

Glufosinate (LibertyLink) and Glyphosate (Roundup Ready/GT) Weed Control Programs for SOA 2- & SOA 9- Resistant Giant Ragweed in Soybean.

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The objective of this trial was to evaluate and compare glufosinate (LibertyLink) and glyphosate (Roundup Ready/GT) programs for control of SOA 2- & SOA 9 herbicide resistant giant ragweed in soybeans in southeastern Minnesota. Preemergence (PRE) / Postemergence (POST) and total POST systems were compared for weed control and crop response. The research site was positioned on a Port Byron silt loam soil with a pH of 7.0, O.M 4.1% and soil test P and K levels of 44 and 175 ppm, respectively. The field was fall chisel plowed and spring disked. Fertilizer was broadcast applied on April 23, 2015 at a rate of 38-70-155-12 (N-P-K-S). The field was field cultivated ahead of planting. The previous crop was a weedy fallow. Soybean varieties planted were Stine 19LF62 (LibertyLink), Stine 22LD23 (LibertyLink), Stine 19RF32 (Roundup Ready), and Stine 22RF22 (Roundup Ready). The trial was planted on May 22, 2015 at a depth of 1.5 inches in 30 inch rows at a rate of 140,000 seeds per acre. A randomized complete block design was used with four replications. PRE treatments and POST systemic herbicide treatments were applied with TTI11002 spray tips. POST contact herbicide treatments were applied with TTIJ60-11002 spray tips. All applications were applied with a tractor-mounted sprayer delivering 15 gpa at 30 psi. Evaluations of the plots were taken in June on the 8, 17, 25, and 30, in July on the 8, 15, 20, and 27 and on September 28, 2015. The two center rows of each plot were machine harvested on October 19, 2015. Application dates, environmental conditions, and weed stages are in Table 1. Performance ratings for control of giant ragweed, crop response control of common lambsquarters and redroot pigweed are in Tables 2 through 5, respectively. Varieties performed similarly in each system, noting soybean recovery and canopy closure was similar after herbicide applications. (University of Minnesota Extension Regional Office, Rochester. Trial partially funded by the Minnesota Soybean Research & Promotion Council).

SUMMARY

There are challenges associated with achieving acceptable weed control of SOA 2- (ALS inhibitors) and SOA 9- (EPSP synthase inhibitors - glyphosate) resistant giant ragweed in soybean. Previous work has shown that three-pass systems are the most effective and that giant ragweed control levels of greater than 95 percent are achievable. The keys to successful weed control of SOA 2- and SOA 9-resistant giant ragweed are 1) selecting an effective PRE herbicide; and 2) following it with a timely POST application of SOA 10 (glufosinate – Liberty) and/or SOA 14 (PPO-Flexstar, Cobra, etc.) herbicide(s).

Planting a glufosinate (LibertyLink) variety is necessary for utilizing the SOA 10 herbicide system. Glufosinate by itself or in a tank mix has provided good resistant giant ragweed control. If planting a glyphosate (Roundup/GT) variety the inclusion of a SOA 14 herbicide is essential for good resistant ragweed control.

Regardless of which herbicide system you choose, weeds need to be treated at the correct stage (2 inches) and proper application practices need to be adhered to when using contact herbicides!

Crop injury will occur when using SOA 14 herbicides and must be accepted by farmers as a condition for satisfactory weed control. However, overuse of SOA 10 and SOA 14 herbicides without a diversified integrated weed management plan will likely result in giant ragweed becoming resistant to both of these SOA's. Waterhemp populations in Minnesota are already becoming resistant to SOA 14 herbicides because of repeated overuse.

In the 2015 study, PRE followed by timely POST systems provided the most durable weed control. This was especially true in SOA 10 systems (LibertyLink) where weed species in addition to giant ragweed needed to be targeted. Relying on total POST systems greatly increases the risk for weed control failures or poor performance. However, weather often limits the application window for PRE herbicides, resulting in the use of a total POST system. Total POST systems that included Prefix (SOA 14) in combination with either glyphosate (Roundup) or glufosinate (Liberty) followed by an additional POST herbicide application, one that is effective on giant ragweed, provided better results than two POST applications of either glufosinate or glyphosate only systems. It is evident that herbicide only management systems to control resistant weed populations are going to be increasingly challenged and non-chemical strategies will need to be implemented.

