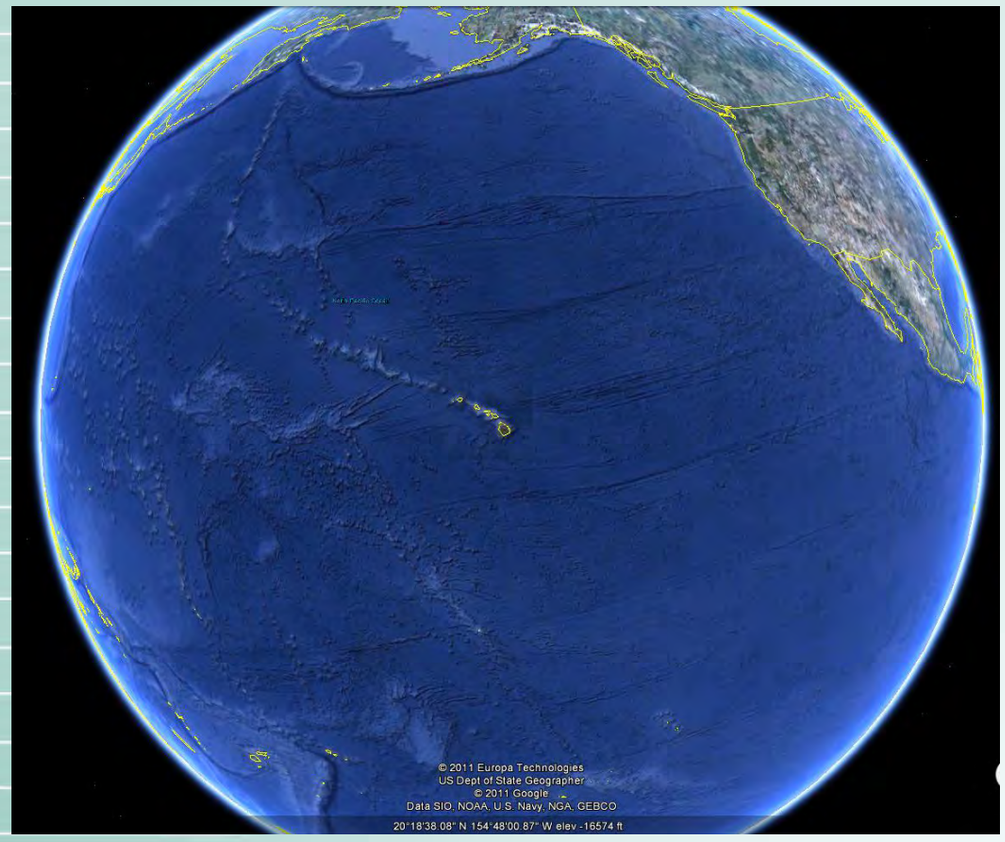
Innovative use of local materials for vegetable production in Hawai'i

HOFA Annual Conference
Hilo, Hawai'I
21 October, 2011

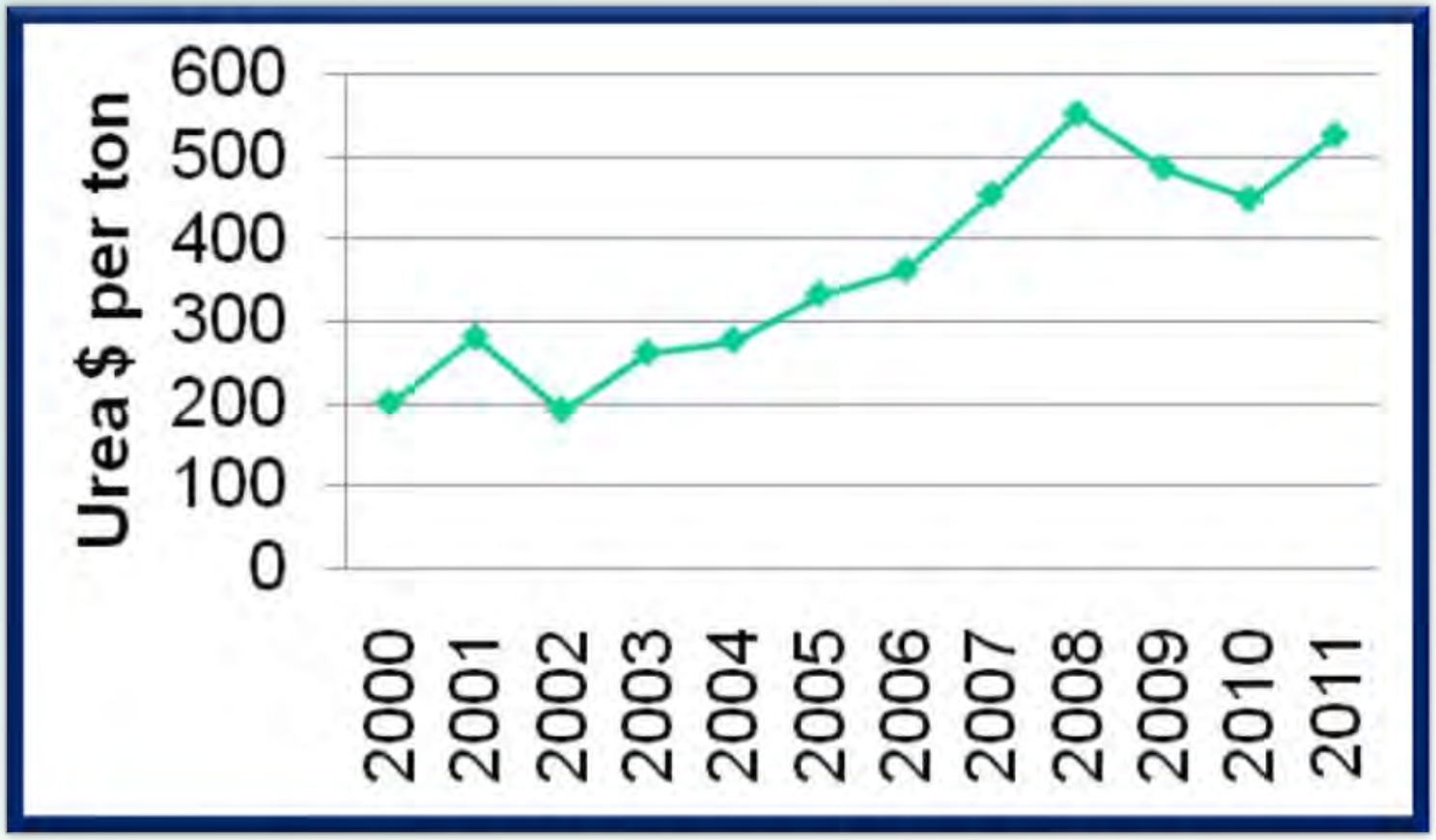
Ted Radovich, N.V. Hue, Archana Pant, Jari Sugano, Ian Gurr, Brent Sipes, Clyde Tamaru, Kai Fox, Kent Kobayashi, Robert Paull

