

**DIRECTORS** | M.G. Collett, B.Sc.Agr., M.Sc., C.P.Ag.  
L.W. Mitchell, B.Agr.Sc.(Hons.), C.P.Ag.  
D.R. Litzow, B.Agr.Sc., C.P.Ag.  
I.S. Ridley, B.Rur.Sc.  
M.R. Lamond, B.Bus.(Agric.), ADFM

**Agrisearch Services Pty Ltd**

ABN 25 000 970 614

50 Leewood Drive  
PO Box 972  
Orange NSW 2800  
Australia

E-mail: [agrisearch@agrisearch.com.au](mailto:agrisearch@agrisearch.com.au)  
Web: [www.agrisearch.com.au](http://www.agrisearch.com.au)  
Telephone: (02) 6362 4539  
Facsimile: (02) 6362 7844

## **THE EVALUATION OF APPLICATION VOLUME AND SPRAY QUALITY ON THE EFFICACY OF ESTER + GARLON + ROUNDUP FOR THE CONTROL OF SUMMER WEEDS IN A KNOCKDOWN SITUATION**

**ONE TRIAL, MUNTADGIN, WESTERN AUSTRALIA,  
AUSTRALIA, 2013**

Submitted to: Bill Gordon  
Bill Gordon Consulting  
PO Box 4197  
Lawrence NSW 2460

Submitted by: Agrisearch Services Pty Ltd  
50 Leewood Drive  
Orange NSW 2800

Agrisearch Services Pty Ltd  
2 Maxwell Street  
York WA 6302

Project Manager: Michael Lamond

Experimenter: Les Finemore

Reference Project: GORDON/13/01, 130683, 130684

Report Number: GORDON/13/01-1

Date Submitted: 10 May 2013

**Orange NSW**  
50 Leewood Drive,  
Orange NSW 2800  
(02) 6362 4539

**Toowoomba QLD**  
78 Hampton Street,  
Toowoomba QLD 4350  
(07) 4634 7265

**Narrabri NSW**  
26 Wee Waa Road,  
Narrabri NSW 2390  
(02) 6792 4187

**Horsham VIC**  
31 Plumpton Road,  
Horsham VIC 3400  
(03) 5382 7229

**Gosford NSW**  
4/16 Jusfrute Drive,  
Gosford NSW 2250  
(02) 4322 8510

**Melbourne VIC**  
2 Parer Street,  
Reservoir VIC 3073  
(03) 9886 9968

**Wagga Wagga NSW**  
Unit 2, 5 Sutton Street,  
Wagga NSW 2650  
(02) 6971 9085

**Shepparton VIC**  
5 Grant Court,  
Shepparton VIC 3630  
(03) 5821 2021

**Bundaberg QLD**  
11/32 Wyllie Street,  
Thabeban QLD 4670  
(07) 4152 4294

**Adelaide SA**  
16 Sunbeam Road,  
Glynde SA 5070  
(08) 8365 7266

**Innisfail QLD**  
1/35 Station Street,  
Innisfail QLD 4860  
(07) 4061 7470

**York WA**  
2 Maxwell Street  
York WA 6302  
(08) 9641 2059

- CONTENTS -

Page Number

1. EXPERIMENTAL DETAILS .....3

2. RESULTS .....7

3. APPENDICES.....9

## 1. EXPERIMENTAL DETAILS

### 1.1 Site Details

Co-operator and Location	Curtis Liebeck, Muntadgin, Western Australia
Crop	Summer fallow
Soil Type	Sand
Seasonal Conditions	Moderate soil moisture conditions existed prior to spray application due to heavy rainfall events at the end of 2012. This aided weed growth over the summer period. During the trial period no significant rainfall events were recorded.

