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## First record and establishment of *Branchiomma coheni* (Polychaeta: Sabellidae) in the Atlantic Ocean and review of non-indigenous species of the genus

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### Abstract

Sabellidae are among the most visible polychaetes of the hard substrate fouling communities and are colonizing new geographic areas. The fouling community was surveyed in 25 shallow coastal estuaries on the Atlantic and Pacific coasts of the United States with the specific goal of detecting non-indigenous species. During surveys in 2012 and 2014, specimens of *Branchiomma coheni* Tovar-Hernández and Knight-Jones, 2006 were found for the first time in Tampa Bay, Florida, occurring at the same marina site (27°53'7.58"N, 82°32'2.29"W) each year and suggesting it is established here. The species was not detected at other sites surveyed in the United States, and has not been reported from the eastern Atlantic or the Mediterranean basin. Type material of *B. coheni*, specimens from southern Gulf of California, and specimens from the Pacific coast of Mexico, were used to corroborate identification. The transfer of this species by ships via the Panama Canal is a probable mechanism of introduction, based on the current known distribution and shipping traffic patterns. This represents the first record of the species in the Atlantic Ocean. A worldwide update of the records of this species and a list of valid species of the genus *Branchiomma* with notes on introduced populations are provided, as well as recommendations for accurate identification and sampling.

**Key words:** Sabellid, non-indigenous species (NIS), Panama Canal, biological invasions, shipping, fouling, Gulf of California, Gulf of Mexico, Florida

### Introduction

Anthropogenic dispersal and introduction of marine non-indigenous species (NIS) has been known since the opening of transoceanic maritime routes in the 16th Century. It is not by chance that the first case of NIS can be attributed to shipworms (Laidlaw 1952, Edmondson 1962) that took a ride around the world, boring into the hulls of wooden ships. Invasions by NIS have received much attention in recent decades, contributing to increased understanding of the magnitude of species transfers, invasion processes, and consequences for biogeography and invaded communities. For example, over 300 marine NIS are documented and considered established in the Mediterranean Sea (Zibrowius 1991; Galil 2000; Galil & Goren 2014), over 200 NIS are reported to occur in the single estuary of San Francisco Bay, California, USA for invertebrates and algae alone (Ruiz *et al.* 2011) and over 250 NIS are reported for Australia (NIMPIS 2009).

A variety of mechanisms are involved in the NIS transfer in marine environments, including: (i) transport through hull fouling of maritime vessels; (ii) translocation by aquaculture or fisheries; (iii) connecting of waterways through canals; (iv) release of species associated with the pet industries or management practices; and (v) transfer of ballast water and dry ballast of ships (Ruiz *et al.* 1997). On a global scale, ships have been a dominant transfer mechanism for invasions (Hulme 2009), driven by species associated with ballast water and biofouling communities on hulls and underwater surfaces (Carlton 1985; Fofonoff *et al.* 2003). The detection rate of NIS invasions from ships has increased greatly over the past 200 years, coincident with increases in global trade and expansion of shipping through the Suez and Panama Canal.