



THE OSTRACODE GENUS *SEMICYTHERURA* FROM THE EARLY MIOCENE BEDS OF KACHCHH AND BOMBAY OFFSHORE, INDIA

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ABSTRACT

Four species of the genus *Semicytherura* are described and illustrated from the early Miocene beds of Kachchh and Bombay Offshore, India. Of these, *Semicytherura khoslai*, *S. royi* and *S. mumbaiensis* are new. The associated ostracodes and foraminifera suggest brackish to shallow inner neritic environment with bathymetry not more than 20m.

Key words: Ostracodes, *Semicytherura*, early Miocene, Kachchh, Bombay Offshore.

INTRODUCTION

Wagner (1957) erected a new genus *Semicytherura* for a previously known species *Cythere nigrescens* Baird, 1838. The species of the genus is abundant in the Recent marine sediments of the Mediterranean and adjoining region in comparison with other parts of the world. Detailed work on ostracodes of the Mediterranean region has been carried out by Bonaduce *et al.*, 1970, 1975, 1976 and 1980; and many new species of the genus *Semicytherura* were recorded.

The record of Recent as well as fossil *Semicytherura* species from the Indian region is however, very rare. The reported species are: *Semicytherura rameshi* Singh & Mishra, 1968, from Eocene beds of Rajasthan, *S. kutchensis* Guha, 1974 from Eocene beds of Kachchh, *S. indica* Neale & Singh, 1985 from the Sylhet Formation, Eocene beds of Assam, *S. padappakkarensis* Khosla and Nagori, 1990 from the Quilon beds, early miocene of Kerala and *S. nealei* Bhandari, 1992 from the Sylhet Formation, Middle Eocene of Assam.

The present paper describes four species of the genus *Semicytherura* from Burdigalian (early Miocene) of Lakhpat and the Khari Nadi section, Kachchh (fig. 1A) and Bombay High wells, Bombay Offshore (fig. 1B). Of these, *Semicytherura khoslai*, *S. royi* and *S. mumbaiensis* are new. They are described here and illustrated in plate 1. The illustrated specimens housed in the Department of

Geology, Mohan Lal Sukhadia University, Udaipur are designated by ML catalogue numbers; those housed in the repository of the Paleontology Laboratory, Keshava Deva Malaviya Institute of Petroleum Exploration, Oil and Natural Gas Corporation Limited, Dehra Dun are designated by IPE catalogue numbers.

SYSTEMATIC DESCRIPTION

Subclass **Ostracoda** Latreille, 1806

Order **Podocopida** Müller, 1894

Suborder **Podocopina** Sars, 1866

Superfamily **Cytheracea** Baird, 1850

Family **Cytheruridae** Müller, 1894

Subfamily **Cytherurinae** Müller, 1894

Genus ***Semicytherura*** Wagner, 1957

Semicytherura khoslai n. sp.

(Pl. I, figs. 1-3)

Etymology: The species is named in honour of Prof. S.C. Khosla, Department of Geology, M. L. Sukhadia University, Udaipur.

Type level and locality: Fossiliferous yellowish-brown clay/marl, early Miocene, Lakhpat, Kachchh, India.

Material: One open valve and 13 carapaces.

Diagnosis: A species of the genus *Semicytherura* having sub-rectangular lateral outline and 5-6 longitudinal ridges over the surface.

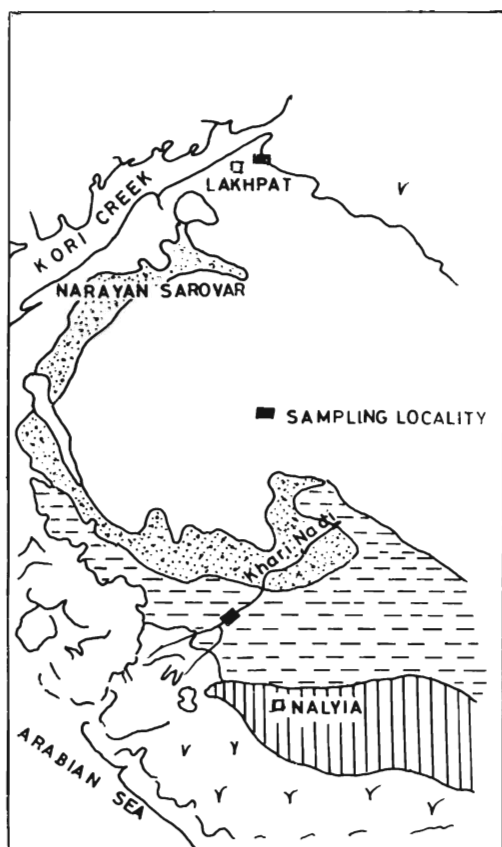


Fig. 1A. Location map showing the studied area of Lakshapat and the Khari Nadi river section, Kachchh.

