



URBAN WORMS

Earthworms are the intestines of the earth.

The Greek philosopher Aristotle (384 – 322 B.C.)

They can breakdown your garbage and transform it into Black Gold, an organic fertilizer for your garden or house plants. That is far superior to anything you can purchase.

As they cultivate and feed, they swallow great quantities of soil & garbage, digest it, extract its food value, and expel castings.

They can help you significantly reduce your family's contribution to our landfills.

They will eat half their weight in waste per day.

They can live in a bin under your sink, on your patio, in your garage, or out in your yard.

They can be planted in your garden to aerate and loosen the soil and fertilize naturally.

They can be a great source of protein for birds, reptiles and fish.

You can even take them fishing! They are great bait. They will live ½ hour in salt water and over an hour in fresh water.

Magical Earth

Easy to understand worm bin basics for beginners

The most difficult problem encountered in explaining how to raise red worms for new breeders is the amount of outside information which is required to make everything clear. With this in mind, I will begin by listing several facts regarding worms in general and vermiculture in particular. Though some of these points may be obvious, and others may not, they are all important in understanding the various principles that are at work here. By making sure everyone understands these things up front, we can hopefully avoid any confusion later.

Facts and Figures

It takes roughly 1000 adult red worms to equal one pound in weight.

It takes roughly 4000 juvenile or bedrun red worms to equal one pound in weight.

It takes over 100,000 red worm spawn (probably way over) to equal one pound in weight.

One pound of worms, regardless of their size, will eat the same amount of waste no matter what size they are.

Worms will breed most often for one of three reasons:

- a) There is an abundance of food available.
- b) Their survival is threatened by environmental conditions, or
- c) They find themselves in an area which is saturated with suitable mates.

Beginning with one thousand sexually mature adult redworms, and including their offspring, and their offspring's offspring, etc., it is possible to produce over one million red worms in one year.

Except in a couple of specific situations, if they are given adequate food and fresh "bedding" material, worms do not appear to be bothered by "overcrowding."

Worms are perfectly adapted to the purpose they serve in nature, which is evidenced by the fact that their genetic development has all but stopped. They have remained in their present form for hundreds, possibly thousands of years.

Perhaps the most amazing thing to consider about worms, is their remarkable ability to adapt to an environment while they are still in the cocoon, and their apparent inability to compensate for relatively small environmental changes during their lifetimes.

Your First Worm Bin

What worms need to live

The whole surface of worms skin absorbs oxygen, it passes through, and enters their blood. This is why worm bins need an adequate supply of air. Worms also need moisture to help them wiggle and move by squeezing muscles around their bodies. Their bodies are filled with water. Water is also needed to help them breath through their skin. Set up a worm bin with lots of bedding in it they eat this along with the food added. The last thing needed is food.

Setting up your worm bin

If you have an upward migration bin like the Can-O-Worms or the Worm Factory, you start with 1 tray worms, bedding and food scraps all in one tray.

Then when the first tray is full, you add the 2nd tray. Continue to add your food trash to the 2nd tray. when the worms finish eating all the food they leave the castings and start eating the 2nd tray. When the 2nd tray is full and you have no more room to add more food scraps, then you add

the 3rd tray. And start putting your food trash in the 3rd tray. By this time the 1st tray will be pure castings, and you can take off the 1st tray, dump in your plants, put that tray on top, and continue to add food to the top tray.

so:

Now you should have **LID**
 Tray 1 - all worms, bedding, & food
 Base

In 2-4 weeks you will have **LID**
 Tray 2 - some worms, most food
 Tray 1 - most worms, bedding, castings, & some food
 Base

In 2 -3 months you will have **Lid**
 Tray 3 - some worms, most food
 Tray 2 - most worms, bedding, castings, & some food
 Tray 1 - no worms, pure castings
 Base

Then when you are ready to use your castings. you will take Tray 1, dump it in your plants, and put on top, and continue to feed the to tray. which is now Tray 1

Lid
Tray 1
Tray 3
Tray 2
Base

Using the Right Worms

Earthworms live in many different environments. Some live under the ground, like Canadian nightcrawlers. others live above the soil, wherever there are dying or dead plants. don't take burrowing worms from your garden soil they won't live in a worm composting bin. Redworms and some varieties of nightcrawlers including Europeans and Alabama Jumpers feed in the top layers of the soil and are perfectly suited to a worm bin.

