Effects of Micro–Blaze on Creeping Bentgrass and Bermudagrass Putting Greens

Justin Moss
Oklahoma State University

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Objectives:

Evaluate the effects of repeated applications of Micro–Blaze Turf Care to creeping bentgrass and bermudagrass putting green turf quality, root growth, and soil moisture on both newly constructed and well–established sand–based greens.

Maintenance of sand–based rooting zones is important for the proper growth and health of golf course putting greens. There are many new microbial based "supplemental" products available to golf course superintendents. However, the effectiveness of many of these products is suspect and little research data is available for superintendents to make informed decision concerning the use of such products. Verde Environmental, Inc. is currently marketing a microbial enhancement product called "Micro–Blaze Turf Care" to golf course superintendents across Oklahoma, Texas, and the southern United States. The objective of this project was to evaluate the effects of repeated applications of Micro–Blaze Turf Care to creeping bentgrass (Agrostis stolonifera) and hybrid bermudagrass (Cynodon dactylon x Cynodon transvaalensis) putting green turf quality, root growth, and soil moisture on both newly constructed (< 5 years old) and well–established (> 10 years old) sand–based greens.

This research was conducted on creeping bentgrass putting greens in Oklahoma and bermudagrass putting greens in Texas. In Oklahoma, the work was conducted at the Oklahoma State University Turfgrass Research Center in Stillwater, OK on relatively old ´Penncross´ creeping bentgrass and relatively young ´Penn A–4´ creeping bentgrass greens. In Ft. Worth, TX, plots were established at the Diamond Oaks Country Club to relatively old ´Champion´ bermudagrass greens and at the

Figure 1. Representative effectiveness of a herbicide safener (Treated on the left and Control on the right).

Location	Treatment	TQ	NDVI	VWC
Penncross	MB + 2 wks[1]	6.5a	0.762a	22.9a
	MB + 4 wks	6.3a	0.757a	22.7a
	MB – 2 wks	6.2a	0.749a	22.6a
	MB – 4 wks	6.2a	0.746a	21.9a
	Standard	6.3a	0.754a	22.4a
	Control	5.9a	0.732a	24.4a
Penn A–4	MB + 2 wks	6.8a	0.779ab	35.5a
	MB + 4 wks	6.7a	0.781ab	35.8a
	MB – 2 wks	6.6a	0.767bc	36.0a
	MB – 4 wks	6.6a	0.769bc	35.1a
	Standard	7.0a	0.792a	35.8a
	Control	6.3a	0.751c	34.1a

[1] MB = Micro–Blaze Turf Care; ´+´ = formulation with microbes; ´–´ = formulation without microbes; 2 wks = applied every two weeks during the growing season; 4 wks = applied every four weeks during the growing season; Standard = plots treated with an industry standard foliar fertilizer program.

[2] For each location, means followed by the same letter within a row are not different at the 0.05 significance level.

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Students collecting volumetric water content (left) and soil samples (right).

Waterchase Golf Club/Jim McLean Golf Center to relatively young ´Champion´ bermudagrass golf greens. Plots were arranged in a randomized complete block design with three replications. Plot area was 4 x 15 ft. All plots were maintained as typical golf course putting greens according to species and golf course site conditions. Treatments were: 1) Untreated Control; 2) Micro−Blaze Turf Care (as formulated) at 16 oz product/1,000 sq. ft. every 14 days; 3) Micro−Blaze Turf Care (as formulated) at 16 oz product/1,000 sq. ft. every 28 days; 4) Micro−Blaze Turf Care (formulation without microbes) at 16 oz product/1,000 sq. ft. every 14 days; 5) Micro−Blaze Turf Care (formulation without microbes) at 16 oz product/1,000 sq. ft. every 28 days. In addition, the creeping bentgrass sites included: 6) Industry comparison foliar fertilizer product applied at labeled rates every 14 days. All plots received equal amounts of N, P, and K throughout the experiment. The following data was collected from each site during 2012 and 2013. 1) Turf quality on the subjective 1−9 rating scale where 1 = lowest turf quality, 6 = acceptable turf quality, and 9 = best turf quality. Turf quality was rated using the methods of the National Turfgrass Evaluation Program (NTEP); 2) Turf color using an objective NDVI (normalized difference vegetative index) meter (GreenSeeker).; 3) Volumetric soil water content using a TDR soil probe with meter (Spectrum Technologies); and 4) Ball roll distance with a stimpmeter (USGA). In addition, root growth data was collected using the Win−Rhizo root scanning software (Regent Instruments, Inc.) and dry oven root mass will be determined after scanning. Root samples were collected in the Spring prior to summer stress and the Fall following summer stress during. All root data and ball roll data will be available in an upcoming final USGA report.

