

# FINAL REPORT

**Evaluation of Dulverton Waste  
Management compost and  
biochar on the growth of  
Pyrethrum**

**North Motton, Tasmania, 2010-11**

**Protocol Number:**

*Dulverton Waste Management Proposal  
19/04/10*

**Client:**

*Dulverton Waste Management*

**Author:**

*Melanie Bower*

**Project Leader:**

*Phillip Frost  
Peracto Pty Ltd*

**Report Number:**

*DUL09502#1*

**Report Date:**

*2 August 2011*



**Peracto Pty Ltd** ABN: 97 109 472 559  
**Head Office:** 16 Hillcrest Road, Devonport, Tasmania, 7310 Australia  
Telephone: +61 3 6423 2044 Fax: +61 3 6423 4876  
[reports@peracto.com](mailto:reports@peracto.com) [www.peracto.com](http://www.peracto.com)

## CONTENTS

<b>SUMMARY .....</b>	<b>3</b>
<b>INTRODUCTION .....</b>	<b>4</b>
Aims.....	4
<b>MATERIALS AND METHODS .....</b>	<b>5</b>
Product list.....	5
Treatment list.....	5
Chronology of events .....	5
<b>RESULTS .....</b>	<b>6</b>
<i>Table 1.</i> Pyrethrum establishment .....	6
<i>Table 2.</i> Soil fertility, 13 days after sowing.....	6
<i>Table 3a.</i> Soil fertility, 13 days after sowing.....	7
<i>Table 3b.</i> Soil fertility, 13 days after sowing.....	8
<i>Table 4.</i> Soil fertility, 13 days after sowing.....	9
<i>Table 5.</i> Pyrethrum plant biomass .....	10
<i>Table 6.</i> Pyrethrum plant biomass .....	10
<b>DISCUSSION.....</b>	<b>11</b>
<b>CONCLUSIONS .....</b>	<b>12</b>
<b>APPENDICES.....</b>	<b>13</b>
Appendix i. Trial details .....	13
Site details .....	13
Trial plan .....	14
Trial location map.....	14
Assessments.....	15
Appendix ii. Raw data.....	16
Appendix iii. Statistical analysis .....	19
Appendix iv. Meteorological details.....	27

## **SUMMARY**

At North Motton, Tasmania, in the 2010-11 season, a trial was conducted in pyrethrum to evaluate two rates of Dulverton Waste Management compost, 10 and 20 t/ha, and biochar, at 10 t/ha, for effect on pyrethrum plant establishment and growth and soil fertility.

Treatments were applied prior to sowing and incorporated into the soil. Soil fertility was assessed during early crop growth. Plant assessments were conducted to evaluate plant establishment and biomass of pyrethrum tops and roots.

Pyrethrum establishment was not significantly affected by application of Dulverton compost. Pyrethrum plant biomass, of tops and roots, increased with a increasing rate of compost applied.

Dulverton compost significantly reduced the cation exchange capacity (CEC) of calcium in the soil and increased the CEC of sodium. A synergism was evident between Dulverton compost and biochar with a greater CEC of magnesium in soil treated with both compost and biochar compared with untreated soil, and soil treated with either product alone.

Strong trends were evident for the application of biochar to cause a reduction in total carbon, organic matter, electrical conductivity, sulphur and potassium and an increase in soil pH, calcium and magnesium.

Dulverton compost and biochar were safe to pyrethrum when incorporated into the soil prior to sowing.

## **INTRODUCTION**

### **Aims**

- To evaluate Dulverton Waste Management compost and biochar for effect on plant establishment and growth in pyrethrum.
- To evaluate the effect of compost and biochar on soil fertility.
- To compare compost at two rates, 10 and 20 t/ha.
- To evaluate the crop safety of Dulverton Waste Management compost and biochar.

## MATERIALS AND METHODS

### Product list

Product name	Active ingredient (ai)
Dulverton Compost	Green Waste
Biochar	Charcoal

### Treatment list

No.	Treatment	Product Rate (t/ha)	Application schedule
1	Untreated control	0	n/a
2	Biochar	10	Dulverton compost and Biochar broadcast onto plots and incorporated before sowing
3	Dulverton compost	10	
4	Dulverton compost + Biochar	10 + 10	
5	Dulverton compost	20	
6	Dulverton compost + Biochar	20 + 10	

### Chronology of events

Date	Days after sowing (DAS)	Crop stage	Event
09/07/10	-51	Pre-plant	Applied compost & incorporated
29/08/10	0	Seed	Sowing
11/09/10	13	2-4 leaf	Soil sample
25/10/10	57	3-5 leaf	Plant establishment assessment
10/12/10	103	8-10 leaf	Biomass fresh and root weight
13/12/10	+ 3 days	8-10 leaf	Dried weight
25/01/11	149	Rosettes to 10 cm	Biomass fresh and root weight

## RESULTS

**Table 1. Pyrethrum establishment**

No.	Treatment	Rate (t/ha)	Plant establishment (plants/m of row) 57DAS
1	Untreated control	0	15.2
3	Dulverton compost	10	14.9
5	Dulverton compost	20	17.2
<b>P-value</b>			0.2469
LSD (5% level)			n/a

DAS: Days after sowing

n/a: not applicable due to non significant P-value, >0.05

**Table 2. Soil fertility, 13 days after sowing**

No.	Treatment	Rate (t/ha)	Total carbon (%)	Organic matter (%)	pH (H <sub>2</sub> O)	Electrical conductivity (dS/m)
1	Untreated control	0	4.7	7.2	6.2 b	0.087
2	Biochar	10	4.6	7.0	6.4 a	0.070
3	Dulverton compost	10	4.9	7.5	6.2 b	0.087
4	Dulverton compost + Biochar	10 + 10	4.7	7.2	6.4 a	0.070
5	Dulverton compost	20	4.8	7.3	6.2 b	0.083
6	Dulverton compost + Biochar	20 + 10	4.7	7.3	6.5 a	0.077
<b>P-value</b>			0.2797	0.2870	0.0036	0.0999
LSD (5% level)			n/a	n/a	0.160	n/a
<b>Factorial analyses</b>						
<b>Compost</b>						
0 t/ha			4.6	7.1	6.3	0.078
10 t/ha			4.8	7.3	6.3	0.078
20 t/ha			4.7	7.3	6.3	0.080
F-test probability			0.3734	0.3821	0.8135	0.9070
LSD (5% level)			n/a	n/a	n/a	n/a
<b>Biochar</b>						
0 t/ha			4.8	7.4	6.2	0.086
10 t/ha			4.6	7.2	6.4	0.072
F-test probability			0.0663	0.0670	0.0744	0.0572
LSD (5% level)			n/a	n/a	n/a	n/a