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

Date	5/23	6/9	6/24	6/25	7/3	7/10
Treatment	PRE (A)	POST I (B)	POST II (C)	POST III (D)	POST IV (E)	POST V (F)
Temperature (F)						
Air	62	69	69	66	57	77
Soil	57.2	65.3	65.3	68.7		
Relative Humidity (%)	51	65	73	88	88	64
Wind (mph)	0	8	6	8	4	9
Soil Moisture	Normal	Normal	Normal	Normal	Normal	Normal
Soybean						
Stage		VC	V3	V4	V5	R1 Flower
Height (inch)		2.5	7	8	9	19
Giant Ragweed						
Weed Density (ft ²)		15.3				5.8
Height (inch)		2.3	4.4	2.8	4.6	
Common Lambsquarter						
Weed Density (ft ²)		34.3				
Height (inch)		1.1	1.8	2.5		
Common Waterhemp						
Weed Density (ft ²)		14				
Height (inch)		0.9	2.1	1.9		
Grass						
Weed Density (ft ²)		43				
Height (inch)		1.6	3.4	2.6		
Rainfall after each application (inch)						
Week 1	1.47	1.69	1.63	1.63	0.69	0.30
Week 2	1.32	0.78	0.69	0.69	0.30	1.64
Week 3	2.82	1.63	0.30	0.30	1.64	1.61

Table 2A. SOA-2 and SOA-9 resistant giant ragweed control in glufosinate and glyphosate systems in soybean at Rochester, MN in 2015.

Pest Code					Giant ragweed											
Rating Date					Jun-8-15	Jun-17-15	Jun-30-15	Jul-15-15	Jul-27-15	Sep-28-15						
Trt	Treatment	Rate	Growth	Appl	Percent control (%)											
Glufosinate systems																
1	STINE 19LF62				90	a	85	bc	98	a	98	ab	99	a	99	a
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	LIBERTY 280	29	fl oz/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
	LIBERTY 280	29	fl oz/a	LAPOWE	F											
	N-PAK AMS	2.5	% v/v	LAPOWE	F											
2	STINE 22LD23				90	a	84	c	98	a	98	ab	99	a	99	ab
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	LIBERTY 280	29	fl oz/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
	LIBERTY 280	29	fl oz/a	LAPOWE	F											
	N-PAK AMS	2.5	% v/v	LAPOWE	F											
3	STINE 19LF62				0	c	97	a	99	a	98	ab	96	ab	96	abc
	PREFIX	2	pt/a	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
4	STINE 22LD23				0	c	94	a	99	a	97	ab	95	ab	95	abc
	PREFIX	2	pt/a	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
5	STINE 22LD23				0	c	97	a	99	a	97	ab	95	ab	95	bc
	LIBERTY 280	29	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
Glyphosate systems																
6	STINE 19RF32				89	ab	88	b	95	b	94	b	92	b	92	c
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	COBRA	12	fl oz/a	MIDPOWE	C											
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C											
	COC	1	pt/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
7	STINE 20RD00				88	b	84	c	96	b	88	c	86	c	86	d
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	COBRA	12	fl oz/a	MIDPOWE	C											
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C											
	COC	1	pt/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
8	STINE 19RF32				0	c	96	a	87	c	98	a	97	a	97	ab
	PREFIX	2	pt/a	EAPOWE	B											
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B											
	NIS	0.25	% v/v	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	COBRA	12	fl oz/a	LAPOWE	E											
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E											
	COC	1	pt/a	LAPOWE	E											
	N-PAK AMS	2.5	% v/v	LAPOWE	E											
9	STINE 20RD00				0	c	96	a	83	d	99	a	98	a	98	ab
	PREFIX	2	pt/a	EAPOWE	B											
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B											
	NIS	0.25	% v/v	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	COBRA	12	fl oz/a	LAPOWE	E											
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E											
	COC	1	pt/a	LAPOWE	E											
	N-PAK AMS	2.5	% v/v	LAPOWE	E											
10	STINE 20RD00				0	c	55	d	58	e	36	d	34	d		
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
LSD P=10					1.3		2.8		1.9		4.4		4.1		3.8	

Table 3. Soybean response to herbicides used to control SOA-2 & SOA-9 resistant giant ragweed in soybean at Rochester, MN in 2015.

