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ORIGINAL ARTICLE



Prionospio atrovitta (Annelida: Spionidae), a new species from Andaman and Nicobar archipelago, northern Indian Ocean

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ABSTRACT

A new species of polychaete, *Prionospio atrovitta*, is described from the sandy sediments of the Andaman and Nicobar insular margin. The major feature distinguishing *P. atrovitta* from other species of the genus *Prionospio* is the presence of well-marked black pigmented band near the anterior dorsal margin of the prostomium and pigmentation on the caruncle in the adults.

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Introduction

The members of genus *Prionospio* Malmgren 1867 *sensu lato* possess pinnate or apinnate branchiae, or combinations of these, usually beginning from chaetiger 2. The genus was first proposed by Malmgren 1867 to describe *Prionospio steenstrupi* collected from northern Iceland. The species was named in honour of Professor Johannes Japetus Smith Steenstrup, a Danish zoologist, University of Copenhagen. Within the genus *Prionospio*, a large group of species have a similar type of arrangement of branchiae (i.e. 4 branchiae beginning on chaetiger 2, with 1st and 4th pairs pinnate), and these were included in the 'steenstrupi group', after the first species described with this branchial arrangement (Maciolek 1985; Hylleberg and Nateewathana 1991). Currently, the genus *Prionospio* includes around 103 species of which 43 species belong to the 'steenstrupi group' (Read and Fauchald 2019).

Although several ecological studies have been done on the polychaete communities in the continental margins of the northern Indian Ocean (e.g. Joydas and Damodaran 2009; Abdul Jaleel et al. 2014; Raman et al. 2014) systematic treatments of spionids are very limited (Fauvel 1953; Mohammad 1970; Hylleberg and Nateewathana 1991; Yokoyama and Sukumaran

2012). Under the BIOSHELF project, along the eastern margin of Andaman Sea (Thailand EEZ), 9 species of *Prionospio* belonging to steenstrupi group were described (Hylleberg and Nateewathana 1991). The species were reported from the shallow depths (10–30 m) off Phuket. Besides this, 1 species of *Prionospio* from Kuwait, Arabian Gulf (Mohammad 1970) has also been reported from northern Indian Ocean. The present new species is collected from the waters of Andaman and Nicobar Islands which are one of the oceanic islands in the northern Indian Ocean known for its marine biodiversity.

Materials and methods

During systematic studies of macrofauna in the insular margin (50–200 m) of Andaman & Nicobar under the Marine Living Resource Programme (MLRP) of the Ministry of Earth Sciences, Government of India, a new species in the genus *Prionospio* Malmgren 1867 was collected. Specimens were collected onboard Fishery and Oceanographic Research Vessel *Sagar Sampada* (FORVSS) during the Cruises FORVSS261 (January 2009), FORVSS292 (December 2011), FORVSS367 (November 2017) in the winter monsoon season (Figure 1). Sampling was done using a 0.1m² Smith

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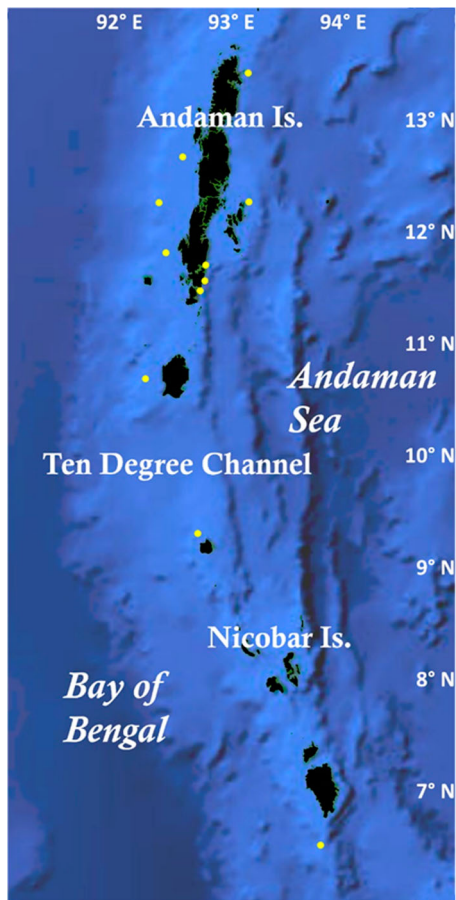


Figure 1. Map of Andaman and Nicobar Islands, indicating collection locations of *Prionospio atrovitta* sp. nov.

