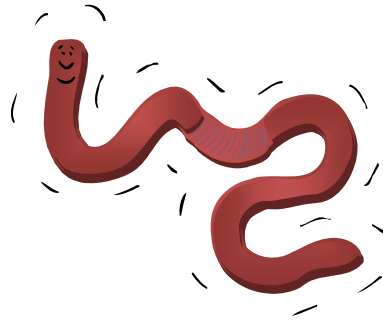




Best Sustainable Practices

How to Vermicompost at Home or Work



*Department of Parks and Recreation
915 I Street, 5th Fl, Sacramento, CA 95814
Contact: J.P. Tindell, jptindell@cityofsacramento.org, 916.808.1955
January 2009*

CONTENTS

Section	Page #
Vermicomposting	1
Benefits	1
Getting Started	1
Bins	1
Bedding	2
Worms	2
Feeding	3
Maintenance	4
Harvesting	4
Troubleshooting	5
Myths	5
Additional Resources	7



So what is Vermicomposting anyway?

Vermicompost (also called worm compost, vermicast, worm castings (poop), worm humus or worm manure) is the end-product of the breakdown of organic matter by some species of earthworm. Vermicompost is a nutrient-rich, organic fertilizer and soil conditioner. The process of producing vermicompost is called vermicomposting.

How does it work?

Without getting too “sciencey”, together with bacteria, earthworms are the major catalyst for decomposition in a healthy vermicomposting system.

Why should I get involved?

Benefits:

- Diverting food waste from the landfill – approximately 1/3 of a community’s waste stream is food
- An incredibly efficient method for recycling
- Your commitment to sustainability and being green
- Converts kitchen waste into nutrient-rich compost

Okay, how can I get started?

- Obtain “small scale” Bins
- Other useful supplies
 - Worms (1-2 lbs)
 - Instruction signs
 - Food scrap container for kitchen area
 - Cutting knife or food shears (to cut scraps for spreading)
 - Newspaper for bedding
 - Fruit fly traps + solution to replace periodically (e.g., orange juice + dish liquid)
 - Cutting board
 - Plastic gloves
 - Spray bottle for providing moisture
 - “Scooper” and containers to harvest and give away castings/compost “tea”
 - Paper shredder

Setting up a bin at home or work

Worm bins vary depending on the desired size of the system. But for an office environment, a small-scale system will do. Look for bins that have holes in the sides to allow air to flow and a spout that can be opened or closed or holes in the bottom to drain into a collection tray.





Continuous vertical flow bin type is a series of trays stacked vertically. The bottom-most tray is filled first but is not harvested when it is full. Instead, a thick layer of bedding is added on top and the tray above is used for adding organic material. Worms finish composting the materials in the bottom tray and then migrate to the one above. When a sufficient number of worms have migrated, the vermicompost in the bottom tray can be collected and should be relatively free of worms. These bins provide the easiest method of harvesting.

The moisture level and oxygen flow should be checked at least once a week.

Cost: Pricing structure for systems varies depending upon type. The “small systems” typically run anywhere from \$70-\$90.



To begin - Bedding

Bedding is the living medium and also a food source for the worms. It is a material high in carbon and made to mimic decaying dried leaves on the forest floor, the worms’ natural habitat. The bedding should be moist (similar to the consistency of a wrung-out sponge) and loose to enable the worms to breathe and to facilitate aerobic decomposition of the food that is buried in it. Keep bin away from warm locations or direct sunlight.



Okay: shredded newspaper, sawdust, hay, cardboard, burlap coffee sacks, peat moss, dried leaves.

No: cat litter, glossy paper from newspapers, magazines, junk mail and shredded paper from offices because they may contain toxins which disrupt the system. Coated cardboard that contains wax or plastic should not be used.

Will any kind of worm work?

No. The earthworm species (or composting worms) most often used are Red Wigglers (*Eisenia foetida*) or Red Earthworms (*Lumbricus rubellus*). These species are commonly found in organic rich soils and especially prefer the special conditions in rotting vegetation, compost and manure piles.



Where can I find these Red Worms?

Refer to the ‘Resource Directory’ for locating worms (p. 7)

How many? Cost?

You'll need approximately 1,000 worms (1 lb) to start a worm box. One pound runs approximately \$20-\$30/lb.

Feeding the critters



Appropriate waste can be added daily or weekly. At first, the worms are fed at most half their body weight per day. After they have established themselves, they can be fed up to their entire body weight. It is best not to add new food on top of old food until the old food has been processed by the worms.

