

**STUDIES ON INDIAN ECHINODERMS-6. REDESCRIPTION  
OF TWO LITTLE KNOWN HOLOTHURIANS WITH A NOTE ON  
AN EARLY JUVENILE OF *HOLOTHURIA SCABRA* JAEGER FROM  
THE INDIAN SEAS**

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**ABSTRACT**

A detailed description of two little known holothurians viz., *Havelockia versicolor* (Semper) and *Pseudocolochirus violaceus* (Theel) are given with notes on their synonymy. Notes on early juvenile of *Holothuria scabra* Jaeger is also given at the end of the paper.

**INTRODUCTION**

DURING the course of his studies on Indian Echinoderms the author came across two little known holothurians which are described in detail below. An early juvenile of *Holothuria scabra* Jaeger which is hitherto not described is also included in the paper.

The author is thankful to Dr. David L. Pawson of U.S. National Museum and to late Dr. Elizabeth Deichmann of the Museum of Comparative Zoology, Harvard for many helpful suggestions; and to Dr. A. P. Kapur, former Director, Zoological Survey of India and Dr. S. T. Satyamurty, former Director, Government Museum for kindly allowing him to examine the collections in their Institutions.

***Havelockia versicolor* (Semper) (Pl. I A)**

*Thyone versicolor* Semper, 1868 : 14.

*Thyone mirabilis* Ludwig, 1874 : 17; Lampert, 1885 : 162; Sluiter, 1901 : 93; Erwe, 1913 : 362.

*Thyone mirabilis*? Bell, 1884 : 149.

*Thyone* (?) *calcareo* Pearson, 1903 : 194.

*Havelockia herdmant* Pearson, 1903 : 197; Koehler and Vaney, 1908 : 25; Panning, 1949 : 466.

*Cucumaria areolata* Ekman, 1918 : 35.

*Pentathyone mirabilis* H. L. Clark, 1938 : 459; H. L. Clark, 1946 : 396; Panning, 1949 : 459.

*Pentathyone versicolor* Panning, 1949 : 460.

*Thyone herdmant* James, 1969 : 60.

*Havelockia versicolor* A. M. Clark and Rowe, 1971 : 180.

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**Material examined :** Two specimens 31 and 130 mm in length from Mandapam (Gulf of Mannar); One specimen 45 mm in length and labelled as *Thyone mirabilis* in the Madras Museum and another specimen 70 mm in length and labelled as *Havelockia herdmani* in the Indian Museum.

**Description :** Body is more or less quadrangular with posterior end narrow and pentagonal. In a 130 mm specimen papillae are arranged in three more or less distinct bands; in each band there are six to eight small papillae arranged side by side. Bases of papillae are broad and triangular. Interambulacral bands on either side of central ambulacral band are conspicuous and more or less free from ambulacral appendages. Ventral side has two bands of pedicels which are arranged very close to each other. Interambulacral space between two ambulacral bands is narrow and inconspicuous. There are 10-14 pedicels arranged side by side on each ambulacral band. Pedicels and papillae extend to tip of body. Anus is surrounded by five small anal papillae. Introvert is fairly well developed and has ten tentacles of which ventral two are small. Calcareous ring consists of five radials and five interradials. Each radial piece is 13 mm long and 3 mm wide in a specimen of 130 mm length with narrow bifid anterior end. Posterior prolongations of radials are composed of two pieces. Each interradial piece is more or less rectangular with a projection at anterior end. There is a single stone canal and a single polian vesicle. Retractor muscles are well developed. Gonadial tubules are arranged in a bunch at middle of body. Respiratory trees are present.

Spicules consist of tables, perforated plates, supporting plates, rosettes, rods and end plates.

**Tables :** Tables (Fig. 1 a, b, c) are present in body wall, pedicels and papillae. Tables have two pillars and end in four points and those present in pedicels and papillae have elongated bases. Height of tables varies from 0.038 to 0.10 mm.

**Perforated plates :** Perforated plates (Fig. 1 a, b, c) are found in body wall, pedicels and papillae. They are of two types. Some of them have four holes and others have numerous holes. Four holed plates are found in deeper layer of skin. Their size varies from 0.031 to 0.078 mm. Irregular plates are found in pedicels and papillae. Their size varies from 0.049 to 0.175 mm.

