

SUB-RECENT OSTRACODES FROM TEHSIL CHARKHI DADRI, DISTRICT MAHENDRAGARH, SOUTHERN HARYANA.

S. B. BHATIA AND S. C. KHOSLA

DEPARTMENT OF GEOLOGY, PANJAB UNIVERSITY, CHANDIGARH AND
 DEPARTMENT OF GEOLOGY, UNIVERSITY OF RAJASTHAN, UDAIPUR, INDIA

ABSTRACT

The paper records the occurrence of nine ostracode taxa from a sub-Recent gastropod-bearing marl bed of village Loharwada, nine kilometers east of Charkhi Dadri, district Mahendragarh, Haryana. The palaeoecology and brief systematics of the ostracodes are discussed.

INTRODUCTION

The present paper is in continuation of an earlier communication by the authors (Bhatia & Khosla, 1967b) on the sub-Recent ostracode fauna of southern Haryana. The marl bed in question has a widespread occurrence under the thin veneer of recent soil and aeolian sand, in the districts of Gurgaon, Hissar, Mahendragarh and Rohtak. It varies in thickness from a few centimeters to a meter. It is being extensively quarried for the manufacture of cement at Charkhi Dadri.

In our earlier communication (Bhatia & Khosla, 1967b), we had reported the occurrence of three species of ostracodes—*Cyprideis torosa* (Jones), *Cyprinotus cingalensis* Brady, and *Darwinula stevensoni* (Brady and Robertson)—from the village Riwasa, tehsil Bhiwani, district Hissar. With a view to further investigate the ostracode fauna of southern Haryana, one of us (SCK) recently collected a few more samples of the gastropod-bearing marl from village Loharwada, 9 kilometers east of Charkhi Dadri (28° 36' N : 76° 16' E), district Mahendragarh (Fig. 1). On examination, the samples have yielded a varied and rich ostracode assemblage besides several species of gastropods, some foraminifers and chara gyrogonites. The ostracode assemblage comprises, in all, nine taxa, the check list of which is as follows :—

- Darwinula* sp.
- Cyprinotus* (*Cyprinotus*) *cingalensis* Brady
- C.* (*Heterocypris*) *incongruens* (Ramdohr)
- Candona lactea* Baird
- C. marengoensis* Klie
- ? *Candonopsis* sp.
- Ilyocypris bradyi* Sars
- Cyprideis torosa* (Jones) forma *littoralis* (Brady)
- Limnocythere inopinata* (Baird)

The palaeoecology and brief systematics of these ostracodes are given in the sequel.

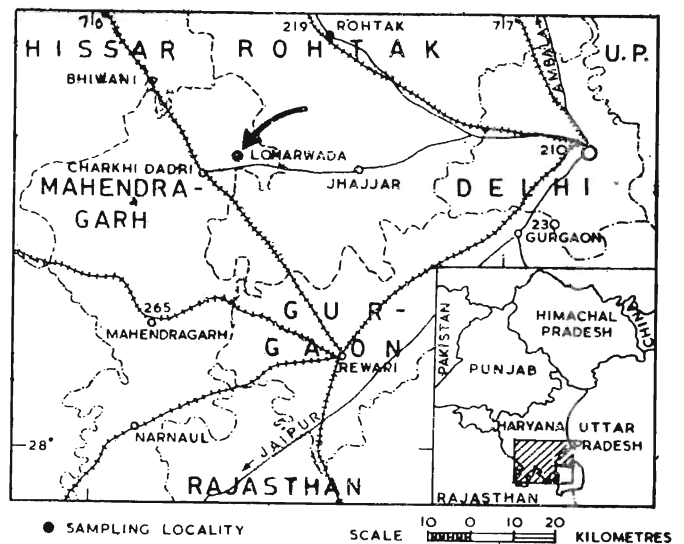


FIGURE 1

Fig. 1. Index map of part of Haryana showing the location of sampling locality.

