Evaluation of Tavium in Dicamba Tolerant Soybeans at Rochester, MN in 2018.

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The objective of this trial was to evaluate the performance of herbicide programs that included s-metolachlor plus dicamba premix, *Tavium*, in dicamba tolerant soybeans at Rochester, MN in 2018. The research site was a loamy sand with a pH of 6.4, O.M. of 2.2%, and soil test P and K levels of 31 ppm and 123 ppm, respectively. ASGROW AG19X8 XTEND soybean was planted May 24, 2018 at 1.5 inches deep in 30-inch rows at 165,000 seeds per acre. Soybean emergence date was May 29, 2018. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 15 gpa at 40 psi with a ground speed of 4.0 mph using TTI 110015 spray tips. Evaluations were taken on June 11, 22, 29, July 10, 18 and September 24, 2018. Application dates, environmental conditions, and weed stages are in Table 1. Performance ratings for control of giant ragweed, common lambsquarters, common waterhemp and grass and crop response are in Tables 2 through 6, respectively. Common waterhemp population at this site is Group-9 and Group-14 susceptible. Giant ragweed is Group-9 susceptible.

DISCUSSION

Dicamba can provide excellent giant ragweed control when applied postemergence. In this study, seven PRE herbicides provided a range of giant ragweed control from 10% with BroadAxe at 25 fl oz/a, up to 87% for Prefix at 32 fl oz/a. Seven of the POST herbicide programs included dicamba and resulted in 99% control of giant ragweed after application and for the remainder of the season. Tavium at 56.6 fl oz/a applied POST also provided 99% control of giant ragweed after application and for the remainder of the season. The addition of s-metolachlor with dicamba (Tavium) should provide extended residual control of many small seeded broadleaf and grassy weeds compared to the herbicide programs with no layered residual. However, we were not able to evaluate this in 2018 because the PRE herbicide programs provided excellent (99%) control of common lambsquarters, common waterhemp and grassy weeds prior to application of the POST herbicides. Control remained at 99% for the entire season. Soybean response was 24-30% injury with Tavium, 38% injury with Dual II Magnum and only 13-14% with XtendiMax or Engenia plus Roundup PowerMax, Table 6. Note: Treatments included in this trial contain unregistered products. (University of Minnesota Extension Regional Office, Rochester.)

Table 1. Application timing, plant stage,	<mark>environmental</mark> con	ditions.	
Date	May 24	June 23	
Treatment	PRE (A)	POST I (B)	
Temperature (F)			
Air	83.0	76.0	
Soil	67.6	74.0	
Relative Humidity (%)	56	66	
Wind (mph)	21	3	
Soil Moisture	Normal	Normal	
Soybean			
Stage		V4	
Height (inch)		9.0	
Giant ragweed			
Weed density (ft ²)		3.3	
Height (inch)		9.0	
Common Lambsquarters			
Weed density (ft ²)			
Height (inch)		5.25	
Common Waterhemp			
Weed density (ft ²)		10.5	
Height (inch)		5.5	
Grass species			
Weed density (ft²)		4.8	
Height (inch)		5.6	
Rainfall after each application (inch)			
Week 1	1.39	2.89	
Week 2	0.0	2.47	
Week 3	0.93	1.26	