**Supporting plates :** Supporting plates (Fig. 1 b, c) are found in pedicels. They are fusiform with four large holes at centre and with a small hole at either end. Length of the plates is c 0.175 mm and breadth c 0.047 mm.

**Rosettes :** Rosettes (Fig. 1 d, e) are found in introvert and in tentacles; rosettes found in tentacles are long and narrow with either end slightly expanded; size of the rosettes from tentacles varies from 0.042 to 0.073 mm. Rosettes of introvert are short and some of them are almost circular in outline, and their size varies from 0.021 to 0.049 mm.

**Rods :** Rods (Fig. 1 e) are found only in tentacles; they have a smooth margin and ends are often expanded with one or two holes; length of rods varies from 0.038 to 0.059 mm.

**End plates :** End plates are found at end of pedicels; they are more or less circular in outline with small holes at centre and larger ones at margin; size of end plates varies from 0.235 to 0.345 mm.

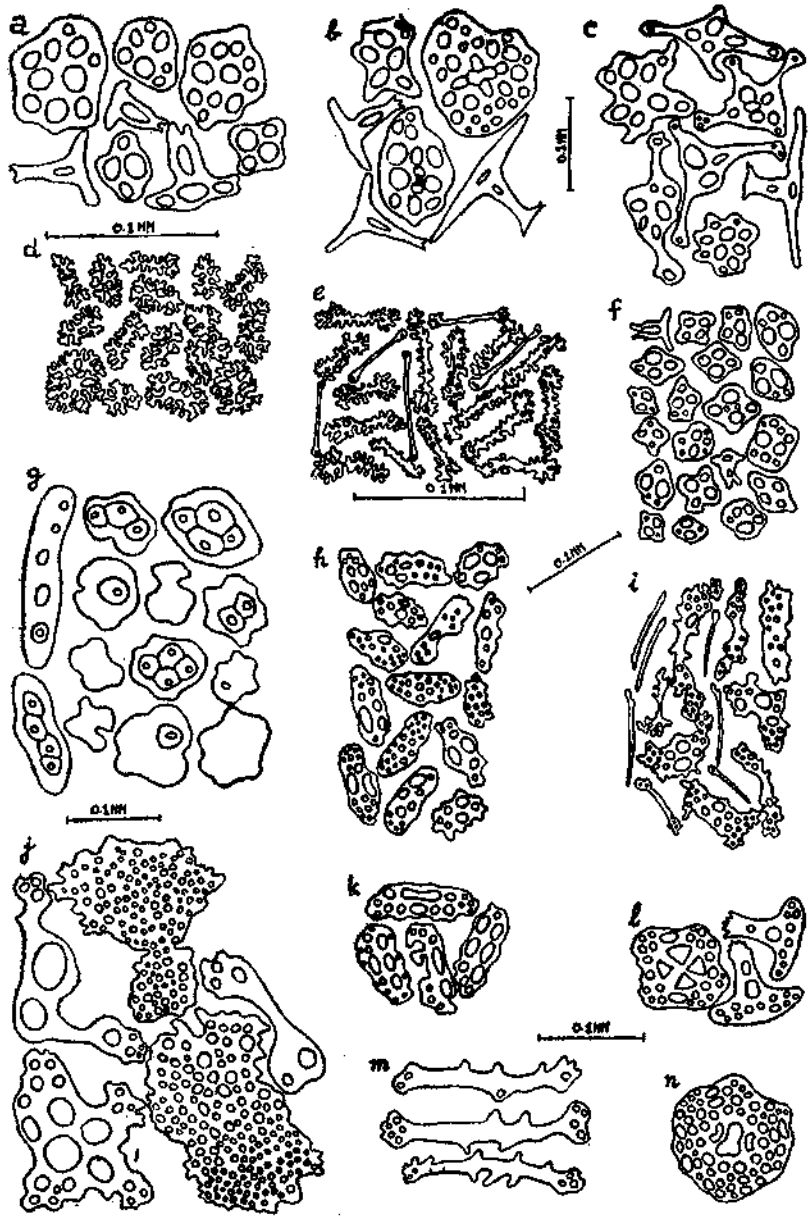


FIG. 1. a-f. *Havelockia versicolor* (Semper). a. spicules from skin free from pedicels and papillae, b. spicules from papillae, c. spicules from pedicels, d. spicules from introvert, e. spicules from tentacles, f. spicules from a specimen labelled as '*Thyone mirabilis*' in the Madras Museum; g-j. *Pseudocolochirus violaceus* (Theel)—g. spicules from ambulacral band, h. spicules from introvert, i. spicules from tentacles, j. spicules from tubefeet, k-n. *Holothuria scabra* Jaeger—k. buttons, l. tables, m. supporting plates, and n. end plate.

