

# Leaf trait variation, phylogenetic signal and ecological strategies in the Italian endemic forest plants: preliminary evidence

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## Background and Aims

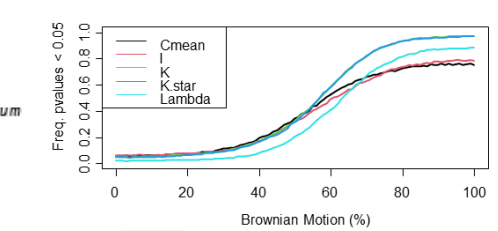
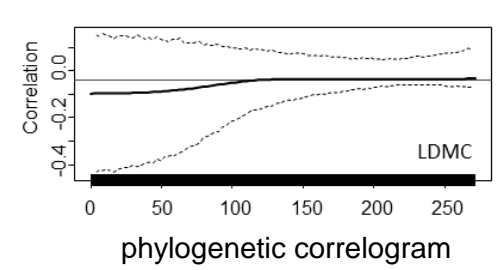
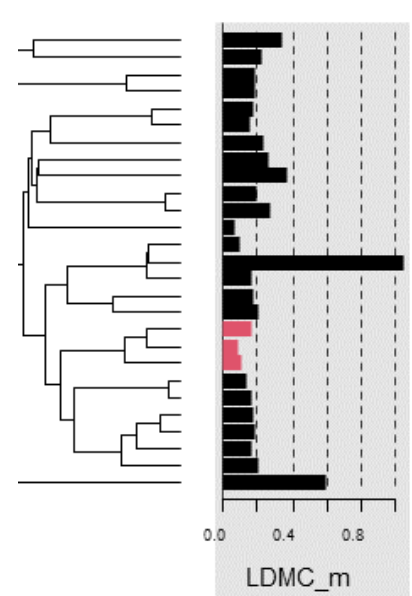
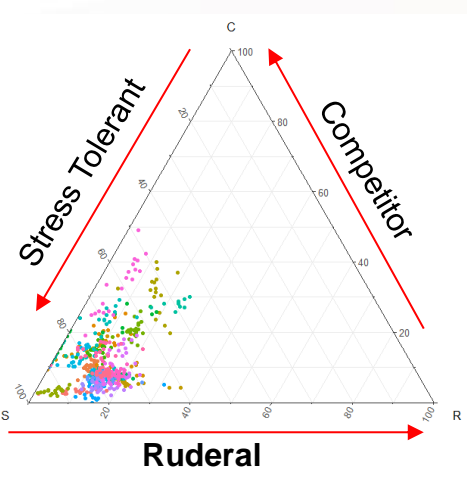
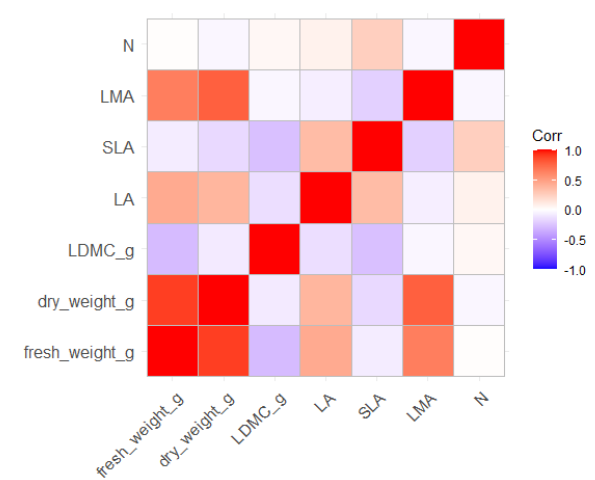
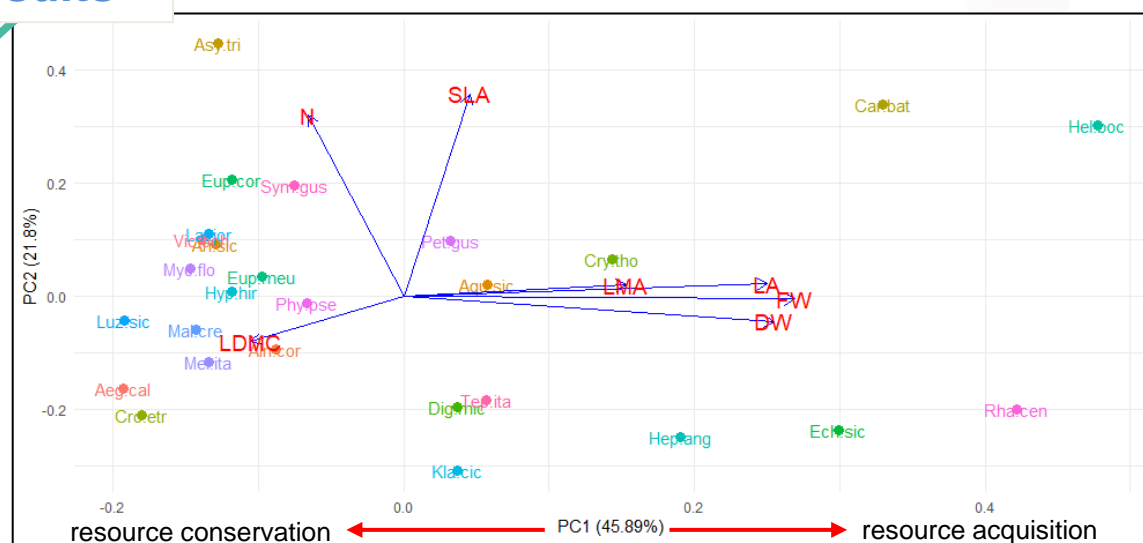
Endemic species represent the most valuable component of the flora of a given region, due to their restricted distribution and, often, vulnerability to habitat changes. The Italian flora includes 135 forest endemic plants, especially in the understory of the southern regions and islands (Selvi et al. 2023). The functional characteristics and ecological strategies of these taxa are still unknown, making it difficult to predict their responses to forest management, disturbances and habitat changes. The aims of our project are:

