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Mysids (Crustacea) from the Exclusive Economic Zone of India with description of a new species

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Running head: Mysids from the EEZ of India

Abstract

Mysid crustaceans, representing twenty–seven species belonging to twenty–one genera, are reported from the Exclusive Economic Zone (EEZ) of India; one of these species *Pseuderythrops abrahami* sp. nov. is described as new. The new species is easily distinguished from all the known species of the genus *Pseuderythrops* by the irregularly lobed cornea of the eye, narrow upturned rim of the anterior region of carapace and the absence of distal suture on the antennal scale. Three species, *Boreomysis plebeja, Anchialina media* and *Synerythrops intermedia*, are new records for Indian waters. *Rhopalophthalmus indicus* and *Euchaetomera glyphidophthalmica* are recorded for the first time from the Bay of Bengal. The morphological differences shown by the present specimens from the published descriptions are discussed and a note on the distribution of each species is given.

Keywords**;** *Crustacea, mysids, taxonomy, new species, Indian EEZ*

Introduction

Mysids are one of the major constituents of zooplankton, occupying a wide variety of aquatic environments. They play an important role in the ecological system and their role in the food chain which has been well documented (Mees et al. 1994; Moffat 1996). The works of Hansen (1910), W. Tattersall (1922), and Pillai (1973) provided much information on the taxonomy of mysids from the Indian Ocean. The foundation of our knowledge on the Indian mysids was for the first time set out by Pillai (1973) when he published the 'Mysidacea of the Indian Ocean' based on materials collected from epipelagic waters down to 200 m during the International Indian Ocean Expedition (IIOE). Subsequently Panampunnayil (1999, 2002), Panampunnayil and Biju (2006), and Biju and Panampunnayil (2009) studied the ecology and taxonomy of mysids from various areas of Indian waters. Even though geographical distribution and quantitative abundance of mysids has been studied in some detail in some of the world oceans (Mauchline 1980), the mysid fauna of the Indian Ocean has been poorly investigated.

The Exclusive Economic Zone (EEZ) of India spans an area of 2.02 million square kilometers, representing two–thirds of Indian land mass. This zone includes the Arabian Sea, Bay of Bengal and the Andaman Sea. The distribution and abundance of mysids in general in the EEZ of India has been presented by Mathew et al. (1989). Apart from this study, no other information is available on the mysids from this area of Indian waters. The present paper deals with 27 species of mysids collected from the EEZ of India, of which one species *Pseuderythrops abrahami* is described as new. A note on the distribution, morphological comments and distinctive features are given for each species. The type specimens are lodged in the Reference Collection of the Indian Ocean Biological Centre (IOBC), National Institute of Oceanography (NIO), Kochi.

Materials and methods

The materials for the present study are based on samples collected in the Arabian Sea, Bay of Bengal and the Andaman Sea (Figure 1) during different cruises of the research vessel, *FORV Sagar Sampada* as part of a multidisciplinary project entitled "Marine Research on Living Resources (MRLR) Assessment Programme" funded by Ministry of Earth Science, New Delhi, India. Details of sampling locations and cruises are given in Table I. A total of 1661 zooplankton samples were collected at five different depth strata (surface to top of thermocline, top of thermocline to bottom of thermocline, bottom of thermocline to 300 m, 300–500 m and 500–1000 m) using Multiple Plankton Net (MPN) (Hydrobios - mesh size 0.2 mm and mouth area 0.25 m^2) and surface using Bongo net (BN) (Hydrobios - mesh size 0.3 mm; filtering cone length 250 cm; ring diameter 60 cm). The plankton samples were fixed in 5% buffered formaldehyde - seawater solution and preserved prior to subsequent analysis.

In the laboratory, mysids were sorted and classified according to the degree of development of secondary sexual characteristics (Mauchline 1980). For each category the following criteria were used: juveniles (individuals without secondary sexual characteristics), adult males (well-developed appendix masculina), immature males (appendix masculina present but not setose), adult females (well-developed marsupium), and immature females (with incompletely developed marsupium). Adult females were also categorized according to reproductive condition- females with eggs/embryo, females with eyeless larvae, females with eyed larvae and spent females. Total length of the specimens was measured (from the tip of the rostral plate along the dorsal surface to the tip of the telson, excluding spines) using a binocular microscope fitted with a micrometer eyepiece.

Results

From the 105 stations in the Indian EEZ, a total of 1661 zooplankton samples were analyzed. (760 from the Arabian Sea, 590 from Bay of Bengal and 311 from the Andaman Sea). Mysids were present in 249 samples, of which 102 were from the Bay of Bengal, 89 from the Arabian Sea and 58 samples were obtained from the Andaman Sea. Twenty-seven species of mysids belonging to 21 genera were recorded from the sampling area, of which one species, *Pseuderythrops abrahami*, is described as new. Three species, *Boreomysis plebeja*, *Anchialiana media* and *Synerythrops intermedia* were new records for Indian waters. *Pseudanchialina pusilla* was the most abundant species, constituting 64.8% of the total mysid population density followed by *Siriella gracilis* (27.2%); all the other species contributed less than 8.0%.

The average population density of mysids in the study area (to a depth of 1000 m) investigated was estimated to be 687.5 ± 3393.4 ind./1000 m^3. In terms of mysid population density, the Arabian Sea (ave. 957.6 ± 3548.5 ind./1000 m^3) was more abundant than Bay of Bengal (ave. 490.3 ± 1354.9 ind./1000 m^3) and the Andaman Sea (ave. 524.6 ± 3139.8 ind./1000 m^3). Maximum species richness were observed in the Arabian Sea (17) followed by Andaman Sea (12) and the Bay of Bengal (9). Population density of mysids showed considerable day (ave. 353.6 ± 1484 ind./1000 m^3) and night (ave. 1853.5 ± 5043.5 ind./1000 m^3) variation; there was an increase by 84% in the night samples over the day samples.

Taxonomy

Order Mysida

Family Mysidae

Subfamily Boreomysinae Holt & Tattersall

Genus *Boreomysis* G.O. Sars

Boreomysis plebeja Hansen, 1910

(Figure 2A, B)

Boreomysis plebeja Hansen 1910: 24–25, plate 2, Figure 2a–d; Illig 1930: 414, 560; O. Tattersall 1955: 68, 74, Figure 11 A; Ii 1964: 35, Figures 5–6.

Materials examined

Bay of Bengal: 1 immature female, Sta. 1351 (13°N, 82°E), 1000–500 m, MPN, 15 July 2003, MRLR-Cr. 215.

Length: immature female 6.2 mm

Remarks: The original description (Hansen 1910) of this species was based on an immature female collected from Indonesia. Even if there are some minor variations, the present specimen agrees well with the type specimen. In the present specimen the antennal scale just reaches the tip of antennular peduncle (Figure 2A) while in type specimen antennal scale and antennular peduncle are in same length. In the type specimen, Hansen did not mention the spines on the uropod, whereas in present specimen there is a single spine on the endopod of uropod, just distal to the statocyst (Figure 2B), as in Ii's description (O. Tattersall illustration showed two spines on the endopod of uropod of immature male specimen). Ii (1964) described two semiglobular protuberances on the dorsal median line at the posterior region of the carapace, while it is absent in the present specimen. In the present specimen, ocular papillae are short as in type specimen whereas in Tattersall's immature male specimen, ocular papillae are long and extend beyond the anterior margin of the cornea. Largest specimens of this species (a sub-adult male, 12.4 mm and an immature female, 14 mm) were collected from Southern Atlantic (O. Tattersall 1955).

This species is easily distinguished from allied species of this genus by the shape and armature of the telson (Figure 2B).

Geographic distribution: *Boreomys plebeja* is a cosmopolitan deepwater form. Hitherto, it was recorded from south–east of Halmahera (Indonesia) (Hansen 1910), Benguela current to the North

West of Cape Town (Southern Atlantic) (Illig 1930), Benguela current from west of the Orange River estuary and west of Walvis Bay (O. Tattersall 1955), and Tokyo Bay and Suruga Bay, Pacific side of central Japan (Ii 1964). This species is recorded for the first time from Indian waters and extends its distribution eastwards in the Indian Ocean.

Subfamily Siriellinae Czerniavsky

Genus *Siriella* Dana

Siriella thompsonii (H. Milne-Edwards, 1837)

(Figure 2C,D)

Cynthia thompsonii H. Milne-Edwards 1837: 462.

Cynthia inermis Kroyer 1861: 44, Figure 6a–g.

Siriella indica Czerniavsky 1882: 103, Taf. 31, Figures 1–16.

Siriella thompsonii, Sars 1884: 40– 41; Thiele 1905: 447– 449, Figures 7–9; Hansen 1910: 31; Colosi 1919: 5–6; 1920: 235; 1922: 1–22; 1924: 3; W. Tattersall 1913: 870–871; 1923: 280; 1926: 9; 1939: 234; 1943: 63–64; 1951: 60–61; Illig 1930: 419; Coifmann 1937a: 2; 1937b: 21–23, plate 8, Figure 12a–e, plate 9, Figure 12f–g; Holmquist 1957: 44–45; Birstein and Tchindonova 1962: 65; O. Tattersall 1962: 223–225, plate 2; Pillai 1973: 47, Figures 15–16; Stuck et al. 1979: 234, Figures 2f, 3f, 4f, 5f; Price et al. 1987: 47; Escobar-Briones and Soto 1991: 80–89; Wittmann and Stagl 1996: 162–163; Wang and Liu 1994: 84–86, Figure 11; 1997: 203; Liu and Wang 2000: 87–89, Figure 12; Panampunnayil 2002: 371–372, Figure 1A–C; Murano and Fukuoka 2008: 41–45.

Materials examined

Arabian Sea: 1 immature female and 1 juvenile, Sta. 1477 (8°N, 76°E), BN, 20 March 2004, MRLR-Cr. 223; 1 mature male and 1 spent female, Sta. 1479 (8°N, 74°E), BN, 21 March 2004, MRLR-Cr. 223; 1 mature male and 1 immature female, Sta. 1481 (8°N, 72°E) BN, 22 March 2004, MRLR-Cr. 223; 2 mature males, 2 immature males, 2 spent females, 2 females with eyed larvae, 2 immature females and 2 juveniles, Sta. 1482 (8°N, 71°E) BN, 24 March 2004, MRLR-Cr. 223; 1 juvenile, Sta. 1489 (10°N, 75° 17'E), BN, 27 March 2004, MRLR-Cr. 223; 1 immature female, Sta. 1496 (13°N, 73°E), BN, 2 April 2004, MRLR-Cr. 223; 2 immature females and 1 juvenile, Sta. 1498 (13°N, 71°E), BN, 2 April 2004, MRLR-Cr. 223; 1 mature male, 1 immature female, 1 immature male and 1 female with eyed larvae, Sta. 1499 (13°N, 70°E), BN, 2 April 2004, MRLR-Cr. 223; 1 immature male, Sta. 1501 (15°N, 71°E), BN, 6 April 2004, MRLR-Cr. 223.

Bay of Bengal: 1 spent female, Sta. 1641 (20° 30'N, 89°E), BN, 21 February 2005, MRLR-Cr. 232; 1 spent female, Sta. 1642 (20° 30'N, 90°E), BN, 21 February 2005, MRLR-Cr. 232; 1 immature male, Sta. 1649 (17°N, 83°E), BN, 26 February 2005, MRLR-Cr. 232; 1 immature male and 2 juveniles, Sta. 1653 (17°N, 87°E), BN, 28 February 2005, MRLR-Cr. 232; 4 mature males, 3 spent females and 2 immature females, Sta. 1657 (15°N, 84°E), BN, 3 March 2005, MRLR-Cr. 232; 1 spent female, Sta. 1658 (15°N, 83°E), BN, 4 March 2005, MRLR-Cr. 232; 2 mature males and 1 spent female, Sta. 1665 (13°N, 83°E), BN, 8 March 2005, MRLR-Cr. 232; 1 mature male and 2 immature males, Sta. 1670 (11°N, 81°E), BN, 11 March 2005, MRLR-Cr. 232; 1 mature male and 2 spent females, Sta. 1671 (11°N, 80°E), BN, 12 March 2005, MRLR-Cr. 232.
Andaman Sea: 1 female with eyed larvae, Sta. 1338 (10°N, 92°E), 9 April 2003, MRLR-Cr. 213; 1 immature male, 1 spent female and 1 juvenile, Sta. 1340 (10°N, 90°E), BN, 10 April 2003, MRLR-Cr. 213; 1 mature male, Sta. 1462 (13° 44'N, 90°E), BN, 1 January 2004, MRLR-Cr. 220.
Length: mature male 4.9–7.5 mm, mature female 5.5–7.7 mm

Remarks: This species belongs to the *thompsonii* - subgroup (Murano and Fukuoka 2008) and can be easily distinguished from allied spcecies by the relative length and acuteness of rostral projection (Figure 2C), the subtruncated apex of the telson, the number of spines arming on the outer margin of the outer uropod and the number of spines on the lateral margin of the telson (Figure 2D).

Geographic distribution: Widely distributed in the tropical Atlantic, Pacific and Indian Oceans.

Siriella gracilis Dana, 1852

(Figure 2E,F)

Siriella gracilis Dana 1852: 655; Sars 1885: 209–210, plate 36, Figures 25–28; Hansen, 1910: 31–32; 1912: 193; Colosi 1919: 6; 1920: 235–236; 1924: 1–7; Illig 1930: 419; Coifmann 1937a: 3; 1937b: 25, plate 10, Figure 14a–e, plate 11, Figure 14; W. Tattersall 1912: 122; 1939: 235; 1951: 62; O. Tattersall 1955: 86; Ii 1964: 72–78, Figure 16; Pillai 1964: 6–7; 1973: 41–42, Figure 12; Taniguchi 1974: 352; Bacescu 1979: 128; Wang and Liu 1994: 78–80, Figure 8; 1997: 202; Jo et al. 1998, 44–45, Figure 10; Liu and Wang 2000: 89–91, Figure 13: Panampunnayil 2002: 372; Fukuoka and Murano 2002: 58; Murano and Fukuoka 2008: 45–49.
Materials examined

Arabian Sea: 4 mature males, 1 female with eyeless larvae, 1 female with eggs, 4 immature females and 7 juveniles, Sta. 1398 (10°N, 69°E), BN, 18 September 2003, MRLR-Cr. 217; 2 mature males and 1 female with eyeless larvae, Sta. 1401 (10°N, 72°E), BN, 19 September 2003, MRLR-Cr. 217; 2 mature males, 1 immature male, 1 spent female, 6 females with eyeless larvae, 1 immature female and 2 juveniles, Sta. 1409 (11° 30'N, 72°E), BN, 24 September 2003, MRLR-Cr. 217; 1 immature male, 1 spent female and 1 immature female, Sta. 1410 (11° 30'N, 71°E), BN, 24 September 2003, MRLR-Cr. 217; 3 mature males, 1 immature male, 2 immature females and 1 juvenile, Sta. 1411 (13°N, 70°E), BN, 25 September 2003, MRLR-Cr. 217; 1 spent female, Sta. 1411 (13°N, 70°E), MPN, 201–68 m, 25 September 2003, MRLR-Cr. 217; 1 juvenile, Sta. 1430 (19°N, 68°E), MPN, 45–0 m, 15 October 2003, MRLR-Cr. 217; 29 mature males, 12 immature males, 22 spent females, 4 females with eyed larvae, 7 females with eyeless larvae, 12 females with eggs, 4 immature females and 18 juveniles, Sta. 1431 (21°N, 66°E), BN, 15 October 2003, MRLR-Cr. 217; 1 female with eggs, Sta. 1431 (21°N, 66°E), MPN, 39–0 m, 15 October 2003, MRLR-Cr. 217; 3 mature males, 3 spent females, 2 females with eyeless larvae, 2 females with eggs and 5 immature females, Sta. 1476 (8°N, 76° 30'E), BN, 19 March 2004, MRLR-Cr. 223; 4 mature males, 1 spent female, 1 female with eyed larvae, 1 female with eyeless larvae, 1 immature female and 5 juveniles, Sta. 1477 (8°N, 76°E), BN, 20 March 2004, MRLR-Cr. 223; 56 mature males, 31 immature males, 7 spent females, 23 females with eyed larvae, 20 females with eyeless larvae, 23 females with eggs, 32 immature females and 26 juveniles, Sta. 1479 (8°N, 74°E), BN, 21 March 2004, MRLR-Cr. 223; 11 mature males, 7 immature males, 5 females with eyed larvae, 9 females with eyeless larvae, 3 females with eggs, 12 immature females and 29 juveniles, Sta. 1481 (8°N, 72°E), BN, 22 March 2004, MRLR-Cr. 223; 22 mature males, 17 immature males, 2 spent females, 12 females with eyed larvae, 9 females with eyeless larvae, 11 females with eggs, 19 immature females, 11 juveniles, Sta. 1482 (8°N, 71°E), BN, 24 March 2004, MRLR-Cr. 223; 1 mature male, 2 spent females and 1 immature female, Sta. 1483 (10°N, 70°E), BN, 27 March 2004, MRLR-Cr. 223; 2 immature males, 1 female with eyed larvae, 1 female with eyeless larvae, 1 female with eggs, 2 immature females and 3 juveniles, Sta. 1487 (10°N, 74°E), BN, 26 March 2004, MRLR-Cr. 223; 4 mature males, 5 immature males, 6 females with eyeless larvae, 3 females with eggs and 2 immature females, Sta. 1489 (10°N, 75° 17'E), BN, 27 March 2004, MRLR-Cr. 223; 1 mature male, 2 spent females, 1 female with eyed larvae, 1 female with eyeless larvae, 2 immature females and 3 juveniles, Sta. 1495 (13°N, 74°E), BN, 1 April 2004, MRLR-Cr. 223; 9 mature males, 4 spent females, 4 females with eyed larvae, 11 females with eyeless larvae, 1 female with eggs, 17 immature females and 14 juveniles, Sta. 1496 (13°N, 73°E), BN, 2 April 2004, MRLR-Cr. 223; 1 mature male, 2 spent females, 2 females with eyed larvae, 2 females with eyeless larvae and 1 female with eggs, Sta. 1498 (13°N, 71°E), BN, 2 April 2004, MRLR-Cr. 223; 34 mature males, 11 immature males, 1 spent female, 1 female with eyed larvae, 16 females with eyeless larvae, 14 females with eggs, 25 immature females and 10 juveniles, Sta. 1499

(13°N, 70°E), BN, 3 April 2004, MRLR-Cr. 223; 5 mature males, 3 immature males, 2 females with eyed larvae, 2 females with eyeless larvae, 4 females with eggs, 7 immature females and 2 juveniles, Sta. 1501 (15°N, 71°E), BN, 6 April 2004, MRLR-Cr. 223; 1 female with eggs, Sta. 1503 (15°N, 73°E), MPN, 31–0 m, 7 April 2004 MRLR-Cr. 223; 1 mature male, 1 spent female, 2 females with eyed larvae and 2 juveniles, Sta. 1504 (15°N, 73° 30'E), BN, 13 April 2004, MRLR-Cr. 223; 1 mature male, 1 immature male, 1 spent female and 1 juvenile, Sta. 1506 (17°N, 70°E), BN, 13 April 2004, MRLR-Cr. 223; 2 mature males and 1 spent female, Sta. 1509 (17°N, 73°E), BN, 15 April 2004, MRLR-Cr. 223; 1 immature female, Sta. 1518 (21°N, 66°E), BN, 23 April 2004, MRLR-Cr. 223; 1 immature female, Sta. 1674 (8°N, 75°E), BN, 28 June 2005, MRLR-Cr. 235; 2 mature males, 1 immature male and 2 immature females, Sta. 1677 (8°N, 72°E), BN, 30 June 2005, MRLR-Cr. 235; 6 mature male, 3 immature males, 1 immature female and 2 juveniles, Sta. 1678 (10°N, 71°E), BN, 30 June 2005, MRLR-Cr. 235; 6 immature males, 5 immature females and 2 juveniles, Sta. 1682 (10°N, 74°E), BN, 1 June 2005, MRLR-Cr. 235; 1 mature male, Sta. 1685 (11° 30'N, 74° 57'E), BN, 4 June 2005, MRLR-Cr. 235; 2 mature males, 1 spent female, 1 female with eyeless larvae, 1 immature female and 2 juveniles, Sta. 1686 (11° 30'N, 74°E), BN, 5 June 2005, MRLR-Cr. 235; 1 mature male and 12 juveniles, Sta. 1688 (11° 30'N, 72°E), BN, 5 June 2005, MRLR-Cr. 235; 1 immature male and 1 immature female, Sta. 1688 (11° 30'N, 72°E), MPN, 36–0 m, 5 June 2005, MRLR-Cr. 235; 2 mature males, 1 spent female, 2 females with eyeless larvae and 2 juveniles, Sta. 1691 (13°N, 71°E), BN, 7 June 2005, MRLR-Cr. 235; 3 immature females and 4 juveniles, Sta. 1693 (13°N, 73°E), BN, 8 June 2005, MRLR-Cr. 235; 7 juvenile, Sta. 1699 (17°N, 71°E), BN, 14 June 2005, MRLR-Cr. 235; 2 mature males, 1 immature male and 2 immature females, Sta. 1703 (19°N, 69°E), BN, 18 June 2005, MRLR-Cr. 235. 1 mature male, 1 immature male, 1 spent female, 2 female with eggs, 1 immature female and 5 juveniles, Sta. 1913 (15°N, 71°E), BN, 2 December 2006, MRLR-Cr. 251; 1 mature male, 4 females with eyed larvae, 5 females with egg, and 12 juveniles, Sta. 1917 (17°N, 71°E), BN, 6 December 2006, MRLR-Cr. 251.

