

EFFECT OF TREE NATIVE SPECIES ASSEMBLAGES IN C, N & P CONTENTS IN BURNED SOILS

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Losses O.M.

Releases of CO₂



Soil exposure and temperature increase

Soil composition

Volatilization of nutrients and removal of organic matter

Soil structure



Nutrient leaching

Erosion



Ash and burnt wood can increase nutrients in the short-term

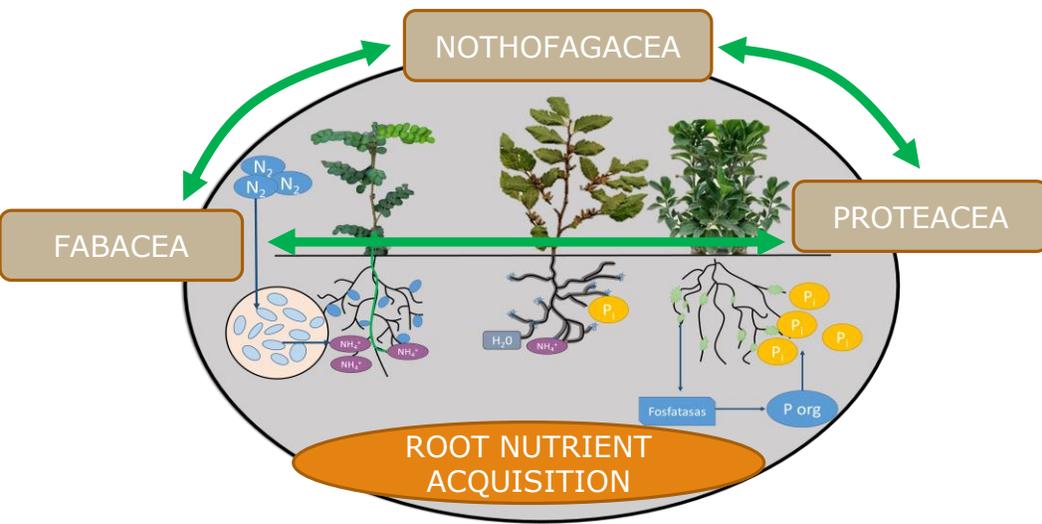


WORKING HYPOTHESIS

¿ How interactions between complementary species modify availability and acquisition of nutrients in degraded soils?

H₁

Inclusion of a **legume** (*Sophora cassiodes*) increases nitrogen fixation, nitrogen availability and acquisition, similarly inclusion of a **proteacea** (*Lomatia dentata*) increases available P and acquisition. The **oak** (*Nothofagus obliqua*) benefits from these previous species and improves its N and P acquisition



