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VERMICOMPOSTING & EARTHWORMS

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Vermicomposting and Earthworms

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Earthworms are a crucial component of the soil food web—the symbiotic network of organisms responsible for soil health and subsequently the health of plants.7 Integrating vermicomposting (composting using earthworms) into a home garden is one of the easiest ways to harness these natural processes to create nutrient-rich soil, helping you grow a beautiful bounty!

The Earthworm

"Earthworm" generally refers to a wide cast of species that perform different functions within the soil food web. They can be found all over the world, except in areas of extreme cold or lacking in vegetation.

The most useful species for vermicomposting in the garden is one particular species—*Eisenia fetida*, the Red Wiggler Worm.6 These worms live in the shallow zone of the soil and break down organic matter that lies on the surface, distinct from other earthworm species which live below the surface and feed on organic matter at a lower depth.2,6 This makes Red Wigglers much better composters in a bin system because they'll eat up all the food scraps at the top of the soil and won't spend time trying to burrow out of the bottom of the bin. Red Wigglers are also special because they reproduce more quickly than other earthworms; in other words they're ideally suited to build a huge colony whose sole purpose is to compost your food waste! To set up your vermicomposting bin, go for the gold and get Red Wigglers, not just any old earthworm.

Why to Keep a Worm Bin

Vermicomposting is a simple and sustainable way to generate rich soil for your vegetable garden with minimal effort. It's amazing to watch these creatures turn normal household waste into organic fertilizer! Using vermicompost to give your garden nutrients can help your plants grow bigger and healthier4 and sending your food scraps to hungry worms helps reduce landfill waste.

How to Set Up a Worm Bin

Setting up a worm bin can be simple and cheap. Follow this example of a small habitat to see how to establish a healthy colony.

1. **Make your bin**. Take a ten-gallon Rubbermaid bin and drill holes in the lid and parallel to the top edge of the box.
2. **Start with just under a pound of worms.** There are many vendors locally and online where you can get more than enough worms to get started. You can easily purchase your worms online,or they can sometimes be found at your local garden store.
3. **Fill your bin with bedding**. Shred some newspaper and lay it at the bottom of the bin to provide a soft bedding for the worms. You'll need about three pounds of newspaper per cubic foot of bin space. Your Rubbermaid container is about two cubic feet.
4. **Add some water**. Mist the paper with some water to moisten it—damp but not soggy.
5. **You're all done!** Finish up by adding your worms.

How to Keep Your Worms Happy

Red Wiggler Worms need just a few things to stay happy and produce vast quantities of organic fertilizer. Their controlled habitat can be just about anything that will pen them in and allow for some temperature control and application of food and water.

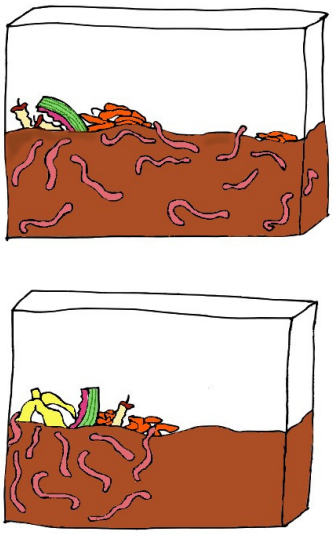
- They need an environment that is moist and temperate (between 40° and 85° F). If the bin is outdoors, make sure it is placed in a shady spot and is covered by a lid and/or old blanket/sheet.
- Regularly check how moist the soil is. If it's dry, give your worms some water with a watering can or just from a cup! The soil should feel moist (think used coffee grounds), but not wet.
- If you've started out with one pound of worms, they should be able to process about one half of a pound of food per day—the rule of thumb is 2:1 worm-to-food ratio by weight.
- Worms are not all that picky about what they eat. Most waste that you produce in your kitchen can end up in the worm bin. The only exceptions are meat, oils, dairy, and citrus.
- Scaling up your worm colony simply requires a bigger box. It's possible to repurpose furniture and other household items into worm bins. Old boxes, storage units, and even bathtubs can all be used for successful worm bins!
- If your bin has an open bottom, keep it clear of thirsty, nutrient hungry trees. A mesquite tree will find the moist, rich soil of your worm bin and turn the bin into a messy tangle of roots.

