

## A new species in the synaptid genus *Patinapta* (Echinodermata: Holothuroidea), from Taiwan

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**Abstract**—The present paper describes a new species *Patinapta taiwaniensis*, collected from Tiau-sue, southern Taiwan. This new species is characterised particularly by the form of the anchor plates which have a well-developed hole each side at the posterior end and few additional posterior holes. It appears most closely related to *P. dumasi* Cherbonnier. The relationship of *P. taiwaniensis* with each of the 5 known species within the genus *Patinapta* is discussed.

### Introduction

In December, 1985, a collection of marine invertebrates was made along the southern coast of Taiwan by a joint team of students from the laboratories of marine biology, National Sun Yat-sen University, and the Institute of Zoology, Academia Sinica. Among the echinoderm collections, were several synaptid holothurians which had been found on the underside of pebbles and in coral sand in the littoral zone of Tiau-sue area. These specimens were recognised as a new species in the genus *Patinapta* Heding, 1928.

### Material and Methods

Holotype ASIZ-50020 and five paratypes, ASIZ-50025, four specimens and AM J20202, one specimen, all from Tiau-sue, southernmost tip of Taiwan (120°45'N, 21°57'E), from the underside of pebbles and in coral sand, upper littoral reef area, April 12th, 1985. This paper describes that new species, type specimens of which are kept in the Institute of Zoology, Academia Sinica (ASIZ), Taiwan, R.O.C. and the Australian Museum (AMJ), Sydney, Australia.

### Systematic Account

Order Apodida  
Family Synaptidae

*Patinapta taiwaniensis* n.sp.

DIAGNOSIS: 12-13 tentacles; numerous (28–36) sensory cups on tentacles; 2 polian vesicles; anchor plates with a large perforation on each side and a few posterior perforations; anterior perforations toothed; anchors 120-160  $\mu$  in length; anchor plates 75-105  $\mu$ m long by 70-90  $\mu$ m wide.

DESCRIPTION: The holotype (ASIZ-50020) measured 150 mm in length and 5 mm in width in life. Four paratypes (ASIZ-50025) measured between 80-120 mm in length and 3-6 mm in width in life (Fig. 1). The fifth paratype (AM J20202) comprises two pieces preserved in alcohol: the anterior end with expanded tentacles, measuring 20 mm long  $\times$  4.5 mm wide, and the second piece, 25 mm long  $\times$  4.5 mm wide.

There are 12-13 digitate tentacles, there being 4-5 pairs of lateral digits and a single terminal digit on each tentacle (Fig. 2A). Sensory cups numerous, 28-36, in a double to triple rowed V-shaped arrangement on the oral side of the tentacle, the V-shaped pattern pointed ventrally towards the disc (Fig. 2B). Eye spots on the disc absent. The calcareous ring delicate, scalloped, with the radial pieces perforated (Fig. 3). The madreporite single and simple, with a looped stone canal. There are two polian vesicles. The ciliated urns occur in a single, but crowded row along a stolon in the left dorsal interradius. The gonad comprises a tangle of slender tubules, which do not appear to be branched.

Spicules of the tentacles comprise smooth, curved, rarely somewhat S-shaped, rods which are either simply bifurcated at each end, or more complexly branched, the branches fused into 1-4 apparent perforations. The rods measured 37-90  $\mu$ m in length and 5-7.5  $\mu$ m in width (Fig. 4E).

Anchors, anchor plates and miliary granules occur in the body wall. Anchors of the body are shorter and thicker in the anterior and (155  $\mu$ m long; fig. 4A), than those in the mid and posterior end (160  $\mu$ m long; figs. 4B, 5A). The flukes bear 2-4 minute teeth (Figs. 4A,B, 5A). The anchor plates irregularly ovoid, sometimes squared off anteriorly (Figs. 4C, 5B). The anterior part of the plate has 1-3 central holes which are surrounded by a ring of up to 6 smaller holes. These holes bear 2-6 spaced teeth, rarely smooth. The posterior part of the plate with two large holes, smooth, one on each side, with a smaller pear-shaped hole in between, and additional 2-6 tiny holes behind them. The large, lateral holes may be divided by the development of bar-like structures across them. There is, however, no development of a posterior bridge. The rim of the plates is smooth, rarely a few teeth may occur laterally. The anterior plates are larger (up to 105  $\mu$ m long  $\times$  70  $\mu$ m wide) than those from the posterior region (up to 80  $\mu$ m long  $\times$  55  $\mu$ m wide) (Figs. 4A,B,C, 5B). The shape of the miliary granules ranged from the simply cheloid to rather rod-like measuring 20-60  $\mu$ m in length (Fig. 4D).

