



## New records of the seacucumbers *Holothuria (Semperothuria) imitans* Ludwig and *Stichopus herrmanni* Semper (Echinodermata: Holothuroidea) from the southwestern coast of India

R.P. Deepa<sup>1</sup> & A. Biju Kumar<sup>2</sup>

<sup>1</sup> Department of Zoology, N.S.S. College, Pandalam, Kerala 689501, India

<sup>2</sup> Department of Aquatic Biology and Fisheries, University of Kerala, Thiruvananthapuram, Kerala 695581, India

Email: <sup>1</sup> deepakudassanad@rediffmail.com, <sup>2</sup> abiju@rediffmail.com (corresponding author)

One of the five extant classes of echinoderms, the Holothuroidea represent a highly diverse group with about 1,400 species of seacucumbers recorded from oceans around the world, from the intertidal and shallow seas to abyssal depths (Pawson 2007). Of the 763 species of echinoderms recorded from India, 160 species classified under 14 families and 62 genera are represented by holothurians (Venkataraman & Wafar 2005). In many parts of the world several species of holothuroids are commercially fished and heavily overexploited for food, and many species are ideal sources of bioactive compounds. Detailed studies are warranted on holothurians primarily due to their prominent role in marine ecosystems. Despite their inclusion in Schedule I of the Wildlife (Protection) Act of India, information about their distribution in the southwestern coast of India is scanty (James 2007; Sastry 2007). During a biodiversity survey along the Kerala coast we found two species of holothurians, *Holothuria (Semperothuria) imitans* Ludwig and *Stichopus herrmanni* Semper. A perusal of the literature found no previous record of these species from the southwestern coast of India.

Date of publication (online): 26 February 2010

Date of publication (print): 26 February 2010

ISSN 0974-7907 (online) | 0974-7893 (print)

Editor: Yves Samyn

### Manuscript details:

Ms # o2323

Received 23 September 2009

Final received 07 December 2009

Finally accepted 08 February 2010

**Citation:** Deepa, R.P. & A.B. Kumar (2010). New records of the seacucumbers *Holothuria (Semperothuria) imitans* Ludwig and *Stichopus herrmanni* Semper (Echinodermata: Holothuroidea) from the southwestern coast of India. *Journal of Threatened Taxa* 2(2): 712-715.

**Copyright:** © R.P. Deepa & A. Biju Kumar 2010. Creative Commons Attribution 3.0 Unported License. JoTT allows unrestricted use of this article in any medium for non-profit purposes, reproduction and distribution by providing adequate credit to the authors and the source of publication.

**Acknowledgements:** The authors acknowledge the financial support of Kerala State Council for Science, Technology and Environment for carrying out the study. Thanks are due to Dr. D.B. James, Senior Scientist (Retd.), Central Marine Fisheries Research Institute for confirming the identity of species and for valuable suggestions on the manuscript. The authors also thank the anonymous referees for their critical suggestions which helped improving the text considerably.

### 1. *Holothuria (Semperothuria) imitans* Ludwig, 1875 (Images 1,2 & Figs. 1 A-I):

**Materials examined:** Eight specimens, 40-120mm in length from Vizhinjam coast (8°22'N & 76°59'E), Lakshadweep Sea; collected by divers from the rocky hard bottom at 2-3m depth. The reference vouchers are deposited at the museum collections of Department of Aquatic Biology and Fisheries, University of Kerala, Reg.nos. AQB ECH HO 01-08.

**Description:** Colour in life yellow to yellowish-brown and in alcohol light brown. Body elongated and cylindrical with distinct anterior and posterior ends (Image 1). Podia scattered as small black warts on dorsal surface. Ventral surface well demarcated with thick arrangement of pedicels (Image 2) in three rows, clearly visible even in preserved specimen. Mouth ventral, surrounded by 20 grey-coloured tentacles. Anus large, without anal teeth. Body wall thick, leathery and body circular in cross-section. Two respiratory trees and a single tuft of gonadial tubules attached to the left side of dorsal mesentery.

Calcareous ring well developed; radial plates 1.5 times longer and 2 times wider than interradial ones; posterior side of radial plates convex; anterior side with well marked notch; interradial plates with posterior side undulating; anterior side with one anterior tooth (Fig. 1A). Stone canal absent.

