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## Indian records of the Genus *Metapenaeopsis* Bouvier, 1905 with special reference to extended distribution of two species

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### Abstract

Genus *Metapenaeopsis* was created by Bouvier (1905) with *M. pubescens* as type. Burkenroad (1934) redefined the genus and relegated this genus as a subgenus of *Penaeopsis* Bate, 1881, on the basis of the shape of petasma. Kubo (1949), however, re-elevated it to the generic status. Wood-Mason (1891) was the first to record this genus from Indian water as *Metapenaeus*.

Present study reveals that Indian water represents a total of 12 species of the genus *Metapenaeopsis* Bouvier, 1905. Among these, *Metapenaeopsis toloensis* Hall, 1962 was previously recorded from Andaman sea. Present record is the first from coastal water of peninsular India. *Metapenaeopsis stridulans* Alcock, 1905 was previously recorded from east coast and up to Trivancor of west coast by Nataraj (1942) & George (1979). During present study, distribution of the species extend upto Gujarat, West coast of India.

**Keywords:** Genus, *Metapenaeopsis*, First, Record, Extend, Distribution.

### 1. Introduction

Shrimps and Prawns of various kinds have certainly been a source of protein for human consumptions from very early times. Within historical times reference is made to prawn in ancient Chinese and Japanese literature (Pérez Farfante & Kensley, 1997) [28]. Usage of the term 'Prawn' and 'Shrimp' are somewhat confusing. In some western literature the term 'Shrimp' is applied for *Penaeoidea* and *Sergestoidea*, but in the east these are called 'Prawn'. Holthuis (1980) [18] discussed the contradiction but did not arrive at any conclusion. In the Prawn Symposium of the Indo-Pacific Fisheries Council held at Tokyo in 1955 it was decided that the word 'Prawn' should be applied to the Penaeids, Pandalids and Palemonids while 'Shrimp' to the smaller species belonging to the other families (Kurian & Sebastian, 1993) [22]. As such in the present study the term 'Prawn' is used for all the species belonging to family *Penaeidae*.

Among a variety of edible decapod crustaceans, prawns contribute largely to the fishery wealth of many nations. Exploitation of prawn resource from the seas around each country is playing increasingly significant role in furthering their national economy. In recent years, inspite of some ecological hazards, the demand for prawns and prawn products has increased so much that every country is making efforts to utilize hitherto unknown but usable stocks and expansion of prawn fisheries and industries near coast line is rightly being given the maximum encouragement in the development programme of each nation. Family *Penaeidae* comprises 15 genera and 65 species from Indian water (Chanda and Bhattacharya, 2009) [8]. Present study reveals that Indian water represents a total of 12 species of the genus *Metapenaeopsis* Bouvier, 1905 [5] under family *Penaeidae*.

### Materials & methods

The present study is mainly based on the specimens collected by the author from commercial trawler catch of different fish landing centers throughout Indian coast line. In addition to this penaeid prawns preserved in the National Collection of the Zoological Survey of India, Kolkata, India; Central Marine Fishery Research Institute, Cochin, Kerala and its regional stations at Mandapam, Tamil Nadu, India.

The materials preserved in rectified spirit (90%) and body parts of taxonomic importance have

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been dissected and studied under a stereoscopic binocular microscope. The detailed synonymies have been furnished to the genus and species and also their diagnosis, distribution, taxonomic remarks have been furnished. A dichotomous key to the species has been provided for easy identification of species under the genus. The species are arranged alphabetically for convenience. In addition an attempt has been made to include a comprehensive coverage of the references in the Reference section. For all citations of taxon author's name and year of publication has been given.

## Results and Discussions

### Genus *Metapenaeopsis* Bouvier, 1905<sup>[5]</sup>

Genus *Metapenaeopsis* was created by Bouvier (1905)<sup>[5]</sup> with *M. pubescens* as type from Cape Verde Islands. Burkenroad (1934)<sup>[6]</sup> redefined the genus and relegated this genus as a subgenus of *Penaeopsis* Bate, 1881<sup>[3]</sup>, on the basis of the shape of petasma. Kubo (1949)<sup>[20]</sup>, however, re-elevated it to the generic status.

*Metapenaeopsis* has been placed on the official list of Generic Names in Zoology, International Commission of Zoological Nomenclature, 1969, Opinion 864, Name No. 1819, Bull. Zool. Nom., 25 (4/5): 139.

Wood-Mason (1891)<sup>[32]</sup> was the first to record this genus from Indian water as *Metapenaeus*. A chronological history of the genus with special reference to Indian contributions are given below.

1891 *Metapenaeus* Wood-Mason<sup>[32]</sup>, Ann. Mag. Nat. Hist., 8(6): 271.

1905a *Metapenaeopsis* Bouvier<sup>[5]</sup>, C.r.hebd. Séanc. Acad. Sci., Paris, 140: 381; Nataraj, 1942<sup>[26]</sup>, Curr. Sc., 11(12): 468; Kunju, 1960<sup>[21]</sup>, J. mar. biol. Ass. India, 2(1): 82-84; George, 1967<sup>[15]</sup>, Proc Symp. Crustacea. Mar. biol. Ass. India, Pt. I: 337-346.

1906 *Metapeneus* Alcock<sup>[2]</sup>, Cat. Indian Dec. Crust., 3(1): 16.

**Type Species:** *Metapenaeopsis pubescens* Bouvier, 1905<sup>[5]</sup>, Comptes Rendus de L'Academie des Sciences, Paris. 140: 980-988.