Body colour in life white, more or less transparent, five longitudinal muscle bands being visible through the body wall. After preservation in alcohol the body wall becomes opaque and yellowish.

ECOLOGY: *P. taiwaniensis* occurs under pebbles in coral sand from the upper intertidal reef area. Their intestine contains coral sand. At the time of collection (December 4th, 1985) water temperature was 25.5°C and salinity 34.5‰ at the collecting site.

ETYMOLOGY: This species is named for the island of Taiwan.

REMARKS: There have been 5 species of *Patinapta* reported in the Indo-west Pacific

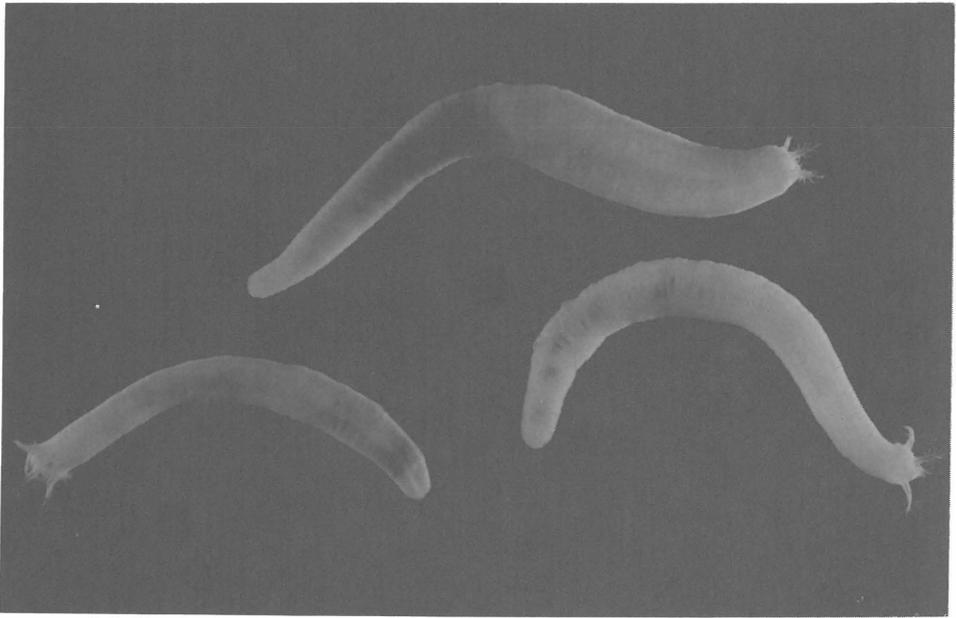


Fig. 1. Three paratype specimens of *Patinapta taiwaniensis* sp. nov., (x 4).

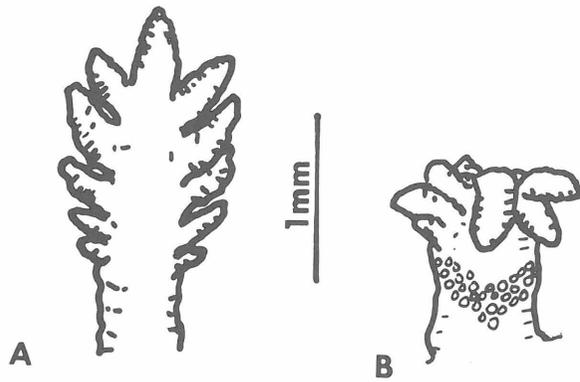


Fig. 2. Tentacles of *Patinapta taiwaniensis*.

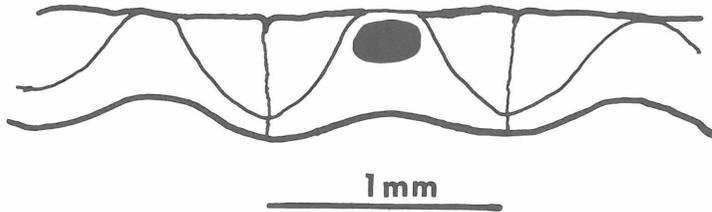


Fig. 3. Calcareous ring of *Patinapta taiwaniensis*.

