FUNGAL DECOMPOSERS REDUCE FUNCTIONALITY TO OFFSET METABOLIC STRESS INDUCED BY WARMING

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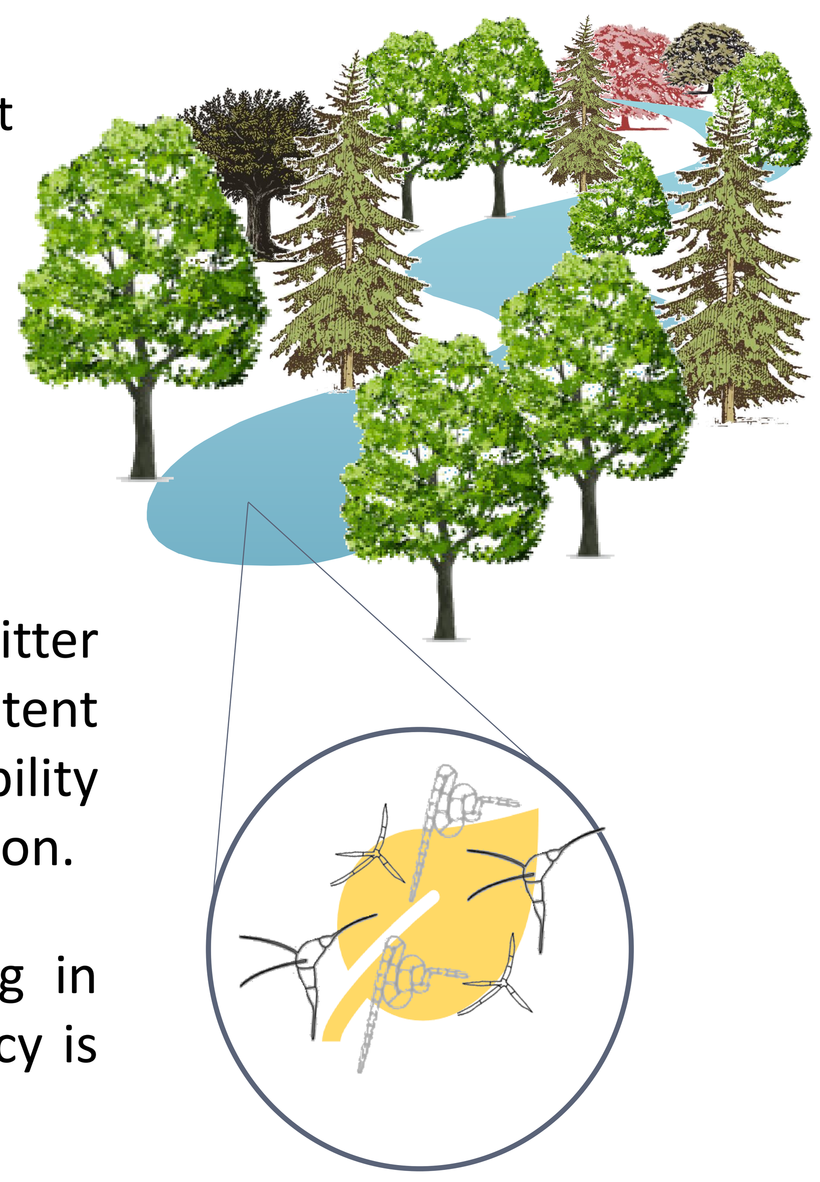
INTRODUCTION

- Riparian vegetation limits light entry to headwater streams.
- Metabolism in these streams is mainly heterotrophic and dependent on leaf inputs from riparian vegetation.
- Fungi are key players in leaf-litter decomposition: nutrient content increase and high palatability favors detritivores consumption.
- Fungal response to warming in terms of carbon-use efficiency is poorly known.

