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Environmental Horticulture Notes

EHN 98

COMPOSTING FOR THE HOME GARDENER

WHY COMPOST?

- Composting is nature's way to turn fruit, vegetable, and yard trimmings into a dark, crumbly, earthy-smelling soil amendment.
- Composting benefits the environment by recycling organic resources and extending the life of landfills.
- Compost reduces the use of carbon fuels, may save money by lowering garbage bills and replacing store bought soil conditioners and fertilizers.
- Compost improves water holding capacity of soil, and helps prevent water runoff and erosion.
- Compost promotes soil fertility, and stimulates healthy root development.
- Compost helps to keep clay soil from compacting and adds structure to both clay and sandy soils.

Compost, made by the breakdown of organic material primarily by bacteria and fungi, is a quality, easy to make, soil amendment. The metabolism of bacterial decomposers heats up the pile. Other organisms, insects, worms, also decompose organic matter and can be seen in the pile. Although compost occurs naturally, specific garden practices can accelerate the process. While compost is rich with nutrients it is not considered a fertilizer. Fertilizers contain specified amounts of nutrients, and the nutrients in compost vary with the variety of materials used.

The compost process requires three components: organic matter, water, and air. Organic matter for home composting comes from kitchen, yard and garden waste. All organic matter is made up of carbon and nitrogen, essential for the life cycle of the bacteria and fungi that decompose the material. Some materials are richer in nitrogen (greens), and others are richer in carbon (browns). Roughly 1 to 2 volumes of browns and 1 volume of greens are the starting proportions for building a compost pile.

CHOOSE A SYSTEM – Bins, Drums and Open Piles

- The bin can be purchased or easily made at home.
- Two basic types of bins are available for purchase: stationary bins and tumblers. Bins can be purchased at local garden supply centers and on the internet.
- Concrete blocks, wood pallets, garbage cans, hardware cloth, welded wire fencing or scrap wood are all suitable for creating a home-made bin.
- The optimal bin size is between 3-by-3-by-3-feet (a cubic yard) and 5-by-5-by-5-feet.
- Bins with three sides and the fourth side left open for a "door" are the easiest to turn.
- Bins can rest on cement or dirt, in the sun or shade.
- Provide a cover and/or line the bin with ¼ inch hardware cloth if pests are a problem.
- Having two bins allows one batch to cook/cure while the other is being assembled.
- Air circulation is necessary, so the bins require air holes.

BEGIN COMPOSTING – It's as easy as 1-2-3

1. Chop materials - about 2 inches is ideal for faster composting. Herbaceous materials do not need to be chopped into very small pieces, but woody materials should be reduced to smaller pieces. Smaller pieces increase the surface area that decomposer organisms feed upon, and speed up the composting process.
2. Mix "browns" (dry, woody materials) and "greens" (moist, green materials). Mix 1 to 2 volumes of browns to 1 volume of greens.
3. Maintain air and water balance by turning the pile and keeping it as moist as a wrung-out sponge.

DO COMPOST

Browns (Carbon)

- Dry leaves
- Eggshells
- Straw
- Coffee filters
- Hair, lint
- Wood shavings
- Pine needles
- Shredded paper, cardboard
- Chopped woody prunings
- Sawdust

Greens (Nitrogen)

- Grass clippings
- Well composted herbivore manures
- Flowers
- Coffee grounds
- Green leaves
- Young weeds
- Tea leaves/bags
- Sod
- Fruit and vegetable waste

DO NOT COMPOST

- Meat, fish or bones
- Dairy products
- Grease, oil or fat
- Glossy paper
- Sawdust from plywood or treated wood
- Invasive plants (Bermuda grass, ivy, oxalis, nutsedge)
- Weeds that have gone to seed, or that spread by roots or bulbs
- Diseased plants
- Stove, fireplace and barbecue ash
- Dog, cat or bird waste
- Herbicide treated lawn/plants/weeds should not be used in the compost pile for 2 years after herbicide application. New persistent herbicides are designed to act for several years, and may be present in herbivore manures as well. Dispose of treated grass in the green waste can or mulch on the lawn.

COMPOST HAPPENS …

as microorganisms (bacteria and fungi) and macroorganisms (worms, insects, and their relatives) break down the contents of a compost pile. There are several methods of composting, all based on the same basic principles. Select the method that best suits your interest and lifestyle. The process of maintaining and monitoring the pile will vary with the compost technique used. Techniques include rapid, slow or a combination of the two. All methods have the basic needs of water, air and food.

Water is essential for the life of the decomposing organisms. Keep the pile as damp as a wrung out sponge. Watering the pile with a hose nozzle while turning it is the easiest way to achieve even dampness. Watering the top of the pile results in runoff. If a pile is too wet, turning it a few times will help to dry it out.

Air is also essential for the compost process and for the decomposers. By turning the pile, air is introduced and distributed throughout the pile. Piles naturally compact in the compost process, so turning throughout the process is important.

Temperature is a function of pile size, oxygen and moisture organic matter content. Heat in the pile is generated mainly by bacterial activity and metabolism. Greens provide the nitrogen the bacteria need, and thus heat up the pile when added. The best decomposer bacteria thrive in a temperature range between 122º and 131º F. Temperatures above 140º F (for at least 10 days) will kill many pathogens and weed seeds. Above 160º F, the bacteria die and the compost process ceases.

