Ecology Across Borders 2021
last seen today at 8:15

Hey! Are you presenting the following?

"Tree species composition and nutrient uptake drive soil nutrient availability in a temperate podzol, even under contrasted levels of water availability"

Hey there! Yes, we (**Tania L. Maxwell**[abc], Nicolas Fanin[a], Alison D. Munson[c], Catherine Lambrot[a], Laura Scolan[a], Pierre Trichet[a], and Laurent Augusto[a]) are!

Can you introduce the topic, give us a **general context**?

Mixing tree species → ↑ Seasonal complementarity[1] & net N mineralization[2,3] → ↑ Soil nut. availab.

Low H_2O → ↓ Microbial acitivity[4], decomposition[5], mineralization[6] → ↓ Soil nutrient availability

But will changes in H_2O affect potential positive effects of mixing tree species?

What was your main **objective**?

Explore potential temporal complementarity of mixing two species ( ) on several belowground nutrient processes, under two levels of water availability ( ).

Where did you carry this out? Using which **methods**?

At ORPHEE, a large-scale long-term experimental platform in southwestern France

Plots
- Pure birch
- Pure pine
- Mixed birch pine

× 3 low H_2O blocks (dry summers)

× 3 high H_2O blocks (seasonal irrigation)

1. Accumulated **available nutrients** *via* ion-exchange resins[7]

2. **Net mineralization** via Raison's *in situ* soil incubation method[8]

3. Nutrient **uptake** using a non-fertilizing dose of soil-applied $^{15}NH_4Cl$ solution

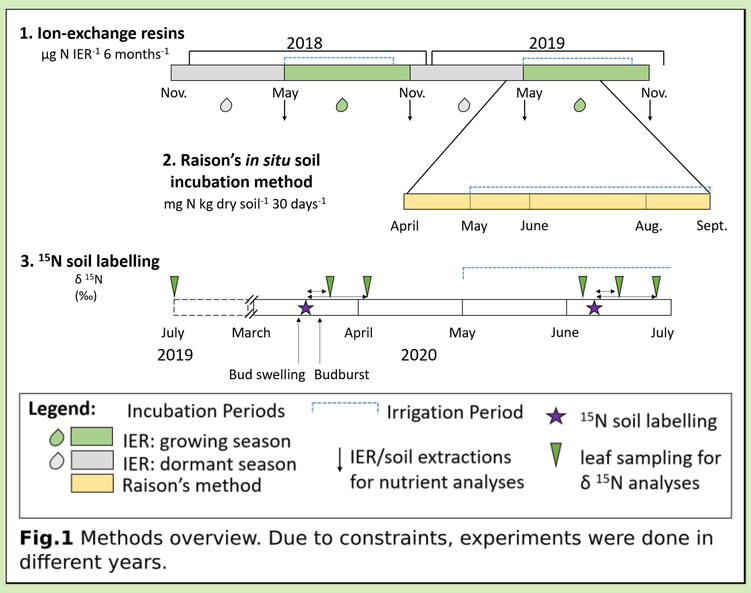

Fig.1 Methods overview. Due to constraints, experiments were done in different years.

What are your main **results**?

1. Soil nutrients

No effect

−

× No effect

At high H_2O
Pure pine: + N
Pure birch: + P

- Pine = larger trees, less need for N[9]
- Birch = higher quality litter, effective P cycling[10]

