

Control of Volunteer glyphosate tolerant Alfalfa in No-Till Roundup Ready 2 Xtend and Enlist E3 Soybeans at Rochester, Minnesota in 2018.

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One effective method of terminating an alfalfa (*Medicago sativa* L) stand is a combination of herbicides and tillage in the fall. Even with fall termination, alfalfa can become a weed in the following crop. Spring termination due to planned rotation or winter injury, often increases the probability of volunteer alfalfa in the subsequent crop. Control becomes even more challenging if it is a glyphosate-tolerant variety. If corn is planted after alfalfa, volunteer alfalfa can be controlled with several herbicides, including dicamba. However, when soybean is planted after alfalfa, most herbicide options only suppress the volunteer alfalfa. Several technologies, dicamba-, 2,4-D- and glufosinate-tolerant soybean, offer alternatives for controlling volunteer alfalfa in soybean. In 2017, we demonstrated that most soybean herbicides only suppressed alfalfa competition by 70%. Using dicamba in a one- or two-pass system improved volunteer alfalfa control to 90-94%, respectively. In 2018, we evaluated dicamba, 2,4-D and glufosinate herbicide systems for controlling volunteer alfalfa. These systems provided 92-99% control demonstrating that these soybean technologies offer more effective herbicide choices for control of volunteer glyphosate-tolerant alfalfa in soybean.

The objective of this trial was to evaluate and demonstrate the effectiveness of 2,4-D (Enlist One or Enlist Duo), dicamba (Fexapan) and glufosinate (Liberty) herbicide systems for controlling volunteer glyphosate-tolerant alfalfa in no-till soybean in southeastern Minnesota. The research site was a loamy sand with pH of 6.5, O.M. 2.6% and soil test P and K levels of 77 ppm and 167 ppm, respectively. A three-year old glyphosate-tolerant alfalfa stand was mowed twice in the spring to suppress the alfalfa prior to planting and to provide volunteer alfalfa competition. Asgrow AG11X8 soybean (dicamba-tolerant) and Enlist 11E17Y3 (2,4-D and glufosinate-tolerant) soybeans were no-till planted June 4, 2018 in 30-inch rows at 149,000 seeds per acre. A randomized complete block design with four replications was used. Twelve treatments were compared. Preemergence (PRE) and postemergence (POST) treatments were applied at 4 mph with a tractor-mounted sprayer delivering 15 gpa at 40 psi using TTI 110015 spray tips, except Liberty was applied using Turbo Tee 110015 spray tips. Evaluations were taken June 14, 22, 27, July 6, 11 and 17. Crop was destroyed on August 2, 2018 to comply with trial protocol. Application dates, environmental conditions, and weed stages are in Table 1. Performance ratings for volunteer alfalfa, mature dandelion, seedling dandelion, and crop response can be found in Tables 2 through 5 respectively. (University of Minnesota Extension Regional Office, Rochester.)

DISCUSSION:

- All dicamba, 2,4-D and glufosinate systems provided excellent control of volunteer glyphosate-tolerant alfalfa in this study, 92-99%.
- PRE sulfentrazone + clorasulam-methyl (Sonic) only suppressed the volunteer alfalfa at 24% control. When followed by POST fomesafen + glyphosate (Flexstar GT), control reached 58%. However, when followed by POST Enlist Duo, 99% control was achieved, July 17 rating, Table 2.
- PRE Liberty, Enlist Duo or Fexapan programs gave 82-94% control initially, June 14. Subsequent POST programs with Liberty, Enlist One, Enlist Duo or Fexapan increased control to 92-99% by July 17, Table 2.
- Two-pass POST programs were effective in controlling volunteer alfalfa, but early season alfalfa competition delayed canopy closure, Trt.5, Figure 1. In poster. Control reached 98-99% after the second POST application.
- Established and seedling dandelion control was 96-99% with all dicamba, 2,4-D and glufosinate systems, Tables 3 and 4.
- Crop response was greatest with POST fomesafen + acetochlor (Warrant Ultra) + Liberty at 41% after application, Trt.7, Table 5.
- These results demonstrate that dicamba-, 2,4-D- and glufosinate-tolerant soybean offer effective herbicide choices for controlling volunteer glyphosate-tolerant alfalfa in soybean.