Picking out a type of bedding

Good Bedding:

white paper

newspaper

egg cartons

Shredded cardboard

coconut husk fiber (coir)

Shred all paper and cardboard into small pieces make it damp, but not dripping wet, then add it to the bin. If only a few drops of water come out when squeezed this is perfect. I also add a handful of Urban Worms' Worm Rx this helps the worms gizzards to grind the food.

What NOT to Feed Your Worms

Don'ts	The Reason...
Meat and Bones	Decaying meat produces offensive odor. May attract flies, rodents, ants and other non-desired pests.
Bones	will not be processed by worms.
Salty snack food or Fast food	Big Macs, potato chips, french fries and olives are a few examples. You can soak salty foods overnight, pour off the water, then feed to your earthworms.
Pet feces	Dog or cat feces do not belong in your worm bin as they are not properly processed manure. May contain viral or bacterial toxins.
Green grass	A big mass of yard clippings will decompose thermophilically and will create high temperatures that are harmful.
Alcohol	Very toxic.
Excess citrus fruit	Citrus fruit contains a substance called limonene that can be toxic to earthworms in large quantities. You can throw in some orange peels -- just not 15 oranges at once!
Pressure-treated wood	The active ingredient is cyanide which is toxic to worms in small quantities.

And if you would like to feed your worms a variety of organic material, here is a list of green and brown material you that your earthworms can consume:

Green Material & Brown Material

- Kitchen scraps not listed above such as vegetables, melon rinds, eggshells, coffee grinds with the filter, tea bags and fruit
- Leaves and grass clippings, after they turn brown, in moderation.
- Dry leaves, grass and the woody stalks of plants such as sunflowers and corn
- Paper and wood products, such as sawdust, and shredded newspaper
- Dryer lint

To make your scraps easily consumable for your worms, be sure to chop up, grind down, or boil. Remember, it takes time for food to break down, especially items such as raw veggies like broccoli and carrots. Chopping the food gives it greater surface area for microscopic organisms to attach themselves too and boiling will soften and break down fibrous material, making the food more readily available to your worms.

Manure. You can use composted cow, rabbit or horse manure to top off your bin if you use peat or coir as bedding. The manure already contains lots of good microorganisms that will break down the food you add to your bin. Try filling your bin with 9" of coir then adding about 3" of manure on top of the peat. If the manure is dry, use a spray bottle to moisten it. The manure may heat up a bit when watered, but this is temporary. Earthworms LOVE manure and thrive on the nutrients available within it. Manure is a natural habitat for composting worms and contain many of the organisms vital to earthworms growth.

Feeding Your Worms

Redworms will eat one to one-half of their weight per day. Feed your worms lightly for the first few weeks, as they get used to their new home.

Mix some good compost or worm compost in a new bin, (if you have it) this will help the food to start decomposing.

The earthworm is an eating machine. It literally eats the earth as it burrows through it. Material that is too large to ingest it pushes aside with its "head" (prostomium). Worms don't have teeth, so the material they eat is first moistened in their mouth then passed into their gizzard, which acts like teeth and grinds the food. The food is then passed to their intestines, which absorb the nutrients contained within. Whatever the worm doesn't digest is then passed out of their bodies as nitrogen rich worm castings.

An important fact to know about feeding your earthworms is that they thrive on the microscopic organisms that live on the decomposing organic matter they ingest. These organisms include a variety of algae, fungi and bacteria that are essential for the worm's growth.

When it comes to kitchen scraps, worms will consume just about everything you do, with the exception of a few. I outlined below the biggest "don'ts" -- anything else that is not listed should be ok to add to your bin. If you are unsure, the best rule of thumb is don't use it.

