Compost Trial 2016 -2017

Liz Mann and Ann Morrison, Australian Processing Tomato Research Council Inc.
Nick O'Halloran, Department of Economic Development, Jobs, Transport and Resources

This project is supported by the Goulburn Broken Catchment Management Authority's Beyond SoilCare program through funding from the Australian Government's National Landcare Program.

AIM

To evaluate the effects of three different rates of a commercial compost on processing tomato production and soil health.

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Site 1

- 10 km north of Rochester, Victoria
  - Geltch Investment - Cimones 2 block

Site 2

- 10 km north of Mathoura, NSW
  - Kagome - Hibma W. 12 block

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COMPOST

Biomix Compost

- Green organic waste
- Composted approximately 12 weeks
- Fine screened to < 20 mm
- pasteurised

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Treatments

- Treatment 1 - Control
- Treatment 2 - 10 t/ha Biomix compost
- Treatment 3 - 20 t/ha Biomix compost
- Treatment 4 - 30 t/ha Biomix compost

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Trial design

- Four replicates
- Each treatment plot - three adjacent rows
- Middle row sampled and harvested

Compost trial layout for both trial sites

Replicate 1				Replicate 2				Replicate 3				Replicate 4			
Control	20 t/ha Biomix	10 t/ha Biomix	30 t/ha Biomix	30 t/ha Biomix	10 t/ha Biomix	Control	20 t/ha Biomix	30 t/ha Biomix	Control	10 t/ha Biomix	20 t/ha Biomix	10 t/ha Biomix	Control	30 t/ha Biomix	20 t/ha Biomix

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Compost Analysis

Nutrient	% w/w (dry basis)	% w/w (wet basis or as applied)	kg per tonne
N	1.57	1.24	12.36
P	0.266	0.21	2.09
K	1.34	1.05	10.55
S	0.245	0.19	1.93
Ca	3.27	2.57	25.73
Mg	0.528	0.42	4.16
Na	0.378	0.30	2.97
Fe	1.12	0.88	8.81
Total Organic C	19.4	15.27	152.68
Moisture Content	21.3%		
C/N ratio	12.36		

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Nutrients Applied in Compost

Nutrient	10 t/ha treatment		20 t/ha treatment		30 t/ha treatment	
	entire area (kg/ha)	banded area (kg/banded ha)	entire area (kg/ha)	banded area (kg/banded ha)	entire area (kg/ha)	banded area (kg/banded ha)
N	6.2	12.4	12.4	24.7	18.5	37.1
P	4.2	8.4	8.4	16.7	12.6	25.1
K	42.2	84.4	84.4	168.7	126.5	253.1
S	4.8	9.6	9.6	19.3	14.5	28.9
Ca	64.3	128.7	128.7	257.3	193.0	386.0
Mg	10.4	20.8	20.8	41.6	31.2	62.3
Total Organic C	763.4	1526.8	1526.8	3053.6	2290.2	4580.3

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Site Details

Summary of trial sites

Site	Date Compost Applied	Tomato Variety Transplanted	Planting Date	Harvest Date	Growing Days
Rochester	3/05/2016	H3402 Mix	22/10/2016	9/03/2017	137
Mathoura	6/05/2016	H1015	11/10/2016	27/02/2017	136