### 1.2 Target

Common Name	Scientific Name	Infestation Level
Mintweed	<i>Salvia reflexa</i>	5 per m <sup>2</sup> , 6-8 leaf
Paddy melon	<i>Cucumis myriocarpus</i>	2 per m <sup>2</sup> , 50 cm diameter

### 1.3 Treatment List

Treatment	Target Application Volume	Ute Speed (km/hr)	Spray Quality	Nozzles/Pressure
1. Untreated control	-	-	-	-
2. ROUNDUP + GARLON + ESTER	40 L/ha	25	Coarse	TT-110-025 @ 200 kPa
3. ROUNDUP + GARLON + ESTER	40 L/ha	28	Medium	AIXR-110-02 @ 400 kPa
4. ROUNDUP + GARLON + ESTER	40 L/ha	28	Extremely Coarse	TTI-110-015 @ 700 kPa
5. ROUNDUP + GARLON + ESTER	60 L/ha	25	Coarse	TT-110-03 @ 300 kPa
6. ROUNDUP + GARLON + ESTER	60 L/ha	26	Medium	AIXR-110-025 @ 500 kPa
7. ROUNDUP + GARLON + ESTER	60 L/ha	25	Extremely Coarse	TTI-110-02 @ 700 kPa

## 1.4 Formulations

ROUNDUP CT BROADACRE HERBICIDE – a granular formulation containing 450 g/kg glyphosate as the isopropylamine salt marketed by Monsanto.

GARLON 600 HERBICIDE – a granular formulation containing 600 g/L triclopyr present as butoxyethyl ester as marketed Dow AgroSciences Australia Limited.

KENSO AGCARE KEN-ESTER LV 680 SELECTIVE HERBICIDE - an emulsifiable concentrate formulation containing 680 g/L 2,4-D present as the ethyl hexyl ester marketed by Kenso Corporation.

## 1.5 Treatment Method

Equipment	Ute mounted boom spray
Nozzles	As per treatment
Nozzle Spacing	50 cm
Pressure	As per treatment
Water Volume	As per treatment
Boom Height	50 cm
Water Source	Water was sourced from the Agrisearch office in York and transported to the site to provide consistency.

## 1.6 Application Details

Night Application	
Date	5 February 2013
Time of Day	1500–1600 hours
Temperature at Target	17°C
Relative Humidity at Target	76%
Temperature at 1.25m	18.4°C
Relative Humidity at 1.25m	70%
Cloud Cover	0%
Wind	8-12 km/hr ESE
Application Rate – Roundup	700 mL
Application Rate – Garlon 600	70 mL
Application Rate – Ken-ester LV 680	480 mL

<b>Day Application</b>	
Date	5 February 2013
Time of Day	1020-1130 hours
Temperature at Target	31.3°C
Relative Humidity at Target	33%
Temperature at 1.25m	32°C
Relative Humidity at 1.25m	34%
Cloud Cover	0%
Wind	5-14 km/hr SE
Application Rate – Roundup	700 mL
Application Rate – Garlon 600	70 mL
Application Rate – Ken-ester LV 680	480 mL

## 1.7 Trial Design

Design	Randomised complete block
Replicates	Two
Plot Size	10 m x 100 m
Buffers	2 m (between plots, with 30 m buffer around trial)

## 1.8 Assessments

Date	Timing	Assessment
05-Feb-13	Pre-spray	Weed counts, weed ground cover
12-Feb-13	7 DAT	Weed counts, weed control
19-Feb-13	14 DAT	Weed counts, weed control

Assessments were made in the section of each plot on the downwind side, outside the tyre tracks and in part of plot where no effect from drift or changes in the tractor speed.

At the pre-spray assessment time, a point in each plot was permanently marked with a peg and a 1 metre square area centred on the peg was photographed. The weed species present were identified, counted and the ground cover (%) of each weed species present was estimated for each plot. At each assessment time, a one square metre quadrat was placed around this permanent marker and the surviving weeds present counted and recorded by species.

At the post spray assessment times, weed brownout/control was assessed using a 0-100 scale where 0 = no control, 50 = 50% brownout or reduction in weed biomass and 100 = complete control.

A photograph of each fixed quadrat within each plot was taken pre-spray and generally at each post spray assessment time. Photographs have been provided separately on a memory stick.

## **1.9 Statistical Analysis**

Statistical analyses were conducted using GenStat Release 11.1 (PC/Windows 2008 – Lawes Agricultural Trust, Rothamsted Experimental Station). The model includes all treatment effects. Analysis of variance and least significant difference (LSD) procedures were used.

## 2. RESULTS

Results are summarised in Tables 1-4 and are given fully in the appendices.