How To Feed Your Worms

Chop up your kitchen food scraps for them. It gets eaten faster that way. When you feed your worms, bury the food in the bedding, Change feeding spots each time you feed. When the original bedding is turned to compost it is time to add new bedding and stop feeding in the old bedding, worms will migrate to the new bedding.

Temperature of the worm bin

Worms do best when the bedding is 55°F-85°F. All the bacteria are happy, and worms are most comfortable. At 45°F, the bin slows down, and at 30° worms can freeze.

Moisture in the worm bin

Now and then it helps to check for and remove excess moisture that may collect in the bottom of your bin (particularly common in plastic bins). "Stink" in a worm bin is a sign that too little oxygen is reaching part or all of the worm bin system. This can occur when the bedding is too wet or worms are overfed. I add dry coconut coir to these areas it will soak up the extra water. Or Take the lid off with a light on. The light will keep the worms down in the bedding, and the fresh air will dry out the bedding a little. Wooden bins can have the opposite problem they can become too dry so may require occasional rewetting.

Harvesting the compost

There are several ways to harvest.

If you are using an upward migrating bin such as the Worm Factory or Can-O-Worms, simply stop feeding the bottom layer. When all food is gone and bedding turned to compost the worms will migrate upward into the bins with food.

When using plastic or wooden bins my favorite method is to move all old compost to one side and start feeding the other side. In a few weeks the worms will have finished composting what is left and will move to the new bedding. The old side can then be removed and used for compost. There is also the method of dividing worms from the compost. Dump out the contents onto a plastic-covered surface in daylight or under a bright lamp and form many small piles of material. The worms will move to the bottom of the pile, and in a few minutes you can remove a small amount of vermicompost free of worms. A few minutes later, the worms in each pile will have gone down again and you can continue to remove the vermicompost. When you get to the bottom you will have only worms left.

The vermicompost you harvest can be used directly in your garden or on your houseplants. It's an excellent fertilizer you only need small amounts. Because it comes from an earthworm, It will not burn plants if you use more. Mixing it with coconut coir in equal amounts creates a good potting soil.

Worm tea

Worm tea is very easy to make and beneficial to all garden and houseplants. Take a handful of compost, put in cloth bag, and add to a five-gallon bucket of water. Add an aerator and let sit for 48 – 72 hours. Your tea is now ready to use. It can be added directly to plants or strain water to separate for use in a sprayer. Compost tea when used regularly helps to control fungus and pests from plants. For more info on worm tea download my worm tea instructions.

TROUBLESHOOTING

STINK!

Once you experience a stink, you'll try your best to make sure it doesn't happen again! When air doesn't get to part of the bedding, then things can get really smelly.

When a stink happens, it's important to get the material in your bin aired out quickly. If there's just one offending item, of course, remove just that. If it's a whole layer of the bin that smells a little bit, try mixing the bedding it to get air in there. While you're at it, add more shredded paper or cardboard to promote even better aeration, and to balance any excess nitrogen there may be matted-down, wet layer of bedding, which stops the flow of air and oxygen, can cause a stink. If your bedding tends to mat down, use several different kinds of bedding material together, which will help keep air spaces open. Also, try to prevent bedding from becoming too damp.

SWAMP!

Ok, so you've got a couple of inches of water on the bottom of the worm bin. "Now what?", you ask. Well, the answer's simple: start bailing!

First, remove any waterlogged castings from the bottom of the bin. Place these in some kind of porous container (a box with holes in the bottom works) to let the castings dry out before using them.

Then, ask yourself how the excess water got into the bin:

- Did you recently added a lot of very wet waste, like watermelon rinds? (If this is the case, problem solved.. remove some of those rinds and vow not to do this again.)
- Is the humidity in your area high enough that very little evaporation happens through the bin's air holes? You can correct the problem by adding a lot more aeration holes or by placing the bin where there's more air circulation.
- Does your bin just seem to collect moisture? Many bins, particularly plastic ones, do. To improve its aeration, add some 1/4" holes on the bottom and sides of your bin. Adding a dozen per square foot should help a lot. If it's a stacking tray bin, look and see where it is designed to allow air to enter. You're going to have to improve the aeration on the bin somehow. Leaving the lid off will help, and so will keeping the spigot open (with a bucket below to catch excess liquid.)