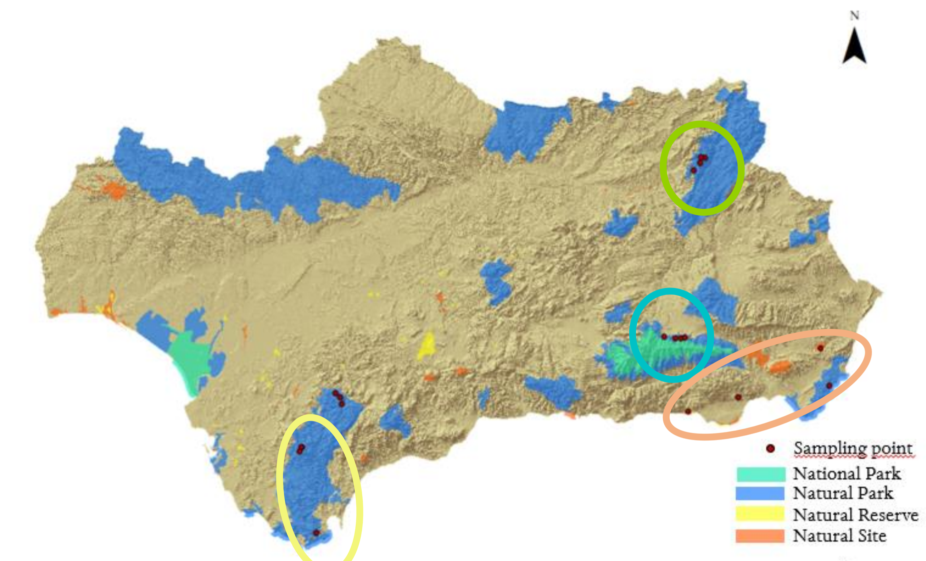


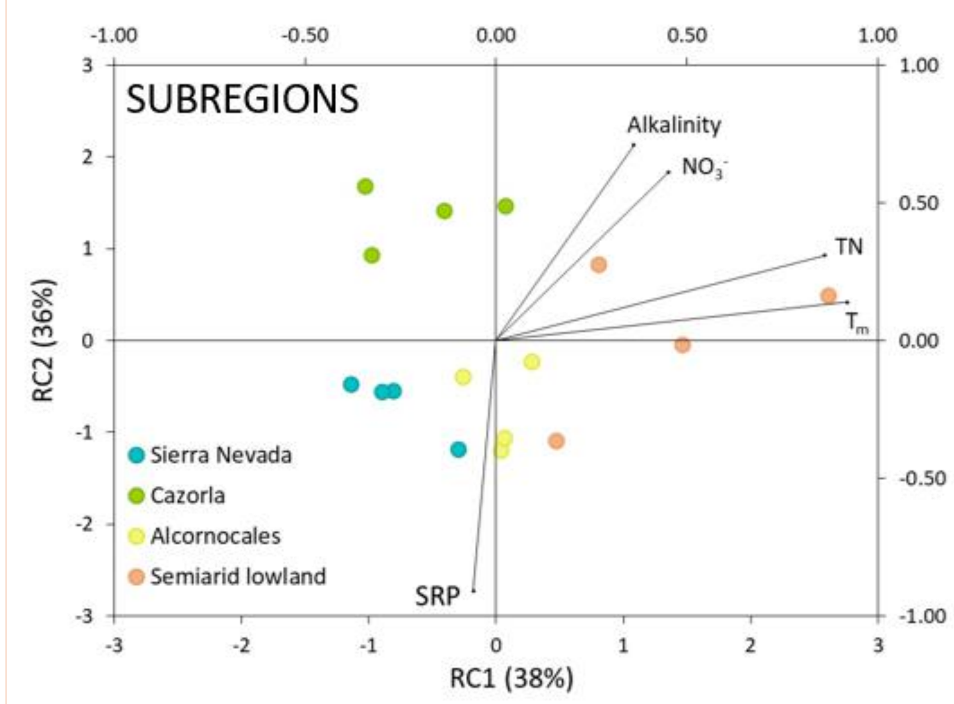
HYPOTHESIS

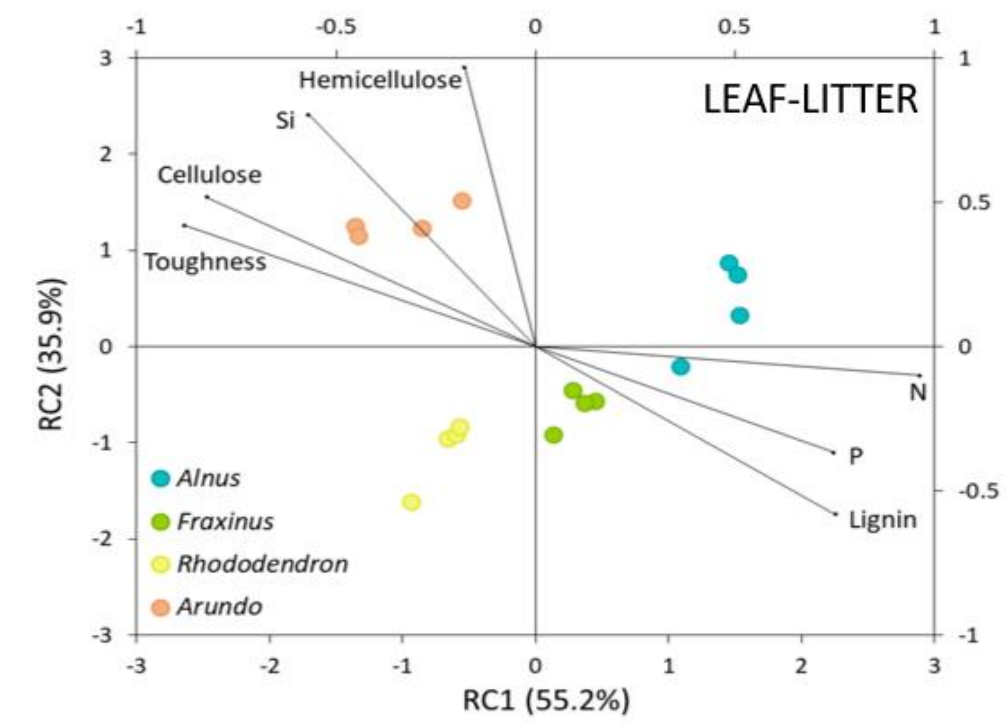
Warming will reduce functional richness of aquatic fungal decomposers due to the increase in metabolic stress.

EXPERIMENTAL DESIGN

- Four studied regions in Andalusia, with contrasting environmental conditions.
- Four streams per region.
- Four leaf-litter species: one native or dominant species by region.







