



Edwardsia sojabio sp. n. (Cnidaria: Anthozoa: Actiniaria: Edwardsiidae), a new abyssal sea anemone from the Sea of Japan

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ABSTRACT

The paper describes new deep-water edwardsiid sea anemone *Edwardsia sojabio* sp. n. which is very common on soft muddy bottoms at lower bathyal and upper abyssal depths in the Sea of Japan. It was recorded in high quantity in depths between 2545 and 3550 m and is the second abyssal species of the genus *Edwardsia*.

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1. Introduction

The deep-sea basin of the Sea of Japan is well isolated from adjacent deep-sea areas by rather shallow straits; its deep-water fauna is poorly studied but the species diversity was described to be low (Zenkevich, 1963).

The present study is based on material collected by the joint Russian–German expedition *SoJaBio* (Sea of Japan Biodiversity Studies) on board of RV Akademik M.A. Lavrentyev in August of 2010. The vast majority of the sea anemones collected by the expedition were numerous specimens of the small edwardsiid sea anemone described here as *Edwardsia sojabio* n. sp. Edwardsiid sea anemones from the North Pacific and, in particular, from the Far East seas of Russia are poorly known. Only two *Edwardsia* species were known previously from the Sea of Japan: *E. japonica* Carlgren, 1931 from shallow water (0–12 m) and *E. octoradiata* Carlgren, 1931 from unspecified depth. An unidentified *Edwardsia* sp. is reported from East Sakhalin (Kostina, 2008).

Although *Edwardsia* species are numerous and widespread, occurring from polar to tropical waters, surprisingly few species are known from deep water. Actually, only one true abyssal species has been described till now, *E. mcmurrichi* Daly et Ljubenkov, 2008 from off San Francisco, California, at 2650–3136 m depth (according to a list of examined specimens) or 2100–3100 m depth (as listed in “Distribution and habitat”, see Daly and Ljubenkov, 2008:11).

2. Material and methods

The specimens were fixed with formaldehyde and then transferred to 70% ethanol for long term storage or placed directly in 96%

ethanol. For histological examinations several specimens were embedded in paraffin using the isopropanol–mineral oil technique (Buessa and Peshkov, 2009) and cut into series of 3.5 μm sections. The sections were stained in Masson’s trichrome (Romeis, 1953). Cnidae were studied using small pieces of macerated tissue and on histological sections. Cnidae were measured according the method of Hand (1954). This method is more suitable to establish accurate size ranges than the method described by Williams (1996). The obtained measurements are not random and therefore are not suitable for statistical analysis. However, accurate size ranges of cnidae are much more important for taxonomic purposes than the statistical data (e.g. mean and standard deviation). Actually this is confirmed by Williams (1996:350) who stated: “Statistically significant differences occurred between mean lengths of cnidae in replicate samples from the same specimen ..., and between samples from different specimens of the same species”. This fact nullifies practical value of the protocol described by Williams (1996) for taxonomy. In fact, we do not know any papers in which these data (the mean and the standard deviation) were used for species’ comparisons.

The material examined is summarized in Table 1. Type material is stored in the Museum of the Institute of Marine Biology (MIMB), Vladivostok, Zoological Institute (ZIN), St.Petersburg, Russia, and in the Zoological Museum of Hamburg (ZMH), Germany.

3. Taxonomy

Order Actiniaria Rafinesque, 1815

Family Edwardsiidae Andres, 1881

***Edwardsia* de Quatrefages, 1841**

***Edwardsia sojabio* sp. n.**

(Figs. 1–3)

Edwardsia arctica: Carlgren, 1940:21.

Not *Edwardsia arctica* Carlgren, 1921:39.

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Table 1List of stations where *E. sojabio* sp. n. was recorded, S=supranet; E=epinet.

