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RECENT OSTRACODA FROM THE BAY OF BENGAL, OFF KARIKKATTUKUPPAM (NEAR CHENNAI), SOUTH EAST COAST OF INDIA

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ABSTRACT

Fifty-six sediment samples and 60 water samples were collected from the inner-shelf off Karikkattukupppam, Chennai, south east coast of India. Fifty-one species belonging to 40 genera were identified. A check-list of the fauna along with their frequency of distribution and zoogeography is given. The temperature and salinity of bottom waters and $CaCO_3$ content of sediment are estimated, and it is observed that these parameters appear to have control over the abundance of ostracod population and distribution. Four new species namely, *Hemitrachyleberis siddiquii, Puricythereis whatleyi, Neocytheromorpha reticulata* and *Pterygocythereis chennaiensis* are established and their detailed morphological description presented with the aid of SEM study. *Hemikrithe orientalis* and *Microceratina punctata* are recorded for the first time from Indian waters. Most of the taxa of the study area show close affinity to the fauna of the Indo-Pacific region.

Key words : Recent Ostracoda, new species, systematic paleontology, South east Coast of India.

INTRODUCTION

Ostracods are one of the best documented groups within the whole of the animal kingdom due to the most characteristic features of their bodies and a well calcified, tiny, bivalved carapace which fossilises easily. Though Jain (1978; 1981), Bhatia and Kumar (1979), Naidu *et al.* (1997), Hussain (1998) and Rajesh Raghunath *et al.* (1999) presented assemblages of Ostracoda from the Indian coast, morphological studies of Recent marine Ostracoda have received little attention as yet in this part of the world. While investigating the ostracod fauna of the Bay of Bengal, off Karikkattukuppam, 4 new species have been encountered. For the sake of brevity, the description of identified taxa has been omitted.

The objective of this paper is to present a detailed external and internal morphological characteristics of the new species with the help of SEM photomicrography. In addition, an overall observation of the environmental parameters and their impact on the population abundance and distribution of ostracoda is also given.

The area under investigation is off the coast of Karikkattukkupam, near Chennai (12°50' N; 80° 16' to 80° 24' E), in the Bay of Bengal, Chennai-Chingleput District, Tamil Nadu (east coast of India), and forms a part of the toposheet no. 66 D/2 of the Survey of India.

The bay depressions, which are normally witnessed between October and December, frequently cross this coast, and there is heavy downpour during that period. The entire south-east coast of India gets most of its precipitation from the north-east monsoon which is active during this period. The climate is characteristically tropical, and the heat and humidity make diurnal weather quite enervating. There is an almost equitable temperature, except during the summer. During the beginning of the year, the monthly average temperature is generally low, whereas during the summer (April to June), the temperatures are high and often soar to more than 40°C. The minimum temperature is recorded during the end of December or beginning of January.

MATERIALS AND METHODS

Bottom sediment and water samples were collected from 15 stations, at depths ranging between 7 and 55 m (fig.1), once in three months over a

