

A GLOBAL ATLAS OF SOIL BACTERIA, WITH ONLY 32 SAMPLES?

HOW DO SOILS DOMINATED BY DIFFERENT PHYLA DIFFER IN ENVIRONMENTAL CONDITIONS
ACROSS COLD AND TEMPERATE FORESTS?



SCAN ME

1. INTRODUCTION

The article «A global atlas of the dominant bacteria found in soil» by Delgado-Baquerizo et al. (2018) found that 2% of bacterial taxa account for nearly half of the soil bacterial communities **across the globe**, and that these **dominant taxa** could be clustered into ecological groups of co-occurring bacteria that share habitat preferences. In our project, we selected a subset of their data to investigate if soils dominated by different bacteria differ in environmental conditions across two different ecosystems.

2. HYPOTHESIS

Two **different ecosystems** dominated by different phyla will **differ in environmental conditions**.

3. METHODS AND RESULTS

- **Modified** original data in Excel
 - Cold forests and temperate forests
 - *Proteobacteria* and *Actinobacteria*
 - 15 environmental variables
- **Two-way ANOVA** in R
- **Power test**: How many samples is needed to have a power of 0.80 and a significance level of 5%?

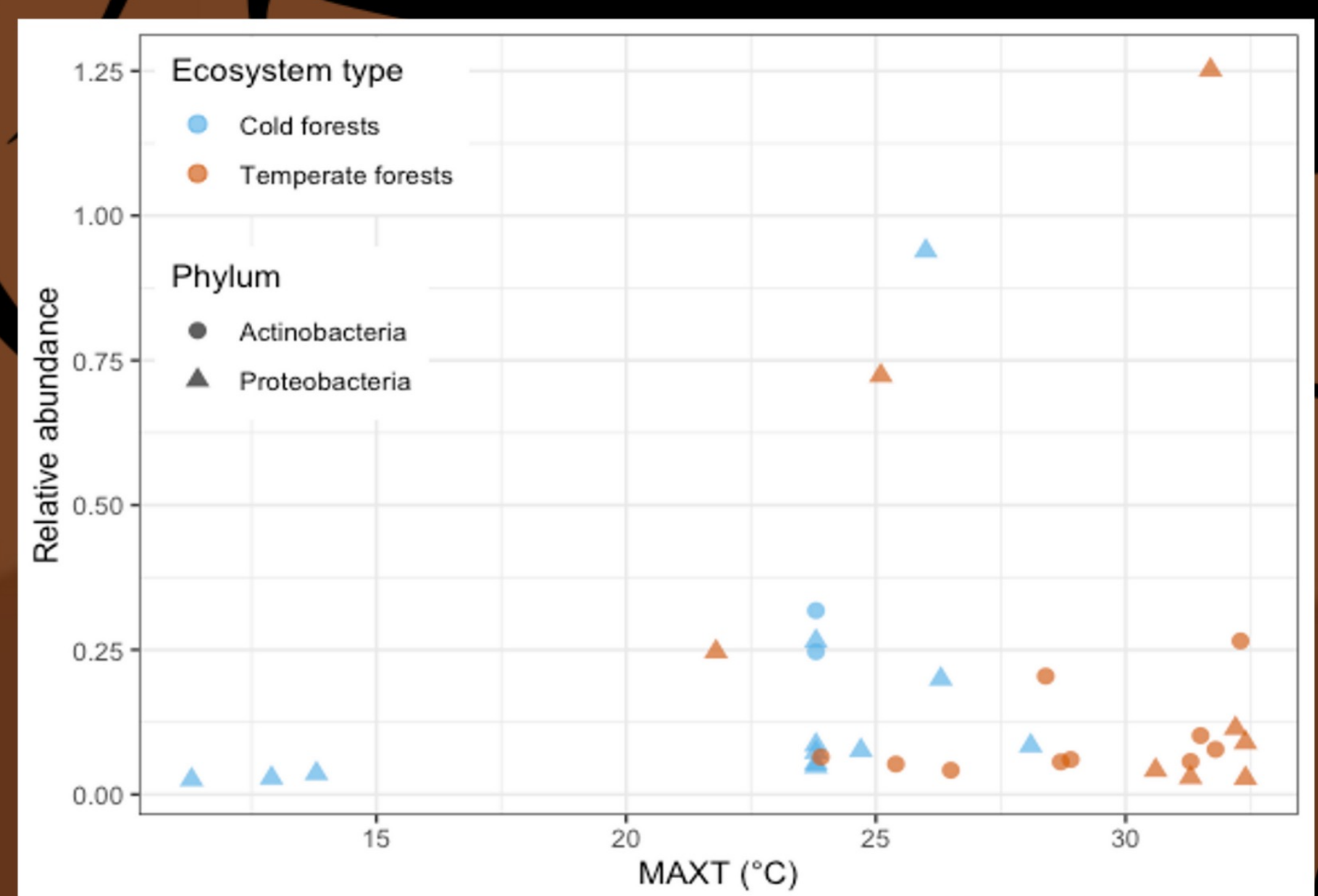


Figure 2: The effect of maximum temperature (in Celsius) on the relative abundance of *Actinobacteria* and *Proteobacteria* in cold forests and temperate forests (n = 32). Ecosystem type is shown in different colours, and bacteria in different shapes.