McIntyre grab and was sieved through 300µm mesh sieve. The residual sediment samples were preserved in 5% buffered formalin and stained using Rose Bengal solution. Specimens were sorted out and identified under the compound microscope (Leica DM1000). Photographs, length and width measurements were



Figure 2. Anterior region of *Prionospio atrovitta* sp. nov. (Holotype IO/SS/POL/00671) showing pigmentation on the prostomium and caruncle.

done using the compound microscope with image analyser (Leica DM750). The specimens have been deposited in Referral Centre, Centre for Marine Living Resources and Ecology (CMLRE), Ministry of Earth Sciences, Govt. of India, Kochi. The registration ID for voucher specimens are as follows IO/SS/POL/00671, where IO stands for Indian Ocean, SS for the research vessel *Sagar Sampada*, POL for Polychaete.

Taxonomic account

Family Spionidae

Genus *Prionospio* Malmgren, 1867

Type species *Prionospio steenstrupi* Malmgren, 1867

Prionospio atrovitta sp. nov.

(Figures 2 and 3)

Material examined

Type specimens. 3 specimens; Holotype: IO/SS/POL/00671, Spike Island, coralline sand, 12°15.268' N, 92°21.200' E, 52 m, FORVSS 261, 11.01.2009; Paratypes: Specimen incomplete, IO/SS/POL/00672, Rutland Island, 11°28.038' N, 92°43.268' E, 57 m, FORVSS 292, 03.10.2011 (1 specimen); IO/SS/POL/00673, Table Island, 13°24.884' N, 93°09.056' E, 60 m, FORVSS 292, 26.11.2011 (1 specimen).

Non-type specimens. 10 specimens; FORVSS 261: IO/SS/POL/00674, Car Nicobar Island, 9°17.967' N, 92°42.016' E, 52 m, 23.01.2009, 10.07 mm length and 0.65 mm width for 42 chaetigers; IO/SS/POL/00675, Car Nicobar Island, 9°17.967' N, 92°42.016' E, 52 m, 23.01.2009, 5.67 mm length and 0.39 mm width for 33 chaetigers; IO/SS/POL/00676, Little Andaman Island, 10°40.809' N, 92°14.001' E, 55 m, 10.01.2009, 9.55 mm length and 0.56 mm width for 39 chaetigers; IO/SS/POL/00677, South Andaman, 11°48.400' N, 92°24.930' E, 48 m, 11.01.2009, 1.49 mm length and 0.74 mm width for 32 chaetigers; IO/SS/POL/00678, Outram Island, 12°15.682' N, 93°09.466' E, 68 m, 15.01.2009, 3.50 mm length and 0.51 mm width for 20 chaetigers.

FORVSS 292: IO/SS/POL/00679, Port Andaman, 12°39.888' N, 92°33.899' E, 68 m, 24.11.2011, 7.39 mm length and 0.44 mm width for 37 chaetigers; IO/SS/POL/00680, Table Island, 13°24.884' N, 93°09.056' E, 60 m, 26.11.2011, 8.02 mm length and 0.64 mm width for 33 chaetigers; IO/SS/POL/00681, Table Island, 13°24.884' N, 93°09.056' E, 60 m, 26.11.2011, 5.64 mm length and 0.38 mm width for 29 chaetigers; IO/SS/POL/00682, Port Blair, 11°41.841' N, 92°46.224' E,