College of Tropical Agriculture and Human Resources
University of Hawai'i at Mānoa

Isolation



Costs



Today

Composts

- aqueous extracts
- media components

Tankage

Invasive algae

Compost

Commercial greenwaste

Handcrafted Artisan

Vermicompost

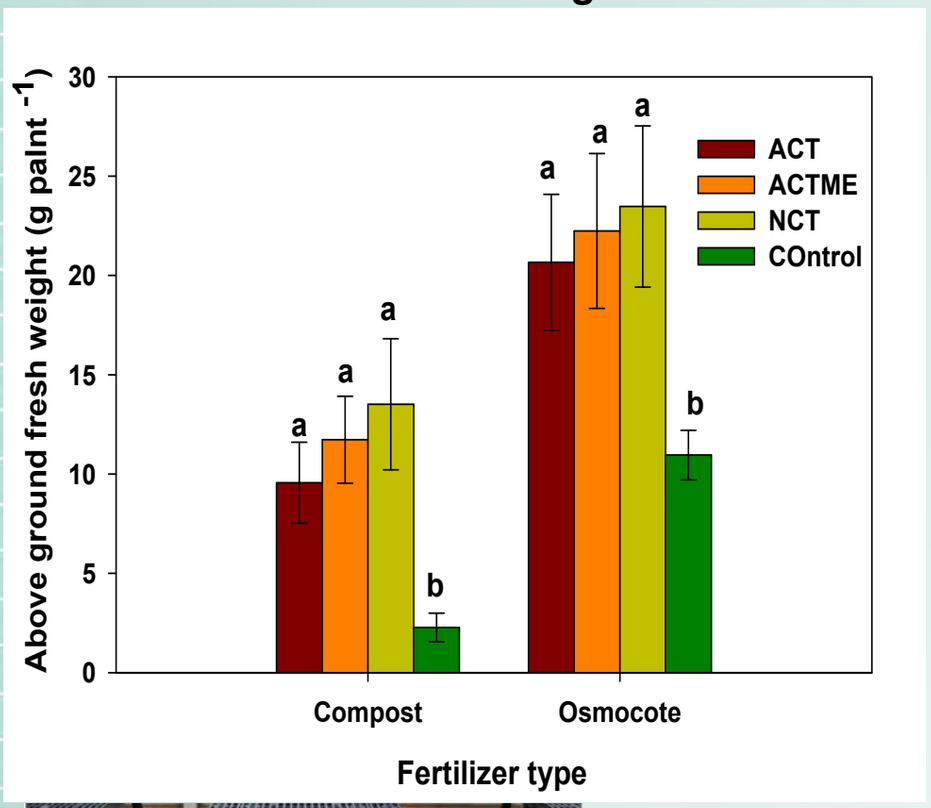
Seedlings in 100% compost

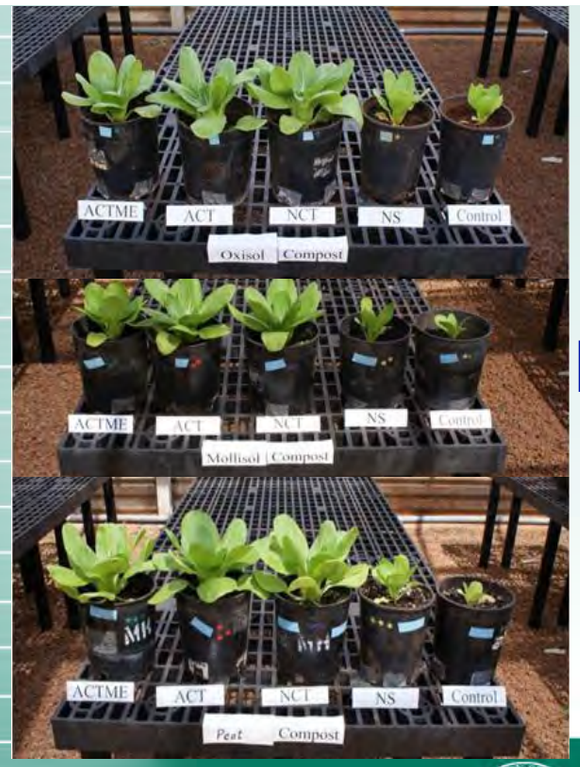
Compost “Tea”

- Uses air and water to extract:
  - Nutrients
  - Organic acids
  - Microbes
- Ratio of water to compost ranges 10:1-100:1
- Water is not circulated, only air
- 12-24 hrs

Compost Tea

Pant et al. 2009. J.Sci.Food Agric.





