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

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# **Abstract**

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

Key words: spionid, *Prionospio*, polychaete, new species, Andaman, Nicobar, islands

#### Introduction

The members of genus *Prionospio*Malmgren 1867 *sensulato*possess pinnate or apinnatebranchiae, or combinations of these, usually beginning from chaetiger2. The genus was first proposed by Malmgren 1867 to describe *Prionospiosteenstrupi* 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 1<sup>st</sup> and 4<sup>th</sup> 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 2007; 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 (10-30m)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**

Duringsystematic studies of macrofauna in the insular margin (50-200m) 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 (Fig.1). Sampling was done using a 0.1m<sup>2</sup> Smith McIntyre grab and were 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 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/0671, 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** *Prionospiosteenstrupi*Malmgren, 1867

Prionospioatrovittasp.nov.

(Fig. 2-3)

#### **Material examined**

**Type specimens**: 3 specimens; Holotype: IO/SS/POL/00671, Spike Island, coralline sand, 12°15.268' N, 92°21.200' E, 52m, FORVSS 261, 11.01.2009; Paratypes:Specimen incomplete, IO/SS/POL/00672, Rutland Island, 11°28.038' N, 92° 43.268' E, 57m, FORVSS 292,03.10.2011 (1 specimen); IO/SS/POL/00673, Table Island, 13°24.884' N, 93° 09.056' E, 60m, 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, 52m, 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, 52m, 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, 55m, 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, 48m, 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, 68m, 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, 68m, 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, 60m, 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, 60m, 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, 64m,

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, 65m, 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, 107m, 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 sidebeneath the anterior margin with pigmented caruncle. Branchiae from chaetiger 2, with 1<sup>st</sup> and 4<sup>th</sup>pairs pinnate and 2<sup>nd</sup> and 3<sup>rd</sup> pair apinnate. Single weak dorsal ridge present starting from chaetigers7 to 16-17. Single sabre chaetae in each fascicle starting from chaetiger 15-17.Notopodial hooded hooks from chaetiger 51, neuropodial hooks from chaetigers16-19. 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-traingular anteriorly with a black pigmented banddorsally, just behind the anterior margin, abruptly tapering posteriorly to form a well-developed narrow caruncle. Caruncle extending up to the end of chaetiger1, with prominent black pigmentation ending just before the tip (Fig. 2, 3a). Eyes not visible. Nuchal organs not readily observable. Peristomium partly fused to chaetiger 1 lacking prominent lateral wings. Branchiae present from chaetiger2 to 5, 1<sup>st</sup> and 4<sup>th</sup>pairs long and pinnate, 2<sup>nd</sup> and 3<sup>rd</sup> pairs short and apinnate. Pinnate branchiae uniformly tapering with long and slender digitiformpinnules which do not extend to the distal tips. The 1<sup>st</sup> pair of branchiaeare the longest, extending to chaetiger 10 (chaetiger 8 in paratype), while the 4<sup>th</sup> pair extendingto chaetiger 9 (Fig. 3b, d).

Notopodial and neuropodial lamellae smallest on chaetiger 1. Notopodialpostsetal lobes of chaetiger 2 intermediate in size, neuropodial lobes with rounded lower corners (Fig. 3b). Notopodial lamellae foliaceous, with maximum size on chaetigers 3 and 4, equalling in length to corresponding apinnatebranchiae (Fig. 3c) and decreasing in size on subsequent chaetigers (Fig. 3c). Notopodial lamellae extending over dorsum forming low dorsal ridges from chaetiger 7 to 16. Small and light

pigmented spots scattered dorsally and laterally on chaetigers 10 to 15, being denser on postsetal lobes (In both para types pigmented spots were completely absent). Interparapodial pouches absent.