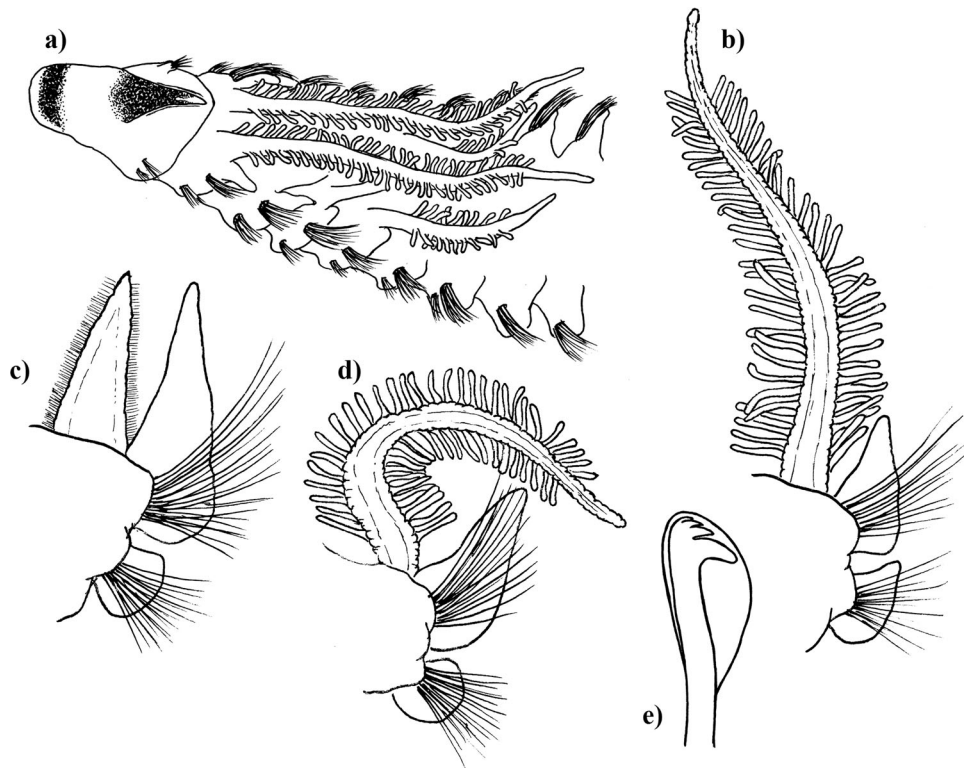


Figure 3. *Prionospio atrovitta* sp. nov. (Holotype IO/SS/POL/00671) (a) anterior region of holotype, (b) 1st pair of branchiae on chaetiger 2, (c) 2nd pair of branchiae on chaetiger 3, (d) 4th pair of branchiae on chaetiger 5, and (e) neuropodial hooded hook.

64 m, 30.11.2011, 3.22 mm length and 0.35 mm width for 21 chaetigers; IO/SS/POL/00683, Indira Point, 6° 30.647' N, 93° 47.810' E, 65 m, 10.12.2011, 3.58 mm length and 0.58 mm width for 24 chaetigers; FORVSS 367: IO/SS/POL/00684, Rutland Island, 11° 33.349' N, 92° 45.804' E, 107 m, 24.11.2017, 3.38 mm length and 0.55 mm width for 15 chaetigers.

Diagnosis

Prostomium rounded anteriorly, with a black pigmented band on the dorsal side beneath the anterior margin with pigmented caruncle. Branchiae from chaetiger 2, with 1st and 4th pairs pinnate and 2nd and 3rd pair apinnate. Single weak dorsal ridge present starting from chaetigers 7–16–17. Single sabre chaetae in each fascicle starting from chaetiger 15–17. Notopodial hooded hooks from chaetiger 51, neuropodial hooks from chaetigers 16–19. Pygidium with a single dorsal medial cirrus and 2 short ventro-lateral cirri.

Type locality: Spike Island, Andaman Islands

Description (primarily based on Holotype)

Holotype (IO/SS/POL/00671), complete specimen with 69 chaetigers having a length of 10.15 mm and width of 0.27 mm. Paratypes, incomplete specimens, IO/SS/

POL/00672 with 13.55 mm length and 0.31 mm width for 54 chaetigers, IO/SS/POL/00673 with 12.76 mm length and 0.45 mm width for 52 chaetigers.

