IDAHO GREEN THUMB HOW-TO'S

University of Idaho Extension BUL 982
www.uidaho.edu/extension/landscapes

Vermicomposting at Home

at a glance

- Composting with worms converts organic materials into a beneficial soil amendment and fertilizer.
- Red wiggler worm (Eisenia fetida) is the most effective worm for vermicomposting.
- Vermicomposting bins can be inexpensively built or assembled at home.
- Fruit and vegetable scraps, coffee grounds, and tea bags can be used as a food source.
- Worm composting requires little space, labor, or maintenance and can be conducted indoors year-round.
- Vermicomposting helps to reduce the amount of garbage collected from your home.

Authors

Nicasio Usabel, Extension Educator, University of Idaho, Canyon County

Bradley Stokes, Extension Educator, University of Idaho, Canyon County

University of Idaho Extension

Introduction

VERMICOMPOSTING (composting with worms) is com-pleted by using red wiggler worms (*Eisenia fetida*). Vermi-composting recycles organic food waste into nutrient-dense vermicast or worm castings to be used as soil amendments (materials that improve soil quality) or growth media for plants. Vermicomposting allows for composting in a limited space, with minimal financial input and little effort. This publication shows you how to construct your own system.

Location

Worms thrive in temperatures between 55°F and 77°F, which allows you to use them in compost stored indoors or outdoors. They will not, however, overwinter in the outdoors. Indeed, if placing your bin outdoors, always consider the environmental conditions, including sunlight, aspect (the geographical direction it faces), temperature, precipitation, and wind. Too, the presence of rodents requires additional considerations: bin design alterations and performance evaluations, followed by upkeep of the bin, as necessary. In general, a well-tended worm bin is odorless and can be kept in a variety of places—under a kitchen sink or in a pantry, utility room, basement, spare room, or garage.

Materials

Manufactured worm bins are available for purchase at select garden centers or online. But you can also construct one. One of the most common vermicomposting bins consists of plastic storage totes with lids, spacers placed between the bins, worms, biodegradable bedding, and organic food scraps. Optional items include a drain valve to remove leachate (liquid residue) and four 1-inch screened vents.

Plastic totes should be opaque, stackable, have a lid, and allow no more than 12 inches of bedding to help maintain healthy aerobic conditions. Length and width can vary to accommodate space or the volume of food waste produced in a household. As a rule, 1 cubic foot of bin space and 1 pound of food waste per week will maintain 1 pound of worms.

Spacers can be made from a variety of materials, including cement bricks, PVC pipe, or 2" × 4" lumber. It should create space that is deep enough to allow for the draining and storing of leachate into the lower bin while providing enough support for the upper compost bin.

These materials can be found at local garden centers or hardware stores.

Red wiggler worms are the most effective for vermicomposting, so purchase the desired amount of them to maintain bin size (approximately 1,000 worms equal 1 pound). You can purchase them online, from other vermicomposting enthusiasts, or at select garden centers or pet stores.

For biodegradable bedding, choose fluffy materials that will allow for air circulation; also make sure they are nontoxic and absorb moisture. Appropriate materials include shredded newspaper or recycled office paper, small pieces of corrugated cardboard, coir (coconut husk fiber), or decaying leaves. If using leaves, springtails or other small insects are harmless creatures that will likely inhabit the bin. It is beneficial to set two types of bedding in the bin, but avoid glossy paper; also, avoid using only crosscut or microcut shredded paper.

Organic food products to use include nonmeaty foods such as fruit and vegetable scraps, tea bags, coffee grounds and filters, crushed eggshells, dryer lint of natural fibers, small amounts of plain cereal, bread, and pasta. Chop these into ½–1-inch pieces to increase the rate of breakdown. Never add meat, poultry, or fish; oils or other fats; dairy products; highly acidic or spicy foods, including citrus, garlic, or onions; green grass clippings; or animal feces.

Constructing the Bin

There are many structural design systems, but this publication focuses on a two-plastic, 10-gallon tote system (Figure 1). It's easier to build and less expensive. Because the lower tote collects leachate from the upper bin (where the composting occurs), set the spacers into the bottom tote first. This will keep the upper bin from sticking to the bottom one's walls, thus allowing for easy lifting and removal (Figure 2). Add a drain valve to the lower tote. This will allow the leachate to empty out, making the upper bin's removal unnecessary.

Figure 1. A vermicomposting bin constructed from two 10-gallon plastic totes with fitted screen vents (approximate volume, 2 cubic feet).

Figure 2. Two spacers set inside the bottom tote prevent the totes from sticking together.

