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# A global review of insular woodiness and its potential functional significance

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## Abstract

The repeated evolution of woody growth form in herbaceous lineages on islands—insular woodiness—has long been recognized as an iconic island phenomenon. Several hypotheses exist on the drivers of the evolution and the adaptive value of derived woodiness on islands, including amongst others the release from climate seasonality and herbivore pressure. However, experimenting studies supporting these hypotheses are virtually absent and a synthetic global view on the biogeography and of correlates of derived insular woodiness is missing so far, mainly because there has been no global overview available on the identity and geographical distribution of derived woody species. Here we present a novel global derived woodiness database and combine it with the Global Inventory of Floras and Traits (GIFT), georeferenced species occurrences, and environmental data in a generalized linear modeling framework to identify global diversity patterns of derived insular woodiness and potential environmental correlates. Specifically, we test the fraction of derived woody species in the flora of oceanic islands globally and relate it to island characteristics including island age and isolation, climate, and herbivore presence. The results show a large difference in importance of derived woodiness across islands, supporting several archipelagos known for derived woodiness as diversity hotspots, especially Hawaii and the Canary Islands. Climate emerged as an important correlate of derived woody species diversity, across latitudes. However, the results suggest taxon-specific drivers among evolutionary lineages. In summary, we introduce a novel dataset on derived insular woody species and provide our first results on a global perspective on the biogeography and correlates of insular woodiness.

**Keywords:** insular woodiness, global biogeography, climate

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