

# Plant functional diversity and the biogeography of biomes in North and South America

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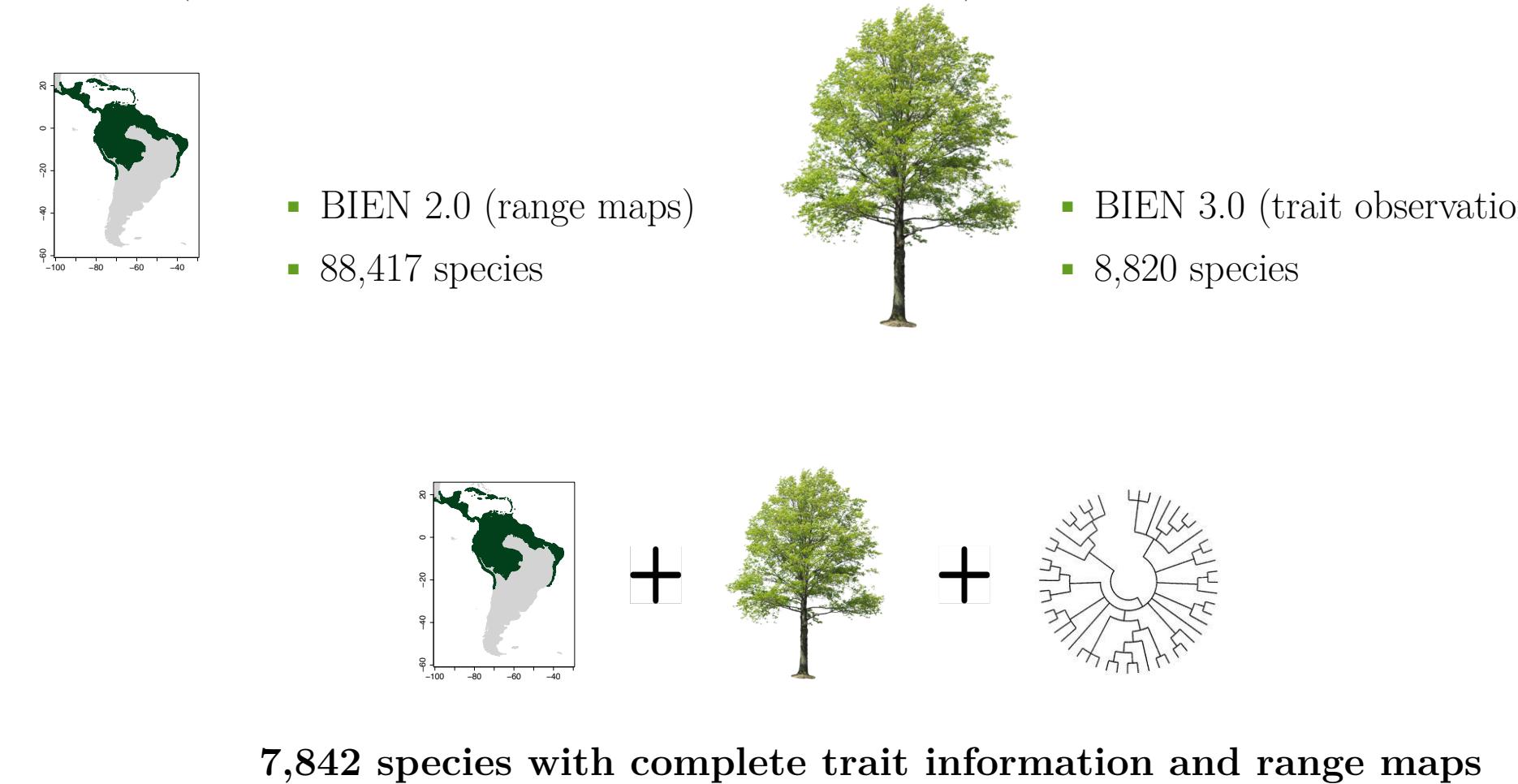
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## Introduction

Understanding functional differences among biomes is critically important to modeling the global carbon cycle and the functioning of the Earth system, including responses to anthropogenic global change (Bonan et al., 2012; van Bodegom et al., 2014; Xia et al., 2015). Our goals in this study are threefold. First, we document the extent of the available data, to highlight persistent data shortcomings and explore their ramifications for characterizing the functional diversity and distinctiveness of biomes. Second, given the available data, we characterize the distribution of functional diversity within biomes across both dominant and subordinate growth forms. These analyses allow us to better quantify the functional distinctiveness of a biome by identifying the most common functional strategies of the most widespread species within it. Third, we ask whether biomes are in fact characterized by functionally distinct collections of species using measures of functional similarity based on multidimensional hypervolumes in functional trait space.