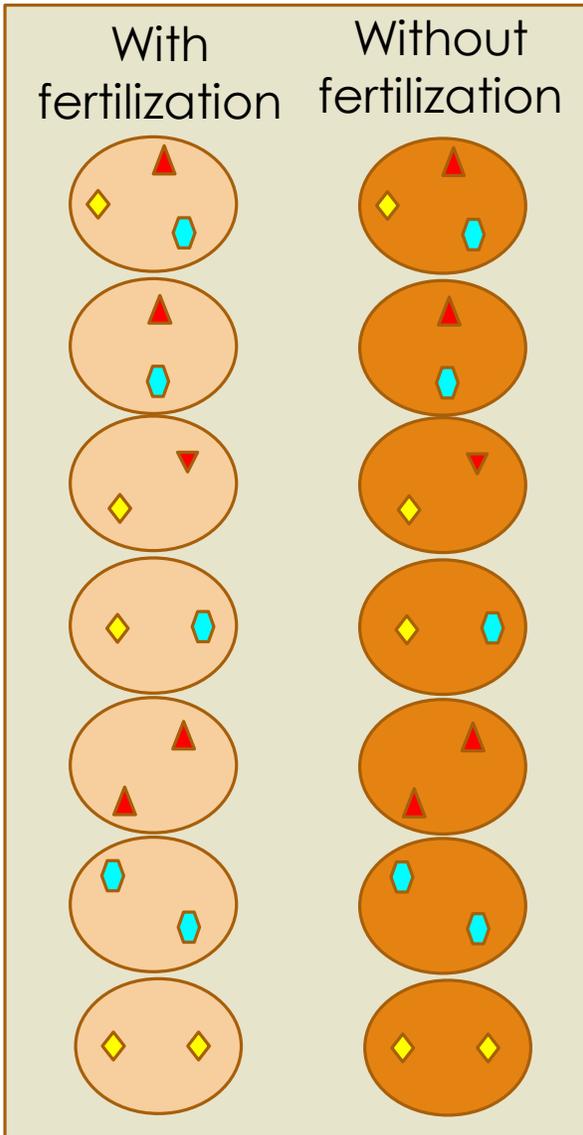
COMMUNITY ASSEMBLAGE

Complementary fertilization reduces the need for complementary interactions nutrient acquisition diluting the effects of interspecific competition

H₂



Experiment setup



- ▲ Oak (*Nothofagus obliqua*)
- ⬡ Legume (*Sophora cassioides*)
- ◆ Proteaceae (*Lomatia dentata*)

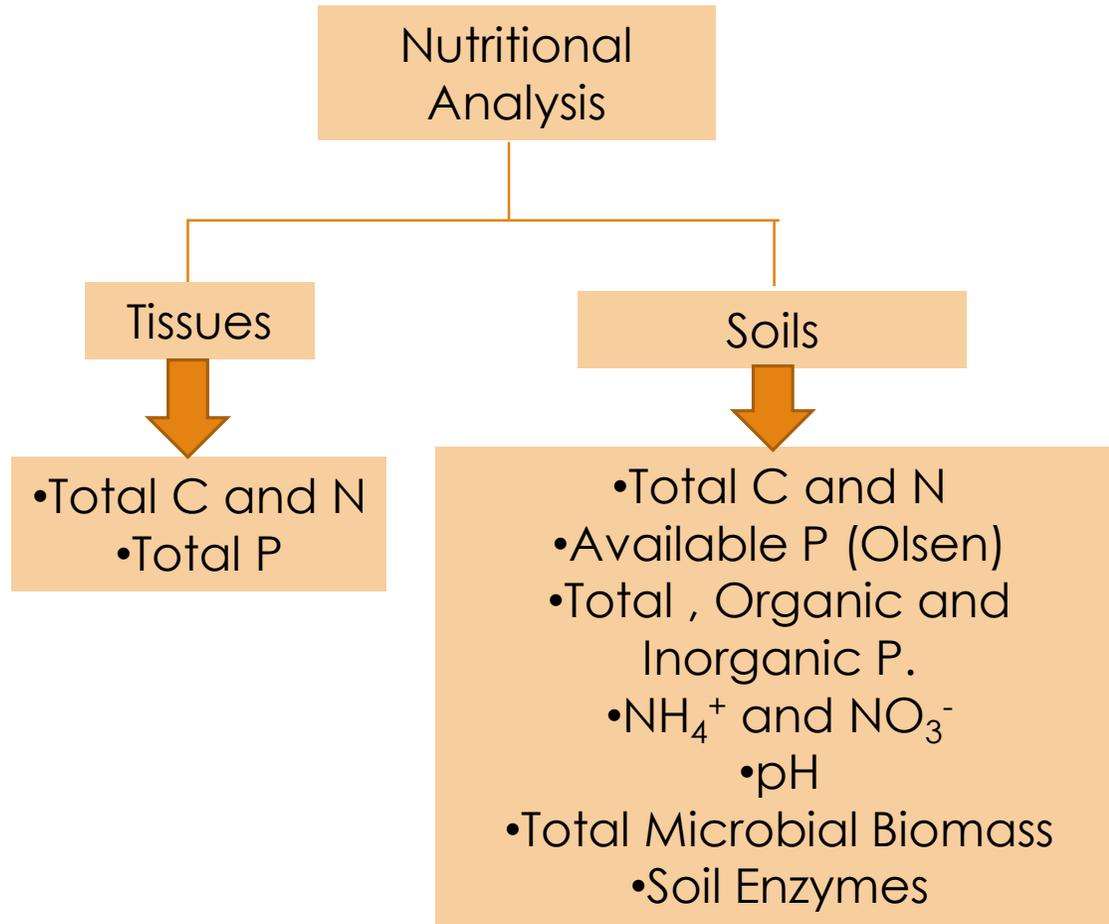
Irrigated with and without a Nutrient Solution based on Hoagland & Arnon (1950)

