



A REVISION OF THE OSTRACODA FROM THE INTER-TRAPPEAN BEDS OF TAKLI, NAGPUR DISTRICT, MAHARASHTRA

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ABSTRACT

Twenty-four species of non-marine Ostracoda are recorded from the Inter-trappean beds exposed in a cliff section of an abandoned Gitti Khadan (Stone Quarry), near Ramdeo Temple at Takli, in Nagpur, Maharashtra. One species - *Gomphocythere whatleyi* - is described as new. Twenty species are assigned to taxa previously described from the Inter-trappean beds of different localities in central and western India. These are - *Darwinula torpedo* Whatley *et al.*, *Limnocythere deccanensis* Khosla *et al.*, *Frambocythere tumiensis anjarensis* Bhandari and Colin, *Gomphocythere falsicarinata* (Whatley and Bajpai), *G. paucisulcatus* Whatley *et al.*, *Paracyprretta jonesi* Bhatia and Rana, *Zonocypris gujaratensis* Bhandari and Colin, *Z. labyrinthicus* Whatley *et al.*, *Z. spirula* Whatley and Bajpai, *Cypridopsis elachistos* Whatley *et al.*, *C. hyperectyphos* Whatley *et al.*, *Mongolianella cylindrica* (Sowerby in Malcolmson), *M. subarcuata* Whatley *et al.*, *Eucypris intervolcanus* Whatley and Bajpai, *E. pelagicos* Whatley and Bajpai, *?E. verruculosa* Whatley *et al.*, *Candona amosi* Whatley *et al.*, *Cyclocypris amphibolos* Whatley *et al.*, *Cyprina cyrtonidion* Whatley and Bajpai and *Cyprois rostellum* Whatley and Bajpai. Three species, *Eucypris* sp., *Mongolianella* sp. and *Talicypridea?* sp., are left in open nomenclature.

Keywords: Ostracoda, Non-marine Inter-trappean, Takli, Nagpur, Maharashtra, India

INTRODUCTION

The non-marine Inter-trappean beds constraining the Deccan Volcanic Suite of rocks at the Cretaceous-Tertiary Boundary (KTB) in central and western India have been extensively studied for their biota during more than the last 150 years. This is in context with the age of the traps and dynamic palaeogeography of the Indian Plate during that period.

A survey of the literature reveals that considerable works have been undertaken on the different groups of vertebrates (fish, amphibians, reptiles and mammals), palynomorphs and mega flora of the *supra cit* non-marine Inter-trappean beds. In so far as ostracods from these beds are concerned, they did not receive much attention from the micropalaeontologists until researchers of the Department of Geology, Panjab University, Chandigarh during the course of study of the mirovertebrates recovered a number of species, which have been worked by Bhatia and Rana (1984), Prasad (1986), Bhatia *et al.* (1990a, 1996) and Singh and Sahni (1996). In addition to these Mathur and Verma (1988), Bhandari and Colin (1999), Whatley and Bajpai (2000a, *et seq.*), Bajpai and Whatley (2001), Whatley *et al.* (2002a, *et seq.*) described non-marine ostracods from the Inter-trappean beds from different localities.

With the intention of enhancing our knowledge of non-marine ostracods of the Inter-trappean beds, the authors took up their study from different sections in Peninsular India. The present record of ostracods from Takli, in Nagpur, Maharashtra is part of this study. Earlier in this series, the authors (Khosla and Nagori, 2005 and 2007) recorded ostracod assemblages from the freshly exposed Inter-trappean beds along the newly constructed broad gauge railway line near Viri, SSW of Anjar, Kachchh District, Gujarat and Mohgaon-Haveli, in Sausar Taluka, Chhindwara District, Madhya Pradesh respectively.

LOCATION OF SAMPLES STUDIED

The samples on which this study is based come from the Inter-trappean beds exposed in a cliff section of an abandoned

Gitti Khadan (Stone Quarry), near Ramdeo Temple, at Takli (fig. 1; field photographs 1-2). The beds at this locality are about 2.5 m. thick and are underlain as well as overlain by Deccan basalt. They comprise green clay at the base overlain by white sandy marl. Ostracods occur abundantly in marl beds, while they are rare or absent in the green clays. In all 24 species, including one new, are recorded from the marl beds of the above locality. Twenty species are assigned to previously known forms and 3 species are left in open nomenclature.