Bentgrass Results

In 2013, there was no treatment effect on TQ or VWC at both locations. However, there was a treatment effect on NDVI on the ´Penn A−4´ green but not on the ´Penncross´ green (Table 1). On the relatively young ´Penn A−4´ green, the industry standard, MicroBlaze as formulated with microbes applied every 2 weeks, and MicroBlaze as formulated with microbes applied every 4 weeks had higher NDVI values compared to control. In addition, the industry standard had higher NDVI values compared to MicroBlaze without microbes applied every 2 or 4 weeks.

Bermudagrass Results

In 2013, there was no treatment effect on NDVI or VWC at Waterchase nor on VWC at Diamond Oaks. There was a treatment effect on TQ at both Waterchase and Diamond Oaks. At Waterchase, TQ on MicroBlaze as formulated with microbes applied every 2 weeks was higher compared to control and both Microblaze treatments applied every 4 weeks. Turf quality for MicroBlaze without microbes applied every 2 weeks was higher than both Microblaze treatments applied every 4 weeks but was not different from the control. However, there was no corresponding statistical difference in average NDVI among treatments. At Diamond Oaks, TQ for MicroBlaze as formulated with microbes applied every 2 weeks was higher than the control and both Microblaze treatments without microbes. Similarly, NDVI for MicroBlaze as formulated with microbes applied every 2 weeks was higher than higher than the control and both Microblaze treatments without microbes.

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Table 2. The effects of Micro-Blaze Turf Care on turf quality (TQ), normalized vegetative index (NDVI), and volumetric soil water content (VWC) on bermudagrass putting greens at two locations in Ft. Worth, TX in 2013.

Location	Treatment	TQ	NDVI	VWC
Waterchase	MB + 2 wks[1]	5.7a[2]	0.588a	16.5a
	MB + 4 wks	5.0c	0.589a	17.0a
	MB – 2 wks	5.4ab	0.593a	15.8a
	MB – 4 wks	4.9c	0.589a	16.4a
	Control	5.1bc	0.594a	15.4a
Diamond Oaks	MB + 2 wks	6.5a	0.698a	11.7 a
	MB + 4 wks	6.1b	0.688ab	11.6 a
	MB – 2 wks	5.8c	0.669b	11.2 a
	MB – 4 wks	5.7c	0.673b	11.6 a
	Control	5.7c	0.672b	11.9 a

[1] MB = Micro-Blaze Turf Care; ´+´ = formulation with microbes; ´–´ = formulation without microbes; 2 wks = applied every two weeks during the growing season; 4 wks = applied every four weeks during the growing season.

[2] For each location, means followed by the same letter within a row are not different at the 0.05 significance level.

Summary

- Micro-Blaze Turf Care as formulated with microbes applied every 2 weeks during the growing season increased average NDVI (turf greenness) on relatively young ´Penn A-4´ creeping bentgrass greens and relatively old ´Champion´ bermudagrass greens compared to control.
- Micro-Blaze Turf Care as formulated with microbes applied every 2 weeks increased turf quality compared to control on bermudagrass greens, but not on creeping bentgrass greens.
- There was no difference in volumetric water content among treatments on both creeping bentgrass and bermudagrass greens.

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