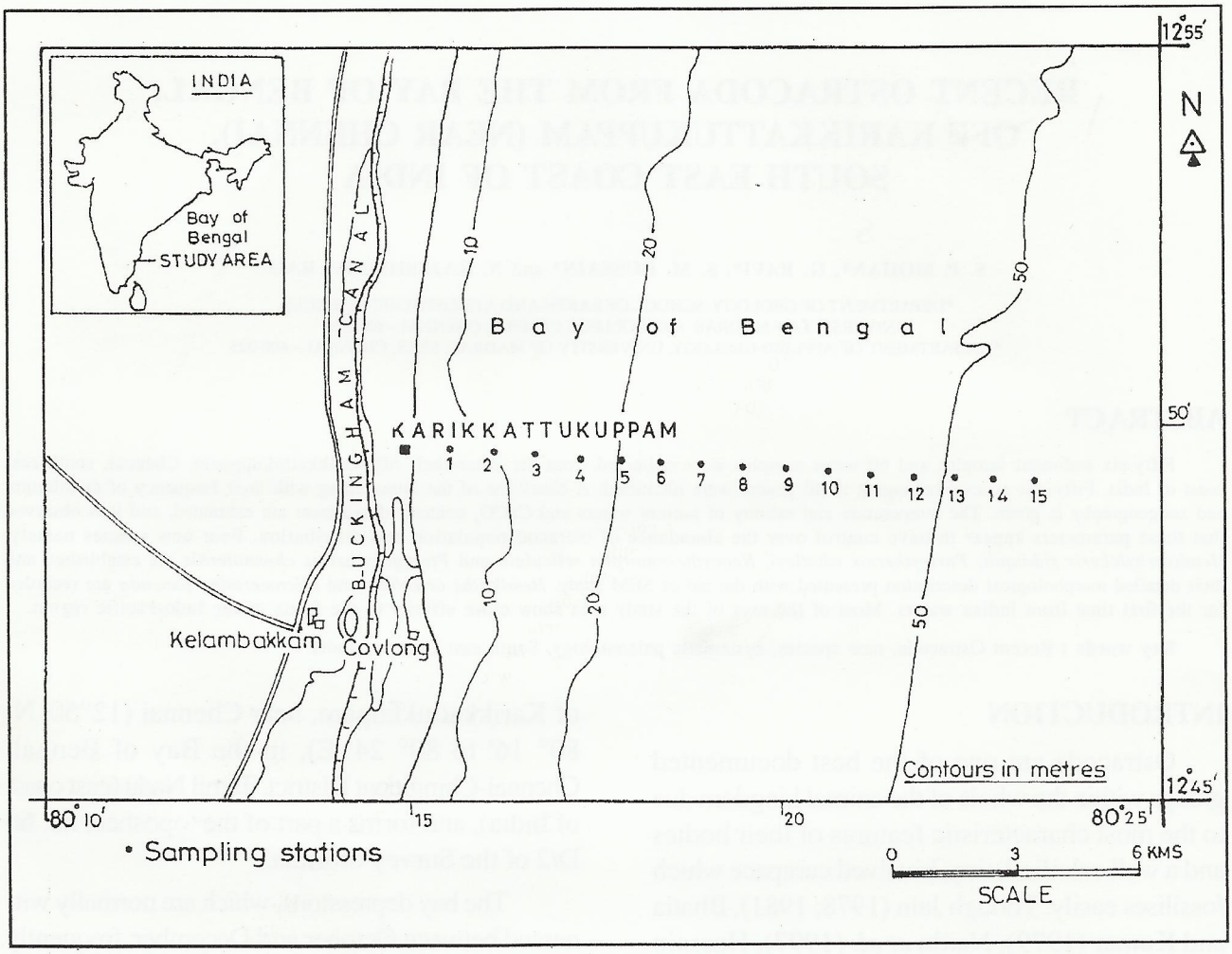
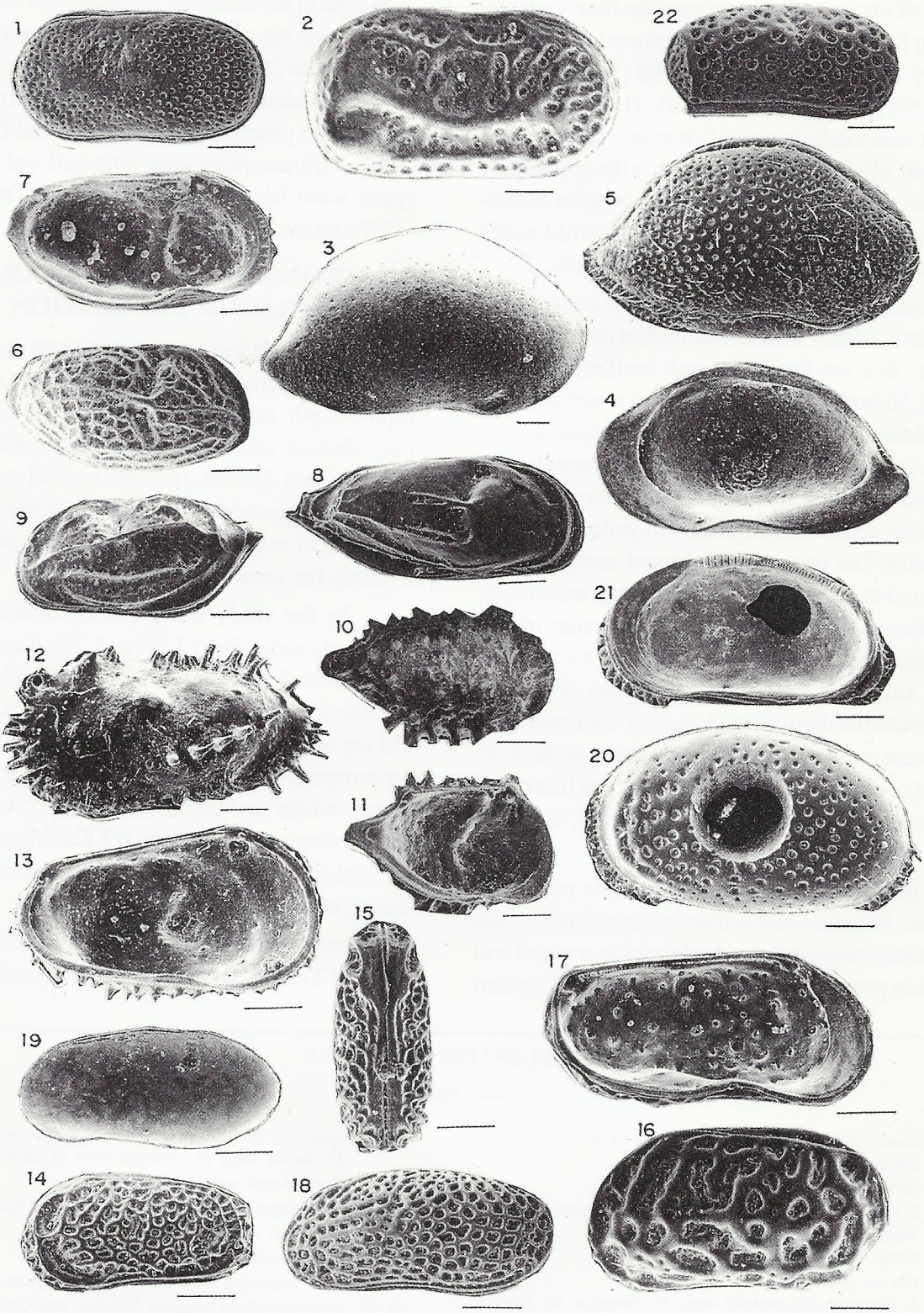


Fig. 1. Location map of the study area showing the sampling stations.

EXPLANATION OF PLATE I

(Bar scale equals 100 μm)

1. *Cytherella hemipuncta* Swanson, 1979
   Carapace, RV extesrnal view.
2. *Cytherelloidea leroyi* Keij, 1964
   ECarapace, RV external view.
3-4. *Bairdoppilata (Bairdoppilata) alcyonicola* Maddocks, 1969
   3, RV external view; 4, RV, internal view.
5. *Paranesidea fracticorallicola* Maddocks, 1969
   Carapace, RV, external view.
6-7. *Neomonoceratina iniqua* (Brady, 1868)
   6, RV external view; 7, LV internal view.
8. *Neomonoceratina jaini* Varma, Shyam Sunder and Naidu, 1993
   Carapace, RV external view.
9. *Neomonoceratina porocostata* Howe and McKenzie, 1989
   Carapace, LV external view.
10-11. *Spinoceratina spinosa* (Annapurna and Rama Sarma, 1987)
   10, Carapace, RV external view; 11, LV internal view.
12-13. *Pterygocythereis chennaiensis* n. sp.
   12, Carapace, LV external view; 13, LV external view.
14-15. *Keijia demissa* (Brady, 1868)
   14, Carapace, LV external view; 15, dorsal view.
16-17. *Callistocythere flavidofusca intricatoides* (Ruggieri, 1953)
   16, Carapace, LV external view; 17, LV internal view.
18. *Tanella gracilis* Kingma, 1948
   Carapace, LV external view.
19. *Paracytheroma ventrosinuosa* Zhao and Whatley, 1989
   Carapace, LV external view.
20-21. *Miocyprideis spinulosa* (Brady, 1868)
   20, Carapace, LV external view; 21, RV internal view (predated).
22. *Cushmanidea guhai* Jain, 1978
   Carapace, RV external view.



