

Anthem® Flex crop safety and efficacy in Kentucky Bluegrass

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Annual grass weeds are difficult to manage in grass seed fields due to similarities in physiology and lifecycles, and infestations can reduce stand longevity and productivity. Preemergence herbicides that control annual grasses selectively in Kentucky bluegrass are critical components of a weed management system. Pyroxasulfone, the active ingredient in Anthem Flex that has soil residual activity, is a new herbicide being considered for use in Kentucky bluegrass. The study objective was to evaluate Anthem Flex (pyroxasulfone + carfentrazone-ethyl) crop safety and efficacy in newly seeded Kentucky bluegrass.

Methods

The study was established in a 2nd-year Kentucky bluegrass field near Rockford, WA. Treatments were applied when the Kentucky bluegrass was 3 to 5 tiller and actively growing in the fall of 2023. Treatments were applied with a CO₂ powered backpack sprayer and a 5 ft boom with 3 Teejet 11002VS nozzles with an effective spray pattern of 8 ft and calibrated to deliver 15 gallons per acre (GPA). The study was conducted in a randomized complete block design with 4 replications. Plots were 10 ft by 25 ft long. Treatments were assessed for crop response and weed control in the spring, 6 months after treatment. Two ½ m² subsamples were harvested from each plot to estimate yield and determine germination rates. Data were subject to ANOVA using the Agricultural Research Manager software (Ver. 2024).

Table 1. Treatment application details.

Study Application		
Application Code	A	B
Date	10/12/2023	4/17/2024
Application volume (GPA)	15	15
Timing	Postemergence	Postemergence
Air temperature (°F)	55	40
Relative humidity (%)	66	62
Wind velocity (mph, direction)	4, NNE	2, N
Cloud Cover (%)	100	0

Results

Control of Italian ryegrass (*Lolium multiflorum*) was very good to excellent for all treatments. Outrider applied alone provided the lowest control at 92%. Treatments that included Anthem Flex consistently provided over 95% control.

Crop injury presented as stunted growth in plots where Anthem Flex was applied at rates over 2.75 oz/A, either alone in the fall or combined fall and spring applications (treatments 3-6, 8) (Table 2). Calculated yields were not different among treatments, though treatments that kept Anthem Flex rates around 3 oz/A yielded higher than other treatments (up to 2370 lb/A) (Table 3). Germination rates remained unaffected by herbicide application, ranging between 65-80% across treatments (Table 3).

In a similar trial in 2022, no injury was observed in any of the treatments, and we found similar rates of germination (65-85%). In another trial in 2023, high rates of Anthem Flex applied either alone in the fall or combined fall and spring applications caused similar injury seen in this trial (10-15%). We observed similar germination rates (62-80%) in the 2023 trial. We did find numerically lower yield in plots treated with Anthem Flex applied at 2.75 oz/A in the fall and 1 oz/A in the spring (treatment 4), however it was not significantly lower than other treatments.

Anthem Flex appears to be a robust tool for Italian ryegrass management in Kentucky bluegrass grown for seed. While Prowl H2O and Outrider offered limited individual efficacy, their integration in tank mixes provided enhanced weed suppression. Crop safety is still a concern, especially at higher rates of Anthem Flex, though we did not find that the stunting affected yield or germination of the crop. Future studies could explore optimizing combinations and application timings for broader weed control.

Table 2. Crop injury and Italian ryegrass control for Kentucky bluegrass in response to increasing rates of Anthem Flex herbicide. Means with the same letter are not statistically different ($\alpha = 0.05$). Control was not statistically different.

	Treatment ¹	Timing	Rate	Stunting (%)		Control (%)	
				5/16/2024		5/16/2024	
1	Nontreated			0 b		0	
2	Anthem Flex	A	2.75 oz/A	0 b		100	
3	Anthem Flex	A	3 oz/A	10 ab		97	
4	Anthem Flex	A	2.75 oz/A	5 ab		97	
	Anthem Flex	B	1 oz/A				
5	Anthem Flex	A	6 oz/A	15 a		97	
6	Anthem Flex	A	2.75 oz/A	10 ab		100	
	Prowl H2O	B	64 oz/A				
7	Prowl H2O	A	64 oz/A	0 b		100	
8	Anthem Flex	A	2.75 oz/A	10 ab		100	
	Anthem Flex	B	2.75 oz/A				
9	Outrider	A	0.38 oz/A	0 b		92	
10	Outrider	A	0.38 oz/A	0 b		97	
	Anthem Flex	A	2.75 oz/A				

¹All treatments included NIS 0.05%V/V.

Table 3. Yield and germination for Kentucky bluegrass in response to increasing rates of Anthem Flex herbicide. Yield and germination were not statistically different.

	Treatment ¹	Timing	Rate	Yield (lb/A)		Germination (%)	
				7/2/2024	11/22/2024		
1	Nontreated				2010		81
2	Anthem Flex	A	2.75 oz/A		1910		65
3	Anthem Flex	A	3 oz/A		2370		80
4	Anthem Flex	A	0.38 oz/A		1700		81
	Anthem Flex	B	2.75 oz/A				
5	Anthem Flex	A	6 oz/A		1070		76
6	Anthem Flex	A	2.75 oz/A		1390		74
	Prowl H2O	B	64 oz/A				
7	Prowl H2O	A	64 oz/A		2620		66
8	Anthem Flex	A	2.75 oz/A		2290		75
	Anthem Flex	B	2.75 oz/A				
9	Outrider	A	0.38 oz/A		1950		79
10	Outrider	A	0.38 oz/A		2310		71
	Anthem Flex	A	2.75 oz/A				

¹All treatments included NIS 0.05%V/V.

Off-Label or Experimental-Use Disclaimer

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