

EARTHWORMS – SAVIOURS OF SOUR SOILS

Why should we care about these creatures that some of us only notice on a rainy day, maybe even lying squashed on the road?

Charles Darwin, who discovered the theory of evolution, had great respect for earthworms, stating that they do not gnaw on plant roots as farmers believed at the time. They 'eat' using a sucking motion, where they take in small earth particles consisting of animal and plant waste which had been partly digested by microorganisms, as well as minerals.

The earthworm then mixes and digests these components and secretes them in the worm's poo. The worm poo now contains living matter mixed with non-living matter (minerals) – the best mix to fertilising the soil [1].

In order to grow plants require sun, water, and porous, nutrient rich soil, that is pH neutral.

What is pH?

pH stands for **p**ower of **H**ydrogen and shows if a substance like soil is either sour (lots of Hydrogen H⁺ ions) like vinegar, neutral like water or alkaline like lime or bleach.

How does the soil turn sour?

Acid rain can cause soil souring, when the rain drops dissolve fumes from car exhausts. Using artificial fertilisers acidifies the soil as they add phosphoric acid, which lowers the pH. Decaying plants and animals also make soil more sour.

This is where the **earthworms** come in. They churn over the soil, creating more pores for air and water.

While tunnelling the soil the earthworm feeds on sugars and proteins from dead plant. As it does not have teeth, it needs bacteria and fungi to break the plant food down. Its trick is to stick the plants bits on its tunnel walls, put its poo on top (which contains the bacteria and fungi) and feed on the resulting mash once its readily digested. Yum! [2]

The resulting poo of the earthworm- it's now much more concentrated and full with minerals- has turned from sour to neutral. Just as growing plants like it.

Did you know?

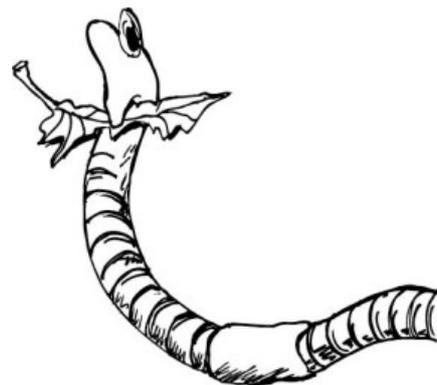
- Earthworms eat every day up to half their body weight.
- Other microorganisms like **bacteria** and **fungi** also contribute to soil fertility by digesting dead plants and animal matters. Nitrogen-fixing bacteria gather the air nitrogen and turn it into nutrients for plants.
- Actinomycetes (a type of soil bacteria) are our best hope for find new antibiotics. Some of the best-known antibiotics (Streptomycin) have already been harvested from this species.



Common earthworm



earthworm poo (very nutrient rich, moister and less acidic than human poo)



Earthworm Experiments [3]

A) Create an earthworm habitat

Equipment: aquarium or plastic bucket with lid
Soil
30 earthworms
Food: Lawn clippings, leaves, coffee grounds, porridge oats, potato or apple peelings

Fill container with soil until 5 cm from the edge. Add earthworms to top and cover with food. Cover and put into a quiet, dark place. Air every 2-4 days and if dry moisten soil. Check the food layer for mould and swap if this is the case for new food.

B) Can earthworms smell?

Equipment: 1 healthy earthworm
1 plate
3 plastic cups
Vinegar, mustard, honey
1 big cup of water
1 table spoon
Cotton buds
Kitchen towel

1. Mix ½ spoon of honey with 4 spoons of water in a cup. Clean spoon with kitchen towel and make solutions with mustard and vinegar as well.
2. Put earthworm on plate.
3. Dip cotton bud into honey water and remove any excess drips before first touching earthworms front end and then its sides with the bud. How does the worm react?
4. Repeat with vinegar and mustard solutions.

What are your conclusions?

➔ Now have a go the OPAL Earthworm quiz. <https://www.opalexplornature.org/soilquiz>