



Rediscovery of the sea cucumber “*Toxodora*” *pacifica* Ohshima, 1915 (Echinodermata: Holothuroidea: Apodida)

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Abstract

The apodous holothurian species originally described by Ohshima (1915) as *Toxodora pacifica* has been rediscovered, and its known geographic range extended from Suruga Bay, Japan to the western side of the Yellow Sea, China. As the genus name *Toxodora* is no longer available, a new genus name, *Neotoxodora* Liao, Pawson, and Wei, is proposed. The type material of *Neotoxodora pacifica* is lost, and a Neotype is named for this species.

Key words: *Toxodora*, *Neotoxodora pacifica*, Holothuroidea, Apodida, Yellow Sea

Introduction

A.E. Verrill (1882) described a new genus and species of apodous holothurian, *Toxodora ferruginea*, from off the northeastern coast of the USA. The genus was placed in the Family Chiridotidae, and it was easily distinguished from *Chiridota* Eschscholtz, 1829, because it appeared to lack the characteristic six-spoked *Chiridota* wheels. Théel (1886) adopted an unnecessarily broad interpretation of the genus *Chiridota*, and he referred *Toxodora ferruginea* to the genus *Chiridota*. H.L. Clark (1908) reinstated *Toxodora* as a genus, and reaffirmed his decision some years later (Clark, 1921). Deichmann (1940) discovered, upon further examination of syntype specimens of *Toxodora ferruginea*, that these animals indeed possess typical *Chiridota* wheels in the posterior part of the body; she transferred *ferruginea* to *Chiridota*. Apparently Verrill (1882) had not found the wheels when he described this species. Today, *Toxodora ferruginea* is known as *Chiridota ferruginea* (Verrill), and the genus *Toxodora* is a subjective junior synonym of *Chiridota*.

Ohshima (1915) described *Toxodora pacifica* on the basis of a distinctive single specimen and fragments collected in Suruga Bay, Japan, during the 1906 cruise of the US Fish Commission Steamer *Albatross*. This species was well characterized by Ohshima, and it complied with the original diagnosis of *Toxodora* in lacking wheels from the body wall. Unfortunately, the type specimens of most of the new species described by Ohshima in his 1915 paper are no longer in existence; a few survive, and are deposited in the National Museum of Natural History (NMNH), Smithsonian Institution, in Washington DC, USA. Regrettably, the majority of the type specimens disappeared before they could be added to the collections of the NMNH. As a result, most of the 46 new taxa described by Ohshima are not represented by type material. The unsuccessful search for Ohshima’s type specimens is fully described in O’Loughlin and Ahearn (2005). No type specimens exist for the species *pacifica*. Additional material (one specimen) of what is unquestionably the species *pacifica* has been collected from the Yellow Sea, and it is described below. The specimen is deposited in the Insti-

tute of Oceanology, Chinese Academy of Sciences (IOCAS). The purpose of this paper is threefold: (1) We briefly describe the specimen of *pacifica* collected from the Yellow Sea, (2) we propose the new genus name *Neotoxodora* to replace the now unavailable name *Toxodora*, and (3) in the interest of stability, we propose a Neotype for the species *pacifica*.

Order Apodida

Suborder Synaptina Smirnov, 1998

Family Chiridotidae Östergren, 1898

Subfamily Chiridotinae Östergren, 1898

Remarks: In his discussion of the content of this Subfamily, Smirnov (1998) included three genera. *Chiridota* Eschscholtz, 1829 and *Polycheira* H.L. Clark, 1907 have wheels in the body wall, but *Paradota* Heding, 1935 lacks wheels. *Paradota* differs from *Neotoxodora* (see below) in having 15 tentacles, approximately 12 polian vesicles, and body wall rods of a different type and size, two to three times as long as those of *Neotoxodora*. *Neotoxodora* is a distinctive addition to the Subfamily Chiridotinae.

