

MEET THE Earthworms OF NEW YORK STATE

Charismatic Denizens

of the

Soil

BY JWORM WORKING GROUP

Unless you are an angler, you probably don't think about worms too much. But like many tiny organisms, worms are often viewed differently by different people. Anglers see them as bait, others see them as icky. But the earthworm is actually an interesting invertebrate.

New York State is home to about 30 different species of earthworms, although only five are native to North America. Most of New York's earthworms have been introduced during the past 400 years from Europe and Asia. They are generally out of sight, living on or in the soil, and are often encountered while gardening or digging for fishing bait, or on sidewalks around town on a warm, rainy morning.

Earthworms are engineers, modifying the soil through their burrowing and feeding activities. Some species excavate their homes up to two meters deep, while others live close to the soil surface, dwelling among decaying leaves and logs. They have a varied diet consisting of leaves and organic matter, fungi, and soil microorganisms. Some worms will

also nibble on live plant roots, and occasionally eat fresh foliage or small seedlings.

Life History and Ecology

Earthworms in New York include annual species that overwinter in small cocoons (egg casings) and long-lived species that can survive several years by burrowing below the frost line. Depending on the species, earthworms may reproduce sexually or clone themselves (self-fertilize). Sexual species are hermaphrodites, possessing both male and female parts. Regardless of their lifecycle, all earthworms produce cocoons that hold one to many tiny eggs.

Earthworms are grouped by where they live in the soil. Some live on the soil surface (epigeic), others burrow horizontally in the soil (endogeic), and still others make deep vertical burrows (anecic).

While all earthworms feed on organic matter, where they consume this food depends on where they spend time in the soil. Epigeic species consume litter at the soil surface. In contrast, anecic species pull organic matter into their burrows, but leave

difficult to digest portions in small, recognizable piles at the soil surface called middens.

Through their burrowing and feeding behaviors, earthworms are highly effective at modifying the soil structure, chemistry, and biodiversity of soil organisms and plants. Often, the activity of non-native earthworms will aid the spread of invasive plant species, such as European buckthorn and garlic mustard.

Identification Tips

While all earthworm species can appear alike at a distance, where earthworms are found in nature can be helpful when trying to identify them. Each species tends to occur in certain habitats and microhabitats, such as within the leaf litter of a forest. Additionally, earthworm species distribute their casts (solid waste or worm manure) in distinctive ways. For example, Asian jumping worms create a uniform layer of granular casts on top of the soil surface, while the common nightcrawler and mud worm produce casts in small piles near the openings of their burrows.



Frank Ashwood

Earthworm Cocoon



Frank Ashwood

Earthworm species differ in size, color, and the shape and position of the collar, called a clitellum, which is the most conspicuous body structure of an earthworm. Most identifiable features of earthworms are only evident when the earthworm is mature, which is indicated by the presence of the clitellum (this structure makes the egg cocoon).

Earthworms can be reddish brown, grey, pink, golden yellow, or pale blue. Species that spend most of their time underground are usually pale pink or grey, whereas species that feed on the soil surface are typically dark reddish brown. All earthworms have a clitellum at maturity; however, its shape, color, and location differs depending on the type of earthworm. Counting the number of segments between the mouth and the clitellum is one of the ways biologists identify earthworms.

On the following pages we highlight a few types of worms.

Conservation and Reporting of Invasives

New York State has only a few native earthworms, and these are all found in undisturbed habitats. The native species listed in this article inhabit unpolluted wetland and stream ecosystems in many parts of the state and provide another reason to support conservation of these valuable habitats. There also is a small group of native litter worms called “bark worms” that are often found under the bark of rotten logs in mature forests. So, we can conserve our native earthworms by conserving natural forest and wetland habitats throughout New York.

Invasive earthworms transform soil and can have negative impacts on other organisms, including ground-nesting birds, salamanders, millipedes, trees, and forest plant species. Currently, there is not an effective method to permanently remove invasive worms from a location, which means preventing their spread into new areas is the best tool to decrease negative impacts.

Although earthworms are familiar animals, there is much that scientists do not know about the earthworms found in natural habitats in New York, making your sightings and contributions very important. There are multiple ways you can report sightings of native and invasive worms. In New York, invasive worm sightings can be reported to NY iMapInvasives, www.nyimainvasives.org/.

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SPECIES Profiles

(N indicates native, I means introduced worms)



Tim McKay

N

Mud Worm

The mud worm (*Sparganophilus eiseni*) is an earthworm of streamside and wetland habitats, both above and below the waterline. This worm makes characteristic little piles of castings at the surface that offer a clue to its presence. When found, this long, thin earthworm will coil into a tight ball. Its clitellum is very close to its nose and is creamy white and large. Although they can be four to six inches long when mature, mud worms appear very small when coiled because they are so thin.