Description: Carapace sub-rectangular in lateral outline, with dorsal margin straight and ventral margin weakly sinuate; anterior margin sub rounded; posterior margin produced into a median caudal process; in dorsal view carapace lenticular and slightly acuminate anteriorly. Valve surface ornamented with 5-6 longitudinal ridges, of which upper three are long and continue up to posterior margin and three ridges in lower half are discontinued. Inter the ridge area reticulate.

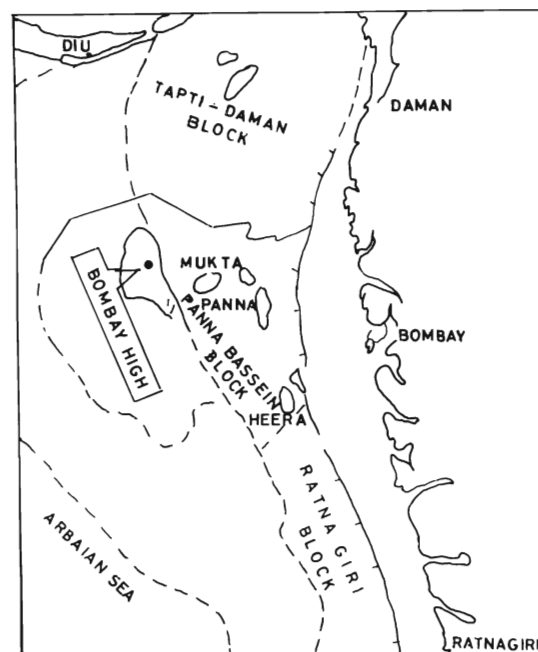


Fig. 1B. Location of Bombay High, Bombay Offshore Basin.

Dimensions (mm):

	Length	Height	Width
Holotype (No.ML49), a carapace	0.38	0.18	0.11
Paratype I (No.ML50), a carapace	0.41	0.18	0.13
Paratype II (No.ML51), a carapace	0.41	0.18	0.15

Discussion: *Semicytherura khoslai* n. sp. resembles *Semicytherura rarecostata* described by Bonaduce *et al.* (1975) from the Adriatic sea closely, in overall outline but differs clearly in the disposition of ridges on the surface.

Semicytherura royi n. sp.

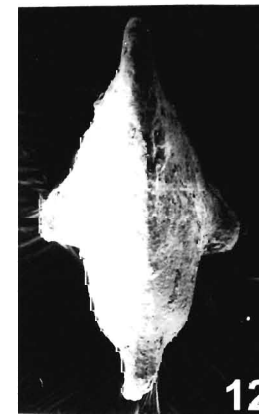
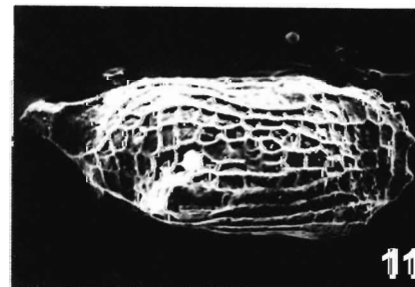
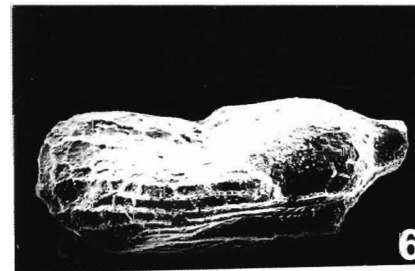
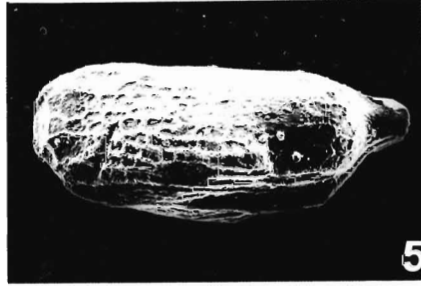
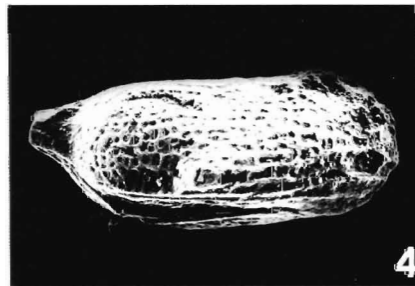
(Pl. I, figs.4-7)