**Type Locality:** Cape Verde Islands.

### Diagnosis of the Genus:

Body pubescent; rostrum with dorsal teeth only, variable in length; carapace without suture; hepatic, cervical and orbitoantennal sulci indistinct, post ocular sulcus absent; antennal, hepatic and pterygostomial spine well developed; orbital spine very short; mid-dorsal carina on abdomen well developed, variable in length; antennule with parapenaeid spine on first segment of antennular peduncle at distoventral half; antennular flagella variable in length; basal spine present on third maxilliped and on first and second pereopod, absent on third; exopod present on all maxilliped and pereopod; telson with a pair of well developed sub-apical fixed spine, variable number of movable lateral spine present anterior to fixed pair; petasma asymmetrical, divided into proximal and distal complex half; distal half with several projections and proximal half with dorsolateral lobules produced proximally into spur like projections; thelycum consisting of well developed median plate on sternite-XIII and variable structures on sternite XIV.

## Remarks

George (1979)<sup>[13]</sup> listed 9 species under *Metapenaeopsis* from Indian coastal water. Subsequently Fischer & Bianchi (1983)<sup>[12]</sup>, Muthu, M.S. 1971<sup>[25]</sup> and Chanda (2014)<sup>[7]</sup> added another three species viz., *M. toloensis* Hall, 1962<sup>[16]</sup>, *M. novaeguineae* (Haswell, 1879)<sup>[17]</sup> and *M. palmensis* (Haswell, 1879)<sup>[72]</sup> respectively to this list. As such at present there are 12 species under this genus. A detailed taxonomic account of the species found in India along with the key for identification is given below.

### Key to the species found in India

1. Stridulating organ present on posterior branchiostegite of carapace ..... 2
- Stridulating organ absent on posterior branchiostegite of carapace ..... 6
2. Stridulating ridge upto 11 in number ..... 4
- Stridulating ridge more than 11 in number ..... 3
3. Stridulating band curved ..... *M. palmensis* (Haswell, 1879)<sup>[17]</sup>
- Stridulating band straight ..... *M. stridulans* (Alcock, 1905)<sup>[1]</sup>
4. Third abdominal somite with convex or flat dorsal carina ..... 5
- Third abdominal somite with sulcate dorsal carina ..... *M. toloensis* Hall, 1962<sup>[16]</sup>
5. Dorsal carina on third abdominal somite flat; anterior thelycal plate as wide as long ..... *M. barbata* (De Haan, 1844)<sup>[10]</sup>.
- Dorsal carina on third abdominal somite convex; anterior thelycal plate much wider than long ..... *M. novaeguineae* (Haswell, 1879)<sup>[17]</sup>.
6. Parapenaeid spine on ventral surface of first antennular segment small or vestigial ..... 7
- Parapenaeid spine on ventral surface of first antennular segment prominent ..... 10
7. Third abdominal somite with strong dorsal carina ..... 8
- Third abdominal somite without dorsal carina ..... *M. commensalis* (Borradaile, 1898)<sup>[4]</sup>.
8. Third abdominal carina without sulcus; left distoventral projection of petasma without terminal process ..... *M. hilarula* (De Man, 1911)<sup>[11]</sup>.
- Third abdominal carina with distinct sulcus; left distoventral projection of petasma with terminal process ..... 9
9. Anterior edge of anterior thelycal plate on sternite XIII almost straight with flat triangular spine at anterolateral corners; distomedian lobule of petasma long, distally broad ..... *M. gallensis* (Pearson, 1905)<sup>[27]</sup>
- Anterior edge of anterior thelycal plate on sternite XIII with four rounded teeth, two median ones being incurved; distomedian lobule of petasma small, ..... *M. mogiensis* (Rathbun, 1902)<sup>[30]</sup>
10. Rostrum as long as or longer than antennular peduncle; centre of the anterior thelycal plate sulcate ..... 11
- Rostrum not reaching tip of antennular peduncle; centre of the anterior thelycal plate not sulcate ..... *M. coniger* (Wood-Mason, 1891)<sup>[32]</sup>.
11. Posterior extension of thelycal plate with indistinct median sulcus and angular posterolateral corners ..... *M. andamanensis* (Wood-Mason, 1891)<sup>[32]</sup>.
- Posterior extension of thelycal plate with distinct median sulcus and rounded posterolateral corners ..... *M. philippii* (Bate, 1881)<sup>[3]</sup>.

***Metapenaeopsis andamanensis* (Wood-Mason, 1891)** <sup>[32]</sup>

*M. andamanensis* was originally described by Wood-Mason (1891) <sup>[32]</sup> as a variety of *Metapenaeus philippinensis* from Andaman sea. A brief history of the species with special reference to Indian contributions are given below.

1891 *Metapenaeus philippinensis andamanensis* Wood-Mason <sup>[32]</sup>, Ann. Mag. Nat. Hist., 8(6): 271.

1906 *Metapeneus coniger andamanensis* Alcock, Cat. Indian Dec. Crust. Part-III, Mac. Fas. I: 1-55.

1911 *Penaeopsis coniger andamanensis* De Man <sup>[11]</sup>, Siboga Exped. Monogr., No. 39a: 1-131.

1961 *Metapenaeopsis andamanensis* Hall, Bull. Raffles Mus., 26: 76-119; 1962, Fish. Publ. Colon. Off., 17: 1-229; George, 1967 <sup>[15]</sup>, Mar. Biol. Ass. India, Pt. I: 337-346; 1969, Bull. Cent. Mar. Fish. Res. Inst., No. 14: 5-48; 1979, Cont. Mar. Sci., dedicated to Dr. C.V. Kurian: 21-59.

**Type species:** *Metapenaeus philippinensis andamanensis* Wood-Mason, 1891 <sup>[32]</sup>, Ann. Mag. Nat. Hist., 8(6): 271.