Means within columns followed by the same letter are not significantly different at the 5% level according to least significant difference (LSD) test

n/a: not applicable due to non significant P-value, >0.05

**Table 3a. Soil fertility, 13 days after sowing**

No.	Treatment	Rate (t/ha)	Available nitrogen (kg/ha)	Nutrient concentration (ppm)		
				P	K	S
1	Untreated control	0	11.1	18.3	297.2	24.3 a
2	Biochar	10	9.8	18.8	274.0	17.2 b
3	Dulverton compost	10	11.5	17.9	299.6	22.4 a
4	Dulverton compost + Biochar	10 + 10	9.9	22.1	268.0	17.0 b
5	Dulverton compost	20	10.7	18.2	314.3	21.4 a
6	Dulverton compost + Biochar	20 + 10	11.0	18.9	303.7	16.7 b
<i>P</i> -value			0.8343	0.7264	0.0556	0.0027
LSD (5% level)			n/a	n/a	n/a	3.616
<b>Factorial analyses</b>						
<b>Compost</b>						
0 t/ha			10.5	18.6	285.6	20.8
10 t/ha			10.7	20.0	283.8	19.7
20 t/ha			10.9	18.6	309.0	19.1
F-test probability			0.9333	0.7496	0.2579	0.5943
LSD (5% level)			n/a	n/a	n/a	n/a
<b>Biochar</b>						
0 t/ha			11.1	18.2	303.7	22.7 a
10 t/ha			10.2	19.9	281.9	17.0 b
F-test probability			0.4154	0.4959	0.0560	0.0061
LSD (5% level)			n/a	n/a	n/a	1.925

Means within columns followed by the same letter are not significantly different at the 5% level according to least significant difference (LSD) test.

n/a: not applicable due to non significant P-value, >0.05

**Table 3b. Soil fertility, 13 days after sowing**

No.	Treatment	Rate (t/ha)	Nutrient concentration (ppm)		
			Ca	Mg	Na
1	Untreated control	0	1979	297.1 bc	47.5
2	Biochar	10	2171	319.9 abc	36.0
3	Dulverton compost	10	1939	285.4 c	50.4
4	Dulverton compost + Biochar	10 + 10	2060	323.9 ab	52.7
5	Dulverton compost	20	1837	288.0 bc	51.4
6	Dulverton compost + Biochar	20 + 10	2233	350.0 a	55.6
<i>P</i> -value			0.1171	0.0185	0.2258
LSD (5% level)			n/a	36.550	n/a
<b>Factorial analyses</b>					
<b>Compost</b>					
0 t/ha			2075	308.5	41.8
10 t/ha			2000	304.6	51.6
20 t/ha			2035	319.0	53.5
F-test probability			0.5032	0.3110	0.1230
LSD (5% level)			n/a	n/a	n/a
<b>Biochar</b>					
0 t/ha			1919	290.2	49.8
10 t/ha			2155	331.2	48.1
F-test probability			0.2120	0.1400	0.7086
LSD (5% level)			n/a	n/a	n/a

Means within columns followed by the same letter are not significantly different at the 5% level according to least significant difference (LSD) test

n/a: not applicable due to non significant P-value, >0.05



**Table 4. Soil fertility, 13 days after sowing**

No.	Treatment	Rate (t/ha)	Cation exchange capacity (%)			
			Ca	Mg	K	Na
1	Untreated control	0	59.6 a	14.1 bc	4.5 ab	1.2
2	Biochar	10	61.1 a	14.9 ab	4.0 c	1.2
3	Dulverton compost	10	56.6 b	13.8 c	4.5 ab	1.3
4	Dulverton compost + Biochar	10 + 10	59.8 a	15.5 a	4.0 c	1.3
5	Dulverton compost	20	55.5 b	14.4 bc	4.8 a	1.4
6	Dulverton compost + Biochar	20 + 10	60.7 a	15.7 a	4.2 bc	1.3
<i>P</i> -value			0.0096	0.0068	0.0146	0.1446
LSD (5% level)			3.029	0.969	0.462	n/a
Factorial analyses						
Compost						
0 t/ha			60.4	14.5	4.2	1.18 b
10 t/ha			58.2	14.7	4.2	1.32 a
20 t/ha			58.1	15.1	4.5	1.33 a
F-test probability			0.1958	0.2897	0.3004	0.0259
LSD (5% level)			n/a	n/a	n/a	0.100
Biochar						
0 t/ha			57.2	14.1 b	4.6 a	1.3
10 t/ha			60.5	15.4 a	4.1 b	1.3
F-test probability			0.0954	0.0448	0.0340	1.000
LSD (5% level)			n/a	1.194	0.425	n/a

Means within columns followed by the same letter are not significantly different at the 5% level according to least significant difference (LSD) test  
n/a: not applicable due to non significant P-value, >0.05

**Table 5. Pyrethrum plant biomass**

No.	Treatment	Rate (t/ha)	Top weight (g/30 plants) 103DAS		Root weight (g/30 plants) 103DAS	
			0 days	Air dry (+3 days*)	0 days	Air dry (+3 days*)
1	Untreated control	0	245.0	160.8	18.12	3.57
3	Dulverton compost	10	259.2	173.3	24.07	4.67
5	Dulverton compost	20	307.9	194.6	26.18	4.60
<b>P-value</b>			0.0757	0.3084	0.1319	0.2880
LSD (5% level)			n/a	n/a	n/a	n/a

DAS: Days after sowing

\*Tops and roots left at room temperature to dry for 3 days

n/a: not applicable due to non significant P-value, >0.05



**Photograph 1: Pyrethrum biomass at 103DAS Dulverton compost 10 t/ha (left), Untreated control (middle) and Dulverton compost 20 t/ha(right)**

**Table 6. Pyrethrum plant biomass**

No.	Treatment	Rate (t/ha)	Top weight (g/20 plants) 149DAS	Root weight (g/20 plants) 149DAS
1	Untreated control	0	328.7	23.3
3	Dulverton compost	10	337.3	25.5
5	Dulverton compost	20	371.7	29.8
<b>P-value</b>			0.7390	0.1337
LSD (5% level)			n/a	n/a

DAS: Days after sowing

n/a: not applicable due to non significant P-value, >0.05

## **DISCUSSION**

The application of Dulverton Waste Management compost did not significantly effect plant establishment in pyrethrum. There was a trend for increasing plant biomass; both vegetative and root biomass, with increasing rate of compost applied.

Dulverton compost significantly reduced the cation exchange capacity (CEC) of calcium in the soil and increased the CEC of sodium. There also appeared to be some synergism between Dulverton compost and biochar for the CEC of magnesium with greater capacity in soil treated with both compost and biochar compared with untreated soil and soil treated with either product alone.

There was a strong trend for the application of biochar to cause a reduction in total carbon, organic matter, electrical conductivity, sulphur and potassium and an increase in soil pH, calcium and magnesium.

Dulverton compost and biochar were safe to pyrethrum when incorporated into the soil prior to sowing.