Bay of Bengal: 1 immature male, Sta. 1238 (19°N, 87°E), BN, 15 November 2002, MRLR-Cr. 209; 1 immature female, Sta. 1239 (19°N, 87° 04'E), BN, 15 November 2002, MRLR-Cr. 209; 3 mature males, 2 immature males, 1 spent female, 4 immature females and 2 juveniles, Sta. 1241 (19°N, 89°E), BN, 16 November 2002, MRLR-Cr. 209; 1 immature female, Sta. 1243 (20° 30'N N, 88° 33'E), BN, 17 November 2002, MRLR-Cr. 209; 1 mature male, 1 immature male and 2 juveniles, Sta. 1247 (15°N, 80° 40'E), BN, 23 November 2002, MRLR-Cr. 209; 1 mature male, 1 female with eyeless larvae, 1 female with eggs and 1 immature female, Sta. 1249 (15°N, 82°E), BN, 24 November 2002, MRLR-Cr. 209; 1 juvenile, Sta. 1257 (11°N, 80°E), BN, 29 November 2002, MRLR-Cr. 209; 2 juveniles, Sta. 1356 (15°N, 80° 30'E), BN, 17 July 2003, MRLR-Cr. 215; 1 immature female, Sta. 1357 (15°N, 81°E), BN, 18 July 2003, MRLR-Cr. 215; 1 mature male, Sta. 1642 (20° 30'N, 90°E), BN, 21 February 2005, MRLR-Cr. 232; 2 immature males and 1 juvenile, Sta. 1647 (19°N, 86°E), BN, 21 February 2005, MRLR-Cr. 232; 1 spent female, 2 females with eggs, Sta. 1648 (19°N, 85° 50'E), BN, 25 February 2005, MRLR-Cr. 232; 4 mature males, 2 immature males, 3 females with eyed larvae, 5 females with eggs and 2 juveniles, Sta. 1649 (17°N, 83°E), BN, 26 February 2005, MRLR-Cr. 232; 3 mature males, 1 spent female, 1 female with eggs, 3 immature females and 8 juveniles, Sta. 1650 (17°N, 84°E), BN, 27 February 2005, MRLR-Cr. 232; 1 mature male, 1 spent female and 10 juveniles, Sta. 1653 (17°N, 87°E), BN, 28 February 2005, MRLR-Cr. 232; 2 immature females, Sta. 1653 (17°N, 87°E), MPN, 9–0 m, 28 February 2005, MRLR-Cr. 232; 1 immature male, Sta. 1655 (15°N, 86°E), BN, 2 March 2005, MRLR-Cr. 232; 2 immature males, 2 females with eggs, 2 immature females and 4 juveniles, Sta. 1656 (15°N, 85°E), BN, 3 March 2005, MRLR-Cr. 232; 7 mature males, 16 immature males, 9 spent females, 2 females with eyed larvae, 2 females with eyeless larvae, 5 females with eggs, 18 immature females and 8 juveniles, Sta. 1657 (15°N, 84°E), BN, 3 March 2005, MRLR-Cr. 232; 1 mature male, 1 immature male and 1 spent female, Sta. 1662 (13°N, 80° 47'E), MPN, 143–35 m, 9 March 2005, MRLR-Cr. 232; 1 spent female and 1 immature female, Sta. 1665 (13°N, 84°E), BN, 9 March 2005, MRLR-Cr. 232; 1 immature male, Sta. 1668 (11°N, 83°E), MPN, 60–0 m, 11 March 2005, MRLR-Cr. 232; 1 immature male and 3 immature females, Sta. 1670 (11°N, 81°E), BN, 11 March 2005, MRLR-Cr. 232; 2 immature males, Sta. 1671 (11°N, 80°E), BN, 12 March 2005, MRLR-Cr. 232; 2 mature males, Sta.1882 (19°N, 88°E), MPN, 13–0 m, 24 September 2006, MRLR-Cr. 249; 4 mature males and 5 females with eggs, Sta. 1891 (15°N, 80° 37'E), BN, 7 October 2006, MRLR-Cr. 249; 1 mature male, Sta. 1897 (15°N, 86°E), BN, 9 October 2006, MRLR-Cr. 249; 1 female with eyed larvae, 2 females with eyeless larvae, 6 immature females, Sta. 1902 (13°N, 81°E), BN, 12 October 2006, MRLR-Cr. 249; 2 mature males, 1 immature male and 6 immature females, Sta. 1905 (11°N, 81°E), BN, 15 October 2006, MRLR-Cr. 249; 1 mature male and 1 female with eggs, Sta. 1907 (11°N, 83°E), BN, 15 October 2006, MRLR-Cr. 249; 3 immature male and 1 female with eggs, Sta. 1907 (11°N, 83°E), MPN, 161–18 m, 15 October 2006, MRLR-Cr. 249; 10 mature males, 2 females with eyed larvae, 2 females with eyeless larvae, 2 females with eggs and 4 immature females, Sta. 1908 (11°N, 84°E), BN, 16 October 2006, MRLR-Cr. 249.

Andaman Sea: 10 mature males, 2 immature males, 1 spent female, 1 female with eyed larvae, 1 female with eggs and 38 juveniles, Sta. 1201 (8°N, 90°E), BN, 16 September 2006, MRLR-Cr. 207; 1 mature male and 4 juveniles, Sta. 1203 (8°N, 94°E), BN, 18 September 2002, MRLR-Cr. 207; 4

juveniles, Sta. 1204 (8°N, 95°E), BN, 18 September 2002, MRLR-Cr. 207; 1 mature male, 1 spent female and 4 juveniles, Sta. 1206 (10°N, 94°E), BN, 20 September 2002, MRLR-Cr. 207; 9 mature males, 6 immature males, 4 spent females, 2 females with eyed larvae, 1 female with eyeless larvae, 1 female with eggs, 24 immature females and 10 juveniles, Sta. 1207 (10°N, 92°E), BN, 21 September 2002, MRLR-Cr. 207; 6 mature males, 10 immature males, 6 spent females, 4 females with eyed larvae, 11 immature females and 19 juveniles, Sta. 1208 (10°N, 90°E), BN, 22 September 2002, MRLR-Cr. 207; 4 mature males, 3 females with eyed larvae and 18 juveniles, Sta. 1209 (13° 30'N, 95°E), BN, 28 September 2002, MRLR-Cr. 207; 7 immature females and 18 juveniles, Sta. 1211 (13° 30'N, 92°E), BN, 30 September 2002, MRLR-Cr. 207; 6 immature females, Sta. 1212 (13° 30'N, 90°E), BN, 1 October 2002, MRLR-Cr. 207; 8 mature males, 12 immature males, 6 spent females, 4 females with eyed larvae, 3 females with eyeless larvae, 7 females with eggs, 11 immature females and 18 juveniles, Sta. 1213 (13° 30'N, 92°E), BN, 3 October 2002, MRLR-Cr. 207; 12 mature males, 11 immature males, 9 immature females and 33 juveniles, Sta. 1326 (8°, 90°E), BN, 31 march 2003, MRLR-Cr. 213; 1 mature male, 1 immature male, 7 females with eyed larvae, 5 females with eyeless larvae, 19 females with eggs, 8 immature females and 3 juveniles, Sta. 1338 (10°N, 92°E), BN, 9 April 2003, MRLR-Cr. 213; 1 spent female, 9 females with eggs and 1 juvenile, Sta. 1340 (10°N, 90°E), BN, 10 April 2003, MRLR-Cr. 213; 1 mature male, 2 immature males, 1 spent female, 2 females with eyeless larvae, 8 immature females and 2 juveniles, Sta. 1442 (10°N, 95°E), BN, 27 December 2003, MRLR-Cr. 220; 2 mature males, 2 females with eyed larvae and 3 immature females, Sta. 1447 (12°N, 95°E), BN, 29 December 2003, MRLR-Cr. 220; 1 immature male, Sta. 1448 (12°N, 94°E), BN, 30 December 2003, MRLR-Cr. 220; 3 immature females, Sta. 1462 (13° 44'N, 90°E), BN, 7 January 2004, MRLR-Cr. 220; 1 female with eyeless larvae, Sta. 1474 (10°N, 91°E), BN, 11 January 2004, MRLR-Cr. 220; 5 mature males, 1 immature male, 1 spent females, 8 immature females and 2 juveniles, Sta. 1524 (12°N, 93° 19'E), BN, 11 June 2004, MRLR-Cr. 226; 12 mature males, 10 immature males, 8 spent females, 20 females with eyeless larvae, 6 females with eggs, 12 immature females and 32 juveniles, Sta. 1530 (13° 45'N, 95°E), BN, 14 June 2004, MRLR-Cr. 226; 1 mature male and 1 immature female, Sta. 1530 (13° 45'N, 95°E), MPN, 90–0 m, 14 June 2004, MRLR-Cr. 226; 1 mature male, Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226; 7 mature males, 4 spent females and 2 juveniles, Sta. 1535 (12°N, 94°E), BN, 17 June 2004, MRLR-Cr. 226; 1 mature male, 5 immature females and 1 juvenile, Sta. 1538 (10°N, 95°E), BN, 19 June 2004, MRLR-Cr. 226; 1 spent female, Sta. 1541 (10°N, 92°E), BN, 21 June 2004, MRLR-Cr. 226; 16 mature males, 8 immature males, 3 spent females, 1 female with eyeless larvae, 17 immature females and 10 juveniles, Sta. 1542 (8°N, 95°E), BN, 26 June 2004, MRLR-Cr. 226.

Length: mature male 5.5–7.2 mm, mature female 4.5–5.8 mm

Remarks: This species is easily distinguished from its allied species by the presence of small eyes, short antennal scale (Figure 2E) and posterior margin of the telson with single pair of long spines (Figure 2F). Panampunnayil (2002) reported the length of adult male as 7.4 mm which is the maximum size observed.

Geographic distribution: *Siriella gracilis* is a warm water species confined to the tropical and subtropical waters of the Indian and Pacific Oceans. This species is usually coexisting with *S. thompsonii* (Pillai 1973; Murano and Fukuoka 2008) but it has not been hitherto recorded from the Atlantic Ocean.

Siriella aequiremis Hansen, 1910

(Figure 2G–I)

Siriella aequiremis Hansen 1910: 41, plate 3, Figure 4a–c, plate 4, Figure 1a–l; 1912: 194; Colosi 1919: 6; 1920: 236, plate 18, Figure 19; Illig, 1930: 562; Coifmann 1937a: 3; 1937b: 18, plate 6, Figure 10a–b; W. Tattersall 1912: 122; 1943: 65; 1951: 78; O. Tattersall 1955: 86; Ii 1964: 135, Figures 36–37; Pillai 1965: 1692; 1973: 47, Figures 15–16; Murano 1983: 82; Cai 1984: 207, plate 2, Figures 1–9; Wang and Liu 1994: 73–76, Figure 6; Wittmann and Stagl 1996: 160; Wang and Liu 1997: 202; Liu and Wang 2000: 91–93, Figure 14; Panampunnayil 2002: 373, Figure 2A, B; Murano and Fukuoka 2008: 8–11.

Materials examined

Arabian Sea: 1 mature male, 4 immature males and 3 juveniles, Sta. 1479 (8°N, 74°E), BN, 21 March 2004, MRLR-Cr. 223; 1 mature male and 2 immature females, Sta. 1481 (8°N, 72°E) BN, 22 March 2004, MRLR-Cr. 223; 2 mature males, 2 spent females and 1 immature female, Sta. 1482 (8°N, 71°E) BN, 24 March 2004, MRLR-Cr. 223; 1 mature male, 1 immature female and 5 juveniles, Sta. 1489 (10°N, 75° 17'E), BN, 27 March 2004, MRLR-Cr. 223; 1 immature female, Sta. 1496 (13°N, 73°E), BN, 2 April 2004, MRLR-Cr. 223; 1 immature female, Sta. 1501 (15°N, 71°E), BN, 6 April 2004, MRLR-Cr. 223.

Andaman Sea: 1 immature male, Sta. 1442 (10°N, 95°E), BN, 27 December 2003, MRLR-Cr. 220; 1 immature male, Sta. 1447 (12°N, 95°E), BN, 29 December 2003, MRLR-Cr. 220; 2 immature males, Sta. 1448 (12°N, 94°E), BN, 30 December 2003, MRLR-Cr. 220;

1 immature female, Sta. 1524 (12°N, 93° 19'E), BN, 11 June 2004, MRLR-Cr. 226; 1 female with eyeless larvae and 1 mature male, Sta. 1530 (13° 45'N, 95°E), BN, 14 June 2004, MRLR-Cr. 226; 1 juvenile, Sta. 1538 (10°N, 95°E), BN, 19 June 2004, MRLR-Cr. 226; 1 immature female and 1 juvenile, Sta. 1542 (8°N, 95°E), BN, 26 June 2004, MRLR-Cr. 226.

Length: mature male 8.5–9.7 mm, mature female 8–8.7 mm

Remarks: This species belongs to the *aequiremis* group (Ii 1964) and can be easily distinguished from other species of this genus by the robust body, modified setae of the fourth male pleopod (Figure 2G,H) and the spinulation of the uropods and telson (Figure 2 I). The present specimens agree with published descriptions except for some minor variations. In the present specimens the modified setae on the penultimate segment of the endopod of the fourth pleopod of male are secondarily armed with fine hairs and spinules while setae on the ultimate segment are naked (Figure 2G,H), whereas in earlier descriptions except Panampunnayil (2002), the modified setae are described as naked. In Panampunnayil's specimens all the modified setae are secondarily armed with fine hairs and spinules.

Geographic distribution: Siriella aequiremis is an oceanic form having a very extensive distribution in tropical and temperate waters (Ii 1964; Pillai 1973). It is absent in the Atlantic Ocean. In the present collection this species occurred at 13 stations. It has been previously recorded from Indian and Pacific Oceans.

Genus *Hemisiriella* Hansen

Hemisiriella parva Hansen, 1910

(Figure 2J)

Hemisiriella parva Hansen 1910: 47, plate 6, Figure 2a–e; Zimmer 1918: 16, Figures 5–7; Colosi 1919: 6; 1920: 236, plate 18, Figure 2a; W. Tattersall 1922: 456; 1936: 147; 1951: 80; Delsman 1939: 167; Ii 1964: 161, Figures 42–43; Pillai 1964: 13, Figure 7; 1973: 53, Figures 22–23; Panampunnayil 2002: 374; Hanamura and De Grave 2004: 64, Figure 2a–c.

Materials examined

Arabian Sea: 1 immature female, Sta. 1485 (10°N, 72°E), MPN, 84–0 m, 26 March 2004, MRLR-Cr. 223; 1 spent female and 1 immature female, Sta. 1675 (8°N, 74°E), MPN, 37–0 m, 28 May 2005, MRLR-Cr. 235; 1 juvenile, Sta. 1678 (10°N, 71°E), BN, 30 May 2005, MRLR-Cr. 235.

Bay of Bengal: 1 immature male, Sta. 1650 (17°N, 84°E), BN, 27 February 2005, MRLR-Cr. 232; 1 immature female, Sta. 1656 (15°N, 85°E), MPN, 300–172 m, 3 March 2005, MRLR-Cr. 232; 1 spent female, Sta. 1662 (13°N, 80° 47'E), MPN, 33–0 m, 6 March 2005, MRLR-Cr. 232; 1 immature male and 1 female with eyed larvae, Sta. 1670 (11°N, 81°E), BN, 30 May 2005, MRLR-Cr. 232; 1 mature male, Sta. 1895 (15°N, 84°E), MPN, 34–0 m, 26 March 2004, MRLR-Cr. 249.

Andaman Sea: 1 immature male, 1 spent female and 1 juvenile, Sta. 1201 (8°N, 90°E), BN, 16 September 2002, MRLR-Cr. 207; 1 juvenile, Sta. 1460 (13° 44'N, 92°E), BN, 7 January 2004, MRLR-Cr. 220; 1 immature male, Sta. 1535 (12°N, 94°E), BN, 17 June 2004, MRLR-Cr. 226; 1 mature male and 1 immature female, Sta. 1538 (10°N, 95°E), BN, 19 June 2004, MRLR-Cr. 226.