Table 1. Application timing, plant stages, environmental conditions.

Date	6/4	6/15	6/23	6/29	7/6
Treatment	PRE (A)	POST I (B)	POST II (C)	POST III (D)	POST IV (E)
Temperature (F)					
Air	79	82	74	74	77
Soil	71.2	72.7	70.0	74.3	76.0
Relative Humidity (%)	29	66	71	71	48
Wind (mph)	15	21	3	18	6
Soil Moisture	Normal	Normal	Normal	Normal	Normal
Soybean					
Stage		VC	V1	V3	V4
Height (in)		2.3	7.3	7.3	11
Volunteer Alfalfa					
Weed Density (ft ²)					
Height (in)		8	13.8	9.9	13.3
Mature Dandelion					
Weed Density (ft ²)					
Diameter (in)		7.0	14.7		
Seedling Dandelion					
Weed Density (ft ²)					
Height (in)		1.5	1.5	1.5	1.5
Grass					
Rainfall after each application (in)					
Week 1	0.93	2.63	2.13	2.47	1.26
Week 2	1.62	2.13	2.47	0	0.64
Week 3	3.14	2.47	1.26	1.9	0

Table 2. Control of volunteer RR 2Xtend alfalfa with dicamba, 2,4-D and glufosinate systems in no-till soybean at Rochester, MN in 2018.

Pest Name				VOLUNTEER ALFALFA											
Rating Date				Jun-14-2018		Jun-22-2018		Jun-27-2018		Jul-6-2018		Jul-11-2018		Jul-17-2018	
Trt	Treatment	Rate	Appl	PERCENT CONTROL (%)											
PRE (6/4/18) / POST II (6/23/18)															
1	SONIC	6.4 oz wt/a	A	24	d	13	g	78	d	68	e	60	c	58	d
	FLEXSTAR GT 3.5	3 pt/a	C												
	N-PAK AMS	2.5 % v/v	C												
	NIS	0.5 % v/v	C												
2	SONIC	6.4 oz wt/a	A	24	d	13	g	60	e	95	abc	98	a	99	a
	ENLIST DUO	75 fl oz/a	C												
	N-PAK AMS	2.5 % v/v	C												
6	LIBERTY 280	32 fl oz/a	A	82	c	80	e	96	a	93	bcd	92	b	92	c
	WARRANT ULTRA	3 pt/a	A												
	N-PAK AMS	2.5 % v/v	A												
	LIBERTY 280	32 fl oz/a	C												
	N-PAK AMS	2.5 % v/v	C												
PRE (6/4/18) / POST III (6/29/18)															
3	SONIC	6.4 oz wt/a	A	87	b	86	d	81	c	94	bcd	97	a	99	a
	ENLIST DUO	75 fl oz/a	A												
	ENLIST DUO	75 fl oz/a	D												
