

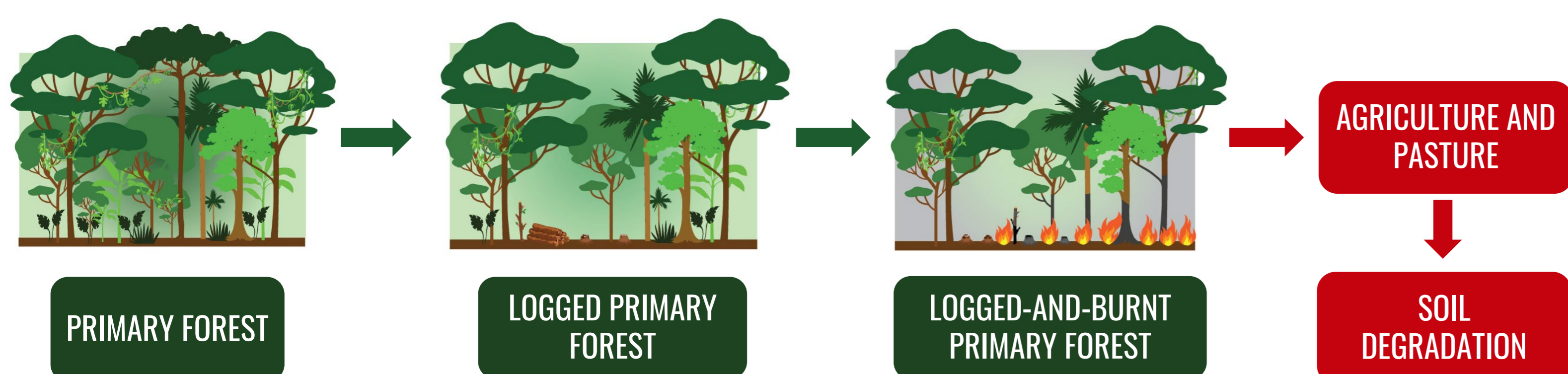
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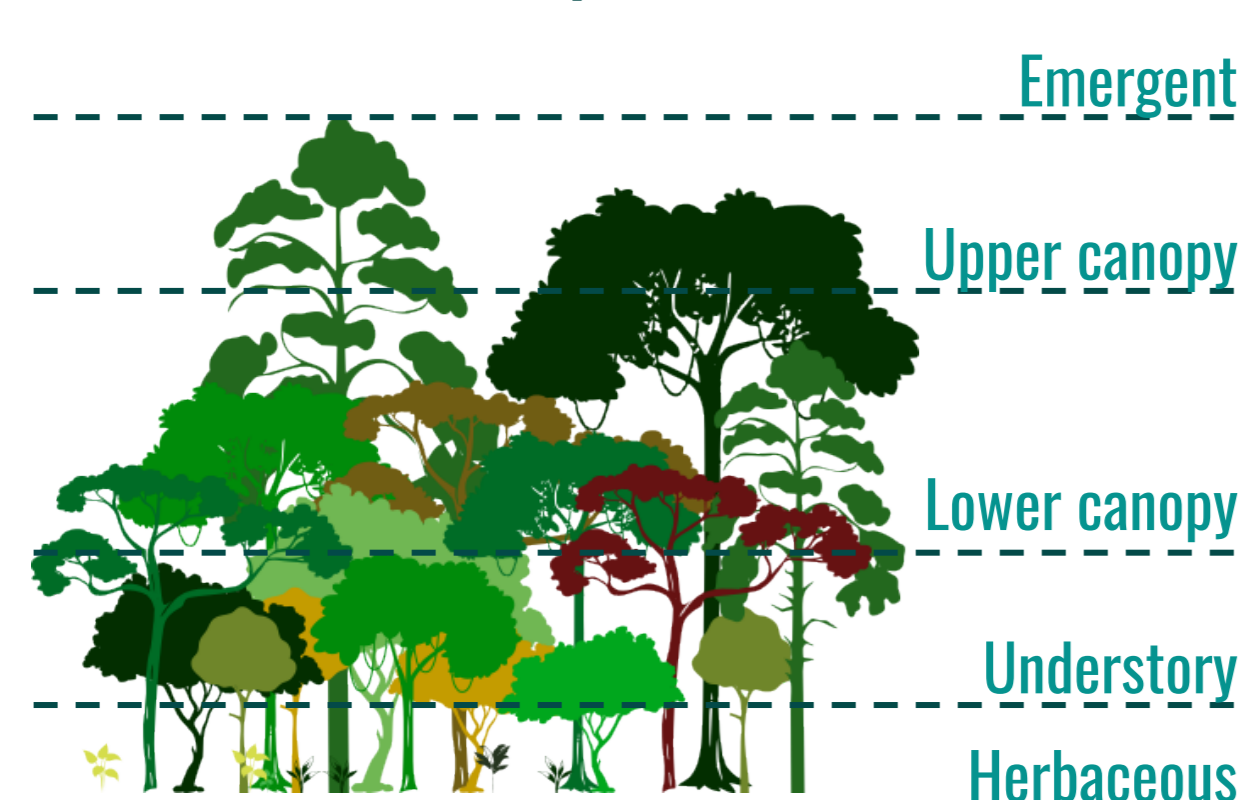
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BACKGROUND



In this context, agroforestry systems (AFS) emerge as a promising alternative for recovering degraded areas and promoting sustainability in tropical agriculture as it can mimic some of the forest characteristics and prevent soil degradation (Nair, 2013)



However, agroforestry systems occur in the Amazon region in a wide range of designs, which are directly tied to the farmer's socioeconomic needs. Changes in agroforestry design may result in differences in tree diversity among farmers (Atangana et al., 2014)

Does the tree diversity of agroforests affect the fungi Community associated with the litter-layer in the Amazon region?

