

Recent Ostracoda in the Cuddalore estuary, East coast of Tamil Nadu, India

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ABSTRACT

The paper reports for the first time Holocene estuary Ostracoda assemblages from three localities in Cuddalore east coast of Tamil Nadu, Chennai, India. In all, thirteen taxa recorded and illustrated. Of these, *Keijella reticulata*, *Actinocythereis scutigera*, *Loxoconcha mandviensis*, *Propontocypris (Propontocypris) crocata* are being reported for the first time from India in Cuddalore.

Keywords: Recent Ostracoda, new records, systematic paleontology, south east coast of India, Cuddalore.

Introduction

Ostracoda 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 fossilizes 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 Indian coast.

Morphological studies of recent marine Ostracoda have received little attention as yet in this part of the world. While investigating the Ostracoda fauna of the Bay of Bengal, off Cuddalore, 13 species have been recorded. Ostracoda live in an environment in which the controlling factors are temperature, bottom topography, depth, salinity, dissolved oxygen, substrate, food supply and sediment organic matter (Puri, 1966). But, the major controlling factors governing Ostracoda distribution in estuarine environments and continental shelf zones are salinity, water temperature and substrate (Yassini and Jones, 1995). The knowledge on Ostracoda fauna from the brackish water of Indian region form the scanty, except for a few (Jain, 1976; Kundsens, 1901) that deals mainly with taxonomy. The main objective from this paper is to present detailed about the identified, systematic and remarks of Ostracoda. In addition, morphological characteristic of the species.

Study Area and Methodology

The area under investigation is off the coast of Cuddalore (79 °45'E; 11°45'N: 80°00' E; 12 °15'N), in the Bengal Bay, Tamil Nadu. The climate is tropical with warm water temperatures. The region is influenced by the northeast monsoon and southeast monsoon with a heavy downpour. The bay depressions, which generally occur during the months of October-November frequently cross the coast near Cuddalore. Coral reefs occur in the Bengal Bay, especially off Cuddalore and they provide a favorable environment for the better thriving of Ostracoda in this region.

Three core sediment samples were collected from the estuary and tidal flat of Bengal Bay at 3 stations in a transect off Cuddalore within a depth range from 100 to 215cm (Fig1) Cuddalore (Core I, 79 °47'E; 11°46'N, Core II 79°47'E; 11°46'N, Core III 79°47'E; 11°45'N). Samples were collected during 2003-2004 over a period of one year (Winter, Summer, 2003 - 2004, SW monsoon and NE monsoon) in the study area. The sediment cores were collected by puncturing PVC pipes (2-inch diameter) in the spot sites to a depth of nearly 1.5-2m with a water depth of nearly 30 cm. These pipes with the core sample were then cut open. The cores were sampled every 2 cm interval. As a sequel, a total of 54 subsamples were collected and subjected to standard micropaleontological techniques. Ostracoda taxa were separated and counted from a unit weight of 25 ml wet sediment after completing all the laboratory work, under a stereomicroscope binocular.

Systematic of Ostracoda

In the present study, the classification given in the "Treatise on Invertebrate Paleontology, part Q, Ostracoda" (Moore and Pitrat, 1961) is followed. Specimens of all the species identified and illustrated are deposited in the Department of Geology, Anna University, Chennai-India.

Suborder Podocopina, Sars, 1866

Superfamily Bairdiacea, Sars, 1866

Family Pectocytheridae Hanai, 1957

Genus *Tanella* Kingma, 1948

Tanella gracilis Kingma, 1948

(Pl.1 fig.1)

Tanella gracilis Kingma, 1948, pp.88-89, pl.x, fig.7-Jain, 1976. fig.9. Harthmann 1978, p.80, pl.4-13. text figs.108-113. Harthmann, 1980, p.126, pl.7, figs.11-18. Harthmann, 1981, p.103, pl.3, figs.7-14. Keij, 1979, p.61. pl.1. figs.7-8. Titterton and Howe and Mckenzie, 1989, p.31. Sreenivas et al. 1991, p.496.

