

MANAGING GLYPHOSATE-RESISTANT HORSEWEED IN ARKANSAS COTTON



2004

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ARKANSAS AGRICULTURAL EXPERIMENT STATION

Division of Agriculture

University of Arkansas System

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MANAGING GLYPHOSATE-RESISTANT HORSEWEED IN ARKANSAS COTTON

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INTRODUCTION

Glyphosate-resistant horseweed (*Conyza canadensis*), sometimes called marestail, was confirmed in Delaware in 2000 and has since been confirmed in at least 12 other states. At least nine counties in Arkansas have reported the presence of the resistant population in conservation-tillage cotton fields. In conventional-tillage cotton, horseweed had been controlled by tillage and was considered an insignificant weed. However, with over 60% of our cotton acreage being produced with conservation-tillage practices, preplant weed control is now necessary to start the cotton crop. As late as 2001, horseweed was still considered an insignificant weed problem because it was controlled with glyphosate, the primary burndown herbicide used in Arkansas, but in 2002 producers noticed scattered populations of uncontrolled horseweed; by 2003, resistant populations had been confirmed.

Glyphosate has been used extensively as a burndown herbicide to control winter and early spring weeds, including horseweed, before planting a crop in reduced-tillage systems, and its extensive use has apparently been the cause of selection for a resistant population. The widespread use of glyphosate-resistant cotton, soybean, and corn in Arkansas increases the potential for further selection of the resistant biotype. Additionally, horseweed seed is small with a plume of hairs and is easily dispersed by wind, making its spread to adjacent and distant fields imminent.

Because glyphosate no longer controls horseweed, the economic impact of resistance in conservation-tillage systems may be severe. Burndown of winter weeds has usually been a one-shot herbicide application, usually glyphosate, 2 weeks prior to planting. Now, it is imperative

either to find a replacement for glyphosate, with its broad spectrum of control, or to determine an effective tank-mix partner that will control the horseweed. This will add a significant cost to a producer's preplant weed management program. If we fail to find adequate, economical burndown alternatives for horseweed, many farmers may move away from conservation-tillage practices, which will increase labor and machinery costs as well as jeopardize soil conservation efforts.

In early 2004, systematic studies were initiated to develop weed management programs for glyphosate-resistant horseweed. Seventeen experiments were conducted in fields in Mississippi, Poinsett, Lee, and Washington counties in Arkansas. Growth chamber and greenhouse studies were initiated in late spring to examine possible factors contributing to erratic control from Ignite (glufosinate), a promising alternative to glyphosate for horseweed control.

Results presented in this report are from one year's data only and should not be considered as recommendations for use. Additionally, some of the herbicides in the experiments are not labeled for the use in which they were evaluated. Always read labels thoroughly before applying any herbicide and check Arkansas recommendations in the annual Arkansas Extension publication "Recommended Chemicals for Weed and Brush Control" (MP-44). The use of trade names does not imply endorsement of specific products, as other equally effective formulations may be available.

GENERAL PROCEDURES

All experiments were conducted as replicated trials using standard experimental procedures. Specific procedures for each experiment are given in the site description appearing before each data table. For field trials, only horseweed data are presented. In some trials, other weeds were rated and are reported in “2004 Weed Control Demonstration and Research Trial Results – Southeast Research and Extension Center” by Kenneth Smith, Monica Kelley, and Jason Meier, Monticello, AR.

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University of Arkansas

**Horseweed Burndown with Ignite (glufosinate) and 2,4-D
Lepanto, Poinsett Co., AR**

Trial ID: 101A

Location: Lepanto, Poinsett Co.

Investigator: Kenneth Smith

TRIAL LOCATION

City: Lepanto (west of), AR

Objective: To evaluate burndown efficacy of Ignite alone and in tank mixture with 2,4-D.

Conclusions: Activity of 2,4-D applied alone was slow, with little activity until 30 days after treatment (DAT) when 32 oz/A controlled horseweed 91%. 2,4-D alone at 16 and 24 oz/A controlled horseweed approximately 85% at 30 DAT, but control declined by 43 DAT, although variability at 43 days was high. Fair early control with Ignite (glufosinate) alone declined rapidly due to regrowth. Horseweed control with Ignite + 2,4-D tank mixtures was good (84 to 91%) at 30 DAT, although by 43 DAT, control was poor. Roundup (glyphosate) controlled some plants, but the resistant population was obvious. Adding 2,4-D to Roundup increased control considerably (93%) by 30 DAT.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERIC horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit: 6.33 FT **Plot Length, Unit:** 30 FT **Reps:** 4

Site Type: Burndown

Tillage Type: Stale Seedbed

Study Design: RANDOMIZED COMPLETE BLOCK

SOIL DESCRIPTION

Soil Name: Silt Loam

APPLICATION DESCRIPTION

A

Application Date: 03-14-04
Time of Day: 4:00 pm
Application Method: SPRAY
Application Timing: BURNDOWN
Appl. Placement: BROADCAST
Air Temp., Unit: 75 F
% Relative Humidity: 44
Wind Velocity, Unit: 6 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 68 F
Soil Moisture: WET
% Cloud Cover: 20

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: BACKPACK
Operating Pressure: 42 PSI
Nozzle Type: AI FLATFA
Nozzle Size: 110015
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Boom Height, Unit: 26 IN
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and 2,4-D
Lepanto, Poinsett Co., AR

Weed Code	ERIC	ERIC	ERIC	ERIC
Rating Data Type	Control	Control	Control	Control
Rating Unit	%	%	%	%
Rating Date	03-30-04	04-06-04	04-13-04	04-26-04

Trt-Eval Interval		Form	Rate	Appl	16 DA-A	23 DA-A	30 DA-A	43 DA-A
Trt	Treatment	Conc	Rate*Unit	Code	1	2	3	4
No.	Name							
1	UTC				0	0	0	3
2	Ignite (glufosinate)	1.67	40 oz/a	PPL	88	64	75	28
3	Ignite	1.67	32 oz/a	PPL	94	49	90	25
4	Ignite	1.67	24 oz/a	PPL	32	18	48	15
5	Ignite	1.67	32 oz/a	PPL	95	85	97	69
	2,4-D Amine	5	24 oz/a	PPL				
6	Ignite	1.67	32 oz/a	PPL	92	45	95	50
	2,4-D Amine	5	18 oz/a	PPL				
7	Ignite	1.67	32 oz/a	PPL	95	87	91	58
	2,4-D Amine	5	12 oz/a	PPL				
8	Ignite	1.67	32 oz/a	PPL	93	85	84	23
	2,4-D Amine	5	6 oz/a	PPL				
9	Ignite	1.67	24 oz/a	PPL	93	90	95	68
	2,4-D Amine	5	32 oz/a	PPL				
10	Ignite	1.67	24 oz/a	PPL	93	65	91	64
	2,4-D Amine	5	24 oz/a	PPL				
11	Ignite	1.67	24 oz/a	PPL	95	75	88	33
	2,4-D Amine	5	16 oz/a	PPL				
12	Ignite	1.67	24 oz/a	PPL	95	86	91	59
	2,4-D Amine	5	8 oz/a	PPL				
13	2,4-D Amine	5	32 oz/a	PPL	44	30	91	91
	NIS	0.25	% v/v	PPL				
14	2,4-D Amine	5	24 oz/a	PPL	14	19	83	75
	NIS	0.25	% v/v	PPL				
15	2,4-D Amine	5	16 oz/a	PPL	21	21	85	66
	NIS	0.25	% v/v	PPL				
16	2,4-D Amine	5	8 oz/a	PPL	4	6	70	53
	NIS	0.25	% v/v	PPL				
17	Roundup WeatherMax	5.5	1 lb ai/a	PPL	88	74	93	75
	2,4-D Amine	5	24 oz/a	PPL				
18	Roundup WeatherMax	5.5	1 lb ai/a	PPL	84	45	88	43
LSD (P=.05)					13	30	17	44
Treatment F					66.232	8.242	14.567	2.356
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0095

* Rates are in oz product/A. Ignite: 40 oz = 0.52 lb ai/A; 32 oz = 0.42 lb/A; 24 oz = 0.313 lb/A.
 2,4-D: 24 oz = 0.94 lb ai/A; 18 oz = 0.7 lb/A; 16 oz = 0.625 lb/A; 12 oz = 0.47 lb/A;
 8 oz = 0.31 lb/A; 6 oz = 0.23 lb/A

University of Arkansas

**Horseweed Burndown with Ignite (glufosinate) and 2,4-D
Pritchett Road, Poinsett County, AR**

Trial ID: 101B

Location: Pritchett Road, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Pritchett Road, AR

Objective: To evaluate burndown efficacy of Ignite alone and in tank mixture with 2,4-D.

Conclusions: At 11 DAT, all Ignite + 2,4-D tank mixtures and Ignite at 40 oz/A alone gave excellent control of horseweed. However, by 38 DAT, only Ignite at 32 oz/A + 2,4-D at 18 or 24 oz/A, Ignite at 24 oz/A + 2,4-D at 32 oz/A, 2,4-D alone at 32 or 24 oz/A, and Roundup WeatherMax (glyphosate) + 2,4-D controlled horseweed greater than 90%. As at Lepanto, activity of 2,4-D was very slow, and activity with 32 and 24 oz/A was not acceptable until after 25 DAT. Lower 2,4-D rates were not effective alone.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA Horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33 FT	Plot Length, Unit:	25 FT	Reps:	4
Study Design: RANDOMIZED COMPLETE BLOCK					

APPLICATION DESCRIPTION

A

Application Date: 03-19-04
Time of Day: 9:00 am
Application Method: SPRAY
Application Timing: BURNDOWN
Applic. Placement: BROADCAST
Air Temp., Unit: 71 F
% Relative Humidity: 36
Wind Velocity, Unit: 4.1 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 59 F
Soil Moisture: MOIST
% Cloud Cover: 10

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: BACKPACK
Operating Pressure: 40 PSI
Nozzle Type: AI FLATFA
Nozzle Size: 110015VS
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and 2,4-D
Pritchett Road, Poinsett County, AR

Weed Code	ERIC	ERIC	ERIC	ERIC
Rating Data Type	Control	Control	Control	Control
Rating Unit	%	%	%	%
Rating Date	03-30-04	04-06-04	04-13-04	04-26-04

Trt-Eval Interval				11 DA-A	18 DA-A	25 DA-A	38 DA-A
Trt No.	Treatment Name	Form Conc	Rate*Unit	Appl Code			
1	UTC				0	0	0
2	Ignite (glufosinate)	1.67	40 oz/a	PPL	95	87	70
3	Ignite	1.67	32 oz/a	PPL	50	0	23
4	Ignite	1.67	24 oz/a	PPL	68	63	64
5	Ignite	1.67	32 oz/a	PPL	91	98	95
	2,4-D Amine	5	24 oz/a	PPL			
6	Ignite	1.67	32 oz/a	PPL	94	96	92
	2,4-D Amine	5	18 oz/a	PPL			
7	Ignite	1.67	32 oz/a	PPL	95	92	90
	2,4-D Amine	5	12 oz/a	PPL			
8	Ignite	1.67	32 oz/a	PPL	96	91	78
	2,4-D Amine	5	6 oz/a	PPL			
9	Ignite	1.67	24 oz/a	PPL	94	95	94
	2,4-D Amine	5	32 oz/a	PPL			
10	Ignite	1.67	24 oz/a	PPL	94	85	80
	2,4-D Amine	5	24 oz/a	PPL			
11	Ignite	1.67	24 oz/a	PPL	84	80	79
	2,4-D Amine	5	16 oz/a	PPL			
12	Ignite	1.67	24 oz/a	PPL	94	85	79
	2,4-D Amine	5	8 oz/a	PPL			
13	2,4-D Amine	5	32 oz/a	PPL	53	28	71
	NIS	0.25	% v/v	PPL			
14	2,4-D Amine	5	24 oz/a	PPL	58	40	76
	NIS	0.25	% v/v	PPL			
15	2,4-D Amine	5	16 oz/a	PPL	59	26	68
	NIS	0.25	% v/v	PPL			
16	2,4-D Amine	5	8 oz/a	PPL	58	20	69
	NIS	0.25	% v/v	PPL			
17	Roundup WeatherMax	5.5	1 lb ai/a	PPL	68	57	84
	2,4-D Amine	5	24 oz/a	PPL			
18	Roundup WeatherMax	5.5	1 lb ai/a	PPL	58	49	45
	LSD (P=.05)				20	15	18
							31
Treatment F				12.920	42.577	14.551	8.619
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001

* Rates are in oz product/A. Ignite: 40 oz = 0.52 lb ai/A; 32 oz = 0.42 lb/A; 24 oz = 0.313 lb/A.
 2,4-D: 24 oz = 0.94 lb ai/A; 18 oz = 0.7 lb/A; 16 oz = 0.625 lb/A; 12 oz = 0.47 lb/A;
 8 oz = 0.31 lb/A; 6 oz = 0.23 lb/A

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and 2,4-D
Blytheville, Mississippi Co., AR

Trial ID: 101C

Location: Blytheville, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Blytheville, AR

Objective: To evaluate burndown efficacy of Ignite alone and in tank mixture with 2,4-D.

Conclusions: Activity of Ignite alone was slightly better at Blytheville (80% at 23 DAT) than at Lepanto or Pritchett Road, although adding 2,4-D tended to increase horseweed control. By 37 DAT, control with Ignite at 32 oz/A tended to be slightly better than Ignite at 24 oz/A when mixed with 2,4-D. As at the other locations, Roundup + 2,4-D controlled horseweed more than 90% at 37 DAT.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33 FT	Plot Length, Unit:	30 FT	Reps:	4
Study Design: RANDOMIZED COMPLETE BLOCK					

APPLICATION DESCRIPTION

A

Application Date: 03-23-04
 Time of Day: 12:00 pm
 Application Method: SPRAY
 Application Timing: BURNDOWN
 Applic. Placement: BROADCAST
 Air Temp., Unit: 60 F
 % Relative Humidity: 34
 Wind Velocity, Unit: 6.8 MPH
 Dew Presence (Y/N): N
 Soil Temp., Unit: 50.4 F
 Soil Moisture: MOIST
 % Cloud Cover: 80

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
 Stage Scale: Mature
 Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: Tractor
 Operating Pressure: 48 psi
 Nozzle Type: AI FlatFa
 Nozzle Size: 110015VS
 Nozzle Spacing, Unit: 19 IN
 Nozzles/Row: 2
 Carrier: WATER
 Spray Volume, Unit: 12 GPA
 Propellant: CO2

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and 2,4-D
Blytheville, Mississippi Co., AR

Weed Code	ERIC	ERIC	ERIC	ERIC
Rating Data Type	Control	Control	Control	Control
Rating Unit	%	%	%	%
Rating Date	03-30-04	04-07-04	04-15-04	04-29-04

Trt-Eval Interval	7 DA-A	15 DA-A	23 DA-A	37 DA-A
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Trt No.	Treatment Name	Form Conc	Rate*Unit	Appl Code	ERIC Control %	ERIC Control %	ERIC Control %	ERIC Control %
1	UTC				0	1	8	0
2	Ignite (glufosinate)	1.67	40 oz/a	PPL	75	93	81	85
3	Ignite	1.67	32 oz/a	PPL	63	80	82	83
4	Ignite	1.67	24 oz/a	PPL	63	90	81	76
5	Ignite	1.67	32 oz/a	PPL	68	90	98	92
	2,4-D Amine	5	24 oz/a	PPL				
6	Ignite	1.67	32 oz/a	PPL	74	90	91	89
	2,4-D Amine	5	18 oz/a	PPL				
7	Ignite	1.67	32 oz/a	PPL	44	91	91	87
	2,4-D Amine	5	12 oz/a	PPL				
8	Ignite	1.67	32 oz/a	PPL	78	86	98	75
	2,4-D Amine	5	6 oz/a	PPL				
9	Ignite	1.67	24 oz/a	PPL	73	91	96	78
	2,4-D Amine	5	32 oz/a	PPL				
10	Ignite	1.67	24 oz/a	PPL	65	88	96	84
	2,4-D Amine	5	24 oz/a	PPL				
11	Ignite	1.67	24 oz/a	PPL	59	90	85	78
	2,4-D Amine	5	16 oz/a	PPL				
12	Ignite	1.67	24 oz/a	PPL	65	91	87	63
	2,4-D Amine	5	8 oz/a	PPL				
13	2,4-D Amine	5	32 oz/a	PPL	36	51	68	79
	NIS	0.25	% v/v	PPL				
14	2,4-D Amine	5	24 oz/a	PPL	31	64	60	68
	NIS	0.25	% v/v	PPL				
15	2,4-D Amine	5	16 oz/a	PPL	13	65	75	78
	NIS	0.25	% v/v	PPL				
16	2,4-D Amine	5	8 oz/a	PPL	24	51	64	55
	NIS	0.25	% v/v	PPL				
17	Roundup WeatherMax	5.5	1 lb ai/a	PPL	31	71	84	93
	2,4-D Amine	5	24 oz/a	PPL				
18	Roundup WeatherMax	5.5	1 lb ai/a	PPL	30	51	69	38
LSD (P=.05)			24		19	23	19	

Treatment F	7.386	12.070	6.739	10.588
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001

* Rates are in oz product/A. Ignite: 40 oz = 0.52 lb ai/A; 32 oz = 0.42 lb/A; 24 oz = 0.313 lb/A.
 2,4-D: 24 oz = 0.94 lb ai/A; 18 oz = 0.7 lb/A; 16 oz = 0.625 lb/A; 12 oz = 0.47 lb/A;
 8 oz = 0.31 lb/A; 6 oz = 0.23 lb/A

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and Clarity (dicamba)
Lepanto, Poinsett Co., AR

Trial ID: 102A

Location: Lepanto, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Lepanto (west of), AR

Objective: To evaluate burndown efficacy of Ignite alone and in tank mixture with Clarity.