Figure 1. Example of multistrata agroforestry. Adapted from Elevitch et al. (2018)

METHODS

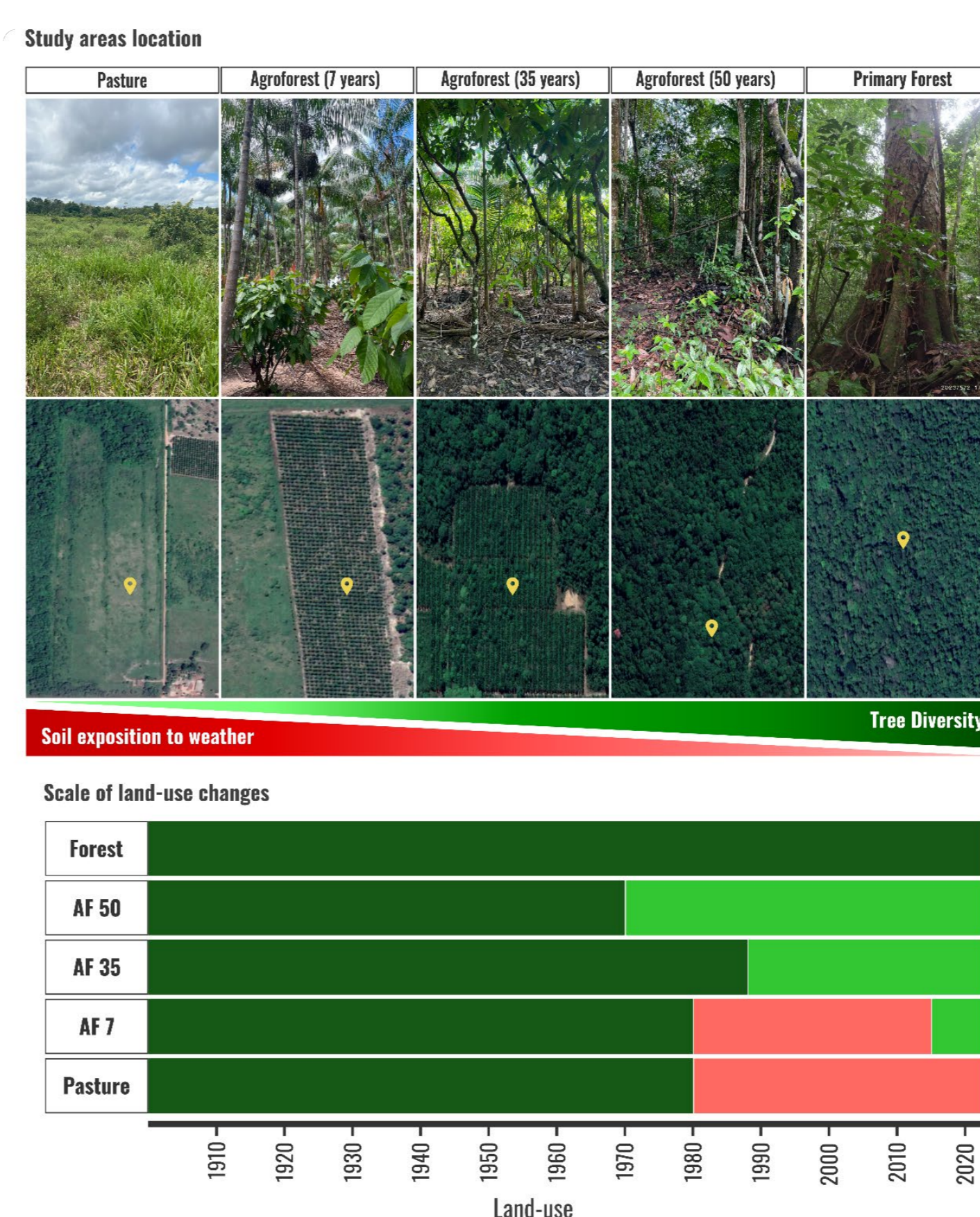


Figure 2. Aerial and terrestrial view of sampling areas within the Amazon biome in the State of Pará followed by the scale of land-use changes in the sampling sites

