

Review Article

Comparative Phylogeography of the Coral Triangle and Implications for Marine Management

Kent E. Carpenter,¹ Paul H. Barber,² Eric D. Crandall,³
Ma. Carmen A. Ablan-Lagman,⁴ Ambariyanto,⁵ Gusti Ngurah Mahardika,⁶
B. Mabel Manjaji-Matsumoto,⁷ Marie Antonette Julino-Meñez,⁸
Mudjekeewis D. Santos,⁹ Craig J. Starger,² and Abdul Hamid A. Toha¹⁰

¹Biological Sciences and International Union for Conservation of Nature/Conservation International Global Marine Species Assessment, Old Dominion University, Norfolk, VA 23529, USA

²Department of Ecology and Evolutionary Biology, University of California Los Angeles, 621 Charles E. Young Dr. South, Los Angeles, CA 90095, USA

³Biological Sciences, Old Dominion University, Norfolk, VA 23529, USA

⁴Biology Department, De La Salle University Manila, 2401 Taft Avenue, Manila 1004, Philippines

⁵Faculty of Fisheries and Marine Science, Diponegoro University, Semarang 50275, Indonesia

⁶Animal Biomedical and Molecular Biology Laboratory, Faculty of Veterinary Medicine, Udayana University Bali, Jl Sesetan-Markisa 6, Denpasar, Bali 80225, Indonesia

⁷Borneo Marine Research Institute, University Malaysia Sabah, Locked Bag 2073, 88400 Kota Kinabalu, Sabah, Malaysia

⁸Marine Science Institute, University of the Philippines, Dilliman, Quezon City 1101, Philippines

⁹Marine Fisheries Research Division, National Fisheries Research and Development Institute, 940 Quezon Avenue, Quezon City 1103, Philippines

¹⁰Faculty of Animal Sciences, Fisheries and Marine Science, The State University of Papua, Manokwari-West Papua 98314, Indonesia

Correspondence should be addressed to Kent E. Carpenter, kcarpent@odu.edu

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Extreme concentration of marine biodiversity and exploitation of marine resources in the Coral Triangle pose challenges to biogeographers and resource managers. Comparative phylogeography provides a powerful tool to test biogeographic hypotheses evoked to explain species richness in the Coral Triangle. It can also be used to delineate management units for marine resources. After about a decade of phylogeographical studies, patterns for the Coral Triangle are emerging. Broad connectivity in some species support the notion that larvae have maintained gene flow among distant populations for long periods. Other phylogeographic patterns suggest vicariant events resulting from Pleistocene sea level fluctuations, which have, at least occasionally, resulted in speciation. Divergence dates ranging back to the Miocene suggest that changing land configurations may have precipitated an explosion of species diversification. A synthesis of the marine phylogeographic studies reveals repeated patterns that corroborate hypothesized biogeographic processes and suggest improved management schemes for marine resources.

1. Introduction

The Coral Triangle is well recognized as the global apogee of marine biodiversity, with species richness incrementally decreasing from this region eastward across the Pacific Ocean and westward across the Indian Ocean [1, 2]. This center

encompasses much of Indonesia, Malaysia, the Philippines, Brunei, Timor L'Este, Papua New Guinea, and the Solomon Islands and is also variously referred to as the East Indies Triangle (e.g., [3–5]), the Indonesian and Philippine Region [6], the Indo-Malay-Philippine Archipelago [7, 8], and a variety of other names [2]. It has also been referred to as