

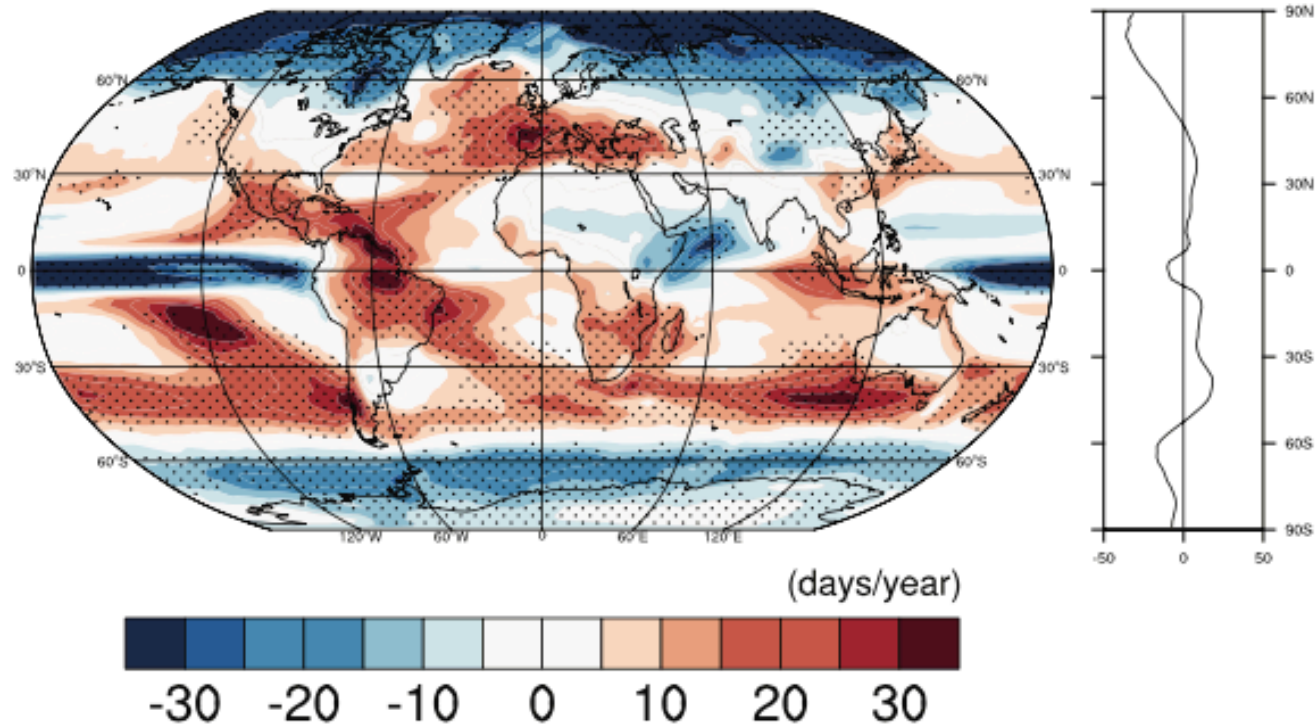


Rainwater deficit affects litter mass loss and microbial decomposer communities in a Mediterranean forest

K. Diallo, M. Santonja, S. Pereira, V. Baldy, T. Gauquelin, C. Fernandez, P. Mirleau



Previsional climate change globally



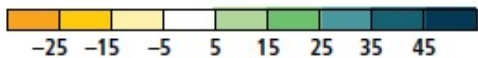
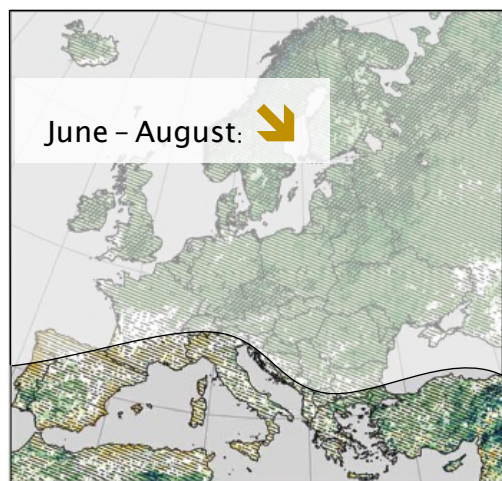
Comparing 1960–1989 records to 2060–2089 estimates

Podale *et al.* (2014) The key role of dry days in changing regional climate and precipitation regimes. Scientific Reports.

