

INTRODUCTION

- **Sugar maple** (*Acer saccharum*) & **Eastern hemlock** (*Tsuga canadensis*) are **declining** across their ranges.
- **Sugar maple** is projected to **migrate** into potentially unsuitable environments of boreal forest, which harbor low abundances of their root fungal symbionts (**arbuscular mycorrhizal [AM] fungi**) and lower soil pH. Despite this, maple seedlings perform well at their range edge¹.
- Projected **hemlock** losses across its range threaten to greatly alter biogeochemical/ecological processes and local microbial communities², particularly **ectomycorrhizal [EM] fungi**.
- The impact of **dominant mycorrhizal community type** on species colonization and establishment as well as microbial community assembly is poorly understood, even though differing mycorrhizal types give rise to distinct soil nutrient syndromes.
- With **sugar maple**, potential differences in AM vs EM soil nutrients syndromes and their respective microbial communities may be contributing to improved establishment at its range edge and beyond, via an 'enemy release'³ and a transition to a soil environment less favorable for pathogens⁴.
- **Eastern hemlock** is a putatively dual-mycorrhizal species², however there is uncertainty as to how a transition between dominant forest mycorrhizal types (AM-EM) would impact mycorrhization.
- Important to understand these dynamics as climate change accelerates; temperate forests are projected to become more AM dominant⁵, potentially leading to environments with **↑ pathogens & faster nutrient cycles**.

