



Les mycorhizes au cœur des interactions de compétition de la molinie sur le jeune chêne

Mycorrhizae in the heart of competitive
interactions of *Molinia* on young oak

Marine Fernandez

Postdoc – Paqlab (UQAM)

PhD Université Clermont Auvergne (France)



Oaks = 37% of trees in France
(42% of the deciduous trees)



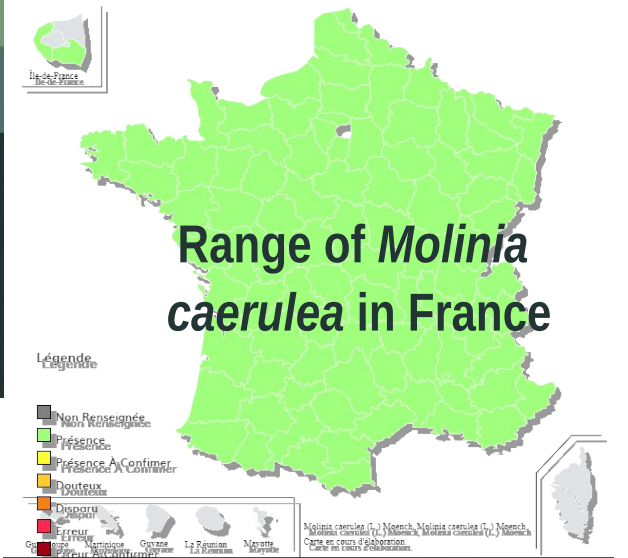
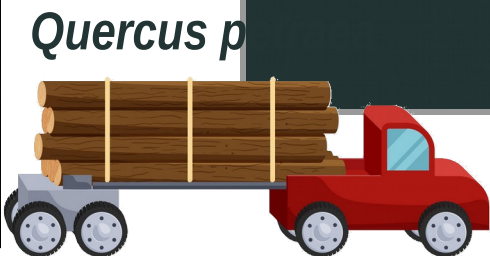
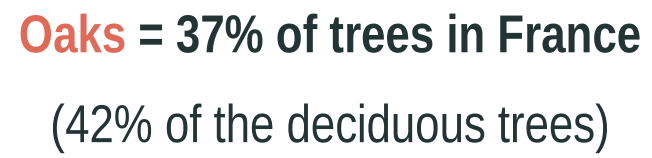


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Quercus p







A photograph showing a forest floor with tall, dry, yellowish-brown grass in the foreground. Several tree stumps are visible, indicating recent logging. In the background, a line of standing trees with green foliage is visible under bright sunlight.



What do we already know?

Contents lists available at [ScienceDirect](#)

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco

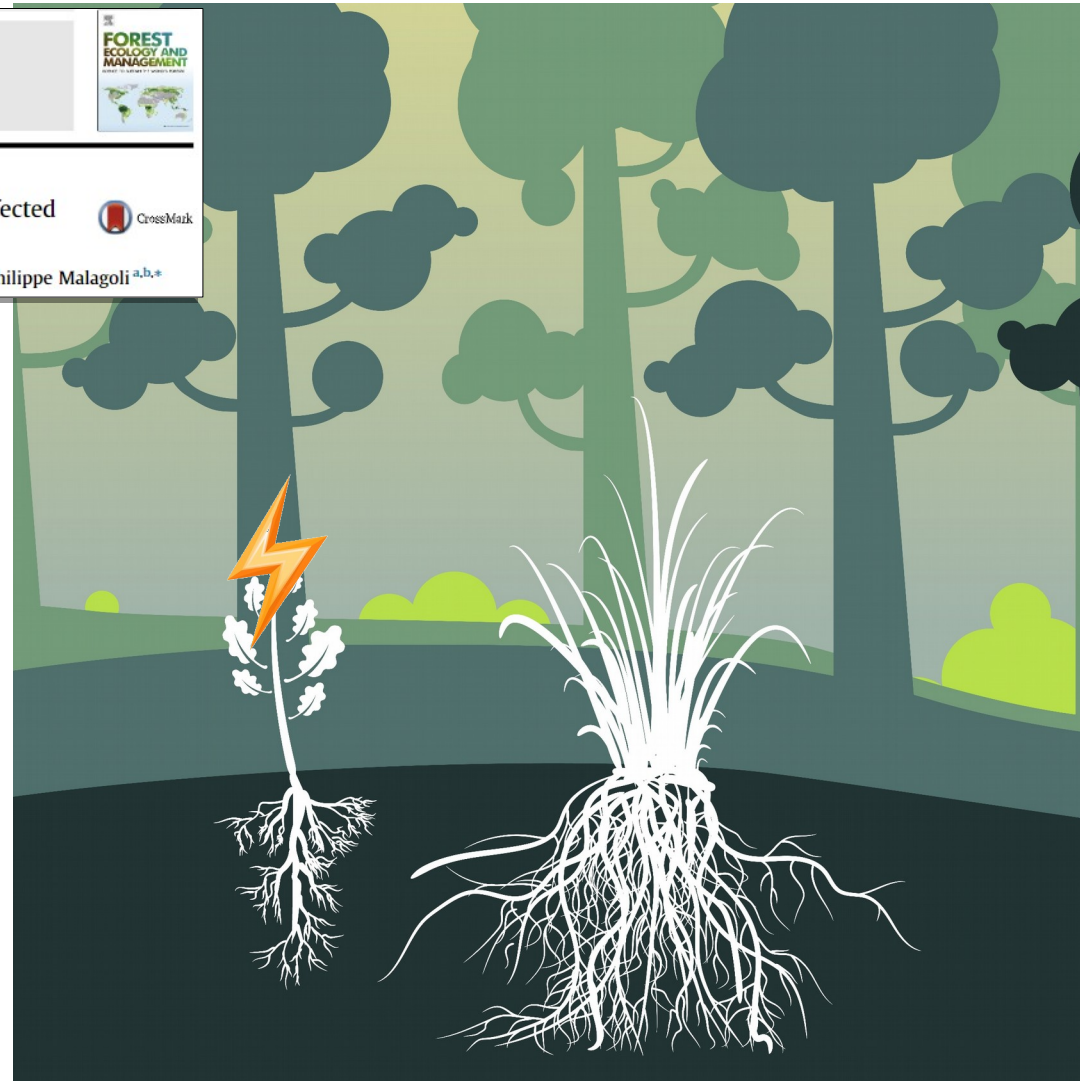
ELSEVIER

FOREST
ECOLOGY AND
MANAGEMENT

Photosynthesis capacity of *Quercus petraea* (Matt.) saplings is affected by *Molinia caerulea* (L.) under high irradiance