PREVIOUS WORK

Sowerby (in Malcolmson, 1840) first studied the non-marine ostracods from the Inter-trappean beds of the Sichel Hills, Andhra Pradesh and described and illustrated two new species - *Cypris cylindrica* and *C. subglobosa*. Incidentally this was also the first systematic record of ostracods from India. Subsequently, Jones (1860) recorded five species, including 3 new, from these beds of Nagpur. They are: *Cypris cylindrica* Sowerby, *C. hislopi* Jones, *C. hunteri* Jones, *C. strangulata* Jones and *C. subglobosa* Sowerby. Only new species were described and illustrated. However, despite these earlier finds, the non-marine ostracods of Nagpur remained neglected for over a century till Bhatia and Rana (1984) described and illustrated 5 species, including one new, viz. *Paracyprretta jonesi* Bhatia and Rana, *Mongolianella hislopi* (Jones), *Cyprois* sp., *Candoniella* sp. and *Metacypris strangulata* (Jones) from the Gitti Khadan in Nagpur. According to the authors the ostracod fauna and associated charophyte flora indicate an overall Laurasian affinity. Further, Bhatia *et al.* (1990a and 1996) recorded the following non-marine ostracods from the Inter-trappean beds of Takli (Takli and Gitti Khadan are the same locality as the latter is an open cast stone quarry in the Takli area) in Nagpur: *Frambocythere tumiensis tumiensis* (Helmdach), *Cytheridella strangulata* (Jones), *Cypridea* (*Cypridea*) *cavernosa* Galeeva, *Candona altanulaensis* Szczechura and Blaszyk, *C. bagmodica* Stankevitch, *C. henaensis* Jiang and Sun, *Candoniella* cf. *C.*