PALAEOECOLOGY

According to the frequency of occurrence, *Cyprideis torosa* forma *littoralis* is the most abundant taxon. It constitutes from 80 to 85% of the ostracode assemblage. Of the other species, *Darwinula* sp., *Limnocythere inopinata*, *Cyprinotus* (*Cyprinotus*) *cingalensis* occur commonly and *Candona lactea*, *C. marengoensis*, *Cyprinotus* (*Heterocypris*) *incongruens*, ? *Candonopsis* sp. and *Ilyocypris bradyi* occur only rarely.

Insofar as the ecology of *Cyprideis torosa* forma *littoralis* is concerned it is a holoeuryhaline taxon (Remane, 1958) (*vide etiam* Bhatia and Khosla, 1970). According to Wagner (1957) the greatest development of the species takes place in mesohaline environment (2-16.5 ‰). Rottgardt (1952) found *C. torosa* to be one of the most common and typical brackish-water (salinity 3.5 to 20‰) ostracode in the Schlei estuary near Kiel. The ecology of this taxon in general is also dealt with by Sohn (1965). *Limnocythere inopinata* inhabits oligohaline environments (salinity less than 2 to 3 ‰; Wagner, Cyprinotus 1957). (*Cyprinotus*) *cingalensis* is a common freshwater taxon.

Of other ostracodes, *Candona lactea* is in general a cold hardy species (Staplin, 1963a). Though it is a freshwater species, it is also reported from polyhaline waters (McKenzie, 1964). Bhatia and Singh (1971) reported it living in the fresh, clear, alkaline water of lakes of Kashmir valley. *Candona marengoensis* tolerates a wide range of environments, but it is characteristic of shallow depth in permanent still waters with moderate vegetation (Staplin, 1963a). *Cyprinotus* (*Heterocypris*) *incongruens* is capable of living in a varied habitat and is in general characteristic of small shallow-water bodies. Gurney (1920) recorded it from the artificial pool, Yakmatch, west Baluchistan. The genus *Cyprinotus*, as such, according to Morkhoven (1963) is predominantly a freshwater taxon, but also occurs in oligo- to mesohaline environments. Although *?Candonopsis* sp. has not been precisely identified, the authors have found this species occurring commonly in the Pichola lake of Udaipur, Rajasthan. *Ilyocypris bradyi* is characteristic of running water where there is vegetation and algae. Less commonly it has been collected from lakes and ponds (Staplin, 1963b).

From the ecological data given above, it is apparent that except for one species *Ilyocypris bradyi*, which is predominantly a running water taxon all other species are characteristic of still water, lacustrine environments. The presence of *I. bradyi* with these ostracodes may be taken as an incidental association. Again, as the most dominating taxon *Cyprideis torosa* forma *littoralis* has greatest development in mesohaline to freshwater environments and other species such as *Limnocythere inopinata*, *Candona lactea*, *Cyprinotus* (*Heterocypris*) *incongruens* can also live in oligo- to mesohaline environments it is concluded that the marl bed at Loharwada must have been deposited in brackish-water (oligo- to mesohaline) lacustrine environments.

SYSTEMATIC DESCRIPTION

The classification followed in this paper is that of van Morkhoven (1963). The synonymies are reduced to a minimum, and, in each case, only the type reference

and one or two other references of immediate interest are given.

- Order Ostracoda
 Suborder Podocopa
 Family Darwinulidae
 Genus *Darwinula* Brady and Robertson, 1885

Darwinula sp.

(Fig. 2A)

Remarks : The present specimens from Loharwada are characterized by elongate-ovate outline in lateral view ; right valve slightly larger than the left, overlapping distinctly along anterior, posterior and ventral margins ; valve surface with a few minute normal pores ; central muscle scar, rosette-shaped, situated anterior to the middle and consists of 9-10 spots.