MOHAN, RAVI, HUSSAIN AND RAJESHWRA RAO

period of one year, representing the four seasons; starting from October 1995 (Northeast monsoon), January 1996 (Winter), April 1996 (Summer) and July 1996 (Southwest monsoon). The sample collection was made in a single transect from the inner shelf off Karikkattukuppam with the help of Petersen grab from a motor launch. Nansen reversible water sampler was used for collecting water samples from the sediment-water interface.

Sediment samples could not be collected at the fourth station because of underlying rock exposures that rendered the grab ineffective. As a sequel, 56 bottom sediment and 60 water samples were obtained for the entire period. Sediment samples were preserved in a mixture of one part of buffered formalin in nine parts of water (4% solution) with a pinch of calcium chloride to achieve neutrality. The preserved sediment samples were subjected to the Rose Bengal staining technique, first described by Walton (1952), in order to differentiate living from dead Ostracoda.. All the sediment samples were subjected to standard micropaleontological techniques and ostracod specimens were separated from a unit weight of 25 ml wet sediment sample under a stereo-binocular microscope and counted. Subsequently, different species were identified.

Bottom water temperatures were measured on board from the built-in thermometer. Salinity was determined using the standard titration method and equation proposed by Knudsen (1901). Calcium carbonate in the sediment samples were determined by adopting the methodology suggested by Loring and Rantala (1992). Sand, silt and clay percentages were calculated using a combination of sieving and pipette procedure. (Krumbein and Pettijohn, 1938). Trilinear plots were prepared and sediment types were identified by adopting Trefethen's (1950) textural nomenclature.

ENVIRONMENT CHARACTERISTICS AND OSTRACOD POPULATION

Ostracods live in an environment in which the controlling factors are temperature, bottom topography, depth, salinity, dissolved oxygen, food supply, substrate and sediment organic matter content (Puri, 1966). Hence, in order to find out the impact of these parameters on the abundance and distribution of ostracoda, an attempt has been made to study the same.

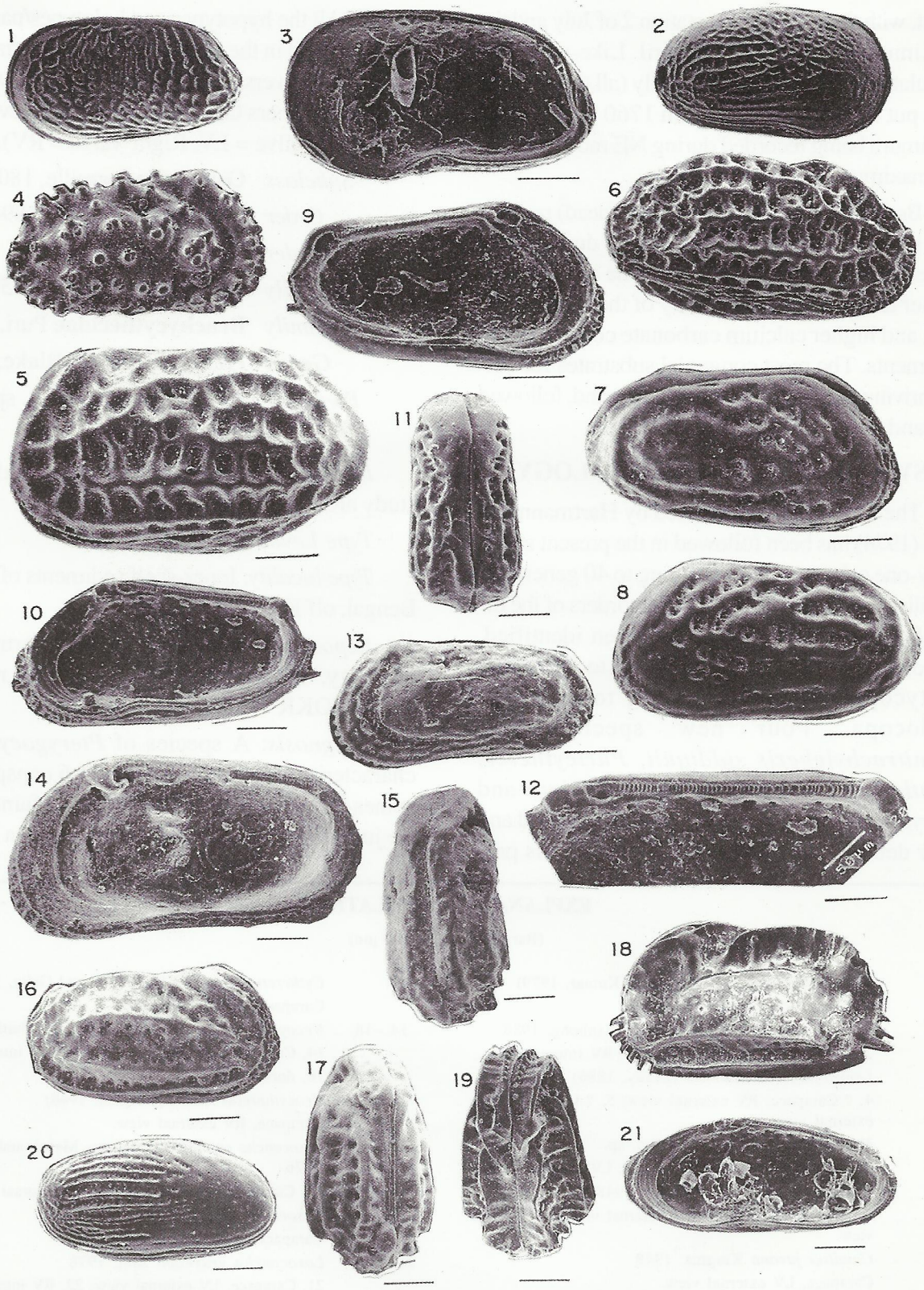
In the study area, $CaCO_3$ content of the sediments varies from 2.5% to 7.2%, the maximum being recorded at station 15 in April. The following 4 sediment types: sand, silty sand, sandy silt and silt are represented. Lower values of bottom water temperature (23.4° to 24.1° C) were recorded during winter and higher values (27.5° to 28.6° C) during summer. Like-wise, off Karikkattukuppam the higher salinity values (35.81 ‰) were observed during summer.

