

Worms and soil structure

There is a complex relationship between how soil is organised and the animals, particularly worms, living within it. Since ploughing was abandoned at Sourhope in about 1750, fresh and partially decomposed vegetation and organic material rich in carbon have accumulated at the surface, forming a shallow peaty layer lying over a mixture of organic and mineral matter.

Earthworms and enchytraeids (another small common wormlike creature), process around 90% of the organic matter in soils, churning it very effectively. Their casts dominate the upper soil layers. This processed carbon is more easily 'digested' by the rest of the soil ecosystem.

Liming caused changes in the stability of soil, partly because it caused more earthworm activity and casts. We used automatic image analysis to distinguish worm casts from other soil features, and confirmed that casts change the soil structure, by making the voids between clumps of particles larger. By adding a fluorescent dye, we also looked at the distribution of bacteria. There were more bacterial in limed than in untreated plots in both the peaty and lowest layers. In the peaty layer the increase is linked to enchytraeid casts. In the organo-mineral layer it is linked to earthworm casts.

When we fed plants with radio-labelled carbon and followed it in the soil, we found the labelled carbon was taken up unevenly, even within plant roots. It did not become concentrated in worm casts.

Further information

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