

# You can still buy her books about raising worms

## Worms Make Compost Easy

*With a handful of earthworms and a 2-foot square box, you can compost kitchen scraps indoors or out, all through the year.*

WARREN SCHULTZ JR.

MARY APPEL-HOF'S compost system may be the easiest ever devised. She doesn't need a large cage or elaborate bin. Neither turning nor watering, nor extra manure is required. Animals don't invade her pile. Neighbors don't object. In fact, she doesn't have to take the garbage out at all. Mary makes compost indoors, all year.

Mary leaves the work to her little helpers—a thousand garbage-men that she raises in her basement in Kalamazoo, Michigan. Once or twice a week she delivers her kitchen scraps to them. But instead of carting the garbage off to the local landfill, the worms convert it into rich black compost, fine enough to be used in potted plants or for starting seedlings.

Mary has found that a pound of worms in a 2-by-2-foot box makes quick work of ½ pound of garbage per day, the normal amount of



**Start with a wooden box, bedding, and a pound of red worms. Then add garbage. Once or twice a week bury your kitchen scraps, starting at site one. When you've filled all nine spots, the garbage at the first site will be completely composted.**





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scraps produced by two people. Along the way, she's solved one of the biggest problems for small-scale composters: what to do with daily garbage. Adding small amounts of material to a large compost pile day after day disrupts the decomposition process so that the compost is never really done. And it's worse in the winter, when you're left with heaps of frozen garbage. You could store the scraps somewhere until you have enough to compost and the weather warms up. Or you can use Mary's system, bury a little bit at a time in worm bedding and let the worms break it down, cleanly and without odor.

Mary first got hooked on worms about a dozen years ago when she ordered two pounds of them through the mail. That first year a galvanized tub of worms in her basement turned out about 300 pounds of castings, which she used to fertilize her 1/3-acre organic garden. She dropped a handful of castings into the holes when transplanting broccoli and got the best crop ever. She knew then she was on to something good.

Most of us probably would have been satisfied with having stumbled on an easy way of composting, and let it go at that. Not Mary Appelhof. She decided to learn as much as she could about what was going on in her worm bin. So she spent the next ten years studying worm biology, experimenting with vermicomposting, keeping careful records all the while. She's finally reduced the system to four easy-to-understand components: the box, bedding, worms and garbage.

## AIR IS THE KEY

The amount of garbage to be disposed of each week will determine the size of the box. Mary's experiments have shown that the bin should have one square foot of surface for every pound of garbage per week. Whatever the size, the box should be shallow, between 8 and 12 inches deep to allow for aeration throughout the bedding. It's only if the air is cut off that anaerobic decomposition takes place, and that's what causes



odors. Otherwise, there's almost no smell.

Mary's standard worm box is 2-by-2 feet and 8 inches deep—big enough to handle two people's garbage. For larger families she recommends a 1-2-3 box, 1 foot deep by 2 feet wide and 3 feet long. That should handle about 6 pounds of kitchen scraps per week. Though the container can be made of metal or plastic, Mary says the best material is wood because it's porous and allows for ventilation and drainage. She's found that a box made from exterior-grade plywood will hold up for two or three years.

Over the years, Mary has tried just about every worm bedding imaginable, but she finally found a combination that worms thrive in. She uses a mix of  $\frac{2}{3}$  shredded corrugated cardboard to  $\frac{1}{3}$  peat moss. But nearly any other light, porous organic material—shredded newspaper, manure, or leaf mold—will work. "The worms have to be moist to be healthy," Mary says. "They're really stressed if you let them dry out." And it's the bedding that helps to maintain an even level of moisture.

A worm's body consists of about 75% moisture, and that's the proper level for the bedding. To prepare the bedding, Mary mixes 3 pounds of water with every 1 pound of dry bedding. A 2-by-2 box will hold 4 to 6 pounds of dry bedding mixed with 1 to 3 gallons of water. Mary mixes the ingredients in a large container, then throws in a couple of handfuls of soil before filling the box. Because worms have gizzards like chickens', they need grit to break down their food particles. The mix goes into the box and she's ready to add the worms.