**Type Locality:** East of North Andaman Island, India.

**Material Examined:**

1 male (63 mm), ZSI. Reg. No. 7381/9, North of Port Blair, Andaman, 29.11.1888, Wood-Mason; 4 females (51-65 mm.), ZSI. Reg. No. 7382-7385/9, North of Port Blair, Andaman, 29.11.1888 Wood-Mason.

**Diagnosis of the species:**

Body pubescent, slender; rostrum straight to slightly uptilted reaching antennular peduncle, armed with 8+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth situated beyond anterior margin of carapace; stridulating organ absent; hepatic, antennal and pterygostomial spine prominent, orbital spine very short; cervical sulcus indistinguishable, hepatic sulcus descend anteriorly towards pterygostomial spine; third abdominal carina without sulcus; antennular flagella unequal, dorsal one shorter; parapenaeid spine on ventral surface of first antennular segment prominent; right distoventral projections of petasma rounded at apex bearing several pointed processes, extending upto distoventral flap; left distoventral projection with 8 apical processes, anterior thelycal plate on sternite XIII centrally sulcate, posterior extension of plate with indistinct median sulcus with angular posterolateral corner; posterior plate of thelycum on sternite XIV broader than long; coxal plates smaller than anterior thelycal plate.

**Distribution:**

India: Cochin. South-West Coast, and Andaman Sea.  
Elsewhere: Strait of Malacca; Malaysia; South China Sea; Taiwan; Japan.

***Metapenaeopsis barbata* (De Haan, 1844)** <sup>10]</sup>

*M. barbata* was described by De Haan (1844) <sup>[10]</sup> as a variety of *Penaeus affinis* from Japan. It was George and Muthu (1968) <sup>[14]</sup> recorded the species for the first from Indian water. A brief history of the species with special reference to Indian contributions are given below.

1844 *Penaeus affinis barbatus* De Haan <sup>[10]</sup>, Crustacea. In P.F. Siebold, 'Fauna Japonica', Leyden: 1-243.

1949 *Metapenaeopsis barbatus* Kubo <sup>[20]</sup>, J. Tokyo Coll. Fish. 36(1): 1-467.

1968 *Metapenaeopsis barbata* George & Muthu <sup>[14]</sup>, J. mar. biol. Ass. India, 10(2): 286-291; 1979, Cont. Mar. Sci., dedicated to Dr. C.V. Kurian, 21-59. Muthu, 1971 <sup>[23]</sup>, Indian J. Fish., 15: 145-154; Paulinose, 1988, J. Nat. Hist., 22: 1565-1577.

**Type Species:** *Penaeus affinis barbatus* De Haan, 1844 <sup>[10]</sup>, Crustacea. In P.F. Siebold, 'Fauna Japonica', Leyden: 1-243

**Type Locality:** Japan Sea.

**Material Examined**

29 females (47-105 mm) and 13 males (44-93 mm) CMFRI-AR-287, Visakhapatnam, Bay of Bengal, Date of Coll. not known (1968), George and Muthu; 12 males (47-79 mm.) and 26 females (42-85 mm.), ZSI. Reg. No. C4949/2, Palk Bay, Tamil Nadu, 7.8.1997, A. Chanda.

**Diagnosis of the species**

Rostrum straight reaching tip of third segment of antennular peduncle, armed with 5+1 dorsal teeth, epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth slightly anterior to orbital margin; stridulating organ present on posterior branchiostegite of carapace as a curved band; hepatic antennal and pterygostomial spine prominent; short subcarina on the dorsum of the fourth abdominal segment present; antennular flagella equal and short; parapenaeid spine prominent; left distoventral projection of petasma triangular, distally bearing 8-9 short processes on the median margin, 3-4 long processes on the outer margin; dorsal intermediate projection about twice as long as broad, thin, leaf-like; outer dorsomedian lobe oval, distal end covered with minute tubercles; a small triangular lobe projects ventrolaterally from the outer margin of this oval plate; right distoventral projection with 3 processes at tip; distomedian lobule broad anteriorly ending in a slightly twisted anteromedian projection; distoventral projection truncately conical, spirally convoluted distally; anterior thelycal plate on sternite XIII broader than long with rounded and elevated anterolateral corners; intermediate plate on sternite XIII slightly sunken, compared to the rest of the thelycum, covered with setae; posteriorly a shallow transverse groove separates it from the anterior sternal plate which has an ill-defined median convexity; two small semi-circular protuberance overhang lateral ends of intermediate plate; posterior thelycal plate on sternite XIV has two prominent lateral lobes and a smaller median elevation; coxal plate of fourth pereopods possess dense setae.

**Distribution**

India: Visakhapatnam, Andhra Pradesh, Palk Bay, Tamil Nadu, East coast of India.  
Elsewhere: Persian Gulf; Malaysia; Indonesia; Taiwan; Japan.

***Metapenaeopsis commensalis* (Borradaile, 1898)** <sup>[4]</sup>

The species was originally described by Borradaile (1898) <sup>[4]</sup> as *Metapenaeus commensalis* from Rotuma Island, South Pacific. It was first recorded from India by Thomas (1970) <sup>[31]</sup> from Laccadive Island. A brief history of the species with special reference to Indian contributions are given below.

1898 *Metapenaeus commensalis* Borradaile <sup>[4]</sup>, Proc. Zool. Soc., London: 1001.

1906 *Metapeneus commensalis* Alcock <sup>[2]</sup>, Cat. Indian. Dec. Crust. Part-III. Mac. Fas.I: 1-55.

1911 *Penaeopsis borradailei* De Man <sup>[11]</sup>, Siboga Exped. Monogr., 39a: 1-131.

