

TWO NEW RECORDS FROM THE FAMILIES POLYNOIDAE AND IPHIONIDAE IN THE MARINE WATERS OF VIET NAM

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Abstract: This paper presents two new records of scale-worms found in dead coral substrates from biodiversity surveys conducted on coral reefs in Northern Vietnam (Oparin 2021), and the emerging and submerged banks and offshore islands in South Vietnam (Oparin 2023). The species *Iphione ovata* Kinberg, 1865 from the family Iphionidae was recorded at Bach Long Vy Island (Hai Phong) and Bishop 2 (Binh Thuan) and *Hyperhalosydna striata* Kinberg, 1865 (Polynoidae) was collected at De Britto (Vung Tau offshore). The paper also describes the identifying characteristics of the two species, accompanied by images.

Keywords: new records, scale-worms, Polynoidae, Iphionidae, polychaetes, Vietnam.

1. INTRODUCTION

The study of marine biodiversity, particularly in coral reef ecosystems, is increasingly important given the challenges faced by marine environments. Polychaetes, especially scale-worms from the families Polynoidae and Iphionidae, play a crucial role in benthic ecosystems, particularly as detritivores and prey for other marine animals. This paper presents new records of two scale-worm species found in coral reef areas of Vietnam, collected during biodiversity surveys in the North (Oparin 2021) and in the submerged banks and offshore islands in the South (Oparin 2023). These species include *Iphione ovata* Kinberg, 1865 (Iphionidae) and *Hyperhalosydna striata* Kinberg, 1865 (Polynoidae).

The families Polynoidae and Iphionidae are characterized by having scale-like structures called elytra that cover their dorsal surface, often displaying a variety of colors and patterns. Polynoidae is one of the most diverse families of polychaetes, with over 160 described species [1]. They inhabit diverse marine environments, from intertidal zones to deep-sea areas, and play a significant role in the marine food web [2]. The family Iphionidae is less studied compared to Polynoidae, consists of 4 genera and a total of 11 species, with the genus *Iphione* containing 7 species [1]. They are often found in deep-sea or more extreme marine environments, such as the Pacific Ocean's hydrothermal vent systems with high temperatures or low oxygen levels [2]. *Iphione muricata* is a species commonly recorded in Vietnam.

2. MATERIALS AND METHODS

The scale-worm specimens in this study were collected from two surveys: (1) *Investigating biodiversity of offshore benthic communities and toxicity of Zoanthid corals and related microalgae*, code QTRU02.09/21-22; (2) *The emerging and submerged banks, offshore islands, and deep-sea waters in South Vietnam*, code QTRU02.03/23-24.

At each survey station, a 1/10 m² quadrat was placed on the dead coral substrate by diving. All dead coral within the quadrat, including small blocks and rubble, was collected and brought aboard the boat for processing. The coral was then broken apart, and all benthic organisms were sieved and extracted. The samples were fixed in 70% ethanol and transferred to the laboratory for further analysis.

Classification of the species *Hyperhalosydna striata* is based on [2], [3], and *Iphione ovata* on [4]; [5].

3. RESULTS

3.1. Checklist of species recorded in Vietnam

In the Polynoidae family, Gallardo (1968) was among the first to study the Polynoidae family in Vietnam during the NAGA expedition,

recording four species [6]. Averincev and Uschakov (1977) discovered two new species of the genus *Lepidasthenia* in the Gulf of Tonkin, specifically *Lepidasthenia strelkovi* and *Lepidasthenia vietnamica* [7]. This highlights the diversity of polychaete worms in this region. Additionally, Britayev and Fauchald (2005) identified a new species, *Asterophilia culcitae* [8]. Britayev and Antokhina (2012) conducted an in-depth study of symbiotic polychaete species in the shallow waters of Nha Trang Bay, identifying 13 species belonging to the Polynoidae family [9]. This research not only increased the number of known species but also expanded the understanding of the ecological diversity of this group.

In 2015, Phan Thi Kim Hong compiled research on the species diversity of the Polynoidae family, including unpublished studies in Nha Trang Bay, and listed 13 species found in the area [10]. However, this compilation did not incorporate data from the studies mentioned above. In addition, some studies in the waters of Northern Vietnam, Quảng Ninh - Hải Phòng, Bình Định, etc., have also recorded the presence of species from the family Polynoidae [11-15]

Table 1. Lists of species of both Polynoidae and Iphionidae families that have been recorded in the waters of Viet Nam