*Remarks*: Ludwig (1874) described a new species of holothurian namely *Thyone mirabilis* from Queensland. He, however, overlooked the description of *T. versicolor* reported earlier from Philippines. After studying the descriptions of the two species and studying a specimen labelled as *T. mirabilis* by Dr. F. H. Gravely in the Madras Museum it is clear that *T. mirabilis* is a synonym of *T. versicolor*. The above specimen labelled as *T. mirabilis* in the Madras Museum was preserved in formalin for a long time and later on transferred to rectified spirit and hence only four-holed plates, a few tables and supporting plates were seen. The four-holed plates appear to be present in the deeper layer of the skin which is free from the pedicels and papillae. Four-holed plates of the type found in the Madras Museum specimen were also found in the skin of *Havelockia versicolor* which is free from pedicels and papillae. It is probable that the spicules of pedicels and papillae which were exposed to the outside in the Madras Museum specimen have been dissolved by formalin and this accounts for the fewer number of tables, supporting plates and perforated plates. The spicules of the specimen '*T. mirabilis*' in the Madras Museum and *H. versicolor* collected from Mandapam are given for comparison (Fig. 1 a, f).

Pearson (1903) reported *Thyone* (?) *calcareo* as a new species from Ceylon. The description of the specimen and the two spicules figured by him agree very well with *H. versicolor*.

Pearson (*op. cit.*) while reporting on the holothurians of Ceylon came across a quadrangular holothurian with long posterior prolongations on the radials and with two pillard tables. He rightly created a new genus namely *Havelockia*, but unfortunately overlooked the description of *T. versicolor* and described his species as a new species *H. herdmani*. *Havelockia herdmani* has been reported by Koehler and Vaney (1908) based on the collections made by R.I.M.S. Investigator. This specimen was also examined by the author at the Indian Museum. In this paper *Havelockia herdmani* is considered as a synonym of *T. versicolor* since the description of *H. herdmani* agrees very well with the description of *H. versicolor*.

H. L. Clark (1938) clearly overlooked the diagnosis of Pearson (*op. cit.*) for the genus *Havelockia* and created a new genus *Pentathyone* with *T. mirabilis* as type species. The generic diagnoses given by H. L. Clark for *Pentathyone* agrees very well with the diagnosis for *Havelockia* given by Pearson and hence *Pentathyone* is considered a synonym of *Havelockia*. This view has also been expressed by Panning (1949) in his work on Cucumariidae.

*Cucumaria areolata* described by Ekman (1918) from Western Australia has already been referred to the synonymy of *Pentathyone mirabilis* by H. L. Clark (1938). In this paper *P. mirabilis* is considered as a synonym of *Havelockia versicolor*.

Likewise the specimen listed as *Thyone herdmani* by the author in his catalogue of the Echinoderms of the Reference Collections of the Central Marine Fisheries Research Institute should be referred to the synonymy of *H. versicolor*.

There appears to be marked diversity in the colour of the species. Pearson's preserved specimen was brown with dark streaks of violet along the middle of each side. The larger specimen collected by the author at Mandapam was ash-coloured with dark streaks of bluish-violet along the middle of each side. H. L. Clark has examined a number of specimens in the living condition and stated that the body colour may be creamy-white to brown, yellowish-brown, greenish cast to deep purple

