Let’s Build an Indoor Worm Bin!

or making black gold from garbage

February 13, 2018

Why worms?

Worms are a logical solution to a wide range of problems. They have been efficiently converting organic residues to a usable form for 300 million years(they've had some practice!)

- ✓ Running a garbage disposal takes more water, treatment plants use more chemicals, and creates more sludge.
- ✓ Organic waste in landfills take up space(7-8% is food waste) and creates methane gas.
- ✓ Incineration reduces volume but carries other risks.

All of these methods of disposing of organic waste are expensive, use lots of energy and resources, and don't use the resources that waste can offer. Thank goodness we have worms!

Barry Commoner – The Closing Circle

- Everything is connected to everything else
- Everything must go somewhere
- Nature knows best
- There is no such thing as a free lunch

The First Step—Food!

What to feed:

Worms will eat pretty much anything except heavy fats and greases. When food recommendations are made, they serve as a guideline. Consideration is also given to other factors such as pests, odors, and the overall PH of the bin environment. The following list will give you an idea of the variety of items that worms can be fed…

-*Apples and peels* -Banana peels -*Baked Beans* -Biscuits -*Cabbage* -Cake -*Celery* -Cereal -*Cheese* -Corn bread -*Cream cheese* -Cream of Wheat -*Cucumber* -Deviled eggs -*Egg shells* -Farina -*Citrus peels* -Grits -Lettuce -*Molasses* -Oatmeal -*Onion peel* -Pancakes -*Pears* -Pineapple and rind -*Pizza crust* -Potatoes -*Coffee grinds(and filter)* -Tea

…and the list goes on!

We like to recommend a vegetarian diet.

Some foods can cause problems:

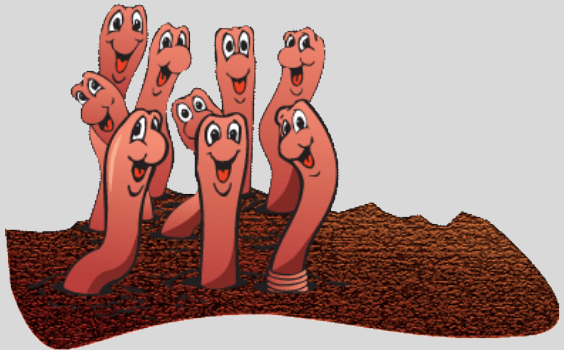
- *Meat and bones*: While meat will be broken down by worms, and offers nitrogen, potassium, and phosphorus, it can create offensive odors and attract flies, ants and rodents. Bones can be a nuisance once the castings are harvested.
- *Excessive citrus, onion, and garlic*: While small amounts are fine, too much of these items are not recommended. Experiment with how much your bin can handle without adverse effect.
- *Pet feces*: Pet feces and especially cat poo and urine are not recommended.
- *Non-organic material and chemicals*: Take a few moments to remove stickers, ties, rubber bands and any other non-organic items from your waste before adding to the bin.

How much waste do I have?

It's a good idea to measure how much waste your household will generate before putting your bin together.

Plan on one square foot of surface for each pound of garbage per week

You can construct your box from lumber to your specifications, utilize plastic bins or totes, or purchase commercially produced set-ups. Our examples will utilize plastic bins and totes.



The Second Step—Worm Bin!

Once you have determined how much waste you will generate, it is time to determine your bin size and location.

- Size constraints within your home
  - Where will the bin be housed?
    - Kitchen is handy, but is there room? How is the temperature?
    - Patio is an option, will you be able to manage temperature extremes?
    - Basement is usually cool and damp, but how accessible is it?
  - Will you choose to have more than one?
    - Two or more smaller bins may be easier to handle than one large one.
- Managing temperature
  - The bin can withstand a range of temperatures, but worms will convert waste best at 59-77 degrees F.
    - Outdoor bins may require insulation and/or supplemental heat during winter.
    - Outdoor bins may need to be brought indoors during extreme heat in summer.

- Managing air flow – the worm bin is an aerobic environment
  - Ensure adequate oxygen can enter the bin.
    - Drill holes in your plastic bin for air to get in.
    - Ensure bedding is loose and allows for air movement.
- Managing moisture – worms need moisture to breathe
  - Check your bin for too dry or too wet conditions
    - Ensure there are drainage holes in the bottom of the bin for excess water to escape. Liquid draining from the bin may be used as a liquid fertilizer.
    - If the bedding or castings seem dry, add water. You can also soak leaves or paper and add to the bin for additional moisture. Your food waste is a good source of added moisture also.
- Managing acidity – the final component of a healthy bin
  - Worms will tolerate pH in the range of pH5(a bit acid) to pH9(somewhat alkaline). pH7 is neutral.
  - The slightly more acid is preferable

Red wrigglers are happy to be in the bin environment! Your best clue that there is an issue is when worms try to escape.

Bin assembly – at last!!

- Bedding
  - Leaves or newspaper work well, and are generally plentiful and free or cheap. Other carbon based bedding such as wood chips, sawdust, peat moss, shredded cardboard, and some manures work well also. For best results, shred newspaper and mulch leaves.
  - Thoroughly wet the bedding before adding to the bin. Bedding moisture should be a 3:1 ratio.
- Soil
  - For a newly started bin, a few handfuls of soil introduce other helpful micro-organisms and “grit” into the bin.
- Pulverized eggshells
  - Also provide grit in the bin as well as calcium carbonate, which is beneficial to the worm’s reproductive health. Eggshells also help prevent the bin from becoming too acidic.
- Worms – the stars of the show!
  - After mixing all of the previous ingredients and adding to the bin, add the worms to the top. They will move to the bottom and start turning your waste into castings!
- Food waste
  - Add some waste as described. Chopped waste, and partially decomposed waste will provide food for the worms immediately. There should be a 2:1 ratio of worms to food.