This species has been erroneously reported as *D. stevensoni* from the Upper Siwalik beds near Chandigarh (Bhatia and Khosla, 1967a) and the limestone bed of Riwasa, tehsil Bhiwani (Bhatia and Khosla, 1967b).

Occurrence : Common.

- Family Cyprididae
 Subfamily Cypridinae
 Genus *Cyprinotus* Brady, 1886

Cyprinotus (*Cyprinotus*) *cingalensis* Brady

(Figs. 2G—J)

Cyprinotus cingalensis Brady, 1886, p. 302, pl. 38, figs. 28-30 ; Bhatia and Khosla, 1967b, p. 508, fig. 1.

Remarks : The specimens recorded herein have the following morphological characters : carapace subtriangular in lateral outline ; left valve slightly larger than the right, overlapping distinctly all along the margins except the dorsal where the right valve is conspicuously higher than the left ; greatest height slightly posterior to middle ; in dorsal view carapace biconvex, maximum width posterior to middle ; valve surface smooth ; anterior, posterior and ventral margins denticulate ; inner lamella of moderate width ; selvage distinct, near the periphery in right valve and slightly away in the left ; muscle scar as for the genus.

The specimens agree in shape, overlap, and other essential features with *Cheikella scholiosa* described by Sohn and Morris, (1963) from Saudi Arabia. The validity of the genus *Cheikella* Sohn and Morris is doubtful in the present authors' opinion as it has the same diagnostic characters as shown by the genus *Cyprinotus* s. s., viz. a subtriangular outline in lateral view, and right valve conspicuously higher than the left. This was confirmed by an examination of the topotypes of *Cheikella*

