

Herbicide Drift Reduction Methods - Study 2.

01-21S-ME100

OBJECTIVE: Evaluate the efficacy associated with glyphosate applications performed using drift reduction type nozzles and drift control spray additives.

SUMMARY: Roundup Ultra Max alone (without additive) applied with Flat Fan nozzles controlled 96% of giant foxtail at 28 days after treatment (DAT). Giant foxtail control was reduced by 14 to 21% when Roundup Ultra Max plus 30% polyacrylamide at 4 oz/100 gal was applied with Turbo Teejet or Air Induction nozzles, respectively. Similarly, giant foxtail control was reduced 8% when Roundup Ultra Max plus HPG at 0.5 lb/100 gal was applied with Air Induction nozzles. The use of drift reducing additives or drift control nozzles with Roundup Ultra Max did not reduce control of velvetleaf, ivyleaf morningglory, and common cocklebur at 28 DAT. However, common ragweed control was reduced slightly when 30% polyacrylamide at 2 oz/100 gal or HPG at 0.25 lb/100 gal was added to Roundup Ultra Max applied with Drift Guard nozzles.

In plots treated with Roundup Ultra Max alone, soybean yield was not affected by nozzle type. Soybean yield was reduced by 8 bu/A when 30% polyacrylamide at 4 oz was added to Roundup Ultra Max applied with Air Induction nozzles. The addition of a drift reducing additive to Roundup Ultra Max applied with Flat Fan, Turbo Teejet, or Drift Guard nozzles did not reduce soybean yield.

HERBICIDE / ADJUVANTS / NOZZLES

ROUNDUP ULTRA MAX 3.7 SL
30% PA 100 LIQ
HPG 77.5 WG
AIR INDUCTION NOZZLES
DRIFT GUARD NOZZLES
FLAT FAN NOZZLES
TURBO TEEJET NOZZLES

WEEDS

cocklebur, common
foxtail, giant
morningglory, ivyleaf
nutsedge, yellow
ragweed, common
velvetleaf

CROP

soybean

Bryan Young

PLANT, SOIL AND GENERAL AGRICULTURE DEPARTMENT

SOUTHERN ILLINOIS UNIVERSITY

Herbicide Drift Reduction Methods - Study 2.

Project Code: 01-21S-ME100 Location: Belleville Research Center

Investigator: Bryan Young, Assistant Professor, Southern Illinois University

City State Zip Country: Belleville IL 62221 USA
 Trial Status: Final Initiation Date: 4-25-01

Objective:

Evaluate the efficacy associated with glyphosate applications performed using drift reduction type nozzels and drift control spray additives.

Weed Code	Common Name	Scientific Name
1. SETFA	foxtail, giant	Setaria faberi Herrm.
2. XANST	cocklebur, common	Xanthium strumarium L.
3. ABUTH	velvetleaf	Abutilon theophrasti Medicus
4. AMBEL	ragweed, common	Ambrosia artemisiifolia L.
5. IPOHE	morningglory, ivyleaf	Ipomoea hederacea (L.) Jacq.
6. CYPES	nutsedge, yellow	Cyperus esculentus L.

Crop 1:	GLXMA soybean	Variety:	B-T 371CR
Planting Method:	Seeded	Planting Date:	5-14-01
Rate:	75 LB/A	Depth:	1.0 IN
Row Spacing:	30 IN		

Plot Width, Unit:	10 FT	Plot Length, Unit:	30 FT	Reps:	4
Tillage Type:	Reduced-Till	Study Design:	Randomized complete block		
Previous Crop, Year:	ZEAMX, 2000				
Field Prep./Maintenance:	N 0 LB/A, P205 0 LB/A, K20 150 LB/A				

Soil Name:	Ebbert	% OM:	1.4	pH:	5.7	CEC:	14
Texture:	Silt loam	Fert. Level:	P1: 97 LB/A, K: 291 LB/A				

APPLICATION DESCRIPTION

A	
Application Date:	6-22-01
Time of Day:	9:00
Application Method:	Spray
Application Timing:	6-8"W
Applic. Placement:	BROFOL
Air Temp., Unit:	70 F
% Relative Humidity:	72
Wind Velocity, Unit:	0-5 MPH
Dew Presence (Y/N):	Y
Soil Moisture:	ABONOR
% Cloud Cover:	25

CROP STAGE AT EACH APPLICATION

A	
Crop 1 Code, Stage:	GLXMA V4
Height, Unit:	5-6 IN

WEED STAGE AT EACH APPLICATION

A	
Weed 1 Code:	SETFA
Stage(leaves):	4-6
Height(inches):	4-8
Density:	High
Weed 2 Code:	XANST
Stage(leaves):	4-6
Height(inches):	6-8
Density:	High
Weed 3 Code:	ABUTH
Stage(leaves):	4-6
Height(inches):	4-8
Density:	Medium

Weed 4 Code: AMBEL
Stage(leaves): 6-8
Height(inches): 6-8
Density: Low

Weed 5 Code: IPOHE
Stage(leaves): 3-4
Height(inches): 3-4
Density: Medium

Weed 6 Code: CYPES

APPLICATION EQUIPMENT

A

Appl. Equipment: CO2 sprayer
Operating Pressure: 40 PSI
Nozzle Type: See note
Nozzle Size: 110015
Boom Length, Unit: 7.5 FT
Spray Volume, Unit: 10 GPA

NOTES: HARVESTED 10-20-01, 2 ROWS X 27 FT.

