



A note on *Lepidonotus cristatus* (Grube, 1876) (Phyllodocida: Polynoidae) from Lakshadweep Archipelago, India

Jyoshna Pradhan^{1,2} and S. Balakrishnan^{1*}

¹Zoological Survey of India, Marine Aquarium and Regional Centre, Digha, West Bengal 721 428, India.

²P.G. Department of Zoology, Fakir Mohan University, Balasore, Odisha 756 020, India.

E-mail: marugalbalu82@gmail.com

Abstract

The present study on the Phyllodocida, Polynoidae, commonly called scale worm, in Lakshadweep Archipelago, India. In the species of scale worm *Lepidonotus cristatus* (Grube, 1876) based on the material collected from the Kavaratti and Kalpeni, Lakshadweep Archipelago as a new report, while Lakshadweep faunal survey, India. This paper discusses detailed taxonomic accounts, species descriptions, photographs, distribution, and ecology.

Keywords: Lakshadweep, New Record, Polychaete, Scale Worm

Introduction

Polychaete species form commensal associations with other marine invertebrates. Six polychaete families are most abundantly found worldwide, i.e., Syllidae (993 species), Polynoidae (876 species), Nereididae (687 species), Spionidae (612 species), Terebellidae (607 species), and Serpulidae (576 species) (Pamungkas *et al.*, 2019). The Polynoidae is the second largest family after Syllidae. Polynoidae, also known as scale worms, is widely distributed throughout various marine environments, and many of its members are connected to other invertebrates (De Assis *et al.*, 2020). Scales or elytra cover the dorsal side of the body. The pair of elytrum arises from notopodia attached to dorsal prominences known as elytophores. The number of elytrum pairs is stable and ranges from comparatively few (7-21) to extremely numerous. Elytra can be minute or large, covering the entire dorsum or leaving the mid dorsum and posterior end uncovered), micro-or macro tubercle-covered surfaces, and fringed or smooth borders (Aneli *et al.*, 2017). Among the Polynoidae, the genus *Lepidonotus* has the highest number of species, with over 70 identified species and subspecies (De Assis *et al.*, 2015). The characteristics of the genus *Lepidonotus* are that the base of the tentacle is

slightly raised above the base of the antennae of the head. It has two spherical hemispheres up front, separated by a deep notch where the tentacle's base protrudes. Two enormous, circular, dark brown eyes are on each side posterior, and two oval-shaped, roughly twice as large eyes on the rounded lateral eminence. In the later, an anterior pale lenticular patch is visible. The antennae arise from basal segments that are slightly beneath the foregoing and proceed very little further forward. Both dorsal cirri and tentacular cirri have smooth surfaces and somewhat tentacle translucent tissue. The long cirri reaches only the ventral bristles' tip (McIntosh, 1885). Among the genus *Lepidonotus*, seven species are reported from Indian waters, i.e., *Lepidonotus cranulatus* (Grube, 1869) *cranulatus* (Grube, 1869), *L. cristatus* (Grube, 1876), *L. glaucus* (Peters, 1854), *L. hedleyi* Benham, 1915, *L. jacksoni* Kinberg, 1855, *L. melanogrammus* Haswell, 1883, and *L. tenuisetosus* (Gravier, 1902) (Fauvel, 1932; Fauvel, 1953; Ramakrishna *et al.*, 2003; Sivaleela & Venkataraman, 2012 and Marudhupandi *et al.*, 2014). This present paper includes additional distributional records of *L. cristatus* (Grube, 1876) from Lakshadweep, whereas previous reports were already made from Tamil Nadu, Andaman and Nicobar Islands of India.

* Author for correspondence

Materials and Methods

The study was conducted in October 2019 in the intertidal and coral reef regions of Kavaratti and Kalpeni, Lakshadweep Archipelago. The specimens of scale worms were collected by hand-picking method by applying a round brush (No. 2) from the intertidal and coral reef habitats. The specimens were relaxed in MgCl₂, fixed in 4% formaldehyde in filtered seawater for one or two days, rinsed in tap water, and transferred to 70% ethanol for further studies. Morphometric measurements were taken by a Digital Vernier Caliper (CD-6" ASX), and the numbers of segments were counted under a stereo zoom microscope (Leica S9i). The specimens were determined by following Day (1967) based on the head morphology, body colour pattern, and chaeta structure. The studied specimens were deposited in the National Zoological Collections of Zoological Survey of India, Marine Aquarium and Regional Centre, Digha, West Bengal, as a voucher specimen for future reference.

