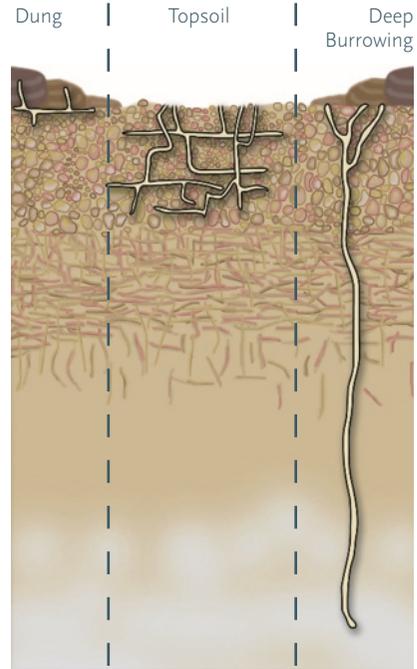


Do you have healthy earthworm populations?

New Zealand's pasture earthworms arrived accidentally with the first European settlers, and because of this they can still have a patchy distribution.



There are three types of earthworms with different roles in the soil that should be present in your soil.

Dung earthworms feed on dung and do not form permanent burrows.

Topsoil earthworms burrow through the topsoil, feeding on the organic matter here.

Deep-burrowing earthworms feed on dung on the soil surface and take this into their deep burrows

Ideally when assessing your soil, in a spade spit you will have...

| Earthworm Type | Number of worms |
|----------------|-----------------|
| Dung | More than 1 |
| Topsoil | More than 14 |
| Deep Burrowing | More than 1 |

...otherwise the ecosystem services earthworms contribute to may be compromised.

- If a type of earthworm is absent it can be introduced
- Earthworm populations may be increased by avoiding pugging events and increasing available organic matter
- The optimum soil pH for earthworms is 6-7



Did you know that the weight of earthworms in the soil is similar to the weight of stock above ground! No wonder they improve plant growth!

Assessing your earthworms

How to sample:

1. During June to September choose a paddock
2. Collect three spade spits (20x20cm, 30cm deep) per paddock
3. Hand-sort earthworms by crumbling the soil onto a sheet of plastic and looking through the roots. Put the earthworms in water.
4. Take the earthworms out of water and place onto a paper towel.
5. Look at the colour and size of the adult earthworms. Using the key can you see different types?
6. Place earthworms on white paper next to a ruler and take a close-up photo out of direct sunlight.
7. Record the abundance/m2 of each type of earthworm (multiply by 8.3).
8. Go to (<https://www.inaturalist.org/projects/the-great-kiwi-earthworm-survey>) and enter your observation.
9. Repeat in as many paddocks as you would like to get a representative sample over your farm

For more information about earthworms and their introduction, contact

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The Great Kiwi Earthworm Survey

Earthworms improve pasture production throughout the year.

Earthworms feed on organic matter and move this into the soil, increasing soil fertility. At the same time earthworms assist the formation of soil structure, improving both the drainage and water holding capacity of soils.

Many soils just have the topsoil earthworms. Results from a controlled study show that adding deep burrowing earthworms can:

- increase pasture production by more than 10%;
- more than double the rate of dung decomposition in winter;
- improve water infiltration to reduce soil moisture content by more than 5% in the winter.

If you have no earthworms, adding all three types of earthworms will have even greater benefits.



Identifying common pasture earthworms

Y Is the earthworm a red-brown colour with a purple sheen and iridescent in bright light? **N**

Is the earthworm very large, forming large casts?
 Deep: *Lumbricus terrestris* 'nightcrawler' (90-300mm)



OR... is it smaller with a reddish saddle and very active when disturbed?
 Dung: *Lumbricus rubellus* 'dung worm' (25-150mm)



Y Is the earthworm bright red with yellow? **N**

Is it found in a rich organic matter with yellow bands (when it stretches)?
 Dung: *Eisenia fetida* 'tiger worm' (30-130mm)



OR... is it short with faint yellow colouring concentrated at the tail end?
 Dung: *Dendrodrilus rubidus* 'bark worm' (20-100mm)



Y Do you have an adult earthworm?

Y Does your earthworm have a paler underside at the head end? **N**

Y Is the earthworm a dark grey-brown colour? **N**

Is the earthworm large?
 Deep: *Aporrectodea longa* (blackhead worm) (90-120mm)



OR... is it smaller, and darker along the length of its body?
 Topsoil: *Aporrectodea trapezoides* 'southern worm' (40-90mm)



Y Is the earthworm a dark green-brown colour? **N**

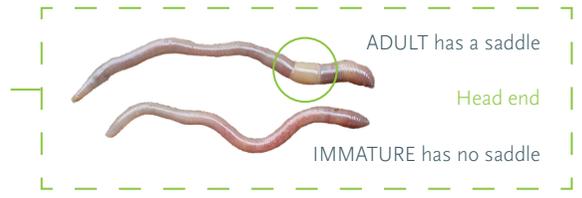
Is it a long slender earthworm which writhes like a snake when disturbed?
 Dung: *Amyntas corticis* 'snake worm' (70-180mm)



OR... is it greenish brown, coiling stiffly when disturbed?
 Topsoil: *Allolobophora chlorotica* 'green worm' (40-70mm)



You have probably found a rare earthworm which is not in this key. Record it as unidentified.



Y Is the earthworm pale along its body with a small yellow tip at the tail? **N**

Topsoil: *Octolasion cyaneum* 'yellow tail' (65-180mm)



Y Is the earthworm pink or grey with a pink head? **N**

Is it very common in your sample, with a darker head?
 Topsoil: *Aporrectodea caliginosa* 'grey worm' (40-100mm)



OR... Does it have a pale pink head and tail with a dark pink-orange saddle?
 Topsoil: *Aporrectodea rosea* 'pink worm' (25-85mm)



N Is the earthworm pink or grey with the saddle quite close to the head end? (Saddle starting before segment 22, compared with after segment 22 in many non-natives.)

Y There are about 200 native species (e.g. *Octochaetus multiporus*) which vary considerably in size and colour. They tend to be found in forests but some are found in low fertility hill country.



Earthworm key modified from J. Springett 1985. Photos by R. Gray. Lengths given are for adult earthworms