Antoine Vernay^{a,b}, Philippe Balandier^c, Ludivine Guinard^{a,b}, Thierry Améglio^{b,a}, Philippe Malagoli^{a,b,*}

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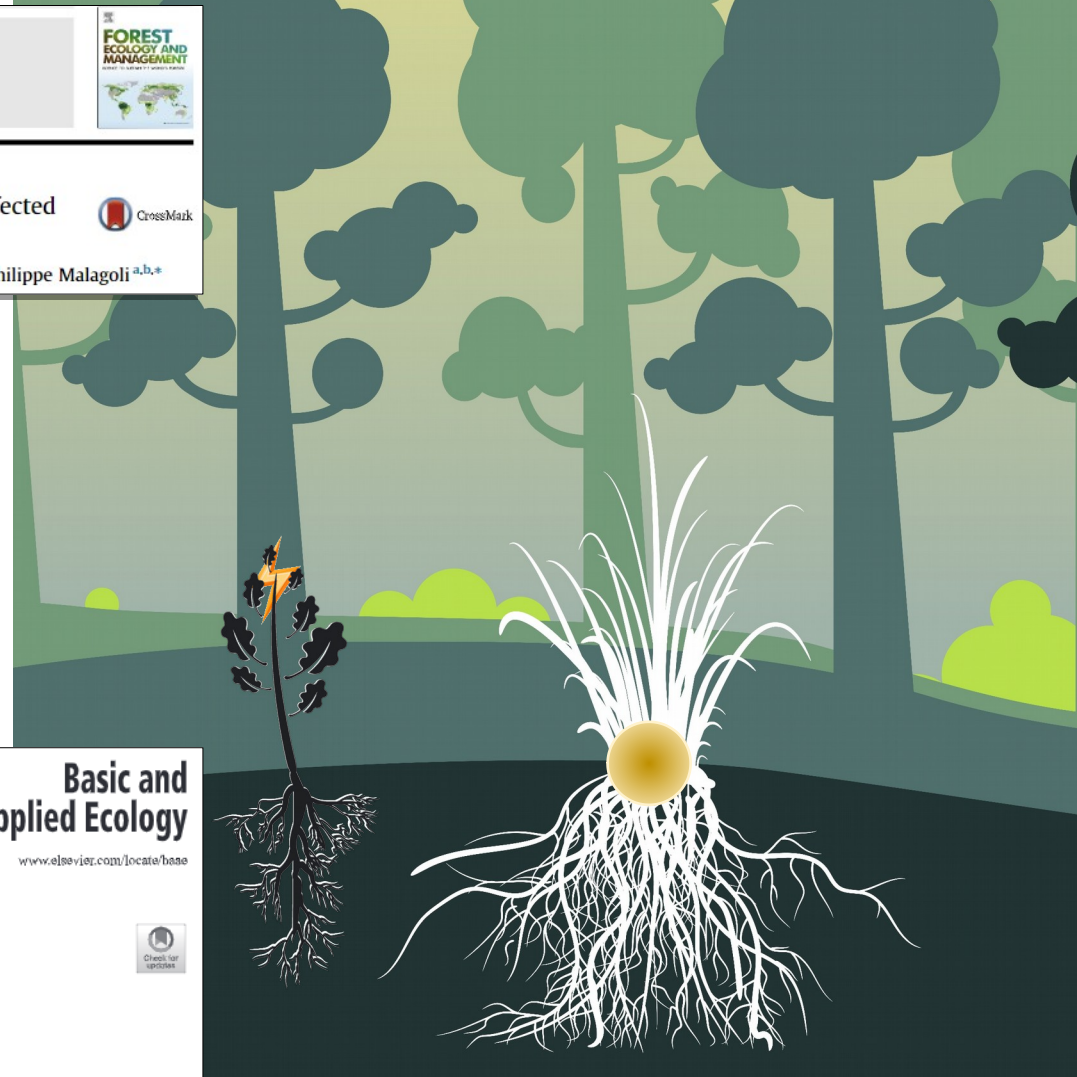
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GfÖ Ecological Society of Germany,
Austria and Switzerland
Basic and Applied Ecology 31 (2018) 21–32

Basic and Applied Ecology
www.elsevier.com/locate/bae

Improved *Deschampsia cespitosa* growth by nitrogen fertilization jeopardizes *Quercus petraea* regeneration through intensification of competition

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Regeneration failure in *oak-Molinia* stands

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Investigating the role of root exudates in the interaction between oak seedlings and purple moor grass in temperate forest

Marine Fernandez^{a,b}, Philippe Malagoli^{a,*}, Christiane Gallet^c, Catherine Fernandez^d, Antoine Vernay^e, Thierry Améglio^a, Philippe Balandier^a