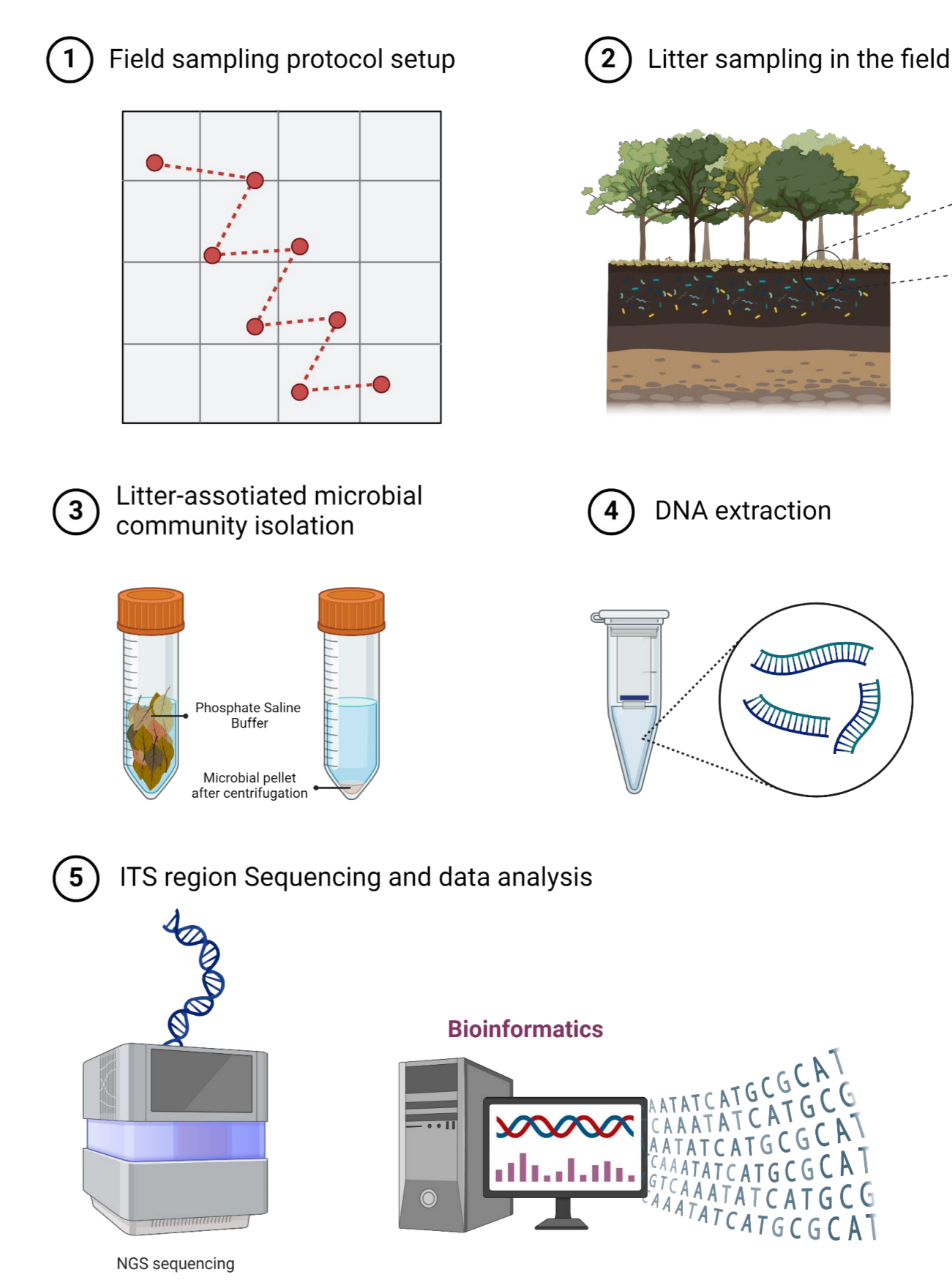


Figure 3. Workflow from sample collection to next-generation sequencing of the ITS fungal region and data analysis

