



for the Gardener

UCSC FARM & GARDEN
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Let Worms Make Your Compost

Vermicomposting is a simple, efficient composting system that appeals to many people, especially those who mainly have food wastes to compost. Getting started requires only a lidded container, redworms, some “bedding” for the worms to live in, and food scraps. Maintenance is simple: bury food scraps in the bedding, add new bedding occasionally, and harvest the digested results, known as castings. Finished worm castings can be harvested in four months, and these crumbly, brown castings have a higher nutrient content than many other composts.

THE WORMS

Redworms, not “earthworms” or “nightcrawlers,” are best suited to the vermicomposting system for many reasons. Also known as “manure worms” and “red wrigglers,” red-worms thrive in areas with high organic matter content. They will naturally colonize a manure or compost pile, as well as areas under trees with high leaf fall, surface feeding in the top 18 inches of material. Red-worms, *Eisenia fetida*, are not the same as “earthworms” and “nightcrawlers” which prefer to construct semi-permanent burrows in undisturbed soils.

There are several options for getting a starter batch of redworms: dig them out of a friend’s bin (best option); mail-order them through the listed sources at the end of this article (good option); dig them out of a horse manure pile (when the pile has cooled down); or buy them at a bait shop (very expensive for the quantity needed). One to two pounds of red-worms (or about 1000-2000 worms), are needed to start an average-size home vermicomposting system. Redworms reproduce rapidly under the right conditions: 8 worms can multiply to 1500 in 6 months! In a well-maintained system, redworms can live one to five years.

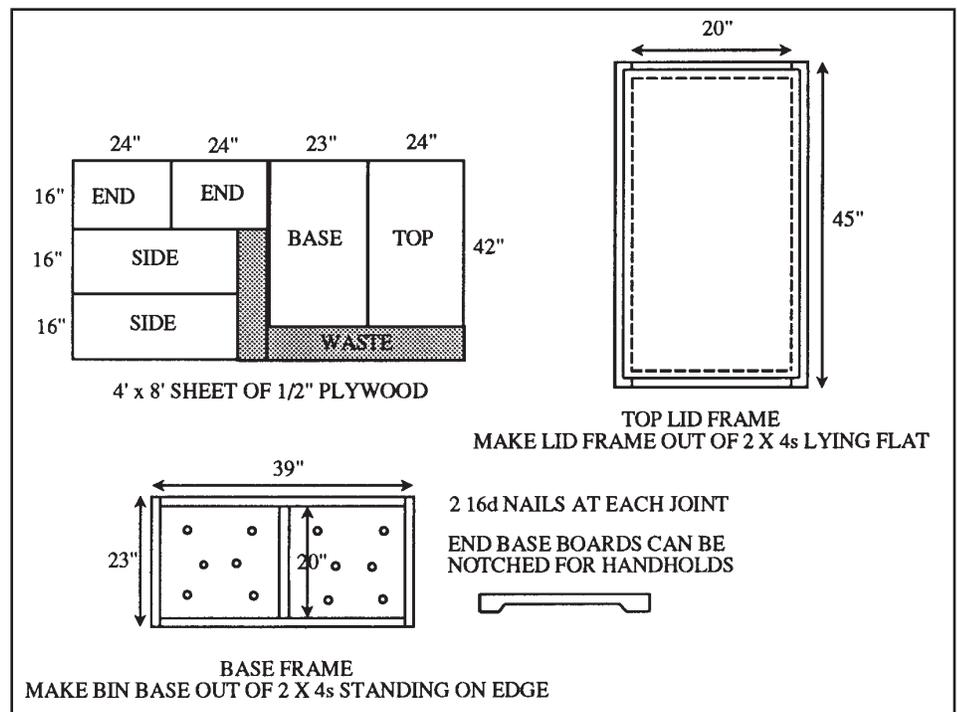
THE BOX

Many different types of containers can be used for vermicomposting, from wooden boxes to plastic tubs, but to work properly they need the following features: 1. a tight fitting lid and a bottom for protection from pests and weather; 2. holes for drainage and aeration; 3. a depth of 12 to 18 inches; 4. the appropriate space for the amount of food waste to be composted.

Redworms do their best work in a dark, damp (but not soggy) environment with temperatures averaging between 55° and 77° F. Lids will protect worms from the light and the drying heat of the sun (as well as keep rodents and flies away). Bottoms will keep out worm-eating moles and other burrowing rodents. In addition, a box with a bottom can be moved indoors in the winter for protection against frost, and into the shade in the summer. Drainage holes and aeration holes will help keep the box

from becoming too soggy (worms can drown!). Containers with depths of 12 to 18 inches work best since redworms are oxygen-needing surface feeders that won’t venture much deeper than 18 inches.

When choosing the size of the box, consider the amount of food scraps generated by your household each week. Mary Appelhof, author of the vermicomposter’s bible *Worms Eat My Garbage*, suggests that prospective vermicomposters collect and weigh their food scraps over several weeks before deciding on a box size. She offers this rule of thumb for calculating a box size: allow one square foot of surface area for each pound of food wastes to be added per week. For example, a two foot by four foot box has eight square feet of surface area and can handle eight pounds of food waste a week (the amount typically produced by two to three adults a week).



Plans for a basic wooden wormbox, using one 4' x 8' sheet of plywood.