### WHICH WORMS WORK?

Not just any worm will do in Mary's system. She uses *Eisenia foetida*, commonly known as the red worm, manure worm, or red wiggler. They are frequently sold in bait shops or through the mail. Mary says they're ideal because they will eat just about any kind of organic matter, they reproduce

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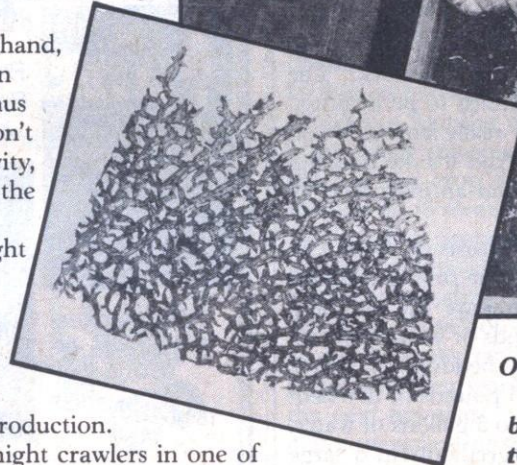


quickly, and they're tough. "They can stand being tossed around and stirred up," she says. The red worm, which sometimes shows a series of red and buff stripes, typically grows 3 to 4 inches in length. Mary sells them for \$12 a pound, but says you can probably find as many as you need if you know where to look. In their natural state they're found in compost heaps and manure piles. She wouldn't recommend them to someone who intended to "plant" them in a garden outdoors, though. They won't survive in the soil long without copious amounts of fresh vegetation to eat.

On the other hand, the bluish garden worm of the genus *Allolobophora* won't survive in captivity, and neither will the common night crawler. The night crawler needs room to roam. It relies on a complex series of tunnels for survival and reproduction.

"I once put 80 night crawlers in one of my bins," Mary says, "and one month later I couldn't find any in there." Red worms have a much better chance of survival. Start with one pound in a bin, give them a steady supply of food (garbage), and you can maintain the system indefinitely. "Actually, I suspect it really doesn't matter how many worms you start with," Mary suggests. "I think the number of worms you wind up with will be the number it takes to do the job."

The number of worms it takes, like the size of the box, depends on the amount of garbage you want to process. Mary estimates that one pound of worms can process about 1/2 pound of garbage per day. Mary doesn't bury trash in her bin every day, though. She normally



**One pound of worms in a 2-by-2-foot box can take care of two people's weekly garbage (about 3½ pounds). After three weeks, all that's left of a melon rind is this paperlike skin.**

saves up her kitchen scraps in a bucket, then empties them into the bin once or twice a week. She starts in one corner of the box, then works her way around, burying the garbage in a different spot each time. In all, a 2-foot-square box has nine burial sites. By the time she's worked her way around to the original site, five weeks later, the garbage there has all been decomposed, and she starts



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over again. After the second time around, nearly all the garbage and bedding have been converted to worm castings, and it's time to replenish the bin.

## THREE WAYS TO HARVEST

Mary describes three methods of harvesting worms and castings—low; medium; and high-maintenance systems. If all you're after is vermicompost for your garden, houseplants, or starting seedlings and don't want to cultivate worms, you can continue to bury garbage in the bin for up to four months, then let it sit unattended for an equal amount of time. At the end of this low-maintenance cycle, you'll have a box full of fine castings and very few worms. That can all be emptied into the garden.

If you want to keep the box going, you'll want to use the medium-maintenance method. That gives you castings and enough worms to start another bin. The easiest way is what Mary calls divide and dump. After about four months of vermicomposting, she removes the castings and whatever is left of the bedding, along with the worms from one-half of the bin. Then she fills that half with fresh bedding and begins burying garbage in that half. The worms from the remaining half will work their way across into the new bedding and decompose the garbage buried there. Mary continues to bury garbage in the fresh bedding for about two months, then removes the castings from the other side and fills that with fresh bedding and starts all over again.

Growing extra worms for fishing, your compost pile, or to start a larger bin means you'll have to use the high-maintenance method and harvest and sort the worms. That will take about two hours' worth of work every two or three months. (Anyone squeamish about handling worms need not apply.) To separate the worms from their castings, Mary spreads a large sheet of plastic on the floor or tabletop, then dumps the contents of the bin onto it divided into nine

