



Composting with Worms, Let Worms Eat Your Garbage

Worm compost or vermicompost, is worm manure. It is a nutrient-rich soil amendment that can be used in your garden, and the nutrients are in a form that makes them readily available to plants. Nutrients in vermicompost are often much higher than traditional compost. It can be blended into the soil or scratched in as a top dressing for indoor or outdoor plants. It can also be used to amend potting soil by mixing four parts of potting soil to one part worm compost.

Composting with worms is an easy and rewarding way to recycle your kitchen food waste. Worms can process the daily accumulation of kitchen scraps that are often inconvenient for incorporating into your backyard compost pile. By feeding your worms every few days you can get rid of the food waste before it starts to rot. With a worm bin for your kitchen scraps and a backyard compost bin for your landscape waste, you can efficiently recycle most of the organic waste from your home that would otherwise go to the dump.

About the Worms

The worms commonly used for vermicomposting are red worms, or red wigglers. Found naturally in old piles of manure, or in decaying leaves beneath trees, this worm species, *Eisenia fetida*, is different than the common earthworms or nightcrawlers that live under the soil surface. These active red composting worms have big appetites and can eat more than half their weight in food every day. Because they thrive and reproduce quickly in the confined environment of a well-maintained worm bin, they are also the worm most raised and sold as fish bait. Fortunately, worm farms also sell red worms at a much more reasonable bulk price of \$15 to \$30 a pound and will ship them to home vermicomposters. Search the internet for "worm composting" to find sources. However, before you order worms you have to create a habitat for them, a worm bin filled with an appropriate bedding material and placed in an environment that will keep them healthy and eager to eat your food scraps.

Worm Bins

An old shipping crate, a homemade wooden box, and an opaque plastic storage bin all work as worm bins. People have also used large old suitcases and abandoned bathtubs as worm bins. To keep in the spirit of recycling try to reuse some container that you already have or build your bin from scrap lumber you've been saving for a project. Plastic storage bins available at hardware stores and commercial worm bins purchased at garden centers or online can also be used. Bins should be 10 to 20 inches deep and have a lid that will shade the worms and that will also keep out rodents. Bins need $\frac{1}{4}$ inch holes or an open bottom for drainage as well as holes in the sides for ventilation. To avoid excessive moisture during the rainy season do not put ventilation holes in the lid. Specifications for making your own plastic or wooden bin and for information on purchasing bins go to compostsantacruzcounty.org.

The size of the bin will determine the quantity of scraps that will get eaten. As a general guideline provide at least two square feet of surface area for every household member. Those who eat a lot of vegetables find they need a bin with four square feet of surface area per person. Worms will eat about one pound of food waste for each square foot of surface area per week.

Where to Place the Bin

Place your bin in a shady area, and if possible, beneath a roof or overhang that will also provide some frost protection.

Worms and other composting organisms in your bin work best at temperatures between 68 and 77 degrees. They will tolerate more extreme temperatures but will be less efficient composters. If your covered bin is placed in a shady area with at least 6 inches of moist bedding material, it should be just fine outdoors year-round in most California climates.



Some options for bin locations are a shady deck, beneath an outdoor potting table, or in a garage, garden shed, or basement. Also make sure that the worms are sheltered from excessive rain since they require oxygen and can easily drown.

Bedding Material

The-natural habitat of composting worms is decaying organic matter, such as the moist piles of decaying leaves or manure where they are commonly found. Bedding material used in the worm bin should provide them with a similar comfortable moist environment. Decaying leaves (no pine, redwood, bay, or eucalyptus) or well- rotted and rinsed horse manure can be used as well as shredded black and white newspaper, sawdust, straw, or coconut pith fiber available at nurseries. Consider using a combination of these materials to avoid matting and restricted air flow.

Put at least six inches of bedding material in the bin and moisten and mix so the material is evenly damp. Aim for the dampness of a wrung-out sponge. Squeezing a handful of properly moistened bedding material should produce only a few drops of water between your fingers. The bin is now ready for your worms and your kitchen scraps.

Feeding Your Worms

Fortunately worms like to eat many of the same things we eat. They also handle rotting and moldy food scraps not fit for human consumption. But for safety and sanitary reasons, and to avoid unwanted pests in the worm bin, certain food items should not be placed in the bin.

