

Looking after your livestock starts below ground!

Under ideal conditions, it is estimated that a healthy earthworm population can process around 12 tons of soil and organic matter in a year, and a healthy pasture will have a greater weight of stock beneath the surface than above. Research from Rothamsted Experimental Station has produced figures suggesting that even poor soil may support 250,000/acre (62/m²), whilst rich fertile grassland may have up to 1,750,000/acre (432/m²). This fact sheet will give you the basics behind the livestock under the surface, and why they are crucial to efficient stock husbandry above ground!

WORMS AND SOIL HEALTH

Earthworms improve soil structure by dragging down organic matter, mixing soil and creating tunnels that improve drainage.



Worm casts are rich in recycled plant nutrients, and can contain up to 40% more beneficial humus than the top 23cm of soil. Research carried out in the USA has shown that a fresh worm cast can hold as much as 5 times more accessible nitrogen, 7 times more accessible phosphorous and 11 times more accessible Potash than the surrounding top soils.

It's estimated that there are around 3000 different species of earthworms found globally, with 20 species in the UK. There are three more common groups or ecotypes:

Organic matter dwelling (EPIGEIC)

Live at or near the soil surface.
Tend not to burrow into the soil.
Eat material that is high in organic matter, e.g. decaying plant roots and shoots, dung and leaves.
Reproduce rapidly.
Short lived.
Often bright red, with no stripes.



A Sub group of these are compost worms- They prefer warm and moist environments with a ready supply of fresh compost material. They very rapidly consume this material and reproduce very quickly. Compost earthworms tend to be bright red and stripey, and larger than most other mature earthworms.

TOPSOIL DWELLING SPECIES (ENDOGEIC)

Live in the top 20-30cm of soil.
Eat significant volumes of soil and decaying organic matter.
Burrow through the soil, ingesting as they go, creating branching horizontal burrows and mixing the top soil layer- will reuse burrows to a certain extent.
Not important in the incorporation of surface litter.
Produce stable casts.
Reproduce rapidly- approx. 1.4 young per adult per week in some species!
Have no skin pigmentation. Usually pale grey or yellow.





SUBSOIL DWELLING SPECIES (ANECIC)

Deep burrowers, ('nightcrawlers').

Create large vertical, permanent burrows up to 2 metres deep in the soil profile.

Come up to the surface to feed, pulling surface plant residues and living plant material down into the mouth of the burrow to soften and be eaten.

Responsible for much of the worm casts usually found on the surface in grassland- usually deposited around the entrance to their burrows

Populations are heavily influenced by tillage and rotations that reduce surface residue levels. To avoid being scooped up by predators, the species *L. Terrestris* has developed retractable bristles called setae, which grip the burrow wall.

Darkly coloured at the head end, and paler towards the tail.

Keeping your earthworms-

Earthworm numbers are affected by several factors:

Soil temperature- Most earthworm species are happy at a range of temperatures but require a minimum of around 7°C. Below this, the adult population drops, although eggs remain viable.

Organic matter content- without organic matter, the worm population is unable to sustain itself. Soils with low organic matter have depleted earthworm numbers.

Soil pH- an acidic soil severely impacts on earthworm numbers- although some species in the UK have been found at pH4.3, the optimum is above pH6.

Soil compaction- to a point, compaction in soils can stimulate casting activity in worm populations, but heavily compacted soils limit the earthworm's ability to burrow, compounding compaction issues. In a well aerated soil, the earthworm's movement acts as a piston, forcing air deeper into the soil, increasing drainage, and nutrient uptake. Their burrows are also very important for letting water into and through soil. This influx of water can flush air out of the soil to be replaced by 'fresh' air.

More information-

<http://www.earthwormsoc.org.uk>

<http://www.webmesh.co.uk/darwinworms3.htm>

<http://www.nhm.ac.uk/nature-online/life/other-invertebrates/earthworm-slideshow/index.html>

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