- 3 Species (Proteaceae/Legume/Oak)
- 7 Plant Assemblages
- 2 Fertilization Treatments
- Full factorial with 10 Replicates
- Soil sampled 2 year after a fire in an non-vegetated site. Soil are Treguaco Asociation (fine, mixed, thermic Dystric xerochrepts)





Methods

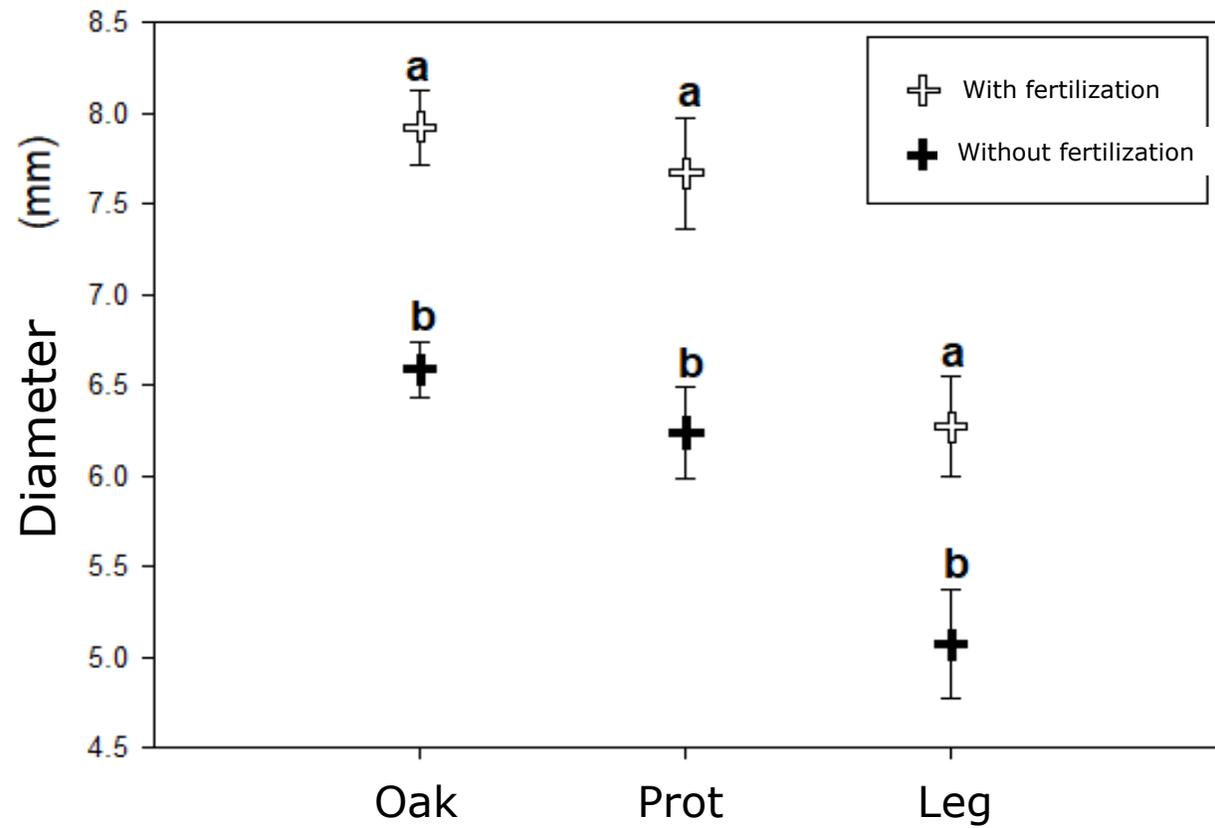
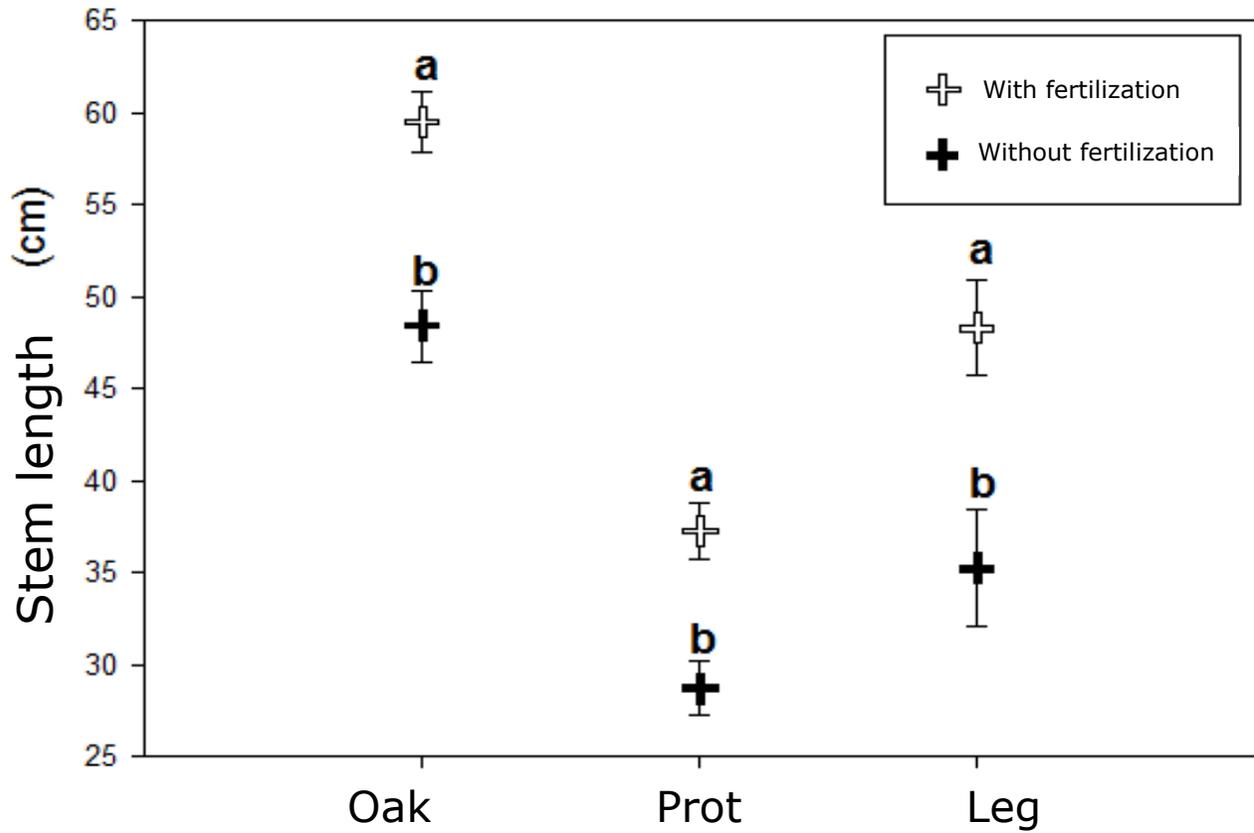


