TURFGRASS RESEARCH
2023

K-STATE TURFGRASS RESEARCH

JULY 2023

Herbicide Effects on Establishment of Zoysiagrass from Sprigs in Two Consecutive Years

Dani McFadden and Jack D. Fry

Summary

Weed control after planting warm-season grasses in the spring can be critical for acceptable establishment of the stand. However, many herbicide labels can be unclear on sprigging restrictions before or after the application of a product. Research was conducted on the growth effects of pre- and postemergence herbicides applied at or near the day of 'Innovation' zoysiagrass sprigging. Preliminary data from this study showed granular (Ronstar G) and liquid (Ronstar Flo) formulations of oxadiazon caused the least amount of injury to zoysiagrass.

Rationale

There are limited preemergence herbicides labeled for application at the time of zoysiagrass (*Zoysia* spp. Willd) sprigging. To our knowledge, no research has been conducted to evaluate how pre- and postemergence herbicides affect the establishment of Innovation zoysiagrass when applied at or near the time of sprigging.

Objective

The objective of this field trial was to determine if commonly used pre- and post-emergence herbicides influence the establishment of Innovation zoysiagrass sprigs.

Study Description

A field study was conducted at the Olathe Horticulture Research and Extension Center in Olathe, KS, in the summers of 2021 and 2022 to investigate the effects of pre- and postemergence herbicides on Innovation zoysiagrass establishment. The

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

experiment was arranged in a randomized complete block design with four replicates. Herbicide treatments included a nontreated control, seven single active ingredient treatments, and two combination postemergence herbicide treatments applied after weed emergence in experimental plots, for a total of 40 individual experimental plots (Table 1).

In 2021, zoysiagrass sod was cut on July 9, 2021 at a 1:10 ratio for sprigging with four equally spaced furrows created for sprigs to be evenly spread into each 4- × 8-ft experimental plot (Figure 2). Preemergence herbicide treatments (all containing a single active ingredient) were applied immediately after sprigging; while two postemergence treatments were applied on August 2, 2021, after grassy and broadleaf weed emergence. On July 30, 2021, and August 16, 2021, 1 lb of N/1000 ft^2 was applied to the entire study area using a 16-0-8 and 46-0-0 ($N\text{-}P_2O_5\text{-}K_2O$) fertilizer, respectively. On April 15, 2022, sequential applications of all preemergence herbicide treatments were applied.

In 2022, zoysiagrass sod was cut on June 6, 2022, and sprigged on June 7, 2022, with the same methods as above. Preemergence herbicide treatments were applied immediately after sprigging and postemergence herbicide treatments were applied on July 8, 2022. On June 24, 2022, and July 15, 2022, 1 lb of N/1000 ft^2 was applied to the entire study area using a 16-0-8 and 46-0-0 ($N\text{-}P_2O_5\text{-}K_2O$) fertilizer, respectively. On April 17, 2023, sequential applications of all preemergence herbicide treatments were applied.

Supplemental irrigation was applied on both studies throughout the duration of the growing season to prevent stress. Data in both years included NDVI (normalized difference vegetation index) measurements, turfgrass vigor, percent establishment, and digital percent green cover. Turfgrass vigor was a visual estimate of green color, stolon expansion, density, etc. that reflects the relative speed as the sprigged plot develops into mature sod. Data herein is focused on visual zoysiagrass establishment and weed coverage; performance of zoysiagrass on all other ratings can be viewed in the 2022 K-State Turfgrass Research Report. Establishment data were subjected to ANOVA in SAS (9.4) using the GLIMMIX procedure to determine those factors which were significant ($P \leq 0.05$) and means were separated according to Tukey's Honest Significant Difference (HSD).

Results

By 9 weeks after sprigging (WAS) in 2021, no zoysiagrass in any treatment had reached > 50% coverage (Table 2). Ronstar G and Ronstar Flo treatments along with postemergence herbicide Acclaim Extra + Speedzone and Q4 had the highest establishment (33%, 29%, 29%, and 26%, respectively). In 2022, at 13 WAS zoysiagrass receiving Ronstar Flo had 68% coverage and weed control was statistically higher than all other herbicide treatments. Zoysiagrass coverage in the Ronstar Flo treatment was also superior to other herbicides on earlier rating dates.

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

In 2022, more weed competition in Ronstar G treatments resulted in a lower level of zoysiagrass establishment (Figure 1). Effective suppression of weeds occurred in several herbicide treatments, and Ronstar Flo provided the best establishment with effective weed suppression.

Acknowledgments

Funding provided by the United States Department of Agriculture (multi-state specialty crops block grant). A special thank you to Syngenta, Bayer, and Corteva for product donations for this study.

