

Earthworms – Nature's Tillage

Are they all just worms?

No! There are many different types of earthworms each performing different functions. Earthworms can be broadly categorized into:

- Composting species
- Aquatic or semi aquatic species
- Soil-dwelling species

Each of these species likes its own environment and doesn't do well in other environments – so composting worms will not survive in the soil and visa versa.

Soil dwelling earthworms

Nearly all worms you see in agriculture are introduced species. Our native species, of which there are nearly 200, do not survive well in the agricultural environment.

As there are different types of worms within the environment there are also different types of soil dwelling worms. The main basis by which they are categorised is where they live within the soil.

The three main categories are

1. Soil surface dwelling species
2. Topsoil dwelling species
3. Subsoil dwelling species

Soil Surface Dwellers:

These species don't burrow down very far. They like material which is high in organic matter such as dung and decaying plant material and they help to incorporate it in the soil.

Topsoil Dwellers:

These worms are the **soil mixers**. They live in the top 20-30cm and ingest a large quantity of soil as they feed. They produce large quantities of 'casts' (earthworm poo) which improves soil structure and their feeding channels increase aeration. After soil has passed through the gut, the nutrients contained in the casts are in a more plant-available form.

Subsoil Dwellers:

The semi-permanent burrows can be up to 3m deep BUT they are still surface feeders. They come up and drag food, such as leaves, down into the burrow and are particularly useful in undisturbed situations where a large amount of organic matter is left on the surface. These worms are **residue consumers** rather than soil mixers.

What good do earthworms do?

Increase water infiltration rates: Research has demonstrated that removing earthworms from soil can decrease infiltration 3 fold, whereas the addition of earthworms increases it by as much as 10 fold.

Increase the soil's water holding capacity: Casts can contain significant amounts of plant available water but the main increase is from improved soil structure.

Improve drainage: A significant increase in the amount of macropores is observed with increase worm numbers.

Increase nutrient availability: Earthworm casts contain mineralised phosphorous and nitrogen. That is ready for use by the plant.

What agricultural practices affect earthworm populations?

Pastoral management – long term pasture is conducive to good earthworm populations providing there is no top soil damage from pugging or compaction.

Tillage and tillage methods – Any form of tillage will kill earthworms. The extent to which the population is decreased is determined by the amount and type of tillage. Tillage also reduces the amount of organic matter present in the soil reducing the earthworm's food source and thereby limiting the population.

Rotations – providing all the earthworm species with varying food sources aids in maintaining populations – clover in particular enhances earthworm populations.

Irrigation – Earthworms don't like droughts. Some species can burrow deep into the soil to find adequate moisture for their survival; others cannot burrow deep so leave eggs behind on the soil surface to hatch when conditions are favourable. Significant periods of moisture stress/prolonged periods of water logging have a negative effect on earthworm populations.

Mulches and crop residues – increasing the organic matter left on the surface of the soil provides food for earthworms as well as shelter from harsh conditions (keeps soil more moist and cool).

Fertilisers – most fertilisers, when applied in accordance with the Fertiliser Code of Practice regulations, will not have a detrimental effect on earth worm populations.

Agrichemicals – Some, but not all, agrichemicals will reduce earthworm populations.

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