

Balance GT/Balance Bean/LL Systems in Soybeans at Rochester, MN

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The objective of this trial was to evaluate Balance GT/Balance Bean/LL Systems in soybeans in southeastern Minnesota. The research site was a loamy sand series with pH of 7.0, O.M. 2.2% and soil test P and K levels of 26 ppm and 132 ppm, respectively. The field was fall chisel plowed, and field cultivated twice in the spring 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 (regulated) was planted on May 31, 2017 at a depth of 1.5 inch in 30-inch rows at a rate of 116,000 seeds per acre. Soybean emergence date was June 7, 2017. 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 with a ground speed of 4.5 mph using TTI 11002 nozzles. Postemergence (POST) treatments were applied at 15 gpa, 30 psi and ground speed of 4.5 MPH. Plots were evaluated on June 23, July 5, and July 10. Crop was destroyed on July 13, 2017 to comply with protocol requirements. Application dates, environmental conditions, and weed stages can be found in Table 1. Performance rating for giant ragweed, common lambsquarters, common waterhemp and grass control, and crop phytotoxicity are reported in Tables 2 through 6, respectively.

Discussion:

Giant ragweed: Preemergence applications of Balance Bean at 1.5 fl oz/A plus Authority First, Tricor, or Warrant provided over 93% control of giant ragweed (6/23) which was comparable to the standard, Authority First at 6.4 oz/a (92%) and better than the standards, Zidua Pro at 6 oz/a (82%) and Fierce at 3 oz/a (77%). Balance Bean at the lower rate of 1 fl oz/a plus Spartan at 5 oz/a only gave 70% control of giant ragweed.

Common lambsquarters: Control was excellent for all treatments, achieving over 98% control, 6/23 and 7/5 ratings).

Common waterhemp: Balance Bean at 1.5 fl oz/A applied preemergence with Dual II Magnum, Warrant or Zidua provided 95% to 99% control of waterhemp which was similar to the standards of Fierce, Zidua Pro and Authority First at 6.4 oz/a (6/23). Balance Bean plus either Dual II Magnum or Warrant performed better than the preemergence treatments of Balance Bean plus 3 oz/a of Authority First or 5.33 oz/a of Tricor (6/23). The lower rate of Balance Bean, 1 oz/a, plus Spartan provided only 79% waterhemp control. **Note: 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	7/7
Treatment	PRE A	POST I B
Temperature (F)		
Air	69	76
Soil	60.8	82.0
Relative Humidity (%)	33	55
Wind (mph)	3	10
Soil Moisture	Normal	Normal
Soybean		
Stage		V5
Height (in)		11.0
Giant Ragweed		
Weed Density (ft ²)		1.6
Height (in)		7.0
Common Lambsquarter		
Weed Density (ft ²)		3.5
Height (in)		3.3
Common Waterhemp		
Weed Density (ft ²)		126.4
Height (in)		6.3
Grass		
Weed Density (ft ²)		14.1
Height (in)		8.3
Rainfall after each application (in)		
Week 1	0.08	0.53
Week 2	1.07	
Week 3	1.94	

Table 2. Giant ragweed control with Balance GT/Balance Bean/LL systems at Rochester, MN in 2017.

Pest Code		AMBTR						
Pest Name		Giant Ragweed						
Rating Date		June-23		July-5		July-10		
Treatment	Rate	Appl	Percent Control (%)					
1	Weedy Check		0.0	e	0.0	f	0.0	e
PRE (6/1/17) / POST I (7/7/17) 1-3 inch weeds								
2	SOA 27,14,10		69.5	d	66.3	e	91.0	cd
	BALANCE BEAN	1 fl oz/a						
	SPARTAN	5 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
3	SOA 27,15,10		92.8	ab	90.8	abc	95.3	a
	BALANCE BEAN	1.5 fl oz/a						
	DUAL II MAGNUM	16 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
4	SOA 27,15,10		88.0	ab	86.5	bc	93.5	bcd
	BALANCE BEAN	1.5 fl oz/a						
	ZIDUA	1.5 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
5	SOA 14,15,10		76.5	cd	74.5	de	90.5	d
	FIERCE	3 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
6	SOA 27,2,14,10		93.3	a	90.8	abc	95.0	b
	BALANCE BEAN	1.5 fl oz/a						
	AUTHORITY FIRST	3 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
7	SOA 27,5,10		96.3	a	94.0	ab	96.0	ab
	BALANCE BEAN	1.5 fl oz/a						
	TRICOR	5.33 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
8	SOA 27, 15,10		98.5	a	98.0	a	98.5	a
	BALANCE BEAN	1.5 fl oz/a						
	WARRANT	3 pt/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
9	SOA 2,14,10		91.8	ab	90.0	abc	94.5	b
	AUTHORITY FIRST	6.4 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
10	SOA 2,14, 15, 10		82.0	bc	82.5	cd	94.0	bc
	ZIDUA PRO	6 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
LSD P=.10			11.0		10.5		3.3	