Spatially, ostracod population size ranges between 12 and 410 specimens per 25 ml wet sedi-

EXPLANATION OF PLATE II →

(Bar scale equals 100 μm)

1. *Hemikrithe orientalis* van den Bold, 1950
   Carapace, LV external view.
2-3. *Hemikrithe peterseni* Jain, 1978
   2, Carapace, RV external view; 3, RV internal view.
4. *Actinocythereis scutigera* (Brady, 1868)
   Carapace, RV external view.
5-6. *Chrysocythere keiji* Jain, 1978
   5, Carapace, LV external view; 6, Carapace, RV external view.
7-12. *Hemitrachyleberis siddiquii* n. sp.
   7, Carapace, RV external view; 8, Carapace, LV external view, 9, RV internal view; 10, LV internal view; 11, dorsal view, 12, enlarged view of hingement.
13-15. *Puricythereis whatleyi* n. sp.
   13, Carapace, LV external view; 14, RV internal view 15, dorsal view.
16-17. *Stigmatocythere indica* (Jain, 1978)
   16, Carapace, RV external view; 17, dorsal view.
18-19. *Stigmatocythere kingmai* Whatley and Quanhong, 1988
   18, Carapace, LV external view; 19, dorsal view.
20-21. *Basslerites liebaui* Jain, 1978
   20, Carapace, RV external view; 21, RV internal view.



MOHAN, RAVI, HUSSAIN AND RAJESHWRA RAO

ment, with the minimum at station 2 of July and the maximum at station 10 of April. Like-wise, the population of ostracoda seasonally (all the 14 samples put together) ranges from 1760 to 2404, the minimum being recorded during NE monsoon and the maximum during the summer.

Both the living and total (living+dead) population sizes were found to be maximum during April collection (Summer), which may be attributed to higher temperature and salinity of the bottom waters, and higher calcium carbonate content of the sediments. The most congenial substrates for better thriving of the population are silty sand, followed by sand.

SYSTEMATIC PALAEONTOLOGY

The classification proposed by Hartmann and Puri (1974) has been followed in the present study. Fifty-one ostracod taxa belonging to 40 genera, 22 families, 3 superfamilies, and 2 suborders of the order Podocopida (table 1) have been identified. Among these, 2 species belong to Suborder Platycopa and the remaining to Suborder Podocopa. Four new species *viz., Hemitrachyleberis siddiquii, Puricythereis whatleyi, Neocytheromorpha reticulata* and *Pterygocythereis chennaiensis* are established and their detailed morphological description is presented. All the hypotypes and holotypes/paratypes are deposited in the museum of the Department of Geology, University of Madras, Chennai, with the register numbers GMOKR 1-55. (Abbreviations used: Left Valve = LV; Right Valve = RV).

Subclass **Ostracoda** Latreille, 1806

Order **Podocopida** Muller, 1894

Suborder **Podocopa** Sars, 1866

Superfamily **Cytheracea** Baird, 1850

Family **Brachycytheridae** Puri, 1954

Genus ***Pterygocythereis*** Blake, 1933

Pterygocythereis chennaiensis n. sp.

(Pl. I; figs.12-13)

Etymology: This species is named after the study area.

Type Level: Recent.

Type locality: Inner-shelf sediments of Bay of Bengal, off Karikkattukuppam.

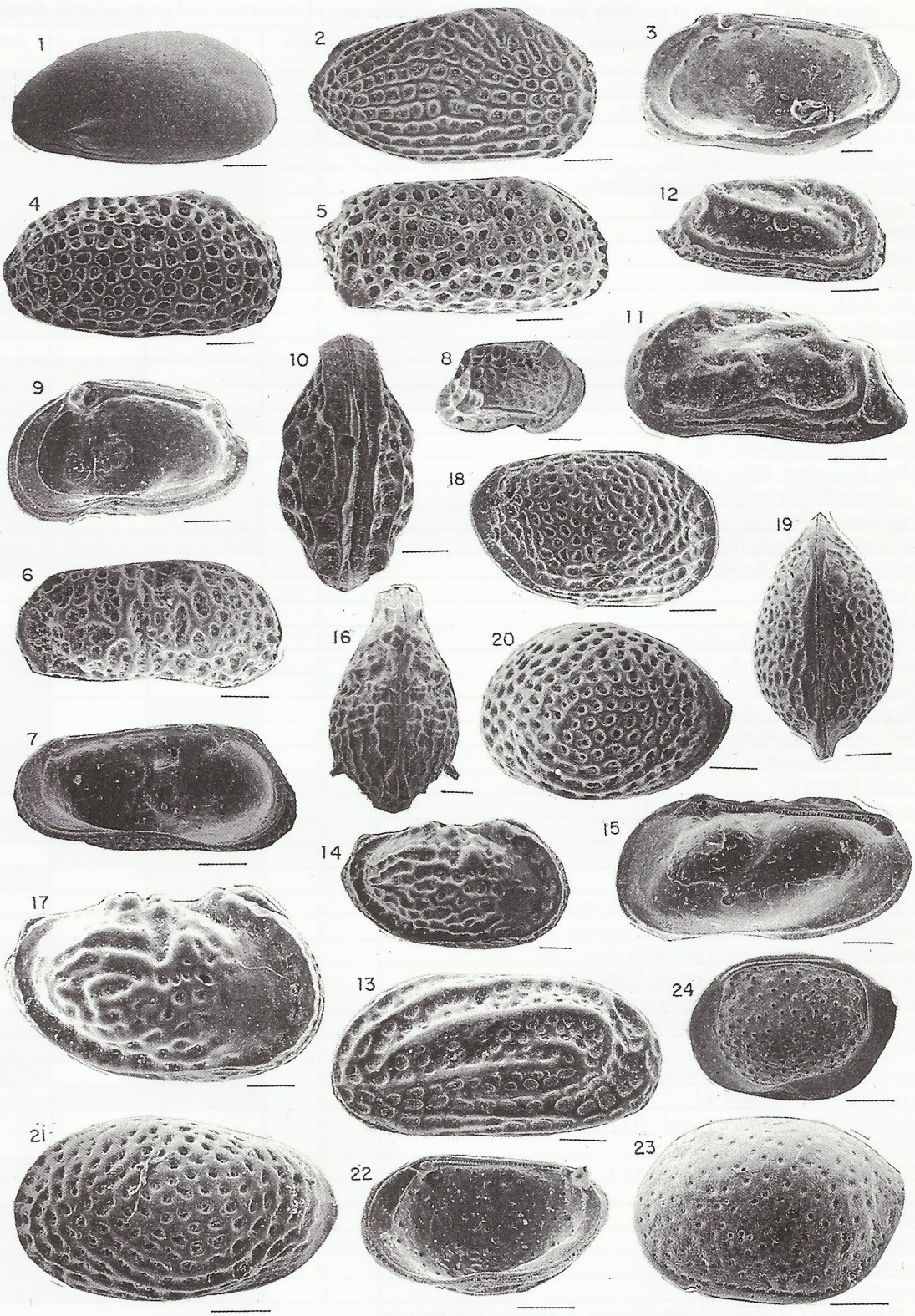
Repository: Deposited in the Department of Geology, University of Madras, with register nos.GMOKR 1-2.