	N-PAK AMS	2.5 % v/v	D												
4	ENLIST DUO	75 fl oz/a	A	88	b	89	c	86	b	99	a	99	a	99	a
	EVERPREX	16 fl oz/a	D												
	2,4-D CHOLINE SALT	32 fl oz/a	D												
	LIBERTY 280	32 fl oz/a	D												
	N-PAK AMS	2.5 % v/v	D												
PRE (6/4/18) / POST IV (7/6/18)															
9	FEXAPAN	44 fl oz/a	A	94	a	95	b	95	a	90	d	93	b	97	b
	ABUNDIT EDGE	32 fl oz/a	A												
	DRA	0.5 % v/v	A												
	CLASS ACT RIDION	1.0 % v/v	A												
	FEXAPAN	22 fl oz/a	E												
	ABUNDIT EDGE	32 fl oz/a	E												
	DRA	0.5 % v/v	E												
	CLASS ACT RIDION	1.0 % v/v	E												
10	SONIC	6.4 oz wt/a	A	94	a	96	ab	96	a	92	cd	93	b	97	b
	FEXAPAN	44 fl oz/a	A												
	ABUNDIT EDGE	32 fl oz/a	A												
	DRA	0.5 % v/v	A												
	CLASS ACT RIDION	1.0 % v/v	A												
	FEXAPAN	22 fl oz/a	E												
	ABUNDIT EDGE	32 fl oz/a	E												
	DRA	0.5 % v/v	E												
	CLASS ACT RIDION	1.0 % v/v	E												
POST I (6/15/18) / POST IV (7/6/18)															
5	ENLIST DUO	75 fl oz/a	B	0	e	70	f	96	a	99	a	99	a	99	a
	N-PAK AMS	2.5 % v/v	B												
	EVERPREX	16 fl oz/a	B												
	2,4-D CHOLINE SALT	32 fl oz/a	E												
	LIBERTY 280	32 fl oz/a	E												
	N-PAK AMS	2.5 % v/v	E												
7	LIBERTY 280	32 fl oz/a	B	0	e	97	a	97	a	96	ab	99	a	99	a
	N-PAK AMS	2.5 % v/v	B												
	WARRANT ULTRA	3 pt/a	E												
	LIBERTY 280	32 fl oz/a	E												
	N-PAK AMS	2.5 % v/v	E												
11	FEXAPAN	22 fl oz/a	B	0	e	70	f	86	b	97	ab	98	a	98	ab
	ABUNDIT EDGE	32 fl oz/a	B												
	DRA	0.5 % v/v	B												
	CLASS ACT RIDION	1.0 % v/v	B												
	WARRANT	3 pt/a	E												
	FEXAPAN	22 fl oz/a	E												
	ABUNDIT EDGE	32 fl oz/a	E												
	DRA	0.5 % v/v	E												
	CLASS ACT RIDION	1.0 % v/v	E												
LSD P=.10				2.7		2.1		2.5		4.2		2.5		1.5	

