

**WORM COMPOSTING**  
**Instructions for Creating a Worm Compost Bin**  
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**INGREDIENTS:**

One 18 gallon opaque storage bins with 2 lids (or 1 lid and 1 tray)  
\*4 “feet”: glass jars, coffee cans, etc.– all the same size, 3-5 inches tall  
4 pounds dry bedding  
3 gallons of water  
crushed eggshells and \*a handful of dirt  
1 pound of worms – “red wigglers,” aka “striped worms” or “tiger worms”  
*Eisenia Fetida* – this variety is best for home composting.

**TOOLS:**

Drill and a bucket, \*handheld rake

**DIRECTONS:**

Use an 18 gallon storage bin with lid. You will also need an extra lid or tray. Any color is okay but not transparent plastic – worms need to be kept in the dark.

In the bin, drill holes (~18) around the sides near the top. These will provide air circulation. Also drill ~ 12 holes in the bottom of the bin to allow for drainage of water produced by worms and decomposing compost. If the bin has a recessed trough in the bottom, drill holes here in the lowest spot for best drainage. Do not drill holes in the lid, worms prefer darkness.

Find 4 equal height containers to put on the extra lid/tray. These will hold the bin up so that the air holes are exposed and also catch some of the liquid that drains out of the compost. Whatever they miss will be caught by the lid/tray – which you might want to line with newspaper. Wide mouth glass jars or plastic coffee containers are good options. Large soup or coffee cans could be used but you will have to watch for rust and occasionally replace them.

You will need approximately 4 pounds of dry bedding. Shredded newspapers, shredded office paper, leaves, shredded cardboard, and peat moss, etc. are all options. AVOID shiny paper, brightly colored paper, and plastic windows from shredded junk mail. I also don't recommend only leaves. I used chopped maple leaves in my home basement bin and the worms seem just as content to eat the leaves as the food I add. My office bin has paper bedding and the worms seem to eat the food first and faster. This might also be because my office is warmer than my basement.

I like to use shredded cardboard/paperboard for bedding – or brown paper bags. Use CLEAN cardboard – toilet paper and paper towel rolls are perfect, or plain corrugated cardboard. Avoid cereal or other boxes with shiny bright colors, etc. I like these unbleached paper options best.

Wet the bedding with approximately 3 gallons of water. You might find it easiest to wet and stir a small amount of bedding in a bucket and add the damp bedding to the bin until all the bedding is in the bin. Shredded paper will take up much less space after you wet it.

Next add crushed eggshells and a handful of garden soil to provide grit for the worms who, like chickens, need it in their gizzard to digest or “chew” their food. Sprinkle this over and through the bedding. Eggshells provide grit and calcium which helps in worm reproduction and it helps prevent the bin from becoming too acidic. DO NOT use slaked or hydrated lime – it will kill your worms.

Finally add 1 pound of worms. You can add them to the top and leave the lid off for awhile to encourage the worms to burrow down into the bedding. Worms will move away from light. Replace lid and let the worms get settled.

The next day – add food. One pound of worms can eat approximately a half pound of food per day or 3.5 pounds per week. Use a small hand rake to pull back the bedding and bury the food. Try to rotate the buried food around the bin as you add it. You can add food daily or 1-2 times per week. If you go on vacation your worms won't starve – they will just eat the bedding instead.

Eventually you will see a grey/brown mud accumulating at the surface – these are worm castings (poop)! You can scoop it out as it develops and add a small amount of bedding often or you can let them really build up and remove worms and start over with new bedding. If you let it go too far, without adding fresh bedding, the worms will start to die from living in their own excrement.

To capture worms, place small piles of compost on sheets of newspaper or plastic. Shine a light on the pile and worms will move to the center to avoid the light. Scoop away the compost and the worms will move deeper. Do this a few times until you have a small pile full of worms.

Another way to change a bin is to push all the compost and castings to one end of the bin. Then add new bedding to the other end. Add all new food into the new bedding and worms will migrate into the new bedding. Then you can remove the compost/castings and pick out any remaining worms.

Watch for egg cocoons. These are small shiny pods that contain 2 or more fertilized worm eggs. You will want to keep these in your bin unless you are adding the castings to the garden where the worms can live free! Adding egg cocoons to potted plants won't hurt the plants but it might not be the best permanent home for the baby worms.