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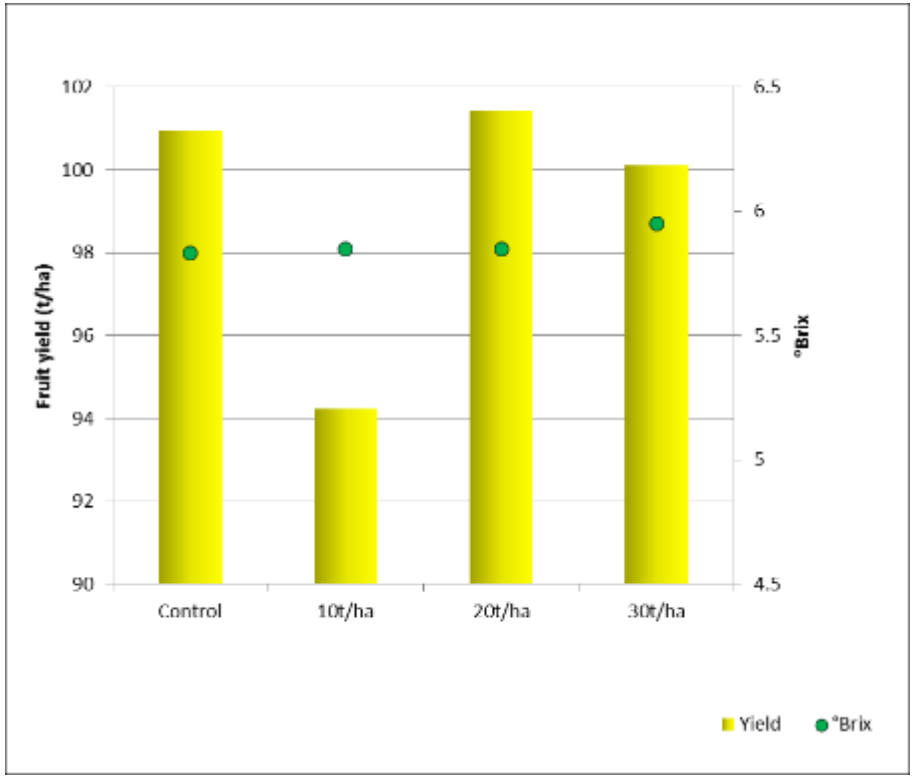
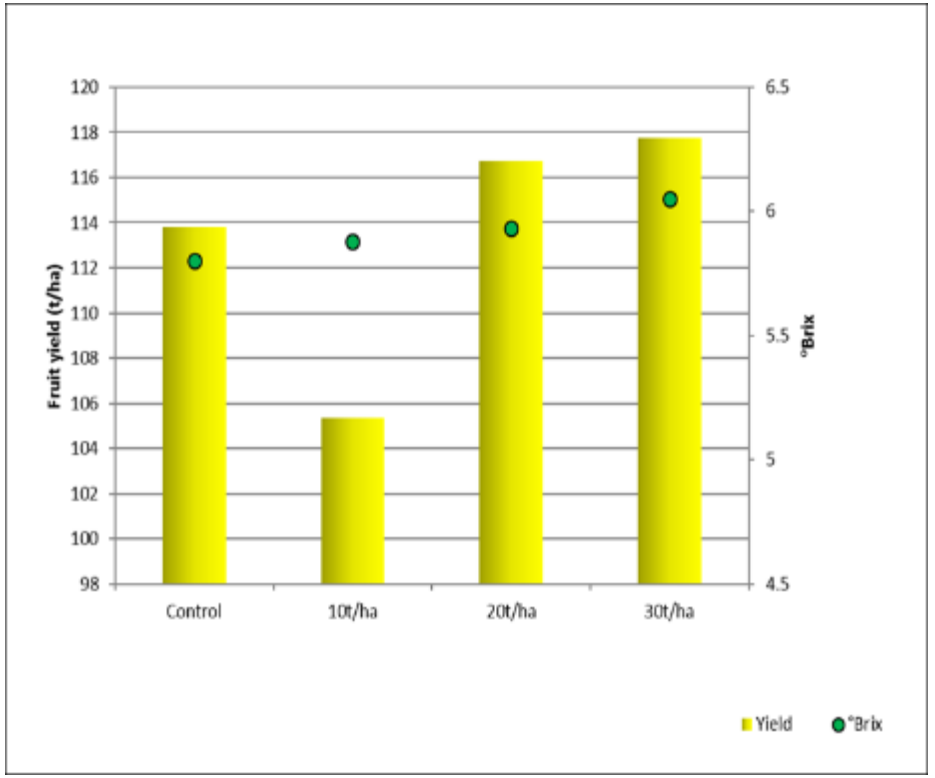
Results - Yield and °Brix

