

# COMPARING PROGRAMS USING PYROXASULFONE PRODUCTS FOR MANAGING ITALIAN RYEGRASS IN WHEAT (2012-2013)

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## **INTRODUCTION**

Pyroxasulfone was recently approved for corn and soybeans and is being considered for use in wheat. It is a relatively new herbicide that is similar to flufenacet and metolachlor in its chemistry and in the spectrum of weeds it controls. During its early stages of development, pyroxasulfone was evaluated under the experimental code KIH-485.

One of the benefits of pyroxasulfone in wheat is that it offers soil-residual control of small seeded annual grasses and broadleaf weeds. It also provides an alternative mode of action compared to ALS and ACCase inhibitors that are commonly used to manage Italian ryegrass in wheat. Pyroxasulfone limits shoot growth by inhibiting long chain fatty acid enzymes. Based on current information, herbicides with this mode of action are at low risk of developing herbicide-resistant weeds.

## **OBJECTIVE**

Compare Italian ryegrass control programs using pyroxasulfone products (i.e. Anthem, Fierce or Zidua) and Axial XL.

## **METHODS**

This research is part of an on-going project that began in the fall of 2011. Results of the first year were discussed in the 2011-2012 Wheat Research Report. Some treatments were modified and the experiment was repeated in the 2012-2013 season. The data discussed in this report are based on results of the 2012-2013 growing season.

Table 1 lists products used in this year's research and compares the active ingredients and their rates per acre. The base rates for

pyroxasulfone products were chosen after reviewing results of previous research and with help of company representatives. Pyroxasulfone, at the base rate, was applied 10 days before planting and was utilized with or without Axial XL as a spring treatment. Also, some treatments included pyroxasulfone and Axial XL at approximately 75% of the base rate.

Roundup PowerMax at 3 pt/A was applied as a preplant burndown treatment to control broadleaf weeds. Italian ryegrass was overseeded to ensure a uniform density for evaluating herbicide treatments. A disc was used to lightly incorporate the ryegrass seed.

A CO<sub>2</sub> back pack sprayer was used to apply all herbicide treatments. Pyroxasulfone was applied October 11, 2012 in a spray volume of 20 GPA. Axial XL was applied in a spray volume of 10 GPA in the fall on November 20, 2012 or in the spring on March 15, 2013. Pioneer 25R32 wheat was planted at a rate of 42 viable seed/ft<sup>2</sup> on October 22, 2012. The original planting date was scheduled October 18, 2012 (i.e. 7 days after pyroxasulfone treatments) but was delayed due to rainfall.

Visual ratings of Italian ryegrass control were made at 2, 4, and 8 weeks after last treatment (WAT) and near maturity on June 17. Ryegrass seedhead counts were made on June 17, 2013 using a 1-square foot quadrat, at four random sites per plot.

Wheat was harvested with a small plot combine on June 21, 2012. Grain yields were adjusted to 13.5% moisture.

Liquid nitrogen was applied with stream bars as split treatment. The first treatment of 40 unit/A was applied February 18, 2013 and the second treatment of 80 units were applied March 14, 2013.

In order to limit variability due to diseases and insects, Prosaro fungicide at 7 oz/A and Warrior II insecticide at 1.5 oz/A were applied as a tankmix on May 13, 2013.

## **RESULTS**

The results of this year's research were similar to those reported for last year. Some of the major observations in this year's study are listed below.

- Preemergence control of ryegrass in early December or at eight weeks after application of Zidua, Fierce, and Anthem was 94%. However, by May 18, ryegrass control with Zidua, Fierce, and Anthem was 58, 60, and 75%, respectively.
- There were a significant number of ryegrass seedheads at the end of the season for the pyroxasulfone herbicides and ranged from a low of 24.1heads/ft<sup>2</sup> for Anthem to a high of 35.2 heads/ft<sup>2</sup> for Fierce.
- Axial XL applied alone in the fall or spring provided 99% ryegrass control. This year's results with Axial XL were somewhat variable. Fall-applied Axial resulted in 93 to 95% control of ryegrass at the end of the season. Delaying application until the spring resulted in 90% control with the full rate and 80% control with the reduced rate of Axial XL.
- The use of a full rate of any of the pyroxasulfone products followed by a full rate of Axial XL in the spring, resulted in 99 to 100% ryegrass control by the end of the season. Similar results were observed when these

herbicide programs were used at the reduced rates.

- The use of pyroxasulfone alone resulted in wheat yields of 74.3, 76.9, and 86.6 bu/A for Zidua, Fierce, and Anthem, respectively. The improved ryegrass control that was achieved by incorporating Axial with pyroxasulfone, increased wheat yields by 32 to 61%.
- Although the wheat yields for the reduced rate programs for Zidua and Fierce were slightly less compared with the full rate programs, these differences were not statistically significant.
- Ryegrass control with Axial XL alone in the fall ranged from 104.6 to 118.9 bu/A. However, when Axial XL alone was delayed until the spring, ryegrass wheat yield did not exceed 64.3 bu/A.