RESULTS

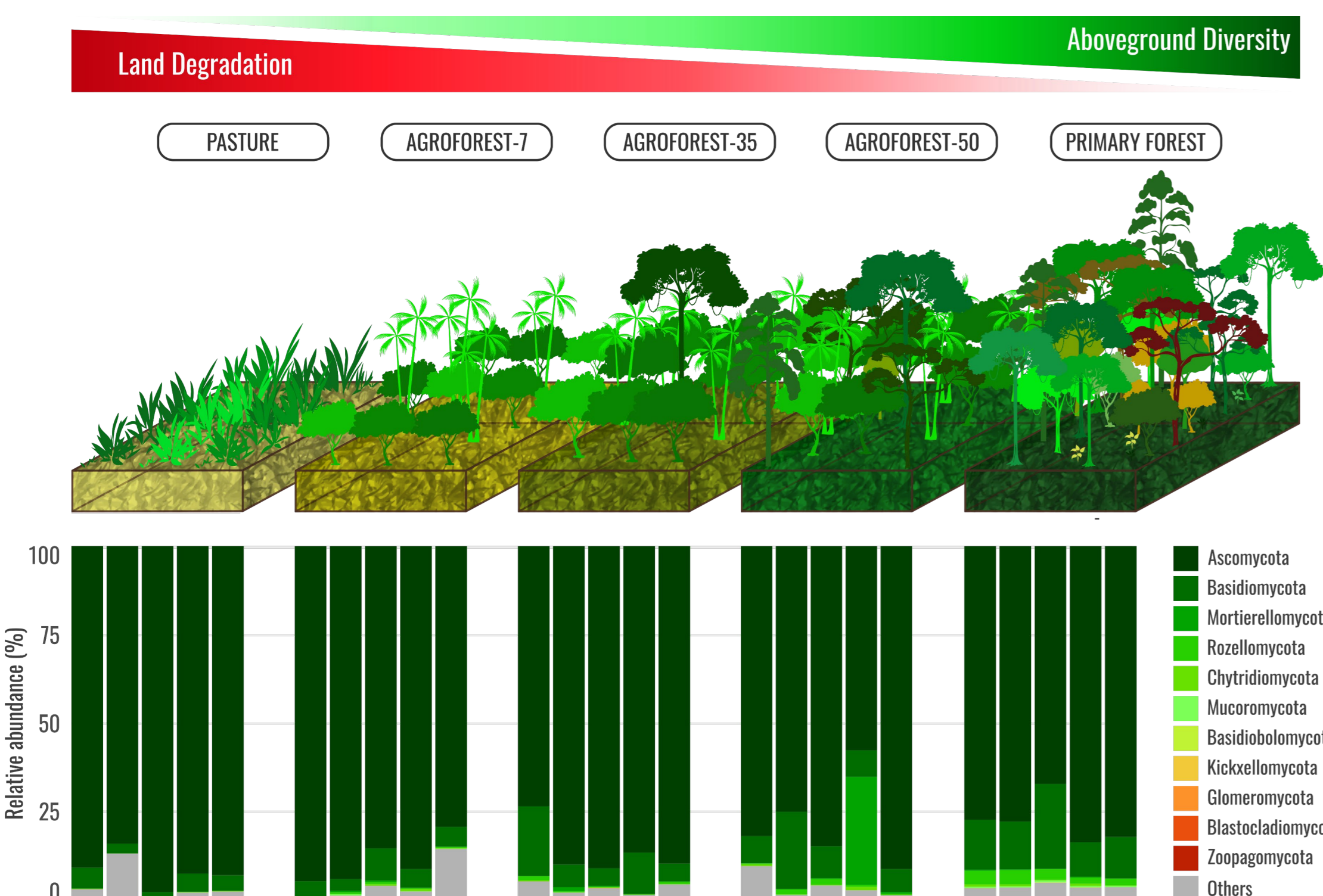


Figure 4. Graphical scheme of the selected agroforests followed by their litter-associated fungal relative abundance at the Phylum level