WORM CRAWL/ESCAPE

Worms that are uncomfortable will try to move on to a new location. If your worms have left you, you're probably already coming up with a song about the experience. What else can you do? Try to determine what caused them to crawl.

- Were they new to the bin? When they first arrive in a new environment, worms will be inclined to look around. It takes time for them to settle down. (Remember that if the new bedding and food are close to that of their old environment, they will be less inclined to leave.
- Was something awful added to the bin?
- Have predators like dogs, moles, birds, even housecats or mice, been in the bin a lot lately? This may disturb them enough to make them want to move on.

Address the causes for your worms' move and you'll find they stay put more often.

A large black silhouette of a tree trunk and its leafy canopy occupies the left and top portions of the page. A person's silhouette is visible within the tree's trunk, standing and looking towards the right. The background is white.

CASTINGS

BLACK GOLD

Created by nature for the purpose of promoting optimum plant growth

Suppress fungal diseases (phythium, fusarium, dollar spot, etc)

An all purpose natural fertilizer that comes to you straight from nature with no alterations whatsoever.

Contains over 60 micro nutrients and trace minerals and rich proportions of water-soluble nutrients

Plants quickly and easily absorb all essentials nutrients & trace elements.

High concentration of beneficial bacteria and microbes that are produced in the earthworm's digestion

Because of the absorbent organic matter contained in the castings themselves, moisture is held in the root zone while allowing excess moisture to drain away.

Can be used straight from the bag on indoor or outdoor plants.

Improved Soil Structure and Aeration

Roots can easily grow fast, full and fibrous.

Naturally Odor Free.

Less Watering Required

Environmentally safe for all plants, animals and humans

OMRI listed

Can be used without risk to your organic certification

Magical Earth

Specifications & Directions for Use

Magical Earth Earthworm Castings are an excellent all natural plant food that come to you directly from Mother Nature in their purest form. For millions of years, the incredible earthworm has been one of nature's greatest producers of readily available plant food. When used in greater concentrations than found in nature, this non-burning, long lasting organic fertilizer can provide remarkable benefits such as:

Vigorous Plant Growth
Fibrous Root System
Improved Aeration of Soil

Directions:

Vegetables and Annual Flowers - Line bottom and sides of plant holes and seed furrows with 1"-2" of earthworm castings. Set seeds or plants in place and cover with soil. Side dress during growing seasons at a rate of 1/2 cup per plant or 1 cup per linear foot of row once every 2 months.

Perennials - Work 1/2 cup into the soil above their root zone taking care not to damage shallow roots. Apply in spring, early summer and early fall.

Potted Plants and Seeds/Seed Flats-New - Potting mix-use 1 part earthworm castings to 1 parts soil to 1 part coco coir.

Potted Plants, Window Boxes or Hanging Baskets- Established - Add 1-2 inches of Earthworm castings to top of soil. Mix in taking care not to damage shallow roots - water - repeat every 2-3 months.

Roses, Trees, Shrubs and Berries - New or freshly transplanted - Mix 1 part earthworm castings to 2 parts soil. Surround newly dug hole with mixture. Spread roots over a mound of the mix in the hole and cover.

Roses - Established - Mix 4 cups of earthworm castings into soil 2-3 inches below the surface for each plant.

Lawns - New - Apply 10 lbs. per 100 sq. ft. Work lightly into the topsoil. Mix in grass seed and water well.

Lawns - Established - Distribute as top dress 10 lbs. per 100 sq. ft.

Casting Tea - Aerate 1 part castings in 3 parts water for 48-72 hours. Stir well and water as usual. Casting tea is excellent for fruiting, flowering or difficult to access potted plants.

Compost Piles - Spread a thin layer of earthworm castings between each new layer of material to be composted.

Organic Earthworm Castings, contain rich proportions of water-soluble nutrients. This is a primary reason for being able to provide incredible results. Worm Castings allow plants to quickly and easily absorb all essential nutrients and trace elements in simple forms, so plants need only minimal effort to obtain them. This is not the case with synthetic fertilizers. Though they may have many nutrients and/or higher analyses, the ability of plants to optimally use them is limited because they are not broken down to the degree in which the earthworm is able to provide them.

