SOIL FAUNA control over DECOMPOSITION

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INTRODUCTION

In terrestrial ecosystems, over **90%** of net primary production is channelled to the soil pool of dead organic matter [1].

Soil fauna plays a significant role in the decomposition of this litter, leading to a **27%** increase in decay rates on average [2].

However, the mechanisms behind animal effect on decomposition are still not fully understood.

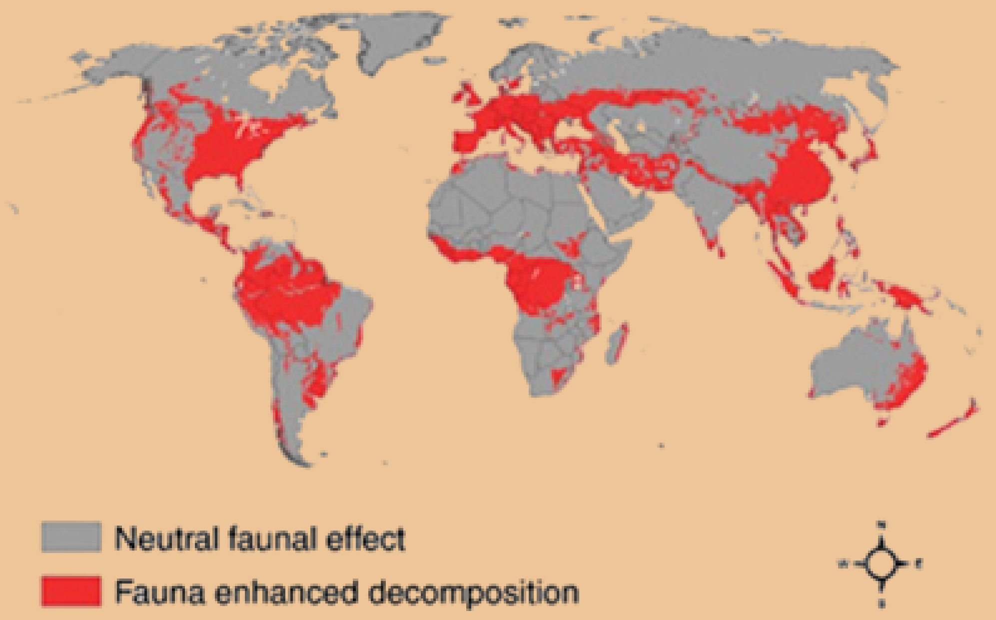

Figure 1: red areas indicate climatic regions where soil fauna increases decomposition rates [3].

OBJECTIVES

- To define the **specific mechanisms** through which soil fauna promote the decomposition of organic matter.
- To study the impact the **main drivers of global change** will have on these mechanisms.

METHODOLOGY

Bibliography was extracted from **PubMed** and **Google Scholar**. Complementary bibliography was recovered using **Connected Papers**.

PubMed | Google Scholar | CONNECTED PAPERS

The review for this final degree project was written following **Trends in Ecology & Evolution**'s guidelines.

Trends in Ecology & Evolution

FAUNA EFFECTS AND GLOBAL CHANGE

DIRECT EFFECTS

- Around 40% of **assimilation** for consumed litter.
- **Selection** of higher quality detritus.

INDIRECT EFFECTS

- **Fragmentation of litter** increases its surface/area ratio, facilitating microbial decomposition.
- Reorganization of microbial communities through **grazing**.
- Deposition of **faeces** and nutrient readjustment.
- **Non-trophic effects** such as soil restructuration and nest building.

