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**MANAGING GLYPHOSATE-RESISTANT
HORSEWEED IN ARKANSAS COTTON
- 2004 -**

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INTRODUCTION

Glyphosate-resistant horseweed (*Conyza canadensis*), sometimes called marestalk, 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.	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

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
Applic. 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	ERICA	ERICA	ERICA	ERICA
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	16 DA-A	23 DA-A	30 DA-A	43 DA-A
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Trt No.	Treatment Name	Form Conc	Rate	Unit	Appl Code	16 DA-A	23 DA-A	30 DA-A	43 DA-A
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	ERICA	ERICA	ERICA	ERICA
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
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Trt No.	Treatment Name	Form Conc	Rate	Unit	Rate*Unit	Appl Code	11 DA-A	18 DA-A	25 DA-A	38 DA-A
1	UTC						0	0	0	0
2	Ignite (glufosinate)	1.67	40	oz/a	PPL		95	87	70	58
3	Ignite	1.67	32	oz/a	PPL		50	0	23	13
4	Ignite	1.67	24	oz/a	PPL		68	63	64	10
5	Ignite	1.67	32	oz/a	PPL		91	98	95	93
	2,4-D Amine	5	24	oz/a	PPL					
6	Ignite	1.67	32	oz/a	PPL		94	96	92	94
	2,4-D Amine	5	18	oz/a	PPL					
7	Ignite	1.67	32	oz/a	PPL		95	92	90	83
	2,4-D Amine	5	12	oz/a	PPL					
8	Ignite	1.67	32	oz/a	PPL		96	91	78	40
	2,4-D Amine	5	6	oz/a	PPL					
9	Ignite	1.67	24	oz/a	PPL		94	95	94	91
	2,4-D Amine	5	32	oz/a	PPL					
10	Ignite	1.67	24	oz/a	PPL		94	85	80	46
	2,4-D Amine	5	24	oz/a	PPL					
11	Ignite	1.67	24	oz/a	PPL		84	80	79	70
	2,4-D Amine	5	16	oz/a	PPL					
12	Ignite	1.67	24	oz/a	PPL		94	85	79	43
	2,4-D Amine	5	8	oz/a	PPL					
13	2,4-D Amine	5	32	oz/a	PPL		53	28	71	93
	NIS		0.25	% v/v	PPL					
14	2,4-D Amine	5	24	oz/a	PPL		58	40	76	90
	NIS		0.25	% v/v	PPL					
15	2,4-D Amine	5	16	oz/a	PPL		59	26	68	63
	NIS		0.25	% v/v	PPL					
16	2,4-D Amine	5	8	oz/a	PPL		58	20	69	56
	NIS		0.25	% v/v	PPL					
17	Roundup WeatherMax	5.5	1	lb ai/a	PPL		68	57	84	93
	2,4-D Amine	5	24	oz/a	PPL					
18	Roundup WeatherMax	5.5	1	lb ai/a	PPL		58	49	45	10
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	ERICA	ERICA	ERICA	ERICA
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	7 DA-A	15 DA-A	23 DA-A	37 DA-A
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

Weed Code	ERICA	ERICA	ERICA	ERICA
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 No.	Treatment Name	Form Conc	Rate	Unit	Appl Code	ERICA 03-30-04	ERICA 04-06-04	ERICA 04-13-04	ERICA 04-26-04
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	40.296
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)
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

Weed Code						ERICA	ERICA	ERICA	ERICA
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	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

Weed Code						ERICA	ERICA	ERICA	ERICA
Rating Data Type						Control	Control	Control	Control
Rating Unit						%	%	%	%
Rating Date						03-30-04	04-07-04	04-16-04	04-29-04
Trt-Eval Interval						7 DA-A	15 DA-A	24 DA-A	37 DA-A
Trt No.	Treatment 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	12.266	45.603
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 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
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 Valor (flumioxazin)
Lepanto, Poinsett Co., AR

Weed Code						ERICA	ERICA	ERICA	ERICA
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 No.	Treatment Name	Form Conc	Rate Rate*	Unit	Appl Code				
1	UTC					0	0	0	15
2	Valor (flumioxazin) (2 oz)	51	0.064	lb ai/a	PPL	13	10	40	16
	COC		1	% v/v	PPL				
3	Valor (1 oz)	51	0.032	lb ai/a	PPL	28	8	20	9
	COC		1	% v/v	PPL				
4	2,4-D Amine	5	1.25	lb ai/a	PPL	37	49	79	96
	COC		1	% v/v	PPL				
5	2,4-D Amine	5	0.94	lb ai/a	PPL	33	46	69	95
	COC		1	% v/v	PPL				
6	2,4-D Amine	5	0.625	lb ai/a	PPL	28	34	56	63
	COC		1	% v/v	PPL				
7	CLARITY (dicamba)	4	0.25	lb ai/a	PPL	28	38	63	89
	COC		1	% v/v	PPL				
8	CLARITY	4	0.125	lb ai/a	PPL	28	38	63	84
	COC		1	% v/v	PPL				
9	Valor	51	0.032	lb ai/a	PPL	50	36	65	80
	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	40	53	66	89
	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	40	46	68	88
	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	40	45	90	100
	CLARITY	4	0.25	lb ai/a	PPL				
	COC		1	% v/v	PPL				
13	Valor	51	0.032	lb ai/a	PPL	38	45	75	94
	CLARITY	4	0.125	lb ai/a	PPL				
	COC		1	% v/v	PPL				
14	Valor	51	0.032	lb ai/a	PPL	53	68	74	49
	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL				
	COC		1	% v/v	PPL				
15	Valor	51	0.064	lb ai/a	PPL	53	63	79	49
	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL				
	COC		1	% v/v	PPL				
16	Valor	51	0.032	lb ai/a	PPL	50	23	43	13
	Ignite	1.67	0.313	lb ai/a	PPL				
17	Ignite	1.67	0.313	lb ai/a	PPL	54	25	43	13
18	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL	35	50	81	65
LSD (P=.05)						11	14	24	25
Treatment F						13.133	12.463	7.113	14.411
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

