

## 2016 Demonstration of the herbicide components in dicamba soybean, PRE plus POST and POST only applied at 3 and 6 inch weed at Rochester, MN.

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The objectives of this demonstration were to show the 1) value of a preemergence (PRE) herbicide in a dicamba soybean system, 2) weeds controlled with each component (PRE (ZiduaPRO), POST (Engenia, glyphosate, or Engenia plus glyphosate) and 3) impact of POST timing, 3 or 6 inch weeds in dicamba tolerant soybeans. The research site was a loamy sand series with a pH of 7.0, O.M. of 2.2%, and soil test P and K levels of 26 ppm and 132 ppm, respectively. Fall fertilizer was applied on November 5, 2015 at a rate of 0-46-180-0 lbs/A (N-P-K-S). The field was field cultivated prior to planting in the spring. Croplan RX1836 soybean was planted on May 6, 2016 at a depth of 1.5 inches in 30-inch rows at a rate of 165,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) treatments were applied with a tractor-mounted sprayer delivering 15 gpa at 30 psi using TTI-11002 nozzles. Postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 15 gpa at 30 psi using TTI-11002 nozzles. Evaluations of the plot were taken on June 6, 20, 28, and July 8, 2016. The crop was destroyed before harvest. Application dates, environmental conditions, and weed stages can be found in Table 1. Performance ratings for control of giant ragweed, common lambsquarters, common waterhemp and grass, and crop response can be found in Tables 2 through 6 respectively. (University of Minnesota Extension Regional Office, Rochester.)

**SUMMARY:** A preemergence, residual herbicide is recommended for full season, robust weed control in a dicamba soybean system, Figures 1 and 2. This demonstration shows the advantage of using the PRE residual herbicide, Zidua Pro, and what each POST component controls when applied with or without a PRE on 3- and 6-inch weeds. Engenia (dicamba) provides excellent control of giant ragweed, however giant ragweed is an early emerging weed, later April to early June, and control remained excellent after the POST applications. However, Engenia and glyphosate do not provide residual control, thus weeds emerging after application, common waterhemp and grasses were problematic later in the season. This demonstration also illustrated the best POST control was achieved when Engenia was applied to small, 3-inch, broadleaf weeds.

**Table 1. Application timing, plant stage, environmental conditions.**

Date	5/6	6/6	6/14	6/21
<b>Treatment</b>	PRE (A)	POST I (B)	POST II (C)	POST III (D)
<b>Temperature (F)</b>				
Air	89	67	76	75
Soil	66.4	64.6	74.4	69.9
<b>Relative Humidity (%)</b>	20	56	79	46
<b>Wind (mph)</b>	20	15	13	10
<b>Soil Moisture</b>	Slightly dry	Normal	Normal	Normal
<b>Soybean</b>				
Stage		V1-V2	V3	V5
Height (inch)		4.8	9.1	12.0
<b>Giant Ragweed</b>				
Weed density (ft <sup>2</sup> )			2.5	
Height (inch)		4.0	5.9	2.5
<b>Common Lambsquarters</b>				
Weed density (ft <sup>2</sup> )			24	
Height (inch)		1.8	5.1	--
<b>Common Waterhemp</b>				
Weed density (ft <sup>2</sup> )			8.0	
Height (inch)		2.4	5.9	--
<b>Grass</b>				
Weed density (ft <sup>2</sup> )			102	
Height (inch)		1.6	5.1	2.0
<b>Rainfall after each application (inch)</b>				
Week 1	1.13	2.27	1.39	0.71
Week 2	0.32	2.38	0.71	0.10
Week 3	2.12	1.01	0.10	2.07