## CONCLUSIONS

- Treatments were broadcast prior to sowing, incorporated into the soil and were safe to pyrethrum.
- Plant establishment was not affected by application of Dulverton Waste Management compost.
- Plant biomass, of tops and roots, increased with increasing compost rate.
- Dulverton compost significantly reduced the cation exchange capacity (CEC) of calcium in the soil and increased the CEC of sodium.
- A synergism was evident between Dulverton compost and biochar with a greater CEC for magnesium in soil treated with both compost and biochar compared with untreated soil, and soil treated with either product alone.
- Strong trends were evident for the application of biochar to cause a reduction in total carbon, organic matter, electrical conductivity, sulphur and potassium and an increase in soil pH, calcium and magnesium.

---

---

## APPENDICES

### Appendix i. Trial details

#### Site details

Grower	Botanical Resources Australia
Location	Church Road, North Motton, Tasmania
Paddock Number	47701
GPS co-ordinates	-41.210277,146.114076
Soil type	Clay loam
Crop	Pyrethrum
Replications	3
Plot size (approximate)	10 m x 100 m
Sowing rate	2.02 kg
Fertiliser	700 kg 0:7:11
Sowing date	29/08/10

Meteorological data from Burnie for the months of August 2010 to January 2011 is included as Appendix iv to this report. The trial site was situated 21 km from Burnie.

**Trial plan**

1	2	1	<b>Block 3</b>
3	4	3	
5	6	5	
1	2	1	<b>Block 2</b>
3	4	3	
5	6	5	
1	2	1	<b>Block 1</b>
3	4	3	
5	6	5	
Biochar			

↑N

**Trial location map**



↑N

## Assessments

<b>1. Soil assessment</b>			
Date	11/09/10		
Days after sowing	13		
Sample size	1 kg		
Method	Soil samples were taken from top soil at a number of randomly selected sites within each plot and mixed together to achieve uniformity. Soil samples were sent to AgVita Analytical where a soil complete and N-check NO <sub>3</sub> expressSoil analysis was conducted.		
Statistical analysis	Analysis of variance (ANOVA) test and Fischer's least significant difference (LSD) test were conducted using ARM 7.		
<b>2. Plant establishment assessment</b>			
Date	25/10/10		
Days after sowing	57		
Sample size	20 x 1 m row		
Method	Twenty 1 m lengths were randomly selected from within each plot and plants were counted and recorded along this length.		
Statistical analysis	Analysis of variance (ANOVA) test and Fischer's least significant difference (LSD) test were conducted using ARM 7.		
<b>3. Pyrethrum biomass - tops and root weights</b>			
Dates	10/12/10	13/12/10	25/1/11
Days after sowing	103	106 (+3 days from 103DAS sample)	149
Sample size	30 pyrethrum plants (10/12/10) & 20 pyrethrum plants (25/1/10)		
Method	Plants were randomly taken from each plot. Plant tops were cut from plant roots. At 103DAS tops and roots were washed and weighed and were weighed again after 3 days of being air dried.		
Statistical analysis	Analysis of variance (ANOVA) test and Fischer's least significant difference (LSD) test were conducted using ARM 7.		

**Appendix ii. Raw data**

Crop Name Description Rating Date	Pyrethrum plant count 25/10/10 57DAS per m 20	Pyrethrum Total Carbon %	Pyrethrum Organic matter>	Pyrethrum pH	Pyrethrum EC dS/m	Pyrethrum root zone m> mm	Pyrethrum available N> KG/ha	Pyrethrum PSR Phosphorus> mg/kg		
Rating Unit Number of Subsamples		1	1	1	1	1	1	1		
Trt No.	Treatment Name	Plot	1	2	3	4	5	6	7	8
1	Dulverton Compost biochar	301 401 901	12.2 16.3 17.1	4.660 4.610 4.790	7.180 7.100 7.380	6.270 6.300 6.030	0.100 0.090 0.070	34.40 34.70 33.80	14.40 10.30 8.60	24.70 16.40 13.90
	Mean =		15.2	4.687	7.220	6.200	0.087	34.30	11.10	18.33
2	Dulverton Compost Biochar	102 402 902		4.420 4.310 4.910	6.810 6.640 7.560	6.280 6.570 6.420	0.070 0.070 0.070	32.30 34.60 36.90	9.60 9.50 10.30	21.10 15.70 19.70
	Mean =		.	4.547	7.003	6.423	0.070	34.60	9.80	18.83
3	Dulverton Compost biochar	101 501 801	14.2 15.5 15.1	4.670 4.940 4.990	7.190 7.610 7.680	6.240 6.160 6.100	0.090 0.080 0.090	32.90 33.60 33.60	13.90 9.60 10.90	17.80 17.00 19.00
	Mean =		14.9	4.867	7.493	6.167	0.087	33.37	11.47	17.93
4	Dulverton Compost Biochar	202 502 802		4.550 4.810 4.630	7.010 7.410 7.130	6.340 6.490 6.380	0.080 0.070 0.060	35.10 34.30 33.40	10.80 11.00 7.80	21.10 22.70 22.40
	Mean =		.	4.663	7.183	6.403	0.070	34.27	9.87	22.07
5	Dulverton Compost biochar	201 601 701	15.1 16.3 20.2	4.680 4.680 4.930	7.210 7.210 7.590	6.200 6.150 6.110	0.100 0.070 0.080	36.70 34.50 32.30	10.20 10.40 11.60	20.00 18.10 16.50
	Mean =		17.2	4.763	7.337	6.153	0.083	34.50	10.73	18.20
6	Dulverton Compost Biochar	302 602 702		4.450 4.850 4.870	6.850 7.470 7.500	6.410 6.480 6.450	0.080 0.070 0.080	33.70 34.90 35.40	10.40 9.60 13.10	16.20 15.50 25.00
	Mean =		.	4.723	7.273	6.447	0.077	34.67	11.03	18.90