Pest Code Pest Name									GIA		BTR AGWEED)				
Rating Date					Jun-11-2	Jun-11-2018 Jun-22-2018 Jun-29-2018 Jul-10-2018								2018	Sep-24-2	2018
Trt Treatmen	t		Rate	Appl					PERCI	ENT C	ONTROL	(%)			•	
1 UNTREA	TED CHECK				0	е	0	f	0	d	0	С	0	b	0	b
PRE (5/24/18	/ POST I (6/	/23/18	8)													
2 BOUNDA	RY	1.8	pt/a	Α	13	d	11	е	86	С	99	а	99	а	99	а
TAVIUM		56.6	fl oz/a	В												
ROUNDU	Р	28 4	fl oz/a	В												
POWERN	1AX			D												
DRA			% v/v	В												
			% v/v	В												
3 BROADA	XE XC		fl oz/a	Α	10	d	10	е	84	С	99	b	99	а	99	а
TAVIUM		56.5	fl oz/a	В												
ROUNDU		28 4	fl oz/a	В												
POWERN	1AX															
DRA			% v/v	В												
	CT RIDION		% v/v	В												
4 PREFIX			fl oz/a	Α	87	а	83	а	94	а	99	а	99	а	99	а
TAVIUM	Б	56.5	fl oz/a	В												
ROUNDU		28.4	fl oz/a	В												
POWERN	IAX		% v/v	D												
DRA	CT RIDION		% v/v % v/v	B B												
5 VALOR X			oz wt/a		63	_	46	d	85	•	99	_	99	•	99	_
XTENDIM			fl oz/a	В	03	С	40	u	00	С	99	а	99	а	99	а
ROUNDU				Ь												
POWERN		28.4	fl oz/a	В												
DRA	I/V\	0.5	% v/v	В												
	CT RIDION		% v/v	В												
6 ZIDUA PR			fl oz/a	A	83	а	79	ab	93	ab	99	а	99	а	99	а
ENGENIA			fl oz/a	В		~		u	00	u	00	~	•	٣	00	ű
ROUNDU				_												
POWERN		28.4	fl oz/a	В												
DRA		0.5	% v/v	В												
CLASS A	CT RIDION	1.0	% v/v	В												
7 AUTHOR	ITY FIRST	6.4	oz wt/a	Α	83	а	74	bc	92	ab	99	b	99	а	99	а
DUAL MA	GNUM	16	fl oz/a	В												
ROUNDU	Р	40	fl oz/a	В												
POWERN	1AX	40	11 02/a	D												
DRA			% v/v	В												
	CT RIDION		% v/v	В												
8 FIERCE			fl oz/a	Α	76	b	68	С	91	b	99	а	99	а	99	а
XTENDIM		22	fl oz/a	В												
ROUNDU		28.4	fl oz/a	В												
POWERN	IAX															
DRA	OT DIDION		% v/v	В												
LSD P=.10	CT RIDION	1.U	% v/v	В	6.6		7.8		3.3		0.5		0.4		NS	

Table 3. Common lambsquarters control with PRE herbicides followed by POST Tavium plus Roundup PowerMax in dicamba tolerant soybean at Rochester, Minnesota in 2018.

	t Code							C	CI OMMON LA	IEAL MBSO	IIΔRTE	RS			
Rat	ing Date				Jun-11-2	018	Jun-22-2		Jun-29-201			1	2018	Sep-24-	2018
	Treatment		Rate	Appl					PERCENT						
1	UNTREATED CHECK				0	b	0	С	0)	0 b	0	b	0	b
PRE	E (5/24/18) / POST I (6/23/18														
2	BOUNDARY TAVIUM ROUNDUP		pt/a fl oz/a	A B	99	а	99	b	99	a 9)9 a	99	а	99	а
	POWERMAX DRA	0.5	fl oz/a % v/v	B B											
	CLASS ACT RIDION		% v/v	В											
3	BROADAXE XC TAVIUM ROUNDUP	56.5	fl oz/a fl oz/a	A B	99	а	99	а	99	1 9)9 a	99	а	99	а
	POWERMAX		fl oz/a % v/v	В											
	DRA CLASS ACT RIDION	1.0	% v/v	B B											
4	PREFIX TAVIUM		fl oz/a fl oz/a	A B	99	а	99	а	99	1 9)9 a	99	а	99	а
	ROUNDUP POWERMAX	28.4	fl oz/a	В											
	DRA CLASS ACT RIDION	0.5 1.0	% v/v % v/v	B B											
5	VALOR XLT		oz wt/a	Α	99	а	99	а	99	a 9	99 a	99	а	99	а
	XTENDIMAX ROUNDUP	22	fl oz/a	В											
	POWERMAX		fl oz/a	В											
	DRA CLASS ACT RIDION		% v/v % v/v	B B											
6	ZIDUA PRO ENGENIA		fl oz/a fl oz/a	A B	99	а	99	а	99	1 9	99 a	99	а	99	а
	ROUNDUP POWERMAX	28.4	fl oz/a	В											
	DRA CLASS ACT RIDION	0.5 1.0	% v/v % v/v	B B											
7	AUTHORITY FIRST	6.4	oz wt/a	Α	99	а	99	а	99	a 9	99 a	99	а	99	а
	DUAL MAGNUM ROUNDUP	16	fl oz/a	В											
	POWERMAX DRA	40 0.5	fl oz/a % v/v	B B											
_	CLASS ACT RIDION	1.0	% v/v	В					0.0						
8	FIERCE MTZ XTENDIMAX		fl oz/a fl oz/a	A B	99	а	99	а	99	1 9	99 a	99	а	99	а
	ROUNDUP POWERMAX		fl oz/a	В											
	DRA CLASS ACT RIDION	0.5 1.0	% v/v % v/v	B B											
LSE) P=.10				NS		0.2		NS		NS	NS		NS	