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: 110115VS
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						ERICA	ERICA	ERICA	ERICA
Rating Data Type						Control	Control	Control	Control
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	Unit	Appl Code				
1	UTC					0	0	0	0
2	Valor (flumioxazin)	51	0.064	lb ai/a	PPL	9	6	30	8
	COC		1	% v/v	PPL				
3	Valor	51	0.032	lb ai/a	PPL	9	23	21	10
	COC		1	% v/v	PPL				
4	2,4-D Amine	4	1.25	lb ai/a	PPL	21	68	85	86
	COC		1	% v/v	PPL				
5	2,4-D Amine	4	0.94	lb ai/a	PPL	26	64	83	87
	COC		1	% v/v	PPL				
6	2,4-D Amine	4	0.625	lb ai/a	PPL	29	65	84	85
	COC		1	% v/v	PPL				
7	CLARITY	4	0.25	lb ai/a	PPL	13	65	83	99
	COC		1	% v/v	PPL				
8	CLARITY	4	0.125	lb ai/a	PPL	15	65	80	87
	COC		1	% v/v	PPL				
9	Valor	51	0.032	lb ai/a	PPL	33	71	86	99
	2,4-D Amine	4	1.25	lb ai/a	PPL				
	COC		1	% v/v	PPL				
10	Valor	51	0.032	lb ai/a	PPL	38	70	86	95
	2,4-D Amine	4	0.94	lb ai/a	PPL				
	COC		1	% v/v	PPL				
11	Valor	51	0.032	lb ai/a	PPL	43	70	84	77
	2,4-D Amine	4	0.625	lb ai/a	PPL				
	COC		1	% v/v	PPL				
12	Valor	51	0.032	lb ai/a	PPL	31	71	89	99
	CLARITY (dicamba)	4	0.25	lb ai/a	PPL				
	COC		1	% v/v	PPL				
13	Valor	51	0.032	lb ai/a	PPL	26	70	84	90
	CLARITY	4	0.125	lb ai/a	PPL				
	COC		1	% v/v	PPL				
14	Valor	51	0.032	lb ai/a	PPL	40	50	69	35
	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL				
	COC		1	% v/v	PPL				
15	Valor	51	0.064	lb ai/a	PPL	29	56	70	54
	Roundup WeatherMax	5.5	0.95	lb ai/a	PPL				
	COC		1	% v/v	PPL				
16	Valor	51	0.032	lb ai/a	PPL	45	38	54	55
	Ignite	1.67	0.313	lb ai/a	PPL				
17	Ignite	1.67	0.313	lb ai/a	PPL	70	55	53	34
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

