

FINAL REPORT

Evaluation of Dulverton Waste Management compost on the growth, yield and quality of green beans cv. Valentino

Kindred, Tasmania, 2010-11

Protocol Number:

*Dulverton Waste Management Proposal
19/04/10*

Client:

Dulverton Waste Management

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SUMMARY

At Kindred, Tasmania, in 2010-11, a trial was conducted to evaluate the effect of Dulverton Waste Management compost on the growth, yield and quality of green beans cv. Valentino. Compost was applied as a single broadcast application at 10 and 20 t/ha and incorporated into the soil prior to sowing.

Soil analysis was conducted at 27 days after sowing (DAS). Root disease assessments for *Aphanomyces* root rot and black root rot (*Thielaviopsis basicola*) were made 70DAS. Bean growth assessments were made at 67 and 95DAS and bean marketability was assessed 3 days after harvest.

Dulverton compost applications showed no significant effect for black root rot and *Aphanomyces* root rot severity of bean roots compared with the untreated control.

Dulverton compost increased bean plant fresh weight, marketable pod weight and marketable pod number by between 90% and 140% of the untreated control at harvest, 95DAS. Differences were not statistically significant.

Dulverton compost also increased the unmarketable pod weight and number though again differences were not statistically significant. The number and weight of harvested pods exhibiting pearing, or incomplete pod fill, was not affected by treatment.

At 27DAS there was a trend for increased soil organic matter, total carbon and available nitrogen with increasing compost rate. There was also a trend for increased sodium and magnesium levels and decreased phosphorus and sulphur levels for both compost rates compared with the untreated control.

All compost treatments were safe to the crop.

INTRODUCTION

Aims

- To investigate the efficacy of the compost produced at the Dulverton Waste Management site for plant growth and control of root rot in beans cv. Valentino.
- To compare Dulverton compost at two rates; 10 t/ha and 20 t/ha.
- To examine the crop safety of the applied compost to the bean crop.

Diseases

Black root rot (*Thielaviopsis basicola* Ferraris)
Aphanomyces root rot (*Aphanomyces* spp.)

MATERIALS AND METHODS

Product list

Product name	Active ingredient (ai)
Dulverton compost	Green waste

Treatment list

No.	Product	Product rate t/ha	Application schedule
1	Untreated control	nil	n/a
2	Dulverton compost	10	Compost broadcast onto plots and incorporated using a tyne and crumble roller prior to sowing green beans
3	Dulverton compost	20	

Chronology of events

Date	Days after sowing (DAS)	Crop stage	Event
09/07/10	-91	Pre-sowing	Treatment application
08/10/10	0	Sowing	Beans sown
25/10/10	17	BBCH 12, 2 true leaf	Soil samples taken
14/12/10	67	BBCH 61, Start of flowering	Growth assessment
17/12/10	70	BBCH 61	Root disease assessment
11/01/11	95	BBCH 77, 70% of pods at typical length	Growth assessment Harvest
14/01/11	98 3 days after harvest	Post harvest	Marketability assessment

RESULTS AND DISCUSSION

Table 1. Root disease severity at 70DAS

No.	Treatment	Rate t/ha	Disease severity index (0-4)	Severe rot incidence (% plants rated 3 or 4)
1	Untreated control	0	2.8	56.7
2	Dulverton Compost	10	2.9	63.3
3	Dulverton Compost	20	2.7	57.5
<i>P</i> -value			0.9682	0.9356
LSD (5% level)			N/A	N/A

N/A = p-value > 0.05.

DAS: Days after sowing

Table 2. Marketable beans and plant fresh weight at harvest

No.	Treatment	Rate t/ha	Marketable weight t/ha (% increase) 98DAS	Marketable number $\times 10^6$ /ha (% increase) 98DAS	Above ground fresh weight t/ha (% increase) 95DAS
1	Untreated control	0	2.3	0.5	6.0
2	Dulverton Compost	10	5.1 (122)	1.2 (140)	12.3 (105)
3	Dulverton Compost	20	4.9 (113)	1.1 (120)	11.4 (90)
<i>P</i> -value			0.4089	0.3292	0.3567
LSD (5% level)			N/A	N/A	N/A

N/A = p-value > 0.05.