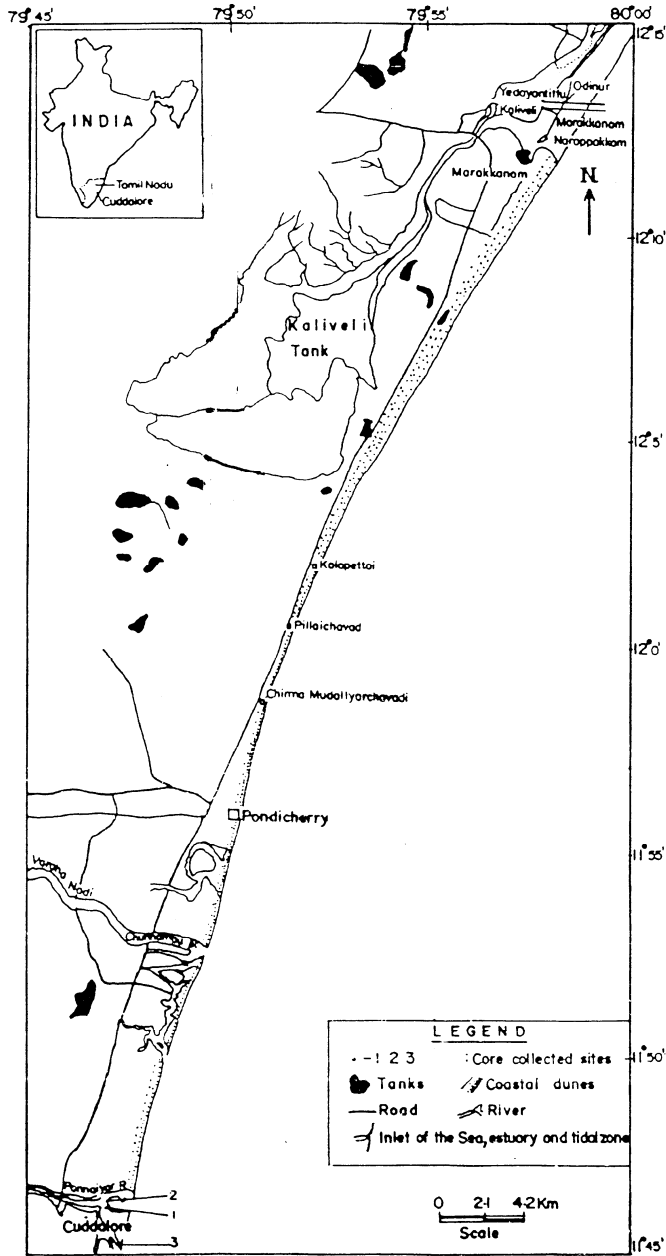


Figure 1: Location map of the study area.

Witte, 1993, pp.31-32, pl.4. figs 13-15. Jellinek, 1993, p.119, pl.7, figs.145-150. Vaidya and Mannikeri, 1994, p.736. Shyam sunder *et al.*, 1995, p.473.

Tanella cf gracilis Kingma-Bate, 1971, p.246, pls.1-3, figs 11.

Al-Abdul Razzaq, Shublaq and Al-Sheikh, 1982, p.62,

figs.7. Whatley and Zhao, 1988, p.6, pl.6, figs.5-6.

Remarks: *Tanella gracilis* is widely distributed in the Indo-West Pacific and is also reported from the west Atlantic (Witte, 1993). Within the Indo-West Pacific, this species is known to exhibit a considerable variation in the intensity of its ornamentation (Harthmann, 1978, 1980; Jain, 1976; 1978; Whatley and Zhao, 1988) which sometimes leads to the description of morphotypes, as new subspecies and species as indicated in the synonymy above.

Dimensions: Length 0.49mm, Height 0.23mm, Thickness 0.20mm

Family Trachyleberididae Sylvester-Bradley, 1948

Subfamily Pterygocytherinae Puri, 1957

Genus *Keijella* Ruggieri, 1967

Keijella reticulata Whatley and Zhao, 1988

(pl.1 fig.2)

Keijella reticulata Whatley and Zhao, 1988, p.15, pl.7, figs.19-23., Vaidya and Mannikeri, 1994, p.736.

Remarks: *Keijella reticulata* is characterized by its large size and reticulate ornamentation, with the reticulations dominated by longitudinal muri on the median and ventral areas and somewhat radial muri dorsally. This species resembles *K.papuensis* (Brady, 1980) in its reticulate ornamentation but differs in lacking the posteroventral spine. The present species also differs from *K.whatleyi* Jain (1981) in having reticulations and in the absence of longitudinal ribs.

To the author's knowledge, this is the first report of *Keijella reticulata* from the east coast of India off Cuddalore.

Dimensions: Length 1.03mm, Height 0.52mm.

Genus *Lankacythere* Bhatia and Kumar, 1979

Lankacythere coralloides (Brady, 1886)

(pl.1 fig.3)

Cythere coralloides Brady, 1886, p.307, pl.39, figs.19-22.