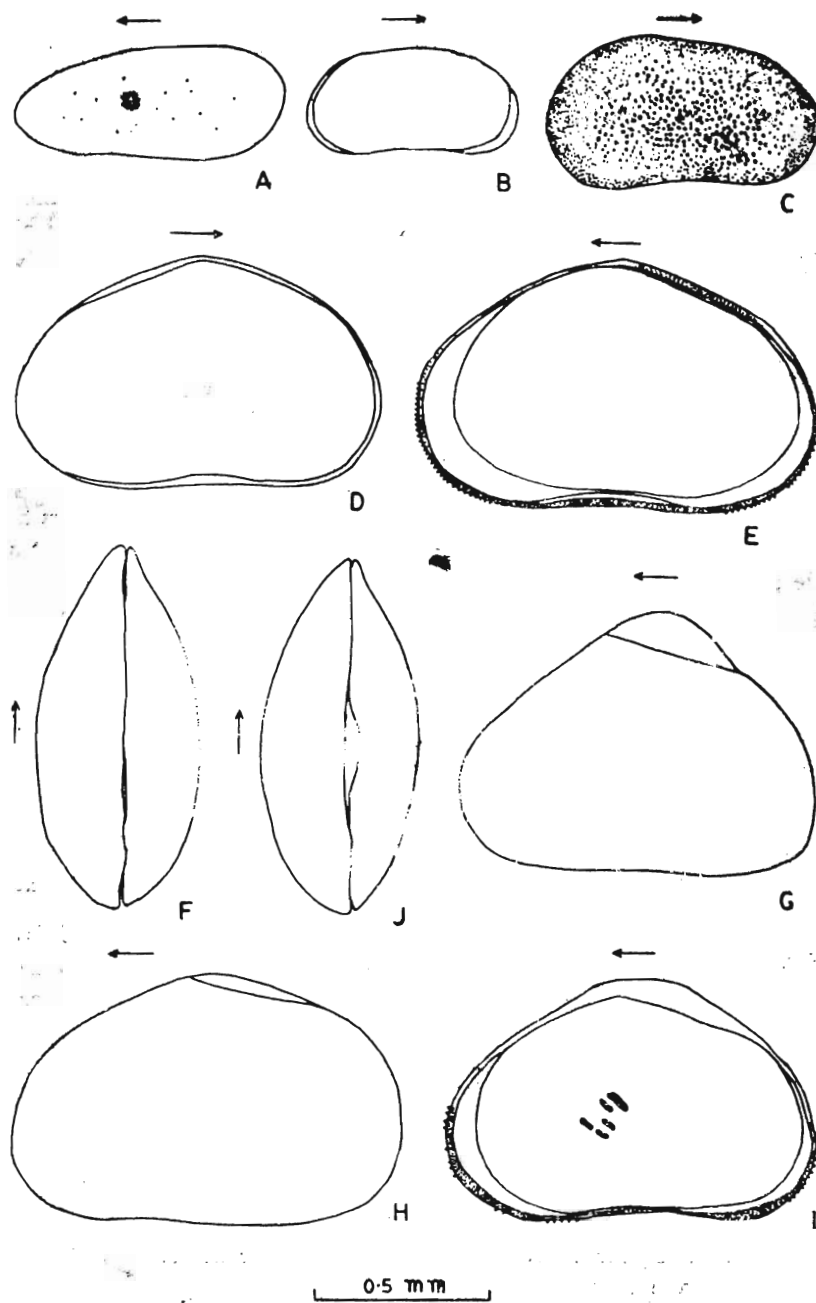


FIGURE 2

- Fig. 2 A. *Darwinula* sp., a left valve, lateral view.
 B. *Candona lactea* Baird, a right valve, lateral view.
 C. *C. marengoensis* Klie, a right valve, lateral view.
 D-F. *Cyprinotus* (*Heterocypris*) *incongruens* (Ramdohr).
 D, a complete carapace, right valve view; F, same specimen, dorsal view.
 E, a right valve, internal view.
 G-J. *Cyprinotus* (*Cyprinotus*) *cingalensis* Brady.
 G, a complete female? carapace, left valve view;
 J, same specimen, dorsal view.
 H, a complete male? carapace, left valve view.
 I, a female? right valve, internal view.

(kindly made available by Dr. Sohn) and the holotype of *Cyprinotus* at the British Museum (Natural History), London by the senior author. In view of this, the genus *Cheikella* is considered a junior synonym of the genus *Cyprinotus* s. s.

Occurrence : Common.

Cyprinotus (Heterocypris) incongruens (Ramdohr)

(Figs. 2 D—F)

Cypris incongruens Ramdohr, 1808, p. 86, pl. 3, figs. 1-12 ; pl. 15, figs. 18-20.

Cyprinotus incongruens (Ramdohr).—Turner, 1895, pp. 330-331, pl. 68, figs. 9-16.

Cyprinotus salinus Bhatia, 1968, p. 471, pl. 1, figs. 1a—c ; pl. 5, fig. 9 (non *Cyprinotus salinus* (Brady) 1868, pp. 368-369, pl. 26, figs. 8-13).

Remarks : This is a cosmopolitan species. It is characterized by a subtriangular outline in lateral view ; left valve larger than right ; greatest height near the middle ; in dorsal view carapace biconvex, maximum width a little posterior to middle ; surface smooth, anterior, posterior and ventral margins in right valve denticulated ; inner lamella of moderate width ; selvage near periphery. The specimens described as *Cyprinotus salinus* by Bhatia (1968) from the Upper Karewas of Kashmir belong to *C. (H.) incongruens*.

Occurrence : Rare.

Subfamily Candoninae

Genus *Candona* Baird, 1845

Candona lactea Baird

(Fig. 2B)

Candona lactea Baird, 1850, p. 255, pl. 18, figs. 25-27.

Remarks : Specimens from Loharwada agree in shape, inner lamella and other characters with *Candona lactea* Baird. The subreniform lateral outline, the narrow inner lamella, and the prominent normal pore canals are characteristic of this species. In India it has already been recorded from the Upper Siwalik beds near Chandigarh (Bhatia and Khosla, 1967a), Upper Karewas of Kashmir (Bhatia, 1968) and fresh-water lakes of Srinagar (Bhatia and Singh, 1971).