Rochester average Yield & °Brix



Mathoura average Yield & °Brix



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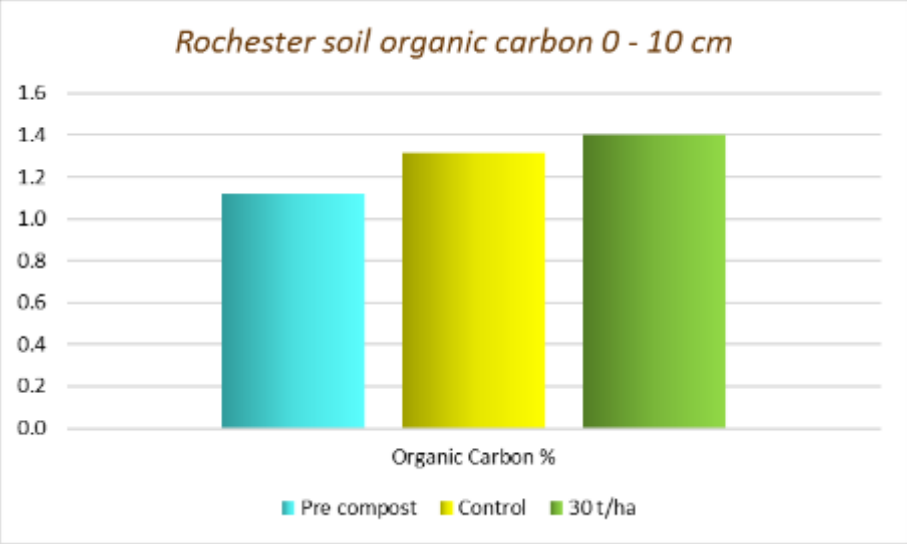
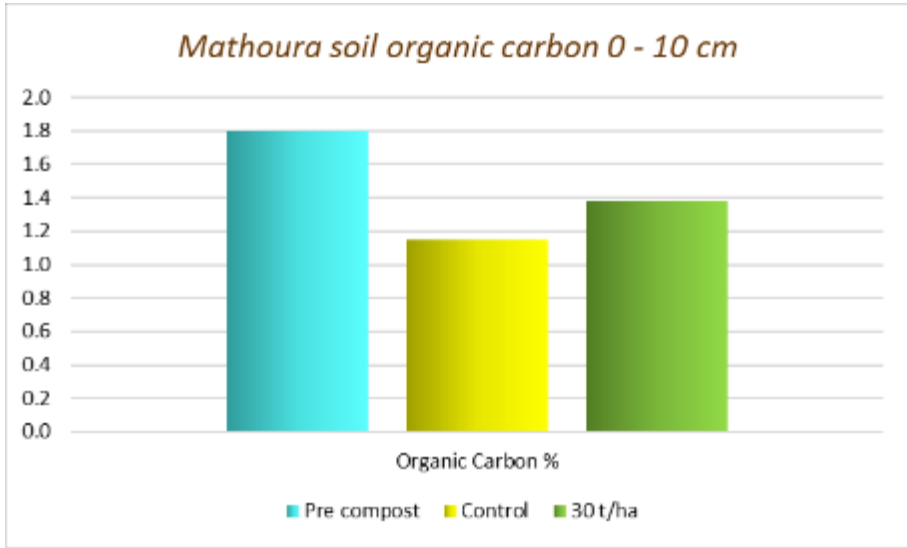
Soil Organic Carbon