Oxisol

Mollisol

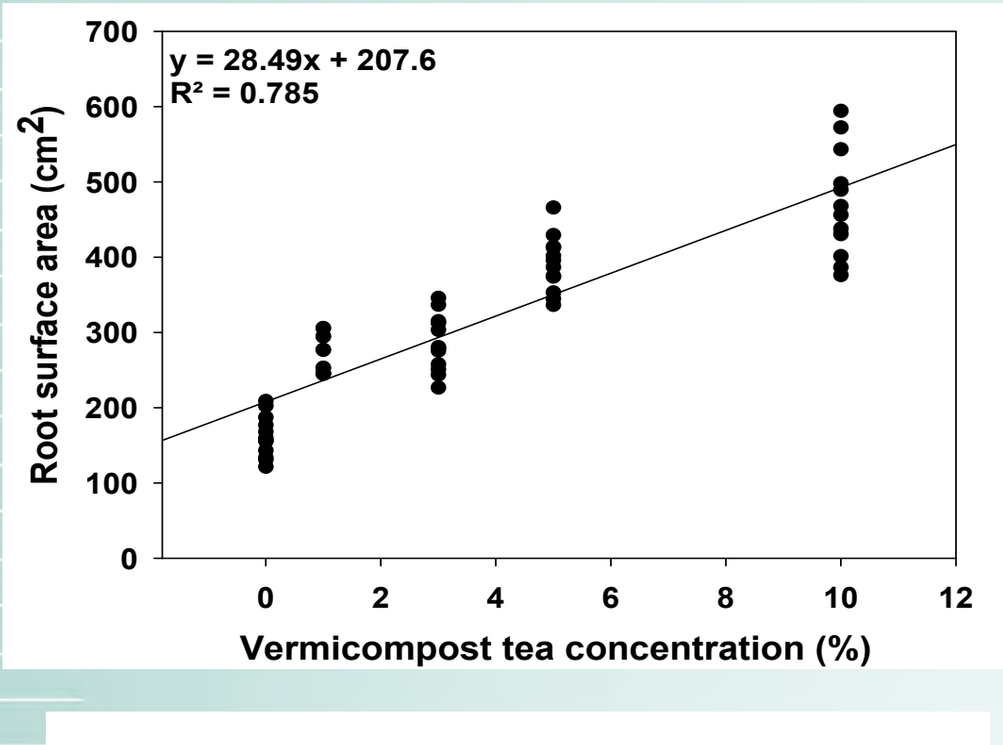
Peat

- Positively impacts growth.
- Glucosinolate and carotenoid follow biomass.
- Effect is consistant across soil and media.
- Response dependent on rate and quality of compost.
- Aeration and additives not necessary.

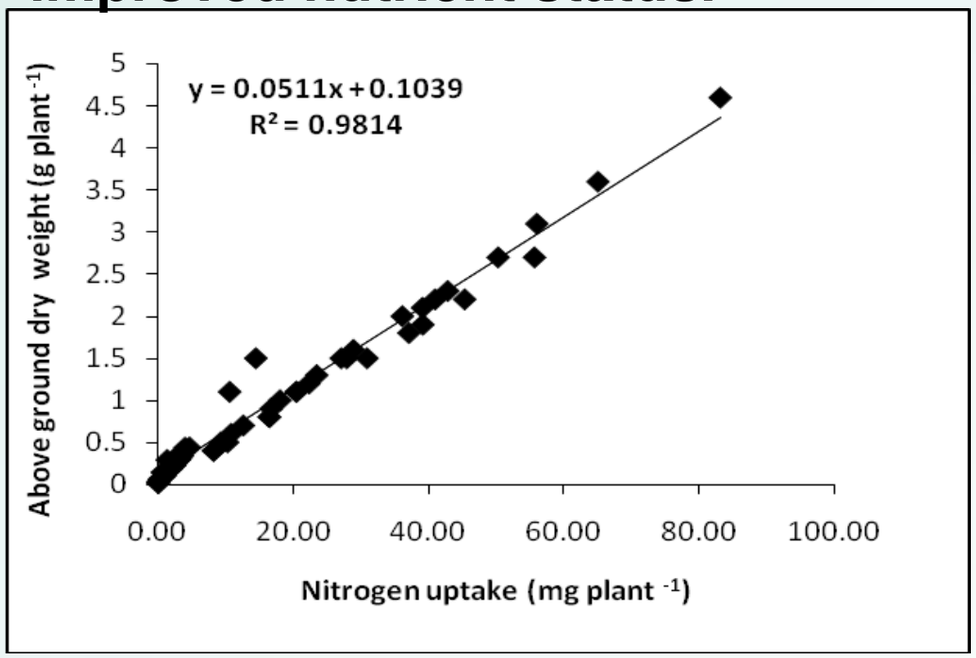
Pant et al. 2011. Compost Science and Utilization.

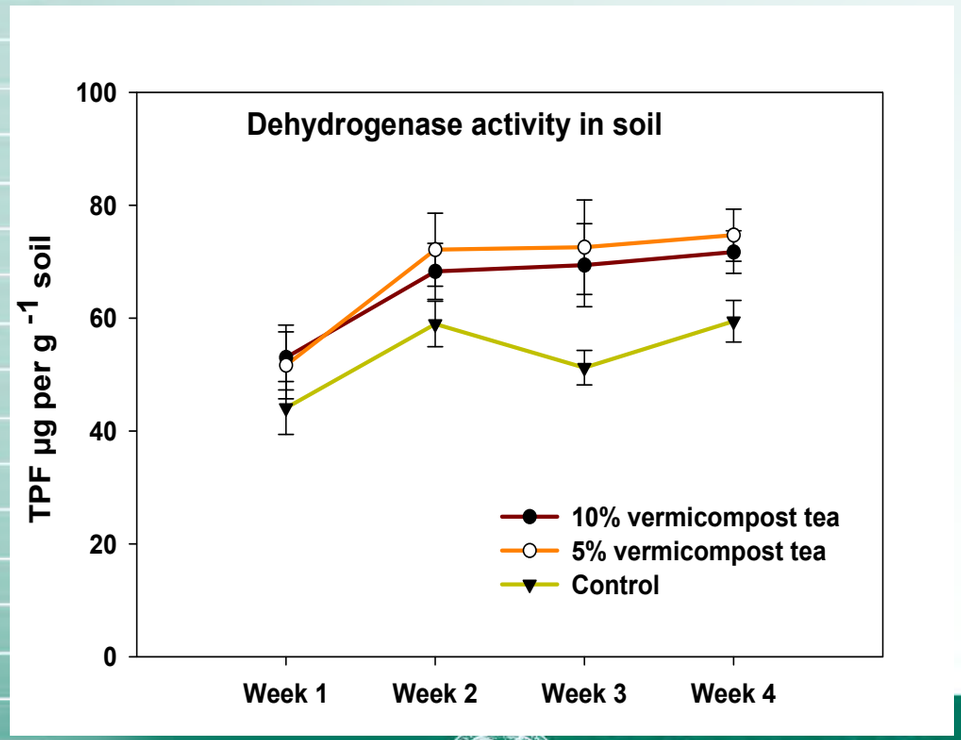
Compost Tea

Root growth also increased.