Gili-Han Chang, Soil Ecology and Biodiversity Lab, National Taiwan University

N

American Gray Soil Worm

The American gray soil worm (*Eisenoides lonnbergi*) is sometimes called the bog worm because it can usually be found in bogs and other types of wetlands. In fact, within New York, this species has only been collected from wetlands. It is a large earthworm at maturity (six to eight inches long), with a color that varies among slate grey, reddish brown, and purple.



Amiee Dodson

I

Common Nightcrawler, Canada Nightcrawler, Dew Worm

The nightcrawler (*Lumbricus terrestris*) is a deep, vertical-burrowing (anecic) earthworm species whose pigmentation reflects its habitat. This worm has a gradient from light pigmentation at the tail, which is usually below ground, to dark pigmentation at the mouth, which is frequently exposed. It has a characteristic flattened 'beaver tail' that facilitates its movement. Except for jumping worms, this is one of the largest pigmented earthworms commonly found in North America, ranging from 4 to 10 inches long.



Tim McKay

I

Octagonal-Tail Worm

The octagonal-tail worm (*Dendrobaena octaedra*) is one of the most widespread earthworms in North America. Originating in mid-latitude regions of Europe, this is a leaf litter-dwelling (epigeic) species with a high tolerance to acidic soils and cold temperatures. It can be distinguished from other common earthworms by its deep purple coloring and small size (3/4 to 1 1/2 inches). In many places previously covered by glaciers, these earthworms continue to inch their way northward.



Gili-Han Chang, Soil Ecology and Biodiversity Lab, National Taiwan University



Tim McKay



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Justin Barabala

Red Composting Worm, Red Wiggler, Tiger Worm

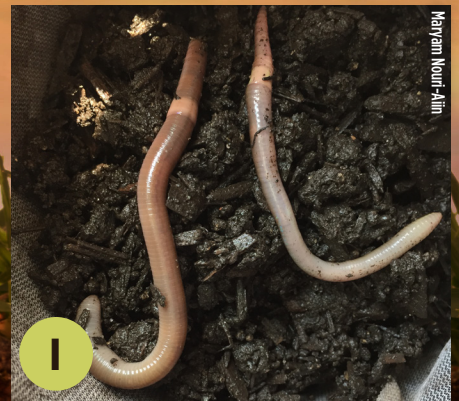
The European red composting worm (*Eisenia fetida*) is the most commonly used earthworm in vermicomposting systems (using worms to recycle food scraps and organic matter into compost). It is rarely found in natural habitats, preferring compost piles where it sometimes forms very dense populations. It is a small, reddish earthworm, usually no more than four inches long. When stretched during movement, it can appear striped with yellow, because it does not have reddish pigment at the junctions between its segments. For this reason, it is sometimes called the tiger worm.



Cih-Han Chang, Soil Ecology and Biodiversity Lab, National Taiwan University

Green Stinkworm

The green stinkworm (*Amyntas hupeiensis*) is a species native to eastern Asia that makes long vertical burrows and feeds at the surface at night (like a nightcrawler). Although they are in the *Amyntas* genus, they do not exhibit the same movement behavior as jumping worms. When encountered, these worms coil themselves into a ball and emit a strange, foul smell. In high abundance, they can be particularly damaging to turf grass through their casting activity.



Mervan Nouri-Amin

Jumping Worm

Native to East and Southeast Asia, jumping worms (*Amyntas agrestis*, *Amyntas tokioensis*, and *Metaphire hilgendorfi*) are spreading quickly into forests and horticultural landscapes throughout New York. These three species, which look very similar to each other, often co-invade. Their common name refers to their movement behavior. When disturbed, they thrash and often appear as if they are jumping. These earthworms are endo-epigeic; they live and feed within the organic layer (e.g., leaves, mulch, etc.) or within a few inches of the topsoil. As annual species, they hatch from small cocoons in the spring, grow to reproductive maturity in a few months, then die in the late fall, usually after the first hard freeze. Adult jumping worms have a milky-white to pink clitellum near their head, in contrast to their reddish-brown pigment. They are highly effective at modifying the topsoil structure into loose, granular castings.



Cih-Han Chang, Soil Ecology and Biodiversity Lab, National Taiwan University

Canadian Worm, Pink-Nosed Worm, Grey Worm

This group of closely related earthworm species (*Aporectodea spp.*) look alike, and their classification is still under debate. Telling these species apart often requires access to molecular techniques, such as DNA barcoding. As a group, these species have an appearance that is patterned from the nose back: a pinkish nose, followed by a whitish area, followed by a brownish-grey body that is interrupted by a clitellum that is often orangish. At maturity, these species will range from three to six inches. They are found in temperate regions across the globe and range in habitat from urban to remote rural areas. They reside deep in the soil (endogeic), so they're either unpigmented or lightly pigmented.



Frank Ashwood



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