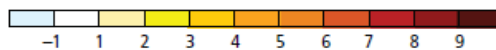
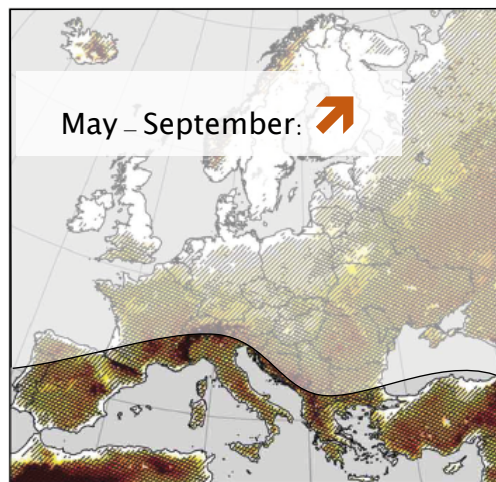
→ **Increasing frequency of dry days in several temperate regions**

Previsional climate change in the Mediterranean

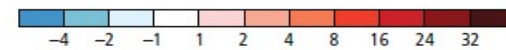
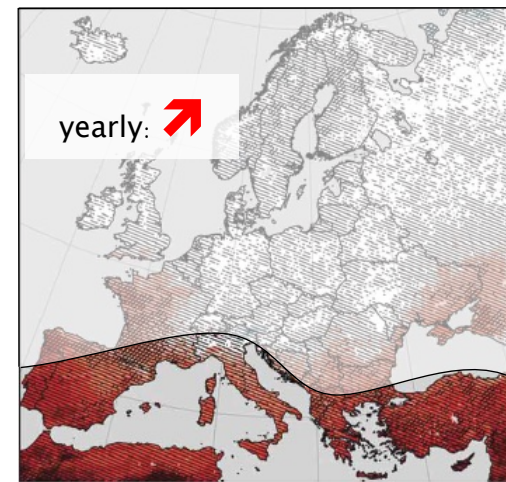
Heavy precipitation (%)



Number of heat waves



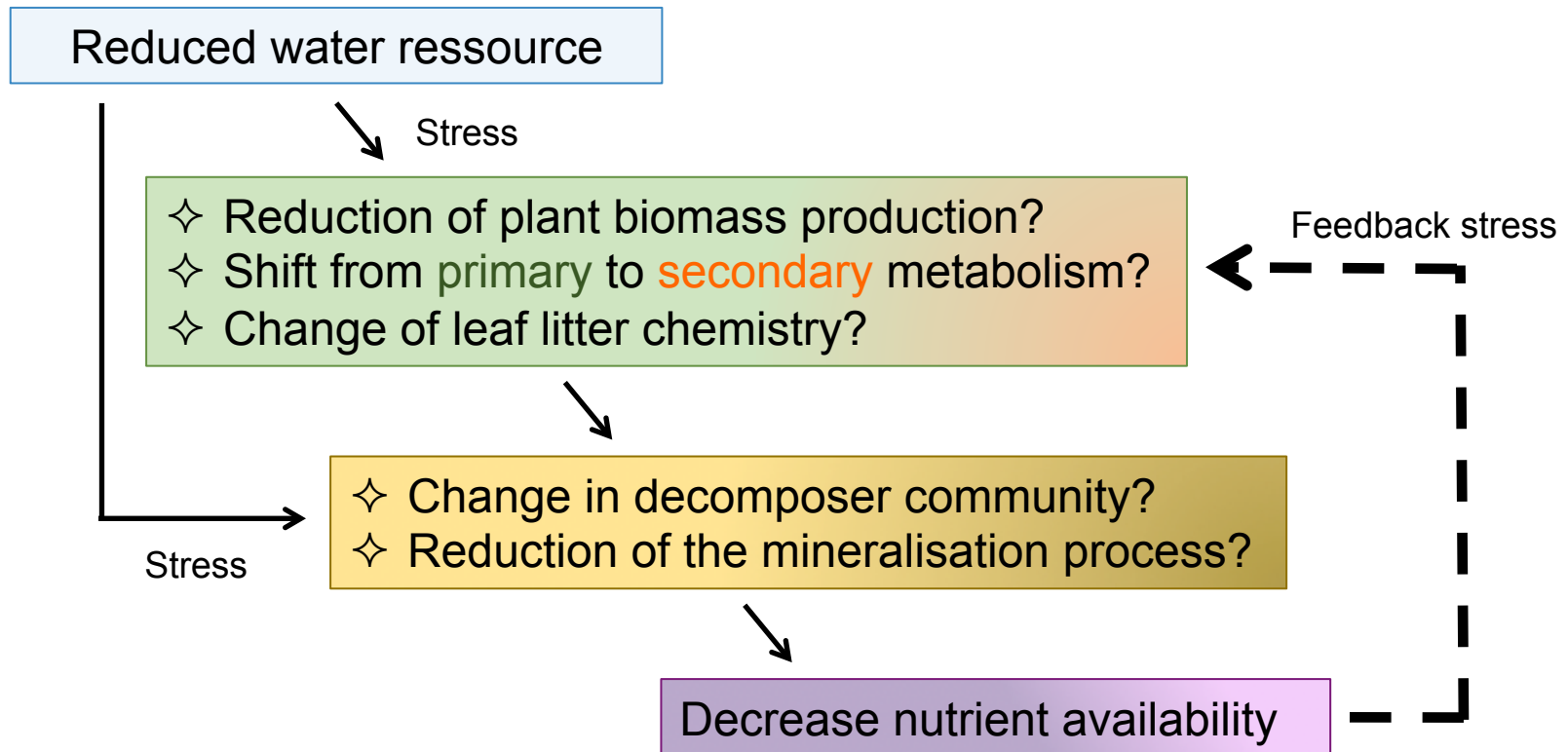
Length of dry spells (days)



