

# VERMICOMPOSTING

“Vermicomposting” (worm composting) focuses on the feedstock and is the topic under discussion here. “Vermiculture” focuses on the worms themselves, and promoting biomass.

**THE WORMS:** There are 3 categories of earthworms, each of which has different habits. Over 4400 species have been identified. Six types of epigeic worms have been found to be successful for composting, but the most commonly used is the red worm, *Eisenia fetica*, which is found on every continent.

## **WHY VERMICOMPOSTING?**

There are several reasons that vermicomposting is preferable over standard composting. Decomposition is faster. The end product is better because it has greater soluble measurable nutrient levels and greater microbial populations. It's more appropriate to apartments and those with small volumes of organic debris. Earthworms do not get sick, and they can destroy pathogens including salmonella, E-coli, parasitic worm eggs. Worms can mine heavy metals from the soil and are the most effective natural cleaning agent known.

## **GETTING STARTED:**

1. Old coolers or a plastic tote can serve as worm bins. They should be opaque, and need aeration holes and a lid. The worms tend to stay at the top. With 1700 predators in North America the worms really won't use the aeration holes to leave the heaven you create for them in the bins.
2. Make a series of ½” holes around the bin, 1.5” up from the bottom, and another row just below the lip of the bin. These holes are important because they provide the oxygen that the worms need to survive. Add 2” of foam packing peanuts. Then comes 2 layers of hardware cloth (galvanized ½” mesh) with a layer of landscape fabric sandwiched in between.
3. Next comes the bedding. Good bedding materials hold moisture while maintaining airflow, and are primarily a source of carbon. Examples include straw, shredded corrugated cardboard (pizza boxes are a special treat!), shredded brown paper bags or paper or leaves. There is not a problem with the ink in the newspaper.
4. Add the worms. Worms can take up to 6 weeks to get going, but usually settle into their new environment and start working in about 10 days.
5. Feedstock materials tend to be soft structured, have a high moisture content and compact easily. The nitrogen is provided by the feed stock. Options include food scraps, brewing wastes, rotted manure, and shredded cardboard. Avoid dairy or animal products as these will attract vectors and create odor.

The worms feed **IN** decaying organic matter, but not directly **FROM** it. Their favorite foods include algae, fungus, and protozoa, so in a vermicomposting ecosystem the microbes provide both nutrition for the worms and reduction of organic material to a form accessible to worms. These microbes require oxygen, water, and a balance of carbon and nitrogen, optimally 25-30 parts carbon to 1 part nitrogen.

Add more feedstock when you see the worms beginning to work and eat the first layer of food, you can add another layer about 1" thick, but go lightly until you get a sense for the rate at which they work. If you add too much food, you risk creating anaerobic conditions. After you have added a layer of food, always add another 1" layer of bedding material.

## **MAINTAINING THE WORM BIN**

**Moisture:** Earthworms breath oxygen, absorbing it through their skin. They can survive low oxygen levels, but cannot coexist with anaerobic microorganisms, because these give off methane, phenols and alcohol which poisons the worms. The worms are 85% water. An environment with 75-85% moisture is ideal, but this leaves 15% oxygen and can become toxic due to anaerobic activity. Therefore an environment with 60% moisture is practical, and at least 35% moisture is required to keep them from drying up. Use a spray bottle to add water during warm weather. System saturation is a potential problem, which results in a sewer odor.

**Temperature:** Tolerance range is between 40-85 degrees Fahrenheit, ideal temperatures are between 60-72 degrees. In winter you can keep the bin warm by wrapping it in an old blanket and surrounding it with a 4" layer of straw. In summer, when temperatures are in the 90's you can dump ice cubes over the top of the bedding layer or freeze water in a 2 liter soda bottle and place that inside the bin. This should create adequate worm air-conditioning.

**Light:** Worms hate light. After 20 minutes exposed to sunlight they will become confused. In 30 minutes they will stop breathing and by 35 minutes exposure they die. Keep worms covered up at all times.

**Bugs:** If successful, the bin will become filled with little critters. If fruit flies are a concern and the bin is operated inside, you can freeze food scraps for 3 days or microwave them for 3 minutes to kill fly larvae.

## **HARVESTING YOUR VERMICOMPOST**

When your worms have been rustling around in the worm bin doing their stuff for about two to three months you will be able to harvest the compost. You will need to bring the worms to the surface to separate them from the compost. A great trick for doing this is to place watermelon rind in the bin. Worms love watermelon rind, they can't get enough of it, they will rush to the surface and gorge!

Lift off the top bedding layer, the rind, the worms and any undecomposed food waste, and place to one side. Sort through the vermicompost at the bottom of the bin, picking out any worms who didn't join the watermelon feast. When the vermicompost is free of worms, you can scrape it out into a bucket.

Rebuild your worm bin by placing a layer of bedding material in the base of the bin and then adding new food supplies and the remaining undecomposed food waste. Add the worms and the watermelon rind and the worms will be ready to go again. They won't worry about this disruption to their home as long as you continue to provide the environment they enjoy.

Approximately 85% of the vermicompost you have taken out of your bin is worm castings, a very high degree of pure worm manure. You will not need to put this concentration of manure on your yard. The vermicompost needs to be diluted with potting soil in a ratio of somewhere between 5% vermicompost/95% soil to 17% vermicompost/83% soil. You can also use the vermicompost as plant feed by adding one tablespoon to the base of a plant followed by one teaspoon of compost a day for two weeks. Vermicompost can be stored in jars for up to two years.

Another use of the vermicompost is tea. Make the tea in a ratio of 1 part vermicompost to 5 parts water. Place the vermicompost in a sock or pair of pantyhose. Add the required amount of water to a bucket. Place the sock into the water for 10 minutes to make the tea. The tea must be used straight away as it does not have a shelf life. Applications include spraying, for example onto black spot, or as a root wash. The vermicompost contains microorganisms that will inoculate the soil against harmful organisms that would feed on plant roots.

The leachate which comes out of the bottom of the worm bin should not be used on plants as it has not been decomposed by worms and could be toxic.

**MORE RESOURCES:** [www.wormwoman.com](http://www.wormwoman.com), [www.wormfarm.com](http://www.wormfarm.com), [www.wormdigest.org](http://www.wormdigest.org).