

Adaptability of Bermudagrasses in Northern Climates
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The objective of this study is to determine if different cultural practices can provide enhanced cold tolerance to 4 winter hardy bermudagrass cultivars.

Methods & Materials

This study was originally initiated on April 2014 on a sand based area at the Ohio Turfgrass Foundation Research and Education Facility, Columbus, Ohio. Four cold tolerant cultivars ('Latitude 36', 'Riviera', 'Patriot', and 'Northbridge') were sodded while still dormant. 'Latitude 36' and 'Riviera' had been grown at the research facility and were harvested and transplanted. 'Patriot', and 'Northbridge' were provided by Oakwood Sod Farms Delmar, Maryland. Treatments were applied and data collected were during the fall of 2014 and reported to the USGA. In the spring of 2015 the study suffered virtually 100% winterkill. On June 1st it was decided to reestablish the study for fall treatments. It was determined that sprigging would be the best method of establishment. The plots were sprigged on July 14th, and mowing began August 3rd.

The plots were all mowed 6x a week at 0.75" Foramsulfuron (Revolver) was used to control annual grassy weeds and overseeded ryegrass in September at a rate of 0.4 fl oz per 1000 sq ft. During the growing season the bermudagrass received 0.5 lb of nitrogen (Ammonium Sulfate) weekly and were sand topdressed and dethatched every two weeks.

Treatments were replicated three times and the design was a split plot design. The main plot factor was bermudagrass cultivar and the subplot factor was cultural practice. The cultural treatments were initiated on September 10, 2015 and will continued until November 12, 2015. The cultural treatments consisted of:

- 1) Untreated Control
- 2) GreenLinks Turf Colorant at a rate of 16 fl oz per 1000 sq ft every 14 days
- 3) Trinexapac-ethyl (Primo MAXX) at a rate of 0.125 fl oz per 1000 sq ft every 14 days
- 4) Trinexapac-ethyl (Primo MAXX) at a rate of 0.375 fl oz per 1000 sq ft every 14 days
- 5) GreenLinks Turf Colorant at a rate of 16 fl oz per 1000 sq ft + Trinexapac-ethyl (Primo MAXX) at a rate of 0.125 fl oz per 1000 sq ft every 14 days.
- 6) GreenLinks Turf Colorant at a rate of 16 fl oz per 1000 sq ft + Trinexapac-ethyl (Primo MAXX) at a rate of 0.375 fl oz per 1000 sq ft every 14 days.

Treatments have been evaluated for color (1-9 scale) and soil temperatures (K-Type Thermocouple).

There were three major changes from the 2014 protocol:

- 1) The mowing height was reduced from 1.25" to .75"

- 2) The rate of plant grow regulator was adjusted to the label rates for the common bermudagrass ('Riviera') and the hybrid bermudagrasses ('Latitude 36', 'Patriot', and 'Northbridge') in the study.
- 3) Evergreen Turf Covers were installed on the plots daily when the forecasted overnight low was < 50° F. The covers will be left on for the entire winter.

Results

- Spring data was not collected as the study suffered nearly 100% winterkill. We speculate that the winterkill was caused when the plots were exposed to record low temperatures while the plots were still green between November 14th – 21st. (**Table 1**) We are also concerned that the plots experienced desiccation throughout the winter on the 100% sand based rootzone.
- The hybrid bermudagrasses ('Latitude 36', 'Patriot', and 'Northbridge') in the trial maintained an acceptable color rating through 10/30. Whereas the common bermudagrass ('Riviera') last acceptable color rating was on 10/22. (**Table 2.**)
- It was observed that PGR application weather alone or in combination with pigment had a negative impact on color when applied to the common bermudagrass variety 'Riviera'. (**Table 3**)
- There were no observed differences of soil temperature between treatments or cultivars

Table 1. Temperatures

	11/14/14	11/15/14	11/16/14	11/17/14	11/18/14	11/19/14	11/20/14	11/21/14
Max Air Temp	32.4	33.0	36.5	34.0	19.1	37.0	30.5	31.5
Min Air Temp	20.5	15.9	29.4	16.2	9.9	11.8	20.7	13.0
Avg Air Temp	27.0	23.9	32.9	26.6	14.4	24.2	25.1	21.7

Table 2. Color rating by Variety

Trt	Cultivar	10/08	10/15	10/22	10/30	11/06	11/25	12/01
1	Patriot	6.52	6.77a	6.71a	5.21a	5.02a	4.31a	3.81a
2	Northbridge	6.50	5.94b	6.40ab	5.02a	4.94ab	3.46b	1.98b
3	Riviera	6.42	5.5c	6.06bc	4.85a	4.54b	4.27b	2.17b
4	Latitude 36	6.69	6.29b	5.62c	5.40a	5.46a	3.46b	1.85b
LSD _(0.05)		NS	0.43	0.53	NS	NS	0.63	0.69

† Color rated on a 1-9 scale where 1 = brown, 5 = lowest acceptable rating, 9 = dark green

‡ Means followed by the same letter are not significantly different (P=0.05) according to Fisher's Protected LSD test

¶ NS means not significantly different (P=0.05) according to Fisher's Protected LSD test

Table 3. Color rating by Cultural Treatment

Trt	Treatment	10/08	10/15	10/22	10/30	11/06	11/25	12/01
1	Untreated	6.58ab	6.25a	6.33ab	5.15b	5.00b	3.71a	2.27b
2	Pigment	6.75a	6.40a	6.48a	5.44a	5.33a	3.77a	2.52a
3	PGR (Hybrid)	6.39bcd	6.11a	6.08b	5.03b	4.92b	3.50ab	2.5ba
4	PGR (Common)	6.17d	5.25b	5.33c	4.58c	4.33c	3.00c	1.83c
5	PGR + Pigment (Hybrid)	6.50bc	6.19a	6.30ab	5.06b	5.05b	3.75a	2.72a
6	PGR + Pigment (Common)	6.3cd	5.25b	5.42c	4.75c	4.25c	3.33b	2.58a
LSD _(0.05)		.25	0.30	0.28	0.24	0.28	0.28	0.24

† Color rated on a 1-9 scale where 1 = brown, 5 = lowest acceptable rating, 9 = dark green

‡ Means followed by the same letter are not significantly different (P=0.05) according to Fisher's Protected LSD test

¶ NS means not significantly different (P=0.05) according to Fisher's Protected LSD test

Research for 2016

- 1) Continue to monitor color until there is no evidence of green tissue.
- 2) Monitor soil moisture and soil temperature throughout the winter.
- 3) Evaluate how the fall treatments affect spring green up, % winterkill and spring dead spot incidence.

Presentations

- 1) Tri-State Green Industry Conference; Cincinnati, Ohio, Feb 5th, 2015
- 2) The Ohio State University/Ohio Turfgrass Foundation Research Field Day, Columbus, Ohio, August 11th, 2015
- 3) Ohio Turfgrass Foundation Conference and Show, Columbus Ohio, Ohio, December 8, 2015