



Worming your way to better compost!!!!

WHAT IS COMPOSTING?

Composting is nature's way of recycling. Composting is a natural process of old food, leaves, etc., breaking down into a rich soil amendment.



WHAT IS WORM COMPOSTING?

Worm composting (or vermicomposting) is when a type of earthworm called "red worms" eats your food waste and leaves rich compost for use on your lawn, garden or house plants. Letting worms eat your garbage is not a new idea. In fact, worms have been eating plant and animal matter for millions of years.

WHY WORM

COMPOST?

Worm composting:

- is an easy way to recycle food waste,
- saves landfill space,
- is environmentally sound,
- can be done indoors year round,
- creates a high quality compost product, and
- makes great conversation at a party!



VERMIPHOBIA

Contrary to published reports in the "National Enquirer," red worms cannot escape their bins and open refrigerator doors or call pizza parlors for delivery . . . they eat only what you feed them and are quite content to stay in their little bin!!!

THE ABC'S OF WORM COMPOSTING

A

If the BIN Fits, Buy It or Build It!

A worm composting bin should be shallow and wide enough to allow you to:

- bury your food in many places
- ensure worms get enough oxygen

An ideal depth is somewhere between 8 to 18 inches. The size of your bin depends on how much food waste your household produces. A general rule to follow is:

"One square foot of surface area for each pound of food waste produced each week".

An average household of up to two people will use about four square feet of area for burying food.

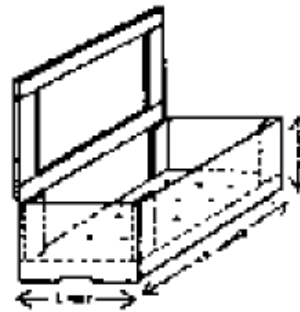
When creating your own worm bin, be sure to drill or punch air holes in the top or sides of the bin so that the worms can breath.

IDEAS FOR WORM BINS

Plastic Storage Boxes - Available at most discount type stores.



Homemade Wooden Boxes - Built from exterior grade plywood.



Premade Worm Bins - Refer to list on back page of this booklet.



B

Let Sleeping Worms Lie -- In Their BEDDING!



Bedding is for the worms to live in and to bury the food waste in. Eventually the bedding and the buried food will be eaten by the worms and turned into the compost. Hand or machine shredded newspaper mixed with water is the most convenient type of bedding and very popular with the worms.

A few handfuls of soil should be added to the bedding to supply "grit" to aid in the worm's digestion process and to introduce helpful digesting micro-organisms into the bin.

C

A WORM'S Work is Never Done!

For worm composting to succeed, it is necessary to use red worms (*Eisneia foetida*) or affectionately known as red-wigglers. Red worms will reproduce quickly, eat large amounts of food, and not try to leave the bin.

These worms will move through the compost bin as they eat the food and bedding and will create compost. The list of companies on the last page of this booklet all sells food-eating red wigglers.

Red worms are usually sold by the pound (about 850 to 1,000 worms), which will eat one-half pound of food scraps per day. They will multiply within a few months to accommodate being fed about 2 pounds or more per day, depending on your bin size.



Photo by V. Jedlicka

D

Worms Do Not Live on BREAD Alone!

Worms will eat any vegetable or fruit waste. Do not include any meat products or foods high in oils or fats. Citrus rinds (orange peels, etc.) can be added but with equal portions of green leafy scraps in order to keep the pH level balanced in their bin.



YES

Fruit & Vegetable Scraps & Peels
Tea Bags & Coffee Grounds
Crushed Egg Shells
Houseplant Clippings
Pasta (No Meat) & Rice
Bread & Cereal

NO

Meats
Bones
Oils
Fats
Vinegar
Dog or Cat Waste

The "yes" foods can be buried as often as every few days to once a week. Simply dig a hole in the bedding large enough to place the food and cover it with one to three inches of bedding. Try to keep track of where you bury the food so you can pick a new spot each time. Cutting up food wastes will speed composting since the larger and harder something is, the longer it will take to break down to the point where the worms can eat it.

Worms have favorite foods including rice, pasta, banana peels, and melon rinds. However, it is important not to feed too much of any one type of food (i.e., banana peels).

OPERATION FOOD RECYCLING!!



STEP 1

Choose your bin and bedding and receive your worms.



STEP 2



Fill the bin with bedding. The worms need a home that contains about 75 percent moisture; add three pints of water to every one pound of bedding. Continue to add bedding and water until you have about five to seven inches of wet but fluffed up bedding. The paper should be as damp as moist sponge that, if you squeezed very hard, will give a drop or two of water. Water pooling on the bottom of the bin indicates there is too much moisture and should be soaked up by adding more bedding. Let prepared bedding sit for 1 to 2 hours before adding the worms so that the water will be room temperature.