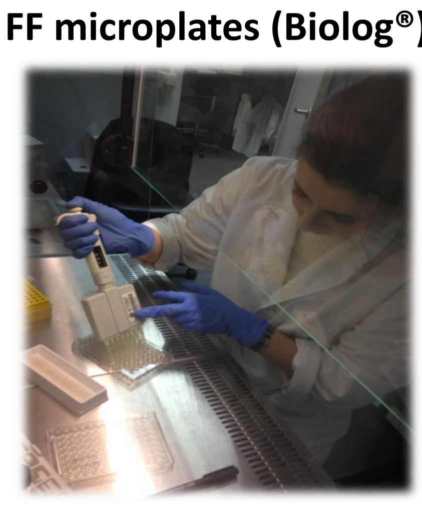
PROCEDURES

5 litter-bags (1 mm mesh size) x 4 species x 4 streams x 4 regions

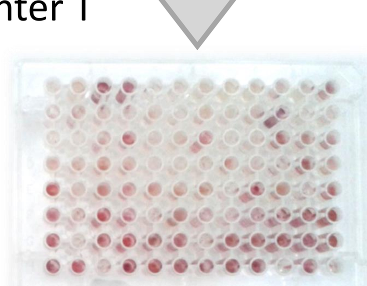
40 days incubation

Leaf litter particles (500-250 μm)

FF microplates (Biolog®)



Region's winter T



CSUP (C-Source Utilization Profile)

RESULTS

Fungal assemblages in warmest regions incorporated less C in new biomass (growth) than fungi in coldest regions.