Ossicles of dorsal and ventral body wall comprise of tables. Tables of ventral surface slightly shorter (33-40µm long) (Fig. 1D) than dorsal surface (30-44µm long) (Fig. 1B, 1C). Tables supported by four pillars. The disc of the table (24-29µm across) with four lateral holes surrounding a large central hole. Crown with eight short spines, the pairs of spines on each pillar lie closer. Tube feet with elongated rods of length 86-190µm (Fig. 1E), tables (25-38µm long) with the disk width 19-22µm (Fig. 1F, 1G) and large perforated plates of width up to 200µm (Fig. 1I). The rods perforated, resembles large buttons with holes arranged in pairs along central axis. The margin of rods rough, with small knobs. Tentacles with elongated unbranched and slightly curved rods up to 36-110µm long (Fig. 1H) with spinous ends.

**Remarks:** First described by Ludwig (1875) from Samoa, *H. imitans* is also recorded from eastern Indian Ocean (Clark & Rowe 1971; James 1986). From the Indian coast it was collected from the Gulf of Mannar (Venkataraman et al. 2002). This is the first report of this species from the southwestern coast of India (western Indian Ocean) and shows the extended distribution of *H. imitans*.

### 2. *Stichopus herrmanni* Semper, 1868 (Images 3, 4; Figs. 2 A-Q):

**Materials examined:** Two specimens of 160 and 185mm length from Vizhinjam coast (8°22'N & 76°59'E), collected by divers from the sandy bottom at 4m depth. The voucher specimens are deposited at the Department of Aquatic Biology and Fisheries, University of Kerala, Reg.nos. AQB ECH HO 09-10.

**Description:** Body colour in live yellowish-green, mottled with small dark black spots on the dorsal surface (Image 3); materials in ethanol light brown. Dorsal papillae grey with their tips brown coloured. Ventral side pale yellow with tube feet of same colour. Body firm and rigid. Irregular and conspicuous conical warts in bivium arranged in eight rows; smaller papillae disbursed in between the conical papillae.