Comparing 1971–2000 records to 2071-2100 estimates

IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects.

What effects on forest ecosystems functioning ?

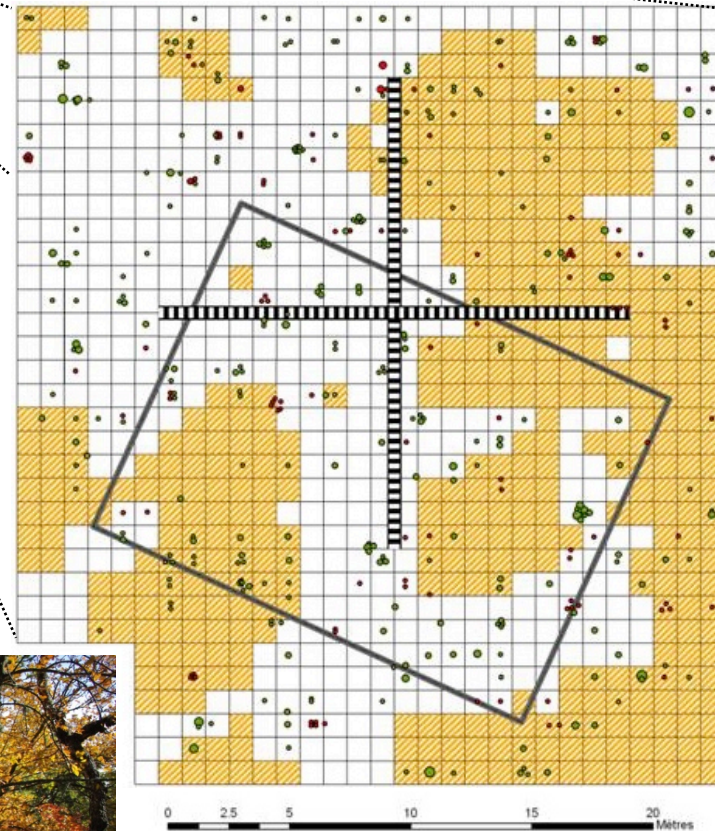


ANR Project SEC-PRIME² (2012-16) Trade-off between SECondary and PRImary MEtabolism in MEditerranean forest under climate change.

O3HP : experimenting reduced precipitation on the functioning of forest ecosystems



Treatment → sliding shutters excluding about 30% rain based on average rainfall in the past decade



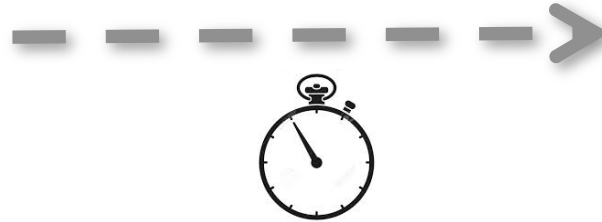
Two levels scaffolding
→ access to the soil and to the canopy

O3HP : experimenting reduced precipitation on leaf litter decomposition

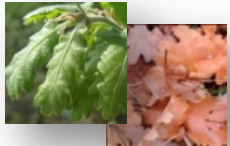
✧ Incubation of litterbags under control (C) and rain exclusion (RE) conditions