STEP 3

Spread the worms over the top of the bedding. The worms, not liking light, will move down into the bedding. Leave the lid off and a light on overnight so the worms can become accustomed to their new home.



STEP 4

Place your worm bin in a convenient, but somewhat out of the way spot. Some suggestions are the basement, a mud room or under the sink. Red worms do well in temperatures between 50 and 80 degrees so it is okay to place the bin outdoors during New Hampshire's warm months.





STEP 5

A day or two after the worms have been in their bedding begin by burying food wastes that decay relatively quickly (i.e., spaghetti, banana peels), See Section D - "Worms Do Not Live on Bread Alone."



STEP 6

Within four to six months, most of the paper bedding and the food wastes will have been converted into a finished compost product (vermicomposting) which is uniformly dark and soil-like. If you leave the worms in their dirty bedding they will eventually start to die off. Following are two methods commonly used to separate the compost from the worms.

1) Move all of the finished compost to one side of the bin, and then add fresh bedding to the empty side. Begin feeding the worms in the fresh bedding, and within a month most of them will have moved over to the clean side. Now you can remove the finished compost and replace it with fresh bedding.

2) Dump your finished compost into a pile, shaped it like a pyramid, and place a bright light over it. The worms, repelled by light, will move down into the compost leaving the top layer worm-free. You can remove the compost from the top of the pile and repeat the process until you have nothing but worms and a little bit of compost left in your original pile.

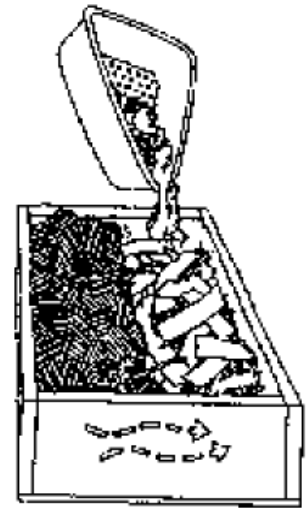


Illustration by Frank Fretz



STEP 7

Your finished compost product is a rich and valuable soil additive known as vermicomposting. It is a mixture of worm castings, organic material and bedding and is high in plant nutrients such as calcium, iron, potassium, sulfur and phosphorus. When added to soil it stimulates plant growth, decreases soil acidity and helps to hold moisture in the soil.

VERMICOMPOST USES!!



Top Dressing Houseplants, Gardens, or Lawns

Sprinkle vermicompost around the base of plants or grass to provide organic matter and additional nutrients.



Ingredient in Potting Mixes

Add 1/3 vermicompost to potting soil when repotting plants indoors or out.



Seeds and Transplants

Sprinkle vermicompost into seed row before planting seeds or place a handful in the bottom of holes dug for transplants.



Fertilize Plant

Place vermicompost in old nylon stocking in a bucket of water for a few days, then use for watering plants.

COMMON VERMICOMPOST QUESTIONS

Will My Worm Bin Smell?

A healthy worm bin should smell like garden soil, so a foul odor coming from the bin indicates that something is wrong. Go through the following check list to prevent or solve odor problems if they arise.



Put plenty of air holes in the bin to ensure the worms have adequate air to breathe.



Bury food wastes completely under the bedding.



Make sure the bin is not too wet.



What about Fruit Flies?

Fruit flies will be attracted to your bin if the food is not completely buried under the bedding. This problem is easily solved and avoided in the future. Some solutions to the problem are:



Stop feeding the worms for about two weeks.



Make the fruit fly trap shown here and place in the bin.



Vacuum fruit flies up when you open the bin.



Fruit fly trap made from a jar and a paper funnel. Bait with cider vinegar or slice of banana.

Will My Worms Crawl out of the Bin?

Generally speaking red worms will be perfectly happy in their bin and not try to escape. If the food waste that the worms are eating is very acidic, they may try to leave the bin. It takes a great deal of oranges, lemons, limes or grapefruit to create this problem so it is easily avoided by also feeding other foods to balance out the citrus.

What Do I Do If My Bedding Seems Too Wet?



Food is 80% moisture, so even though you are not actually adding water to your bin it may appear to be getting wetter over time. If there is pooling in the bottom of the bin or there are several drops of water dripping from the bedding when you squeeze it, the bedding is too wet. Some easy solutions are:



Mix in dry bedding near the bottom

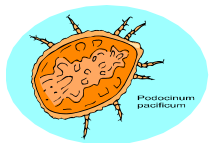
Periodically leave the lid off or ajar until bedding returns to normal dampness.

Remove bottom moisture using a turkey baster.

Dig a trench in the middle of the bin and insert a full roll of paper towel.