Length: mature male 5.8–7.1 mm, mature female 4.5–6 mm

Remark: This species can be readily distinguished from the only other Indian species, *H. pulchra* Hansen, 1910 by the following points. In *H. parva* the endopod of the uropod clearly overreaches the exopod (Figure 2J) while in *H. pulchra* the endopod is as long as or slightly shorter than the exopod. In *H. parva* the telson lacks a waist and steadily narrows towards the apex (Figure 2J). In *H. pulchra*, the telson has a marked constriction at the basal one fourth.

Geographic distribution: Hemisiriella parva is an oceanic surface living planktonic species. It is not usually found in inshore waters unless there is some unusual incursion of oceanic waters into the inshore region (Pillai 1973). This species is widely distributed in the warmer region of both Pacific and Indian Oceans and does not occur in Atlantic. Hitherto this species has been known from the Indonesia (Hansen 1910), Malaya (Colosi 1920), the Bay of Bengal (W. Tattersall 1922), Great Barrier Reef (W. Tattersall 1936), Java (Delsman 1939), Philippines (W. Tattersall 1951), the Arabian Sea, the Bay of Bengal (Pillai, 1964; 1973), the South China Sea (Ii 1964), the Andaman Sea (W. Tattersall 1922; Panampunnayil 2002), and Palau, Northwestern Pacific (Hanamura and De Grave 2004).

Subfamily Rhopalophthalminae Hansen

Genus *Rhopalophthalmus* Illig

Rhopalophthalmus indicus Pillai, 1961

(Figure 2K)

Rhopalophthalmus indicus Pillai 1961: 20, plate II, Figures C–L.

Materials examined

Bay of Bengal: 1 mature male and 1 immature male, Sta. 1665 (13°N, 83°E), MPN, 26–0 m, 8 March 2005, MRLR-Cr. 232.
Length: mature male 15.3 mm

Remarks: The members of *Rhopalophthalmus* are coastal in habitate and when present, occur in swarms (Pillai 1973) even though the present collection contains only two specimens. This species is easily distinguished from the other species of this genus by the presence of 5 spines on the antennal sympod (Figure 2K), 4 to 5 propodal segments of third to seventh thoracic endopods, and relative length of the eighth thoracic endopod and the apical spines of the telson. By the presence of five spines on the inner distal corner of the antennal sympod, this species resembles *R. phyllodus* Murano, 1988, but the latter is distinguished by the presence of broad, leaf like, obtuse subsidiary teeth on the apical spines of the telson and strong setae with subsidiary spinules on the carpopropodus of the seventh thoracic endopod. *R. indicus* is the largest species of this genus with a body length of 15–17 mm (Pillai 1961).

Geographic distribution: *Rhopalophthalmus indicus* has been known only from Indian waters (Pillai 1961; Chandramohan 1983; Biju 2009).

Subfamily Gastrosaccinae Norman

Genus *Gastrosaccus* Norman

Gastrosaccus dunckeri Zimmer, 1915

(Figure 2L)

Gastrosaccus dunckeri Zimmer 1915: 165, Figures 13–18; W. Tattersall 1922: 459; Pillai 1957: 7, Figure 111, 1–7; O. Tattersall 1960: 170, Figure 2A–N; Pillai 1961: 25, plate III, Figures K–N; 1964: 17, Figure 9; 1973: 61– 64, Figures 28–29; Ii 1964: 235 and 580, Figure 59.

Materials examined

Arabian Sea: 2 mature males, Sta. 1504 (15°N, 73° 30'E), BN, 7 April 2004, MRLR-Cr. 223.
Length: mature male 8.2–8.6 mm

Remarks: The genus *Gastrosaccus* now includes only those species in which the endopod of the third pleopod of male is multiarticulated, and *G. dunckeri* and *G. kempi* W. Tattersall, 1922 are the Indian species. *G. dunckeri* was described by Zimmer (1915) for specimens collected from an unspecified locality in Indian Ocean between Ceylon and New Guinea. It is a coastal form but is occasionally captured in offshore waters. The shape and armature of the telson and the spinulation of the inner uropod (Figure 2L) easily distinguish this species from all the other species of the genus.

Geographic distribution: This species has been recorded from several localities in the Indian and Pacific Oceans namely between Sri Lanka and New Guinea (Zimmer 1915), Orissa, India (W. Tattersall 1922), Singapore (O. Tattersall 1960), the South China Sea (Ii 1964), the Arabian Sea, (Pillai 1973; Biju and Panampunnayil 2009), the East China Sea (Wang and Liu 1997) and the Andaman Sea (Fukuoka and Murano 2002).

Genus *Haplostylus* Kossmann

Haplostylus pusillus (Coifmann, 1937)

(Figure 3A–C)

Gastrosaccus pusillus Coifmann 1937b: 30, Figure 19; Pillai 1973: 64. Figure 30, 31. *Haplostylus pusillus,* Hatzakis 1977: 284; Bacescu 1979: 128, Figure 1A; Panampunnayil 2002: 377, Figure 4A–I; Fukuoka and Murano 1997: 526, Figure 3H–K.

Materials examined

Andaman Sea: 4 mature males, Sta. 1448 (12°N, 94°E), BN, 30 December 2003, MRLR-Cr. 220; 1 spent female, Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226; 1 spent female, Sta. 1533 (13° 45'N, 92° 40'E), MPN, 170–70 m, 15 June 2004, MRLR-Cr. 226.
Length: mature male 5.1–7.2 mm, mature female 5.8 mm

Remarks: This species is easily distinguished from the allied species by the segmentation on the exopod of third pleopod of male (Figure 3A), and number of spines on the lateral margins of cleft of the telson and endopod of uropod (Figure 3B,C).

Geographic distribution: Hitherto, *Haplostylus pusillus* has been known from three localities, Red Sea (Coifmann 1937b; Bacescu 1979; Almeida Prado–Por 1980), Andaman Sea (Pillai 1973; Panampunnayil 2002) and Iriomote Island, Japan (Fukuoka and Murano 1997). From the biogeographical viewpoint, it is interesting to note that the distribution area of the species in the Indian Ocean extends from Red Sea in the west to Andaman Sea in the east. The material examined for this species at two extremes of hydrographical regimes of the Indian Ocean suggest that it must obviously be widely distributed in the Indian Ocean.

Genus *Eurobowmaniella* Murano

Eurobowmaniella simulans (W. Tattersall, 1915)

(Figure 3D–G)

Gastrosaccus simulans W. Tattersall 1915: 155, Figure 1c; 1922: 460; Pillai 1957: 6, Figure II 6–8; 1961: 24, plate 3, Figures I, J; 1965, Figure 29.

Erobowmaniella phuketensis, Murano 1995: 22, Figures 1–3.

Erobowmaniella simulans, Murano 1996: 65.

Materials examined

Arabian Sea: 4 mature males, 2 immature males, 4 females with eyed larvae, 2 females with eyeless, 6 females with eggs, 4 immature females and 2 juveniles, Sta. 1684 (10°N, 76°E), BN, 2 June 2005, MRLR-Cr. 235; 3 mature males, 4 immature males, 1 spent female, 2 female with eyed larvae, 1 female with eyeless larvae, 3 females with eggs, 3 immature females and 7 juveniles, Sta. 1707 (17°N, 73°E), BN, 19 June 2005, MRLR-Cr. 235.

Length: mature male 7–7.5 mm, mature female 7–8.4 mm.

Remarks: In the Indian waters, *Eurobowmaniella* is represented by two species, *E. muticus* (W. Tattersall, 1915) and *E. simulans.* This species can be easily distinguished from *E. muticus* by the following points. In *E. simulans* lateral border of telson has 6–8 spines (Figure 3D) as against 10 –15 in *E. muticus*. In *E. simulans* the posterior border of carapace has with 6 to 7 filaments (Figure 3E) while in *E. muticus* hind border with 8 to 10 filaments. In *E. simulans* exopod of third pleopods of male is eight segmented (Figure 3F) and modified spines are present only in the last segment (Figure 3G) while in *E. muticus* exopod is five segmented and modified spines are present in the last three segments.

Geographic distribution: Presently this species is distributed in the coast of Orissa, Goa (W. Tattersall 1922), Kerala (Pillai 1957; 1961; Sujoy 2005), sandy beaches of Phuket Island (Murano 1995; Dexter 1996) and Peninsular Malaysia (Hanamura et al. 2007).

Genus *Anchialina* Norman and Scott

Anchialina typica orientalis Nouvel, 1971

(Figure 3H–K)

Anchialina typica Hansen 1910: 52–53, plate 7, Figure 2a–k; 1912: 196; W. Tattersall 1936: 96; Pillai 1964: 18, Figure 10a–i; 1973: 69–70, Figure 32A–D; Ii 1964: 188–195, Figures 48, 49.

Anchialina typica orientalis, Nouvel 1971; 328–329 Figures 2–9; Fukuoka and Murano 1997: 523, Figure 3E.

Materials examined

Arabian Sea: 1 mature male, 1 spent female, 4 females with eggs and 1 juvenile, Sta. 1418 (15°N, 72°E), MPN, 17–0 m, 6 October 2003, MRLR-Cr. 217; 1 immature male, Sta. 1427 (19°N, 71°E), MPN, 42–0 m, 12 October 2003, MRLR-Cr. 217; 2 spent females, Sta. 1515 (21°N, 69°E), MPN, 62–0 m, 22 April 2004, MRLR-Cr. 223; 10 mature males, 2 immature females, 5 immature males, 1 female with eyed larvae, 1 female with eye less larvae and 2 juveniles, Sta. 1503 (15°N, 73°E), BN, 7 April 2004, MRLR-Cr. 223; 1 immature female and 3 juveniles; Sta. 1515 (21°N, 70°E), BN, 22 April 2004, MRLR-Cr. 223; 2 immature females and 1 juvenile, Sta. 1688 (11° 30'N, 72°E), BN, 5 June 2005, MRLR-Cr. 235.

Bay of Bengal: 1 spent female, 2 females with eye less larvae and 4 juveniles, Sta. 1257 (11°N, 80°E), BN, 29 November 2002, MRLR-Cr. 209; 1 immature male, Sta. 1646 (19°N, 87°E), BN, 24 February 2005, MRLR-Cr. 232; 1 female with eyed larvae, Sta. 1904 (11°N, 80°E), BN, 14 October 2006, MRLR-Cr. 249; 1 female with eyeless larvae, Sta. 1905 (11°N, 81°E), BN, 15 October 2006, MRLR-Cr. 249.

Andaman Sea: 2 mature males, 1 immature female, Sta. 1531 (13° 45'N, 94°E), BN, 14 June 2004, MRLR-Cr. 226; 3 mature males, 1 spent female, 1 immature female and 2 juveniles, Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226.

Length: mature male 5.2–5.4 mm, mature female 5–5.5 mm

Remarks: This species belongs to the *typica* group (Ii 1964) and can be easily distinguished from other species by the shape of the rostrum (Figure 3H), the modification of the third pleopod of male (Figure 3I,J), relative length of the endopod of uropod and number of spines on the lateral border of telson (Figure 3K). Nouvel (1971) divided *Anchialina typica* into two subspecies; *Anchialina typica typica* and *Anchialina typica orientalis* based on the armature on the exopod of the third male pleopod. *A. typica orientalis* is easily distinguished from the other subspecies, *A. typica typica* by folloing points. In *A. typica orientalis*, bent and naked setae present on the outside of the fifth to seventh or eighth segments, counted from the distal end, of the third male pleopod, while in *A. typica typica* such setae are present on the outside of the fourth to sixth segments. In *A. typica orientalis* an enlarged outer lobe is present on the third segment of third male pleopod, while in *A. typica typica* the outer lobe is absent.

Geographic distribution: Anchialina typica orientalis is truly oceanic species widely distributed in the Indian and Pacific Oceans. It has been recorded from the Indian Ocean (Hansen 1910; 1912; Pillai 1964; 1973), South China Sea (Ii 1964; Jo 1991), and Japan (Jo 1991; Fukuoka and Murano 1997).

Anchialina grossa Hansen, 1910

(Figure 3L,M)

Anchialina grossa Hansen 1910: 54, plate 7 Figure 3; 1912: 96; W. Tattersall 1922: 458, Figure 6; 1936: 148; 1951: 102; Ii 1964: 202–204, Figure 53K–M; Pillai 1965: 1701, Figures 35–38; Wang and Liu 1987: 218, Figures 7, 1–12; Hanamura and De Grave 2004: 66, Figure 2d, e.

Anchialina frontalis, Zimmer 1915: 159, Figures 1–6.

Materials examined

Andaman Sea: 1 partially damaged mature male, Sta. 1333 (11° 40'N, 92° 47'E), MPN, 23–0 m, 5 April 2003, MRLR-Cr. 213; 1 spent female and 1 juvenile, Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226.

Length: mature female 6.8 mm

Remarks: Anchialina grossa is distinguished from by allied species by the triangular pointed rostrum (Figure 3L) in both sexes and the typical lamellar process of the exopod of the third pleopod in the male (Figure 3M). In the case of modification of third pleopod, this species closely resembles *A. obtusifrons* Hansen, 1912, but the latter is easily distinguished by the shape of rostrum and the length of the endopod of the uropod. In *A. grossa*, rostrum is triangular and pointed while in *A. obtusifrons* rostrum is truncate. In *A. grossa* endopod of uropod is longer than telson whereas in *A. obtusifrons* endopod is as long as or slightly longer than telson.

Geographic distribution: Anchialina grossa is a neritic form and has been recorded from Indonesia, Bay of Bengal, Gulf of Thailand, South China Sea (Hansen 1910), Gilbert Islands (Hansen 1912), between Sri Lanka and New Guinea (Zimmer 1915), Andaman Islands (W. Tattersall 1922), Great Barrier Reef (W. Tattersall 1936), Philippine Islands (W. Tattersall 1951), and Palau, Northwestern Pacific (Hanamura and De Grave 2004).

Anchialina dentata Pillai, 1964

(Figure 3N–R)

Anchialina dentata Pillai 1964: 19; Figure 11; 1973: 70 72, Figures 33–34; Murano 1990: 195; Panampunnayil 2002: 378, Figure 5A–D.

Anchialina parva Ii 1964: 196–201, Figures 50–51; O. Tattersall 1965: 83.

Materials examined

Arabian Sea: 2 mature males, 4 immature females, 4 spent females, 1 female with eyeless larvae, 1 female with eggs and 1 juvenile, Sta. 1490 (11° 30'N, 75°E), BN, 28 March 2004, MRLR-Cr. 223; 2 mature males, 1 immature female and 2 spent females, Sta. 1504 (15°N, 73° 30'E), BN, 7 April 2004, MRLR-Cr. 223.

Length: mature male 6–7 mm, mature female 5.7–6.2 mm

Remarks: This species belongs to the *typica* group (Ii 1964) and can be readily distinguished from other allied species by short triangular rostral plate (Figure 3N), saw like distal border of the merus of the second thoracic endopod (Figure 3O,P) and the modification of the third pleopod of male (Figure 3Q,R).

Geographic distribution: Anchialina dentata has been recorded from Arabian Sea (Pillai 1964, 1973), South China Sea (Ii 1964; Wang and Liu 1987), south of Java (Pillai 1973) South West of Japan (Murano 1990) and the Andaman Sea (Pillai 1973; Panampunnayil 2002). *A. dentata* is a rare species and its records from widely distant places indicate that it has an extensive distribution in the tropical and subtropical parts of the Indo–Pacific waters (Panampunnayil 2002).

Anchialina media Ii, 1964

(Figure 4A–K)

Anchialina media Ii 1964: 204, Figures 52A–Q, 53A–J, 54A–P.

Materials examined

Andaman Sea: 2 mature males, Sta. 1531 (13° 45'N, 94°E), BN, 14 June 2004, MRLR-Cr. 226; 11 mature males, 4 immature males and 6 juveniles, Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226.
Length: mature male 8–8.2 mm

Remarks: The present species belongs to the *grossa* group in having lobiform process along with the distal modification of the third pleopod of male (Ii 1964). Compared to Ii's description the following variations were observed in the present specimens. In Ii's specimens the antennal scale is a little more than twice as long as broad, while in present specimens it is two and half times as long as broad (Figure 4A,B). In present specimens, the second segment of the antennal peduncle is broad and little more than five times as long as the third and the sympodial spines have two rows of spines (Figure 4B,C), whereas in type specimens, the second segment of the antennal peduncle is 4 times as long as the third and sympodial spines have only one row of spines. In the present specimens, the labrum has a long median process armed with six pair of denticles on dorsal surface (Figure 4D), whereas in type specimen, Ii did not mention the number of teeth in median process. In the present specimens, inner lobe of the maxillule with plumose setae, outer lobe with 10–11 spines (Figure 4E), while in type specimen, Ii's illustration of the maxillule but did not show the exact number of spines on the outer lobe of maxillule. Second segment of the mandibular palp 3 times as long as third in the present specimens (Figure 4F) while in type specimens it is 2.5 times as long as third. In the present specimens, exopod of the third pleopod is 13–14 segmented (Figure 4H) while in type specimens it is 16 segmented. In the present specimens, lateral margin and cleft of telson are armed with 24–26 and 26–27 spines respectively (Figure 4J,K) while in type specimen these are 35 and 38 respectively. Exopod of uropod has 16–17 spines on the outer margin as opposed to 17–19 in the type specimen (Figure 4J). Present specimens have a length of 8–8.1 mm (male) while Ii's specimen measured only 7 mm.

This species is easily distinguished from other species of *Anchialina* by the modified setae on the third segment of the mandibular palp (Figure 4F,G) and the modification of the exopod of the third pleopod of the male (Figure 4H,I).

Geographic distribution: Anchialina media is an oceanic gregarious form and was previously recorded only from the South China Sea (Ii 1964). The present record in the Andaman Sea extends its distribution westward.

Genus *Pseudanchialina* Hansen

Pseudanchialina pusilla (G.O. Sars, 1883)

(Figure 4L,M)

Promysis pusilla Sars 1883: 42.

Anchialus pusillus, Sars 1885: 200, plate 35, Figures 19–20.

Pseudanchialina pusilla, Hansen 1910: 60, plate 8, Figure 4a–c, plate 9, Figure 1a–k; W. Tattersall 1936: 149; Pillai 1957: 9, Figure 4; O. Tattersall 1960: 176, Figure 4; Ii 1964: 217; Pillai 1964: 21, Figure 12; 1973: 73, Figure 36; Panampunnayil 2002: 379.