Weed Code					ERICA	ERICA	ERICA	ERICA	
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				PPL	0	0	0	5
2	Aim EC (carfentrazone)	2	0.5	oz/a	PPL	71	36	74	64
	Roundup WeatherMax	5.5	1.09	pt/a	PPL				
	COC		1	pt/a	PPL				
3	Aim EC	2	0.5	oz/a	PPL	63	50	69	46
	Roundup WeatherMax	5.5	1.09	pt/a	PPL				
	Diuron	4	1.5	pt/a	PPL				
	COC		1	pt/a	PPL				
4	Aim EC	2	0.5	oz/a	PPL	93	28	88	58
	Ignite (glufosinate)	1.67	24	oz/a	PPL				
	COC		1	pt/a	PPL				
5	Aim EC	2	0.5	oz/a	PPL	95	60	95	69
	Ignite	1.67	24	oz/a	PPL				
	Diuron (Direx)	4	1.5	pt/a	PPL				
	COC		1	pt/a	PPL				
6	Aim EC	2	0.5	oz/a	PPL	25	13	40	24
	Gramoxone Max (paraquat)	3	10.2	oz/a	PPL				
	COC		1	pt/a	PPL				
7	Aim EC	2	0.5	oz/a	PPL	19	20	18	18
	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	11	5	23	10
	Diuron	4	1.5	pt/a	PPL				
	COC		1	pt/a	PPL				
9	Aim EC	2	0.5	oz/a	PPL	51	25	86	76
	2,4-D LV Ester	4	1	pt/a	PPL				
	COC		1	pt/a	PPL				
10	Aim EC	2	0.5	oz/a	PPL	46	18	82	99
	Clarity (dicamba)	4	6	oz/a	PPL				
	COC		1	pt/a	PPL				
11	Aim EC	2	0.5	oz/a	PPL	34	31	93	100
	Distinct (diflufenzopyr/ dicamba)	76%	3	oz/a	PPL				
	COC		1	pt/a	PPL				
12	Roundup Weathermax	5.5	1.09	pt/a	PPL	54	28	79	54
13	2,4-D LV Ester	4	1.5	pt/a	PPL	44	33	80	82
	COC		1	pt/a	PPL				
14	Clarity	4	8	oz/a	PPL	25	16	84	96
	COC		1	pt/a	PPL				
LSD (P=.05)						26	28	22	23
Treatment F						10.111	2.604	16.054	16.259
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
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: 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					ERICA	ERICA	ERICA
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 No.	Treatment Name	Form Conc	Rate	Appl Unit Code			
1	UTC				0	0	0
2	Aim EC (carfentrazone)	2	0.5	oz/a	PPL	36	35
	Roundup WeatherMax	5.5	1.09	pt/a	PPL		
	COC		1	pt/a	PPL		
3	Aim EC	2	0.5	oz/a	PPL	9	35
	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	53	70
	Ignite (glufosinate)	1.67	24	oz/a	PPL		
	COC		1	pt/a	PPL		
5	Aim EC	2	0.5	oz/a	PPL	58	80
	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	13	28
	Gramoxone Max (paraquat)	3	10.2	oz/a	PPL		
	COC		1	pt/a	PPL		
7	Aim EC	2	0.5	oz/a	PPL	6	45
	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	35
	Diuron	4	1.5	pt/a	PPL		
	COC		1	pt/a	PPL		
9	Aim EC	2	0.5	oz/a	PPL	54	75
	2,4-D LV Ester	4	1	pt/a	PPL		
	COC		1	pt/a	PPL		
10	Aim EC	2	0.5	oz/a	PPL	48	80
	Clarity (dicamba)	4	6	oz/a	PPL		
	COC		1	pt/a	PPL		
11	Aim EC	2	0.5	oz/a	PPL	52	69
	Distinct (diflufenzopyr/ dicamba)	76	3	oz/a	PPL		
	COC		1	pt/a	PPL		
12	Roundup Weathermax	5.5	1.09	pt/a	PPL	13	50
13	2,4-D LV Ester	4	1.5	pt/a	PPL	33	48
	COC		1	pt/a	PPL		
14	Clarity	4	8	oz/a	PPL	41	70
	COC		1	pt/a	PPL		
LSD (P=.05)					29	21	27
Treatment F					4.396	10.304	14.070
Treatment Prob(F)					0.0002	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
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: 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

Weed Code					ERICA	ERICA	ERICA	ERICA	
Rating Data Type					Control	Control	Control	Control	
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	Unit	Appl Code				
1	UTC				PPL	0	0	0	
2	Aim EC (carfentrazone)	2	0.5	oz/a	PPL	38	23	53	
	Roundup WeatherMax	5.5	1.09	pt/a	PPL			45	
	COC		1	pt/a	PPL				
3	Aim EC	2	0.5	oz/a	PPL	33	25	64	
	Roundup WeatherMax	5.5	1.09	pt/a	PPL			45	
	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	
	Ignite (glufosinate)	1.67	24	oz/a	PPL			89	
	COC		1	pt/a	PPL				
5	Aim EC	2	0.5	oz/a	PPL	66	93	92	
	Ignite	1.67	24	oz/a	PPL			90	
	Diuron	4	1.5	pt/a	PPL				
	COC		1	pt/a	PPL				
6	Aim EC	2	0.5	oz/a	PPL	28	19	50	
	Gramoxone Max (paraquat)	3	10.2	oz/a	PPL			21	
	COC		1	pt/a	PPL				
7	Aim EC	2	0.5	oz/a	PPL	31	21	48	
	Gramoxone Max	3	10.2	oz/a	PPL			43	
	Diuron	4	1.5	pt/a	PPL				
	COC		1	pt/a	PPL				
8	Aim EC	2	0.5	oz/a	PPL	9	11	18	
	Diuron	4	1.5	pt/a	PPL			0	
	COC		1	pt/a	PPL				
9	Aim EC	2	0.5	oz/a	PPL	40	66	85	
	2,4-D LV Ester	4	1	pt/a	PPL			84	
	COC		1	pt/a	PPL				
10	Aim EC	2	0.5	oz/a	PPL	38	68	88	
	Clarity (dicamba)	4	6	oz/a	PPL			94	
	COC		1	pt/a	PPL				
11	Aim EC	2	0.5	oz/a	PPL	35	65	89	
	Distinct (diflufenzopyr/ dicamba)	76	3	oz/a	PPL			95	
	COC		1	pt/a	PPL				
12	Roundup Weathermax	5.5	1.09	pt/a	PPL	14	30	68	
13	2,4-D LV Ester	4	1.5	pt/a	PPL	28	61	85	
	COC		1	pt/a	PPL			89	
14	Clarity	4	8	oz/a	PPL	13	60	86	
	COC		1	pt/a	PPL			90	
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)	<i>Conyza canadensis</i>