What Other Creatures Will Live in My Bin?

You will find other decomposers living and working in your bin. Most of them, in small quantities, are harmless and actually help the red worms do their work. A few common creatures that you may notice are:



MITES -- These are difficult to see due to their size, but look like minute white, gray or brown dots that move slowly. In small numbers they are harmless, but if large quantities are noticed on the bedding and the inside walls of the bin, you should wipe them off and remove large bunches found on food.



ENCHYTRAEIDS -- Known as white worms, or pot worms, they are 1/4 to 1 inch long, white, segmented worms and sometimes are confused with newly hatched baby red worms. They seem to be harmless in the bin and can be left alone.

Can I Use My Red worms for Fishing?

Yes, as long as you have not become too attached to your red worms, they are fine to use as fishing worms. However, they are very small and the fish might prefer other worms.

Can I Have Too Many Worms?

No, red worms will breed quickly and you may notice more and more worms as the months go by. If you don't harvest the worms to give to your friends or for fishing, they will continue to multiply relative to the size of your bin and how much food you feed them.

How Do Worms Reproduce?

Each worm is both male and female, and can produce as well as fertilize eggs. The swollen white band on the worm's body will shed and become an egg (or cocoon). In approximately three weeks, 1-3 baby worms will hatch from this egg.

FOR MORE INFORMATION

This handout is an overview of worm composting which reviews all the major points of this wonderful form of food recycling.

Books:

Worms Eat My Garbage, Mary Appelhof, Flowerfield Enterprises. This is the ultimate worm composting book. A must read if you are serious about composting with worms.

Worms Eat Our Garbage: Classroom Activities for a Better Environment, Mary Appelhof, Mary Frances Fenton, and Barbara Loss Harris.

This curriculum uses over 150 worm-related classroom or home activities to develop problem-solving and critical-thinking skills in children grades 4-8. Activities integrate science, mathematics, language arts, biology, solid waste issues, ecology, and the environment.

Squirmy Wormy Composters, Bobbie Kalman & Janine Schaub, Crabtree Publishing. Some topics covered are: worm bins, how worms eat, setting up a vermicomposter, a school composting project and more.

Recycle With Earthworms: The Red Wiggler Connection
by Shelley C. Grossman, Toby Weitzel & Melissa Weitzel

On-line Resources:

Integrated Waste Management Board, CA

<http://www.ciwmb.ca.gov/Schools/Curriculum/Worms/> - This is a downloadable guide. The guide explores vermicomposting - the practice of using worms to transform food waste into a nutrient-rich finished product called vermicompost. In a school setting, vermicomposting can set the stage for a variety of fun, interdisciplinary activities.

City Farmer - <http://homepage.mac.com/cityfarmer/PhotoAlbum23.html> - This website shows you a step by step process with pictures on how to start vermin composting at your house.

Worms.com - <http://www.worms.com/> - A general website about everything you ever wanted to know about worms and composting.

Mary Appelhof - <http://www.wormwoman.com/acatalog/index.html> - Mary Appelhof's (author of Worms eat my garbage) website about vermicomposting.

Boreal Wormer - <http://members.shaw.ca/borealwormer/> - Another example of indoor vermicomposting in a northern climate. Very good pics of a worm bin in action!

Garden Web Vermicomposting Forum - <http://forums.gardenweb.com/forums/verm/> - Another great place to pick up tips and connect with worm composters in your area.

RESOURCES FOR WORMS & BINS

<p>Redworms For a Green Earth 380 Rollins Road Rollinsford NH 03869 877-660-7125 www.redworms-greenearth.com</p>	<p>Connecticut Valley Worm Farm PO Box 206 Enfield, CT 06083-0206 1-800-317-3576 www.ctvalley.com</p>	<p>Gardener's Supply Co. 128 Intervale Road Burlington, VT 05401-2850 (888) 833-1412 www.gardeners.com</p>
<p>Cape Cod Worm Farm 30 Center Avenue Buzzards Bay, MA 02532-3145 (508) 759-5664 www.capecodwormfarm.com</p>	<p>Flowerfield Enterprises 10332 Shaver Road Kalamazoo, MI 49024-6744 (616) 327-0108 www.wormwoman.com</p>	<p>Wormainea Maine http://www.wormmainea.com/</p>
<p>New York Worms 7 Germaine Street Glen Cove, NY 11542-1732 (516) 759-3538 www.nyworms.com</p>	<p>Beaver River Association RR 1, Box 100 Pawlet, VT 05761 -9701 (800) 325-2109</p>	<p>Worm World 26 Ihnat Lane Avella, PA 15312-2106 (724) 356-2397 www.wormwrld.com</p>

ACKNOWLEDGMENTS

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