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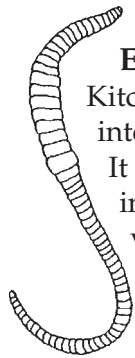
Composting with WORMS

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by

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Composting With the Help of Earthworms

Kitchen wastes can be effectively turned into a rich compost using earthworms.

It reduces the amount of waste going into the landfill. The end result is vermicompost, a mixture of worm castings and compost. It is beneficial both as a soil amendment and slow release fertilizer.

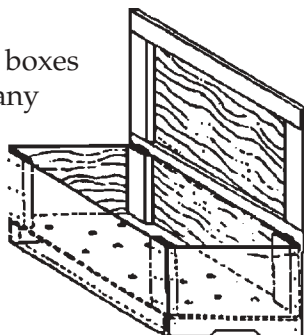
To get started, you will need at least one pound of worms and a container. Worms will cost between \$20-\$30 per pound.

Where to Place a Worm Box

Put the earthworm box in a convenient spot where the temperature and moisture can be controlled. An ideal temperature for earthworms is from 55°-77°F. Air circulation is a must in and around the box.

Type and Size of Box

Commercial earthworm boxes are available through many garden supply catalogs. Homemade containers can be constructed from untreated wood or plastic. Use a shallow container with plenty of



aeration holes. Never use a container which has been used for chemicals. Plans are available through the Extension office.

The size of the box will depend upon the pounds of wastes. One square foot of surface area is needed for each pound of garbage buried each week. If your family generates a lot of waste, build a bigger box or build two small boxes. Keep in mind that smaller boxes are easier to move and empty. An average family of 4 generates 6 lbs. of kitchen waste per week. A box 2 foot by 3 foot or 6 square feet will work for the average family.

How Many Worms Are Needed

Worms raised at the proper temperature will consume half their weight in kitchen waste per day. In other words, you will need one pound of worms for half pound of food waste produced per day: a ratio of 2:1. On a weekly basis, one pound of worms should be able to process 3.5 lbs. of waste. If the growing conditions are cooler or not ideal, the rate at which they consume will drop.

$$\frac{3.5 \text{ lbs kitchen waste per week}}{7 \text{ days a week}}$$

$$= \frac{1}{2} \text{ lbs. waste per day average}$$

Kind of Earthworms to Use

There are two species of red worms which successfully adapt to a box environment.

1. Red worm (*Lumbricus rubellus*)
2. Red worm (*Eisenia foetida*)

Nightcrawlers and other garden worms are very important for soil improvement, but are not as adaptable to indoor conditions.

Starting a Earthworm Box

Start by placing damp bedding material loosely in the box. Cut or tear corrugated cardboard or newspaper into 1 inch wide strips. A mixture of leaf mold, horse/cow manure, peat and soil will also make good bedding. Bedding should be moist, the consistency of a damp sponge.

Earthworms need grit to physically break down their food. Add a little sand or topsoil. Add one teaspoon of garden lime (calcium carbonate) per box to help keep the mixture from becoming too acidic. Red worms are top feeders. Put them on top. The worms will move down into the bedding.

Feed the worms once a week, but don't overfeed them. Too much food will harm the worms, create odors, contribute to pest problems, and may lead to fermentation and subsequent acidity problems.

What to Add to the Box

- Vegetable leftovers
- Egg shells
- Coffee grounds
- Oatmeal
- Cake
- Fruit rinds
- Teabags
- Spoiled food
- Small meat scraps
- Cheese

What Not to Add

- Non-biodegradable
- Cat litter
- Bones (unless ground)
- Vegetable oils
- Chicken bones
- Fats

Worms need a moist environment to breathe

Moisture

The earthworm and the bedding should have the same moisture content, between 75% to 90%. Earthworms will suffocate if the bedding is too dry, because they breathe through their skin. Three pounds of water for one pound of dry bedding, or a ratio of 3:1, is needed. To determine correct moisture, squeeze a handful of bedding; less than 5 drops of extrudable water indicate the right moisture level.

Adding the Waste

Place the waste on top and cover it with a thin layer of fresh moistened bedding material. This will help minimize earthworm disturbance.