Rating Date				Jun-8-15	Jun-17-15	Jun-25-15	Jun-30-15	Jul-8-15	Jul-15-15							
Part Rated				Crop Response - Injury												
No.	Name	Rate Unit	Stage	Code	Percent (%)											
Glufosinate systems																
1	STINE 19LF62				5	a	0	c	14	e	16	cd	10	c	10	b
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	LIBERTY 280	29	fl oz/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
	LIBERTY 280	29	fl oz/a	LAPOWE	F											
	N-PAK AMS	2.5	% v/v	LAPOWE	F											
2	STINE 22LD23				5	a	0	c	15	e	19	c	0	d	5	c
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	LIBERTY 280	29	fl oz/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
	LIBERTY 280	29	fl oz/a	LAPOWE	F											
	N-PAK AMS	2.5	% v/v	LAPOWE	F											
3	STINE 19LF62				0	b	60	a	33	c	20	c	10	c	0	d
	PREFIX	2	pt/a	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
4	STINE 22LD23				0	b	59	a	26	d	29	b	10	c	0	d
	PREFIX	2	pt/a	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
5	STINE 22LD23				0	b	13	b	0	f	18	c	0	d	0	d
	LIBERTY 280	29	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	LIBERTY 280	29	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
Glyphosate systems																
6	STINE 19RF32				5	a	0	c	65	a	63	a	43	b	5	c
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	Cobra	12	fl oz/a	MIDPOWE	C											
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C											
	COC	1	pt/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
7	STINE 20RD00				5	a	0	c	65	a	65	a	46	b	13	b
	VERDICT	5	fl oz/a	PREPRE	A											
	ZIDUA	2	oz/a	PREPRE	A											
	Cobra	12	fl oz/a	MIDPOWE	C											
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C											
	COC	1	pt/a	MIDPOWE	C											
	N-PAK AMS	2.5	% v/v	MIDPOWE	C											
8	STINE 19RF32				0	b	60	a	38	c	11	d	85	a	36	a
	PREFIX	2	pt/a	EAPOWE	B											
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B											
	NIS	0.25	% v/v	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	Cobra	12	fl oz/a	LAPOWE	E											
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E											
	COC	1	pt/a	LAPOWE	E											
	N-PAK AMS	2.5	% v/v	LAPOWE	E											
9	STINE 20RD00				0	b	59	a	45	b	18	c	85	a	39	a
	PREFIX	2	pt/a	EAPOWE	B											
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B											
	NIS	0.25	% v/v	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	Cobra	12	fl oz/a	LAPOWE	E											
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E											
	COC	1	pt/a	LAPOWE	E											
	N-PAK AMS	2.5	% v/v	LAPOWE	E											
10	STINE 20RD00				0	b	11	b	0	f	11	d	0	d	0	d
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B											
	N-PAK AMS	2.5	% v/v	EAPOWE	B											
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	D											
	N-PAK AMS	2.5	% v/v	LAPOWE	D											
LSD P=.10					.		3.7		5.1		5.7		5.0		4.7	

Table 4. Common lambsquarters control in a SOA-2 & SOA-9 resistant giant ragweed soybean site in Rochester, MN in 2015.