## Methods

We used the BIEN database to extract range maps and trait measurements of plant species distributed in North and South America. The BIEN (Botanical Information and Ecology Network) database integrates standardized plant observations stemming from herbarium specimens and vegetation plot inventories (Enquist, B.J. et al. 2016, Goldsmith et al., 2016).



7,842 species with complete trait information and range maps

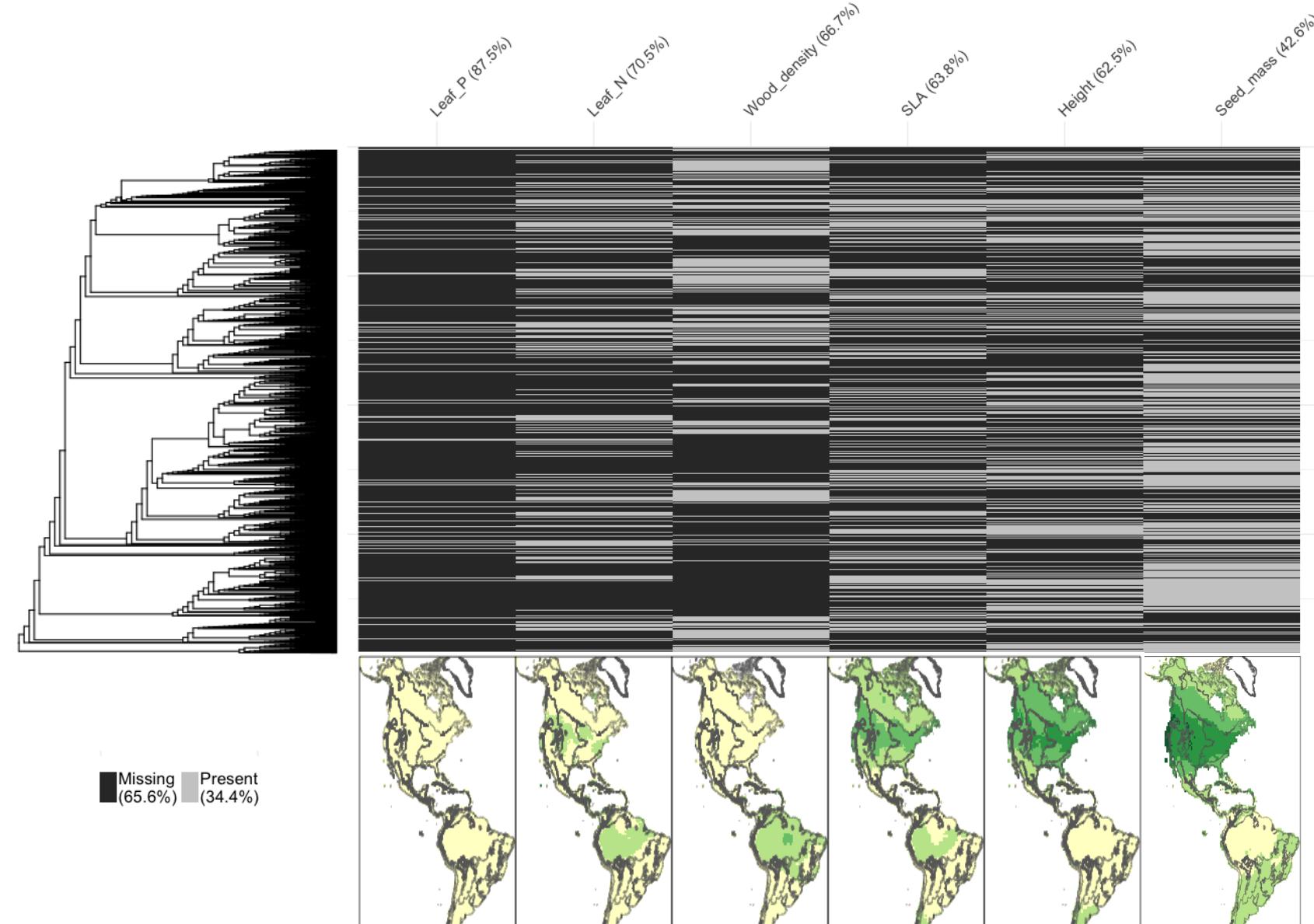
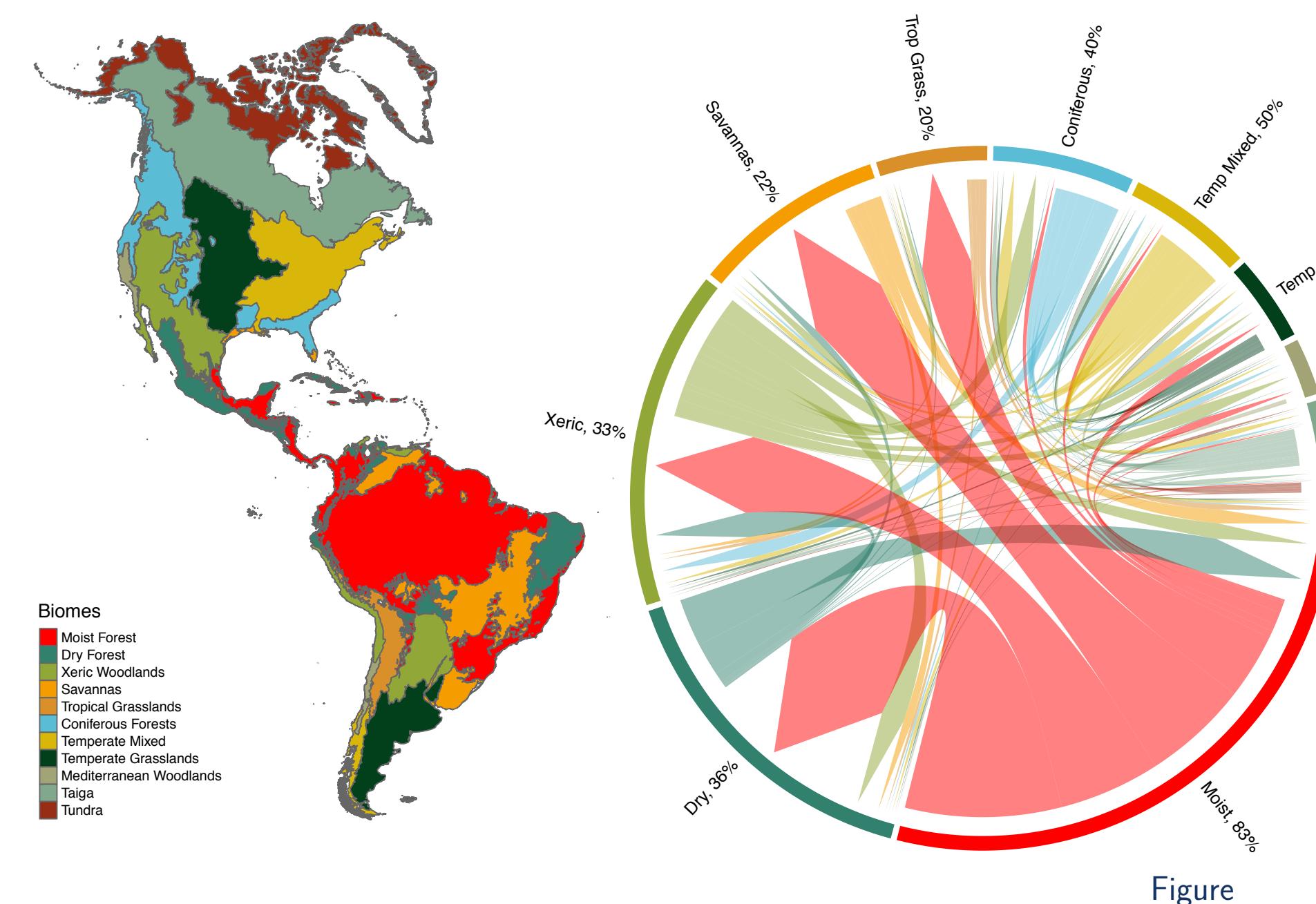
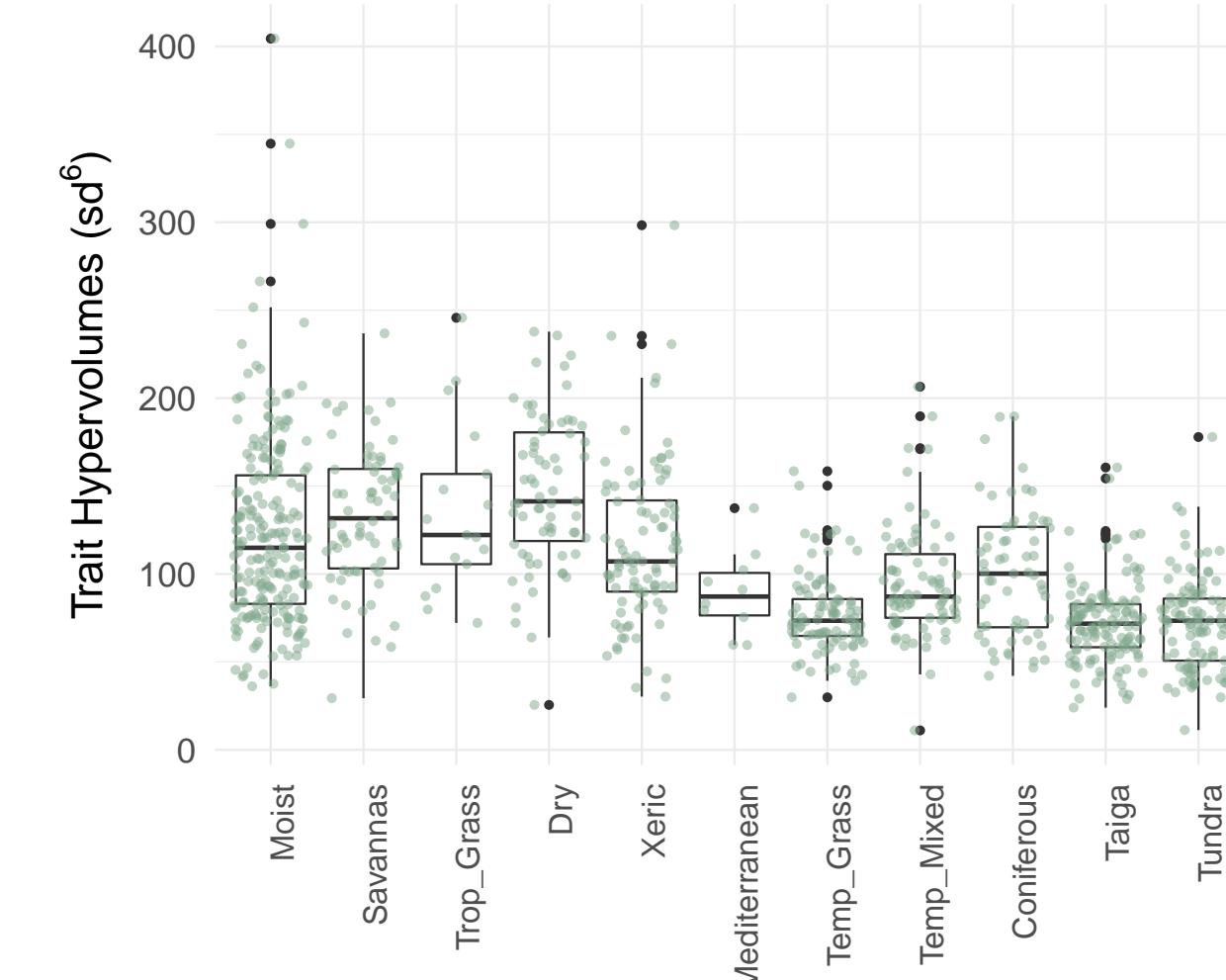


