

Efficacy of Enlist Duo Herbicide Programs in Soybean at Rochester, MN

Breitenbach, Fritz R., Lisa M. Behnken, Amelia Welter and Matthew Bauer

The objective of this trial was to evaluate the efficacy of Enlist Duo Herbicide Programs in soybean in southeastern Minnesota. The research site was a loamy sand series with pH of 6.3, O.M. 2.6% and soil test P and K levels of 30 ppm and 154 ppm, respectively. The field was spring disked and field cultivated twice prior to planting. Fall fertilizer was broadcast on November 3, 2016 at a rate of 0-46-180-0 lbs/A. The previous crop was corn. The soybean variety was REGULATED and was planted on May 31, 2017 at a depth of 1.5 inches in 30-inch rows at a rate of 149,344 seeds per acre. Soybean emergence date was June 6, 2017. 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 30 psi with a ground speed of 4.5 mph using TTI 11002 nozzles. Evaluations of the plots were taken June 26, July 3, July 10, and July 17. Crop was destroyed on July 18, 2017 to comply with protocol requirements. Application dates, environmental conditions, and weed stages can be found in Table 1. Performance rating for common lambsquarters, common waterhemp, velvetleaf, grass control, and crop injury can be found in Tables 2 through 6, respectively.

Discussion: POST herbicide systems that included Enlist Duo or 2,4-D choline provided excellent control of common lambsquarters, common waterhemp, velvetleaf and grasses. The addition of 2,4-D choline to Liberty POST, increased common waterhemp control to 98% compared to Liberty alone, 94%. Adding 2,4-D choline to Liberty increased crop response slightly, from 16% to 20%. Response was in the form of necrotic speckling on soybean leaves. *Treatments included in this trial contain unregistered products.* (University of Minnesota Extension Regional Office, Rochester.)

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

Date	6/1	6/21	7/3
Treatment	PRE (A)	POST I (B)	POST II (C)
Temperature (F)			
Air	68	62	74
Soil	63.7	63.9	72.1
Relative Humidity (%)	34	80	55
Wind (mph)	3	7	10
Soil Moisture	Normal	Normal	Normal
Soybean			
Stage		V2	V4
Height (in)	0	5.8	10.8
Common Lambsquarter			
Weed Density (ft ²)		5.5	
Height (in)		1.5	2.5
Common Waterhemp			
Weed Density (ft ²)		16.9	
Height (in)		1.4	3.3
Grass			
Weed Density (ft ²)		14.8	
Height (in)		4.0	8.3
Velvetleaf			
Weed Density (ft ²)		2.25	
Height (in)		1.9	3.5
Rainfall after each application (in)			
Week 1	0.08	0.95	0.53
Week 2	1.07	1.53	0.00
Week 3	1.94	0.53	0.00

Table 2. Common lambsquarters control with Enlist Duo Herbicide Programs in Soybean at Rochester, MN in 2017.

Pest Code		CHEAL								
Pest Name		Common Lambsquarters								
Rating Date		June-26		July-3		July-10		July-17		
Treatment	Rate	Appl	Percent Control (%)							
1	Weedy Check		0.0	b	0.0	d	0.0	d	0.0	e
PRE (6/1/17)										
6	SOA 2, 14		97.0	a	97.0	a	94.5	b	94.3	b
	SONIC	5.33 oz wt/a A								
PRE (6/1/17) / POST II (7/3/17) <4 inch weeds										
2	SOA 2, 14, 9		98.0	a	97.5	a	99.0	a	99.0	a
	SONIC	5.33 oz wt/a A								
	DURANGO	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
3	SOA 2, 14, 4, 9		96.8	a	95.8	ab	99.0	a	98.8	a
	SONIC	5.33 oz wt/a A								
	ENLIST DUO	75 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
4	SOA 2, 14, 10		98.5	a	97.8	a	98.8	ab	98.8	a
	SONIC	5.33 oz wt/a A								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
5	SOA 2, 14, 4, 10		96.8	a	97.0	a	99.0	a	98.8	a
	SONIC	5.33 oz wt/a A								
	2, 4-D CHOLINE SALT	32 fl oz/a C								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
POST I (6/21/17) <4 inch weeds										
7	SOA 9		97.0	a	93.3	bc	81.8	c	77.5	c
	GLYPHOSATE CHECK									
	DURANGO	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
8	SOA 10		96.5	a	93.0	c	80.0	c	74.5	d
	LIBERTY 280	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
LSD P=.10			2.4		2.7		4.3		2.7	