Nozzel types are flat fan, turbo teejet, air induction and drift guard, see treatment list.

Herbicide Drift Reduction Methods - Study 2.

Project Code: 01-21S-ME100 Location: Belleville Research Center
 Special spray tips required, see treatment list.

Weed Code		GLXMA																				
Crop Code		Yield	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants					
Rating Data Type		bu/A	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2					
Rating Unit		10-20-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01					
Rating Date		14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A					
Trt-Eval Interval		14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A					
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code													
1	NONTREATED									9	0	0	842.0	0	0	1.5	0	0	24.5	0	0	10.5
2	FLAT FAN NOZZLES									39	95	96	6.0	91	79	8.5	92	83	15.5	77	65	18.5
2	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
3	FLAT FAN NOZZLES									44	99	98	4.5	91	79	8.5	97	86	5.5	84	71	17.5
3	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
3	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"W	A													
4	FLAT FAN NOZZLES									45	99	98	2.0	91	77	8.0	97	84	7.0	85	73	16.0
4	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
4	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"W	A													
5	FLAT FAN NOZZLES									49	99	99	2.5	88	70	10.5	97	89	6.0	84	69	11.5
5	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
5	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"W	A													
6	FLAT FAN NOZZLES									45	99	98	8.0	89	76	8.5	94	86	11.5	87	76	10.5
6	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
6	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL	6-8"W	A													
7	TURBO TEEJET NOZZLES									45	98	98	3.0	91	76	8.5	96	89	4.5	85	77	11.5
7	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
8	TURBO TEEJET NOZZLES									51	99	98	1.0	90	70	23.0	97	94	2.5	88	77	10.0
8	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
8	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"W	A													
9	TURBO TEEJET NOZZLES									39	86	82	109.0	86	74	7.5	91	83	6.5	83	74	23.0
9	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
9	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"W	A													
10	TURBO TEEJET NOZZLES									48	98	98	3.5	86	71	17.0	97	89	0.5	86	76	15.0
10	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
10	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"W	A													
11	TURBO TEEJET NOZZLES									43	98	96	6.0	93	84	9.0	96	92	4.0	84	75	12.0
11	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
11	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL	6-8"W	A													
12	AIR INDUCTION NOZZLES									45	98	98	3.0	91	82	16.5	98	95	2.5	83	73	16.0
12	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
13	AIR INDUCTION NOZZLES									47	98	94	11.5	91	80	17.5	98	92	5.0	85	69	12.5
13	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
13	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"W	A													
14	AIR INDUCTION NOZZLES									37	92	75	128.5	93	83	5.0	93	81	10.0	82	68	15.0
14	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
14	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"W	A													

Weed Code				GLXMA																		
Crop Code				Yield	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants			
Rating Data Type				bu/A	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2			
Rating Unit				10-20-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01			
Rating Date				14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A				
Trt-Eval Interval				14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A				
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code													
15	AIR INDUCTION NOZZLES									43	99	98	17.5	93	81	8.0	97	89	6.0	81	73	20.0
15	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
15	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"W	A													
16	AIR INDUCTION NOZZLES									45	95	88	33.0	89	77	11.5	92	83	8.5	87	79	8.0
16	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
16	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL	6-8"W	A													
17	DRIFT GUARD NOZZLES									45	98	95	6.5	88	70	18.5	97	91	5.5	83	74	27.5
17	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
18	DRIFT GUARD NOZZLES									46	99	95	1.5	92	77	4.5	98	90	5.0	85	73	12.5
18	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
18	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"W	A													
19	DRIFT GUARD NOZZLES									44	98	96	8.5	88	78	7.0	97	93	10.5	84	74	15.0
19	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
19	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"W	A													
20	DRIFT GUARD NOZZLES									50	99	97	8.0	90	77	15.5	98	92	1.0	89	75	18.5
20	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
20	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"W	A													
21	DRIFT GUARD NOZZLES									49	99	97	3.5	91	85	10.5	97	92	4.5	86	74	13.5
21	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"W	A													
21	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL	6-8"W	A													
22	HANDWEED									58	99	99		99	99		99	99		99	99	
	LSD (P=.05)									7.8	2.0	4.9	77.41	3.7	7.0	17.69	4.4	6.3	11.22	4.7	4.7	12.03
	Replicate F									1.263	0.355	2.450	2.281	0.338	2.140	1.304	7.075	11.403	6.753	0.471	1.375	4.101
	Replicate Prob(F)									0.2949	0.7856	0.0717	0.0884	0.7978	0.1040	0.2814	0.0004	0.0001	0.0005	0.7037	0.2587	0.0103
	Treatment F									10.362	844.677	150.665	44.707	222.925	52.239	0.731	174.144	77.031	1.833	125.079	104.515	1.218
	Treatment Prob(F)									0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.7788	0.0001	0.0001	0.0371	0.0001	0.0001	0.2723

Herbicide Drift Reduction Methods - Study 2.

