



Vermicomposting

UCCE Stanislaus County
Master Gardeners



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Meet Your Speakers!

Master Gardeners

- Dennis Lee
- Terry Pellegrini



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Poll #1



- Did you attend our 2019 Vermicomposting class?
- Have you ever composted using worms?
- Were you successful?

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Agenda


- What is vermicomposting?
- Building a vermicompost bin
- Worm feeding, care, and harvest
- Troubleshooting
- Resources



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Vermicomposting Demystified!

Dennis Lee
UCCE Stanislaus County Master Gardener



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What is Vermicomposting?



- *Vermi* is Latin for worm
- Worms eat food scraps & "organic" materials
- Creates vermicompost, a valuable soil amendment!



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Types of Worms



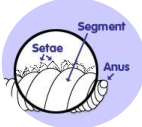
- **Red Wigglers** (*Eisenia foetida*)
 - Reproduce quickly
- **Red Earthworms** (*Lumbricus rubellus*)
 - Slower to reproduce
- Rarely found in soil.
- Live in rotting vegetation, compost and manure piles.
- **Earthworms not used!**
 - Do not like to be disturbed

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Worm Anatomy

- Worms have
 - A mouth
 - A gizzard to digest food
 - 5 hearts that pump blood through its body
 - Segments that have bristly hairs (setae) that help them move

(photo: Brian Grothwick)

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Why Do Worms Eat Our “Garbage?”

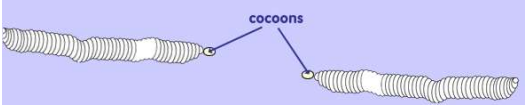
- Red wigglers eat decomposing organic materials.
- Vermicomposting takes advantage of this talent!




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Worm Reproduction

- Worms are hermaphrodites; they need a partner to reproduce.
- Worms produce up to 2-3 cocoons per week during breeding season.
- Each one may have 1-5 baby worms!



The diagram shows a worm with several small, oval-shaped cocoons attached to its body. Two lines point from the word 'cocoons' to two of these small ovals.

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More Worms!

- Babies hatch in 2-3 weeks.
- New worms are whitish/clear.
- 6-week-old worms can reproduce.



The first photo shows several small, yellowish, oval-shaped worm cocoons in dark soil. The second photo shows a pink bell pepper with a small worm on its stem.

Worm cocoons. (Photo by Timothy Musson.)




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Vermicompost

- Contains small amounts of many nutrients.
- Nutrients released slowly as compost breaks down.
- Add to houseplant containers, seed starter mix or your garden.



The photo shows a pair of hands holding a cup of dark, rich, crumbly vermicompost.

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Questions?



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Poll #2

- What kind of worms thrive in a worm bin?
 - Worms from your garden.
 - Red wigglers.
 - Earthworms.
 - Night crawlers.



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Poll #2 Answers

- What kind of worms thrive in a worm bin?
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Let's Build a Worm Bin!


Terry Pellegrini



UCCE Stanislaus County Master Gardener

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Where can redworms live?



Use untreated wood.

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Worm Ambiance

- Choose a moist, dark environment.
- 50-80 F is ideal.
- Indoors works great.
- Outside: avoid direct sunlight.
- Place in a protected area.



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Worm Homes & "Hotels"

- Use a shallow container, 18" deep.
- Don't use clear or light-colored bins.
- Repurpose plastic kitty litter containers or other kinds of bins.



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- Drill 8 to 12 holes (3/16- 1/4 ") in the top, sides, and bottom for aeration and drainage.
- A plastic bin may need more drainage - if contents get too wet, drill more holes.



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- Place bin on bricks or wooden blocks for air circulation.
- Use a tray underneath to capture excess liquid.
- Use liquid as plant fertilizer.




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Bedding

- Shredded
 - Newspaper, leaves, & cardboard
- Chopped up
 - Straw, dead plants
- Coconut coir
- Sawdust
- Dried grass clippings
- Use 2 handfuls of sand or soil to provide grit for best digestion.



