

Evaluating Zidua Herbicide in a Sweet Corn Weed Management Program

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Introduction

The objective of this study was to evaluate a new herbicide from BASF marketed as Zidua (pyroxasulfone) for its effectiveness in a sweet corn weed management program.

Materials and Methods

The trial was conducted on a Fruitfield coarse sand soil with 1.5 percent organic matter and soil pH of 6.0 (buffer pH of 7.0). Previous crop was soybean. Spring tillage included chisel plowing and disking in preparation for planting. Except for herbicide treatments, normal cultural practices were followed for fertilization, irrigation, and pest control. Seed of BC 0805 sweet corn was planted in rows 30 in. apart on May 10 at 27,700 seeds/acre. Trial design was a randomized complete block with three replications. A herbicide plot consisted of 6 rows 20 ft in length. Herbicide treatments were applied with a CO₂ small plot sprayer with 4-nozzle boom calibrated to apply 20 gpa at 20 psi. Herbicide treatments are described in Table 1. Crop preemergence (PRE) treatments were applied on May 14 to a dry soil surface and were incorporated by 0.8 in. of rainfall on May 19. Early post (EPOST) treatments were applied on May 29 when sweet corn was at the V3 growth stage and soil surface was moist. Post (POST) herbicide treatments were applied on June 13 to sweet corn at the V5 growth stage. Weed counts were taken on June 19 and July 3 to determine effectiveness of PRE, EPOST, and POST herbicide treatments on weeds. Harvest data were taken from center rows on August 2 to determine effects of herbicide treatment on sweet corn yield.

Results and Discussion

Sweet corn, cultivar BC 0805, was planted on May 10 and PRE treatments applied May 14 to a weed-free soil surface. None of the PRE treatments affected sweet corn emergence and a good uniform stand was established. Above average rainfall in May contributed to strong weed pressure.

Probably 75 percent of grass weeds present were crabgrass but some yellow foxtail also was observed. Zidua provided grass control comparable to Dual II Magnum at the 3.0 oz/acre rate (2X) or 4.5 oz/acre rate (3X). There was discernable, but not severe, sweet corn plant stunting in plots receiving the 3X rate of Zidua, which is above labeled use rates. Several broadleaf weeds were present with annual morning glory, carpetweed, and common lambsquarter being most prevalent.

Zidua used by itself provided mediocre control of these weeds but used in conjunction with Atrazine, Callisto, or Armezon provided much improved control. Treatment yields at harvest were not significantly different, although the control plots and the 3X Zidua rate tended to produce ears slightly smaller than other treatments.

Zidua is a group 15 herbicide and should be considered an alternative to other products in this important group that includes Dual, Harness, Outlook, and several others. It showed good crop safety with BC 0805 and Temptation (data not shown) except at above label rates. In this study, Zidua provided good preemergence grass control and fair broadleaf weed control. Treatments that included Zidua in combination with Armezon, Atrazine, or Callisto generally improved broadleaf weed

control. By harvest, treatments that included POST applications were generally not as weedy as treatments that were PRE only. This may be due to the high amount of rainfall received in May causing possible dilution of PRE treatments.

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Table 1. Herbicide product descriptions.

Herbicide	Formulation	Company	Active ingredient	Group
Armezon	2.8 SC	BASF	topramezone	27
Atrazine 4L	4 L	MANA	atrazine	5
Callisto	4 SC	Syngenta	mesiotrione	27
Dual II Magnum	7.64 EC	Syngenta	s-metolachlor	15
Zidua	85 WG	BASF	pyroxasulfone	15

Table 2. Herbicide treatment descriptions, application rates, and BC0805 yield.

Herbicide treatment	Timing	Rate/acre	Dozen ears/acre	Yield cwt/acre	Husked ear wt
1. Control - untreated check			1783	161.9	0.55
2. Dual II Magnum	PRE	1.3 pt	1767	168.7	0.60
3. Dual II Magnum + Atrazine	PRE	1.3 pt + 2.0 pt	1815	183.8	0.61
4. Zidua (1X)	PRE	1.5 oz	1791	173.3	0.60
5. Zidua (2X)	PRE	3.0 oz	1863	178.3	0.58
6. Zidua (3X)	PRE	4.5 oz	1694	155.9	0.55
7. Zidua (1X) + Atrazine	PRE	1.5 oz + 2.0 pt	1936	184.9	0.57
8. Zidua (2X) + Atrazine	PRE	3.0 oz + 2.0 pt	1912	170.4	0.53
9. Zidua (3X) + Atrazine	PRE	4.5 oz + 2.0 pt	1754	172.8	0.58
10. Zidua (1X) + Atrazine	E POST	1.5 oz + 2.0 pt	1912	186.7	0.58
11. Zidua (2X) + Atrazine	E POST	3.0 oz + 2.0 pt	1767	179.7	0.61
12. Zidua + Atrazine + Callisto	PRE	1.5 oz + 1.0 pt + 6.0 oz	1940	187.6	0.59
13. Zidua	PRE	1.5 oz	1839	187.3	0.60
Atrazine + Callisto	POST	1.0 pt + 3.0 oz			
14. Zidua	PRE	1.5 oz	1839	192.8	0.62
Atrazine + Armezon	POST	1.0 pt + 0.75 oz			
15. Zidua + Atrazine	PRE	1.5 oz + 1.0 pt	2033	203.5	0.65
Armezon + Atrazine	POST	0.75 oz + 1.0 pt			
LSD 5%			n.s.	n.s.	0.04

Table 3. Percent weed control by herbicide treatment on June 13 and July 3.

Herbicide treatments	<u>Grass</u>		<u>Morning Glory</u>		<u>Lambsquarter</u>		<u>Carpetweed</u>	
	June 13	July 3	June 13	July 3	June 13	July 3	June 13	July 3
1. Control - untreated check	0	0	0	0	0	0	0	0
2. Dual II Magnum (PRE)	97	77	62	71	38	40	17	0
3. Dual II Magnum + Atrazine (PRE)	97	68	82	77	77	75	67	56
4. Zidua (1X) (PRE)	89	61	69	42	62	68	53	81
5. Zidua (2X) (PRE)	96	79	73	59	95	76	93	78
6. Zidua (3X) (PRE)	99	81	78	81	96	96	99	92
7. Zidua (1X) + Atrazine (PRE)	92	62	80	83	95	96	100	100
8. Zidua (2X) + Atrazine (PRE)	93	66	75	74	93	94	100	100
9. Zidua (3X) + Atrazine (PRE)	98	89	71	71	99	96	100	100
10. Zidua (1X) + Atrazine (E POST)	73	55	88	100	100	100	100	100
11. Zidua (2X) + Atrazine (E POST)	90	86	95	94	100	100	100	100
12. Zidua + Atrazine + Callisto (PRE)	95	70	64	65	100	100	100	97
13. Zidua (PRE) Atrazine + Callisto (POST)	90	87	95	100	77	100	100	100
14. Zidua (PRE) Atrazine + Armezon (POST)	83	86	71	83	62	100	100	100
15. Zidua + Atrazine (PRE) Armezon + Atrazine (POST)	89	78	95	88	94	99	100	100