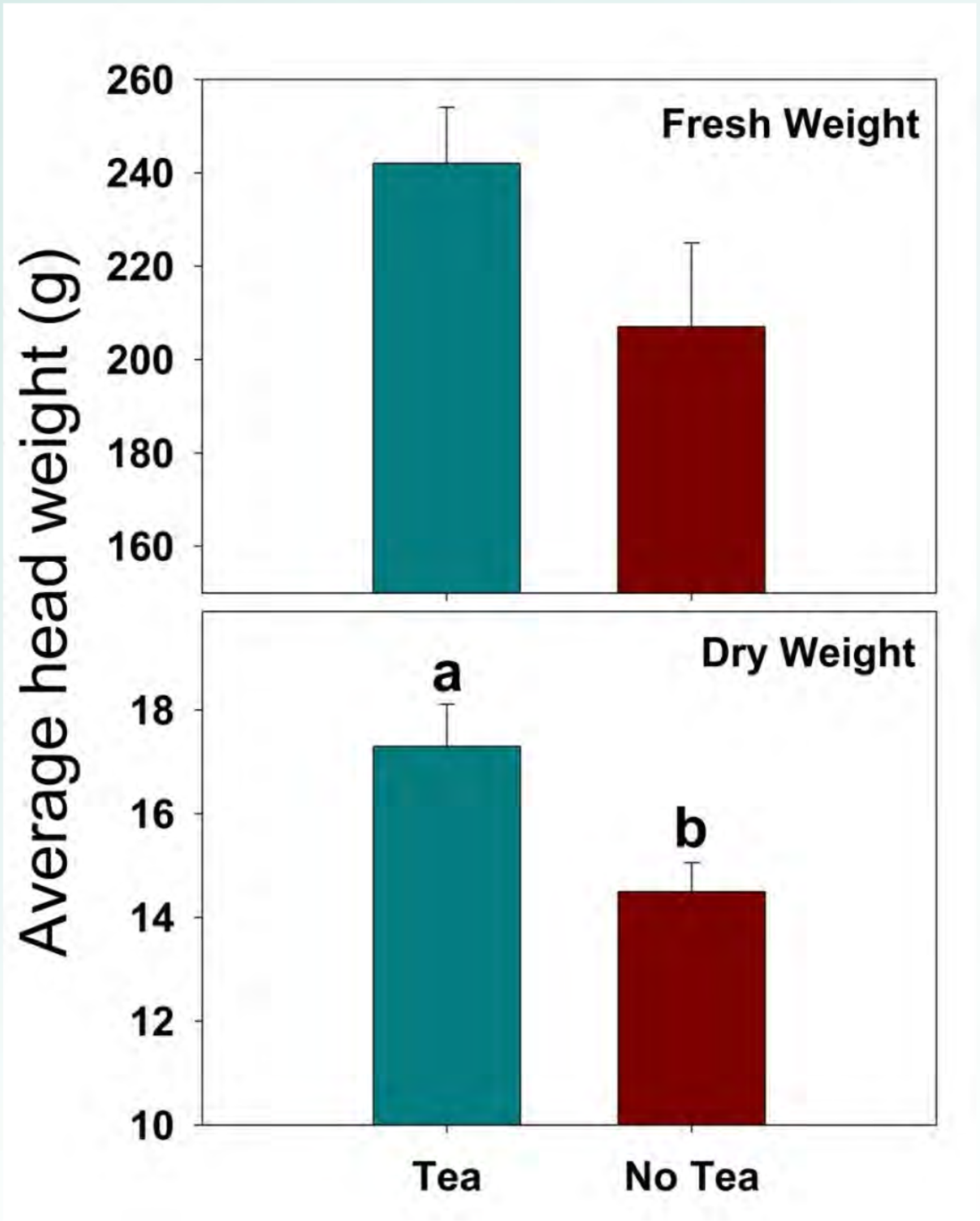
Growth response associated with improved nutrient status.