Treatments 8 and 12, untreated checks, are not shown in table.

Means followed by same letter or symbol do not significantly differ (P=.10, LSD).

Table 3. Established dandelion control with dicamba, 2,4-D, and glufosinate systems in no-till soybean at Rochester, MN in 2018.

Pest Name			ESTABLISHED DANDELION												
Rating Date			Jun-14-2018		Jun-22-2018		Jun-27-2018		Jul-6-2018		Jul-11-2018		Jul-17-2018		
Trt	Treatment	Rate Appl													
PRE (6/4/18) / POST II (6/23/18)															
1	SONIC	6.4 oz wt/a	A	31	c	15	e	93	bc	97	a	98	abc	99	a
	FLEXSTAR GT 3.5	3 pt/a	C												
	N-PAK AMS	2.5 % v/v	C												
	NIS	0.5 % v/v	C												
2	SONIC	6.4 oz wt/a	A	31	c	13	e	65	e	98	a	97	bc	99	a
	ENLIST DUO	75 fl oz/a	C												
	N-PAK AMS	2.5 % v/v	C												
6	LIBERTY 280	32 fl oz/a	A	95	a	93	bc	98	a	99	a	99	a	99	a
	WARRANT ULTRA	3 pt/a	A												
	N-PAK AMS	2.5 % v/v	A												
	LIBERTY 280	32 fl oz/a	C												
	N-PAK AMS	2.5 % v/v	C												
PRE (6/4/18) / POST III (6/29/18)															
3	SONIC	6.4 oz wt/a	A	91	b	96	a	97	ab	98	a	99	ab	99	a
	ENLIST DUO	75 fl oz/a	A												
	ENLIST DUO	75 fl oz/a	D												
	N-PAK AMS	2.5 % v/v	D												
4	ENLIST DUO	75 fl oz/a	A	91	b	97	a	98	a	99	a	99	a	99	a
	EVERPREX	16 fl oz/a	D												
	2,4-D CHOLINE SALT	32 fl oz/a	D												
	LIBERTY 280	32 fl oz/a	D												
	N-PAK AMS	2.5 % v/v	D												
PRE (6/4/18) / POST IV (7/6/18)															
9	FEXAPAN	44 fl oz/a	A	91	b	91	c	92	c	88	c	92	d	97	c
	ABUNDIT EDGE	32 fl oz/a	A												
	DRA	0.5 % v/v	A												
	CLASS ACT RIDION	1.0 % v/v	A												
	FEXAPAN	22 fl oz/a	E												
	ABUNDIT EDGE	32 fl oz/a	E												
	DRA	0.5 % v/v	E												
	CLASS ACT RIDION	1.0 % v/v	E												
10	SONIC	6.4 oz wt/a	A	92	b	95	ab	96	abc	93	b	93	d	97	b
	FEXAPAN	44 fl oz/a	A												
	ABUNDIT EDGE	32 fl oz/a	A												
	DRA	0.5 % v/v	A												
	CLASS ACT RIDION	1.0 % v/v	A												
	FEXAPAN	22 fl oz/a	E												
	ABUNDIT EDGE	32 fl oz/a	E												
	DRA	0.5 % v/v	E												
	CLASS ACT RIDION	1.0 % v/v	E												
POST I (6/15/18) / POST IV (7/6/18)															
5	ENLIST DUO	75 fl oz/a	B	0	d	71	d	96	abc	99	a	99	a	99	a
	N-PAK AMS	2.5 % v/v	B												
	EVERPREX	16 fl oz/a	B												
	2,4-D CHOLINE SALT	32 fl oz/a	E												
	LIBERTY 280	32 fl oz/a	E												
	N-PAK AMS	2.5 % v/v	E												
7	LIBERTY 280	32 fl oz/a	B	0	d	97	a	97	ab	98	a	99	a	99	a
	N-PAK AMS	2.5 % v/v	B												
	WARRANT ULTRA	3 pt/a	E												
	LIBERTY 280	32 fl oz/a	E												
	N-PAK AMS	2.5 % v/v	E												
11	FEXAPAN	22 fl oz/a	B	0	d	70	d	85	d	89	c	97	c	99	a
	ABUNDIT EDGE	32 fl oz/a	B												
	DRA	0.5 % v/v	B												
	CLASS ACT RIDION	1.0 % v/v	B												
	WARRANT	3 pt/a	E												
	FEXAPAN	22 fl oz/a	E												
	ABUNDIT EDGE	32 fl oz/a	E												
	DRA	0.5 % v/v	E												
	CLASS ACT RIDION	1.0 % v/v	E												
LSD P=.10				3.0		2.8		4.1		3.0		1.9		0.4	

Treatments 8 and 12, untreated checks, are not shown in table.
Means followed by same letter or symbol do not significantly differ (P=.10, LSD).

Table 4. Seedling dandelion control with dicamba, 2,4-D, and glufosinate systems in no-till soybean at Rochester, MN in 2018.

