

University of Georgia

Controlling glyphosate-resistant Palmer amaranth with PRE herbicides.

Trial ID: C8-07

Study Dir.: Stanley Culpepper

Location: Macon County

Investigator: Stanley Culpepper

Reps: 3

Plots: 12 by 25 feet

Spray vol: 14.8 gal/ac

Mix size: 1.5 liters (min 1.1575)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Form Rate	Rate Unit	Grow Stg	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	Non-treated									101	210	302
2	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx	102	211	317
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
3	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	103	204	314
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
4	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	104	217	315
	Cotoran	4		L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
5	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	105	216	307
	Prowl H2O	3.8		L	2	PT/A	PRE	A	25.34 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
6	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	106	203	308
	Caparol	4		L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
7	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	107	208	303
	Direx	4		L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
8	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	108	220	309
	Staple	3.2		L	1.7	OZ/A	PRE	A	1.346 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
9	Reflex	2		L	1	PT/A	PRE	A	12.67 ml/mx	109	219	304
	Dual Magnum	7.62		L	0.75	PT/A	PRE	A	9.501 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			
10	Prowl H2O	3.8		L	2	PT/A	PRE	A	25.34 ml/mx	110	201	310
	Cotoran	4		L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Touchdown Total	4.17		SL	1.5	PT/A	POST	B	19.0 ml/mx			
	Suprend	80		WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6		L	2	PT/A	PD	C	25.34 ml/mx			
	COC			L	1	% V/V	PD	C	15.0 ml/mx			

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Reps: 3

Plots: 12 by 25 feet

Spray vol: 14.8 gal/ac

Mix size: 1.5 liters (min 1.1575)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Form Rate	Rate Unit	Grow Stg	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
11	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	111	218	312
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
	COC		L	L	1	% V/V	PD	C	15.0 ml/mx			
12	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	112	206	311
	Cotoran	4	L	L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
13	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	113	205	306
	Prowl H2O	3.8	L	L	2	PT/A	PRE	A	25.34 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
14	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	114	202	316
	Caparol	4	L	L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
15	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	115	209	319
	Direx	4	L	L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
16	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	116	215	313
	Staple	3.2	L	L	1.7	OZ/A	PRE	A	1.346 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
17	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	117	213	320
	Dual Magnum	7.62	L	L	0.75	PT/A	PRE	A	9.501 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
18	Reflex	2	L	L	1	PT/A	PRE	A	12.67 ml/mx	118	214	305
	Prowl H2O	3.8	L	L	2	PT/A	PRE	A	25.34 ml/mx			
	Cotoran	4	L	L	1.5	PT/A	PRE	A	19.0 ml/mx			
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
19	Non-treated									119	207	301
	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx			
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
	COC		L	L	1	% V/V	PD	C	15.0 ml/mx			
20	Sequence	5.25	SL	SL	2.5	PT/A	POST	B	31.67 ml/mx	120	212	318
	Suprend	80	WG	WG	30	OZ/A	PD	C	22.77 g/mx			
	MSMA	6	L	L	2	PT/A	PD	C	25.34 ml/mx			
	COC		L	L	1	% V/V	PD	C	15.0 ml/mx			

Sort Order: Treatment

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Reps: 3 Plots: 12 by 25 feet
 Spray vol: 14.8 gal/ac Mix size: 1.5 liters (min 1.1575)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Form Rate	Form Unit	Rate Stg	Grow Code	Appl to Measure	Amt Product 1	Product 2	Plot No. 3	By Rep
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Product quantities required for listed treatments and applications in one trial:

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
213.765	ml	Touchdown Total	4.17	SL	
512.350	g	Suprend	80	WG	
570.041	ml	MSMA	6	L	
337.464	ml	COC		L	
221.683	ml	Reflex	2	L	
95.007	ml	Cotoran	4	L	
126.676	ml	Prowl H20	3.8	L	
47.503	ml	Caparol	4	L	
47.503	ml	Direx	4	L	
3.365	ml	Staple	3.2	L	
23.752	ml	Dual Magnum	7.62	L	
356.276	ml	Sequence	5.25	SL	

- * 'Per area' calculations based on spray volume= 14.8 gal/ac, mix size= 1.5 liters (mix size basis).
- * Product amount calculations increased 25 % for overage adjustment.
- * 'Per volume' calculations use spray volume= 14.8 gal/ac, mix size= 1.5 liters.

Trial Comments

OBJECTIVE: Determine the most effective herbicide system to control glyphosate-resistant Palmer amaranth.

VISUAL COTTON INJURY:

1. Soil applied herbicides did not injure the crop, which was expected as no rainfall occurred for 17 d after planting.
2. Sequence POST caused leaf speckling and chlorosis as expected.
3. Injury could not be determined with layby treatments because the spray never got to the cotton for all the pigweed.

PALMER AMARANTH CONTROL:

1. Control was poor by all systems. Rainfall did not occur for 17 d after planting and the early flush was never controlled.
2. Data was variable but suggested that season long control was generally more consistent with at planting application of Reflex plus Direx.
3. Activity from Staple may have been hampered by ALS resistance also being present at a moderate level at this location.

