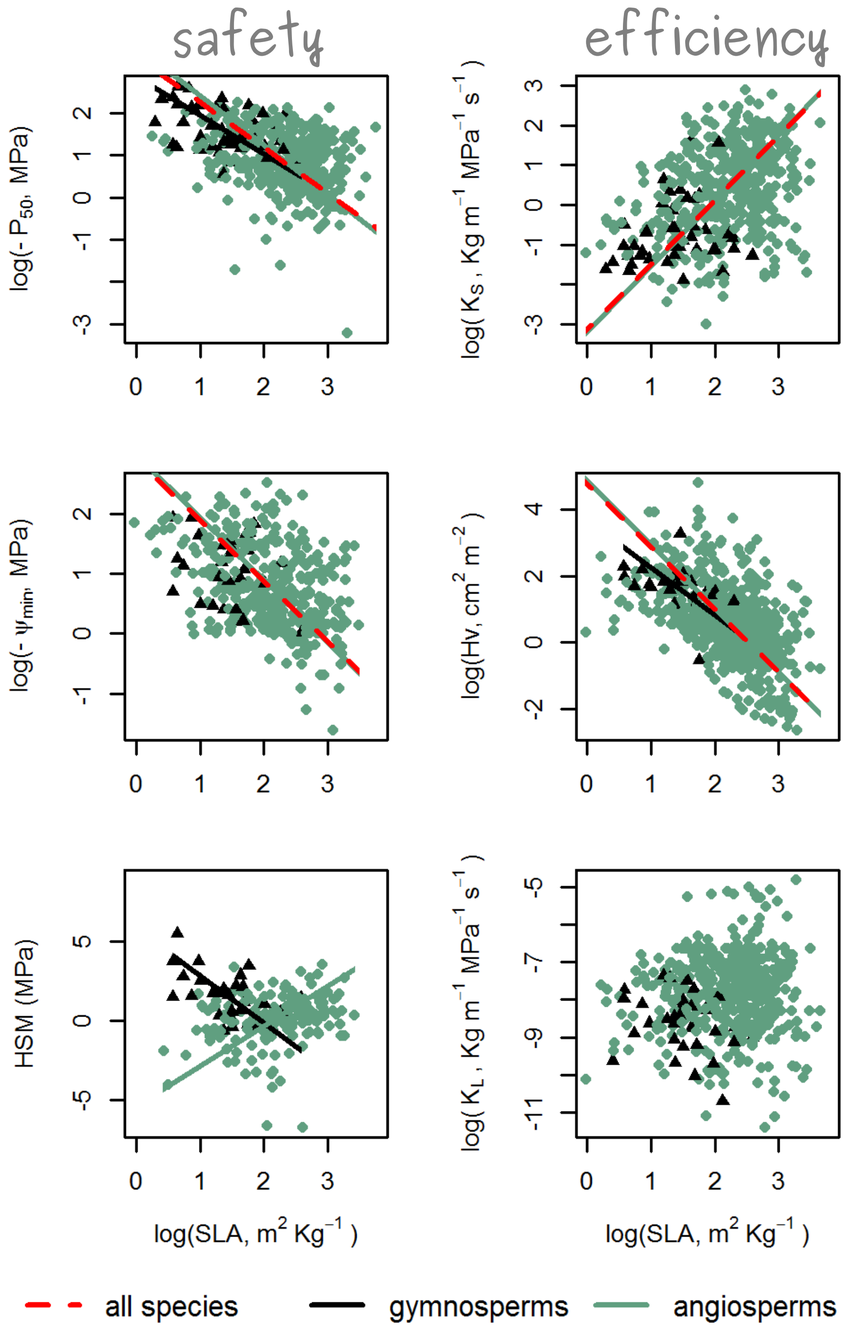
Teresa Rosas, Jordi Martínez-Vilalta and Maurizio Mencuccini

WHOLE-PLANT HYDRAULICS ARE DECOUPLED FROM THE LEAF ECONOMICS SPECTRUM

We found evidence of coordination of the leaf economics spectrum (LES) with hydraulics at the tissue level but also compensatory responses resulting in LES being largely decoupled from whole-plant water economics

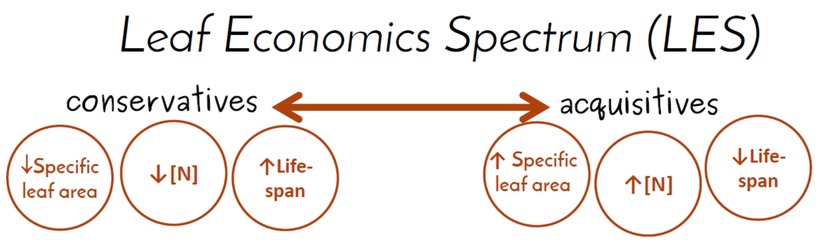


1. At the **tissue level**, plants with acquisitive leaves invested more in xylem efficiency (K_S) but less in hydraulic safety (P_{50}) compared to those with conservative leaves. Thus, we found evidence of coordination of LES with hydraulic efficiency and safety at the tissue level.

