

# A How-To Guide for Do-It-Yourself Worm Bins

*By Bethany Wright, Solid Waste/Recycling Specialist  
at the Oregon Association of Water Utilities*

Reproduced by permission of OAWU © 2007



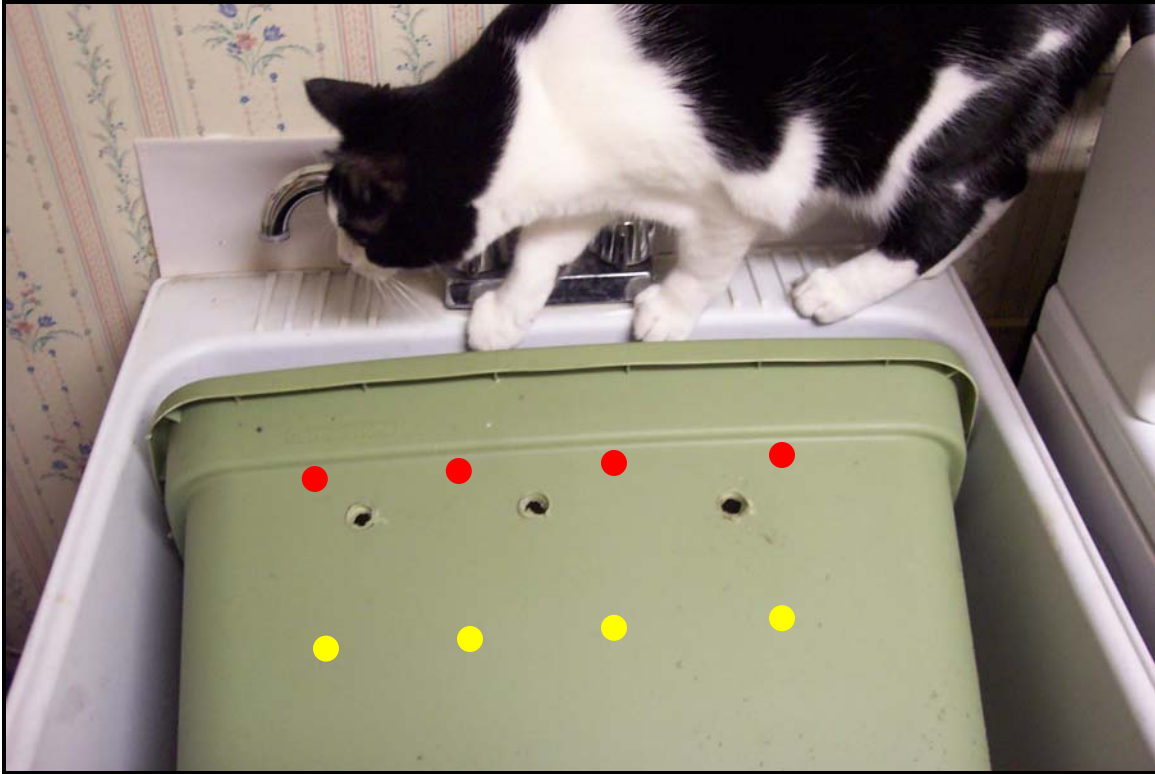
## **Worm bin placement:**

This is a picture of the worm bin I have at my house. I just keep it in the laundry room. It is important to keep the worms at 50° or above, and not to let them get over about 85°. The temperature in the ground is almost constant, and never gets below about 55° (except for the very top layers, which can freeze). Worms do not have a way to regulate their body temperature, so you must keep them in a stable environment. They are most active when kept between 60° and 75 ° F.

You can put your worm bin outside in temperate weather, or if it is well insulated with straw bales or Styrofoam. But for most people, it is easiest to keep them inside.

### **Worm bin size:**

They can be any size. This one is 12” high by 18” long by 12” deep. I needs to be at least 10” high, but the other dimensions can be whatever suits you best. Worms need at least 4” or 5” of material to bury in, and air space, so you need at least a 10” high container.



### **Worm Bin Needs**

**The bin needs to be solid** enough to hold the worms in, so plastic or wood is a good choice. Mesh screening would not work, and you cannot put holes into glass. Wood will eventually rot but plastic lasts very well. Also, the bin must be light-proof. The ultraviolet rays in sunlight will kill worms, so they must be kept in the dark.

**They need an air supply.** Please note the three holes in the bin in the picture above. Also, the holes on one side should be about 5” or 6” inches lower than the holes on the other side. This allows warm air to rise and escape out the high holes while cool air flows in the lower holes, keeping the worm bin at an optimum temperature.

If I had it to do over, I would put these three holes even higher up, just under the little lip where the main body of the bin starts. (See red dots.) I would also put in four or even five holes. I would put the holes on the other side lower than I did last time also, about where the yellow dots are on the picture above. (See yellow dots.) If you are concerned with flies, glue some fine mesh screen over each hole to keep them out.

**Worm bins also need drainage.** I put six holes in the bottom of mine, but I suggest putting in more like 10 or 12 for a worm bin of 18" x 12". I put in small holes, much smaller than the air holes, because I did not want the worms to fall through.