## **FOOD:**

Feed your worms plenty of fruit and vegetable scraps and peels, tea bags (remove metal staples) egg shells, pasta, oatmeal, rice, etc., etc., etc.

Feed in moderation:

Coffee grinds are very acidic – one pot's worth a week could be pushing it. Watch how your worms react and adjust accordingly.

Citrus Rinds: also acidic – feed in moderation

Bread – it will mold quickly and although mold is a perfectly acceptable method of decomposition it might bother you when you next visit the bin.

To reduce mold build up and speed decomposition of any of the foods above – particularly the “feed in moderation” foods, tear/cut/chop into small pieces and bury well.

DO NOT FEED your worms meat, bones, oil, butter, fat, grease, raw eggs, etc. These things will stink up your bin. Some people have had success composting cooked meat but in large outdoor piles. Meat will also attract more pests.

Banana peels should be cut up, otherwise they will take a long time to break down. Avocado, peach, mango and other pits will not hurt the worms but they won't break down either. They might sprout!

Manure is good bedding/food for worms but for outdoor piles. Do Not add cat litter/feces to the worm bin. The ammonia could kill the worms and cat feces can carry a disease particularly dangerous to pregnant women.

## **TEMPERATURE:**

Keep your bin in a relatively warm place, 55-77°F is optimum for eating and reproducing. You can keep your worms in a basement at 50-55°F but they will eat and reproduce more slowly. Do not leave a bin in direct sunlight on a hot day or in a car on a warm sunny day. Hot, dead worms REALLY stink and you will know if you have killed them.

An out of the way spot in the kitchen is best. The double bin design ensures cleanliness. If problems occur you will notice it and correct it sooner. And of course this location makes for a short trip with the compost bucket !

## **TROUBLE SHOOTING:**

If your worms are trying to escape by climbing up the sides and even over the edge – check your bin. Is it too wet? Add dry bedding and stir it in. Is it too dry? Sprinkle on some water. Is it too acidic (too much coffee grinds or citrus)? Sprinkle a SMALL amount of wood ash (a half cup or less) over the top and gently water it in.

Are your worms climbing up the sides and forming clumps of worms on any ledge they can find? They are probably mating. Close the lid, give them some privacy and check back next week for egg cocoons!

Is the bin starting to smell bad? It may be too wet – mix in dry bedding. Or you might be overfeeding your worms. In this case add some bedding (moist bedding if wet is not the problem) and stop feeding the worms until you can dig around and find most of the food is gone. When you resume feeding, try tearing or chopping the scraps into smaller pieces.

Are you getting a lot of water dripping out of the drainage holes? Then your bin is too wet or you are overfeeding. Reduce the amount of food you are adding – particularly wet things like fresh fruits and vegetables, and add dry bedding. This liquid is the result of anaerobic decomposition – meaning the material in the bottom of the bin is too wet and there is not enough oxygen. This is bad for the worms and the liquid may contain phytotoxins that could damage plants if you use it to water them.

Fruit flies? Bury food scraps deeper and keep lid closed. Mites? Some bins will develop a population of mites which you may notice scurrying around the sides of the bin. They should not be a problem. If they bother you – wipe them up with a damp paper towel and dispose of them outdoors or in your covered trash. Other bugs crawling around? They are okay too – they are also decomposers and are just helping your worms eat all that food.

Mice or Moles? A BIG problem – they will eat your worms! Trap and remove them ASAP. Chickens also like worms but probably can't get into the bin as well as mice or moles!

### **USING WORM CASTINGS**

Worm castings are worm excrement. They are rich in micronutrients and trace elements, humates, and microbial life, though worm castings do have macronutrients as well. Castings are perfect for potted houseplants and during transplant into the garden for vegetable crops. Castings have abundant microbial life and natural time release (3 weeks or so).

Earthworm Castings (From <http://special-tworms.com/worm-castings> )  
Nature's Best and Original Organic Plant Food and Soil Conditioner.

As earthworms eat food scrapes, manure and other non-living substances, they excrete tiny pellets called castings. The casting are water-soluble plant food that is easily available to the plant when the plant needs it, both immediately and long-term.

Castings are rich in nitrogen, phosphorus, calcium and potassium. They also balance the pH, help retain moisture, improve drainage and aerate the soil.