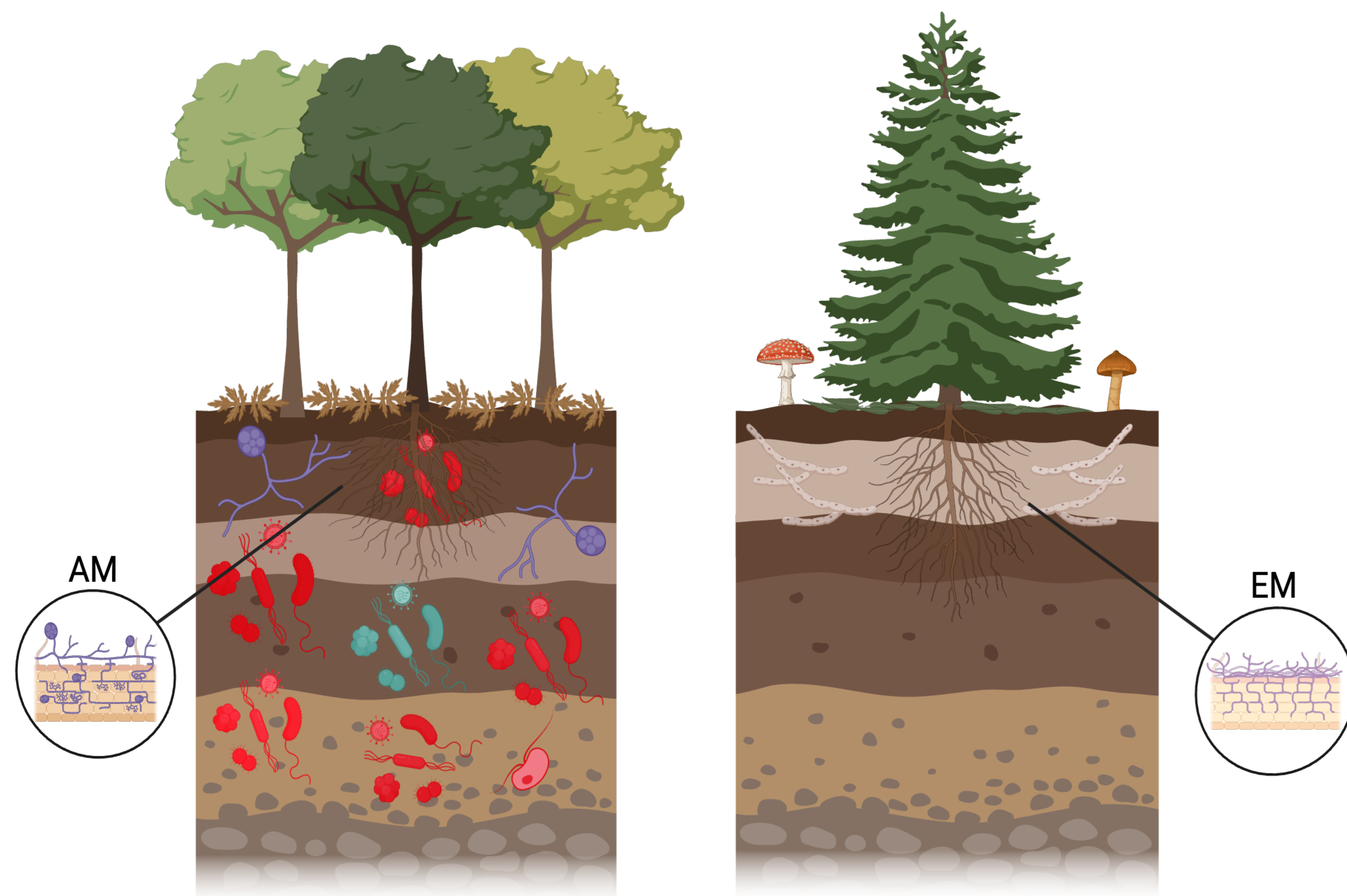
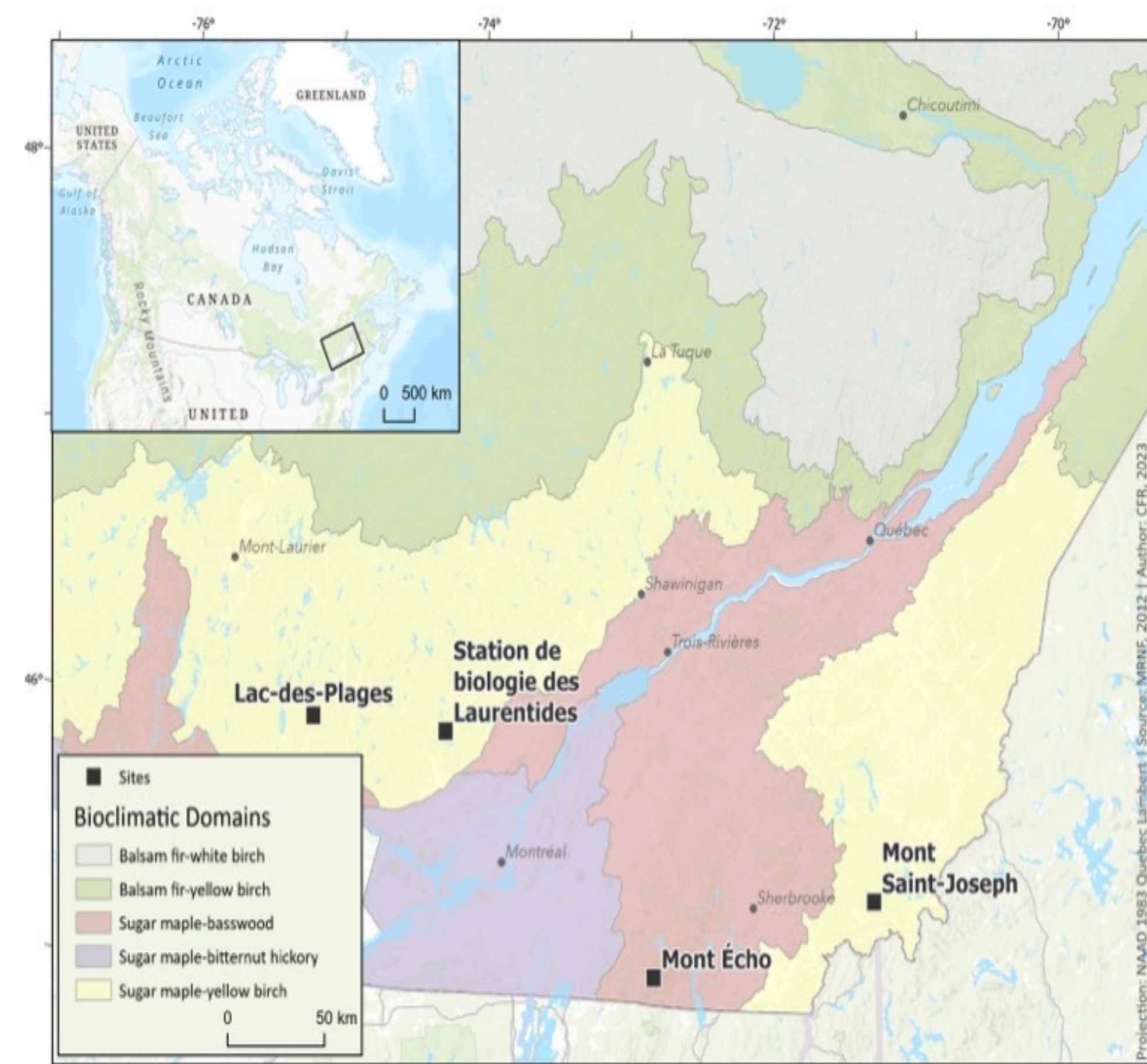
OBJECTIVES

Determine the effect of **dominant forest mycorrhizal type** on the relative abundance, diversity, community composition and function of soil and rhizosphere fungal communities along four temperate-to-boreal gradients.

PREDICTIONS

- 1 Maple seedlings will experience '**enemy release**' at range edge due to **↓ pathogen abundances** in EM vs. AM stands.
- 2 **Fungal community composition** in soil and root will change as a function of mycorrhizal type, with **↑ pathogenic and saprotrophic guilds** in AM vs EM stands.
- 3 Hemlock seedlings will experience **↑ dual-mycorrhization** in ecotones.

STUDY SITES



AM dominated stands harbor **↑ fungal diversity**⁶.

- **↑ Pathogens and saprotrophs**
- **Nutrient rich leaf litter and soils**
- **↑ Nutrients = potential ↑ disease severity**
- **Drives Negative Density Dependence**

EM dominated stands **↓ in pathogenic taxa**⁶.

- **Competition with saprotrophs**
- **Modification of soil environment**
- **Nutrient poor soils and leaf litter**
- **Drives Positive Density Dependence**

METHODS