Materials examined

Arabian Sea: 1 immature male, Sta. 1401 (10°N, 72°E), BN, 19 September 2003, MRLR-Cr. 217; 2 immature males and 2 juveniles, Sta. 1405 (10°N, 75°E), BN, 21 September 2003, MRLR-Cr. 217; 1 mature male, Sta. 1411 (13°N, 70°E), MPN, 201–68 m, 25 September 2003, MRLR-Cr. 217; 3 mature males, Sta. 1419 (15°N, 71°E), BN, 6 October 2003, MRLR-Cr. 217; 1 spent female, Sta. 1422 (17°N, 70°E), BN, 9 October 2003, MRLR-Cr. 217; 3 mature males, 2 spent females and 5 juveniles, Sta. 1430 (19°N, 68°E), BN, 15 October 2003, MRLR-Cr. 217; 2 immature males and 4 juveniles, Sta. 1430 (19°N, 68°E), MPN, 45–0 m, 15 October 2003, MRLR-Cr. 217; 2 immature males, Sta. 1431 (21°N, 66°E), BN, 15 October 2003, MRLR-Cr. 217; 4 immature males, Sta. 1432 (21°N, 67°E), BN, 16 October 2003, MRLR-Cr. 217; 2 mature males and 1 juvenile, Sta.1477 (8°N, 76°E), BN, 20 March 2004, MRLR-Cr. 223; 3 mature males, 12 immature male, 3 females with eggs, 4 immature females and 5 juveniles, Sta. 1478 (8°N, 75°E), MPN, 116–20 m, 20 March 2004, MRLR-Cr. 223; 1 mature male and 4 juveniles, Sta. 1478 (8°N, 75°E), MPN, 300–116 m, 20 March 2004, MRLR-Cr. 223; 21 mature males, 11 immature males, 3 spent females, 6 immature females and 18 juveniles, Sta. 1479 (8°N, 74°E), BN, 21 March 2004, MRLR-Cr. 223; 1 mature male, Sta. 1480 (8°N, 73°E), MPN, 172–47 m, 21 March 2004, MRLR-Cr. 223; 7 mature males, 1 immature male, 1 female with eyed larvae, 6 females with eggs, 4 immature females and 12 juveniles, Sta. 1481 (8°N, 72°E), MPN, 172–47 m, 22 March 2004, MRLR-Cr. 223; 1 mature male, 4 immature males, 1 spent female, 2 females with eyed larvae, 2 females with eyeless larvae and 1 juvenile, Sta. 1482 (8°N, 71°E), MPN, 184–48 m, 24 March 2004, MRLR-Cr. 223; 5 mature males and 1 juvenile, Sta. 1483 (10°N, 70°E), BN, 25 March 2004, MRLR-Cr. 223; 4 mature males and 2 immature males, Sta. 1485 (10°N, 72°E), MPN, 84–0 m, 26 March 2004, MRLR-Cr. 223; 3 juveniles, Sta. 1487 (10°N, 74°E), MPN, 204–19 m, 26 March 2004, MRLR-Cr. 223; 1 mature male, 2 immature males and 1 juvenile, Sta. 1488 (10°N, 75°E), MPN, 194–50 m, 27 March 2004, MRLR-Cr. 223; 42 mature males, 9 immature males, 3 spent females, 3 females with eyed larvae, 13 females with eyeless larvae, 2 females with eggs, 25 immature females and 47 juveniles, Sta. 1489 (10°N, 75° 17'E), BN, 27 March 2004, MRLR-Cr. 223; 3 mature males, 1 immature male and 1 immature female, Sta. 1490 (11° 30'N, 75°E), MPN, 166–37 m, 28 March 2004, MRLR-Cr. 223; 1 mature male and 4 juveniles, Sta. 1494 (11°N, 72°E), BN, 31 March 2004, MRLR-Cr. 223; 4 mature males, 7 immature males, 4 immature females and 16 juveniles, Sta. 1496 (13°N, 73°E), BN, 2 April 2004, MRLR-Cr. 223; 1 mature male, Sta. 1498 (13°N, 71°E), BN, 2 April 2004, MRLR-Cr. 223; 1 mature male and 1 juvenile, Sta. 1499 (13°N, 70°E), MPN, 218–43 m, 3 April 2004, MRLR-Cr. 223; 2 immature males, 1 spent female, 1 female with eyeless larvae, 1 female with eggs and 5 juveniles, Sta.1501 (15°N, 71°E), BN, 6 April 2004, MRLR-Cr. 223; 2 mature males, 3 immature males, 1 female with eyed larvae, 2 female with eggs and 14 juveniles, Sta. 1504 (15°N, 73° 30'E), BN, 7 April 2004, MRLR-Cr. 223; 1 immature male, Sta. 1508 (17°N, 72°E), BN, 16 April 2004, MRLR-Cr. 223; 4 juveniles, Sta. 1674 (8°N, 75°E), BN, 28 May 2005, MRLR-Cr. 235; 1 juvenile, Sta. 1677 (8°N, 72°E), BN, 30 May 2005, MRLR-Cr. 235; 6 mature males, 1 immature male, 3 females with eggs and 4 juveniles, Sta. 1678 (10°N, 71°E), BN, 30 May 2005, MRLR-Cr. 235; 3 mature males, 1 immature males and 3 juveniles, Sta. 1679 (10°N, 70°E), MPN, 39–0 m, 31 May 2005, MRLR-Cr. 235; 1 mature male, 6 immature females and 13 juveniles, Sta. 1682 (10°N, 74°E), BN, 2 June 2005, MRLR-Cr. 235; 3 mature males and 2 immature males, Sta. 1682 (10°N, 74°E), MPN, 150–53 m, 2 June 2005, MRLR-Cr. 235; 1 mature male and 2 juveniles, Sta. 1685 (11° 30'N, 74° 57'E), BN, 4 June 2005, MRLR-Cr. 235; 1 mature male, 1 immature male and 2 immature females, Sta.1686 (11° 30'N, 74°E), BN, 5 June 2005, MRLR-Cr. 235; 1 mature male, 1 spent female and 1 juvenile, Sta. 1686 (11° 30'N, 74°E), MPN, 300–173 m, 5 June 2005, MRLR-Cr. 235; 6 mature males, 4 immature males and 3 juveniles, Sta. 1688 (11° 30'N, 72°E), BN, 5 June 2005, MRLR-Cr. 235; 3 immature males, 13 immature females and 19 juveniles, Sta. 1691 (13°N, 71°E), BN, 7 June 2005, MRLR-Cr. 235; 13 mature males, 2 immature males, 1 female with eggs and 14 juveniles, Sta. 1693 (13°N, 73°E), BN, 8 June 2005, MRLR-Cr. 235; 2 mature males, Sta. 1699 (15°N, 73°E), BN, 10 June 2005, MRLR-Cr. 235; 1 mature male and 1 juvenile, Sta. 1703 (19°N, 69°E), BN, 18 June 2005, MRLR-Cr. 235; 2 females with eggs, Sta. 1912 (15°N, 72°E), BN, 2 November 2006, MRLR-Cr. 251; 2 mature males, Sta. 1917 (17°N, 71°E), BN, 6 December 2006, MRLR-Cr. 251; 1 mature male, Sta. 1921 (19°N, 71°E), BN, 10 December 2006, MRLR-Cr. 251; 1 juvenile, Sta. 1928 (21°N, 67°E), BN, 15 December 2006, MRLR-Cr. 251.

Bay of Bengal: 4 mature males and 1 juvenile, Sta. 1232 (17°N, 83°E), BN, 12 November 2002, MRLR-Cr. 209; 20 mature males, 1 spent female, 11 immature females and 21 juveniles, Sta. 1236 (17°N, 86°E), BN, 14 November 2002, MRLR-Cr. 209; 6 mature males and 3 immature females, Sta. 1239 (19°N, 87° 04'E), BN, 15 November 2002, MRLR-Cr. 209; 38 mature males, 82 immature males, 6 spent females, 4 females with eyed larvae, 2 females with eyeless larvae, 5 females with eggs, 30 immature females and 160 juveniles, Sta. 1241 (19°N, 89°E), BN, 16 November 2002, MRLR-Cr. 209; 5 mature males, 1 spent female and 3 immature females, Sta. 1243 (20° 30'N N, 88° 33'E), BN, 17 November 2002, MRLR-Cr. 209; 1 mature male, Sta. 1244 (20° 30'N, 88°E), BN, 18 November 2002, MRLR-Cr. 209; 17 mature males, 10 immature males, 2 immature females and 7 juveniles, Sta. 1247 (15°N, 80° 40'E), BN, 23 November 2002, MRLR-Cr. 209; 2 mature males, Sta. 1248 (15°N, 81°E), BN, 24 November 2002, MRLR-Cr. 209; 2 immature males and 2 juveniles, Sta. 1249 (15°N, 82°E), BN, 24 November 2002, MRLR-Cr. 209; 13 mature males, 5 immature males, 3 immature females and 15 juveniles, Sta. 1254 (13°N, 81°E), BN, 27 November 2002, MRLR-Cr. 209; 2 mature males, 1 immature female and 1 juvenile, Sta. 1257 (11°N, 80°E), BN, 29 November 2002, MRLR-Cr. 209, 8 mature males, 4 immature males and 11 juveniles, Sta. 1259 (11°N, 81°E), BN, 29 November 2002, MRLR-Cr. 209; 1 mature male, Sta. 1261 (11°N, 83°E), BN, 30 November 2002, MRLR-Cr. 209; 12 mature males, 1 spent female, 9 immature females and 2 juveniles, Sta. 1344 (11°N, 81°E), BN, 10 July 2003, MRLR-Cr. 215; 8 immature males and 8 immature females, Sta. 1348 (13°N, 85°E), BN, 13 July 2003, MRLR-Cr. 215; 15 mature males, 3 immature males, 3 spent females, 1 females with eggs and 7 juveniles, Sta. 1350 (13°N, 83°E), BN, 14 July 2003, MRLR-Cr. 215; 4 mature males, 3 immature females and 5 juveniles, Sta. 1352 (13°N, 81°E), BN, 15 July 2003, MRLR-Cr. 215; 2 mature males, 1 immature male, 2 spent female, and 2 juveniles, Sta. 1353 (13°N, 80°E), BN, 16 July 2003, MRLR-Cr. 215; 21 mature males, 11 immature males, 4 spent females, 16 immature females and 20 juveniles, Sta. 1357 (15°N, 81°E), BN, 18 July 2003, MRLR-Cr. 215; 1 immature male and 1 spent female, Sta. 1641 (20° 30'N, 89°E), BN, 21 February 2005, MRLR-Cr. 232; 1 spent female and 2 immature females and 4 juveniles, Sta. 1642 (20° 30'N, 90°E), BN, 21 February 2005, MRLR-Cr. 232; 2 immature females, Sta. 1642 (20° 30'N, 90°E), MPN, 12–0 m, 21 February 2005, MRLR-Cr. 232; 21 mature males, 17 immature males, 6 spent females, 7 immature females and 19 juveniles, Sta. 1645 (19°N, 88°E), BN, 23 February 2005, MRLR-Cr. 232; 1 mature male and 2 immature females and 8 juveniles, Sta. 1646 (19°N, 87°E), BN, 24 February 2005, MRLR-Cr. 232; 3 mature males, 2 immature males and 7 juveniles, Sta. 1646 (19°N, 87°E), MPN, 174–17 m, 24 February 2005, MRLR-Cr. 232; 2 mature males, Sta. 1647 (19°N, 86°E), MPN, 19–0 m, 24 February 2005, MRLR-Cr. 232; 4 mature males, 2 immature males, 1 immature female and 3 juveniles, Sta. 1647 (19°N, 86°E), MPN, 178–19 m, 24

February 2005, MRLR-Cr. 232; 12 mature males, 7 immature males, 2 spent females, 8 immature females and 28 juveniles, Sta. 1648 (19°N, 85° 50'E), BN, 25 February 2005, MRLR-Cr. 232; 7 mature males and 2 immature males, Sta. 1648 (19°N, 85° 50'E), MPN, 159–17, 25 February 2005, MRLR-Cr. 232; 4 mature males, 12 immature males, 17 immature females and 68 juveniles, Sta. 1649 (17°N, 83°E), BN, 26 February 2005, MRLR-Cr. 232; 4 mature males and 11 juveniles, Sta. 1649 (17°N, 83°E), MPN, 164–10 m, 26 February 2005, MRLR-Cr. 232; 4 mature males, 2 immature males, 3 immature females and 2 juveniles, Sta. 1650 (17°N, 84°E), BN, 27 February 2005, MRLR-Cr. 232; 1 spent female, Sta. 1650 (17°N, 84°E), MPN, 201–11 m, 27 February 2005, MRLR-Cr. 232; 1 immature male and 1 immature female, Sta. 1651 (17°N, 85°E), BN, 28 February 2005, MRLR-Cr. 232; 2 mature males, 3 immature males, 1 female with eggs, 9 immature females and 7 juveniles, Sta. 1653 (17°N, 87E), BN, 28 February 2005, MRLR-Cr. 232; 7 mature males, 3 immature males, 2 spent females and 2 immature females, Sta. 1653 (17°N, 87E), MPN, 208–13 m, 28 February 2005, MRLR-Cr. 232; 10 mature males, 9 immature males, 6 spent females, 6 females with eyed larvae and 5 juveniles, Sta. 1654 (17°N, 88E), BN, 2 March 2005, MRLR-Cr. 232; 1 immature male, Sta. 1655 (15°N, 86°E), BN, 2 March 2005, MRLR-Cr. 232; 3 juveniles, Sta. 1656 (15°N, 85°E), MPN, 19–0 m, 3 March 2005, MRLR-Cr. 232; 2 mature males, 1 immature female and 4 juveniles, Sta. 1656 (15°N, 85°E), MPN, 172–19 m, 3 March 2005, MRLR-Cr. 232; 1 mature male and 4 juveniles, Sta. 1656 (15°N, 85°E), MPN, 500–300 m, 3 March 2005, MRLR-Cr. 232; 20 mature males, 16 immature males, 10 spent females, 4 females with eyed larvae, 2 females with eyeless larvae, 8 females with eggs, 26 immature females and 32 juveniles, Sta. 1657 (15°N, 84°E), BN, 3 March 2005, MRLR-Cr. 232; 2 juveniles, Sta. 1658 (15°N, 83°E), BN, 4 March 2005, MRLR-Cr. 232; 4 mature males, 21 immature males and 48 juveniles, Sta. 1661 (15°N, 81°E), MPN, 116–20 m, 6 March 2005, MRLR-Cr. 232; 3 immature males and 2 juveniles, Sta. 1662 (13°N, 80° 47'E), MPN, 143–35 m, 6 March 2005, MRLR-Cr. 232; 3 mature males and 2 immature males, Sta. 1667 (11°N, 84°E), MPN, 214–26 m, 10 March 2005, MRLR-Cr. 232; 1 female with eggs, Sta. 1668 (11°N, 83°E), BN, 11 March 2005, MRLR-Cr. 232; 4 mature males, 3 immature females and 7 juveniles, Sta. 1668 (11°N, 83°E), MPN, 40–0 m, 11 March 2005, MRLR-Cr. 232; 1 juvenile, Sta. 1669 (11°N, 82°E), BN, 11 March 2005, MRLR-Cr. 232; 7 mature males, 18 immature males and 1 spent female, Sta. 1669 (11°N, 82°E), MPN, 35–0 m, 11 March 2005, MRLR-Cr. 232; 26 mature males, 21 immature males, 21 spent females, 12 immature females, 57 juveniles, Sta. 1670 (11°N, 81°E), BN, 11 March 2005, MRLR-Cr. 232; 5 juveniles, Sta. 1671 (11°N, 80°E), BN, 12 March 2005, MRLR-Cr. 232; 29 mature males, 16 immature males, 4 spent females, 43 immature females and 21 juveniles, Sta. 1881 (19°N, 87°E), BN, 24 September 2006, MRLR-Cr. 249; 2 mature males, Sta. 1881 (19°N, 87°E), MPN, 134–15 m, 24 September 2006, MRLR-Cr. 249; 15 mature males and

2 immature males, Sta. 1883 (19°N, 89°E), BN, 25 September 2006, MRLR-Cr. 249; 1 immature male and 1 spent female, Sta. 1883 (19°N, 89°E), MPN, 300–144 m, 25 September 2006, MRLR-Cr. 249; 3 immature males, Sta. 1884 (19°N, 90°E), MPN, 159–13 m, 26 September 2006, MRLR-Cr. 249; 3 mature males, 2 immature males, 3 immature females and 21 juveniles, Sta.1887 (17°N, 86°E), BN, 28 September 2006, MRLR-Cr. 249; 2 mature males, Sta. 1894 (15°N, 83°E), MPN, 167–8 m, 8 October 2006, MRLR-Cr. 249; **7** mature males, 2 immature males, 4 spent females, 2 females with eyed larvae, 13 immature females and 4 juveniles, Sta. 1895 (15°N, 84°E), BN, 8 October 2006, MRLR-Cr. 249; 6 mature males, 2 immature females and 12 juveniles, Sta. 1896 (15°N, 85°E), MPN, 9–0 m, 10 October 2006, MRLR-Cr. 249; 1 mature male and 2 immature females, Sta. 1896 (15°N, 85°E), MPN, 178–9 m, 10 October 2006, MRLR-Cr. 249; 2 mature males, Sta. 1896 (15°N, 85°E), MPN, 500–300 m, 10 October 2006, MRLR-Cr. 249; 1 mature male, 1 immature female and 3 immature females, Sta. 1897 (15°N, 86°E), BN, 10 October 2006, MRLR-Cr. 249; 2 mature males, 1 immature male, 14 immature females and 7 juveniles, Sta. 1900 (13°N, 83°E), BN, 12 October 2006, MRLR-Cr. 249; 2 immature females, Sta. 1902 (13°N, 81°E), BN, 12 October 2006, MRLR-Cr. 249; 3 mature males, 2 immature males, 1 female with eggs, 3 immature females and 21 juveniles, Sta. 1904 (11°N, 80°E), BN, 14 October 2006, MRLR-Cr. 249; 7 immature females and 4 juveniles. Sta. 1905 (11°N, 81°E), BN, 15 October 2006, MRLR-Cr. 249; 1 immature female, Sta. 1907 (11°N, 83°E), MPN, 161–18 m, 15 October 2006, MRLR-Cr. 249; 8 mature males, 4 immature males, 1 spent female and 3 immature females, Sta. 1908 (11°N, 84°E), BN, 16 October 2006, MRLR-Cr. 249.