Prostomium rounded, sub-triangular anteriorly with a black pigmented band dorsally, just behind the anterior margin, abruptly tapering posteriorly to form a well-developed narrow caruncle. Caruncle extending up to the end of chaetiger 1, with prominent black pigmentation ending just before the tip (Figures 2 and 3 (a)). Eyes not visible. Nuchal organs not readily observable. Peristomium partly fused to chaetiger 1 lacking prominent lateral wings. Branchiae present from chaetiger 2–5, 1st and 4th pairs long and pinnate, 2nd and 3rd pairs short and apinnate. Pinnate branchiae uniformly tapering with long and slender digitiform pinules which do not extend to the distal tips. The 1st pair of branchiae are the longest, extending to chaetiger 10 (chaetiger 8 in paratype), while the 4th pair extending to chaetiger 9 (Figure 3b, d).

Notopodial and neuropodial lamellae smallest on chaetiger 1. Notopodial postsetal lobes of chaetiger 2 intermediate in size, neuropodial lobes with rounded lower corners (Figure 3b). Notopodial lamellae foliaceous, with maximum size on chaetigers 3 and 4, equalling in length to corresponding apinnate branchiae (Figure 3c) and decreasing in size on subsequent chaetigers (Figure 3c). Notopodial lamellae extending

over dorsum forming low dorsal ridges from chaetiger 7–16. Small and light pigmented spots scattered dorsally and laterally on chaetigers 10–15, being denser on postsetal lobes (In both paratypes pigmented spots were completely absent). Interparapodial pouches absent.

Anterior chaetae all capillaries, heavily granulated with prominent sheath. Posterior capillaries becoming slender and lacking granules from chaetiger 13, with thin sheath. Ventral sabre chaetae appearing from chaetiger 15 (chaetiger 16 in both paratypes) and present up to the last chaetiger, 1 per fascicle; chaetae with clear base and granulated near the tip. Neuropodial hooded hooks from chaetiger 18 to last chaetiger; numbering 1 in chaetiger 18 (chaetigers 17 in both paratypes) and up to 6 per fascicle (1–7 fascicle in paratype) in the succeeding chaetigers; notopodial hooks from chaetiger 51 to last chaetiger, numbering 3 per fascicle. Hooks with 4 small teeth above the main fang (Figure 3e). Pygidium with a single dorsal medial cirrus and two short ventro-lateral cirri.

In non-type specimens, the variations were present in the dorsal crest, sabre chaetae and neuropodial hooks. The dorsal crest were present on chaetigers 7–17 in most specimens, except in few specimens (IO/SS/POL/00674; IO/SS/POL/00678; IO/SS/POL/00681) the dorsal crest were present from chaetiger 7–16. Sabre chaetae starts from chaetiger 15 in all specimens, except from chaetiger 16 in IO/SS/POL/00675. Neuropodial hooded hooks were showing its presence from chaetiger 17 with few exceptions IO/SS/POL/00675 (chaetiger 19), IO/SS/POL/00677, IO/SS/POL/00680, IO/SS/POL/00683 (chaetiger 16).

Habitat

The specimens were collected from the sandy sediments with a dissolved oxygen content of 0.89–3.35 ml/l, temperature of 20.17–26.61°C and salinity of 33.39–34.45.

Etymology

The name 'atrovitta' (Latin: 'atro' = black or dark, 'vitta' = head band) refers to black pigmented band across the prostomium of the species in the adults.

Differential diagnosis

Prionospio atrovitta sp. nov. is most similar to *Prionospio oshimensis* Imajima 1990b, reported from Japanese waters. Both species possess pigmentation on the prostomium, but the in *P. oshimensis* the pigmentation is