Cythere reticulineata, Kingma, 1948, p.82, pl.9, figs.2a-b

Cythere coralloides Brady, Misra and Shrivastava, 1979, p.294, pl.1, fig.5.

Lankacythere coralloides (Brady), Bhatia and Kumar, 1979, pl.1 figs1-5, Jain, 1981,p.108,pl.1,fig.12.-Whatley and Quanhong, 1988,p.17,pl.8, figs.19-22.Naid *et al.*, 1997,p.728,p.III, fig.10.Hueeain, 1998, p.10, pl.II, figs.11-12.-Sridhar *et al.*, 1998,p.193,figs.3g-h.

Remarks: Brady (1886) originally recorded this species from off Ceylon (now Srilanka).Bhatia examined the taxa described by Bate (1971) and Jain (1978) and opine that both are assignable to the genus *Lankacythere* (Bhatia and Kumar, 1979,p.176).However, in those two indeterminate taxa, the posteroventral ridge is less prominent.

Dimensions: Length 0.71mm, Height 0.32mm.

Subfamily Trachyleberidinae Sylvester-Bradley, 1948

Genus *Actinocythereis* Puri, 1953

Actinocythereis scutigera Brady 1868

(Pl.1fig.4)

Cythere scutigera Brady, 1868, p.70, pl.8, figs.15-16, Brady-1880, p.109.pl.22, fig.5.

Cythere scutigera Brady,-Kingma, 1948, p.83, pl.9, fig.6.

Trachyleberis scutigera Brady-Keij, 1954, p.356, p.3, fig.2.-Guha, 1980, pp.44-45,pl.1, figs.4.21 and 27.

Actinocythereis sp. cf. *A. scutigera* Brady, Paik, 1976, p.48, pl.3, figs.50-52-Vaidya and Mannikeri, 1994, p.736.

Remarks *A. scutigera* has been widely recorded from many Indo-Pacific regions such as Indonesia (Kingma, 1948), the Arabian Gulf (Paik, 1976, 1977), Mandvi Beach (Jain, 1978), Juhu Beach (Guha, 1980) and Malacca Straita (Whatley and Zhao, 1988). This is the first report of this species from the east coast of India in Cuddalore.

Dimensions: Length 0.96mm, Height 0.50mm

Genus *Chrysocythere* Ruggieri, 1961

Chrysocythere keiji Jain, 1978

(Pl.1fig.5)

Chrysocythere sp, Paik, 1976, p.61, pl.4, figs. 65-67, figs, 27-28.-Paik, 1977, p.40.pl9.fig.160.-Khosla *et al.*, 1982.pl.2.fig.2.

Chrysocythere keiji Jain, 1978, pp.113-114, figs, 3L1-2,6k.,Jain, 1981, p.108,pl.2,fig.2.Vaidya and Mannikeri, 1994, p.736.

Remarks. This species is now Known from the following other Indian Localities; Mandvi Beach (Jain, 1978); southwest Keralla coast (Jain, 1981); and off Karwar (Bhatia and Kumar, 1979). It also occurs in the

Arabian Gulf (Paik, 1976, 1977).

Dimensions: Length 0.65mm, Height 0.32mm

Family Loxoconchidae Sars, 1925

Genus *Loxoconcha*, Sars, 1866

Loxoconcha mandviensis Jain, 1978

(Pl.1fig.6)

Loxoconcha mandviensis Jain, 1978, p.125, figs.4k1-2, 60.-Vaidya and Mannikeri, 1994,p.736.

Remarks: *L. mandviensis* was originally reported from the beach sands of Mandvi, Kutch (Jain, 1978). Its characteristic features are the concentrically arranged reticules, conspicuous smooth posterior margin, wide inner lamella both anteriorly and posteriorly, and sieve-type normal pores and straight and simple radial pore canals. Most of the specimens are found either in the substrate of silty sand or sand in the study area. To the author, knowledge, this is the first report of occurrence of *L. mandviensis* from the east coast of India in Cuddalore.

Dimensions: Length 0.49mm, Height 0.39mm.

Subfamily Loxocochinae Sars, 1925

Genus *Hemicytheridae* Kingma, 1948

Hemicytheridae reticulata Kingma, 1948

(pl.1fig.7)

Hemicytheridae reticulata Kingma, 1948, pp.71-72, pl.VII, fig.7.- Sreenivas et al., 1991, pp.492-499, pl.1, figs.11-12.