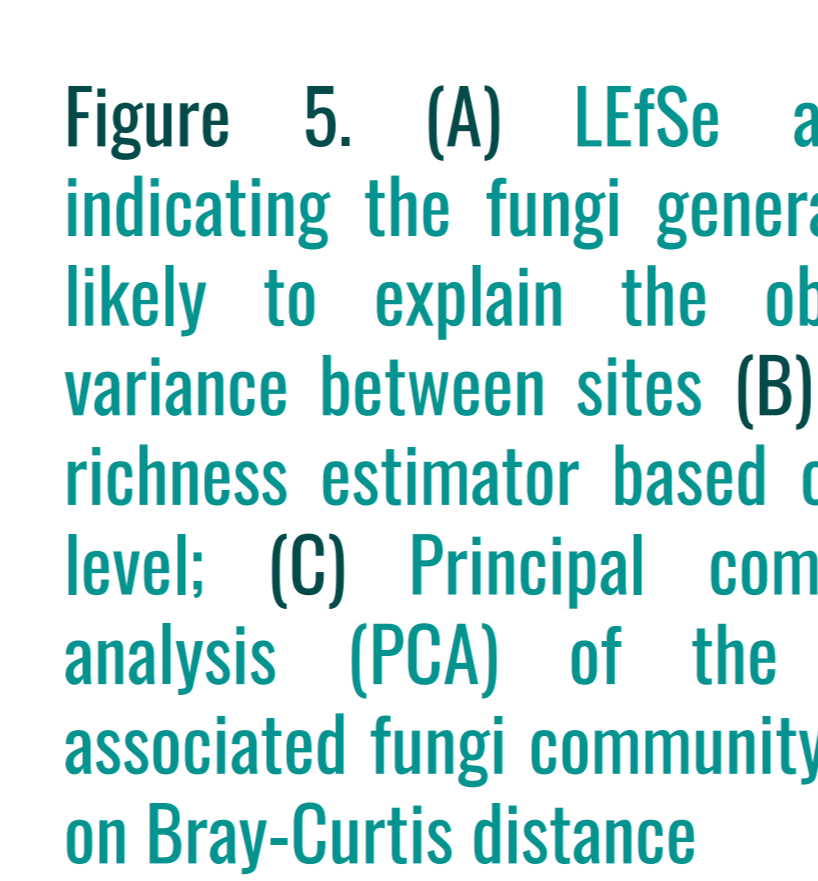
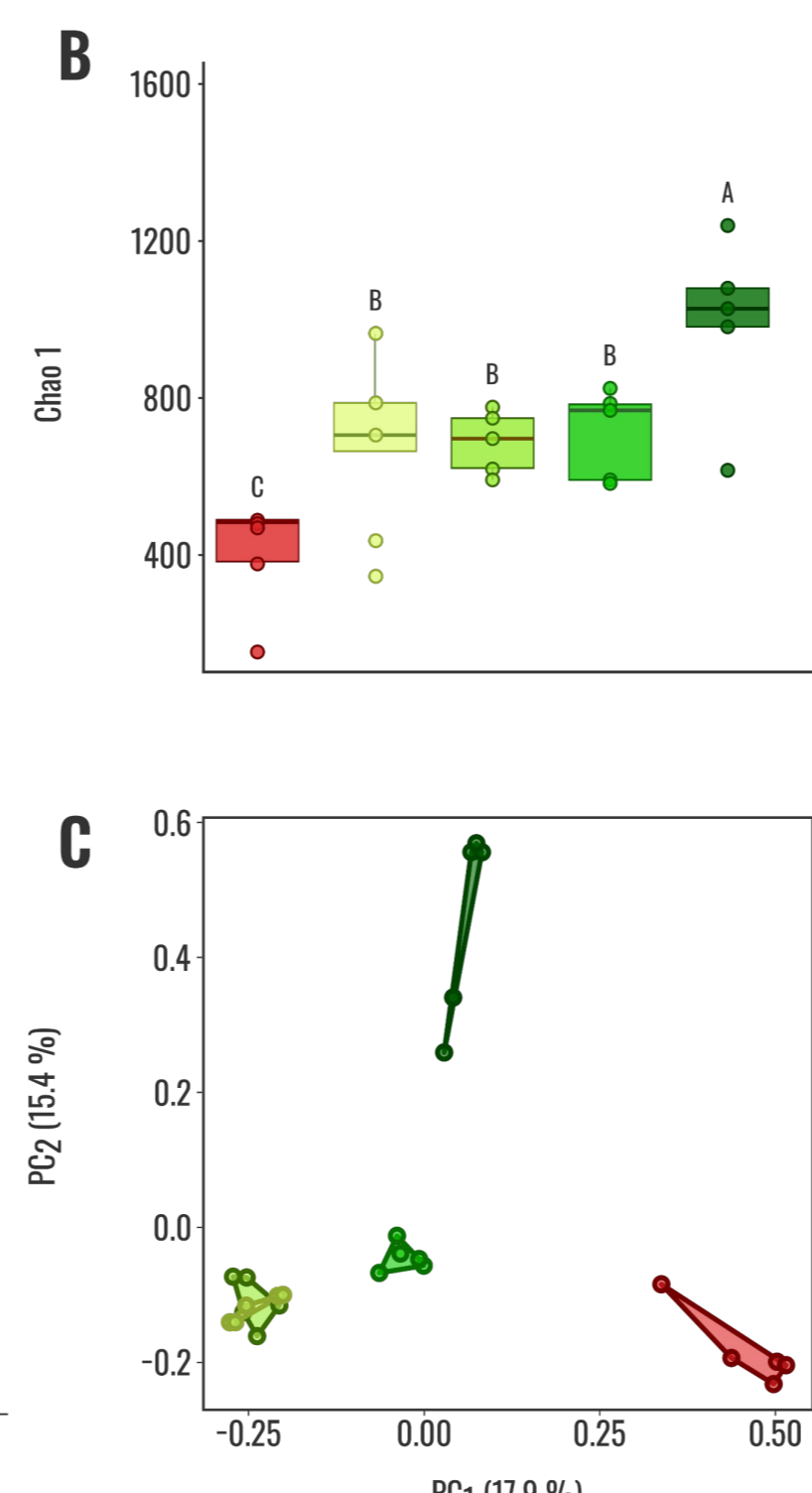