As well as an abundance of available nutrients, worm castings also provide a perfect mix of nutritional needs. This allows plants to feed as needed for weeks and months at time, depending on the plant.

High Availability of Nutrients - Over 60 micronutrients and trace minerals along with high numbers of beneficial microbes and bacteria.

Another point in favor of earthworm castings is the high concentration of beneficial bacteria and microbes added to them by the earthworm in the digestive process. These microscopic creatures help different elements of the soil work in conjunction with each other to create healthy, working soil that provides the best possible atmosphere for optimum growth.

Our worm casting contain earthworm eggs and the occasional earthworm too.

Synthetic fertilizers usually provide only available synthetic nutrients (N-P-K), much of what are quickly lost into the soil with watering, as a plants' root system can only absorb so much. Chemical fertilizers are most often detrimental to soil microbiology, bypassing and often destroying much of its beneficial microbial and bacterial activity

Yet, another benefit is the ability to improve soil structure. These miniature football shaped particles improve aeration, which promotes rapid plant growth. It also allows for excellent drainage in soil so roots don't become waterlogged or develop root rot, while also increasing the soil's water retention capacity as they contain absorbent organic matter that holds only the necessary amounts of water needed by the roots and their shape allows unnecessary water to easily drain.

Earth Worm Castings are also an effective way to repel white flies, aphids and spider mites & any pest that feeds on plant juices. According to recent studies, applying earthworm castings to the soil around your plants increases the production of a certain enzyme that is offensive to these insects. How quickly the pests depart depends on the size of the plant. For instance, it may take as little as two weeks for an infestation to clear up on a houseplant or as long as two months to rid a large rose of pests.

Earthworm castings are an organic, non-toxic fertilizer that can be used on just about any plant in the garden! They are a great source of calcium, magnesium, nitrogen, phosphates and potash.

Reduce algae in greenhouses, ponds, & lagoons no nitrogen run-off

May be applied to phosphate sensitive areas

Reduce irrigation cost up to 50%

Increases drought resistance

Reduce all chemical costs by 75% first year of 3 year program

No ground water contamination

Improve crumb structure of soil

Not toxic - reduce liabilities for employees and clients when used professionally

A high-contrast black and white image. On the left, a large, dark silhouette of a person stands with their back to the viewer, looking towards the right. Above them, the dark, leafy canopy of a tree hangs down. The background is a stark white. The title 'WORM TEA' is printed in large, white, serif capital letters across the upper middle of the image, partially overlapping the tree's canopy.

WORM TEA

What are the benefits?

Improve plant growth as a result of protecting plant surfaces with beneficial organisms which occupy infection sites and prevent disease-causing organisms from finding the plant,

Improve plant growth as a result of improving nutrient retention in the soil, and therefore reduce fertilizer use, and loss of nutrients into ground- and surface waters

Improve plant nutrition by increasing nutrient availability in the root system as the foodweb increases plant available nutrients in exactly the right place, time and amounts that the plant needs,

Reduce the negative impacts of chemical-based pesticides, herbicides and fertilizers on beneficial microorganisms in the ecosystem

Improve uptake of nutrients by increasing foliar uptake.

Reduce water loss, improve water-holding in the soil, and thus reduce water use in your system.

Improve tillage by building better soil structure. Only the biology builds soil structure.

Magical Earth

Compost Teas: Brewing a Sweet Blend

A nice cup of good, hot tea has for years been enjoyed as a restorative to the mind and body. Centuries ago human kind learned that the flavor and beneficial essence of certain plants could be drawn from their leaves, bark and roots by steeping them in water, sometimes fortifying the brew with a bit of milk and honey.

