

Don't get me wrong. I'm as squeamish as the next person, and the idea of creepy critters wiggling in the dark makes my skin crawl... but only to a point.

I grew up in a small village in France where the integration of gardening into everybody's way of life was quite taken for granted. Our family ate the organically grown produce carefully tended by dad, and returned pails of peels and trimmings to the compost heap after meals.

Given the Town of Canmore's location in bear country, garden composting is not a good idea because it constitutes a wildlife attractant. But if you want to keep your garbage down to a minimum and create life where there would otherwise be useless dumping into landfills, you do have other options.

I started my compost bin shortly after attending a workshop put on by Andreas Comeau (of the Town of Canmore's solid waste department) in the fall of 2005. I bought a half pound of red wrigglers from Clean Calgary's EcoStore downtown for \$40. Expensive, yes, but we're talking about athletes here, specialists in their field, mighty eating machines. Redworms (*Eisenia foetida* and *Lumbicus rubellus* for a Latin erudite or red wrigglers, brandlings, and manure worms for us normal folks) are best for composting because they thrive on organic matter such as food scraps. Earthworms or "night crawlers" prefer to live in soil, and need an extensive tunneling system to survive: they'll die in a container.

The dream condo for my new pets consists of a sturdy dark plastic tote, 25 cm deep, which provides about 2 sq. ft. of surface area. I drilled 20 holes (5 mm across) in the top and bottom for aeration and drainage, and placed the bin on a tray, raising it at one end with a wooden block to allow air to circulate. Next I prepared the bedding, consisting of shredded newspaper (approximately 20 papers for 20 cm of bedding) soaked in water to the point where it has the



consistency of a wrung-out sponge, but kept reasonably loose. (You can also add fresh grass clippings, fallen leaves, and straw). The right level of moisture in the bedding is critical to the worms' ability to wiggle.

Just like birds, worms have gizzards and need "grit" to help them break down their food. A couple of table spoons of clean sand sprinkled on the bedding mix does the job. Finally, to keep fruit flies away and retain

moisture, I spread full-size, wet sheets of newspaper over the bedding.

Temperature-wise the little critters like it fairly consistent between 13°C and 25°C. In fact, wherever is good for you will be good for them too!

As far as food is concerned, they'll eat just about anything we eat and then some, but there are some definite do's and don'ts to keep the environment most productive and hassle-free.

GIVE THEM	DON'T GIVE THEM
Fruit peels and cores (no seed!)	Meat
Vegetable trimmings	Dairy
Tea bags and coffee grinds (with filter)	Bones
Egg shells (finely crushed)	Oily foods

Soggy breadcrumbs are fine on occasions too. In any case, chopping the food finely will help speed up processing. Just don't give them anything like the stalk of a banana unless you're ready to look at it for the next six months: tough fiber doesn't digest well.

The softer the food, the better. Paper is the worms' starch, and the vegetables their proteins.

For them as for us, a balanced diet is the foundation of well-being, so I make sure to give them variety. Organic foods are definitely best, but not a must. Though worms thrive in a fairly acidic environment, too much citrus waste will make acidity shoot up, so I include eggshells approximately once a month to balance it out and provide

minerals at the same time.

The key here is to start slowly, and to give the colony only the amount of food it can handle. Once you've figured out what that is, you can increase feeding incrementally.

We divide the bin into six, numbered quadrants to define six feeding areas. Rotating food deliveries from quadrant to quadrant encourages the worms to travel through their habitat and consume the bedding as they do. What they leave behind is their magnificent poop (castings). And black gold it is! Compared to ordinary soil, the castings contain five times more nitrogen, seven times more phosphorus, and eleven times more potassium. They are rich in humic acids and improve the structure of soil.

But as in any complex environment, the worms don't work wonders all by themselves. Fungi, springtails, sow bugs, pill bugs and millipedes break down the organics before the worms ingest them, and are an integral part of the composting process. So don't worry if you see other tiny living creatures in the bin.

People who are new to composting have two nightmare visions: worms escaping and crawling all over the house, and a stinking bin.

If you follow the simple rules above, you will have created an environment in which the worms will want to stay. Remember: they need moisture to breathe through their skin—leaving the bin would mean certain death in our dry climate. Also, the worms' skin is sensitive to light, and that's why they always burrow in deep when exposed: you can be sure that they're not about to leave the bin in broad daylight! The tote we use comes with a tight-fitting lid which is perfect to keep moisture in and light out. Your worms will thrive in this environment.

As far as smell is concerned (again, if you follow the rules above) you will find that the scent that pervades the bin at first is that of wet, mushy paper. Even as you add organic materials that break down over time, you will not smell foul rot the way you do when you lift the lid of your kitchen garbage bin right now. That's because the decaying matter becomes very quickly assimilated in the bacterial environment that promotes its total decomposition.

Finally, as the worms 'process' their food and slowly replace bedding and vegetable waste with compost, the smell is reminiscent of wet earth, like a garden after the rain, the colour and texture of moist, rich, chocolate cake.