Diagnosis: A species of *Pterygocythereis* characterized by the presence of 4-6 conspicuous spines arranged ventrolaterally, and a faint tubercle just above sub-central region behind a sulcus.

EXPLANATION OF PLATE III ⟶

(Bar scale equals 100 μm)

1. *Keijella karwarensis* (Bhatia and Kumar, 1979) Carapace, RV external view.
2-3. *Keijella reticulata* Whatley and Quanhong, 1988 2, Carapace, RV external view; 3, RV internal view.
4-5. *Lankacythere coralloides* (Brady, 1886) 4, ? Carapace, RV external view; 5, ? Carapace, RV external view.
6-7. *Neocytheromorpha reticulata* n. sp. 6, Carapace, RV external view; 7, LV internal view.
8-10. *Mutilus pentoekensis* (Kingma, 1948) 8, RV external view; 9, RV internal view; 10, Dorsal view.
11. *Caudites javana* Kingma, 1948 Carapace, LV external view.
12. *Falsocythere maccagnoi* (Ciampo, 1971) Carapace, RV external view.
13. *Cytheretta trifurcata* Lubimova and Guha, 1960 Carapace, LV external view.
14 –16. *Neocytheretta murilineata* Zhao and Whatley, 1989 14, Carapace, RV external view; 15, RV internal view 16, dorsal view.
17. *Neocytheretta snellii* (Kingma, 1948) Carapace, RV external view.
18-19. *Loxoconcha cercinata* Bonaduce, Masoli and Pugliese, 1976 18, Carapace, RV external view; 19, dorsal view.
20. *Loxoconcha mandviensis* Jain, 1978 Carapace, LV external view.
21-22. *Loxoconcha gruendeli* Jain, 1978 21, Carapace, LV external view; 22, RV internal view.
23-24. *Loxoconchella anomala* (Brady, 1880). 23, Carapace, LV external view; 24, RV internal view.



MOHAN, RAVI, HUSSAIN AND RAJESHWRA RAO

Table 1 : A check list of Ostracoda of the study area along with their frequency of occurrence and zoogeographic distribution.

Sl. No	Name of the species	Frequency	East Coast	West Coast	Indo-Pacific Area
1	*Actinocythereis scutigera* (Brady) (L)	A			
2	*Bairdoppilata (B.) alcyonicola* Maddocks (L)	A			
3	*Basslerites liebaui* Jain ** (L)	R			
4	*Bythoceratina mandviensis* Jain (L)	C			
5	*Callistocythere flavidofusca intricatoides* Ruggieri (L)	A			
6	*Caudites javana* Kingma (L)	C			
7	*Chrysocythere keiji* Jain (L)	A			
8	*Cushmanidea guhai* Jain (L)	R			
9	*Cytherella hemipuncta* Swanson (L)	R			
10	*Cytherelloidea leroyi* Keij (L)	A			
11	*Cytheretta trifurcata* (Lubimova and Guha) (D)	R			
12	*Cytheropteron* sp. (L)	C			
13	*Falsocythere maccagnoi* (Ciampo) ** (L)	R			
14	*Hemikrithe orientalis* van den Bold * (L)	A			
15	*H. peterseni* Jain (L)	C			
16	*Hemitrachyleberis siddiquii* n. sp. *?* (L)	C			
17	*Keijella karwarensis* (Bhatia and Kumar) (L)	A			
18	*K. reticulata* Whatley and Quanhong (L)	A			
19	*Keijia demissa* (Brady) (L)	C			
20	*Lankacythere coralloides* (Brady) (L)	A			
21	*Loxoconcha cercinata* Bonaduce *et al.* ** (L)	C			
22	*L. gruendeli* Jain ** (L)	A			
23	*L. mandviensis* Jain (L)	A			
24	*Loxoconchella anomala* (Brady) (D)	R			
25	*Macrocyprina decora* (Brady) (L)	R			
26	*Microceratina punctata* Whatley and Quanhong * (L)	R			
27	*Miocyprideis spinulosa* (Brady) (L)	C			
28	*Mutilus pentoekensis* (Kingma) (L)	R			
29	*Neocytheretta murilineata* Zhao and Whatley (L)	C			
30	*N. snellii* Kingma (D)	R			
31	*Neocytheromorpha reticulata* n. sp. *?* (L)	C			
32	*Neomonoceratina iniqua* Brady (L)	C			
33	*N. jaini* Varma *et al.* (L)	R			
34	*N. porocostata* Howe and McKenzie (L)	R			
35	*Spinoceratina spinosa* (Annapurna and Rama Sarma) (L)	A			
36	*Paijenborchellina prona* (Lubimova and Guha) (D)	R			
37	*Paracytheridea pseudoremanei* (Bonaduce *et al.*) ** (L)	C			
38	*Paracytheroma ventrosinuosa* Zhao and Whatley (L)	R			
39	*Paradoxostoma bhatiai* Shyam Sunder *et al. (D)*	R			
40	*Paranesidea fracticorallicola* Maddocks (L)	R			
41	*Phlyctenophora orientalis* (Brady) (L)	C			
42	*Propontocypris (P.) crocata* Maddocks (L)	R			
43	*P. (S.) bengalensis* Maddocks (L)	R			
44	*Pterygocythereis chennaiensis* n. sp. *?* (L)	A			
45	*Puricythereis whatleyi* n. sp. *?* (L)	R			
46	*Semicytherura contraria* Zhao and Whatley (L)	R			
47	*S.* sp. (L)	C			
48	*Stigmatocythere indica* (Jain) (L)	C			
49	*S.kingmai* Whatley and Quanhong (L)	C			
50	*Tanella gracilis* Kingma (L)	A			
51	*Xestoleberis variegata* Brady (L)	C			