- quantify the range and patterns of variation for selected leaf traits across a representative taxon sample
- determine the conservative vs. acquisitive attitude and the Grime ecological strategies of the endemics
- explore the relationships with major habitat characteristics of the population sampling sites
- evaluate the role of evolutionary constraints and explore the phylogenetic signal of the traits

**Methods.** Leaf area, dry matter content, specific leaf area and nitrogen content were measured in 35 endemics (one population per species, 20 leaves per pop.) from different regions, forest types and angiosperm clades, and in selected non-endemic sister taxa for pairwise comparison. Blomberg's K metrics was used to determine the trait phylogenetic signal, e.g. the likelihood of closely related species of displaying more similar trait values than expected by chance. The R package *phylosignal* was used (Keck et al. 2016).



## Results



Preliminary results point to a broad leaf trait variation in our taxon sample. Some endemics show more resource-acquisitive traits (e.g. high LA) while others are more resource-conservative (e.g. high LDMC). Significant covariation between some traits was detected, such as between SLA and LNC. Endemics showed a dominance of stress-tolerant strategy (*sensu* Grime) and low ruderal and competitor components. Blomberg K statistics and phylogenetic correlograms suggest trait evolution to be largely independent of phylogeny and fitting a random model. Although similar LDMC values were found in the Apiaceae paleoendemics *Petagnaea*, *Cryptotaenia* and *Heptaptera*, the phylogenetic correlogram of this trait followed a random model (Fig). Other traits provided a significant signal when including non-endemic sister species in the analysis (not shown). Dependency of trait variation on environmental variables is still under study and more results will come once more species will be sampled.

Reference: Selvi F, Campetella G, Canullo R, Chelli S, Domina G, Farris E, Gasperini C, Rosati L, Wellstein C, Carrari E (2023) The Italian endemic forest plants: an annotated inventory and synthesis of knowledge. *Plant Ecology and Evolution* 156(1): 29-45. <https://doi.org/10.5091/plecevo.95929>