Remarks: The elongate subreniform shape and heavily reticulata ornamentation are the characteristic features of *H. reticulata*. This species was originally recorded from Java and Sumatra by Kingma, (1948). Subsequently, Bentley (1988) recorded it from Brisbane water, near Sydney, Zhao and Whatley (1989b) identified *H. reticulata* from the Sedili river estuary and Jason Bay, southeastern Malay Peninsula from water depths between 0 and 20m. From India, Sreenivas et al (1991) recorded this species from Pulicat Lake estuary.

Dimensions: Length 0.53mm, Height 0.25mm

Family: Candonidae Kaufmann, 1900

Subfamily Paracypridinae Sars, 1923

Genus *Phlyctenophora* Brady, 1880

Phlyctenophora orientalis Brady, 1868

(Pl.2fig.8)

Macrocypris orientalis Brady, 1868, pp.61-62, pl.7, figs.1-3.

Phlyctenophora zealandica Brady, 1880, p.33, pl.3, figs.1a-m.-Guha, 1980, p.43, pl.1, figs.17 and 24.-Hussain, 1998, p.14,pl.III, fig.19.

Phlyctenophora orientalis Brady, Whatley and Quanhong, 1987, pp.336-337, pl.2, figs.3-4.- Vaidya and Mannikeri, 1994, p.736.-Hussain and Mohan, 2000, p.26,pl.II, fig.12.

Remarks: *P. orientalis* Brady reported by Whatley and Quanhong, (1987) was variously referred to as: *P.zealandica* by Brady (1880) and Jain (1976). Whatley and Quanhong (1987) after comparing the specimens of Malacca Straits with Brady's type material of *Macrocypis orientalis* transferred all the foresaid species to the genus *Phlyctenophora*. This species has also been reported from New Zealand, Australia, China and Indonesia. *P. orientalis* Brady occurs commonly along the west and east coasts of India. This species is much similar to *Phlyctenophora zealandica* Brady in having a convex dorsal margin, somewhat sinuous ventral margin and in the occurrence of a wide anterior and posterior inner lamella; however, *P. orientalis* is subtriangular in lateral view, with a narrow posterior end
Dimensions: Length 0.91mm, Height 0.43mm.

Family Leptocytheridae Hanai, 1957

Genus *Callistocythere* Ruggieri, 1953

Callistocythere sp.cf. *flavidofusca intricatoides* (Ruggieri, 1953)

(Pl.2fig.9)

Leptocythere (*Callistocythere*) *flavidofusca intricatoides* Ruggieri, 1953, p.100, pl.3, fig.23; pl.16, fig.58.

Leptocythere flavidofusca intricatoides Ruggieri-Uffenorde, 1972, p.67, pl.7, fig.1 and synonymy.

(*Callistocythere*) *flavidofusca intricatoides* Ruggieri-Paik, 1976, p.35, pl.2, fig.32-34.-1977, p.40, pl.2, figs 32-34.ain, 1978, p.96, figs. 21., Vaidya and Mannikeri, 1994, p.736.

Remarks: This species closely resembles *C. flavidofusca intricatoides* (Ruggieri, 1953) as described by Jain (1978) but slightly differs in having strong ornamentation. It is rather similar to *C. warnei* Howe and Mckenzie, (1989) in general appearance but the latter has a more transversely reticulata ornamentation and also possesses a distinct anterodorsal eye tubercle. In the present species, the eye tubercle is indistinct.

Dimensions: Length 0.43mm, Height 0.30mm

Family Cytheridae Sars, 1925

Subfamily Cytherideinae Sars, 1925

Genus *Miocyprideis* Kollmann, 1960

Miocyprideis spinulosa Brady, 1868

(pl.2, fig.10)

Cytheridae spinulosa Brady, 1868, p.182, pl.13, figs.1-6.-Brady 1880, p.112, pl.33, figs.6a-b.

Miocyprideis spinulosa Brady, Zhao and whatley, 1989b, p.235, pl.1.figs13-14.-Hussain, 1998,p.7, pl.II,fig.3.

Remarks: a species of *Miocyprideis* is characteristic of its ovate shape, conspicuous anterior and posterior marginal denticles and a strong overlap of the left valve over the right one. Hussain (1998) reported *M. spinulosa* for the first time from India waters in Cuddalore.