DAS: Days after sowing

Table 3. Unmarketable beans at harvest

No.	Treatment	Rate t/ha	Unmarketable weight (t/ha)	Unmarketable number ($\times 10^5$ /ha)	Peared weight (t/ha)	Peared number ($\times 10^4$ /ha)
1	Untreated control	0	0.6	0.6	0.2	6.3
2	Dulverton Compost	10	1.3	1.2	0.2	6.6
3	Dulverton Compost	20	1.0	1.0	0.2	5.4
<i>P</i> -value			0.5396	0.3273	0.9354	0.8868
LSD (5% level)			N/A	N/A	N/A	N/A

N/A = p-value > 0.05.

Peared beans are those which, due to environmental factors, exhibit incomplete filling in the upper part of the bean pod (see Photograph 6).

DAS: Days after sowing

At 70 days after sowing (DAS) Dulverton compost applications did not significantly affect the incidence or severity of root diseases (black root rot (*Thielaviopsis basicola*) and *Aphanomyces* root rot) of bean roots compared with the untreated control.

Dulverton compost increased bean plant fresh weight, marketable pod weight and marketable pod number by between 90% and 140% of the untreated control. Differences were not statistically significant.

Dulverton compost also increased the unmarketable pod weight and number, again differences were not significant. The number and weight of harvested pods exhibiting pearing, or incomplete pod fill, was not affected by treatment.

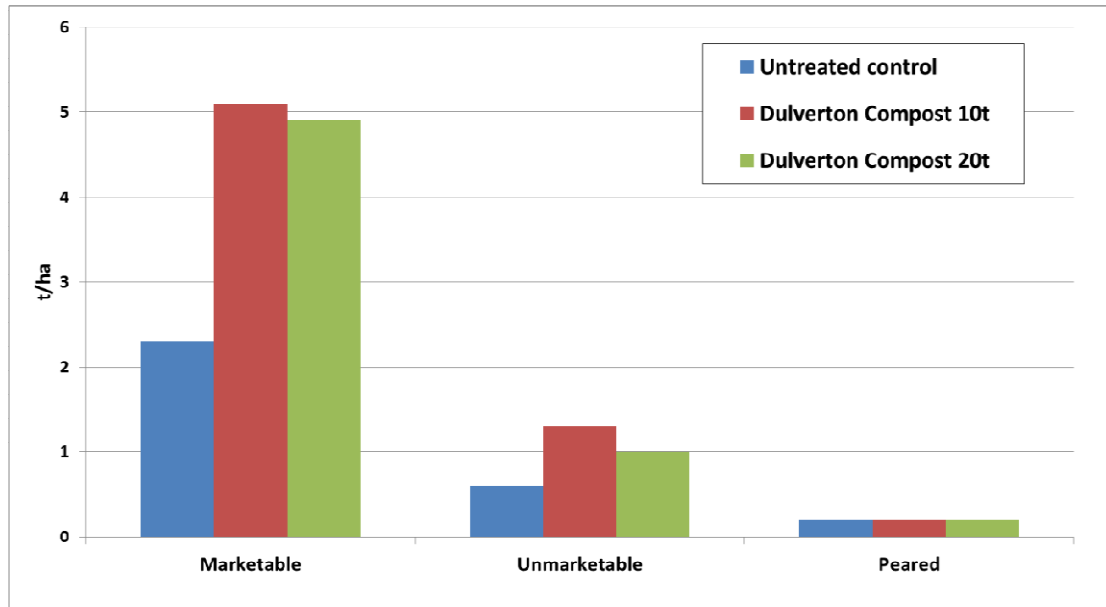


Figure 1. Harvested bean pod yield by category

Table 4. Plant growth at 67DAS

No.	Treatment	Rate t/ha	Fresh weight ¹ (kg/100 plants) 67DAS
1	Untreated control	0	1.026
2	Dulverton Compost	10	0.981
3	Dulverton Compost	20	1.125
P-value			0.7235
LSD (5% level)			N/A

N/A = p-value > 0.05.