Crop Name Description Rating Date Rating Unit Number of Subsamples		Pyrethrum PSR Potassium>	Pyrethrum PSR Sulphur	Pyrethrum PSR Calcium	Pyrethrum PSR Magnesium>	Pyrethrum PSR Sodium	Pyrethrum CEC Calcium	Pyrethrum CEC Magnesium>	Pyrethrum CEC Potassium>	Pyrethrum CEC Sodium
		mg/kg 1	mg/kg 1	mg/kg 1	mg/kg 1	mg/kg 1	% 1	% 1	% 1	% 1
Trt Treatment No. Name	Plot	9	10	11	12	13	14	15	16	17
1 Dulverton Compost biochar	301	326.80	23.90	2118.0	303.30	46.70	58.50	13.90	4.60	1.10
	401	308.70	26.10	2166.0	309.90	49.70	60.20	14.20	4.40	1.20
	901	256.20	22.90	1654.0	278.10	46.10	60.20	14.20	4.40	1.20
	Mean =	297.23	24.30	1979.3	297.10	47.50	59.63	14.10	4.47	1.17
2 Dulverton Compost Biochar	102	279.10	18.00	1960.0	276.70	48.90	58.80	13.70	4.30	1.30
	402	291.30	19.20	2335.0	350.60	11.70	62.70	15.60	4.00	1.10
	902	251.60	14.50	2218.0	332.30	47.40	61.90	15.30	3.60	1.20
	Mean =	274.00	17.23	2171.0	319.87	36.00	61.13	14.87	3.97	1.20
3 Dulverton Compost biochar	101	333.20	20.60	2033.0	295.50	48.80	58.10	14.00	4.90	1.20
	501	292.90	23.00	1888.0	283.50	48.90	55.60	13.90	4.40	1.30
	801	272.60	23.70	1897.0	277.20	53.60	56.10	13.60	4.10	1.40
	Mean =	299.57	22.43	1939.3	285.40	50.43	56.60	13.83	4.47	1.30
4 Dulverton Compost Biochar	202	304.60	16.90	1986.0	306.20	55.10	58.90	15.00	4.60	1.40
	502	258.00	15.70	2200.0	351.90	53.40	60.90	16.10	3.70	1.30
	802	241.50	18.40	1994.0	313.50	49.60	59.50	15.50	3.70	1.30
	Mean =	268.03	17.00	2060.0	323.87	52.70	59.77	15.53	4.00	1.33
5 Dulverton Compost biochar	201	329.50	23.70	2030.0	292.70	47.70	58.20	13.90	4.80	1.20
	601	301.60	18.80	1729.0	281.90	49.70	54.30	14.60	4.80	1.40
	701	311.90	21.70	1752.0	289.50	56.90	54.00	14.70	4.90	1.50
	Mean =	314.33	21.40	1837.0	288.03	51.43	55.50	14.40	4.83	1.37
6 Dulverton Compost Biochar	302	308.80	17.90	2164.0	329.60	54.30	60.90	15.30	4.40	1.30
	602	298.40	16.70	2408.0	360.60	57.30	61.60	15.20	3.90	1.30
	702	303.90	15.60	2126.0	359.80	55.10	59.60	16.70	4.40	1.30
	Mean =	303.70	16.73	2232.7	350.00	55.57	60.70	15.73	4.23	1.30

Crop Name Description Rating Date			Pyrethrum Root weight 10/12/10 103DAS	Pyrethrum Root weight 13/12/10 106DAP	Pyrethrum Top weight 10/12/10 103DAP	Pyrethrum Top weight 13/12/10 106DAP	Pyrethrum Top Weight 25/01/11 149DAP	Pyrethrum Root Weight 25/01/11 149DAP
Rating Unit Number of Subsamples			1	1	1	1		
Trt No.	Treatment Name	Plot	18	19	20	21	22	23
1	Dulverton Compost biochar	301	15.820	3.600	246.750025	161.560	385.0	27.790
		401	21.100	3.920	241.320031	166.620	323.0	22.560
		901	17.450	3.180	246.860025	154.210	278.0	19.570
		Mean =	18.123	3.567	244.976694	160.797	328.7	23.30
3	Dulverton Compost biochar	101	27.990	5.900	258.390040	166.120	392.0	32.450
		501	24.670	4.520	283.740019	197.460	319.0	24.290
		801	19.540	3.580	235.550027	156.440	301.0	19.640
		Mean =	24.067	4.667	259.226680	173.340	337.3	25.460
5	Dulverton Compost biochar	201	29.390	5.930	295.380034	179.360	292.0	29.950
		601	22.500	3.460	290.350035	178.930	407.0	30.690
		701	26.660	4.410	337.910037	225.570	416.0	28.790
		Mean =	26.183	4.600	307.880036	194.620	371.7	29.810

**Appendix iii. Statistical analysis**

Crop Name Description Rating Date Rating Unit Number of Subsamples	Pyrethrum plant count 25/10/10 57DAS per m	Pyrethrum Total Carbon %	Pyrethrum Organic matter	Pyrethrum pH	Pyrethrum EC dS/m	Pyrethrum root zone m mm	Pyrethrum available N Kg/ha	Pyrethrum PSR Phosphorous mg/kg
Trt Treatment No. Name	1	2	3	4	5	6	7	8
1 Dulverton Compost biochar	15.2 a	4.687 a	7.220 a	6.200 b	0.087 a	34.30 a	11.10 a	18.33 a
2 Dulverton Compost Biochar		4.547 a	7.003 a	6.423 a	0.070 a	34.60 a	9.80 a	18.83 a
3 Dulverton Compost biochar	14.9 a	4.867 a	7.493 a	6.167 b	0.087 a	33.37 a	11.47 a	17.93 a
4 Dulverton Compost Biochar		4.663 a	7.183 a	6.403 a	0.070 a	34.27 a	9.87 a	22.07 a
5 Dulverton Compost biochar	17.2 a	4.763 a	7.337 a	6.153 b	0.083 a	34.50 a	10.73 a	18.20 a
6 Dulverton Compost Biochar		4.723 a	7.273 a	6.447 a	0.077 a	34.67 a	11.03 a	18.90 a
LSD (P=.05)	3.37	0.2767	0.4270	0.1599	0.0155	2.805	3.397	6.407
Standard Deviation	1.48	0.1521	0.2347	0.0879	0.0085	1.542	1.867	3.522
CV	9.43	3.23	3.24	1.4	10.77	4.5	17.5	18.49
Bartlett's X2	2.931	3.266	3.246	5.308	2.973	8.397	6.219	9.111
P(Bartlett's X2)	0.231	0.659	0.662	0.379	0.562	0.136	0.285	0.105
Replicate F	4.647	5.160	5.086	2.403	3.769	0.043	1.050	0.857
Replicate Prob(F)	0.0905	0.0289	0.0299	0.1406	0.0603	0.9584	0.3855	0.4533
Treatment F	2.025	1.478	1.453	7.514	2.523	0.286	0.406	0.564
Treatment Prob(F)	0.2469	0.2797	0.2870	0.0036	0.0999	0.9103	0.8343	0.7264