| No. | Station | Gear C-EBS | Date | Depth (m) | Coordinates | Number of specimens (catalog numbers) |
|-----|----------|------------|--------------|-----------|--|---------------------------------------|
| 1 | B4-8 | S | 21–22.8.2010 | 3312–3334 | 43°01.3440N 135°28.0092E 43°01.2126N 135°28.1308E | 154 (MIMB 27388) |
| 2 | D2-8 | E | 01.09.2010 | 2653–2683 | 42°06.6051N 131°21.0149E 42°06.4555N 131°20.9308E | 18 |
| 3 | B4-8 | E | 21–22.8.2010 | 3312–3334 | 43°01.3440N 135°28.0092E 43°01.2126N 135°28.1308E | 18 |
| 4 | B5-8 | S | 23.8.2010 | 2609–2655 | 43°01.3064N 135°05.9562E 43°00.9363N 135°06.5366E | 32 |
| 5 | A7-9 | E | 18.08.2010 | 3340–3347 | 44°00.8871N 137°29.7822E 44°00.1668N 137°31.3496E | 5 (ZMH-C12153) |
| 6 | D2-8 | S | 01.09.2010 | 2653–2683 | 42°06.6051N 131°21.0149E 42°06.4555N 131°20.9308E | 137 |
| 7 | A6-8 | E | 16.08.2010 | 2545–2555 | 44°18.6270N 137°24.4079E 44°18.4712N 137°24.3985E | 39 |
| 8 | A6-8 | S | 16.08.2010 | 2545–2555 | 44°18.6270N 137°24.4079E 44°18.4712N 137°24.3985E | 26 |
| 9 | C1-9 | E | 27.08.2010 | 2693–2725 | 42°26.4275N 133°08.6525E 42°26.4636N 133°08.8737E | 17 |
| 10 | B5-8 | E | 23.8.2010 | 2609–2655 | 43°01.3064N 135°05.9562E 43°00.9363N 135°06.5366E | 1 |
| 11 | D1-4 | E | 30.08.2010 | 3356 | 41°28.7198N 131°46.7702E 41°28.6028N 131°46.6796E | 2 |
| 13 | D1-4 | S | 30.08.2010 | 3356 | 41°28.7198N 131°46.7702E 41°28.6028N 131°46.6796E | 1 |
| 14 | A7-9 | S | 18.08.2010 | 3340–3347 | 44°00.8871N 137°29.7822E 44°00.1668N 137°31.3496E | 1 (MIMB 27387) 35 (ZIN 11284) |
| 15 | C1-9 | S | 27.08.2010 | 2693–2725 | 42°26.4275N 133°08.6525E 42°26.4636N 133°08.8737E | 53 |
| 16 | C3-4 | E | 28.08.2010 | 3427–3431 | 42°01.5613N 133°09.5741E 42°01.4637N 133°09.7381E | 13 (ZIN 11285) |
| 17 | B4-7 | S | 21.08.2010 | 3298–3353 | 43°01.5063N 135°26.4484E 43°01.3831N 135°26.3669E | 62 |
| 18 | C1-8 | E | 27.08.2010 | 2670–2681 | 42°26.5832N 133°09.1471E 42°26.6230N 133°09.3740E | 5 |
| 19 | B7-6 | S | 25.08.2010 | 517–521 | 43°13.4229N 135°04.2286E 43°13.5581N 135°04.3569E | 1 |
| 21 | B4-5 #18 | MUC | 21.08.2010 | 3340 | 43°01.1496N 135°26.1901E | 1 |
| 22 | D2-6 #47 | MUC | 31.08.2010 | 2654 | 42°06.3910N 131°21.8463E | 4 |
| 23 | D2-6 #47 | MUC | 31.08.2010 | 2654 | 42°06.3910N 131°21.8463E | 7 |
| 24 | C3-7 #18 | MUC | 29.08.2010 | 3428 | 42°02.1420N 133°10.8608E | 1 |
| 25 | C3-7 #18 | MUC | 29.08.2010 | 3428 | 42°02.1420N 133°10.8608E | 2 |
| 26 | C3-7 #18 | MUC | 29.08.2010 | 3428 | 42°02.1420N 133°10.8608E | 2 |
| 27 | C3-7 #18 | MUC | 29.08.2010 | 3428 | 42°02.1420N 133°10.8608E | 1 |
| 28 | C3-7 #18 | MUC | 29.08.2010 | 3428 | 42°02.1420N 133°10.8608E | 1 |
| 33 | C3-4 | S | 28.08.2010 | 3427–3431 | 42°01.5613N 133°09.5741E 42°01.4637N 133°09.7381E | 6 (ZIN 11286) |
| 34 | A7-8 | S | 17.08.2010 | 3345–3357 | 44°00.8877N 137°29.7822E 44°00.7933N 137°30.2780E | 160 |
| 34' | | | | | | |
| 36 | C3-3 | S | 28.08.2010 | 3431–3435 | 42°01.3458N 133°09.7454E 42°01.2359N 133°09.8746E | 12 |
| 37 | A6-7 | S | 16.08.2010 | 2511–2534 | 44°00.2607N 137°31.1584E 44°19.2650N 137°24.1206E | 60 |
| 38 | D1-9 | AGT-20 | 31.08.2010 | ~3550 | 41°28.7198N 131°46.7702E 41°28.6028N 131°46.6796E | 37 |
| 39 | D2-9 | AGT-22 | 01.09.2010 | 2629 | 42°05.9640N 131°19.4615E 42°06.0733N 131°19.4347E | 84 |
| 40 | D2-10 | AGT-23 | 01.09.2010 | 2641 | 42°06.7346N 131°20.4442E 42°06.9080N 131°20.5326E | 88 |

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