**Table 2. Giant ragweed control in PRE/POST or POST only systems in dicamba soybeans at Rochester, MN in 2016.**

Pest Code					AMBTR							
Pest Name					Giant ragweed							
Rating Date					Jun-6-2016	Jun-20-2016	Jun-28-2016	Jul-8-2016				
No.	Name	Rate	Unit	Code	Description	(% Control)						
1	SOA 2, 14, 15 / 4					88	80	c	95	c	98	ab
	ZIDUA PRO	6	fl oz/a	A								
	ENGENIA	12.8	fl oz/a	D	3 INCH WEEDS							
	NIS	0.25	% v/v	D	3 INCH WEEDS							
2	SOA 2, 14, 15 / 9					88	79	c	95	bc	96	ab
	ZIDUA PRO	6	fl oz/a	A								
	GLYPHOSATE	32	fl oz/a	D	3 INCH WEEDS							
3	SOA 2, 14, 15 / 4, 9					87	79	c	96	abc	98	ab
	ZIDUA PRO	6	fl oz/a	A								
	ENGENIA	12.8	fl oz/a	D	3 INCH WEEDS							
	GLYPHOSATE	32	fl oz/a	D	3 INCH WEEDS							
4	SOA 4						96	a	98	ab	99	a
	ENGENIA	12.8	fl oz/a	B	3 INCH WEEDS							
	NIS	0.25	% v/v	B	3 INCH WEEDS							
5	SOA 9						96	a	97	abc	97	ab
	GLYPHOSATE	32	fl oz/a	B	3 INCH WEEDS							
6	SOA 4, 9						98	a	99	a	99	a
	ENGENIA	12.8	fl oz/a	B	3 INCH WEEDS							
	GLYPHOSATE	32	fl oz/a	B	3 INCH WEEDS							
7	SOA 4						80	c	96	abc	95	ab
	ENGENIA	12.8	fl oz/a	C	6 INCH WEEDS							
	NIS	0.25	% v/v	C	6 INCH WEEDS							
8	SOA 9						80	c	91	d	87	c
	GLYPHOSATE	32	fl oz/a	C	6 INCH WEEDS							
9	SOA 4, 9						86	b	95	bc	95	b
	ENGENIA	12.8	fl oz/a	C	6 INCH WEEDS							
	GLYPHOSATE	32	fl oz/a	C	6 INCH WEEDS							
<b>LSD P=.10</b>						<b>NS</b>	<b>5</b>		<b>3</b>		<b>4</b>	

**Table 3. Common lambsquarters control in PRE/POST or POST only systems in dicamba soybeans at Rochester, MN in 2016.**

Pest Code				CHEAL					
				Common Lambsquarters					
Rating Date				Jun-6-2016	Jun-20-2016	Jun-28-2016	Jul-8-2016		
No.	Name	Rate	Unit	Code	Description	(% Control)			
1	SOA 2, 14, 15 / 4					99	99 a	99 a	99 a
	ZIDUA PRO	6	fl oz/a	A					
	ENGENIA	12.8	fl oz/a	D	3 INCH WEEDS				
	NIS	0.25	% v/v	D	3 INCH WEEDS				
2	SOA 2, 14, 15 / 9					98	99 a	99 a	99 a
	ZIDUA PRO	6	fl oz/a	A					
	GLYPHOSATE	32	fl oz/a	D	3 INCH WEEDS				
3	SOA 2, 14, 15 / 4, 9					99	99 a	99 a	99 a
	ZIDUA PRO	6	fl oz/a	A					
	ENGENIA	12.8	fl oz/a	D	3 INCH WEEDS				
	GLYPHOSATE	32	fl oz/a	D	3 INCH WEEDS				
4	SOA 4						95 b	98 a	98 ab
	ENGENIA	12.8	fl oz/a	B	3 INCH WEEDS				
	NIS	0.25	% v/v	B	3 INCH WEEDS				
5	SOA 9						94 b	90 b	90 c
	GLYPHOSATE	32	fl oz/a	B	3 INCH WEEDS				
6	SOA 4, 9						99 a	99 a	97 ab
	ENGENIA	12.8	fl oz/a	B	3 INCH WEEDS				
	GLYPHOSATE	32	fl oz/a	B	3 INCH WEEDS				
7	SOA 4						82 d	91 b	94 bc
	ENGENIA	12.8	fl oz/a	C	6 INCH WEEDS				
	NIS	0.25	% v/v	C	6 INCH WEEDS				
8	SOA 9						73 e	70 c	67 d
	GLYPHOSATE	32	fl oz/a	C	6 INCH WEEDS				
9	SOA 4, 9						88 c	89 b	96 ab
	ENGENIA	12.8	fl oz/a	C	6 INCH WEEDS				
	GLYPHOSATE	32	fl oz/a	C	6 INCH WEEDS				
LSD P=.10						NS	4	4	5