Anterior chaetae all capillaries, heavily granulated with prominent sheath. Posterior capillaries becoming slender and lacking granules fromchaetiger 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 upto 6 perfascicle (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 (Fig. 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 to 17in 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 to 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**

Prionospioatrovittasp. nov.is most similar to PrionospiooshimensisImajima 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 completely lacking in P. atrovitta. Both species bear the 'steenstrupi' type of branchial arrangement (4 pairs of branchiae beginning on chaetiger 2,

1<sup>st</sup> and 4<sup>th</sup> pair pinnate), and the digitiformpinnules do not extend to the tip of the pinnate branchiae in either species. The pinnules were absent in the distal half of the branchiaein *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 apinnatebranchiae. 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 *Prionospioandamanensis*, *Prionospiocornuta*, *Prionospiohenriki*, *Prionospiokomaeti*, *Prionospiomalayensis*, *Prionospioneenae*, *Prionospionielseni*, *Prionospiophuketensis andPrionospiorunei* (Hylleberg and Nateewathana, 1991). The major distinguishing character of *Prionospioatrovitta* from all the aforementioned species is the presence of pigmentation on the prostomium and caruncle.

# Key to species of *Prionopsio* of thesteenstrupi group reported from the Andaman Sea (Adapted from Hylleberg&Nateewathana, 1991)

l.	Neuropodialpostchaetal lobe of chae	etiger 2 with lower corne	ers pointed, triangular	2
	Neuropodialpostchaetal lobe of chae	etiger 2 with lower corne	ers rounded	5
2.	Dorsal crest from chaetiger7			3
	Dorsal crest from chaetiger10-13			4
3.	Dorsal crest prominent on chaetig	gers 7 and 10 only		
		P.phuketensisHylle	berg&Nateewathana, 1991	
	Dorsal crestlow onchaetigers7-11	<i>P.komaeti</i> Hylleb	erg&Nateewathana, 1991	
1.	Prostomium wi	th	straight	anterior
	margin			
	. P.nielseniHylleberg&Nateewathana	a, 1991 <sup>§</sup>		
	Prostomiummarkedly notched with r	rounded lateral corners.		•••
		P. cornutaHylle	berg&Nateewathana, 1991 <sup>§</sup>	
5.	Dorsal crest from chaetiger7			6
	Dorsal crest from chaetiger 10-13			7

6.	Dark pigmented band across the prostomium dorsally, base of caruncle pigmented
	No pigmentation on prostomium, except one pair of small eye spots
7.	Ventrolateral folds between neuropodia present
	Ventrolateral folds between neuropodia absent
8.	Neuropodialpostsetal lobe of chaetiger 8 rounded, rhomboidal
	Neuropodialpostsetal lobe of chaetiger 8elliptical with a 'nipple tip'
	Neuropodialpostsetal lobe of chaetiger 8crenulate
	<i>P</i>
	andamanensisHylleberg&Nateewathana, 1991§

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

The other species belonging to *Prionospiosteenstrupi* 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 Table 1 and 2.

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# **Figure Legends**

- **Fig. 1.** Map of Andaman& Nicobar Islands, indicating collection locations of *Prionospioatrovittasp.* nov.
- **Fig. 2.** Anterior region of *Prionospioatrovitta* sp. nov. (HolotypeIO/SS/POL/00671) showing pigmentation on the prostomium and caruncle
- **Fig. 3.** *Prionospioatrovitta* sp. nov. (HolotypeIO/SS/POL/00671) a) anterior region of holotype, b) 1<sup>st</sup> pair of branchiae on chaetiger 2, c) 2<sup>nd</sup> pair of branchiae on chaetiger 3, d) 4<sup>th</sup> pair of branchiae on chaetiger 5, and e) neuropodial hooded hook.

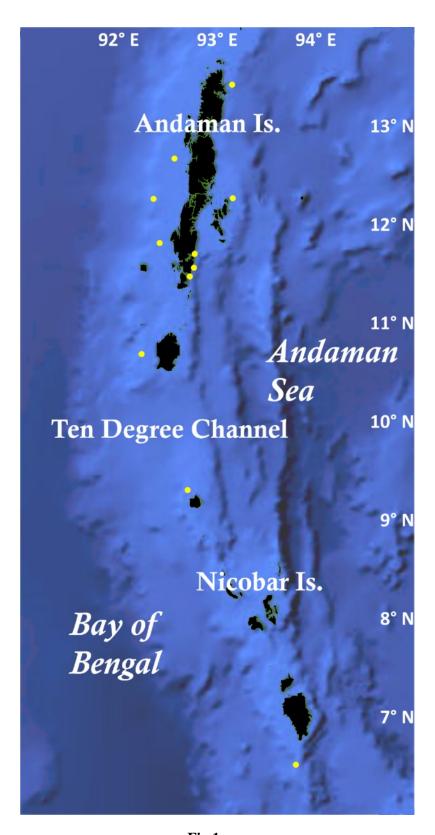


Fig.1



Fig. 2.

