Do multiple nutrient additions impact mesofauna-mediated litter decomposition in Patagonian woodlands?

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BACKGROUND

Chronic nutrient enrichment of ecosystems is increasing globally. In temperate areas, **microarthropods** can contribute substantially to leaf litter **decomposition**. Cascading effects of **nutrient enrichment (NPK)** on secondary decomposers remain elusive.

HYPOTHESIS

Since our site was limited by N and P, we expect multiple nutrient addition with N and P to decrease litter C/N ratio and accelerate litter decomposition in the presence of mesofauna.

RESULTS

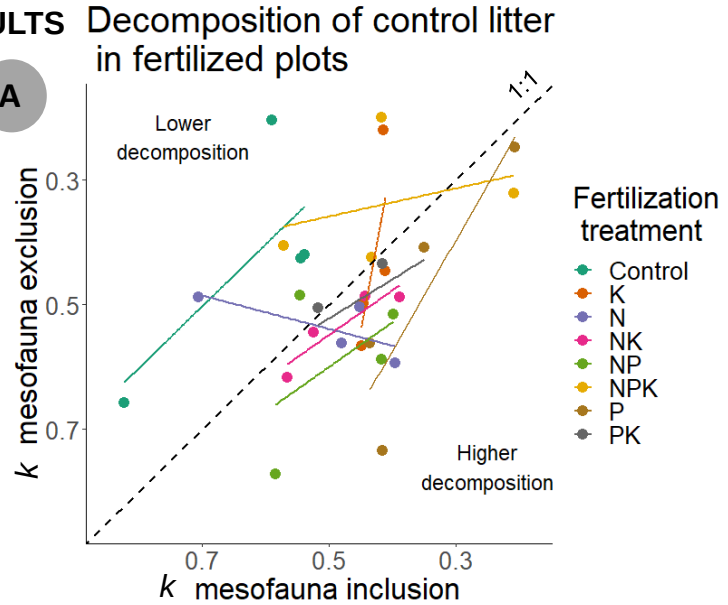


Fig.A. Impact of mesofauna exclusion on decomposition rate (*k*). Departures from the 1:1 dashed line suggest an impact of the mesofauna exclusion on *k*: values above the line indicate lower decomposition rates when mesofauna was excluded and vice versa.

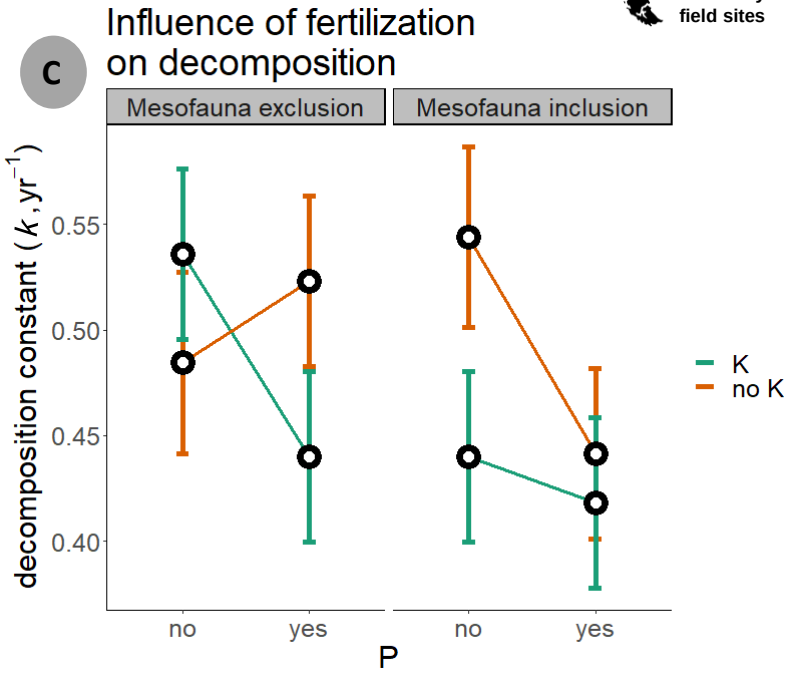
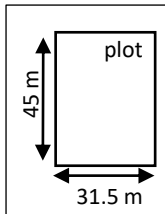


Fig. C. Fertilization impact on decomposition rate with mesofauna inclusion/exclusion. Fertilization with P and K significantly reduced the contribution of mesofauna to litter decomposition.



Factorial NPK fertilization experiment.
4 blocks were installed in *Nothofagus antarctica* woodlands.
Woodlands were colimited by N and P.

4 decomposition treatments

- Mesofauna (Inclusion, Exclusion)
- Litter type (Fertilized, Unfertilized)

METHODS AND STATISTICAL ANALYSIS

Litterbags were collected at: 40, 72, 180, and 376 days.
Decomposition constant: -k (yr^{-1}) = ln (OM)/t, where "t" is time.
Thus, faster decomposition would be reflected in a more positive k.
We used R to build GLMM´s as: k (yr^{-1})~N x P x K x mesh+ litter type

ACKNOWLEDGMENTS

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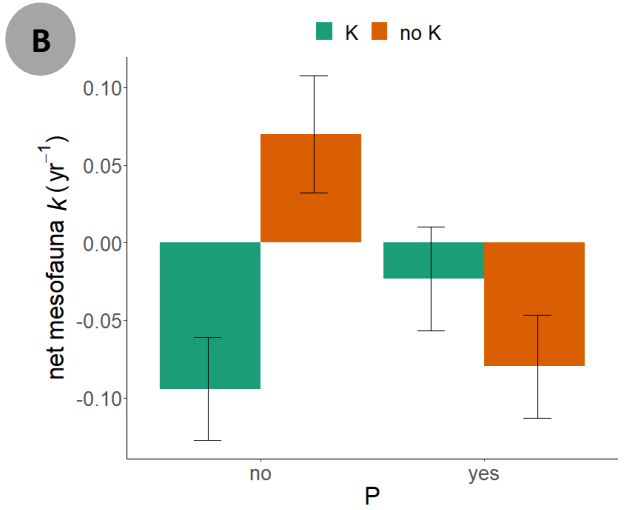

Fig. B. Net contribution of mesofauna to the litter decomposition rate (*k*). Mesofauna increased decomposition with no fertilization. Fertilization with P and K drastically changed this pattern.

Oribatida mite

Collembola

Photo credits: Andy Murray soilanimals

CONCLUSIONS

Fertilization decreased litter C/N **15-45%**.

Higher nutrient content in the litter after fertilization did not impact decomposition by mesofauna.

Mesofauna contributed more to litter decomposition with no fertilization (Fig. A, B)

Fertilization with P and K negatively affected mesofauna contribution to decomposition (Fig B,C).

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