	<i>Species</i>	<i>Reference</i>
I	Family Polynoidae	
1	<i>Asterophilia culcitae</i> Britayev & Fauchald, 2005	[8], [9]
2	<i>Australaugeneria michaelsoni</i> Pettibone, 1969	[9]
3	<i>A. rutilans</i> (Grube, 1878)	[9]
4	<i>Drieschia pelagica</i> Michaelsen, 1892	[10]
5	<i>Eunoe pallida</i> (Ehlers, 1908)	[12]
6	<i>Gastrolepidia clavigera</i> Schmarda, 1861	[9], [10]
7	<i>Harmothoe dictyophora</i> (Grube, 1878)	[6], [10], [18]
8	<i>H. holothuricola</i> Izuka, 1912	[6], [10]
9	<i>Hermenia acantholepis</i> (Grube, 1876)	[10]
10	<i>Heteralenticia ptycholepis</i> (Grube, 1878)	[9]

	Species	Reference
11	<i>Hololepidella laingensis</i> Britayev, Doignon & Eeckhaut, 1999	[9]
12	<i>H. millari</i> Britayev, Doignon & Eeckhaut, 1999	[9]
13	<i>Hololepidella</i> sp.	[9]
14	<i>Lepidasthenia grimaldii</i> (Marenzeller, 1892)	[10]
15	<i>L. izukai</i> Imajima & Hartman, 1964	[6], [10]
16	<i>L. strelkovi</i> Averincev & Uschakov, 1977	[7]
17	<i>L. vietnamica</i> Averincev & Uschakov, 1977	[7]
18	<i>Lepidonotus carinulatus</i> (Grube, 1869)	[10],[14], [11]
19	<i>L. hedleyi</i> Benham, 1915	[13]
20	<i>L. jacksoni</i> Kinberg, 1855	[10]
21	<i>L.s tenuisetosus</i> (Gravier, 1902)	[10], [15]
22	<i>Ophthalmonoe pettiboneae</i> Petersen & Britayev, 1997	[9]
23	<i>Paradyte crinoidicola</i> (Potts, 1910)	[9], [10]
24	<i>P.e levis</i> (Marenzeller, 1902)	[9]
25	<i>Paralentia annamita</i> (Fauvel, 1934)	[10]
26	<i>Paralepidonotus ampulliferus</i> (Grube, 1878)	[10], [15]
27	<i>P. indicus</i> (Kinberg, 1856)	[10], [11]
28	<i>Pararctonoella aphthalma</i> (Gallardo, 1968)	[6], [10]
29	<i>Pottisiscalisetosus praelongus</i> (Marenzeller, 1902)	[9]
30	<i>Subadyte pellucida</i> (Ehlers, 1864)	[10]
31	<i>Thormora jukesii</i> Baird, 1865	[10]
32	<i>Uncopolynoe corallicola</i> Hartmann-Schröder, 1960	[9]
33	<i>Hyperhalosydna striata</i> (Kinberg, 1856)	This study
II Family Iphionidae		
1	<i>Iphione muricata</i> (Lamarck, 1818)	[10], [11]
2	<i>I.ovata</i> Kinberg, 1856	This study

The *Iphione* genus consists of highly distinctive scale-worms characterized by their elliptical shape, resembling chitons. Adults typically measure between 1 to 3 cm in length and have up to 39 segments [16]. In the East Sea, three species have been identified: *Iphione malifera*, *I. muricata*, and *I. ovata* [17]. Among these, *I. muricata* is the most frequently recorded species in Viet Nam. Its presence has been confirmed in studies by [10], [11].

Thus, a total of 32 species from the family Polynoidae and 1 species from the family Iphionidae have been recorded in Viet Nam (Table 1). This notable number highlights the biodiversity of the Vietnamese marine environment.

3.2. Two new records of scale-worm species

Family Iphionidae Kinberg, 1856

Genus *Iphione* Kinberg, 1856

***Iphione ovata* Kinberg, 1856, Figure 1a-h**

Specimen collection: Two specimens of *Iphione ovata*, designated as voucher ID 58141 and K198, were analyzed. Specimen ID 58141 was collected at Bishop2 station (9.7177°N, 108.1039°E, Binh Thuan Province) in 2023, from coral reef rubble at a depth of 17m. Specimen ID K189 was collected at Bach Long Vy Island (20.13674°N, 107.72263°E) in 2021, from dead coral at a depth of 10m. These specimens provide valuable data for the study of *Iphione ovata* in the waters of Viet Nam.

Description: *Iphione ovata* has an elongated, oval-shaped body measuring up to 15 mm in length in specimen ID 58141 and 12 mm in specimen ID K189. The prostomium (Fig. 1c) with an occipital papilla is located right in the middle of the rounded nuchal fold on the buccal segment, covering the posterior part of the prostomium. Two pairs of eyes are found on the posterior half of the prostomium, with the anterior pair positioned at or near the widest part and the posterior pair located in front of the hind margin of the prostomium. Lateral antennae are papillate and slightly longer than the ceratophores, tapering to a distinct terminal filum.