¹Fresh weight is of whole plants including roots

DAS: Days after sowing

At 67DAS there was no significant effect from compost for whole plant fresh weight compared with the untreated control.

Table 5. Soil nutrient assessment at 17DAS

Treatment		Untreated control	Dulverton compost 10 t/ha	Dulverton compost 20 t/ha
Product Rate	t/ha	Nil	10	20
Organic matter		5.98	6.07	6.39
Total Carbon	%	3.88	3.94	4.15
Available N	kg/ha	6	6.7	7
Phosphorus	mg/kg	5.3	2.8	2.7
Potassium	mg/kg	351.9	321.5	392.2
Sulphur	mg/kg	23.3	10.3	11.0
Calcium	mg/kg	2932	2902	2855
Magnesium	mg/kg	294.5	314.0	313.6
Sodium	mg/kg	66.7	71.1	76.0

DAS: Days after sowing

At 17DAS there was a trend for increased soil organic matter, total carbon and available nitrogen levels with increasing rate of compost.

There was also a trend for increased soil sodium and magnesium and decreased soil phosphorus and sulphur for both treatment rates when compared to the untreated control.

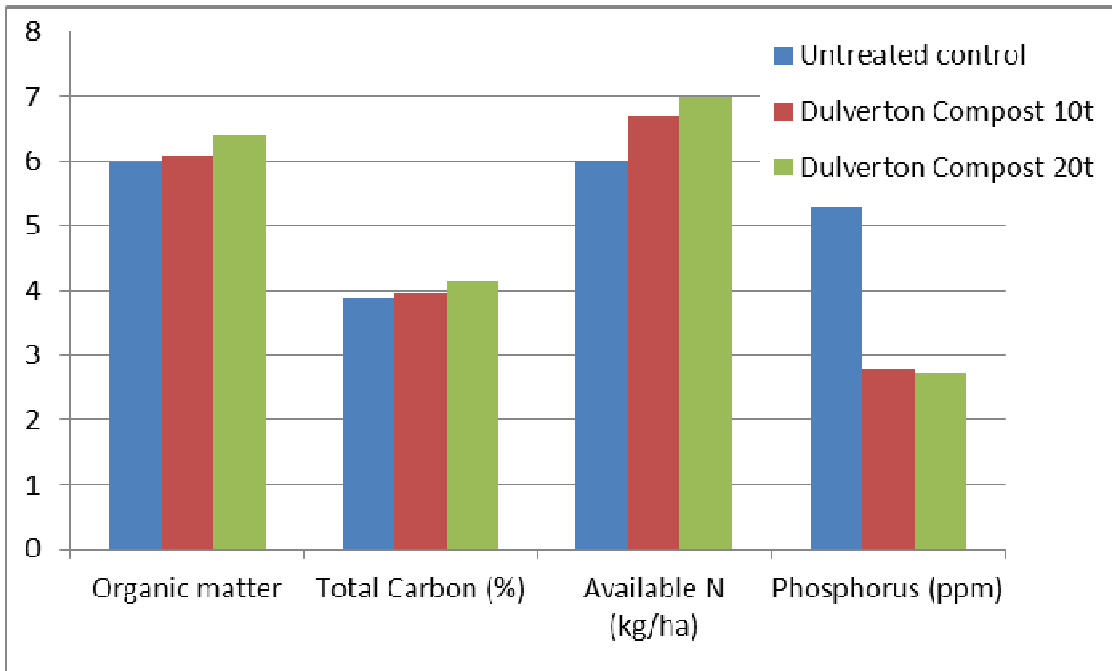


Figure 2. Soil properties

PHOTOGRAPHS



Photograph 1: (17/12/10 – 70DAS) Root rot disease severity index categories



Photograph 2: (11/01/11 – 95DAS) Untreated control (Trt 1)



Photograph 3: (11/01/11 – 95DAS) Dulverton compost applied at 10 t/ha (Trt 2)



Photograph 4: (11/01/11 – 95DAS) Dulverton compost applied at 20 t/ha (Trt 3)