Even though it seems counter-intuitive to disturb the worm's habitat, it is actually very important to work the bedding with a gardening fork on a regular basis to keep the organic matter from settling into a thick, wet mat. The densification of the bin's materials while decay is happening can lead to a lack of oxygen and can asphyxiate the whole worm population. I speak of experience and trust me, it is not a pretty sight!

Also, make sure that you lift your bin every few days to check if any "compost tea" needs to be collected from the base tray. This liquid is the result of the breakdown of water-rich foods, and it is a powerful fertilizer. But it will also go 'bad' fairly quickly (5-7 days) if not drained. So if you go away on holiday and a neighbour doesn't volunteer to look after your worms, even though it will be a bit of a waste, place the bin over a sink to allow the liquid to drain away.

When you're home, dilute 50/50 with water, use on your houseplants, and see them thrive!

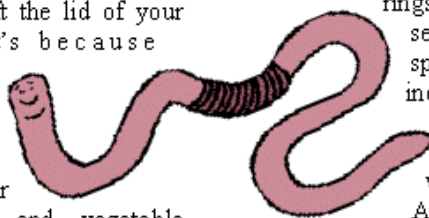


Let's talk about sex, baby!

Of course you know that worms are hermaphrodites: they can have it both ways. But it still takes two to make more.

Sexually mature worms are "banded". The bands (or rings) are called clitellum, and contain their sexual organs (look at this well-endowed specimen!). To reproduce, two individuals line themselves up and secrete a bonding substance that attaches them to each other for 15 minutes while they exchange sperm and egg. After several days, the fertilized eggs

form a cocoon which separates from the worms and incubates for at least three weeks. Though each cocoon may contain 20 young, only 2-5 babies typically survive. They look like a thin thread at first, approximately 1 cm in length and totally white, as they have not yet developed pigmentation or do not have enough pigmentation (blood) to be seen. It takes 8 to 10 weeks for them to become sexually mature and begin the cycle all over again. With a good food supply and optimal living conditions, worms can double their population every 90 days, which means that you'll be able to process your kitchen waste in greater quantities and shorter times as the colony grows. Remember to take the seeds out of apple cores or peppers



before you throw them in, or you may find germinating shoots among the castings: the stuff is so rich that seeds will naturally sprout in it!

Worms don't survive in their own waste and therefore as the bin fills with compost, it is time to harvest. There are a few good methods to separate the worms from the compost.

The fastest way is to take advantage of their sensitivity to light: open the bin and shine a strong lamp on it or expose it to the sun. This will cause the worms to work their way toward the bottom of the bin as they rush to avoid the light. While they move ever downward, scoop one shallow layer of compost at a time. By the time you see the bottom of the bin, it will be wriggling pink.

At this point, simply place a new layer of bedding over the colony and start the cycle again.

One important thing to remember is that you don't want to have any worms left in your compost prior to using it to repot plants or fertilize your garden. The red wigglers are voracious eaters and when deprived of 'proper food' will nibble at plants' roots, easily killing them; I speak of experience.

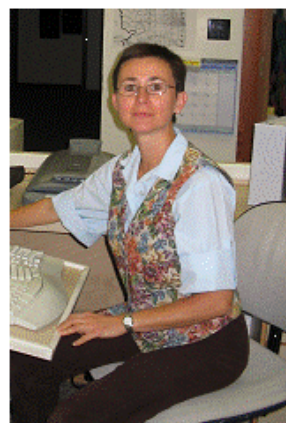
The way to ensure that there is none left in your compost is to... be patient. Harvest your compost in the fall, and store it over the winter. Check it once a month or so, and remove any worms that you see. Because they are very resilient, they can last for ages on the poor food source that their castings constitute. One sign of their failing health is their darkening colour as they become saturated with 'dark matter'.

Did you know that the word 'humble' comes from the Latin word '*humus*', meaning earth? Our worms' work is certainly humble, going on as it does mostly unacknowledged and in the dark. Yet observation skills and patience can certainly awaken your sense of wonder at the act of creation (or re-creation) taking place in your blue tote. As life thrives again from wastes that humans consider disgusting and undesirable, the humble worm has much to teach us about how skewed our modern value system is. One household at a time, our composting initiatives today can truly pave the way for a paradigm shift on environmental consciousness, showing that simple, daily, seemingly insignificant action forms the basis of a more caring attitude toward all life forms.

I gratefully acknowledge <http://www.cleancalgary.org/> , <http://compost.css.cornell.edu/worms/basics.html> - Biology , <http://lancaster.unl.edu/enviro/pest/factsheets/107-97.htm> , and <http://www.toronto.ca/compost/withworm.htm> for resources and information included in this article.

Come see me and my wriggling friends any time you like!

Marie-Pierre Chappeland



Marie-Pierre Chappeland is a Canmore resident. She works as office manager for the Bow Valley district of Kananaskis Country, at Bow Valley Provincial Park. She has a compost bin both at home and at work.