1970 *Metapenaeopsis borradailei* Thomas <sup>[31]</sup>, J. mar. biol. Ass. India, 12: 213-216; George, 1979 <sup>[13]</sup>, Cont. Mar. Sci., dedicated to Dr. C.V. Kurian: 21-59.

1991 *Metapenaeopsis commensalis* Crosnier, Results of Musorstom Cruises, 152: 155-297; Pérez Farfante and Kensley, 1997 <sup>[28]</sup>, Mem. Mus. nat. d'Hist. nat., 175: 1-233.

**Type species:** *Metapenaeus commensalis* Borradaile, 1898 <sup>[4]</sup>, Proc. Zool. Soc. London: 1001.

**Type Locality:** Rotuma, South Pacific (North of Fiji: 13°S, 177°E).

#### Material Examined

No specimen were collected or examined during the present study. Therefore, diagnosis of the species is given on the basis of existing literature.

#### Diagnosis of the species

Body pubescent; rostrum slightly upward, extend upto antennular peduncle, armed with 7-8+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; stridulating organ absent at posterior branchiostagite on carapace; carapace with prominent hepatic, antennal and pterygostomial spine; third abdominal carina without dorsal carina; parapenaeid spine on ventral side of first antennular segment is very small; antennules are equal in length; right distoventral projection of petasma swollen, rounded at tip, without apical process; left distoventral projection slender, bearing 5-7 apical processes; anterior plate of thelycum wider than long, a pair of sunken bosses behind the plate; posterior plate of thelycum also wider than long, subrectangular in outline.

#### Distribution

India: Lakshadive Island.

Elsewhere: Maldive Island; Indonesia; Philippines; Taiwan; North Western Australia; Torres Strait; New Caledonia; Ellice Islands.

#### *Metapenaeopsis coniger* (Wood-Mason, 1891) <sup>[32]</sup>

*M. coniger* was originally described as *Metapenaeus coniger* from Ganjam, Orissa coast, India by Wood-Mason (1891) <sup>[32]</sup>.

A brief history of the species with special reference to Indian contributions are given below.

1891 *Metapenaeus coniger* Wood-Mason <sup>[32]</sup>, Ann. Mag. nat. Hist.: 269-286.

1906 *Metapeneus coniger* Alcock <sup>[2]</sup>, Cat. Indian Dec. Crust. Part-III, Macr. Fas. I.: 1-55.

1938 *Penaeopsis (Metapenaeopsis) coniger* Ramadan, John Murray Exped. Sci. Rep., 5: 35-76.

1957 *Metapenaeopsis coniger* Dall. Aust. J. Mar. Freshw. Res., 8: 136-231; George, 1979 <sup>[13]</sup>, Cont. Mar. Sci., dedicated to Dr. C.V. Kurian: 21-59.

**Type Species:** *Metapenaeus coniger* Wood-Mason, 1891 <sup>[32]</sup>, Ann. Mag. Nat. Hist.,: 269-286.

**Type Locality:** Ganjam, Orissa, east coast of India.

#### Material Examined

4 males (64-72 mm) and 10 females (56-79 mm), ZSI. Reg.

No. C4855/2, Lowsom's Bay, Visakhapatnam, Andhra Pradesh. 26.3.1997, T. Roy and Party; 1 male (89 mm), ZSI. Reg. No. 4174/9 (Type), Ganjam, Orissa coast, 4.2.1889, 1 female (87 mm), ZSI. Reg. No. 4296/7, Andaman, Bay of Bengal, 31.1.1894, Wood-Mason.

#### Diagnosis of the species

Body pubescent; rostrum more or less straight, reaching to the tip of the antennular peduncle, armed with 6-8+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; postrostral carina not reaching posterior border of carapace; penultimate tooth anterior to the orbital margin of carapace; orbital spine vestigial, antennal and hepatic spine prominent but devoid of posterior carina; hepatic and cervical sulcus indistinguishable; branchiostegal spine prominent; stridulating organ absent; dorsal carination on second segment indistinct sharp carination found from third to sixth segment; distinct subcarination found from fourth segment to sixth segment; parapenaeid spine spine very small, antennular flagella unequal, dorsal one longer than ventral; left distoventral projection larger than right, bearing two small apical processes; right distoventral projection narrow and carrying 4 small apical processes; distoventral flap moderate; right distodorsal lobule fused with outer and inner intermediate lobule; left distodorsal lobule elongated; distomedian lobule proximally narrow with semicircular apical plate like structure; two very short processes found on the sternite XI and on XII with an anterior, a posterior pair of low bosses, latter pair slightly larger and bound posteriorly by conspicuous lateral extensions of coxae of the third pereopods; anterior thelycal plate on sternite XIII 'T' shaped, horizontal limb of 'T' narrow, vertically placed plate with convex anterior surface; vertical limb narrow, short, with short setae at its posterior margin; a deep transverse sulcus with posterior extension on the vertical limb present on this plate, edges of this sulcus setose; posterior plate on sternite XIV broader than long concave with anterolateral margin slightly raised; minute setae present on concave surface of the plate.

#### Distribution

Indian: Orissa to Andhra Pradesh, east coast, Cochin, south-west coast, Andaman Islands.

Elsewhere: Gulf of Aden; Gulf of Oman; Japan.

#### *Metapenaeopsis gallensis* (Pearson, 1905) <sup>[27]</sup>

*M. gallensis* was originally described as *Parapenaeus gallensis* from Ceylon by Pearson (1905) <sup>[27]</sup>. The species was first recorded from India by Muthu (1972) <sup>[24]</sup> from Chennai East coast of India. A brief history of the species with special reference to Indian contributions are given below.