Photograph 5 and 6: (14/01/11 – 98DAS) Marketable and unmarketable bean pods



Photograph 7: (14/01/11 – 98DAS) Peared beans

CONCLUSIONS

- Dulverton compost applications did not significantly affect the incidence or severity of black root rot (*Thielaviopsis basicola*) and *Aphanomyces* root rot when incorporated into soil at a rate of 10 t/ha or 20 t/ha, 91 days before sowing of beans, compared with the untreated control.
- Dulverton compost increased bean plant fresh weight, marketable pod weight and marketable pod number by between 90% and 140% of the untreated control at harvest. Differences were not statistically significant.
- The weight and number of unmarketable bean pods was also dramatically, though not significantly, increased by application of compost.
- The weight and number of bean pods exhibiting peering, or incomplete pod fill, was not affected by treatment.
- There was a trend for increased soil organic matter, total carbon and available nitrogen levels with increasing compost rates. There was also a trend for increased soil sodium and magnesium and decreased soil phosphorus and sulphur for both compost rates when compared with the untreated control.
- All Dulverton compost treatments were safe to beans when incorporated into the soil prior to sowing.

APPENDICES

Appendix i. Trial details

Site details

Grower	Harvest Moon
Location	Kindred, Tasmania
GPS co-ordinates	-41.19479, 146.23532
Soil type	Clay loam
Crop	Green beans
Cultivar	Valentino
Trial design	Randomised complete block
Replications	2
Plot size	10 m x 100 m
Sowing date	08/10/10
Harvest date	11/01/11

Trial plan

1	Block 1
2	Block 2
3	Block 3
1	Block 4
3	Block 5
2	Block 6

↑N

Trial location map



↑N

Application details

Application equipment	
Equipment	Tyne and crumble roller
Method	Compost was broadcast onto 10 m wide strips and cultivated using tyne and crumble roller
Date	09/07/10

Meteorological data from Sheffield School Farm for the months of July 2010 up to and including January 2011 is included as Appendix iv to this report. The trial site was situated 18.5 km from Sheffield School Farm.

Assessments

1. Soil nutrient assessment		
Dates	25/10/10	
Days after sowing	17	
Sample size	1 kg soil (bulked from two blocks)	
Method	Soil was taken from multiple random locations within each block. Soil was sampled to 10 cm depth with a uniform volume of soil sampled with depth. Samples were delivered to AgVita Analytical laboratory where a soil nutrient analysis was undertaken.	
Statistical analysis	Nil - non replicated sampling.	
2. Plant growth assessment		
Dates	14/12/10	11/01/11
Days after sowing	67	95
Sample size	30-32 plants per plot	
Method	Whole plant fresh weight and fresh shoot weight	
Statistical analysis	Analysis of variance (ANOVA) test and Fischer's least significant difference (LSD) test were conducted using ARM7.	
3. Marketability assessment		
Dates	14/01/11	
Days after sowing	98	
Sample size	30-32 plants per plot	
Method	Bean pods were visually assessed for marketability, unmarketability and peering, pod numbers and weights were recorded for each category.	
Statistical analysis	Analysis of variance (ANOVA) test and Fischer's least significant difference (LSD) test were conducted using ARM7.	
4. Root disease assessment		
Dates	17/12/10	
Days after sowing	70	
Sample size	30-32 plants per plot	
Method	<p>The disease severity was assessed on a scale of 0-4 according to the following severity rating:</p> <ul style="list-style-type: none"> 0 – no hypocotyl discolouration and no root rot 1 – some superficial hypocotyl rot, light root pruning, with good root branching 2 – superficial hypocotyl rot and moderate root pruning 3 – severe hypocotyl rot and moderate root pruning 4 – severe hypocotyl rot and severe root pruning <p>Incidence of each category was recorded and the disease severity index was calculated according to the formula:</p> <p>Disease severity index = ((1 x no. plants in rating 1) + (2 x no. plants in rating 2) + (3 x no. plants in rating 3) + (4 x no. plants in rating 4) + (5 x no. plants in rating 5)) / (total plants assessed) x 100</p>	
Statistical analysis	Analysis of variance (ANOVA) test and Fischer's least significant difference (LSD) test were conducted using ARM7.	