Results

Lepidonotus cristatus (Grube, 1876) is recorded for the first report in Lakshadweep Archipelago waters. The detailed taxonomic accounts, species description, photographs, distribution, and ecology are given below.

Systematics

Phylum ANNELIDA Lamarck, 1802

Class POLYCHAETA Grube, 1850

Order PHYLLODOCIDA Dales, 1962

Family POLYNOIDAE Kinberg, 1856

Genus *Lepidonotus* Leach, 1816

Lepidonotus cristatus (Grube, 1876) (Figure 1).

Synonyms: 1876, *Polynoe cristata* Grube, Jahres-Bericht der, Schlesische, Gesellschaft für vaterländische Cultur, Breslau, 53: 46–72.1901. 1901, *L. cristatus* Gravier, 210, pl. 7 figs. 104–110, pl. 9 fig. 136, text-figs. 214–218; 1953, Fauvel, 35, fig. 13 n; 1967, Day, 82, fig. I. 14. f–i.

Material examined: 02 ex. Kavaratti (10°32.995"N; 072°37.448"E), October 30, 2019, and 01 ex. Kalpeni (10°05.551"N; 072°38.673"E), October 27, 2019, Lakshadweep, coll. S. Balakrishnan; (ZSI/MARC/P10801 and ZSI/MARC/P10802) (Figure 2).

Diagnostic characters: Body length 22.24–32.28mm and its width 4.40–5.92mm (Figure 2a). The prostomium is partially obstructed by a square occipital fold but longer than broad (Figure 2b). Median and lateral antennae are subequal. The anterior pair of eyes is large, and the posterior pair is smaller, closer together, and often hidden by the occipital fold. Elytra without margin fringes. Each elytron (Figure 2c) palette is shaped with a dark mark over the elyrophore and two large soft cushions. The surface is covered with conical tubercles. Dorsal cirri resemble the antennae and extend to the neurosetae's extremities. Notoseate (Figure 2d) has short tips and is coarsely but closely serrated. Neurosetae (Figure 2e) stout with numerous rows of spinules; most neurosetae are unidentate, but some have a very small secondary tooth.

Occurrence: Global - Red Sea, Indo-Pacific Ocean (Day, 1967), China (Glasby *et al.*, 2016), Western Australia (Day, 1975); India - Tamil Nadu, Andaman and Nicobar Islands (Sivadas & Carvalho, 2020).

Remarks: The first distributional record to Kavaratti and Kalpeni, Lakshadweep Archipelago.

Discussion

Leach (1816) provided with generic characters of *Lepidonotus*. Later, Seidler (1923) extensively reviewed Lepidonotinae, including descriptions and keys of more than 50 species of *Lepidonotus*. It has a small tuft of somewhat elongated, slender bristles on the dorsal extent of the foot. The smooth part of the tip is very short and rather blunt. The spinous rows are compact and closely spaced (McIntosh, 1885). *Lepidonotus squamatus* appeared to have a limited coast on Atlantic coasts, and *L. carinulatus* seemed to be an Indo-Pacific and Red Sea species (Barnich & Fiege, 2003). This species differs from *L. tenuisetosus* in the thread. It lacks fringed marginal papillae on the elytra and has numerous rugose micro and macro-tubercles, as opposed to *L. tenuisetosus* cylindrical micro-tubercles and few blunt or warty ones. *Lepidonotus tenuisetosus* like *L. squamatus* and *L. carinulatus*, have elytra with marginal papillae but differ in having slender notochaetae with capillary tips and neurochaetae with unidentate tips (exclusively bidentate in *L. squamatus* unidentate and a few minutely bidentate in *L. carinulatus*), as well as cylindrical macro-tubercles, and a few blunt or warty macro-tubercles (micro-tubercles with pointed projections, macro-tubercles (Day, 1967) (Table 1). The