R: Rare 0-50 specimens; C: Common 51-200 specimens; A: Abundant >200 specimens
L: Living; D: Dead
? New species; * First record from Indian waters; ** First record in the east coast of India

Description: The carapace is subrectangular in lateral view. Both the dorsal and ventral margins are almost straight with numerous spines throughout the margin. The anterior margin is broadly rounded with 10-12 marginal spines. The posterior margin is somewhat narrowly truncated with 4-6 blunt spines. In dorsal view, the carapace appears arrow shaped. The maximum length is at mid-anterior to mid-posterior and maximum height at the anterior. Ventrolaterally, 4-6 spines are arranged in a row, which run mid-posterior to mid-ventral. Also, just above sub-central region a faint tubercle is present behind a sulcus. The remaining surface is smooth. Eye spot is large. Valves are unequal in size, the left being larger.

Inner lamella is moderately wide. Line of concrescence and inner margin coincide throughout and is parallel to outer margin. Normal pores are few and open. Radial pore canals are simple and straight and about 15-20 anteriorly and posteriorly. The central muscle scar pattern comprises a vertical row of 4 adductor scars with a V-shaped frontal scar. The hinge is of the amphidont type. Sexual dimorphism is observed.

Remarks: This species closely resembles *P. jonesi* (Baird) and *P. ceratoptera* (Bosquet) described by Bonaduce *et al.* (1975) in general outline and internal features. But it differs in the shape and arrangement of spines. In both the species, the spines are robust and blade-like. The new species has 4-6 conspicuous ventrolateral spines which are lacking in the latter species. In *P. jonesi,* the upper part of anterior margin is constituted with smooth carina and lower part with 3-4 spines. Whereas, *P. chennaiensis* possesses spines throughout the anterior margin. The posterior margin of *P. ceratoptera* is more acuminate and truncate than the new one.

Material: In the study area, 216 specimens were encountered, out of which 7 are living; 24 carapaces and 192 valves.

Ecology: This species is rarely distributed in different stations of four seasons. A maximum of 37 specimens are found at station 10 of July. Its favourable ecological parameters are: temperature 25.2 to 26.0°C; salinity 33.08 to 34.1 ‰; $CaCO_3$ 4.4 to 6.2 %; and silty sand substrate.

Holotype: Length 0.74 mm, Height 0.37 mm (GMOKR 1).

Paratype: Length 0.69 mm, Height 0.32 mm (GMOKR 2).

Family **Trachyleberididae** Sylvester-Bradley, 1948

Subfamily **Trachyleberidinae** Sylvester-Bradley, 1948

Genus ***Hemitrachyleberis*** Hartmann, 1974

Hemitrachyleberis siddiquii n. sp.

(Pl. II, figs.7-12)

Hemitrachyleberis sp.A – Paik, 1976, pp.54-55, pl.3, figs.56-58.

Etymology: This species is named in honour of Prof. Q. A. Siddiqui, Department of Geology, St.Mary's University, Nova Scotia, Halifax, Canada.

Type level: Recent.

Type locality: Inner-shelf sediments of the Bay of Bengal, off Karikkattukuppam.

Repository: Deposited in the Department of Geology, University of Madras, with register nos. GMOKR 3-4.

Diagnosis: A medium-sized species of *Hemitrachyleberis* characterised by the presence of two U-shaped ridges, one from posterodorsal to posteroventral and another ridge seen inside, almost parallel, presence of pores in the reticules, a prominent posterior spine and smooth anterior margin.

Description: The carapace is medium in size and subovate to subrectangular in lateral outline. The dorsal margin is straight, whereas the ventral margin is slightly sinuous at the middle. The anterior margin is broadly rounded with 12-14 marginal denticles anteroventrally. The posterior margin is

narrowly rounded with a prominent posteroventral spine. The maximum length is median and the maximum height is at the anterior. In dorsal view, the carapace is almost parallel-sided. The surface is ornamented with 2 U-shaped ridges that are parallel along the posterodorsal, posterior and posteroventral margins. Two small ridges are seen from mid-dorsal to mid-anterior region. The remaining surface is ornamented with pitted reticules. The anterior margin is smooth. Valves are unequal in size. LV is larger and overlaps the RV conspicuously anterodorsally and posterodorsally.

The inner lamella is wide anteriorly and posteriorly. The anterior vestibulum is narrow. Radial pore canals are simple and numerous. The muscle scar pattern consists of 4 subvertically arranged adductors and a frontal scar. The hinge is of the holamphidont type: large, terminal, lobed sockets, a small tooth behind the anterior socket, median bar crenulate in the LV, and complimentary hinge in the RV. Sexual dimorphism is noticed, males being more elongate and short.

Remarks: This species somewhat resembles *Hemitrachyleberis nealei* Vaidya (1993) in general outline but differs in the presence of ridges on the reticules. This species also occurs in the Persian Gulf (Paik, 1976).

Material: 137 specimens: 8 living; 54 carapaces, 83 valves.

Ecology: This species is rarely distributed during all the seasons. A maximum number of 30 specimens encountered during October. Its favourable ecological conditions are temperature 23.5° - 25.0° C; salinity 31.5 ‰ - 33.05 ‰; $CaCO_3$ 3.0 % - 4.6 %; siltysand and sandysilt substrate.

Holotype: Length 0.51 mm, Height 0.24 mm, Thickness 0.23 mm. (GMOKR 3)

Paratype: Length 0.52 mm, Height 0.27 mm., Thickness 0.22 mm. (GMOKR 4)

Genus ***Puricythereis*** Bonaduce, Masoli and Pugliese, 1976

Puricythereis whatleyi n. sp.