Table 3. Common lambsquarters control with Balance GT/Balance Bean/LL systems at Rochester, MN in 2017.

Pest Code					CHEAL					
Pest Name					Giant Ragweed					
Rating Date					June-23		July-5		July-10	
Treatment		Rate	Appl		Percent Control (%)					
1	Weedy Check				0.0	c	0.0	b	0.0	c
PRE (6/1/17) / POST I (7/7/17) 1-3 inch weeds										
2	SOA 27,14,10				99.0	a	99.0	a	99.0	a
	BALANCE BEAN	1	fl oz/a	A						
	SPARTAN	5	fl oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
3	SOA 27,15,10				99.0	a	98.8	a	99.0	a
	BALANCE BEAN	1.5	fl oz/a	A						
	DUAL II MAGNUM	16	fl oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
4	SOA 27,15,10				98.8	ab	98.5	a	99.0	a
	BALANCE BEAN	1.5	fl oz/a	A						
	ZIDUA	1.5	oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
5	SOA 14,15,10				98.8	ab	98.8	a	98.8	b
	FIERCE	3	oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
6	SOA 27,2,14,10				99.0	a	99.0	a	99.0	a
	BALANCE BEAN	1.5	fl oz/a	A						
	AUTHORITY FIRST	3	oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
7	SOA 27,5,10				99.0	a	99.0	a	99.0	a
	BALANCE BEAN	1.5	fl oz/a	A						
	TRICOR	5.33	oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
8	SOA 27, 15,10				99.0	a	99.0	a	99.0	a
	BALANCE BEAN	1.5	fl oz/a	A						
	WARRANT	3	pt/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
9	SOA 2,14,10				99.0	a	99.0	a	99.0	a
	AUTHORITY FIRST	6.4	oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
10	SOA 2,14, 15, 10				98.5	b	98.5	a	99.0	a
	ZIDUA PRO	6	fl oz/a	A						
	LIBERTY 280	32	fl oz/a	B						
	AMS	8.5	lb/100 gal	B						
LSD P=.10					0.5		0.6		0.2	

Table 4. Common waterhemp control with Balance GT/Balance Bean/LL systems at Rochester, MN in 2017.

Pest Code		AMATA						
Pest Name		Common Waterhemp						
Rating Date		June-23		July-5		July-10		
Treatment	Rate	Appl	Percent Control (%)					
1	Weedy Check		0.0	e	0.0	e	0.0	e
PRE (6/1/17) / POST I (7/7/17) 1-3 inch weeds								
2	SOA 27,14,10		79.3	d	77.8	d	89.0	d
	BALANCE BEAN	1 fl oz/a						
	SPARTAN	5 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
3	SOA 27,15,10		97.5	a	95.8	ab	97.0	ab
	BALANCE BEAN	1.5 fl oz/a						
	DUAL II MAGNUM	16 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
4	SOA 27,15,10		95.0	abc	94.5	abc	96.8	ab
	BALANCE BEAN	1.5 fl oz/a						
	ZIDUA	1.5 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
5	SOA 14,15,10		98.8	a	98.3	a	98.5	a
	FIERCE	3 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
6	SOA 27,2,14,10		90.0	c	90.0	c	93.5	c
	BALANCE BEAN	1.5 fl oz/a						
	AUTHORITY FIRST	3 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
7	SOA 27,5,10		91.0	bc	90.0	c	93.8	c
	BALANCE BEAN	1.5 fl oz/a						
	TRICOR	5.33 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
8	SOA 27, 15,10		98.8	a	98.5	a	99.0	a
	BALANCE BEAN	1.5 fl oz/a						
	WARRANT	3 pt/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
9	SOA 2,14,10		94.5	abc	92.5	bc	95.5	bc
	AUTHORITY FIRST	6.4 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
10	SOA 2,14, 15, 10		97.0	ab	97.0	ab	97.8	ab
	ZIDUA PRO	6 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
LSD P=-.10			6.1		5.5		2.9	

Table 5. Grass control with Balance GT/Balance Bean/LL systems at Rochester, MN in 2017.