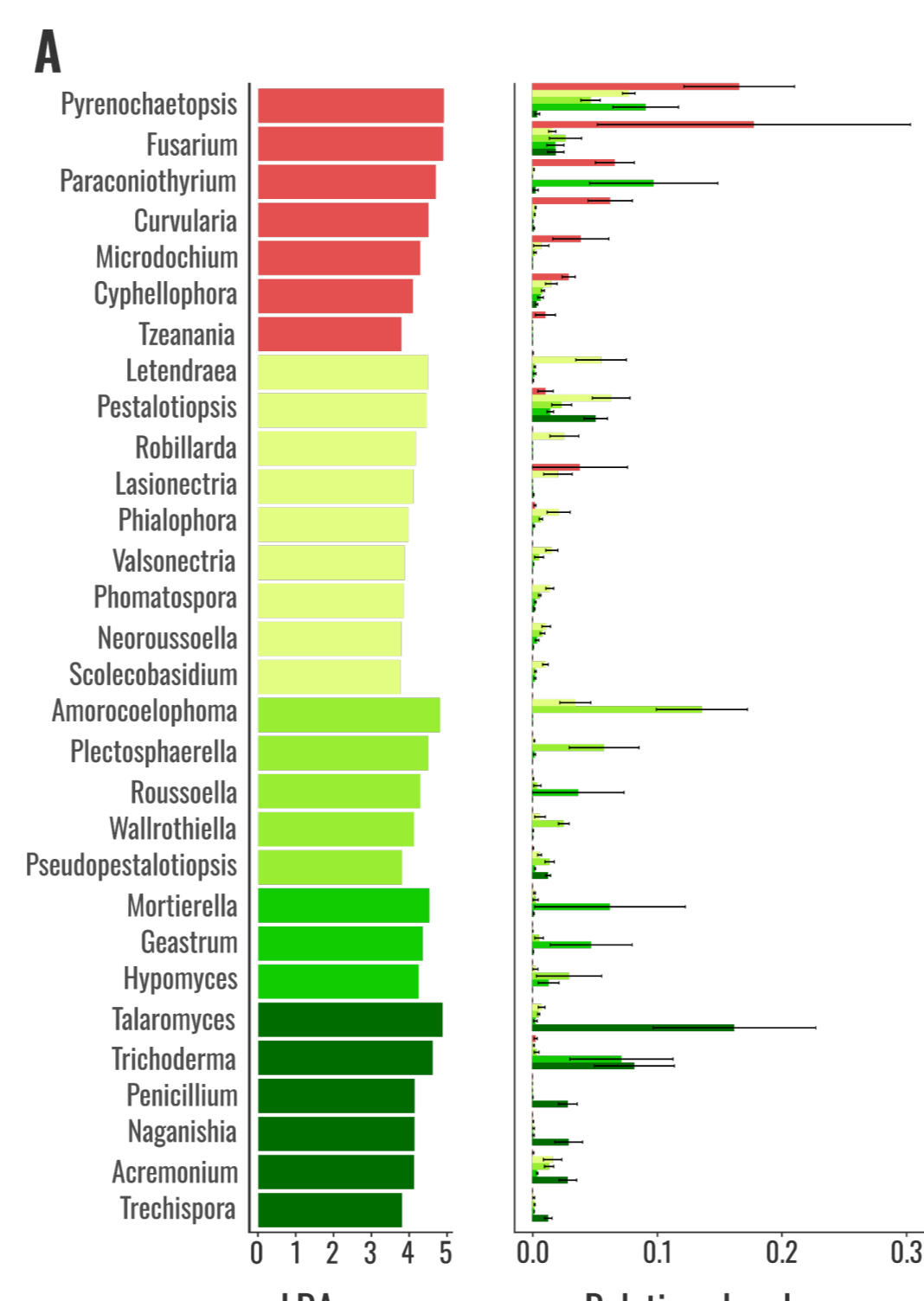


