

Making Worms Work for You

University of California
Agriculture and Natural Resources



UCCE Master Gardener Program

Decompose (Decay, Rot)

- *Compose* = to make or form by combining things, parts, or elements
- *Decompose* = to separate into constituent parts or elements

Food scraps *decompose* in a compost system leaving a collection of plant nutrients that can be used again to benefit more plants and grow more food.

Worms - The Original Master Composter!

Worms get their nutrition from decomposing organic material and the microbes such as bacteria and fungi that grow in compost.

Vermicomposting: Use worm castings to enhance soil by RECYCLING nutrients.

Why Worms?

- Recycle kitchen scraps
- Suited to apartments and households
- Castings are great for plants
- Worms can eat ½ their weight in scraps daily
- It's fun and great science for children!

Kinds of Worms

- More than 4000 species of earthworms
- Very diverse group
- Earthworms are divided into 3 categories based upon the soil layer they live in.

Nightcrawlers go deep

- Earth workers -- sideways
- Compost worms live in leaf litter and top layers

Anecic worms (Nightcrawlers)

Lumbricus terrestris

- Deep permanent burrows, up to 4 – 6' deep
- Cycle HUGE amounts of organic material deep into soil
- Coat burrow w/ mucus, recognize own burrow!
- Anchor with tail and forage in a circle
- Won't reproduce in a bin

Endogeic Worms (Earth workers)

- Live in the top 12 inches of soil -rarely come to the surface
- Create extensive horizontal burrows in upper layers of soil
- Feed on mineral soil particles and decayed organic matter
- Aerate and mix soil

Epigeic Worms: Your Worm, the Red Wiggler

- Live in forest litter, duff, loose topsoil layer
- Build no permanent burrows
- Reproduce rapidly
- *Eisenia fetida*
 - Red wiggler
 - Tiger worm
 - Manure worm
 - Fish worm

Your Worms' Needs

1. Water-Moisture
2. Air
3. Decaying organic matter (food scraps)
4. Darkness, Quiet
5. The Right Temperature

Moisture and Air

- A worm's body is 70- 90% water
- They breathe through their skin
- Water standing in the bin can reduce available oxygen- anaerobic conditions
- The worms will drown in too much water

Earthworms and Vibration

- Can hear robin hopping on surface?
- Come to surface in rain
- Worm fiddling, "grunting"
- Consider where you put your worms!

Earthworms and Light

- Worms don't like light
- First night leave light on and lid off

Your Worms and Temperature

- Worms feed most rapidly and convert food waste best at temperature between 60-78°
- They like same temps we like!

◆ *Should you need assistance, or, require accommodations for any physical challenge, please call 530-621-5502.* ◆

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- If the bin freezes, or gets too hot in the summer, the worms will die

A Comfortable Worm Bin Has It All!

- Bedding moistened to provide air and water
- The lid keeps it dark
- A cool/warm place with yummy food scraps to eat
- Lots of microbes for company

Worm Anatomy

- Basically one big intestine!
- Worms don't have eyes, ears, bones or teeth
- Can distinguish between light and dark using sensors in their skin and on their "nose."

Earthworm Reproduction

- Earthworms are hermaphroditic, meaning each worm have both male and female reproductive organs but it takes two worms to reproduce.
- Two worms join with mucus from their clitella.
- Then, a cocoon forms on the clitellum of each worm. The worm backs out of the hardening cocoon which contains the egg.
- In about 30 days 1-5 babies will hatch from the cocoon.
- They will mature in about 3 months.

How Earthworms Eat

- Worms have no teeth
- Gizzard, sort of like a bird
- No teeth - a flap of skin called a prostomium
- Food moves down to the crop where it is stored
- Food moves to the gizzard where it is ground up
- Food moves out of the worm creating castings

Feeding Your Worms

- Red worms like to eat decaying organic matter; they also eat the little bacteria and fungi etc...
- Worms eat ½ their weight per day. In ideal conditions, worms can eat up to their own weight per day.
- One pound of worms will eat ½ pound of food per day.

Yummy

- Fruit Peeling
- Vegetable Peelings
- Egg shells
- Coffee grounds (including filter)
- Tea bags (string, staple and all)
- Bread

- Lettuce
- Watermelon rinds
- Banana peels

Yucky

- Bones
- Mayonnaise
- Salad Dressing
- Meat
- Cheese
- Butter
- Oil
- Open a hole in bedding in a corner and deposit food.
- Feed a different corner each time.
- Finished vermicompost in 3-4 months.

How to Harvest

- Dump and sort
- Screen method- plastic mesh
- Vertical or horizontal migration method

Other Harmless Critters in the Bin

- Fruit flies come on the peel or rind of fruit. You can avoid them by freezing the peels, or putting wet newspaper on top.
- Other decomposers you might see: potworms, springtails, black soldier fly larve, mold, rolypolys, mites, soldierfly larvae, mold and fungi, pillbug/sowbug

The Finished Product

Worm castings - the manure of the earthworm - RICH STUFF!

- Contains humus, a complex mixture of nutrients stored in a form that is readily available to plants.
- Stimulates plant growth
- May help control harmful pathogens, bacteria and fungi

A valuable resource -- use it selectively and sparingly. Castings are like concentrated plant fertilizer

- Sprinkle some in the row when planting seeds
- Add a handful to the hole when transplanting young plants (2 tablespoons per 4" pot, ¼ - ½ cup for one-gallon transplants)
- Mix into the top soil of potted plants
- Work it into the soil during the growing season
- *Don't let it dry out!*