Other critters in the bin….

Good bugs or bad bugs?

- white worms
- springtails
- isopods (sowbugs, pill bugs, woodlice, slaters)
- centipedes
- millipedes
- flatworms
- mites

The Final Step—Harvest!

Depending on the amount of worms, waste, and bedding you have added to your bin, you will be able to harvest castings within two to four months. This can be achieved by:

- Dump and sort method—dump the entire bin and use a bright light to force the worms to seek the center of mounds of castings.
- Self sort method—when the bedding mix has depleted in the bin, make another fresh batch of bedding. Push bin castings completely to one side of the bin. Place the new bedding on the empty side and place food waste only on the new side. In a few months, the worms will be completely on the "new" side, and you can pull out the original castings. This will now be your new, new side!
- Some commercially produced systems have a mesh bottom which allow you to harvest from the bottom of the bin.

How do I use vermicompost(mix of castings and bedding)?

- Seed beds
  - Won't burn plants like some commercial fertilizers can.
  - Stretch your supply by placing vermicompost only in the trench where you bury the seeds. This way, the seeds can utilize the nutrients when they germinate and in early stages of development.
- Transplants
  - Place in the holes where you will plant transplant seedlings.
- Top dressing
  - Nutrient boost for established plants.

What about castings (pure castings)?

- Potting mixes
  - Create a potting mix of equal parts castings, peat moss, perlite, and sand or garden soil.
- Top dressing or turn into your garden soil.

Outdoor System

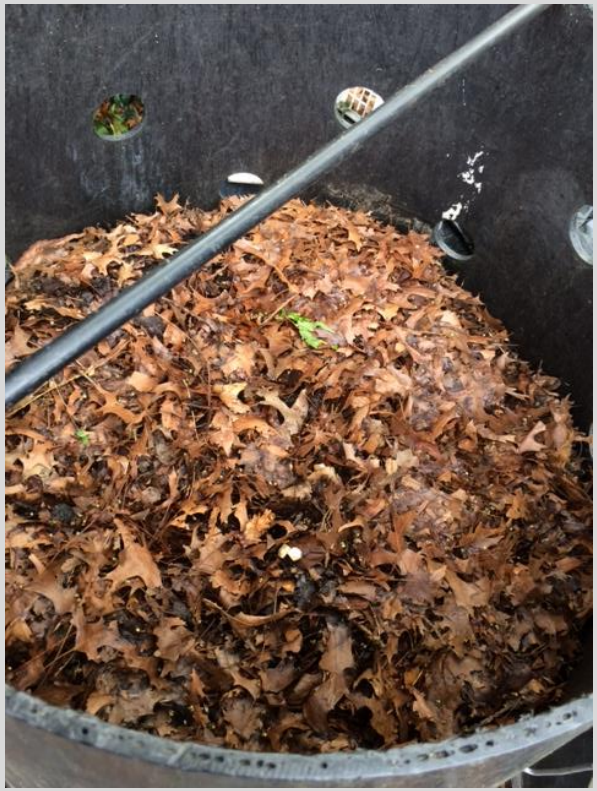
The outdoor system works much like the indoor system and a full cycle takes about nine months.

- Select a shady spot(about 60%) and ensure an adequate supply of leaves. Water should be readily available as well.
- Barrel one has the most holes. Add carbon(we like mulched leaves, but shredded paper or cardboard or other bedding materials will work as well) and nitrogen(food waste) in equal amounts. Add worms from your indoor bin.
- Always add the food waste first, then the bedding. This will help prevent the bin from attracting critters.

- Barrel two has fewer holes. When Barrel one is full(about 3mos), lift the barrel off of the compost and shovel or pitch the contents into Barrel two. Do not add worms or food to this barrel. Add water to keep moist. Aerate occasionally.
- Barrel three has the least amount of holes. When Barrel one is full for the second time, lift the Barrels one and two off of their respective contents. Shovel or pitch the contents of Barrel two into Barrel three and Barrel one into Barrel two. Aerate Barrel three occasionally. It should stay moist due to less air.
- By the time Barrel one is full for the third time, Barrel three has become finished vermicompost.

Barrel two w/water supply

Barrel two contents



Barrel three

Barrel three contents

- Ground contact allows access to other worms and beneficial micro-organisms
- This system can easily be adapted to your food waste amounts and available space.
- Select containers with a cone shape, they are easier to lift off. Darker containers that don't allow light in are recommended.
- Monitor temperature in Barrel one, maintain the 59 – 77 range if possible.

Tools recommended for outdoor worm composting:

-Thermometer

-Aerator

-Shovel and/or Pitchfork

-Hose and timer for adding water to barrel two – drip irrigation is an easy, low pressure option that will require minimal effort once set up.

-pH Meter

-Moisture Meter

Most readily available online at various sources. Try to purchase these items specific to vermicomposting or read specifications carefully to ensure you are getting what you want.

Resources:

- Worms Eat My Garbage: How to Set Up and Maintain a Worm Composting System, 2nd Edition [Paperback]

  by Mary Appelhof , Mary Frances Fenton

- John Christy, 827 Hobson St. WW 99362

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