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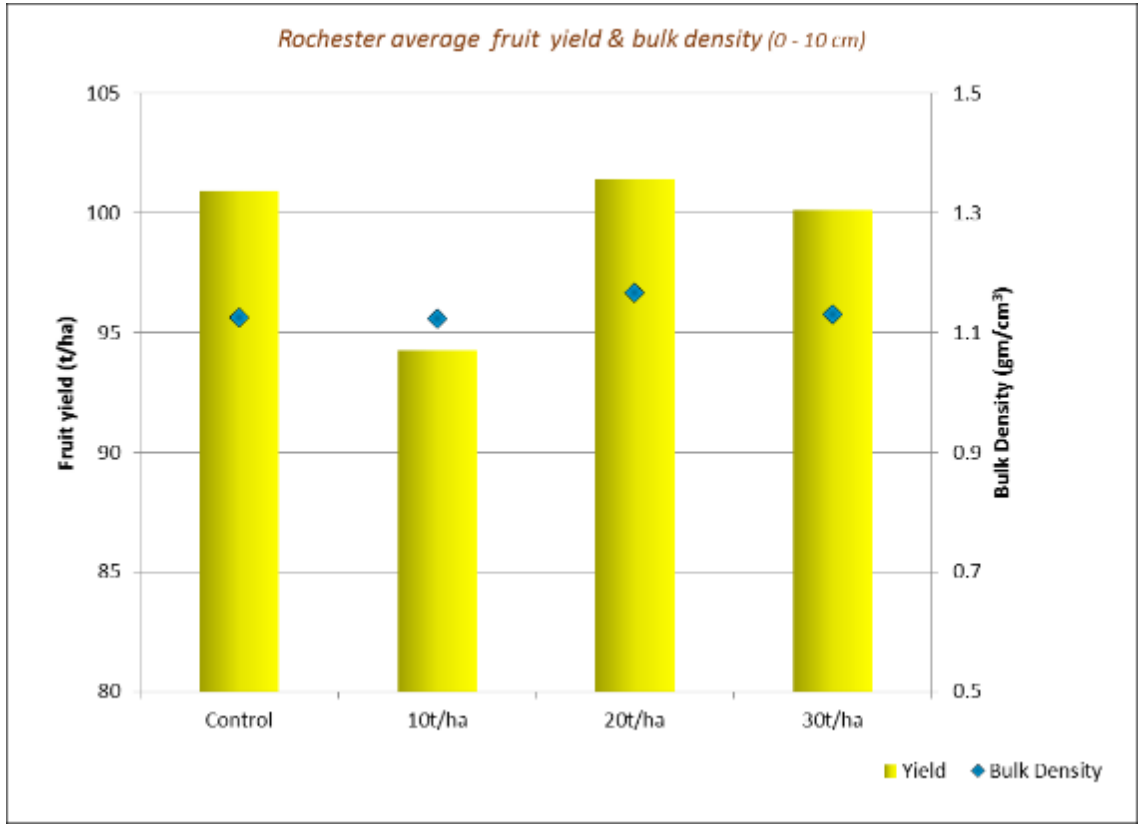
Bulk Density