Conclusions: Activity of Clarity (dicamba), a hormone herbicide like 2,4-D, was slow, with maximum activity not evident until after 20 DAT. Horseweed control with Clarity at 4 oz/A was poorer than at 8 to 16 oz/A, but control with 4 oz/A mixed with Ignite at 32 or 24 oz/A was statistically equal to the higher rates at 20 and 33 DAT at this location. Early activity of Ignite alone declined due to regrowth (28 to 30% by 33 DAT), and tank mixtures with Clarity were needed for horseweed control.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit: 6.33 FT **Plot Length, Unit:** 30 FT **Reps:** 4

Site Type: Burndown

Tillage Type: Stale Seedbed **Study Design:** RANDOMIZED COMPLETE BLOCK

APPLICATION DESCRIPTION

A

Application Date: 03-24-04
Time of Day: 8:00 am
Application Method: SPRAY
Application Timing: BURNDOWN
Applic. Placement: BROADCAST
Air Temp., Unit: 58 F
% Relative Humidity: 57
Wind Velocity, Unit: 9 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 51 F
Soil Moisture: MOIST
% Cloud Cover: 40

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: TRACTOR
Operating Pressure: 48 PSI
Nozzle Type: AI FF
Nozzle Size: 110115VS
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and Clarity (dicamba)
Lepanto, Poinsett Co., AR

Rating Date	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %
Trt-Eval Interval	03-30-04	04-06-04	04-13-04	04-26-04
Trt Treatment No.	Form Conc	Rate*Unit	Appl Code	
1 UTC				0 0 0 13
2 Ignite(glufosinate)	1.67 40	oz/a	PPL	95 0 83 18
3 Ignite	1.67 32	oz/a	PPL	90 20 85 30
4 Ignite	1.67 24	oz/a	PPL	95 44 68 21
5 Ignite	1.67 32	oz/a	PPL	95 95 100 100
CLARITY (dicamba)	4 16	oz/a	PPL	
6 Ignite	1.67 32	oz/a	PPL	95 98 100 90
CLARITY	4 12	oz/a	PPL	
7 Ignite	1.67 32	oz/a	PPL	94 97 100 100
CLARITY	4 8	oz/a	PPL	
8 Ignite	1.67 32	oz/a	PPL	95 96 99 93
CLARITY	4 4	oz/a	PPL	
9 Ignite	1.67 24	oz/a	PPL	93 62 95 100
CLARITY	4 16	oz/a	PPL	
10 Ignite	1.67 24	oz/a	PPL	95 98 98 95
CLARITY	4 12	oz/a	PPL	
11 Ignite	1.67 24	oz/a	PPL	95 98 95 88
CLARITY	4 8	oz/a	PPL	
12 Ignite	1.67 24	oz/a	PPL	93 98 91 91
CLARITY	4 4	oz/a	PPL	
13 CLARITY	4 16	oz/a	PPL	68 49 88 100
NIS	0.25	% v/v	PPL	
14 CLARITY	4 12	oz/a	PPL	23 44 91 100
NIS	0.25	% v/v	PPL	
15 CLARITY	4 8	oz/a	PPL	28 50 84 100
NIS	0.25	% v/v	PPL	
16 CLARITY	4 4	oz/a	PPL	10 41 78 81
NIS	0.25	% v/v	PPL	
17 Roundup WeatherMax	5.5 22	oz/a	PPL	48 54 86 96
CLARITY	4 8	oz/a	PPL	
18 Roundup WeatherMax	5.5 22	oz/a	PPL	23 43 74 39
LSD (P=.05)			6 30 11 14	
Treatment F		242.547	10.617	32.090
Treatment Prob(F)		0.0001	0.0001	0.0001

* Rates are in oz product/A. Ignite: 40 oz = 0.52 lb ai/A; 32 oz = 0.42 lb/A; 24 oz = 0.313 lb/A.
Clarity: 16 oz = 0.5 lb ai/A; 12 oz = 0.375 lb/A; 8 oz = 0.25 lb/A; 4oz = 0.125 lb/A.

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and Clarity (dicamba)
Pritchett Road, Poinsett Co., AR

Trial ID: 102B

Location: Pritchett Road, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Pritchett Road

Objective: To evaluate burndown efficacy of Ignite alone and in tank mixture with Clarity.

Conclusions: All Ignite + Clarity tank mixtures gave excellent (>95%) control of horseweed by 25 DAT. At 38 DAT, control with Clarity alone was also good. Although by 25 DAT Clarity + Roundup Weathermax gave 86% control of horseweed, better control was obtained earlier with the Ignite + Clarity tank mixtures.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33 FT	Plot Length, Unit:	30 FT	Reps:	4
Study Design: RANDOMIZED COMPLETE BLOCK					

APPLICATION DESCRIPTION

A

Application Date: 03-19-04
 Time of Day: 12:00 pm
 Application Method: SPRAY
 Application Timing: BURNDOWN
 Applic. Placement: BROADCAST
 Air Temp., Unit: 71 F
 % Relative Humidity: 36
 Wind Velocity, Unit: 4.1 MPH
 Dew Presence (Y/N): N
 Soil Temp., Unit: 59 F
 Soil Moisture: MOIST
 % Cloud Cover: 10

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
 Stage Scale: Mature
 Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: BACKPACK
 Operating Pressure: 40 PSI
 Nozzle Type: AI FF
 Nozzle Size: 110015VS
 Nozzle Spacing, Unit: 19 IN
 Nozzles/Row: 2
 Carrier: WATER
 Spray Volume, Unit: 12 GPA
 Propellant: CO2

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and Clarity (dicamba)
Pritchett Road, Poinsett Co., AR

Rating Unit	Rating Date	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %
Trt-Eval Interval		03-30-04	04-06-04	04-13-04	04-26-04
Trt	Treatment No.	Form Conc	Rate	Appl Unit	Code
1	UTC				0 0 0 0
2	Ignite (glufosinate)	1.67	40	oz/a	PPL 95 68 89 80
3	Ignite	1.67	32	oz/a	PPL 95 94 86 66
4	Ignite	1.67	24	oz/a	PPL 76 65 71 50
5	Ignite	1.67	32	oz/a	PPL 98 98 100 100
	CLARITY (dicamba)	4	16	oz/a	PPL
6	Ignite	1.67	32	oz/a	PPL 96 98 100 100
	CLARITY	4	12	oz/a	PPL
7	Ignite	1.67	32	oz/a	PPL 96 98 98 100
	CLARITY	4	8	oz/a	PPL
8	Ignite	1.67	32	oz/a	PPL 95 92 98 100
	CLARITY	4	4	oz/a	PPL
9	Ignite	1.67	24	oz/a	PPL 96 98 100 100
	CLARITY	4	16	oz/a	PPL
10	Ignite	1.67	24	oz/a	PPL 96 97 100 100
	CLARITY	4	12	oz/a	PPL
11	Ignite	1.67	24	oz/a	PPL 97 98 100 100
	CLARITY	4	8	oz/a	PPL
12	Ignite	1.67	24	oz/a	PPL 98 95 96 98
	CLARITY	4	4	oz/a	PPL
13	CLARITY	4	16	oz/a	PPL 51 48 84 100
	NIS	0.25	% v/v	PPL	
14	CLARITY	4	12	oz/a	PPL 50 41 70 100
	NIS	0.25	% v/v	PPL	
15	CLARITY	4	8	oz/a	PPL 45 53 85 100
	NIS	0.25	% v/v	PPL	
16	CLARITY	4	4	oz/a	PPL 61 39 70 83
	NIS	0.25	% v/v	PPL	
17	Roundup WeatherMax	5.5	22	oz/a	PPL 70 48 86 100
	CLARITY	4	8	oz/a	PPL
18	Roundup WeatherMax	5.5	22	oz/a	PPL 46 44 70 61
	LSD (P=.05)				17 20 8 22
	Treatment F				20.318 17.783 59.254 11.176
	Treatment Prob(F)				0.0001 0.0001 0.0001 0.0001

* Rates are in oz product/A. Ignite: 40 oz = 0.52 lb ai/A; 32 oz = 0.42 lb/A; 24 oz = 0.313 lb/A.
Clarity: 16 oz = 0.5 lb ai/A; 12 oz = 0.375 lb/A; 8 oz = 0.25 lb/A; 4oz = 0.125 lb/A.

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and Clarity (dicamba)
Blytheville, Mississippi Co., AR

Trial ID: 102C

Location: Blytheville, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Blytheville, AR

Objective: To evaluate burndown efficacy of Ignite alone and in tank mixture with Clarity.

Conclusions: As in the experiments with Ignite + 2,4-D, Ignite alone tended to be more effective at this location than at Lepanto or Pritchett Road, and control lasted much longer during the preplant period. By 24 DAT, Ignite at 40 and 32 oz/A alone controlled horseweed 99%. As at Pritchett Road, control with Clarity at 4 oz/A alone was poor, but control in a tank mixture with Ignite was excellent.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33 FT	Plot Length, Unit:	30 FT	Reps:	4
				Study Design:	RANDOMIZED COMPLETE BLOCK

APPLICATION DESCRIPTION

A

Application Date: 03-23-04
Time of Day: 12:00 pm
Application Method: SPRAY
Application Timing: BURNDOWN
Applic. Placement: BROADCAST
Air Temp., Unit: 60 F
% Relative Humidity: 34
Wind Velocity, Unit: 6.8 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 50.4 F
Soil Moisture: MOIST
% Cloud Cover: 80

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: TRACTOR
Operating Pressure: 48 PSI
Nozzle Type: AI FF
Nozzle Size: 110115VS
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Ignite (glufosinate) and Clarity (dicamba)
Blytheville, Mississippi Co., AR

Rating Date	ERICAControl %	ERICAControl %	ERICAControl %	ERICAControl %
Trt-Eval Interval	03-30-04	04-07-04	04-16-04	04-29-04
Trt Treatment No. Name	Form Conc	Rate*Unit	Appl Code	
1 UTC				0 0 0 0
2 Ignite (glufosinate)	1.67 40	oz/a	PPL	75 90 99 94
3 Ignite	1.67 32	oz/a	PPL	74 91 99 90
4 Ignite	1.67 24	oz/a	PPL	78 75 72 81
5 Ignite	1.67 32	oz/a	PPL	75 91 99 99
CLARITY (dicamba)	4 16	oz/a	PPL	
6 Ignite	1.67 32	oz/a	PPL	73 91 92 99
CLARITY	4 12	oz/a	PPL	
7 Ignite	1.67 32	oz/a	PPL	70 90 99 98
CLARITY	4 8	oz/a	PPL	
8 Ignite	1.67 32	oz/a	PPL	73 90 99 99
CLARITY	4 4	oz/a	PPL	
9 Ignite	1.67 24	oz/a	PPL	61 91 99 98
CLARITY	4 16	oz/a	PPL	
10 Ignite	1.67 24	oz/a	PPL	70 91 99 99
CLARITY	4 12	oz/a	PPL	
11 Ignite	1.67 24	oz/a	PPL	71 90 99 99
CLARITY	4 8	oz/a	PPL	
12 Ignite	1.67 24	oz/a	PPL	74 89 99 95
CLARITY	4 4	oz/a	PPL	
13 CLARITY	4 16	oz/a	PPL	34 79 87 99
NIS	0.25	% v/v	PPL	
14 CLARITY	4 12	oz/a	PPL	13 66 86 97
NIS	0.25	% v/v	PPL	
15 CLARITY	4 8	oz/a	PPL	14 60 84 98
NIS	0.25	% v/v	PPL	
16 CLARITY	4 4	oz/a	PPL	38 51 65 96
NIS	0.25	% v/v	PPL	
17 Roundup WeatherMax	5.5 22	oz/a	PPL	35 83 89 99
CLARITY	4 8	oz/a	PPL	
18 Roundup WeatherMax	5.5 22	oz/a	PPL	41 60 54 60
LSD (P=.05)				21 20 20 10
Treatment F			11.951	10.377
Treatment Prob(F)			0.0001	0.0001
				12.266 45.603
				0.0001 0.0001

* Rates are in oz product/A. Ignite: 40 oz = 0.52 lb ai/A; 32 oz = 0.42 lb/A; 24 oz = 0.313 lb/A.
Clarity: 16 oz = 0.5 lb ai/A; 12 oz = 0.375 lb/A; 8 oz = 0.25 lb/A; 4oz = 0.125 lb/A.

University of Arkansas

Horseweed Burndown with Valor (flumioxazin)
Lepanto, Poinsett Co., AR

Trial ID: 103A

Location: Lepanto (west of), AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Lepanto, AR

Objective: To evaluate the efficacy of Valor as a burndown herbicide.

Conclusions: Valor has little postemergence activity on horseweed. As in other experiments, activity of 2,4-D and Clarity was slow, and optimal control of horseweed was noted at the rating taken 33 DAT. Valor + Clarity or 2,4-D generally controlled horseweed greater than 80%. Later ratings were not taken to determine residual effect of Valor in these experiments.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit: 6.33 FT **Plot Length, Unit:** 30 FT **Reps:** 4

Site Type: Burndown

Tillage Type: Stale Seedbed **Study Design:** RANDOMIZED COMPLETE BLOCK

APPLICATION DESCRIPTION

A

Application Date: 03-24-04
Time of Day: 9:00 am
Application Method: SPRAY
Application Timing: BURNDOWN
Appl. Placement: BROADCAST
Air Temp., Unit: 58 F
% Relative Humidity: 57
Wind Velocity, Unit: 9 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 51 F
Soil Moisture: MOIST
% Cloud Cover: 40

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: TRACTOR
Operating Pressure: 48 PSI
Nozzle Type: AI FF
Nozzle Size: 110115VS
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Valor (flumioxazin)
Lepanto, Poinsett Co., AR

Weed Code	ERIC	ERIC	ERIC	ERIC
Rating Data Type	Control	Control	Control	Control
Rating Unit	%	%	%	%
Rating Date	03-30-04	04-06-04	04-13-04	04-26-04
Trt-Eval Interval	6 DA-A	13 DA-A	20 DA-A	33 DA-A
Trt Treatment	Form	Rate	Appl	
No. Name	Conc	Rate*	Unit	Code
1 UTC		0	0	0
2 Valor (flumioxazin) (2 oz)	51	0.064	lb ai/a	PPL
COC		1	% v/v	PPL
3 Valor (1 oz)	51	0.032	lb ai/a	PPL
COC		1	% v/v	PPL
4 2,4-D Amine	5	1.25	lb ai/a	PPL
COC		1	% v/v	PPL
5 2,4-D Amine	5	0.94	lb ai/a	PPL
COC		1	% v/v	PPL
6 2,4-D Amine	5	0.625	lb ai/a	PPL
COC		1	% v/v	PPL
7 CLARITY (dicamba)	4	0.25	lb ai/a	PPL
COC		1	% v/v	PPL
8 CLARITY	4	0.125	lb ai/a	PPL
COC		1	% v/v	PPL
9 Valor	51	0.032	lb ai/a	PPL
2,4-D Amine	5	1.25	lb ai/a	PPL
COC		1	% v/v	PPL
10 Valor	51	0.032	lb ai/a	PPL
2,4-D Amine	5	0.94	lb ai/a	PPL
COC		1	% v/v	PPL
11 Valor	51	0.032	lb ai/a	PPL
2,4-D Amine	5	0.625	lb ai/a	PPL
COC		1	% v/v	PPL
12 Valor	51	0.032	lb ai/a	PPL
CLARITY	4	0.25	lb ai/a	PPL
COC		1	% v/v	PPL
13 Valor	51	0.032	lb ai/a	PPL
CLARITY	4	0.125	lb ai/a	PPL
COC		1	% v/v	PPL
14 Valor	51	0.032	lb ai/a	PPL
Roundup WeatherMax	5.5	0.95	lb ai/a	PPL
COC		1	% v/v	PPL
15 Valor	51	0.064	lb ai/a	PPL
Roundup WeatherMax	5.5	0.95	lb ai/a	PPL
COC		1	% v/v	PPL
16 Valor	51	0.032	lb ai/a	PPL
Ignite	1.67	0.313	lb ai/a	PPL
17 Ignite	1.67	0.313	lb ai/a	PPL
18 Roundup WeatherMax	5.5	0.95	lb ai/a	PPL
LSD (P=.05)		11	14	24
Treatment F		13.133	12.463	7.113
Treatment Prob(F)		0.0001	0.0001	0.0001

* Rates are in lb ai/A. Valor: 0.032 lb ai/A = 1 oz product/A; 0.064 lb/A = 2 oz/A. 2,4-D: 1.25 lb/A = 32 oz/A; 0.94 lb/A = 24 oz/A; 0.625 lb/A = 16 oz/A; Clarity: 0.25 lb/A = 8 oz/A; 0.125 lb/A = 4 oz/A. Ignite: 0.313 lb/A = 24 oz product/A.

University of Arkansas

Efficacy of Valor (flumioxazin) as a Preplant Burndown Herbicide
Blytheville, Mississippi Co., AR

Trial ID: 103C

Location: Blytheville, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Blytheville, AR

Objective: To evaluate the efficacy of Valor as a burndown herbicide.

Conclusions: Valor has little postemergence activity on horseweed. As in other experiments, activity of 2,4-D and Clarity was slow, and optimal control of horseweed was noted at the ratings taken 24 to 37 DAT. Valor + Clarity or 2,4-D generally controlled horseweed greater than 80%. Later ratings were not taken to determine residual effect of Valor in these experiments.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33 FT	Plot Length, Unit:	30 FT	Reps:	4
Study Design: RANDOMIZED COMPLETE BLOCK					

APPLICATION DESCRIPTION

A

Application Date: 03-23-04
 Time of Day: 4:00 pm
 Application Method: SPRAY
 Application Timing: BURNDOWN
 Applic. Placement: BROADCAST
 Air Temp., Unit: 60 F
 % Relative Humidity: 34
 Wind Velocity, Unit: 6.8 MPH
 Dew Presence (Y/N): N
 Soil Temp., Unit: 50.4 F
 Soil Moisture: MOIST
 % Cloud Cover: 40

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
 Stage Scale: Mature
 Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: TRACTOR
 Operating Pressure: 48 PSI
 Nozzle Type: AI FF
 Nozzle Size: 1101115VS
 Nozzle Spacing, Unit: 19 IN
 Nozzles/Row: 2
 Carrier: WATER
 Spray Volume, Unit: 12 GPA
 Propellant: CO2

University of Arkansas

Efficacy of Valor (flumioxazin) as a Preplant Burndown Herbicide
Blytheville, Mississippi Co., AR

Location: Blytheville, AR

Investigator: Kenneth Smith

Weed Code				ERIC A Control	ERIC A Control	ERIC A Control	ERIC A Control
Rating Data Type				%	%	%	%
Rating Unit							
Rating Date				03-31-04	04-07-04	04-16-04	04-29-04
Trt-Eval Interval				8 DA-A	15 DA-A	24 DA-A	37 DA-A
Trt No.	Treatment Name	Form Conc	Rate	Appl Unit	Code		
1	UTC					0	0
2	Valor (flumioxazin)	51	0.064	lb ai/a	PPL	9	6
	COC		1	% v/v	PPL		30
3	Valor	51	0.032	lb ai/a	PPL	9	23
	COC		1	% v/v	PPL		21
4	2,4-D Amine	4	1.25	lb ai/a	PPL	21	68
	COC		1	% v/v	PPL		85
5	2,4-D Amine	4	0.94	lb ai/a	PPL	26	64
	COC		1	% v/v	PPL		83
6	2,4-D Amine	4	0.625	lb ai/a	PPL	29	65
	COC		1	% v/v	PPL		84
7	CLARITY	4	0.25	lb ai/a	PPL	13	65
	COC		1	% v/v	PPL		83
8	CLARITY	4	0.125	lb ai/a	PPL	15	65
	COC		1	% v/v	PPL		80
9	Valor	51	0.032	lb ai/a	PPL	33	71
	2,4-D Amine	4	1.25	lb ai/a	PPL		86
	COC		1	% v/v	PPL		99
10	Valor	51	0.032	lb ai/a	PPL	38	70
	2,4-D Amine	4	0.94	lb ai/a	PPL		86
	COC		1	% v/v	PPL		95
11	Valor	51	0.032	lb ai/a	PPL	43	70
	2,4-D Amine	4	0.625	lb ai/a	PPL		84
	COC		1	% v/v	PPL		77
12	Valor	51	0.032	lb ai/a	PPL	31	71
	CLARITY (dicamba)	4	0.25	lb ai/a	PPL		89
	COC		1	% v/v	PPL		99
13	Valor	51	0.032	lb ai/a	PPL	26	70
	CLARITY	4	0.125	lb ai/a	PPL		84
	COC		1	% v/v	PPL		90
14	Valor	51	0.032	lb ai/a	PPL	40	50
	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL		69
	COC		1	% v/v	PPL		35
15	Valor	51	0.064	lb ai/a	PPL	29	56
	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL		70
	COC		1	% v/v	PPL		54
16	Valor	51	0.032	lb ai/a	PPL	45	38
	Ignite	1.67	0.313	lb ai/a	PPL		54
17	Ignite	1.67	0.313	lb ai/a	PPL	70	55
18	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL	20	56
						50	60
LSD (P=.05)				20	16	17	22
Treatment F				5.238	15.139	18.154	17.869
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001

* Rates are in lb ai/A. Valor: 0.032 lb ai/A = 1 oz product/A; 0.064 lb/A = 2 oz/A. 2,4-D: 1.25 lb/A = 32 oz/A; 0.94 lb/A = 24 oz/A; 0.625 lb/A = 16 oz/A; Clarity: 0.25 lb/A = 8 oz/A; 0.125 lb/A = 4 oz/A. Ignite: 0.313 lb/A = 24 oz product/A.