Andaman Sea: 5 immature males, 4 immature females and 8 juveniles, Sta. 1201 (8°N, 90°E), BN, 16 September 2006, MRLR-Cr. 207; 1 mature male, 6 immature males, 1 female with eyeless larvae, and 12 juveniles, Sta. 1203 (8°N, 94°E), BN, 18 September 2002, MRLR-Cr. 207; 1 mature male, Sta. 1204 (8°N, 95°E), BN, 18 September 2002, MRLR-Cr. 207; 2 mature males and 4 juveniles, Sta. 1206 (10°N, 94°E), BN, 20 September 2002, MRLR-Cr. 207; 7 mature males, 11 immature males, 11 immature females and 22 juveniles, Sta. 1207 (10°N, 92°E), BN, 21 September 2002, MRLR-Cr. 207, 4 mature males, 9 immature males, 1 spent females, 1 females with eggs, 4 immature females and 21 juveniles, Sta. 1208 (10°N, 90°E), BN, 22 September 2002, MRLR-Cr. 207; 12 mature males, 7 immature males, 12 immature females and 18 juveniles, Sta. 1209 (13° 30'N, 95°E), BN, 28 September 2002, MRLR-Cr. 207; 2 mature males, Sta. 1210 (13° 30'N, 94°E), BN, 30 September 2002, MRLR-Cr. 207; 5 mature males, 3 immature males, 11 immature females and 9 juveniles, Sta. 1211 (13° 30'N, 92°E), BN, 30 September 2002, MRLR-Cr. 207; 1 mature male, 1 immature male, 4 females with eggs, 1 immature female and 5 juveniles, Sta. 1212 (13° 30'N, 90°E), BN, 1 October 2002, MRLR-Cr. 207; 1 mature male and 12 juveniles, Sta. 1334 (13°

30'N, 92°E), BN, 6 April 2003, MRLR-Cr. 213; 1 juvenile, Sta. 1338 (10°N, 92°E), BN, 9 April 2003, MRLR-Cr. 213, 21 mature males, 14 immature females and 81 juveniles, Sta. 1340 (10°N, 90°E), BN, 10 April 2003, MRLR-Cr. 213; 1 mature male and 1 juvenile, Sta. 1438 (8°N, 92°E), BN, 24 December 2003, MRLR-Cr. 220; 2 immature females and 1 juvenile, Sta. 1440 (8°N, 94°E), BN, 25 December 2003, MRLR-Cr. 220; 1 immature male and 1 juvenile, Sta. 1442 (10°N, 95°E), BN, 27 December 2003, MRLR-Cr. 220; 1 mature male, 1 immature male and 1 juvenile, Sta. 1442 (10°N, 95°E), MPN, 97–0 m, 27 December 2003, MRLR-Cr. 220; 3 juveniles, Sta. 1443 (10°N, 94°E), MPN, 181–47 m, 27 December 2003, MRLR-Cr. 220; 4 mature males, 2 immature males and 3 juveniles, Sta. 1444 (10°N, 93°E), BN, 27 December 2003, MRLR-Cr. 220; 3 mature males and 2 juveniles, Sta. 1447 (12°N, 95°E), BN, 29 December 2003, MRLR-Cr. 220; 10 mature males, 13 immature males, 11 immature females and 10 juveniles, Sta. 1460 (13° 44'N, 92°E), BN, 7 January 2004, MRLR-Cr. 220; 31 mature males, 41 immature males, 38 immature females and 55 juveniles, Sta. 1462 (13° 44'N, 90°E), BN, 7 January 2004, MRLR-Cr. 220; 22 mature males, 28 immature males, 19 immature females and 7 juveniles, Sta. 1468 (12°N, 90°E), BN, 9 January 2004, MRLR-Cr. 220; 36 mature males, 26 immature males, 7 immature females and 58 juveniles, Sta. 1470 (12°N, 92°E), BN, 10 January 2004, MRLR-Cr. 220; 12 mature males, 8 immature males, 11immature females and 62 juveniles, Sta. 1474 (10°N, 91°E), BN, 11 January 2004, MRLR-Cr. 220; 4 immature males and 5 juveniles, Sta. 1475 (10°N, 90°E), BN, 11 January 2004, MRLR-Cr. 220; 1 juvenile, Sta. 1524 (12°N, 93° 19'E), BN, 11 June 2004, MRLR-Cr. 226; 4 juveniles, Sta. 1530 (13° 45'N, 95°E), BN, 14 June 2004, MRLR-Cr. 226; 2 mature males, Sta. 1531 (13° 45'N, 94°E), MPN, 112–0 m, 14 June 2004, MRLR-Cr. 226; 2 mature males, 1 immature male, 7 females with eggs, 5 immature females, 3 juveniles, Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226; 2 mature males and 7 juveniles, Sta. 1533 (13° 45'N, 92° 40'E), MPN, 170–0 m, 15 June 2004, MRLR-Cr. 226; 4 mature males, 1 immature male and 6 juveniles, Sta. 1535 (12°N, 94°E), BN, 17 June 2004, MRLR-Cr. 226; 6 mature males, 7 immature males and 4 juveniles, Sta. 1538 (10°N, 95°E), BN, 19 June 2004, MRLR-Cr. 226; 4 mature males, 7 immature males, 2 females with eyeless larvae and 3 juveniles, Sta. 1538 (10°N, 95°E), BN, 19 June 2004, MRLR-Cr. 226;
Length: mature male 2.7–3.2 mm, mature female 2.5–3.3 mm

Remarks: In the present collections *Pseudanchialina pusilla* was the most abundant species. In general appearance, *P. pusilla* closely resembles only other species of the genus *P. inermis* (Illig, 1906). *P. pusilla* can be easily distinguished from *P. inermis by* the subtruncate rostral process (Figure 4L) and 6–9 lateral spines on the telson (Figure 4M).

Geographic distribution: Pseudanchialina pusilla has been recorded from Celebes Sea (Sars 1885), Indonesia, the Bay of Bengal (Hansen 1910), Great Barrier Reef (W. Tattersall 1936), Arabian Sea (Pillai 1957, 1973), the South China Sea (Wang and Liu 1987), Malacca Strait (O. Tattersall 1960), southwestern Japan (Fukuoka and Murano 1997), and the Andaman Sea (Panampunnayil 2002).

Pseudanchialina inermis (Illig, 1906)

(Figure 4N,O)

Chlamydopleon inermis Illig 1906: 209, Figure 16.

Pseudanchialina erythraea, Nouvel 1944: 267–269; Bacescu 1975:45.

Pseudanchialina inermis, Hansen 1910: 61, plate 9, Figure 2a–d; Illig 1930: 422–423; Pillai 1973: 75–77; Valbonesi and Murano 1980: 213–215. Hanamura and De Grave 2004; 66, Figure 2f; Wang and Liu 1987: 226–228, Figure 11; 1994: 95; Murano 1990: 195, Figure 7; Jo 1991: 59–64, Figures 40–42.

Materials examined

Arabian Sea: 1 spent female, Sta. 1405 (10°N, 75°E), BN, 21 September 2004, MRLR-Cr. 217.

Length: mature female 3.3 mm

Remarks: *Pseudanchialina inermis* collected from different geographical areas showed some morphological variations. The rostrum is broader in the Indian specimens (Pillai 1973) and is narrow in the specimens from Timor (Hansen 1910), Japan (Valbonesi and Murano 1980) and Northwestern Pacific (Hanamura and De Grave 2004). Number of spines on the lateral margin of telson also show slight tendency for geographical variations (Hanamura and De Grave 2004). The present specimens have a relatively broad and narrow rostrum and 4–5 spines on the lateral margine of telson. The largest size for the present specimen is 3.3 mm, whereas the specimens collected from Akajima Island (Murano 1990) measured 2.3–2.6 mm, from Tanabe Bay, measured 2.2–2.3 mm (Valbonesi and Murano 1980), from Micronesia, measured 2.7–3 mm (Murano 1983) and Northwestern Pacific (Hanamura and De Grave 2004), measured 2.2 mm only.

P. inermis differs from only other species of the genus, *P. pusilla*, in having apically rounded rostrum (Figure 4N) and 3–5 pairs of spines along the lateral margin of the telson whereas there are 6–9 spines in the latter species (Figure 4O).

Geographic distribution: This species is distributed in the coastal and oceanic regions of the tropical and subtropical regions of the Indo-West Pacific (Fukuoka and Murano 1997; Hanamura and De Grave 2004).

Subfamily Erythropinae Hansen

Genus *Pseuderythrops* Coifmann

Pseuderythrops abrahami sp. nov.

(Figures 5,6)

Materials examined

Types

Holotype, spent female (8.5 mm) (IOBC– 0508–10–50–2009), dissected, Sta. 1524 (12°N, 93° 19'E), MPN, 300–199 m, 11 June 2004, Andaman Sea, MRLR-Cr. 226. Allotype, immature male (6.4 mm) (IOBC-0508A-10-50-2009), data same as holotype, MRLR-Cr. 226

Other materials

Andaman Sea: 1 spent female and 2 immature females. Sta. 1524 (12°N, 93° 19'E), MPN, 300–199 m, 11 June 2004, MRLR-Cr. 226.

Description

Body smooth and slender, carapace anteriorly short, leaving antennular peduncles and antennae fully exposed; anterior margin broadly and evenly rounded with narrow somewhat upturned rim; anterolateral corner narrowly rounded (Figure 5A); posterior margin emarginated, leaving last two thoracic somites uncovered. Eye large, extending beyond base of second segment of the antennular peduncle, cornea divided in to two pigmentary parts with ocelli free in between.

Antennular peduncle slender, first segment as long as following two segments together, armed on outer distal corner with 2–3 very long plumose setae; second segment very short, dorsal lobe with setae; third segment somewhat wider than preceding segment, armed on inner distal corner with 2 long setae (Figure 5B).

Antennal scale overreaches antennular peduncle; scale large, curves sigmoidally, broadest at level of base of large outer distal spine. Outer spine just reaches middle of the apical lobe, distal suture absent. Antennal peduncle comparatively short and stout, three segments almost same length (Figure 5C).

Labrum with rounded frontal margin (Figure 5D). Mandible with well developed incisor process, *lacinia mobilis* and spine row (Figure 5E). Mandibular palp small, second segment long with characteristic proximal bend, third segment more than half as long as the second (Figure 5F). Maxillule with broad inner lobe armed distally with three strong barbed spines and three pectinate setae; outer lobe with 10 strong spines on distal margin (Figure 5G). Maxilla basal lobe large with gnathobasic lobe, second segment of endopod is oblong and exopod borderd with plumose setae (Figure 5H).

Second segment of the endopod of the first thoracic limb with a prominent endite (Figure 5I). Second thoracic endopod pediform; merus and carpus subequal in length (Figure 5J). In third thoracic endopod, merus is the longest segment; 3 carpopropodal segments; carpus long, jointed obliquely with propodus bearing 5 long naked setae in inner distal corner; propodus 2 subsegmented (Figure 6A), proximal subsegment bears 5 long, curved setae in inner distal corner, 2 short naked setae present in inner margin of distal propodal subsegment (Figure 6B). Fourth to eighth thoracic endopods slender, without characteristic setae on distal corner of propodus (Figure 6C–F). Eighth endopod considerably shorter than preceding ones (Figure 6F,G). Oostegites fully developed in holotype specimen.

Pleopods rudimentary, unsegmented and rod shaped.

Uropod over-reaching telson, setose all round, exopod 1.3 times longer than endopod, without spines in statocyst region of endopod (Figure 6H).

Telson shorter than last abdominal segment, triangular, broadest at the base, 1.7 times as long as broad. Posterior half of the lateral border of the telson armed with 16–17 pairs of sharp subequal spines. Apex of the telson armed with a pair of long spines almost twice the length of the last lateral spine (Figure 6H).

Length: mature female 8.5 mm

Etymology

This species is named in honour of first author’s late father, M. Abraham.

Remarks

The new species closely resembles *P. gracilis* Coifmann, 1936, but differs from it in the following points.

(1) In the new species the carapace has a narrow, upturned frontal rim, while in *P. gracilis* this rim is absent. (2) In the new species cornea of the eye is divided into two pigmentary parts, while in *P. gracilis* eye is normal. (3) In *P. gracilis*, distal suture is present on the antennal scale, while in new species distal suture is absent. (4) In the new species, 3 segments of the antennal peduncle are subequal, whereas in *P. gracilis*, first segment is shorter than the second and third

segment. (5) In *P. gracilis*, the endopod of the third thoracic limb is furnished with five short, curved, naked setae along the inner margin of the distal propodal subsegment whereas in the new species only two naked setae are present on the inner margin of the distal propodal subsegment. (6) In the new species the lateral border of telson has 16–17 spines while there are 10–15 in *P. gracilis*.

The new species also resembles *P. megalops* Murano, 1998 but easily distinguished by the partition in the eye, curves on the antennal scale and shape and armature of the telson.

Genus *Gibberythrops* Illig

Gibberythrops acanthura (Illig, 1906)

(Figure 7A,B)

Parerythrops acanthura Illig 1906: 197.

Erythrops acanthura, Illig 1930: 431

Gibberythrops acanthura, W. Tattersall 1951: 122.

Materials examined

Arabian Sea: 5 immature males and 3 juveniles, Sta. 1673 (8°N, 76°E), MPN, 1000–500 m, 28 May 2005, MRLR-Cr. 235; 1 mature male, Sta. 1674 (8°N, 75°E), MPN, 163–26 m, 28 May 2005, MRLR-Cr. 235; 2 mature males, 1 immature male, 3 spent females and 2 juveniles, Sta. 1674 (8°N, 75°E), MPN, 500–300 m, 28 May 2005, MRLR-Cr. 235.

Length: mature male 4.5–5.2 mm, mature female 6.3 mm

Remarks: It is a deep water form and can be easily distinguished from allied species by the relative length of the antennal scale, the cornea which is as wide as eyestalks (Figure 7A) and number of spines on telson (Figure 7B). Telson of this species resembles that of *G. typicus* (Murano, 1969) but the eye and antennal scale are considerably different.

Geographic distribution: It has been recorded from Arabian Sea (W. Tattersall 1939; Pillai 1964), Sri Lanka (Illig 1906; 1930), Red Sea (Coifmann 1937b), Gulf of Aden (W. Tattersall 1939; Bacescu 1979), Philippines (W. Tattersall 1951), south east of Durben, south of Cape Guardafui and north east of Seychelles (O. Tattersall 1955).

Genus *Pleurerythrops* Ii

Pleurerythrops inscita Ii, 1964

(Figure 7C,D)

Pleurerythrops inscita Ii 1964: 323; Panampunnayil, 1998: 624–628, Figures 23–48.

Materials examined

Arabian Sea: 1 mature male, Sta. 1427 (19°N, 71°E), MPN, 76–34 m, 12 October 2003, MRLR-Cr. 217; 1 immature male, Sta. 1430 (19°N, 68°E), BN, 15 October 2003, MRLR-Cr. 217.
Length: mature male 3.4 mm.

Remarks: The present specimens fully agree with those described by Panampunnayil (1998) except the anterior part of the carapace. In the present specimen, the anterior margin of the carapace is broadly rounded (Figure 7C) as described by Ii (1964) whereas in Panampunnayil's specimen, it is subtruncate.

In general appearance, *P. inscita* closely resembles only other Indian species of the genus, *P. constricta* Panampunnayil, 1977. *P. inscita* can be distinguished from *P. constricta* by the following points. In *P. inscita* anterior part of the carapace is broadly rounded (Figure 7C) while in *P. constricta* it is broadly triangular. In *P. constricta* the lateral margin of telson has a distinct constriction at the basal part whereas in *P. inscita* lateral margins are entire without any constriction (Figure 7D). In *P. inscita* inner border of endopod of uropod is armed with 11–14 spines (Figure 7D) compared with 17 in *P. constricta.*

Geographic distribution: This species has been previously recorded from South China Sea (Ii 1964; Liu and Wang 1986), Malacca Strait (O. Tattersall 1965), Indian water (Panampunnayil 1998) and the Andaman Sea (Fukuoka and Murano 2002).

Genus *Euchaetomera* G.O. Sars

Euchaetomera glyphidophthalmica Illig, 1906

(Figure 7E,F)

Euchaetomera glyphidophthalmica Illig 1906: 201–202, Figure 9; 1930: 445, Figures 84–87; W. Tattersall 1939: 243; O. Tattersall 1955: 131; Pillai 1964: 227, Figure 16; Murano 1977: 146–147, Figure 3; Panampunnayil 2002: 379, Figure 6A–H.

Materials examined

Arabian Sea: 1 mature male, Sta. 1483 (10°N, 70°E), MPN, 218–70 m, 25 March 2004, MRLR-Cr. 223.

Bay of Bengal: 1 spent female, Sta. 1237 (17°N, 87°E), BN, 15 November 2002, MRLR-Cr. 209.

Andaman Sea: 1 immature male, Sta. 1530 (13° 45'N, 95°E), MPN, 216–96 m, 14 June 2004, MRLR-Cr. 226.

Length: mature male 5.8 mm, mature female 6.3 mm

Remarks: This species is distinguished from other species of the genus by the small narrow acute rostral plate, the larger lateral cornea (Figure 7E) and the naked lateral margin of the telson (Figure 7F). Pillai (1964) reported the length of adult female as 9.4 mm which is the maximum size observed.

Geographic distribution: Though it is a widely distributed species, most of the hauls contained only one or two specimens. This mesopelagic form has a wide geographical range and has been recorded from the tropical and temperate regions of the Atlantic Ocean (Zimmer 1914; Illig 1930; W. Tattersall 1943; O. Tattersall 1955), the Mediterranean Sea (Zimmer 1915; Colosi 1929), the Pacific Ocean (Murano 1977), Gulf of Aden (W. Tattersall 1939), the Arabian Sea (Pillai 1964) and the Andaman Sea (Panampunnayil 2002). The present report from the Bay of Bengal is a new record for this area.

Genus *Synerythrops* Hansen

Synerythrops intermedia Hansen, 1910

(Figure 7G–J)

Synerythrops intermedia Hansen 1910: 64–65; Illig 1930: 64–65, plate 9, Figure 5a–e, plate 10, Figure 1a– c; W. Tattersall 1939: 237–238, Ii 1964: 342; Murano 1975: 12, 90.

Materials examined

Bay of Bengal: 1 mature male, Sta. 1248 (15°N, 81°E), MPN, 300–186 m, 24 November 2003, MRLR-Cr. 209.

Length: mature male 12.3 mm

Remarks: The present species was established in 1910 by Hansen a single immature female collected during Siboga–Expedition. The present specimen showed some variation from the earlier descriptions. Rostrum in the present specimen is obtusely pointed (Figure 7G), in the type specimen it is moderately rounded while obtusely pointed in Murano's specimen. In Tattersall's and Murano's specimens a distal suture is present on the antennal scale while it is absent in the present specimen (Figure 7G). In the present specimen eyes are small and do not extend laterally beyond lateral line of anterior part of the body, while in Murano's specimen, eyes are large and extend laterally beyond lateral line of anterior part of body. In Tattersall's male specimen, pseudobranchial process of first pleopod is as long as endopod, and endopod bears 13 segments, while in present specimen, pseudobranchial process is smaller than endopod and the endopod bears 12 segments (Figure 7H). In earlier descriptions pseudobranchial process in the pleopods are straight but in present specimen pseudobranchial processes of second to fifth pleopods are somewhat bent (Figure 7I). In the present specimen telson is armed with 6 spines while Murano recorded 8 spines (Figure 7J).

Geographic distribution: Synerythrops intermedia is a deep sea form and widely distributed in the Indian and the western Pacific Oceans. They are recorded from Manipa Strait of Indonesia (Hansen 1910), Gulf of Aden (W. Tattersall 1939), and Sagami Bay and Suruga Bay, Japan (Murano 1975). The present record of *S. intermedia* extends its distribution eastwards in the Indian waters.