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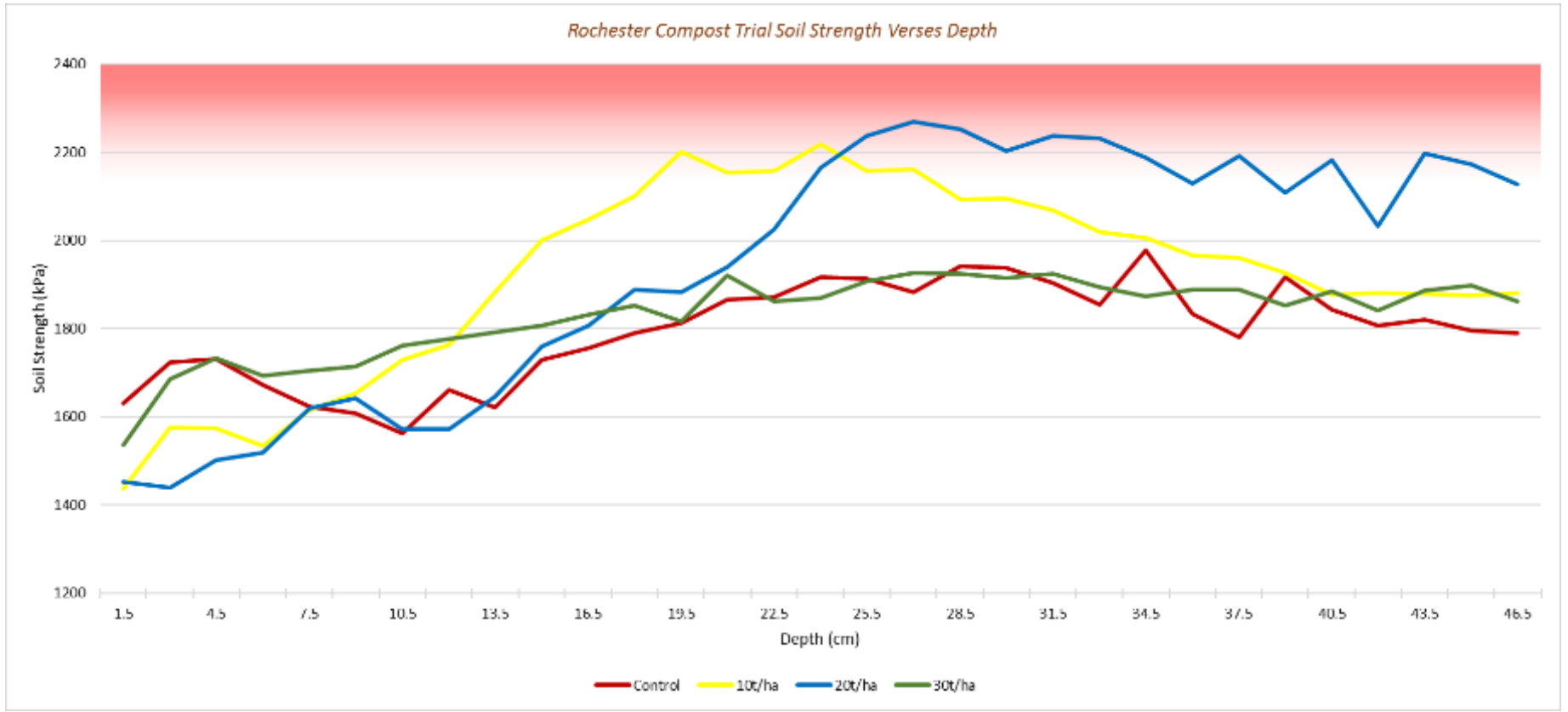
Soil Strength



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Site 1

	Treatment	Pre compost	Control	30 t/ha compost
pH	pH (H_2O)	6.28	6.05	6.28
	pH ($CaCl_2$)	6.06	5.28	5.53
dS/m	EC	0.6	0.15	0.15
%	Organic Carbon	1.12	1.32	1.21
meq/100g	Potassium (NH_4Cl)	0.93	0.77	0.78
	Calcium (NH_4Cl)	12.07	10.15	10.33
	Magnesium (NH_4Cl)	11.56	9.27	10.20
	Sodium (NH_4Cl)	1.75	0.77	0.97
	Aluminium (KCl)	0.17	0.11	0.11
	CECe	26.3	20.97	22.26
ppm	Chloride	68.5	9.43	12.85
	Nitrate-N (H2O)	42.5	14.68	13.83
	Olsen P	39.2	62.13	65.58
	PBI	91	104.20	102.20
	Potassium	363.6	302.0	304.0
	Sulphur (MCP)	430.5	55.93	67.38
	Boron (hot water)	2.85	2.35	2.56
	Copper (DTPA)	1.6	4.75	4.05
	Iron (DTPA)	27.71	97.98	92.36
	Zinc (DTPA)	0.21	0.54	0.59
	Manganese (DTPA)	14.33	32.05	32.50
% CEC	Calcium	45.9	48.38	46.38
	Magnesium	43.94	44.25	45.78
	Potassium	3.53	3.69	3.49
	Sodium	6.63	3.69	4.36
Ratio	Ca:NO_3	1.42	3.49	3.77
	Mg:K	12.45	11.99	13.14
	Ca:Mg		1.10	1.02