Etymology: The species is named in honour of Prof. A.B. Roy, Department of Geology, M.L. Sukhadia University, Udaipur.

EXPLANATION OF PLATE I

- 1-3 *Semicytherura khoslai* n. sp.
 1, holotype (No.ML 49), a carapace, left valve view, X 150;
 2, paratype II (No.ML 51) a carapace, dorsal view, X 139; 3,
 paratype I (No.ML50), a carapace, right valve view, X 139.
- 4-7 *Semicytherura royi* n. sp.
 4, holotype (No.ML52), a carapace, right valve view, X 137;
 5, paratype I (No.ML53), a carapace, left valve view, X 131;
 6, paratype III (No.ML55), carapace (Deformed) left valve view,
 130; 7, paratype II (No.ML54) a carapace, dorsal view, X 137.

- 8-10,12 *Semicytherura mumbaiensis* n. sp.
 8,12 holotype (IPE/H02/04/9018), 8, male carapace, right valve
 view, X119, 12, dorsal view, X157; 9, 10 paratype (IPE/P02/
 04/9019) a female carapace:9, right valve view, X108; 10, left
 valve view, X 108.
- 11, 13 *Semicytherura* sp. cf. *S. padappakkarensis* Khosla & Nagori,
 1990
 11 a right valve (No.ML56), lateral view, X 137.
 13, a carapace (No.ML57) dorsal view, X 147.



Type level and locality: Fossiliferous yellowish-brown clay/marl, early Miocene, Lakhpat, Kachchh, India.

Material: Five open valves and 20 carapaces from Kachchh and 18 carapaces from Bombay High, Bombay Offshore Basin, India.

Diagnosis: A species of the genus *Semicytherura* with posterodorsal caudal process, finely reticulate valve surface and a small spine in ventromedian region.

Description: Carapace elongate sub-rectangular in lateral outline; dorsal and ventral margins nearly parallel; anterior margin rounded; posterior margin produced into a sub-dorsal caudal process, parallel to dorsal margin; in dorsal view carapace nearly biconvex; valve surface ornamented with fine reticulation and a small spine/wing-like prolongation in the ventromedian region.

Dimensions (mm):

	Length	Height	Width
Holotype (No.ML52), a carapace	0.41	0.16	0.16
Paratype I (No.ML53), a carapace	0.43	0.18	0.18
Paratype II (No.ML54), a carapace	0.41	0.18	0.16
Paratype III (No.ML55), a carapace	0.43	0.18	0.17

Discussion: *Semicytherura royi* n. sp. resembles *Semicytherura rara*, a species described from the Adriatic Sea by Bonaduce *et al.* (1975) in overall lateral outline but clearly differs in surface ornamentation. The species also resembles *S. reticuliforma*, a species described by Ishizaki and Gunther (1974) from the Gulf of Panama but differs in ridge pattern.

Occurrence: This species has been recorded from hypostratotype section of Khari Nadi, Kachchh, and subsurface well section of Bombay High, Bombay Offshore Basin.

Semicytherura mumbaiensis n. sp.

(Pl. I, figs. 8-10, 12)

Etymology: After Mumbai, Maharashtra, India.

Type level and locality: Sample 1379m. (Cc.2-1368-1385m), L-III limestone, Bombay Formation, early Miocene, SI well E, Bombay High, Bombay Offshore.

Material: Fifteen carapaces from Bombay High and twelve carapaces from the Khari Nadi section, Kachchh.