Harvesting and Using Compost

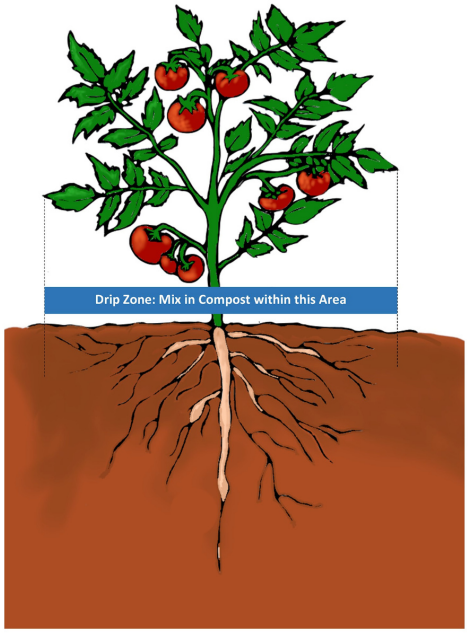
After a few weeks, you'll start to see small blackish clusters of what looks like muddy soil. These are the excretions of the worms—castings.

Once you have a reasonable quantity of these castings, you can harvest and apply them to your garden. When harvesting the castings, you'll want to ensure that you don't remove too many worms from the colony so that it can continue to expand. This can either be done by hand on a plastic sheet, manually separating the worms from the castings, or by beginning to add any new food to one half of the bin. In this method, the worms will migrate to the area of the bin rich in food, leaving the other half of the bin full of worm-free, ready-to-harvest castings.

These castings are garden gold. Earthworms' digestive enzymes cause nutrients that would not have been otherwise bioavailable to become usable by plants.4 They are incredibly rich in nitrogen, phosphorous, and potassium, and add organic matter to the soil.6,7 Apply them to your garden by top-dressing mature plants around the root zone (also called the drip zone, think the diameter around the plant that water would drip onto from water poured over the leaves5) and lightly till/mix



the castings in to a depth of about two inches. The nutrient-dense castings can burn the roots of delicate plant starts, but unlike commercial fertilizers is unlikely to damage mature plants. A little goes a long way with vermicompost, but it can't really be overused with mature plants; start with a sprinkle or mix in a hefty amount.



Tips on Keeping Your Worm Bin Pest Free

- T**ry not to overfeed the worms**, as this can result in a stinky, moldy bin. If the worms have the appropriate quantity of food, they will process it quickly enough that it won't putrefy on its own.
- **Cover food scraps** with dirt and moist paper to prevent flies from being attracted to the bin.
- **Freeze your food scraps** before adding them to your worm bin to slow them from breaking down before the worms do.

Involving Your Kids (STEM at Home)

Kids LOVE to play with worms and can be easily involved in the simple steps of taking care of your worm bin. Taking care of the worms and using vermicompost is also a great way to bring science into their home lives. To involve a STEM aspect, have your kids start by asking questions and figuring out what data they'd need to collect to find the answers, then start taking and recording your measurements! For example, your kiddos could investigate:

- Do your worms have a favorite or least favorite food?
- How many days does it take for your worms to eat all of their food scraps?
- How does the temperature of the worm bin change based on where in your home/yard it is placed?
- How much water does your worm bin need and what is the best way of watering your worms?
- Do your plants grow taller if they get nourished with compost from your worms?
- Does the level of compost in your bin change every day?

Your worm bin can also help bring math into everyday life. Younger kids can simply practice counting or count the number of worms they can fit in their hand (be careful not to squish any!). Older kids can practice calculating the volume of your worm bin or even try their hand at investigating the number of worms in the bin by sampling dirt selections, counting the number of worms, and extending that to the larger volume.

Time to Get Started!

Whether you start small or go big, creating your own worm bin is a fun, engaging, and eco-friendly activity! Divert those food scraps from the landfill, give your plants a nutritious gift, and enjoy the curiosity and wonder that come along with caring for your worms.

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