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
Applic. 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
Stage Scale:	DESC		DESC		DESC		ERICA
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		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

University of Arkansas

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

Weed Code						ERICA	ERICA	ERICA	ERICA	ERICA
Rating Data Type						CONTROL	CONTROL	CONTROL	CONTROL	CONTROL
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	Rate Unit	Appl Code					
1	Untreated					0	0	0	0	0
2	Touchdown Total (glyph)	4.17	0.75	lb ae/a	A	48	60	63	66	53
	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	48	25	43	14
	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	50	38	53	35
	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	63	56	65	51
	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	63	58	64	49
	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	65	53	66	58
	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	60	55	66	55
	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	60	58	63	40
	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	68	53	63	49
	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	65	55	75	64
	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.

University of Arkansas

Weed Code	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	ERICA CONTROL PERCENT	ERICA CONTROL PERCENT	ERICA CONTROL PERCENT	ERICA CONTROL PERCENT	ERICA CONTROL PERCENT	
					03-30-04	04-06-04	04-19-04	05-12-04	06-01-04	
					11 DA-A	18 DA-A	31 DA-A	54 DA-A	42 DA-B	
Trt No.	Treatment Name	Form Conc	Rate	Rate Unit	Appl Code					
12	Clarity (dicamba)	4	0.25	lb ai/a	A	91	99	99	98	96
	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	100	98	98	98
	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	100	95	95	96
	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	100	99	97	97
	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	100	96	97	97
	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	63	53	56	45
	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.

University of Arkansas

Weed Code	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	ERICA CONTROL PERCENT 03-30-04 11 DA-A	ERICA CONTROL PERCENT 04-06-04 18 DA-A	ERICA CONTROL PERCENT 04-19-04 31 DA-A	ERICA CONTROL PERCENT 05-12-04 54 DA-A	ERICA CONTROL PERCENT 06-01-04 42 DA-B	
18	Envoke	75	0.00528	lb ai/a	A	59	60	61	64	61
	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					
	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	75	0.00528	lb ai/a	A	65	60	65	69	61
	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					
	AG-98		0.25	% v/v	D					
	Envoke	75	0.00702	lb ai/a	E					
	AG-98		0.25	% v/v	E					
20	Envoke	75	0.00528	lb ai/a	A	70	55	60	63	50
	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	0.00468	lb ai/a	E					
	AG-98		0.25	% v/v	E					
21	Envoke	75	0.00354	lb ai/a	A	43	70	83	91	84
	Touchdown Hi-Tech	5	0.75	lb ae/a	A					
	AG-98		0.25	% v/v	A					
	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	75	0.00528	lb ai/a	A	35	69	80	93	91
	Touchdown Hi-Tech	5	0.75	lb ae/a	A					
	AG-98		0.25	% v/v	A					
	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	0
LSD (P=.05)						10	9	14	16	22
Treatment F						44.601	67.220	30.085	21.603	14.555
Treatment Prob(F)						0.0001	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: STONEVILLE
Planting 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
Applic. 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

Weed Code				ERICA	ERICA	ERICA	ERICA
Rating Data Type				CONTROL	CONTROL	CONTROL	CONTROL
Rating Unit				PERCENT	PERCENT	PERCENT	PERCENT
Rating Date				04-14-04	04-19-04	05-12-04	06-01-04
Trt-Eval Interval				26 DA-A	31 DA-A	54 DA-A	20 DA-B
Trt No.	Treatment Name	Form Conc	Rate Rate	Appl Unit	Appl Code	Description	
1	Untreated check					0	0
2	Valor (flumioxazin)	51	0.063	lb ai/a	A	79	86
	2,4-D ester	3.8	0.475	lb ae/a	A		
	AG-98		0.25	% v/v	A		
	Roundup WeatherMax	4.5	0.77	lb ae/a	B		
	AMS	100	2.5	lb/a	B		
3	Valor	51	0.063	lb ai/a	A	66	79
	Ignite (glufosinate)	1.67	0.42	lb ai/a	A		
	AG-98		0.25	% v/v	A		
	Roundup WeatherMax	4.5	0.77	lb ae/a	B		
	AMS	100	2.5	lb/a	B		
4	Valor	51	0.063	lb ai/a	A	85	96
	2,4-D ester	3.8	0.475	lb ae/a	A		
	Roundup WeatherMax	4.5	0.77	lb ae/a	A		
	AG-98		0.25	% v/v	A		
	Roundup WeatherMax	4.5	0.77	lb ae/a	B		
	AMS	100	2.5	lb/a	B		
5	Roundup WeatherMax	4.5	0.77	lb ae/a	A	54	63
	AG-98		0.25	% v/v	A		
	Roundup WeatherMax	4.5	0.77	lb ae/a	B		
	AMS	100	2.5	lb ai/a	B		
LSD (P=.05)						13	16
Treatment F						59.220	49.376
Treatment Prob(F)						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 evaluate 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: 12.7 FT Plot Length, Unit: 40 FT Reps: 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