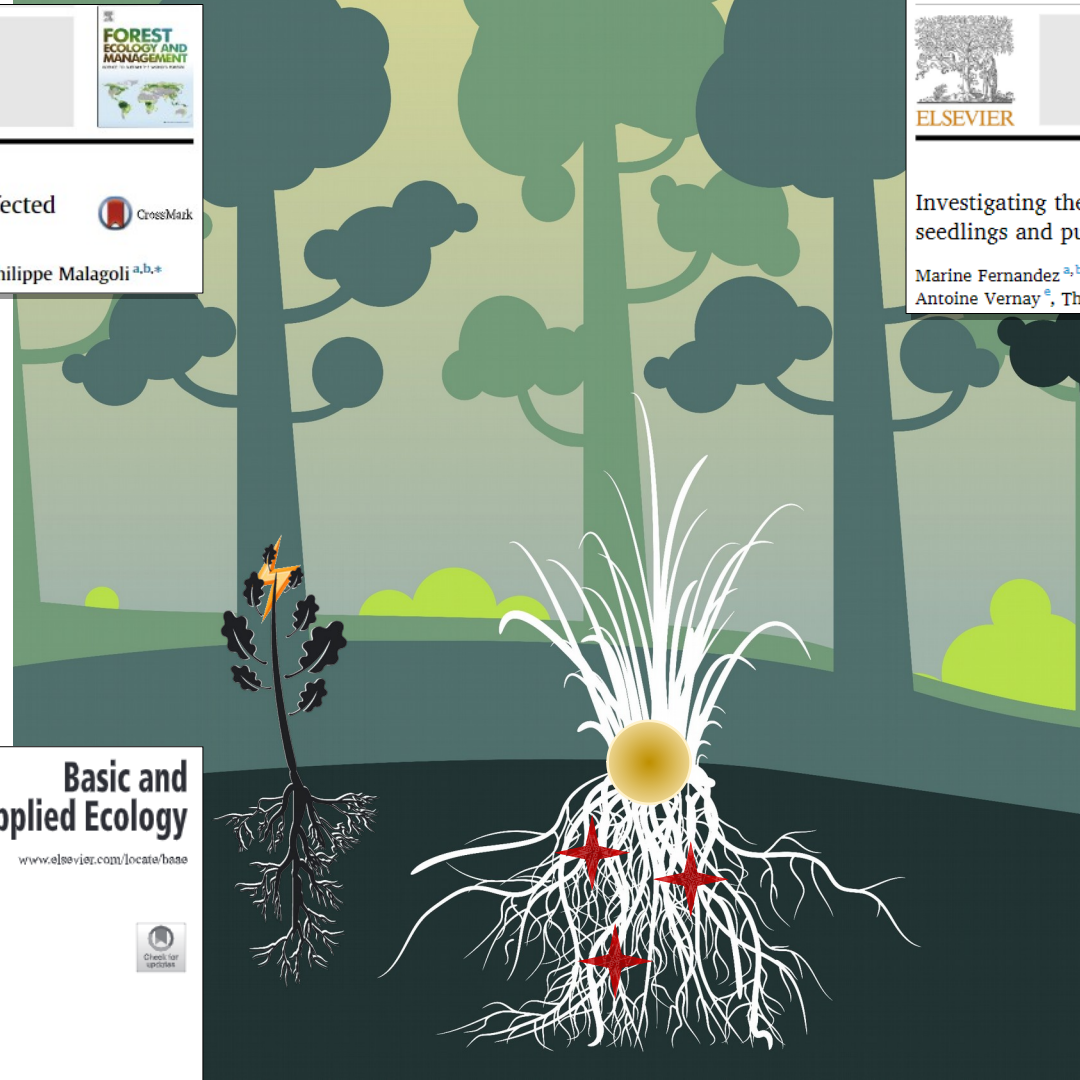
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REVIEW

Journal of Ecology

Plant N economics and the extended phenotype: Integrating the functional traits of plants and associated soil biota into plant-plant interactions

Marine Fernandez^{1,2} | Antoine Vernay³ | Ludovic Henneron⁴ | Larissa Adamik² | Philippe Malagoli² | Philippe Balandier²

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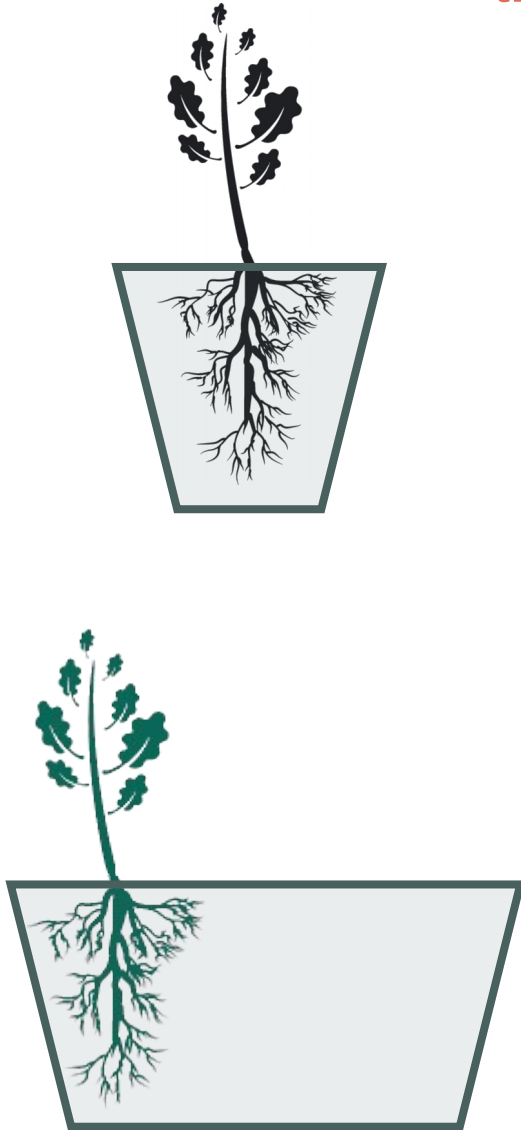
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Hypothesis: oak regeneration failure is partly explained by the negative effect of *Molinia* on oak ectomycorrhizae



