Indian Journal of Geo Marine Sciences
Vol. 51 (12), December 2022, pp. 982-984
DOI: 10.56042/ijms.v51i12.4292

Short Communication

First record of two parasitic isopods of the family Cymothoidae from Odisha coast, India

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Received 24 June 2022; Revised 11 December 2022

The present paper deals with the first report of the parasitic isopod *Cymothoa frontalis* Milne Edwards, 1840 found attached to host fish *Strongylura strongylura* (van Hasselt, 1823) collected from Chandanipal fish landing Centre, Dhamara, and *Nerocila exocoeti* Pillai, 1954 found attached to host fish, *Exocoetus volitans* Linnaeus, 1758 collected from Aryapalli fish landing centre, Gopalpur-on-Sea. The reports constitute first material evidence of the two parasites from the coastal waters of Odisha, India.

[**Keywords**: Isopods, *Cymothoa frontalis*, *Nerocila exocoeti*, Odisha coast]

Introduction

Among the 144 families in the order Isopoda, seven are parasitic and the species belonging to the family Cymothoidae are known to parasitize marine, freshwater and brackish water fishes[1,2]. These isopods have been observed attaching to mouth, branchial cavity and body surface of the fish. The Cymothoidae contains approximately 42 genera, of which 16 genera have been documented from India[2]. Study on marine isopods is essential as they play a notable role in the ecological food chain and web, mainly in removing the decaying matter from different ecosystems where they are living around[3]. The study of the parasitic isopods is vital as they infect the body of the host fishes and, therefore, have an impact on the fisheries sector and the aquaculture productivity[4-6]. Seasons, climatic conditions in an area and the salinity may influence the prevalence of these isopods[3]. Therefore, continuous surveys and sampling of parasitic isopods from different ecosystems are essential to know their actual diversity and host preference. The present manuscript reports the two new records of the parasitic isopods *viz*., *Cymothoa frontalis*, and *Nerocila exocoeti* of the family Cymothoidae; an outcome of the constant monitoring along the Odisha coast.

The genus *Cymothoa* of the family Cymothoidae comprises about 43 species worldwide[7]. This genus differs from other Cymothoid genera in having a vaulted body, sub-truncated rostrum, antenna and antennule widely separated and slender, posterior margins of 7th pereonite extending beyond 1st pleonite and with uropod rami not extending beyond the pleotelson margin. In India, 5 species of the genus *Cymothoa* have been reported earlier[2]. The parasitic isopod *Cymothoa frontalis* has been known to infect marine fishes like *Cyclopterus* sp., *Strongylura strongylura* and *S. leiura*[8].

Similarly, 12 valid species of the genus *Nerocila* have been reported earlier from India[2,9]. The genus *Nerocila* can be identified by the presence of a dorsoventrally flattened, non-vaulted body with trilobed posterior margin of cephalon, antenna larger than antennule, posterolateral margins of pereopod 6 and 7 produced, uropod rami crossing the margin of pleotelson, endopod smaller than the exopod[2,9]. The species *N. exocoeti* has been known only from the host fishes of the family Exocoetidae and Hemiramphidae[2].

Materials and Methods

The specimens of isopod *C. frontalis* were collected from the host fish *Strongylura strongylura* from Chandanipal fish landing centre (20°47′13″ N; 86°57′20″ E), Dhamara, Odisha, on October 2021. Whereas, the specimen of *N. exocoeti* was collected from the Aryapalli fish landing centre (19°19′01″ N; 84°58′46″ E), Gopalpur-on-sea, Odisha, on November 2021. The parasite *N. exocoeti* was found attached to the host fish *Exocoetus volitans* captured through drag net. The isopods were identified following the identification key and descriptions provided in literatures[2,8]. The identification of host fishes was done by following the standard identification features[10]. These isopods were preserved in 70 % ethanol for further study and are registered at National Zoological Collection (NZC), Estuarine Biology

Table 1 — Morphometric measurements and meristic count of different parasitic isopods

Characters	*Cymothoa frontalis* EBRC/ZSI/Cr-13339	*Nerocila exocoeti* EBRC/ZSI/Cr-13341
Total length (in mm)	11.2 – 22	21.0
Total width (in mm)	6.0 – 8.2	10.0
Cephalon length (in mm)	2.1 – 3.2	2.5
Cephalon width (in mm)	3.0 – 3.2	3.1
Eye diameter (in mm)	1.0 – 1.2	0.8
Pleotelson length (in mm)	3.8 – 4.0	5.0
Pleotelson width (in mm)	5.0 – 7.5	5.1
Number of pereonite	07	07
Number of pleonite	05	05

Regional Centre (EBRC), Zoological Survey of India (ZSI), Gopalpur-on-Sea, Odisha.

Results

The morphometric measurements of body parts of the reported isopods are provided in Table 1. The images of the host along with the isopods are provided in the Figure 1. The brief description of the isopods under consideration is provided below.

***Cymothoa frontalis* Milne Edwards, 1840**

Materials examined: 04 ex.; Sex: female; registration number (Reg. No.): EBRC/ZSI/Cr-13339.