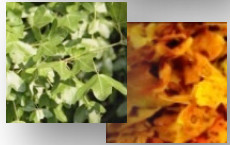
Meteorology data



15 possible litter mixtures containing 1, 2, 3 or 4 leaf species of:



Quercus pubescens



Acer monspessulanum



Cotinus coggygria



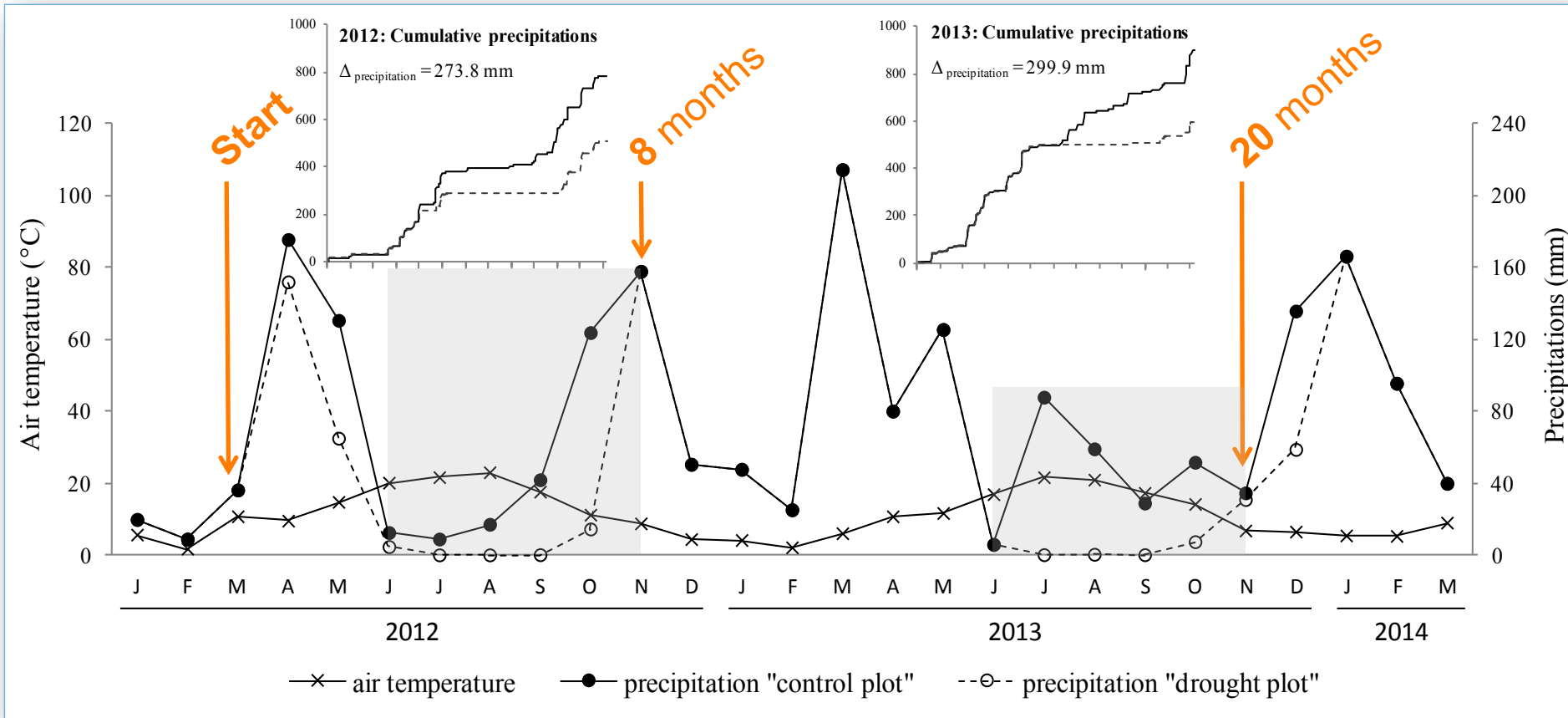
Pinus halepensis

Sample collection and labwork:

- ✧ Litter mass loss
- ✧ Litter chemistry
- ✧ Mesofauna
- ✧ DNA extraction
 - Microbial abundances (qPCR)
 - Microbial diversity (Illumina Miseq)