And there is more! The casting in your soil adds beneficial bacteria that inhibit pest and pathogens. Your soil is healthier so your plants are healthier.

#### Suggested Uses

Potted Plants: Use 1 part earthworm castings to 3 parts potting soil mix

Vegetables and Annual Flowers: Sprinkle liberally on bottoms and sides of plant holes and seed furrows. Set seeds/plants in place and cover with soil.

Perennials: Work 1/2 cup into soil above the root zone taking care not to damage the shallow roots. Apply in spring, early summer and fall.

Roses, Trees, Shrubs and Berries (New and Freshly Transplanted): Mix 1 part earthworm castings to 3 parts soil. Sprinkle newly dug hole with mixture. Spread roots over a mound of the mix in the hole and cover.

These are guidelines. Use as little or as much as you like. Earthworm castings will not burn plants at any concentration. There is no need to fear overuse or misuse.

### **USING WORM COMPOST**

Worm compost – which includes worm castings and partially decomposed bedding and food scraps and maybe even some worms – can be used in potted plants but is best for use in the garden. You can stir it into your garden soil before you plant in the spring or use it to top-dress the soil around established plants. Or add it to your outdoor compost to get things moving faster.

**RESOURCES:** Some of the information above was provided by these sources:

*Worms Eat My Garbage* by Mary Appelhof

<http://whatcom.wsu.edu/ag/compost/Redwormsedit.htm>

Worm Bin Critter Gallery at <http://www.wormdigest.org/content/view/35/2/>

### **COMMERCIAL SITES:**

<http://www.cathyscomposters.com/>

<http://organicwormfarm.com>

<http://www.redwormcomposting.com/>



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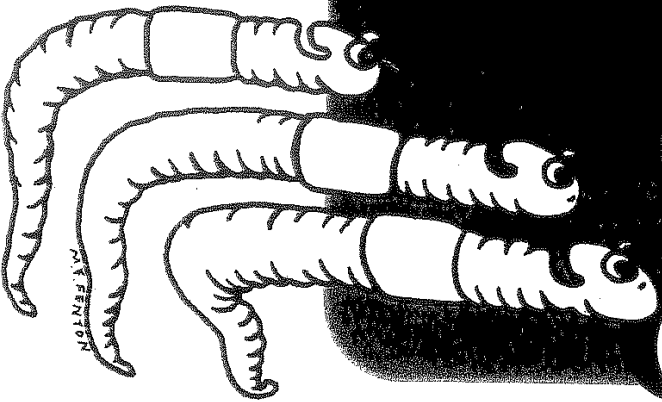


What is the sex life of a worm?



by  
Mary Appelhof

- Recycle kitchen food waste
- Save energy
- Produce fertilizer for house plants and garden
- Grow fishing worms
- Reduce waste disposal cost

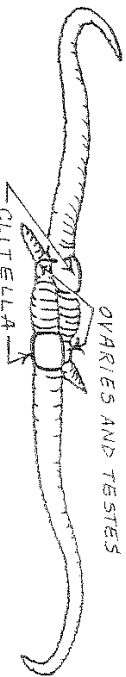


## EARTHWORM MATING AND COCCON FORMATION

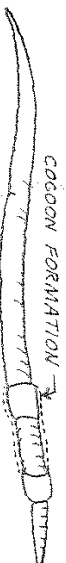
EACH WORM HAS BOTH OVARIES AND TESTES.



TWO WORMS JOIN BY MUCUS FROM THEIR CLITELLA. SPERM THEN PASS FROM EACH WORM TO THE SPERM STORAGE SACS IN THE OTHER WORM.



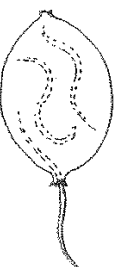
LATER, A COCCON FORMS ON THE CLITELLUM OF EACH WORM. THE WORM BACKS OUT OF THE HARDENING COCCON.



EGGS AND SPERM ARE DEPOSITED IN THE COCCON AS IT PASSES OVER OPENINGS FROM OVARIES AND SPERM STORAGE SACS.



AFTER BEING RELEASED FROM THE WORM, THE COCCON CLOSES AT BOTH ENDS. EGG FERTILIZATION TAKES PLACE IN THE COCCON.



TWO OR MORE BABY WORMS HATCH FROM ONE END OF THE COCCON.

# Anatomy