Pest Name				SEEDLING DANDELION									
Rating Date				Jun-22-2018		Jun-27-2018		Jul-6-2018		Jul-11-2018		Jul-17-2018	
Trt	Treatment	Rate	Appl	PERCENT CONTROL (%)									
PRE (6/4/18) / POST II (6/23/18)													
1	SONIC	6.4 oz wt/a	A	99	a	99	a	99	a	97	ab	96	c
	FLEXSTAR GT 3.5	3 pt/a	C										
	N-PAK AMS	2.5 % v/v	C										
	NIS	0.5 % v/v	C										
2	SONIC	6.4 oz wt/a	A	99	a	99	a	99	a	98	a	97	bc
	ENLIST DUO	75 fl oz/a	C										
	N-PAK AMS	2.5 % v/v	C										
6	LIBERTY 280	32 fl oz/a	A	98	ab	99	a	98	a	96	bc	97	bc
	WARRANT ULTRA	3 pt/a	A										
	N-PAK AMS	2.5 % v/v	A										
	LIBERTY 280	32 fl oz/a	C										
	N-PAK AMS	2.5 % v/v	C										
PRE (6/4/18) / POST III (6/29/18)													
3	SONIC	6.4 oz wt/a	A	99	a	99	a	99	a	99	a	99	ab
	ENLIST DUO	75 fl oz/a	A										
	ENLIST DUO	75 fl oz/a	D										
	N-PAK AMS	2.5 % v/v	D										
4	ENLIST DUO	75 fl oz/a	A	96	b	96	b	99	a	99	a	99	ab
	EVERPREX	16 fl oz/a	D										
	2,4-D CHOLINE SALT	32 fl oz/a	D										
	LIBERTY 280	32 fl oz/a	D										
	N-PAK AMS	2.5 % v/v	D										
PRE (6/4/18) / POST IV (7/6/18)													
9	FEXAPAN	44 fl oz/a	A	93	c	89	c	81	c	94	c	99	ab
	ABUNDIT EDGE	32 fl oz/a	A										
	DRA	0.5 % v/v	A										
	CLASS ACT RIDION	1.0 % v/v	A										
	FEXAPAN	22 fl oz/a	E										
	ABUNDIT EDGE	32 fl oz/a	E										
	DRA	0.5 % v/v	E										
	CLASS ACT RIDION	1.0 % v/v	E										
10	SONIC	6.4 oz wt/a	A	99	a	99	a	98	a	99	a	99	a
	FEXAPAN	44 fl oz/a	A										
	ABUNDIT EDGE	32 fl oz/a	A										
	DRA	0.5 % v/v	A										
	CLASS ACT RIDION	1.0 % v/v	A										
	FEXAPAN	22 fl oz/a	E										
	ABUNDIT EDGE	32 fl oz/a	E										
	DRA	0.5 % v/v	E										
	CLASS ACT RIDION	1.0 % v/v	E										
POST I (6/15/18) / POST IV (7/6/18)													
5	ENLIST DUO	75 fl oz/a	B	98	a	99	a	99	a	99	a	99	a
	N-PAK AMS	2.5 % v/v	B										
	EVERPREX	16 fl oz/a	B										
	2,4-D CHOLINE SALT	32 fl oz/a	E										
	LIBERTY 280	32 fl oz/a	E										
	N-PAK AMS	2.5 % v/v	E										
7	LIBERTY 280	32 fl oz/a	B	98	a	99	a	98	a	99	a	99	a
	N-PAK AMS	2.5 % v/v	B										
	WARRANT ULTRA	3 pt/a	E										
	LIBERTY 280	32 fl oz/a	E										
	N-PAK AMS	2.5 % v/v	E										
11	FEXAPAN	22 fl oz/a	B	98	ab	99	a	92	b	99	a	99	a
	ABUNDIT EDGE	32 fl oz/a	B										
	DRA	0.5 % v/v	B										
	CLASS ACT RIDION	1.0 % v/v	B										
	WARRANT	3 pt/a	E										
	FEXAPAN	22 fl oz/a	E										
	ABUNDIT EDGE	32 fl oz/a	E										
	DRA	0.5 % v/v	E										
	CLASS ACT RIDION	1.0 % v/v	E										
LSD P=.10				2.0		1.5		3.6		2.7		1.7	

Treatments 8 and 12, untreated checks, are not shown in table.
Means followed by same letter or symbol do not significantly differ (P=.10, LSD).

Table 5. Crop response to herbicide systems used to control volunteer RR 2Xtend alfalfa in soybean at Rochester, MN in 2018.