present on the dorsal as well as ventral sides, while it occurs only dorsally in *P. atrovitta*. The caruncle is of similar size with pigmentation in both species, but the opaque membrane covering the caruncle in *P. oshimensis* is completely lacking in *P. atrovitta*. Both species bear the 'steenstrupi' type of branchial arrangement (4 pairs of branchiae beginning on chaetiger 2, 1st and 4th pair pinnate), and the digitiform pinnules do not extend to the tip of the pinnate branchiae in either species. The pinnules were absent in the distal half of the branchiae in *P. oshimensis*, while in *P. atrovitta*, pinnules are absent only at the tip of the branchiae. In both species, notopodial lamellae of the branchiate chaetigers were well-developed and foliaceous, equalling in length with apinnate branchiae. Interparapodial pouches were absent in both species. In *P. atrovitta*, weak dorsal ridges from chaetiger 7 or 9 to chaetiger 16 or 17, but absent in *P. oshimensis*. Ventral sabre chaetae form chaetiger 15 or 16 in both species numbering 1 per fascicle. Neuropodial hooded hooks starts from chaetiger 16–19 in *P. atrovitta* and from chaetiger 17 in *P. oshimensis*. Notopodial hooks are not described in *P. oshimensis*, but in *P. atrovitta* notopodial hooks appear at chaetiger 51.

The species belonging to the genus *Prionospio* reported from Andaman Sea under 'steenstrupi' group include *Prionospio andamanensis*, *Prionospio cornuta*, *Prionospio henriki*, *Prionospio komaeti*, *Prionospio malayensis*, *Prionospio neenae*, *Prionospio nielsenii*, *Prionospio phuketensis* and *Prionospio runei* (Hylleberg and Nateewathana, 1991). The major distinguishing character of *P. atrovitta* from all the aforementioned species is the presence of pigmentation on the prostomium and caruncle.

Key to species of *Prionospio* of the 'steenstrupi' group reported from the Andaman Sea (Adapted from Hylleberg & Nateewathana, 1991)

1. Neuropodial postchaetal lobe of chaetiger 2 with lower corners pointed, triangular 2
- Neuropodial postchaetal lobe of chaetiger 2 with lower corners rounded 5
2. Dorsal crest from chaetiger 7 3
- Dorsal crest from chaetiger 10–13 4
3. Dorsal crest prominent on chaetigers 7 and 10 only
..... *P. phuketensis* Hylleberg & Nateewathana, 1991
- Dorsal crest low on chaetigers 7–11
..... *P. komaeti* Hylleberg & Nateewathana, 1991

Table 1. Locations of *Prionospio* species under steenstrupi group collected through FORVSS surveys.