Soil details

Assessment 1

Treatment		1	2	3
Product rate	t/ha	Nil	10	20
Soil analysis report no.		22229-1	22229-2	22229-3
Laboratory name		AgVita Analytical	AgVita Analytical	AgVita Analytical
Date soil sampled		25 October 2010	25 October 2010	25 October 2010
Date soil received by laboratory		28 October 2010	28 October 2010	28 October 2010
Sample depth	cm	10 cm	10cm	10cm
Soil type at site		Heavy soil CECe > 12 meq	Heavy soil CECe > 12 meq	Heavy soil CECe > 12 meq
Soil bulk density	g/cm ³	0.85	0.85	0.76
Total carbon	%	3.88	3.94	4.15
Organic matter		5.98	6.07	6.39
pH (1:5 H ₂ O)		6.68	6.88	6.80
Electrical conductivity (EC)	dS/m	0.10	0.06	0.07
Root zone moisture	mm	20.9	21.5	19.4
Total available Nitrogen	kg/ha	6	6.7	7
P Saturation Ratio (PSR)				
Phosphorus	mg/kg	5.3	2.8	2.7
Potassium	mg/kg	351.9	321.5	392.2
Sulphur	mg/kg	23.3	10.3	11.0
Calcium	mg/kg	2932	2902	2855
Magnesium	mg/kg	294.5	314.0	313.6
Sodium	mg/kg	66.7	71.1	76.0
Cation Exchange Capacity (CECe)				
Calcium	%	68.5	72.3	71.3
Magnesium	%	11.4	12.9	12.9
Potassium	%	4.2	4.1	5.0
Sodium	%	1.4	1.5	1.7

Compost details

Nitrogen (N)	1.98%
Phosphorus (P)	0.86%
Potassium (K)	0.70%
Sulphur (S)	0.28%
Calcium (Ca)	2.30%
Magnesium (Mg)	1.05%
Sodium (Na)	0.21%
Iron (Fe)	2.20%
Manganese (Mn)	600 ppm
Zinc (Zn)	178 ppm
Copper (Cu)	74 ppm
Cobalt (Co)	9.02 ppm
Boron (B)	26.0 ppm
Molybdenum (Mo)	2.80 ppm
Ph - (1:5 Water)	6.8
Electrical Conductivity	2100 us/cm
Total Organic Carbon	25%

Supplied by Dulverton Organics

Appendix ii. Raw data

Description		Whole plant including roots
Rating Date		14/12/10
Days after sowing		67
Rating Unit		KG/100 PLANTS
Number of Subsamples		2
Trt Treatment		
1 Dulverton Compost		1.025
	Mean =	1.025
2 Dulverton Compost		0.831
	Mean =	1.132
		0.981
3 Dulverton Compost		1.078
	Mean =	1.172
		1.125

Description	Marketable weight 14/01/11	Marketable number 14/01/11	Unmarketable weight 14/01/11	Unmarketable number 14/01/11	Peared weight 14/01/11	Peared number 14/01/11	Top weight 11/01/11
Rating Date	98	98	98	98	98	98	95
Days after sowing	YIELD	NUMBER	YIELD	NUMBER	YIELD	NUMBER	WEIGHT
Rating Data Type	T/HA	NUMB/HA	T/HA	NUMB/HA	T/HA	NUMB/HA	T/HA
Rating Unit	3	3	3	3	3	3	2
Number of Subsamples							
Trt Treatment							
1 Dulverton Compost	2.3	527500	0.6	577500	0.2	62500	6.0
	Mean =	2.3	527500	0.6	577500	0.2	62500
2 Dulverton Compost	4.0	1000000	1.3	1170000	0.2	72500	11.0
	Mean =	6.2	1350000	1.3	1205000	0.2	60000
		5.1	1175000	1.3	1187500	0.2	66250
3 Dulverton Compost	5.1	1187500	1.4	1187500	0.3	77500	12.7
	Mean =	4.7	1052500	0.6	830000	0.1	30000
		4.9	1120000	1.0	1008750	0.2	53750

