






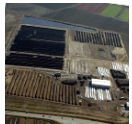


# Evaluation of Compost For Strawberry Plant and Root Health

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National Strawberry  
Sustainability Initiative

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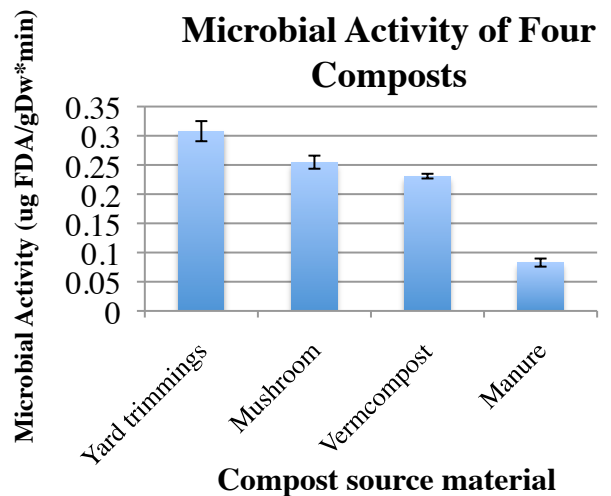


## Compost Qualities

	Material Name	Description of source material	
	<b>Vermicompost</b>	100% Composted dairy manure + rice hull bedding, fed to worms	
	<b>Manure Compost</b>	20% steer manure 30-40% green waste fines 35-45% mix of: Waste+straw bedding from stalls <5% vegetable waste	
	<b>Yard Trimmings Compost</b>	100% Yard trimmings	
	<b>Mushroom Compost</b>	Spent mushroom compost from button mushrooms Composted horse manure + straw Amended with gypsum and peat post-decomposition	

	Mushroom Compost	Manure Compost	Yard Trimmings Compost	Vermicompost
Nitrate-N* (ppm)	120	234	6.6	502
Total N (%)	1.9	1	1.5	2.5
pH	7.3	8.1	7.6	7
EC (dS/m)	4.8	28	4.5	7.1
C:N	14:01	12:01	17:01	13:01
Cost	\$3/T	\$5/T	\$21/T	\$500/yd
Application method	Broadcast	Broadcast	Broadcast	Apply to rootzone
OMRI Approved	✓	✓	✓	✓

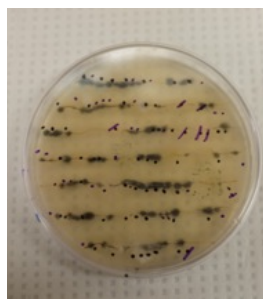
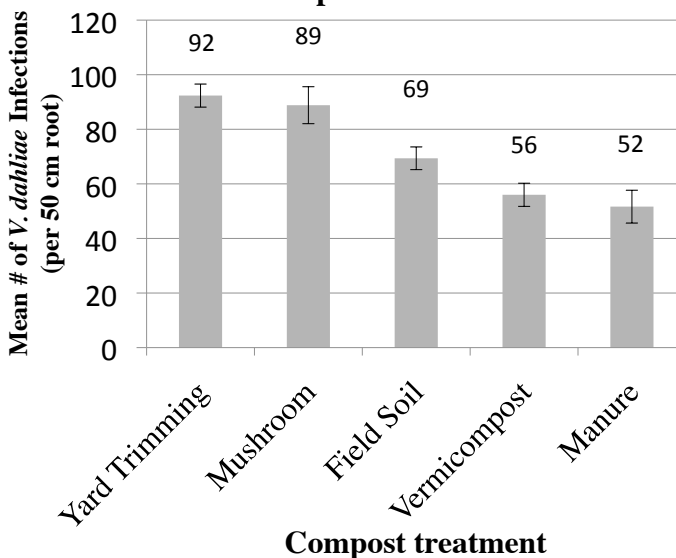
	Fungal abundance (cfu/g soil)	Bacterial abundance (cfu/g soil)
<b>Mushroom Compost</b>	4.6 x 10 <sup>6</sup>	1.9 x 10 <sup>9</sup>
<b>Yard Trimmings Compost</b>	4.6 x 10 <sup>5</sup>	4.4 x 10 <sup>8</sup>
<b>Manure Compost</b>	2.3 x 10 <sup>5</sup>	7.6 x 10 <sup>7</sup>
<b>Vermicompost</b>	1.8 x 10 <sup>5</sup>	1.2 x 10 <sup>7</sup>



