

PREFACE

Systematics of tropical eastern Pacific fishes

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The tropical eastern Pacific (TEP) extends from the Gulf of California and the southern portion of the outer coast of Baja California southeastward to northern Peru. The region is bounded to the north and south by steep thermal gradients which act as partial barriers isolating the majority of the region's fish fauna from that of the temperate coastal regions of North and South America. To the west is the east Pacific barrier, the world's largest marine biogeographic barrier, a stretch of uninterrupted deep water some 4,000 - 7,000 km wide between the TEP and the easternmost islands of the central Pacific (the Hawaii, Line and Marquesas island groups; Grigg & Hey, 1992). To the east, the TEP is isolated from the tropical western Atlantic by the Central American land bridge, an impenetrable barrier from the perspective of marine fishes. This barrier has remained intact for the last 3.5 million years since the final closure of the isthmus of Panama (Jackson et al., 1996).

Biogeographically, the TEP is fascinating in several respects. Its marine shore biota is most similar to that of the tropical western Atlantic, but, as a result of the independent evolution of their faunas in very different environments over the past 3.5 million years, the two regions share relatively few fish species in common (Rosenblatt, 1967). The TEP includes five oceanic islands or island archipelagos whose fish faunas are relatively well known (McCosker & Rosenblatt, 1975; Robertson & Allen, 1996; Grove & Lavenberg, 1997; Garrison, 2000). These islands harbor subsets of the mainland fauna, a significant number of insular endemics, and numerous species that also occur on the western side of the east Pacific barrier (Leis, 1984). The geographic isolation of the TEP has resulted in its having the highest level of regional endemism among shore fishes of any comparably sized region in the world. Approximately 85 percent of its fishes are found nowhere else, although many of them regularly or periodically (e.g., during El Niño events, Lea & Rosenblatt, 2000) cross the thermal barrier to the north, and are found in California. Although less well documented, a similar periodic transgression of the southern thermal barrier presumably also occurs.

Many species of TEP fishes have wide distributions within the region. Others have more limited distributions, with the Panamic Province (Nicaragua to Peru) and the Cortez Province (essentially the Gulf of California) serving as centers of regional endemism. Precise distributions of many species of fishes between these regions, along the coast of southern Mexico southward to Honduras, are not well documented. Some species, particularly small, benthic reef fishes, support the recognition of a third, Mexican, province located between the Cortez and Panamic Provinces (Hastings, 2000), as suggested by several studies on the systematics of coastal fishes (e.g., Hubbs, 1952; Briggs, 1955; Springer, 1959; Stephens, 1963).

The last decade has seen a great deal of activity aimed at making the TEP fish fauna better known - especially through the publication of both regional and more localized fish guides. These include Bussing & Lopez (1993), Humann (1993), Allen & Robertson (1994), Fischer, et al. (1995), Grove & Lavenberg (1997), and most recently Garrison (2000). Before these, the only

modern guide to the region's fishes was that of Thomson, et al. (1979; updated in 2000) for the reef fishes of the Gulf of California.

Despite these and other efforts to compile information on the systematics of its ichthyofauna, the shorefish fauna of the TEP has included a considerable number of "orphan" species of fishes - species whose existence is well known, often for decades, but which lack formal descriptions and scientific names (e.g., Walker & Bollinger, this issue). The reasons for this backlog of formal descriptions for these species are as varied as the fishes themselves. However, the persistent absence of descriptions and scientific names for these species continues to hamper construction of field guides as well as attempts at broad comparisons of the TEP with other biogeographic regions. In addition, previously unknown species of TEP shorefishes continue to be discovered, often as a result of extensive collecting efforts such as those of Allen and Robertson (e.g., Hastings, this issue) and recent expeditions collecting in deep waters around the Islas Galápagos (e.g., Baldwin & McCosker, this issue) and in the shallow coastal regions of the Gulf of Panama (e.g., Chao et al, McCosker & Robertson, this issue). Finally, application of molecular techniques has in some cases helped to clarify the specific status of eastern Pacific populations compared to morphologically similar populations from other regions (e.g., Banford & Collette, this issue).

In order to move our understanding of the ichthyofauna of the TEP forward, we sought a way to facilitate the publication of formal taxonomic descriptions of "orphaned" species as well as newly discovered and newly recognized species. We turned to the principal regional biological journal, *Revista de Biología Tropical*, and, thanks to the cooperation and assistance of its editor, Dr. Julian Monge-Najera, the current issue devoted exclusively to papers on the systematics of eastern Pacific fishes was conceived. In the call for papers, we encouraged submission of all papers contributing to our understanding of the systematics of eastern Pacific fishes whether or not they included the description of new species or were conducted on groups outside of the tropics. The result is this special issue of *Revista de Biología Tropical* which includes 21 papers that deal directly with the taxonomic status of over 29 species (16 of them described as new).

The California Academy of Sciences and the David and Lucile Packard Foundation (via John McCosker) provided funds permitting inclusion of color plates, and the Smithsonian Tropical Research Institute generously supported all other publication costs for this special issue of *Revista de Biología Tropical*. Dr. Ira Rubinoff, Director of STRI, enthusiastically supported the publication of this issue, and it is with pleasure that we dedicate it to him in recognition of both his pioneering research on the role of the isthmus in the evolution of shorefishes in tropical America and his sponsorship of research on marine and terrestrial biology of Central America during his 27 year tenure as Director of the Smithsonian Tropical Research Institute.

Orphaned species remain for a few groups of TEP fishes (e.g., gobies), and the systematics of other groups (e.g., brotulas) is in need of study. And most certainly, new species remain to be collected and described, especially in poorly sampled habitats such as deep reefs. Yet our understanding of the diversity and distributions of TEP fishes has grown to the extent that we are beginning to approach a level of knowledge equivalent to that of the well-studied tropical western Atlantic ichthyofauna.

During publication of this issue, one of its contributors, Genie Böhlke, passed away after a long battle with cancer. We would like to co-dedicate this issue to her and asked her fellow anguillophile, John McCosker, to provide a short statement regarding her contributions to ichthyology. His comments follow this preface.

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Eugenia Brandt Böhlke

This volume is co-dedicated to the memory of Eugenia Brandt Böhlke, whose recent death left ichthyologists at a loss for her absence but much the wiser from her life's contributions. Trained in biochemistry, Genie arrived at the Academy of Natural Sciences of Philadelphia in 1954 with her husband Jim and assisted him with his numerous and important studies of neotropical fishes. After Jim's death in 1982, she completed the monumental FWNA treatise, the eel volume, serving as general editor and the coauthor of the muraenid and ophichthid sections. Genie was organized and assiduous, and developed a keen eye for species differences -- a difficult task within families of fishes bereft of scales and often without coloration or other useful characters.

During her career Genie published 34 ichthyological papers and described a new genus and 25 new species of muraenid and ophichthid eels. Most are from the New World and all remain valid. In recognition of her contributions, Genie achieved well-deserved patronymy through the eels *Uropterygius genie* and *Ophichthus genie*, the Venezuelan characin *Aulixidens eugeniae*, and the lovely cleaning goby, *Gobiosoma genie*. Neotropical eel biology has benefited greatly from Genie's work, and will continue to do so, ranging from her paper in this volume to future papers by ichthyologists who will rely on her publications and the millions of eel vertebrae that she counted, analyzed and documented.

John E. McCosker