Figure 5. (A) LefSe analysis indicating the fungi genera most likely to explain the observed variance between sites (B) Chao1 richness estimator based on ASV level; (C) Principal component analysis (PCA) of the litter-associated fungi community based on Bray-Curtis distance

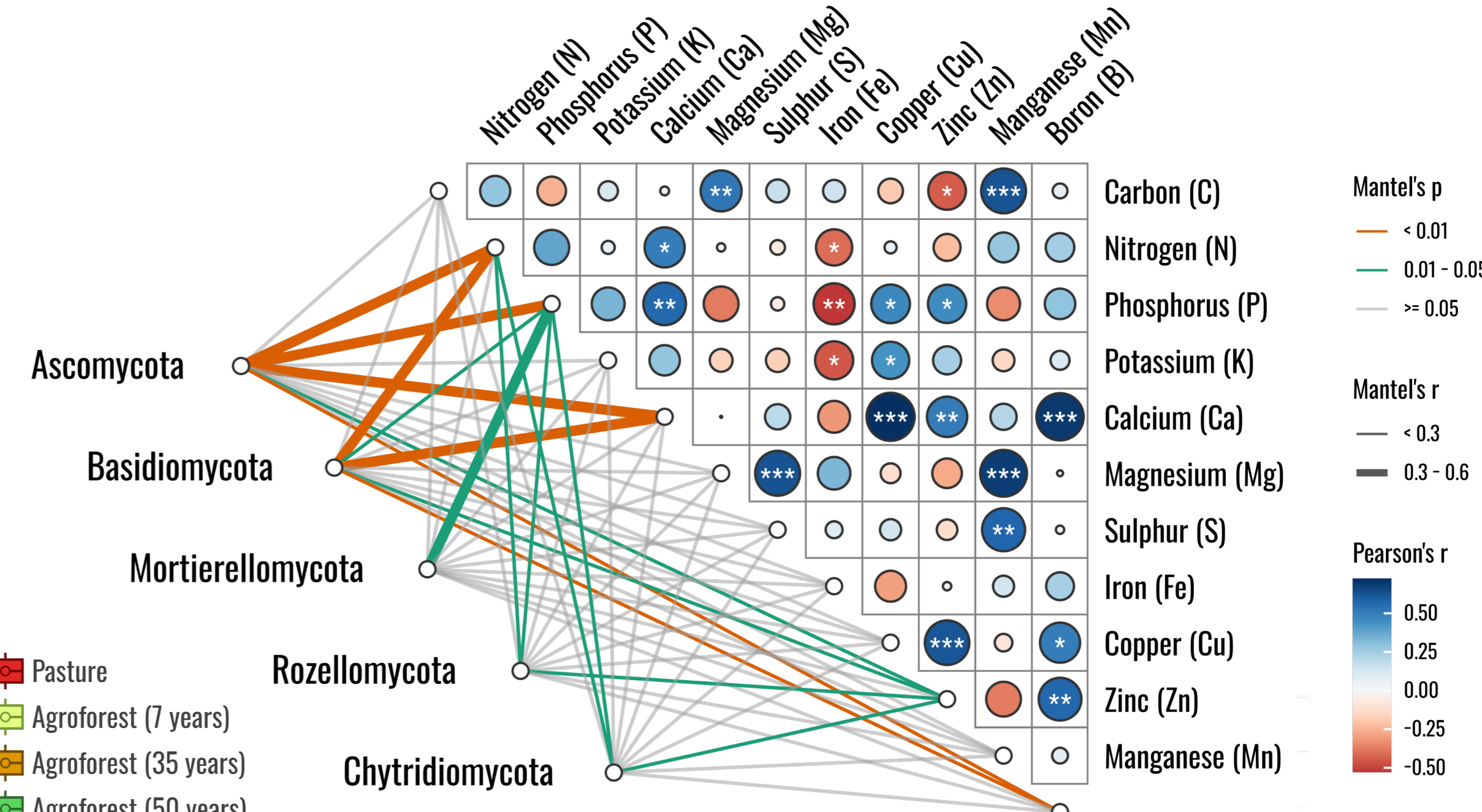


Figure 6. Correlation heatmap and the relationship between litter chemical profile and the most abundant fungi phyla through Mantel test