Image 1. *Holothuria (Semperothuria) imitans* - Dorsal View



Image 2. *Holothuria (Semperothuria) imitans* - Dorso-lateral view

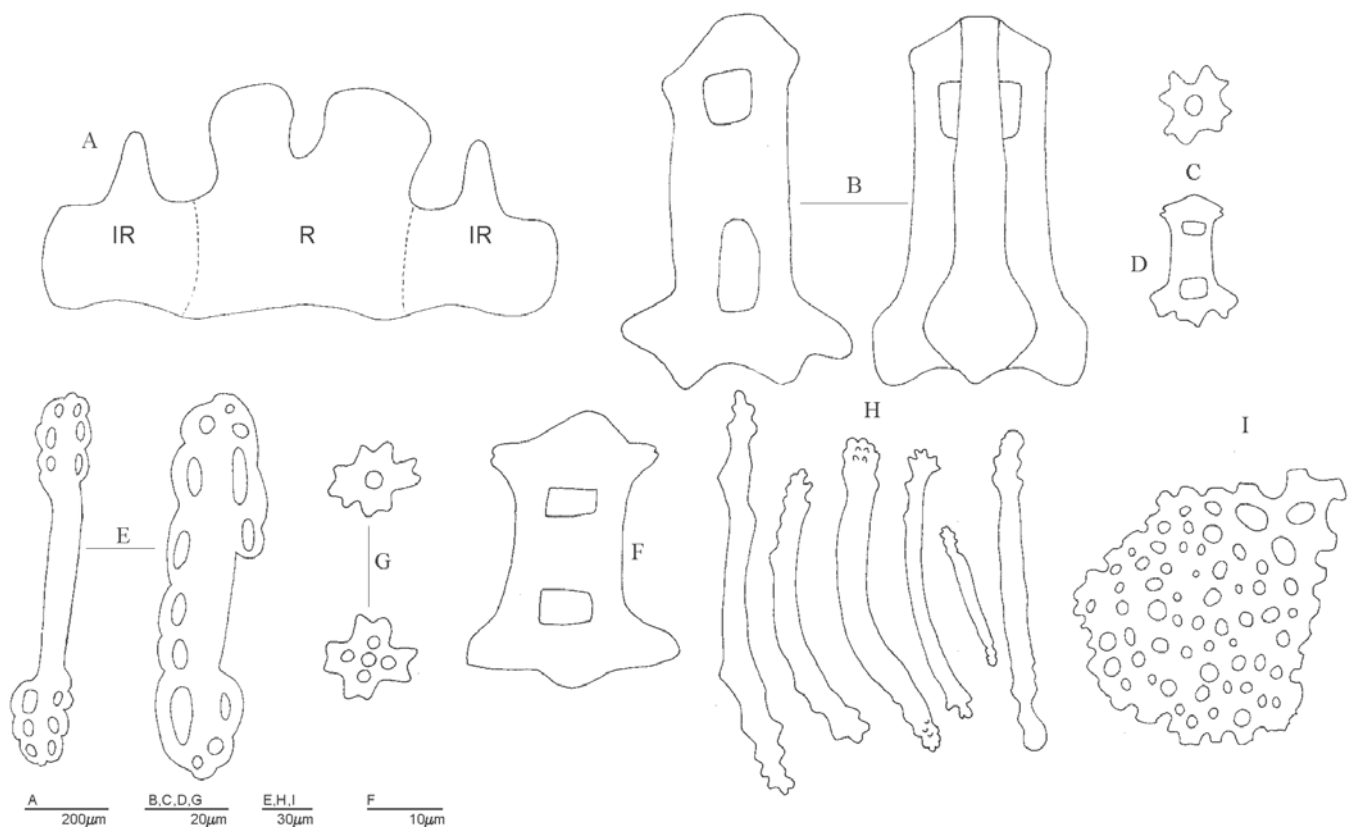


Figure 1 A-I. *Holothuria (Semperothuria imitans)* - Ossicles

A - Calcareous ring; B, C - Tables from dorsal body wall; D - Table from ventral body wall; E - Rods from tube feet; F, G - Tables from tube feet; H - Rods from tentacles; I - Perforated plate from tube feet; R - Radial plate; IR - Interradial plate

Trivium flat and with pedicels arranged in three bands along the radii (Image 4). Mouth ventral, surrounded by a circle of conical papillae and twenty peltate yellowish tentacles. Long tentacular ampullae about one-sixth of body length. A single contracted polian vesicle and one stone canal ending in madreporic plate. Anus terminal. Cuvierian tubules absent. Calcareous ring with deeply indented radial pieces and small interradials. Radials 1.5 times larger than interradials (Fig. 2A). A deep notch at the rear of the radial plates.

Dorsal body wall with small to large 'C' shaped rods with size ranging from 75- 175µm long (Fig. 2B). Rosettes of length

ranging from 18-37µm (Fig. 2C) and tables with length up to 40µm (Fig. 2E). Tables supported by four pillars with rounded disc; four central and 12-14 marginal holes. The tower is of moderate length, with a broad crown bearing 8-12 spines. 'C' shaped rods occur in cluster. 'S' shaped rods (165µm long) (Fig. 2D) and 'x' shaped rods (88µm long) (Fig. 2F) random. Ventral body wall consists of tables (38- 44µm long) (Fig. 2G, 2H), rosettes (31-40µm long) (Fig. 2I) and 'C' shaped rods (156µm long) (Fig. 2J). Tube feet on ventral side with tables of length between 36-50µm (Fig. 2K, 2L), rods of length 73-98µm (Fig. 2N) and large perforated plates (Fig. 2M). Tables with