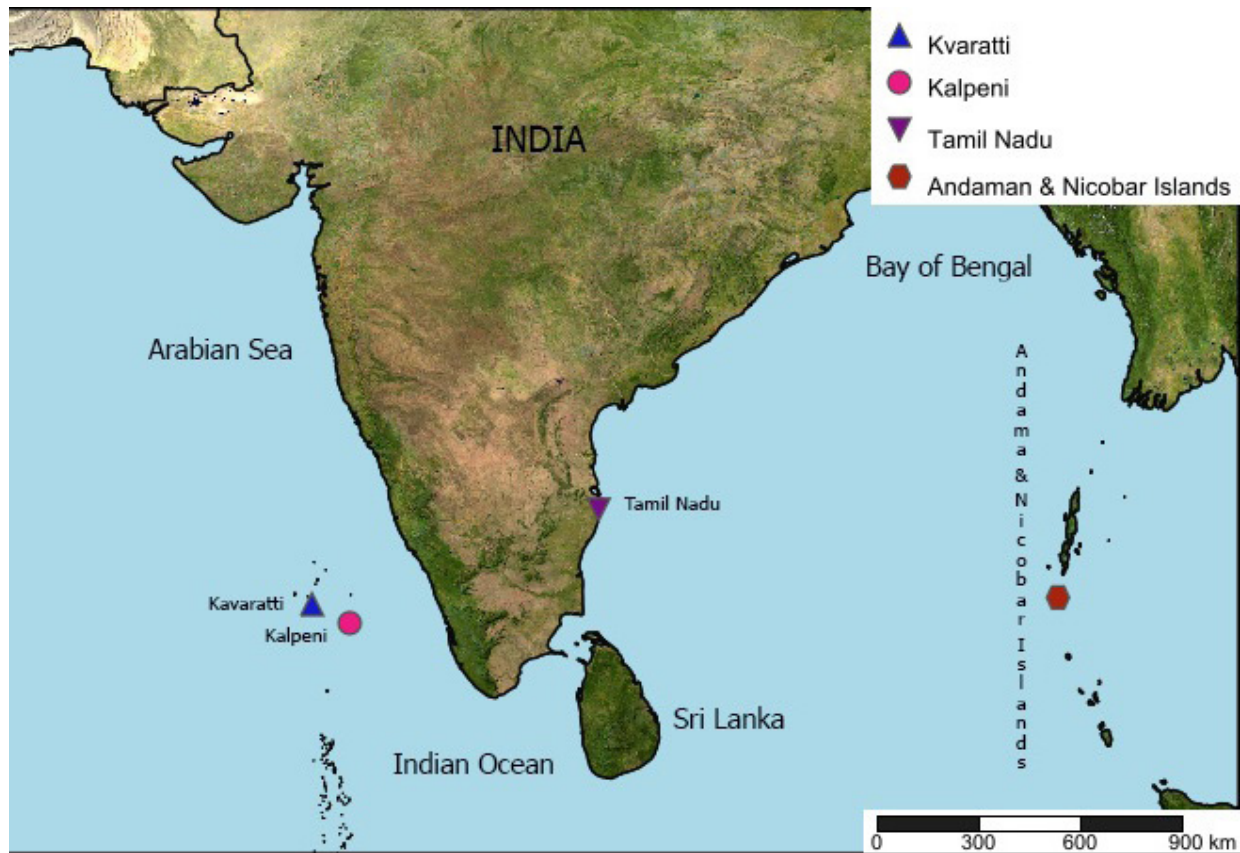


Figure 1. Distribution of *Lepidonotus cristatus* (Grube, 1878) (Simple mapper).