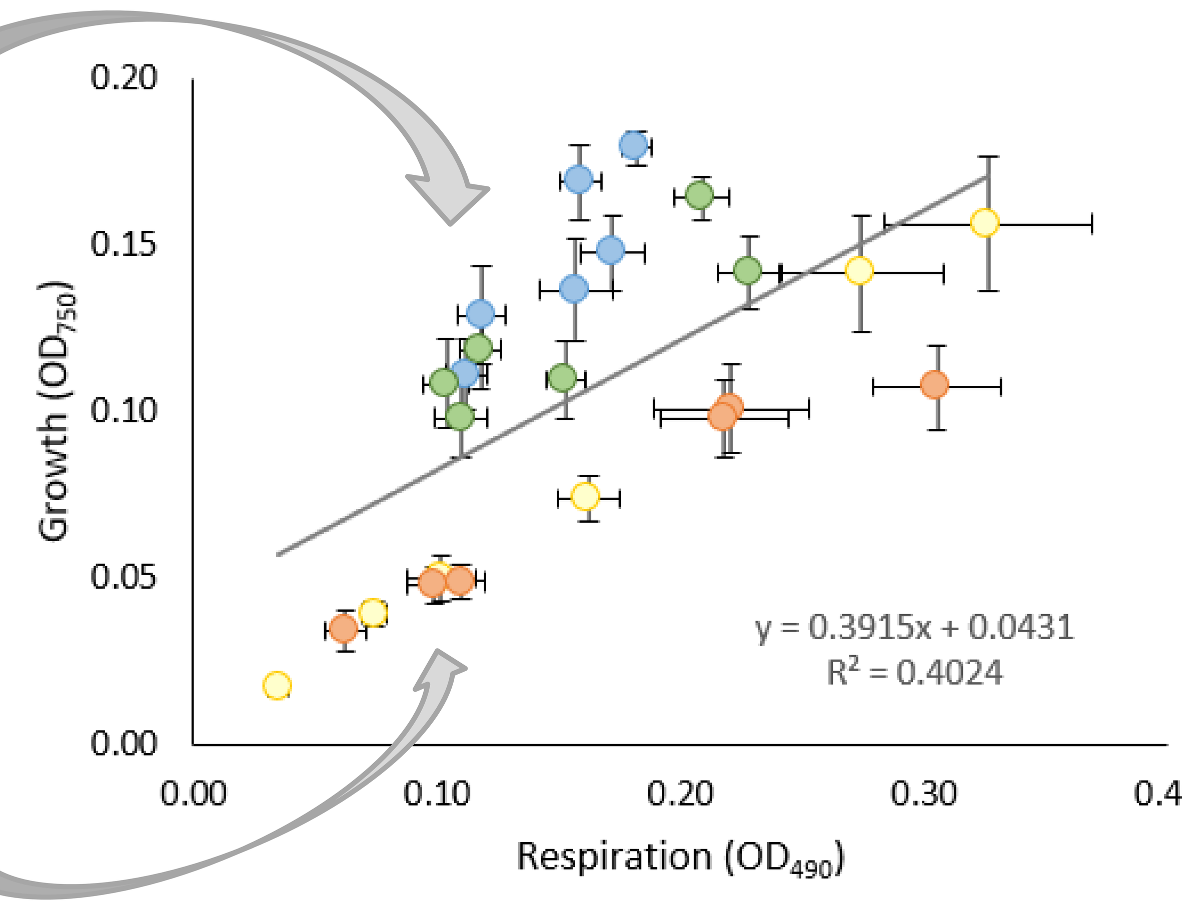


Figure 1. Respiration to growth relationship of fungal assemblages from four regions in a temperature gradient.