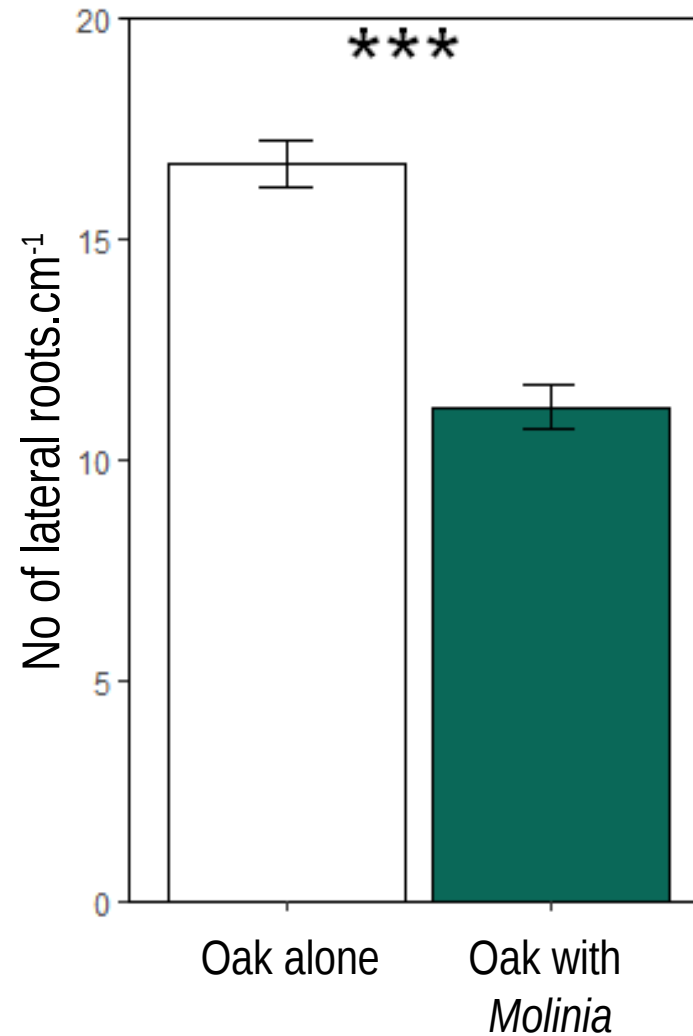
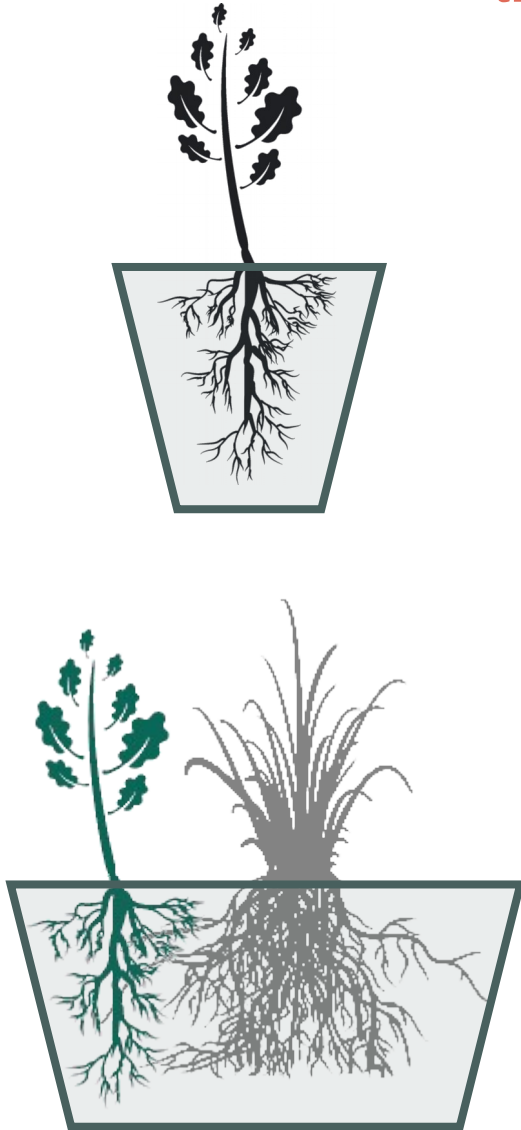
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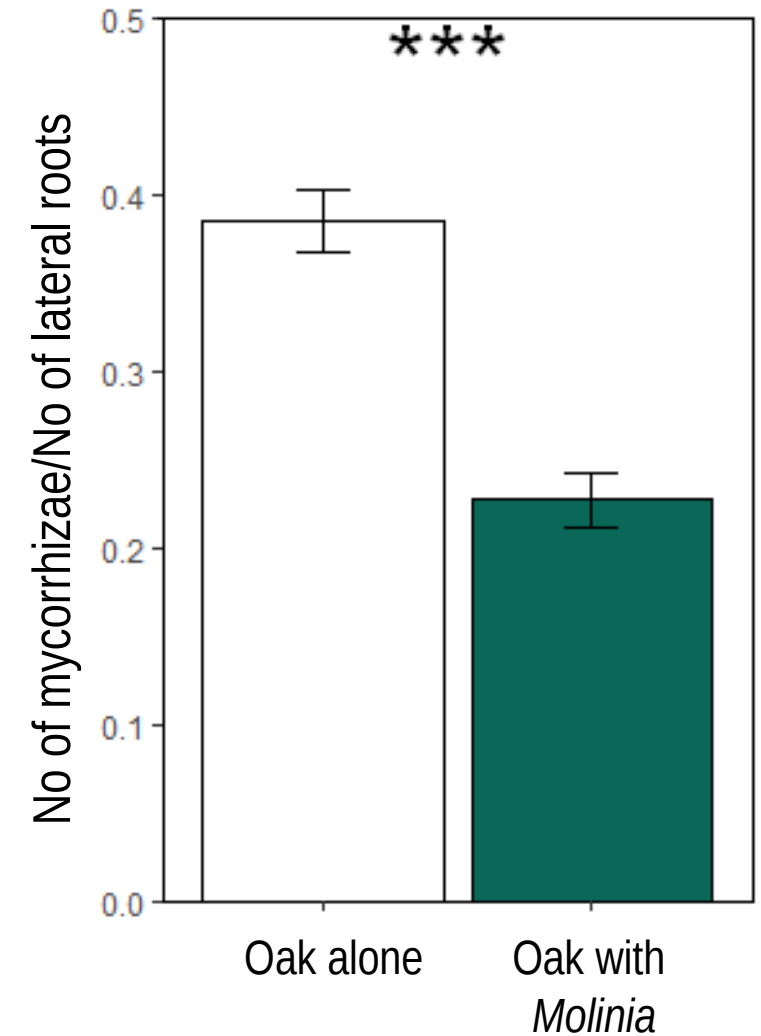