University of Arkansas

Horseweed Burndown with Aim (carfentrazone)
Lepanto, Poinsett Co., AR

Trial ID: 104A
Location: Lepanto, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Lepanto, AR

Objective: To evaluate activity of Aim (carfentrazone) for burndown of glyphosate-resistant horseweed.

Conclusions: Aim had no significant postemergence activity on horseweed, as manifested in the tank mixture with Roundup WeatherMax. Treatments that gave adequate control of horseweed at the final rating (38 DAT) were Clarity alone, Aim + Clarity, and Aim + Distinct. Gramoxone was not evaluated alone, but control with Aim + Gramoxone was poor even a few days after application.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33 FT	Plot Length, Unit:	30 FT	Reps:	4
Study Design: RANDOMIZED COMPLETE BLOCK					

APPLICATION DESCRIPTION

A

Application Date: 03-19-04
 Time of Day: 4:00 pm
 Application Method: SPRAY
 Application Timing: BURNDOWN
 Applic. Placement: BROADCAST
 Air Temp., Unit: 75 F
 % Relative Humidity: 44
 Wind Velocity, Unit: 6 MPH
 Dew Presence (Y/N): N
 Soil Temp., Unit: 59 F
 Soil Moisture: wet
 % Cloud Cover: 20

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
 Stage Scale: Mature
 Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: BACKPACK
 Operating Pressure: 42 PSI
 Nozzle Type: AI FF
 Nozzle Size: 110115VS
 Nozzle Spacing, Unit: 19 IN
 Nozzles/Row: 2
 Carrier: WATER
 Spray Volume, Unit: 12 GPA
 Propellant: CO2

University of Arkansas

Horseweed Burndown with Aim (carfentrazone)
Lepanto, Poinsett Co., AR

Rating Date	ERICAControl%	ERICAControl%	ERICAControl%	ERICAControl%			
Trt-Eval Interval	03-30-04 11 DA-A	04-06-04 18 DA-A	04-13-04 25 DA-A	04-26-04 38 DA-A			
Trt No.	Treatment Name	Form Conc	Rate*Unit	Appl Code			
1	UTC				0	0	0
2	Aim EC (carfentrazone)	2 5.5	0.5 oz/a 1.09 pt/a	PPL PPL	71	36	74
	Roundup WeatherMax						64
	COC		1	pt/a	PPL		
3	Aim EC	2 5.5	0.5 oz/a 1.09 pt/a	PPL PPL	63	50	69
	Roundup WeatherMax						46
	Diuron	4	1.5 pt/a	PPL			
	COC		1	pt/a	PPL		
4	Aim EC	2 1.67	0.5 oz/a 24 oz/a	PPL PPL	93	28	88
	Ignite (glufosinate)						58
	COC		1	pt/a	PPL		
5	Aim EC	2 1.67	0.5 oz/a 24 oz/a	PPL PPL	95	60	95
	Ignite						69
	Diuron (Direx)	4	1.5 pt/a	PPL			
	COC		1	pt/a	PPL		
6	Aim EC	2 3	0.5 oz/a 10.2 oz/a	PPL PPL	25	13	40
	Gramoxone Max (paraquat)						24
	COC		1	pt/a	PPL		
7	Aim EC	2 3	0.5 oz/a 10.2 oz/a	PPL PPL	19	20	18
	Gramoxone Max						18
	Diuron	4	1.5 pt/a	PPL			
	COC		1	pt/a	PPL		
8	Aim EC	2 4	0.5 oz/a 1 oz/a	PPL PPL	11	5	23
	Diuron						10
	COC		1	pt/a	PPL		
9	Aim EC	2 4	0.5 oz/a 1 pt/a	PPL PPL	51	25	86
	2,4-D LV Ester						76
	COC		1	pt/a	PPL		
10	Aim EC	2 4	0.5 oz/a 6 oz/a	PPL PPL	46	18	82
	Clarity (dicamba)						99
	COC		1	pt/a	PPL		
11	Aim EC	2 76%	0.5 oz/a 3 oz/a	PPL PPL	34	31	93
	Distinct (diflufenzoxypr/dicamba)						100
	COC		1	pt/a	PPL		
12	Roundup Weathermax	5.5	1.09 pt/a	PPL	54	28	79
13	2,4-D LV Ester	4	1.5 pt/a	PPL	44	33	80
	COC		1	pt/a	PPL		82
14	Clarity	4	8 oz/a	PPL	25	16	84
	COC		1 pt/a	PPL			96
LSD (P=.05)					26	28	22
Treatment F					10.111	2.604	16.054
Treatment Prob(F)					0.0001	0.0105	0.0001
							0.0001

* Rates are in product/A. Aim: 0.5 oz/A = 0.0078 lb ai/A; Roundup WeatherMax: 1.09 pt = 0.75 lb ai/A; diuron: 1.5 pt = 0.75 lb/A; Ignite: 24 oz/A = 0.313 lb/A.; Gramoxone Max: 10.2 oz/A = 0.24 lb/A; 2,4-D: 1 pt/A = 0.5 lb/A, 1.5 pt/A = 0.75 lb/A; Clarity: 6 oz/A = 0.19 lb/A, 8 oz/A = 0.25 lb/A; Distinct: 3 oz/A = 0.142 lb/A.

University of Arkansas

Horseweed Burndown with Aim (carfentrazone)
Pritchett Road, Poinsett Co., AR

Trial ID: 104B

Location: Pritchett Road, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Pritchett Road, AR

Objective: To evaluate burndown of glyphosate-resistant horseweed with Aim (carfentrazone).

Conclusions: Aim had no significant postemergence activity on horseweed, as manifested in the tank mixture with Roundup WeatherMax. Treatments that gave adequate control of horseweed at the final rating (38 DAT) were Clarity alone, Aim + Clarity, and Aim + Distinct. Gramoxone was not evaluated alone, but control with Aim + Gramoxone was poor even a few days after application.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit: 6.33 FT **Plot Length, Unit:** 30 FT **Reps:** 4

Site Type: Burndown

Study Design: RANDOMIZED COMPLETE BLOCK

APPLICATION DESCRIPTION

A

Application Date: 03-19-04
Time of Day: 12:00 pm
Application Method: SPRAY
Application Timing: BURNDOWN
Appl. Placement: BROADCAST
Air Temp., Unit: 71 F
% Relative Humidity: 36
Wind Velocity, Unit: 4.1 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 59 F
Soil Moisture: wet
% Cloud Cover: 10

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: BACKPACK
Operating Pressure: 42 PSI
Nozzle Type: AI FF
Nozzle Size: 110115VS
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Aim (carfentrazone)
Pritchett Road, Poinsett Co., AR

Weed Code			ERIC	ERIC	ERIC
Rating Data Type			Control	Control	Control
Rating Unit			%	%	%
Rating Date			04-06-04	04-13-04	04-26-04
Trt-Eval Interval			18 DA-A	25 DA-A	38 DA-A
Trt	Treatment	Form	Rate	Appl	
No.	Name	Conc	Rate*Unit	Code	
1	UTC			0	0
2	Aim EC (carfentrazone)	2	0.5 oz/a	PPL	36
	Roundup WeatherMax	5.5	1.09 pt/a	PPL	35
	COC		1	PPL	16
3	Aim EC	2	0.5 oz/a	PPL	9
	Roundup WeatherMax	5.5	1.09 pt/a	PPL	35
	Diuron (Direx)	4	1.5 pt/a	PPL	5
	COC		1	PPL	
4	Aim EC	2	0.5 oz/a	PPL	53
	Ignite (glufosinate)	1.67	24 oz/a	PPL	70
	COC		1	PPL	33
5	Aim EC	2	0.5 oz/a	PPL	58
	Ignite	1.67	24 oz/a	PPL	80
	Diuron	4	1.5 pt/a	PPL	43
	COC		1	PPL	
6	Aim EC	2	0.5 oz/a	PPL	13
	Gramoxone Max (paraquat)	3	10.2 oz/a	PPL	28
	COC		1	PPL	3
7	Aim EC	2	0.5 oz/a	PPL	6
	Gramoxone Max	3	10.2 oz/a	PPL	45
	Diuron	4	1.5 pt/a	PPL	5
	COC		1	PPL	
8	Aim EC	2	0.5 oz/a	PPL	9
	Diuron	4	1.5 pt/a	PPL	35
	COC		1	PPL	13
9	Aim EC	2	0.5 oz/a	PPL	54
	2,4-D LV Ester	4	1 pt/a	PPL	75
	COC		1	PPL	68
10	Aim EC	2	0.5 oz/a	PPL	48
	Clarity (dicamba)	4	6 oz/a	PPL	80
	COC		1	PPL	93
11	Aim EC	2	0.5 oz/a	PPL	52
	Distinct (diflufenzoxypr/dicamba)	76	3 oz/a	PPL	69
	COC		1	PPL	98
12	Roundup Weathermax	5.5	1.09 pt/a	PPL	13
13	2,4-D LV Ester	4	1.5 pt/a	PPL	33
	COC		1	PPL	40
14	Clarity	4	8 oz/a	PPL	48
	COC		1	PPL	73
	LSD (P=.05)			41	86
	Treatment F			29	21
	Treatment Prob(F)			4.396	27
				0.0002	10.304
					14.070
					0.0001
					0.0001

* Rates are in product/A. Aim: 0.5 oz/A = 0.0078 lb ai/A; Roundup WeatherMax: 1.09 pt = 0.75 lb ai/A; diuron: 1.5 pt = 0.75 lb/A; Ignite: 24 oz/A = 0.313 lb/A.; Gramoxone Max: 10.2 oz/A = 0.24 lb/A; 2,4-D: 1 pt/A = 0.5 lb/A, 1.5 pt/A = 0.75 lb/A; Clarity: 6 oz/A = 0.19 lb/A, 8 oz/A = 0.25 lb/A; Distinct: 3 oz/A = 0.142 lb/A.

University of Arkansas

Horseweed Burndown with Aim (carfentrazone)
Blytheville, Mississippi Co., AR

Trial ID: 104C

Location: Blytheville, AR

Investigator: Kenneth Smith

TRIAL LOCATION

City: Blytheville, AR

Objective: To evaluate burndown of glyphosate-resistant horseweed with Aim (carfentrazone).

Conclusions: Aim had no significant postemergence activity on horseweed, as manifested in the tank mixture with Roundup WeatherMax. Treatments that gave adequate control of horseweed at the final rating (38 DAT) were Clarity alone, Aim + Clarity, and Aim + Distinct. Horseweed at Blytheville was also controlled by Aim + Ignite and by the 2,4-D treatments. Gramoxone was not evaluated alone, but control with Aim + Gramoxone was poor even a few days after application. However, in another experiment at this location Gramoxone had good initial burndown activity, suggesting that there may have been antagonism of Gramoxone activity with Aim.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	6.33	FT	Plot Length, Unit:	30	FT	Reps:	4
Site Type:	Burndown						

Study Design: RANDOMIZED COMPLETE BLOCK

APPLICATION DESCRIPTION

A

Application Date: 03-23-04
Time of Day: 2:00 pm
Application Method: SPRAY
Application Timing: BURNDOWN
Appl. Placement: BROADCAST
Air Temp., Unit: 60 F
% Relative Humidity: 34
Wind Velocity, Unit: 6.8 MPH
Dew Presence (Y/N): N
Soil Temp., Unit: 50.4 F
Soil Moisture: MOIST
% Cloud Cover: 60

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA
Stage Scale: Mature
Density, Unit: Heavy

APPLICATION EQUIPMENT

A

Appl. Equipment: Tractor
Operating Pressure: 48 psi
Nozzle Type: AI FlatFa
Nozzle Size: 110015VS
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Carrier: WATER
Spray Volume, Unit: 12 GPA
Propellant: CO2

University of Arkansas

Horseweed Burndown with Aim (carfentrazone)
Blytheville, Mississippi Co., AR

Rating Date	ERIC Control %	ERIC Control %	ERIC Control %	ERIC Control %				
Trt-Eval Interval	03-31-04	04-07-04	04-16-04	04-29-04				
Trt No.	Treatment Name	Form Conc	Rate*Unit	Appl Code				
1	UTC				0	0	0	0
2	Aim EC (carfentrazone)	2	0.5 oz/a	PPL	38	23	53	45
	Roundup WeatherMax	5.5	1.09 pt/a	PPL				
	COC		1 pt/a	PPL				
3	Aim EC	2	0.5 oz/a	PPL	33	25	64	45
	Roundup WeatherMax	5.5	1.09 pt/a	PPL				
	Diuron (Direx)	4	1.5 pt/a	PPL				
	COC		1 pt/a	PPL				
4	Aim EC	2	0.5 oz/a	PPL	70	80	68	89
	Ignite (glufosinate)	1.67	24 oz/a	PPL				
	COC		1 pt/a	PPL				
5	Aim EC	2	0.5 oz/a	PPL	66	93	92	90
	Ignite	1.67	24 oz/a	PPL				
	Diuron	4	1.5 pt/a	PPL				
	COC		1 pt/a	PPL				
6	Aim EC	2	0.5 oz/a	PPL	28	19	50	21
	Gramoxone Max (paraquat)	3	10.2 oz/a	PPL				
	COC		1 pt/a	PPL				
7	Aim EC	2	0.5 oz/a	PPL	31	21	48	43
	Gramoxone Max	3	10.2 oz/a	PPL				
	Diuron	4	1.5 pt/a	PPL				
	COC		1 pt/a	PPL				
8	Aim EC	2	0.5 oz/a	PPL	9	11	18	0
	Diuron	4	1.5 pt/a	PPL				
	COC		1 pt/a	PPL				
9	Aim EC	2	0.5 oz/a	PPL	40	66	85	84
	2,4-D LV Ester	4	1 pt/a	PPL				
	COC		1 pt/a	PPL				
10	Aim EC	2	0.5 oz/a	PPL	38	68	88	94
	Clarity (dicamba)	4	6 oz/a	PPL				
	COC		1 pt/a	PPL				
11	Aim EC	2	0.5 oz/a	PPL	35	65	89	95
	Distinct (diflufenzoxy/dicamba)	76	3 oz/a	PPL				
	COC		1 pt/a	PPL				
12	Roundup Weathermax	5.5	1.09 pt/a	PPL	14	30	68	78
13	2,4-D LV Ester	4	1.5 pt/a	PPL	28	61	85	89
	COC		1 pt/a	PPL				
14	Clarity	4	8 oz/a	PPL	13	60	86	90
	COC		1 pt/a	PPL				
LSD (P=.05)					25	17	16	24
Treatment F					4.912	22.048	22.704	17.303
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0001

* Rates are in product/A. Aim: 0.5 oz/A = 0.0078 lb ai/A; Roundup WeatherMax: 1.09 pt = 0.75 lb ai/A; diuron: 1.5 pt = 0.75 lb/A; Ignite: 24 oz/A = 0.313 lb/A.; Gramoxone Max: 10.2 oz/A = 0.24 lb/A; 2,4-D: 1 pt/A = 0.5 lb/A, 1.5 pt/A = 0.75 lb/A; Clarity: 6 oz/A = 0.19 lb/A, 8 oz/A = 0.25 lb/A; Distinct: 3 oz/A = 0.142 lb/A.

University of Arkansas

Control of glyphosate-resistant horseweed with Gramoxone Max (paraquat)
Blytheville, Mississippi Co., AR

Trial ID: Jlb401

Location: Blytheville, AR

Investigator: Dr. Jim Barrentine

TRIAL LOCATION**City:** Blytheville, AR**Initiation Date:**

03-19-04

Objective: 1) Evaluate Gramoxone Max combinations with Envoke or Clarity for preplant and PRE burndown control of glyphosate-resistant Conyza canadensis and crop safety in RR cotton.

2) Evaluate use of Envoke, Sequence, Suprend, and MSMA in sequential applications with Touchdown Total for postemergence control of glyphosate-resistant Conyza canadensis and crop safety in RR cotton.

3) Compare complete PRE and POST programs to all glyphosate programs for general weed control and crop safety.

