



Earthworms: Nature's little Farmers

by Soubarna Mishra

When I was a kid, I loved digging soil in my backyard to play. Low and behold I would come across these long, squiggly, boneless, slimy things that first evoked fear and then disgust. My grandfather helped me understand that these mysterious, fear-evoking creatures under the soil are a gardener's best friend and completely harmless. They are responsible for building healthy soils which grow healthy plants that provide us food.

Since then, I have looked at earthworms with a sense of gratitude. I feel happy when I see them in my garden, because it tells me that the soil is in good care.

Earthworms are invisible, hardworking, free garden helpers who eat broken bits of leaves, grass, food scraps and things that plants can't use. They turn them into nutrient-rich, finer organic matter, called worm castings, that is a valuable natural fertilizer, by simply passing them through their digestive systems.

Therefore, Aristotle referred to them as "the intestines of the Earth," and Charles Darwin called them "nature's little farmers," while describing their beneficial effects on soil structure and fertility.



Benefits for Humans

Earthworms are animal decomposers that extract food energy from dead and decaying plants and animals. They take in nutrients from small bits of decaying organic matter and microorganisms as they ingest the soil with their mouth, in front of their tubular segmented bodies, in an action to move forward within the soil. In this way they break down the organic matter into even finer parts, help to loosen the soil, increase air circulation and water penetration, and thereby support plant root growth. Their excreted waste deposits, known as worm castings, are rich in nitrogen, phosphorus and potassium,

essential for plant growth.

Earthworms "turn" the soil, which means they bring down organic matter from the top and mix it with the soil below.

They need moist environments to survive and function. If the soil dries out, they either dig deeper in search for moisture, or have trouble burrowing to move forward within the soil and eventually die.

Natural Fertilizer-Producing Factories

For instance, if there are 500,000 worms living in an acre of soil, they could make 50 tons of castings. These same 500,000 worms burrowing into an acre of soil can create a drainage system equal to 2,000 feet of 6-inch pipe. This is an amazing feat for just a little worm.



Wormy Facts

Earthworms are neither an insect nor an arthropod. However, they do live underground like many of these creatures do. They are invertebrates that lack an exoskeleton and instead have soft bodies.

There are more than 5,500 named species of earthworms known around the world.

They exist almost everywhere except for polar and arid climates. They range in size from 2 cm to more than 3 m.

Earthworms have no eyes or legs. Their bodies are made up of ring-like segments called annuli. These segments are covered in

setae, or small bristles, which the worm uses to move and burrow. They travel underground by moving their segmented bodies through muscular contractions that shorten and lengthen their body. Worms can replace or replicate lost segments, although this ability varies between species and depends on the extent of the damage.

Earthworms breathe through their skin. They spend most of their time inside the soil.

Earthworms are unable to produce their own food, nor do they eat other live organisms.

Three Types of Earthworms Act as Decomposers

Epigeic earthworms—live on the surface of the soil and plant litter, making them ideal for making compost. They are also known as Compost earthworms. They are most likely to be found around very rich, rotting vegetation. They can rapidly consume this material; they also reproduce very quickly. Compost earthworms tend to be bright red in color and with stripes. They are often used to help dispose of waste and remove contaminants from soil. Example: Red Wiggler, *Eisenia fetida*



Endogeic earthworms—live in the top layer of soil, make horizontal burrows to move around, and feed mainly on organic matter. They often come in pale colors, such as grey, pale pink, green or blue.

Example: Grey Worm, *Aporrectodea caliginosa*

Anecic earthworms—make deep, permanent vertical burrows in soil. They feed on leaves on the soil surface that they transport into their burrows. Their castings can be easily found on the surface of the soil.

Example: Nightcrawlers, *Lumbricus terrestris*



The Dark Side of Earthworms

While farmers and gardeners appreciate earthworms for their beneficial effects on agricultural and vegetable garden soils, they lose their “Good Samaritan” image when it comes to forests. Study after study show that earthworms can have a negative impact on our forest ecosystems. These gentle, hardworking creatures that miraculously help our farms and gardens to flourish can wreak havoc on our forests.

Earthworms, several of which are not native to North America, are to blame for changing the forest floor in ways that threaten the survival of some indigenous plants and animal species. Earthworms don’t migrate into forest floors by themselves. People are responsible for

introducing them into new environments and ecosystems. Earthworms by themselves advance no more than 15-30 feet per year.

In the forests, earthworms are most common around lakes, ponds and streams, because anglers dumped unused fishing bait there.

Native North American earthworms have been gradually replaced by more rigorous earthworm species introduced by early European settlers, suitable for farming and agricultural purposes. These new introductions can rapidly reproduce and dominate forest ecosystems, disrupting their delicate balance. They can speed up decomposition of the thick layer of plant matter that carpets the forest floor. This thick layer of plant materials acts like a sponge that retains water and nutrients. It is home to a complex web of microlife that slowly processes these nutrients.

When invasive earthworms find their way into these ecosystems, they can decompose this layer of forest ground cover in just one summer, when normally it takes several years to decay. As a result of this activity, the affected grounds become more receptive to other invasive species.

To protect our forests' delicate ecosystems, we can start by being mindful of the ripple effects of our gardening and farming practices and their impact on the larger environment. We must be careful to keep these earthworms within our farms and gardens, and not move them around to places where they can cause trouble. Ironically, earthworms are a bane to forests for the very same reason they're a boon to farms and gardens.

RESOURCES

Two UC research-based articles to start your worm composting journey:

- Composting with Worms, UC Master Gardener Program of Contra Costa County Information Handout:
<https://ccmg.ucanr.edu/files/240303.pdf>
- Composting and Vermiculture for Home Gardeners, a YouTube talk by Joie Spinelli and Dr. Dennis Shusterman:
<https://youtu.be/E77Yps9K2bw>

More on Earthworms:

- Earthworm Information, Sustainable Agriculture Resource and Education Program:
<https://sarep.ucdavis.edu/are/ecosystem/earthworm>
- Earthworm Ecology in California, UC Oaks, Oaks 'n' Folks, Volume 15, March 2000:
<https://oaks.cnr.berkeley.edu/earthworm-ecology-in-california/>
- Earthworm—*Lumbricus terrestris*, UC IPM, Guide to Healthy Lawns,
<http://ipm.ucanr.edu/TOOLS/TURF/PESTS/inearthwm.html>
- Earthworm Problems? UC Cooperative Extension, Ventura County:
<https://ceventura.ucanr.edu/index4.cfm/&blogasset=109383&sharebar=email&blogtag=PCO&close=yes?blogtag=worm&blogasset=109383>

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