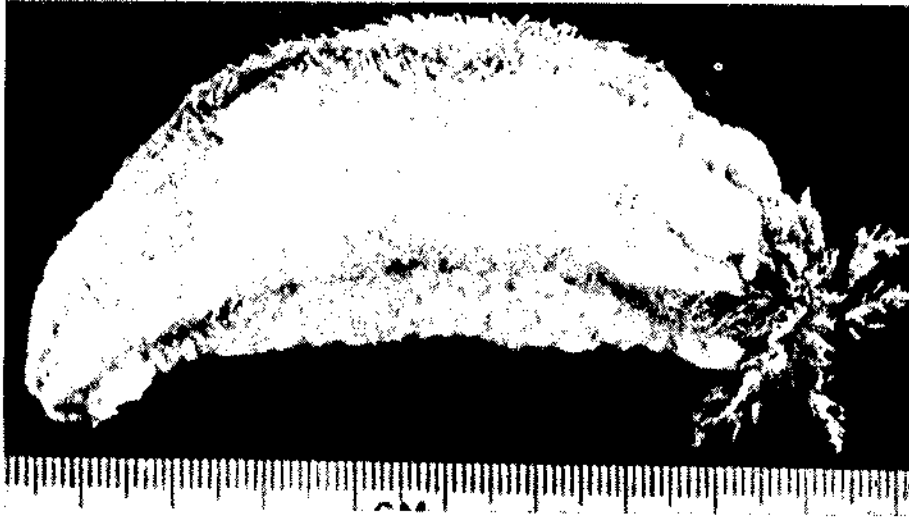


PLATE I. Top - *Havelockia versicolor* (Semper); and Bottom - *Pseudocolochirus violaceus* (Theel).

or almost black. The introvert is yellowish or greenish-white, the tentacles are white speckled with black and the pedicels and the tips of the papillae are bright red, reddish-brown or deep purplish brown.

*Distribution* : East Africa ; Ceylon (Gulf of Mannar) ; Palk Bay ; Malacca Strait ; East Indies ; North Australia ; Western Australia ; Philippines.

***Pseudocolochirus violaceus* (Théel) (Pl. I B)**

*Colochirus violaceus* Théel, 1882 : 78 ; Koehler and Vaney, 1908 : 24.

*Cucumaria tricolor* Pearson, 1903 : 188. (Non *Cucumaria tricolor* Sluiter, 1901 : 81).

*Pseudocolochirus violaceus* Pearson, 1910 : 172 ; James, 1969 : 60 ; A. M. Clark and Rowe, 1971 : 180.

*Material* : Three specimens from Mandapam (Gulf of Mannar) CMFRI-E. 137 ; one specimen off Kalingapatnam (19° 15' N, 84° 50' E), 20-34 metres in depth ; three specimens from Ganjam Coast (I.M. reg. No. ZEV 3521-24/7) from the collections of the Indian Museum, Calcutta.

*Description* : Specimens are barrel-shaped with trivium longer than bivium. On preservation specimens become curved and appear to have mouth and anus on dorsal side. In well narcotised and fully expanded specimens anus is seen on ventral side.

Tubefeet on trivium are thickly distributed with pedicels 6 to 8 in number at broadest part of ambulacral band and are arranged side by side in transverse rows. Ambulacral bands on trivium are almost bare except for a few tubefeet distributed here and there with a maximum number of three in a row. Distribution of tubefeet commences at one-third distance from anterior end. Interambulacral areas are smooth and free from tubefeet.

Calcareous ring consist of ten pieces, five radials and five interradials which have no posterior prolongations. Radials are much longer than interradials, each of them ending with a notch at anterior end. Surrounding mouth there are ten thickly branched tentacles of which ventral two are small. There is a single stone canal and a single polian vesicle. Two respiratory trees are of equal size and are richly branched. Anus is armed with five calcareous papillae.

Following types of spicules are found in different parts of body. Wide interambulacral regions of body are singularly free from spicules of any kind.

*Ambulacral band spicules* (Fig. 1 g) : Two types of plates irregular and linear are present at base of tubefeet. The spicules are arranged in a rather crowded manner. The irregular type of plates have 0 to 7 holes (the usual number varying from 1 to 4) some of which possess a circular line round them. Peculiar 'ring lines' may be stages in breakdown of spicules (Deichmann, personal communication). Length of spicules varies from 0.115 to 0.171 mm and breadth from 0.035 to 0.045 mm.