Description: Body is vaulted, greyish black; chromatophores densely distributed on the distal margins of all the pereonites (1–7) and pleonites lighter in colour in the posterior part. The size of body is about 3.8 times as long as wide. The frontal margin of the head is truncated. Eyes not distinctly visible. Both antennule and antenna reaching a little beyond the middle of cephalon. Antennule is stout having 8 articles. Antenna bears 9 articles. Anterolateral projection short, not reaching half of the cephalon. The Coxae 2 – 7 visible dorsally. The pereonite 1 – 7 decreasing in length. The posterolateral angle of pereonites not produced. None of the pleonites concealed by pereonite 7. Width of pereonite increasing from pleonite 1 – 5. The pleotelson is rounded and 1.3 time as wide as long, and rounded in shape. Pereopods without spine. Uropod not reaching upto the margin of pleotelson. Uropodal endopod larger than exopod (Fig. 1b – d).

***Nerocila exocoeti* Pillai, 1954**

Materials examined: 01; Sex: female (Reg. No.: EBRC/ZSI/Cr- 13341)

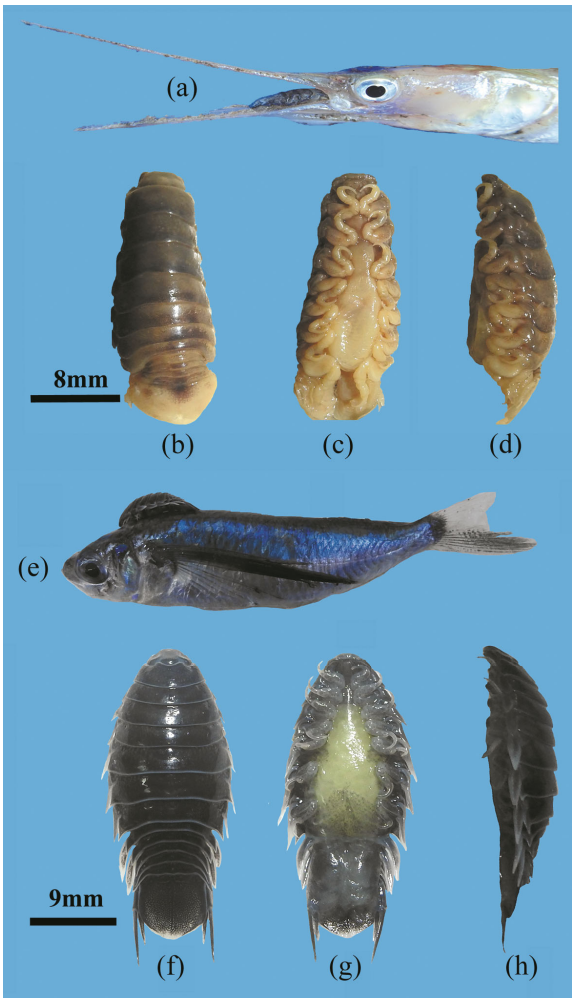

Fig. 1 — (a) *Cymothoa frontalis* attached to the buccal cavity host *Strongylura strongylura*, (b) Dorsal view, (c) Ventral view, (d) Lateral view of *Cymothoa frontalis*; (e) *Nerocila exocoeti* attached to the host *Exocoetus volitans*, (f) Dorsal view, (g) Ventral view, (h) Lateral view of *Nerocila exocoeti*

Description: Body elongated with steel blue colouration dorsally. The length of the parasite is 2.41 times as elongated as width. Eyes are not distinct with facet. Coxae visible in dorsal view. Coxae 5^{th} – 7^{th} extending beyond pereonites. Posterolateral angle of pereonite 1 – 4 not produced, posterolateral angles of pereonite 6 and 7 produced and acute, 5^{th} pereonite has produced posterolateral angle but is not acute. Pereonite 7 not concealing pleonite 1. All pleonites sub-equal in width. The pleotelson is about as long as wide and having a caudomedial point. Antennule is 8 articled. Antenna with 10 articulations. The exopod is about 1.42 times longer than the endopod. The endopod is not extending beyond the posterior margin of the pleotelson. The exopod extending beyond the pleotelson (Fig 1f – h).

Discussion

The species *C. frontalis* has been reported earlier from the southeast coast of India, the Indian Ocean, the West coast of Australia, Singapore, and Bangkok[2]. The complete life cycle of the species *C. frontalis* was described in the host fish species *S. strongylura*[8]. The current record of the species *C. frontalis* from the buccal cavity of the same host from the coastal water of Odisha, India, clearly indicates the high site and host specificity of the said parasite. The species *C. frontalis*, due to its site and host specificity, can be used as a model organism to understand the different aspects of host and parasite relationships[8]. The parasite *N. exocoeti* has been reported earlier from the coastal waters of West Bengal, Southern India, Indonesia, Papua New Guinea, and Taiwan[3]. The current records of these two parasites provide the first material evidence of their occurrence along the Odisha coast.

Acknowledgements

Authors would like to acknowledge the working facilities provided by Dr. Dhriti Banerjee, Director, ZSI. The communicating author likes to acknowledge the support extended by the Berhampur University, Odisha and SERB, DST, Government of India (File No. EEQ/2021/000048).

Conflict of Interest

Authors don't have any conflict of interest.

Author Contributions

SKM & SR: Collection, preservation, identification and manuscript preparation; AG: Collection and preservation; JKS: Identification and manuscript preparation; and BT & AM: Critical analysis of the manuscript.

Ethical Statement

The organisms under the study are not under schedule list/protection categories, thus ethical clearance certification is not applicable.

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