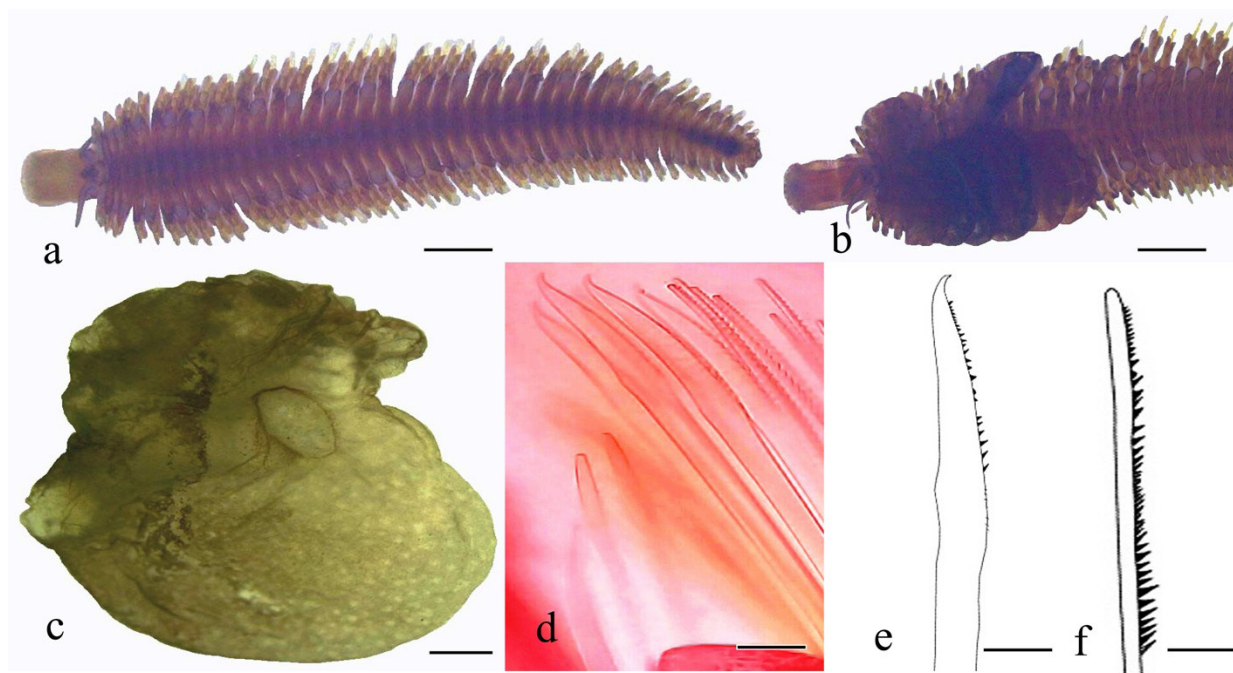


Figure 2. *Lepidonotus cristatus* (Grube, 1878) ZSI/MARC/P10801 and ZSI/MARC/P10802; (a) Whole body; dorsal view (b) Prostomium; (c) Elytron; (d) microscopic pictures of Notosetae and neurosetae; (e) Notosetae and (f) Neurosetae.

Table 1. Comparative features of species of the genus *Lepidonotus* available in India

Sl. No.	Characters	<i>Lepidonotus tenuietous</i> (Gravier, 1902)	<i>L. carinulatus</i> (Grube, 1869)	<i>L. jacksoni</i> Kinberg, 1855	<i>L. cristatus</i> (Grube, 1876)	References
1.	Median ceratophore	Slightly inflated subdistally	Slightly inflated subdistally	Not defined	Median and lateral antennae are subequal, about twice the prostomial length	Barnich and Fiege (2003), Wehe (2006), Day (1967)
2.	Eyes pair on the prostomium	Anterior dorsolateral on the widest part, posterior dorsally near the hind margin	Anterior dorsolateral on the widest part, posterior dorsally near the hind margin	Prostomium with the larger anterior pair of eyes lateral	Prostomium longer than broad but partly covered by an occipital fold	
3.	Dorsal cirri	Slightly inflated subdistally	Slight sub-terminal swelling and terminal filum	A dark band and a subterminal swelling	Dorsal cirri similar to the antennae and reach the end of the neurosetae	
4.	Elytra microtubercles	Cylindrical with a multifid, crown-like tips	Posterolateral warty, with nodules or pointed projections	Crown-like with a spine	The palette is shaped with a dark mark over the elytraphore	
5.	Elytra macrotubercles	Absent	Centrally conical and globular, posterolateral wart	Covered with spinules	Absent	
6.	Neurochaetae 1 st chaetiger	Non-defined	Slender, with numerous rows of spines and fine tip	Not defined	Neurosetae stout with very numerous spinules, at the first minute but become the long-hooked tips	

species of the family Polynoidae is highly large and has a wide range of behaviours, including various commensal species. The contrast between free-living and commensal behaviours and the evolution of the connections between animals and their hosts. Polychaete is the most numerous group in vegetated areas, comprising 60.2% to 92.97% of the total macrofauna numbers (Ansari, 1991). This species is reported for the first time in Lakshadweep Archipelago, which increases the diversity of polychaete species.

Acknowledgements

The authors thank Dr Dhriti Banerjee, Director, Zoological Survey of India, Kolkata, for providing

the necessary facilities and permission. The authors also thank the Ministry of Environment, Forests and Climate Change, Government of India, for financial support. The second author would like to thank the Lakshadweep Administration and Dr N. Marimuthu, Scientist-E and Officer-in-Charge (General Non-Chordata Section), Zoological Survey of India, FPS Building, Indian Museum complex, Kolkata – 700016, West Bengal, India, for the permit and logistic support to carry out the study. We also like to thank the anonymous reviewers for their valuable comments, which greatly improved the manuscript.

