

EARTHWORM FUN QUIZ

Lesson developed by: Geoff Kennedy, Summit County Master Gardener Volunteer

WHY??

So why would anyone want to give a quiz about earthworms? Let alone take one! Actually, earthworms play a very important part in the biology of the soil and lead very interesting lives. This quiz is a fun way to get people thinking about earthworms in a new way.

BACKGROUND

Earthworms live all over the world, pretty much anywhere there is moisture and decaying plant material. In fact, Clive A. Edwards of Ohio State University notes that, "In terms of biomass and overall activity, earthworms dominate the world of soil invertebrates, including arthropods [insects, spiders, etc.]" As the quiz points out, there are lots of different kinds (species) of earthworms, and since they are so widely distributed and live underground it is really difficult for scientists to figure out exactly how many different kinds there are.

Earthworms are invertebrates, meaning that they have no skeletons. But they do have lots of muscles. Their bodies are made up of many segments, how many depends on the kind of earthworm it is and how old it is. Some have 150 segments or more. While some earthworms can re-grow some of these segments, like a tail, it is a myth that you can cut them up and they will grow into whole new worms.

Earthworms eat dead plant material. And they can eat a lot of it. As the quiz notes, Red Wigglers can eat half their body weight a day. In doing so they provide important services to the soil food web. Earthworms alter soil structure, improve the way water moves through the soil, enhance the availability of nutrients and how they are used, and enhance plant growth. Here are just some of the things earthworms do:



Earthworms stimulate microbial activity. As earthworms eat and excrete dead plant material it is ground up and inoculated with microorganisms. Microbes help convert organic matter into forms readily useable by plants.

Earthworms mix the soil. Charles Darwin calculated that earthworms can move large amounts of soil from the lower strata to the surface and also carry organic matter down into deeper soil layers. It is projected that earthworms can completely turn over the top six inches of soil in ten to twenty years.

Earthworms increase air and water infiltration. Some earthworms make permanent burrows or tunnels deep into the soil. Other earthworms make less permanent horizontal burrows near the surface. These burrows increase the overall porousness and drainage of the soil and can help rainwater to get deep into the soil instead of running off. This can help prevent soil erosion.

Earthworms grind up and bury plant residue. Plant and crop residue are gradually eaten by the earthworms and buried in their cast material (worm poop) as earthworms move surface residue into their burrows. See a video at <https://youtube.com/watch?v=80C-rzynlYw>

Earthworms improve water-holding capacity. By incorporating organic matter into the soil and increasing soil porosity and aggregation, earthworms can significantly increase the water-holding capacity of soils, which is important for plants during dry spells.

Earthworms provide channels for root growth. Plant roots are not drill bits. They follow pores and spaces in the soil. Burrows made by earthworms not only provide channels for roots to follow, but they are also lined with nutrients that the plants can draw upon.



BUT...

It seems that there is always a “but”. As noted in the quiz, there are no earthworms that are native to our area, or to much of the northern United States and Canada. Glaciers wiped them out. These areas were traditionally forests, and they evolved without earthworms and became adapted to growing in soil covered heavily with leaves. Worms have been introduced to those areas by humans, often accidentally. Worms destroy that leaf cover by eating it. This makes it more difficult for seeds from native plants to germinate and grow while at the same time making it easier for invasive weeds to take over. The good news is that worms expand their range fairly slowly, so if people can be educated to be more careful and not move earthworms around it can make a big difference.

THE QUIZ!

The Earthworm Fun Quiz has 11 questions. Depending on the applicable safety protocols, players can work individually or in teams. **NO LOOKING ANSWERS UP ON THE INTERNET!**

Traditionally, all the questions would be read and answered by the players, and then the answers would all be given at the end. Scoring could be done on the honor system. Obviously this quiz can be handled any way that works best for your situation. In addition to the correct answer most questions have a little additional information to share, to make the quiz educational, and hopefully fun, for the participants.

THE SNACK

You always need a snack at a Pub Quiz. Depending on your participants’ sense of humor, it might be fun to serve gummy worm dirt cups after the quiz. These are easy to make using chocolate pudding, some crushed up chocolate cookies and a few gummy worms.



To make the soil layers, spoon a little pudding in the bottom of a clear glass or cup and sprinkle a layer of cookie crumbs on it. Arrange about three gummy worms on top of that layer so that they stick up out of the top of the cup and hold them in place with some more pudding.



Then top with some more crushed cookies.

Contact Information:

If you have any questions about this activity, please email mgsummitcounty@gmail.com.

We hope you benefitted from this activity. Please let us know if you utilized this with a quick email to the above address. Please send your name, facility name, number of participants involved in this activity, and your feedback for improvement so we can measure our impact and improve this product. Thank you!

Unlabeled photo sources: Geoff Kennedy

The Earthworm Quiz

1. How many different species of earthworms are there?

- 2,700
- 3,000
- 4,400
- 5,000
- 6,000
- 7,000

Answer: They are all correct (depending on who you ask). So point for everyone! As the name suggests, earthworms live in the earth, and they live all over the world. They live anywhere there is moist soil and dead plant material. Their wide distribution and underground habitat makes it difficult to determine exactly how many different species there are. So what we are left with are educated guesses. But there are lots of different species.