Weed Code					ERICA	ERICA	ERICA	
Rating Data Type					CONTROL	CONTROL	CONTROL	
Rating Unit					PERCENT	PERCENT	PERCENT	
Rating Date					04-12-04	04-20-04	05-05-04	
Trt-Eval Interval					6 DA-A	14 DA-A	29 DA-A	
Trt No.	Treatment Name	Form Conc	Rate	Unit	Appl 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

Weed Code				ERICA	ERICA	ERICA	ERICA	ERICA		
Rating Data Type				Control	Control	Control	Control	Control		
Rating Unit				%	%	%	%	%		
Rating Date				05-15-04	05-24-04	06-01-04	06-07-04	06-17-04		
Trt-Eval Interval				7 DA-A	16 DA-A	24 DA-A	30 DA-A	40 DA-A		
Trt No.	Treatment Name	Form Conc	Rate	Unit	Appl 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 (trifloxysulfuron) 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
 Applic. 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+/ft² 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

Weed Code	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %
Rating Data Type	05-24-04	06-01-04	06-09-04	06-17-04	07-23-04
Rating Unit	8 DA-A	16 DA-A	24 DA-A	32 DA-A	68 DA-A
Rating Date					
Trt-Eval Interval					

Trt No.	Treatment Name	Form Conc	Rate	Unit	Appl Code	1	2	3	4	5
1	Check					0	0	0	0	0
2	Paraquat (2pts)	3	0.75	lb ai/a	A	100	100	98	96	98
	AG-98		0.25	% v/v	A					
3	Buctril (bromoxynil)	4	0.5	lb ai/a	A	97	92	97	83	97
4	Envoke (trifloxysulfuron)	75	0.00705	lb ai/a	A	40	60	75	77	88
	AG-98		0.25	% v/v	A					
5	MSMA	6.6	2	lb ai/a	A	72	77	72	70	70
	AG-98		0.25	% v/v	A					
6	MSMA	6.6	2	lb ai/a	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	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	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	A	40	52	60	58	58
10	Clarity (dicamba) 8oz	4	0.25	lb ae/a	A	43	77	82	93	99
11	Roundup Weathermax (glyph)	4.5	0.56	lb ae/a	A	100	100	100	100	100
12	Stinger (clopyralid)0.5pt	3	0.19	lb ae/a	A	40	58	67	87	100
13	FirstRate (cloransulam)	84	0.016	lb ai/a	A	38	58	82	78	80
	AG-98		0.25	% v/v	A					
14	Ignite 32oz	1.67	0.42	lb ai/a	A	100	99	100	100	92
15	Ignite 40oz	1.67	0.52	lb ai/a	A	100	100	100	100	98
16	Ignite 40oz	1.67	0.52	lb ai/a	A	97	99	100	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	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	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	100
	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	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 diflufenzopyr 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 + diflufenzopyr (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
Applic. 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	23 psi	23 psi	23 psi	23 psi
Nozzle Type:	flat fan	flat fan	flat fan	flat fan	flat fan
Nozzle Size:	8002xr	8002XR	8002XR	8002XR	8002XR
Nozzle Spacing, Unit:	18 in.	18 in.	18 in.	18 in.	18 in.
Nozzles/Row:	2	2	2	2	2
Band Width, Unit:	36 in.	36 in.	36 in.	36 in.	36 in.
Boom Length, Unit:	18	18	18	18	18
Boom Height, Unit:	20	20	20	20	20
Ground Speed, Unit:	3 mph	3 mph	3 mph	3 mph	3 mph
Carrier:	water	water	water	water	water
Spray Volume, Unit:	15 GPA	15 GPA	15 GPA	15 GPA	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

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

Crop	Cotton	Cotton	Cotton	Cotton	Cotton
Rating data	injury	injury	injury	injury	injury
Rating Data Type	%	%	%	%	%
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
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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	1	0
2	22 DPP	B	1	1	1	2	1
3	14 DPP	C	8	8	12	6	3
4	7 DPP	D	12	16	22	10	5
5	at planting	E	39	44	46	30	11
	LSD (5%)		7	6	7	5	4

TABLE OF B MEANS

1	2,4-D ester	0.71 lb ae/a	13	13	13	9	3
2	2,4-D ester	0.475 lb ae/a	12	11	13	5	3
3	2,4-D ester	0.237 lb ae/a	12	11	13	7	3
4	Dicamba (Clarity)	0.375 lb ae/a	16	20	21	17	7
5	Dicamba	0.25 lb ae/a	17	19	22	14	3
6	Dicamba	0.125 lb ae/a	10	12	16	8	9
7	Valor (flumioxazin)	0.032 lb ai/a	4	4	7	3	2
8	Valor	0.064 lb ai/a	8	9	10	4	3
9	Diflufenzopyr + dicamba	0.175 lb ai/a	11	17	22	13	5
9	(Distinct, 0.05 + 0.125 lbae)						
10	Diflufenzopyr + dicamba	0.175 lb ae/a	17	23	27	18	5
10	(Distinct, 0.05 + 0.125 lbae)						
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	0
1	2,4-D ester	0.71 lb ae/a					
2	22 DPP	B	0	0	0	0	0
1	2,4-D ester	0.71 lb ae/a					
3	14 DPP	C	0	0	1	3	3
1	2,4-D ester	0.71 lb ae/a					
4	7 DPP	D	3	6	5	0	0
1	2,4-D ester	0.71 lb ae/a					
5	at planting	E	58	60	58	41	10
1	2,4-D ester	0.71 lb ae/a					
1	29 DPP	A	0	0	0	0	0
2	2,4-D ester	0.475 lb ae/a					
2	22 DPP	B	3	0	0	4	0
2	2,4-D ester	0.475 lb ae/a					
3	14 DPP	C	4	5	8	0	0
2	2,4-D ester	0.475 lb ae/a					
4	7 DPP	D	6	3	10	0	8
2	2,4-D ester	0.475 lb ae/a					
5	at planting	E	48	49	48	21	6
2	2,4-D ester	0.475 lb ae/a					