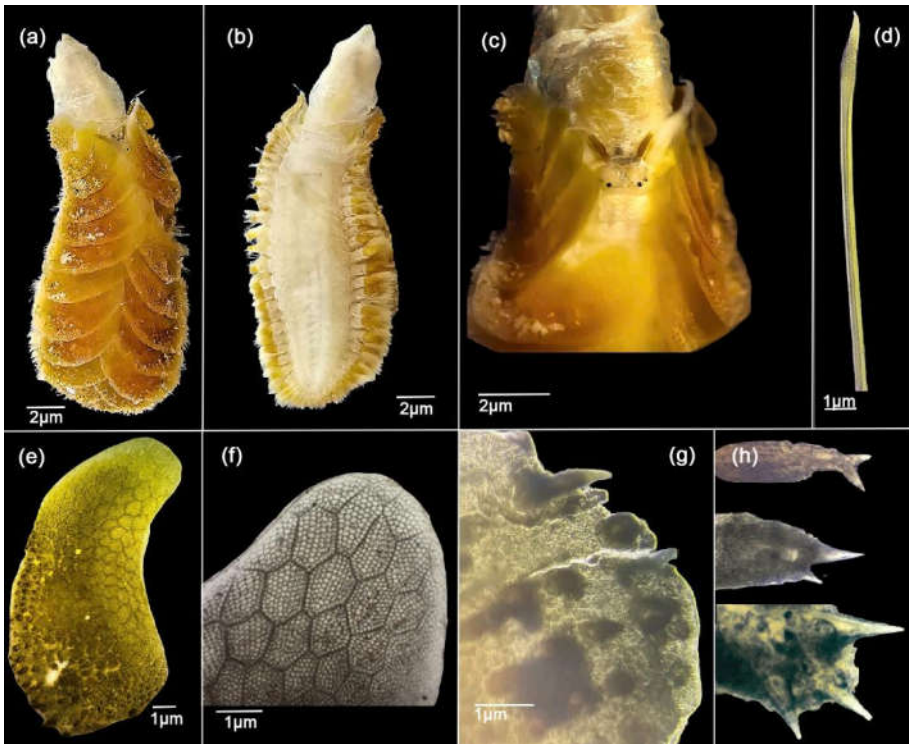


Figure 1a-h. *Iphione ovata* (ID 58141): (a). Dorsal view; (b). abdomen view; (c). anterior end; (d). neurochaetae are unidentate; (e). 5th right elytron without lateral fringe of papillae; (f). small polygonal areas on elytra; (g). macrotubercles on elytra surface; (h). anterior end of spine-like macrotubercles.

There are 13 pairs of elytra that are yellowish, with smooth margins and macrotubercles arranged in 3-8 rows along the posterior and lateral regions of the elytra (Fig. 1e). The tips of the macrotubercles slightly surpass the borders of the elytra (Fig. 1e), each macrotubercle having a spinulose surface with 1-3 spines at the tips (Fig. 1h). Notochaetae are very abundant, transparent, and delicate, with capillaries bearing series of transverse funnel-shaped spinose rows, and the tips are bare. Neurochaetae are unidentate, thick, basally smooth, swollen subdistally, with rows of fine transverse denticulations that do not surpass the swollen region of the chaeta, and the tips are falcate and sharp (Fig. 1d). The

pharynx is exposed with brownish, sharp jaws, each bearing two accessory denticles (Fig. 1a-b).

Remark: *Iphione ovata* is distinguished from other species by the following features: Elytra lack a lateral fringe of papillae; Elytral macrotubercles are spine-like and organized in 3 to 8 concentric rows; Neurochaetae are unidentate, as indicated by [5]. The mentioned features were observed from the specimens collected in this study.

Ecology and distribution: *Iphione ovata* has a wide distribution across the Indo-Pacific region, including the Red Sea, Madagascar, Maldives, the Persian Gulf, Australia, Hawaii, the Caroline Islands, the Gulf of California, Clipperton Island, and western Mexico, inhabiting shallow waters with rocky substrates or mixed coral rubble [5]. In Viet Nam, this species was recorded in coral rubble at Bach Long Vy Island (Hai Phong) and Bishop 2 Bank (Binh Thuan), at depths of 10-17 meters .

Family Polynoidae Kinberg, 1856

Genus *Hyperhalosydna* Augener, 1922

***Hyperhalosydna striata* (Kinberg, 1856), Figure 2a-d.**

Specimen collection: A single specimen of *Hyperhalosydna striata*, designated as voucher ID 58146, was analyzed. Specimen ID 58146 was collected at De Britto 1 station (10.48475°N, 107.83133°E) in 2023, from coral reef rubble at a depth of 10 meters.