Growth Variables

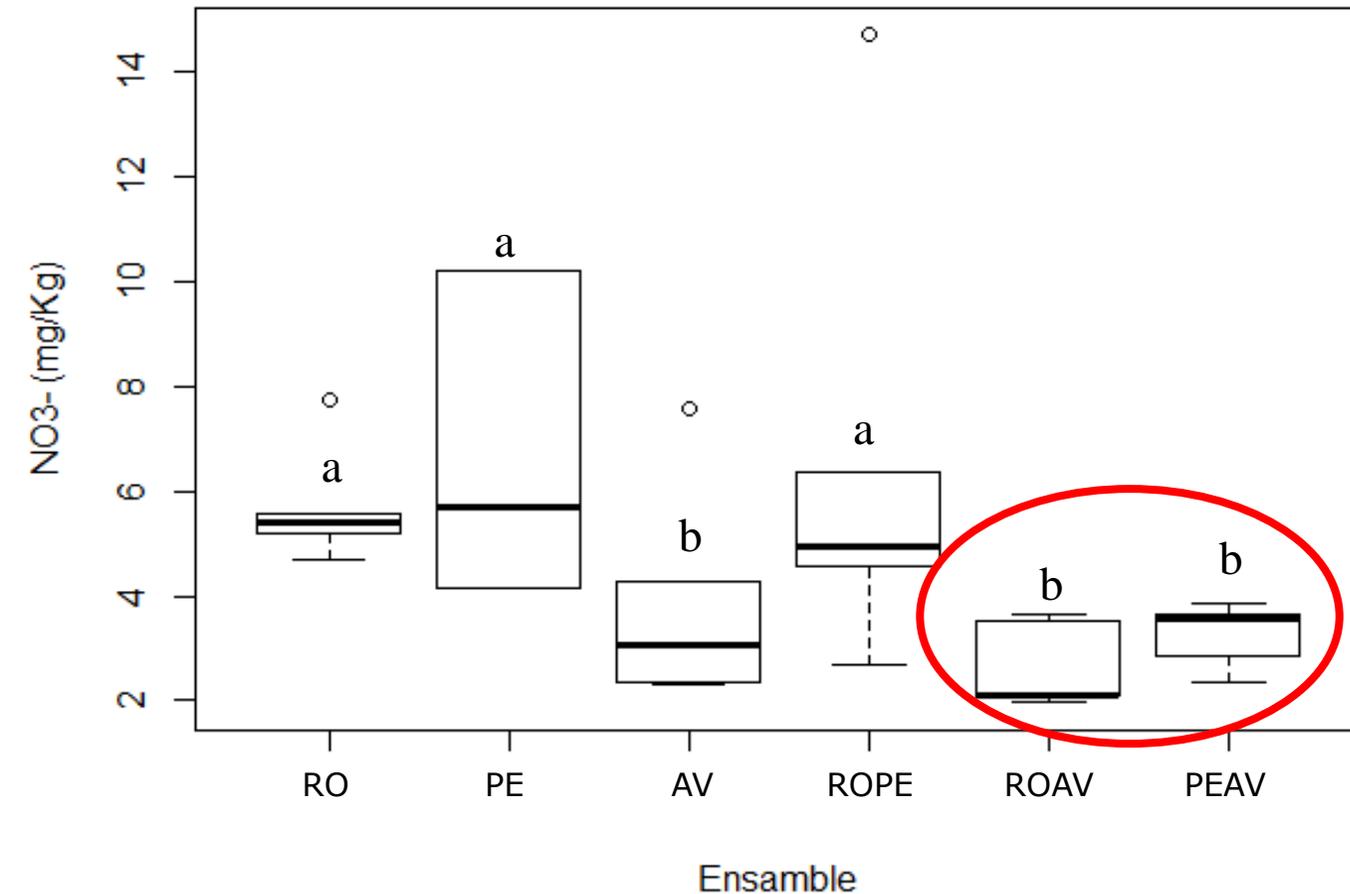
- Total Root Biomass
- Total Aerial Biomass (Shoot and Leaf)
- Monthly Shoot length and diameter