Pes	t Code									AMA		-MD				
Rati	ng Date				COMMON WATERHEMP Jun-11-2018 Jun-22-2018 Jun-29-2018 Jul-10-2018 Jul-18-201										Sep-24-2	2018
	Treatment		Rate	Appl	Outi-11-2	.010	ouii-ZZ-	2010	PERCEN				OUI-10-2	.010	ОСР-24-7	LUIC
1	UNTREATED CHECK		Nato	Дррі	0	b	0	С	0	b	0	- (<i>/</i> 0) b	0	b	0	C
	(5/24/18) / POST I (6/2	3/18)				~		Ť		~						_
	BOUNDARY TAVIUM ROUNDUP POWERMAX DRA	1.8 56.6	pt/a fl oz/a fl oz/a % v/v	A B B	99	а	99	а	99	а	99	а	99	а	99	k
3	CLASS ACT RIDION BROADAXE XC TAVIUM ROUNDUP POWERMAX DRA	28.4 0.5	% v/v fl oz/a fl oz/a fl oz/a % v/v	B A B B	99	а	99	а	99	а	99	a	99	а	99	а
4	CLASS ACT RIDION PREFIX TAVIUM ROUNDUP POWERMAX DRA CLASS ACT RIDION	32 56.5	% v/v fl oz/a fl oz/a fl oz/a % v/v % v/v	B A B B	99	а	99	а	99	а	99	а	99	а	99	а
5	VALOR XLT XTENDIMAX ROUNDUP POWERMAX DRA CLASS ACT RIDION	22	oz wt/a fl oz/a fl oz/a % v/v % v/v	A B B B	99	а	98	b	99	а	99	а	99	а	99	a
6	ZIDUA PRO ENGENIA ROUNDUP POWERMAX DRA CLASS ACT RIDION	4.5 12.8 28.4	fl oz/a fl oz/a fl oz/a fl oz/a % v/v % v/v	A B B B	99	а	99	а	99	а	99	а	99	а	99	а
7	AUTHORITY FIRST DUAL MAGNUM ROUNDUP POWERMAX DRA CLASS ACT RIDION		oz wt/a fl oz/a fl oz/a % v/v % v/v	A B B B	99	а	99	ab	99	а	99	a	99	a	99	а
	FIERCE MTZ XTENDIMAX ROUNDUP POWERMAX DRA CLASS ACT RIDION P=.10	16 22 28.4	fl oz/a fl oz/a fl oz/a fl oz/a % v/v % v/v	A B B B	99 NS	а	99	а	99 NS	а	99 NS	a	99	а	99	a

Table 5. Grass control with PRE herbicides followed by POST Tavium plus Roundup PowerMax in dicamba tolerant soybean at Rochester, Minnesota in 2018.