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Crop Name Description Rating Date Rating Unit Number of Subsamples	Pyrethrum PSR Potassium mg/kg 1	Pyrethrum PSR Sulphur mg/kg 1	Pyrethrum PSR Calcium mg/kg 1	Pyrethrum PSR Magnesium mg/kg 1	Pyrethrum PSR Sodium mg/kg 1	Pyrethrum CEC Calcium % 1	Pyrethrum CEC Magnesium % 1	Pyrethrum CEC Potassium % 1	Pyrethrum CEC Sodium % 1
Trt Treatment No. Name	9	10	11	12	13	14	15	16	17
1 Dulverton Compost biochar	297.23 a	24.30 a	1979.3 a	297.10 bc	47.50 a	59.63 a	14.10 bc	4.47 ab	1.17 a
2 Dulverton Compost Biochar	274.00 a	17.23 b	2171.0 a	319.87 abc	36.00 a	61.13 a	14.87 ab	3.97 c	1.20 a
3 Dulverton Compost biochar	299.57 a	22.43 a	1939.3 a	285.40 c	50.43 a	56.60 b	13.83 c	4.47 ab	1.30 a
4 Dulverton Compost Biochar	268.03 a	17.00 b	2060.0 a	323.87 ab	52.70 a	59.77 a	15.53 a	4.00 c	1.33 a
5 Dulverton Compost biochar	314.33 a	21.40 a	1837.0 a	288.03 bc	51.43 a	55.50 b	14.40 bc	4.83 a	1.37 a
6 Dulverton Compost Biochar	303.70 a	16.73 b	2232.7 a	350.00 a	55.57 a	60.70 a	15.73 a	4.23 bc	1.30 a
LSD (P=.05)	31.671	3.616	304.27	36.550	16.683	3.029	0.969	0.462	0.168
Standard Deviation	17.410	1.988	167.26	20.092	9.171	1.665	0.533	0.254	0.092
CV	5.95	10.01	8.21	6.47	18.74	2.83	3.61	5.87	7.24
Bartlett's X2	5.798	1.624	2.868	6.696	18.701	2.676	7.04	7.651	2.382
P(Bartlett's X2)	0.326	0.898	0.72	0.244	0.002*	0.75	0.218	0.177	0.666
Replicate F	8.219	0.191	1.776	1.924	0.807	0.241	3.156	5.172	0.845
Replicate Prob(F)	0.0077	0.8291	0.2187	0.1963	0.4731	0.7906	0.0866	0.0287	0.4582
Treatment F	3.196	8.134	2.351	4.668	1.684	5.705	6.301	5.027	2.130
Treatment Prob(F)	0.0556	0.0027	0.1171	0.0185	0.2258	0.0096	0.0068	0.0146	0.1446

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Crop Name Description Rating Date Rating Unit Number of Subsamples	Pyrethrum Root weight 10/12/10 103DAS 1	Pyrethrum Root weight 13/12/10 106DAS (+3days) 1	Pyrethrum Top weight 10/12/10 103DAS 1	Pyrethrum Top weight 13/12/10 106DAS (+3days) 1	Pyrethrum Top Weight 25/0 1/11 149DAS 1	Pyrethrum Root Weight 25/01/11 149DAS 1
Trt Treatment No. Name	18	19	20	21	22	23
1 Dulverton Compost biochar	18.123 a	3.567 a	244.976694 a	160.797 a	328.7 a	23.307 a
2 Dulverton Compost Biochar						
3 Dulverton Compost biochar	24.067 a	4.667 a	259.226680 a	173.340 a	337.3 a	25.460 a
4 Dulverton Compost Biochar						
5 Dulverton Compost biochar	26.183 a	4.600 a	307.880036 a	194.620 a	371.7 a	29.810 a
6 Dulverton Compost Biochar						
LSD (P=.05)	8.7592	1.8426	56.4003162	53.0456	156.22	6.9817
Standard Deviation	3.8645	0.8129	24.8832842	23.4032	68.92	3.0802
CV	16.96	19.0	9.19	13.28	19.93	11.76
Bartlett's X2	0.373	2.393	5.505	3.067	0.264	4.65
P(Bartlett's X2)	0.83	0.302	0.064	0.216	0.877	0.098
Replicate F	0.509	2.618	0.057	0.222	0.103	4.353
Replicate Prob(F)	0.6354	0.1876	0.9451	0.8100	0.9046	0.0991
Treatment F	3.508	1.727	5.271	1.601	0.327	3.470
Treatment Prob(F)	0.1319	0.2880	0.0757	0.3084	0.7390	0.1337

Means followed by same letter do not significantly differ (P=.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Crop Name Description Rating Date Rating Unit Number of Subsamples	Pyrethrum plant count 25/10/10 per m 20	Pyrethrum Total Carbon %	Pyrethrum Organic matter %	Pyrethrum pH	Pyrethrum EC dS/m	Pyrethrum root zone moisture mm	Pyrethrum available N KG/ha
Trt Treatment No. Name Rate	1	2	3	4	5	6	7
TABLE OF R MEANS							
Replicate 1	13.8	4.6	7.0	6.3	0.1	34.2	11.6
Replicate 2	16.0	4.7	7.2	6.4	0.1	34.4	10.1
Replicate 3	17.5	4.9	7.5	6.2	0.1	34.2	10.4
TABLE OF A MEANS							
1 Dulverton Compost 0	15.2	4.6	7.1	6.3	0.1	34.5	10.5
2 Dulverton Compost 10000	14.9	4.8	7.3	6.3	0.1	33.8	10.7
3 Dulverton Compost 20000	17.2	4.7	7.3	6.3	0.1	34.6	10.9
TABLE OF B MEANS							
1 biochar 0	15.8	4.8	7.4	6.2	0.1	34.1	11.1
2 Biochar 10000	.	4.6	7.2	6.4	0.1	34.5	10.2

COMPLETE STRIP-BLOCK AOV For Pyrethrum plant count 25/10/10 per m 20 (Data Column 1)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	1154.511241					
R	2	10.243334	5.121667	4.647	0.0905	1.3	
A	2	4.463329	2.231665	2.025	0.2469	1.3	
RA	4	4.408332	1.102083	1.000	0.5000	2.2	
B	1	1116.281250	1116.281250	217.953	0.0046	3.1	
RB	2	10.243334	5.121667	4.647	0.0905	1.8	
AB	2	4.463329	2.231665	2.025	0.2469	1.8	
RAB	4	4.408332	1.102083				
COMPLETE STRIP-BLOCK AOV For Pyrethrum Total Carbon % 1 (Data Column 2)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	0.640850					
R	2	0.238633	0.119317	4.796	0.0866	0.2	
A	2	0.077033	0.038517	1.273	0.3734	0.2	
RA	4	0.121033	0.030258	1.216	0.4271	0.3	
B	1	0.073472	0.073472	13.592	0.0663	0.1	
RB	2	0.010811	0.005406	0.217	0.8136	0.3	
AB	2	0.020344	0.010172	0.409	0.6894	0.3	
RAB	4	0.099522	0.024881				
COMPLETE STRIP-BLOCK AOV For Pyrethrum Organic matter 1 (Data Column 3)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	1.511451					
R	2	0.560233	0.280117	4.787	0.0868	0.3	
A	2	0.179733	0.089867	1.236	0.3821	0.3	
RA	4	0.290933	0.072733	1.243	0.4191	0.5	
B	1	0.174051	0.174051	13.440	0.0670	0.2	
RB	2	0.025900	0.012950	0.221	0.8107	0.4	
AB	2	0.046533	0.023267	0.398	0.6958	0.4	
RAB	4	0.234067	0.058517				
COMPLETE STRIP-BLOCK AOV For Pyrethrum pH 1 (Data Column 4)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	0.404378					
R	2	0.037011	0.018506	7.313	0.0461	0.1	
A	2	0.002144	0.001072	0.217	0.8135	0.1	
RA	4	0.019722	0.004931	1.948	0.2671	0.1	
B	1	0.283756	0.283756	11.953	0.0744	0.2	
RB	2	0.047478	0.023739	9.381	0.0309	0.1	
AB	2	0.004144	0.002072	0.819	0.5034	0.1	
RAB	4	0.010122	0.002531				
COMPLETE STRIP-BLOCK AOV For Pyrethrum EC dS/m 1 (Data Column 5)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	0.002178					
R	2	0.000544	0.000272	2.722	0.1794	0.0	
A	2	0.000011	0.000006	0.100	0.9070	0.0	
RA	4	0.000222	0.000056	0.556	0.7085	0.0	
B	1	0.000800	0.000800	16.000	0.0572	0.0	
RB	2	0.000100	0.000050	0.500	0.6400	0.0	
AB	2	0.000100	0.000050	0.500	0.6400	0.0	
RAB	4	0.000400	0.000100				
COMPLETE STRIP-BLOCK AOV For Pyrethrum root zone moisture mm 1 (Data Column 6)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	27.385025					
R	2	0.209999	0.104999	0.038	0.9631	2.0	
A	2	2.013345	1.006673	0.663	0.5642	1.5	
RA	4	6.076668	1.519167	0.549	0.7119	3.5	
B	1	0.933892	0.933892	0.282	0.6487	2.5	
RB	2	6.634464	3.317232	1.200	0.3907	2.9	
AB	2	0.457776	0.228888	0.083	0.9221	2.9	
RAB	4	11.058882	2.764720				
COMPLETE STRIP-BLOCK AOV For Pyrethrum available N kg/ha KG/ha 1 (Data Column 7)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	49.259998					
R	2	7.323331	3.661665	1.189	0.3934	2.2	
A	2	0.563329	0.281665	0.070	0.9333	2.5	
RA	4	16.033338	4.008334	1.301	0.4023	3.7	
B	1	3.380003	3.380003	1.038	0.4154	2.5	
RB	2	6.509999	3.254999	1.057	0.4281	3.1	
AB	2	3.130005	1.565002	0.508	0.6359	3.1	
RAB	4	12.319995	3.079999				