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

Table 1. Herbicides evaluated for effects on zoysiagrass when sprigged on the same day of application in Olathe, KS

Trade name	Active ingredient	Rate per acre
Untreated control	--	--
Ronstar G	Oxadiazon	150 lb
Ronstar Flo	Oxadiazon	80.5 fl. oz.
Specticle Flo	Indaziflam	10 fl. oz.
Pennant MAGNUM	*S*-metolachlor	2.6 pt
Princep Liquid	Simazine	2 qt
Dimension 2EW	Dithiopyr	2 pt
Barricade	Prodiamine	2.3 lb
Q4	Quinclorac + sulfentrazone + 2,4-D + dicamba	7 pt
Acclaim EXTRA + SpeedZone	Fenoxaprop-p-ethyl + carfentrazone-ethyl + 2,4-D + MCPP + dicamba	13 fl. oz. + 4 pt

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

K-STATE TURFGRASS RESEARCH

Table 2. Establishment of Innovation zoysiagrass sprigs at intervals after herbicide application at the Olathe Horticulture Research and Extension Center in 2021–2022

	Establishment (%)[a]					
	Year 1			Year 2		
Treatment[b]	5WAS[c]	7WAS	9WAS	7WAS	9WAS	13WAS
Untreated control	18a[d]	22a	6d	4f	1d	10c
Granular oxadiazon	16ab	23a	33a	16bc	5cd	13bc
Liquid oxadiazon	13bc	18ab	29ab	25a	30a	68a
Indaziflam	6de	9cd	13cd	4f	5cd	9c
S-metolachlor	5e	6d	10d	10de	21b	23b
Simazine	6de	8cd	14cd	19bc	20b	11bc
Dithiopyr	10cd	13bc	21bc	8fe	12c	15bc
Prodiamine	10cd	11cd	21bc	4f	8cd	10c
Quinclorac + sulfentrazone + 2,4-D + dicamba	13bc	19a	29ab	14cd	9c	18bc
Fenoxaprop-ethyl + carfentrazone-ethyl + 2,4-D + MCPP + dicamba	11c	18ab	26ab	20ab	6cd	11bc

[a] Establishment was rated visually on a 0 to 100% scale on which 0 = no establishment, and 100 = complete establishment of plot.
[b] Preemergence herbicides (from oxadiazon to prodiamine) applied immediately after sprigging on July 9, 2021 (Year 1) and June 7, 2022 (Year 2). Combination herbicides applied on August 2, 2021 (Year 1) and July 8, 2022 (Year 2).
[c] WAS = weeks after sprigging.
[d] Means followed by the same letter in a column are not significantly different according to Tukey's Honest Significant Difference ($P < 0.05$). Means are averages over replication, n = 4.

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

K-STATE TURFGRASS RESEARCH

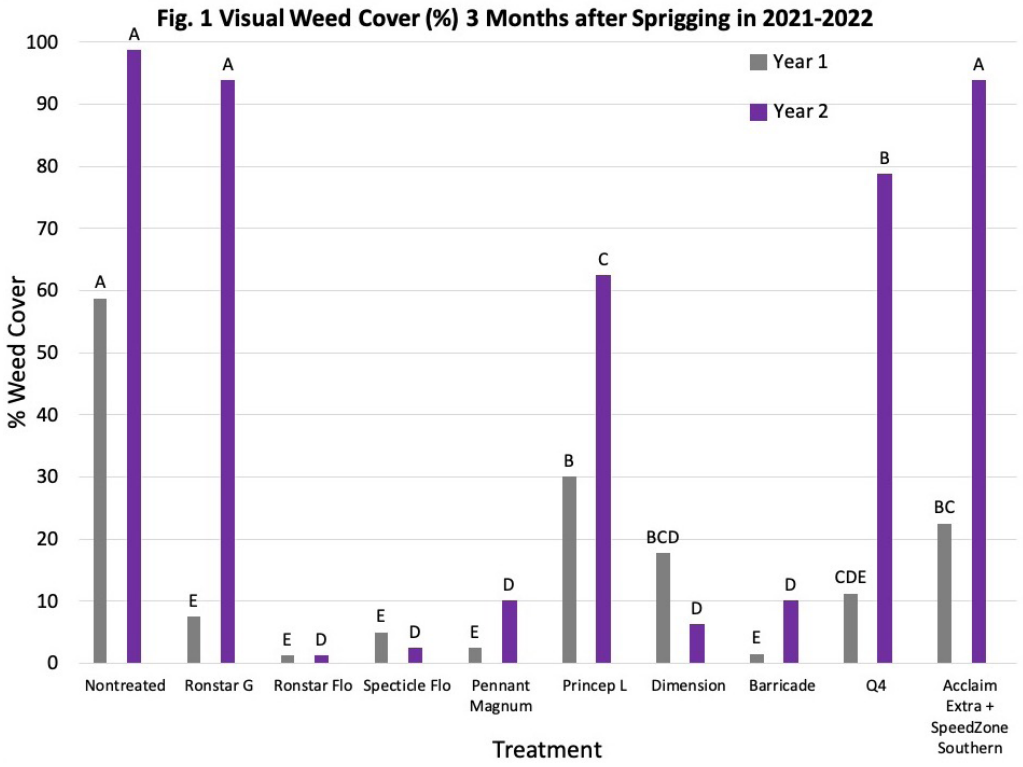

Figure 1. Visual weed cover (%) 3 months after sprigging in 2021–2022.

Figure 2. Experimental plots immediately after zoysiagrass sprigging on July 9, 2021, prior to herbicide application.

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

Figure 3. (A) Liquid Oxadiazon-treated plot; (B) Indaziflam-treated plot. Photos taken 5 months after sequential application in 2022.

K-STATE Research and Extension

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service