

Evaluating Zidua Herbicide for Use in Potato Production

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Introduction

Zidua (pyroxasulfone) is a relatively new herbicide from BASF currently being used in corn, soybeans, and wheat. In the future, BASF would like to expand the Zidua label to include additional crops such as potatoes. In support of this goal, we conducted a field trial in 2014 to evaluate weed control effectiveness and potato crop tolerance to Zidua when used alone and in combination with other herbicides in a potato production system.

Materials and Methods

The trial was conducted on a Toolesboro sandy loam soil with 2.5 percent organic matter and soil pH of 6.5. The ground was prepared for planting by chisel plowing and disking. Normal cultural practices were followed for fertilization, irrigation, and pest control. Whole, B-sized, seed pieces of potato cultivar Atlantic were planted on April 18 at 8-in. spacing in rows 42 in. apart. Trial design was a randomized complete block with three replications. A herbicide plot consisted of 3 rows 20 ft in length. Herbicide treatments were applied using a CO₂ small plot sprayer with 4-nozzle boom calibrated to apply 20 gpa at 20 psi. Herbicide products are described in Table 1. Preemergence (PRE) herbicide treatments were applied to a dry soil surface on May 3 before potato sprouts had emerged. All plots were cultivated and hilled on June 9. At this time, good stands had been established and largest potato vines had 7 to 8 fully developed leaves and a few were just starting to flower. Postemergence (POST) herbicide treatments were applied over the top of potato plants on June 10. Weed control ratings were conducted on June 2 and again at harvest. The most abundant weeds were crabgrass, yellow

foxtail, annual morning glory, redroot pigweed, and common lambsquarters. Ratings were done by counting number of weeds in a 10 square ft area of each plot. The center row of each plot was harvested for tuber yield determinations on July 23.

Results and Discussion

None of the herbicide treatments in Table 2 visibly hurt potato emergence or subsequent plant growth. Treatment yields did not differ significantly for total, A-size yield or specific gravity (specific gravity data not presented, trial average was 1.089). Thus, this trial didn't provide any evidence that Zidua, even at the 3X (4.5 oz/acre) rate or when combined with other common potato herbicides, affected plant growth enough to hurt potato yield.

Weed counts on June 2 (Table 2) revealed that all herbicide treatments provided good grass control, although grass pressure was not very strong. Differences were seen between treatments for broadleaf weed control. Zidua, like Dual II Magnum and Prowl H₂O, gave rather poor control of morning glory, however, control did improve at the high 4.5 oz/acre rate. Zidua controlled lambsquarter and redroot pigweed better than Dual II Magnum or Prowl H₂O when used alone, but tank mixing them with Senior, Lorox, or Reflex dramatically improved control.

Treatments 11, 12, and 13 included a POST application of herbicide, which provides late-season weed control. After hilling, potatoes require frequent irrigation, which can encourage late emerging weeds to become a problem by harvest. Under conditions of this trial, the POST herbicide applications did not hurt potato yield and plots remained fairly weed free till harvest.

This work is encouraging. It showed Zidua has crop safety on potatoes and provides good control of several grass and broadleaf weeds. However, it is important to note Zidua is not labeled for use on potatoes at this time and more observations under differing conditions still are needed.

Acknowledgements

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Table 1. Herbicide product descriptions.

Herbicide	Formulation	Company	Active ingredient	MOA Group
Dual II Magnum	7.64 EC	Syngenta	s-metolachlor	15
Lorox	50 DF	Griffin	linuron	7
Prowl H ₂ O	3.8 AS	BASF	pendimethalin	3
Reflex	2 L	Syngenta	fomesafen	14
Sencor	75 DF	Bayer	metribuzin	5
Zidua	85 WG	BASF	pyroxasulfone	15

Table 2. Percent weed control by herbicide treatment on June 2, before cultivating and hilling.

Herbicide treatment	Rate per acre	Application timing ¹	Grass ²	Morning glory	Lambs quarter	Redroot pigweed
1. Untreated Control	--	--	0	0	0	0
2. Zidua 1X	1.5 oz	PRE	96	29	94	98
3. Zidua 2X	3.0 oz	PRE	94	44	98	100
4. Zidua 3X	4.5 oz	PRE	100	83	100	100
5. Dual II Magnum	1.5 pt	PRE	100	58	60	85
6. Prowl H ₂ O	2.0 pt	PRE	98	60	83	67
7. Zidua	3.0 oz	PRE	100	100	100	100
Sencor	0.33 lb	PRE				
8. Zidua	3.0 oz	PRE	100	92	100	100
Lorox	1.5 lb	PRE				
9. Dual II Magnum	1.5 pt	PRE	100	69	100	100
Sencor	0.33 lb	PRE				
10. Zidua	3.0 oz	PRE	100	100	100	100
Lorox	1.5 lb	PRE				
Reflex	1.0 pt	PRE				
11. Dual II Magnum	1.5 pt	PRE	96	72	94	93
Sencor	0.33 lb	POST				
12. Prowl H ₂ O	2.0 pt	PRE	100	84	100	100
Sencor	0.33 lb	PRE				
Reflex	1.0 pt	PRE				
Dual II Magnum	1.5 pt	POST				
13. Zidua	3.0 oz	PRE	100	100	100	100
Sencor	0.33 lb	PRE				
Prowl H ₂ O	2.0 pt	POST				

¹PRE treatments applied May 3, POST treatments applied June 10 after cultivation and hilling.

²Grasses present predominantly crabgrass and yellow foxtail.

Table 3. Herbicide treatment descriptions, potato yield, and weed control ratings at harvest.

Herbicide treatment	Rate per acre	Application timing¹	Total cwt/acre	A-size cwt/acre	Avg. tuber wt.-oz	Grass weed control²	Broadleaf weed control²
1. Untreated Control	--	--	240.6	202.9	4.4	P	P
2. Zidua 1X	1.5 oz	PRE	243.1	201.6	4.5	G	F
3. Zidua 2X	3.0 oz	PRE	254.7	221.9	4.5	E	G
4. Zidua 3X	4.5 oz	PRE	246.8	192.9	4.4	E	E
5. Dual II Magnum	1.5 pt	PRE	257.2	215.3	4.5	E	F
6. Prowl H ₂ O	2.0 pt	PRE	241.9	207.0	4.7	E	F
7. Zidua Sencor	3.0 oz 0.33 lb	PRE PRE	231.9	199.5	4.6	E	E
8. Zidua Lorox	3.0 oz 1.5 lb	PRE PRE	249.7	200.8	4.4	E	E
9. Dual II Magnum Sencor	1.5 pt 0.33 lb	PRE PRE	261.8	210.7	4.5	E	E
10. Zidua Lorox Reflex	3.0 oz 1.5 lb 1.0 pt	PRE PRE PRE	230.7	194.2	4.3	E	E
11. Dual II Magnum Sencor	1.5 pt 0.33 lb	PRE POST	267.2	227.3	4.5	E	E
12. Prowl H ₂ O Sencor Reflex Dual II Magnum	2.0 pt 0.33 lb 1.0 pt 1.5 pt	PRE PRE PRE POST	261.4	223.6	4.4	E	E
13. Zidua Sencor Prowl H ₂ O	3.0 oz 0.33 lb 2.0 pt	PRE PRE POST	243.5	202.0	4.6	E	E
LSD 5%			n.s.	n.s.	n.s.		

¹PRE treatments applied May 3, POST treatments applied June 10 after cultivation and hilling.

²Overall weed control ratings before harvest on July 20. Weed control ratings: E = excellent, G = good, F = fair, P = poor.