Conclusions: Even three applications of glyphosate (Touchdown Total) applied preplant and in the cotton crop failed to control the glyphosate-resistant horseweed population. Control with Clarity + Gramoxone Max applied 4 weeks before planting was approximately 90% at 11 DAT and was greater than 95% through the final rating June 1, with in-crop applications of Touchdown Total, MSMA, and Envoke. Control with Envoke + Gramoxone Max applied preplant was only 60 to 78% 11 DAT and declined even with in-crop applications of Sequence, Suprend, and Envoke. This experiment illustrated how difficult a problem glyphosate-resistant horseweed can be without effective preplant control, which was obtained only with Clarity + Gramoxone Max. Cotton had to be replanted three times because of poor stands after heavy rains, and uncontrolled horseweed plants were a problem each time.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

Crop 1: GOSHI	glyphosate-resistant cotton	Variety: STONEVILLE 5599 BR
Planting Date: 04-20-04		Planting Method: DRILLED
Rate: 10	LB/A	Depth: 1 IN
Row Spacing: 38	IN	Seed Bed: MEDIUM
Soil Moisture: NORMAL		

SITE AND DESIGN

Plot Width, Unit: 12.67 FT	Plot Length, Unit: 40 FT	Reps: 4
Tillage Type: NO-TILL	Study Design: RANDOMIZED COMPLETE BLOCK	

Previous Crops	Previous Pesticides	Year
1. COTTON		2003

APPLICATION DESCRIPTION

	A	B	C	D
Application Date:	03-19-04	04-20-04	06-21-04	06-21-04
Time of Day:	1000		1800	1800
Application Method:	SPRAY	SPRAY	SPRAY	SPRAY
Application Timing:	EARPRE	ATPLAN	POSPOS	POSPOS
Appli. Placement:	BROFOL	BROFOL	BROFOL	BROFOL
Air Temp., Unit:	60 F			
% Relative Humidity:	64			
Wind Velocity, Unit:	3 MPH			
Dew Presence (Y/N):	N			
Soil Temp., Unit:	58 F			
Soil Moisture:	ADEQUATE	ADEQUATE		
% Cloud Cover:	0			

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	WEED STAGE AT EACH APPLICATION			
	A	B	C	D
Weed 1 Code, Stage:	ERICA ROS-2 IN	ERICA 1-4 IN	ERICA	ERICA
Stage Scale:	DESC	DESC		
Density, Unit:	1 FT2	5 FT2		

	APPLICATION EQUIPMENT			
	A	B	C	D
Appl. Equipment:	BACKPACK	BACKPACK	BACKPACK	BACKPACK
Operating Pressure:	25 PSI		25 PSI	25 PSI
Nozzle Type:	FLATFAN	FLATFAN	FLATFAN	FLATFAN
Nozzle Size:	XR110003	XR11003	XR110003	XR110003
Nozzle Spacing, Unit:	19 IN	19 IN	19 IN	19 IN
Nozzles/Row:	2	2	2	2
Boom Length, Unit:	76 IN	76 IN	76 IN	76 IN
Boom Height, Unit:	18 IN	17 IN	18 IN	18 IN
Ground Speed, Unit:	3 MPH	3 MPH	3 MPH	3 MPH
Carrier:	WATER	WATER	WATER	WATER
Spray Volume, Unit:	20 GPA	20 GPA	1111 SVUn	1111 SVUn
Spray pH:			1111	1111
Propellant:	CO2	CO2	Propel	Propel
Tank Mix (Y/N):	Y	N	Y	Y

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Control of glyphosate-resistant horseweed with Gramoxone Max (paraquat)
Blytheville, Mississippi Co., AR

Rating Date		ERICACONTROL	ERICACONTROL	ERICACONTROL	ERICACONTROL	ERICACONTROL
Rating Unit		%	%	%	%	%
Rating Date		03-30-04	04-06-04	04-19-04	05-12-04	06-01-04
Trt-Eval Interval		11 DA-A	18 DA-A	31 DA-A	54 DA-A	42 DA-B
Trt No.	Treatment Name	Form Conc	Rate	Appl Unit	Code	
1	Untreated			0	0	0
2	Touchdown Total (glyph)	4.17	0.75	lb ae/a	A	48
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
3	Envoke (trifloxysulfuron)	75	0.00234	lb ai/a	A	60
	Gramoxone Max (paraquat)	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
4	Envoke	75	0.00354	lb ai/a	A	63
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
5	Envoke	75	0.00528	lb ai/a	A	71
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
6	Envoke	75	0.00528	lb ai/a	A	69
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Sequence (glyph+metol.)	5.25	1.6	lb ae/a	C	
7	Envoke	75	0.00528	lb ai/a	A	78
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Sequence	5.25	1.6	lb ae/a	C	
8	Envoke	75	0.00528	lb ai/a	A	71
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Touchdown Total	4.17	0.75	lb ae/a	B	
	Sequence	5.25	1.6	lb ae/a	C	
	Envoke	75	0.00702	lb ai/a	D	
	AG-98		0.25	% v/v	D	
9	Envoke	75	0.00528	lb ai/a	A	71
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Sequence	5.25	1.6	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
10	Envoke	75	0.00528	lb ai/a	A	70
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Sequence	5.25	1.6	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
11	Envoke	75	0.00528	lb ai/a	A	68
	Gramoxone Max	3	0.75	lb ai/a	A	
	AG-98		0.25	% v/v	A	
	Sequence	5.25	1.6	lb ae/a	B	
	Touchdown Total	4.17	0.75	lb ae/a	C	
	Envoke	75	0.00702	lb ai/a	E	
	AG-98		0.25	% v/v	E	

cont.

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Trt-Eval Interval	ERICA CONTROL PERCENT 03-30-04	ERICA CONTROL PERCENT 04-06-04	ERICA CONTROL PERCENT 04-19-04	ERICA CONTROL PERCENT 05-12-04	ERICA CONTROL PERCENT 06-01-04
Trt	Form Conc	Rate Rate	Appl Unit	Code	
No.	Name				
12	Clarity (dicamba)	4	0.25	lb ai/a A	91
	Gramoxone Max	3	1.0	lb ai/a A	
	AG-98		0.25	% v/v A	
	Touchdown Total	4.17	0.75	lb ae/a B	
	MSMA	6.6	0.75	lb ai/a D	
	Touchdown Total	4.17	0.75	lb ae/a D	
	AG-98		0.25	% v/v D	
	Envoke	75	0.00702	lb ai/a E	
	AG-98		0.25	% v/v E	
13	Clarity	4	0.25	lb ai/a A	90
	Gramoxone Max	3	1.0	lb ai/a A	
	AG-98		0.25	% v/v A	
	Touchdown Total	4.17	0.75	lb ae/a B	
	MSMA	6.6	0.75	lb ai/a D	
	Touchdown Total	4.17	0.75	lb ae/a D	
	AG-98		0.25	% v/v D	
	Envoke	75	0.00702	lb ai/a E	
	AG-98		0.25	% v/v E	
14	Clarity	4	0.25	lb ai/a A	89
	Gramoxone Max	3	1.0	lb ai/a A	
	AG-98		0.25	% v/v A	
	Touchdown Total	4.17	0.75	lb ae/a B	
	MSMA	6.6	0.75	lb ai/a D	
	AG-98		0.25	% v/v D	
	Envoke	75	0.00702	lb ai/a E	
	AG-98		0.25	% v/v E	
15	Clarity	4	0.25	lb ai/a A	90
	Gramoxone Max	3	1.0	lb ai/a A	
	AG-98		0.25	% v/v A	
	Touchdown Total	4.17	0.75	lb ae/a B	
	MSMA	6.6	0.75	lb ai/a D	
	Touchdown Total	4.17	0.75	lb ae/a D	
	AG-98		0.25	% v/v D	
16	Clarity	4	0.25	lb ai/a A	91
	Gramoxone Max	3	1.0	lb ai/a A	
	AG-98		0.25	% v/v A	
	Touchdown Total	4.17	0.75	lb ae/a B	
	MSMA	6.6	0.75	lb ai/a D	
	AG-98		0.25	% v/v D	
	Sequence	5.25	1.6	lb ae/a D	
	Envoke	75	0.00702	lb ai/a E	
	AG-98		0.25	% v/v E	
17	Envoke	75	0.00528	lb ai/a A	69
	Gramoxone Max	3	0.75	lb ai/a A	
	AG-98		0.25	% v/v A	
	Touchdown Total	4.17	0.75	lb ae/a B	
	MSMA	6.6	0.75	lb ai/a D	
	Touchdown Total	4.17	0.75	lb ae/a D	
	AG-98		0.25	% v/v D	
	Envoke	75	0.00702	lb ai/a E	
	AG-98		0.25	% v/v E	

cont.

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Trt-Eval Interval	ERICACONTROL PERCENT 03-30-04	ERICACONTROL PERCENT 04-06-04	ERICACONTROL PERCENT 04-19-04	ERICACONTROL PERCENT 05-12-04	ERICACONTROL PERCENT 06-01-04
Trt Treatment No. Name	Form Conc Rate	Rate Unit	Appl Code		
18 Envoke Gramoxone Max AG-98	75 0.00528 3 0.75 0.25	lb ai/a lb ai/a % v/v	A A	59 60 61	64 61
Touchdown Total	4.17 0.75	lb ae/a	B		
MSMA	6.6 0.75	lb ai/a	D		
AG-98	0.25	% v/v	D		
Sequence	5.25 1.6	lb ae/a	D		
Envoke	75 0.00702	lb ai/a	E		
AG-98	0.25	% v/v	E		
19 Envoke Gramoxone Max AG-98	75 0.00528 3 0.75 0.25	lb ai/a lb ai/a % v/v	A A	65 60 65	69 61
Touchdown Total	4.17 0.75	lb ae/a	B		
MSMA	6.6 0.75	lb ai/a	D		
AG-98	0.25	% v/v	D		
Envoke	75 0.00702	lb ai/a	E		
AG-98	0.25	% v/v	E		
20 Envoke Gramoxone Max AG-98	75 0.00528 3 0.75 0.25	lb ai/a lb ai/a % v/v	A A	70 55 60	63 50
Touchdown Total	4.17 0.75	lb ae/a	B		
MSMA	6.6 0.75	lb ai/a	D		
Touchdown Total	4.17 0.75	lb ae/a	D		
AG-98	0.25	% v/v	D		
Envoke	75 0.00468	lb ai/a	E		
AG-98	0.25	% v/v	E		
21 Envoke Touchdown Hi-Tech AG-98	75 0.00354 5 0.75 0.25	lb ai/a lb ae/a % v/v	A A	43 70 83	91 84
Sequence	5.25 1.6	lb ae/a	B		
MSMA	6.6 0.75	lb ai/a	D		
AG-98	0.25	% v/v	D		
Envoke	75 0.00702	lb ai/a	E		
AG-98	0.25	% v/v	E		
22 Envoke Touchdown Hi-Tech AG-98	75 0.00528 5 0.75 0.25	lb ai/a lb ae/a % v/v	A A	35 69 80	93 91
Sequence	5.25 1.6	lb ae/a	B		
MSMA	6.6 0.75	lb ai/a	D		
AG-98	0.25	% v/v	D		
Envoke	75 0.00702	lb ai/a	E		
AG-98	0.25	% v/v	E		
23 Untreated		0	0	0	0
LSD (P=.05)		10	9	14	16
Treatment F		44.601	67.220	30.085	21.603
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001

University of Arkansas

Roundup-Resistant Horseweed Control with Valor (flumioxazin)
Blytheville, Mississippi Co., AR

Trial ID: Jlb409

Study Dir.: Barrentine, Sparks, Talbert, mmcc

Location: Blytheville, AR

Investigator: Dr. Jim Barrentine

TRIAL LOCATION

City: Blytheville, AR Initiation Date: 04-06-04

Objective: Evaluate Valor (flumioxazin) for control of glyphosate-resistant horseweed.

Conclusions: Valor + 2,4-D, with or without Roundup WeatherMax, applied 30 days before cotton planting controlled glyphosate-resistant horseweed 83 to 88% by the cotton planting date. Control with Valor + Ignite tended to be slightly lower than control with Valor + 2,4-D, although the difference was not statistically significant. Because 2,4-D was not applied alone in this experiment, it was difficult to determine the residual activity of Valor. Valor is being evaluated as a 2004 fall treatment and 2005 early spring treatment to determine residual activity.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

Crop 1: GOSHI COTTON, SHORT STAPLE **Variety:** STONEVILLEPlanting Date: 04-20-04 **Planting Method:** DRILLED

Rate: 10 LB/A Depth: 1 IN

Row Spacing: 38 IN Soil Moisture: NORMAL Seed Bed: MEDIUM/TRASHY

Plot Width, Unit: 12.7 FT Plot Length, Unit: 40 FT Reps: 4
Study Design: RANDOMIZED COMPLETE BLOCK**APPLICATION DESCRIPTION**

	A	B
Application Date:	03-19-04	05-12-04
Time of Day:	10:00 am	1800
Application Method:	SPRAY	SPRAY
Application Timing:	PREPOS	PREPOS
Appl. Placement:	BROFOL	BROFOL
Air Temp., Unit:	60 F	
% Relative Humidity:	64	
Wind Velocity, Unit:	3 MPH	
Dew Presence (Y/N):	N	N
Soil Temp., Unit:	58 F	
Soil Moisture:	ADEQUATE	ADEQUATE

WEED STAGE AT EACH APPLICATION

	A	B
Weed 1 Code, Stage:	ERICA 10-15LF	ERICA
Stage Scale:	2"tall	
Density, Unit:	5 m ²	

APPLICATION EQUIPMENT

	A	B
Appl. Equipment:	BACKPACK	BACKPACK
Operating Pressure:	25 PSI	25 PSI
Nozzle Type:	FLAT FAN	FLAT FAN
Nozzle Size:	XR 11003	XR 10003
Nozzle Spacing, Unit:	18 IN	18 IN
Ground Speed, Unit:	3 MPH	3 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	20 GPA	20 GPA
Propellant:	CO ₂	CO ₂
Tank Mix (Y/N):	Y	N

University of Arkansas

Roundup-Resistant Horseweed Control with Valor (flumioxazin)
Blytheville, Mississippi Co., AR

Rating Date	ERIC CONTROL PERCENT	ERIC CONTROL PERCENT	ERIC CONTROL PERCENT	ERIC CONTROL PERCENT				
Rating Unit	04-14-04	04-19-04	05-12-04	06-01-04				
Rating Date								
Trt-Eval Interval	26 DA-A	31 DA-A	54 DA-A	20 DA-B				
Trt Treatment No.	Form Name	Rate Conc	Appl Unit	Appl Code Description	ERIC CONTROL PERCENT	ERIC CONTROL PERCENT	ERIC CONTROL PERCENT	ERIC CONTROL PERCENT
1 Untreated check					0	0	0	0
2 Valor (flumioxazin)	51	0.063	lb ai/a	A	30 d PPL	79	83	71
2,4-D ester	3.8	0.475	lb ae/a	A	30 d PPL			
AG-98		0.25	% v/v	A	30 d PPL			
Roundup WeatherMax	4.5	0.77	lb ae/a	B	21 DAP			
AMS	100	2.5	lb/a	B	21 DAP			
3 Valor	51	0.063	lb ai/a	A	30 d PPL	66	66	56
Ignite (glufosinate)	1.67	0.42	lb ai/a	A	30 d PPL			
AG-98		0.25	% v/v	A	30 d PPL			
Roundup WeatherMax	4.5	0.77	lb ae/a	B	21 DAP			
AMS	100	2.5	lb/a	B	21 DAP			
4 Valor	51	0.063	lb ai/a	A	30 d PPL	85	88	83
2,4-D ester	3.8	0.475	lb ae/a	A	30 d PPL			
Roundup WeatherMax	4.5	0.77	lb ae/a	A	30 d PPL			
AG-98		0.25	% v/v	A	30 d PPL			
Roundup WeatherMax	4.5	0.77	lb ae/a	B	21 DAP			
AMS	100	2.5	lb/a	B	21 DAP			
5 Roundup WeatherMax	4.5	0.77	lb ae/a	A	30 d PPL	54	74	56
AG-98		0.25	% v/v	A	30 d PPL			
Roundup WeatherMax	4.5	0.77	lb ae/a	B	21 DAP			
AMS	100	2.5	lb ai/a	B	21 DAP			
LSD (P=.05)					13	20	21	16
Treatment F					59.220	29.010	21.065	49.376
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0001

University of Arkansas

IGNITE (GLUFOSINATE) FOR CONTROL OF HORSEWEED

Trial ID: Jlb408
Location: Marianna, AR

Study Dir.:
Investigator: Dr. Jim Barrentine

TRIAL LOCATION

City: MARIANNA, AR **Initiation Date:** 04-06-04

Objective: To evalutate efficacy of Ignite (glufosinate) on horseweed.

Conclusions: This experiment was conducted on a horseweed population susceptible to glyphosate. By 29 DAT, horseweed was controlled 98% by glyphosate (Glyphomax Plus), and control with Ignite at 0.63 lb ai/A (48 oz/A) and Ignite at 0.31 or 0.42 lb/A (24 or 32 oz/A) + 2,4-D did not differ statistically. Ignite rates of 0.31 to 0.63 lb/A gave more than 80% control at 14 DAT, but control declined with these lower rates by 29 DAT due to horseweed regrowth.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	FT	Plot Length, Unit:	FT	Reps:
12.7		40		4
Site Type: FIELD				
Tillage Type: NO-TILL		Study Design: RANDOMIZED COMPLETE BLOCK		

APPLICATION DESCRIPTION

A

Application Date: 04-06-04
Time of Day: 0900
Application Method: SPRAY
Application Timing: NCPOPE
Applic. Placement: BROFOL
Air Temp., Unit: 60 F
Wind Velocity, Unit: 2 MPH
Dew Presence (Y/N): N
Soil Moisture: ADEQUATE
% Cloud Cover: 0

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA COT-8 LF
Stage Scale: DESC
Density, Unit: 1 FT2

APPLICATION EQUIPMENT

A

Appl. Equipment: TRACTOR
Operating Pressure: 29 PSI
Nozzle Type: FLAT FAN
Nozzle Size: XR 11003
Nozzle Spacing, Unit: 19 IN
Nozzles/Row: 2
Boom Length, Unit: 12.7 FT
Boom Height, Unit: 17 IN
Ground Speed, Unit: 3.5 MPH
Carrier: WATER
Spray Volume, Unit: 20 GPA
Propellant: COMP AIR
Tank Mix (Y/N): Y

University of Arkansas
IGNITE (GLUFOSINATE) FOR CONTROL OF HORSEWEED

Trt-Eval Interval	ERICA CONTROL	ERICA CONTROL	ERICA CONTROL				
Trt Treatment No. Name	Form Conc	Rate Rate	Appl Unit	Code	1	2	3
01 IGNITE (glufosinate)	1.67	0.21	lb ai/a	A-EPP	64	78	40
02 IGNITE	1.67	0.31	lb ai/a	A-EPP	64	83	57
03 IGNITE	1.67	0.42	lb ai/a	A-EPP	66	84	55
04 IGNITE	1.67	0.52	lb ai/a	A-EPP	65	92	70
05 IGNITE	1.67	0.63	lb ai/a	A-EPP	67	90	92
06 IGNITE	1.67	0.31	lb ai/a	A-EPP	66	84	82
2,4-D	4	0.5	lb ai/a	A-EPP			
07 IGNITE	1.67	0.42	lb ai/a	A-EPP	70	90	85
2,4-D	4	0.5	lb ai/a	A-EPP			
08 GLYPHOMAX PLUS	4	1	lb ai/a	A-EPP	56	91	98
09 2,4-D	4	0.5	lb ai/a	A-EPP	34	33	26
10 UNTREATED					0	0	0
11 UNTREATED					0	0	0
LSD (P=.05)					10	8	20
Treatment F					50.513	156.800	24.076
Treatment Prob(F)					0.0001	0.0001	0.0001

University of Arkansas

AT-PLANTING BURNDOWN MANAGEMENT FOR HORSEWEED IN COTTON
Fayetteville, AR

Trial ID: ATPLT

Location: Fayetteville, AR

Investigator: TALBERT, MCCLELLAND, GRIFFITH

TRIAL LOCATION

City: Fayetteville, AR

Objective: Evaluate herbicides applied at cotton planting for burndown and residual control of horseweed present at planting in no-till cotton.

Conclusions: This experiment was conducted on a horseweed population susceptible to glyphosate, and treatments were applied preemergence the day after cotton was planted. Glyphosate (Roundup WeatherMax and Sequence) controlled all horseweed by 30 DAT. Control with Ignite (>90%) was better at this location than at most other test sites. Significant regrowth of horseweed plants from Ignite did not occur until 40 DAT. Gramoxone (paraquat) treatments controlled horseweed 83 to 94% at 7 DAT, but regrowth occurred, and control was poor by 24 DAT. Control with MSMA was poor at all rating dates. Declining control with most treatments appeared to be due to regrowth rather than to emergence of more plants. At 24 DAT, no significant cotton injury was observed.