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

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

University of Arkansas

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			

University of Arkansas

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
Applic. 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.

University of Arkansas

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 Rate	Appl Unit	Appl Code	Description
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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-lf	86	99	100	100
2	45-lf	75	71	52	32
3	54-lf	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-lf				
2	cool/cool	88	99	100	100
1	11-lf				
3	cool/warm	86	99	100	100
1	11-lf				
4	warm/cool	88	99	100	100
1	11-lf				
5	warm/warm	90	100	100	100
1	11-lf				
1	greenhous	76	86	87	78
2	45-lf				
2	cool/cool	77	66	45	16
2	45-lf				
3	cool/warm	73	70	43	17
2	45-lf				
4	warm/cool	78	68	50	31
2	45-lf				
5	warm/warm	71	64	38	18
2	45-lf				
1	greenhous	73	81	81	65
3	54-lf				
2	cool/cool	80	67	45	27
3	54-lf				
3	cool/warm	72	61	37	22
3	54-lf				
4	warm/cool	79	69	45	26
3	54-lf				

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Weed Code	ERICA Control	ERICA Control	ERICA Control	ERICA Control
Rating Data Type	%	%	%	%
Rating Unit	09-22-04	09-29-04	10-06-04	10-13-04
Rating Date	1 WAT	2 WAT	3 WAT	4 WAT
Trt-Eval Interval				

Trt No.	Treatment Name	Form Conc	Rate	Appl Unit	Appl Code	Appl Description				
5	warm/warm						73	65	46	23
3	54-lf									
					(LSD)		NS	9	12	14

TABLE OF AC MEANS

1	greenhouse						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	greenhouse						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	greenhouse						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	NS	14

TABLE OF BC MEANS

1	11-lf						85	99	100	100
1	20 OZ Ignite									
2	45-lf						71	63	40	21
1	20 OZ Ignite									
3	54-lf						71	57	38	16
1	20 OZ Ignite									
1	11-lf						85	99	100	100
2	30 OZ Ignite									
2	45-lf						75	73	55	32
2	30 OZ Ignite									
3	54-lf						76	72	51	34
2	30 OZ Ignite									
1	11-lf						88	100	100	100
3	40 OZ Ignite									
2	45-lf						78	76	62	43
3	40 OZ Ignite									
3	54-lf						80	78	63	49
3	40 OZ Ignite									
					(LSD)		3	4	6	4

University of Arkansas

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 Rate	Appl Unit	Appl Code	Appl Description
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TABLE OF ABC MEANS *(interaction NS at each date)*

1	greenhouse					75	100	100	100
1	11-lf								
1	20 OZ Ignite								
2	cool/cool					86	99	100	100
1	11-lf								
1	20 OZ Ignite								
3	cool/warm					84	99	100	100
1	11-lf								
1	20 OZ Ignite								
4	warm/cool					89	100	100	100
1	11-lf								
1	20 OZ Ignite								
5	warm/warm					89	100	100	100
1	11-lf								
1	20 OZ Ignite								
1	greenhouse					73	78	68	43
2	45-lf								
1	20 OZ Ignite								
2	cool/cool					74	58	33	9
2	45-lf								
1	20 OZ Ignite								
3	cool/warm					68	60	25	11
2	45-lf								
1	20 OZ Ignite								
4	warm/cool					75	63	43	29
2	45-lf								
1	20 OZ Ignite								
5	warm/warm					68	58	31	13
2	45-lf								
1	20 OZ Ignite								
1	greenhouse					69	68	60	29
3	54-lf								
1	20 OZ Ignite								
2	cool/cool					75	55	38	16
3	54-lf								
1	20 OZ Ignite								
3	cool/warm					65	49	24	9
3	54-lf								
1	20 OZ Ignite								
4	warm/cool					74	58	31	9
3	54-lf								
1	20 OZ Ignite								
5	warm/warm					70	58	38	18
3	54-lf								
1	20 OZ Ignite								
1	greenhouse					79	100	100	100
1	11-lf								
2	30 OZ Ignite								
2	cool/cool					88	98	100	100
1	11-lf								
2	30 OZ Ignite								
3	cool/warm					84	99	100	100
1	11-lf								
2	30 OZ Ignite								
4	warm/cool					84	99	100	100
1	11-lf								
2	30 OZ Ignite								