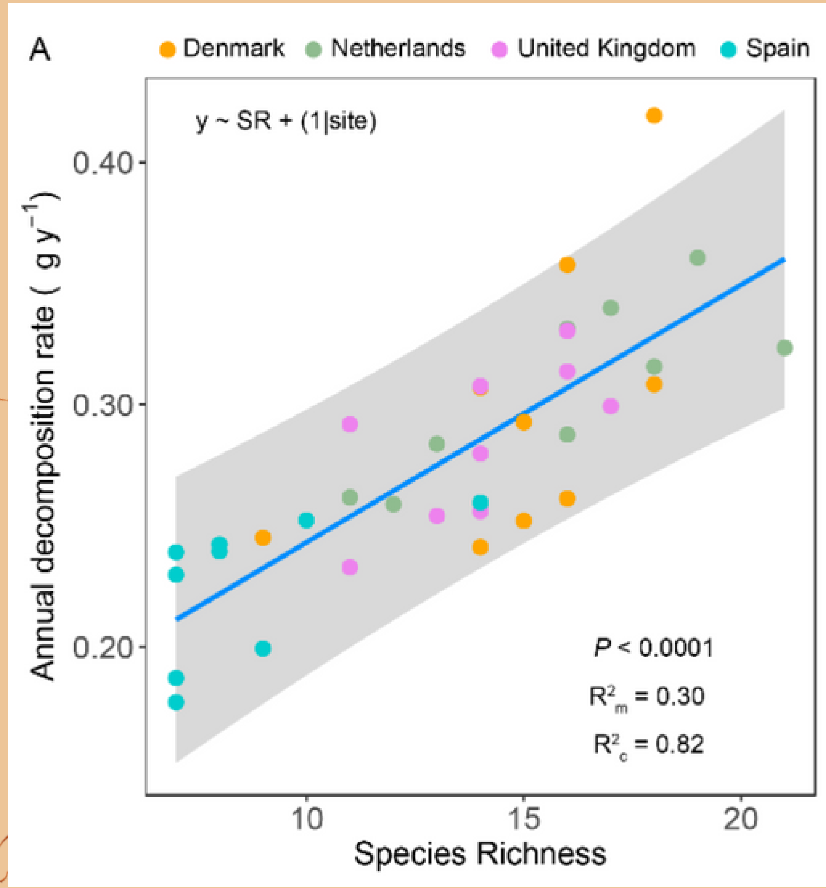

Figure 2: correlation between annual decomposition rate and species richness of collembolans. This implies that diversity loss can potentially hinder ecosystem capabilities of litter decomposition, and therefore, overall carbon sink capacity [4].

GLOBAL CHANGE

Soil fauna may partly **compensate the expected lower rates of decomposition** caused by climate change thanks to litture mixture effect, nest building and the burial of faeces.

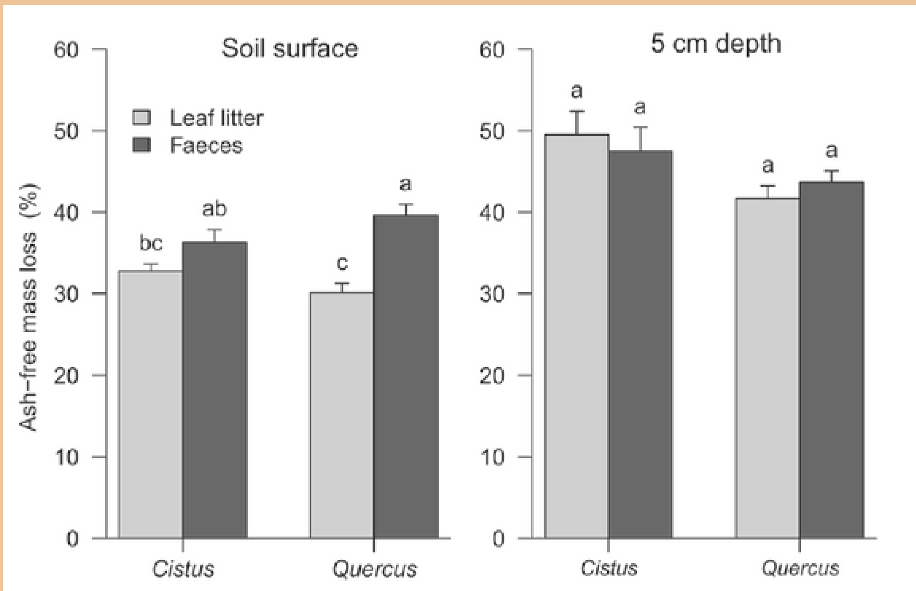

Figure 3: the burial of faeces promotes water retention on organic matter, enhancing conditions for microbial decomposers [5].

CONCLUSIONS

- Soil fauna promote decomposition through the **direct consumption** of litter, **interactions with the community of microbial decomposers**, and through **non-trophic effects** such as nest building.
- Research is beginning to perceive how **biodiversity loss** and **climate change** impact soil fauna effect on decomposition. However, further analyses need to consider the effect of several drivers conjointly.
- The effect of soil fauna on decomposition needs to be expanded on and incorporated into global carbon budgets in order to accurately **predict** global change.

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