Pest Code		GRAM						
Pest Name		Grass						
Rating Date		June-23		July-5		July-10		
Treatment	Rate	Appl	Percent Control (%)					
1	Weedy Check		0.0	e	0.0	e	0.0	e
PRE (6/1/17) / POST I (7/7/17) 1-3 inch weeds								
2	SOA 27,14,10		85.5	d	82.5	d	94.8	d
	BALANCE BEAN	1 fl oz/a						
	SPARTAN	5 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
3	SOA 27,15,10		98.8	a	98.0	a	98.5	ab
	BALANCE BEAN	1.5 fl oz/a						
	DUAL II MAGNUM	16 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
4	SOA 27,15,10		97.3	abc	98.5	a	99.0	a
	BALANCE BEAN	1.5 fl oz/a						
	ZIDUA	1.5 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
5	SOA 14,15,10		94.8	abc	94.3	ab	97.3	bc
	FIERCE	3 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
6	SOA 27,2,14,10		92.0	c	87.5	cd	96.3	cd
	BALANCE BEAN	1.5 fl oz/a						
	AUTHORITY FIRST	3 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
7	SOA 27,5,10		98.0	ab	95.0	ab	97.0	bc
	BALANCE BEAN	1.5 fl oz/a						
	TRICOR	5.33 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
8	SOA 27, 15,10		98.3	a	97.8	a	98.5	ab
	BALANCE BEAN	1.5 fl oz/a						
	WARRANT	3 pt/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
9	SOA 2,14,10		92.5	bc	90.8	bc	96.0	cd
	AUTHORITY FIRST	6.4 oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
10	SOA 2,14, 15, 10		97.0	abc	95.3	ab	97.5	abc
	ZIDUA PRO	6 fl oz/a						
	LIBERTY 280	32 fl oz/a						
	AMS	8.5 lb/100 gal						
LSD P=.10			5.5		6.7		1.7	

Table 6. Crop Response to Balance GT/Balance Bean/LL systems at Rochester, MN in 2017.

					CROP PHYTOTOXICITY					
					INJURY					
Rating Date					June-23		July-5		July-10	
Treatment		Rate	Appl		Percent Injury (%)					
1	Weedy Check				0.0	b	0.0	e	0.0	d
PRE (6/1/17) / POST I (7/7/17) 1-3 inch weeds										
2	SOA 27,14,10				0.0	b	15.0	c	18.8	c
	BALANCE BEAN	1 fl oz/a	A							
	SPARTAN	5 fl oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
3	SOA 27,15,10				0.0	b	23.8	b	20.0	bc
	BALANCE BEAN	1.5 fl oz/a	A							
	DUAL II MAGNUM	16 fl oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
4	SOA 27,15,10				0.0	b	26.3	b	22.5	ab
	BALANCE BEAN	1.5 fl oz/a	A							
	ZIDUA	1.5 oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
5	SOA 14,15,10				10.0	a	10.0	d	17.5	c
	FIERCE	3 oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
6	SOA 27,2,14,10				0.0	b	27.5	b	23.8	a
	BALANCE BEAN	1.5 fl oz/a	A							
	AUTHORITY FIRST	3 oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
7	SOA 27,5,10				0.0	b	37.5	a	23.8	a
	BALANCE BEAN	1.5 fl oz/a	A							
	TRICOR	5.33 oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
8	SOA 27, 15,10				0.0	b	26.3	b	22.5	ab
	BALANCE BEAN	1.5 fl oz/a	A							
	WARRANT	3 pt/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
9	SOA 2,14,10				0.0	b	0.0	e	20.0	bc
	AUTHORITY FIRST	6.4 oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
10	SOA 2,14, 15, 10				0.0	b	0.0	e	20.0	bc
	ZIDUA PRO	6 fl oz/a	A							
	LIBERTY 280	32 fl oz/a	B							
	AMS	8.5 lb/100 gal	B							
LSD P= .10					.		4.8		3.2	