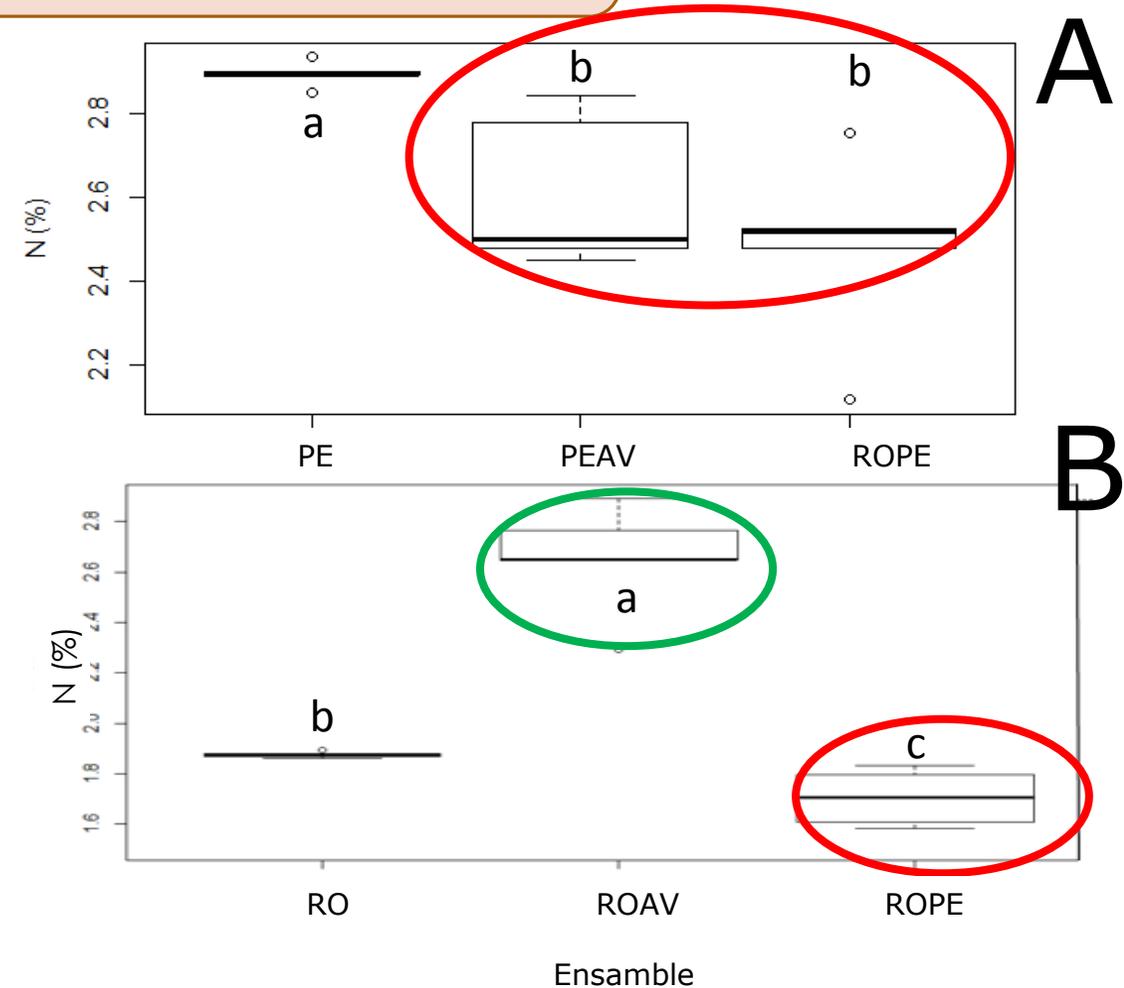
Does complementary fertilization reduces the effects of interspecific competition?



Does the presence of a Legume (*Sophora cassioides*) increase nitrogen in the soil? Do the accompanying species benefit?

