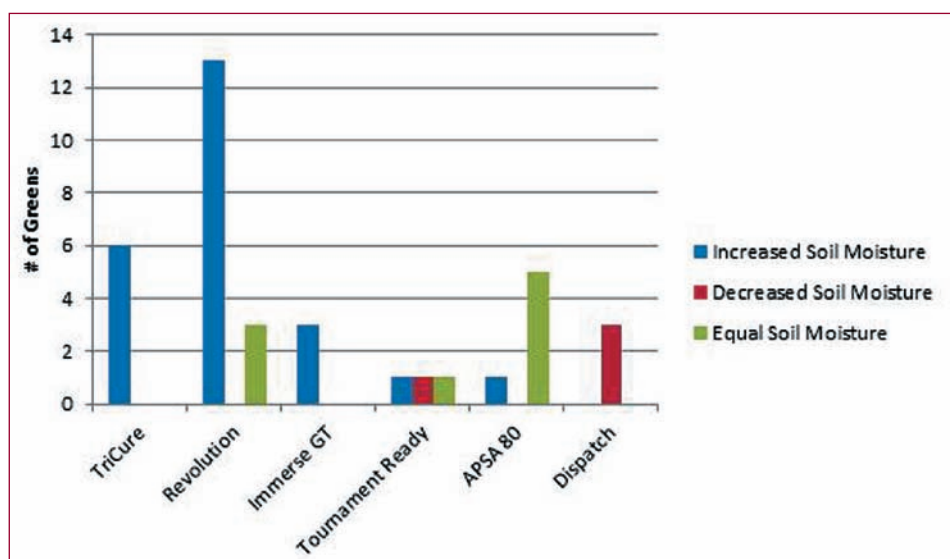
Soil moisture uniformity before treatment ranged from 54 to 90.2%, with the average soil moisture being 78.8%. Wetting agents with block polymer and modified block polymer active ingredients demonstrated increased uniformity on 17 of 22 greens with an average increase of 4.8%. Immerse GT demonstrated similar properties to the gluco ether block polymer blend and nonionic surfactant wetting agents, which had decreased uniformity on all sites. The average decrease in uniformity for these wetting agents was 3.9%.

It could be suggested that the soil moisture and uniformity differences demonstrated are due to a factor other than wetting agents. Given the minimum span of five days between data collection, this is entirely possible. Changes in soil

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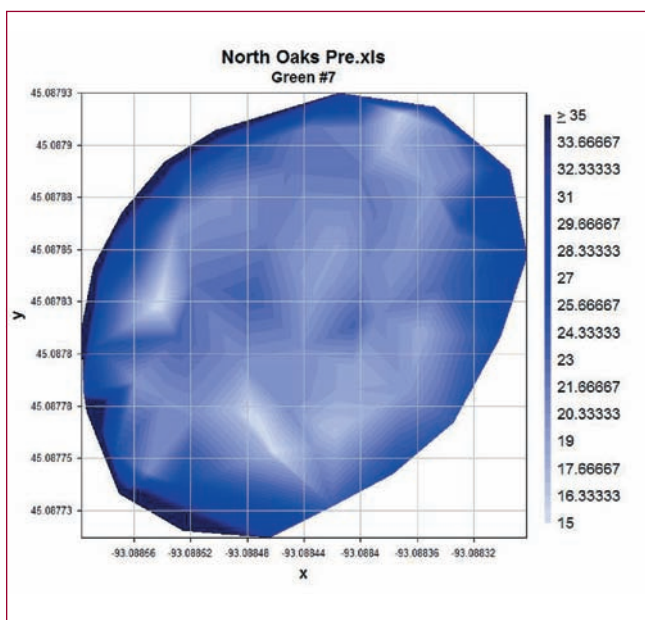


Average soil moisture difference between pre and post wetting agent.

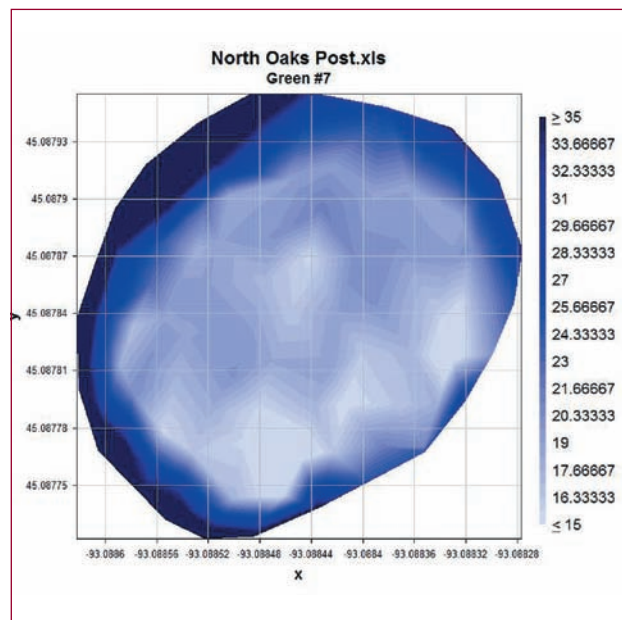


Number of greens exhibiting a soil moisture response to wetting agent application.