University of Arkansas

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	Appl Unit	Appl Code	Description	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %
5	warm/warm						91	100	100	100
1	11-lf									
2	30 OZ Ignite									
1	greenhous						76	89	94	91
2	45-lf									
2	30 OZ Ignite									
2	cool/cool						78	69	46	14
2	45-lf									
2	30 OZ Ignite									
3	cool/warm						73	74	50	11
2	45-lf									
2	30 OZ Ignite									
4	warm/cool						78	69	46	24
2	45-lf									
2	30 OZ Ignite									
5	warm/warm						71	66	40	23
2	45-lf									
2	30 OZ Ignite									
1	greenhous						73	84	84	68
3	54-lf									
2	30 OZ Ignite									
2	cool/cool						79	69	40	23
3	54-lf									
2	30 OZ Ignite									
3	cool/warm						76	64	38	23
3	54-lf									
2	30 OZ Ignite									
4	warm/cool						79	74	41	25
3	54-lf									
2	30 OZ Ignite									
5	warm/warm						74	69	53	30
3	54-lf									
2	30 OZ Ignite									
1	greenhous						79	100	100	100
1	11-lf									
3	40 OZ Ignite									
2	cool/cool						89	100	100	100
1	11-lf									
3	40 OZ Ignite									
3	cool/warm						91	100	100	100
1	11-lf									
3	40 OZ Ignite									
4	warm/cool						91	99	100	100
1	11-lf									
3	40 OZ Ignite									
5	warm/warm						89	100	100	100
1	11-lf									
3	40 OZ Ignite									
1	greenhous						79	91	100	100
2	45-lf									
3	40 OZ Ignite									
2	cool/cool						79	73	55	26
2	45-lf									
3	40 OZ Ignite									
3	cool/warm						78	76	53	28
2	45-lf									
3	40 OZ Ignite									

University of Arkansas

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	Appl Unit	Appl Code	Description	ERICA control %	ERICA control %	ERICA control %	ERICA control %
4	warm/cool						81	71	60	40
2	45-lf									
3	40 OZ Ignite									
5	warm/warm						75	69	41	20
2	45-lf									
3	40 OZ Ignite									
1	greenhous						79	93	99	100
3	54-lf									
3	40 OZ Ignite									
2	cool/cool						85	78	58	44
3	54-lf									
3	40 OZ Ignite									
3	cool/warm						75	71	50	35
3	54-lf									
3	40 OZ Ignite									
4	warm/cool						85	76	62	45
3	54-lf									
3	40 OZ Ignite									
5	warm/warm						76	70	49	20
3	54-lf									
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			

University of Arkansas

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.	ERICA1 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.

University of Arkansas

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

Weed Code	ERICA	ERICA	ERICA	ERICA
Rating Data Type	Control	Control	Control	Control
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	Form Conc	Rate	Appl Unit	Code
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TABLE OF R MEANS

Replicate 1	69	81	80	62
Replicate 2	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
	<i>LSD</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>

TABLE OF B MEANS

1 5- to 7-inch	72	86	82	67
2 11- to 16-inch	74	87	87	68
	<i>LSD</i>	<i>(all NS)</i>		

TABLE OF C MEANS

1 Ignite	1.67	30	oz/a	POE	70	82	80	58
2 Ignite	1.67	40	oz/a	POE	76	91	89	77
	<i>LSD</i>				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				
	<i>LSD</i>	<i>(all NS)</i>		

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
	<i>LSD (0.1)</i>	<i>NS</i>	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

University of Arkansas

Weed Code	ERICA	ERICA	ERICA	ERICA
Rating Data Type	Control	Control	Control	Control
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	Form Conc	Rate	Unit	Appl Code	ERICA Control %	ERICA Control %	ERICA Control %	ERICA Control %
2	Warm (76/59)					70	70	60	17
1	5- to 7-inch								
1	Ignite	1.67	30	oz/a	POE				
1	Cool (58/44)					73	97	96	90
2	11- to 16-inch								
1	Ignite	1.67	30	oz/a	POE				
2	Warm (76/59)					68	67	67	28
2	11- to 16-inch								
1	Ignite	1.67	30	oz/a	POE				
1	Cool (58/44)					75	97	98	97
1	5- to 7-inch								
2	Ignite	1.67	40	oz/a	POE				
2	Warm (76/59)					73	81	71	56
1	5- to 7-inch								
2	Ignite	1.67	40	oz/a	POE				
1	Cool (58/44)					77	98	99	99
2	11- to 16-inch								
2	Ignite	1.67	40	oz/a	POE				
2	Warm (76/59)					78	88	86	55
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

Application Date:	11-26-04	
Time of Day:	1 pm	
Application Method:	spray	WEED STAGE AT EACH APPLICATION
Application Timing:	post	A
Applic. Placement:	brofol	Weed 1 Code, Stage: ERICA 36 lvs
Air Temp., Unit:	54 F	Stage Scale: rosette
% Relative Humidity:	80	
Wind Velocity, Unit:	5 mph	
Soil Moisture:	adequate	
% Cloud Cover:	100	

APPLICATION EQUIPMENT

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

Weed Code		ERICA	ERICA	ERICA	ERICA
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