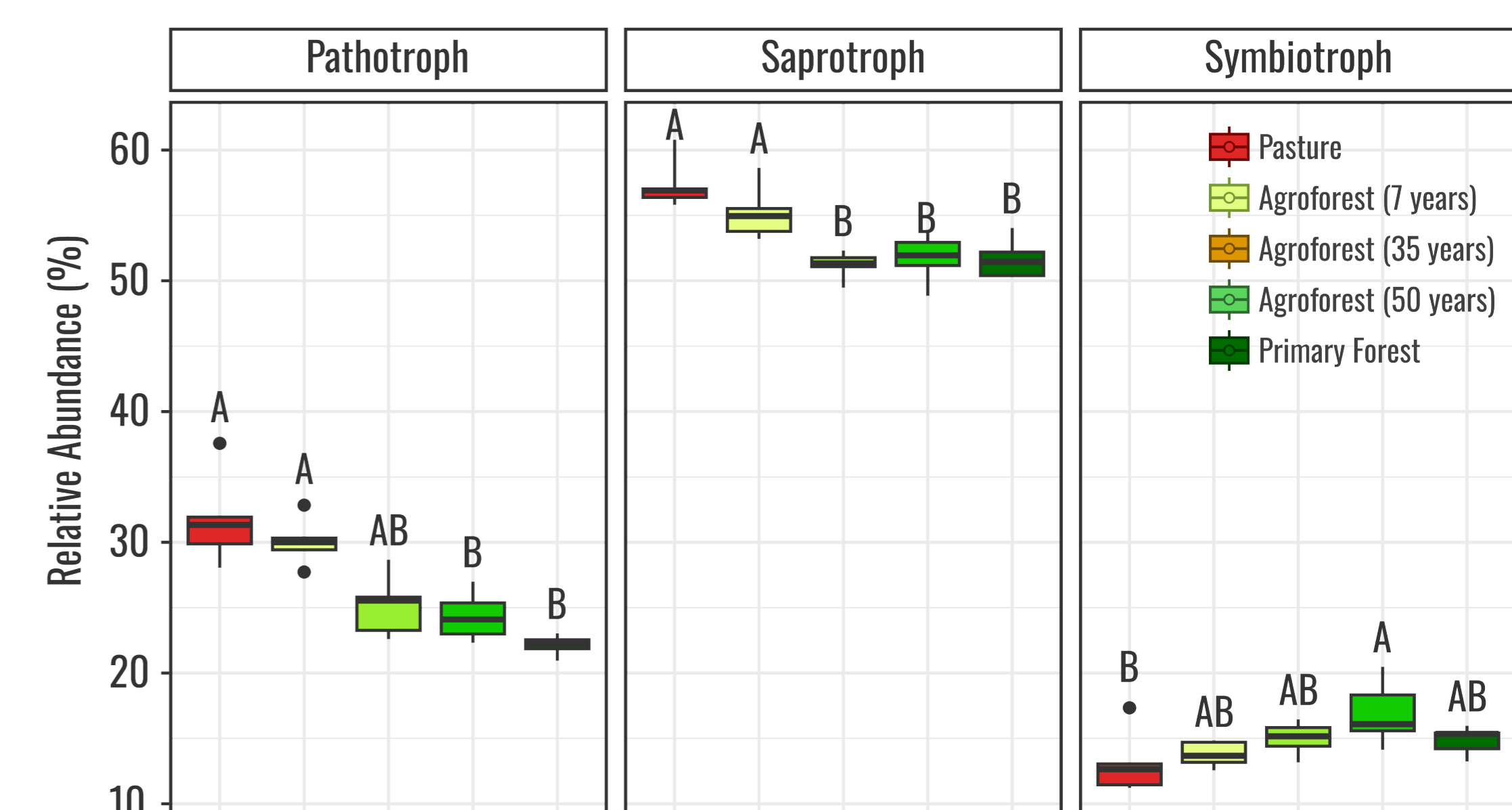


Figure 7. Box-plot of the major fungi functional guilds

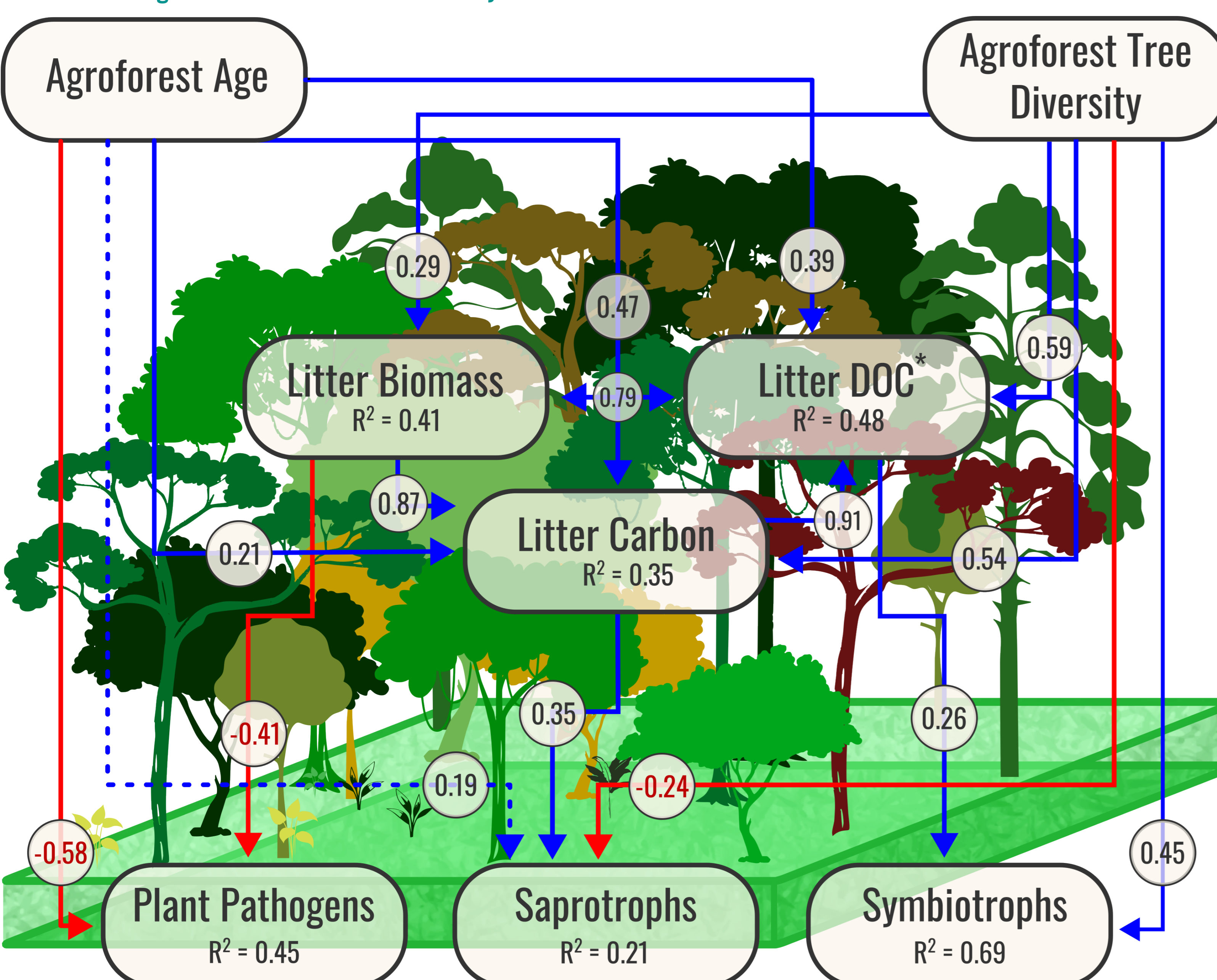


Figure 8. Structural equation model (SEM) of the major drivers of litter-associated fungi guild distribution

*Dissolved Organic Carbon

HIGHLIGHTS

- The tree diversity and age of agroforestry systems can modulate the fungal community associated with the litter as it increases the litter biomass, total and dissolved carbon, and through changes in its chemical profile;
- The increase in the diversity of trees in agroforestry systems also had a suppressive effect against plant pathogenic fungi in the litter, which are an increasing threat to cocoa (*Theobroma cacao* L.) based agroforestry of the region due to the potential presence of *Moniliophthora perniciosa*;
- The fungi community structure of the litter might also act as a bioactive barrier against pathogens and other biological stressors.



References and other information about our research are available in the QR code!