Description: The body is elongated, flattened, and tapers at both the anterior and posterior ends, measuring 30-42 mm in length and 4-7 mm at its widest point. The body is tinged with reddish-brown pigment on the ceratophores, cirrophores, and the styles of the antennae and cirri. There are 22 pairs of elytra on segments 2, 4, 5, 7, 9, and alternate segments up to 39, 41, and 42. The elytra from the mid-body to the posterior are large, overlapping medially and posteriorly, covering the dorsum. The elytra exhibit five reddish-brown longitudinal stripes and a white spot above the

elytrophore. The surface of the elytra is smooth except for a band of numerous microtubercles along the outer edge (Fig. 2).

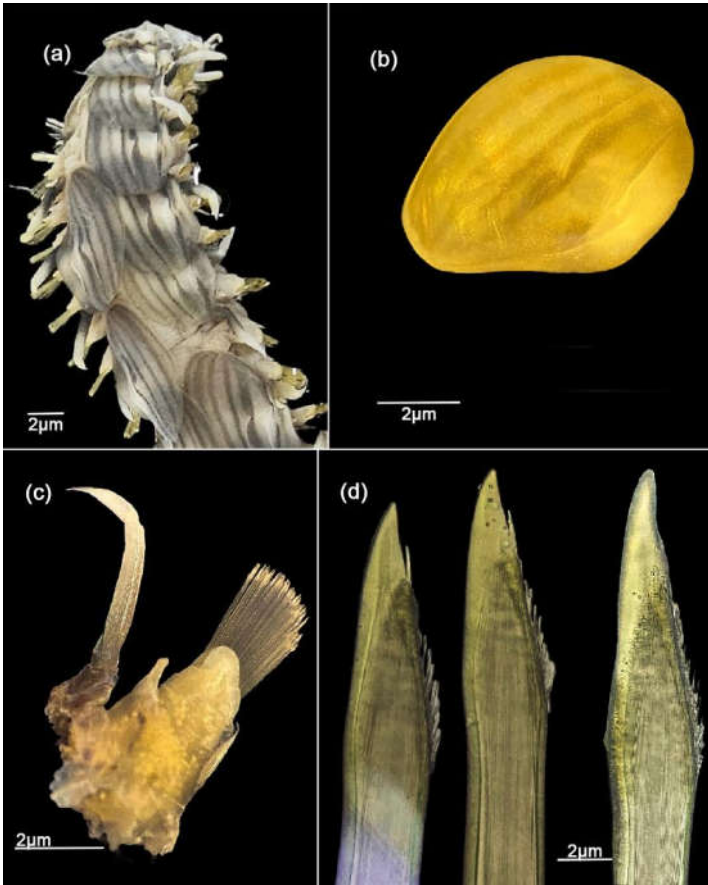


Figure 2. *Hyperhalosydna striata*: (a). Anterior end with elytra, dorsal view; (b). 5th right elytron; (c). Segment 14; (d). Neurochaeta from segment 14;

Remark: *Hyperhalosydna striata* can be easily distinguished from its congeners by distinct morphological characteristics, notably the presence of reddish-brown longitudinally striped elytra. The number and morphology of the uniquely striped elytra are entirely consistent with previous redescriptions by [2], [3], [19].

Ecology and distribution: *Hyperhalosydna striata* is found in the eastern Asian seas [19] and has also been recorded in the Indian Ocean [9]; the Red Sea; the Persian Gulf; the Indo-West Pacific region [2]; The species is also known from the southern waters of South Korea; More specifically, *Hyperhalosydna striata* has been recorded in the following regions: the East Sea; Socotra Island and the Arabian coast; Australia; Japan [2]. This species inhabits coral reefs (coral rubble), lives in symbiosis with sponges, and coexists with eunicid polychaetes, at depths of 8-95 meters [2] [19]. This observation aligns with previous research mentioning commensal associations by [19] [3]. Notably, *Hyperhalosydna striata* has been closely associated with eunicid polychaetes, as confirmed by [3]. In Việt Nam this species was recorded from coral reef rubble at De Britto (Vung Tau offshore).

4. CONCLUSION

This paper describes the morphology and provides new information on the distribution of the scale-worms *Iphione ovata* and *Hyperhalosydna striata* in Vietnam. Along with the 33 species recorded in previous studies, these findings bring the total number of polychaete species from the families Polynoidae and Iphionidae to 35. These discoveries highlight the importance of continued research into marine biodiversity, particularly polychaetes, to gain a deeper understanding of Vietnam's marine ecosystems.

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