Table 3. Common waterhemp control with Enlist Duo Herbicide Programs in Soybean at Rochester, MN in 2017.

Pest Code		AMATA								
Pest Name		Common Waterhemp								
Rating Date		June-26		July-3		July-10		July-17		
Treatment	Rate	Appl	Percent Control (%)							
1	Weedy Check		0.0	e	0.0	d	0.0	d	0.0	e
PRE (6/1/17)										
6	SOA 2, 14		84.8	bc	87.8	bc	84.5	b	83.0	c
	SONIC	5.33 oz wt/a A								
PRE (6/1/17) / POST II (7/3/17) <4 inch weeds										
2	SOA 2, 14, 9		85.8	b	87.0	bc	98.5	a	98.3	a
	SONIC	5.33 oz wt/a A								
	DURANGO	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
3	SOA 2, 14, 4, 9		80.0	d	84.3	c	98.8	a	99.0	a
	SONIC	5.33 oz wt/a A								
	ENLIST DUO	75 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
4	SOA 2, 14, 10		82.8	bcd	86.3	c	95.0	a	93.8	b
	SONIC	5.33 oz wt/a A								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
5	SOA 2, 14, 4, 10		81.5	cd	85.0	c	98.0	a	98.3	a
	SONIC	5.33 oz wt/a A								
	2, 4-D CHOLINE SALT	32 fl oz/a C								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
POST I (6/21/17) <4 inch weeds										
7	SOA 9		95.0	a	93.3	a	72.0	c	71.3	d
	GLYPHOSATE CHECK									
	DURANGO	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
8	SOA 10		95.0	a	91.5	ab	71.3	c	82.5	d
	LIBERTY 280	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
LSD P=.10			3.5		4.7		4.1		3.8	

Table 4. Velvetleaf control with Enlist Duo Herbicide Programs in Soybean at Rochester, MN in 2017.

Pest Code			ABUTH							
Pest Name			Velvetleaf							
Rating Date			June-26		July-3		July-10		July-17	
Treatment	Rate	Appl	Percent Control (%)							
1	Weedy Check		0.0	d	0.0	d	0.0	d	0.0	d
PRE (6/1/17)										
6	SOA 2, 14 SONIC	5.33 oz wt/a A	85.0	b	85.0	b	85.0	c	83.5	c
PRE (6/1/17) / POST II (7/3/17) <4 inch weeds										
2	SOA 2, 14, 9 SONIC DURANGO N-PAK AMS	5.33 oz wt/a A 32 fl oz/a C 2.5 %v/v C	82.5	bc	83.0	bc	95.3	b	96.0	ab
3	SOA 2, 14, 4, 9 SONIC ENLIST DUO N-PAK AMS	5.33 oz wt/a A 75 fl oz/a C 2.5 %v/v C	80.0	c	80.0	c	96.0	ab	98.8	a
4	SOA 2, 14, 10 SONIC LIBERTY 280 N-PAK AMS	5.33 oz wt/a A 32 fl oz/a C 2.5 %v/v C	84.0	b	85.0	b	97.0	ab	95.8	ab
5	SOA 2, 14, 4, 10 SONIC 2, 4-D CHOLINE SALT LIBERTY 280 N-PAK AMS	5.33 oz wt/a A 32 fl oz/a C 32 fl oz/a C 2.5 %v/v C	82.8	bc	82.5	bc	98.8	a	98.8	a
POST I (6/21/17) <4 inch weeds										
7	SOA 9 GLYPHOSATE CHECK DURANGO N-PAK AMS	32 fl oz/a B 2.5 %v/v B	95.0	a	95.5	a	96.8	ab	96.5	a
8	SOA 10 LIBERTY 280 N-PAK AMS	32 fl oz/a B 2.5 %v/v B	95.0	a	96.0	a	94.5	b	93.0	b
LSD P=.10			3.4		4.5		3.3		3.5	

Table 5. Grass control with Enlist Duo Herbicide Programs in Soybean at Rochester, MN in 2017.