CROP AND WEED DESCRIPTION

Weed Code Common Name Scientific Name
1. ERICA horseweed Conyza canadensis

Crop 1: GOSHI COTTON **Variety:** Paymaster 1218BR
Planting Date: 05-07-04 **Planting Method:** Flat
Rate: 5 ft **Depth:** 0.75 in **Seed Bed:** no-till
Soil Moisture: NORMAL

SITE AND DESIGN

Plot Width, Unit: 2 M **Plot Length, Unit:** 6 M **Reps:** 3
Study Design: RANDOMIZED COMPLETE BLOCK

APPLICATION DESCRIPTION

	A
Application Date:	05-08-04
Time of Day:	6:30 am
Application Method:	spray
Application Timing:	PRE CROP
Applic. Placement:	BROFOL
Air Temp., Unit:	65 F
% Relative Humidity:	75
Wind Velocity, Unit:	1 MPH
Dew Presence (Y/N):	Y
Soil Temp., Unit:	64 F
Soil Moisture:	ADEQUATE
% Cloud Cover:	0

APPLICATION EQUIPMENT

	A
Appl. Equipment:	BACKPACK
Operating Pressure:	28
Nozzle Type:	FLAT FAN
Nozzle Size:	8002
Nozzle Spacing, Unit:	17 IN.
Nozzles/Row:	4
Band Width, Unit:	68 IN.
Boom Length, Unit:	51 IN.
Boom Height, Unit:	25 IN.
Ground Speed, Unit:	3 MPH
Carrier:	WATER
Spray Volume, Unit:	15 GPA
Propellant:	CO2

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA 2-15in.
Stage Scale: avg. 8 in
Density, Unit: 3 m²

Treatment Application Comment

few emerging hw. 1 to 2/plot of 1-in. size.

University of Arkansas

AT-PLANTING BURNDOWN MANAGEMENT FOR HORSEWEED IN COTTON
Fayetteville, AR

Trt	Treatment	Form	Rate	Appl	ERIC Control	ERIC Control	ERIC Control	ERIC Control	ERIC Control	
No.	Name	Conc	Unit	Description	%	%	%	%	%	
1	Ignite (glufosinate 40oz)	1.67	0.52	lb ae/a	PRE	96	93	92	97	80
2	Gramoxone (paraquat 2pt AG-98	3	0.75	lb ai/a	PRE	85	50	48	45	40
			0.25	% v/v	PRE					
3	Roundup WMax (22oz)	4.5	0.77	lb ae/a	PRE	50	98	93	100	99
4	MSMA AG-98	6.6	2	lb ai/a	PRE	30	52	47	60	48
			0.25	% v/v	PRE					
5	Diumate (diur+msma AG-98	4.6	2.5	lb ai/a	PRE	38	47	45	47	38
			0.25	% v/v	PRE					
6	Diumate (diur+msma Direx (spike to 1lb) AG-98	4.6	2.5	lb ai/a	PRE	50	58	58	62	37
		4	0.67	lb ai/a	PRE					
			0.25	% v/v	PRE					
7	Ignite 40oz Prowl (pendimethalin)	1.67	0.52	lb ae/a	PRE	95	93	88	87	67
		3.3	0.75	lb ai/a	PRE					
8	Gramoxone (paraquat 2pt Prowl AG-98	3	0.75	lb ai/a	PRE	94	75	60	67	43
		3.3	0.75	lb ai/a	PRE					
			0.25	% v/v	PRE					
9	Roundup WMax (22oz) Prowl	4.5	0.77	lb ae/a	PRE	63	99	99	100	100
		3.3	0.75	lb ai/a	PRE					
10	MSMA Prowl AG-98	6.6	2	lb ai/a	PRE	47	55	60	65	63
		3.3	0.75	lb ai/a	PRE					
			0.25	% v/v	PRE					
11	Gramoxone (paraquat 2pt Cotoran (fluometuron) AG-98	3	0.75	lb ai/a	PRE	88	68	50	53	48
		4	1	lb ai/a	PRE					
			0.25	% v/v	PRE					
12	Gramoxone (paraquat 2pt Dual Magnum (metolachlor) AG-98	3	0.75	lb ai/a	PRE	83	62	47	42	35
		7.62	0.95	lb ai/a	PRE					
			0.25	% v/v	PRE					
13	Gramoxone (paraquat 2pt Staple (pyrithiobac) AG-98	3	0.75	lb ai/a	PRE	87	82	58	58	50
		85	0.062	lb ai/a	PRE					
			0.25	% v/v	PRE					
14	Sequence (glyph+metol)	5.25	1.64	lb ae/a	PRE	62	99	100	100	100
15	Check					0	0	0	0	0
LSD (P=.05)					9	14	12	13	16	
Treatment F					80.321	29.855	37.115	33.810	24.487	
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0001	0.0001	

University of Arkansas

HORSEWEED SCREENING (POST)
Fayetteville, AR

Trial ID: HWscreen

Location: Fayetteville, AR

Investigator: Talbert, McClelland

Objective: To evaluate herbicide efficacy on horseweed burndown.

Conclusions: Horseweed in this experiment was not a resistant population. Soil in the area had not been disturbed for several years, and a heavy horseweed population was present in the area. Activity of all herbicides was good, and little to no emergence of new plants was observed after herbicide were applied. Even with Ignite alone and with paraquat treatments, regrowth of horseweed plants was minimal in this experiment. Although control with 2,4-D alone was poor (40 to 60%), control with 2,4-D + paraquat or Ignite was excellent. As in 2003 at this location, activity of Stinger (clopyralid), Clarity (dicamba), and Envoke (trifloxsulfuron) was very slow. Control with Envoke was fair (77%) by 32 DAT and increased to 88% by 68 DAT. The potential of Envoke for horseweed control needs to be further examined. As in other horseweed experiments, control with Clarity was excellent.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA HORSEWEED	Conyza canadensis

SITE AND DESIGN

Plot Width, Unit:	2	M	Plot Length, Unit:	4	M	Reps:	3
Study Design: RANDOMIZED COMPLETE BLOCK							

APPLICATION DESCRIPTION

A

Application Date:	05-16-04
Time of Day:	7 PM
Application Method:	SPRAY
Application Timing:	PPL
Appl. Placement:	BROFOL
Air Temp., Unit:	72 F
% Relative Humidity:	75
Wind Velocity, Unit:	2 MPH
Dew Presence (Y/N):	N
Soil Temp., Unit:	70 F
Soil Moisture:	ADEQUATE
% Cloud Cover:	30

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage:	ERICA 2-6 IN.
Stage Scale:	MOST 5-IN
Density, Unit:	VARI a few/plot to 40+/ft ² in spots.

APPLICATION EQUIPMENT

A

Appl. Equipment:	BACKPACK
Operating Pressure:	25 PSI
Nozzle Type:	FLAT FAN
Nozzle Size:	8002XR
Nozzle Spacing, Unit:	17 IN.
Nozzles/Row:	4
Band Width, Unit:	68 IN.
Boom Length, Unit:	51 IN.
Boom Height, Unit:	25 IN.
Ground Speed, Unit:	3 MPH
Carrier:	WATER
Spray Volume, Unit:	15 GPA
Propellant:	CO2

University of Arkansas

HORSEWEED SCREENING (POST)
Fayetteville, AR

Trt	Treatment	Form	Rate	Appl	ERIC Control %	ERIC Control %	ERIC Control %	ERIC Control %	ERIC Control %
No.	Name	Conc	Unit	Code	1 8 DA-A	2 16 DA-A	3 24 DA-A	4 32 DA-A	5 68 DA-A
1	Check				0	0	0	0	0
2	Paraquat (2pts)	3	0.75	lb ai/a	100	100	98	96	98
	AG-98		0.25	% v/v	A				
3	Buctril (bromoxynil)	4	0.5	lb ai/a	97	92	97	83	97
4	Envolve (trifloxysulfuron)	75	0.00705	lb ai/a	40	60	75	77	88
	AG-98		0.25	% v/v	A				
5	MSMA	6.6	2	lb ai/a	72	77	72	70	70
	AG-98		0.25	% v/v	A				
6	MSMA	6.6	2	lb ai/a	78	77	89	78	96
	Direx	4	1	lb ai/a	A				
	AG-98		0.25	% v/v	A				
7	Paraquat	3	0.75	lb ai/a	100	98	99	93	94
	Direx	4	1	lb ai/a	A				
	AG-98		0.25	% v/v	A				
8	Paraquat	3	0.75	lb ai/a	100	99	100	98	88
	Caparol (prometryn)	4	0.5	lb ai/a	A				
	AG-98		0.25	% v/v	A				
9	2,4-D ester 16 oz	3.8	0.475	lb ae/a	40	52	60	58	58
10	Clarity (dicamba) 8oz	4	0.25	lb ae/a	A	43	77	82	93
11	Roundup Weathermax (glyph	4.5	0.56	lb ae/a	A	100	100	100	100
12	Stinger (clopyralid)0.5pt	3	0.19	lb ae/a	A	40	58	67	87
13	FirstRate (cloransulam)	84	0.016	lb ai/a	A	38	58	82	78
	AG-98		0.25	% v/v	A				
14	Ignite 32oz	1.67	0.42	lb ai/a	A	100	99	100	100
15	Ignite 40oz	1.67	0.52	lb ai/a	A	100	100	100	100
16	Ignite 40oz	1.67	0.52	lb ai/a	A	97	99	100	100
	Clarity (dicamba) 8oz	4	0.25	lb ae/a	A				
17	Ignite 40oz	1.67	0.52	lb ai/a	A	100	100	100	100
	Clarity (dicamba) 4oz	4	0.125	lb ae/a	A				
18	Ignite 40oz	1.67	0.52	lb ai/a	A	100	100	99	100
	2,4-D ester 16 oz	3.8	0.475	lb ae/a	A				
19	Paraquat	3	0.75	lb ai/a	A	98	100	100	99
	Clarity (dicamba) 8oz	4	0.25	lb ae/a	A				
	AG-98		0.25	% v/v	A				
20	Paraquat	3	0.75	lb ai/a	A	100	100	100	99
	2,4-D ester 16 oz	3.8	0.475	lb ae/a	A				
	AG-98		0.25	% v/v	A				
21	Check				0	0	0	0	0
	LSD (P=.05)				8	9	13	18	17
	Treatment F				138.025	84.083	40.856	21.279	22.739
	Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001	0.0001

University of Arkansas

2,4-D, Dicamba, and Valor Plantback Timings in Cotton
Fayetteville, 2004

Trial ID: PLTBCK

Location: Fayetteville, AR

Investigator: McClelland, Talbert

Objective: To evaluate response of cotton to 2,4-D, dicamba, Valor, and diflufenzoxyr applied at 7, 14, 21, and 28 days prior to crop planting. Various rates of each herbicide will be used to determine a potential 'safe burndown rate' that could be applied within 28 days prior to planting.

Conclusions: This experiment was established as a split plot design, and the LSD for each factor is shown in the analysis of variance tables following the means. Cotton was not injured by any of the herbicides applied 28 and 21 days prior to planting (DPP). At 4 weeks after planting (June 17) slight injury (12%) occurred from applications made 14 DPP and increased with treatments applied 7 DPP (22%) and at planting (46%). Injury from dicamba, especially at 0.25 and 0.375 lb/A (8 and 12 oz/A) and dicamba + diflufenzoxyr (Distinct) was generally higher than injury from 2,4-D. At 9 weeks after planting, injury from dicamba applied at planting was still noticeable. Injury from Valor at 0.064 lb/A applied at planting was moderate (23 to 28%) for at least 4 weeks after planting, but had dissipated by 9 weeks after treatment.

Crop 1: GOSHI cotton Variety: PM1218BR Planting Date: 05-16-04 Planting Method: BEDDED
Rate: 5/FT Depth: 1 IN Soil Temperature: 70F Soil Moisture: SLIGHTLY WET Emergence Date: 05-21-04

SITE AND DESIGN

Plot Width, Unit: 6.7	FT	Plot Length, Unit: 25	FT	Reps: 4
Study Design: SPLIT-PLOT				

SOIL DESCRIPTION: **Texture:** silt loam **Soil Name:** Taloka

APPLICATION DESCRIPTION

	A	B	C	D	E
Application Date:	04-17-04	04-24-04	05-02-04	05-09-04	05-18-04
Time of Day:	6 am	5:30 pm	9 am	7 am	6:30 am
Application Method:	Preplant	Preplant	Preplant	Preplant	PRE
Application Timing:	29 d PPL	22 d PPL	14 d PPL	7 d PPL	PRE
Appl. Placement:	BROFOL	BROFOL	BROFOL	BROFOL	BROFOL
Air Temp., Unit:	64 F	65 F	61 F	65 F	70 F
% Relative Humidity:	70	88	90	80	70
Wind Velocity, Unit:	3 MPH	3 MPH	1 mph	3 MPH	3 MPH
Dew Presence (Y/N):	N	N	N	Y	Y
Soil Temp., Unit:	60 F	62 F	57 F	64 F	69 F
Soil Moisture:	ADEQUATE	EXCESSIVE	EXCESSIVE	ADEQUATE	ADEQUATE
% Cloud Cover:	0	80	0	20	25

APPLICATION EQUIPMENT

	A	B	C	D	E
Appl. Equipment:	backpack	backpack	backpack	backpack	backpack
Operating Pressure:	23 psi				
Nozzle Type:	flat fan				
Nozzle Size:	8002xr	8002XR	8002XR	8002XR	8002XR
Nozzle Spacing, Unit:	18 in.				
Nozzles/Row:	2	2	2	2	2
Band Width, Unit:	36 in.				
Boom Length, Unit:	18	18	18	18	18
Boom Height, Unit:	20	20	20	20	20
Ground Speed, Unit:	3 mph				
Carrier:	water	water	water	water	water
Spray Volume, Unit:	15 GPA				
Propellant:	CO2	CO2	CO2	CO2	CO2

Application Comment

Timing B 21 d PPL, water standing in most row middles; soil was saturated.
 Timing C saturated soil. rained hard Fri. and Sat.; standing water

Note: All treatments contained Activate Plus surfactant at 0.25% v/v

University of Arkansas

2,4-D, Dicamba, and Valor Plantback Timings in Cotton
Fayetteville, 2004

Crop	Rating data	Cotton injury %				
Rating Date		06-04-04	06-11-04	06-17-04	07-01-04	07-23-04
Trt No.	Treatment Name	Rate	Unit	Appl Code		
TABLE OF R MEANS						
Replicate 1		16	15	19	10	5
Replicate 2		10	11	15	8	2
Replicate 3		11	15	17	11	6
Replicate 4		12	14	15	9	4
TABLE OF A MEANS						
1	29 DPP	A	1	0	1	0
2	22 DPP	B	1	1	2	1
3	14 DPP	C	8	8	12	3
4	7 DPP	D	12	16	22	5
5	at planting	E	39	44	46	11
		LSD (5%)	7	6	7	5
						4
TABLE OF B MEANS						
1	2,4-D ester	0.71 lb ae/a	13	13	9	3
2	2,4-D ester	0.475 lb ae/a	12	11	5	3
3	2,4-D ester	0.237 lb ae/a	12	11	7	3
4	Dicamba (Clarity)	0.375 lb ae/a	16	20	17	7
5	Dicamba	0.25 lb ae/a	17	19	22	14
6	Dicamba	0.125 lb ae/a	10	12	16	8
7	Valor (flumioxazin)	0.032 lb ai/a	4	4	7	3
8	Valor	0.064 lb ai/a	8	9	10	4
9	Diflufenzoxyr + dicamba (Distinct, 0.05 + 0.125 lbae)	0.175 lb ai/a	11	17	22	13
10	Diflufenzoxyr + dicamba (Distinct, 0.05 + 0.125 lbae)	0.175 lb ae/a	17	23	27	18
10	Dicamba "spike"	0.125 lb ae/a				
10	for 0.25 lbae or 8oz total					
		LSD (5%)	5	5	5	6
						6
TABLE OF AB MEANS						
1	29 DPP	A	4	0	0	0
1	2,4-D ester	0.71 lb ae/a				
2	22 DPP	B	0	0	0	0
1	2,4-D ester	0.71 lb ae/a				
3	14 DPP	C	0	0	1	3
1	2,4-D ester	0.71 lb ae/a				
4	7 DPP	D	3	6	5	0
1	2,4-D ester	0.71 lb ae/a				
5	at planting	E	58	60	58	41
1	2,4-D ester	0.71 lb ae/a				
1	29 DPP	A	0	0	0	0
2	2,4-D ester	0.475 lb ae/a				
2	22 DPP	B	3	0	0	4
2	2,4-D ester	0.475 lb ae/a				
3	14 DPP	C	4	5	8	0
2	2,4-D ester	0.475 lb ae/a				
4	7 DPP	D	6	3	10	0
2	2,4-D ester	0.475 lb ae/a				
5	at planting	E	48	49	48	21
2	2,4-D ester	0.475 lb ae/a				6

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Crop Rating	Rating Data Type	Rating Date	Rate	Unit	Cotton	Cotton	Cotton	Cotton	Cotton
					injury %	injury %	injury %	injury %	injury %
Trt No.	Treatment Name		Rate	Appl Code	06-04-04	06-11-04	06-17-04	07-01-04	07-23-04
1	29 DPP			A	3	0	3	0	0
3	2,4-D ester		0.237	lb ae/a	B	3	0	0	1
2	22 DPP				C	6	3	9	8
3	2,4-D ester		0.237	lb ae/a	D	13	13	19	9
3	14 DPP				E	38	38	33	16
3	2,4-D ester		0.237	lb ae/a	A	0	3	0	0
4	7 DPP				B	0	5	3	5
3	2,4-D ester		0.237	lb ae/a	C	8	11	14	5
5	at planting				D	16	20	15	13
3	2,4-D ester		0.237	lb ae/a	E	55	61	75	60
1	29 DPP				A	4	0	3	6
4	Dicamba (Clarity)		0.375	lb ae/a	B	0	5	3	5
2	22 DPP				C	8	11	14	3
4	Dicamba (Clarity)		0.375	lb ae/a	D	16	20	15	13
3	14 DPP				E	55	61	75	60
4	Dicamba (Clarity)		0.375	lb ae/a	A	0	3	0	0
4	7 DPP				B	0	5	3	5
4	Dicamba (Clarity)		0.375	lb ae/a	C	8	11	14	3
5	at planting				D	16	20	15	13
4	Dicamba (Clarity)		0.375	lb ae/a	E	55	61	75	60
1	29 DPP				A	4	0	3	6
5	Dicamba		0.25	lb ae/a	B	0	0	0	0
2	22 DPP				C	14	8	13	0
5	Dicamba		0.25	lb ae/a	D	14	24	30	15
5	Dicamba				E	54	61	63	49
4	7 DPP		0.25	lb ae/a	A	0	0	0	0
5	Dicamba				B	0	0	0	0
5	at planting		0.25	lb ae/a	C	4	3	3	0
5	Dicamba				D	10	10	23	8
6	Dicamba		0.125	lb ae/a	E	38	49	55	30
2	22 DPP				A	0	0	0	0
6	Dicamba		0.125	lb ae/a	B	0	0	0	0
3	14 DPP				C	4	3	3	0
6	Dicamba		0.125	lb ae/a	D	10	10	23	8
4	7 DPP				E	38	49	55	30
6	Dicamba		0.125	lb ae/a	A	0	0	0	0
5	at planting				B	0	0	0	0
6	Dicamba		0.125	lb ae/a	C	4	3	3	0
1	29 DPP				D	10	10	23	8
7	Valor (flumioxazin)		0.032	lb ai/a	E	38	49	55	30
2	22 DPP				A	0	0	0	0
7	Valor (flumioxazin)		0.032	lb ai/a	B	0	0	0	0
3	14 DPP				C	10	3	13	5
7	Valor (flumioxazin)		0.032	lb ai/a	D	0	9	9	0
4	7 DPP				E	10	9	14	9
7	Valor (flumioxazin)		0.032	lb ai/a	A	0	0	0	0
5	at planting				B	0	0	0	0
7	Valor (flumioxazin)		0.032	lb ai/a	C	10	9	14	9
1	29 DPP				D	0	9	9	0
8	Valor		0.064	lb ai/a	E	10	9	14	8
2	22 DPP				A	0	0	0	0
8	Valor		0.064	lb ai/a	B	4	0	0	0
3	14 DPP				C	3	11	11	0
8	Valor		0.064	lb ai/a	D	6	10	18	6
4	7 DPP				E	0	0	0	0
8	Valor		0.064	lb ai/a	A	0	0	0	0