Site 2

	Treatment	Pre compost	Control	30 t/ha compost
pH	pH (H_2O)	5.49	6.12	5.86
	pH ($CaCl_2$)	5.27	5.29	5.08
dS/m	EC	0.48	0.15	0.14
%	Organic Carbon	1.8	1.15	1.38
meq/100g	Potassium (NH_4Cl)	0.43	0.35	0.35
	Calcium (NH_4Cl)	8.96	7.41	7.10
	Magnesium (NH_4Cl)	1.85	5.04	4.25
	Sodium (NH_4Cl)	0.7	0.83	0.65
	Aluminium (KCl)	0.5	0.11	0.15
	CECe	11.94	13.63	12.34
ppm	Chloride	37.6	9.85	10.53
	Nitrate-N (H2O)	60	22.55	25.10
	Olsen P	50.7	41.00	39.45
	PBI	45.5	70.00	67.75
	Potassium	168.1	138.0	134.9
	Sulphur (MCP)	185.5	59.90	52.23
	Boron (hot water)	0.98	1.69	1.47
	Copper (DTPA)	0.63	1.71	1.82
	Iron (DTPA)	64.64	70.51	89.14
	Zinc (DTPA)	0.69	0.56	0.95
	Manganese (DTPA)	17.32	25.72	29.72
% CEC	Calcium	75.1	54.48	57.75
	Magnesium	15.5	36.79	34.19
	Potassium	3.57	2.61	2.82
	Sodium	5.88	6.10	5.26
Ratio	Ca:NO_3	0.75	1.74	1.47
	Mg:K	4.34	14.08	12.12
	Ca:Mg		1.49	1.72

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																	Yield Range
	Geltch	t/ha						N↑									
	115.8	117.5	131.6	85.1	108.8	98.2	106.1	113.2	120.2	117.5	76.3	110.5	110.5	103.5	116.7	123.7	120-140
	124.6	98.2	121.9	79.8	114.0	76.3	95.6	107.9	93.9	119.3	64.9	93.9	107.9	111.4	120.2	127.2	110-120
	112.3	107.0	111.4	98.2	107.9	85.1	88.6	97.4	86.0	108.8	80.7	91.2	112.3	90.4	113.2	118.4	100-110
	79.8	55.3	96.5	72.8	94.7	65.8	77.2	93.0	78.9	107.9	62.3	81.6	106.1	56.1	111.4	86.8	90-100
Treatment	1	3	2	4	4	2	1	3	4	1	2	3	2	1	4	3	80-90
Row Average	108	95	115	84	106	81	92	103	95	113	71	94	109	90	115	114	70-80
																	<70
	Hibma	t/ha						N←									>140
	119.3	127.7	94.6	119.3	147.0	116.2	107.0	86.9	119.3	54.6	86.9	107.7	61.6	124.7	83.9	100.8	120-140
	113.9	126.2	95.4	113.9	94.6	127.0	125.4	97.0	133.9	117.0	118.5	140.8	100.0	132.3	115.4	118.5	110-120
	93.9	108.5	89.3	104.6	107.7	111.6	116.2	90.0	122.3	108.5	121.6	127.7	122.3	145.4	123.1	141.6	100-110
	114.7	128.5	102.3	121.6	113.1	111.6	112.3	100.0	133.9	115.4	117.7	123.9	109.3	120.0	130.0	141.6	90-100
			spray row					spray row					spray row				80-90
Treatment	1	3	2	4	4	2	1	3	4	1	2	3	2	1	4	3	70-80
Row average	110	125	95	115	116	116	115	93	127	99	111	125	98	131	113	126	<70

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Summary

No statistical variation between the treatments

Higher compost rates (20 t/ha or more) = slight benefit compared

Slightly more organic carbon post harvest in the 30 t/ha treatment

Regular soil chemistry tests, from constant points in the paddock (recorded using a GPS)

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