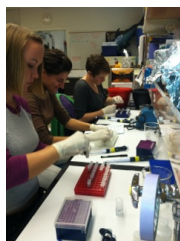
## Disease Suppression

The effect of compost on infection by *Verticillium dahliae*, the cause of Verticillium wilt, was evaluated by growing strawberry crowns in soil amended with compost and inoculated with *V. dahliae*. After three weeks, plants were removed and 150-200 cm of roots were placed on a semi-selective medium and evaluated for root infections (*image below*). Roots grown in vermicompost and steer manure compost had the fewest infections whereas those grown in yard trimming and spent mushroom compost had the most infections. One possible explanation for the observed differences is the extent to which compost elevates the activity of microorganisms in soil that compete with *V. dahliae* for space and/or nutrients.

**Frequency of *Verticillium dahliae* root colonization of strawberries grown in compost-amended soil**



*Individual roots are cleaned, separated and cultured on a medium selective for *V. dahliae*, which can be seen as dark, circular colonies emerging from the roots (left).*

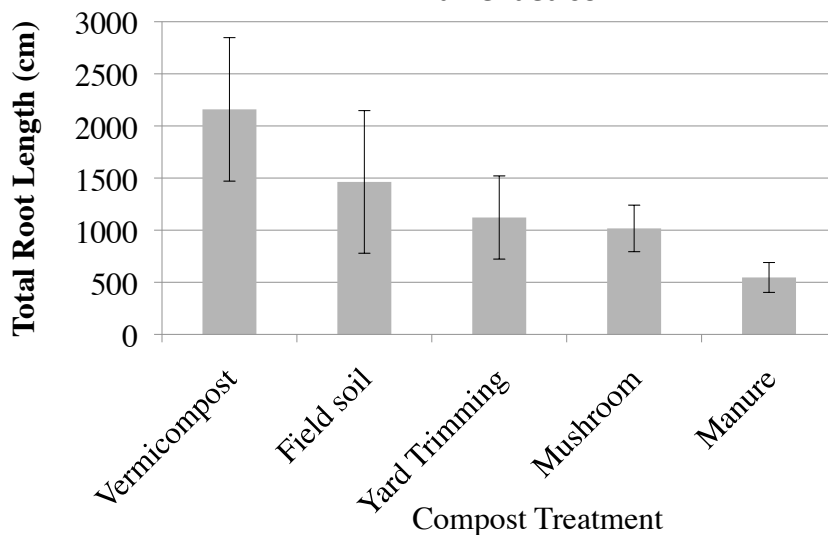


*Lab team at work at UC Davis (left); compost is ready for application at field trial (middle); Farm advisor Chuck Ingles and assistant Ria DeBiase help establish compost field trial (right).*

## Root Growth

Strawberries cv 'Albion' were grown in field soil from the Central Coast amended with compost (~30T/ac). One-gallon pots of each mixture were planted with 1 strawberry crown and grown in the greenhouse for 3 weeks. Roots were cleaned from the soil, scanned and total root length was analyzed using the software program 'WinRhizo.'