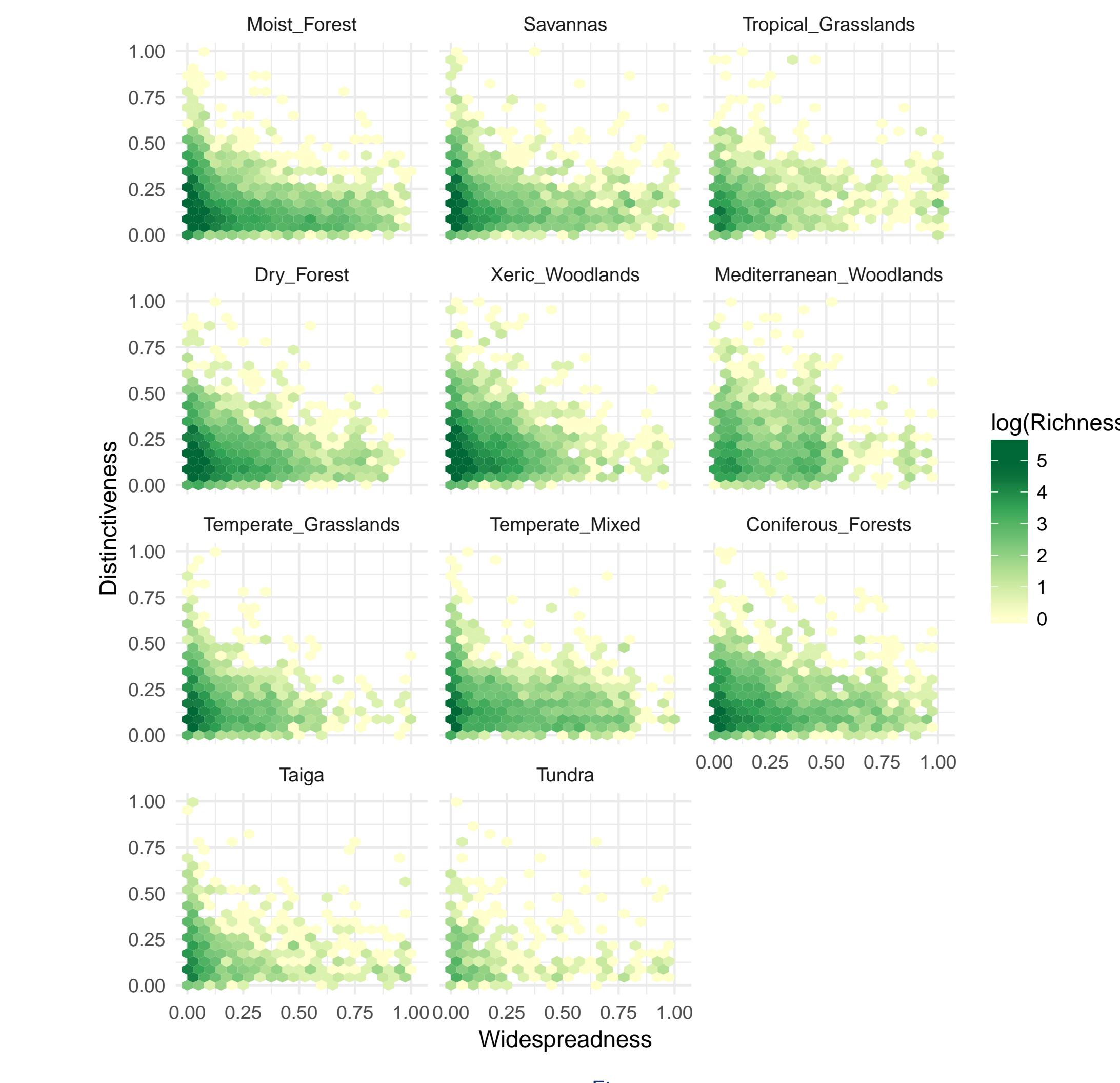
Figure: To estimate the functional trait space for each biome, we require complete trait data. For this reason, we phylogenetically imputed missing trait data using the R package "Rphylopars" v 0.2.9 (Goolsby et al., 2017) and the recently published phylogeny of seed plants by (Smith and Brown, 2018) as a baseline.