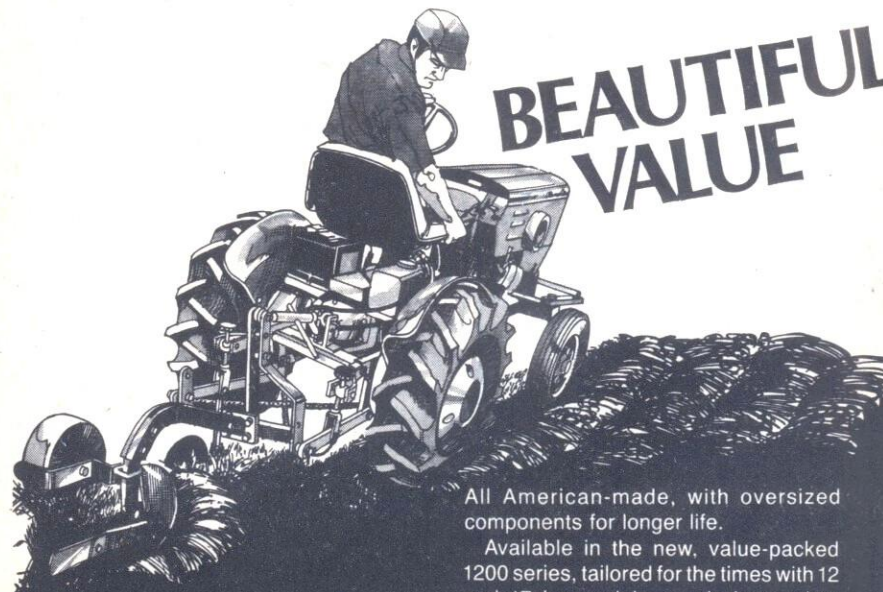


piles. The worms actually do most of the work, separating themselves from the castings. Mary shines a strong light on the piles and leaves it on for a few minutes while she takes care of other chores. Worms don't like light, so they burrow toward the bottom of the pile. When Mary returns she scrapes off the worm-free castings from the top of the heaps. By the time she's removed the top layer from all the piles, the worms have burrowed deeper, so she repeats the process until all that's left is a pile of wiggling worms. They go into a new bin. The castings can go into the garden or a potting mix.

Mary proudly displays before and after photos of plants transplanted into

vermicompost. Maybe the most spectacular pair shows a sickly African violet purchased for half price at a supermarket, then the same plant, bursting with 80 blossoms only a few months after it was repotted into castings. Mary says that gloxinias sown in worm castings will bloom within 2½ months whereas planted in conventional potting soil, it would take them 6 to 8 months to reach that stage. She's also found it to be a perfect medium for rooting avocado pits. Buried in her bins, nine out of ten of them rooted and grew.

It's really best not to use castings full strength to get those kinds of results either. For most of her potted plants, Mary uses a mix of equal parts castings, ver-



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**Separating worms from compost is easy. A bright light sends the worms deep into the pile, leaving pure castings above.**

thorough study of home vermicomposting, including a look at the biology of worms. In her book Mary admits that there are a few drawbacks to indoor composting. The most serious is fruitflies. But she says they're never

more than a nuisance unless you overload your bin with more garbage than the worms can handle.

According to Mary, though, the major problem is not with the bin itself, but with the public's attitude toward worms. The system works—Mary has no doubts about that—and her goal now is to calm people's anxiety about inviting worms into their homes. No, they won't escape from the box—they have no desire to be anywhere else.

As part of a government grant, Mary commissioned a survey to determine public attitude toward home vermicomposting. She found that 25% didn't want anything to do with it, 33% thought it sounded like a great idea, and the rest wanted to know more about it. "Using the system will involve some behavioral changes," Mary says. "You'll have to be willing to do things you haven't done before." But she's found that many people have accepted her system enthusiastically.

Earthworms will work nearly anywhere: basement, garage or outdoors as long as the temperature stays above 50°. They're clean, quick, and a lot more environmentally sound than sending your garbage to the dump.

miculite and peat moss. In the garden, she side-dresses her vegetables with castings, or sprinkles them right into the seed row or transplant hole.

The finished product from a worm bin will be nearly pure worm castings. After four months of work, the worms will have digested just about all of the garbage and bedding. The castings, an amalgam of soil, digested organic matter, enzymes, bacteria and other organisms, are high in nutrition. Compared to ordinary soil, they contain five times more nitrogen, seven times more phosphorus, and 11 times more potassium. They're also rich in humic acids and improve the structure of soils. Vermicompost is actually a more precise term for the worm-bin product because along with the castings it will also contain some undecomposed organic matter, soil, bedding, worms and other microorganisms. And it will continue to decompose once it's added to the garden.

### THE PUBLIC'S ATTITUDE

Last year Mary published a book, *Worms Eat My Garbage* (Flower Press, 10332 Shaver Rd., Kalamazoo, Mich., \$5.95 plus \$1 postage and handling), a

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