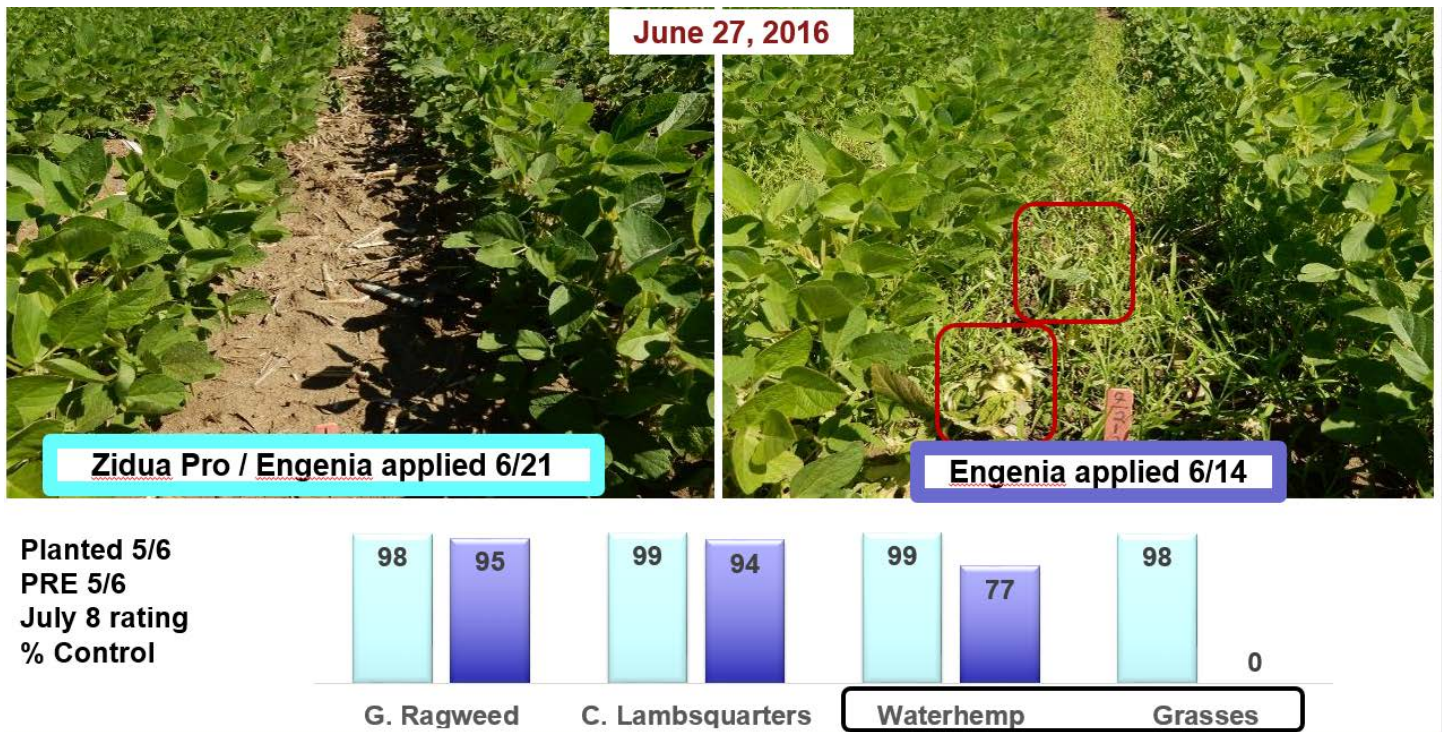
**Table 4. Common waterhemp control in PRE/POST or POST only systems in dicamba soybeans at Rochester, MN in 2016.**