## **SUMMARY**

Zidua, Fierce, and Anthem provided similar levels of Italian ryegrass control and wheat yield. Ryegrass control was poor when pyroxasulfone was applied alone without a spring application of Axial XL. Delaying Axial XL alone until the spring resulted in a substantial reduction in wheat yield, compared with applying it in the fall.

**TABLE 1. HERBICIDE FORMULATIONS AND RATES /A  
(UKREC 2012-2013)**

	<b>RATE/A</b>	<b>ACTIVE INGREDIENT(S)</b>	<b>AI/A</b>
Anthem 2.15 lb/gal  (FMC)	6.5 oz/A	pyroxasulfone +  fluthiacet (CADET)	0.106 lb ai/A  0.003 lb ai/A
	5 oz/A	pyroxasulfone +  fluthiacet (CADET)	0.082 lb ai/A  0.002 lb ai/A
Fierce 76% DG  (Valent)	3 oz/A	pyroxasulfone +  flumioxazin (VALOR)	0.08 lb ai/A  0.063 lb ai/A
	2.25 oz/A	pyroxasulfone +  flumioxazin (VALOR)	0.06 lb ai/A  0.047 lb ai/A
Zidua 85% DG  (BASF)	1.5 oz/A	pyroxasulfone	0.08 lb ai/A
	1 oz/A	pyroxasulfone	0.053 lb ai/A
Axial XL 0.42 lb ai/gal  (Syngenta)	16.4 oz/A	pinoxaden	0.054 lb ai/A
	12.25 oz/A	pinoxaden	0.040 lb ai/A

**TABLE 2. ITALIAN RYEGRASS CONTROL USING PYROXASULFONE PRODUCTS  
(ZIDUA, FIERCE, AND ANTHEM) PREEMERGENCE AND AXIAL XL POSTEMERGENCE  
(UKREC 2012-2013)**

HERBICIDE	TIMING	RYEGRASS					WHEAT Yield (Bu/A) (6/6/12)
		---- % CONTROL ----				(Heads/Ft <sup>2</sup> )	
		2 WAT	4 WAT	8 WAT	MATURITY (05-18-13)	(06-17-13)	
Zidua (1.5 oz/A)	Early Preplant	98	96	94	58	25.4	74.3
Zidua (1.5 oz) Axial XL (16.4 oz/A)	Early Preplant Spr Post	90	99	99	99	0.3	113.4
Zidua (1 oz) + Axial XL (12.25 oz/A)	Early Preplant Spr Post	80	98.3	96	96	2	101.5
Fierce (3 oz/A)	Early Preplant	99	95	94	60	35.2	76.9
Fierce (3 oz/A) + Axial XL (16.4 oz/A)	Early Preplant Spr Post	94	95	99	99	0	123.5
Fierce (2.25 oz/A)+ Axial XL (12.25oz/A)	Early Preplant Spr Post	85	97	98	98	0.7	101.6
Anthem 6.5 oz/A	Early Preplant	98	94	94	75	24.1	86.6
Anthem (6.5 oz/A)+ Axial XL (16.4 oz/A)	Early Preplant Spr Post	94	97	100	100	0.2	114.
Anthem (5 oz/A)+ Axial XL (12.25oz/A)	Early Preplant Spr Post	85	95	99	99	0.5	114.2
Axial XL 16.4 oz/A	Fall Post	18	70	95	95	1.5	118.9
Axial XL (12.25oz/A)	Fall Post	10	70	93	93	2.6	104.6
Axial XL (16.4 oz/A)	Spr Post	18	80	90	90	18.3	63.4
Axial XL (12.25oz/A)	Spr Post	18	81	80	80	20.1	64.3
Non-treated Check		0	0	0	0	199	9.1
	LSD <sub>(0.05)</sub>	6	2	3	5	9.5	16

<sup>1</sup> Anthem: (pyroxasulfone + fluthiacet [Cadet])

Fierce: (pyroxasulfone + flumioxazin [Valor])

Zidua: (pyroxasulfone)

Axial XL: (pinoxaden)

- Overseeded ryegrass (10-09-12 & 10-11-12)
- Burndown Roundup PowerMax 3 pt/A (10-09-12)
- Early Preplant 10-11-12
- Planted Pioneer 25R32 (10-22-12)
- Axial treatments applied in 10 GPA volume. All other treatments applied in 20 GPA volume.
- Fall Post 11-20-12 (Wheat 2.5" tall 2 to 3 leaf and Ryegrass 1 tiller)
- Spr Post 03-15-13 (Wheat 5" tall 3 tiller and Ryegrass 6" tall and 5 tillers)
- Ryegrass control ratings made at 2, 4, and 8 Weeks After Last Treatment (WAT) and late season