Patterns and drivers of beta diversity across geographic scales and lineages in the Macaronesian flora

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Abstract for oral presentations: The main aim was to assess whether beta diversity varies across taxa and archipelagos and identify the mechanisms behind beta diversity variation across taxa and archipelagos at different spatial scales by using Beta diversity and its two components. Species turnover and nestedness were compared within and among archipelagos across four taxonomic groups: liverwort, moss, pteridophyte and spermatophyte. The relationship between beta diversity and climatic, geological and geographic factors was analysed using generalised dissimilarity models.

Species turnover increased with scale. This increment decreased from spermatophytes, pteridophytes, and then mosses and liverworts. Species turnover was significantly higher in the Canary Islands than in Azores in pteridophytes and spermatophytes, but similar among archipelagos in mosses and liverworts. Mosses and liverworts exhibited a significantly higher nestedness than spermatophytes, and the reverse trend was observed for species turnover. Precipitation contributed more to the explained deviance of turnover in bryophytes and pteridophytes than in spermatophytes. Archipelago adscription significantly contributed to explain turnover in spermatophytes, but not in bryophytes and pteridophytes. Spermatophyte floras clustered by archipelago, whereas the clustering patterns in pteridophyte and bryophyte floras reflect macroclimatic conditions.

The lower increment of species turnover with spatial scale and the higher nestedness in bryophytes and pteridophytes than in spermatophytes reflect the variation in dispersal capacities and distributions ranges among land plant lineages. Accordingly, extant climatic conditions contributed more to explain turnover in bryophytes and pteridophytes than in spermatophytes, whereas factors associated with dispersal limitations exhibited the reverse trend. The differences in beta diversity patterns, caused by different responses of Macaronesian land plant lineages to the main factors shaping their community composition, explain their different biogeographic affinities, spermatophyte floras clustering by archipelago, whereas pteridophyte and bryophyte floras tend to cluster as a function of macroclimatic factors. These differences reflect distinct mechanisms of origin and diversification among Macaronesian land plant lineages and archipelagos.