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- Fill bin with damp bedding.
- Bedding should be like a "wrung-out sponge."
- Lift bedding gently to:
 - Create air spaces & help control odors.
 - Give worms more space to move.



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Add Your Worms!

One pound of worms (1,000 worms!) can eat about ½ to 1 lb of scraps per day



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Worm Care, Feeding, & Harvest

Dennis Lee

UCCE Stanislaus County Master Gardener



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Best Food for Worms



- Vegetable, fruit scraps, eggshells, bread, grains
- Shredded newspaper & cardboard
- Coffee grounds, tea bags, tissues, paper towels
- Dried leaves

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Not Good for Worms

- Onions, garlic
- Meat, dairy products
- Fats/oils
- Pet feces
- Too many citrus peels



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Feeding Instructions

- At first, feed once per week.
- As worms increase, feed more often.
- Worms eat bacteria growing on the food waste along with very small pieces of food.



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Feeding Your Worms

- Cut food into small pieces.
- Bury food 3-4" under bedding.
 - Never lay it on top! (attracts fruit flies)
- Divide bin into 3 or 4 imaginary sections and bury successive loads in different locations in the bin.



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Handle Worms Gently!

- Use a plastic garden fork or a wooden kitchen spoon to bury food.
- A "fork" is less likely to injure worms.
- *Don't use a hand trowel.*



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Remember...

- Worms don't eat as much as we do. ☺
- Some foods need to break down before worms can eat them.
- Never put food in the blender.
 - This releases water that can make your bin too wet.



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Poll # 3.1: What do red wiggler worms eat?

- They love everything!
- Only fruits and vegetables.
- Steak and potatoes only.
- Everything except for oils, fats, onions, garlic, meat, dairy.



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Poll # 3.2: How should you feed your worms?

- Dump and run.
- Bury a small amount of food in one location per feeding.
- Delicately, with tweezers. Make sure classical music is playing in the background.



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Maintenance

- Check bedding weekly.
- It should feel like a wrung-out sponge.
 - Too dry? Add water.
 - Too wet? Add bedding.

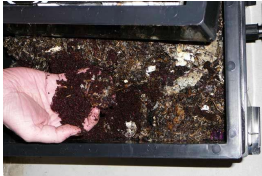


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Worm Castings or Compost

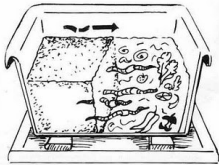
- After 6 weeks
 - Bedding becomes darker and decreases in volume.
- You can “harvest” the castings!
 - If the bin becomes overly full of worm castings, worms will die.



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One-Side Harvest Method

- Add food to just one side of bin.
- Once worms move over, harvest castings.
- Prepare fresh bedding & add new food.
- Repeat on other side.



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Moving Up Method

- Stop feeding worms in lower tray.
- Add food to the tray above the worms.
- Worms will leave the bottom bin and move into the upper tray.
- Harvest castings from lower tray.



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Pile Method

- Dump contents onto a plastic sheet.
- Divide castings into 5-6 piles.
- Worms will move to the bottom of the piles.
- Harvest from the top.



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Questions?



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Resources

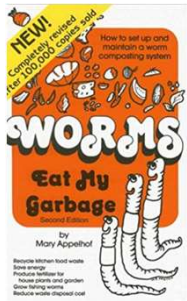
Terry Pellegrini

UCCE Stanislaus County Master Gardener

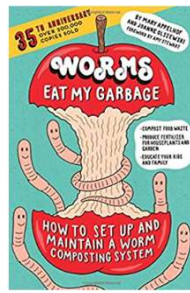


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The book that started it all...



Published in 1970's by Mary Appelhof



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Helpful Links

- Composting with Worms: *UCCE San Joaquin Master Gardeners*
http://sjmastergardeners.ucanr.edu/Composting/_Composting_with_Worms_220/
- Includes
 - Worm and worm bin suppliers
 - Instructions on building bins
 - “Adventures of worms” website

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Where to Get Bedding Material

- At home
 - Shredded newspapers & cardboard; chopped up plants
 - *Avoid glossy magazine pages*
- Hardware stores & nurseries
 - Coconut coir
 - Sand (two handfuls is enough grit for worm digestion)
 - Sawdust



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Where to Find Worms!