1905 *Parapenaeus gallensis* Pearson <sup>[27]</sup>, In Rep. Govt. Ceylon on the Pearl Oyster Fisheries of the Gulf of Mannar. Part-4: 65-92.

1972 *Metapenaeopsis gallensis* Muthu <sup>[24]</sup>, J. mar. biol. Ass. India, 14(2): 564-567.

**Type Species:** *Parapenaeus gallensis* Pearson, 1905 <sup>[27]</sup>, In Rep. Govt. Ceylon on the Pearl Oyster Fisheries of the Gulf of Mannar. Part-4: 65-92.

**Type Locality:** Gulf of Mannar, Sri Lanka.

#### Material Examined

No specimen was collected during the present study and

therefore, diagnosis is based on the existing literature.

### Diagnosis of the species

Body pubescent; rostrum straight, reaching second antennular segment, armed with 6+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; carapace with small orbital spine; hepatic spine pointed with shallow cervical and hepatic sulcus; antennal spine prominent, carina absent, pterygostomian spine short, pointed; stridulating organ absent; antennular flagella subequal, ventral one longer; parapenaeid spine small; dorsal abdominal carina starting from posterior half of second segment; carina prominent from third to six segment; third with a distinct sulcus; fourth and fifth with subcarina; left distoventral projection slender, slightly longer than right one, carrying four to five apical processes; right distoventral projection swollen without apical processes; distomedian lobule broad distally, shorter than distoventral flap; a pair of long spinous processes present on sternite XI, a pair of well developed projection on sternite XII; anterior thelycal plate on sternite XII broader than long with a slight median protuberance along anterior edge with rounded anterolateral corners; a pair of well developed concave protuberance rising from sternal surface behind anterior thelycal plate, the concavity facing posteriorly; grooves from middle of concavity in protuberance and from intermediate plate leading into opening of seminal receptacle; posterior thelycal plate on sternite XIV has a more or less straight anterior edge with a broad triangular spine at anterolateral corners; the plate behind thelycal plate with two rounded lateral projections and a low wavy median one; coxa of fourth pereopod small rounded with a bunch of setae.

### Remarks

Muthu (1972)<sup>[24]</sup> redescribed the species and placed it under *Metapenaeopsis*.

### Distribution

India: Chennai, Tamil Nadu, east coast.

Elsewhere: Madagascar, Tanzania; Maldives; Sri Lanka; Malaysia; Indonesia; Philippines; North Western Australia; New Caledonia; Japan.

### *Metapenaeopsis hilarula* (De Man, 1911)<sup>[11]</sup>

*M. hilarula* was originally described by De Man (1911)<sup>[11]</sup> during Siboga Expedition as a possible species under genus *Penaeopsis*. De Bruin (1965)<sup>[9]</sup> confirmed its specific status. Muthu (1971)<sup>[25]</sup> recorded the species from India for the first time. A brief history of the species with special reference to Indian contributions are given below.

1911 *Penaeopsis* sp. (*hilarulus*) De Man<sup>[11]</sup>, Siboga Exped. Monogr. 39a: 1-131.

1965 *Metapenaeopsis hilarulus* De Bruin<sup>[9]</sup>, Zool. Meded., 41(4): 73-104; Muthu, 1971<sup>[25]</sup>, Indian J. Fish., 15: 145-154; Racek and Yaldwyn, 1971<sup>[29]</sup>, Proc. Linn. Soc. N.S.W., 95: 209-214; George, 1979<sup>[13]</sup>, Cont. Mar. Sci. dedicated to Dr. C.V. Kurian, 21-59.

**Type Species:** *Penaeopsis* sp. (*hilarulus*) De Man, 1911<sup>[11]</sup>, Siboga Exped. Monogr. 39a: 1-131.

**Type Locality:** Siboga, Indonesia.

### Material Examined

No specimen could be collected or examined during the present study and diagnosis is based on existing literature.

### Diagnosis of the species

Body pubescent; rostrum more or less straight or slightly upcurved, extending upto the middle of the second segment of the antennular peduncle, armed with 7-8+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; a distinct round dot absent on tomentum clearly visible on the posterodorsal region of the carapace of female; carapace with distinct hepatic, antennal and pterygostomian spine, orbital spine very small, stridulating organ absent; parapenaeid spine on ventral surface of first segment of antennular peduncle is vestigial; flagella equal in length; dorsal carina of third abdominal somite without sulcus; left distoventral projection of petasma without terminal processes; distal plate of fused intermediate lobe flat distally; distomedian lobule broad distally as long as distoventral flap; sternite XI with two long spines, two blunt processes on sternite XII; anterior thelycal plate on sternite XIII broader than long apically pointed anteriorly; intermediate plate with two blunt tooth; thelycal plate on sternite XIV with two pointed lateral end and a median tubercle.

### Distribution

India: Chennai, Tamil Nadu, East coast, Cochin, Kerala, West coast.

Elsewhere: Natal, South Africa; Mozambique; Madagascar; Gulf of Aden; Seychelles; Reunion Island; Maldives, Sri Lanka; Singapore; Malaysia; Indonesia; Philippines; New Guinea; Queensland; Australia; New Caledonia; Chesterfield Island; Tahiti.

### *Metapenaeopsis mogiensis* (Rathbun, 1902)<sup>[30]</sup>

*M. mogiensis* was originally described by Rathbun (1902)<sup>[30]</sup> as *Parapenaeus mogiensis* from Japan. Alcock (1906)<sup>[2]</sup> recorded the species from India for the first time as *Metapenus mogiensis*. A brief history of the species with special reference to Indian contributions are given below.

1902 *Parapenaeus mogiensis* Rathbun<sup>[30]</sup>, Proc. U.S. Nat. Mus. 26: 23-55.