**Table 1 Agrisearch Services Summary of Results - Muntadgin, WA  
Night Time Application - 7 DAT**

Treatment/Nozzle	Pressure	App Rate	Mint Weed 7 DAT	Melon 7 DAT	Kerosene Grass 7 DAT
1. Untreated	-	-	0.0 d	0.0 c	0.0 d
2. TT-025 (Course)	2	40 L/ha	35.0 c	40.0 b	30.0 c
3. AIXR-02 (Medium)	4	40 L/ha	50.0 b	57.5 ab	35.0 c
4. TTI-015 (Ex Course)	7	40 L/ha	50.0 b	55.0 ab	45.0 b
5. TT-03 (Course)	3	60 L/ha	80.0 a	75.0 a	62.5 a
6. AIXR-025 (Medium)	5	60 L/ha	75.0 a	65.0 ab	65.0 a
7. TTI-02 (Ex Course)	7	60 L/ha	45.0 bc	65.0 ab	65.0 a
F Probability			<.001	0.005	<.001
LSD 5 %			11.9	26.4	8.2

Means within the same column with a letter in common are not significantly different ( $P>0.05$ )

**Table 1 Agrisearch Services Summary of Results - Muntadgin, WA  
Night Time Application - 14 DAT**

Treatment/Nozzle	Pressure	App Rate	Mint Weed 14 DAT	Melon 14 DAT	Kerosene Grass 14 DAT
1. Untreated	-	-	0.0 c	0.0 c	0.0 c
2. TT-025 (Course)	2	40 L/ha	90.0 b	100.0 a	65.0 b
3. AIXR-02 (Medium)	4	40 L/ha	90.0 b	100.0 a	67.5 ab
4. TTI-015 (Ex Course)	7	40 L/ha	100.0 a	97.5 a	70.0 ab
5. TT-03 (Course)	3	60 L/ha	100.0 a	100.0 a	77.5 a
6. AIXR-025 (Medium)	5	60 L/ha	95.0 ab	100.0 a	72.5 ab
7. TTI-02 (Ex Course)	7	60 L/ha	90.0 b	92.5 b	70.0 ab
F Probability			<.001	<.001	<.001
LSD 5 %			10.0	5.0	11.9

Means within the same column with a letter in common are not significantly different ( $P>0.05$ )

**Table 3 Agriseach Services Summary of Results - Muntadgin, WA  
Day Time Application - 7 DAT**

Treatment/Nozzle	Pressure	App Rate	Mint Weed 7 DAT	Melon 7 DAT	Kerosene Grass 7 DAT
1. Untreated	-	-	0.0 d	0.0 b	0.0 c
2. TT-025 (Course)	2	40 L/ha	30.0 c	12.5 b	30.0 bc
3. AIXR-02 (Medium)	4	40 L/ha	45.0 b	80.0 a	50.0 ab
4. TTI-015 (Ex Course)	7	40 L/ha	45.0 b	70.0 a	45.0 ab
5. TT-03 (Course)	3	60 L/ha	67.5 a	60.0 a	62.5 a
6. AIXR-025 (Medium)	5	60 L/ha	45.0 b	62.5 a	55.0 ab
7. TTI-02 (Ex Course)	7	60 L/ha	45.0 b	60.0 a	50.0 ab
F Probability			<.001	0.002	0.029
LSD 5 %			15.0	25.7	31.1

Means within the same column with a letter in common are not significantly different (P>0.05)

**Table 4 Agriseach Services Summary of Results - Muntadgin, WA  
Day Time Application - 14 DAT**

Treatment/Nozzle	Pressure	App Rate	Mint Weed 14 DAT	Melon 14 DAT	Kerosene Grass 14 DAT
1. Untreated	-	-	0.0 c	0.0	0.0 b
2. TT-025 (Course)	2	40 L/ha	90.0 b	100.0	65.0 a
3. AIXR-02 (Medium)	4	40 L/ha	97.5 a	100.0	65.0 a
4. TTI-015 (Ex Course)	7	40 L/ha	97.5 a	100.0	65.0 a
5. TT-03 (Course)	3	60 L/ha	97.5 a	100.0	75.0 a
6. AIXR-025 (Medium)	5	60 L/ha	95.0 a	100.0	70.0 a
7. TTI-02 (Ex Course)	7	60 L/ha	97.5 a	100.0	65.0 a
F Probability			<.001		<.001
LSD 5 %			4.6	ana	15.6