Image 3. *Stichopus herrmanni* - Dorsal View



Image 4. *Stichopus herrmanni* - Ventral view showing three rows of pedicels

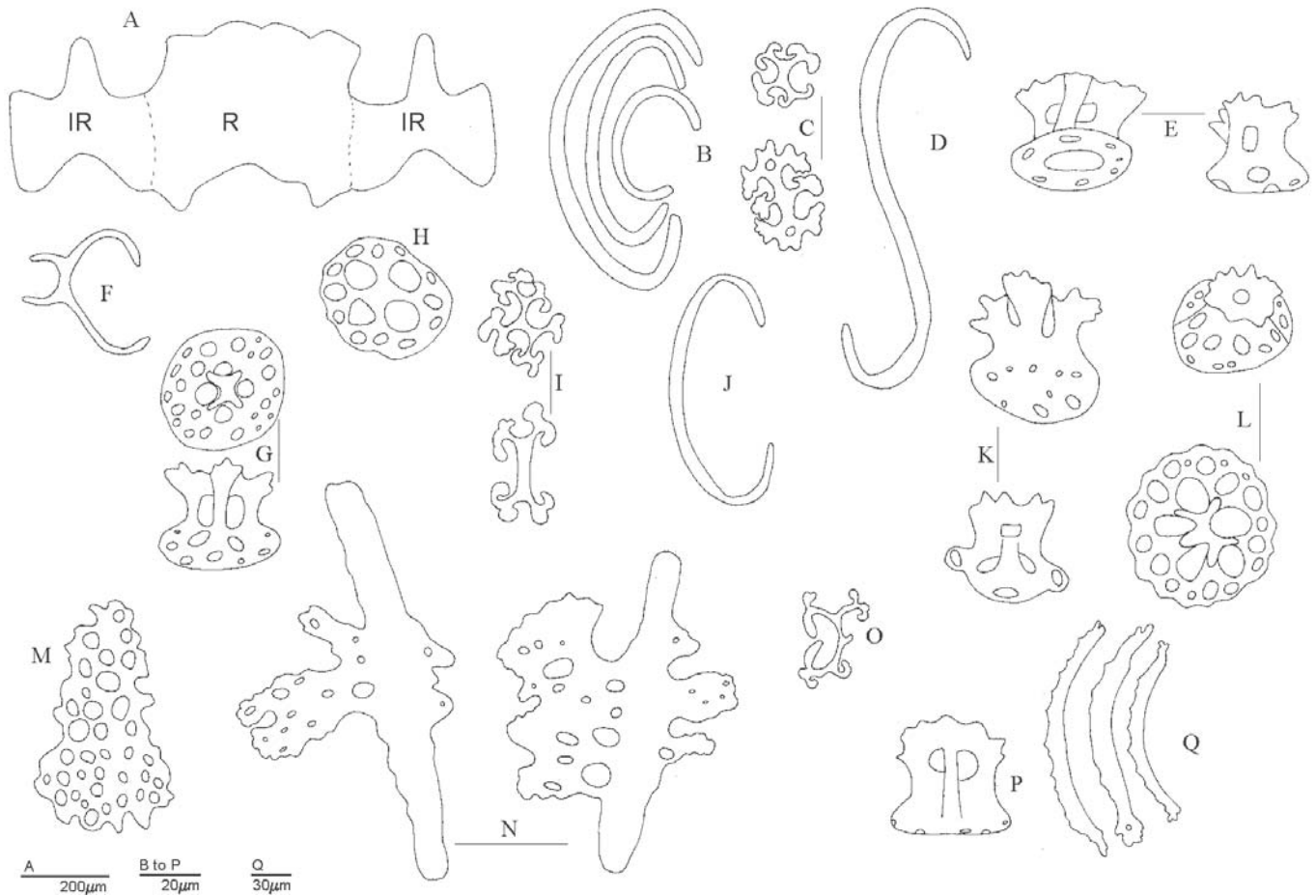


Figure 2. A-Q. *Stichopus herrmanni* - Ossicles

A - Calcareous ring; B - 'C' shaped rods from dorsal body wall; C - Rosettes from dorsal body wall; D - 'S' shaped rod from dorsal body wall; E - Tables from dorsal body wall; F - 'X' shaped rod from dorsal body wall; G, H - Tables from ventral body wall; I - Rosettes from ventral body wall; J - 'C' shaped rod from ventral body wall; K, L - Tables from tubefeet; M - Perforated plate from tubefeet; N - Rods from tubefeet; O - Rosette from dorsal papillae; P - Table from dorsal papillae; Q - Rods from tentacles; R - Radial plate; IR - Interradial plate

rounded spiny or wavy disc having four to five central holes and 12-18 marginal holes. Perforation process present on one side or either side of the rod. Dorsal papillae consists of tables (40µm long) (Fig. 2P), rosettes (34µm long) (Fig. 2O) and 'C' shaped rods. Tentacle include small to large curved rods (length 137µm) (Fig. 2Q) with spiny undulations on one side.