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Crop Rating	Rating Data Type	Rating Date		Cotton injury %						
Trt No.	Treatment Name		Rate	Unit	Appl Code	06-04-04	06-11-04	06-17-04	07-01-04	07-23-04
5	at planting		0.064	lb ai/a	E	28	2	25	3	4
8	Valor								15	5
1	29 DPP		0.175	lb ai/a	A	0	0	0	0	0
9	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
2	22 DPP		0.175	lb ai/a	B	0	3	0	5	8
9	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
3	14 DPP		0.175	lb ai/a	C	10	18	24	18	13
9	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
4	7 DPP		0.175	lb ai/a	D	21	26	50	18	4
9	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
5	at planting		0.175	lb ai/a	E	24	39	35	24	3
9	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
1	29 DPP				A	0	0	0	0	0
10	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)		0.175	lb ae/a						
10	Dicamba "spike"		0.125	lb ae/a						
10	for 0.25 lbae or 8oz total									
2	22 DPP		0.175	lb ae/a	B	3	3	4	0	0
10	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
10	Dicamba "spike"		0.125	lb ae/a						
10	for 0.25 lbae or 8oz total									
3	14 DPP		0.175	lb ae/a	C	18	22	27	20	7
10	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
10	Dicamba "spike"		0.125	lb ae/a						
10	for 0.25 lbae or 8oz total									
4	7 DPP		0.175	lb ae/a	D	26	39	46	33	14
10	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
10	Dicamba "spike"		0.125	lb ae/a						
10	for 0.25 lbae or 8oz total									
5	at planting		0.175	lb ae/a	E	39	51	58	35	4
10	Diflufenzoypyr + dicamba (Distinct, 0.05 + 0.125 lbae)									
10	Dicamba "spike"		0.125	lb ae/a						
10	for 0.25 lbae or 8oz total									
LSD (AB means)						12	11	11	13	13

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**2,4-D, dicamba, and Valor Plantback Timings in Cotton
Fayetteville, 2004**

COMPLETE SPLIT-PLOT AOV For injury 06-04-04

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	199	64481.053242				
R	3	951.166605	317.055535	4.477	0.0050	3
A	4	39251.469799	9812.867450	45.640	0.0001	7
ERROR A	12	2580.083289	215.006941	3.036	0.0008	7
B	9	3008.833501	334.314833	4.721	0.0001	5
AB	36	9129.083308	253.585647	3.581	0.0001	12
ERROR B	135	9560.416742	70.817902			

COMPLETE SPLIT-PLOT AOV For injury 06-11-04

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	199	78745.058023				
R	3	536.166702	178.722234	3.176	0.0262	3
A	4	52122.141822	13030.535456	99.486	0.0001	6
ERROR A	12	1571.749988	130.979166	2.328	0.0097	7
B	9	5782.833042	642.537005	11.419	0.0001	5
AB	36	11135.916487	309.331014	5.497	0.0001	11
ERROR B	135	7596.249982	56.268518			

COMPLETE SPLIT-PLOT AOV For injury 06-17-04

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	199	92381.721329				
R	3	439.833331	146.611110	2.404	0.0703	3
A	4	57002.555500	14250.638875	74.158	0.0001	7
ERROR A	12	2305.999973	192.166664	3.151	0.0006	7
B	9	7066.165808	785.129534	12.874	0.0001	5
AB	36	17333.833383	481.495372	7.895	0.0001	11
ERROR B	135	8233.333334	60.987654			

COMPLETE SPLIT-PLOT AOV For injury 07-01-04

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	199	51003.875000				
R	3	325.375000	108.458333	1.315	0.2720	4
A	4	22900.750000	5725.187500	52.838	0.0001	5
ERROR A	12	1300.250000	108.354167	1.314	0.2173	8
B	9	4830.125000	536.680556	6.509	0.0001	6
AB	36	10516.750000	292.131944	3.543	0.0001	13
ERROR B	135	11130.625000	82.449074			

COMPLETE SPLIT-PLOT AOV For injury 07-23-04

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	199	22340.888916				
R	3	412.333326	137.444442	1.610	0.1901	4
A	4	2932.555731	733.138933	8.774	0.0015	4
ERROR A	12	1002.666681	83.555557	0.979	0.4725	8
B	9	838.666663	93.185185	1.091	0.3733	6
AB	36	5627.999905	156.333331	1.831	0.0071	13
ERROR B	135	11526.666610	85.382716			

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**Effect of Temperature and Horseweed Size on Ignite (glufosinate) Activity
Growth chamber/greenhouse, Fayetteville, AR**

Trial ID: TEMP1

Location: Fayetteville

Investigator: McClelland, Talbert

Objective: To evaluate effects of plant size and temperatures on glyphosate-resistant horseweed response to Ignite rates.

Conclusions: Small rosette plants (11-leaf) were controlled better than larger plants (45- and 54-leaf). Regrowth from living terminals in larger plants not controlled completely soon after application was evident in these experiments, and those plants would have been quite competitive with emerging cotton in a field situation. Regrowth of larger plants occurred even with Ignite at 40 oz/A in the growth chamber, although 40 oz/A controlled greenhouse-grown plants, perhaps because of warmer temperatures in the greenhouse. The effects of temperature in this experiment remain elusive. Control of greenhouse-grown plants was better than any growth chamber plants. Differences between cool and warm temperatures in the growth chamber were not diverse enough to detect differences in control.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA	horseweed
		Conyza canadensis

Study Design: SPLIT-PLOT Plot Reps: 4 4-inch-diam pots 2 plants/pot

APPLICATION DESCRIPTION

A

Application Date:	09-15-04
Time of Day:	9:30 am
Application Method:	spray
Application Timing:	POST
Appl. Placement:	brofol
% Relative Humidity:	60
Soil Moisture:	ADEQUATE

APPLICATION EQUIPMENT

A

Appl. Equipment:	backpack
Operating Pressure:	33 psi
Nozzle Type:	flat fan
Nozzle Size:	8001XR
Nozzle Spacing, Unit:	18 in
Nozzles/Row:	2
Band Width, Unit:	36
Boom Length, Unit:	18
Boom Height, Unit:	26 in
Ground Speed, Unit:	3 mph
Carrier:	water
Spray Volume, Unit:	15 gpa
Propellant:	co2

Trial Comments

Plants were grown in Sunshine mix. Seed (glyphosate-resistant seed from Marion, AR) started in large flats, transplanted to 4-inch pots when 2 to 4 leaves. Plants were supposed to grow to 2-inch, 6-inch, and rosette but did not bolt, so sizes were 54-leaf, 45-leaf (both 5 inches tall, but were dense 'rosettes'), and 11-leaf (0.25-in. tall). Plants were grown in greenhouse until 1 week before Ignite application. They were placed in appropriate growth chamber (cool or warm) to equilibrate for 1 week, and plants were sprayed and returned to appropriate temp. chamber. One set of plants was kept in the greenhouse at ambient temperatures (approx. 75 to 95 F range). Actual temperature regimes were: cool: 45/75 F; warm: 58/79 F. (daytime temps were higher than planned because, although temp. reading on chamber was correct, actual temp at the plant surface was higher because of heat from lights. PAR (photosynthetic active radiation) was approximately 650 umol/m²/s for the greenhouse and 450 umol/m²/s for the growth chambers.

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**Effect of Temperature and Horseweed Size on Ignite (glufosinate) Activity
Growth chamber/greenhouse, Fayetteville, AR**

Weed Code		ERICA	ERICA	ERICA	ERICA
Rating Data Type		Control	Control	Control	Control
Rating Unit		%	%	%	%
Rating Date		09-22-04	09-29-04	10-06-04	10-13-04
Trt-Eval Interval		1 WAT	2 WAT	3 WAT	4 WAT
Trt No.	Treatment Name	Form Conc	Rate Unit	Appl Code	Appl Description

TABLE OF R MEANS

Replicate 1	80	79	68	57
Replicate 2	80	78	67	54
Replicate 3	78	80	68	55
Replicate 4	78	82	68	54

TABLE OF A MEANS

1 greenhous	76	89	89	81
2 cool/cool	81	77	63	48
3 cool/warm	77	77	60	46
4 warm/cool	82	79	65	52
5 warm/warm	78	77	61	47
	(LSD)	4	7	7
				8

TABLE OF B MEANS

1 11-If	86	99	100	100
2 45-If	75	71	52	32
3 54-If	76	69	51	33
	(LSD)	7	3	4
				5

TABLE OF C MEANS

1 20 OZ Ignite	75	73	59	46
2 30 OZ Ignite	79	81	69	55
3 40 OZ Ignite	82	84	75	64
	(LSD)	2	2	4
				6

TABLE OF AB MEANS

1 greenhous	78	100	100	100
1 11-If				
2 cool/cool	88	99	100	100
1 11-If				
3 cool/warm	86	99	100	100
1 11-If				
4 warm/cool	88	99	100	100
1 11-If				
5 warm/warm	90	100	100	100
1 11-If				
1 greenhous	76	86	87	78
2 45-If				
2 cool/cool	77	66	45	16
2 45-If				
3 cool/warm	73	70	43	17
2 45-If				
4 warm/cool	78	68	50	31
2 45-If				
5 warm/warm	71	64	38	18
2 45-If				
1 greenhous	73	81	81	65
3 54-If				
2 cool/cool	80	67	45	27
3 54-If				
3 cool/warm	72	61	37	22
3 54-If				
4 warm/cool	79	69	45	26
3 54-If				

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Weed Code	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	ERICA	ERICA	ERICA	ERICA
					Control	%	Control	%
			09-22-04	1 WAT	09-29-04	2 WAT	10-06-04	3 WAT
								4 WAT
Trt	Treatment	Form	Rate	Appl	Appl			
No.	Name	Conc	Rate	Unit	Code	Description		
5	warm/warm				73	65	46	23
3	54-If				(LSD)	NS	9	12
								14
<u>TABLE OF AC MEANS</u>								
1	greenhous				72	82	76	57
1	20 OZ Ignite							
2	cool/cool				78	70	57	42
1	20 OZ Ignite							
3	cool/warm				72	69	50	40
1	20 OZ Ignite							
4	warm/cool				79	73	58	46
1	20 OZ Ignite							
5	warm/warm				75	72	56	43
1	20 OZ Ignite							
1	greenhous				76	91	93	86
2	30 OZ Ignite							
2	cool/cool				81	79	62	45
2	30 OZ Ignite							
3	cool/warm				78	79	63	45
2	30 OZ Ignite							
4	warm/cool				80	80	63	50
2	30 OZ Ignite							
5	warm/warm				79	78	64	51
2	30 OZ Ignite							
1	greenhous				79	95	99	100
3	40 OZ Ignite							
2	cool/cool				84	83	71	57
3	40 OZ Ignite							
3	cool/warm				81	83	68	54
3	40 OZ Ignite							
4	warm/cool				86	82	74	62
3	40 OZ Ignite							
5	warm/warm				80	80	63	47
3	40 OZ Ignite							
					(LSD)	NS	NS	14
<u>TABLE OF BC MEANS</u>								
1	11-If				85	99	100	100
1	20 OZ Ignite							
2	45-If				71	63	40	21
1	20 OZ Ignite							
3	54-If				71	57	38	16
1	20 OZ Ignite							
1	11-If				85	99	100	100
2	30 OZ Ignite							
2	45-If				75	73	55	32
2	30 OZ Ignite							
3	54-If				76	72	51	34
2	30 OZ Ignite							
1	11-If				88	100	100	100
3	40 OZ Ignite							
2	45-If				78	76	62	43
3	40 OZ Ignite							
3	54-If				80	78	63	49
3	40 OZ Ignite							
					(LSD)	3	4	4

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Trt	Treatment	Form	Rate	Appl	Appl	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %
No.	Name	Conc	Rate	Unit	Code	<i>(interaction NS at each date)</i>			
TABLE OF ABC MEANS									
1	greenhous					75	100	100	100
1	11-If								
1	20 OZ Ignite								
2	cool/cool					86	99	100	100
1	11-If								
1	20 OZ Ignite								
3	cool/warm					84	99	100	100
1	11-If								
1	20 OZ Ignite								
4	warm/cool					89	100	100	100
1	11-If								
1	20 OZ Ignite								
5	warm/warm					89	100	100	100
1	11-If								
1	20 OZ Ignite								
1	greenhous					73	78	68	43
2	45-If								
1	20 OZ Ignite								
2	cool/cool					74	58	33	9
2	45-If								
1	20 OZ Ignite								
3	cool/warm					68	60	25	11
2	45-If								
1	20 OZ Ignite								
4	warm/cool					75	63	43	29
2	45-If								
1	20 OZ Ignite								
5	warm/warm					68	58	31	13
2	45-If								
1	20 OZ Ignite								
1	greenhous					69	68	60	29
3	54-If								
1	20 OZ Ignite								
2	cool/cool					75	55	38	16
3	54-If								
1	20 OZ Ignite								
3	cool/warm					65	49	24	9
3	54-If								
1	20 OZ Ignite								
4	warm/cool					74	58	31	9
3	54-If								
1	20 OZ Ignite								
5	warm/warm					70	58	38	18
3	54-If								
1	20 OZ Ignite								
1	greenhous					79	100	100	100
1	11-If								
2	30 OZ Ignite								
2	cool/cool					88	98	100	100
1	11-If								
2	30 OZ Ignite								
3	cool/warm					84	99	100	100
1	11-If								
2	30 OZ Ignite								
4	warm/cool					84	99	100	100
1	11-If								
2	30 OZ Ignite								

TEMP1

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Weed Code	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	ERICA	ERICA	ERICA	ERICA
					Control %	Control %	Control %	Control %
			09-22-04	09-29-04	10-06-04	10-13-04		
					1 WAT	2 WAT	3 WAT	4 WAT
Trt	Treatment	Form	Rate	Appl	Appl			
No.	Name	Conc	Rate	Unit	Code	Description		
5	warm/warm				91	100	100	100
1	11-If							
2	30 OZ Ignite				76	89	94	91
1	greenhous							
2	45-If							
2	30 OZ Ignite				78	69	46	14
2	cool/cool							
2	45-If							
2	30 OZ Ignite				73	74	50	11
3	cool/warm							
2	45-If							
2	30 OZ Ignite				78	69	46	24
4	warm/cool							
2	45-If							
2	30 OZ Ignite				71	66	40	23
5	warm/warm							
2	45-If							
2	30 OZ Ignite				73	84	84	68
1	greenhous							
3	54-If							
2	30 OZ Ignite				79	69	40	23
2	cool/cool							
3	54-If							
2	30 OZ Ignite				76	64	38	23
3	cool/warm							
3	54-If							
2	30 OZ Ignite				79	74	41	25
4	warm/cool							
3	54-If							
2	30 OZ Ignite				74	69	53	30
5	warm/warm							
3	54-If							
2	30 OZ Ignite				79	100	100	100
1	greenhous							
1	11-If							
3	40 OZ Ignite				89	100	100	100
2	cool/cool							
1	11-If							
3	40 OZ Ignite				91	100	100	100
3	cool/warm							
1	11-If							
3	40 OZ Ignite				91	99	100	100
4	warm/cool							
1	11-If							
3	40 OZ Ignite				89	100	100	100
5	warm/warm							
1	11-If							
3	40 OZ Ignite				79	91	100	100
1	greenhous							
2	45-If							
3	40 OZ Ignite				79	73	55	26
2	cool/cool							
2	45-If							
3	40 OZ Ignite				78	76	53	28
3	cool/warm							
2	45-If							
3	40 OZ Ignite							

TEMP1

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Trt	Treatment	Form	Rate	Appl	Appl	ERICA control %	ERICA control %	ERICA control %	ERICA control %
No.	Name	Conc	Rate	Unit	Code	Description			
4	warm/cool					81	71	60	40
2	45-If								
3	40 OZ Ignite					75	69	41	20
5	warm/warm								
2	45-If								
3	40 OZ Ignite					79	93	99	100
1	greenhous								
3	54-If								
3	40 OZ Ignite					85	78	58	44
2	cool/cool								
3	54-If								
3	40 OZ Ignite					75	71	50	35
3	cool/warm								
3	54-If								
3	40 OZ Ignite					85	76	62	45
4	warm/cool								
3	54-If								
3	40 OZ Ignite					76	70	49	20
5	warm/warm								
3	54-If								
3	40 OZ Ignite								

02-01-05 (TEMP1)

COMPLETE SPLIT-PLOT AOV For ERICA control 09-22-04 1 WAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	179	13618.194444				
R	3	152.638889	50.879630	0.656	0.5857	4
A	4	1032.777778	258.194444	4.196	0.0236	4
ERROR A	12	738.333333	61.527778			
B	2	4493.611111	2246.805556	28.956	0.0001	3
AB	8	1056.388889	132.048611	1.702	0.1389	7
ERROR B	30	2327.777778	77.592593			
C	2	1300.277778	650.138889	30.595	0.0001	2
AC	8	133.055556	16.631944	0.783	0.6190	4
BC	4	223.055556	55.763889	2.624	0.0398	3
ABC	16	247.777778	15.486111	0.729	0.7580	7
ERROR C	90	1912.500000	21.250000			

COMPLETE SPLIT-PLOT AOV For ERICA control 09-29-04 2 WAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	179	57864.577778				
R	3	487.111111	162.370370	1.453	0.2470	5
A	4	4039.022222	1009.755556	5.598	0.0089	7
ERROR A	12	2164.666667	180.388889			
B	2	35251.544444	17625.772222	157.769	0.0001	4
AB	8	2366.677778	295.834722	2.648	0.0251	9
ERROR B	30	3351.555556	111.718519			
C	2	4032.811111	2016.405556	50.359	0.0001	2
AC	8	157.411111	19.676389	0.491	0.8594	5
BC	4	2238.922222	559.730556	13.979	0.0001	4
ABC	16	171.188889	10.699306	0.267	0.9977	9
ERROR C	90	3603.666667	40.040741			

COMPLETE SPLIT-PLOT AOV For ERICA control 10-06-04 3 WAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	179	158816.950000				
R	3	83.572222	27.857407	0.141	0.9344	6
A	4	21546.977778	5386.744444	25.521	0.0001	7
ERROR A	12	2532.844444	211.070370			
B	2	94059.033333	47029.516667	238.614	0.0001	5
AB	8	11726.355556	1465.794444	7.437	0.0001	12
ERROR B	30	5912.833333	197.094444			
C	2	7566.533333	3783.266667	37.938	0.0001	4
AC	8	1353.522222	169.190278	1.697	0.1100	8
BC	4	3964.333333	991.083333	9.938	0.0001	6
ABC	16	1095.944444	68.496528	0.687	0.7998	14
ERROR C	90	8975.000000	99.722222			

COMPLETE SPLIT-PLOT AOV For ERICA control 10-13-04 4 WAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	179	295056.200000				
R	3	219.977778	73.325926	0.267	0.8485	7
A	4	31601.811111	7900.452778	30.091	0.0001	8
ERROR A	12	3150.633333	262.552778			
B	2	183077.033333	91538.516667	333.620	0.0001	6
AB	8	17876.688889	2234.586111	8.144	0.0001	14
ERROR B	30	8231.388889	274.379630			
C	2	9971.033333	4985.516667	17.938	0.0001	6
AC	8	6188.522222	773.565278	2.783	0.0085	14
BC	4	5554.133333	1388.533333	4.996	0.0011	11
ABC	16	4170.977778	260.686111	0.938	0.5299	24
ERROR C	90	25014.000000	277.933333			

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Effects of Temperature and Horseweed Size on Ignite Activity (II)
Growth chamber, Fayetteville

Trial ID: TEMP2

Location: Fayetteville, AR

Investigator: McClelland, Talbert

Objective: To evaluate effect of temperature on large horseweed plants in the growth chamber.