Not being very experienced with power tools, I made this bin with an ice pick heated over the stove, melting the plastic to make the holes. For the air holes, I inserted the ice pick and rotated it to make the hole bigger. In the picture above, you can see how the holes are thicker around the edges, because the hot ice pick moved the melted plastic to the edges. In contrast, the drainage holes on the bottom were just made by piercing the bottom with the hot ice pick. The drainage holes are small. If you are handy with a drill you could select a bit of the proper size to make the different holes.

**Worm bins need a bottom to catch the falling liquid.** Please notice in the top picture that you can use two bins stacked on top of each other to accomplish this. The bottom bin does not have any holes. I found it useful to put some pieces of Styrofoam block in the bottom to lift up the upper bin to ensure good airflow. Please see the picture below.



Please note: it is not absolutely necessary to put in drainage holes and use a second catch bin. You can just put in air holes and leave the bottom intact. However, in my experience I have found a worm bin with drain holes keeps the worm compost from getting too soggy much better than a bin with a solid bottom.

The liquid that drains out of the worm bin is very high in nutrients. It is sometimes called "worm tea". You can pour it off and dilute it 1:3 with water and put it on your plants. It is rich in nitrogen, phosphate, calcium and magnesium.

## **Worm Compost Needs**

The bulk of the material in your worm bin is called bedding. In nature, red worms live in the upper layers of the soil where there is a large percentage of organic matter such as dead leaves and pieces of grass. In your bin, the bulk of the bedding will be some woody organic material.

**Newspaper:** Newspaper is the easiest bedding to find. Simply rip up some newspapers by hand or run them through a paper shredder. Use the regular plain newspaper, not the glossy advertisements. Many newspapers use a black ink made of soy oil and black carbon color, so the ink is safe for worms. However, the colored ink can have heavy metals in it which are not good for worms. For this reason it is best to use black and white newspaper only, or pages that only have a little bit of color. As more newspapers move to color printing, black and white pages are harder to find. I have found the classified section of the *Statesman Journal* often has plain black and white pages, and the *Wall Street Journal* is a good source of black and white printing.

If you use newspaper, rip it into 1 or 2 inch wide strips. Newspaper rips easily by hand from top to bottom. To keep the layers of paper from sticking together, separate the strips once you have ripped them, and loosely crumple them up. This creates air pockets for the worms. In paper shredder, shred one or two pages at a time for best results.

**Coconut fiber:** Coconut fiber, or coir, can also be used. You can buy compressed blocks of the fiber at any garden store. It absorbs water very well and is very good for maintaining moisture in your worm bin. Mary Appelhof, the foremost worm composting specialist, recommends using bedding that is no more than 1/3 to 1/2 coconut fiber.

**Wood chips:** You can also mix in wood chips. They are good because they help create air spaces. Just be sure to use raw wood, not painted or arsenic-treated wood chips. Also, hardwoods like cherry or alder or oak are better than pine or fir, which are more acidic. I did not have any wood chips, but I put in three small sticks for air pockets in my worm bin.

**Dirt:** You need to mix in some dirt. You can add it by the handful or the shovelful. Dirt has lots of good bacteria for your worm bin. The dirt also provides grit for the worms. They don't have teeth, but they swallow dirt and the little particles of rock grind against the food in a special part of the digestive tract called the gizzard. You can also add in a handful or two of sand for grit, if you wish.

**Calcium:** Worms need a source of calcium. Eggshells are easy for most people to use. However, eggs often have salmonella bacteria on them, which can infect your worms, so I recommend sterilizing them before you add them to your bin. Rinse the eggshells out and place them on a cookie sheet. Bake them in the oven at 350° for 10-15 minutes. When they are cool, crush them and add them to your worm bin. You can also add powdered limestone (calcium carbonate - CaCO<sub>3</sub>). Feed stores sometimes sell powdered limestone.

*(Note: powdered limestone is NOT the same thing as "lime". Lime has a very high pH and it will kill your worms if you add it to your bin.)*

**Assemble the bedding:** To assemble your worm bin bedding, mix together the newspaper, dirt, and whatever else you are using. Fill the bin about 80% full. If you are using just newspaper, fill it close to the top. (It should be very fluffy.) If you are using coconut fiber, soak it in water first before mixing it in.

Once it is mixed you need to wet it. Worms do not have lungs - they absorb oxygen through their skin. But they cannot absorb oxygen unless their skin is moist. **They must be in a moist environment at all times.** Add water to your worm bin. Pour water over the bedding until it is dripping wet. The rule of thumb is three times the weight of water to the weight of your bedding. That is about 6 cups of water per pound of bedding. If you don't know how much your bedding weighs, its OK. Just keep adding water until it is all wet. If you are using coir, just add water to the weight of the dry bedding. The presoaked coir is already wet.

I recommend letting the bin sit a day or two before adding in worms. This lets little dry pockets absorb water and excess water to drip out of the bottom. It also allows bacteria from the dirt to start multiplying. It also allows the bin to come to stable temperature. To make a really good home for your worms, add in some fruit scraps to the bedding to start growing them a food supply before their arrival.

