

Glyphosate and ALS resistant Giant Ragweed Control in Soybean in SE Minnesota in 2014

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The objective of this trial was to evaluate the performance of herbicide systems for herbicide resistant giant ragweed control in soybean in southeastern Minnesota. The research site was a Port Byron silt loam soil with a pH of 7.2, O.M. of 3.0%, and soil test P and K levels of 9 ppm and 85 ppm, respectively. The field was fall chisel plowed, and disked and field cultivated twice prior to planting in the spring. The soybean variety Asgrow AG2232 was used for the glyphosate based treatments, and Stine 17LD02 was used for the LibertyLink based treatment. Both soybean brands were planted on May 23, 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) treatments were applied at 4 mph with a tractor-mounted sprayer delivering 15 gpa at 40 psi using TurboTeeJet Induction (TTI) 110015 spray tips. Postemergence (POST) treatments were applied at 5 mph with a tractor-mounted sprayer delivering 15 gpa at 40 psi using TTJ60 11002 nozzles. POST II treatment #16 was applied at 5 mph, 15 gpa at 40 psi using TTI 11002 nozzles.

Evaluations of the plot were taken on June 5, 10, 16, 23, 30 and July 9, 16 and 24. Yields are not reported. Application dates, environmental conditions, and weed stages are listed in Table 1. Herbicide performance for giant ragweed and crop injury ratings are found in Tables 2 and 3 respectively. (University of Minnesota Extension Regional Office, Rochester)

SUMMARY

This study demonstrates the challenges associated with achieving an acceptable level of control of a SOA 2- and SOA 9- resistant giant ragweed population in soybean. The highest level of giant ragweed control (> 95%) was achieved with three-pass systems, a PRE followed by two well-timed POST herbicide applications. These systems relied on

the inclusion of SOA 10 and/or SOA 14 herbicides to achieve this level of control. However, over-reliance on SOA 10 and SOA 14 herbicides without a diversified plan destines these SOA's to failure.

The inclusion of SOA group 14 herbicides in this study demonstrates the risk of crop phytotoxicity that must be accepted by farmers to achieve a satisfactory level of control. It also demonstrates the need for an integrated system, one that includes non-chemical approaches to manage weed populations with multiple SOA resistance.

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

Date	5/24	6/6	7/3
Treatment	PRE	POST I	POST II
Temperature (F)			
Air	70	68	69
Soil	55.9	64.4	65.7
Relative Humidity (%)	43	84	38
Wind (mph)	13	5	7
Soil Moisture	Normal	Normal	Slightly Wet
Soybean			
Stage		VC	V6-R1
Height (inch)		3.0	11.0
Giant Ragweed			
Weed density (ft ²)			
Height (inch)		2.13	4.75
Rainfall after each application (inch)			
Week 1	0.03	0.06	0.52
Week 2	1.10	5.92	0.58
Week 3	0.06	0.58	0.0

Table 2. Performance of herbicide systems for herbicide resistant giant ragweed control in soybeans on June 5, 10, 23, 30, July 9, 16 and 24 at Rochester, MN in 2014.

Treatment	Rate	Giant Ragweed Control							
		6/5	6/10	6/16	6/23	6/30	7/9	7/16	7/24
	(rate/A)	(% Control)							
PRE / POST I (2" GIRW)									
Fierce + Classic / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 1 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	83	93	94	93	92	89	85	77 cd
Fierce + Firstrate / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 0.6 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	87	90	94	92	88	84	78	74 de
Fierce + metribuzin / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 5 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	85	93	95	95	92	89	86	82 c
Fierce + Lorox / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 24 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	86	91	94	92	91	86	77	74 de
Gangster V + Gangster FR / Cobra + Roundup PowerMax + COC + N-PaK-AMS	2.5 oz wt/a + 0.5 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	82	93	93	94	92	89	85	80 cd
Gangster V + Gangster FR + Metribuzin / Cobra + Roundup PowerMax + COC + N-PaK-AMS	2.5 oz wt/a + 0.5 oz wt/a + 5 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	83	93	94	94	93	90	84	77 cd
Dual Magnum + Sonic / Cobra + Roundup PowerMax + COC + N-PaK-AMS	16 fl oz/a + 6.4 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	69	93	93	91	88	84	79	65 fg
Authority First / Marvel + Roundup PowerMax + COC + N-PaK-AMS	6.4 oz wt/a / 6 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	73	93	80	82	78	73	66	60 g
Authority First / Flexstar GT 3.5 + COC + N-PaK-AMS	6.4 oz wt/a / 3.5 pt/a + 1.5 pt/a + 3.3 gal/100 gal	65	89	83	82	81	79	74	68 ef
Prefix + Sharpen / Cobra + Roundup PowerMax + COC + N-PaK-AMS	2 pt/a + 1 fl oz/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	85	97	99	98	98	95	94	92 ab
PRE / POST I (2" GIRW) / POST II (2" GIRW regrowth)									
Fierce / Cobra + COC + N-PaK-AMS / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal / 32 fl oz/a + 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	83	89	92	89	86	95	96	96 ab
Verdict / Cobra + COC + N-PaK-AMS / Cobra + Roundup PowerMax + COC + N-PaK-AMS	5 fl oz/a / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	70	95	98	97	95	96	98	98 a
Authority First / Flexstar GT 3.5 + COC + N-PaK-AMS / Cobra + COC + N-PaK-AMS	6.4 oz wt/a / 3.5 pt/a + 1% v/v + 3.3 gal/100 gal / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	79	95	90	90	91	95	97	97 ab
Verdict / Liberty 280 + N-PaK-AMS / Liberty 280 + N-PaK-AMS	5 fl oz/a / 29 fl oz/a + 3.3 gal/100 gal / 29 fl oz/a + 3.3 gal/100 gal	80	91	96	95	96	93	97	96 ab
POST I (2" GIRW) / POST II (2" GIRW regrowth)									
Flexstar GT 3.5 + COC + N-PaK-AMS / Cobra + COC + N-PaK-AMS	3.5 pt/a + 1% v/v + 3.3 gal/100 gal / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	86	73	70	72	92	92	91 b
Prefix + Roundup PowerMax + NIS + N-PaK-AMS / Cobra + COC + N-PaK-AMS	2 pt/a + 32 fl oz/a + 0.125% v/v + 3.3 gal/100 gal / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	88	81	77	76	90	93	92 ab
Roundup PowerMax + N-PaK-AMS / Roundup PowerMax + N-PaK-AMS	32 fl oz/a + 3.3 gal/100 gal / 32 fl oz/a + 3.3 gal/100 gal	0	41	44	43	43	45	45	48 h
LSD (P=0.10)		7	5	5	6	7	5	6	7