Conclusions: Factors: warm (78/59 F) and cool (58/44) day/night temperature regimes; plants at 5- to 7-inches tall and 11- to 16-inches tall; Ignite at 30 and 40 oz/A (0.39 and 0.52 lb ai/A).

Plants in the cool temperature regime were generally controlled better than in those maintained in the warm temperatures, although the effect was significant only at 27 DAT, when average control of plants in the warm chamber was 39% and control in the cool chamber was 96%. Plant size had no effect on control. However, plants were controlled better by 40 oz/A than by 30 oz/A (77 and 58%, respectively, at 27 DAT, averaged over plant size and temperatures). These plants were larger than the large plants in the shade study, but like those, control in the cool temperature regime was (unexpectedly) excellent.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERIC1	horseweed
		Conyza canadensis

Study Design: SPLIT-PLOT **Reps:** 3 4-inch-diam pots, two plants/pot

APPLICATION DESCRIPTION

A

Application Date: 11-26-04
 Time of Day: 1 pm
 Application Method: spray
 Application Timing: post
 Applic. Placement: brofol
 Air Temp., Unit: 54 F
 % Relative Humidity: 80
 Wind Velocity, Unit: 5 mph
 Soil Moisture: adequate
 % Cloud Cover: 100

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA 5-7" tall
 Stage Scale: 100 leaf
 Weed 2 Code, Stage: ERICA 11-16"tal
 Stage Scale: >100 leaf

APPLICATION EQUIPMENT

A

Appl. Equipment: backpack
 Operating Pressure: 32 psi
 Nozzle Type: flat fan
 Nozzle Size: 80015
 Nozzle Spacing, Unit: 18 in.
 Nozzles/Row: 2
 Band Width, Unit: 36 in.
 Boom Length, Unit: 18 in.
 Boom Height, Unit: 24 in.
 Ground Speed, Unit: 3 mph
 Carrier: water
 Spray Volume, Unit: 15 gpa
 Propellant: CO2

Trial Comments

All plants were from glyph.-resistant Marion seed. Put plants in growth chambers 11-21. Sprayed 11-26. Plant size at application: 5- to 7 inches tall; most over 100 leaves. 11 to 16 inches tall; over 100 leaves. Temps steady: cool: 58/44; warm: 76/59; rel humid. avg. 45%; Light intensity: 400 umol/m²/s (PAR). Plants fertilized with Miracle Gro every 7 to 10 days.

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**Effects of Temperature and Horseweed Size on Ignite Control
Growth chamber, Fayetteville**

Trt	Treatment	Form	Rate	Appl	ERIC A	ERIC A	ERIC A	ERIC A
No.	Name	Conc	Rate	Unit	Control	Control	Control	Control
	Weed Code							
	Rating Data Type							
	Rating Unit				%	%	%	%
	Rating Date				12-03-04	12-10-04	12-17-04	12-23-04
	Trt-Eval Interval				7 DA-A	14 DA-A	21 DA-A	27 DA-A
TABLE OF R MEANS								
1	Cool (58/44)				69	81	80	62
2	Warm (76/59)				75	89	91	78
	Replicate 3				76	90	82	62
TABLE OF A MEANS								
1	Cool (58/44)				74	97	98	96
2	Warm (76/59)				73	77	71	39
	LSD				NS	NS	NS	37
TABLE OF B MEANS								
1	5- to 7-inch				72	86	82	67
2	11- to 16-inch				74	87	87	68
	LSD				(all NS)			
TABLE OF C MEANS								
1	Ignite	1.67	30	oz/a	POE	70	82	80
2	Ignite	1.67	40	oz/a	POE	76	91	89
	LSD				5	9	8	17
TABLE OF AB MEANS								
1	Cool (58/44)				73	97	98	97
1	5- to 7-inch							
2	Warm (76/59)				72	76	66	37
1	5- to 7-inch							
1	Cool (58/44)				75	97	98	94
2	11- to 16-inch							
2	Warm (76/59)				73	78	77	42
2	11- to 16-inch				LSD	(all NS)		
TABLE OF AC MEANS								
1	Cool (58/44)				72	96	97	94
1	Ignite	1.67	30	oz/a	POE			
2	Warm (76/59)				69	68	63	23
1	Ignite	1.67	30	oz/a	POE			
1	Cool (58/44)				76	98	99	98
2	Ignite	1.67	40	oz/a	POE			
2	Warm (76/59)				76	85	79	56
2	Ignite	1.67	40	oz/a	POE			
	LSD (0.1)				NS	12	11	24
TABLE OF BC MEANS (all NS)								
1	5- to 7-inch				70	83	79	57
1	Ignite	1.67	30	oz/a	POE			
2	11- to 16-inch				71	82	82	59
1	Ignite	1.67	30	oz/a	POE			
1	5- to 7-inch				74	89	85	77
2	Ignite	1.67	40	oz/a	POE			
2	11- to 16-inch				78	93	93	77
2	Ignite	1.67	40	oz/a	POE			
TABLE OF ABC MEANS (all NS)								
1	Cool (58/44)				70	96	98	97
1	5- to 7-inch							
1	Ignite	1.67	30	oz/a	POE			

TEMP2

University of Arkansas

Trt	Treatment	Form	Rate	Appl		ERIC A Control	ERIC A Control	ERIC A Control	ERIC A Control
No.	Name	Conc	Rate	Unit	Code	%	%	%	%
2	Warm (76/59)					70	70	60	17
1	5- to 7-inch								
1	Ignite	1.67	30	oz/a	POE	73	97	96	90
1	Cool (58/44)								
2	11- to 16-inch								
1	Ignite	1.67	30	oz/a	POE	68	67	67	28
2	Warm (76/59)								
2	11- to 16-inch								
1	Ignite	1.67	30	oz/a	POE	75	97	98	97
1	Cool (58/44)								
1	5- to 7-inch								
2	Ignite	1.67	40	oz/a	POE	73	81	71	56
2	Warm (76/59)								
1	5- to 7-inch								
2	Ignite	1.67	40	oz/a	POE	77	98	99	99
1	Cool (58/44)								
2	11- to 16-inch								
2	Ignite	1.67	40	oz/a	POE	78	88	86	55
2	Warm (76/59)								
2	11- to 16-inch								
2	Ignite	1.67	40	oz/a	POE				

TEMP2

COMPLETE SPLIT-PLOT AOV For ERICA % 12-03-04 7 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	940.625000				
R	2	231.250000	115.625000	3.000	0.1600	9
A	1	9.375000	9.375000	0.231	0.6784	11
ERROR A	2	81.250000	40.625000			
B	1	26.041667	26.041667	0.676	0.4573	7
AB	1	1.041667	1.041667	0.027	0.8774	10
ERROR B	4	154.166667	38.541667			
C	1	176.041667	176.041667	6.500	0.0342	5
AC	1	9.375000	9.375000	0.346	0.5725	7
BC	1	9.375000	9.375000	0.346	0.5725	7
ABC	1	26.041667	26.041667	0.962	0.3555	10
ERROR C	8	216.666667	27.083333			

COMPLETE SPLIT-PLOT AOV For ERICA % 12-10-04 14 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	5432.958333				
R	2	409.333333	204.666667	1.554	0.3166	16
A	1	2501.041667	2501.041667	12.685	0.0706	25
ERROR A	2	394.333333	197.166667			
B	1	12.041667	12.041667	0.091	0.7774	13
AB	1	2.041667	2.041667	0.016	0.9069	18
ERROR B	4	526.666667	131.666667			
C	1	477.041667	477.041667	5.491	0.0472	9
AC	1	330.041667	330.041667	3.799	0.0871	12
BC	1	40.041667	40.041667	0.461	0.5164	12
ABC	1	45.375000	45.375000	0.522	0.4904	18
ERROR C	8	695.000000	86.875000			

COMPLETE SPLIT-PLOT AOV For ERICA % 12-17-04 21 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	7524.000000				
R	2	571.750000	285.875000	2.999	0.1601	14
A	1	4320.166667	4320.166667	16.346	0.0561	29
ERROR A	2	528.583333	264.291667			
B	1	150.000000	150.000000	1.573	0.2780	11
AB	1	204.166667	204.166667	2.142	0.2172	16
ERROR B	4	381.333333	95.333333			
C	1	416.666667	416.666667	5.679	0.0443	8
AC	1	308.166667	308.166667	4.200	0.0746	11
BC	1	42.666667	42.666667	0.581	0.4676	11
ABC	1	13.500000	13.500000	0.184	0.6793	16
ERROR C	8	587.000000	73.375000			

COMPLETE SPLIT-PLOT AOV For ERICA % 12-23-04 27 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	28297.833333				
R	2	1220.083333	610.041667	4.061	0.1089	17
A	1	19266.666667	19266.666667	43.586	0.0222	37
ERROR A	2	884.083333	442.041667			
B	1	8.166667	8.166667	0.054	0.8271	14
AB	1	96.000000	96.000000	0.639	0.4688	20
ERROR B	4	600.833333	150.208333			
C	1	2128.166667	2128.166667	6.390	0.0354	17
AC	1	1232.666667	1232.666667	3.701	0.0906	24
BC	1	4.166667	4.166667	0.013	0.9137	24
ABC	1	192.666667	192.666667	0.579	0.4687	34
ERROR C	8	2664.333333	333.041667			

University of Arkansas

**Resistant and Susceptible Horseweed Response to Ignite
Growth chamber, Fayetteville**

Trial ID: RESSUS

Location: Fayetteville, AR

Investigator: McClelland, Talbert

Objective: To compare response of glyphosate-resistant and susceptible horseweed to Ignite (glufosinate) and to compare response of plants under cool and warm temperature regimes.

Conclusions: Factors: warm (78/59 F) and cool (58/44) day/night temperature regimes; resistant and susceptible plants; Ignite applied at 10, 20, 30, and 40 oz/A (0.13, 0.26, 0.39, 0.52 lb ai/A, respectively). All plants were in the rosette stage with 36 leaves.

Ignite at 20, 30, and 40 oz/A controlled all plants by 21 DAT. Many plants treated with the 10-oz rate had significant regrowth, especially those maintained at the warm temperature regime. The data suggest that glyphosate-resistant plants were more tolerant to glufosinate at 10 oz/A than susceptible plants. However, there were fewer susceptible plants available for testing at this rate, and resistance to glufosinate is not suspected. In the cool temperature and for all other Ignite rates, there was no indication that glyphosate-resistant plants also had resistance to glufosinate. Although these plants were larger than previous plants tested at the rosette stage, they were still quite susceptible to glufosinate. The experiment should also be conducted with larger plants.

CROP AND WEED DESCRIPTION

Weed Code Common Name Scientific Name

1. ERICA horseweed Conyza canadensis (glyphosate-resistant)

Study Design: SPLIT-PLOT **Reps:** 3 4-inch-diam pots, 2 plants/pot

APPLICATION DESCRIPTION

A

Application Date: 11-26-04
 Time of Day: 1 pm
 Application Method: spray
 Application Timing: post
 Appl. Placement: brofol
 Air Temp., Unit: 54 F
 % Relative Humidity: 80
 Wind Velocity, Unit: 5 mph
 Soil Moisture: adequate
 % Cloud Cover: 100

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage: ERICA 36 lvs
 Stage Scale: rosette

APPLICATION EQUIPMENT

A

Appl. Equipment: backpack
 Operating Pressure: 32 psi
 Nozzle Type: flat fan
 Nozzle Size: 80015
 Nozzle Spacing, Unit: 18 in.
 Nozzles/Row: 2
 Band Width, Unit: 36 in.
 Boom Length, Unit: 18 in.
 Boom Height, Unit: 24 in.
 Ground Speed, Unit: 3 mph
 Carrier: water
 Spray Volume, Unit: 15 gpa
 Propellant: CO2

Seed started in large flats 9-27-04. Used Marion resistant seed and susceptible Fayetteville seed. Put in growth chambers 11-21. Sprayed 11-26. Plant size at application: 36 leaves. Temps were quite steady: cool: 58/44; warm: 76/59; rel humid. avg. 45%; Light intensity: 400 umol/m²/s (PAR). Plants were fertilized with Miracle Gro every 7 to 10 days.

University of Arkansas

Resistant and Susceptible Horseweed Response to Ignite
Growth chamber, Fayetteville

Weed Code	ERICA	ERICA	ERICA	ERICA
Rating Unit	%	%	%	%
Rating Date	12-03-04	12-10-04	12-17-04	12-23-04
Trt-Eval Interval	7 DA-A	14 DA-A	21 DA-A	27 DA-A

Trt No.	Treatment Name	Rate	Appl Unit	Code
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TABLE OF A MEANS

1	Warm (78/59)	88	97	96	87
2	Cool (58/44)	67	98	99	99
	LSD (5%)	12	NS	NS	NS

TABLE OF B MEANS (All NS)

1	Resistant	78	97	95	92
2	Susceptible	77	98	99	94

TABLE OF C MEANS

1	Ignite	10	oz/a	POE	70	92	90	72
2	Ignite	20	oz/a	POE	76	99	100	100
3	Ignite	30	oz/a	POE	81	99	100	100
4	Ignite	40	oz/a	POE	83	100	100	100
	LSD (5%)				4	3	6	11

TABLE OF AB MEANS (All NS)

1	Warm (78/59)	89	95	92	84
1	Resistant				
2	Cool (58/44)	68	99	99	100
1	Resistant				
1	Warm (78/59)	88	99	100	90
2	Susceptible				
2	Cool (58/44)	66	98	99	98
2	Susceptible				

TABLE OF AC MEANS

1	Warm (78/59)		73	88	82	48
1	Ignite	10	oz/a	POE		
2	Cool (58/44)		68	97	98	95
1	Ignite	10	oz/a	POE		
1	Warm (78/59)		88	99	100	100
2	Ignite	20	oz/a	POE		
2	Cool (58/44)		64	98	100	100
2	Ignite	20	oz/a	POE		
1	Warm (78/59)		95	100	100	100
3	Ignite	30	oz/a	POE		
2	Cool (58/44)		68	99	100	100
3	Ignite	30	oz/a	POE		
1	Warm (78/59)		98	100	100	100
4	Ignite	40	oz/a	POE		
2	Cool (58/44)		68	99	100	100
4	Ignite	40	oz/a	POE		

RESSUS

Trt	Treatment	Rate	Appl	ERIC	ERIC	ERIC	ERIC
No.	Name	Rate	Unit	Code	%	%	%
1	Resistant			73	88	83	68
1	Ignite	10	oz/a	POE			
2	Susceptible			68	96	98	75
1	Ignite	10	oz/a	POE			
1	Resistant			75	99	100	100
2	Ignite	20	oz/a	POE			
2	Susceptible			78	98	100	100
2	Ignite	20	oz/a	POE			
1	Resistant			81	99	100	100
3	Ignite	30	oz/a	POE			
2	Susceptible			82	99	100	100
3	Ignite	30	oz/a	POE			
1	Resistant			84	100	100	100
4	Ignite	40	oz/a	POE			
2	Susceptible			82	100	100	100
4	Ignite	40	oz/a	POE			
	LSD (5%)			NS	5	8	NS

TABLE OF ABC MEANS

1	Warm (78/59)			77	78	66	37
1	Resistant						
1	Ignite	10	oz/a	POE			
2	Cool (58/44)			70	98	99	99
1	Resistant						
1	Ignite	10	oz/a	POE			
1	Warm (78/59)			70	97	98	60
2	Susceptible						
1	Ignite	10	oz/a	POE			
2	Cool (58/44)			65	95	97	90
2	Susceptible						
1	Ignite	10	oz/a	POE			
1	Warm (78/59)			87	100	100	100
1	Resistant						
2	Ignite	20	oz/a	POE			
2	Cool (58/44)			63	99	99	99
1	Resistant						
2	Ignite	20	oz/a	POE			
1	Warm (78/59)			90	99	100	100
2	Susceptible						
2	Ignite	20	oz/a	POE			
2	Cool (58/44)			65	98	100	100
2	Susceptible						
2	Ignite	20	oz/a	POE			
1	Warm (78/59)			94	100	100	100
1	Resistant						
3	Ignite	30	oz/a	POE			
2	Cool (58/44)			67	99	99	100
1	Resistant						
3	Ignite	30	oz/a	POE			
1	Warm (78/59)			95	100	100	100
2	Susceptible						
3	Ignite	30	oz/a	POE			
2	Cool (58/44)			68	99	100	100
2	Susceptible						
3	Ignite	30	oz/a	POE			
1	Warm (78/59)			98	100	100	100
1	Resistant						
4	Ignite	40	oz/a	POE			

University of Arkansas

Weed Code Rating Data Type Rating Unit Rating Date Trt-Eval Interval	ERICA			
	%	%	%	%
	12-03-04	12-10-04	12-17-04	12-23-04
	7 DA-A	14 DA-A	21 DA-A	27 DA-A
Trt Treatment No. Name	Rate	Appl Unit	Code	
2 Cool (58/44)		70	99	100
1 Resistant				100
4 Ignite	40	oz/a	POE	
1 Warm (78/59)		97	100	100
2 Susceptible				100
4 Ignite	40	oz/a	POE	
2 Cool (58/44)		67	99	100
2 Susceptible				100
4 Ignite	40	oz/a	POE	
	LSD (5%)	NS	6	12
				NS

COMPLETE SPLIT-PLOT AOV For ERICA % 12-03-04 7 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	47	8882.666667				
R	2	82.291667	41.145833	0.735	0.5346	7
A	1	5590.083333	5590.083333	59.298	0.0164	12
ERROR A	2	188.541667	94.270833			
B	1	14.083333	14.083333	0.252	0.6423	6
AB	1	0.333333	0.333333	0.006	0.9422	8
ERROR B	4	223.833333	55.958333			
C	3	1125.666667	375.222222	18.229	0.0001	4
AC	3	1030.250000	343.416667	16.684	0.0001	5
BC	3	124.916667	41.638889	2.023	0.1375	5
ABC	3	8.666667	2.888889	0.140	0.9348	8
ERROR C	24	494.000000	20.583333			

COMPLETE SPLIT-PLOT AOV For ERICA % 12-10-04 14 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	47	1721.812500				
R	2	16.625000	8.312500	0.524	0.6281	4
A	1	25.520833	25.520833	1.214	0.3854	6
ERROR A	2	42.041667	21.020833			
B	1	31.687500	31.687500	1.996	0.2306	3
AB	1	82.687500	82.687500	5.209	0.0846	5
ERROR B	4	63.500000	15.875000			
C	3	448.229167	149.409722	10.115	0.0002	3
AC	3	227.562500	75.854167	5.135	0.0069	5
BC	3	148.729167	49.576389	3.356	0.0355	5
ABC	3	280.729167	93.576389	6.335	0.0026	6
ERROR C	24	354.500000	14.770833			

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COMPLETE SPLIT-PLOT AOV For ERICA % 12-17-04 21 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	47	4729.666667				
R	2	92.041667	46.020833	0.958	0.4570	7
A	1	176.333333	176.333333	3.525	0.2012	9
ERROR A	2	100.041667	50.020833			
B	1	184.083333	184.083333	3.833	0.1218	6
AB	1	200.083333	200.083333	4.167	0.1108	8
ERROR B	4	192.083333	48.020833			
C	3	860.833333	286.944444	5.972	0.0034	6
AC	3	608.833333	202.944444	4.224	0.0156	8
BC	3	477.083333	159.027778	3.310	0.0372	8
ABC	3	685.083333	228.361111	4.753	0.0097	12
ERROR C	24	1153.166667	48.048611			

COMPLETE SPLIT-PLOT AOV For ERICA % 12-23-04 27 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	47	19777.312500				
R	2	338.625000	169.312500	1.058	0.4278	12
A	1	1575.520833	1575.520833	10.450	0.0838	15
ERROR A	2	301.541667	150.770833			
B	1	42.187500	42.187500	0.264	0.6347	10
AB	1	188.020833	188.020833	1.175	0.3394	14
ERROR B	4	640.166667	160.041667			
C	3	7267.729167	2422.576389	15.140	0.0001	11
AC	3	4865.229167	1621.743056	10.135	0.0002	15
BC	3	105.229167	35.076389	0.219	0.8821	15
ABC	3	612.729167	204.243056	1.276	0.3050	21
ERROR C	24	3840.333333	160.013889			

University of Arkansas

Effect of shade on activity of Ignite on horseweed Growth chamber and greenhouse, Fayetteville

Trial ID: SHADE

Location: Fayetteville, AR

Investigator: Talbert, McClelland

Objective: Determine if shade affects control of glyphosate-resistant horseweed with Ignite and to compare control in the growth chamber and greenhouse.