How well we understand that a nip of soothing mint tea will settle the stomach, a cup of fragrant chamomile tea will soothe frayed nerves, and a heavy mug of vitamin rich alfalfa tea can stimulate a weak appetite. By steeping these plant materials in water we can partake of what is best about them when eating the plant is not an option. This concept of using water to draw beneficial extracts from solid materials for the purpose of making a liquid solution has applications beyond making we humans feel better, however. Our plants and even our soils can benefit greatly from a nice cup of tea when that tea is derived from a plant nutrition source like worm castings.

Understanding the Value of Castings [worm poop]

Castings added to the soil carry to the root zone a rich compliment of soluble plant nutrients and growth enhancing compounds, a diverse and populous consortium of microbial life and a substrate of organic matter harboring a storehouse of nutrients that are not lost to rain and irrigation. The plant is delivered an ongoing, reliable food source when bacteria and microscopic fungi feed on the organic matter, releasing some of the nutrients to the soil and storing others for their own energy and reproduction. When nematodes and protozoa in turn feed upon them, the nutrients stored in the bacterial and fungal bodies are released to the soil in a plant-available form.

Further, unlike soluble plant fertilizers, the nutrients stored in organic matter and the bodies of the microbial life are not lost through irrigation to contaminate ground water. When we add castings and the microbial life they support to the soil, we aid in increasing the complexity and diversity of organisms in the root zone, thus aiding in disease and pest suppression.

From Castings to Tea

So, “why tea?” one may wonder. With compost and worm products demonstrating such tremendous benefit to soil and plant life, why take the extra steps to generate a liquid from this already understood and easily applied solid material?

Leaf surfaces, like plant roots, harbor a rich microbial population that protects the leaf, and thus the plant, from infection and attack by pathogenic organisms. When the microbial consortium present on the leaf surface is reduced by pesticide use or environmental damage, it exposes leaf surface, opening infection points. We can reinoculate the leaf with the diverse communities of microbial life found in compost and worm castings by applying a tea made from these materials. Further, teas can be applied as soil drenches and root washes after pesticide use, to reintroduce to the soil microbial communities that may have been damaged by the pesticide. The microbes can then continue to provide protection from pathogens to the plant as well as aiding in breakdown of any pesticide residues in the soil, thereby preventing ground water contamination. Teas also carry the soluble nutrients and beneficial

growth regulators contained in the solid matter used to make the tea. Many of these compounds can be absorbed through the leaf surface, feeding and enriching the plant.

Steeping the finished, stable end product of a composting or vermicomposting system in agitated, aerated water, then adding a nutrient mix for microbial growth makes a true tea. The water is agitated to extract as many of the organisms clinging to the solid matter as possible, and the nutrient mix provides those microbes dislodged into the liquid with a food source on which to grow and reproduce. Aerating the water ensures that it is the aerobic organisms that are supported in the liquid.

This blend of food and oxygen in the tea enables the microorganisms to grow to numbers rivaling those found in the solid matter from which the tea is derived. Teas must then be used within a few hours of being generated in order to ensure aerobicity and high microbial populations. Once the oxygen and food are consumed, anaerobic organisms will begin to populate the system, producing alcohols and phenols toxic to plants.

Good tea begins with good, quality compost, worm castings or vermicompost, or a blend of these materials. Provided the solid material is stable and supports sufficient beneficial microbial life, there is nothing in these liquids to cause plant damage.

Using the tea

Compost and castings teas are a relatively new product in today's agriculture and gardening industries. Researchers are still identifying uses, though there is considerable research demonstrating that teas can suppress fungal disease in a variety of plant species and aid in disease prevention on plants where disease pressure is great.

Application rates for tea will vary considerably with the type of plant being treated, climate, and whether or not the plant is already battling a pest or infection. Dr. Ingham suggests that in agricultural fields the application rate begin at five gallons of undiluted tea per acre per week and adjusted as needed based on performance. For home use, teas can be applied to flowers, perennials, turf, roses, shrubs, trees and vegetables.

What we do not know about teas still far outweighs what we do know, though research demonstrates an exciting future for tea use. The possibility of finding a means of controlling certain plant diseases with a truly effective yet benign material that simply capitalizes on nature's own means of control is a basic precept of sustainability and promises to help us repair the damage already caused by conventional agriculture techniques.