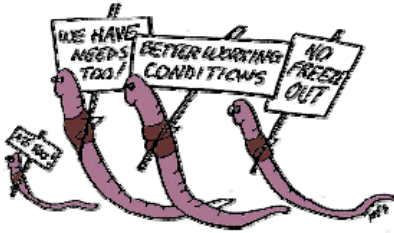
Don't dump and run. Always bury food under bedding. Start feeding the bottom working tray and when full, place the next tray (6-8 weeks) on top and add food and a layer of fresh bedding – feed upper tray only! Bedding in lower working trays must touch the bottom of higher working trays for worms to migrate up to the next working tray.

- **Okay**
 - Kitchen waste: bits of lettuce, tomatoes, moistened strips of newspaper or cardboard, dry coffee grounds, filters, tea bags, plate scrapings, vegetable peels, leftovers (raw or cooked), soft garden waste. An occasional sprinkling of garden soil in the bin gives the worms the grit they need to digest food. Compostable plates and cups are suitable but they should be torn first into smaller pieces so as not to block oxygen flow.

- **No**
 - High water content material (like watermelon rinds) provides very little food for the worms while disrupting the moisture level of the system.
 - Grass clippings and other products sprayed with pesticides should be avoided. Some banana peels are heavily sprayed and can kill everything if added to a small bin.
 - Worms are said to dislike highly spiced foods such as onions, garlic and salt.
 - Meat, dairy, bones, fish, greasy foods.
 - Metal, foil or plastic
 - Plants with heavy cellulose content (like avocado skins) or large seeds/pits.

Sticky food labels, rubber bands, tea bag staples, and other inedible items should be removed before placing the food in the worm bin as these items will not decompose.

Maintenance



- Feed approximately twice a week
- Don't leave unattended too long (need moisture occasionally)
- Suggest rotating responsibility if in workplace
- Daily: check on fruit flies (use traps, bedding on top of food layers to prevent these)

Note: If too much waste is added, the bin mixture putrefies before the worms can process it and becomes harmful to the worms.

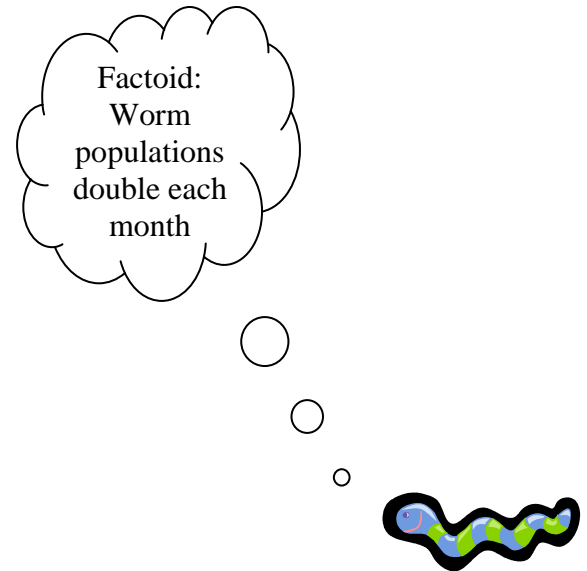
Climate and Temperature: Worms in a composting system prefer temperatures of 55 to 70 degrees Fahrenheit.

Harvesting Vermicastings



Vermicompost is ready for harvest when it contains few to no scraps of uneaten food or bedding.

Empty bottom working tray when contents look like dark black soil and most worms have migrated up to the second and third working trays.



Vermicastings are a valuable soil conditioner and plant growth stimulant with a wide range of applications in homes, and municipal parks and gardens. 'A little goes a long way' is an appropriate adage because the benefits of castings are so concentrated. It takes 6-8 weeks after startup before first harvest can happen.

Using vermicompost

Use like compost---dig it lightly into the topsoil around your plants or dilute and pour. Vermicompost gives seedlings a really good start in life.



Want to spread the love?

Start a second box. Prime it with fresh bedding and a supply of worms from the first box. Just leave the first box until the second box is full, by which time the first box will contain a very high proportion of fine castings and very few worms.

Troubleshooting

Odor is usually due to overabundance of wet waste in the bin from too much nitrogen combining with hydrogen to form ammonia. To neutralize the odors, add a fair amount of shredded newspaper to the mix to absorb excess moisture, remove the smelly waste and stop adding food to the bin until a substantial portion of the uneaten food has been turned into compost.