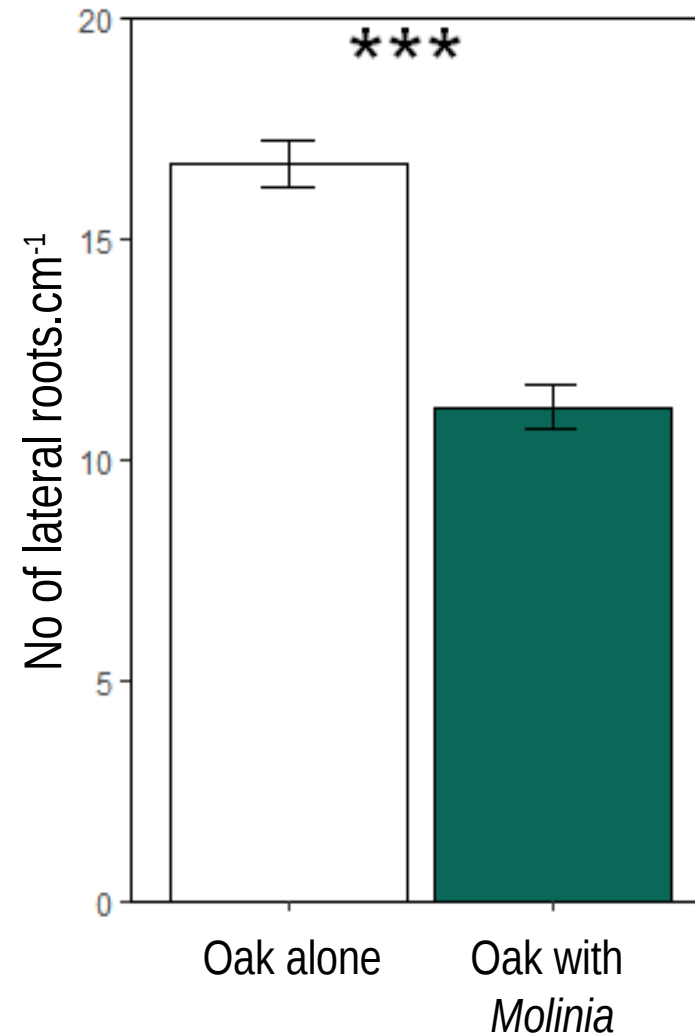
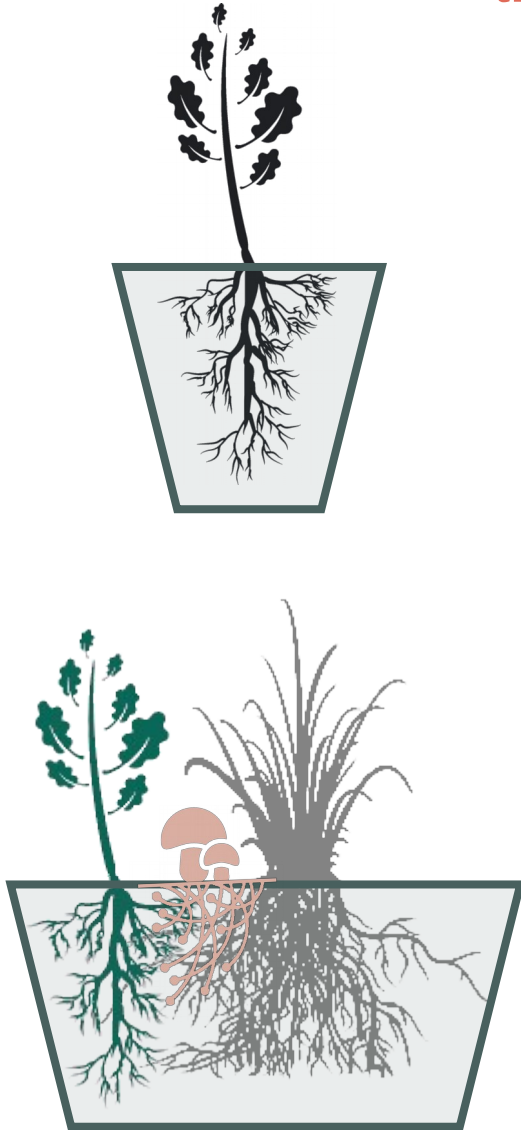
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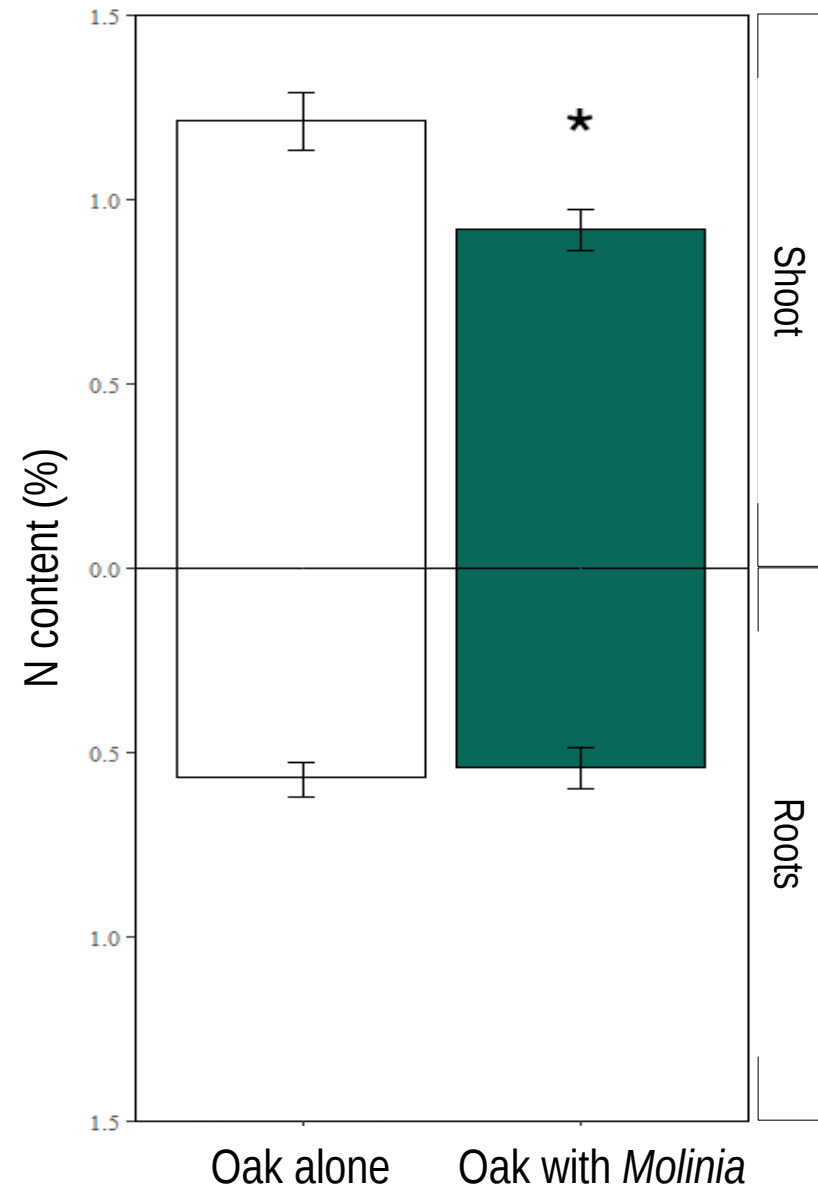