Description		DSI 1	DSI 2	DSI 3	DSI 4	DSI 0-4	Severe rot root count	Severe root rot % incidence
Rating Date		17/12/10	17/12/10	17/12/10	17/12/10	17/12/10	17/12/10	17/12/10
Days after sowing		70	70	70	70	70	70	70
Trt Treatment								
No. Name	Rate	47	48	49	50	51	52	53
1 Dulverton Compost	0	4.0	11.0	9.0	6.0	2.6	15.0	50.0
biochar	0	4.0	7.0	4.0	15.0	3.0	19.0	63.3
	Mean =	4.0	9.0	6.5	10.5	2.8	17.0	56.7
3 Dulverton Compost	10000	5.0	6.0	6.0	13.0	2.9	19.0	63.3
biochar	0	5.0	6.0	8.0	11.0	2.8	19.0	63.3
	Mean =	5.0	6.0	7.0	12.0	2.9	19.0	63.3
5 Dulverton Compost	20000	2.0	5.0	6.0	18.0	3.3	24.0	77.4
biochar	0	14.0	6.0	5.0	7.0	2.2	12.0	37.5
	Mean =	8.0	5.5	5.5	12.5	2.7	18.0	57.5

Appendix iii. Statistical analysis

Description	Marketable weight	Marketable number	Unmarketable weight	Unmarketable number	Peared weight	Peared number
Rating Date	14/01/11	14/01/11	14/01/11	14/01/11	14/01/11	14/01/11
Days after sowing	98	98	98	98	98	98
Rating Data Type	YIELD	NUMBER	YIELD	NUMBER	YIELD	NUMBER
Rating Unit	T/HA	NUMB/HA	T/HA	NUMB/HA	T/HA	NUMB/HA
Trt Treatment						
1 Dulverton Compost	2.30 a	527500.1 a	0.6000 a	577500.1 a	0.2250 a	62500.0 a
2 Dulverton Compost	5.10 a	1175000.1 a	1.2875 a	1187500.1 a	0.2000 a	66250.0 a
3 Dulverton Compost	4.90 a	1120000.1 a	0.9875 a	1008750.1 a	0.1875 a	53750.0 a
LSD (P=.05)	17.788	3180521.32	5.61381	2759901.78	1.28377	312849.00
Standard Deviation	1.400	250316.49	0.44182	217212.47	0.10104	24622.15
CV	34.15	26.61	46.1	23.49	49.49	40.47
Bartlett's X2	1.928	0.735	2.928	3.028	0.0	1.309
P(Bartlett's X2)	0.165	0.391	0.087	0.082	.	0.253
Replicate F	0.276	0.123	0.361	0.367	0.500	0.990
Replicate Prob(F)	0.6923	0.7853	0.6557	0.6531	0.6082	0.5016
Treatment F	2.490	4.114	1.217	4.169	0.071	0.136
Treatment Prob(F)	0.4089	0.3292	0.5396	0.3273	0.9354	0.8868

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.

Description		DSI 1	DSI 2	DSI 3	DSI 4	DSI 0-4	Severe rot root count	Severe root rot % incidence
Rating Date		17/12/10	17/12/10	17/12/10	17/12/10	17/12/10	17/12/10	17/12/10
Days after sowing		70	70	70	70	70	70	70
Trt Treatment								
No. Name Rate		47	48	49	50	51	52	53
1 Dulverton Compost	0	4.0 a	9.0 a	6.5 a	10.5 a	2.8 a	17.0 a	56.7 a
3 Dulverton Compost	10000	5.0 a	6.0 a	7.0 a	12.0 a	2.9 a	19.0 a	63.3 a
5 Dulverton Compost	20000	8.0 a	5.5 a	5.5 a	12.5 a	2.7 a	18.0 a	57.5 a
LSD (P=.05)		21.08	8.05	10.69	30.48	2.44	25.34	84.24
Standard Deviation		4.90	1.87	2.48	7.08	0.57	5.89	19.58
CV		86.45	27.38	39.21	60.71	20.33	32.71	33.11
Bartlett's X2		0.0	1.392	2.005	1.839	4.044	0.943	0.943
P(Bartlett's X2)		.	0.238	0.367	0.399	0.132	0.331	0.331
Replicate F		1.000	0.429	0.432	0.053	0.315	0.308	0.308
Replicate Prob(F)		0.4226	0.5799	0.5784	0.8391	0.6310	0.6349	0.6349
Treatment F		0.361	2.048	0.189	0.043	0.033	0.058	0.069
Treatment Prob(F)		0.7347	0.3281	0.8409	0.9586	0.9682	0.9455	0.9356

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.