Subfamily Leptomysinae Hansen

Genus *Dioptromysis* Zimmer

Dioptromysis perspicillata Zimmer, 1915

(Figure 8A)

Dioptromysis perspicillata Zimmer 1915: 168, Figure 20–22; W. Tattersall 1922: 477; Pillai 1963a: 9–14.

Materials examined

Arabian Sea: 1 spent female and 2 juveniles, Sta. 1392 (8°N, 76° 39'E), BN, 14 September 2003, MRLR-Cr. 217.

Length: mature female 5.2 mm

Remarks: Dioptromysis perspicillata appears to be a surface dwelling coastal form. This species was rare in the present samples; only 3 specimens were recorded from the surface waters of Arabian Sea.

The present specimens well agree with the description of Pillai (1963a) but show some minor variations. Pillai observed 17 spines on the inner border of the endopod of the uropod while in the present specimen there were only 16. In the present specimen, lateral margin of telson is armed with 14 spines (Figure 8A), while in Pillai's descriptions, there are 11–13. Pillai's mature specimens measured 3.8–4.3 mm and W. Tattersall's (1922) 3.5–5 mm while present female specimen is 5.2 mm in length.

Geographic distribution: The distribution of this species extends to Ceylon (Zimmer 1915), the Andaman Island (W. Tattersall 1922), Gulf of Mannar (W. Tattersall 1922) and the Arabian Sea (Pillai 1963a).

Genus *Afromysis* Zimmer

Afromysis dentisinus Pillai, 1957

(Figure 8B–C)

Afromysis dentisinus Pillai 1957: 11, Figure 1–7; 1964: 28, Figure 17; 1967: 1716, Figure 75; 1973: 100, Figure 54; Biju and Panamapunnayil 2009: 352, Figure 5A,B.

Materials examined

Arabian Sea: 4 mature males, 5 immature males, 2 spent females and 1 immature female, Sta. 1392 (8°N, 76° 39'E), BN, 14 September 2003, MRLR-Cr. 217.

Length: mature male 8.5 mm, mature female 9 mm

Remarks: This species was established by Pillai (1957) for specimens collected from the inshore waters of Kerala, and can be readily distinguished from the only other Indian species of the genus, *A. macropsis* W. Tattersall, 1922, by the following points. In *A. macropsis*, there are three modified setae on the exopod of the fourth pleopod of the male while in *A. dentisinus* there is only one modified setum (Figure 8B). In *A. macropsis* there are 3 spines on the widened basal part of the telson and the spines on the distal margin are blunt. In *A. dentisinus* there is only one spine on the basal part of the telson, and the spines on the distal margin are pointed (Figure 8C).

Geographic distribution: Inshore waters of Kerala (Pillai 1957) and off shore waters of the Arabian Sea (Pillai 1964, 1973; Biju and Panampunnayil 2009).

Genus *Doxomysis* Hansen

Doxomysis longiura Pillai, 1963

(Figure 8D–J)

Doxomysis sp. W. Tattersall 1922: 480, Figure 18.

Doxomysis littoralis, W. Tattersall 1936: 154 (in part); Pillai 1957: 12, Figure 7, 1–2

Doxomysis longiura, Pillai 1963b: 258, Figures 1–19; 1964: 30, Figure 18; 1965: 1717, Figure 79; 1973: 105–109, Figure 58.

Materials examined

Arabian Sea: 9 mature males, 6 immature males, 9 immature females, 2 females with eyeless larvae and 22 juveniles, Sta. 1392 (8°N, 76° 39'E), BN, 14 September 2003, MRLR-Cr. 217; 1 immature female, Sta. 1503 (15°N, 73°E), BN, 7 April 2004, MRLR-Cr. 223.

Length: mature male 5.8–6.9 mm, mature female 5.7–5.9 mm.

Remarks: The present specimens agree with the descriptions of Pillai (1973) but show some variations in the following characters. In the present specimen outer lobe of the maxillule carries 14 short spines (Figure 8E) while in Pillai's specimen, there are only 10. In the present specimen telsonic sinus is broader and armed with 15 pairs of strong spines (Figure 8H,I) as against 11 in Pillai's specimens.

This well–known and widely distributed species is readily recognized by the hispid body, relative length of the antennal scale (Figure 8D), modifications of exopod of fourth pleopod (Figure 8F,G) and relative length of the endopod of uropod (Figure 8J).

Geographic distribution: This species has been recorded from the Andaman Island (W. Tattersall 1922), Great Barrier Reef (W. Tattersall 1936) and the Arabian Sea (Pillai 1957, 1973).

Subfamily Mysinae Haworth

Genus *Mesopodopsis* Czerniavsky

Mesopodopsis orientalis (W. Tattersall, 1908)

(Figure 9A,B)

Macropsis orientalis W. Tattersall 1908: 236, Plate 22, Figures 1–9.

Mesopodopsis orientalis, W. Tattersall 1922: 482; Nair 1939: 175; Nouvel 1957: 323; Murano 1988: 298; Biju and Panampunnayil 2009: Figure 8A–E.

Materials examined

Arabian Sea: 1 spent female and 1 immature female**,** Sta. 1392 (8°N, 76° 39'E), BN, 14 September 2003, MRLR-Cr. 217.

Length: mature female 10 mm

Remarks: Even though *Mesopodopsis orientalis* was collected from only one station in the present study, it is the most widespread and abundant mysid in the backwaters and estuaries of both east and west coasts of India (Biju et al. 2009). The present report in the Arabian Sea confirms its presence in the oceanic waters also.

This taxon was created by Tattersall (1908) for specimens collected from the brackish water of Bengal and can be easily distinguished from allied species by the semicircular frontal plate (Figure 9A), unsegmented outer apical setae and relative length of the endopod of fourth male pleopod and the number of spines on the distal part of the telson (Figure 9B).

Mesopodopsis orientalis is closely related to *M. tenuipes* Hanamura, Koizumi, Sawamoto, Siow and Chee, 2008, which were previously treated as a single species. But *M. tenuipes* differs from *M. orientalis* in having broader cornea, short antennal peduncle, and longer and slender fourth male pleopods.

Geographic distribution: This species been recorded from India (Panikkar and Aiyar 1937; George 1958; Gupta and Gupta 1984; Chandramohan 1983; Sarkar and Chowdhury 1986; Biju et al. 2009; Biju and Panampunnayil 2009), Java (Nouvel 1957), Malaysia and Indonesia (Hanamura et al. 2008) and Thailand (Murano 1988; Pinkaew et al. 2001; Hanamura et al. 2008).

Genus *Acanthomysis* Czerniavsky

Acanthomysis macrops Pillai, 1973

(Figure 9C–F)

Acanthomysis macrops Pillai 1973: 110, Figure 61; Biju and Panampunnayil 2009: Figure 5A,B.

Materials examined

Arabian Sea: 1 mature male, 4 immature females and 1 spent female, Sta. 1392 (8°N, 76° 39'E), BN, 14 September 2003, MRLR-Cr. 217.

Length: mature male and female 6 mm.

Remarks: This species can be easily distinguished from all the known species of this genus by the short obtusely rounded triangular rostral plate (Figure 9C), the large hump on the outer lobe of the maxillule (Figure 9D) and linguiform telson (Figure 9E,F). The present material very well agrees with the descriptions and figures published by Biju and Panampunnayil (2009) except for some minor variations. In the present specimen, lateral border of the distal half of the telson carry 11–16 pairs of spines (Figure 9E,F) as against 9–10 in the Biju and Panampunnayil's specimens. In the present male specimens, telson base is broad and apex proper carry four pairs of large spines, regularly decreasing in length towards the middle (Figure 9E) and in female outer two pairs are long and subequal (Figure 9F) whereas in Biju and Panampunnayil's specimens, both in male and female, the outer two pairs are long and subequal and the inner most pair is the shortest.

Geographic distribution: Acanthomysis macrops has so far been recorded from the Arabian Sea (Pillai 1973; Biju and Panampunnayil 2009) only.

Genus *Lycomysis* Hansen

Lycomysis spinicauda Hansen, 1910

(Figure 9G)

Lycomysis spinicauda Hansen 1910: 77, plate xi, Figure 3a–f, plate xii, Figure 2a–h; Colosi 1917: 1964, Figure 1a–d; 1919: 10; 1920: 251, plate xx. Figure 10a–g; W. Tattersall 1922: 492, Figure 25.
Lycomysis pusilla, Zimmer 1915: 175, Figures 30–37.

Materials examined

Andaman Sea: 1 mature male and 2 juveniles Sta. 1532 (13° 45'N, 93°E), BN, 15 June 2004, MRLR-Cr. 226.

Length: immature female 4.7 mm

Remarks: The present specimens are distinguished from the only other Indian species of this genus, *L. platycauda* Pillai, 1961 by the following points. In the present specimens, apex of telson is subtruncate, with two pairs of long spines and two pairs of very short spines and the endopod of uropod without spines (Figure 9G). In *L. platycauda* apex of telson is rounded, with five pairs of long spines and endopod of uropod is armed with four spines below the statocyst.

Geographic distribution: Hitherto, *Lycomysis spinicauda* known from the Indian Ocean and the Western Pacific. It has been previously recorded from Buton Strait (Hansen 1910), the China Sea (Colosi 1917), between Ceylon to Dampier Strait (Zimmer 1916) and the Andaman waters (W. Tattersall 1922; Fukuoka and Murano 2002).

Genus *Anisomysis* Hansen

Anisomysis spinata Panampunnayil, 1993

(Figure 9H–J)

Anisomysis spinata Panampunnayil 1993: 1141–1145, Figures 1–19; 2002: 384, Figure 8H,I.

Materials examined

Andaman Sea: 2 mature male, Sta. 1332 (10°N, 94°E), MPN, 30–0 m, 3 April 2003, MRLR-Cr. 213.

Length: mature male 4 mm

Remarks: Anisomysis spinata is a rare and endemic species in the Indian waters. The shape and armature of the telson and acutely pointed process on uropodal endopod with articulation at base distinguishes this species from allied species of the genus. The present specimens agree very well with the type specimen except for the following minor points. In the present specimens, the rostrum is narrow, covering only the basal part of the eyestalks (Figure 9H), whereas in the type specimen the rostrum is broad, covering proximal half of eyestalks. In the present specimens the third segment of the exopod of the fourth male pleopod is longer than the second segment (Figure 9I) while in the type specimen the third segment is shorter than the second segment. In the present specimens the lateral border of telson carry only 5 spines (Figure 9J), as against 6 in the type specimens.

Geographic distribution: Lakshadweep (Panampunnayil 1993) and the Andaman waters (Panumpunnayil 2002).

Discussion

Mysids were widely distributed in the area investigated (Figures 10–13). In general, Indian EEZ was rich in mysids with a relatively higher abundance in the Arabian Sea than the Bay of Bengal (Mathew et al. 1989). Comparatively low species diversity observed in the Bay of Bengal and the Andaman Sea in the present study may be due to the discharge of larger amount of fresh water from perennial rivers, which may prevent the existence of high salinity tolerant species. In the present study, mysid population density is relatively high compared with an earlier report (Mathew et al. 1989). The present records for the Arabian Sea (ave. 957.6 ind./1000 m^3) and the Bay of Bengal (ave. 490.3 ind./1000 m^3) are much higher than in Mathew et al's. data; they reported only an average of 430 ind./1000 m^3 in the Arabian Sea and 265 ind./1000 m^3 in the Bay of Bengal. This is probably an artifact of seasonal /diel variations, migratory behaviour of mysids or difference in the sampling strategies.

The present collection includes 27 mysid species, of these *Pseudanchialina pusilla* is the dominant species constituting 64.8% of the total mysid collected. This species was also dominant in the collections of the IIOE (Pillai 1973) and the Andaman Sea (Panampunnayil 2002). Pillai (1973) state that because of its abundance, *P. pusilla* obviously plays an important role in the ecology of the Indian Ocean and its small size is compensated by its abundance.

As in other zooplankton species, the mysids showed a significant variation in their population density during day and night. For instance, the high abundant of species such as *Pseudanchialina pusilla* and *Siriella gracilis* contributing 86.6% and 86.5 % respectively to the night samples and 13.4% and 13.5% respectively during the day, which may closely reflect a strong vertical migration. Earlier reports of mysids collected from the Arabian Sea and the Bay of Bengal also showed clear day (38%) and night (62%) variations (Mathew et al. 1989).

In the present collections, *Siriella thompsonii*, *S. gracilis*, *Hemisiriella parva*, *Anchialina typica orientalis*, *Pseudanchialina pusilla* and *Eucheatomera glyphidothalmica* were commonly recorded in the Arabian Sea, Bay of Bengal and the Andaman Sea. Below the thermocline layer mysid population density and species diversity were low. Only two species, *Boreomysis plebeja* and *Gibberythrops acanthura* were found below 500 m depths.

The genus *Anchialina* is represented by four species, followed by *Siriella* and *Pseudanchialina*. All other genera are represented by a single species. *Boreomysis plebeja*, *Anchialina media* and *Synerythrops intermedia* are new records for the Indian waters. *Rhopalophthalmus indicus* and *Euchaetomera glyphidophthalmica* were previously found only on the west coast of India, while the present study extends its distribution to east coast.

Most of the species collected in the study have a very wide range of distribution in the tropical and subtropical Indo-Pacific waters. Based on the distributional ranges of species, oceanic grouping of mysids collected in the Indian EEZ are shown in Table II. There is a closer affinity between the Indian and Pacific mysids than between those of Indian and Atlantic mysids; out of 27 species 18 species are Indo-Pacific. Such affinity was also observed in mysids collected during IIOE (Pillai 1973) and in the Andaman waters (Panampunnayil 2002). This may be related to the changes in the current and sea level according to the changes of the past diastrophism. Pillai (1973) reported that this predominance of tropical Indo-Pacific fauna is due to the large - scale interchange of water between Pacific and Indian Oceans through the Indonesian Archipelago, which helps to maintain a wide distribution of warm water species. The widely distributed Indo-Pacific species like *Siriella gracilis*, *Hemisiriella parva* and *Pseudanchialina pusilla*, have never been recorded from the Atlantic Ocean, perhaps because the Suez and Panama canals, two narrow man-made connections to the Atlantic Ocean, are apparently inadequate to facilitate migration into the Atlantic (Pillai 1973).

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Figure captions

Figure 1. Location of stations in the EEZ of India

Figure 2. *Boreomysis plebeja* Hansen (immature female)

A. Anterior part of the body

B. Posterior part of the body with telson and uropod

Figure 2. *Siriella thompsonii* (H. Milne–Edwards) (mature male)

C. Anterior part of the body

D. Posterior part of the body with telson and uropod

Figure 2. *Siriella gracilis* Dana (mature male)

E. Anterior part of the body

F. Posterior part of the body with telson and uropod

Figure 2. *Siriella aequiremis* Hansen (mature male)

G. Fourth pleopod

H. Same, tip of exopod enlarged

I. Posterior part of the body with telson and uropod

Figure 2. *Hemisiriella parva* Hansen (mature male)

J. Posterior part of the body with telson and uropod

Figure 2. *Rhopalophthalmus indicus* Pillai (mature male)

K. Antennal sympodial spines

Figure 2 *Gastrosaccus dunckeri* Zimmer (mature male)

I. Posterior part of the body with telson and uropod

Figure 2. *Haplostylus pusillus* (Coifmann) (mature male)

A. Third pleopod

B. Telson

C. Same, tip enlarged

Figure 3. *Eurobowmaniella simulans* (W. Tattersall) (mature male)

D. Posterior part of the body with telson and uropod

E. Hind border of carapace

F. Third pleopod

G. Same, tip of exopod enlarged

Figure 3 *Anchialina typica orientalis* Nouvel (mature male)

H. Anterior part of the body

I. Third pleopod

J. Same, tip of exopod enlarged

K. Posterior part of the body with telson and uropod

Figure 3 *Anchialina grossa* Hansen

L. Anterior part of the body of female

M. Tip of endopod of the third pleopod of male

Figure 3 *Anchialina dentata* Pillai (mature male)

N. Anterior part of the body

O. Second thoracic limb

P. Same, tip of endopod enlarged

Q. Third pleopod

R. Same, tip of exopod enlarged

Figure 4. *Anchialina media* Ii (mature male)

A, Anterior part of the body

B. Antenna

C. Same, sympodial spine enlarged

D. Labrum

E. Maxillule

F. Mandibular palp

G. Same, tip enlarged

H. Third pleopod

I. Same, tip of exopod enlarged

J. Posterior part of the body with telson and uropod

K. Tip of the telson enlarged

Figure 4. *Pseudanchialina pusilla* (G.O. Sars) (mature male)

L. Anterior part of the body

M. Posterior part of the body with telson and uropod

Figure 4.*Pseudanchialina inermis* (Illig) (spent female)

N. Anterior part of the body

O. Posterior part of the body with telson and uropod

Figure 5. *Pseuderythrops abrahami* sp.nov. (holotype spent female)

A. Anterior part of the body

B. Antennule

C. Antenna

D. Labrum

E. Masticatory part of mandibles

F. Mandibular palp

G. Maxillule

H. Maxilla

I. First thoracic endopod

J. Second thoracic endopod

Figure 6. *Pseuderythrops abrahami* sp.nov (holotype, spent female)

A. Third thoracic endopod

B. Same, tip enlarged

C. Fifth thoracic endopod

D. Same, tip enlarged

E. Seventh thoracic limb

F. Eighth thoracic endopod

G. Same, tip enlarged

H. Posterior part of the body with telson and uropod

Figure 7. *Gibberythrops acanthura* (Illig) (mature male)

A. Anterior part of the body

B. Posterior part of the body with telson and uropod

Figure 7. *Pleurerythrops inscita* Ii (mature male)

C. Anterior part of the body

D. Posterior part of the body with telson and uropod

Figure 7. *Euchaetomera glyphidophthalmica* Illig (mature male)

E.Anterior part of the body

F. Posterior part of the body with telson and uropod

Figure 7. *Synerythrops intermedia* Hansen (mature male)

G. Anterior part of the body

H. First pleopod

I. Third pleopod

J. Posterior part of the body with telson and uropod

Figure 8. *Dioptromysis perspicillata* Zimmer (mature male)

A. Posterior part of the body with telson and uropod

Figure 8. *Afromysis dentisinus* Pillai (mature male)

B. Fourth pleopod

C. Posterior part of the body with telson and uropod

Figure 8. *Doxomysis longiura* Pillai (mature male)

D. Anterior part of the body

E. Maxillule

F. Fourth pleopod

G. Same, tip of exopod enlarged

H. Telson

I. Same, tip enlarged

J. Uropods

Figure 9. *Mesopodopsis orientalis* (W. Tattersall) (spent female)

A. Anterior part of the body

B. Posterior part of the body with telson and uropod

Figure 9. *Acanthomysis macrops* Pillai (mature male)

C. Anterior part of the body of male

D. Maxillule of male

E. Telson of male

F. Telson of female

Figure 9. *Lycomysis spinicauda* Hansen (mature male)

G. Posterior part of the body with telson and uropod

Figure 9. *Anisomysis spinata* Panampunnayil (mature male)

H. Anterior part of the body

I. Fourth pleopod

J. Posterior part of the body with telson and uropod

Figure 10. Distribution of *Boreomysis plebeja*, *Siriella thompsonii*, *S. gracilis*, *S. aequiremis*, and *Hemisiriella parva* in the EEZ of India.

