
Functional diversity of the flora of the Canary Islands

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Abstract

Plant traits that determine under which environmental conditions plants can survive and reproduce have gained increasing interest, especially in the face of rapid global change. However, research on functional traits of island floras has been underrepresented so far. This is despite the fact that islands harbour an exceptionally high diversity of endemic plant species which have adapted to an isolated environment. In this study, we measured the functional differences between all endemic and non-endemic spermatophytes of the Canary Islands ($n = 2197$) in order to identify how environment drives species' distributional patterns. Therefore, we modelled species' occurrences and collected data on functional morphological traits, associated with resource allocation and dispersal ability. Subsequently, we calculated different measures of functional diversity and analysed the resulting patterns across climatically and topographically-determined zones. Overall, we found that endemic plant species were functionally less diverse and had less extreme trait values than non-endemic plant species (Figure 1). Interestingly, we show that there are only few trait combinations that are exclusively associated with endemism and that many trait characteristics are redundant across endemic and non-endemic plant species. Even across environmental zones species occupied similar sets of the functional spectra. However, functional dissimilarity across environmental

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zones occurred when endemics were removed from the analyses. All in all, our results indicate that most endemic species are not functionally unique and are able to occupy a broad environmental niche. We conclude that the adaptation of plant species to isolated island environments yields species with a similar set of functional traits suitable for the occurrence across diverse environmental conditions.

Keywords: biogeography, Canary Islands, endemism, functional traits, plant functional diversity