

How near, how far? Adaptive radiation in mammals and birds on various islands

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Insular evolution has long fascinated biologists and palaeontologists. For them, the term depicts the evolution of life on the island, not the development of the island itself, but they are closely related. Isolation is one of the main driving forces behind the evolution of endemics developing on the various islands.

Islands, particularly archipelagos, have played an important role in the development of evolutionary theory. Honeycreepers on Hawaii and Darwin's finches in the Galapagos are textbook examples of adaptive radiation. The topography and geological history of these islands played an important role in these radiations (Ricklefs & Bermingham, 2007). Both archipelagos are far from any continent and formed over a volcanic hotspot, yet similar island groups show far fewer radiations. In the New Hebrides, this can be related to the islands of Melanesia functioning as stepping stones, effectively reducing the distance to the mainland. The Mascarenes consist of only a few islands, which may have limited the possibility of radiations.

Of the above, only the Galapagos had indigenous mammals. Adaptive radiations of mammals are part of insular evolution, but the best examples are found on islands much closer to shore. Flores and Crete belong to island arcs in subduction zones. On Flores, we recognise a radiation in the rodents (Locatelli, 2011); Crete yielded a clade of insular deer (De Vos & Van der Geer, 2002). Both also host an endemic avifauna, with flightless forms (Weesie, 1988), yet there are no signs of radiations among the birds, although individual species may show strong island adaptations (Meijer & Due, 2010). Islands even closer to a continent, like Sardinia and Sicily, or which are much smaller, such as the Balearics, show no signs of radiations in either mammals or birds.

Many factors control radiations on islands, but some general patterns do emerge. Bird radiations are mostly found on oceanic archipelagos far from the continental coast line. Mammal radiations are mostly known from island arcs, which are somewhat easier to reach though still isolated enough to allow evolutionary lineages to develop and diverge. In contrast to birds, strong mammal radiations seem possible on a single island.

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