



Plant Aloha Sustainable Farming Series

Thursday Feb 9, 2017

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hawaiiansanctuary.com/plantaloha

How to Grow a Complete Diet with Permaculture Principles:

Tropical Subsistence Gardening. 24 part permaculture class series

Part 6 of 24 Composting, Vermicomposting & Compost Teas:

How to make compost from kitchen and yard “waste.” How to build & manage a worm bin and how to use vermicompost to make compost tea.

Acknowledgements:

A special thanks to Hawaiian Sanctuary, County of Hawaii Research and Development (Plant Aloha’s main grant funder) and all others involved for helping obtain grants providing the venue and support to make these classes a reality! We are still looking for support to complete and enhance this amazing FREE program. Please give what you can: hawaiiansanctuary.com/donate

Introduction: Recycling of “Yard waste” or “green waste” should be thought of as “green resources” which are a valuable input to build composts and soil fertility. If we continually take these resources off-site and do not bring other materials back in we setting ourselves up for deficiency. Cycling of nutrients through our site is crucial to be able to farm the same land for a long period of time, especially in the tropics. Composting is decomposing organic material usually plants and or manures into a rich soil amendment.

Composting Basics: At its simplest pile up organic material and wait for it to rot and break down into compost. Then spread this around the dripline of your trees and plants to fertilize them. Finely chopping the material and or turning the pile frequently speeds up the process.

Greens are high in nitrogen (fresh leaves, weeds, lawn clippings, kitchen scraps)

Browns are high in carbon (dry leaves, small twigs, ground up mulch)

2 parts browns to 1 part greens is generally what we want to build the pile with

Different browns and greens have different **C(carbon) to N(nitrogen) ratios**, for example chicken manure 7:1, grass clippings or veggie scraps 25:1, brown leaves 60:1, wood chips 400:1

When building a compost pile ideally we want about a 30 to 1 Carbon to Nitrogen ratio.

Layer alternating greens and browns and soil, ideally some compost, and amendments should be sprinkled between layers as well. The pile is often watered as it is made to speed decomposition and to ensure the interior of the pile is moist. Poke a shovel handle into the pile in multiple places for **air**.

NPK values of Compost - homemade = 1-0.5-1 to 2-1-2 balanced and slow release

Hot vs. Cold. **Cold** compost piles are not turned can take 1-2 years to be ready. **Hot piles** are turned frequently every few weeks can be ready in as soon as 3 months, internal temperatures can reach 140-160 degrees which kills most weed seeds and plant disease causing organisms

Dealing with pests: Compost and especially fresh kitchen scraps can be very attractive to rats, mice and feral pigs. Burying kitchen scraps in the center of the pile is helpful. Outdoor cats are beneficial to control rodent populations, do not overfeed them so they hunt more. Wire bins that are fully enclosed (including bottom) or rotating barrels are good at excluding pests. Diverting most kitchen scraps to a worm bin is an excellent solution. A separate pile can be made for other less attractive compostables.

Types of Composting Systems:

Unenclosed Pile: the simplest form is just creating a pile on the ground, ideally covered (often with a tarp) to keep nutrients from leaching from the pile. On a large scale the pile could be built and turned by a tractor. On a small scale a pile can be turned with a pitchfork to speed up or not turned at all.

Pallet 3 Bin systems are easily constructed from recycled wooden or plastic pallets, and scrap metal roofing or tarps to cover to keep excess rainfall from leaching nutrients from the compost.

Wire Bin, usually circular this can be ½ inch wire mesh to exclude mice, or hog-fencing to just exclude pigs, sometimes both are used in conjunction.

Rotating Barrel, these can be homemade or purchased and consist of a barrel with a closeable hatch, small holes for aeration and that is mounted horizontally on a pipe with a hand crank so that it can be spun, this tumbles and mixes the compost inside.

Macadamia nut shell compost: can be purchased locally in quantity and is generally weed seed free.

Vermicomposting:

Worm needs: cool, dark, damp but not soaking, food, substrate

Worm bin construction: roofing tin bent into a U shape with screen ends and close fitting lid, bin must exclude rodents that will eat worms, or be closely monitored. Keep bin in shade.

Worm food + kitchen scraps, vegetable trimmings, coffee grounds, tea bags, and eggshells. Feed on one side of the bin and harvest vermicompost from the other, worms move to the food.

Avoid in bin: Garlic, onions, meat, dairy, oils, citrus.

Substrate: shredded cardboard or black and white newspaper, (not glossy or colored) damp.

Other Insect composting systems: Black soldier fly larvae, Cockroaches

NPK value of Worm castings - 0.5 - 0.5 - 0.3 Micronutrients - good for improving soil structure, + plant hormones.

Compost Teas: Are fertilizers and disease suppressants made by soaking vermicompost, and or compost, or manure, in water and then applying to plant leaves and or soil. Other common ingredients include, molasses, fish emulsion, kelp or seaweed extract, humic acid and more.

Aerobic(oxygenated): these have air bubbled through them for 12-24 hrs and are then immediately applied to the garden. A 5 gallon bucket can be used, or larger with more aeration. Primarily for microorganisms, and secondarily for nutrients.

Aerobic vermiculture tea recipe: in 5 gallon bucket, 4 cups vermicompost, 2 tbsp un sulphured molasses, 2 tbsp kelp, aerate for 24 hrs with an aquarium bubbler, apply with sprayer or watering can.

Anaerobic(non-oxygenated) can be made with green leaves or manures soaked in water as below.

Manure teas: soak manure in water for 5-7 days then **dilute** and spread. Primarily for nutrients.

Further Reading: Worm bin plans: <http://shaunsbackyard.com/560/worm-troughs/>

“Tea Time In the Tropics A handbook for compost tea production and use” www.sare.org/content/download/66749/944806/Compost_Tea_Manual.pdf

Hawaii compost guide [https://kokuahawaiiifoundation.org/images/ugc/uploads/](https://kokuahawaiiifoundation.org/images/ugc/uploads/KHF_AINA_Resource_AerobicCompost.pdf)

[KHF_AINA_Resource_AerobicCompost.pdf](https://kokuahawaiiifoundation.org/images/ugc/uploads/KHF_AINA_Resource_AerobicCompost.pdf)

Homework: Make a compost pile. Make a simple compost tea and apply it.

Next Thursday Feb 16th part 7, Plant Propagation & Home Nursery Maintenance:

Learn how to grow all kinds of food plants from seed, cuttings, division, and more. Learn which trees are “true to seed” and which need grafting to produce.

Contact: Malama Aina Permaculture: Edible Landscape Design, Education & Nursery

We provide consultation, design, install, maintenance, edible plants & work-exchange.

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(Past class notes, registration and links to further educational materials available below)

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