Crop Name		Pyrethrum PSR Phospho>	Pyrethrum PSR Potassi>	Pyrethrum PSR Sulphur	Pyrethrum PSR Calcium	Pyrethrum PSR Magnesi>	Pyrethrum PSR Sodium	Pyrethrum CEC Calcium
Description		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
Rating Date		1	1	1	1	1	1	1
Rating Unit								
Number of Subsamples								
Trt Treatment								
No. Name	Rate	8	9	10	11	12	13	14
TABLE OF R MEANS								
Replicate 1		20.2	313.7	20.2	2048.5	300.7	50.3	58.9
Replicate 2		17.6	291.8	19.9	2121.0	323.1	45.1	59.2
Replicate 3		19.4	273.0	19.5	1940.2	308.4	51.5	58.6
TABLE OF A MEANS								
1 Dulverton Compost	0	18.6	285.6	20.8	2075.2	308.5	41.8	60.4
2 Dulverton Compost	10000	20.0	283.8	19.7	1999.7	304.6	51.6	58.2
3 Dulverton Compost	20000	18.6	309.0	19.1	2034.8	319.0	53.5	58.1
TABLE OF B MEANS								
1 biochar	0	18.2	303.7	22.7	1918.6	290.2	49.8	57.2
2 Biochar	10000	19.9	281.9	17.0	2154.6	331.2	48.1	60.5

COMPLETE STRIP-BLOCK AOV For Pyrethrum PSR Phosphorus mg/kg 1 (Data Column 8)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	180.264505				
R	2	21.267780	10.633890	1.454	0.3352	3.3
A	2	8.221119	4.110560	0.310	0.7496	4.5
RA	4	53.035564	13.258891	1.813	0.2892	5.8
B	1	14.222249	14.222249	0.681	0.4959	6.3
RB	2	41.754443	20.877221	2.855	0.1697	4.7
AB	2	12.514455	6.257227	0.856	0.4905	4.7
RAB	4	29.248895	7.312224			

COMPLETE STRIP-BLOCK AOV For Pyrethrum PSR Potassium mg/kg 1 (Data Column 9)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	12857.635328				
R	2	4982.440638	2491.220319	31.091	0.0037	11.0
A	2	2373.481464	1186.740732	1.938	0.2579	30.5
RA	4	2449.155496	612.288874	7.642	0.0371	19.1
B	1	2138.578936	2138.578936	16.372	0.0560	15.7
RB	2	261.243144	130.621572	1.630	0.3035	15.6
AB	2	332.229507	166.114754	2.073	0.2411	15.6
RAB	4	320.506143	80.126536			

COMPLETE STRIP-BLOCK AOV For Pyrethrum PSR Sulphur mg/kg 1 (Data Column 10)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	201.705113				
R	2	1.509999	0.755000	0.378	0.7076	1.7
A	2	8.830013	4.415006	0.594	0.5943	3.4
RA	4	29.710009	7.427502	3.714	0.1159	3.0
B	1	147.347310	147.347310	163.618	0.0061	1.3
RB	2	1.801112	0.900556	0.450	0.6662	2.5
AB	2	4.507778	2.253889	1.127	0.4090	2.5
RAB	4	7.998893	1.999723			

COMPLETE STRIP-BLOCK AOV For Pyrethrum PSR Calcium mg/kg 1 (Data Column 11)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	708046.444444				
R	2	99386.111111	49693.055556	2.340	0.2124	179.4
A	2	17127.444444	8563.722222	0.819	0.5032	125.8
RA	4	41804.888889	10451.222222	0.492	0.7454	310.7
B	1	250632.000000	250632.000000	3.276	0.2120	380.7
RB	2	153012.333333	76506.166667	3.603	0.1274	253.7
AB	2	61141.000000	30570.500000	1.440	0.3381	253.7
RAB	4	84942.666667	21235.666667			

COMPLETE STRIP-BLOCK AOV For Pyrethrum PSR Magnesium mg/kg 1 (Data Column 12)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	15012.287598				
R	2	1553.350375	776.675188	5.905	0.0640	14.1
A	2	665.307684	332.653842	1.586	0.3110	17.8
RA	4	838.728761	209.682190	1.594	0.3312	24.5
B	1	7589.113984	7589.113984	5.681	0.1400	50.3
RB	2	2671.958819	1335.979410	10.157	0.0271	20.0
AB	2	1167.688595	583.844297	4.439	0.0965	20.0
RAB	4	526.139379	131.534845			