Table 3. Crop response to herbicide systems used to control resistant giant ragweed in soybeans on June 5, 10, 16, 23, 30, July 9, 16 and 24 at Rochester, MN in 2014.

Treatment	Rate	Injury							
		6/5	6/10	6/16	6/23	6/30	7/9	7/16	7/24
	(rate/A)	(% Injured)							
PRE / POST I (2" GIRW)									
Fierce + Classic / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 1 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	9	76	56	39	19	11	0	0
Fierce + Firstrate / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 0.6 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	14	75	58	36	15	5	0	0
Fierce + metribuzin / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 5 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	14	76	58	41	19	5	0	0
Fierce + Lorox / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a + 24 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	14	76	59	41	19	10	6	0
Gangster V + Gangster FR / Cobra + Roundup PowerMax + COC + N-PaK-AMS	2.5 oz wt/a + 0.5 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	13	74	53	39	13	6	0	0
Gangster V + Gangster FR + Metribuzin / Cobra + Roundup PowerMax + COC + N-PaK-AMS	2.5 oz wt/a + 0.5 oz wt/a + 5 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	14	75	55	39	16	5	0	0
Dual Magnum + Sonic / Cobra + Roundup PowerMax + COC + N-PaK-AMS	16 fl oz/a + 6.4 oz wt/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	71	54	36	15	5	0	0
Authority First / Marvel + Roundup PowerMax + COC + N-PaK-AMS	6.4 oz wt/a / 6 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	70	46	29	8	0	0	0
Authority First / Flexstar GT 3.5 + COC + N-PaK-AMS	6.4 oz wt/a / 3.5 pt/a + 1.5 pt/a + 3.3 gal/100 gal	0	60	44	25	5	0	0	0
Prefix + Sharpen / Cobra + Roundup PowerMax + COC + N-PaK-AMS	2 pt/a + 1 fl oz/a / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	3	73	59	39	20	0	0	0
PRE / POST I (2" GIRW) / POST II (2" GIRW regrowth)									
Fierce / Cobra + COC + N-PaK-AMS / Cobra + Roundup PowerMax + COC + N-PaK-AMS	3 oz wt/a / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal / 32 fl oz/a + 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	11	74	59	40	19	83	79	55
Verdict / Cobra + COC + N-PaK-AMS / Cobra + Roundup PowerMax + COC + N-PaK-AMS	5 fl oz/a / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal / 12 fl oz/a + 32 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	68	50	31	14	79	74	54
Authority First / Flexstar GT 3.5 + COC + N-PaK-AMS / Cobra + COC + N-PaK-AMS	6.4 oz wt/a / 3.5 pt/a + 1% v/v + 3.3 gal/100 gal / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	60	40	25	8	66	56	38
Verdict / Liberty 280 + N-PaK-AMS / Liberty 280 + N-PaK-AMS	5 fl oz/a / 29 fl oz/a + 3.3 gal/100 gal / 29 fl oz/a + 3.3 gal/100 gal	0	16	10	5	0	10	0	0
POST I (2" GIRW) / POST II (2" GIRW regrowth)									
Flexstar GT 3.5 + COC + N-PaK-AMS / Cobra + COC + N-PaK-AMS	3.5 pt/a + 1% v/v + 3.3 gal/100 gal / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	60	40	25	5	68	34	21
Prefix + Roundup PowerMax + NIS + N-PaK-AMS / Cobra + COC + N-PaK-AMS	2 pt/a + 32 fl oz/a + 0.125% v/v + 3.3 gal/100 gal / 12 fl oz/a + 1.5 pt/a + 3.3 gal/100 gal	0	46	49	31	15	75	60	35
Roundup PowerMax + N-PaK-AMS / Roundup PowerMax + N-PaK-AMS	32 fl oz/a + 3.3 gal/100 gal / 32 fl oz/a + 3.3 gal/100 gal	0	11	0	0	0	0	0	0
LSD (P=0.10)		3	4	4	5	3	3	2	3