Trt No.	Treatment Name	Rate	Appl 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				

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Weed Code	ERICA	ERICA	ERICA	ERICA
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

Trt No.	Treatment Name	Rate	Appl Unit	Code				
2	Cool (58/44)				70	99	100	100
1	Resistant							
4	Ignite	40	oz/a	POE				
1	Warm (78/59)				97	100	100	100
2	Susceptible							
4	Ignite	40	oz/a	POE				
2	Cool (58/44)				67	99	100	100
2	Susceptible							
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			

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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
Applic. 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:	ERICA ros. 14lf
Stage Scale:	3-in diam
Weed 2 Code, Stage:	ERICA 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				ERICA	ERICA	ERICA	ERICA	ERICA	ERICA	ERICA	ERICA
Rating Date				Growth	Growth	Growth	Growth	GREEN	GREEN	GREEN	GREEN
Trt-Eval Interval				chamber	chamber	chamber	chamber	HOUSE	HOUSE	HOUSE	HOUSE
				11-11-04	11-18-04	11-26-04	12-02-04	11-11-04	11-18-04	11-26-04	12-02-04
				7 DA-A	14 DA-A	22 DA-A	28 DA-A	7 DA-A	14 DA-A	22 DA-A	28 DA-A
Trt No.	Treatment Name	Form Conc	Rate Unit	1	3	5	7	2	4	6	8
1	No shade rosette (14-lf)			53	99	100	100	91	85	65	67
	Ignite, 20 oz/A	1.67	20 fl oz/a								
2	No shade rosette (14-lf)			60	99	100	100	99	100	100	100
	Ignite, 40 oz/A	1.67	40 fl oz/a								
3	No shade bush (55-lf)			57	93	98	98	60	45	38	28
	Ignite, 20 oz/A	1.67	20 fl oz/a								
4	No shade bush (55-lf)			65	97	99	99	80	78	68	60
	Ignite, 40 oz/A	1.67	40 fl oz/a								
5	Shade rosette (14-lf)			47	87	99	100	98	100	100	100
	Ignite, 20 oz/A	1.67	20 fl oz/a								
6	Shade rosette (14-lf)			55	92	100	100	98	100	100	100
	Ignite, 40 oz/A	1.67	40 fl oz/a								
7	Shade bush (55-lf)			43	83	97	98	65	75	75	62
	Ignite, 20 oz/A	1.67	20 fl oz/a								
8	Shade bush (55-lf)			47	87	97	98	80	94	95	95
	Ignite, 40 oz/A	1.67	40 fl oz/a								
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
Applic. 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

University of Arkansas

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

Weed Code	ERICA	ERICA	ERICA	ERICA	ERICA
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 No.	Treatment Name	Form Conc	Rate	Unit	Appl Code	Appl Description
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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	80
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		62	60	42	45	37
1	One applic.				A	POE				
2	Ignite 20 oz	1.67	20	fl oz/a		70	77	67	66	50
1	One applic.				A	POE				
3	Ignite 30 oz	1.67	30	fl oz/a		82	95	99	100	100
1	One applic.				A	POE				
4	Ignite 40 oz	1.67	40	fl oz/a		85	88	82	87	75
1	One applic.				A	POE				
1	Ignite 10 oz	1.67	10	fl oz/a		65	98	100	100	100
2	Repeated				AB	POE & 10 d later				
2	Ignite 20 oz	1.67	20	fl oz/a		77	92	89	85	88
2	Repeated				AB	POE & 10 d later				
3	Ignite 30 oz	1.67	30	fl oz/a		83	97	99	100	100
2	Repeated				AB	POE & 10 d later				
4	Ignite 40 oz	1.67	40	fl oz/a		85	96	99	100	100
2	Repeated				AB	POE & 10 d later				
						LSD (5%)	NS	12	19	26
									26	23

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 pyriithiobac. 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

Trt No.	Treatment Name	Rate	Rate Unit	ERICA	ERICA	ERICA	ERICA	ERICA	ERICA	COTTON INJ
1	Check			0	0	0	0	0	0	0
2	Diuron (Direx)	1	lb ai/a A	100	100	100	95	17	0	0
3	Metolachlor (Dual)	0.95	lb ai/a A	67	99	78	96	13	0	7
4	Prometryn (Caparol)	1	lb ai/a A	100	99	100	88	13	0	3
5	Fluometuron (Cotoran)	1.25	lb ai/a A	98	100	98	97	89	0	0
6	Pendimethalin (Prowl)	1	lb ai/a A	28	43	57	35	7	10	10
7	Linuron (Linex)	0.25	lb ai/a A	97	100	90	93	13	13	7
8	Flumioxazin (Valor)	0.063	lb ai/a A	100	99	98	97	23	25	15
9	Oxyfluorfen (Goal)	0.375	lb ai/a A	100	100	95	93	77	17	3
10	Pyriithiobac (Staple)	0.042	lb ai/a A	60	72	75	77	20	0	32
11	Trifloxysulfuron (Envoke)	0.00705	lb ai/a A	70	85	97	100	100	100	47
12	Norflurazon (Zorial)	1.5	lb ai/a A	100	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



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