

Evaluation of weed control in soybean with tolerance to the herbicides mesotrione, glufosinate, and isoxaflutole in Rochester, Minnesota in 2014.

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The objective of this trial was to evaluate the performance of PRE/POST herbicide programs for weed control in soybean with tolerance to mesotrione, glufosinate and isoxaflutole in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.6, O.M of 2.3%, and soil test P and K levels of 41 ppm and 126 ppm, respectively. The field was fall moldboard plowed, and disked and field cultivated once prior to planting. Soybeans were planted on May 29, 2014, at a depth of 1.5 inches in 30 inch rows at a rate of 149,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer at 4 mph, delivering 15 gpa at 40 psi using TTI 11015 nozzles. POST treatment #9 was applied with AIJ60 nozzles. Evaluations of the plots were taken on June 18 and 24, July 1 and 9. Application dates, environmental conditions, and weed stages are listed in Table 1. The plot was not harvested. Herbicide performance for control of giant ragweed, common lambsquarters, common waterhemp, giant foxtail, and crop injury ratings can be found in Tables 2 through 6, respectively. (University of Minnesota Extension Regional Office, Rochester)

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

Date	5/29	6/25
Treatment	PRE	POST I
Temperature		
Air	70	66
Soil	67.5	69.4
Relative Humidity (%)	43	84
Wind (mph)	12	8
Soil Moisture	Normal	Wet
Soybean		
Stage		V3
Height (inches)		8.0
Giant Ragweed		
Weed density (ft ²)		1.5
Height (inches)		3.5
Common Lambsquarters		
Weed density (ft ²)		0.5
Height (inches)		1.0
Common Waterhemp		
Weed density (ft ²)		3.33
Height (inches)		1.5
Grass		
Weed density (ft ²)		18
Height (inches)		3.25
Rainfall after each application		
Week 1	1.06	1.94
Week 2	0.10	0.52
Week 3	5.15	0.59

Table 2. Giant ragweed control in soybean tolerant to mesotrione, glufosinate and isoxaflutole on June 18, 24, 30 and July 9 in Olmsted County, MN in 2014.

Treatment	Rate (rate/A)	Giant Ragweed Control			
		6/18	6/24	6/30	7/9
		(% Control)			
Untreated		0	0	0	0
PRE / POST I					
Zemax / Flexstar GT 3.5 + N-Pa-K-AMS + Upland MSO	64 fl oz/a / 56.7 fl oz/a + 2.5% v/v +1% v/v	98	95	99	99
Zemax + Reflex / Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 28.7 fl oz/a + 2.5% v/v	98	95	99	98
Zemax + Reflex / Liberty 280 + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 29 fl oz/a + 2.5% v/v	98	95	98	96
Zemax / Prefix + Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 32 fl oz/a / 28.7 fl oz/a + 2.5% v/v	97	94	99	99
Prefix / Halex GT + N-Pa-K-AMS + Induce NIS	32 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	97	97	99	99
Boundary / Flexstar GT + N-Pa-K-AMS + Upland MSO	29 fl oz/a / 56.7 fl oz/a + 2.5% v/v + 1% v/v	0	0	98	98
Boundary + Reflex / Halex GT + N-Pa-K-AMS + Induce NIS	29 fl oz/a + 16 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	96	96	99	99
Valor SX + Warrant / Roundup WeatherMax + N-Pa-K-AMS	2 oz wt/a + 48 fl oz/a / 26.6 fl oz/a + 2.5% v/v	28	15	91	97
Dual Magnum + Sonic / Roundup WeatherMax + N-Pa-K-AMS	16 fl oz/a + 6 oz wt/a / 26.6 fl oz/a + 2.5% v/v	96	95	98	98
LSD (P=0.10)		2	4	2	3

Table 3. Common lambsquarters control in soybean tolerant to mesotrione, glufosinate and isoxaflutole on June 18, 24, 30 and July 9 in Olmsted County, MN in 2014.

Treatment	Rate (rate/A)	Common Lambsquarters Control			
		6/18	6/24	6/30	7/9
		(% Control)			
Untreated		0	0	0	0
PRE / POST I					
Zemax / Flexstar GT 3.5 + N-Pa-K-AMS + Upland MSO	64 fl oz/a / 56.7 fl oz/a + 2.5% v/v +1% v/v	99	99	99	99
Zemax + Reflex / Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 28.7 fl oz/a + 2.5% v/v	99	99	99	99
Zemax + Reflex / Liberty 280 + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 29 fl oz/a + 2.5% v/v	99	99	99	99
Zemax / Prefix + Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 32 fl oz/a / 28.7 fl oz/a + 2.5% v/v	99	99	99	99
Prefix / Halex GT + N-Pa-K-AMS + Induce NIS	32 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	99	99	99	99
Boundary / Flexstar GT + N-Pa-K-AMS + Upland MSO	29 fl oz/a / 56.7 fl oz/a + 2.5% v/v + 1% v/v	99	99	99	99
Boundary + Reflex / Halex GT + N-Pa-K-AMS + Induce NIS	29 fl oz/a + 16 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	99	99	99	99
Valor SX + Warrant / Roundup WeatherMax + N-Pa-K-AMS	2 oz wt/a + 48 fl oz/a / 26.6 fl oz/a + 2.5% v/v	99	99	99	99
Dual Magnum + Sonic / Roundup WeatherMax + N-Pa-K-AMS	16 fl oz/a + 6 oz wt/a / 26.6 fl oz/a + 2.5% v/v	99	99	99	99
LSD (P=0.10)		0	0	0	0

Table 4. Common waterhemp control in soybean tolerant to mesotrione, glufosinate and isoxaflutole on June 18, 24, 30 and July 9 in Olmsted County, MN in 2014.