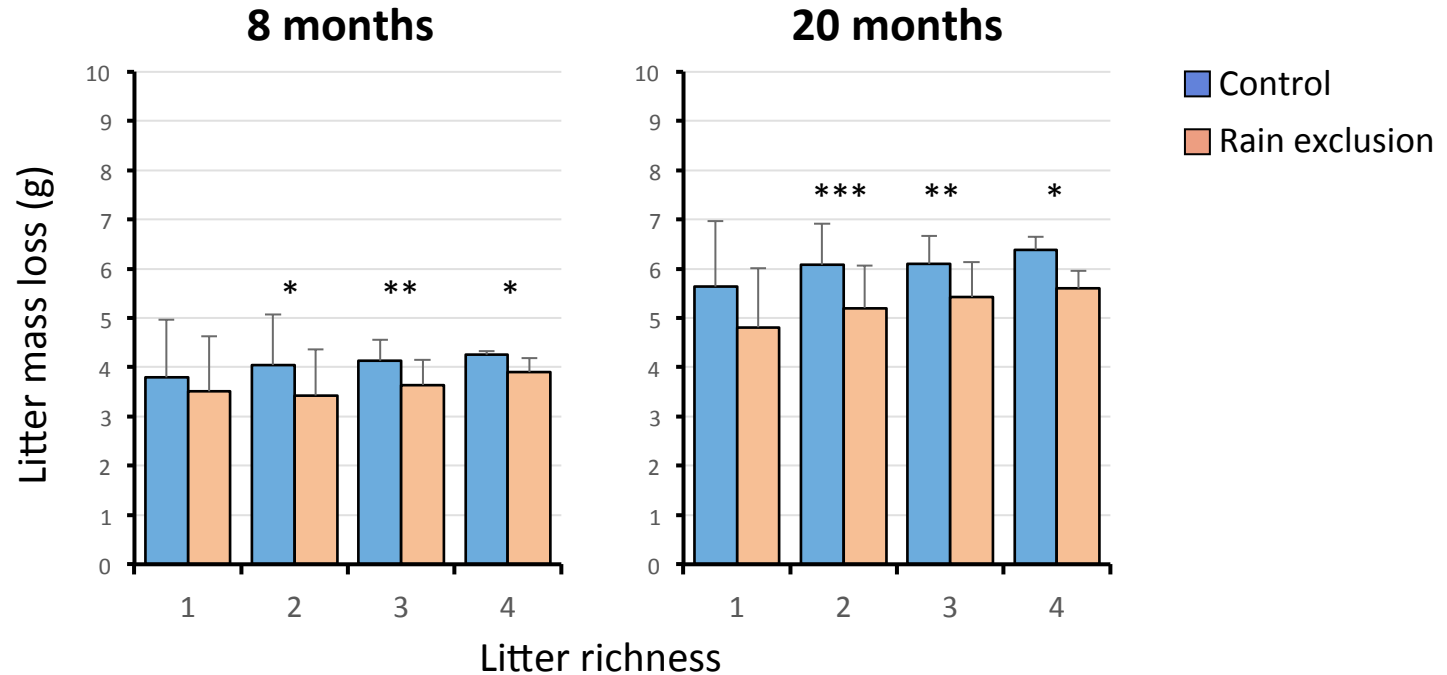
O3HP : the rain exclusion treatment during litterbags incubation

✧ Meteorology helped choosing appropriate sampling dates!



Litterbags were collected following periods of maximum rain exclusion (30%)

