



NEWSPAPER ARTICLES

Under Our Feet: An Earthworm Story (June 14, 2025)

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My compost pile is teeming with red, wiggly worms. How did they get there? What are they doing? Are they beneficial in my garden? What other types of organisms are living in the soil? Research shows millions (maybe billions) of organisms are living in my little compost pile and in my yard. Gardeners and earthworms work hand in hand, working the soil and feeding the plants.

Let's start with some basic earthworm biology. Earthworms can be divided into three groups:

- **Epigeic** worms, which include the common red wiggler used in compost bins, live on the surface of the soil and eat rotting organic matter. They have a high rate of reproduction, thus are most useful to composting systems.
- **Endogeic** worms live within the soil, build lateral burrows, and are the only worms that eat large quantities of soil. They have little effect on surface litter, but prefer soils (12-18 inches below the surface) rich in organic matter, where they may play a role in decomposition of dead plant roots and in soil aeration. Red marsh worms are an example of an endogeic worm.
- **Anecic** worms, also known as nightcrawlers, come to the surface at night to drag leaves and other organic matter into their deep and permanent vertical burrows. These worms play a central role in the decomposition of leaf litter and in soil formation. Night crawlers **will not** survive in a compost pile, and are commonly sold as bait for fishing.

There are about 180 species of earthworms found in North America (Canada and USA); over thirty percent have been introduced. Worldwide, there are approximately 4,000 species of earthworms. Earthworms are hermaphrodites, with both male and female reproductive organs. Earthworms deposit their eggs into cocoons which are deposited in the soil. Red wigglers may produce over 900 eggs in a year; nightcrawlers produce only about forty. After the new worms hatch, empty cocoons add to enriching the soil.



Worms average six months to two years to reach adult size. Immature earthworms look much like adults. Adult red wigglers are small (2 to 5 inches), reddish-brown and striped; red marsh worms are larger (2.5 to 6 inches) and more purplish; nightcrawlers (4 to 12 inches) are pink to dark red. Red wigglers can live for up to a year, night crawlers up to six years.

Some earthworms have the ability to regrow lost segments, but this ability varies and depends on the extent of the damage. Several studies have shown a bisected worm can grow two whole worms, but this regrowth rarely occurs. In nightcrawlers, some studies have shown the head might regrow the tail section, but the tail section never regrew the head.

My worm research revealed that regardless of whether the earthworms present in a given area are native or non-native, they influence soil fertility. By breaking up plant residues in the soil and mixing them with the topsoil, earthworms bring these digested materials into contact with soil microorganisms that carry out decomposition and the formation of soil organic matter. The microorganisms themselves are a nutrient-rich food source for earthworms, and are ingested along with soil and plant residues. The worms return these nutrients to the soil, primarily in their feces, known as casts, which are readily available for uptake by plants. This cycling is known as the food soil web.

In many soils, earthworms play a major role in converting large pieces of organic matter into rich humus. A worm acts by pulling deposited organic matter, such as leaf fall or manure, below the surface. Once in the burrow, the worm will shred the leaf, partially digest it and mingle it with the earth in the form of casts, deposited on the surface or deeper in the soil. Minerals and plant nutrients are thus changed to an accessible form for plants to use. Investigations in the United States show fresh earthworm casts are five times richer in available nitrogen, seven times richer in available phosphates, and 11 times richer in available potassium than the surrounding upper 6 inches of soil. In conditions where organic matter in the soil is plentiful, the weight of casts produced may be greater than 9.9 pounds per worm per year. The earthworm's burrowing creates a multitude of channels through the soil and is of great value in maintaining the soil structure, enabling processes of aeration and drainage. No wonder an abundance of earthworms is generally considered beneficial by farmers and gardeners!

Recent research has produced figures suggesting that even poor soil may support 250,000 earthworms per acre while rich fertile farmland may have up to 1,750,000 per acre, meaning that the weight of earthworms beneath a farmer's soil could be greater than that of the livestock upon its surface!

Charles Darwin (1809-1882), famous for his theory of evolution by natural selection and his book, The Origin of Species, was also an avid researcher of earthworms. After visiting and observing worms at his uncle's home in Shrewsbury, England, he concluded earthworms alone were responsible for the rich uppermost layer of soil, which he referred to as "vegetable mould." In 1881, he published a little book (300+pages!) The Formation of Vegetable Mould. He calculated that an acre of garden soil could contain over fifty thousand earthworms and yield eighteen tons of castings per year. He studied their ability to bury objects in the soil, from chalk to Roman ruins, but mostly credited them with transformation of soil itself. "Their chief work is to mingle the whole with vegetable debris, and to saturate it with their intestinal secretions. No one will doubt earthworms play an important role in nature. There are not many other animals which have played so important a part in the history of the world, as have these lowly organized creatures."

So, next time you are out in your garden, pick up a worm, run your finger gently along its side and wonder at the role this creature plays in our planet Earth! I used several on-line resources, mostly university websites, for this article. Besides these sources, I enjoyed reading The Earth Moved, On the Remarkable Achievement of Earthworms, by Amy Stewart. Science and humor mixed together. You might enjoy reading it too.

Questions? Call the Master Gardeners:

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