	t Code									GR/	ASS					
	ng Date				Jun-11-2	2018	Jun-22-	2018	Jun-29-2			018	Jul-18-2	018	Sep-24-	2018
	Treatment		Rate	Appl					PERCEN				00 10 =			
1	UNTREATED CHECK				0	С	0	d	0	d	0	C	0	С	0	С
PR	E (5/24/18) / POST I (6/23	3/18)													<u> </u>	
2	BOUNDARY	1.8	pt/a	Α	99	а	99	а	99	а	99	а	99	а	99	а
	TAVIUM	56.6	fl oz/a	В												
	ROUNDUP POWERMAX	28.4	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
3	BROADAXE XC	25	fl oz/a	Α	99	а	99	а	99	а	99	а	99	а	99	а
	TAVIUM	56.5	fl oz/a	В												
	ROUNDUP POWERMAX	28.4	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
4	PREFIX	32	fl oz/a	Α	99	а	96	ab	98	а	99	а	99	а	99	а
	TAVIUM	56.5	fl oz/a	В												
	ROUNDUP POWERMAX	28.4	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
5	VALOR XLT	2.5	oz wt/a	Α	79	b	68	С	92	С	99	b	98	b	98	b
	XTENDIMAX	22	fl oz/a	В												
	ROUNDUP POWERMAX	28.4	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
6	ZIDUA PRO	4.5	fl oz/a	Α	99	а	97	а	98	а	99	а	99	а	99	а
	ENGENIA	12.8	fl oz/a	В												
	ROUNDUP POWERMAX	28.4	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
7	AUTHORITY FIRST	6.4	oz wt/a	Α	95	а	88	b	95	b	99	а	99	а	99	а
	DUAL MAGNUM	16	fl oz/a	В												
	ROUNDUP POWERMAX	40	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
8	FIERCE MTZ	16	fl oz/a	Α	99	а	98	а	99	а	99	а	99	а	99	а
	XTENDIMAX	22	fl oz/a	В												
	ROUNDUP POWERMAX	28.4	fl oz/a	В												
	DRA	0.5	% v/v	В												
	CLASS ACT RIDION	1.0	% v/v	В												
LSE	P=.10				4.9		7.7	,	2.1		0.2		0.9		0.9	

Table 6. Soybean response to PRE herbicides followed by POST Tavium plus Roundup PowerMax in dicamba tolerant soybean at Rochester, Minnesota in 2018.

ı Cəl	Code					SO	BEAN RI	ESPONS	E			
Ratir	ng Date				Jun-11-2		Jun-29-			Jul-10-2018		
	Treatment		Rate	Appl		PE	RCENT IN	JURY (%	6)			
	UNTREATED CHECK				0	b	0	е	0	е		
	(5/24/18) / POST I (6/23/18)				I							
2	BOUNDARY	1.8	pt/a	Α	10	а	26	bc	10	b		
	TAVIUM	56.6	fl oz/a	В								
	ROUNDUP POWERMAX	28.4	fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
3	BROADAXE XC	25	fl oz/a	Α	10	а	30	b	10	b		
	TAVIUM	56.5	fl oz/a	В								
	ROUNDUP POWERMAX	28.4	fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
4	PREFIX	32	fl oz/a	Α	11	а	24	С	10	b		
	TAVIUM	56.5	fl oz/a	В								
	ROUNDUP POWERMAX	28.4	fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
5	VALOR XLT	2.5	oz wt/a	Α	10	а	14	d	8	С		
	XTENDIMAX	22	fl oz/a	В								
	ROUNDUP POWERMAX	28.4	fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
6	ZIDUA PRO	4.5	fl oz/a	Α	0	b	13	d	8	С		
	ENGENIA	12.8	fl oz/a	В								
	ROUNDUP POWERMAX	28.4	fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
7	AUTHORITY FIRST	6.4	oz wt/a	Α	0	b	38	а	15	а		
	DUAL MAGNUM	16	fl oz/a	В								
	ROUNDUP POWERMAX		fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
8	FIERCE MTZ	16	fl oz/a	A	10	а	14	d	5	d		
	XTENDIMAX	22	fl oz/a	В		-		-	•	-		
	ROUNDUP POWERMAX	28.4	fl oz/a	В								
	DRA	0.5	% v/v	В								
	CLASS ACT RIDION	1.0	% v/v	В								
LSD	P=.10	1.0	/U V/V		2.1		4.1		1.8			