1906 *Metapenus mogiensis* Alcock<sup>[2]</sup>, Cat. Indian. Dec. Crust. Part-III. Mac. Fas. I: 1-55.

1942 *Metapenaeopsis mogiensis* Nataraj<sup>[26]</sup>, Curr. Sci., 11(12): 468-469; Muthu, 1971<sup>[25]</sup>, Indian J. Fish., 15: 145-154; George, 1967<sup>[15]</sup>, J. mar. biol. Ass. India, 18(1): 78-90; 1979, Cont. Mar. Sci., dedicated to Dr. C.V. Kurian, 21-59.

**Type Species:** *Parapenaeus mogiensis* Rathbun, 1902<sup>[30]</sup>, Proc. U.S. Nat. Mus., 26: 23-55.

**Type Locality:** Japan Sea.

### Material Examined

2 males (52-56 mm) and 1 female (56 mm), ZSI. Reg. No. C4770/2, Chilagalapudi, Kakinada, Andhra Pradesh, 11.9.1995, A. Chanda; 1 male (40 mm) and 1 female (42 mm), ZSI. Reg. No. C4798/2, Pulicot Lake, Andhra Pradesh, 26.8.1995, A. Chanda.

### Diagnosis of the Species

Body pubescent; rostrum short extending upto second segment of antennular peduncle, slightly uptilted, armed with 6+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth situated at the level of orbital margin of carapace; carapace with four spine; orbital spine and pterygostomian spine very small; antennal and

hepatic spine strong; cervical sulcus short, oblique; hepatic sulcus long, posteriorly horizontal, extend upto cardiac region, anterior portion descend vertically but not reaching ventral margin of carapace; stridulating organ absent; third abdominal somite with a sulcus on its dorsal carina; parapenaeid spine on ventral side of first antennular segment vestigial; left distoventral projection of petasma longer than right bearing 4-5 short processes distally; terminal filaments present in the left lobe of petasma; distal plate of fused intermediate lobe pointed, distomedian lobule broad distally, shorter than distoventral flap; in female sternite XI with a pair of long spine, a pair of blunt tooth present on sternite XII; apex of anterior plate of thelycum on sternite XIII pointed, laterally rounded; a pair of spine in excavation between the fourth pair of pereopod on sternite XIII small and pointed at tip; anterior border of sternite XIV bears four protuberances, median two are incurved and enclose the spines situated on posterior part of sternite XIII; coxal plates on fourth pereopod small and rounded.

#### Distribution

India: Andhra Pradesh East coast; Cochin, West coast and Andaman sea.

Elsewhere: Natal, South Africa; Djibouti, East Africa; Red Sea; Gulf of Aden; Madagascar, Seychelles, Persian Gulf; Sri Lanka; South China Sea, Indonesia.

#### *Metapenaopsis novaeguineae* (Haswell, 1879) <sup>[17]</sup>

*M. novaeguineae* was originally described by Haswell (1879) <sup>[17]</sup> as *Penaeus novaeguineae* from Australia. A brief history of the species with special reference to Indian contributions are given below.

1879 *Penaeus novae-guineae* Haswell <sup>[17]</sup>, Proc. Linn. Soc. N.S.W. 4(1): 38-44; 1957 *Metapenaopsis novaeguineae* Dall, Aust. J. Mar. Freshw. Res., 8(2): 136-231.

**Type Species:** *Penaeus novaeguinae* Haswell, 1879 <sup>[17]</sup>, Proc. Linn. Soc. N.S.W., 4(1): 38-44.

**Type Locality:** Northern Australia.

#### Material Examined

1 male (46 mm.) and 2 females (46-53 mm.), ZSI. Reg. No. C4721/2, Kakinada Bay, Andhra Pradesh, 12.7.1995, A. Chanda.

#### Diagnosis of the species

Body pubescent, slender; rostrum straight or with slightly uptilted tip; reaching tip of antennular peduncle, armed dorsally with 5-6+1 teeth; epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth slightly anterior to orbital margin; orbital spine very small, hepatic, antennal and pterygostomian spine prominent; cervical sulcus feeble, hepatic sulcus horizontal shallow, tomentose; stridulating organ with 12-17 ridge in a curved band; antennular flagella subequal, lower one slightly longer than upper; parapenaeid spine on ventral side of first antennular segment very small; dorsal carina of abdomen on second somite a faint, carina on third to sixth somites distinct; no distinct sulcus on dorsal carina of third abdominal somite; right distoventral projection shorter than left, bearing 3-4 small distal processes; left distoventral projection with 10-15 large, broad processes; both projections distally swollen; dorsal intermediate lobule usually slender and cylindrical, outer one

with numerous minute distal setae; right distodorsal lobule short, broad, distally bilobed; in females two long spines present on sternite XI and XII, two short blunt denticular projections on sternite XII; anterior thelycal plate on sternite XIII broadly trapezoidal, on sternite XIV an intermediate plate with blunt, short lateral inwardly curved projections; posterior sternal plate behind thelycal plate divided into three blunt lobes.

#### Distribution

India: Kakinada, Andhra Pradesh East coast.

Elsewhere: New Guinea; Western Australia; Northern Territory and Queensland, Australia.

#### *Metapenaopsis palmensis* (Haswell, 1879) <sup>[17]</sup>

*M. palmensis* was originally described as *Penaeus palmensis* by Haswell (1879) <sup>[17]</sup> from N.E. Coast of Australia. It was first recorded from Indian water by A. Chanda (2014) <sup>[7]</sup>. A brief history of the species with special reference to Indian contributions are given below.

1879 *Penaeus palmensis* Haswell <sup>[17]</sup>, Proc. Linn. Soc. N.S.W. 4(1): 38-44.