Project Code: 01-21S-ME100 Location: Belleville Research Center

Weed Code	AMBEL	AMBEL	AMBEL	IPOHE	IPOHE	IPOHE
Rating Data Type	Control	Control	Plants	Control	Control	Plants
Rating Unit	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2
Rating Date	7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01
Trt-Eval Interval	14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code	AMBEL Control Percent	AMBEL Control Percent	AMBEL Plants	IPOHE Control Percent	IPOHE Control Percent	IPOHE Plants
1	NONTREATED									0	0	6.5	0	0	21.0
2	FLAT FAN NOZZLES									94	91	1.0	76	69	23.0
2	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
3	FLAT FAN NOZZLES									95	87	1.5	82	70	21.5
3	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
3	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"	W A						
4	FLAT FAN NOZZLES									96	86	4.0	81	74	31.0
4	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
4	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"	W A						
5	FLAT FAN NOZZLES									98	92	1.5	77	70	28.5
5	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
5	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"	W A						
6	FLAT FAN NOZZLES									95	88	2.5	79	76	23.5
6	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
6	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL	6-8"	W A						
7	TURBO TEEJET NOZZLES									96	88	4.5	77	71	37.5
7	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
8	TURBO TEEJET NOZZLES									98	93	0.0	81	74	30.0
8	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
8	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"	W A						
9	TURBO TEEJET NOZZLES									96	92	3.0	80	74	28.5
9	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
9	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"	W A						
10	TURBO TEEJET NOZZLES									97	92	1.0	77	72	36.0
10	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
10	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"	W A						
11	TURBO TEEJET NOZZLES									97	90	2.0	77	74	27.5
11	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
11	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL	6-8"	W A						
12	AIR INDUCTION NOZZLES									95	88	5.5	79	70	29.0
12	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
13	AIR INDUCTION NOZZLES									95	85	5.0	81	73	23.5
13	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
13	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL	6-8"	W A						
14	AIR INDUCTION NOZZLES									95	85	4.0	77	73	28.5
14	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
14	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL	6-8"	W A						
15	AIR INDUCTION NOZZLES									94	86	8.0	81	70	28.5
15	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A	6-8"	W A						
15	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL	6-8"	W A						

Weed Code		AMBEL	AMBEL	AMBEL	IPOHE	IPOHE	IPOHE
Rating Data Type		Control	Control	Plants	Control	Control	Plants
Rating Unit		Percent	Percent	1.0 m2	Percent	Percent	1.0 m2
Rating Date		7-6-01	7-20-01	7-13-01	7-6-01	7-20-01	7-13-01
Trt-Eval Interval		14 DA-A	28 DA-A	21 DA-A	14 DA-A	28 DA-A	21 DA-A

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code						
16	AIR INDUCTION NOZZLES									93	86	3.5	78	70	33.5
16	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A						
16	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL		6-8"W A						
17	DRIFT GUARD NOZZLES									92	88	2.5	79	70	28.0
17	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A						
18	DRIFT GUARD NOZZLES									93	84	6.0	77	69	32.0
18	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A						
18	30% PA	100	LIQ	2.0	OZ/100 GAL	2	OZ/100 GAL		6-8"W A						
19	DRIFT GUARD NOZZLES									91	88	4.5	82	70	37.5
19	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A						
19	30% PA	100	LIQ	4.0	OZ/100 GAL	4	OZ/100 GAL		6-8"W A						
20	DRIFT GUARD NOZZLES									93	83	3.5	79	70	31.0
20	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A						
20	HPG	77.5	WG	0.25	LB A/100 GAL	5.16	OZ/100 GAL		6-8"W A						
21	DRIFT GUARD NOZZLES									92	87	7.0	78	71	25.5
21	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A						
21	HPG	77.5	WG	0.5	LB A/100 GAL	10.3	OZ/100 GAL		6-8"W A						
22	HANDWEED									99	99		99	99	
LSD (P=.05)										4.2	6.3	5.68	3.1	3.7	12.85
Replicate F										3.243	1.067	3.845	3.402	1.374	1.739
Replicate Prob(F)										0.0278	0.3694	0.0139	0.0230	0.2590	0.1686
Treatment F										186.023	74.018	1.155	259.933	166.906	1.125
Treatment Prob(F)										0.0001	0.0001	0.3236	0.0001	0.0001	0.3506

Herbicide Drift Reduction Methods - Study 2.

Project Code: 01-21S-ME100 Location: Belleville Research Center

Trial Comments

1. Protocol: SIU - BGY / ISPOB.
2. DA-A = days after 6-8"W application. 1.0 m² = 1.0 square meter.