Region	Cruise / Station No.	Locality	Latitude (N)	Longitude (E)	Depth (m)	<i>Prionospio andamanensis</i>	<i>P. bocki</i>	<i>P. cornuta</i>	<i>P. ehlersi</i>	<i>P. henriki</i>	<i>P. komaeti</i>	<i>P. nielseni</i>	<i>P. neenae</i>	<i>P. phuketensis</i>
AI	292/5	Little Andaman Is.	10.67	92.30	63				✓		✓	✓		✓
AI	292/4; 261/3B	Little Andaman Is.	10.67	92.23	111			✓	✓			✓	✓	
AI	292/3; 261/3C	Little Andaman Is.	10.66	92.20	185				✓		✓			
AI	292/50	Little Andaman Is.	10.68	92.68	49	✓	✓							
AI	292/52	Little Andaman Is.	10.67	92.74	225				✓			✓		
AI	292/7; 261/6A	Duncan Passage	11.25	92.45	61	✓		✓	✓		✓			
AI	292/8	Duncan Passage	11.25	92.44	160		✓		✓		✓	✓		
AI	292/9; 261/6C	Duncan Passage	11.26	92.41	100				✓					
AI	292/13	South Andaman	11.78	92.48	59				✓				✓	✓
AI	292/12	South Andaman	11.79	92.37	100									✓
AI	292/11; 261/7C	South Andaman	11.79	92.33	208		✓		✓		✓	✓		✓
AI	292/15; 261/10B	Spike Is.	12.25	92.31	100			✓					✓	
AI	292/21	Port Andaman	12.66	92.56	68	✓	✓				✓	✓		
AI	292/20	Port Andaman	12.67	92.40	119	✓			✓					
AI	292/19	Port Andaman	12.67	92.37	208	✓								
AI	292/22	Interview Is.	12.93	92.47	101	✓			✓			✓		
AI	292/24	Interview Is.	12.93	92.40	224	✓								
AI	292/25; 261/14A	North Andaman	13.52	92.78	52		✓	✓	✓				✓	
AI	292/26	North Andaman	13.53	92.65	113						✓			
AI	292/27	North Andaman	13.53	92.62	219	✓			✓					✓
AI	292/29	Table Is.	13.41	93.15	60	✓		✓						✓
AI	292/30	Table Is.	13.42	93.17	110	✓				✓	✓			✓
AI	292/31	Table Is.	13.42	93.19	210	✓			✓					✓
AI	292/35	Sound Is.	12.93	93.01	56	✓		✓						✓
AI	292/36	Sound Is.	12.92	93.02	109	✓								✓
AI	292/37	Sound Is.	12.93	93.07	221	✓								✓
AI	292/46	Port Blair	11.70	92.77	64	✓			✓					✓
AI	292/45	Port Blair	11.70	92.80	120	✓			✓			✓		✓
AI	292/44; 261/28C	Port Blair	11.69	92.82	248	✓		✓	✓		✓	✓		✓
AI	292/49	Rutland Is.	11.47	92.72	57	✓		✓				✓	✓	✓
NI	292/59	Car Nicobar Is.	9.30	92.79	55									✓
NI	292/58	Car Nicobar Is.	9.30	92.82	107	✓								✓
NI	292/57	Car Nicobar Is.	9.30	92.87	222				✓					✓
NI	292/62	Car Nicobar Is.	9.29	92.67	220	✓			✓					✓
NI	292/67	Katchall Is.	8.00	93.25	200			✓	✓					✓
NI	292/70	Nancowry Is.	8.00	93.64	58			✓						
NI	292/75	Great Nicobar Is.	7.00	93.96	50			✓						
NI	292/77	Great Nicobar Is.	7.04	93.96	230				✓					
NI	292/84	Great Nicobar Is.	7.13	93.52	225	✓			✓					
NI	292/82	Indira Point	6.51	93.80	65	✓					✓			✓

AI = Andaman Islands; NI = Nicobar Islands.

Red tick – collected only from FORVSS 261.

Green tick – collected from both FORVSS 261 & FORVSS 292.

Black tick – collected only from FORVSS 292.

4. Prostomium with straight anterior margin
 *P. nielsenii* Hylleberg & Nateewathana, 1991^s
 Prostomium markedly notched with rounded lateral
 corners
 *P. cornuta* Hylleberg & Nateewathana, 1991^s
5. Dorsal crest from chaetiger 7 6
 Dorsal crest from chaetiger 10–13 7
6. Dark pigmented band across the prostomium dor-
 sally, base of caruncle pigmented
 *P. atrovitta* n. sp.
 No pigmentation on prostomium, except one pair of
 small eye spots
 *P. runei* Hylleberg & Nateewathana, 1991
7. Ventrolateral folds between neuropodia present ...
 *P. henriki* Hylleberg & Nateewathana, 1991
 Ventrolateral folds between neuropodia absent ...
 8
8. Neuropodial postsetal lobe of chaetiger 8 rounded,
 rhomboidal
 *P. malayensis* (Caullery, 1914)^s
 Neuropodial postsetal lobe of chaetiger 8 elliptical
 with a 'nipple tip'
 *P. neenae* Hylleberg & Nateewathana, 1991
 Neuropodial postsetal lobe of chaetiger 8 crenulate

 *P. andamanensis* Hylleberg & Nateewathana, 1991^s

Hylleberg & Nateewathana (1991) also described other specimens which were conferred to *P. andamanensis*, *P. cornuta*, *P. malayensis* and *P. nielsenii*.

The other species belonging to *P. steenstrupi* group identified around Andaman and Nicobar Islands during the surveys FORVSS 261 and FORVSS 292 are provided with their locations in Table 1. A comparison of key morphological features of the known species of *Prionospio* falling under the 'steenstrupi' group are presented in Supplementary Tables SI and SII.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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