COMPLETE STRIP-BLOCK AOV For Pyrethrum PSR Sodium mg/kg 1 (Data Column 13)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	1684.902928					
R	2	135.804414	67.902207	0.612	0.5862		13.0
A	2	476.334412	238.167206	3.703	0.1230		9.9
RA	4	257.248961	64.312240	0.580	0.6947		22.5
B	1	13.004979	13.004979	0.186	0.7086		11.5
RB	2	140.173351	70.086676	0.632	0.5774		18.3
AB	2	218.703370	109.351685	0.986	0.4486		18.3
RAB	4	443.633440	110.908360				
COMPLETE STRIP-BLOCK AOV For Pyrethrum CEC Calcium % 1 (Data Column 14)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	108.158094					
R	2	1.334444	0.667222	2.843	0.1706		0.6
A	2	20.121078	10.060539	2.520	0.1958		2.5
RA	4	15.972244	3.993061	17.012	0.0089		1.0
B	1	48.675877	48.675877	9.002	0.0954		3.2
RB	2	10.814442	5.407221	23.037	0.0064		0.8
AB	2	10.301121	5.150560	21.943	0.0070		0.8
RAB	4	0.938887	0.234722				

Crop Name		Pyrethrum CEC Magnesi>	Pyrethrum CEC Potassi>	Pyrethrum CEC Sodium	Pyrethrum Root weight 10/12/10	Pyrethrum Root weight 13/12/10	Pyrethrum Top weight 10/12/10	Pyrethrum Top weight 13/12/10
Description		%	%	%				
Rating Date								
Rating Unit								
Number of Subsamples		1	1	1	1	1	1	1
Trt Treatment								
No. Name	Rate	15	16	17	18	19	20	21
TABLE OF R MEANS								
Replicate 1		14.3	4.6	1.3	24.4	5.1	266.8	169.0
Replicate 2		14.9	4.2	1.3	22.8	4.0	271.8	181.0
Replicate 3		15.0	4.2	1.3	21.2	3.7	273.4	178.7
TABLE OF A MEANS								
1 Dulverton Compost	0	14.5	4.2	1.2	18.1	3.6	245.0	160.8
2 Dulverton Compost	10000	14.7	4.2	1.3	24.1	4.7	259.2	173.3
3 Dulverton Compost	20000	15.1	4.5	1.3	26.2	4.6	307.9	194.6
TABLE OF B MEANS								
1 biochar	0	14.1	4.6	1.3	22.8	4.3	270.7	176.3
2 Biochar	10000	15.4	4.1	1.3	.	.	.	.



COMPLETE STRIP-BLOCK AOV For Pyrethrum CEC Magnesium % 1 (Data Column 15)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	13.564442					
R	2	1.791112	0.895556	3.922	0.1141	0.6	
A	2	1.054447	0.527223	1.716	0.2897	0.7	
RA	4	1.228889	0.307222	1.345	0.3903	1.0	
B	1	7.219992	7.219992	20.827	0.0448	0.8	
RB	2	0.693333	0.346667	1.518	0.3232	0.8	
AB	2	0.663333	0.331667	1.453	0.3356	0.8	
RAB	4	0.913335	0.228334				
COMPLETE STRIP-BLOCK AOV For Pyrethrum CEC Potassium % 1 (Data Column 16)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	2.936112					
R	2	0.667778	0.333889	13.977	0.0157	0.2	
A	2	0.381112	0.190556	1.649	0.3004	0.4	
RA	4	0.462222	0.115556	4.837	0.0780	0.3	
B	1	1.227223	1.227223	27.962	0.0340	0.3	
RB	2	0.087778	0.043889	1.837	0.2717	0.3	
AB	2	0.014444	0.007222	0.302	0.7546	0.3	
RAB	4	0.095556	0.023889				
COMPLETE STRIP-BLOCK AOV For Pyrethrum CEC Sodium % 1 (Data Column 17)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	0.191111					
R	2	0.014444	0.007222	4.333	0.0997	0.1	
A	2	0.081111	0.040556	10.429	0.0259	0.1	
RA	4	0.015556	0.003889	2.333	0.2160	0.1	
B	1	0.000000	0.000000	0.000	1.0000	0.2	
RB	2	0.063333	0.031667	19.000	0.0091	0.1	
AB	2	0.010000	0.005000	3.000	0.1600	0.1	
RAB	4	0.006667	0.001667				
COMPLETE STRIP-BLOCK AOV For Pyrethrum Root weight 10/12/10 1 (Data Column 18)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	2517.166746					
R	2	7.602874	3.801437	0.509	0.6354	3.4	
A	2	52.383556	26.191778	3.508	0.1319	3.4	
RA	4	29.868822	7.467205	1.000	0.5000	5.8	
B	1	2337.456244	2337.456244	614.888	0.0016	2.7	
RB	2	7.602874	3.801437	0.509	0.6354	4.8	
AB	2	52.383556	26.191778	3.508	0.1319	4.8	
RAB	4	29.868822	7.467205				
COMPLETE STRIP-BLOCK AOV For Pyrethrum Root weight 13/12/10 1 (Data Column 19)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	90.732978					
R	2	1.730078	0.865039	2.618	0.1876	0.7	
A	2	1.141111	0.570556	1.727	0.2880	0.7	
RA	4	1.321689	0.330422	1.000	0.5000	1.2	
B	1	82.347222	82.347222	95.195	0.0103	1.3	
RB	2	1.730078	0.865039	2.618	0.1876	1.0	
AB	2	1.141111	0.570556	1.727	0.2880	1.0	
RAB	4	1.321689	0.330422				
COMPLETE STRIP-BLOCK AOV For Pyrethrum Top weight 10/12/10 1 (Data Column 20)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	338814.312380					
R	2	35.436627	17.718313	0.057	0.9451	21.7	
A	2	3263.520162	1631.760081	5.271	0.0757	21.7	
RA	4	1238.364332	309.591083	1.000	0.5000	37.5	
B	1	329739.670139	329739.670139	18610.107	0.0001	5.8	
RB	2	35.436627	17.718313	0.057	0.9451	30.6	
AB	2	3263.520162	1631.760081	5.271	0.0757	30.6	
RAB	4	1238.364332	309.591083				
COMPLETE STRIP-BLOCK AOV For Pyrethrum Topweight 13/12/10 1 (Data Column 21)							
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)	
Total	17	143980.338089					
R	2	121.745475	60.872737	0.222	0.8100	20.4	
A	2	877.095192	438.547596	1.601	0.3084	20.4	
RA	4	1095.423521	273.855880	1.000	0.5000	35.3	
B	1	139791.809715	139791.809715	2296.460	0.0004	10.7	
RB	2	121.745475	60.872737	0.222	0.8100	28.8	
AB	2	877.095192	438.547596	1.601	0.3084	28.8	
RAB	4	1095.423521	273.855880				

Crop Name Description Rating Date Rating Unit Number of Subsamples		Pyrethrum Top Weight 25/01/11	Pyrethrum Root Weight 25/01/11
Trt Treatment No. Name	Rate	22	23
TABLE OF R MEANS			
Replicate 1		356.3	30.1
Replicate 2		349.7	25.8
Replicate 3		331.7	22.7
TABLE OF A MEANS			
1 Dulverton Compost	0	328.7	23.3
2 Dulverton Compost	10000	337.3	25.5
3 Dulverton Compost	20000	371.7	29.8
TABLE OF B MEANS			
1 biochar	0	345.9	26.2
2 Biochar	10000	.	.