Diagnosis: A species of the genus *Semicytherura* with posterodorsal caudal process, smooth valve surface and a prominent ventromedian wing-like prolongation.

Description: Sexual dimorphism distinct; presumed males are more elongate and less high than females; carapace sub-rectangular in lateral outline; dorsal and ventral margins nearly straight and parallel; anterior margin narrow and obliquely rounded; posterior margin produced in a dorsal caudal process; in dorsal view carapace arrow-shaped, with maximum width posterior to middle. Valve surface smooth with a prominent spine/wing-like prolongation present in ventromedian region.

Dimensions (mm):

	Length	Height	Width
Holotype (IPE/H02/04/9018) male carapace	0.48	0.21	0.21
Paratype (IPE/P02/04/9019) female carapace	0.50	0.22	0.30

Discussion: *Semicytherura mumbaiensis* n. sp. resembles in shape *S. padappakkarensis* Khosla and Nagori (1989) described from early Miocene of Kerala but differs in having smooth valve surface and prominent ventromedian wing like prolongation.

Semicytherura sp. cf. *S. padappakkarensis*
Khosla & Nagori, 1990
(Pl. I, figs. 11,13)

cf. *Semicytherura indica* Khosla & Nagori, 1989, p. 50, pl. 12, figs. 3-4.- Khosla & Nagori, 1990, p. 314.

Material: Twenty-two open valves and 24 carapaces.

Description: Carapace elongate, sub-rectangular in lateral outline; dorsal and ventral margins straight; anterior margin rounded with two spines, preserved in few forms only; posterior margin produced in a upwardly directed sub-dorsal caudal process; in dorsal view carapace roughly biconvex with maximum width posterior to middle. Surface of each valve marked by 10 low longitudinal ridges, interconnected by short vertical ridges forming a reticulated pattern. A spine/wing-like prolongation

in posteroventral region. Internal characters are as for the genus.

Dimensions (mm):

	Length	Height	Width
A right valve (ML56)	0.43	0.20	-
A carapace (ML57)	0.40	0.18	0.19

Remarks: *Semicytherura* sp. cf. *S. padappakkarensis* closely resembles *S. padappakkarensis* described by Khosla and Nagori (1989, 1990) from the Quilon beds (early Miocene) of Kerala in overall lateral outline but differs in having comparatively more prominent ridges over the surface.

PALAEOENVIRONMENT

The genus *Semicytherura* is represented by four species in the Burdigalian (early Miocene) sediments of Kachchh and Bombay High wells. In Lakhpat and Khari Nadi, Kachchh, the genus *Semicytherura* has been recorded from the yellowish-brown clay/marl. These sediments are moderately rich in ostracodes, represented in order of abundance by *Miocyprideis*, *Neomonoceratina*, *Stigmatocythere*, *Alocopocythere*, *Actinocythereis* and *Paijenborchellina*. Of these, *Miocyprideis* suggests brackish water environment, *Neomonoceratina*, *Stigmatocythere*, *Paijenborchellina* and *Alocopocythere* tolerate brackish to inner-neritic environment. Foraminifera recorded include *Ammonia gaimardii*, *Austrorillina*, *Archais* and rare *Miogypsina* and *Operculina*. The above microfaunal assemblage suggests brackish to shallow, inner-neritic environment with depth not more than 20m.

In Bombay High, genus *Semicytherura* has been recorded from 2-3 levels in L-III limestone (Burdigalian). Here, this genus is associated with *Pokornyella*, *Dentokrithe*, *Bairdoppilata*, *Loxoconcha*, *Stigmatocythere* and *Neomonoceratina*. Most of these genera occur in inner-neritic environment. Associated foraminifera such as *Operculina*, *Sphaerogypsina*, *Miogypsina*, *Lepidocyclina*, *Borelis* and *Austrorillina* also suggest inner-neritic environment.

Semicytherura species recorded from Kachchh and Bombay High wells in general suggest brackish

to shallow, inner-neritic environment with depth not more than 20m.

CONCLUSIONS

Four species of the genus *Semicytherura* have been recorded from the early Miocene of Kachchh and Bombay High, Bombay Offshore Basin.

Ostracodes and associated foraminifera suggest brackish to shallow, inner-neritic environment with depth not more than 20m.

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