1911 *Penaepsis palmensis* De Man <sup>[11]</sup>, Siboga Exped. Monogr. No. 39a: 1-131.

1955 *Penaepsis (Metapenaepsis) novaeguineae* Racek, Aust. J. Mar. Freshw. Res., 6(2): 209-241.

1965 *Metapenaopsis palmensis* Racek and Dall, Verh. K. ned. Akad. Wet., 56: 1- 116; Chanda, 2014 <sup>[7]</sup>, *J. Ento. Zoo.Studies* 2(4): 18-20.

**Type Species:** *Penaeus palmensis* Haswell, 1879 <sup>[17]</sup>. Proc. Linn. Soc. N.S.W., 4(1): 38-44.

**Type Locality:** N.E. Coast of Australia.

#### Material Examined

2 males (45-56 mm) and 14 female (49-68 mm), ZSI. Reg. No. C4860/2, Bhimapattnam, Andhra Pradesh, 25.3.1997, T. Roy and party; 2 males (40-42 mm) and 2 females (43-50 mm), ZSI. Reg. No. C4799/2, Pulicot Lake, Andhra Pradesh, 26.8.1995. A. Chanda.

#### Diagnosis of the species

Body pubescent, slender; rostrum straight, reaching upto third segment of antennular peduncle; armed dorsally with 7+1 teeth; epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth situated at the level of orbital margin of carapace. Orbital spine very short, hepatic spine small, with a well defined short cervical sulcus; antennal carina short, spine strong and prominent; hepatic sulcus deep and covered with dense setae; stridulating organ consisting of eight strong ridges in a curved band; parapenaeid spine on ventral surface of first segment of antennular peduncle vestigial; flagellum equal and shorter than peduncle; dorsal carina on abdominal somite extending from posterior half of second segment to posterior end of sixth segment; third segment with median sulcus on carina; fifth and sixth somite has a short posterodorsal spine; right distoventral projection shorter than left, with 3 dorsally bent processes; left distoventral projection, swollen, toe-shaped, with a semicircular arrangement of 12 blunt processes; dorsal intermediate lobule short, cylindrical; outer one broad, curved, conspicuously longer than inner lobule with numerous distal setae; distomedian lobule triangular, long; in female, two

spines on sternite XI and two blunt spine on sternite XII; anterior thelycal plate on sternite XIII subrectangular, anteriorly convex; transverse plate on sternite XIV with laterally raised margin; posterior plate behind thelycal plate three lobed, median lobe broadly elevated, covered with setae; coxal plates small rounded, setose.

#### Distribution

India: Pulicot Lake and Bhimapattnam, Andhra Pradesh, East coast.

Elsewhere: Singapore; Malaysia; Thailand; Vietnam; Indonesia; Philippines; Taiwan; Japan; New Guinea; Western Australia; Darwin; Queensland; New South Wales; Australia.

#### *Metapenaeopsis philippii* (Bate, 1881) <sup>[3]</sup>

*M. philippii* was originally described by Bate (1881) <sup>[3]</sup> from East Indian Archipelago, as *Penaeus philipinensis*. It was first recorded from India by John & Kurian (1959). A brief history of the species with special reference to Indian contributions are given below.

1881 *Penaeus philipinensis* Bate <sup>[3]</sup>, Ann. Mag. nat. Hist. (8) 5: 169-196; 1888, Rep. Sci. Res. "Challenger", 24: 1-942.

1925 *Penaeopsis philippii* Calman, Rep. Fish. Mar. Biol. Surv. S. Afr., 4(3): 1-26; John & Kurian, 1959, Bull. Cent. Res. Inst. Trivandrum, Ser. C., 7(1): 155-162.

1957 *Metapenaeopsis philippii* Dall, Aust. J. mar. Freshw. Res., 8(2): 136-231; George, 1969, Bull. Cent. Mar. Fish. Res. Inst. No. 14: 5-48; 1979, Cont. Mar. Sci. dedicated to Dr. C.V. Kurian, 21-59.

**Type species:** *Penaeus philipinensis* Bate, 1881 <sup>[3]</sup>, Ann. Mag. nat. Hist., (8)5: 169-196.

**Type Locality:** East Indian Archipelago.

#### Material Examined

No specimen could be collected during the present study, therefore, diagnosis is based on existing literature.

#### Diagnosis of the species

Body pubescent; rostrum straight, extending little beyond the tip of antennular peduncle, armed with 6-7+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; carapace with short orbital spine and pterygostomial spine; hepatic and antennal spine prominent; cervical sulcus short, hepatic sulcus feeble, covered with setae; stridulating organ absent; antennular flagella shorter than peduncle and equal in length; parapenaeid spine developed and located on ventral surface of first segment of antennular peduncle; dorsal subcarination on last three abdominal segment very weak; left petasma projection longer than right in ventral view; left one slender and right one with numerous distal processes; in female, two spines on sternite XI, two blunt spines on somite XII; anterior thelycal plate as wide as long; posterior extension of thelycal plate longitudinally grooved, bilobed posteriorly; plate behind thelycal plate, trilobed anteriorly at the posterior border of sternite XIV; coxal plate of fourth pereopod small and covered with setae.

#### Distribution

India: Cochin, South-west coast.

Elsewhere: Indonesia; Philippines; Admiralty Islands.

#### *Metapenaeopsis stridulans* Alcock, 1905 <sup>[1]</sup>

Original description of *M. stridulans* was given by Alcock (1905) <sup>[1]</sup> as *Metapenus stridulans* from Orissa coast. A brief history of the species with special reference to Indian contributions are given below.