PITTED MORNINGGLORY:

1. At plant herbicides including Reflex + Cotoran, Prowl + Cotoran, Reflex + Direx, and Reflex + Staple provided at least 70% control at 23 DAT. Again, excellent control considering lack of rain.
2. Glyphosate provided excellent control of emerged plants throughout the season.

CONCLUSIONS:

1. Dry land Roundup Ready cotton can not be produced when heavy populations of glyphosate-resistant Palmer amaranth are present, unless one can make it rain in a timely fashion.

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Weed Code			AMAPA	AMAPA	AMAPA	AMAPA	IPOLA	IPOLA			
Crop Code	cotton	cotton									
Rating Data Type	%	%	%	%	%	%	%	%			
Rating Unit	injury	injury	control	control	control	control	control	control			
Rating Date	May-11-07	May-18-07	May-11-07	May-18-07	Jun-19-07	Jul-10-07	May-11-07	Jun-19-07			
Trt-Eval Interval	23 DA-A	6 DA-B	23 DA-A	6 DA-B	10 DA-C	31 DA-C	23 DA-A	10 DA-C			
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7	8
18	Prowl H20	2	PT/A	0 a	11 abc	72 abc	47 ab	52 cde	45 b-e	73 ab	99 a
	Cotoran	1.5	PT/A								
	Sequence	2.5	PT/A								
	Suprend	30	OZ/A								
	MSMA	2	PT/A								
	COC	1	% V/V								
19	Non-treated			0 a	2 fg	0 e	0 c	0 f	0 g	0 f	0 b
20	Sequence	2.5	PT/A	0 a	9 bcd	0 e	50 ab	58 a-e	28 ef	0 f	98 a
	Suprend	30	OZ/A								
	MSMA	2	PT/A								
	COC	1	% V/V								
LSD (P=.05)				0.0	5.5	11.6	22.0	11.8	14.2	15.5	2.3
Standard Deviation				0.0	3.3	7.0	13.3	7.2	8.6	9.4	1.4
CV				0.0	49.8	12.48	30.13	13.64	24.92	19.64	1.58
Bartlett's X2				0.0	13.084	8.867	14.756	14.724	16.386	14.206	15.855
P(Bartlett's X2)				.	0.667	0.884	0.469	0.471	0.426	0.36	0.147

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

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Weed Code			IPOLA
Crop Code			
Rating Data Type			%
Rating Unit			control
Rating Date			Jul-10-07
Trt-Eval Interval			31 DA-C
Trt No.	Treatment Name	Rate	Rate Unit
			9
1	Non-treated		0 c
2	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
3	Reflex	1	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
4	Reflex	1	PT/A
	Cotoran	1.5	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
5	Reflex	1	PT/A
	Prowl H20	2	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
6	Reflex	1	PT/A
	Caparol	1.5	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
7	Reflex	1	PT/A
	Direx	1.5	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
8	Reflex	1	PT/A
	Staple	1.7	OZ/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
9	Reflex	1	PT/A
	Dual Magnum	0.75	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
10	Prowl H20	2	PT/A
	Cotoran	1.5	PT/A
	Touchdown Total	1.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V

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Weed Code			IPOLA
Crop Code			
Rating Data Type			%
Rating Unit			control
Rating Date			Jul-10-07
Trt-Eval Interval			31 DA-C
Trt No.	Treatment Name	Rate	Unit
			9
11	Reflex	1	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
12	Reflex	1	PT/A
	Cotoran	1.5	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
13	Reflex	1	PT/A
	Prowl H20	2	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
14	Reflex	1	PT/A
	Caparol	1.5	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
15	Reflex	1	PT/A
	Direx	1.5	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
16	Reflex	1	PT/A
	Staple	1.7	OZ/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
17	Reflex	1	PT/A
	Dual Magnum	0.75	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
18	Prowl H20	2	PT/A
	Cotoran	1.5	PT/A
	Sequence	2.5	PT/A
	Suprend	30	OZ/A
	MSMA	2	PT/A
	COC	1	% V/V
19	Non-treated		0 c

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Weed Code	IPOLA		
Crop Code			
Rating Data Type	%		
Rating Unit	control		
Rating Date	Jul-10-07		
Trt-Eval Interval	31 DA-C		
Trt No.	Treatment Name	Rate	Unit
			9
20	Sequence	2.5 PT/A	100 a
	Suprend	30 OZ/A	
	MSMA	2 PT/A	
	COC	1 % V/V	
LSD (P=.05)	2.1		
Standard Deviation	1.3		
CV	1.44		
Bartlett's X2	0.0		
P(Bartlett's X2)	.		

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

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Controlling glyphosate-resistant Palmer amaranth with PRE herbicides.