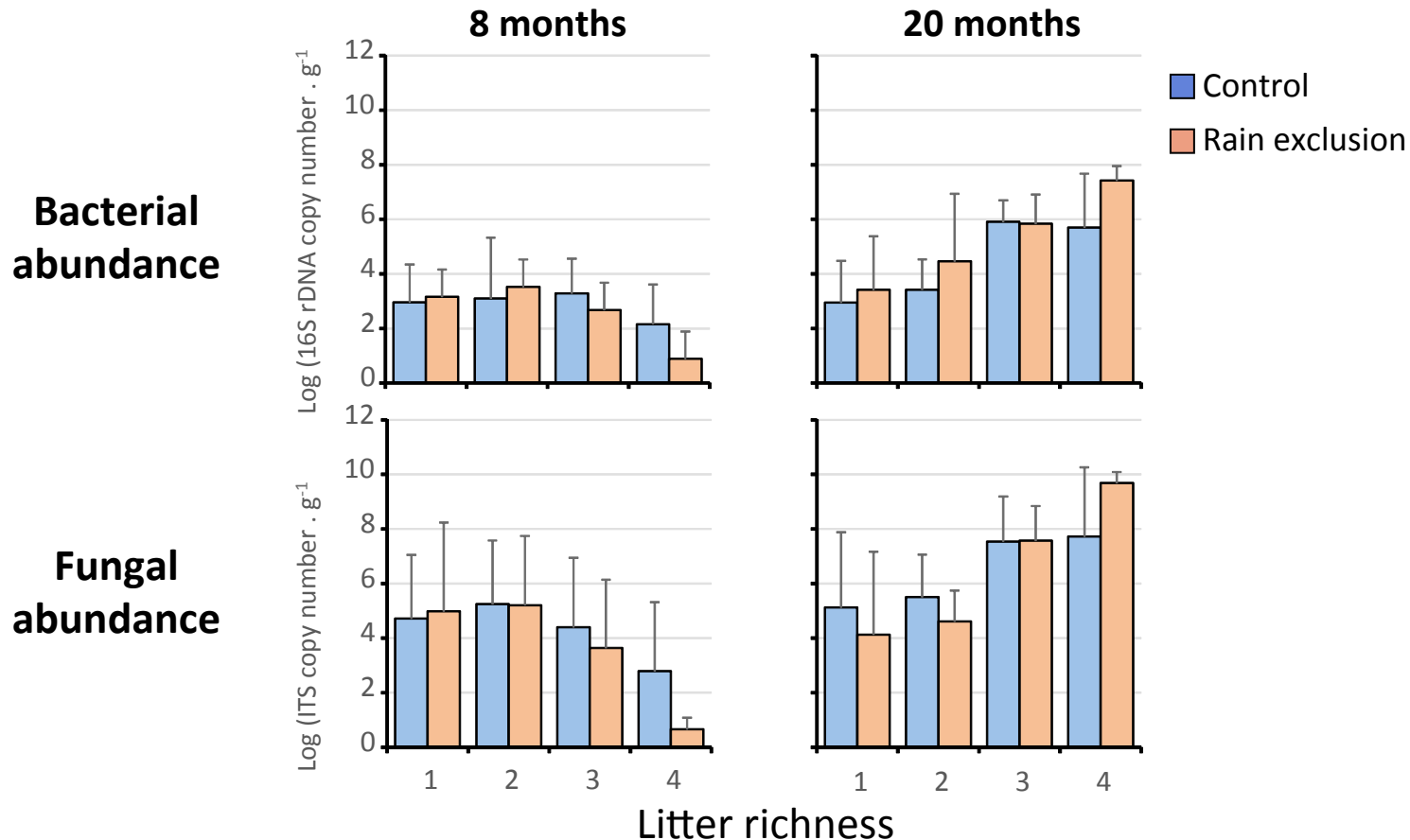
Results: litter mass loss



→ Litter decomposition is not affected by leaf litter richness

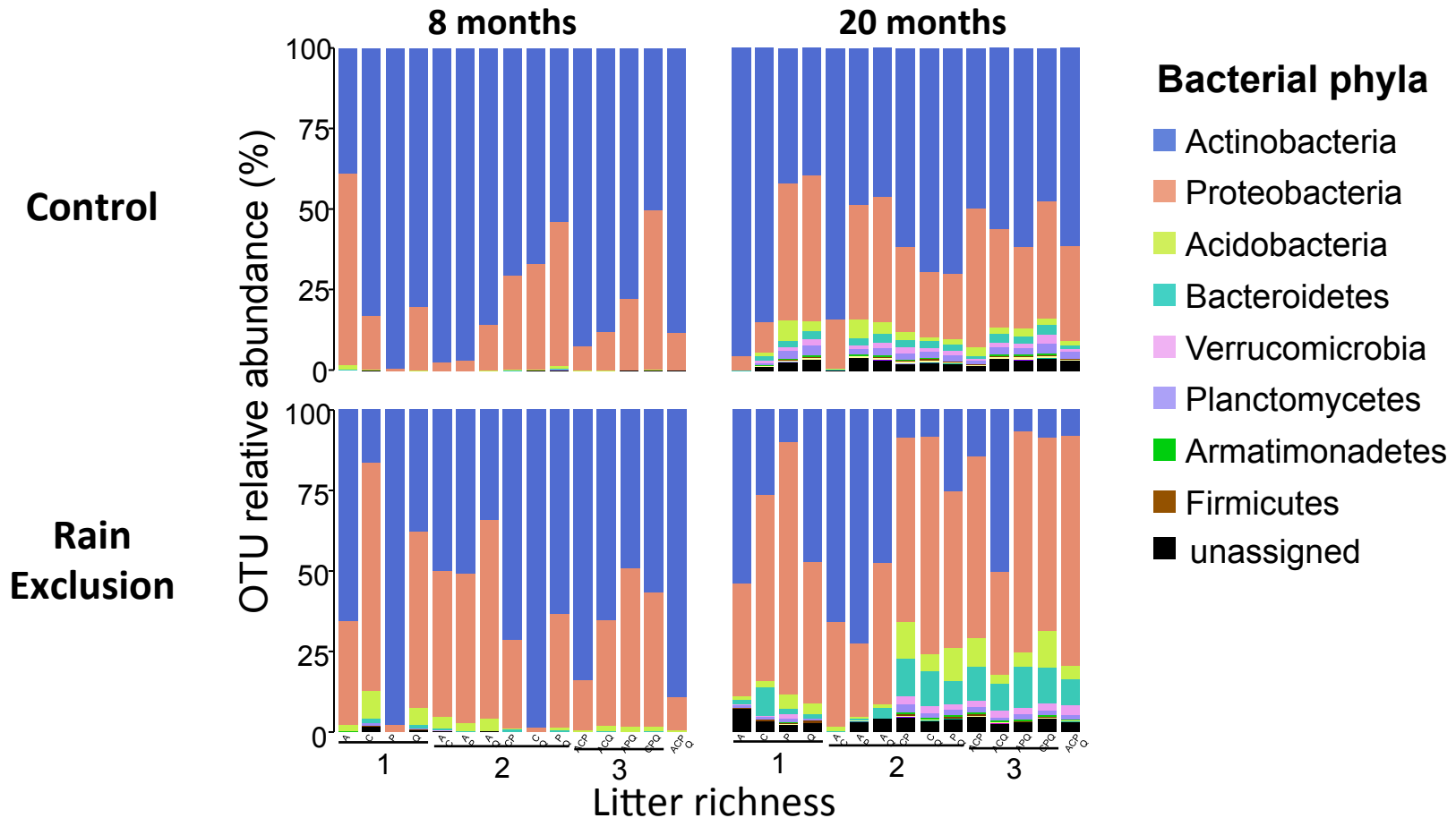
→ **Rain deficit lowers leaf litter decomposition**

Results: bacterial and fungal abundances