## **What To Feed Your Worms**

**What to feed them:** Worms need food to eat as well as a place to live. As they move through the contents of the bin they swallow some of the bedding material. They digest the bacteria and fungi that are growing on the material they swallow, and also get some nutrition from tiny pieces of organic matter. They have bacteria in their guts that further decompose the woody material, so their worm droppings (or “worm castings”, as they are often called) are rich in organic matter and nutrients.

Worms favorite foods are fruits, particularly melons. Since they don't have teeth, they can only “suck” up juice and little bits of soft particles. If you have some juice left over on a plate from cutting melons, pour that into your bin. The worms will love it!

(As a side note, using melons as bait is one way to attract outside worms for collection. Put some pieces of watermelon or cantaloupe outside on the ground, especially the round end piece, out in a place that has lots of decaying vegetation like leaves around. Come back in three days and lift up the melon. You will very likely find some red worms under there. Harvest them every day for a week, and then put new melons out in a different place.)

As for what to feed your worms, any fruit or vegetable scraps will work. Small amounts of bread are fine, but bread is more attractive to pests like flies than fruits and vegetables. It is not advisable to add in meat or cheese or grease. They will decompose, but they take

longer and are very attractive to pests. Also, it is best not to add in large amounts of citrus peelings or tomato scraps or grape pulp. These wastes are acidic and can change the pH of the bin enough so that the good bacteria cannot live there anymore. Add acidic scraps only in small doses.

**How much to feed them:** “Red Wiggler” *Eisenia fetida* worms will eat about ½ of their weight in food each day. So theoretically, if you had a pound of worms, you could add in ½ pound of food scraps each day. In practice, I have not found this to be important. If you add in extra food, it’s just extra. It will make your worm compost bin a little more compost-like and little less soil-like, but worms LOVE to live in compost bins. Bacteria and fungi will break down the extra food, and water will soak into the bedding, so even extra food will be gone in a week or two. However, if you add extra food every day, soon the bin will be full to the top. But aside from watching to make sure you don’t overload the bin, the amount of food you feed the worms is not important. You can even feed them just once a week, if you wish.

**How to add scraps to the bin:** bury the food scraps under a layer of bedding. It is easiest to dig hole/lift up a layer, add in the food, and then cover the food up. This allows bacteria and worms to quickly start breaking down the food, it reduces the odors of decomposing fruit, and it reduces the attraction of pests like flies.

If you want, you can use this method to conduct a “worm taste test”. Bury three or four different kinds of food in the different areas of the worm bin. Come back in two days, and see which food has the most worms gathered around it. The general rule is that worms love anything juicy and sweet. Try it and see for yourself.



*This picture shows a mass of red worms gathered to feast on pear scraps.  
The other parts of the bedding have very few worms.*

While you have the bin open, check to make sure the bedding is moist. If it is too dry, add some water. You want the top of the bedding to be moist, and the bottom will probably be almost soggy. If you are unsure, add some water. Too wet is always better than too dry.



*This is a picture of worm bin that is ready to harvest. Please note how the bedding has decreased over time. The bin is more than half empty, there is very little newspaper left, and there are quite a lot of brown worm castings.*

### **Harvesting worms or worm castings**

After several weeks, you may notice that the amount of bedding has greatly decreased, and the amount of little brown worm castings has greatly increased. This is a good time to separate the worms from the casting. There are two main good ways to do this. (Note: sorting them by hand is NOT a good option. I tried this last year, and the several hours I spent hunched over the worm bin on the porch last summer quickly showed me the error of my ways. )

One option is to let their food supply run low. Do not feed them for at least a week. Then put a juicy piece of fruit on one end of the bin. A day or two later, most of the worms should have migrated over toward the fruit. Remove the half of the bedding on the other of the bin, away from the fruit. What you take out will be almost all bedding and castings, and will have very few worms in. You can then spread the remaining contents of the bin out, and do this again. Doing it twice will allow you to remove approximately 75% of the bedding and castings, while leaving the majority of the worms in the bin.

Once you have them separated, you can either put the bedding in your garden (where any stray worms will do the soil good), or you can take the worms out of your bin to give away, sell, or use as bait. (It all depends on the purpose of your worm bin.)

If you wish to take the worms out rather than leave the worms in, put the removed bedding and castings back into the worm bin, add some fresh bedding, and start adding food again. The few remaining worms will multiply and in a few months you will have replenished your worm population.

The other good method is to sort them outside on a tarp. First, take the lid off your worm bin. All of the worms will burrow down to escape the light. Wait a few minutes. Then scrape off the top layer. This will be mostly worm free. Then, place the remaining contents of the bin onto a plastic tarp. Kind of pile the contents in a heap. Wait a few minutes for the worms to burrow down again, then remove the top layer of bedding and castings. Keep repeating this cycle until you have driven most of the worms into the center of the pile, and removed much of the castings and bedding. Once you have separated them, you can use the castings and worms as you wish.



This document was prepared by the Oregon Association of Water Utilities. It has been reproduced here with permission, all rights reserved. © 2007 You may contact OAWU on their website at [www.oawu.net](http://www.oawu.net)