



Redescriptions of *Eunice filamentosa* and *E. denticulata* and description of *E. tovarae* n. sp. (Polychaeta: Eunicidae), highlighted with morphological and molecular data

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Abstract

In a series of studies on eunicids, three Grand Caribbean species *Eunice filamentosa*, *E. denticulata*, and *E. conglomerans* were regarded as synonyms, or part of a species complex with an amphiamerican distribution. The revision of type and additional materials collected in the Grand Caribbean Region (GCR) and along the Mexican Pacific coasts, allowed us to clarify that *E. conglomerans* is a junior synonym of *E. denticulata*. Thus, *E. filamentosa* and *E. denticulata* are valid species in the GCR; while the specimens from the Tropical Eastern Pacific belong to a newly described species, *E. tovarae* n.sp. Herein we describe these three species, and some morphological features described in previous studies are reevaluated. Additionally, we found an important genetic divergence in nucleotide sequence variation of COI, which supported the morphological data. *E. filamentosa* and *E. denticulata* have a genetic divergence of 19.6%; whereas *E. tovarae* n. sp. has a genetic divergence of 20.7% from *E. denticulata*, and a 12.9% divergence from *E. filamentosa*.

Key words: taxonomy, amphiamerican species, COI-Barcoding, cryptic species

Introduction

The geological history of Central America indicates that the completion of the Panamanian isthmus is a recent event, dating back to about 2 million years (MY). Before the closure, there was biogeographic continuity since several marine groups were present throughout the region, and a single biogeographic province was recognized during the Miocene. Thus, once the Central American isthmus was complete, there were biotic remains on both sides of it, and because the resulting populations were very similar, they were regarded as geminate species if they could be distinguished as separate species (Jordan 1908), or in case they could not be separated, they were called amphiamerican because they were living on both sides of the isthmus before its closure (Marko & Jackson 2001).

This distribution pattern was later applied to many groups of marine organisms. However, once more detailed studies were done on the regional biota, it was discovered that there were differences between these populations and several names were reintroduced. This trend has included not only small marine invertebrates (Mathews & Anker 2009), but even some of the largest fishes in the region (Craig *et al.* 2009). Further, it has been shown that evolutionary divergences started some time before the closure of the Panamanian isthmus, reaching about 3–10(15) MY, and consequently, the closure was not a generalized or relevant trigger for diversification.

The American tropics contain about 2,300 polychaete species (Salazar-Vallejo 1996, Salazar-Vallejo & Londoño-Mesa 2004), and about 5% are regarded as contemporary amphiamerican species. The Grand Caribbean Region (GCR), which includes all the Caribbean biogeographic province and the southern portion of the Carolinian biogeographic province, includes records of many species described from Southern California. In the Tropical Eastern Pacific region, which includes three biogeographic provinces (Cortez, Mexican, and Panamanian), and hydrothermal vent sites and Galapagos the records contain many Caribbean or even Scandinavian species. Monro (1928a, b, 1933a, b; updated by Fauchald 1977) made the first indications for amphiamerican species, in a series of publications based upon materials collected in Panama. He noticed that 37 species (about one-quarter) among his