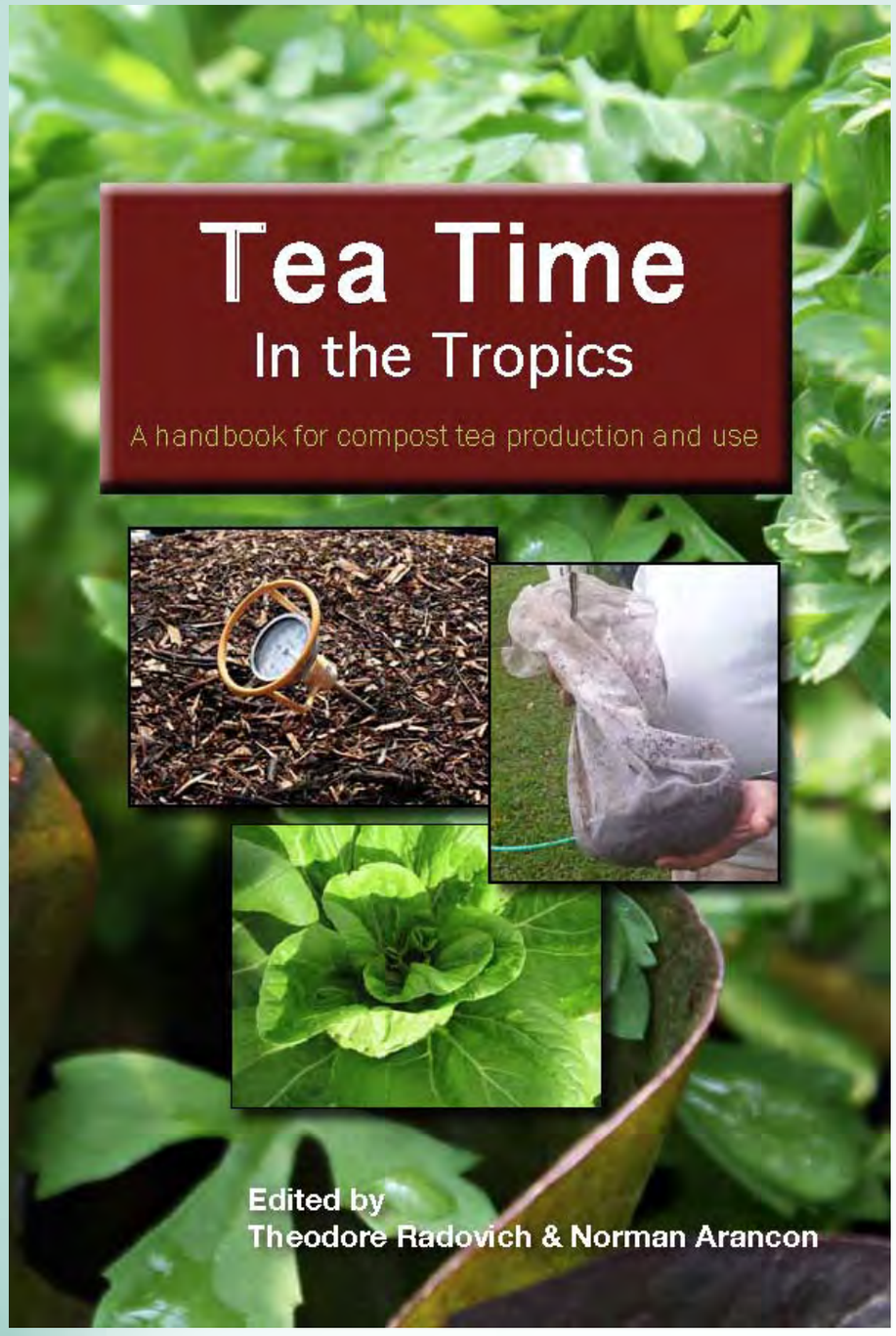


Soil and media biological activity increased with tea applications.

Back to the field



Guiding new adoptors



http://www.ctahr.hawaii.edu/RadovichT/lab-local_resources.html#compost

Summary

Compost tea improves plant nutrient status:

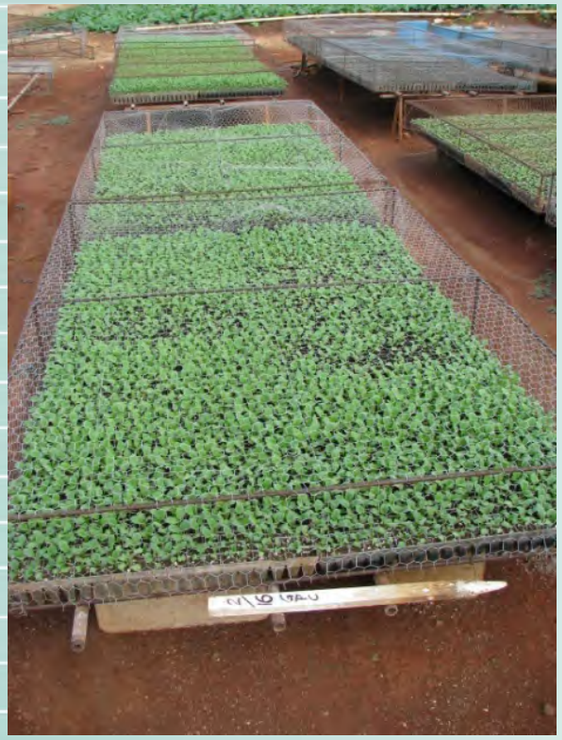
1. **Mineral nutrients**
2. **Stimulated root growth.**
3. **Improved soil biological activity**

Recommendations to Growers:

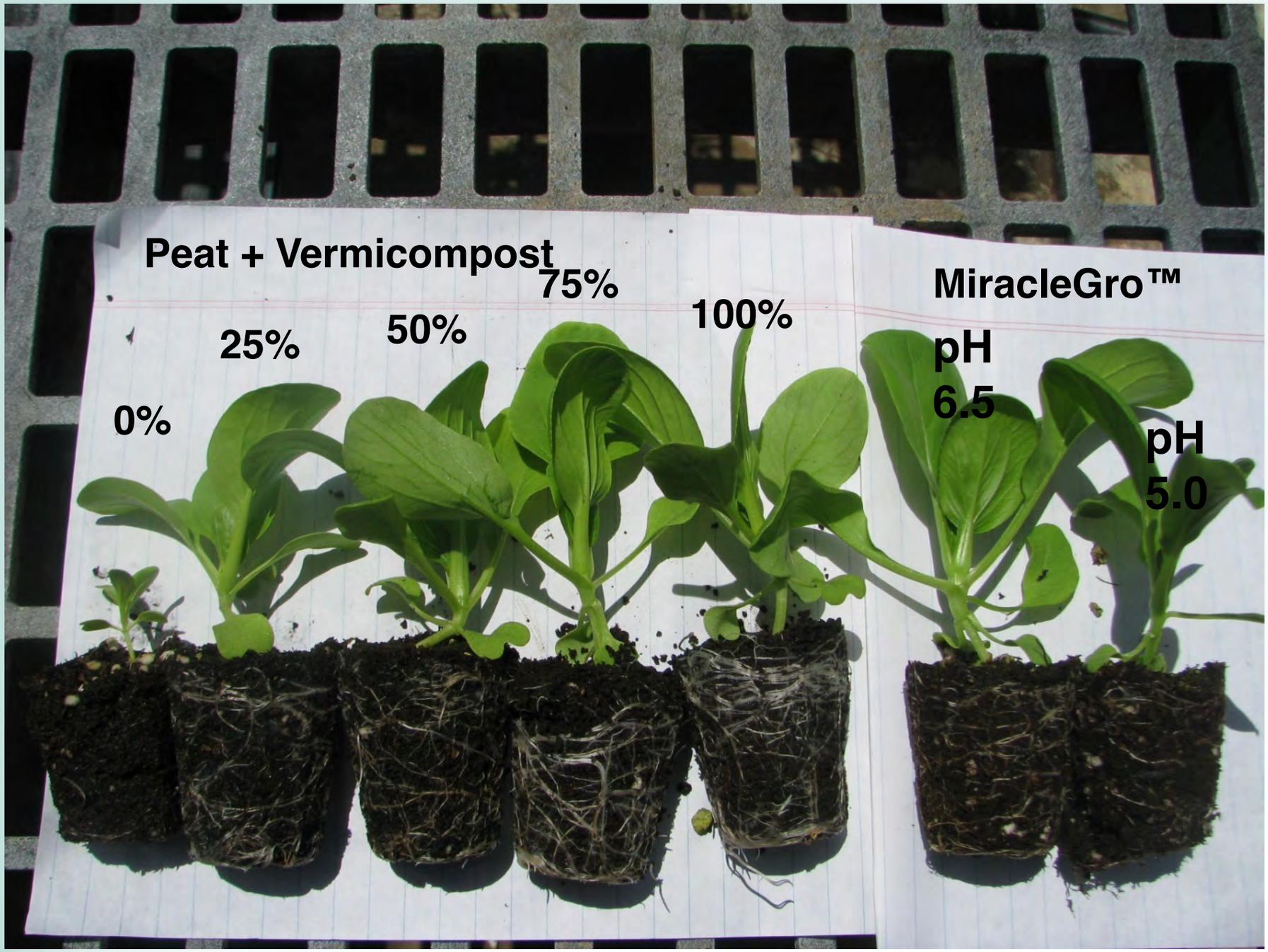
1. **Compost quality matters.**
2. **More mature better. >300 ppm nitrate.**
3. **>1% compost.**
4. **Aeration recommended, not additives.**
5. **Inject into drip.**