Pest Code					Common lambsquarters							
Rating Date					Jun-8-2015	Jun-17-2015	Jun-30-2015	Sep-28-2015				
No.	Name	Rate	Unit	Stage	Code				Percent control (%)			
Glufosinate Sysyems												
1	STINE 19LF62				99	a	99	ab	99	a	98	ab
	VERDICT	5	fl oz/a	PREPRE	A							
	ZIDUA	2	oz/a	PREPRE	A							
	LIBERTY 280	29	fl oz/a	MIDPOWE	C							
	N-PAK AMS	2.5	% v/v	MIDPOWE	C							
	LIBERTY 280	29	fl oz/a	LAPOWE	F							
	N-PAK AMS	2.5	% v/v	LAPOWE	F							
2	STINE 22LD23				99	a	99	a	99	a	99	a
	VERDICT	5	fl oz/a	PREPRE	A							
	ZIDUA	2	oz/a	PREPRE	A							
	LIBERTY 280	29	fl oz/a	MIDPOWE	C							
	N-PAK AMS	2.5	% v/v	MIDPOWE	C							
	LIBERTY 280	29	fl oz/a	LAPOWE	F							
	N-PAK AMS	2.5	% v/v	LAPOWE	F							
3	STINE 19LF62				0	b	95	bc	99	a	93	ef
	PREFIX	2	pt/a	EAPOWE	B							
	LIBERTY 280	29	fl oz/a	EAPOWE	B							
	N-PAK AMS	2.5	% v/v	EAPOWE	B							
	LIBERTY 280	29	fl oz/a	LAPOWE	D							
	N-PAK AMS	2.5	% v/v	LAPOWE	D							
4	STINE 22LD23				0	b	89	d	99	a	93	def
	PREFIX	2	pt/a	EAPOWE	B							
	LIBERTY 280	29	fl oz/a	EAPOWE	B							
	N-PAK AMS	2.5	% v/v	EAPOWE	B							
	LIBERTY 280	29	fl oz/a	LAPOWE	D							
	N-PAK AMS	2.5	% v/v	LAPOWE	D							
5	STINE 22LD23				0	b	43	e	95	b	91	f
	LIBERTY 280	29	fl oz/a	EAPOWE	B							
	N-PAK AMS	2.5	% v/v	EAPOWE	B							
	LIBERTY 280	29	fl oz/a	LAPOWE	D							
	N-PAK AMS	2.5	% v/v	LAPOWE	D							
Glyphosate systems												
6	STINE 19RF32				99	a	99	a	99	a	96	bc
	VERDICT	5	fl oz/a	PREPRE	A							
	ZIDUA	2	oz/a	PREPRE	A							
	Cobra	12	fl oz/a	MIDPOWE	C							
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C							
	COC	1	pt/a	MIDPOWE	C							
	N-PAK AMS	2.5	% v/v	MIDPOWE	C							
7	STINE 20RD00				99	a	99	ab	99	a	95	cde
	VERDICT	5	fl oz/a	PREPRE	A							
	ZIDUA	2	oz/a	PREPRE	A							
	Cobra	12	fl oz/a	MIDPOWE	C							
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C							
	COC	1	pt/a	MIDPOWE	C							
	N-PAK AMS	2.5	% v/v	MIDPOWE	C							
8	STINE 19RF32				0	b	99	ab	87	c	95	cd
	PREFIX	2	pt/a	EAPOWE	B							
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B							
	NIS	0.25	% v/v	EAPOWE	B							
	N-PAK AMS	2.5	% v/v	EAPOWE	B							
	Cobra	12	fl oz/a	LAPOWE	E							
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E							
	COC	1	pt/a	LAPOWE	E							
	N-PAK AMS	2.5	% v/v	LAPOWE	E							
9	STINE 20RD00				0	b	99	ab	89	c	96	abc
	PREFIX	2	pt/a	EAPOWE	B							
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B							
	NIS	0.25	% v/v	EAPOWE	B							
	N-PAK AMS	2.5	% v/v	EAPOWE	B							
	Cobra	12	fl oz/a	LAPOWE	E							
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E							
	COC	1	pt/a	LAPOWE	E							
	N-PAK AMS	2.5	% v/v	LAPOWE	E							
10	STINE 20RD00				0	b	92	cd	95	b		
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B							
	N-PAK AMS	2.5	% v/v	EAPOWE	B							
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	D							
	N-PAK AMS	2.5	% v/v	LAPOWE	D							
LSD P=.10					.		4.0		3.6		2.7	

Table 5. Redroot pigweed control in a SOA-2 & SOA-9 resistant giant ragweed soybean site in Rochester, MN in 2015.

