

Herbicide Drift Reduction Methods - Study 2.

02-21M-E100

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

SUMMARY: Reduced control of giant foxtail was observed with all drift reduction nozzle types at 28 DAT compared to glyphosate alone applied with XR Flat Fan nozzles. At 28 DAT, the use of Turbo TeeJet and Air Induction nozzles tended to reduce control of giant foxtail for all treatments, with the exception of when HPG at a rate of 5.16 oz/100 gal was applied using Air Induction nozzles. The most noticeable reductions occurred with the addition of PA at 4 oz/100 gal applied using Turbo TeeJet or Air Induction nozzles. At 28 DAT, the use of Drift Guard nozzles reduced control of common cocklebur with glyphosate alone by 6% compared to similar treatments with XR Flat Fan nozzles. Reductions in control of common cocklebur were also observed with the addition of PA at 4 oz/100 gal to glyphosate when applied using Turbo TeeJet nozzles. At 28 DAT, the addition of PA to glyphosate at a rate of 4 oz/100 gal reduced velvetleaf control by 7 to 10% regardless of nozzle type. Also, the addition of HPG at 10.3 oz/100 gal reduced velvetleaf control when applied with XR Flat Fan or Drift Guard nozzles. Ivyleaf morningglory control was increased at 28 DAT with the addition of PA at 2 oz/100 gal to glyphosate applied with XR Flat Fan nozzles compared to the standard treatment of glyphosate alone applied with XR Flat Fan nozzles. As evidenced in these studies, the use of drift reduction nozzles and agents does significantly influence glyphosate efficacy, however the extent of this influence may vary on a species dependent basis. All herbicide treated plots yielded similar to glyphosate alone applied with flat fan nozzles regardless of nozzle type or addition of drift retardant.

HERBICIDES/ADJUVANTS/NOZZLES	WEEDS	CROP
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	cocklebur, common foxtail, giant morningglory, ivyleaf velvetleaf	soybean

Bryan Young

PLANT, SOIL AND GENERAL AGRICULTURE DEPARTMENT

SOUTHERN ILLINOIS UNIVERSITY

Herbicide Drift Reduction Methods - Study 2.

Project Code: 02-21M-E100 Location: Belleville Research Center

Investigator: Bryan Young, Assistant Professor, Southern Illinois University

City State Zip Country: Belleville IL 62221 USA
 Trial Status: Final Updated: 10-24-02

Objective:

Evaluate the efficacy associated with glyphosate applications performed using drift reduction type nozzles 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. IPOHE	morningglory, ivyleaf	Ipomoea hederacea (L.) Jacq.

Crop 1: GLXMA soybean Variety: B-T 371CR
 Planting Method: Seeded Planting Date: 6-3-02
 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, 2001

Field Prep./Maintenance: N 0 LB/A, P205 50 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: 7-1-02
 Time of Day: 12:30
 Application Method: Spray
 Application Timing: 6-8"W
 Applic. Placement: BROFOL
 Air Temp., Unit: 92 F
 % Relative Humidity: 36
 Wind Velocity, Unit: 3-5 MPH
 Soil Moisture: BELNOR
 % Cloud Cover: 5

CROP STAGE AT EACH APPLICATION

A
 Crop 1 Code, Stage: GLXMA V2-V3
 Height, Unit: 3-5 IN

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code:	SETFA
Stage(leaves):	3-7
Height(inches):	2-8
Density:	High
Weed 2 Code:	XANST
Stage(leaves):	2-6
Height(inches):	1-6
Density:	High
Weed 3 Code:	ABUTH
Stage(leaves):	5-6
Height(inches):	3-5
Density:	Low
Weed 4 Code:	IPOHE
Stage(leaves):	0-8
Height(inches):	1-4
Density:	Medium

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:

Nozzle types are flat fan, turbo teejet, air induction and drift guard, see treatment list.
Harvested Oct-8-02, (2) 30 inch rows by 27 ft.

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Weed Code		SETFA SETFA SETFA XANST XANST XANST ABUTH ABUTH ABUTH IPOHE IPOHE IPOHE																				
Crop Code		GLXMA																				
Rating Data Type		Yield	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants					
Rating Unit		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 Date		10-8-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02	7-22-02					
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 Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code													
1	NONTREATED									1	0	0	197	0	0	34	0	0	3	0	0	23
2	FLAT FAN NOZZLES									27	95	93	41	92	92	5	79	73	1	54	30	34
2	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A													
3	FLAT FAN NOZZLES									28	95	89	75	96	95	5	82	79	1	59	36	30
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									30	97	93	14	95	95	4	74	63	2	54	28	25
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									28	96	94	25	92	93	4	78	71	3	51	29	21
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									31	96	95	17	95	96	1	64	55	5	49	29	25
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									27	94	90	51	91	91	11	78	70	2	60	31	19
7	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A													
8	TURBO TEEJET NOZZLES									24	94	90	43	94	88	7	76	69	4	59	30	26
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									25	93	82	85	88	84	11	76	64	1	60	31	23
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									25	94	89	38	92	91	4	76	71	4	60	34	19
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									27	93	88	43	90	92	8	71	71	1	48	28	26
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									31	94	89	28	92	93	5	71	69	3	49	30	27
12	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A													

Weed Code		SETFA	SETFA	SETFA	XANST	XANST	XANST	ABUTH	ABUTH	ABUTH	IPOHE	IPOHE	IPOHE
Crop Code		GLXMA											
Rating Data Type		Yield	Control	Control	Plants	Control	Control	Plants	Control	Control	Plants	Control	Control
Rating Unit		bu/A	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent	1.0 m2	Percent	Percent
Rating Date		10-8-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02	7-22-02	7-15-02	7-29-02
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

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code													
13	AIR INDUCTION NOZZLES									29	93	89	44	93	94	2	73	70	3	46	30	30
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									25	92	84	38	88	89	3	67	66	2	46	26	23
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									29	94	93	33	92	95	6	73	70	1	48	30	29
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									27	95	90	36	85	90	6	66	69	4	48	30	20
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									27	92	89	80	86	86	11	73	68	5	53	29	20
17	ROUNDUP ULTRA MAX	3.7	SL	0.188	LB AE/A	0.4	PT/A		6-8"W A													
18	DRIFT GUARD NOZZLES									28	96	94	20	91	93	5	66	61	6	56	33	23
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									29	97	92	53	93	92	4	67	64	3	58	31	20
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									24	96	94	31	91	90	7	70	70	3	63	34	20
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									26	96	89	44	92	92	4	66	65	5	60	31	20
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									48	99	99	0	99	99	0	99	99	0	99	99	0
LSD (P=.05)										5.5	2.6	2.7	44.7	3.4	4.1	7.7	4.4	5.4	4.0	4.6	4.3	14.1
Replicate F										19.069	2.967	10.748	0.350	3.552	2.256	0.534	2.531	3.231	1.796	1.593	2.020	8.345
Replicate Prob(F)										0.0001	0.0386	0.0001	0.7894	0.0192	0.0905	0.6603	0.0650	0.0282	0.1570	0.2000	0.1201	0.0001
Treatment F										15.048	476.918	429.488	6.200	270.397	191.602	6.129	125.098	77.274	1.305	98.255	118.120	1.687
Treatment Prob(F)										0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.2069	0.0001	0.0001	0.0575

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Trial Comments

1. Protocol: SIU (BGY/ISPOB).
2. Yield.
3. DA-A = days after 6-8"W application. 1.0 m² = 1.0 square meter.
4. No crop injury was apparent with any treatment.