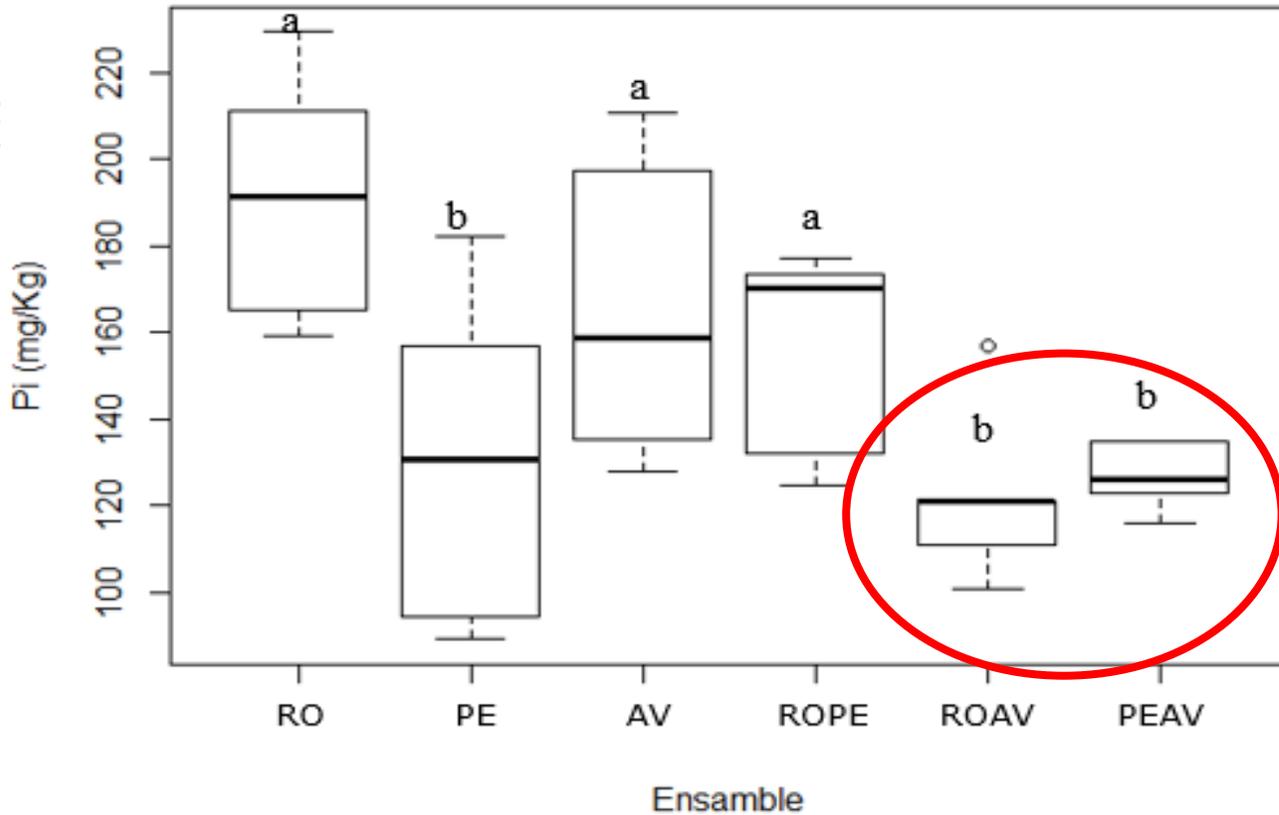


Soil NO₃⁻. Different letters indicate statistically significant differences ($p \leq 0,05$) RO (*N. obliqua*), PE (*S. cassioides*), AV (*L. dentata*)

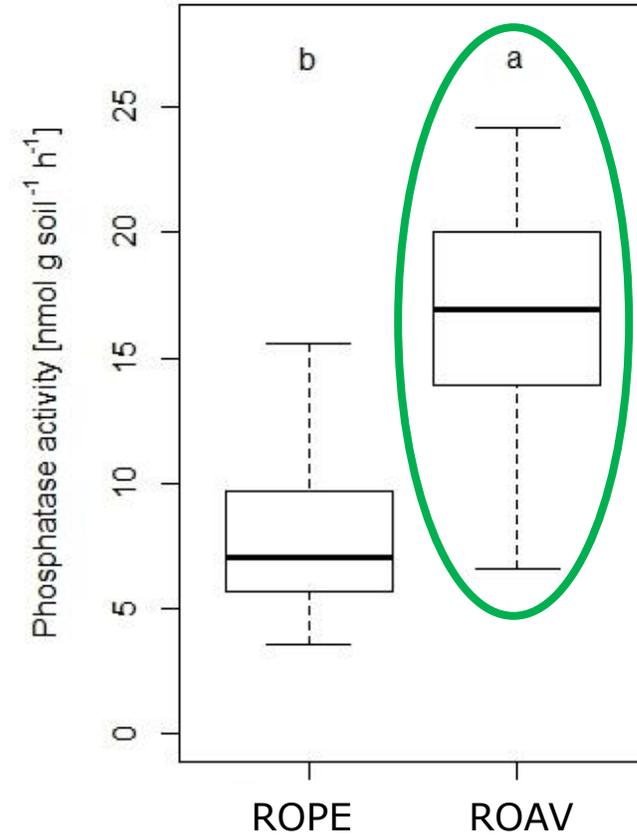


C. foliar total nitrogen (N%) of *S. cassioides* (A) and *N. obliqua* (B) in each assemblage. Different letters indicate statistically significant differences ($p \leq 0.05$)

Does the presence of a Proteacea (*Lomatia dentata*) increase the phosphorus in the soil? Are the accompanying species benefited?



Inorganic phosphorus in the soil. Different letters indicate statistically significant differences ($p \leq 0.05$) RO (*N. obliqua*), PE (*S. cassioides*), AV (*L. dentata*)





Final thoughts

- There is competition for resources when look at the specific level, however there is an increment in the total mesocosm productivity and nutrient acquisition.
- Assemblages have a direct effect in nutrient available pools and reservoirs. C, N and P are increase under assemblages especially the ones including the proteacea specie.
- The inclusion of the proteacea specie seems to contribute more significantly to the overall increment in mesocosm productivity.



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