Species Diversity **20**: 199–209
25 November 2015
DOI: 10.12782/sd.20.2.199

Redescription of the Sea Anemone *Exocoelactis actinostoloides* (Cnidaria: Anthozoa: Actiniaria) Based on a Topotypic Specimen Collected from Tokyo Bay, Japan

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(Received 4 April 2013; Accepted 7 October 2015)

We collected a specimen of *Exocoelactis actinostoloides* (Wassilieff, 1908) from the type locality of the species in October, 2012. The name of *Ex. actinostoloides* has been misapplied to a species of *Entacmaea* (Ehrenberg, 1834) around the Indo-Pacific region in many works, including scientific reports, although some authors have noted the error. A true specimen of *Ex. actinostoloides* has not been found in Japanese waters since the collection of the type specimen at Jogashima, Kanagawa Prefecture, in 1904. Here, we redescribe *Ex. actinostoloides* based on the present specimen from the opposite side of the Uraga Strait, and analyze the phylogenetic position of this species within Actiniaria based on mitochondrial 12S and 16S rDNA sequence data. These are the first molecular data ever provided for the family Exocoelactinidae. The sequence data indicate that *Ex. actinostoloides* is a member of the superfamily Actinostoloidea, and that it is most closely related to the family Actinostolidae.

Key Words: Sea anemone, *Exocoelactis*, 16S rDNA, 12S rDNA, Doflein, Actinostoloidea, *Entacmaea*, "Actinostola rule", "Exocoelactis rule".

Introduction

The original description of *Exocoelactis actinostoloides* (Wassilieff, 1908) was based on one specimen collected from Jogashima, Sagami Bay, Japan, by Frantz Theodor Doflein. At Enoshima, not far from the type locality of *Ex. actinostoloides*, Doflein also collected an additional specimen, which was described as *Cymbactis maxima* Wassilieff, 1908 (*q.v.*). *Cymbactis maxima* was synonymized with *Ex. actinostoloides* under the latter name by Arellano and Fautin (2001). In many sources, including field guides, fauna lists, and scientific reports (*e.g.*, Uchida 1965; Uchida *et al.* 1975; Moyer and Bell 1976; Suzuki and Hayashi 1977; Cha and Song 2001; Uchida 1992; Ono *et al.* 2007; Ninh *et al.* 2008; Yamaguchi *et al.* 2010; Wakahama *et al.* 2012; Iwatsubo and Iwatsubo 2013), the species name *Ex. actinostoloides* (=*C. actinostoloides*, *Parasicyonis actinostoloides*) has been used erroneously to refer to different species, *Entacmaea quadricolor* Rüppell and Leuchart, 1828, which inhabits shallow-water coral reefs and rocky shores in the Indo-Pacific region (*cf*. Dunn 1981; Arellano and Fautin 2001).

Arellano and Fautin (2001) redescribed *Ex. actinostoloides* based on 23 specimens collected in New Caledonia, the Philippines, and Palau from depths of 175 to 480 m. After the holotypes of *Ex. actinostoloides* and *C. maxima*, no additional specimens have been found in Japanese waters, including the type localities.

Recently, we obtained a specimen of *Ex. actinostoloides* from off Kanaya, Futtsu City, Chiba Prefecture, at the mouth of Tokyo Bay (nearly the same place as the type locality, Jogashima, Sagami Bay, which lies on the opposite side of the Uraga Strait). We conducted morphological and molecular studies on this specimen.

Materials and Methods

The single specimen in this study was collected with a gill net off the island of Ukishima, Kanaya, Futtsu, Chiba Prefecture at 100–200 m depth (Fig. 1). This specimen is deposited in the zoological collection of the Costal Branch of Natural History Museum and Institute, Chiba (CMNH).

The specimen was photographed *in situ*, then anesthetized overnight using $MgSO_4$ solution. Two tentacles were removed from the anesthetized specimen for DNA analysis. The specimen was fixed in seawater with 20% formalin for two weeks and preserved in 70% EtOH. Histological sections, 6 μm thick and stained with hematoxylin and eosin (Presnell and Schreibman 1977), were made for the observation of tentacle musculature, sphincter musculature, and mesenterial arrangement. The remaining paraffin-embedded tissues were deparaffinized by xylol and substituted with butyl alcohol, dried in a VFD-21S (VACUUM DEVICE,