Description		Top weight	Whole plant
Rating Date		11/01/11	17/12/10
Days after sowing		95	67
Rating Data Type		WEIGHT	FRESH WEIGHT
Rating Unit		T/HA	KG/100 PLANTS
Trt Treatment			
1 Dulverton Compost		6.0 a	1.02550016 a
2 Dulverton Compost		12.3 a	0.98145006 a
3 Dulverton Compost		11.4 a	1.12510001 a
LSD (P=.05)		33.35521	1.960185605
Standard Deviation		2.62515	0.154272438
CV		26.56	14.78
Bartlett's X2		0.001	1.043
P(Bartlett's X2)		0.971	0.307
Replicate F		0.000	1.095
Replicate Prob(F)		0.9901	0.4855
Treatment F		3.430	0.455
Treatment Prob(F)		0.3567	0.7235

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.

Appendix iv. Meteorological details

Year: 2010

Location: Sheffield, Tasmania

	July 2010				August 2010				September 2010			
	Activity	Min °C	Max °C	mm	Activity	Min °C	Max °C	mm	Activity	Min °C	Max °C	mm
1		0.7	11.1	0		4.8	10.8	19.8		7.2	13.6	23.4
2		0.3	8.4	0.4		1.9	14.6	0		0.4	12.8	0
3		1.0	12.9	0.2		1.3	11.6	0		1.0	9.9	0.2
4		2.6	11.0	0		4.0	11.1	6.8		5.3	12.2	15.6
5		2.2	12.3	0		2.3	11.9	1.2		8.8	12.4	43.8
6		1.5	10.2	0.2		3.6	11.1	0		1.8	11.1	0
7		1.0	11.8	0.4		1.6	9.6	0.4		0.1	11.9	0.6
8		0.9	11.4	0.2		4.4	7.8	11.6		0.3	9.3	0.2
9	Treat	2.4	11.6	0		4.0	11.7	0		5.4	10.6	3.4
10		4.2	11.5	2.2		6.2	11.8	0		8.1	13.7	17.2
11		8.5	11.8	39.4		7.8	11.8	16.8		4.2	13.6	1
12		7.6	13.2	2.8		7.3	14.4	15.6		6.6	12.8	0.2
13		5.8	12.8	0.8		1.2	11.3	0		5.0	9.8	3.2
14		7.0	10.6	21.8		6.0	10.4	0.6		0.3	11.9	0
15		3.4	9.8	0.2		7.5	12.7	22.8		4.8	9.6	0
16		-0.6	12.0	0.2		4.0	7.8	3.8		3.5	8.9	3.4
17		2.6	10.5	0.6		1.1	10.5	6.6		4.4	11.0	1.2
18		5.4	9.7	4.6		0.8	9.6	0.6		7.8	13.1	0
19		0.9	9.8	3.6		5.5	11.5	17.4		2.9	13.2	0
20		2.4	11.7	1		1.6	8.1	3.8		8.7	19.3	0
21		0.4	11.9	0		3.6	11.3	10.4		8.2	16.5	0
22		3.7	15.1	1.4		2.1	12.1	0		4.7	14.1	0
23		3.0	13.2	0.2		5.2	12.8	7.2		4.8	14.5	0
24		2.3	10.7	0		6.0	9.5	10.4		8.3	14.2	0
25		-0.5	11.1	0.4		1.2	8.1	7.4		8.8	14.4	0
26		3.0	12.9	0		-0.1	9.5	5.2		1.8	13.9	1.8
27		4.3	13.1	0		1.5	10.2	6.6		7.1	11.7	4.8
28		5.1	10.5	0		2.0	12.4	0		1.1	8.8	2.2
29		5.8	11.6	0		0.7	12.4	0		0.7	10.2	5.4
30		4.3	10.2	2		-0.2	12	0.2		-0.9	11.8	0
31		6.6	12.6	22.6		5.4	10.6	0				
Total				105.2				175.2				127.6