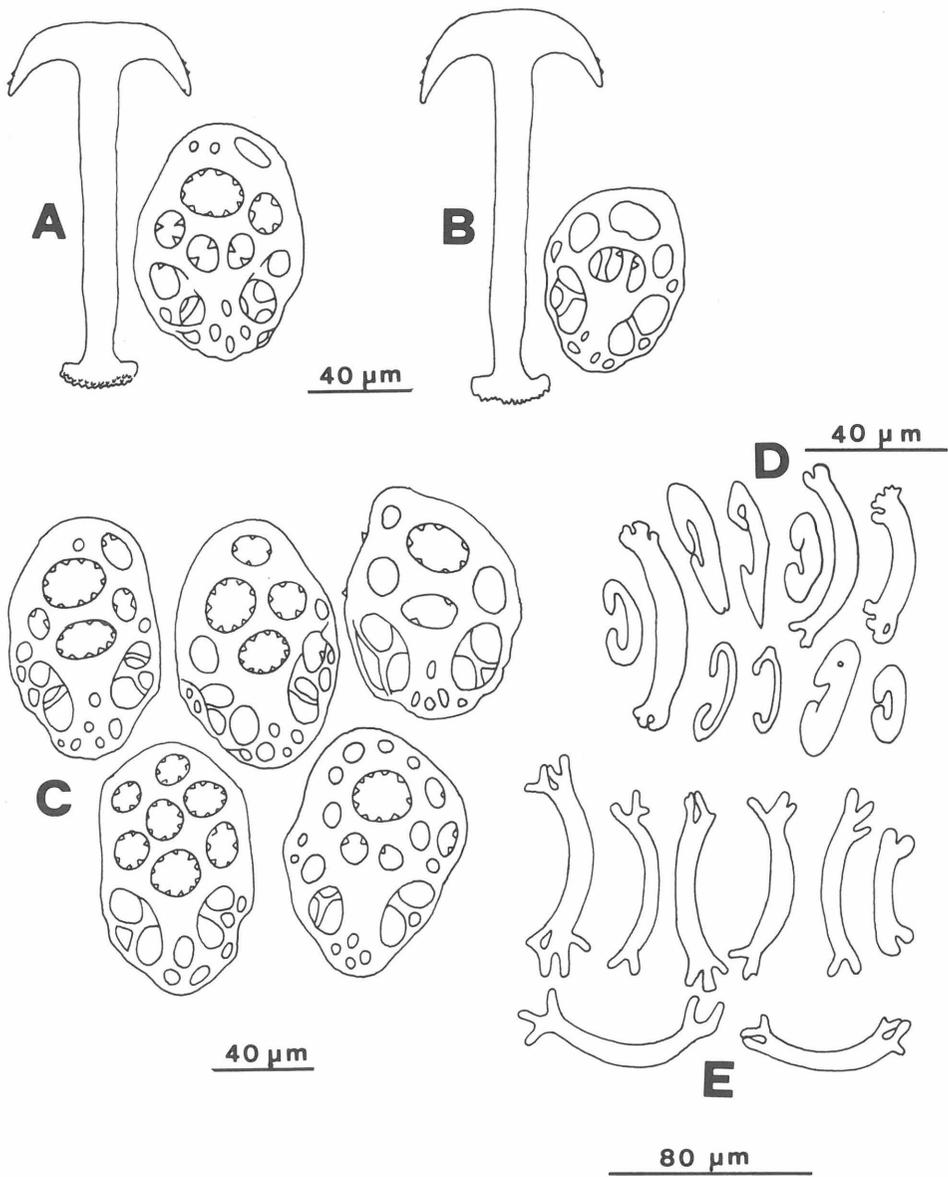


Fig. 4. Spicules of *Patinapta taiwaniensis*. A and C, from the anterior body region; B, from the posterior body region; D, miliary granules and rods from the body wall; E, rods from the tentacles.