Rating Date					Jun-27-2018	Jul-6-2018	Jul-11-2018	Jul-17-2018				
Trt	Treatment	Rate	Appl	PERCENT INJURY (%)								
PRE (6/4/18) / POST II (6/23/18)												
1	SONIC	6.4	oz wt/a	A	28	a	20	b	0	d	0	d
	FLEXSTAR GT 3.5	3	pt/a	C								
	N-PAK AMS	2.5	% v/v	C								
	NIS	0.5	% v/v	C								
2	SONIC	6.4	oz wt/a	A	11	c	0	e	3	d	0	d
	ENLIST DUO	75	fl oz/a	C								
	N-PAK AMS	2.5	% v/v	C								
6	LIBERTY 280	32	fl oz/a	A	23	b	8	d	0	d	0	d
	WARRANT ULTRA	3	pt/a	A								
	N-PAK AMS	2.5	% v/v	A								
	LIBERTY 280	32	fl oz/a	C								
	N-PAK AMS	2.5	% v/v	C								
PRE (6/4/18) / POST III (6/29/18)												
3	SONIC	6.4	oz wt/a	A	0	e	14	c	3	d	0	d
	ENLIST DUO	75	fl oz/a	A								
	ENLIST DUO	75	fl oz/a	D								
	N-PAK AMS	2.5	% v/v	D								
4	ENLIST DUO	75	fl oz/a	A	0	e	24	a	10	c	0	d
	EVERPREX	16	fl oz/a	D								
	2,4-D CHOLINE SALT	32	fl oz/a	D								
	LIBERTY 280	32	fl oz/a	D								
	N-PAK AMS	2.5	% v/v	D								
PRE (6/4/18) / POST IV (7/6/18)												
9	FEXAPAN	44	fl oz/a	A	0	e	8	d	8	c	0	d
	ABUNDIT EDGE	32	fl oz/a	A								
	DRA	0.5	% v/v	A								
	CLASS ACT RIDION	1.0	% v/v	A								
	FEXAPAN	22	fl oz/a	E								
	ABUNDIT EDGE	32	fl oz/a	E								
	DRA	0.5	% v/v	E								
	CLASS ACT RIDION	1.0	% v/v	E								
10	SONIC	6.4	oz wt/a	A	0	e	0	e	9	c	0	d
	FEXAPAN	44	fl oz/a	A								
	ABUNDIT EDGE	32	fl oz/a	A								
	DRA	0.5	% v/v	A								
	CLASS ACT RIDION	1.0	% v/v	A								
	FEXAPAN	22	fl oz/a	E								
	ABUNDIT EDGE	32	fl oz/a	E								
	DRA	0.5	% v/v	E								
	CLASS ACT RIDION	1.0	% v/v	E								
POST I (6/15/18) / POST IV (7/6/18)												
5	ENLIST DUO	75	fl oz/a	B	6	d	18	b	23	b	11	b
	N-PAK AMS	2.5	% v/v	B								
	EVERPREX	16	fl oz/a	B								
	2,4-D CHOLINE SALT	32	fl oz/a	E								
	LIBERTY 280	32	fl oz/a	E								
	N-PAK AMS	2.5	% v/v	E								
7	LIBERTY 280	32	fl oz/a	B	0	e	10	d	41	a	24	a
	N-PAK AMS	2.5	% v/v	B								
	WARRANT ULTRA	3	pt/a	E								
	LIBERTY 280	32	fl oz/a	E								
	N-PAK AMS	2.5	% v/v	E								
11	FEXAPAN	22	fl oz/a	B	10	c	14	c	9	c	9	c
	ABUNDIT EDGE	32	fl oz/a	B								
	DRA	0.5	% v/v	B								
	CLASS ACT RIDION	1.0	% v/v	B								
	WARRANT	3	pt/a	E								
	FEXAPAN	22	fl oz/a	E								
	ABUNDIT EDGE	32	fl oz/a	E								
	DRA	0.5	% v/v	E								
	CLASS ACT RIDION	1.0	% v/v	E								
LSD P=.10					3.1		2.9		3.7		2.5	

Treatments 8 and 12, untreated checks, are not shown in table.

Means followed by same letter or symbol do not significantly differ (P=.10, LSD).

Control of Glyphosate-Tolerant Alfalfa in No-Till Roundup Ready 2 Xtend and Enlist E3 Soybean

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Introduction

One effective method of terminating an alfalfa (*Medicago sativa* L) stand is a combination of herbicides and tillage in the fall. Even with fall termination, alfalfa can become a weed in the following crop. Spring termination due to planned rotation or winter injury, often increases the probability of volunteer alfalfa in the subsequent crop. Control becomes even more challenging if it is a glyphosate-tolerant variety. If corn is planted after alfalfa, volunteer alfalfa can be controlled with several herbicides, including dicamba. However, when soybean is planted after alfalfa, most herbicide options only suppress the volunteer alfalfa. Several technologies, dicamba-, 2,4-D- and glufosinate-tolerant soybean, offer alternatives for controlling volunteer alfalfa in soybean. In 2017, we demonstrated that most soybean herbicides only suppressed alfalfa competition by 70%. Using dicamba in a one- or two-pass system improved volunteer alfalfa control to 90-94%, respectively. In 2018, we evaluated dicamba, 2,4-D and glufosinate herbicide systems for controlling volunteer alfalfa. These systems provided 92-99% control demonstrating that these soybean technologies offer more effective herbicide choices for control of volunteer glyphosate-tolerant alfalfa in soybean, Table 1.