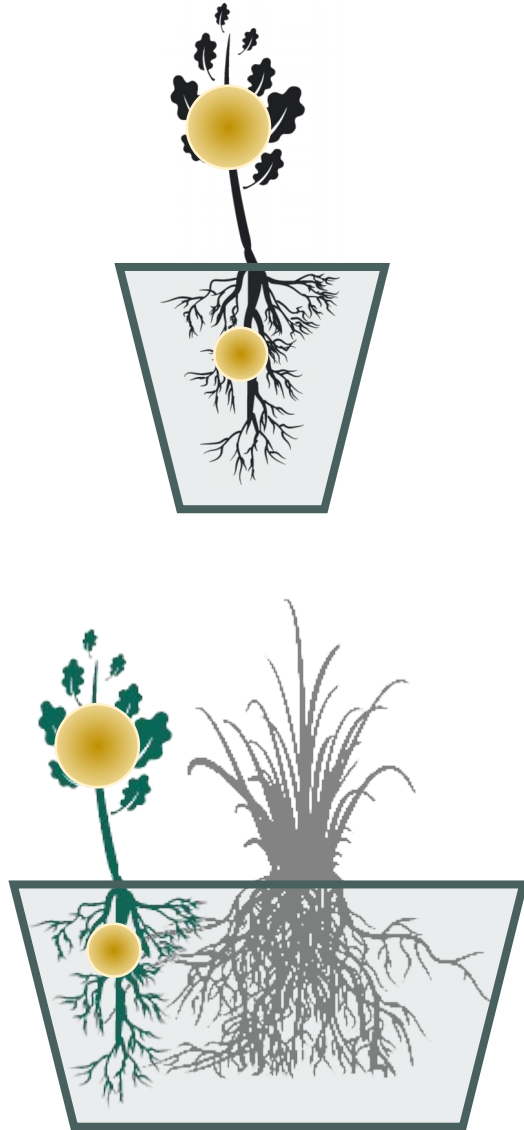
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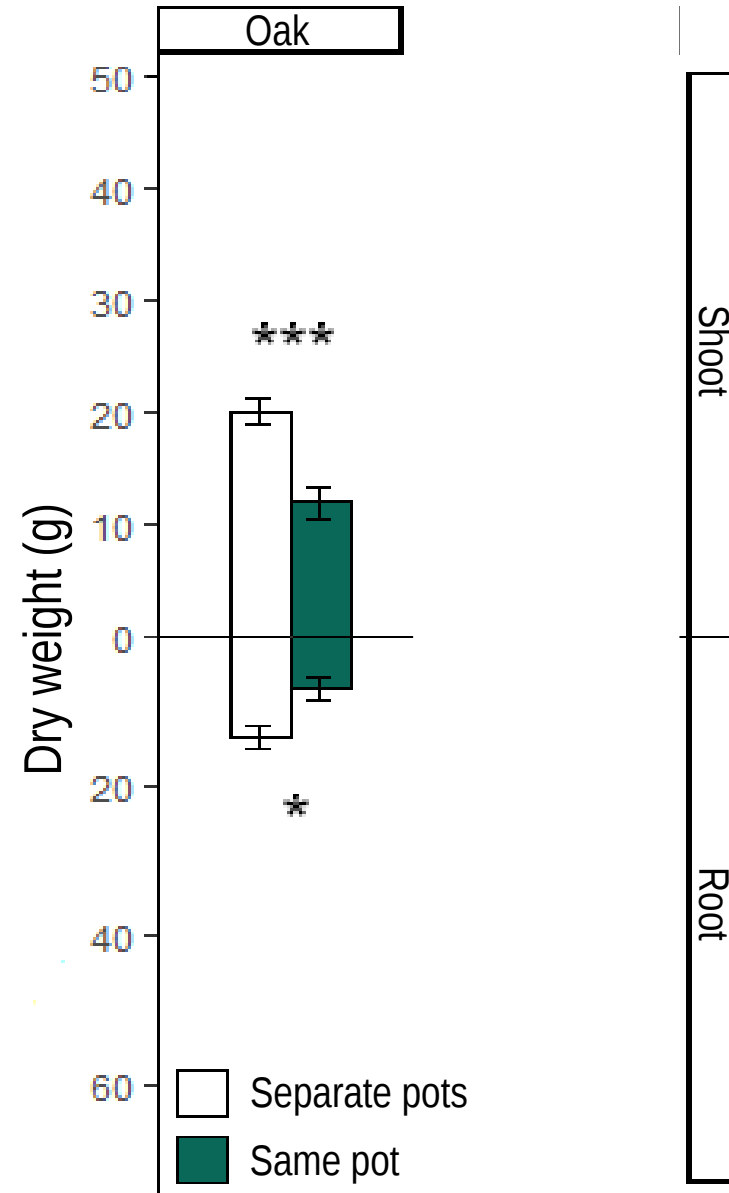
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Consequences