A wooden worm box is preferable to one made of plastic or metal. Wood absorbs and drains excess moisture, while metal and plastic trap moisture inside. Especially in wet climates, plastic worm bins can foster anaerobic conditions due to excess moisture build up and resulting compaction. If using metal and plastic bins, be sure to drill adequate drainage holes in the bottom and aeration holes in the sides. Beginning vermicomposters can get started in almost any container – plastic laundry tubs, galvanized tin buckets, old bureau drawers, packing crates – before building a more permanent box. Wooden boxes, whether made from scrap wood or new plywood and two-by-fours, can be designed to accommodate the specific needs of a household. Commercially made bins are also available (see below).

THE “BEDDING”

After you’ve built or acquired your box, you’re ready to fill it with a one foot layer of “bedding.” Bedding materials such as leaves, peat moss, and shredded newspaper, provide worms with a damp, aerated place to live, as well as a food source. Bulky and high in carbon, the bedding materials provide a matrix in which to bury the wet, high-nitrogen food scraps. Composting food scraps without bedding can result in a slimy, smelly mess. Together, the bedding and the food scraps are a balanced compost composition and a balanced diet for the worms. In a few months the worms will eat their way through both the food scraps and the bedding.

My favorite bedding material is maple leaves with a bit of peat moss and soil mixed in. Leaves from other deciduous trees make great bedding also, with the exception of walnut leaves which contain tannins that are harmful to worms. Peat moss, favored by some vermicomposters for its moisture retention, is considered by others to be too acidic and too expensive to use in quantity. If you use peat moss, mix it with other bedding materials and keep the moistened peat moss volume to one-third of the total volume. Shredded newspaper and corrugated cardboard can be torn into one to two inch wide strips and used as bedding. Straw works best if mixed with other bedding materials due to its tendency to mat.

All bedding materials need to be moist, but not soggy. Worms are 75 to 90 percent moisture and they must

keep their skin moist for respiring (they breathe through their skin). Bedding should be moist as a wrung-out sponge, or about 70 percent moisture. Dry bedding materials – dry leaves, straw, newspaper, peat moss – are best soaked and then allowed to drain overnight before adding them to the worm box. If the materials seem too wet, squeeze out excess moisture.

FEEDING & MAINTAINING THE WORMS

Everyday, a redworm can eat half its weight in food. Redworms will eat their way through any food waste except for hard bones. Fruit and vegetable scraps, grains and breads, coffee grounds and tea bags are all wonderful worm food. Worms will also eat meat, dairy products, and oily foods, but if pests and odors are a problem, then avoid putting these attractive items in the worm box. Worms have favorite foods and foods they will avoid. They will flock to the underside of a melon rind, and may avoid a citrus peel or onion for weeks until bacteria have broken down its caustic substances.

The easiest system for feeding the worms is to bury food scraps in holes dug into the bedding. Use a hand fork to open a hole or a small trench in the bedding, dump in the food scraps, and then cover them with a few inches of bedding. Covering the food with bedding and worm castings will help keep flies and odors away. Rotate food burial sites to distribute the food scraps evenly throughout the box.

While worm composting is relatively trouble free, there are a couple of problems that can be avoided with preventive measures. If a worm box starts to have smelly, slimy spots, chances are the bin is too wet or has too much food waste in it. Remedy this problem by adding fresh bedding and/or reducing the amount of wet food put in the box. Make sure to have adequate drainage holes and aeration holes. Fruit flies, a potential problem in the summer, can be avoided by covering food wastes with a few inches of bedding and castings. As a second line of defense, cover the bedding with a sheet of plastic or canvas; tuck the sheet in around the edges.

HARVESTING & USING THE CASTINGS

After about four months, the worms will have chewed their way through most of the food scraps and the bedding material, leaving behind a box-full

of nutrient-rich castings. The easiest method for harvesting the castings is called the “Divide and Migrate” method. Simply push all the material to one side of the box (side A). Add moist, fresh bedding to the remaining space (side B). Bury food only in the new bedding in side B. Over the next six weeks to two months, the worms will work their way through the remaining material in side A, and will migrate to the new food and bedding in side B. Once the castings are removed from side A, fresh bedding can be added and food burial can be shifted to that side only. This method will keep you in a new supply of worm castings about every four months and will keep your worms in fresh food and bedding.

The harvested castings will look dark and crumbly and should smell like good soil. High in nitrogen and phosphorus and a great source of organic matter, castings are wonderful additions to potting mixes for seeds, transplants, or house plants. Castings can also be used like compost in vegetable and flower beds, as a cover soil for seed beds, and as a top-dressing for perennials.

Worm and Worm Bin Suppliers

Ecology Action of Santa Cruz
125 Water St.
Santa Cruz, CA 95060
(831) 426-5925, 427-3452
www.compostsantacruzcounty.org

For a list of other worm bin suppliers in California, see:
www.ciwmb.ca.gov/organics/Worms/BinSupply.htm

For more information on worms and worm compost:
Worms Eat My Garbage, by Mary Appelhoff. Kalamazoo, MI: Flower Press, 1997.
The web site *Worm Digest* is also an excellent resource:
www.wormdigest.org

This material is written, produced, and distributed by staff of the UC Santa Cruz Center for Agroecology & Sustainable Food Systems. The Center manages the UCSC Farm and Alan Chadwick Garden on the UCSC campus. Both sites are open to the public daily from 8 am to 6 pm. For more information or additional resources, call (831) 459-3240 or see our web site, casfs.ucsc.edu.