In the composting bin (upper tote) drill up to 20 ¼-inch holes in the bottom to allow for drainage (Figure 3). To maintain ventilation, drill up to 10 ¼-inch holes on the sides, 3 inches below the lip of the tote. If using a 1-inch screened vent, drill two 1-inch holes on the sides along the top edge of the tote where you will place the vents (Figure 4).

Figure 3. Twenty ¼-inch drainage holes drilled in the lowest form mold on the upper tote.

Figure 4. Fitted screen vents in predrilled holes.

Preparing for Worms

The bedding in the bottom of the worm bin should measure about 4–6 inches deep. Prepare the bedding by soaking it in a bucket of water for at least 10 minutes. Once time has elapsed, wring out the excess water so that the material is very damp (like a wrung-out sponge). Fluff it as you add it to the bottom of the bin until it achieves the desired depth. Sprinkle coffee grounds or finely crushed eggshells on top for grit. Then place the worms on top of the bedding.

Several methods introduce worms to their new environment. One is to add worms to the fresh bedding and give them two days to acclimate before feeding them. Another is to add kitchen scraps to the fresh bedding, allowing for a few days of decomposition prior to adding the worms. A third technique is to introduce the worms and food scraps at the same time.

Regardless of the method used, check the worms daily for three weeks to observe how they are feeding. Spritz them with water if the bedding starts to get dry. **Always** keep a 2-inch layer of new bedding over the worms and food in your bin.

Feeding the Worms

Feed the worms gradually at first, introducing ¼–½ pound of food scraps per pound of worms per week until the worms adjust to their new environment. There are two common ways to do this. First, add food scraps in a thin layer on top of the bedding before placing additional bedding on top. The worms will move upward toward the new food by creating burrows, which help to circulate oxygen. Second, pull aside the bedding to make space for the food scraps, then cover them with the bedding (select a different spot each time you add food). Observe the

process closely to ensure that the worms are eating the food you've added. If the food has been untouched for 2–3 weeks, wait up to two weeks before feeding them again.

Harvesting Compost

Vermicomposting takes 3–6 months from the initial bin setup to a finished worm compost. The compost is ready for harvest when the material resembles crumbly chocolate cake and smells earthy and fresh. Material can be very moist at harvest and will need time to dry if you screen the compost. Harvesting the compost should occur at least twice a year to maintain healthy worms.

There are a number of options when it comes to harvesting compost. One method starts with placing the composted material onto a tarp in sunny conditions or under a bright light. Next, divide the contents of the bin into small cone-shaped piles (Figure 5). Allow the worms up to twenty minutes to move away from the light toward the center of the pile. Remove small amounts of compost from the top of the pile so that the worms can move deeper into the center. Continue until the worms reach the center of the pile (Figure 6). Repeat the process for additional piles. Collect and weigh the worms to ensure that environmental space and needs are met in the refreshed or new bin(s). At this point, you may have extra worms to give to someone else who is just starting out.

Figure 5. Compost has been placed on a tarp and shaped into cones. The pile on the left has one layer of compost removed. The worms will continue to move deeper into the pile to allow removal of another layer.

Figure 6. The final layer of compost has been removed. These worms will be placed in a refreshed or new bin.

Another method allows the worms to migrate on their own from the finished bin to a new one. This requires the addition of an identical plastic tote. Prepare the tote as was done for the original composting bin (upper tote). When the bedding in the composting bin fits snug against the bottom of the additional tote purchased, place the second composting bin inside the first and add the bedding so that feeding can begin in the newly added bin. The worms will move through the holes into the upper bin, while the lower bin contains mostly compost to harvest.

Still another option is to take out the top third of the bin where worms, bedding, and undigested food scraps reside. Scoop out the remaining two-thirds on the bottom of the bin to use as compost. Return the original top third of content to the bin and mix with fresh bedding. If the worms are overpopulated, divide them and use a portion of them to start another bin to maintain worm health. During the compost-harvest process, watch for egg capsules, which you can return to the bin. Egg capsules are very small (the size of a match head) and a shiny golden-brown color (Figure 7).

Figure 7. An egg capsule (center of photo).

Regardless of the strategy you choose, vermicompost can be used directly from the bin or stored for later use as a soil amendment or a mild slow-release fertilizer. The average nutrient analysis of the composted material is 2–2–2 (Nitrogen–Phosphorus–Potassium [N–P–K]). The compost will contain seeds, which went into the compost, because worms do not digest seeds, and also because the compost never reaches temperatures that inhibit seed germination. As for the leachate, dilute it to a ratio of 10:1 (water:leachate) for use as a liquid fertilizer for garden soil.

Photo credits

All photos by **Nicasio Usabel**.

BUL 982 | Published September 2020 |