(Pl. II, figs.13-15)

Etymology: This species is named in honour of Prof. R. C. Whatley, University College of Wales, Aberystwyth, U.K.

Type level: Recent.

Type locality: Inner-shelf sediments of the Bay of Bengal, off Karikkattukuppam.

Repository: Deposited in the Department of Geology, University of Madras, with register nos. GMOKR 5-6.

EXPLANATION OF PLATE IV ⟶

(Bar scale equals 100 μm)

1-2. *Paracytheridea pseudoremanei* Bonaduce *et al.*, 1980
1, Carapace, LV external view; 2, LV internal view.

3. *Paracytheridea* sp.
Carapace, RV external view.

4. *Paijenborchellina prona* (Lubimova and Guha, 1960)
Carapace, RV external view.

5-6. *Semicytherura contraria* Zhao and Whatley, 1989
5, Carapace, RV external view; 6, LV internal view

7. *Semicytherura* sp.
Carapace, LV external view.

8-9. *Cytheropteron* sp.1
8, Carapace, RV external view; 9, Dorsal view

10. *Cytheropteron* sp.2
Carapace, LV external view.

11-12. *Xestoleberis variegata* Brady, 1880
11, Carapace, RV external view; 12, Carapace, LV external view.

13. *Bythoceratina mandviensis* Jain, 1978
Carapace, LV external view.

14-15. *Microceratina punctata* Whatley and Quanhong, 1987
14, Carapace, RV external view; 15, dorsal view.

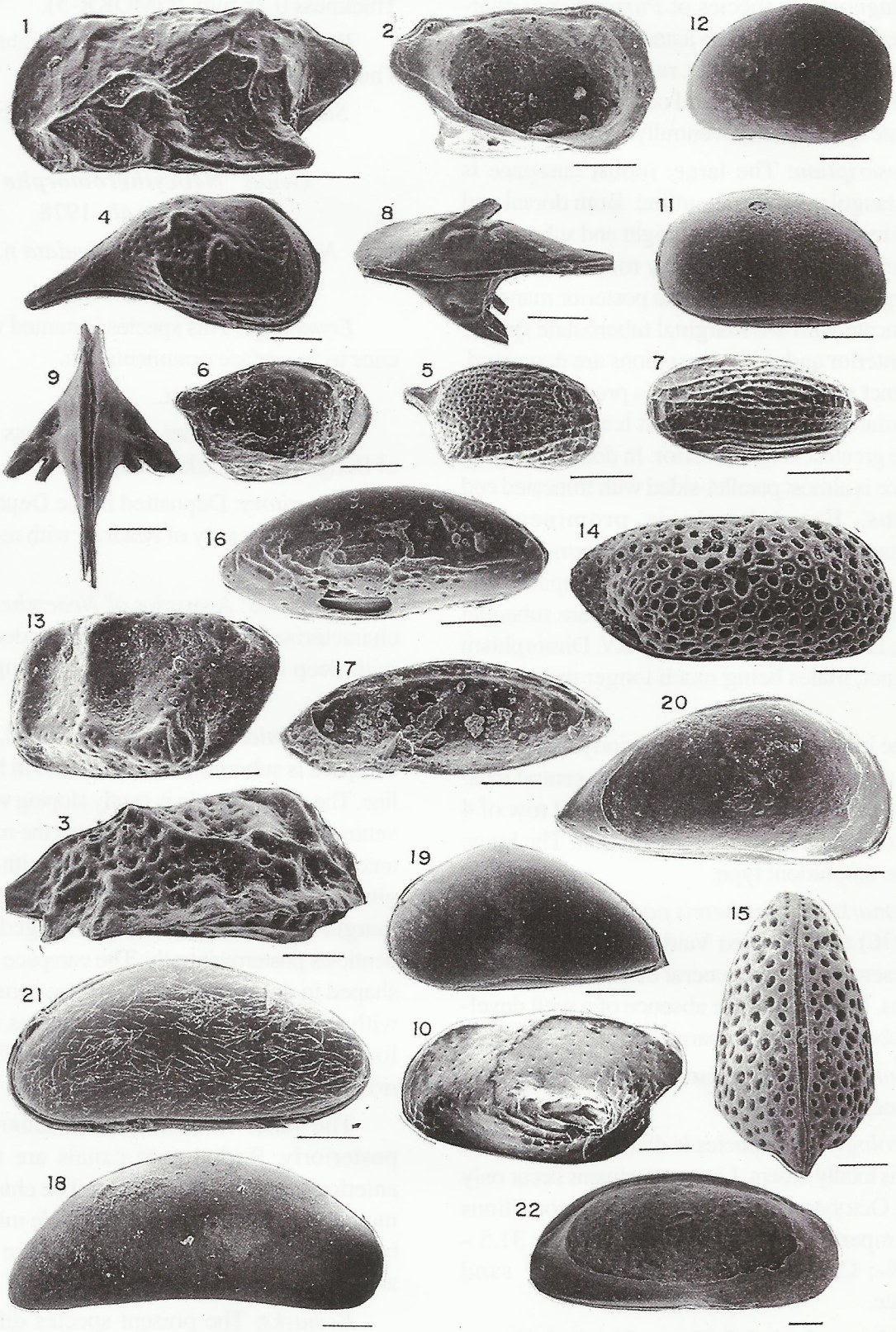
16-17. *Paradoxostoma bhatiai* Shyam Sunder, Varma and Naidu, 1995
16, Carapace, RV external view; 17, RV internal view.

18. *Macrocyprina decora* (Brady, 1866)
Carapace, RV external view.

19-20. *Propontocypris (Propontocypris) crocata* Maddocks, 1969
19, Carapace, LV external view; 20, LV internal view.

21. *Propontocypris (Schedopontocypris) bengalensis* Maddocks, 1969
Carapace, LV external view.

22. *Phlyctenophora orientalis* (Brady, 1868)
LV internal view.



MOHAN, RAVI, HUSSAIN AND RAJESHWRA RAO

Diagnosis: A species of *Puricythereis* characterised by its tuberculate anterior marginal ridge, presence of subrectangular, raised, swelling platform-like central portion and occurrence of 4-6 tuberculate spines posteroventrally.