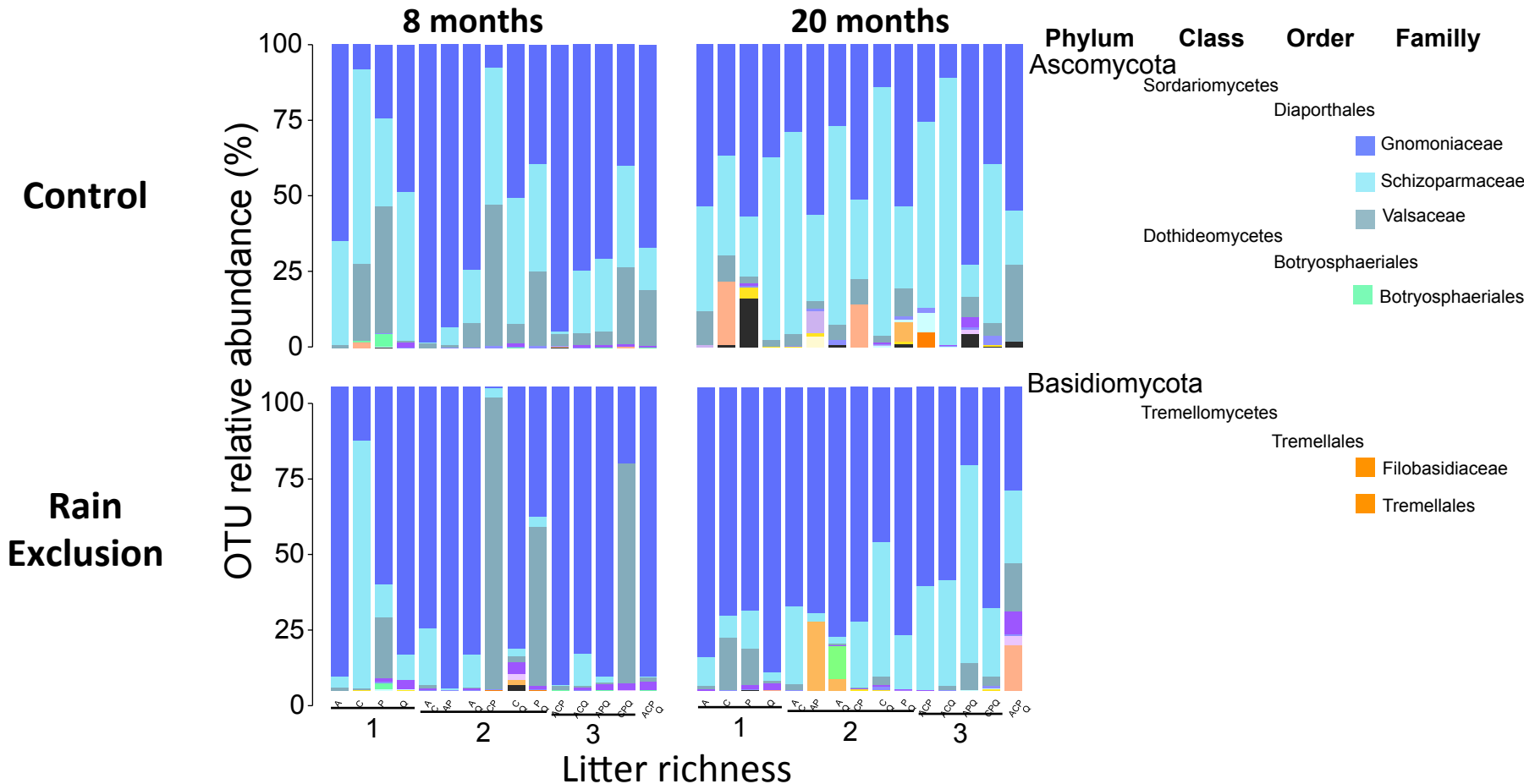
- Microbial abundance increase with decomposition time
- Variation of microbial abundance with litter richness interacts with time
- **Rain deficit doesn't affect microbial abundance !**