Figure 11. Distribution of *Rhopalophthalmus indicus*, *Gastrosaccus dunckeri*, *Haplostylus pusillus*, *Eurobowmaniella simulans*, *Anchialina typica orientalis*, *A. grossa*, *A. dentata*, and *A. media* in the EEZ of India.

Figure 12. Distribution of *Pseudanchialina pusilla* in the EEZ of India.

Figure 13. Distribution of *Pseudanchialina inermis*, *Pseuderythrops abrahami*, *Gibberythrops acanthura*, *Pleurerythrops inscita*, *Euchaetomera glyphidophthalmica*, *Synerythrops intermedia*, *Dioptromysis perspicillata*, *Afromysis dentisinus*, *Doxomysis longiura*, *Mesopodopsis orientalis*, *Acanthomysis macrops* , *Lycomysis spinicauda*, and *Anisomysis spinata* in the EEZ of India.

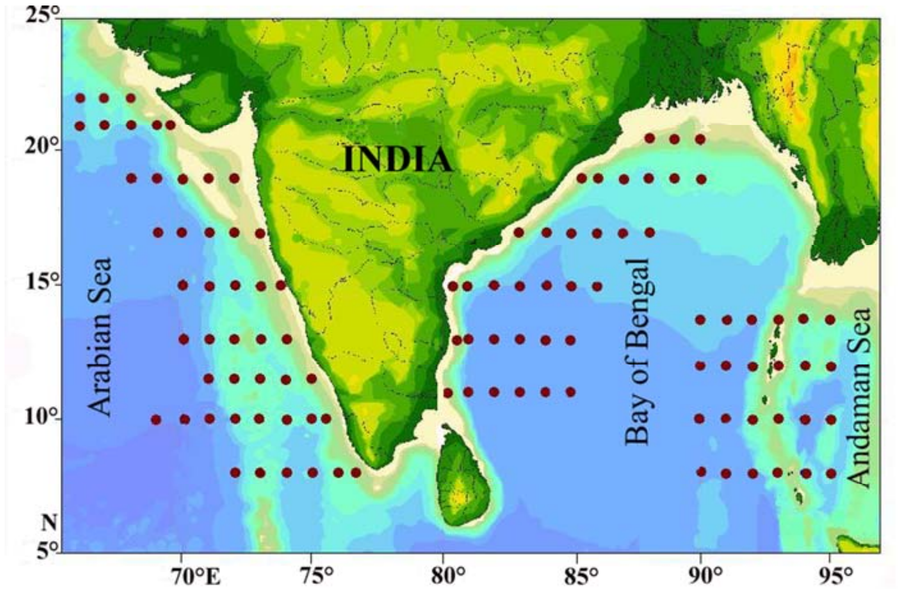
Table I. Details of sampling locations and cruises in the EEZ of India.

Area	Positions		No. of stations	Cruise	Duration
	Latitude (°N)	Longitude (°E)			
Arabian Sea	8°–22°	65°–77°	47	217	12 September 2003 – 23 October 2003
	(Transects–8°, 10°,11° 30',			223	18 March 2004 – 4 May 2004
	13°, 15°, 17°, 19°, 21° &			235	26 May 2005 – 24 June 2005
	22°)			251	29 November 2006 – 20 December 2006
Bay of Bengal	11°–20° 30'	80°–90°	34	209	7 November 2002 – 5 December 2002
	(Transects–11°, 13°, 15°,			215	9 July 2003 – 6 August 2003
	17°, 19° & 20° 30')			232	17 February 2005 – 16 March 2005
				249	15 September 2006 – 21 October 2006
Andaman Sea	8°–13° 45'	90°–95°	24	207	16 September 2002 – 10 October 2002
	(Transects–8°, 10°, 12° & 13° 45')			213	28 March 2003 – 15 April 2003
				220	11 April 2006 – 4 May 2004
				226	6 May 2004 – 10 June 2004

Table II. Oceanic grouping of mysids collected from the EEZ of India based on distribibitional ranges of species.

Indian Ocean	Indian & Pacific	Indian, Pacific & Atlantic
Rhopalophthalmus indicus	*Siriella gracilis*	*Boreomysis plebeja*
Afromysis dentisinus	*Siriella aequiremis*	*Siriella thompsonii*
Dioptromysis perspicillata	*Hemisiriella parva*	*Euchaetomera glyphidophthalmica*
Acanthomysis macrops	*Haplostylus pusillus*	
Anisomysis spinata	*Gastrosaccus dunckeri*	
Pseuderythrops abrahami	*Eurobowmaniella simulans*	
	Anchialina typica orientalis	
	Anchialina grossa	
	Anchialina dentata	
	Anchialina media	
	Pseudanchialina pusilla	
	Pseudanchialina inermis	
	Gibberythrops acanthura	
	Pleurerythrops inscita	
	Synerythrops intermedia	
	Doxomysis longiura	
	Mesopodopsis orientalis	
	Lycomysis spinicauda	

Figure 1



25°
20°
15°
10°
N
5°
70°E
75°
80°
85°
90°
95°
INDIA
Arabian Sea
Bay of Bengal
Andaman Sea