Materials and Methods

The objective of this trial was to evaluate and demonstrate the effectiveness of 2,4-D (Enlist One or Enlist Duo), dicamba (Fexapan) and glufosinate (Liberty) herbicide systems for controlling volunteer glyphosate-tolerant alfalfa in no-till soybean in southeastern Minnesota. The research site was a loamy sand with pH of 6.5, O.M. 2.6% and soil test P and K levels of 77 ppm and 167 ppm, respectively. A three-year old glyphosate-tolerant alfalfa stand was mowed twice in the spring to suppress the alfalfa prior to planting and provide volunteer alfalfa competition. Asgrow AG11X8 soybean (dicamba-tolerant) and Enlist 11E17Y3 (2,4-D and glufosinate-tolerant) soybeans were no-till planted June 4, 2018 in 30-inch rows at 149,000 seeds per acre. A randomized complete block design with four replications was used. Twelve treatments were compared, Table 1. (not all treatments shown). Preemergence (PRE) and postemergence (POST) treatments were applied at 4 mph with a tractor-mounted sprayer delivering 15 gpa at 40 psi using TTI 110015 spray tips, except Liberty was applied using Turbo Tee 110015 spray tips. Evaluations were taken June 14, 22, 27, July 6, 11 and 17. Crop was destroyed on August 2, 2018 to comply with trial protocol.

Results and Summary

- All dicamba, 2,4-D and glufosinate systems provided excellent control of volunteer glyphosate-tolerant alfalfa in this study, 92-99%.
- PRE sulfentrazone + cloransulam-methyl (Sonic) only suppressed the volunteer alfalfa at 24% control. When followed by POST fomesafen + glyphosate (Flexstar GT), control reached 58%. However, when followed by POST Enlist Duo, 99% control was achieved, July 17 rating.
- PRE Liberty, Enlist Duo or Fexapan programs gave 82-94% control initially, June 14. Subsequent POST programs with Liberty, Enlist One, Enlist Duo or Fexapan increased control to 92-99% by July 17.
- Two-pass POST programs were effective in controlling volunteer alfalfa, but early season alfalfa competition delayed canopy closure, Trt.5, Figure 1. Control reached 98-99% after the second POST application.
- Established and seedling dandelion control was 96-99% with all dicamba, 2,4-D and glufosinate systems, data not shown.
- Crop response was greatest with POST fomesafen + acetochlor (Warrant Ultra) + Liberty at 41% after application, Trt.7, data not shown.
- These results demonstrate that dicamba-, 2,4-D- and glufosinate-tolerant soybean offer effective herbicide choices for controlling volunteer glyphosate-tolerant alfalfa in soybean.