Pest Code					AMATA					
					Common Waterhemp					
Rating Date					Jun-6-2016	Jun-20-2016	Jun-28-2016	Jul-8-2016		
No.	Name	Rate	Unit	Code Description	(% Control)					
1	SOA 2, 14, 15 / 4 ZIDUA PRO ENGENIA NIS	6 12.8 0.25	fl oz/a fl oz/a % v/v	A D D	3 INCH WEEDS 3 INCH WEEDS	99	99	99	99	a a a
2	SOA 2, 14, 15 / 9 ZIDUA PRO GLYPHOSATE	6 32	fl oz/a fl oz/a	A D	3 INCH WEEDS	99	99	99	99	a a a
3	SOA 2, 14, 15 / 4, 9 ZIDUA PRO ENGENIA GLYPHOSATE	6 12.8 32	fl oz/a fl oz/a fl oz/a	A D D	3 INCH WEEDS 3 INCH WEEDS	99	98	99	99	a a a
4	SOA 4 ENGENIA NIS	12.8 0.25	fl oz/a % v/v	B B	3 INCH WEEDS 3 INCH WEEDS		83	83	83	c bc b
5	SOA 9 GLYPHOSATE	32	fl oz/a	B	3 INCH WEEDS		85	79	69	c c e
6	SOA 4, 9 ENGENIA GLYPHOSATE	12.8 32	fl oz/a fl oz/a	B B	3 INCH WEEDS 3 INCH WEEDS		93	86	78	b b c
7	SOA 4 ENGENIA NIS	12.8 0.25	fl oz/a % v/v	C C	6 INCH WEEDS 6 INCH WEEDS		75	79	77	d c cd
8	SOA 9 GLYPHOSATE	32	fl oz/a	C	6 INCH WEEDS		77	73	73	d d de
9	SOA 4, 9 ENGENIA GLYPHOSATE	12.8 32	fl oz/a fl oz/a	C C	6 INCH WEEDS 6 INCH WEEDS		88	83	79	bc bc bc
LSD P=.10					NS	5	6	5		

**Table 5. Grass control in PRE/POST or POST only systems in dicamba soybeans at Rochester, MN in 2016.**

Pest Code					GRASS			
Rating Date					Jun-6-2016	Jun-20-2016	Jun-28-2016	Jul-8-2016
No.	Name	Rate	Unit	Code Description	(% Control)			
1	SOA 2, 14, 15 / 4				99	96	97	98
	ZIDUA PRO	6	fl oz/a	A		a	ab	a
	ENGENIA	12.8	fl oz/a	D 3 INCH WEEDS				
	NIS	0.25	% v/v	D 3 INCH WEEDS				
2	SOA 2, 14, 15 / 9				99	97	99	98
	ZIDUA PRO	6	fl oz/a	A		a	a	a
	GLYPHOSATE	32	fl oz/a	D 3 INCH WEEDS				
3	SOA 2, 14, 15 / 4, 9				99	97	99	98
	ZIDUA PRO	6	fl oz/a	A		a	a	a
	ENGENIA	12.8	fl oz/a	D 3 INCH WEEDS				
	GLYPHOSATE	32	fl oz/a	D 3 INCH WEEDS				
4	SOA 4					0	0	0
	ENGENIA	12.8	fl oz/a	B 3 INCH WEEDS		d	d	d
	NIS	0.25	% v/v	B 3 INCH WEEDS				
5	SOA 9					86	84	81
	GLYPHOSATE	32	fl oz/a	B 3 INCH WEEDS		c	c	c
6	SOA 4, 9					86	84	82
	ENGENIA	12.8	fl oz/a	B 3 INCH WEEDS		c	c	c
	GLYPHOSATE	32	fl oz/a	B 3 INCH WEEDS				
7	SOA 4					0	0	0
	ENGENIA	12.8	fl oz/a	C 6 INCH WEEDS		d	d	d
	NIS	0.25	% v/v	C 6 INCH WEEDS				
8	SOA 9					93	95	89
	GLYPHOSATE	32	fl oz/a	C 6 INCH WEEDS		b	b	b
9	SOA 4, 9					93	94	87
	ENGENIA	12.8	fl oz/a	C 6 INCH WEEDS		b	b	b
	GLYPHOSATE	32	fl oz/a	C 6 INCH WEEDS				
<b>LSD P=.10</b>					<b>NS</b>	<b>2</b>	<b>4</b>	<b>4</b>

**Figure 1.** Weed control on July 8, 2016 with Zidua Pro (PRE) followed by Engenia (POST) compared to Engenia used POST only in dicamba tolerant soybeans at Rochester, MN in 2016.



**Figure 2.** Weed control on July 8, 2016 with Zidua Pro (PRE) followed by Engenia + Glyphosate (POST) compared to Engenia + Glyphosate used POST only in dicamba tolerant soybeans at Rochester, MN in 2016.