Do Feed Your Worms:	Don't Feed Your Worms:
Vegetable scraps	Meat, bones
Fruit rinds and peels	Fish
Bread and grains	Dairy products (cheese, butter, etc.)
Pasta	Oily foods, peanut butter
Coffee grounds and filters	Pet waste and cat litter
Tea bags	Avoid too much citrus-should not be more than 1/5 of food waste
Crushed eggshells	

Tips for Maintaining a Healthy Worm Bin

Start slowly by feeding your worms small portions - a quart or less of food scraps per week. As the worm population increases and other biological activity speeds up in the bin, they will eat more.

Do not over-feed your worms. Too much food in the bin may create an acidic unhealthy environment for the worms and cause odors. Before feeding look to see if most of the food from the previous feeding has been eaten. Always cover food scraps with bedding material that is already in the bin, or by adding new bedding on top of the food. Exposed food will draw fruit flies and other unwanted pests.

Maintain your bedding as moist as a wrung-out sponge. Plastic bins tend to accumulate moisture and will need dry bedding added to absorb excess moisture. For convenience keep a bucket or bag of dry shredded newspaper or sawdust next to your worm bin. Wooden bins tend to dry out, and you will have to add water occasionally.

Be sure to allow at least 3 inches of space between the top of the bedding material and the lid of the bin to ensure that your worms receive enough fresh air to breathe.

Monitor your worm bin frequently at first until you establish a good feeding rate and a stable moisture level.

Harvesting Worms and Compost

In addition to eating all the food scraps you place in the bin, after a few months the worms will also have eaten and broken down their bedding into dark, crumbly vermicompost. The contents of the bin will have been significantly reduced into a much denser material that is a less suitable habitat for your worms. Then it is time to separate the worms from the compost. Two methods are described below but neither method will separate all the worms from the compost. The goal is to separate out enough worms to repopulate your bin.



Method #1 Dump and Sort - Use the worm's love of a cool dark and damp environment to help with the sorting. On a warm day in the full sun dump the entire contents of your bin, forming a pile or two on a concrete driveway or sheet of plastic. Exposed worms will immediately start squirming towards the middle of the pile to escape the sunlight and the heat. After about 15 minutes in direct sunlight, use a small lawn rake to scrape off the top inch or two of the pile that is worm-free. Repeat the process until you have a very wormy bottom layer that can go back into your bin in fresh bedding material.

Method #2 Scrape off Top Layer - As worms chew up their bedding material, the finer denser composted material settles to the bottom of the bin and the worms migrate to the looser bedding material and food in the upper layer of your bedding. Most of the worms can be harvested by simply removing this top worm-rich layer and setting it aside. The lower vermicomposted layer can then be removed from the bin. Add new bedding material and return the worms to the bin

Troubleshooting Your Worm Bin

PROBLEM	CAUSE	REMEDY
Bin attracts flies	Food is exposed	Bury food completely, feed less fruit
Worm bin smells bad	Too wet or too much food	Check drainage holes, add dry material, feed less
Worms dying	Too much food in bin, too dry	Feed less or get a larger bin, add water to maintain dampness
Bin attracts ants	Too dry	Add water to maintain dampness

Resources:

Hands-on Workshops

For information on free vermicomposting workshops presented by UCCE Master Gardeners-Yolo County, go to <https://yolomg.ucanr.edu/>. For workshops by UC Davis students through Project Compost go to project.compost.ucdavis.edu. Workshops often include free worms.

Helpful Web Sites

compostsantacruzcounty.org - This Santa Cruz County site offers excellent information on all aspects of worm composting including worm composting basics, adapting plastic storage bins, building a wood bin, and purchasing worm bins and worms.

davisrecycling.org - The City of Davis website includes information on all types of residential recycling including a brochure and a 12-minute video on vermicomposting

calrecycle.ca.gov/organics/worms/ - The California Department of Resources Recycling and Recovery website answers all your vermicomposting questions and maintains a current list of worm and worm bin suppliers.

Further Reading

Worms Eat My Garbage by Mary Appelhof- Flower Press, Kalamazoo, Michigan, 1997, 162 pages. This is a comprehensive and practical guide to all aspects of home vermicomposting.

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