Conclusions: Growth Chamber. Plants were maintained at a cool temperature regime (59/45 F day/night). Activity of Ignite was more rapid in no-shade than in shaded plants (97 vs 87% at 14 days after treatment [DAT] averaged over plant size and Ignite rate). However, by 22 DAT, control was 99 and 98% for no-shade and shaded plants, respectively. Control of all plants was at least 98% by 22 DAT, regardless of plant size or Ignite rate, and no regrowth occurred later.

Greenhouse. As in the growth chamber experiment, only main effects were significant (data shown only as randomized complete block analysis for ease of comparing individual treatments). Although control did not differ between shade and no shade at 7 DAT, control of plants in shade increased and control in non-shaded plants declined. By 22 DAT, control of plants in shade was 92 %, and those without shade were controlled only 68%. In the greenhouse environment, there were also differences in control between the 20 and 40 oz/A rates (64 and 89% at 28 DAT) and between the rosette and larger plants (98 and 61% at 28 DAT).

Discussion. Activity in the greenhouse was better on shaded plants than on non-shaded plants. In this and another experiment, plants maintained at the cool temperatures in the growth chamber (<60 F) appear to be more susceptible to Ignite than plants in warmer temperatures, although activity is initially slower at the cooler temperature. It is possible that plants grown in the warmer temperatures of the greenhouse have a greater ability for regrowth than those grown in cooler temperatures and that shaded conditions in the warmer greenhouse environment may also inhibit the plant's ability to begin new growth. Experiments should be repeated under controlled temperature regimes.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICAL HORSEWEED (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Study Design: SPLIT-PLOT **Reps:** 3 4-inch-diam. pots; 2 plants/pot

APPLICATION DESCRIPTION

A

Application Date:	11-04-04
Time of Day:	3 p.m.
Application Method:	SPRAY
Application Timing:	POST
Appl. Placement:	BROFOL
Air Temp., Unit:	58 F
% Relative Humidity:	65
Wind Velocity, Unit:	5 mph
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	20

WEED STAGE AT EACH APPLICATION

A

Weed 1 Code, Stage:	ERIC A ros. 14lf
Stage Scale:	3-in diam
Weed 2 Code, Stage:	ERIC A bush 55lf
Stage Scale:	4.3"tall

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APPLICATION EQUIPMENT

A

Appl. Equipment: BACKPACK
Operating Pressure: 30 PSI
Nozzle Type: FLAT FAN
Nozzle Size: 80015XR
Nozzle Spacing, Unit: 18 IN.
Nozzles/Row: 2
Band Width, Unit: 35 IN.
Boom Length, Unit: 18 IN.
Boom Height, Unit: 22 IN.
Ground Speed, Unit: 3 MPH
Carrier: WATER
Spray Volume, Unit: 15 GPA
Propellant: CO2

Trial Comments

Growth chamber::

-- set GC to 7.2 C (45F) day and night; goal was 55 F day (with lights on) at plant level. Temp avg.- 59 (no shade); 55 shade; night temp 45 F. Rel. humid. 42%. -- Light intensity at plant level=430 ug/cm²/s (PAR) for no shade; 185 PAR for shade. (sunlight=1250; building fluorescent lights=15 PAR). Taken with Li-Cor Steady State porometer. Greenhouse: avg. light intensity: 10:30 am : no shade = 620 PAR; shade = 240 PAR (under lights). IGNITE RATES: 20 oz/A = 0.26 lb ai/A; 40 oz/A = 0.52 lb ai/A.

DATA (% control)

Weed Code	Rating Date	Trt-Eval Interval	Trt Treatment No. Name	Form Conc	Rate	Unit	ERICA	ERICA	ERICA	ERICA	ERICA	ERICA	ERICA	ERICA
							Growth chamber	Growth chamber	Growth chamber	Growth chamber	GREEN HOUSE	GREEN HOUSE	GREEN HOUSE	GREEN HOUSE
					11-11-04	7 DA-A	11-18-04	14 DA-A	11-26-04	22 DA-A	12-02-04	28 DA-A	11-11-04	7 DA-A
1	No shade rosette (14-lf)				53	fl oz/a	99	100	100	100	91	85	65	67
2	No shade rosette (14-lf)				60	fl oz/a	99	100	100	100	99	100	100	100
3	No shade bush (55-lf)				57	fl oz/a	93	98	98	98	60	45	38	28
4	No shade bush (55-lf)				65	fl oz/a	97	99	99	99	80	78	68	60
5	Shade rosette (14-lf)				47	fl oz/a	87	99	100	100	98	100	100	100
6	Shade rosette (14-lf)				55	fl oz/a	92	100	100	100	98	100	100	100
7	Shade bush (55-lf)				43	fl oz/a	83	97	98	98	65	75	75	62
8	Shade bush (55-lf)				47	fl oz/a	87	97	98	98	80	94	95	95
LSD (P=.05)					6		5	0.8	1	13	22	30	28	
Treatment F					10.514		12.579	24.727	7.579	12.503	6.475	4.992	7.805	
Treatment Prob(F)					0.0001		0.0001	0.0001	0.0007	0.0001	0.0015	0.0052	0.0006	

University of Arkansas

**Split Applications of Ignite (glufosinate) on Glyphosate-Resistant Horseweed
Greenhouse, Fayetteville**

Trial ID: SPLIT

Location: Fayetteville, AR

Investigator: McClelland, Talbert

Objective: To compare single and repeated applications of Ignite for control of large glyphosate-resistant horseweed.

Conclusions: Factors: Ignite rates of 10, 20, 30, and 40 oz/A (0.13, 0.26, 0.39, 0.52 lb ai/A, respectively); one or two applications. Plants were 4 to 5 inches tall and had 88 leaves.

Repeated applications of Ignite increased horseweed control over single applications. An interaction between factors occurred, whereby control with 10 oz/A applied twice completely controlled horseweed, but control with 20 oz/A applied twice did not. A single application of 30 oz/A tended to control horseweed better than a single 40-oz rate, but the effect was not significant. This experiment should be conducted again with a larger plant sample. The variability in control in this small sample, however, is similar to variability seen in the field and leads us back to the question of why such variability occurs. As with many other postemergence herbicides, however, repeated applications are superior to single applications if control is not complete with a first application.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

SITE AND DESIGN

Study Design: FACTORIAL **Reps:** 3 4-inch-diam pots, two plants/pot

APPLICATION DESCRIPTION

	A	B
Application Date:	10-25-04	11-04-04
Time of Day:	2 pm	3 pm
Application Method:	spray	spray
Application Timing:	post	10-d afte
Appl. Placement:	BROFOL	BROFOL
Air Temp., Unit:	73 F	58 F
% Relative Humidity:	81	65
Wind Velocity, Unit:	5 mph	5 mph
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	Adequate
% Cloud Cover:	95	20

WEED STAGE AT EACH APPLICATION

	A	B
Weed 1 Code, Stage:	ERICA 88 lvs.	ERICA (partial
Stage Scale:	4-5.5 in.	control)

APPLICATION EQUIPMENT

	A	B
Appl. Equipment:	backpack	backpack
Operating Pressure:	32 psi	30 psi
Nozzle Type:	flat fan	flat fan
Nozzle Size:	80015XR	80015XR
Nozzle Spacing, Unit:	17 in.	17 in.
Nozzles/Row:	2	2
Band Width, Unit:	35 in.	35 in.
Boom Length, Unit:	17 in.	17 in.
Boom Height, Unit:	17 in.	17 in.
Ground Speed, Unit:	3 mph	3 mph
Carrier:	water	water
Spray Volume, Unit:	15 gpa	15 gpa
Propellant:	co2	co2

SPLIT

University of Arkansas

Split Applications of Ignite (glufosinate) on Glyphosate-Resistant Horseweed
Greenhouse, Fayetteville

Weed Code	ERIC	ERIC	ERIC	ERIC	ERIC
Rating Data Type	Control	Control	Control	Control	Control
Rating Unit	%	%	%	%	%
Rating Date	11-04-04	11-11-04	11-18-04	11-26-04	12-02-04
Trt-Eval Interval	10 DA-A	7 DA-B	14 DA-B	22 DA-B	28 DA-B
Trt Treatment Form Rate Appl Appl					
No. Name Conc Rate Unit Code Description					

TABLE OF R MEANS

Replicate 1	74	87	86	88	81
Replicate 2	77	86	77	75	75
Replicate 3	78	92	91	93	88

TABLE OF A MEANS

1 Ignite 10 oz 1.67 10 fl oz/a	63	79	71	73	68
2 Ignite 20 oz 1.67 20 fl oz/a	73	84	78	76	69
3 Ignite 30 oz 1.67 30 fl oz/a	83	96	99	100	100
4 Ignite 40 oz 1.67 40 fl oz/a	85	92	90	93	88
LSD (5%)	7	9	13	19	16

TABLE OF B MEANS

1 One applic.	A	POE	75	80	72	74	65
2 Repeated	AB	POE & 10 d later	78	96	97	96	97
		LSD (5%)	NS	6	9	13	11

TABLE OF AB MEANS

1 Ignite 10 oz 1.67 10 fl oz/a	A	POE	62	60	42	45	37
1 One applic.	A	POE	70	77	67	66	50
2 Ignite 20 oz 1.67 20 fl oz/a	A	POE	82	95	99	100	100
1 One applic.	A	POE	85	88	82	87	75
4 Ignite 40 oz 1.67 40 fl oz/a	A	POE	65	98	100	100	100
1 One applic.	AB	POE & 10 d later	77	92	89	85	88
1 Ignite 10 oz 1.67 10 fl oz/a	AB	POE & 10 d later	83	97	99	100	100
2 Repeated	AB	POE & 10 d later	85	96	99	100	100
2 Ignite 20 oz 1.67 20 fl oz/a	AB	POE & 10 d later	NS	12	19	26	23
2 Repeated	AB	POE & 10 d later	LSD (5%)				

SPLIT

University of Arkansas

Split Applications of Ignite (glufosinate) on Glyphosate-resistant Horseweed
Greenhouse, Fayetteville

FACTORIAL/POOLED ERROR AOV For ERICA Control 11-04-04 10 DA-A

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	2348.958333				
R	2	64.583333	32.291667	1.000	0.3927	6
A	3	1744.791667	581.597222	18.011	0.0001	7
B	1	51.041667	51.041667	1.581	0.2292	5
AB	3	36.458333	12.152778	0.376	0.7715	10
ERROR	14	452.083333	32.291667			

FACTORIAL/POOLED ERROR AOV For ERICA Control 11-11-04 7 DA-B

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	4574.958333				
R	2	163.583333	81.791667	1.630	0.2310	8
A	3	1103.458333	367.819444	7.331	0.0034	9
B	1	1488.375000	1488.375000	29.665	0.0001	6
AB	3	1117.125000	372.375000	7.422	0.0033	12
ERROR	14	702.416667	50.172619			

FACTORIAL/POOLED ERROR AOV For ERICA control 11-18-04 14 DA-B

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	11687.958333				
R	2	884.333333	442.166667	3.778	0.0487	12
A	3	2839.791667	946.597222	8.089	0.0023	13
B	1	3626.041667	3626.041667	30.986	0.0001	9
AB	3	2699.458333	899.819444	7.689	0.0028	19
ERROR	14	1638.333333	117.023810			

FACTORIAL/POOLED ERROR AOV For ERICA 11-26-04 22 DA-B

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	13161.333333				
R	2	1371.583333	685.791667	2.999	0.0824	16
A	3	3243.000000	1081.000000	4.728	0.0176	19
B	1	2860.166667	2860.166667	12.509	0.0033	13
AB	3	2485.500000	828.500000	3.623	0.0400	26
ERROR	14	3201.083333	228.648810			

FACTORIAL/POOLED ERROR AOV For ERICA 12-02-04 28 DA-B

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.05)
Total	23	16412.500000				
R	2	625.000000	312.500000	1.817	0.1989	14
A	3	4220.833333	1406.944444	8.179	0.0022	16
B	1	6016.666667	6016.666667	34.976	0.0001	11
AB	3	3141.666667	1047.222222	6.088	0.0072	23
ERROR	14	2408.333333	172.023810			

University of Arkansas

Control of Glyphosate-Resistant Horseweed with Preemergence Herbicides (Greenhouse)

Trial ID: HWPre Study Dir.: Grant Carter, Talbert, McClelland
Location: Fayetteville, AR Greenhouse

Objective: To evaluate efficacy of residual herbicides applied preemergence to glyphosate-resistant horseweed.

Conclusions: Residual herbicides that gave excellent (97 to 100%) preemergence horseweed control at 4 weeks after the initial planting were diuron, prometryn, fluometuron, linuron, flumioxazin, oxyfluorfen, and norflurazon. Control with these herbicides was at least 88% at 6 weeks after treatment (WAT) (11/12 rating). Control with metolachlor was unexplainably variable and will be reassessed. Activity of trifloxysulfuron increased from 70% at 4 WAT to 97% at 6 WAT. By 10 weeks after application (12/16 rating), control with fluometuron was still 89%, control with oxyfluorfen was fair (77%), and trifloxysulfuron and norflurazon were still giving 100% control. Activity of other herbicides had dissipated. Cotton was planted into the flats at 10 weeks after treatment to determine its response to these herbicide residues. Moderate stunting was evident from trifloxysulfuron and slightly less from pyrithiobac. Norfluazon caused some bleaching symptoms.

CROP AND WEED DESCRIPTION

Weed Code	Common Name	Scientific Name
1.	ERICA horseweed (glyphosate-resistant)	Conyza canadensis

cotton

Variety: PM1218 BR

Planting Date: 12-16-04 **Planting Method:** hand **Rate:** 6 seed/flat **Depth:** 0.5 in

SITE AND DESIGN

Plot Width, Unit: 0.25 FT	Plot Length, Unit: 0.25 FT	Reps: 3
Study Design: RANDOMIZED COMPLETE BLOCK		

APPLICATION DESCRIPTION

A

Application Date:	10-01-04
Application Method:	spray
Application Timing:	PRE
Applic. Placement:	soil
Air Temp., Unit:	72 F
Soil Moisture:	adequate

APPLICATION EQUIPMENT

A

Appl. Equipment:	spray chamber
Operating Pressure:	40 psi
Nozzle Type:	flat fan
Spray Volume, Unit:	15 GPA

Planting procedure:

Flats, 6 by 12 by 3 inches, were filled with moist Taloka silt loam. Flats were sprayed with herbicide treatments 10-1-04 in a laboratory spray chamber with flat fan nozzles set to deliver 15 gal/a output volume. Flats were placed in the greenhouse and were surface watered to activate the herbicides. Horseweed seeds (glyphosate-resistant from Crittenden County, AR) were placed on the surface of one-fourth of the area of each flat at planting times of approximately 0, 1, 2, and 3 weeks after treatment (WAT). At 6 and 8 WAT, seed were placed on the first and second areas of the flats after previous foliage (if any) was removed. After seeds were placed on the soil surface, they were covered with a layer of laboratory Kimwipe tissue, which was kept moist and then removed when seeds germinated. Treatments were rated for control (germination reduction and seedling injury) at 3 and 4 weeks after planting (WAP). A row of cotton (Paymaster 1218 BR) was planted across each flat approximately 10 WAT to evaluate residual cotton tolerance.

University of Arkansas

Horseweed Pre(Greenhouse)

Trial ID: HWPre

Weed Code		ERICA	ERICA	ERICA	ERICA	ERICA	ERICA	COTTON INJ
Planting date.....		(10-1)	(10-8)	(10-14)	(10-22)	(11-19)	(12-3)	(12-16)
Rating Data Type		%	%	%	%	%	%	%
Rating Date		10-29-04	11-05-04	11-12-04	11-19-04	12-16-04	12-23-04	01-06-04
Trt-Eval Interval (wk after planting)		4wap	4wap	4wap	4wap	4 wap	4 wap	3 wap
Wks after trt. (WAT)		4 WAT	5 WAT	6 WAT	7 WAT	10 WAT	11 WAT	13 WAT
1 Check		0	0	0	0	0	0	0
2 Diuron (Direx)	1	lb ai/a A	100	100	95	17	0	0
3 Metolachlor (Dual)	0.95	lb ai/a A	67	99	96	13	0	7
4 Prometryn (Caparol)	1	lb ai/a A	100	99	88	13	0	3
5 Fluometuron (Cotoran)	1.25	lb ai/a A	98	100	97	89	0	0
6 Pendimethalin (Prowl)	1	lb ai/a A	28	43	35	7	10	10
7 Linuron (Linex)	0.25	lb ai/a A	97	100	93	13	13	7
8 Flumioxazin (Valor)	0.063	lb ai/a A	100	99	97	23	25	15
9 Oxyfluorfen (Goal)	0.375	lb ai/a A	100	100	93	77	17	3
10 Pyriproxyfen (Staple)	0.042	lb ai/a A	60	72	77	20	0	32
11 Trifloxysulfuron (Envoy)	0.00705	lb ai/a A	70	85	100	100	100	47
12 Norflurazon (Zorial)	1.5	lb ai/a A	100	100	100	100	100	28
LSD (P=.05)		13	15	14	17	25	23	21
Treatment F		49.465	34.997	37.234	27.721	20.260	21.654	4.302
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0020