Occurrence : Rare.

Candona marengoensis Klie

(Fig. 3C)

Candona marengoensis Klie, 1931, pp. 337, 341-343, figs. 13-16.

Remarks : The specimens recorded herein are characterized by a subquadrate outline in lateral view ; greatest height posterior to middle ; surface of each valve reticulate. They are identical with *Candona marengoensis*

Klie. In India it has already been recorded from the Manasbal lake of Kashmir (Bhatia and Singh, 1971).

Occurrence : Rare.

Genus *Candonopsis* Vavra, 1891

?*Candonopsis* sp.

(Figs. 3 D—F)

Remarks : The species has the following characteristics ; carapace subreniform in lateral view ; greatest height posterior to the middle ; left valve larger than the right ; dorsal margin arched, slightly sinuate at postero-dorsal part, ventral concave ; anterior and posterior margins rounded ; in dorsal view carapace biconvex, maximum width posteriorly ; valve surface smooth ; normal pore canals prominent ; inner lamella broad along anterior margin and comparatively narrow along ventral and posterior margins.

The species possibly belongs to *Candonopsis arida* Sieber, 1905, but the identification cannot be confirmed for want of comparative material.

Occurrence : Rare.

Subfamily Ilyocypridinae

Genus *Ilyocypris* Brady and Norman, 1889

Ilyocypris bradyi Sars

(Figs. 3 A—C)

Ilyocypris bradyi Sars, 1890, pp. 59-60—Swain, 1963, pp. 807-808, pl. 95, fig. 6 ; pl. 96, fig. 13a-b ; text-fig. 4b.

Remarks : *Ilyocypris bradyi* is a cosmopolitan species and our specimens from Loharwada agree with it in shape, ornamentation and other essential morphological characters. A subquadrate outline in lateral view, valve surface distinctly pitted and with two prominent sulcii and lobes lacking in major structure are the characteristics of this species. In India it has already been reported from Upper Siwalik beds near Chandigarh (Bhatia and Khosla, 1967a), and Upper Karewas of Kashmir (Bhatia, 1968).

Occurrence : Rare.

Family Cytheridae

Subfamily Cytherideinae

Genus *Cyprideis* Jones, 1857

Cyprideis torosa (Jones) forma *littoralis* (Brady)

(Figs. 3 H—L)

Candona torosa Jones, 1850, pp. 25—28, pl. 3, figs. 6a—c.

Cytheridea littoralis Brady, 1869, p. 125.

Cyprideis torosa (Jones) forma *littoralis* (Brady), Hartmann, 1964.