*Introvert spicules* (Fig. 1 h) : Spicules of introvert are more or less oval in shape with numerous holes. Length of plates varies from 0.770 to 0.940 mm and the breadth from 0.017 to 0.045 mm.

*Tentacle spicules* (Fig. 1 i): Tentacles have both irregular perforated rods and slender rods. Length of perforated rods varies from 0.078 to 0.565 mm and breadth varies from 0.016 to 0.031 mm. Slender rods are present in finest branches of tentacles with pointed ends or with a small hole at one or both ends. Length of slender rods varies from 0.049 to 0.081 mm.

*Tubefeet spicules* (Fig. 1 j): Tubefeet have both supporting rods and perforated plates which are large and irregular with numerous perforations. Length of supporting rods varies from 0.081 to 0.369 mm and breadth from 0.031 to 0.129 mm. Length of perforated plates varies from 0.157 to 0.329 mm and breadth from 0.094 to 0.282 mm.

Colour of specimens is very striking with interambulacral and introvert deep purple. Ambulacral bands and tubefeet are deep yellow in colour.

*Remarks*: *Pseudocolochirus violaceus* was first reported by Theel (1882) under the name *Colochirus violaceus* from the vicinity of Philippines. Pearson (1903) described a small holothurian as *Cucumaria tricolor* from the Gulf of Mannar which agrees in colour pattern and other anatomical details with *Pseudocolochirus violaceus*. The author has also collected *P. violaceus* from the Gulf of Mannar. The specimen described by Pearson as *Cucumaria tricolor* differs from *C. tricolor* Sluiter in the pattern of colour and nature of spicules.

There seems to be some confusion with regard to the author of the genus *Pseudocolochirus*. Pearson (1910) described *Pseudocolochirus* as a new genus and described *P. violaceus*. H. L. Clark (1938) has stated that the name of the new genus *Pseudocolochirus* did not appear in Zoological records till the volume for 1930. Deichmann (1930) in her monograph on the holothurians of the western Atlantic published *Pseudocolochirus* as a *genus novis*. Presumably because of this Panning (1949) and A. M. Clark and Rowe (1971) give Deichmann as the author of the genus *Pseudocolochirus*. H. L. Clark (1938, 1946) and the present author consider Pearson as the author of the genus.

Two specimens of this species were kept in an aquarium tank at Mandapam alive for more than three months. In the living condition they often attach themselves to the corners of the tank with the tentacles with drawn into the body. Sometimes they were seen with all the tentacles extended out from the introvert evidently to gather the planktonic organisms in the water. At the slightest disturbance the tentacles retract into the body.

One of the specimens collected from Mandapam had a small crab in the cloaca belonging to the genus *Pinnotheres*.

*Distribution*: Mandapam (Gulf of Mannar); Ceylon; off Kalingapatnam; coast of Ganjam; East Indies; North Australia; Philippines; coast of Vietnam.

#### NOTES ON AN EARLY JUVENILE HOLOTHURIAN, *HOLOTHURIA SCABRA* JAEGER FROM MANDAPAM (PALK BAY)

A study of the juvenile holothurians is very important to understand the breeding activity and reproductive cycles. *Holothuria scabra* Jaeger is the most important holothurian commercially from Palk Bay and Gulf of Mannar. So far as the author is aware there is no description of an early juvenile of *Holothuria scabra* Jaeger and hence the same is given here.

A single specimen of *H. scabra* of 30 mm length was collected along with algae on 9-4-70 from the Palk Bay near Mandapam. The specimen was tubular in shape with pedicels and papillae scattered over the body without any definite arrangement. Small peltate tentacles were seen at the anterior end of the holothurian. The spicules of the juvenile holothurian differs greatly from the adult. The buttons (Fig. 1 k) have 3-8 holes on each side. The number of holes is not equal on each side and some of the buttons are knobbed. The Tables (Fig. 1 l) are of medium height with transverse bar for each spire. The bases of the tables are roughly square-shaped with numerous holes near the margin. The supporting rods (Fig. 1 m) are found in the pedicels and papillae. They are elongated with expanded ends having a few holes. The end plates (Fig. 1 n) found in the pedicels are more or less circular in outline with numerous holes. Small holes are usually found near the margin.

The specimen was uniformly ash-coloured. The characteristic yellow markings found in the adult were absent.

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