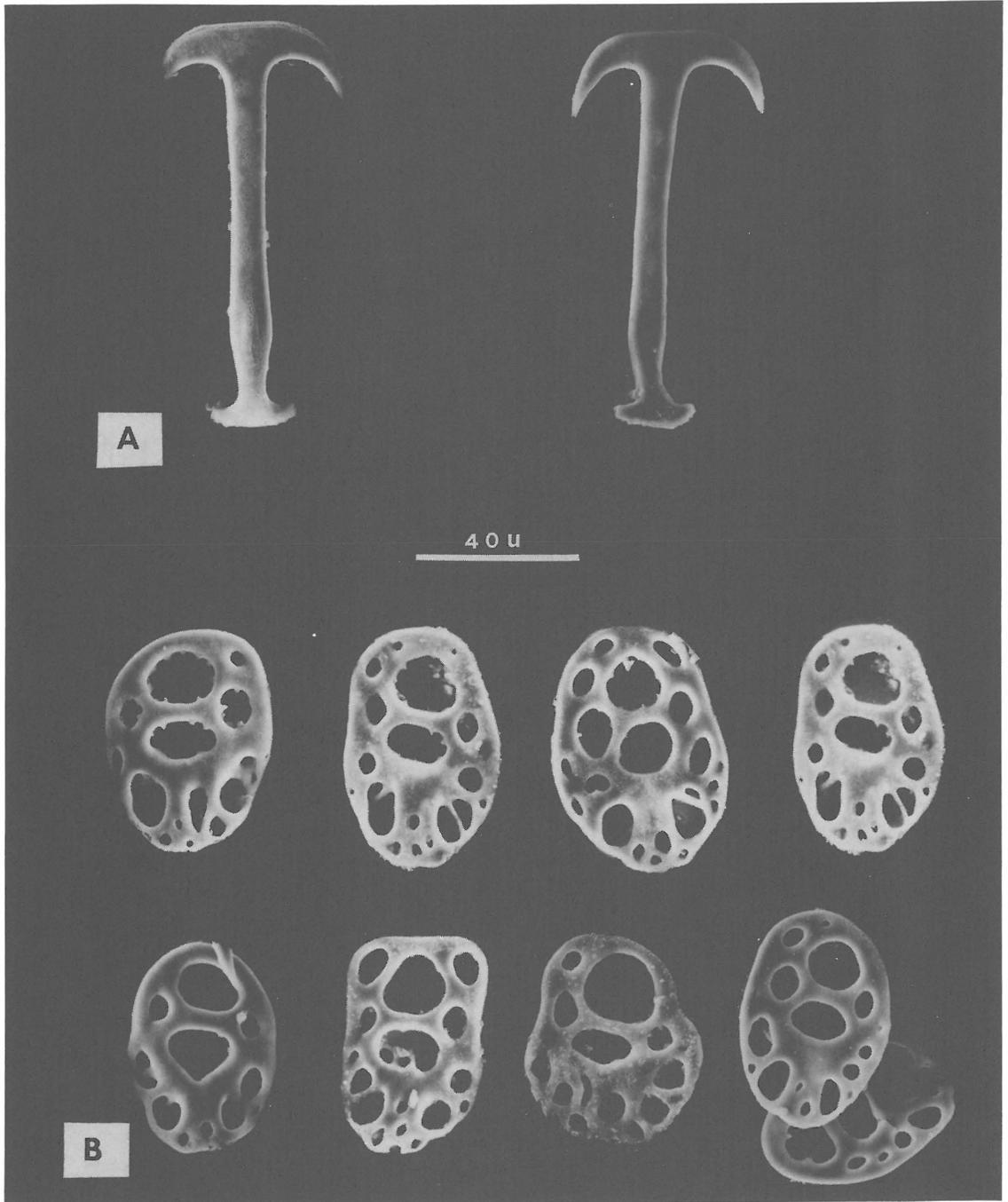


Fig. 5. Scanning electron micrographs of anchors (A) and plates (B).

area, namely: *P. ooplax* (von Marenzeller, 1882), *P. laevis* (Bedford, 1899), *P. crosslandi* Heding 1929, *P. vaughani* Cherbonnier, 1953 and *P. dumasi* Cherbonnier, 1955 (Clark and Rowe, 1971). *Leptosynapta steinitzi* from the Red Sea described by Cherbonnier (1967) is a synonym of *P. dumasi* (F.W.E. Rowe, unpubl.).

*P. vaughani* differs from all other species in the genus, including *P. taiwaniensis* by having fewer tentacles (10) and digits (5).

The present new species has 12-13 tentacles and 9-11 digits compared with 12 tentacles and 15 digits in *P. crosslandi*, 11-12 tentacles and 6-9 digits in *P. dumasi*; 12 tentacles and 9-11 digits in *P. ooplax* and 12 tentacles and 9-11 digits in *P. laevis*.

Sensory cups numerous (28-36) and arranged in V shape in *P. taiwaniensis* compared with the rest of the species (*P. vaughani*: 2-10, *P. crosslandi*: 0-14, *P. dumasi* and *P. ooplax*: 0-10, *P. laevis*: 6-12).

*P. taiwaniensis* possesses 2 polian vesicles compared with 1 in *P. vaughani* and *P. crosslandi*, 1-8 in *P. dumasi* and 2-8 in *P. ooplax* and *P. laevis*.

The most distinctive difference between *P. taiwaniensis* and its congeners lies in the form of the anchor plates, which have a well developed hole each side at the posterior end of the plates and few additional posterior holes. These plates appear most similar to those figures by Cherbonnier (1955) for *P. dumasi*. However, the arrangement of posterior perforations in *P. taiwaniensis* does not leave such an expanse of unperforated plate in this region as occurs in *dumasi*. The greater number of small perforations in the posterior portion of the anchor plates, which also lack the large lateral holes of *P. taiwaniensis* serves to distinguish the other species of the genus from the new species.

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