Means within the same column with a letter in common are not significantly different (P>0.05)

ana = analysis not applicable



### 3. APPENDICES

#### 3.1 Full Results

##### 3.1.1 Night Time Spray Application

Treatment/Nozzle	Pressure (Bar)	App Rate	Rep	Mint Weed 7 DAT	Melon 7 DAT	Kerosene Grass 7 DAT	Mint Weed 14 DAT	Melon 14 DAT	Kerosene Grass 14 DAT
1. Untreated	-	-	1	0.0	0.0	0.0	0.0	0.0	0.0
			2	0.0	0.0	0.0	0.0	0.0	0.0
			Mean	0.0	0.0	0.0	0.0	0.0	0.0
2. TT-025 (Course)	2	40L/ha	1	40.0	40.0	30.0	95.0	100.0	65.0
			2	30.0	40.0	30.0	85.0	100.0	65.0
			Mean	35.0	40.0	30.0	90.0	100.0	65.0
3. AIXR-02 (Medium)	4	40L/ha	1	50.0	50.0	40.0	90.0	100.0	75.0
			2	50.0	65.0	30.0	90.0	100.0	60.0
			Mean	50.0	57.5	35.0	90.0	100.0	67.5
4. TTI-015 (Ex Course)	7	40L/ha	1	50.0	40.0	50.0	100.0	100.0	75.0
			2	50.0	70.0	40.0	100.0	95.0	65.0
			Mean	50.0	55.0	45.0	100.0	97.5	70.0
5. TT-03 (Course)	3	60L/ha	1	70.0	80.0	65.0	100.0	100.0	80.0
			2	70.0	70.0	60.0	100.0	100.0	75.0
			Mean	70.0	75.0	62.5	100.0	100.0	77.5
6. AIXR-025 (Medium)	5	60L/ha	1	80.0	70.0	70.0	90.0	100.0	70.0
			2	70.0	60.0	60.0	100.0	100.0	75.0
			Mean	75.0	65.0	65.0	95.0	100.0	72.5
7. TTI-02 (Ex Course)	7	60L/ha	1	40.0	70.0	70.0	90.0	90.0	70.0
			2	50.0	60.0	60.0	90.0	95.0	70.0
			Mean	45.0	65.0	65.0	90.0	92.5	70.0

### 3.1.2 Day Time Spraying

Treatment/Nozzle	Pressure (Bar)	App Rate	Rep	Mint Weed 7 DAT	Melon 7 DAT	Kerosene Grass 7 DAT	Mint Weed 14 DAT	Melon 14 DAT	Kerosene Grass 14 DAT
1. Untreated	-	-	1	0.0	0.0	0.0	0.0	0.0	0.0
			2	0.0	0.0	0.0	0.0	0.0	0.0
			Mean	0.0	0.0	0.0	0.0	0.0	0.0
2. TT-025 (Course)	2	40L/ha	1	30.0	10.0	40.0	90.0	100.0	60.0
			2	30.0	15.0	20.0	90.0	100.0	70.0
			Mean	30.0	12.5	30.0	90.0	100.0	65.0
3. AIXR-02 (Medium)	4	40L/ha	1	50.0	90.0	70.0	95.0	100.0	60.0
			2	40.0	70.0	30.0	100.0	100.0	70.0
			Mean	45.0	80.0	50.0	97.5	100.0	65.0
4. TTI-015 (Ex Course)	7	40L/ha	1	40.0	70.0	40.0	95.0	100.0	70.0
			2	50.0	70.0	50.0	100.0	100.0	60.0
			Mean	45.0	70.0	45.0	97.5	100.0	65.0
5. TT-03 (Course)	3	60L/ha	1	60.0	50.0	65.0	95.0	100.0	80.0
			2	75.0	70.0	60.0	100.0	100.0	70.0
			Mean	67.5	60.0	62.5	97.5	100.0	75.0
6. AIXR-025 (Medium)	5	60L/ha	1	40.0	70.0	50.0	95.0	100.0	70.0
			2	50.0	55.0	60.0	95.0	100.0	70.0
			Mean	45.0	62.5	55.0	95.0	100.0	70.0
7. TTI-02 (Ex Course)	7	60L/ha	1	40.0	70.0	50.0	95.0	100.0	70.0
			2	50.0	50.0	50.0	100.0	100.0	60.0
			Mean	45.0	60.0	50.0	97.5	100.0	65.0

### 3.2 Climate Data

Climate data from BOM weather station at Merredin, approximately 20 km from the trial site.