Remarks : The species has already been recorded by

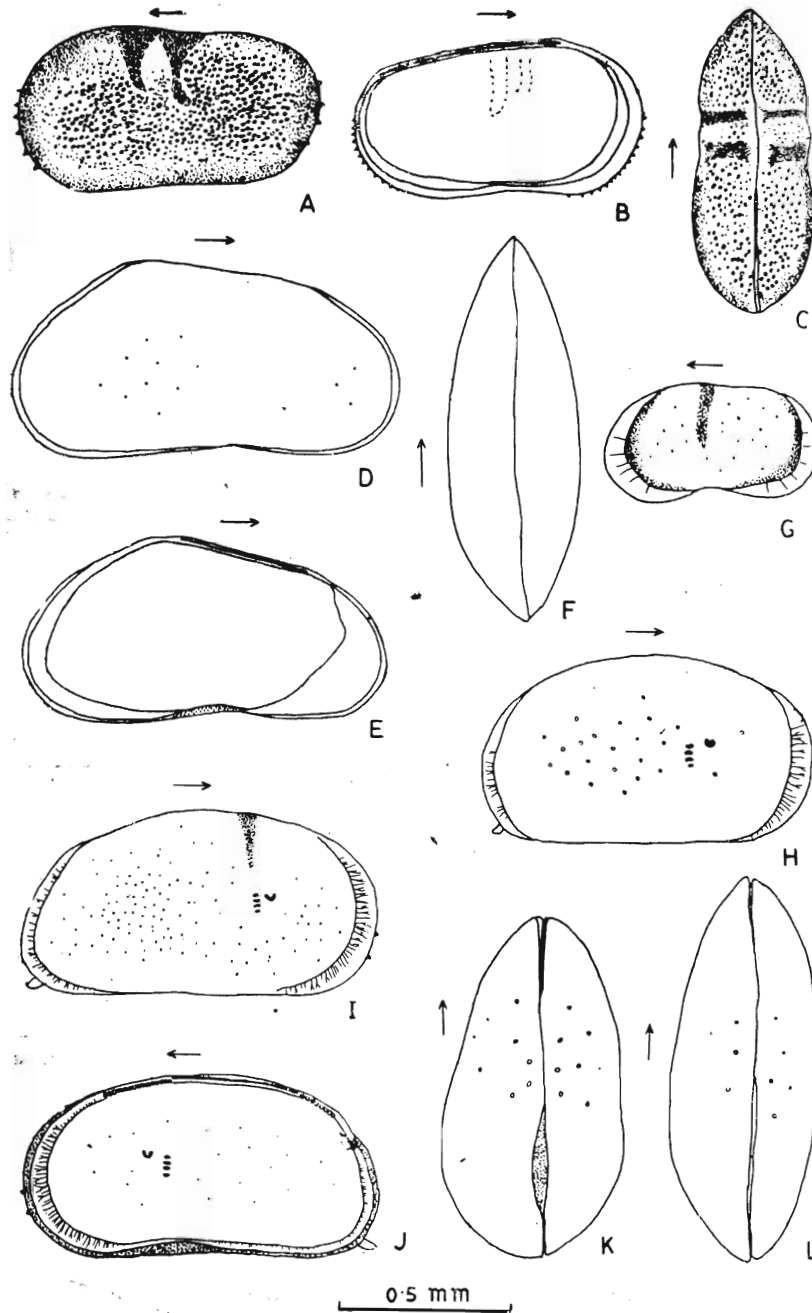


FIGURE 3

Fig. 3 A-C. *Ilyocypris bradyi* Sars

- A, a complete carapace, left valve view ;
- C, same specimen, dorsal view.
- B, a left valve, internal view.
- D-F. ?*Candonopsis* sp.
- D, a complete carapace, right valve view ;
- F, same specimen, dorsal view.
- E, a left valve, internal view.
- G. *Limnocythere inopinata* (Baird), a left valve, lateral view.
- H-L. *Cyprideis torosa* (Jones) forma *littoralis* Brady
- H, a female right valve, lateral view.
- I, a male right valve, lateral view ;
- J, same specimen, internal view.
- K, a complete female carapace, dorsal view.
- L, a complete male carapace, dorsal view.

the authors from Haryana (Bhatia and Khosla, 1967b) as *Cyprideis torosa*. Hartmann's interpretation (1964) is followed here. This is a cosmopolitan species.

Occurrence : Abundant.

Subfamily Limnocytherinae

Genus *Limnocythere* Brady, 1868

Limnocythere inopinata (Baird)

(Fig. 3G)

Cythere inopinata Baird, 1843, p. 195, fig. 1a—e.

Limnocythere inopinata (Baird.)—Brady and Norman, 1889, p. 170.

Remarks : The specimens from Loharwada have subreniform outline in lateral view, anterior and posterior ends compressed ; dorsal margin nearly straight, ventral deeply sinuate ; valve surface pitted and with a sulcus near the middle. They agree in shape, ornamentation and other features with *Limnocythere inopinata*.

Occurrence : Common.

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