Phylogenetic relationships among foam-nesting clades of Old World tree frogs are assessed by using both nuclear and mitochondrial DNA sequence data, with particular focus on Sri Lankan members of the genus *Polypedates*. A distinctive, highly supported, endemic Sri Lankan clade is identified and recognized as a new genus, *Taruga*. This clade, which previously was assigned to *Polypedates*, comprises three species: *P. eques*, *P. fastigo*, and *P. longinasus*. Adult *Taruga* possess many morphological characters and character states that distinguish them from *Polypedates* and other anuran genera. Tadpoles of *Taruga eques* and *Polypedates cruciger* similarly are distinguished by numerous characters. *Taruga* is the sister group to the remaining *Polypedates sensu stricto*. Since *Taruga* comprises a geographically isolated, species-depauperate clade, it is identified as a relict taxon. Recognition of an additional endemic Sri Lankan clade reinforces the contemporary biogeographic pattern of clade-level faunal endemicity between Sri Lanka and India, which arose despite several land-bridge connections between island and mainland during the past 50 million years. Their narrow distributional limits leave all three species of *Taruga* highly vulnerable to future climate change, but this is especially true for *T. eques* and *T. fastigo*, which are restricted to high elevations. According to the 2011 IUCN Red List, *T. longinasus* and *T. eques* are Endangered, whereas *T. fastigo* is Critically Endangered.

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Spatial patterns of fern diversity: a comparison of Hawaii and Mexico

Ferns comprise about 16% of the vascular flora of Hawaii, an almost four-fold larger fern-angiosperm ratio than in Mexico. This ratio is a consequence of lower barriers to dispersal of ferns from continents to remote islands. Fern spores are about 10 times smaller than any angiosperm seeds and are likely dispersed randomly by air currents. This study investigated if the higher fern proportion is related to a higher α-diversity of ferns at smaller scales (<1000 m^2), and if the fern flora of Hawaii can be interpreted as a result of random arrivals of continental taxa. Fern diversity in Hawaii as well as Mexico in each of two intact montane forest sites at similar latitude and elevation was measured, by sampling ten subplots of 100 m^2 at each site, and compared species numbers at the family level against the world flora. Forest sites in Hawaii and Mexico did not differ in α-diversity with 28 to 33 species per 1000 m^2, but β-diversity between Hawaiian sites was lower (Bray-Curtis dissimilarity of 0.34) in comparison to Mexican sites (0.54). These results indicate that niche availability for ferns is comparable among all sites and unaffected by the fern-angiosperm ratio. Although 18 of 40 fern families are missing in Hawaii, proportions of 16 fern families are harmonic between Hawaii and the world's flora. Over-representation of five families in Hawaii may indicate selective advantages of polyploidy taxa suffering lower inbreeding depression (Aspleniaceae) or may be the consequence of evolutionary radiation (Blechnaceae) rather than non-random spore dispersal.

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Meyer, Jean-Yves[1]

Alien species invasions, endemic species extinctions, mutualism breakdowns, plant succession trajectory changes, and biodiversity conservation strategy in southeastern Polynesian Islands: how "good" are novel ecosystems?

The concept of "novel ecosystems" has recently emerged in both the scientific and popular literature based on the fact that no ecosystem on Earth remains pristine because of local and global anthropogenic changes, including climate change. Human -past and present- direct or indirect impacts have modified natural ecosystems, even in the most isolated islands of remote Oceania. According to some authors, these new or emergent ecosystems are not "bad" compared to the original native ones and the benefits of novel organisms may counterbalance their negative effects, e.g. vacant niches are filled up by alien species, extinct species are replaced by ecologically "redundant" other species; ecosystem functions, goods and services are still provided, and remain "resilient" to further disturbances. Thus, "Tout est pour le mieux dans le meilleur des mondes" (Voltaire 1759 in his masterpiece "Candide"). It is shown that the terrestrial biodiversity of some Pacific islands, especially French Polynesia and Rapa Nui (Southeastern Polynesia), was dramatically altered during the last centuries and past decades by an increasing number of invasive alien species, with past and contemporary plant and animal (vertebrates and invertebrates) extinctions leading to probable extinction cascades; that mutualism between plants are animals

(e.g. fruit dispersal, pollination) are profoundly modified in favor of invaders; and that plant successions following disturbances have their trajectories profoundly changed towards alien-dominated communities. As ecosystem dynamics still remain too poorly studied, it is recommended that conservation of the native island biota, also considered as a cultural heritage, and restoration of degraded habitats should remain a priority and should not be sacrificed on the altar of functional and global ecology.