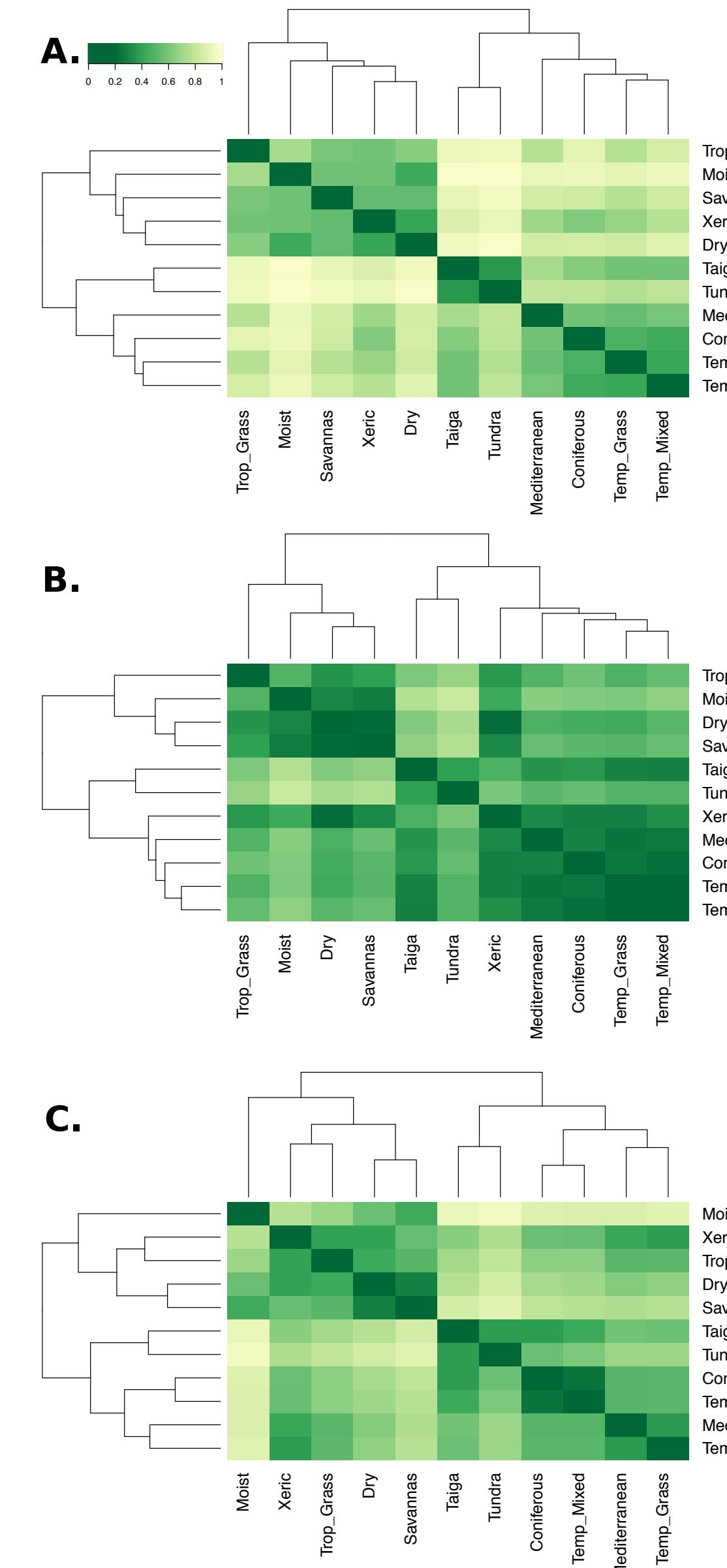
Figure



Results



Figure



Figure

## Discussion

## Next steps

## References

## Acknowledgments