Select a different spot each day to place the waste. Divide the box into grids and start burying at one end. When all the locations have been filled, start over with the first location.

Grinding most kitchen waste is not necessary because it breaks down in a short time. Egg shells should be pulverized.

When You're Away

Feed the earthworms a little extra and leave them undisturbed. To keep the bedding moist and prevent flies, cover with several layers of wet newspaper and a loose lid. They can maintain themselves for several weeks. If you leave for a longer time, make arrangements with a responsible person to care for your worms.

Changing the Bedding

After three to four months you will want to harvest the castings. Decomposition and composting have taken place. The bedding will become dark and earth-like. If left in the box too long, the castings become toxic to the worms.

Push the old material to one side of the box. Put fresh bedding material in the other side. Continue feeding only in the new bedding material. After a week or two, the worms should migrate to the new bedding material. Remove the old bedding material and earth-worm castings.

Dividing the Worms

Earthworms multiply rapidly. At 4 to 6 weeks the worms mature, mate and produce cocoons. Two or more baby worms will hatch from each cocoon. Realistically each adult can give rise to 150 offspring per year. Overpopulation should be avoided. The extra worms could be used to start a new earthworm box or shared with a friend.

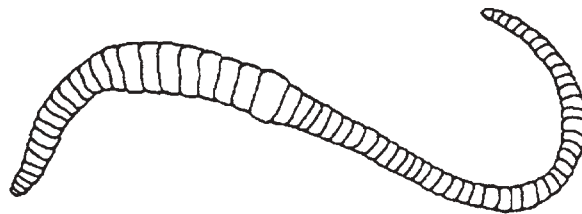
Troubleshooting

Overfeeding, too-wet and acidic conditions cause pest problems. Fruit flies, fungus gnats and excess mites can be controlled by a combination of methods. Insect traps can reduce high pest numbers, but do not remedy the problem. Temporarily stop feeding, mix in dry bedding and a sprinkling of garden lime when pests are suspected. Cover the top with at least 2 inches of moist bedding. Commercial Bt products are available that will kill fungus gnat larvae, but do not harm the worms. Consult with the local Extension office.

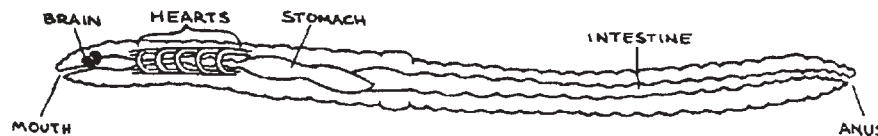
Common Questions

Can an earthworm see? No, earthworms don't have eyes. They are sensitive to light, and try to hide when exposed to light.

Where is the earthworm's mouth? It is in the first segment. There is a small protruding lip just over the mouth. When foraging, this lip will be stretching out for sensing his food.



EARTHWORM



Does an earthworm have teeth? No, they grind food in their gizzard by muscle action.

How does a worm grind his food? Earthworms have a muscular gizzard. Small parts of food, mixed with some grinding material such as sand, topsoil, or limestone is ingested. Contractions from muscles in the gizzard compress particles against each other, mix it with fluid, and grind it to smaller pieces.

Do earthworms need air? Yes, gaseous oxygen diffuses across the moist tissue of their skin, from the region of greater concentration (air) to that of lower concentration (inside the worm). A constant supply of fresh air is needed by the earthworms.

How to use worm compost? Earthworm compost can be used like any other compost, for mulch, fertilizer, soil conditioner or amendment. Sterilizing is not necessary. An excellent potting mix can be made from 1 part castings, 1 part peat moss, 1 part perlite and 1 part sand.

Acknowledgment

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4. Home, Farm and Garden Research Associates, *Let An Earthworm Be Your Garbage Man* (Elgin, IL: Shields Publications, 1984) 64 p.
5. Minnich, Jerry, *The Earthworm Book* (Emmaus, PA: Rodale Press, 1977) 372 p.

Sources for Redworms

Check the classified ads of gardening magazines and catalogs and fishing magazines. You may have to pay air shipping!

Your local extension office may have a listing of local sources of earthworms.

Visit the Cooperative Extension Service Web site at
www.uaf.edu/coop-ext