Neotoxodora, new genus

Diagnosis: Tentacles 12. Polian vesicles six. Wheels absent from body wall; ossicles in body wall exclusively minute, slender rods.

Type species: *Toxodora pacifica* Ohshima, 1915.

Neotoxodora pacifica (Ohshima, 1915)

Figures 1–2.

Toxodora pacifica Ohshima, 1915, page 286, plate 11 fig. 35.

Diagnosis: Large, approximately 150 mm long and 10–14 mm in diameter. Tentacles 12, each with 6 digits of equal size. Body wall with slender rods of average length 59 μm ; rods usually slightly curved.

Material examined: NEOTYPE, IOCAS E 1119, Yellow Sea, 33°30'N, 125°E, 79 meters, 12 January 2003, muddy sand bottom, Peterson grab, 1 specimen.

Description: Body (Fig. 1) cylindrical, 150 mm long and 10–14 mm in diameter. Color in alcohol purplish-gray overall, lighter in relaxed area where body wall is thin and translucent. Color fades to whitish after several months in alcohol. Tentacles 12, more or less contracted, peltato-digitate, each with six equal-sized digits. Anterior part of body contracted, with transverse wrinkles. Calcareous ring conspicuous, strong, rigid, composed of 10 pieces 1.2 mm high, radial pieces notched anteriorly for passage of radial nerves. Polian vesicles six; stone canal single, coiled. Genital tubules branched once or twice near base; genital papilla in mid-dorsal interradius, immediately posterior to tentacle crown. Ciliated funnels few, scattered along midline of left dorsal interradius. Ossicles in body wall (Fig. 2) exclusively minute slender rods 36–68 μm long, average length 59 μm , often with ends incurved and thickened at the middle. Tentacles contain rods similar to those in body wall.

Remarks: There is no doubt that the Yellow Sea specimen should be referred to Ohshima's *Toxodora*

pacifica. In terms of size and color, and other details, they are identical. In his description, Ohshima (1915) noted that the rods in his material were 370–660 μm long; this was clearly a typographical error, confirmed by his illustration of the rods on Plate 11 figure 35, in which, according to his scale, the four rods are 40–56 μm long.



FIGURE 1. *Neotoxodora pacifica* (Ohshima), Neotype specimen.