Figure 2

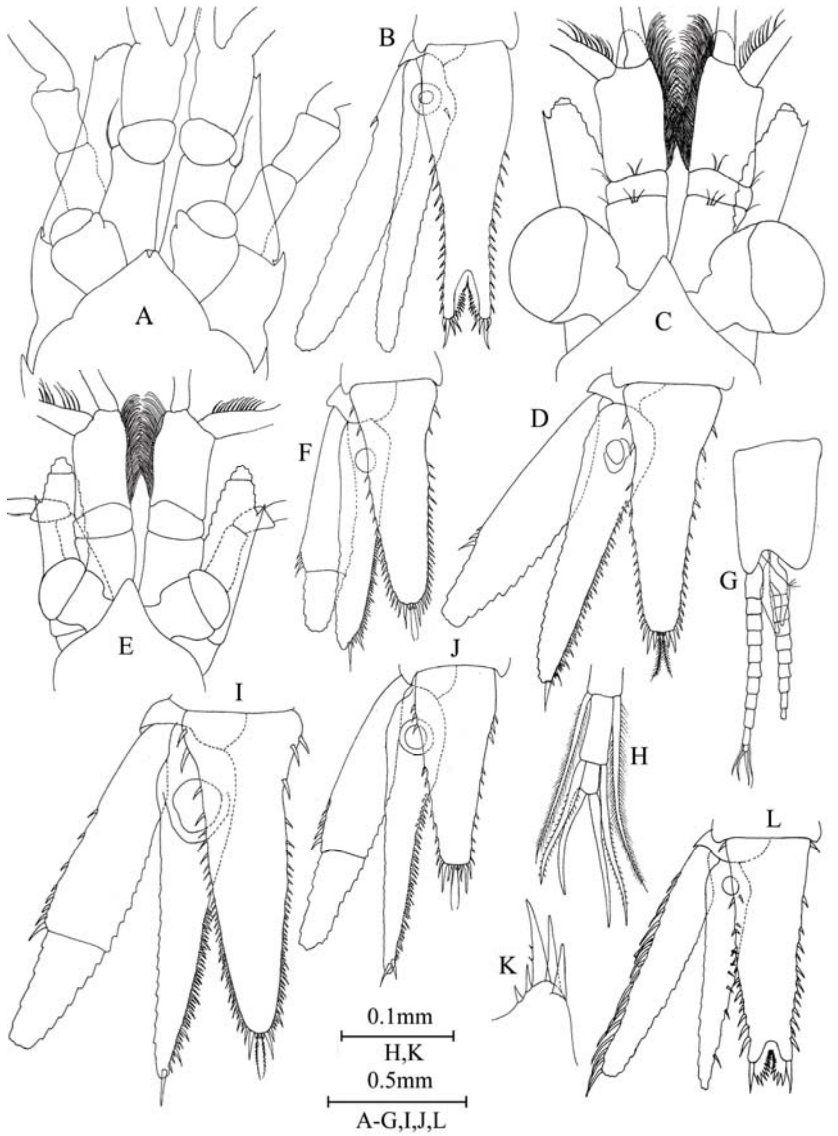


Figure 3

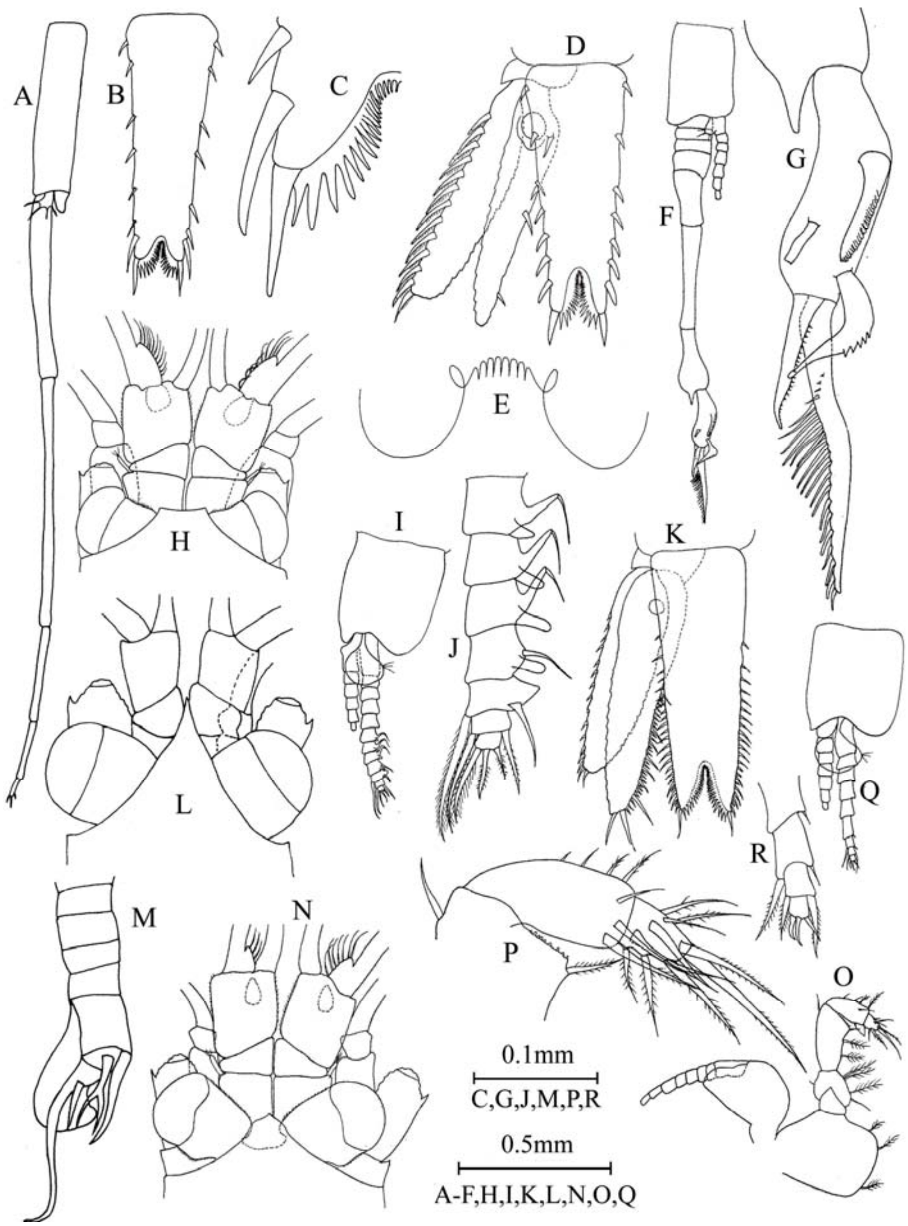


Figure 4

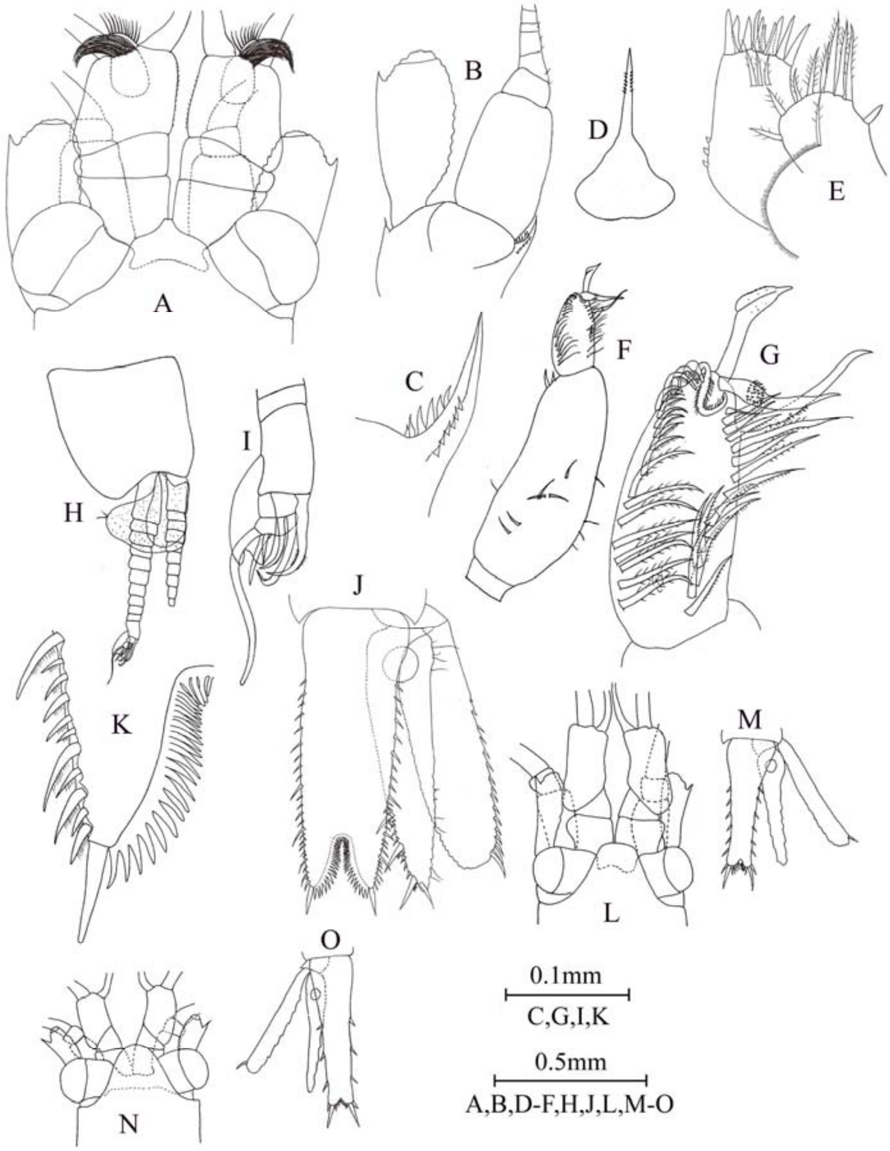


Figure 5

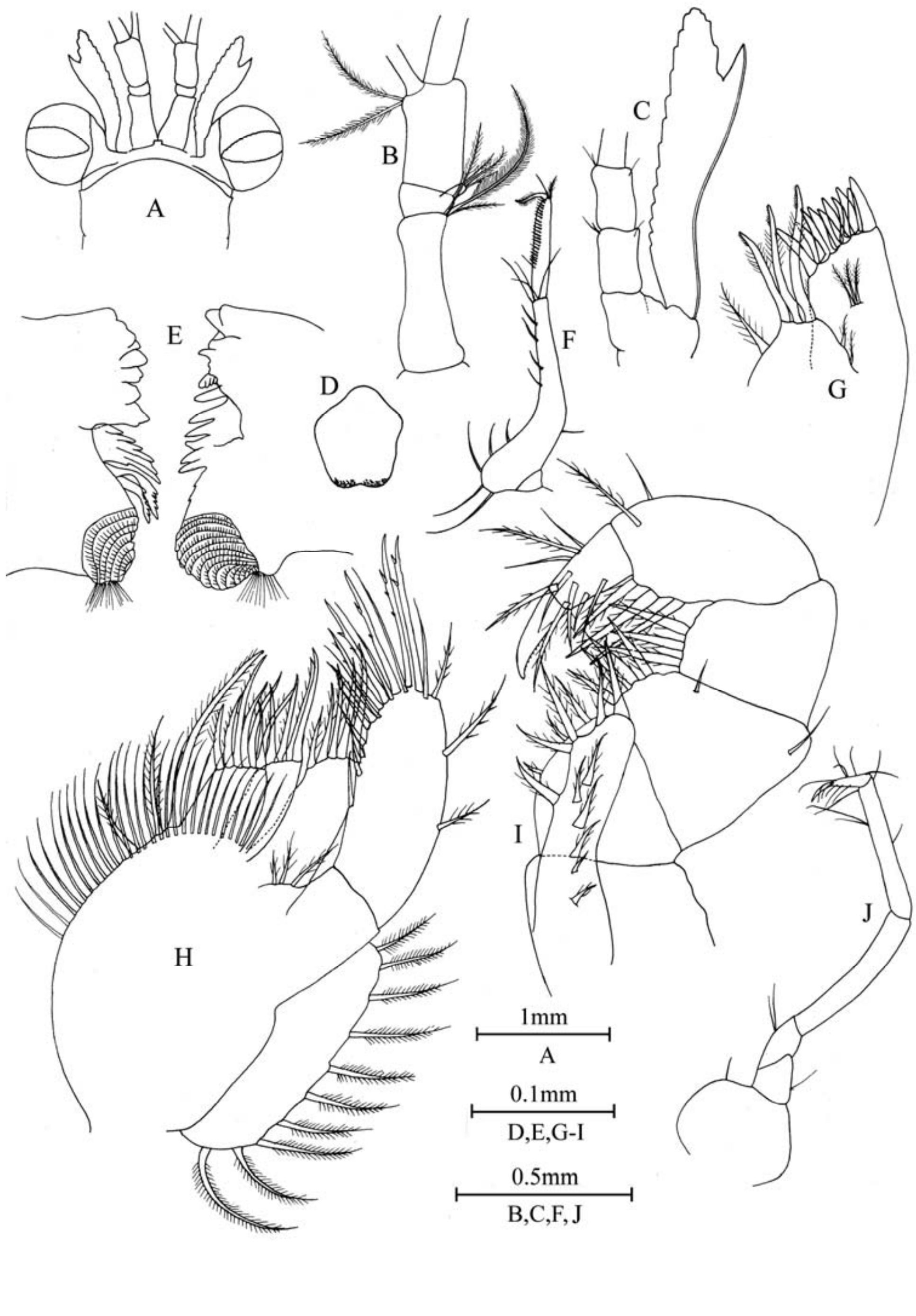


Figure 6

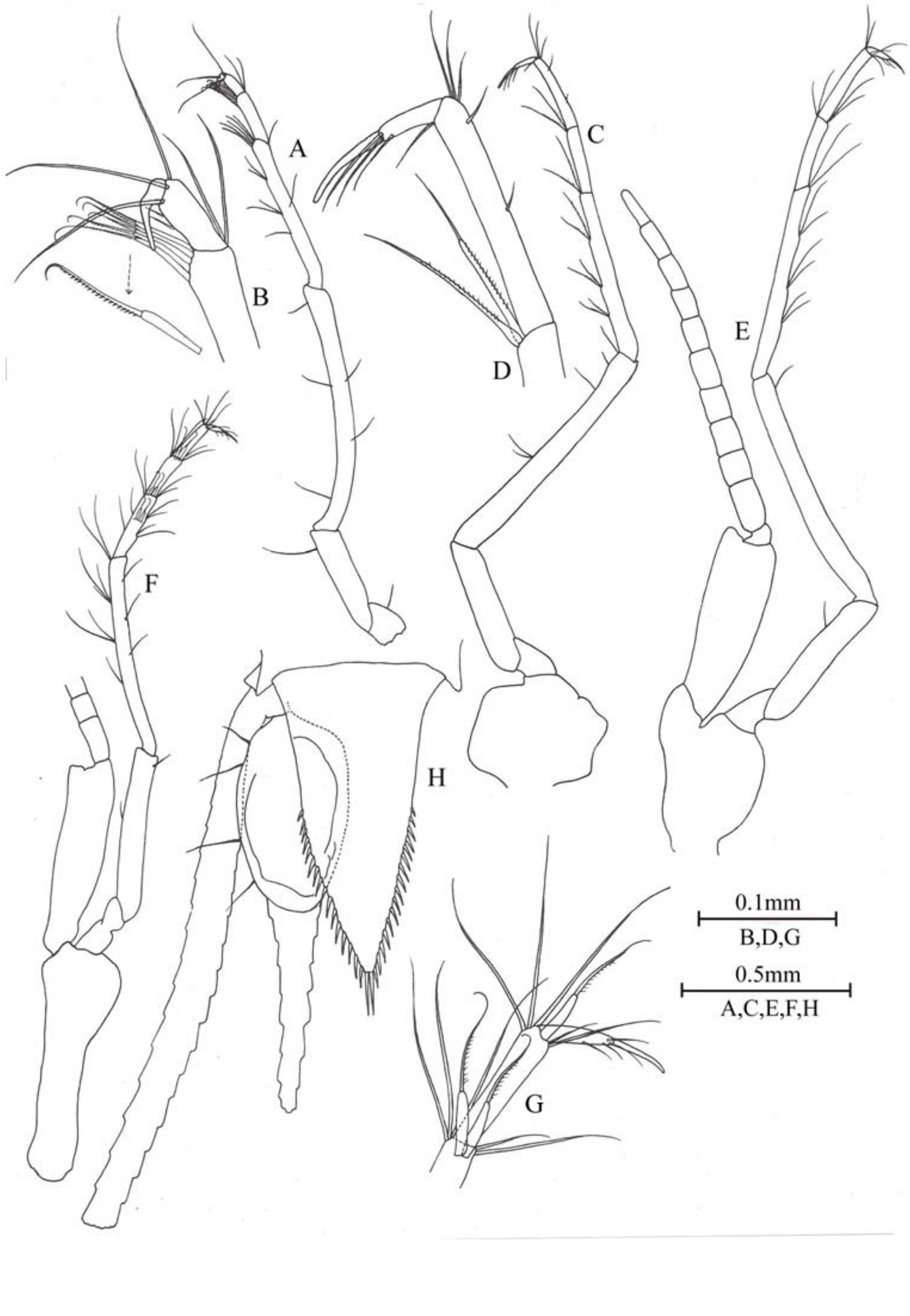


Figure 7

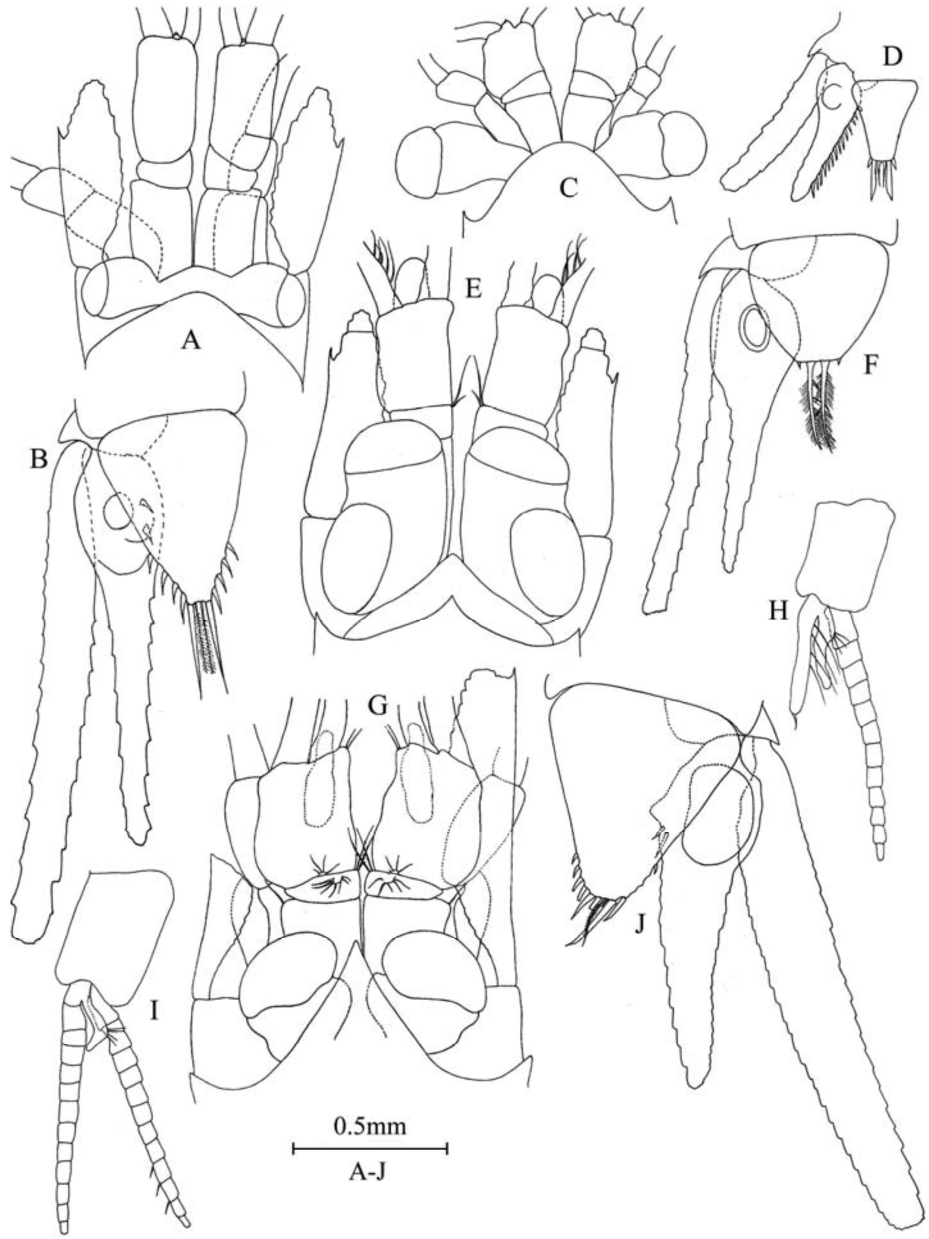


Figure 8

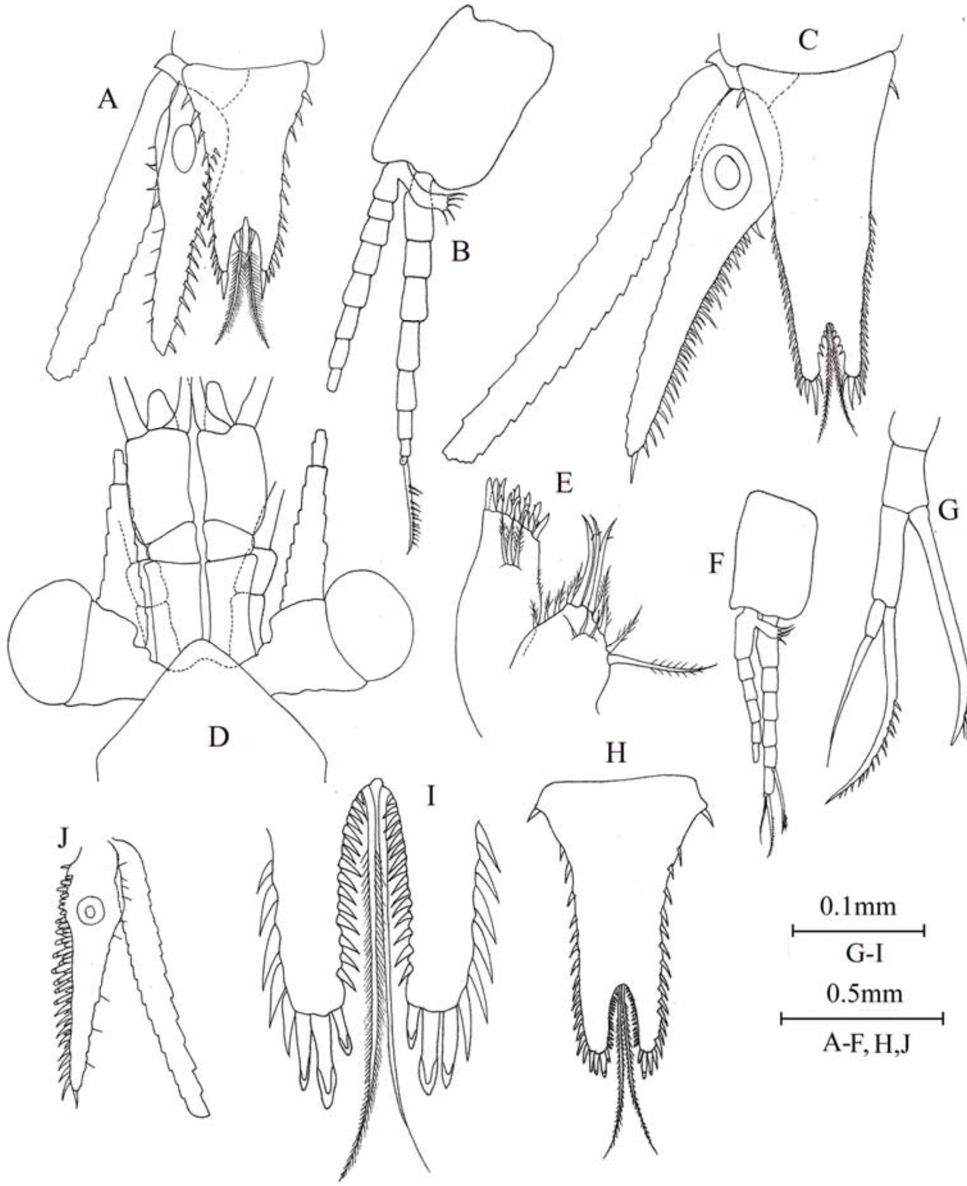


Figure 9

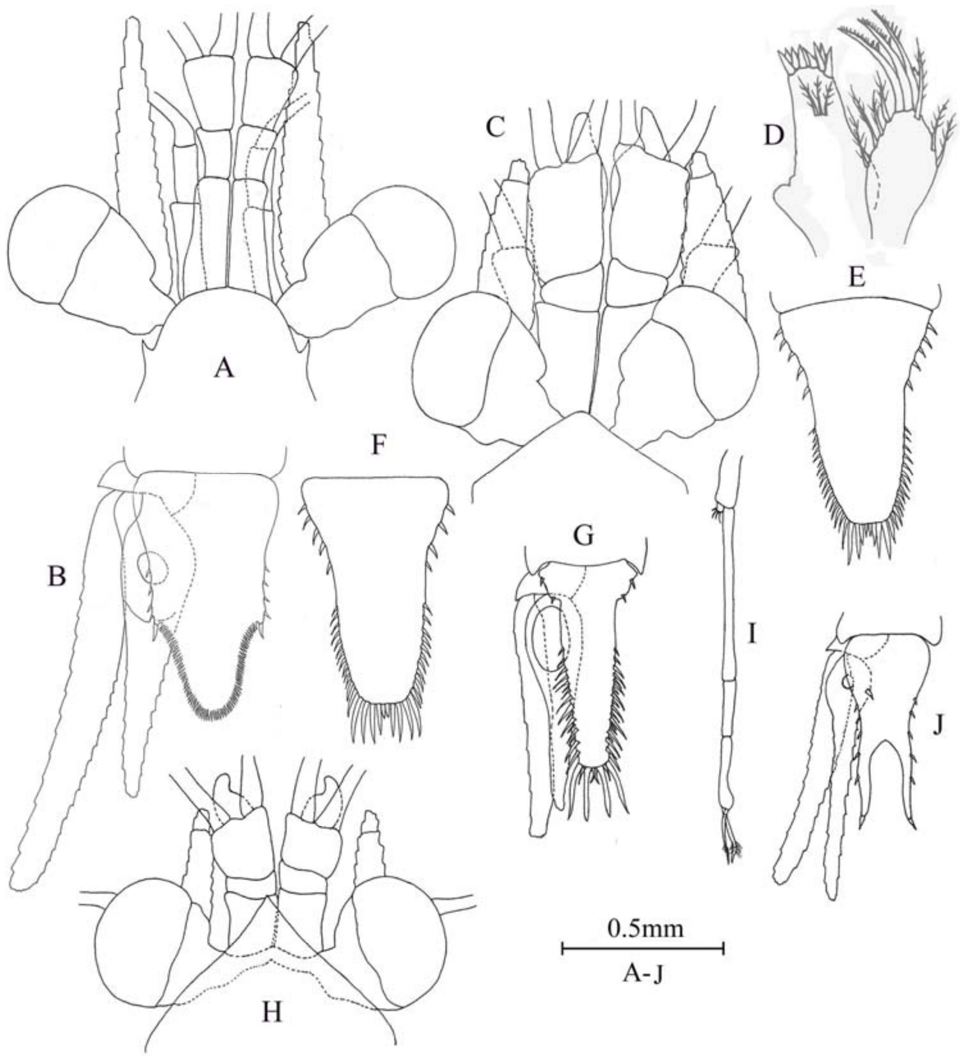
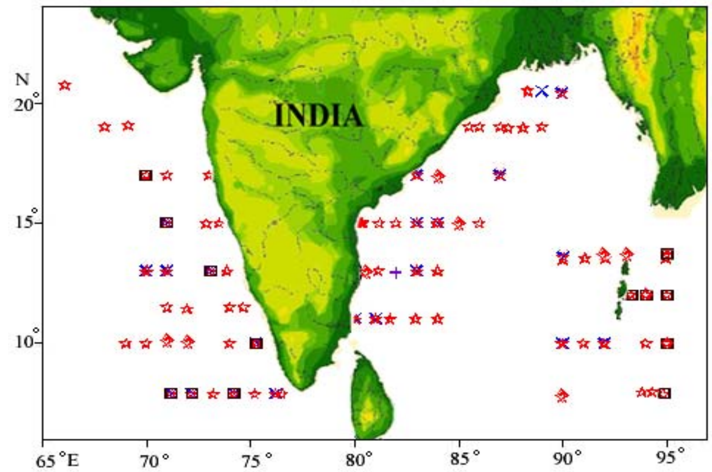
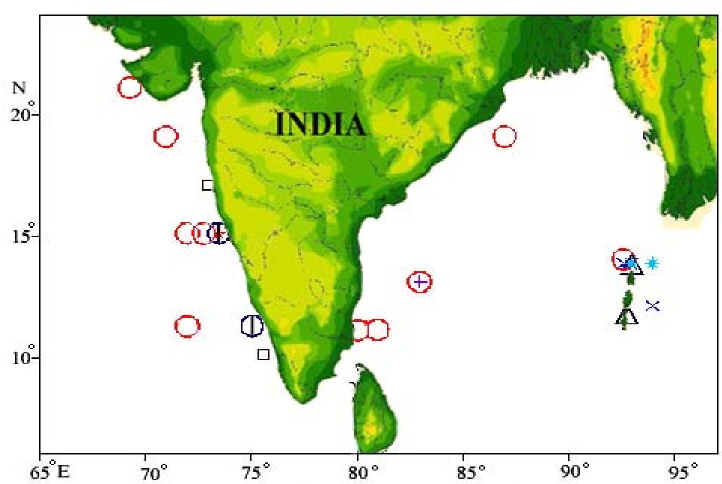


Figure 10



+ *Boreomysis plebeja*, × *Siriella thompsonii*, ☆ *S. gracilis*, □ *S. aequiremis*,
◇ *Hemisiriella parva*

Figure 11



+ *Rhopalophthalmus indicus*, ☆ *Gastrosaccus dunckeri*, × *Haplostylus pusillus*,
□ *Eurobowmaniella simulans*, ○ *Anchialina typica orientalis*
△ *A. grossa*, ⦶ *A. dentata*, ✳ *A. media*

Figure 12

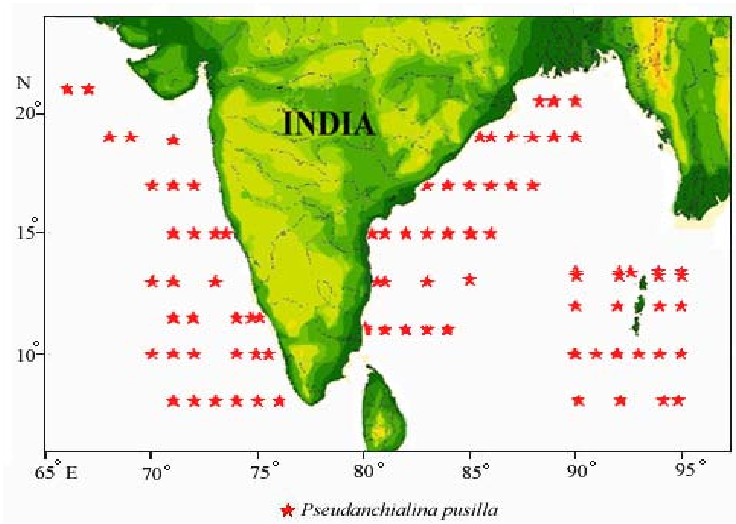


Figure 13