References

- Aneli, N.B., Shunkina, K.V., Vays, V.B. and Plyusheva, M.V. 2017. Ultrastructure and morphology of the elytrum of scale worm *Lepidonotus squamatus* Linnaeus, 1767 (Polychaeta, Polynoidae). *Invertebrate Zoology*, **14**(2): 99-107.
- Ansari, Z.A., Rivonker, C.U., Ramani, P. and Parulekar, A.H. 1991. Seagrass habitat complexity and macro-invertebrate abundance in Lakshadweep coral reef lagoons, Arabian Sea. *Coral Reefs*, **10**: 127-131.

- Barnich, R. and Fiege, D. 2003. The Aproditoidea (Annelida: Polychaeta) of the Mediterranean Sea. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, **559**: 1-167.
- Day, J.H. 1967. A monograph on the Polychaeta of Southern Africa. Part I. Errantia. *Trustees of the British Museum (Natural History)*, 82-83.
- Day, J.H. 1975. On a collection of Polychaeta from intertidal and shallow reefs near Perth, Western Australia. *Records of the Western Australian Museum*, **3**(3): 167-208.
- De Assis, J.B., Souza, T.K.D. and De Souza, J.R.B. and Christoffersen, M.L. 2020. An updated checklist of the scale worm *Harmothoe* (Annelida, Polynoidae) from South America, with two new records from Brazil. *Pan-American Journal of Aquatic Science*, **15**(4): 283-302.
- De Assis, J.E., De Brito, R.J., Christoffersen, M.L. and De Souza, J.R.B. 2015. A catalogue of the scale worm genus *Lepidonotus* (Polynoidae, Polychaeta) from South America, with two new records for Brazilian waters. *Zookeys*, **533**: 63-98.
- Fauvel, P. 1932. Annelida Polychaeta of the Indian Museum, Calcutta. *Memoirs of the Indian Museum*, **12**(1): 1-262.
- Fauvel, P. 1953. The fauna of India including Pakistan, Ceylon, Burma and Malaysia - Annelida Polychaeta, Part I (Errantia) and Part II (Sedentaria), (The Indian Press Ltd, India).
- Glasby, C.J., Lee, Y.N. and Hsueh, P.W. 2016. Marine Annelida (excluding clitellates and siboglinids) from the South China Sea. *Raffles Bulletin of Zoology*, **34**: 178-234. <http://zoobank.org/urn:Isid:zoobank.org:pub:21B8D064-67AB-487F-A63D-4AFAC701FC5>
- Leach, W.E. 1816. Annulosa. In supplement to the Fourth, Fifth and Sixth editions of the Encyclopedia Britannica (Supplementary Edition ed), **1**(2): 401-453.
- Marudhupandi, T., Kumar, T.T.A., Prakash, S., Gopi, M. and Balasubramanian, T. 2014. A first report of symbiotic polychaete scale worm *Gastolepidia clavigera* Schmarda, 1861 (Phyllodocida: Polynoidae) from Lakshadweep Archipelago, India. *Journal of Threatened Taxa*, **6**(10): 6385-6388.
- McIntosh, W.C. 1885. Report on the Annelida Polychaeta collected by H.M.S. Challenger during the years 1873-1876. Report on the Scientific Results of the Voyage of H.M.S Challenger during the year 1873-76. *Zoology*. **12**(34): i-xxxvi, 1-55, pl. 1-55, 1A-39A and pages (s): 67-69, Pl. ZI figs. 2-3, Pl. XVIII fig. 1, Pl. XA figs. 10-11.
- Pamungkas, J., Glasby, C.J., Read, G B., Wilson, S.P. and Costello, M.J. 2019. Progress and perspectives in the discovery of polychaete worms (Annelida) of the world. *Helgoland Marine Research*, **73**(4): 1-10.
- Ramakrishna, I., Sarkar, S. and Talukdar. 2003. Marine invertebrates of Digha coast and some recommendations on their conservation. *Records of the Zoological Survey of India*, **101**(374): 1-23.
- Seidler, H.J. 1923. Beitrage zur Kenntnis der Polynoiden, III. *Zoologischer*, **56**: 145-155.
- Sivadas, S.K. and Carvalho, R. 2020. Marine Annelida of India: Taxonomy and status evaluation and an updated checklist. *Journal of Threatened Taxa*, **12**(12): 16647-16714.
- Sivaleela, G. and Venkataraman, K. 2012. Distribution of Marine Polychaetes of India. *Records of the Zoological Survey of India*, **112**(4): 113-126.
- Wehe, T. 2006. Revision of the scale worms (Polychaeta: Aphroditoidea) occurring in the seas surrounding the Arabian Peninsula. Part I: Polynoidae. *Fauna of Arabia*, **22**: 23-197.