These images are from an application of APSA 80. There was a significant reduction in soil moisture in the bottom center of the green and addition of water along the top left edge of the green from wetting agent application.



APSA 80 pre wetting agent.



APSA 80 post wetting agent.

Wetting Agent-

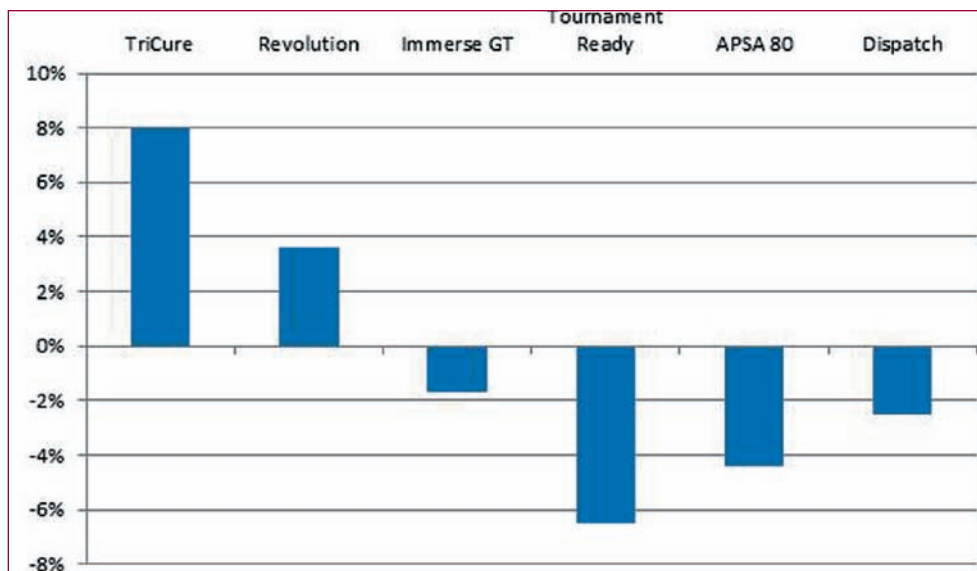
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moisture and uniformity are mostly due to the removal and addition of water. The primary source of removal was the turfgrass, which should be fairly constant across sites. Water was added between data collection through rain and irrigation. Total rainfall between ratings ranged from 0.12 to 4.33 inches, with an average of 0.73 inches. Irrigation systems ran between ratings one to four times, with an average of two runs. This suggests water removal and addition was not the principal reason for the soil moisture and uniformity responses.

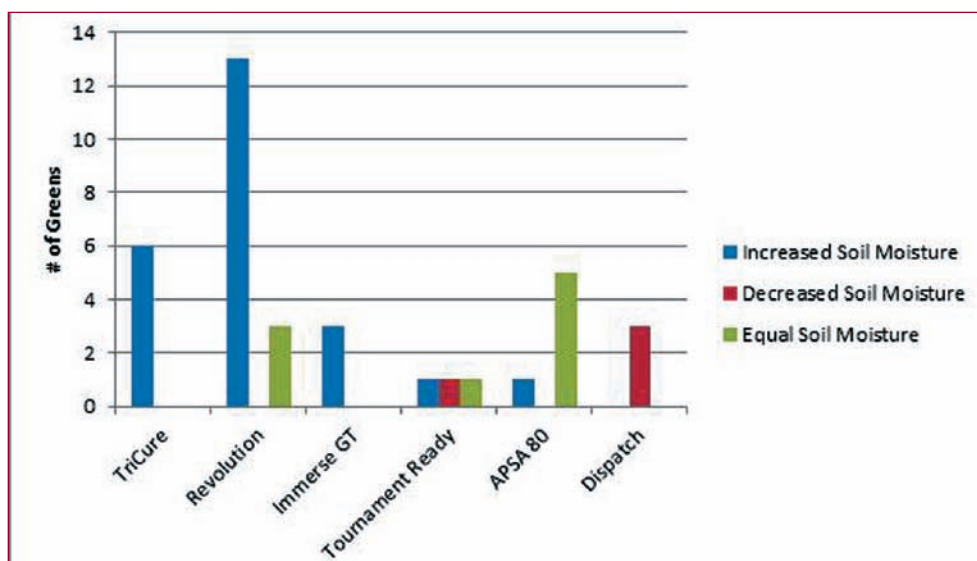
Conclusion

This study demonstrates a distinct soil moisture response to wetting agent applications and the active ingredient of a wetting agent. Soil moisture uniformity responded similarly to soil moisture values in this study. Wetting agents with similar active ingredients also responded in the same way. It should be noted that data was collected in the top 3-in of the soil and these wetting agents may demonstrate different characteristics at shallower and deeper soil depths. Whether the goal of a wetting agent application is to reduce localized dry spots or move water through the soil profile, there appears to be a wetting agent that will work.

