

Biogeography of East Africa's coral reef fishes, as determined using diver-operated stereo video census

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Understanding biogeographic patterns of reef fish fauna is critical for effective conservation strategies. We present results of a biogeographic assessment of East Africa's coral reef ichthyofauna, from a diver-operated stereo video survey of shallow-water (<25 m) coral reefs. Surveys were conducted at 208 sites within 13 regions, from southern Mozambique to central Kenya. Species richness showed no latitudinal gradient, and ranged from 149 species at the Primeras and Segundas, Mozambique, to 198 species in Quirimbas archipelago. Fish density also showed no latitudinal gradient and ranged from 244 (\pm 129) fish/1000m² at Primeras and Segundas to 1464 (\pm 1210) fish/1000m² at Pemba Island, Tanzania. Biomass showed a general increase with latitude, but ranged from 193 (\pm 98) kg/ha at Lindi, Tanzania, to 940 (\pm 767) kg/ha in Ponta do Ouro, Mozambique. Multi-dimensional scaling and cluster analysis identified three distinct ichthyofaunal groups. A southern group included sites from Ponto do Ouro to Bazaruto Archipelago, in southern Mozambique. A second group comprised only the Primeras and Segundas islands, while a third group encompassed all northern surveyed sites from Nacala (Mozambique) to Malindi (central Kenya). The mechanism driving the split between the northern group and the Primeras and Segundas is likely the bifurcation of the westerly flowing south equatorial current, where it strikes the African East coast at 10 to 15°S, effectively creating northerly and southerly flowing currents. The split between the two lower groups is likely the outflow of highly turbid freshwater from the Zambezi and Save rivers into the Bight of Sofala, where reef habitat is absent. This biogeographical pattern closely matches those of previous ichthyofaunal assessments and modelled larval flow. Considering the distinct ichthyofauna within each of the regional clusters, including a trans-boundary cluster, conservation planning processes should strive for representative protection of each cluster, to ensure their persistence