#### Merredin, Western Australia February 2013 Daily Weather Observations



Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am					3pm						
		Min	Max				Dirn	Spd	Time	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld
		°C	°C	mm	mm	hours	Dirn	Spd	local	°C	%	eighths	Dirn	Spd	hPa	°C	%	eighths	Dirn	Spd	hPa
1	Fr	14.8	33.5	0	11.0					23.0	38	0	E	17		33.0	16	1	E	6	
2	Sa	20.5	35.8	0	10.0					26.8	31	0	NE	17		33.2	20	0	NE	4	
3	Su	22.1	38.3	0	10.0					28.3	26	0	NE	13		37.2	14	1	NNW	4	
4	Mo	16.6	38.8	0	8.0					27.5	31	0	SW	4		38.0	11	1	SW	6	
5	Tu	19.0	36.5	0	8.0					25.3	53	5	SE	4		36.0	25	3	SW	4	
6	We	18.0	32.5	0	8.0					23.8	60	3	SSE	6		31.7	25	0	SE	6	
7	Th	15.6	32.5	0	8.0					21.5	54	1	SE	6		31.3	25	0	ESE	6	
8	Fr	16.6	35.3	0	8.0					25.0	35	0	E	9		34.8	15	0	SE	4	
9	Sa	16.8	36.8	0	8.0					24.7	36	0	E	6		36.5	17	0	SE	2	
10	Su	17.0	37.3	0	8.0					24.7	43	0	E	9		36.3	14	0	S	4	
11	Mo	22.4	39.3	0	12.0					28.8	29	1	NE	17		37.7	14	2	E	4	
12	Tu	24.7	40.0	0	12.0					30.7	27	1	NE	6		38.2	17	5	E	4	
13	We	25.9	39.5	0	8.0					30.0	27	7	NE	4		38.2	17	3	NE	4	
14	Th	28.5	41.3	0	8.0					31.5	24	5	NE	4		40.6	13	7	NW	4	
15	Fr	20.0	39.0	0.2	8.2					25.6	58	1	E	6		38.7	25	1	S	2	
16	Sa	20.3	43.2	0	8.0					30.7	41	0	NE	6		43.0	14	2	W	4	
17	Su	23.6	35.7	0	8.0					27.7	53	2	SSW	4		35.5	16	6	S	6	
18	Mo	13.0	29.4	0	10.0					19.2	45	1	ESE	13		28.7	17	0	SE	6	
19	Tu	14.6	33.0	0	8.0					22.0	37	0	NE	13		31.3	19	0	E	6	
20	We	21.0	34.4	0	8.0					25.5	33	1	NE	6		33.5	21	1	NE	9	
21	Th	24.8	37.0	0.2	10.2					27.7	38	5	NE	9		35.5	23	2	NE	13	
22	Fr	25.5	38.0	0.8	7.4					32.1	37	6	NW	4		36.5	29	6	W	6	
23	Sa	13.5	28.5	0	7.4					19.0	42	0	S	4		27.0	19	0	S	2	
24	Su	12.7	33.3	0	6.0					22.8	46	0	SE	4		32.7	19	0	SE	4	
25	Mo	17.3	36.2	0	8.0					25.8	44	2	NE	9		36.0	21	5	SE	6	
26	Tu	19.0	35.4	1.0	7.8					22.0	80	5	NW	2		34.8	32	2	E	2	
27	We	17.1	32.0	0	8.0					23.0	49	0	E	9		31.7	26	1	E	9	
28	Th	17.4	31.0	0	8.0					21.8	49	0	NE	17		30.3	18	0	E	17	
<b>Statistics for February 2013</b>																					
Mean		19.2	35.8		8.6					25.6	41	1		8		34.9	19	1		5	
Lowest		12.7	28.5		6.0					19.0	24	0	NW	2		27.0	11	0	#	2	
Highest		28.5	43.2	1.0	12.0					32.1	80	7	#	17		43.0	32	7	E	17	
Total				2.2	240.0																

Observations were drawn from Merredin (station 010092)

IDC:DW6084\_201302 Prepared at 13:07 UTC on 3 May 2013  
Copyright © 2013 Bureau of Meteorology  
Users of this product are deemed to have read the information and accepted the conditions described in the notes at <http://www.bom.gov.au/climate/dwo/IDC:DW6084.pdf>