Pests such as fruit flies (actually vinegar flies) may be attracted by certain materials and odors. They can get into the box, but they do no harm. Cut down the feeding rate and cover the surface with damp newspaper. The problem is largely avoided if a sealed bin is used and flies and pests cannot access the material.

Vermicomposting Myths

- **Worms are gross!**
 - *Sadly, this will probably remain one of the major reasons most people never bother vermicomposting. If you approach the process with a childlike curiosity and an open mind, you will develop a new found respect for your wiggling friends especially with more focus on environmental matters and people re-connecting with the earth and developing a greater appreciation for other life forms.*
- **It's going to stink and attract vermin!**
 - *While it is certainly possible to create a horrible stinky mess, with a little attention paid to a few key principles this should rarely be a concern. Stinky smells tend to be caused when conditions go anaerobic (i.e. no oxygen). Absorbent bedding is the ultimate 'anti-stink' safeguard.*
- **Worms and bugs are going to invade the office!**
 - *Worms will from time to time attempt to venture outside the bin, but this usually only occurs when conditions inside are intolerable. Again, many headaches can be avoided when you continually add new bedding to your bin. It helps to balance excess nitrogen, absorbs excess moisture and offers cleaner habitat for the worms, not to mention great oxygen flow.*
- **It can't possibly be good for our health.**
 - *Naturally, some people tend to think that vermicompost is 'dirty' and hazardous. Of course (like many things) it certainly CAN be if not done properly. It's very important to stick to certain safety guidelines, but for the most part, people just need to lighten up a little. A reasonably well balanced worm bin should pose no more threat than digging in the garden.*
- **Too much work/not enough time.**
 - *Aside from setting up your bin, worm composting should take virtually no time at all (15-20 minutes per week in an office). You simply add your waste materials to your bin along with some fresh bedding if needed, and leave the rest up to the worm bin residents.*

- **I tried it once and all my worms died.**
 - *The best advice for people just getting started is to focus on patience and moderation. It is highly recommended to create an ideal worm habitat well before you even add the worms.*

Vermicomposting
The Worms do the Work for you!

WHY?

Aerators
Worms add Oxygen for all the beneficial micro-organisms.

Turners
Like Tiny Plows, worms work throughout the material

Mixers
Worms move all kinds of organisms and nutrients throughout the compost pile adding many small aggregates.

Screeners
Worms eat the bedding materials and the feed and turn it into a rich soil product.

Accelerators
Worms can eat 1/2 to all their weight per day. A 5'x8' large scale Flow-through system can process 100 lbs of food scraps per day and will produce 78-80 lbs of castings per day.

Pathogen Controllers
Worms inges and render useless, the "bad guys".

Additional Resources

Bin Suppliers:

- www.Gardeners.com
- www.wormwrangler.com
- www.topline-worms.com
- www.allthingsorganic.com (Wriggly Wranch)
- www.mastergardening.com
- www.kitchengardeners.com
- www.compostbins.com

Composting Worms

Local

- P.J. Dunn Working Red Worms, 27395 N. Kennefick Rd, Galt, 95632, (209)712-3646. Contact: Michael. \$18-\$25/lb

Regional

- Cosmo's Red Worms, 432 Lawton St, San Francisco, CA 94122 (415)759-7874, www.alcasoft.com/cosmos, \$32.75 includes shipping
- Happy D Ranch & Worm Farm, PO Box 3001, Visalia, CA 93278, (559)738-9301, www.happydranch.com, \$30/1 lb

Web

- www.findworms.com
- www.unclejimswormfarm.com
- www.vermiculture.com
- www.eco-gardening.com
- www.ecologycenter.org

Bins & Worms

- www.allthingsorganic.com

Fruit Fly Traps

- www.safehomeproducts.com

General Information

- www.ciwmb.ca.gov/organics/worms
- California.local.com
- www.stopwaste.org
- www.wormdigest.org/forum/index.cgi
- Worm Digest, P.O. Box 544, Eugene, OR 97440-0544
- Local composting demo sites: www.vegweb.com

Books

- The Worm Book: The Complete Guide To Worms in Your Garden, by Loren Nancarrow
- Easy Composters You Can Build, by Nick Noyes
- Let it Rot: The Gardener's Guide to Composting, by Stu Campbell
- Worms Eat My Garbage, by Mary Appelhof
- Harnessing the Earthworm, by Thomas Barrett