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Recent colonization and diversification of the endemic Hawaiian genus *Hesperomannia* (Asteraceae)

Previous studies on the origin of the endemic Hawaiian genus *Hesperomannia* suggested that its founder colonized now submerged high Hawaiian Islands ca. 17 mya. Sister taxa to *Hesperomannia* are African species of the Vernonieae tribe and migration to Hawaii occurred via a long-distance dispersal event from that continent. Colonization to later formed islands then occurred via the Progression Rule to Kaua`i, O`ahu, and Maui Nui. Present taxonomic boundaries suggest two lines of radiation: Kaua`i (*H. lydgatei*) to Waianae Mtns, O`ahu (*H. arbuscula*) to Moloka`i and Lana`i (*H. arbuscula*), and Kaua`i to Koolau Mtns, O`ahu (*H. arborescens*) to Maui (*H. arborescens*). However, morphological variation across islands was not consistent with taxonomic treatments. Species were investigated using genetic markers to examine the relationships among the three currently recognized species and to test the hypothesis of dispersal among the islands. RAPD markers and ITS sequences both suggest that four species should be recognized: *H. lydgatei* (Kaua`i), *H. oahuensis* (Waianae Mtns, O`ahu), *H. swezeyi* (Koolau Mtns, O`ahu), and *H. arborescens* (Maui, Moloka`i and Lana`i). Sequence analysis is consistent with arrival to Hawaii in the last 2.3 MY, after all three island groups had emerged, and was followed by rapid dispersal among these islands. Although a long-distance dispersal model is evoked for colonization to Hawaii and dispersal among distantly situated islands, a vicariant model is possible for dispersal among O`ahu and Maui Nui, and is probable among the islands of Maui Nui (Maui, Moloka`i and Lana`i) following erosion and subsidence of this island complex.

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Evidence for intraspecific divergence in `ōhi`a lehua along a successional gradient of East Hawai`i Island

Theory suggests that successional gradients are capable of driving within-species divergence, but to date this idea has not been tested empirically. Morphologically distinct varieties of the Hawaiian endemic tree, `ōhi`a lehua (*Metrosideros polymorpha*) are the community dominants in a successionally dynamic environment. Furthermore, population distributions of *M. polymorpha* var. *incana* and var. *glaberrima* indicate that these two varieties may be diverging into habitats characteristic of early- and late-successional communities. As successionally dynamic communities incorporate gradients in temperature, light, water and soil nutrients, Early- and late- successional conditions were replicated through controlled greenhouse experiments and reciprocal transplants utilized to isolate and determine what selection pressures may be acting to diverge these two varieties. Measurements of growth and germination rates, seedling survival, chlorophyll fluorescence and biomass after one year as proxies for relative fitness were recorded. Varieties exhibited differential survival to soil moisture and light level treatments, a pattern consistent with intraspecific divergence along a successional gradient. In combination with previous observation of partial late-acting reproductive isolation between these varieties, this work suggests that successional gradients may be selecting for ecological speciation in 'ōhi'a lehua.

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Divergence time estimation of *Kadua* (Rubiaceae), fast and slow in archipelagos of Eastern Polynesia

Kadua, a recently resurrected genus, is mostly endemic to the Hawaiian Archipelago, with many member taxa autochthonous to individual islands. Sequence analyses of the quickly evolving nuclear regions ITS and 5s-NTS regions for the 20 Hawaiian and 7 French Polynesian species of *Kadua* revealed a single colonization of Hawaii, with a subsequent dispersal(s) from Hawaii to French Polynesia. Using the software BEAST, divergence time estimation analysis determined using island ages as calibration points and revealed that *Kadua* colonized Hawaii 15 million years ago, before the currently extant high islands were formed. Many