

# Soil biology and beneficial species for soil health

Organic matter is the essence of healthy, fertile, productive soil. It is made up of living plants and animals, as well as degraded and decomposing plant and animal matter. Soil organic carbon provides energy for biota and contributes to soil structure, water retention and the storage and supply of nutrients.

When asked what advice he would give to other landholders after everything he's learned through the Farming for Sustainable Soils Project, farmer David Poole says:

**"I'd tell them to get as much organic matter into the soil as they can and get the little bugs going. Once you've got them growing and there's roots underneath, [the soil] just gets better and better."**

## Beneficial biota

Understanding soil biology is a key component of community-driven capacity building through the Farming for Sustainable Soils (FSS) Project. With support from the North Central Catchment Management Authority (CMA), farmers throughout the region have worked with Community Facilitators and a range of experts to increase their applied understanding of soil biology.



Soil biology describes soil biota and the interactions between living organisms in the soil. A wide diversity of soil organisms is crucial for healthy soil ecosystems. These organisms include microflora, microfauna, mesofauna and macrofauna - ranging from tiny bacteria, viruses, protozoa and fungi to soil creatures like centipedes, earthworms, spiders, earwigs, springtails and termites. Earthworms are particularly important, as their tunnelling through the soil creates pathways for the flow of nutrients, water and roots.



**Healthy soil with earthworm activity**

Soil biology research suggests that there could be more than 15,000 different visible and invisible species within one gram of soil, as one FSS Project stakeholder reflects:

**"What really brought it home to me was something that a [soils expert] said... That there's more living interactions in one cubic metre of soil than in the whole of New York City. We're not thinking about the things you can see - it's all those living interactions that you can't see."**



Entomologist Neil Hives conducting a field demonstration

### **“Good bugs and bad bugs”**

It’s important for farmers to understand the biological composition of their soils. Through the FSS Project, farmers in the Charlton area of north central Victoria were given the opportunity to monitor the living organisms in their soils and refine some of their farming practices. Community Facilitator Mel Watts explains that entomologist Neil Hives worked with FSS Groups across the catchment to set up demonstrations, sampling and trials:

**“We did an integrated pest management project, [it was] more of a demonstration site where we would set up pit fall traps. [Neil Hives] came out and told us all about the bugs, [so] we could recognise what the good ones and bad ones were. [We] set up the monitoring and he did some vacuum sampling as well so we could get an idea of what was around...”**

Mel explains how an improved understanding of the natural biological functions of their soils allows farmers in the FSS Project to examine and adapt their pest management practices.

**“[The demonstrations, sampling and trials] challenged the farmers who were spraying. [Learning] that if you pull back on the spraying it’s going to save you money and help your soils...”**

**It’s going to encourage those beneficial species back into the soil. It’s amazing because we actually showed that the beneficial species would win out every time.”**