Description: The large, robust carapace is subrectangular in lateral outline. Both dorsal and ventral margins are almost straight and subparallel. The anterior margin is broadly rounded with 10-11 marginal denticles while the posterior margin is subtruncate with 4-6 marginal tuberculate spines. Both anterior and posterior regions are depressed. A distinct anteromarginal rim is present with 7-8 tuberculate spines. The greatest length is median and the greatest height anterior. In dorsal view, the carapace is almost parallel-sided with truncated end margins. Eye tubercle is prominent. A subrectangular, raised, swelling platform-like portion is present at the centre of the carapace. The remaining surface is smooth. Valves are subequal in size, LV being larger than the RV. Dimorphism is distinct, males being much longer than the females.

The inner lamella is wide anteriorly. Radial pore canals are numerous and straight. The central muscle scar pattern consists of a subvertical row of 4 adductors and a V-shaped frontal scar. The hinge is of the amphidont type.

Remarks: *Puricythereis papilio* Bonaduce *et al.* (1976) and *P. indica* Vaidya (1993) resemble the present species in general outline and internal features, but differ in the absence of a well developed tuberculate anteromarginal rim.

Material: 47 specimens: 5 are living; 17 carapaces, 30 valves.

Ecology: This species is distributed rarely. In July, it is totally absent. Living specimens occur only during October. Congenial ecological conditions are: temperature 23.5 - 28.5°C; salinity 31.5 - 35.5 ‰; $CaCO_3$ 3.0 - 4.6 % and silty sand substrate.

Holotype: Length 0.87 mm, Height 0.42 mm, Thickness 0.38 mm. (GMOKR-5).

Paratype: Length 0.92 mm, Height 0.45 mm, Thickness 0.40 mm. (GMOKR-6).

Subfamily **Arculacytherinae** Hartmann, 1981

Genus ***Neocytheromorpha*** Guan in Guan *et al.*, 1978

Neocytheromorpha reticulata n. sp.

(Pl. III, figs.6-7)

Etymology: This species is named with reference to its surface ornamentation.

Type level: Recent.

Type locality: Inner-shelf sediments of the Bay of Bengal, off Karikkattukuppam.

Repository: Deposited in the Department of Geology, University of Madras, with register nos. GMOKR 7-8.

Diagnosis: A species of *Neocytheromorpha* characterised by suboval to subrounded reticules with deep fossae and irregular arrangement of ridges.

Description: The medium-sized, elongate carapace is subreniform to subovate in lateral outline. The dorsal margin is gently sloping whereas the ventral margin is slightly sinuous at the middle. The anterior margin is broadly rounded with 8-10 marginal denticles anteroventrally, and the posterior margin is narrowly rounded, fringed with 7-8 denticles posteroventrally. The carapace is spindle-shaped in dorsal view. The surface is ornamented with suboval to subrounded reticules with deep fossae and irregularly arranged ridges. The posterior margin is deeply depressed.

The inner lamella is wide anteriorly and posteriorly. Radial pore canals are numerous anteriorly and few posteriorly. The characteristic muscle scar pattern is distinctly visible mid-dorsally, below the hinge margin. The hinge is of the amphidont type.

Remarks: The present species differs from *Neocytheromorpha goguleruensis* Shyam Sunder

et al. (1995) in ornamentation; the former has irreugular arrangement of ridges and suboval to subrounded reticules. This species resembles *N.* sp. cf. *N. indoarabica* Khosla (1989) in general outline and internal features, described by Hussain (1998), but differs in the arrangement of ribs and reticules. The present species is also similar to *N. regalis* Guan, described by Whatley and Quanhong (1988) in general outline and presence of posterior marginal depression, but differs in the arrangement of reticules. Whatley and Quanhong (1988, p.23) remarked, "The subfamily Arculacythereinae was proposed by Hartmann in 1981 with *Arculacythereis* Hartmann, 1981, as its type genus, which the present author believes to be congeneric with *Neocytheromorpha* Guan, 1978 from the Pliocene of South China. Under ICZN rules 23 and 40, Arculacythereinae should, however, be retained." Hence, we have described *Neocytheromorpha* under the subfamily Arculacythereinae in the present study.

Material: 64 specimens: 3 living; 23 carapaces, 41 valves.

Ecology: Its living forms are present only during October. temperature 23.5 - 25.0° C; salinity 31.5 – 33.05 ‰; $CaCO_3$ 3.0 – 4.6 %; Sandy and silty sand substrates are observed to be the congenial ecological condition of this species.

Holotype: Length 0.62 mm, Height 0.31 mm, Thickness 0.29 mm. (GMOKR-7).

Paratype: Length 0.65 mm, Height 0.30 mm, Thickness 0.28 mm. (GMOKR-8).

CONCLUSION

Out of 56 bottom sediment samples collected from the Bay of Bengal, off Karikkattukuppam, a total of 51 species belonging to 40 genera were identified. Among these, four new species namely, *Hemitrachyleberis siddiquii, Puricythereis whatleyi, Neocytheromorpha reticulata* and *Pterygocythereis chennaiensis* are established and described in detail. In the Bay of Bengal, the occurrence of *Hemikrithe orientalis* and *Microceratina punctata* is considered to be the first report from Indian waters. In addition, the follwing five species namely, *Basslerites liebaui, Falsocythere maccagnoi, Loxoconcha cercinata, L. gruendeli* and *Paracytheridea psuedoremanei* are recorded for the first time from the east coast of India. The maximum ostracod population noticed in summer (April collection) is correlated with higher temperature and salinity of the bottom waters and higher calcium carbonate content of the sediment. Silty sand followed by sand are observed to be the favourable substrates of ostracoda in the study area.

The ostracod fauna of the present area exhibit close affinity with the ostracod assemblage of the Indo-Pacific region, viz., other parts of east and west coasts of India, Persian Gulf, Gulf of Aqaba (Red Sea), South China Sea, Malacca Straits, Jason Bay and Indo- Malayan areas. Nevertheless, *Basslerites liebaui, Chrysocythere keiji, Cushmanidea guhai* and *Neomonoceratina jaini* appear endemic to Persian Gulf and Indian waters. But, the occurrence of *Falsocythere maccagnoi* and *Loxoconchella anomala* is rather difficult to explain. As a whole, the faunal assemblage is characteristic of shallow water, neritic and tropical in nature.

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