COMPLETE STRIP-BLOCK AOV For Pyrethrum Top Weight 25/1/11 (Data Column 22)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	561456.944444				
R	2	488.444444	244.222222	0.103	0.9046	60.0
A	2	1551.444444	775.722222	0.327	0.7390	60.0
RA	4	9500.555556	2375.138889	1.000	0.5000	103.9
B	1	538376.055556	538376.055556	2204.452	0.0005	21.5
RB	2	488.444444	244.222222	0.103	0.9046	84.8
AB	2	1551.444444	775.722222	0.327	0.7390	84.8
RAB	4	9500.555556	2375.138889			
COMPLETE STRIP-BLOCK AOV For Pyrethrum Root Weight 25/1/11 (Data Column 23)						
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	Prob(F)	LSD (.10)
Total	17	3273.555547				
R	2	41.301687	20.650843	4.353	0.0991	2.7
A	2	32.926347	16.463174	3.470	0.1337	2.7
RA	4	18.976460	4.744115	1.000	0.5000	4.6
B	1	3087.146560	3087.146560	149.493	0.0066	6.3
RB	2	41.301687	20.650843	4.353	0.0991	3.8
AB	2	32.926347	16.463174	3.470	0.1337	3.8
RAB	4	18.976460	4.744115			

## Appendix iv. Meteorological details

Year: 2010

Location: Burnie, Tasmania

	August 2010			September 2010			October 2010				
	Min °C	Max °C	mm	Min °C	Max °C	mm	Min °C	Max °C	mm		
1	7	12.3	3	8.9	16.3	10.4	4.6	13.8	0		
2	6.2	17.4	0.2	5.1	14.8	0	5.2	15.2	0		
3	5.8	14.1	0	6.7	12.3	0	10	16.8	0		
4			1.4	10	13.8	16.6	13.8	15.3	0		
5		13.1	1.8	10.4	14.2	29	10.4	17.5	3.4		
6	3.6	13.2	0	6	14	0	7.7	14.6	0		
7	6.2	11.3	0	3.6	13.1	0	5.3	13.5	1		
8	7.2	12.1	10.6	5.7	12.2	0	5.3	14.9	3.6		
9	<b>Sow</b>	8.1	13.6	1	9.5	12.7	2.2	7.8	18.6	0	
10		9.8	14.4	0	9.9	15	17	9	14	0	
11		10.6	13.8	19.2	7.8	14.8	0	11.6	16.2	0	
12		8.4	15.3	4	9.7	14.2	4	11.8	16.7	0	
13		5.1	13.2	0	7.7	13.6	3	10.5	16	3.4	
14		8.2	13.3	0	4	12.9	0	5.8	13.8	0	
15		10.9	14.5	11.8	7.2	12.5	0.2	10.5	13.8	15.4	
16		6.4	9.4	2.4	6.4	11.7	2.4	2.3	13	3	
17		3.5	13.8	3	7.2	12.4	1.2	5.5	16	0.4	
18		6.4	12.6	0.6	9.5	14.9	0	8.2	15.2	0	
19		9.6	12.7	17.2	6.8	15.3	0	6	17.2	0.4	
20		4.5	12.6	8.4	10	19.1	0	6.5	20.9	0	
21		6.6	14	10.4	10	19.4	0	11	15.5	0	
22		6.2	13.8	0.6	6.2	16	0	8.1	17.8	0	
23		8.9	13.9	3.8	7	16.5	0	11.2	16.8	7.2	
24		9.7	12.5	1.4	10.3	15	0	5.4	14.9	0	
25		4.2	10.2	6.2	Assess	10.8	16.1	0	6	15.5	0.4
26		1.9	11	6.6		5.3	13.5	2.2	8.2	16.6	0
27		3.2	11.7	3.4		9.2	13.2	1.4	8.4	17.7	0
28		3.2	14.1	0.2		4.2	11	2.6	11.4	16	0
29		3.9	13.6	0		2.3	12.3	4	12.7	17.7	0
30		5.7	13.5	0		3.4	14	0.5	13.6	18	0
31		8	13	0		16.9	36	0	14	16.3	44
<b>Total</b>			<b>172</b>				<b>96.7</b>				<b>82.2</b>

Year: 2010-2011

Location: Burnie, Tasmania

	November 2010			December 2010			January 2011				
	Min °C	Max °C	mm	Min °C	Max °C	mm	Min °C	Max °C	mm		
1	5.6	15	7	11.1	20.5	0	12.5	22.2	0		
2	8.8	17.8	0	16.3	19.7	2.4	8.9	19.8	0		
3	4.4	16.5	0.6	16.9	20	5.8	9.8	22.6	0		
4	6.3	15.9	0	14.5	22.1	0	14.2	19.9	0		
5	10.8	16.2	0	14	17.1	0	14.8	21.1	3.2		
6	10.8	16	0	12.3	18.5	0	14.9	21.8	1.4		
7	11.9	14.9	0	13.7	18.9	3.4	16.5	22.8	0		
8	10.5	16.3	22.8	14	19.5	28.4	19.2	22.9	0		
9	7.8	17.4	0.6	12.3	18.4	21.2	14.4	22.4	0		
10	12.7	19.4	0	Assess	11	15.7	0.4	16.5	19.8	0	
11	9	16.8	1		9.7	16.6	7.4	16.5	21.2	13.6	
12	12.2	21.6	0.8		9.4	17	16	18.4	20	7	
13	13.5	19.3	2.6	Assess	8.7	17.2	0	16.8	20.3	87.2	
14	9.7	14.8	19.8		11.3		4.8	18.1	19.4	44.1	
15	9.5	19	0.4			19.8	0	15.5	25.3	5.9	
16	8.9	19.2	0		8.5		3	12.5	22.2	0	
17	10	15.9	0			17.5	5	13.2	19.6	0	
18	12.1	17.2	0.4		8.4	18.1	15.8	10.3	21.2	0	
19	5	16.6	0		9.9	16.8	11.6	12.2	23.5	0	
20	8	20.2	0		10.6	21	4.4	15.6	20.1	0	
21	11	18.5	0		10.1	16.8	0	16.7	24.8	0.4	
22	13	20.4	0		8	17.6	0	14.5	21.2	1.8	
23	14.5	22	0		11.5	18.6	0	13.6	19.5	0	
24	16.6	21.4	12.1		9	18.4	0	13.5	20.6	12.4	
25	15.7	19.8	17.4		12	20.1	0	Assess	11.4	17.8	0
26	9.2	18.1	0.8		11.4	18	0	10.7	20.2	0	
27	12.6	17.8	0		6	15.9	0	12.8	22.8	0	
28	13.3	21	9.8		6.6		0.8	9.8	23.7	0	
29	10.7	17.7	0.4			21.7	0	10.9	20.8	0	
30	13.5	18.1	0		8.2	22.6	0	15.5	30.6	0	
31					10.1	18.9	0	16.5	20.4	0	
<b>Total</b>			<b>96.5</b>				<b>130.4</b>			<b>177</b>	