1905 *Metapenus stridulans* Alcock <sup>[1]</sup>, Ann. Mag. nat. Hist., 16(7): 508-532; 1906, Cat. Indian. Dec. Crust. Part-III Mac. Fas. I: 1-55.

1942 *Metapenaeopsis stridulans* Nataraj <sup>[26]</sup>, Curr. Sci. 11(2): 468-469; George, 1967 <sup>[15]</sup>, J. mar. biol. Ass. India, 18(1): 78-90; 1979, Cont. Mar. Sci., dedicated to Dr. C.V. Kurian, 21-59.

**Type Species:** *Metapenaeus stridulans* Alcock, 1905 <sup>[1]</sup>, Ann. Mag. nat. Hist., 16(7): 508-532.

**Type Locality:** Off Ganjam, Orissa Coast, India.

#### Material Examined

1 male (62 mm.) and 1 female (66 mm.), ZSI. Reg. No. C4838/2, Lowsom's Bay, Visakhapatnam, Andhra Pradesh, 14.9.1995, A. Chanda; 1 male (71 mm.) and 2 females (71-72 mm.), ZSI. Reg. No. C4840/2, Muthukuru F.L.C., Nellore, Andhra Pradesh, 1.9.1995, A. Chanda; 6 males (52-61 mm.) and 4 females (51-66 mm.), ZSI. Reg. No. C4939/2, Dwarka F.L.C., Gujarat, 14.3.1994, P.K. Moorthy.

#### Diagnosis of the species

Body densely pubescent; rostrum low, straight or slightly upturned, reaching tip of third segment of antennular peduncle, armed with 7+1 dorsal teeth; epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth anterior to the level of orbital margin of carapace; stridulating organ on posterior branchiostegal region of carapace consisting of 5 to 7, strong ridges in a wide straight band; carapace with hepatic, antennal and pterygostomial spines; mid-dorsal carina on third abdominal somite with a broad sulcus; antennular flagella short and equal in length; petasma asymmetrical, right distoventral projection shorter than left, bearing a few small apical processes, left distoventral projection with 5 to 12 large apical processes; dorsal intermediate projection broadly quadrangular, longer than right dorsal projection; anterior plate on sternite XIII of thelycum subquadrate with rounded corners, slightly broader than long; posterior thelycal plate on sternite XIV broadly trapezoidal, much wider than long, with a shallow median sulcus situated transversely; coxal plate of pereopod fourth smaller than anterior thelycal plate.

#### Remarks

During present study, distribution of the species extend upto Gujarat, West coast of India.

#### Distribution

India: Orissa, Andhra Pradesh, East coast of India; Gujarat, Maharashtra and Travancore, West coast of India and Andaman sea.

Elsewhere: Gulf of Aden; Persian Gulf; Gulf of Oman; Arabian sea; Maldives Island; Sri Lanka; Malaysia; Singapore; Thailand; Vietnam; South China Sea; Philippines; Indonesia; Chesterfield Islands; New Caledonia.

#### *Metapenaeopsis toloensis* Hall, 1962 <sup>[16]</sup>

*M. toloensis* was described by Hall (1962) <sup>[16]</sup> from middle of the South China sea, 30 miles north-east of Tolo Bay. The

species was first reported from India by Fischer and Bianchi (1983) [12]. A brief history of the species with special reference to Indian contributions are given below.

1962 *Metapenaeopsis toloensis* Hall [16], Fish. Publ. Colon. Off., London 17: 1-229; Fischer and Bianchi, 1983 [12], FAO Species Identification Sheets for Fishing purposes. Western Indian Ocean, Fishing Area 51, Vol. 5, FAO, Rome. Pérez Farfante and Kensley, 1997 [21], Mem. Mus. nat. d'Hist. nat. 175: 1-233.

**Type Species:** *Metapenaeopsis toloensis* Hall, 1962 [16], Fish. Publ. Colon. Off., London, 7: 1-229.

**Type Locality:** Middle of the South China Sea, 30 miles north-east of Tolo Bay on the Island of Linga.

#### Material Examined

1 female (68 mm.) and 1 male (48 mm.), ZSI. Reg. No. C4851/2, Machelipattanam, Andhra Pradesh, 5.9.1995, A. Chanda.

#### Diagnosis of the species

Body densely pubescent, thick skin; rostrum upcurved distally, reaching tip of second antennular peduncle, armed with 8+1 dorsal teeth, epigastric tooth conspicuously separated from penultimate tooth; penultimate tooth situated at level of orbital margin of carapace; stidulating organ on posterior branchiostagite of carapace consisting of 14-22 small ridges in a curved band; hepatic, antennal, pterygostomian spine well developed, cervical sulcus weak, hepatic sulcus marked; mid-dorsal carina on third abdominal somite with deep sulcus; antennular flagella short, equal in length; petasma asymmetrical, right distoventral projection shorter than left, bearing several small apical processes, left distoventral projection broadly swollen, with distomedian and distolateral processes; left distodorsal projection flat, slender, right distodorsal projection longer than left; anterior plate on sternite XIII of thelycum subquadrate with rounded corners, almost as long as wide; posterior thelycal plate on sternite XIV trapezoidal and slightly wider than long, with strongly elevated, densely setose lateral sides; coxal plate of fourth pereopod hairy, as broad as anterior plate.

#### Remarks

The species was previously recorded from Andaman sea. Present record is the first from coastal water of peninsular India.

#### Distribution

India: Andaman sea, Andhra Pradesh, east coast of India. Elsewhere: Arabian sea; Maldive Islands; Sri Lanka; Malaysia; Thailand; Indonesia; Gulf of Tonkin; South China Sea; Philippines; New Guinea; Australia; Chesterfield Island.

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