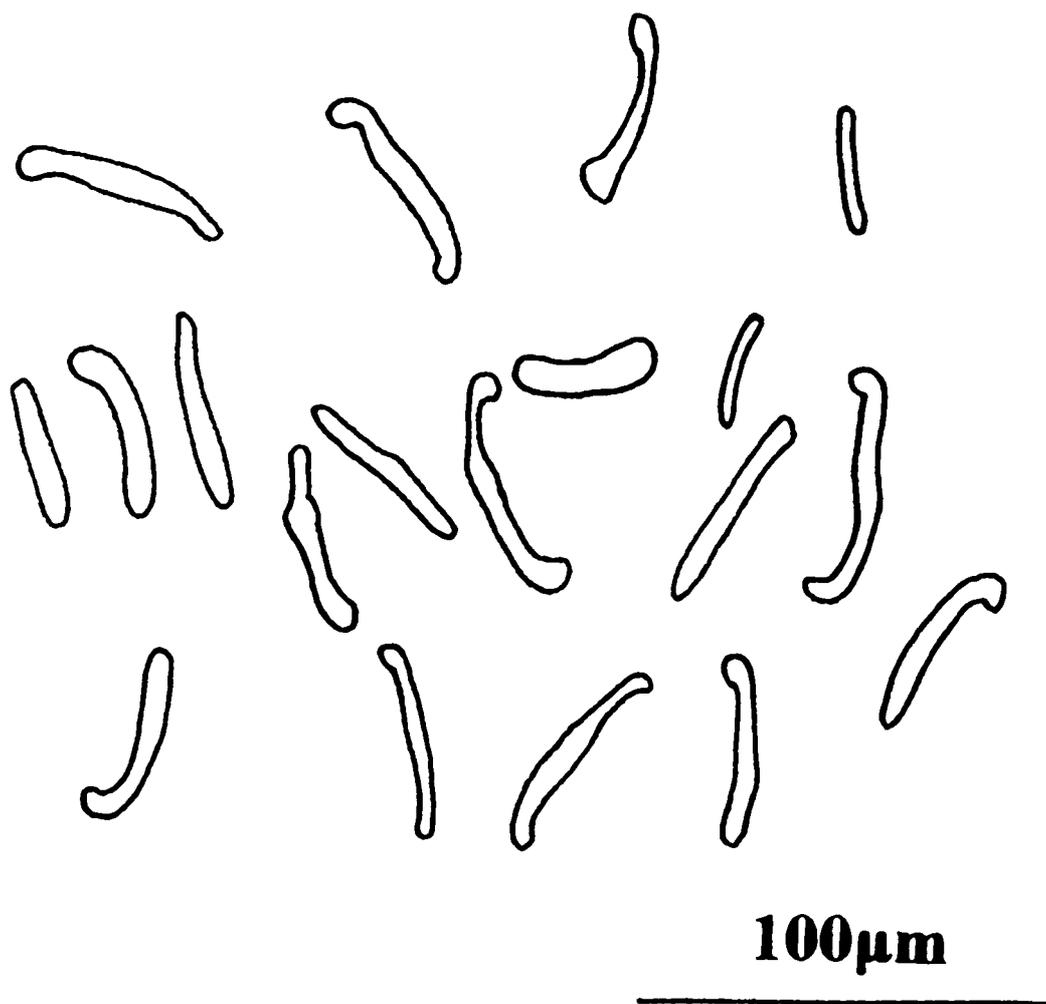


FIGURE 2. *Neotoxodora pacifica* (Ohshima), rods from body wall.

The designation of a neotype for this species is fully in accordance with the requirements in the International Code of Zoological Nomenclature, Article 75 (1999). The original type material is lost, the characters of the neotype are consistent with those described by Ohshima (1915) in his original description of the species, and the neotype locality is not too far removed from the original type locality of *N. pacifica*.

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References

- Clark, H.L. (1908) The apodous holothurians. *Smithsonian Contributions to Knowledge* 35, 1–231.
- Clark, H.L. (1921) The echinoderm fauna of Torres Strait. Papers from the Department of Marine Biology, *Carnegie Institution of Washington*, 10, 1–223.
- Deichmann, E. (1940) Report on the holothurians, collected by the Harvard-Havana Expeditions 1938 and 1939, with a revision of the Molpadonia of the Atlantic Ocean. *Memorias de la Sociedad Cubana de Historia Natural*, 14(3), 183–240.
- International Trust for Zoological Nomenclature (1999) International Code of Zoological Nomenclature, 4th Edition. Natural History Museum, London.
- Ohshima, H. (1915) Report on the holothurians collected by the United States steamer *Albatross* in the northwestern Pacific during the summer of 1906. *Proceedings of the United States National Museum*, 48, 213–291.
- O'Loughlin, P.M. & Ahearn, C. (2005) A review of pygal-furrowed Synallactidae (Echinodermata: Holothuroidea), with new species from the Antarctic, Atlantic, and Pacific Oceans. *Memoirs of Museum Victoria*, 62(2), 147–179.
- Smirnov, A. (1998) On the classification of the apodid holothurians. In: Mooi R. & Telford M. (Ed) *Echinoderms: San Francisco*. A.A. Balkema, Rotterdam, pp 517–522.
- Théel, H. (1886) Report on the Holothuroidea dredged by the H.M.S. *Challenger* during the years 1873–1876, part 2. Report of Scientific Results of the Voyage of H.M.S. *Challenger* 1873–1876. *Zoology*, 14(39), 1–290.
- Verrill, A.E. (1882) Notice of the remarkable marine fauna occupying the outer banks of the northern coast of New England. No. 4. *American Journal of Science and Arts*, 23, 216–222.