**Total root length of strawberries grown in Compost-amended soil**



*Scanned image of roots used to estimate total root length (left).*

# Sacramento County Trial Results

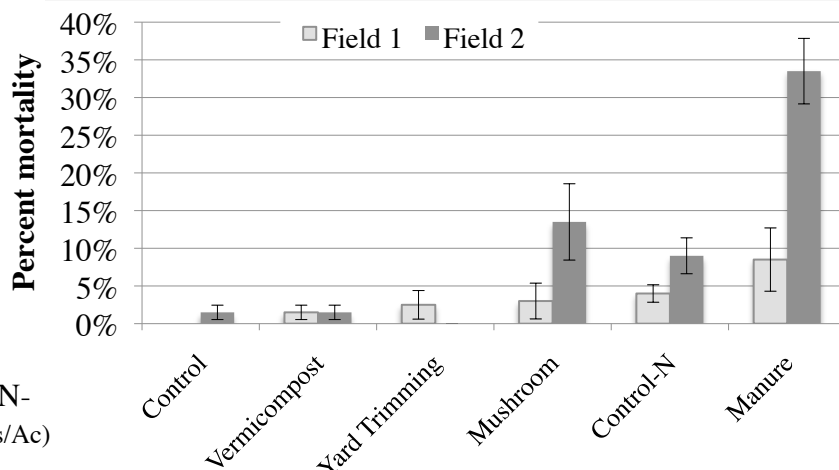
## Trial Description

Four composts were added to each plot and planted with strawberry crowns cv 'Chandler'.

### Treatments

1. Control No compost added
2. Vermicompost 1c/plant
3. Manure 30T/ac
4. Mushroom 30T/ac
5. Yard trimming 30T/ac
6. Control+N No compost, added N-Cottonseed meal (300lbs/Ac)

## Plant Mortality in Compost-Amended Soil



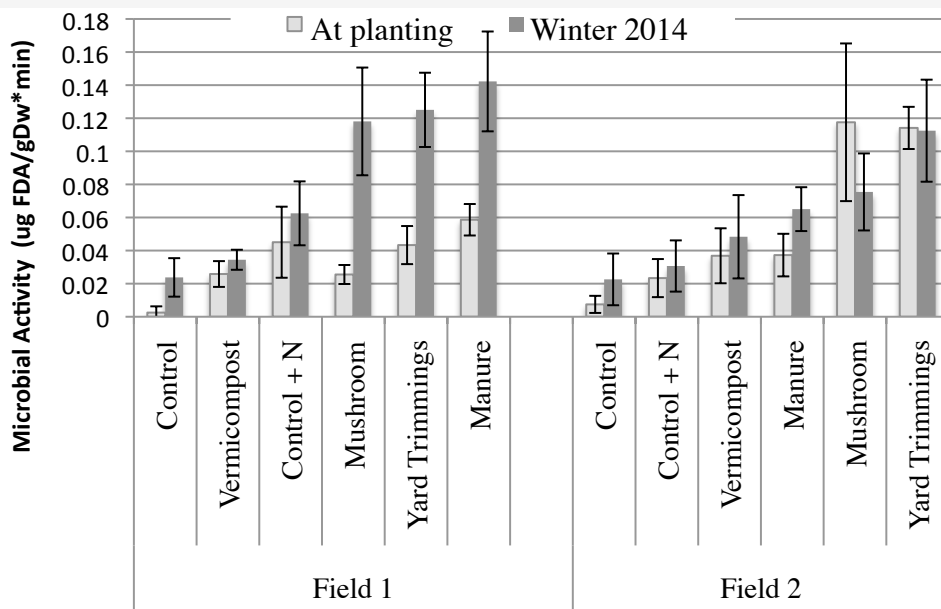
## Microbial Activity in Response to Compost Amended Soil at Planting and Mid-Winter

### Summary Points

1. Microbial activity in the soil was greatest with yard trimming and mushroom compost, intermediate/mixed with manure and least with vermicompost, control+N or control (no compost).

2. Activity significantly increased in the winter at field one in some treatments.

3. Field two maintained the same trend at planting and in winter.



## Plant Health Rating of Strawberries Grown in Compost-Amended Soil

### Summary Points

1. Vermicompost, control+N and control all showed the best overall plant health.

2. Manure and mushroom compost showed the poorest health, also evident in plant mortality.

3. Both manure and mushroom treatments greatly improved in late winter whereas others remained equally healthy.

