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 Kentucky bluegrass grown for seed.

The study was established in a 1st-year Kentucky bluegrass field near Rockford, Washington. Treatments were applied when the Kentucky bluegrass was 3 to 5 tiller and actively growing in the fall of 2024. Treatments were applied with a CO_2 powered backpack sprayer. The spray boom had four Teejet 11002VS nozzles with 20-inch spacing and spray output was calibrated to deliver 15 gallons per acre at 3 mph. Plots were 10 ft wide by 30 ft long, arranged in a randomized complete block design with four replications. Treatments were assessed for crop response and weed control in the spring, 6 months after treatment A. Two ½ m^2 subsamples were harvested from each plot to estimate yield. Data were subject to ANOVA using the Agricultural Research Manager software (Ver. 2024).

Table 1. Treatment application details.

Application Code	**A**	**B**
Date	10/29/2024	4/17/2025
Application volume (GPA)	15	15
Timing	Postemergence	Postemergence
Crop Stage	3-5 tillers	3-5 tillers
Air temperature (˚F)	42	53
Relative humidity (%)	78	28
Wind velocity (mph, direction)	6, SSW	8, N

Control of Italian ryegrass (*Lolium multiflorum*) was very good to excellent for all treatments. All treatments 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 3400 lb/A) (Table 3).

In previous iterations of this trial, similar injury was observed with high rates of Anthem Flex on newly seeded and 1st-year Kentucky bluegrass (5-10%) (2023 and 2024 trials), but no injury was observed in the 2022 trial on 2nd-year bluegrass. We did find numerically lower yield in plots treated with Anthem Flex applied at 6 oz/A in the fall (treatment 5), 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. Injury and control were not statistically different ($\alpha = 0.05$) between treatments.

					Stunting (%)	Control (%)
	Treatment[1]	**Timing**	**Rate**		**4/23/2025**	**4/23/2025**
1	Nontreated				0	0
2	Anthem Flex	A	2.75	oz/A	0	95
3	Anthem Flex	A	3	oz/A	0	100
4	Anthem Flex	A	2.75	oz/A	5	95
	Anthem Flex	B	1	oz/A		
5	Anthem Flex	A	6	oz/A	5	95
6	Anthem Flex	A	2.75	oz/A	5	95
	Prowl H2O	B	64	oz/A		
7	Prowl H2O	A	64	oz/A	0	100
8	Anthem Flex	A	2.75	oz/A	5	95
	Anthem Flex	B	2.75	oz/A		
9	Outrider	A	0.38	oz/A	0	95
10	Outrider	A	0.38	oz/A	0	95
	Anthem Flex	A	2.75	oz/A		

[1]All 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 was not significantly different between treatments ($\alpha = 0.05$).

					Yield (lb/A)
	Treatment[1]	**Timing**	**Rate**		**6/20/2025**
1	Nontreated				3067
2	Anthem Flex	A	2.75	oz/A	2275
3	Anthem Flex	A	3	oz/A	2260
4	Anthem Flex	A	2.75	oz/A	2710
	Anthem Flex	B	1	oz/A	
5	Anthem Flex	A	6	oz/A	1759
6	Anthem Flex	A	2.75	oz/A	2712
	Prowl H2O	B	64	oz/A	
7	Prowl H2O	A	64	oz/A	2699
8	Anthem Flex	A	2.75	oz/A	2751
	Anthem Flex	B	2.75	oz/A	
9	Outrider	A	0.38	oz/A	3475
10	Outrider	A	0.38	oz/A	3105
	Anthem Flex	A	2.75	oz/A	

[1]All treatments included NIS 0.05%V/V.

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