# 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.

The study was established in a newly seeded Kentucky bluegrass field near Rockford, WA. Treatments were applied when the Kentucky bluegrass was tillering and actively growing in the fall of 2022. Treatments were applied with a $CO_2$ 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 $m^2$ subsamples were harvested from each plot. Samples were dried, threshed, and cleaned to provide yield data for each treatment. A subset of seeds from each ½ $m^2$ sample were used to collect data on germination differences between treatments. Biomass, yield, and germination data are still being analyzed. Data were subject to ANOVA using the Agricultural Research Manager software (Ver. 2023).

***Table 1.*** *Treatment application details.*

| Study Application | | |
|---|---|---|
| **Application Code** | **A** | **B** |
| Date | 10/20/2022 | 5/4/2023 |
| Application volume (GPA) | 15 | 15 |
| Timing | Postemergence | Postemergence |
| Air temperature (˚F) | 62 | 66 |
| Relative humidity (%) | 47 | 46 |
| Wind velocity (mph, direction) | 7, NE | 6, NNE |
| Cloud Cover (%) | 90 | 30 |

***Figure 1***. *Nontreated plot (left) and Anthem Flex 2.75 oz/A in fall plus Anthem Flex 1 oz/A in spring.(right).*

**Results**

Treatments that included a spring treatment of Anthem Flex or high rates of Anthem Flex (2.75 and 3.76 oz/A) caused significant stunting to the newly seeded Kentucky bluegrass (Figure 1 and Table 2). The injury did become less apparent throughout the growing season but was still visually detectable at time of harvest. The injury ratings presented here are more accurately described as 'percent of plot area affected'; the magnitude of the stunting injury was 60-80%. Weed control was not significantly different among treatments, but higher rates of Anthem Flex had numerically increased weed control compared to other rates of Anthem Flex, or the Outrider treatment. Anthem Flex does not appear to be a safe herbicide option for newly seeded Kentucky bluegrass at high rates. Applying Anthem Flex at low rates or on older stands of bluegrass is a potential input for control of annual grass weeds in Kentucky bluegrass.

**Table 2**. Crop injury (rated as percent of plot area affected by injury) and weed control for Kentucky bluegrass in response to increasing rates of Anthem Flex herbicide. Means with the same letter are not statistically different (α = 0.05).

| | | | | | Injury (%) | | Injury (%) | | Control[1] (%) |
|---|---|---|---|---|---|---|---|---|---|
| | Treatment | Timing | Rate | | 5/23/2023 | | 6/5/2023 | | 6/5/2023 |
| 1 | Anthem Flex | A | 2.75 | oz/A | 20 | cd | 0 | b | 72 |
| 2 | Anthem Flex | A | 3 | oz/A | 10 | cd | 5 | b | 67 |
| 3 | Anthem Flex | A | 0.38 | oz/A | 100 | a | 25 | b | 87 |
| | Anthem Flex | B | 2.75 | oz/A | | | | | |
| 4 | Anthem Flex | A | 6 | oz/A | 56 | bc | 25 | b | 87 |
| 5 | Anthem Flex | A | 2.75 | oz/A | 0 | d | 12 | b | 77 |
| | Prowl H2O | B | 64 | oz/A | | | | | |
| 6 | Prowl H2O | A | 64 | oz/A | 0 | d | 0 | b | 70 |
| 7 | Anthem Flex | A | 2.75 | oz/A | 85 | ab | 95 | a | 90 |
| | Anthem Flex | B | 2.75 | oz/A | | | | | |
| 8 | Outrider | A | 0.38 | oz/A | 0 | d | 0 | b | 67 |
| 9 | Outrider | A | 0.38 | oz/A | 20 | cd | 5 | b | 67 |
| | Anthem Flex | A | 2.75 | oz/A | | | | | |
| 10 | Anthem Flex | A | 3.76 | oz/A | 58 | bc | 10 | b | 70 |

[1]Control was not significantly different among treatments (α = 0.05).

**Off-label or Experimental-Use Disclaimer**

Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.