Piles are hottest in the center, with heat loss at the edges. Turning the pile brings fresh materials (food) to the bacteria and maintains pile heat. Turning also prevents temperatures above 160º F, which can occur if excess high nitrogen materials are added and not well mixed with enough browns. As the compost process finishes, the pile temperature will cool to about 70º F.

Rapid Compost Technique

- Build a 3-by-3-by-3-foot pile with equal amounts of browns and greens, mixing thoroughly. Do not add any more organic matter to the pile during the composting process.
- Chop materials into 1 to 2 inch lengths (increases surface area for the microorganisms to work).
- Using a compost thermometer, monitor the pile temperature daily–put it into the center of the pile.
- If the pile reaches 150º F turn it immediately.
- When the temperature reaches between 140º to150º F, turn the pile, watering it as you turn it, if needed. Continue this until pile no longer reaches 140º F–this may take a few weeks.
- As the temperature drops, turn and water it whenever it reaches 120 degrees-this also may take a few weeks.
- When the temperature no longer reaches 120 degrees, turn and water weekly for 3 weeks.
- Compost should be ready in 6 to 8 weeks.
- Finished compost looks like rich brown soil and smells earthy. Original ingredients cannot be identified. The pile will be about 1/3 the original size.
- Sift the finished compost through a ½ inch screen over a wheelbarrow; return the larger pieces to the next pile for additional composting.

Slow Compost Technique

- Combine chopped and unchopped yard waste, kitchen vegetable and fruit waste as they are generated, into a pile. Adding to the pile is a continuous process.
- Bury food scraps 6 to 12 inches deep into the heart of the pile; never leave food scraps exposed in the top of the pile.
- Turn and water if you are so inclined.
- Harvest composted material from the bottom of the pile in 12 to 18 months.
- Sift the compost through a ½ inch screen over a wheelbarrow; return larger pieces to the pile for further decomposition.

Mixed Compost Technique

- Combine fruit, vegetable and chopped yard trimmings (2 inches is ideal) at a ratio of 1 part greens to 2 parts browns in a 3-by-3-by-3-foot pile. Water as the pile is assembled.
- Bury food scraps 6 to 12 inches deep in the heart of the pile. Never leave food scraps exposed on top of the pile.
- Turn the pile about weekly, watering as it is turned, if needed.
- Harvest rich, brown, finished compost after 3 to 8 months. Sift out coarse, unfinished materials.

Always:

- Keep the pile as moist as a wrung-out sponge, watering as it is turned.
- Bury food scraps 6 to 12 inches into the heart of the pile
- Wear gloves, long-sleeved shirt and pants, close-toed shoes when turning the pile.
- If the pile is dry and dusty, wear a face mask, and water it as you turn it.
- Change clothes and wash your hands thoroughly after working with compost and before eating or drinking.

USING COMPOST

- "Finished" compost continues to decompose, feeding the garden soil. Repeated additions of compost to the garden over the seasons improve the soil.
- Compost can be dug into the garden, applying 2 to 4 inches at a time.
- Compost can be used in established beds as 3 to 4 inch thick mulch, taking care to keep compost 4 inches away from the plant stem/trunk.
- Compost can be spread on the lawn, ½ inch thick, as a soil amendment.
- Compost can be sprinkled around the base of houseplants as well.
- Finished compost is slightly acidic or pH neutral, even when acidic material such as pine needles is added.
- Remember: Compost Happens!

TROUBLESHOOTING

Symptoms	Problems	Solutions
Pile is not composting	Too dry	Turn, add water only until damp as a wrung out sponge.
	Too wet	Turn the pile.
	Pile is too small	Add browns and greens.
	Too much brown material	Add fresh matter or organic nitrogen fertilizer. Turn pile.
Pile smells rotten	Too wet or compacted	Turn the pile.
	Too many food scraps or lawn clippings	Turn the pile and add browns. Bury food scraps 6 to 12 inches.
Ammonia odor	Too much green material	Turn the pile and add browns.
Attracts flies	Food scraps exposed	Bury and mix food scraps 6 to12 inches into heart of pile.
	Non-compostables	Remove meat, dairy, grease, etc. from the pile.
Ants	Too dry	Check moisture, add water if needed.
Rodents in the pile	Food scraps exposed Bin holes larger than ½ inch Non-compostables	Use traps or baits; rodent proof bin; remove meat, grease, etc.; bury food; turn pile. Line the bin with ¼ inch hardware cloth. Cover pile.

RESOURCES

- UC Master Gardeners, Sacramento County website: http://ucanr.edu/sacmg
- Available from the UC Master Gardeners, Sacramento County. (916) 876-5338.
  - *Composting Tips and Tricks,* Garden Notes #142.
  - *Fair Oaks Horticulture Center, Home Compost Research and Demonstration Project*, Garden Notes #126.
  - *Worm Composting: The Basic Steps for Creating a Worm Bin*, Garden Notes #144.
- *Composting is Good for Your Garden and the Environment;* Master Gardener Tip Sheet at http://anrcatalog.ucdavis.edu/Items/8367.aspx
- *Compost in a Hurry,* UC ANR publication 8037. http: anrcatalog.ucdavis.edu.
- UC Master Gardener Program, Placer County: http://pcmg.ucanr.org

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