- Red wigglers best choice for bins
 - Bait/fishing stores (\$\$\$)
 - Online Worm Farms
 - Local?



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Questions?





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Troubleshooting with Terry





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Smelly or Humid Bin?

- Too much moisture.
 - Blocked drainage holes.
 - Too much food.
 - Added too many acidic foods like citrus peels or overly wet melon rinds.
- Correct
 - Add more holes, unblock holes, use drier foods, add more paper.



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Worms in a mud bath?

- Several inches of water at the bottom? Yikes!
- Save the worms.
- Remove waterlogged castings.
- Pour out the water.
- Start over.



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Fruit Flies



- Mostly a nuisance, swat/squish.
- Avoid adding too much food or spoiled fruit.
- If uncovered, cover with piece of old carpet, cardboard or lid on the surface.
- Add a spider or two to help reduce populations.






Cellar spider aka "daddy long legs"

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Good Bugs!
Found in Outdoor Bins


- Springtails (jump when disturbed)
- Sowbugs or pill bugs (rollie pollies)
- Fungus gnats (too many=too wet)
- Millipedes
- Soldier Fly Larvae

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Worms “Missing?”

- May try to escape if bin is too hot, too cold, too wet, or too dry.
- Predators digging/disturbing the (outdoor) bin.



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Questions?

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Help Us Grow!

Our follow-up email survey provides us the tools we need to grow and improve the quality of our program.




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Stanislaus County Library

Diane Bartlett, Librarian




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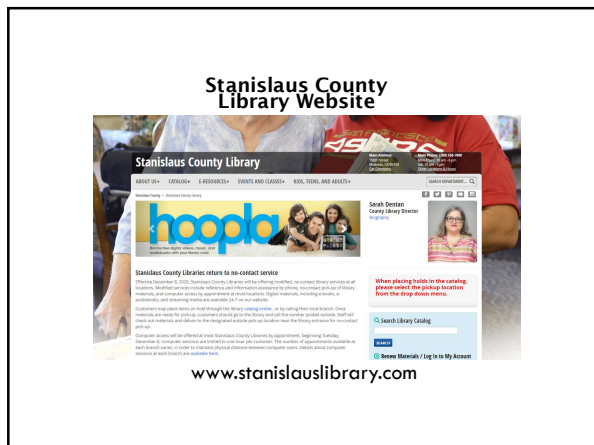
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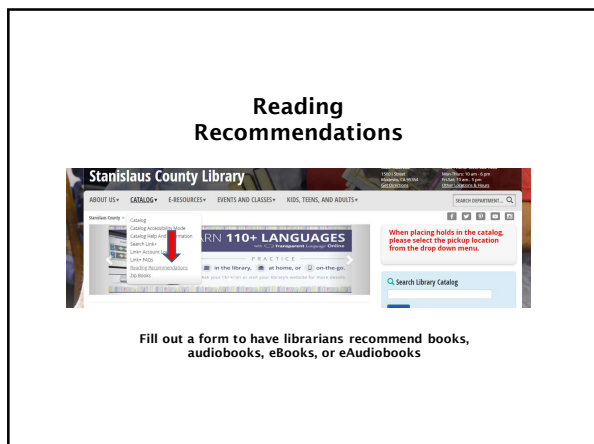
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FAQ's

- **I thought worms ate anything organic. Bones, meat, and dairy are organic. Why don't they eat those?**
- Actually, they will eat them, but it takes much longer for bones, meats, and dairy to break down to a point where worms will process them. In the interim, these products will rot, cause smelly conditions, and will attract pests and scavengers. It's best just to avoid these products.
- **Why shouldn't I feed them oily or salty products?**
- Worms breathe through their skin. To do this, their skin must stay moist. Oils will make it impossible for their skin to absorb air and salts will pull moisture from their body. Oils and salts could dehydrate, suffocate, and kill the worms