Results: bacterial diversity analysis



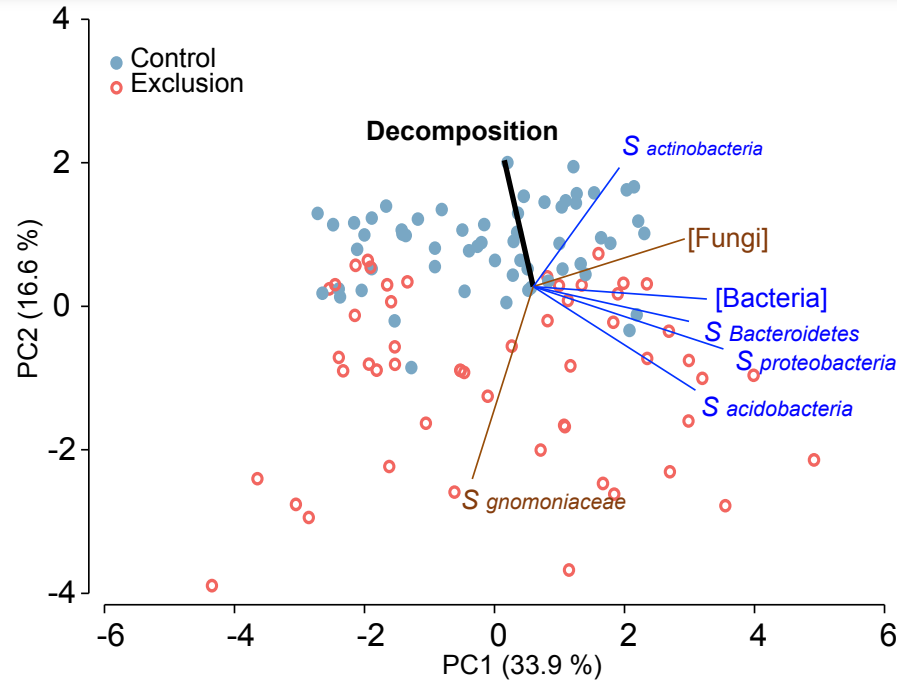
- Bacterial diversity increase with decomposition time
- Rain deficit affect the relative abundance of *Actinobacteria* to the profit of *Proteobacteria*, *Acidobacteria* and *bacteroidetes*

Results: Fungal diversity analysis



- Fungal diversity increase with decomposition time – later Basidiomycota
- Rain deficit affect the relative abundance of *Schizoparmaceae* to the profit of *Gnomoniaceae*

To conclude



Rain deficit affects litter decomposition and associated microbial diversity.

What about microbial functions of particular importance for nutrient cycling?

→ Biocomputing package ***Tax4fun*** may provide some clues...

Thank you !

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Analyse et
Valorisation de la
Biodiversité

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