

# Fossil floras on oceanic volcanic islands [part 1]: late Miocene - early Pliocene records of gymnosperms and laurisilva on Gran Canaria

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Volcanic island archipelagos e.g. the Hawaiian and Canary Islands have been the focus of numerous studies concerning the evolution and biogeography of island endemic plants. Fossils would be an important tool for testing phylogenetical and biogeographical hypotheses, plus provide minimum/maximum ages for molecular dating of phylogenies, and data for paleoecological and climatological studies. Unfortunately, fossil plant records from these island groups are rare. A late Miocene - early Pliocene flora on Gran Canaria occurs within clastic deposits associated with the end of a ca. 4 million year volcanic hiatus (post dating creation of the Tejedá Caldera) and initial eruptive phases in the development of the Roque Nublo Stratovolcano. Approximately 20 plant fossil horizons are distributed within a 100 km<sup>2</sup> region in the North-East of the island at altitudes up to 1400m.

Typically plants occur as casts of *in situ* tree stumps with associated prostrate logs within breccias. Or, as transported trunks, branches, twigs, leaves, and fruits in fluvial sediments. Cellular preservation of tissues by carbonate permineralisation is common. Wood fragments include several kinds of angiosperms (as yet not securely identified) plus the gymnosperms *Tetraclinis* and *Pinus*. Charcoalified *Pinus* wood has anatomy closely resembling the Canary Islands endemic *P. canariensis*. The presence of *Tetraclinis* (Cupressaceae), which today has relict populations in Malta, SE Spain and NW Africa, but which became extinct across most of Europe during the Neogene is the first evidence that the genera had a distribution that included Macaronesia. The leaf assemblage, often with well preserved morphology, leaf venation and cuticular characters appears to be dominated by members of the broad-leaved sclerophyllous genera of today's Macaronesian laurisilva. Less common fossils include fruits/capsules [of Laurales and/or eudicots] and monocot stems and leaves.

This preliminary work suggests that both laurisilva and *Pinus*-dominated ecosystems were established on Gran Canaria between major late Miocene/early Pliocene volcanic events, supporting the concept of these elements of the Islands flora as Miocene relicts. The study furthermore suggests great potential of finding fossil floras associated with other volcanic islands. Good potential targets include islands having protracted subaerial volcanic development phases punctuated by erosional episodes. Here potentially fossiliferous fine grained volcanoclastic, epiclastic and sedimentary sequences are often present but as yet unexplored by palaeontologists.