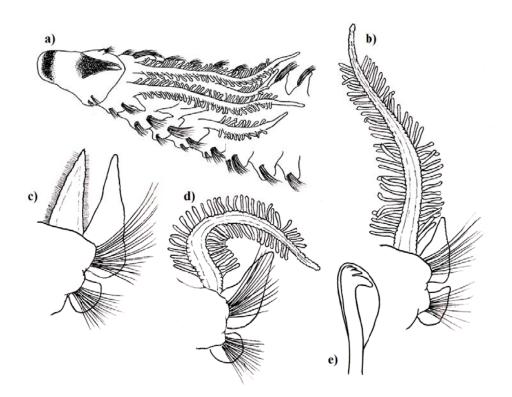


Fig. 3.

 ${\bf Table~1.~Locations~of} {\it Prionospio} species~under~steen strupi~group~collected~through~FORVSS~surveys$ 

	Cruise /Station		Latitude	Longitude	Depth	Prionospio	Р.	P.	<i>P</i> .	P.	P.	P.	<i>P</i> .	P.
Region	No.	Locality	(N)	(E)	(m)	andamanensis	bocki	cornuta	ehlersi	henriki	komaeti	nielseni	neenae	phuketensis
		Little												
		Andaman												
AI	292/5	Is.	10.67	92.30	63				✓		✓	✓		✓
		Little												
	292/4;	Andaman												
AI	261/3B	Is.	10.67	92.23	111			✓	$\checkmark$			✓	✓	
		Little												
	292/3;	Andaman												
AI	261/3C	Is.	10.66	92.20	185				$\checkmark$		✓			
		Little			_			_			_			
		Andaman												
AI	292/50	Is.	10.68	92.68	49	✓	✓							
		Little												
		Andaman												
AI	292/52	Is.	10.67	92.74	225				✓			✓		
	292/7;	Duncan												
AI	261/6A	Passage	11.25	92.45	61	✓		✓	✓		✓			
		Duncan												
AI	292/8	Passage	11.25	92.44	160		✓		✓		✓	✓		
	292/9;	Duncan												
AI	261/6C	Passage	11.26	92.41	100				$\checkmark$					
		South												
AI	292/13	Andaman	11.78	92.48	59				✓				✓	✓
		South												
AI	292/12	Andaman	11.79	92.37	100				1					✓
	292/11;	South												
AI	261/7C	Andaman	11.79	92.33	208		✓		✓		✓	✓		✓
	292/15;													
AI	261/10B	Spike Is.	12.25	92.31	100			✓					✓	
		Port												
AI	292/21	Andaman	12.66	92.56	68	✓	✓		1		✓	✓		
		Port												
AI	292/20	Andaman	12.67	92.40	119	✓			✓					

	202/10	Port	10.65	02.25	200	,								
AI	292/19	Andaman Interview	12.67	92.37	208	✓								
AI	292/22	Is.	12.93	92.47	101	✓			✓			✓		
		Interview	42.02	0.5.40		,								
AI	292/24	Is.	12.93	92.40	224	✓								
AI	292/25; 261/14A	North Andaman	13.52	92.78	52		✓	✓	✓				✓	
		North									,			
AI	292/26	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	✓		✓	<b>√</b>		✓	✓		✓
AI	292/49	Rutland Is.	11.47	92.72	57	✓		✓				✓	✓	✓
NI	292/59	Car Nicobar Is.	9.30	92.79	55									<b>√</b>
		Car												,
NI	292/58	Nicobar Is.	9.30	92.82	107	✓								✓
NI	292/57	Car Nicobar Is.	9.30	92.87	222				✓					
		Car				,								
NI	292/62	Nicobar Is.	9.29	92.67	220	✓			✓					<b>√</b>
NI	292/67	Katchall Is.	8.00	93.25	200			✓	✓					✓
NI	292/70	Nancowry Is.	8.00	93.64	58			✓						

		Great									
NI	292/75	Nicobar Is.	7.00	93.96	50		✓				
		Great									
NI	292/77	Nicobar Is.	7.04	93.96	230			✓			
		Great									
NI	292/84	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