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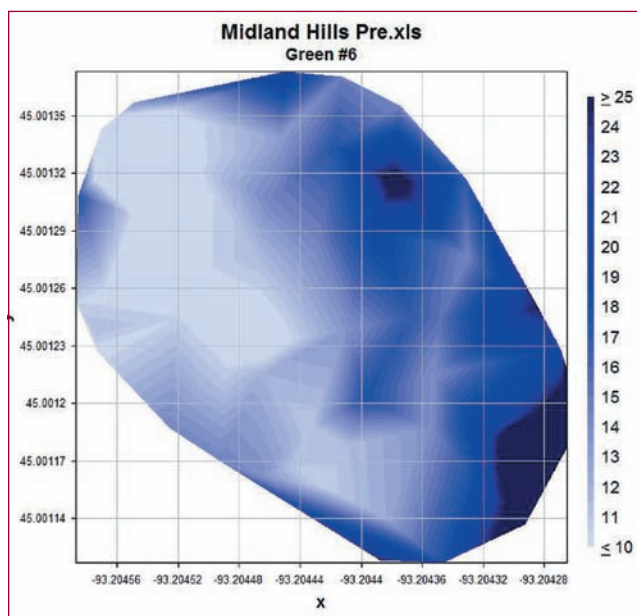


Average soil moisture uniformity difference between pre and post wetting agent.

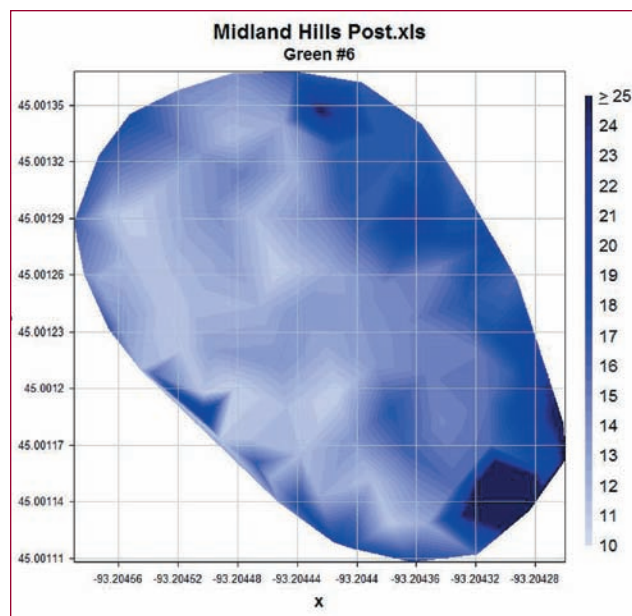


Number of greens exhibiting a soil moisture uniformity response to wetting agent application.

These images are from an application of Revolution. There was a distinct dry spot on the top left side of the green that was reduced after wetting agent application. The wet areas were not eliminated from wetting agent application.



Revolution pre wetting agent.



Revolution post wetting agent.

Wetting Agent-

(Continued from Page 24)

2011 Plans

This work will continue during the 2011 season at these sites and more. Several new products will be added to the study. Two of these are Performa Gold, a 100% gluco ether block polymer blend, and Magnus, a 100% block polymer. After the 2011 season data will be analyzed in a similar manner. In addition, the interaction of soil type and species with wetting agents will be analyzed.

References

Karcher, D., M. Richardson, A. Patton, and J. Summerford.

2010. Wetting agent effects on rootzone moisture distribution under various irrigation regimes - year 2 summary. Arkansas Turfgrass Report 2009, Ark. Ag. Exp. Stn. Res. Ser. 579:50-56.

Karnok, K.J., K. Xia, and K.A. Tucker. 2004. Wetting agents: What are they, and how do they work? Golf Course Management Magazine. June: 84-86.

Kostka, S.J. 2005. ACA1820 - A novel chemistry for rootzone water management in turfgrass systems. Non-peer-reviewed Paper at the 10th International Turfgrass Society Research Conference.



FIELD EVENT WINNERS AT THE MGCSA ASSISTANTS' SPRING MIXER AT NEW PRAGUE GOLF CLUB

From the left are, Troy Tschida, Medina Golf and Country Club; Ben Walker, Somerset Country Club; Nick Folk, The Minikahda Club; Eric Rasmussen, Southview Country Club; Manley Vinke-meier, Glencoe Country Club, and Jim O'Neill, Cycle Works Golf Supply.

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