2. In the wild the average earthworm can live about

- 6 months
- 1 year
- 2 years
- 4 years
- 6 years

Answer: 6 YEARS! But they usually don't. They usually get eaten first. Birds and mammals are the main predators of earthworms. More than 70% of the diet of the American Woodcock is earthworms.

3. How long was the largest earthworm recorded?

- 10 inches
- 18 inches
- 3 feet
- 6 feet
- 22 feet

Answer: 22 FEET (FOUND IN SOUTH AFRICA). The Australian Gippsland Earthworm grows to 12 feet long and can weigh 1-1/2 pounds.

4. In the TV show *WKRP in Cincinnati* advertising jingle, what worm was "The Cadillac of Worms?"

- Night Crawler
- Red Wiggler
- Alabama Jumper
- Blue Darter

Answer: RED WIGGLER, THE CADILLAC OF WORMS!

(<https://www.youtube.com/watch?v=8K4mK7R9zSA>)

The Earthworm Quiz Continued

5. Given favorable conditions, how many earthworms can an acre of land support?

- Ten thousand
- Fifty thousand
- One hundred thousand
- Five hundred thousand
- One million

Answer: ONE MILLION! In part this is because different types of worms inhabit different soil levels and have different feeding strategies. **Epigeic** species live at or near the soil surface and feed on leaf litter, decaying plant roots or dung. These earthworms do not form permanent burrows. **Endogeic** species live in the topsoil, roughly the top 10 inches of the soil, and eat large amounts of soil and the organic matter in it. They form shallow semi-permanent burrows. **Anecic** species burrow deep into the subsoil, making permanent burrows as deep as 10 feet below the soil surface. These burrows extend horizontally and vertically through the subsoil. They collect food from the soil surface and ingest organic matter from the soil. When they eliminate this material we call it “worm castings.” You can actually buy worm castings for your garden! According to the University of Illinois, if there are 500,000 worms living in an acre of soil, they could make 50 tons of castings. That’s like lining up 100,000 one pound coffee cans filled with 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.

6. Charles Darwin spent how many years studying earthworms?

- None, he didn’t study them.
- 2 years
- 13 years
- 26 years
- 39 years

Answer: 39 YEARS! Mostly in his own garden. Darwin determined that worms played an important role in turning over the soil at a time when many people considered them merely pests. His book, *The Formation of Vegetable Mould Through the Action of Worms, With Observations on Their Habits*, published in 1881, **sold better than On the Origin of Species during Darwin's lifetime**. Darwin said, “All the fertile areas of this planet have at least once passed through the bodies of earthworms,” and noted, “It may be doubted whether there are many other animals which have played so important a part in the history of the world, as have these lowly organized creatures.” Although this was a revelation in 19th century Britain, it was actually Old News! In the 4th century B.C., Aristotle said that “worms are the Intestines of the Earth”

7. In the wild, are there

- More male earthworms
- More female earthworms
- The same number of each.



Answer: THE SAME NUMBER OF EACH. EXACTLY! Worms are hermaphrodites. Each worm has both male and female organs. Most other species need a male and a female to reproduce, but each worm produces eggs, sperm and offspring. Earthworms produce egg capsules which are about the size of a grain of rice, and the young hatch as fully formed worms, only tiny.

The Earthworm Quiz Continued

8. A study in 2004 reported 161 species of earthworms **known** to occur in North America north of Mexico. How many of these are native to northeast Ohio?

- 5
- 9
- 17
- 26
- None

Answer: NONE! There are NO native earthworms in Northern Ohio, in the entire Great Lakes region, or in the entire northern part of North America. The last glaciers killed any native earthworms in the areas they covered. As a result, for the last 11,000 years, since the glaciers receded, our ecosystems have developed without earthworms. The worms we have in our yards and gardens now were brought here by settlers, either intentionally or in plant material, or more recently have escaped from compost piles or have been discarded by fishermen. While this might seem like a good thing, it is a problem for woodland areas because those areas became adapted to growing in soil covered heavily with leaves. Worms destroy that leaf cover by eating it. This makes it more difficult for seeds from native plants to germinate and grow while at the same time making it easier for invasive weeds to take over.

9. The Worm Moon is

- Not a real thing.
- A name for the crescent moon.
- A name for the new moon.
- A name for the full moon in March

Answer: A name for the full moon in March. Worm Moon is a traditional name referring to the full moon in March, the time of year earthworms are visible on the surface as the soil thaws.

10. How many hearts do earthworms have?

- None
- 1
- 2
- 3
- 5

Answer: Five. In earthworms, structures called aortic arches function like a human heart. There are five pairs of aortic arches, which have the responsibility of pumping blood into the blood vessels. On the other hand, earthworms don't have any lungs. Earthworms breathe through their skin.

11. Red Wigglers are frequently used as composters, eating garden waste and kitchen scraps. In good conditions how much food can Red Wigglers typically consume per day?

- 5% of its own weight
- 10% of its own weight
- 20% of its own weight
- 50% of its own weight

Answer: 50% of their body weight. So how much food per day would that be for YOU? (You don't need to tell anyone.) See, Red Wigglers really are the Cadillac of Worms. To help them digest food, worms have tiny stones in their gizzard.