**Remarks:** The present specimens bear close resemblance in morphology and nature of spicules with *Stichopus herrmanni* redescribed in detail by Massin (1999) and Massin et al. (2002). Massin et al. (2002) considered the type locality of the species as Malaysia. This species earlier described in literature as *Stichopus variegatus* Semper, 1868, has been assigned new status by Rowe (in Rowe & Gates 1995) and is now named



*Stichopus herrmanni* Semper, 1868. *Stichopus variegatus* Semper, 1868 is considered to be the junior subjective synonym of *S. monotuberculatus* (Quoy & Gaimard, 1833).

*S. herrmanni* is recorded from Minicoy Island as *S. variegatus* by Nagabhusanam & Rao (1972), from Lakshadweep by Mukhopadhyay & Samantha (1983), James (1989), and Mukhopadhyay (1991); and from Gulf of Mannar and Palk Bay along the southeastern coast of India and Maldives by James (2001, 2003). This is the first record of this species from the southwestern coast of India.

## References

- Clark, A.M. & F.W.E. Rowe (1971).** *Monograph of shallow-water Indo-west Pacific Echinoderm*. British Museum (Natural History), London, 238pp.
- James, D.B. (1986).** Zoogeography of shallow-water Echinoderms of Indian Seas, pp.569-591. In: James, P.S.B.R (ed.). *Recent Advances in Marine Biology*. Today & Tomorrow's Printers and Publishers, New Delhi.
- James, D.B. (1989).** Echinoderms of Lakshadweep and their zoogeography. *Bulletin of Central Marine Fisheries Research Institute* 43: 97-144.
- James, D.B. (2001).** Twenty sea cucumbers from seas around India. *Naga ICLARM Quarterly* 24(1&2): 4-8.
- James, D.B. (2003).** Echinoderms of Maldives. *Records of Zoological Survey of India* 103: 1-5.
- James, D.B. (2007).** Echinoderms of the west coast of India. *Fishing Chimes* 27(7): 19-21.
- Ludwig, H. (1875).** 'Beitrage zur Kenntniss der Holothurien'. *Arbeiten aus dem Zoologischen zootom Institut in Wurzburg* 2(2): 77-120.
- Massin, C., Y. Zulficar, A.T.S. Hwai & S.Z.R. Boss (2002).** The genus *Stichopus* (Echinodermata: Holothuroidea) from the Johore Marine Park (Malaysia) with the description of two new species. *Bulletin De L Institut Royal Des Sciences Naturelles DE Belgique, Biologie* 72: 73-99.
- Mukhopadhyay, S.K. & T.K. Samanta (1983).** On a collection of shallow water holothurians from the Lakshadweep. *Records Zoological Survey of India* 81: 299-314.
- Mukhopadhyay, S.K. (1991).** Echinodermata: Holothuroidea, pp. 399-413. In: Jairajpuri, M.S. (ed.), *Fauna of Lakshadweep*. Zoological Survey of India, Calcutta.
- Nagabhusanam, A.K & C.G. Rao (1972).** An ecological survey of the marine fauna of Minicoy Atoll (Laccadive Archipelago, Arabian Sea), *Mitteilungen Zoologischen useum in Berlin* 48(2): 265-324.
- Pawson, D.L. (2007).** Phylum Echinodermata. *Zootaxa* 1668: 749-764.
- Rowe, F.W.E. & J. Gates (1995).** Echinodermata. In: Wells, A. (ed.). *Zoological Catalogue of Australia*. Vol. 33 CSIRO Australia, Melbourne, 510pp.
- Venkatraman, K., M. Srinivasan, C.H. Satyanarayana & D. Prabhakar (2002).** Faunal diversity of Gulf of Mannar biosphere reserve. *Zoological Survey of India, Conservation Area Series*, No. 15, 77pp.
- Venkataraman, K. & M. Wafar (2005).** Coastal and marine biodiversity of India. *Indian Journal of Marine Sciences* 34(1): 54-75.