Dimensions: Length 0.74mm, Height 0.45mm

Family Cytheruridae G.W. Muller, 1894

Subfamily Cytherurinae G.W. Muller, 1894

Genus *Paijenborchellina* Kuznetsova, 1957

Paijenborchellina prona Lubimova and Guha, 1960

(pl.2fig.11)

Paijenborchellina prona Lubimova and Guha- Lubimova,1960. Guha and Mohan, 1960, pp.43-44, pl.4, figs.1a-b. - Guha, 1968b, p.213, pl.2.fig.4.

Paijenborchellina prona (Lubimova and Guha,1960)-Khosla and Nagori, 1989, p.49, pl.12, fig.1.

Remarks: a species of *Paijenborchellina* characterized by the presence of fine ribs and numerous pits on the surface. *Paijenborchellina* sp illustrated by Bate (1971) from Abu Dhabi and *Paijenborchellina* sp. reported by Jain (1978) from Mandvi Beach, are clearly conspecific.

Dimensions: Length 0.60mm, Height 0.33mm.

Subfamily: Arculacythereinae Hartmann, 1981

Genus: *Neocytheromorpha* sp.cf. *N. indoarabica* Khosla, 1989

(Pl.2fig.12)

Arculacythereis indoarabica Khosla, 1989

Remarks: *N. indoarabica* was originally reported by Khosla (1989) from the creek sediments of Miani. A comparison of Tuticorin specimens with his topotype (Khosla1989) reveals that they are almost identical but the former has slightly denser and coarser reticules.

Dimensions: Length 0.65mm, Height 0.32mm.

Super family Cypridae Baird, 1845

Family Pontocyprididae Muller, 1894

Genus *Propontocypris* Sylvester-Bradley, 1947

Propontocypris (Propontocypris) crocata Maddocks, 1969a

(Pl.2, fig.13)

Propontocypris sp. Maddocks, 1968.fig.2.

Propontocypris (Propontocypris) crocata Maddocks, 1969a, pp.11-15, figs.9,10, 11B. D-F, I-M.

Remarks :*Propontocypris (P.) crocata* was first described from Nosy Be, Madagascar by Maddocks, (1969a) . *Propontocypris (P.)* sp. described by Jain (1978) is identical in outline to the present species but is smaller, *Propontocypris (P.) herdmanni* (Scott, 1905) somewhat resemble *P. crocata* but differs in being larger, in having a more angular shape and in the occurrence of a posterventral spine.

To The author's Knowledge, this is the first report of the occurrence of *P.(P) crocata*

from Indian waters in Cuddalore.

Dimensions: Length 0.84mm, Height 0.47mm, Thickness 0.23mm.

SUMMARY

54 sediment subsamples were collected from the east coast of India, off Cuddalore-Chennai. From these of, a total of 13 species were identified. Among these taxa, *Tanella gracilis*, *Lankacythere coralloides* were abundant and widespread.. They occur in almost all the samples collected. It indicates their tolerance to the environmental variations during the 4 seasons. It is also observed that favourable substrate for the forms to thrive is silty and followed by sand. Off Cuddalore, the following species *Keijella reticulata*, *Actinocythereis scutigera*, *Loxoconcha mandviensis*, *Propontocypris (Propontocypris) crocata* are being reported for the first time from India in Cuddalore.

ACKNOWLEDGEMENTS

The authors are thankful to Prof.L.Elango, the former Head of Department of Geology, for providing the working facilities at the Department of Geology, Anna University, Chennai, India and Dr.S.M.Hussein, Department of Geology, Madras University, Chennai, India for the help during the Laboratory work.

The major part of the work was done during the scholarship, financed by I.C.C.R (Indian Council of Culture and Relations), New Delhi.