Regeneration failure in *oak-Molinia* stands

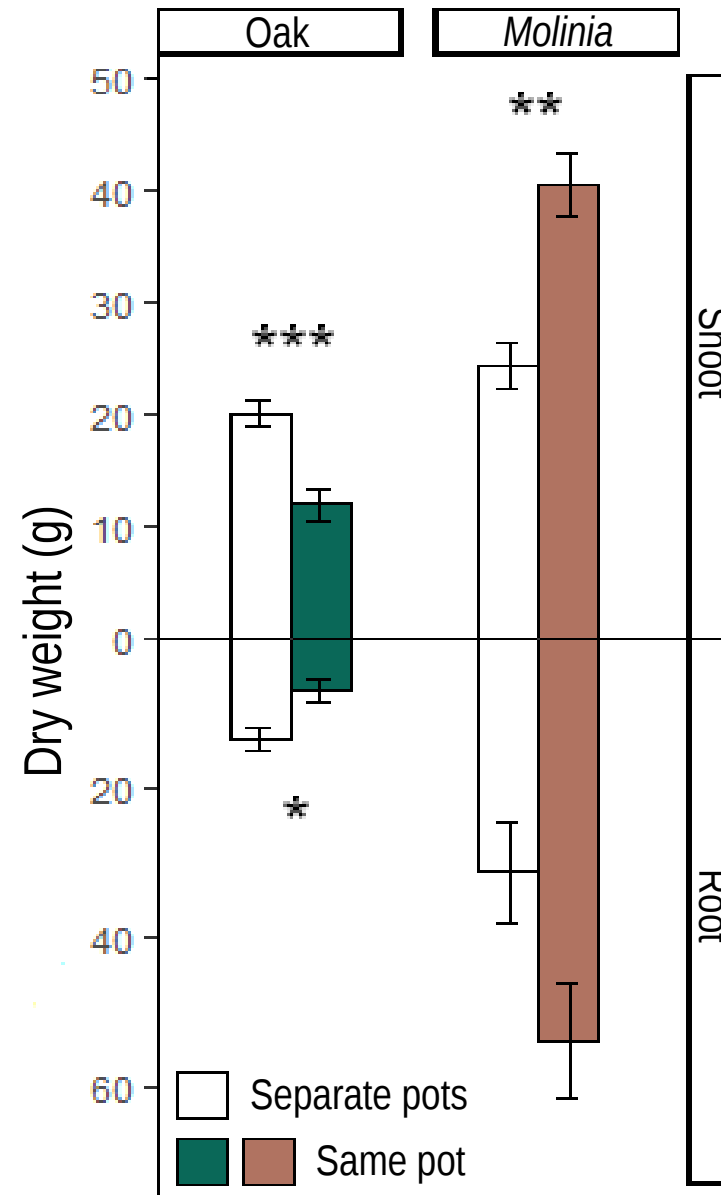
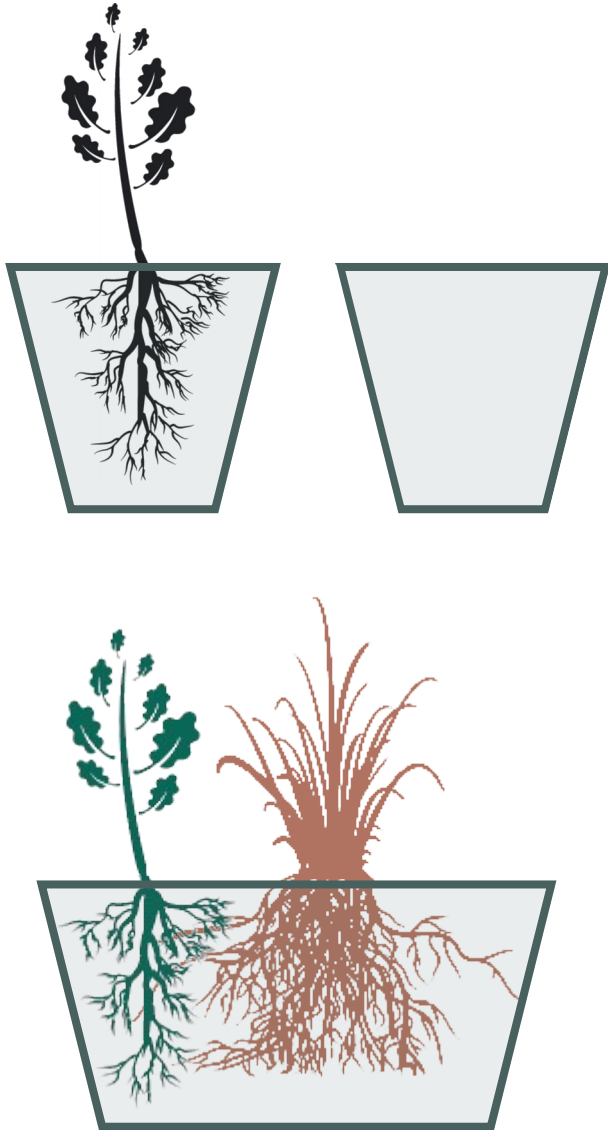
Consequences



- Less roots
- Less ectomycorrhizae
- Less nitrogen
- Lower biomass

Regeneration failure in *oak-Molinia* stands

Consequences &... surprise



- Less roots
- Less ectomycorrhizae
- Less nitrogen
- Lower biomass

Molinia alters oak seedling growth
...
while oak facilitates *Molinia* growth!

Regeneration failure in *oak-Molinia* stands



Plant Soil

<https://doi.org/10.1007/s11104-020-04473-9>

REGULAR ARTICLE

Below-ground nitrogen transfer from oak seedlings facilitates *Molinia* growth: ^{15}N pulse-chase labelling

Marine Fernandez • Philippe Malagoli • Antoine Vernay •
Thierry Améglio • Philippe Balandier