2. We also found **compensatory responses** as SLA was negatively correlated with Huber value (Hv) and minimum water potentials (ψ_{min}).

3. The previous correlation pattern effectively decouples the LES from the **whole-plant** water economics as no significant overall relationships were found betweem SLA and either hydraulic safety margin (HSM) or K_L.

Framework and questions

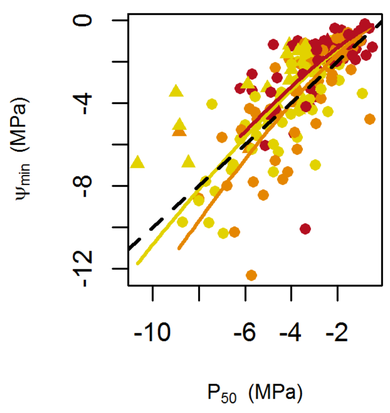


*Are hydraulic traits and LES coordinated at the **tissue level**?
*To what extent LES can be scaled-up to **whole-plant** water economics?

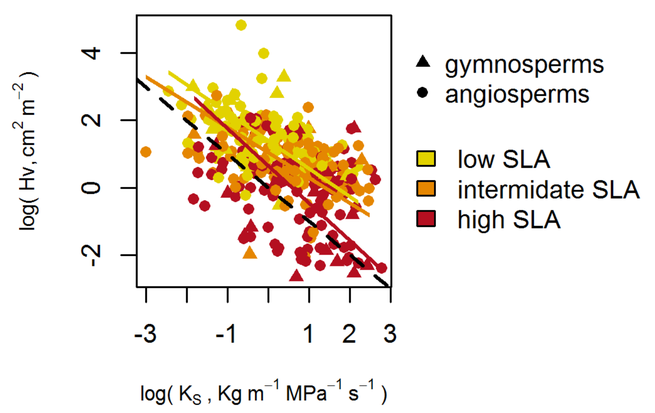
Hydraulics offer a promising avenue to understand the scaling…

- long distance water transport system is crucial for plant functioning as it connects resource supply and demand and distributes resources.
- allow incorporating water in the carbon/nutrient economics spectrum.
- have been related to plant performance and drought-induced mortality.

Looking closely...

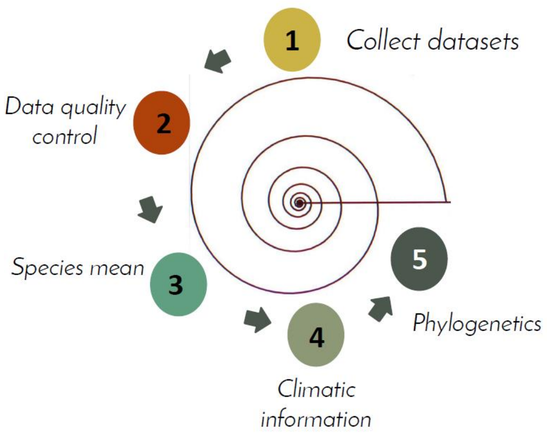


A substantial proportion of the variability reported by Choat et al. (2012) in the relationship between ψmin and P_{50} is correlated with SLA.

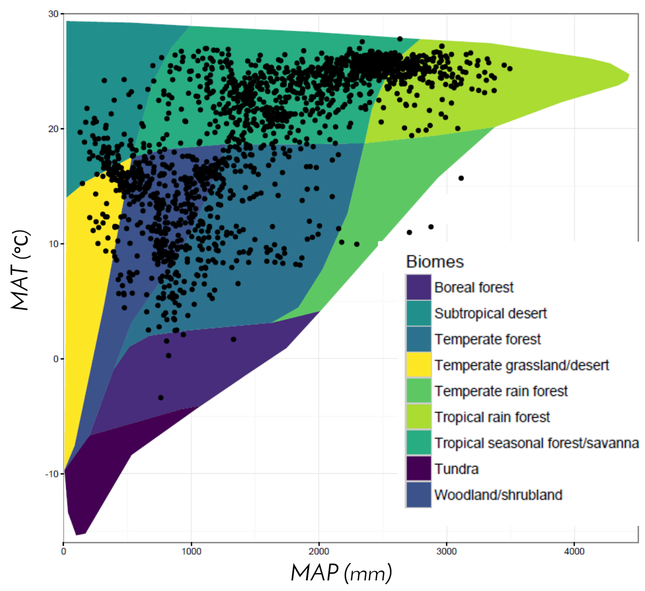


We found that the negative relationship between Hv and K_S was also regulated by SLA, with high SLA species showing a steeper relationship.

How did we do it?



HydraTRY
database
1648 sp



Hydraulics need to be included to improve our capacity to scale-up from the leaf to the plant in predicting vegetation changes under new climatic conditions