Pest Code		GRAM								
Pest Name		Grass								
Rating Date		June-26		July-3		July-10		July-17		
Treatment	Rate	Appl	Percent Control (%)							
1	Weedy Check		0.0	c	0.0	d	0.0	d	0.0	d
PRE (6/1/17)										
6	SOA 2, 14		25.0	b	25.0	b	23.8	c	23.8	c
	SONIC	5.33 oz wt/a A								
PRE (6/1/17) / POST II (7/3/17) <4 inch weeds										
2	SOA 2, 14, 9		23.8	b	25.0	b	98.5	a	98.3	a
	SONIC	5.33 oz wt/a A								
	DURANGO	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
3	SOA 2, 14, 4, 9		22.5	b	20.0	c	98.3	a	98.5	a
	SONIC	5.33 oz wt/a A								
	ENLIST DUO	75 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
4	SOA 2, 14, 10		22.5	b	22.5	bc	98.3	a	97.3	a
	SONIC	5.33 oz wt/a A								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
5	SOA 2, 14, 4, 10		22.5	b	22.5	bc	97.8	a	96.0	a
	SONIC	5.33 oz wt/a A								
	2, 4-D CHOLINE SALT	32 fl oz/a C								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
POST I (6/21/17) <4 inch weeds										
7	SOA 9		95.0	a	93.8	a	90.8	b	88.8	b
	GLYPHOSATE CHECK									
	DURANGO	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
8	SOA 10		95.0	a	93.8	a	88.5	b	86.5	b
	LIBERTY 280	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
LSD P=.10			3.4		4.9		2.9		2.8	

Table 6. Crop response to Enlist Duo Herbicide Programs in Soybean at Rochester, MN in 2017.

Pest Code		CROP RESPONSE								
Pest Name		Injury								
Rating Date		June-26		July-3		July-10		July-17		
Treatment	Rate	Appl	Percent Injury (%)							
1	Weedy Check		0.0	c	0.0	-	0.0	d	0.0	-
PRE (6/1/17)										
6	SOA 2, 14		0.0	c	0.0	-	0.0	d	0.0	-
	SONIC	5.33 oz wt/a A								
PRE (6/1/17) / POST II (7/3/17) <4 inch weeds										
2	SOA 2, 14, 9		0.0	c	0.0	-	0.0	d	0.0	-
	SONIC	5.33 oz wt/a A								
	DURANGO	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
3	SOA 2, 14, 4, 9		0.0	c	0.0	-	11.3	c	0.0	-
	SONIC	5.33 oz wt/a A								
	ENLIST DUO	75 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
4	SOA 2, 14, 10		0.0	c	0.0	-	16.3	b	0.0	-
	SONIC	5.33 oz wt/a A								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
5	SOA 2, 14, 4, 10		0.0	c	0.0	-	20.0	a	0.0	-
	SONIC	5.33 oz wt/a A								
	2, 4-D CHOLINE SALT	32 fl oz/a C								
	LIBERTY 280	32 fl oz/a C								
	N-PAK AMS	2.5 %v/v C								
POST I (6/21/17) <4 inch weeds										
7	SOA 9		10.0	b	0.0	-	0.0	d	0.0	-
	GLYPHOSATE CHECK									
	DURANGO	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
8	SOA 10		35.0	a	0.0	-	0.0	d	0.0	-
	LIBERTY 280	32 fl oz/a B								
	N-PAK AMS	2.5 %v/v B								
LSD P=.10							1.4			