Pest Code					Common waterhemp						
Rating Date					Jun-8-15	Jun-17-15	Jun-30-15	Sep-28-15			
No.	Name	Rate	Unit	Stage	Code	Percent control (%)					
Glufosinate systems											
1	STINE 19LF62					99	a	99	a	99	a
	VERDICT	5	fl oz/a	PREPRE	A						
	ZIDUA	2	oz/a	PREPRE	A						
	LIBERTY 280	29	fl oz/a	MIDPOWE	C						
	N-PAK AMS	2.5	% v/v	MIDPOWE	C						
	LIBERTY 280	29	fl oz/a	LAPOWE	F						
	N-PAK AMS	2.5	% v/v	LAPOWE	F						
2	STINE 22LD23					99	a	99	a	99	a
	VERDICT	5	fl oz/a	PREPRE	A						
	ZIDUA	2	oz/a	PREPRE	A						
	LIBERTY 280	29	fl oz/a	MIDPOWE	C						
	N-PAK AMS	2.5	% v/v	MIDPOWE	C						
	LIBERTY 280	29	fl oz/a	LAPOWE	F						
	N-PAK AMS	2.5	% v/v	LAPOWE	F						
3	STINE 19LF62					0	b	96	ab	99	a
	PREFIX	2	pt/a	EAPOWE	B						
	LIBERTY 280	29	fl oz/a	EAPOWE	B						
	N-PAK AMS	2.5	% v/v	EAPOWE	B						
	LIBERTY 280	29	fl oz/a	LAPOWE	D						
	N-PAK AMS	2.5	% v/v	LAPOWE	D						
4	STINE 22LD23					0	b	90	c	99	a
	PREFIX	2	pt/a	EAPOWE	B						
	LIBERTY 280	29	fl oz/a	EAPOWE	B						
	N-PAK AMS	2.5	% v/v	EAPOWE	B						
	LIBERTY 280	29	fl oz/a	LAPOWE	D						
	N-PAK AMS	2.5	% v/v	LAPOWE	D						
5	STINE 22LD23					0	b	43	d	97	ab
	LIBERTY 280	29	fl oz/a	EAPOWE	B						
	N-PAK AMS	2.5	% v/v	EAPOWE	B						
	LIBERTY 280	29	fl oz/a	LAPOWE	D						
	N-PAK AMS	2.5	% v/v	LAPOWE	D						
Glyphosate systems											
6	STINE 19RF32					99	a	99	a	99	a
	VERDICT	5	fl oz/a	PREPRE	A						
	ZIDUA	2	oz/a	PREPRE	A						
	Cobra	12	fl oz/a	MIDPOWE	C						
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C						
	COC	1	pt/a	MIDPOWE	C						
	N-PAK AMS	2.5	% v/v	MIDPOWE	C						
7	STINE 20RD00					99	a	99	a	99	a
	VERDICT	5	fl oz/a	PREPRE	A						
	ZIDUA	2	oz/a	PREPRE	A						
	Cobra	12	fl oz/a	MIDPOWE	C						
	ROUNDUP POWERMAX	32	fl oz/a	MIDPOWE	C						
	COC	1	pt/a	MIDPOWE	C						
	N-PAK AMS	2.5	% v/v	MIDPOWE	C						
8	STINE 19RF32					0	b	99	a	91	c
	PREFIX	2	pt/a	EAPOWE	B						
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B						
	NIS	0.25	% v/v	EAPOWE	B						
	N-PAK AMS	2.5	% v/v	EAPOWE	B						
	Cobra	12	fl oz/a	LAPOWE	E						
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E						
	COC	1	pt/a	LAPOWE	E						
	N-PAK AMS	2.5	% v/v	LAPOWE	E						
9	STINE 20RD00					0	b	99	a	90	c
	PREFIX	2	pt/a	EAPOWE	B						
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B						
	NIS	0.25	% v/v	EAPOWE	B						
	N-PAK AMS	2.5	% v/v	EAPOWE	B						
	Cobra	12	fl oz/a	LAPOWE	E						
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	E						
	COC	1	pt/a	LAPOWE	E						
	N-PAK AMS	2.5	% v/v	LAPOWE	E						
10	STINE 20RD00					0	b	92	bc	96	b
	ROUNDUP POWERMAX	32	fl oz/a	EAPOWE	B						
	N-PAK AMS	2.5	% v/v	EAPOWE	B						
	ROUNDUP POWERMAX	32	fl oz/a	LAPOWE	D						
	N-PAK AMS	2.5	% v/v	LAPOWE	D						
LSD P=.10						.		4		2	