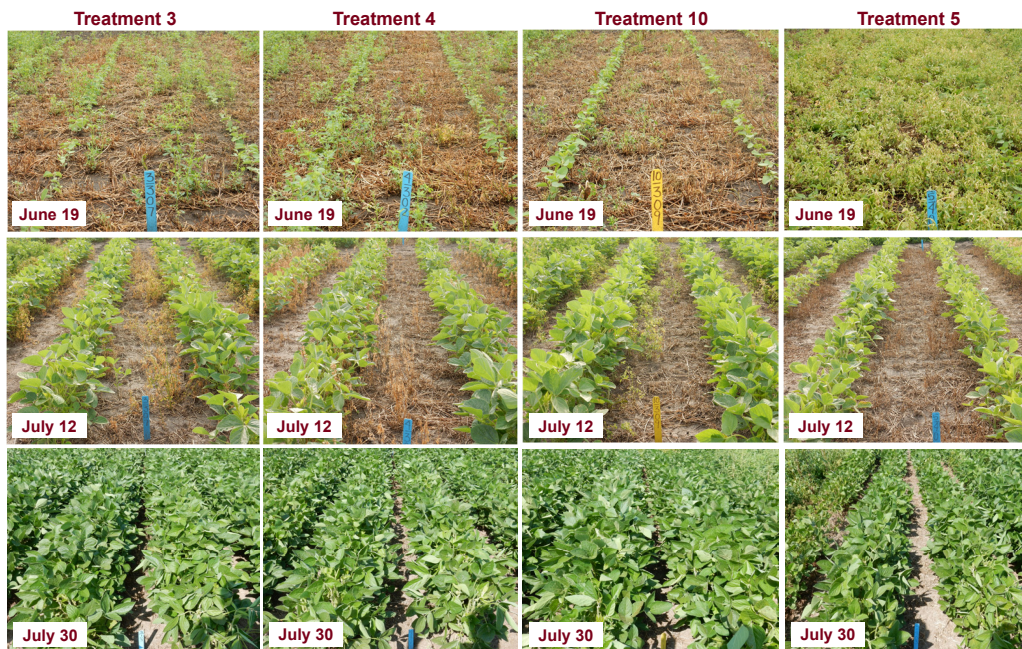


Figure 1. Photos over time of four herbicide systems used to control glyphosate-tolerant alfalfa in no-till soybean at Rochester, MN in 2018.

Table 1. Control of glyphosate-tolerant alfalfa in no-till dicamba, 2,4-D and glufosinate-tolerant soybean at Rochester, MN in 2018.

Weed				Volunteer alfalfa		
Rating Date				June-14	June-27	July-17
Trt ¹	Herbicide ²	Appl ³	Rate/Acre	Control (%)		
1	Sonic / Flexstar GT + N-Pak AMS + NIS	A/C	6.4 oz / 3 pt	24 d	78 d	58 d
2	Sonic / Enlist Duo + N-Pak AMS	A/C	6.4 oz / 75 fl oz	24 d	60 e	99 a
6	Liberty + Warrant Ultra + N-Pak AMS / Liberty + N-Pak AMS	A/C	32 fl oz + 3 pt / 32 fl oz	82 c	96 a	92 c
3	Sonic + Enlist Duo / Enlist Duo + N-Pak AMS	A/D	6.4 oz + 75 fl oz / 75 fl oz	87 b	81 c	99 a
4	Enlist Duo / Everprex + Enlist One + Liberty + N-Pak AMS	A/D	75 fl oz / 16 fl oz + 32 fl oz + 32 fl oz	88 b	86 b	99 a
9	Fexapan + Abundit Edge + On Target DRA + Class Act Ridion / Fexapan + Abundit Edge + On Target DRA + Class Act Ridion	A/E	44 fl oz + 32 fl oz / 22 fl oz + 32 fl oz	94 a	95 a	97 b
10	Sonic + Fexapan + Abundit Edge + On Target DRA + Class Act Ridion / Fexapan + Abundit Edge + On Target DRA + Class Act Ridion	A/E	6.4 oz + 44 fl oz + 32 fl oz / 22 fl oz + 32 fl oz	94 a	96 a	97 b
5	Enlist Duo + Everprex + N-Pak AMS / Enlist One + Liberty + N-Pak AMS	B/E	75 fl oz + 16 fl oz / 32 fl oz + 32 fl oz	0 e	96 a	99 a
7	Liberty + N-Pak AMS / Warrant Ultra + Liberty + N-Pak AMS	B/E	32 fl oz / 3 pt + 32 fl oz	0 e	97 a	99 a
11	Fexapan + Abundit Edge + On Target DRA + Class Act Ridion / Warrant + Fexapan + Abundit Edge + On Target DRA + Class Act Ridion	B/E	22 fl oz + 32 fl oz / 3 pt + 22 fl oz + 32 fl oz	0 e	86 b	98 ab
LSD P= .10				3	3	1.5

1. Not all treatments shown.

2. Abundit Edge (glyphosate), Everprex (s-metolachlor), Warrant (acetochlor), N-Pak AMS at 2.5% v/v, On Target DRA at 0.5% v/v and Class Act Ridion at 1% v/v.

3. A = PRE, B = POST I, C = POST II, D = POST III, E = POST IV.