4. DISCUSSION AND CONCLUSION

UV index and **MAXT** were the only significant variables ($p < 0.001$). Power test revealed that we would need a total of **200 samples** to have a **power of 0.8** and **significance level of 5%**.

Not enough samples to conclude, the samples are not spread enough (figure 2). Temperate forests and cold forests have differences in communities, species interaction and environmental conditions. This, in addition to geographic separation, will cause differences. Generalizing is unrealistic and not supported by enough data. **Further research** is needed to reach a conclusion.

Sampling sites for **cold forests** and **temperate forests**.

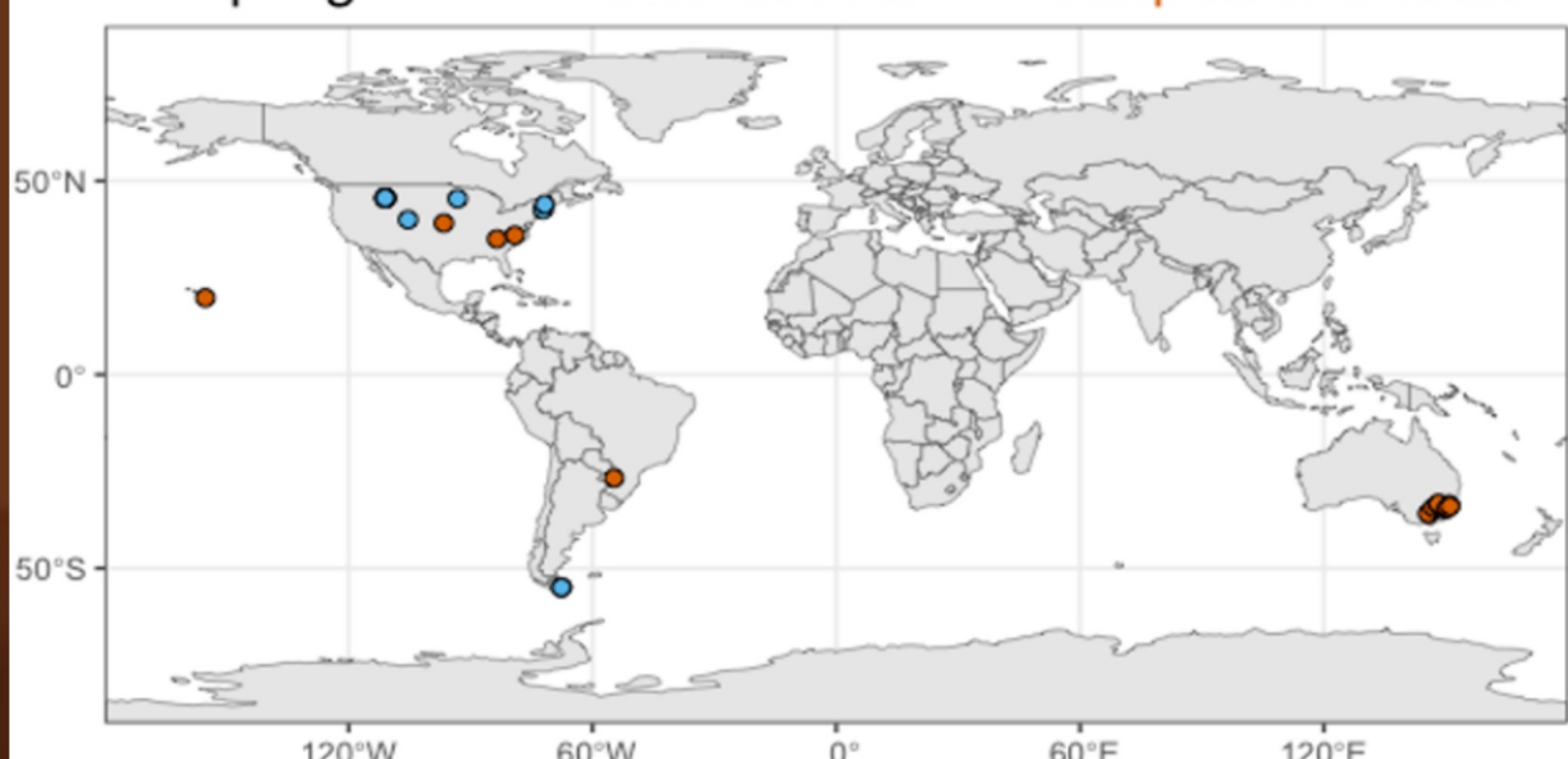


Figure 1: World map showing the sampling sites for cold forests (n = 14) and temperate forests (n = 18), where either *Proteobacteria* or *Actinobacteria* were the most dominant bacteria.



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Silhouette images are by Gareth Monger (*Streptococcus pneumoniae*) and Matt Crook (*Fimbrimonas ginsengisoli*, *Thermodesulfobacterium commune*, *Waddlia chondrophila*).