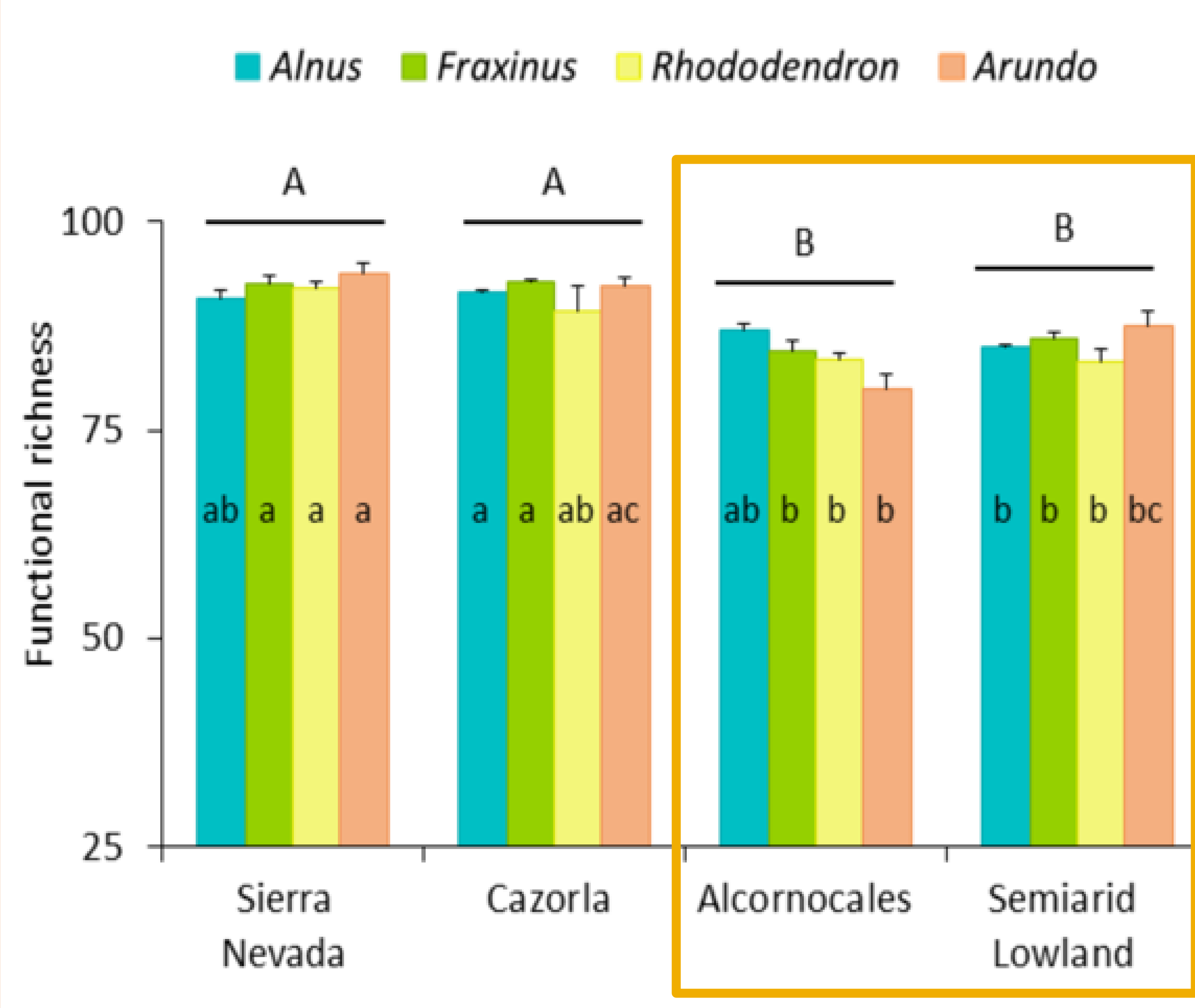


Figure 2. Functional richness of fungal assemblages (number of substrates used). Leaf-litter had minor effects on functionality.