Manure Thermophilic **----------Vermicomposts----------** **Greenwaste Thermophilic**

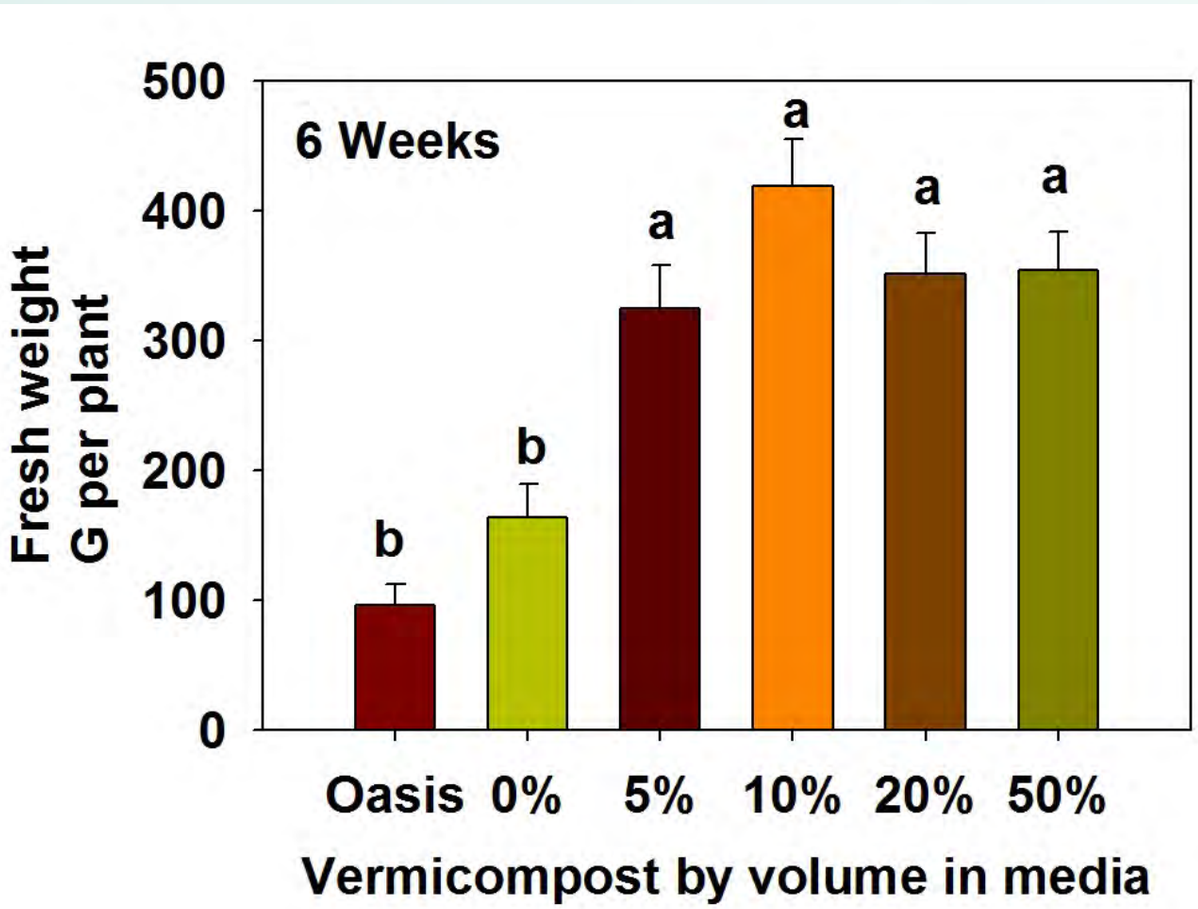
Compost in Seedling Media



Seedling Production



Aquaponics

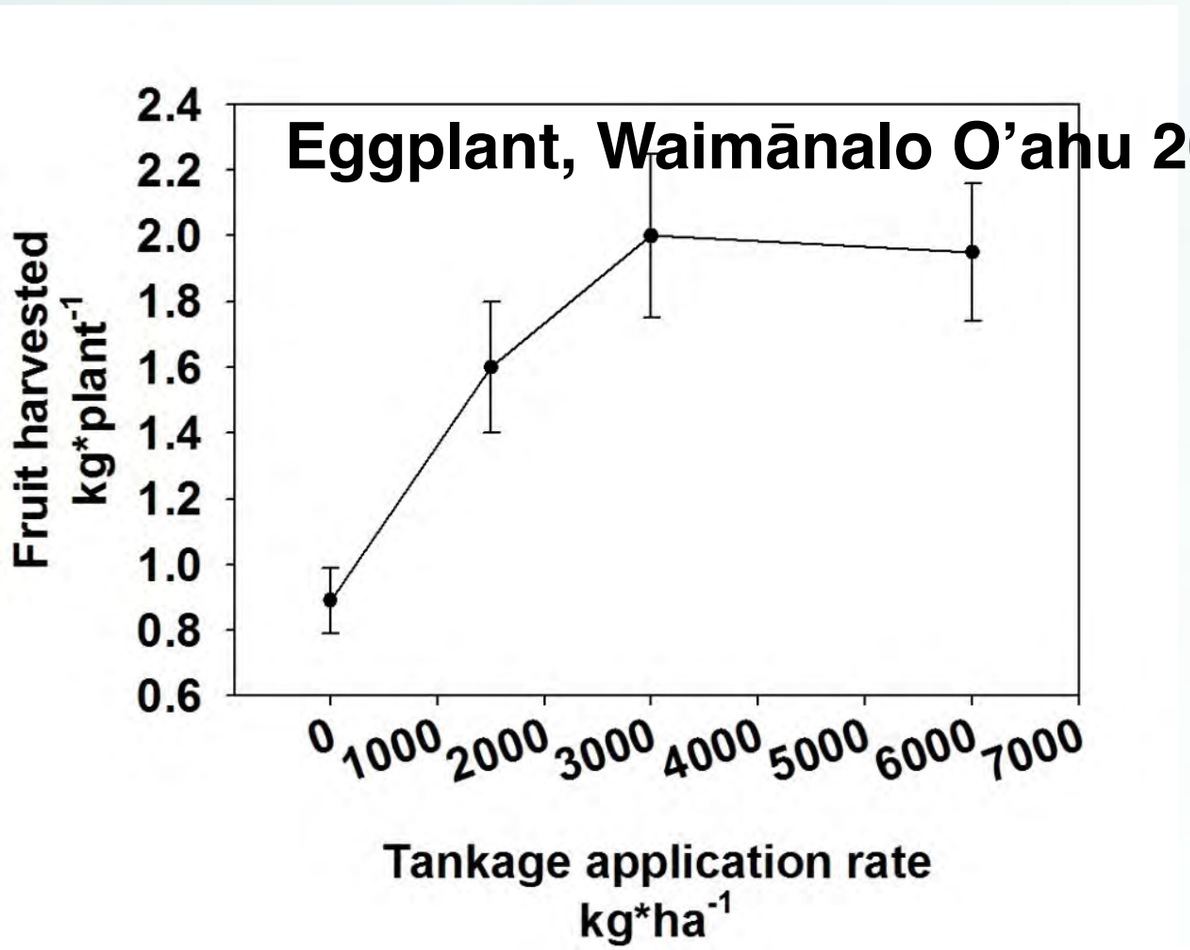

6 Weeks
Fresh weight G per plant
500
400
300
200
100
0
a
a
a
a
b
b
Oasis
0%
5%
10%
20%
50%
Vermicompost by volume in media