Year: 2010

Location: Sheffield, Tasmania

	October 2010				November 2010				December 2010			
	Activity	Min °C	Max °C	mm	Activity	Min °C	Max °C	mm	Activity	Min °C	Max °C	mm
1		2.2	14.3	0		3.8	13.1	5.6		7.0	20.7	0
2		2.1	14.5	0		6	16.8	0.4		13.0	20.9	0
3		6.6	17.5	0		3.3	13.8	0		15.3	20.2	27.6
4		11.4	14.5	0		3.2	14.5	3		13.0	26.0	4.8
5		7.9	16.6	3.4		5.7	14.9	0		11.4	16.1	0
6		5.5	12.4	0		7.2	15.4	0		9.2	18.4	0.2
7		4.0	11.4	1.8		8.0	13.2	0		11.9	17.7	0.6
8	Sowing	4.8	13.4	5.6		7.3	16.6	23		12.1	18.4	41.2
9		5.3	16.6	0		4.5	17.4	0		11.4	19.8	30.6
10		6.6	14.6	0		9.0	17.7	0		8.8	14.2	1.8
11		9.4	16.7	0		6.2	16.4	0.2		6.0	15.9	3.2
12		9.9	16.9	0.2		9.7	21.3	1		7.5	15.0	11.2
13		11.1	16.1	3		11.9	19.9	4		3.8	16.9	0
14		4.0	14.0	0		7.2	15.4	27	Assess	6.3	19.2	11.8
15		8.2	12.1	21.4		7.9	18.4	2.8		10.8	18.3	0.4
16		1.1	10.6	4		8.3	17.0	0		4.6	16.1	2.6
17		4.1	14.1	0		5.5	15.1	0	Assess	6.7	15.4	4.6
18		5.6	13.0	0		10.1	14.4	0		4.5	16.6	37.6
19		3.3	14.7	0.6		2.2	15.6	0		7.4	15.4	1.0
20		4.9	19.9	0		5.2	19.9	0		6.6	19.9	12.8
21		4.9	14.6	0		8.1	17.8	0		7.4	15.3	0.8
22		5.9	19.0	0		10.3	19.7	0		5.2	18.9	0.2
23		8.7	14.2	9.2		10.8	24.6	0		9.2	16.9	0
24		1.2	13.6	0		14.5	20.4	12.8		4.7	18.6	0
25	Soil sample	1.9	13.9	0.6		15.0	17.3	18.4		8.9	22.7	0
26		5.2	15.4	0		9.9	19.2	1		8.8	16.0	0
27		6.0	15.8	0		10.7	16.7	0		2.8	13.5	0
28		6.5	15.3	0		11.2	20.1	18.2		3.4	18.4	0
29		9.6	18.5	0.4		7.0	17.8	0		8.7	20.1	0
30		11.8	16.2	0		10.2	17.8	0		4.6	20.6	0
31		13.6	16.4	76.4						7.9	20.9	0
Total				126.6				117.4				193.0

Year: 2011

Location: Sheffield, Tasmania

	January 2011			
	Activity	Min °C	Max °C	mm
1		10.9	21.4	0
2		8.2	18.2	0
3		6.0	19.8	0
4		10.4	19.8	0
5		10.9	21.4	0
6		11.7	21.4	0.6
7		11.3	26.3	0
8		14.0	26.0	0
9		10.3	24.4	0
10		11.6	18.6	0
11	Assess	14.6	20.3	0
12		15.4	18.0	0
13		15.0	18.7	0
14	Assess	16.7	20.9	0
15		13.5	25.9	45.6
16		9.9	21.7	0
17		9.8	18.1	0
18		8.1	22.2	0
19		8.2	21.6	0
20		12.6	20.6	0
21		14.2	23.3	0
22		9.9	21.9	3.8
23		9.0	20.6	0
24		12.3	19.0	13
25		8.8	18.9	0
26		8.8	20.9	0.4
27		8.5	21.0	0
28		8.1	19.8	0
29		7.8	20.7	0
30		13.7	28.9	0
31				
Total				63.4