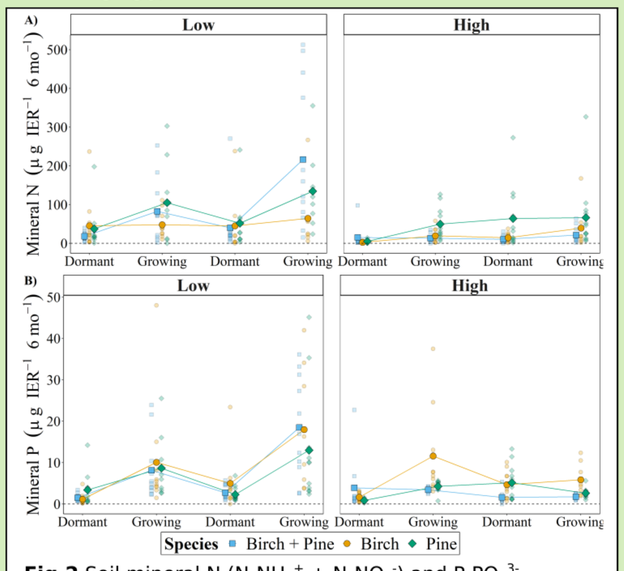

Fig.2 Soil mineral N (N-NH_4^+ + N-NO_3^-) and P-PO_4^{3-} concentrations accumulated in the ion-exchange resins (IER) each incubation period (dormant & growing seasons of 2018 and 2019). Raw data and mean are presented.

2. Net mineralization

No effect

−

× No effect

- High intra-plot variability
- Similar N and P trends

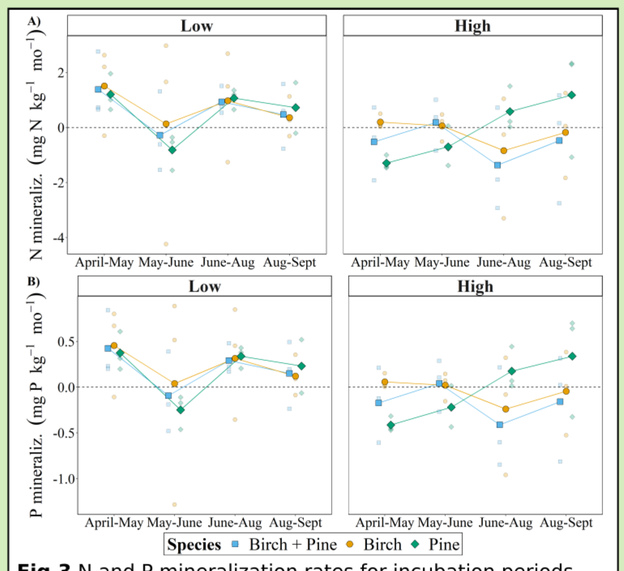

Fig.3 N and P mineralization rates for incubation periods in 2019. Net mineraliz. are values above 0; net immobiliz. are values below 0. Raw data and mean are presented.

3. Uptake

@budburst only: + for pine, − for birch

No effect

× No effect

- Due to differences in canopy cover[11]
- Effect lost in summer

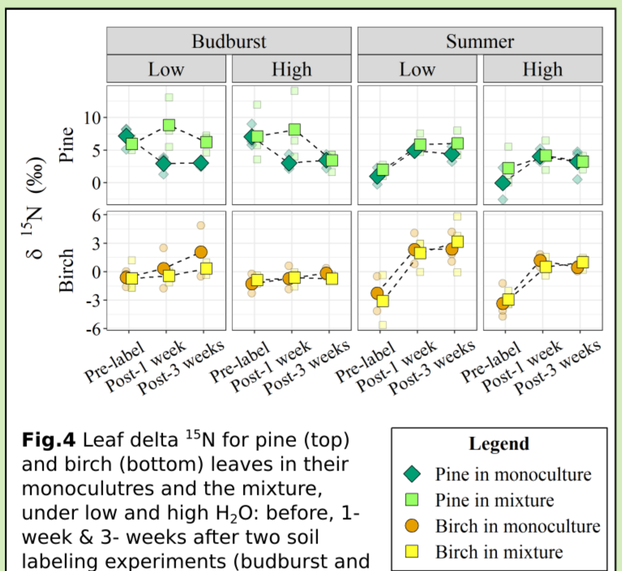

Fig.4 Leaf delta ^{15}N for pine (top) and birch (bottom) leaves in their monoculutres and the mixture, under low and high H_2O: before, 1-week & 3- weeks after two soil labeling experiments (budburst and early June) in 2020. Raw data and mean presented.

Looks interesting! So what are your **conclusions**?

- The **timing** of nutrient demands and **uptake** of species within a mixture may be a **stronger driver** than **net mineralization** for soil nutrient availability in young mixed forest plantations.
-Overall, belowground net mineralization and soil nutrient availability were more **strongly driven by water availability** than by mixing tree species.

What's next for this experiment and the research area?

●●●
[to be continued]

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