Metabolic stress due to warming could be **mitigated** by microbial consortium: **lower functional richness.**

Respiration > Growth

Metabolic stress!!

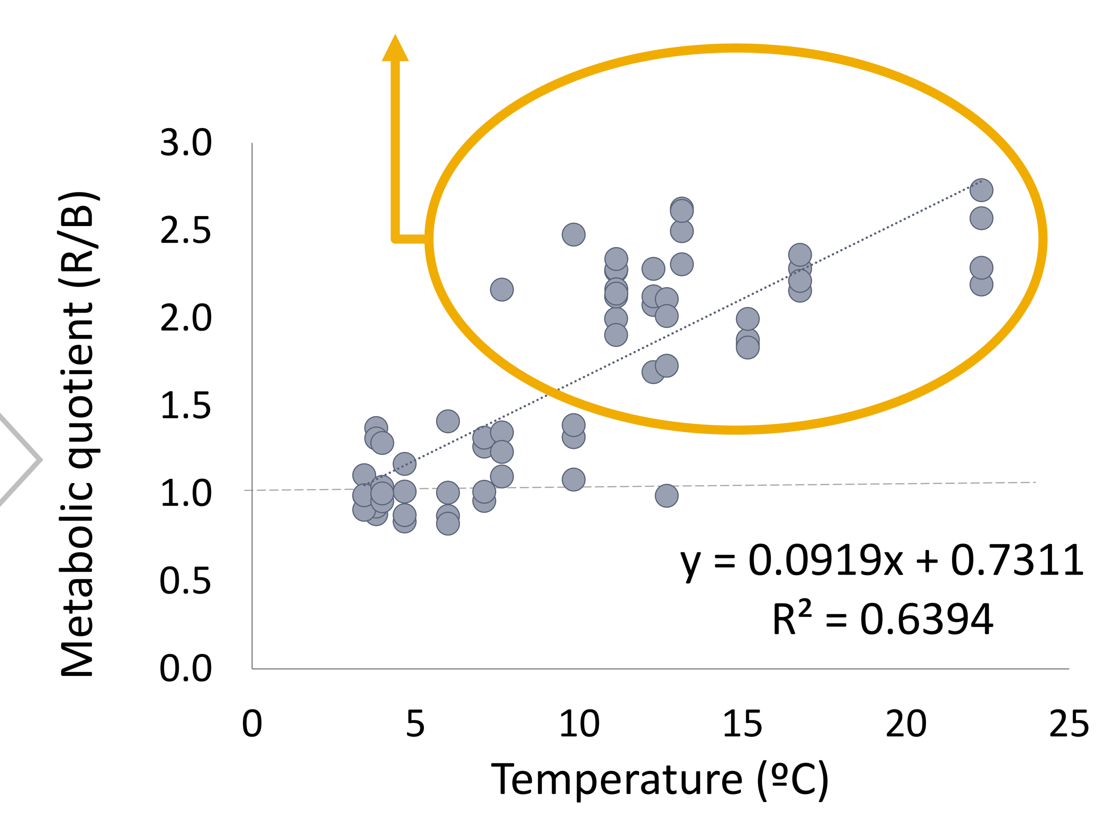


Figure 3. Relationship of metabolic quotient (OD_{490}/OD_{750}) with incubation temperature.

CONCLUSIONS

- **First study on functionality of aquatic fungi across a temperature gradient.**
- **Warming reduces fungal efficiency to incorporate C.**
- **Microbial consortium might mitigate metabolic stress by reducing functional richness.**

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