

Symposium on Marine Diversity and Biogeography in the Tropics Pacific Science Congress, May–June 1991, Honolulu¹

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Seven persons were asked to discuss the diversity and biogeography of various groups of marine organisms from as wide a geographic span as possible in the warm Pacific. The organisms covered were marine algae, marine mollusks, and fishes; unfortunately, J. E. N. Veron of Australia, who was expected to speak on corals, was unable to attend. We present here three abstracts and three full-length papers. No symposium on marine diversity has ever been presented to the Congress, although each member country in the Congress is impacted by one or more oceans or seas. Of the major groups of marine organisms, probably the least studied (and least understood) are the marine algae. The three papers are on algae and show different perspectives although the subject matter is systematics and ecology. In "Geographic patterns of diversity in benthic marine algae," Paul Silva defines diversity and shows that although land plant diversity is greater in the tropics, marine algae show more diversity in the warm-temperate boundaries. In "Marine phytogeography of the Juan Fernández Archipelago: A new assessment," Bernabe Santelices shows that the relatively high diversity with 32% endemism found in the Juan Fernández Islands is largely due to the physical barrier of the cold northward-flowing Perú or Humboldt Current. Celia Smith in "Diversity in intertidal habitats: An assessment of the marine algae of select high islands in the Hawaiian Archipelago" revealed many data that furnished the bases for far-reaching comparisons: age-related basalt substrates and limestone benches on an island about 35,000 yr old yielded a flora with greater diversity than similar transects on a younger basalt island, contributing to the conclusion that similar diversity patterns appear to depend on substrate similarity as well as current patterns around islands.

The three abstracts cover algae from French Polynesia, fishes, and marine mollusks. The papers that stem from these abstracts have been or are being published elsewhere.

Diversity in the Coral Reef Algal Flora in French Polynesia

CLAUDE ELISABETH PAYRI³

ABSTRACT: The marine algal flora of French Polynesia is relatively impoverished compared with the known flora of the western

Pacific, but perhaps richer than that known from the tropical islands of the eastern Pacific. Some pantropical genera are poorly represented and others are absent in these islands, whose algal floras have only recently been systematically studied. Many families of algae are two to four times less rich in species numbers than the same families recorded from the western Pacific. Comparisons made

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within island groups in French Polynesia show a decrease in species number in comparison to the flora of Moorea, the best collected of all of these areas. Continued collections are

being made that will affect future conclusions on diversity and species richness as found between ca. 10 to 24° S latitude in French Polynesia.

Endemism of Fishes in Oceania⁴

JOHN E. RANDALL⁵

ABSTRACT: Only shore fishes, defined as those benthic or bottom-oriented species occurring in less than 200 m depth, or inshore surface-dwelling species are considered in the present analysis of endemism of fishes at oceanic islands of the central and western Pacific. Most of the island groups of Oceania are not sufficiently isolated from one another to have many endemic species of fishes. The Marshall Islands and the Mariana Islands, for example, have about 1% endemism. About 2% of the fish fauna of the Society Islands, Tuamotu Archipelago, and Austral Islands combined is endemic. The Hawaiian Islands, with 536 species of shore fishes, have the highest percentage of endemic fishes, 25.0%;

this is not surprising in view of the geographic and hydrographic isolation of the archipelago. Next is tiny, remote Easter Island; of its total of only 125 species of shore fishes, 23.2% are endemic. The island group with the third highest percentage is the Marquesas with an estimated 350 species of inshore fishes and an estimated 10% endemism. Fourth is Lord Howe Island and Norfolk Island combined; of their 471 species of shore fishes, 7.2% are restricted to one or both of these small islands. Fifth is Rapa, with 5.5% of its 256 species of shore fishes endemic. With the exception of the Marquesas, all of these islands lie at subtropical latitudes.

Marine Molluscan Species Diversity on Isolated Oceanic Islands: Hawai'i, Easter Island, and the Galápagos

E. ALISON KAY⁶

ABSTRACT: Two rules of life on isolated oceanic islands are that major groups of animals and plants are absent on these islands and that there are fewer numbers of species than in source areas of comparable size. Thus nautilus and abalone are not found east of Samoa and the Caroline Islands in the Pacific,

and only 34 species of cowries occur in the Hawaiian Islands in comparison with 54 species on Guam. If distance were the sole determinant of the composition of the marine biota of these islands, the faunas should be miniature mirror images of the faunas of the source areas. Neither the absence of major groups nor the lesser number of species appear to be random. Three determinants of the composition of the faunas of isolated oceanic islands are recognized: the oceanic setting of isolated islands, which restricts but does not prevent gene flow; changes in oceanographic and/or climatological conditions that may result in

⁴The paper upon which this abstract was drawn has been submitted for publication in the UN Regional Seas publication.

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sporadic gene flow, sometimes leading to extinction and/or re-immigration; and island topography. In the last case, organisms may arrive but if conditions are not suitable, they cannot settle and reproduce. These faunal

determinants are shown to be present in the marine molluscan faunas of the Hawaiian Islands, Easter Island, and the Galápagos Islands.