Aquaponics

Human Resources

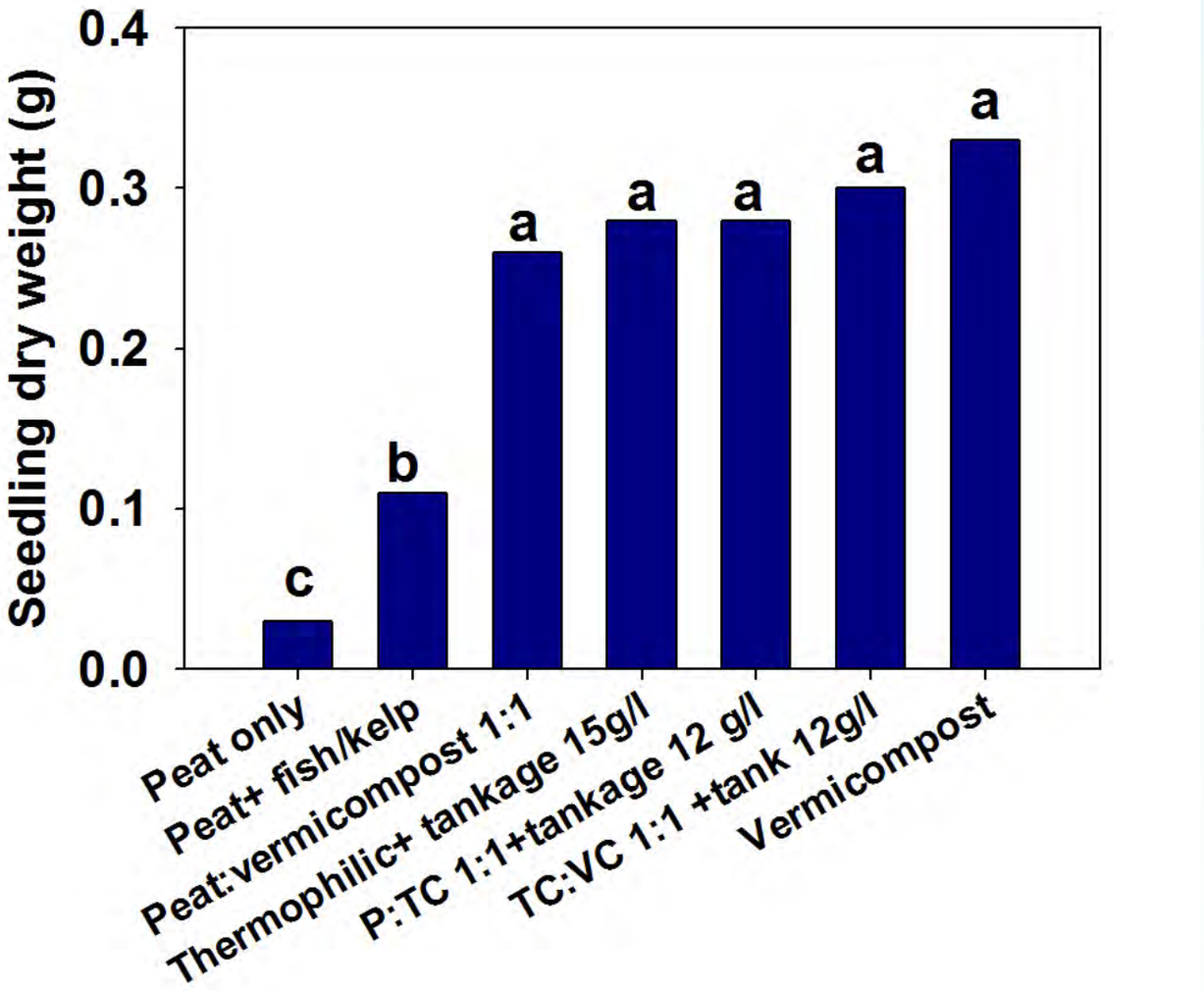
Tankage

Local rendered meat product. N = 7.5- 9.5%, P = ~2.5%.
C:N = 5:1

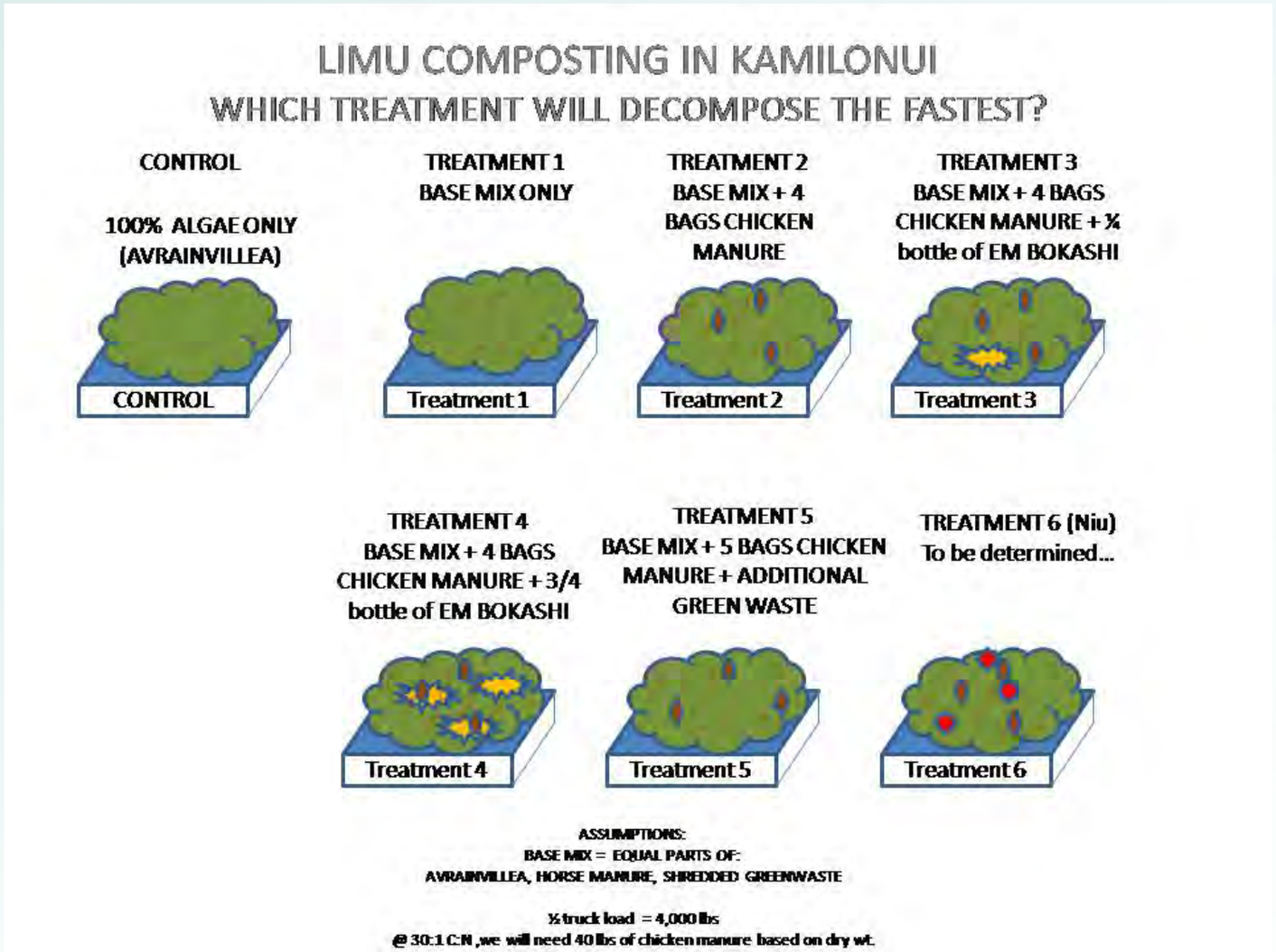


Tankage


DO NOT FEED TO CATTLE OR OTHER RUMINANTS
KAUAI


Seedling dry weight (g)
0.4
0.3
0.2
0.1
0.0
c
b
a
a
a
a
a
Peat only
Peat+ fish/kelp
Peat:vermicompost 1:1
Thermophilic+ tankage 15g/l
P:TC 1:1+tankage 12 g/l
TC:VC 1:1 +tank 12g/l
Vermicompost

Invasive Algae



sive Algae

Hanai'Ai (Vol. 5)

Table 1. Nutrient analysis from Maunalua Bay limu species. Values are means of at 4-10 analyses ± standard error of the mean. Note the significant variability in potassium (K) among species.

	%						
Species	N	C	P	K	Ca	Mg	Na
Aravinvillea amadelphia	0.9 ± 0.1	16.7 ± 0.9	0.06 ± 0.001	**0.2 ± 0.04**	16.9 ± 1.7	1.5 ± 0.1	2.0 ± 0.2
Acanthrophora spicifera	1.14 ± 0.17	20.0 ± 01.5	0.04 ± 0.004	**4.2 ± 1.9**	8.8 ± 1.6	1.5 ± 0.07	3.2 ± 0.1
Gracilaria salicornia	0.58 ± 0.13	15.7 ± 2.6	0.05 ± 0.004	**10.4 ± 2.6**	6.1 ± 1.8	1.1 ± 0.2	3.0 ± 0.2

Figure 1. Compost is being made from algae along with tree trimmings.

Figure 2. Radish grown on a field amended with algal compost.

Acknowledgements

- Archana Pant
- Jensen Uyeda
- Ted Goo
- Gita Neupane
- Robert Saito
- Roger Corrales
- Servalano Lamer
- Craig Okazaki
- USDA Funding:
  - OREI
  - TSTAR
  - WSARE
- Hatch

Sustainable and Organic Agriculture Program

College of Tropical Agriculture and Human Resources
University of Hawai'i at Mānoa

http://www.ctahr.hawaii.edu/sustainag/