Treatment	Rate	Common Waterhemp Control			
		6/18	6/24	6/30	7/9
	(rate/A)	(% Control)			
Untreated		0	0	0	0
PRE / POST I					
Zemax / Flexstar GT 3.5 + N-Pa-K-AMS + Upland MSO	64 fl oz/a / 56.7 fl oz/a + 2.5% v/v +1% v/v	99	99	99	99
Zemax + Reflex / Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 28.7 fl oz/a + 2.5% v/v	99	99	99	99
Zemax + Reflex / Liberty 280 + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 29 fl oz/a + 2.5% v/v	99	99	99	99
Zemax / Prefix + Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 32 fl oz/a / 28.7 fl oz/a + 2.5% v/v	99	99	99	99
Prefix / Halex GT + N-Pa-K-AMS + Induce NIS	32 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	99	99	99	99
Boundary / Flexstar GT + N-Pa-K-AMS + Upland MSO	29 fl oz/a / 56.7 fl oz/a + 2.5% v/v + 1% v/v	99	99	99	99
Boundary + Reflex / Halex GT + N-Pa-K-AMS + Induce NIS	29 fl oz/a + 16 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	99	99	99	99
Valor SX + Warrant / Roundup WeatherMax + N-Pa-K-AMS	2 oz wt/a + 48 fl oz/a / 26.6 fl oz/a + 2.5% v/v	99	99	99	99
Dual Magnum + Sonic / Roundup WeatherMax + N-Pa-K-AMS	16 fl oz/a + 6 oz wt/a / 26.6 fl oz/a + 2.5% v/v	99	99	99	99
LSD (P=0.10)		0	0	0	0

Table 5. Giant foxtail control in soybean tolerant to mesotrione, glufosinate and isoxaflutole on June 18, 24, 30 and July 9 in Olmsted County, MN in 2014.

Treatment	Rate	Grass Control			
		6/18	6/24	6/30	7/9
	(rate/A)	(% Control)			
Untreated		0	0	0	0
PRE / POST I					
Zemax / Flexstar GT 3.5 + N-Pa-K-AMS + Upland MSO	64 fl oz/a / 56.7 fl oz/a + 2.5% v/v +1% v/v	99	99	99	99
Zemax + Reflex / Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 28.7 fl oz/a + 2.5% v/v	99	99	99	99
Zemax + Reflex / Liberty 280 + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 29 fl oz/a + 2.5% v/v	99	99	99	99
Zemax / Prefix + Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 32 fl oz/a / 28.7 fl oz/a + 2.5% v/v	99	99	99	99
Prefix / Halex GT + N-Pa-K-AMS + Induce NIS	32 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	99	99	99	99
Boundary / Flexstar GT + N-Pa-K-AMS + Upland MSO	29 fl oz/a / 56.7 fl oz/a + 2.5% v/v + 1% v/v	99	99	99	99
Boundary + Reflex / Halex GT + N-Pa-K-AMS + Induce NIS	29 fl oz/a + 16 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	99	99	99	99
Valor SX + Warrant / Roundup WeatherMax + N-Pa-K-AMS	2 oz wt/a + 48 fl oz/a / 26.6 fl oz/a + 2.5% v/v	97	95	98	98
Dual Magnum + Sonic / Roundup WeatherMax + N-Pa-K-AMS	16 fl oz/a + 6 oz wt/a / 26.6 fl oz/a + 2.5% v/v	99	99	99	99
LSD (P=0.10)		2	2	1	1

Table 6. Crop response to herbicides on June 18, 24, 30 and July 9 in Olmsted County, MN in 2014.

Treatment	Rate (rate/A)	Injury			
		6/18	6/24	6/30	7/9
		(% Injured)			
Untreated		0	0	0	0
PRE / POST I					
Zemax / Flexstar GT 3.5 + N-Pa-K-AMS + Upland MSO	64 fl oz/a / 56.7 fl oz/a + 2.5% v/v +1% v/v	0	0	53	17
Zemax + Reflex / Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 28.7 fl oz/a + 2.5% v/v	0	0	0	0
Zemax + Reflex / Liberty 280 + N-Pa-K-AMS	64 fl oz/a + 16 fl oz/a / 29 fl oz/a + 2.5% v/v	0	0	17	5
Zemax / Prefix + Touchdown Total + N-Pa-K-AMS	64 fl oz/a + 32 fl oz/a / 28.7 fl oz/a + 2.5% v/v	0	0	52	20
Prefix / Halex GT + N-Pa-K-AMS + Induce NIS	32 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	0	0	26	18
Boundary / Flexstar GT + N-Pa-K-AMS + Upland MSO	29 fl oz/a / 56.7 fl oz/a + 2.5% v/v + 1% v/v	0	0	48	17
Boundary + Reflex / Halex GT + N-Pa-K-AMS + Induce NIS	29 fl oz/a + 16 fl oz/a / 57.5 fl oz/a + 2.5% v/v + 0.25% v/v	0	0	25	20
Valor SX + Warrant / Roundup WeatherMax + N-Pa-K-AMS	2 oz wt/a + 48 fl oz/a / 26.6 fl oz/a + 2.5% v/v	0	0	0	0
Dual Magnum + Sonic / Roundup WeatherMax + N-Pa-K-AMS	16 fl oz/a + 6 oz wt/a / 26.6 fl oz/a + 2.5% v/v	0	0	0	0
LSD (P=0.10)		0	0	5	2