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FEBRUARY 2006 | PRIMEFACT 37 | MASTER — MANAGING ACID SOILS THROUGH EFFICIENT ROTATIONS

MASTER — Earthworm numbers and microbial carbon concentration

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Summary

This Primefact shows the long-term trend of earthworm population and microbial carbon concentration in response to lime application.

Earthworm abundance

- Earthworm activity is one of the indicators of healthy soil.
- The total population of earthworms increased linearly from 1994 to 1997 for both limed and unlimed perennial and annual pastures (Fig. 1 top).
- From 1997 onwards, the total population of earthworm on the limed pastures decreased gradually, whereas the earthworm population on the unlimed pastures stabilised, fluctuating around 100–150/m^2.
- Lime had little effect on the population of native species before 1999, but had a negative effect after 1999 (Fig. 1).
- In contrast, the numbers of introduced earthworms in the limed soils were consistently higher than those in the unlimed soils (Fig. 1).
- There were no differences in earthworm numbers between perennial and annual pastures.

Catching earthworms

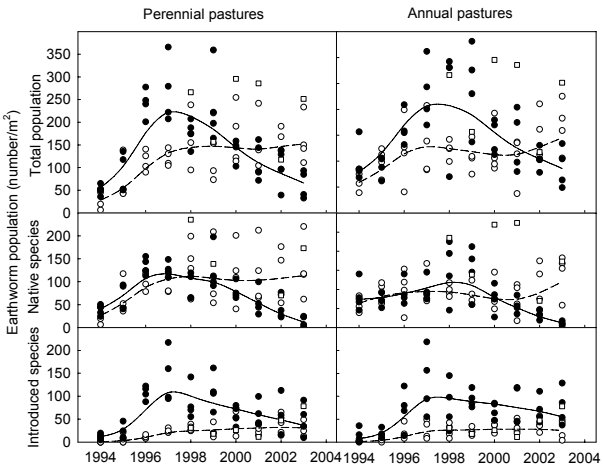

Fig. 1. Earthworm population dynamics in perennial (left) and annual pastures (right) from 1994 to 2003. Top figures are for total population, middle for native species and bottom for introduced species. ● limed treatment; ○ unlimed treatment; □ farmer's paddock. Solid and dashed lines are the cubic smoothing splines fitted with log-transformed data for the limed and unlimed treatments, respectively.

Microbial carbon concentration

- Microbial carbon is a measurement of soil microbial level (μg/g).
- There was more microbial carbon at the 0–5 cm depth than at the 5–10 cm depth.
- Microbial carbon values at 5–10 cm depth were usually about half those in the surface soil.
- Microbial carbon in the limed soil was consistently greater than that in the unlimed soil for both depths.
- There were no significant differences in microbial carbon level between annual and perennial pastures in either soil depth.
- Microbial carbon varied between sampling dates, but no clear trend over the three years.

Sorting earthworms

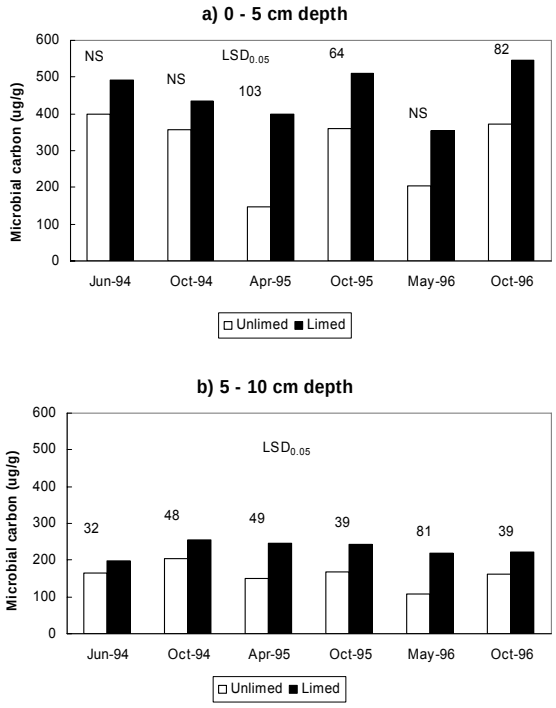

Fig. 2. Effects of lime application on the microbial carbon concentration (μg/g) at (a) 0–5 cm depth and (b) 5–10 cm depth.

Acknowledgments

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Further information

- Primefact 31, *MASTER — Experimental design*
- Primefact 32, *MASTER — Soil acidity and lime responses*
- Primefact 33, *MASTER — Crop responses to lime*
- Primefact 34, *MASTER — Pasture responses to lime*
- Primefact 35, *MASTER — Sheep responses to limed pastures*
- Primefact 36, *MASTER — Nitrate leaching and deep drainage on acid soils*
- Primefact 38, *MASTER — Economic analysis*

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