Trial ID: C8-07 Study Dir.: Stanley Culpepper
 Location: Macon County Investigator: Stanley Culpepper

GENERAL TRIAL INFORMATION

Study Director: Stanley Culpepper **Title:** Ext. Weed Science
Affiliation: Univ. of Georgia
Postal Code: 31794
Investigator: Stanley Culpepper **Title:** Ext. Weed Science
Affiliation: Univ. of Georgia
Postal Code: 31794

TRIAL LOCATION

City: Macon County **Trial Status:** completed
State/Prov.: GA **Trial Reliability:** good
Postal Code: _____ **Initiation Date:** Apr-17-07
Country: USA **Planned Completion Date:** _____
E-Longitude of LL Corner °: _____ **N-Latitude of LL Corner °:** _____
Altitude of LL Corner: _____ **Unit:** _____ **Angle y-axis to North °:** _____
Directions:

COOPERATOR/LANDOWNER

Cooperator: _____ **Country:** _____
Org: _____ **Phone No:** _____
Address 1: _____ **Fax No:** _____
Address 2: _____
City: _____
State/Prov: _____
Postal Code: _____

Conducted Under GLP (Y/N): N **Conducted Under GEP (Y/N):** N
Guidelines: _____ **Guideline Description:** _____

Objective:

Conclusions:

CROP AND WEED DESCRIPTION

Weed	Code	Common Name	Scientific Name
1.	AMAPA	Amaranth, Palmer	Amaranthus palmeri
2.	IPOLA	Morningglory, pitted	Ipomoea lacunosa

Crop 1: GOSHI COTTON, SHORT STAPLE **Variety:** DP 143 B2RF
Planting Date: Apr-17-07 **Planting Method:** hill drop
Rate: 2 8 in **Depth:** 0.75 in **Perennial Age:** ____ ____
Row Spacing: 36 in **Spacing Within Row:** ____ ____ **Seed Bed:** bedded
Soil Temperature: 54 F **Soil Moisture:** moist **Emergence Date:** Apr-23-07

SITE AND DESIGN

Plot Width, Unit: 12 FT **Plot Length, Unit:** 25 FT **Reps:** 3
Site Type: On Farm
Tillage Type: Conventional **Study Design:** RANDOMIZED COMPLETE BLOCK

Trial Initiation Comments:

	Previous Crops	Previous Pesticides	Year
1.			

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MAINTENANCE

Field Prep./Maintenance:

No.	Date	Maintenance Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit
1.							

SOIL DESCRIPTION

% Sand: 82	% OM: 6.3	Texture: loamy sand
% Silt: 14	pH: 2.0	Soil Name: _____
% Clay: 4	CEC: _____	Fert. Level: _____

ADDITIONAL MEASURED ELEMENTS

Element	Quantity	Unit

MOISTURE CONDITIONS

No.	Date	Time	Amount	Unit	Type	Interval	Unit
1.							

Overall Moisture Conditions: _____

Closest Weather Station: _____ Distance: _____ Unit: _____

APPLICATION DESCRIPTION

	A	B	C
Application Date:	Apr-18-07	May-12-07	Jun-09-07
Time of Day:	8:00 am	9:00 am	9:00 am
Application Method:	broadcast	broadcast	broadcast
Application Timing:	PRE	Post	PD
Applic. Placement:	on soil	overtop	directed
Air Temp., Unit:	60 F	83 F	88 F
% Relative Humidity:	48	42	47
Wind Velocity, Unit:	2 mph	0 mph	4 mph
Dew Presence (Y/N):	N	N	N
Water Hardness:			
Soil Temp., Unit:	57 F	80 F	91 F
Soil Moisture:	moist	fair	fair
% Cloud Cover:	100	100	0

CROP STAGE AT EACH APPLICATION

	A	B	C
Crop 1 Code, Stage:	GOSHI PRE	GOSHI POST	GOSHI PD
Stage Scale:	not up	1 leaf	10 leaf
Height, Unit:	0 inch	1.5 in	12 inch

WEED STAGE AT EACH APPLICATION

	A	B	C
Weed 1 Code, Stage:	AMAPA PRE	AMAPA POST	AMAPA PD
Stage Scale:	not up	2-5 inch	4-14 inch
Density, Unit:	0 ydsq	4 ydsq	40 ydsq
Weed 2 Code, Stage:	IPOLA PRE	IPOLA POST	IPOLA PD
Stage Scale:	not up	2 inch	< 3 inch
Density, Unit:	0 ydsq	2 ydsq	2 ydsq

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APPLICATION EQUIPMENT

	A	B	C
Appl. Equipment:	backpack	backpack	backpack
Operating Pressure:	24	24	26
Nozzle Type:	flat fan	flat fan	floodjet
Nozzle Size:	11002	11002	D2
Nozzle Spacing, Unit:	18 in	18 in	36 in
Nozzles/Row:	2	2	1
Band Width, Unit:			
Boom Length, Unit:	4.5 ft	4.5 ft	
Boom Height, Unit:	15 in	15 in	12 in
Ground Speed, Unit:	3 mph	3 mph	3 mph
Incorporation Equip.:			
Hours to Incorp.:			
Incorp. Depth, Unit:			
Carrier:	water	water	water
Spray Volume, Unit:	15 GPA	15 GPA	15 GPA
Spray pH:			
Propellant:	CO2	CO2	CO2
Tank Mix (Y/N):			

Trt No	Treatment Application Comment