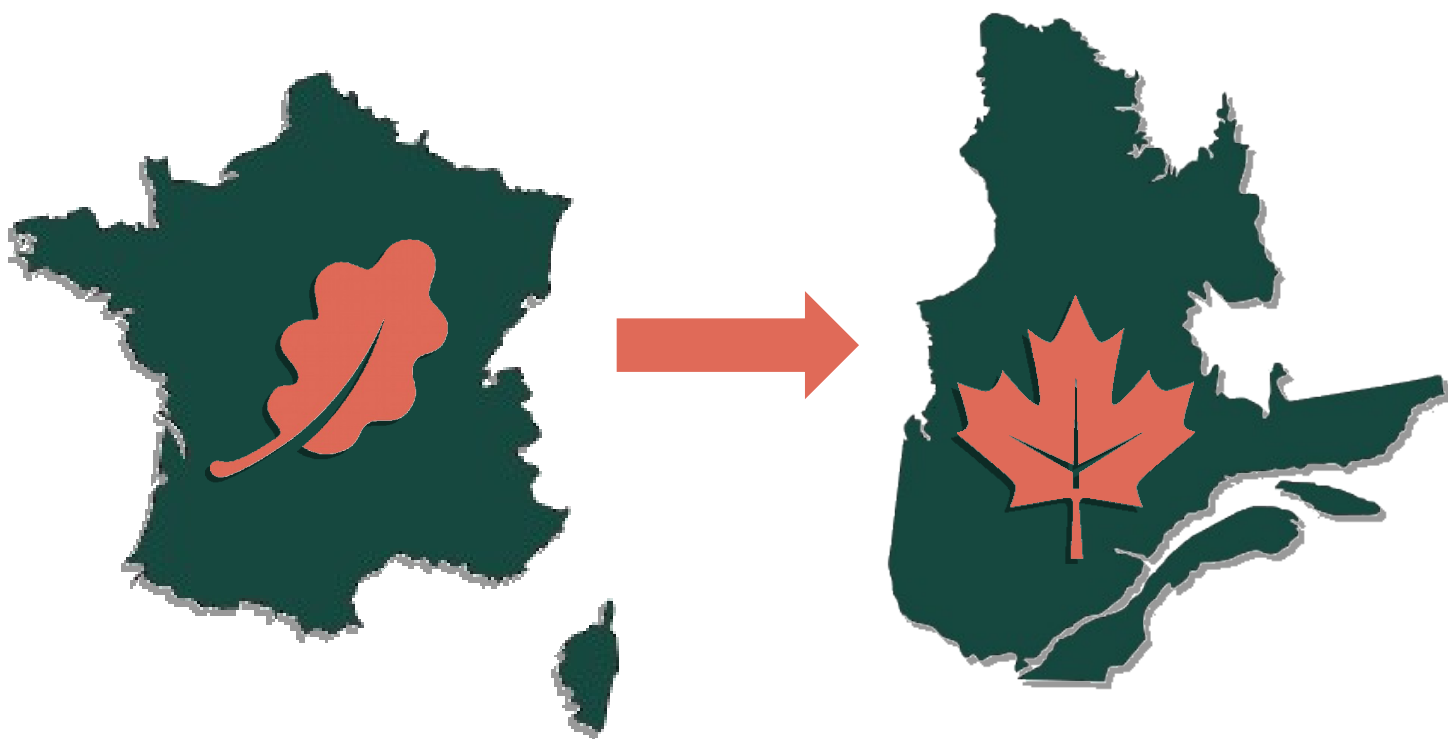


Check for
updates

Are mycorrhizae involved in interspecific nitrogen transfers?

To be continued...

And now...



UQÀM



Paqlab

The effect of urbanization gradient on rhizosphere microbial community

Urbanization gradient

Norway maple

Silver maple

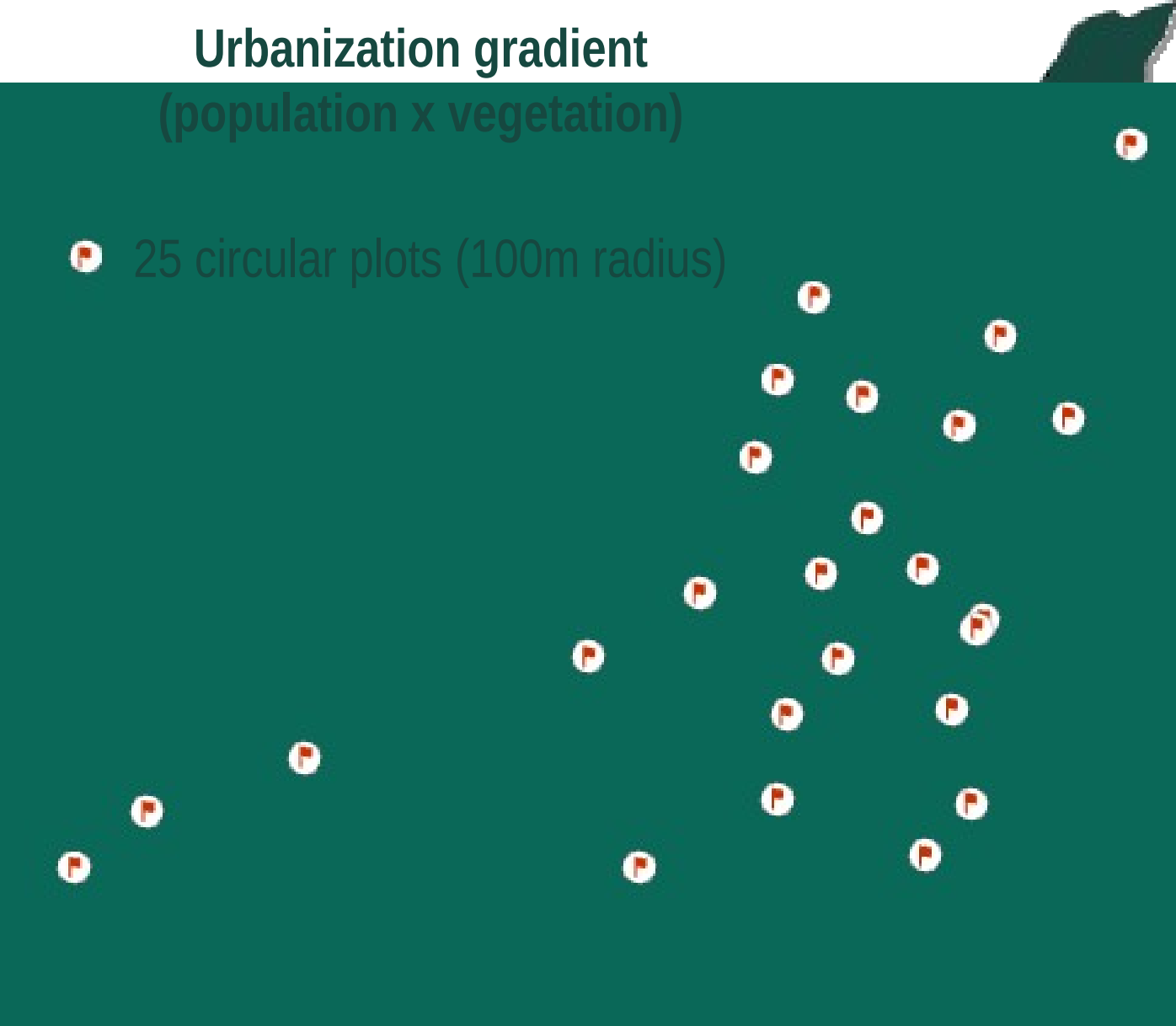


Rhizosphere microbial community

The effect of urbanization gradient on rhizosphere microbial community

Urbanization gradient
(population x vegetation)

25 circular plots (100m radius)



The effect of urbanization gradient on rhizosphere microbial community

Urbanization gradient (population x vegetation)

• 25 circular plots (100m radius)

- Tree inventory & DHP (density and diversity)
- 3 Norway Maple + 3 Silver Maple / plot
- Harvest: soil, roots
- **Other projects:** pollen, leaves, collembolas, air, insects, birds...

The effect of urbanization gradient on rhizosphere microbial community

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Soil properties

OM, pH, compaction, %VWC, T°C, WHC...

Nutrients, MicroResp (FungiResp)... & mycorrhizae!

MERCI !