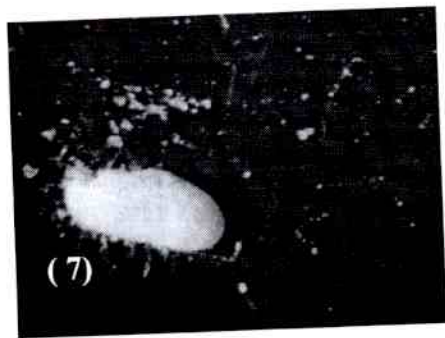
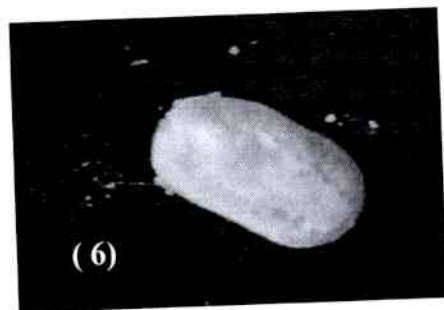
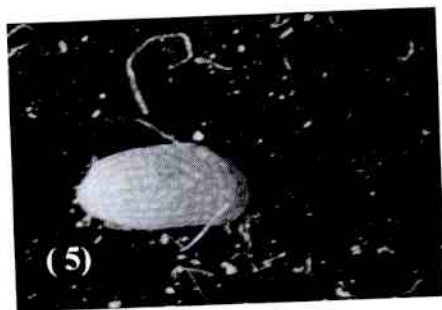
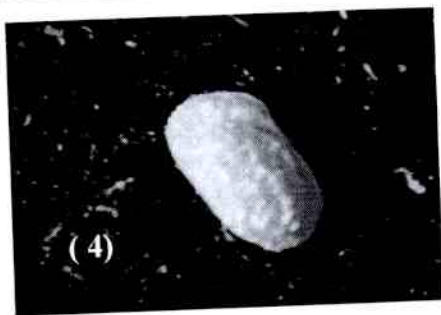
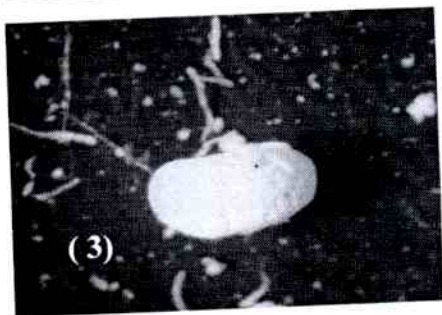
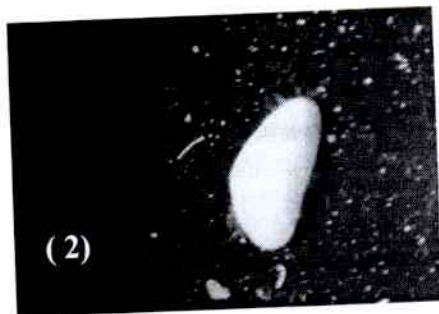
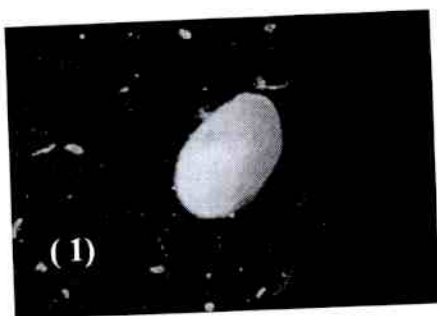
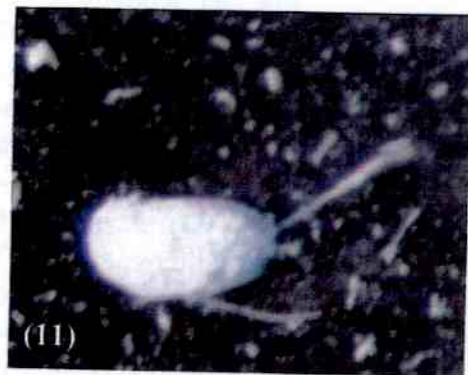


Plate 1 : 1. *Tanella gracilis* Kingma 2. *Keijella reticulata* Whatley and Zhao 3. *Lankacythere coralloides* Brady 4. *Actinocythereis scutigera* Brady 5. *Chrysocythere keiji* 6. *Loxoconcha mandviensis* Jain 7. *Hemicysteridae reticulata* Bingma



(Plate :2.) 8. *Phlyctenophora orientalis* Brady 9. *Callistocythere* sp. Ef.
Flavidofusca intricatoides Ruggieri 10. *Miocyprideis spinulosa* Brady
 11. *Paijenborchellina prona* Lubimova and Guha 12. *Arculacythereis*
indoarabica Khosla 13. *Propontocypris* (*Propontocypris*) *crocata*
 Maddocks

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الدرعيات الحديثة في مصبات كيدلور الساحل الشرقي من مدينة تاميل نادوا، جنوب الهند

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الخلاصة

تم في هذا البحث لأول مرة دراسة تجمعات الأوستراكوندا من ثلاثة مواقع في كيدلور في الساحل الشرقي من مدينة جنائي، تامل نادو في الهند. عثر على ثلاثة عشر نوع سجلت وصورت ومن بين هذه الأنواع *Keijella reticulata*, *Actinocythereis scutigera*, *Loxoconcha mandviensis*, *Propontocypris (Propontocypris) crocata* في كيدلور.