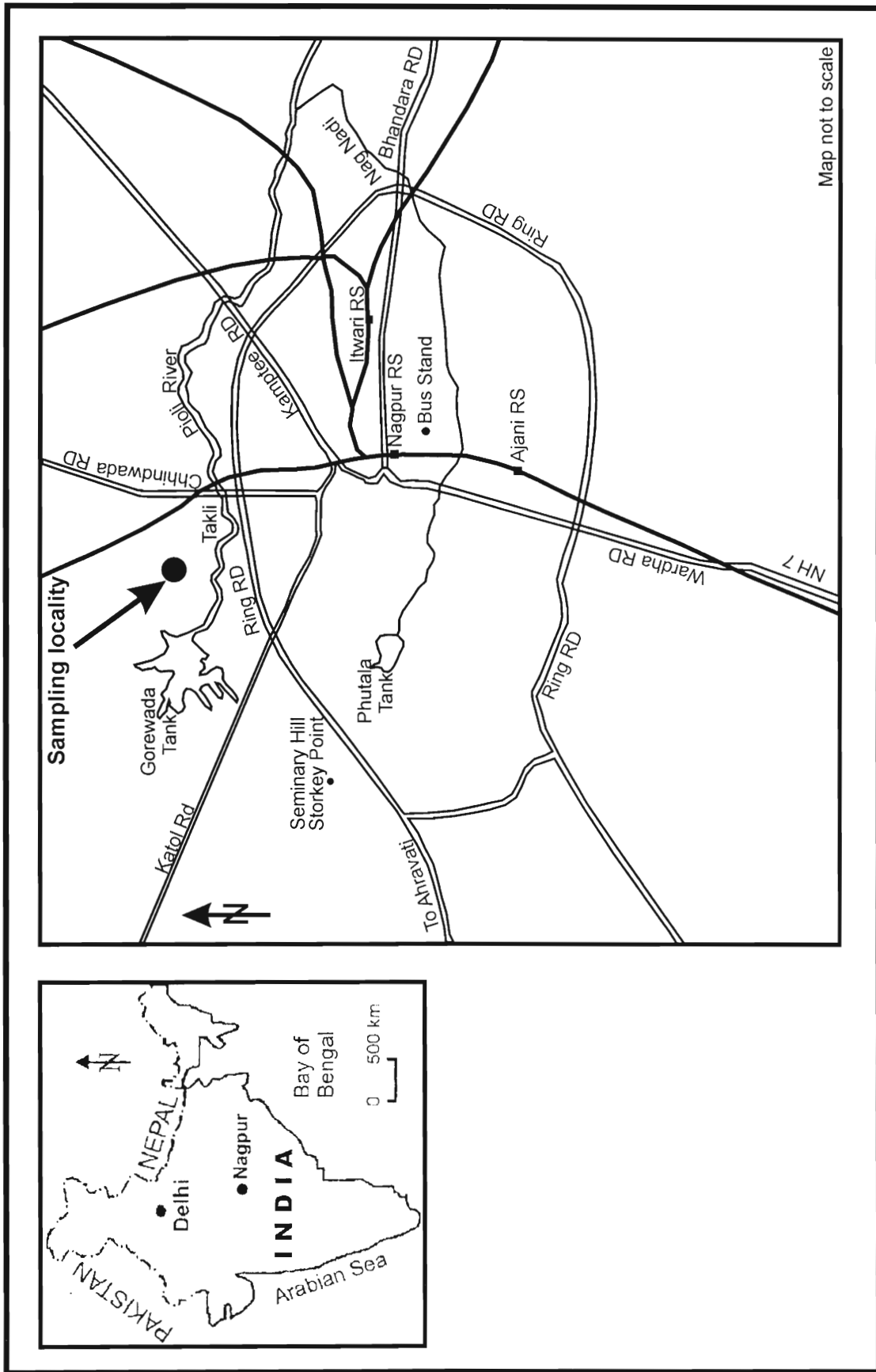
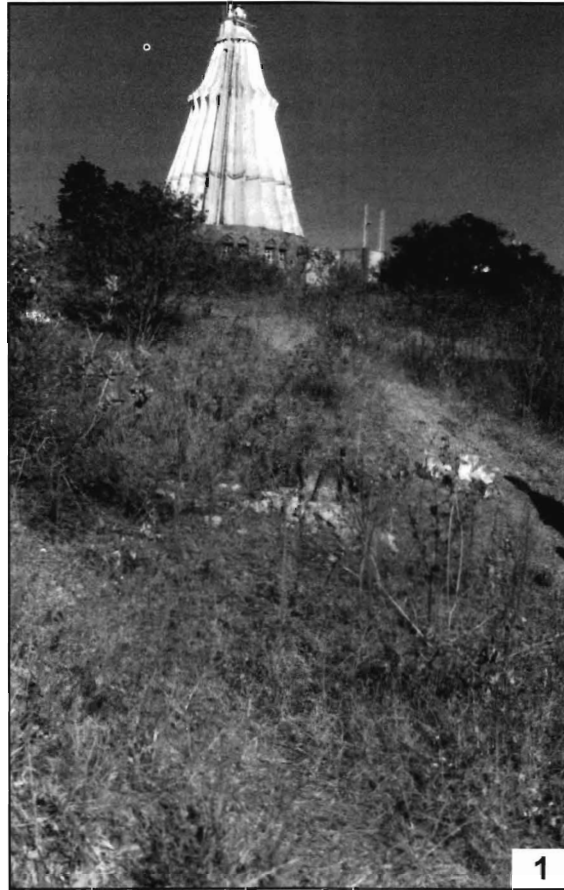


Fig. 1. Index map of Takli, Nagpur showing sampling locality.



Field photographs of Inter-trappean beds near Ramdev Temple, Takli, Nagpur;

1. Generalised view;
2. Close-up view of sandy marlstone.

altanica (Stankevitch), *Mongolocypis longa* (Hou), *Leiria jonesi* (Bhatia and Rana), *Altanicypris szzechuræ* (Stankevitch), *Talicypridea biformata* (Szzechura and Blaszyk), *Cypridopsis bugintsavicus* (Stankevitch), *Mongolianella palmosa* Mandelstam and *M. khamariniensis*

Galeeva. On the basis of these ostracods they postulated that the fauna is not only conclusive evidence in support of a Late Cretaceous age of the Deccan volcanism, but also for Laurasian affinity.

The identifications of number of the above stated ostracod

Table 1: Identifications of ostracod species of previous workers and their current taxonomy.

Identifications of previous workers	Current taxonomy
Jones (1860)	
<i>Cypris cylindrica</i> Sowerby	<i>Mongolianella cylindrica</i> (Sowerby) Whatley & Bajpai, 2000a
<i>Cypris hislopi</i> Jones	<i>Mongolianella hislopi</i> (Jones) Bhatia and Rana, 1984
<i>Cypris hunteri</i> Jones	<i>Moenocypris hunteri</i> (Jones) Mathur & Verma, 1988
<i>Cypris strangulata</i> Jones	<i>Gomphocythere strangulata</i> (Jones) Whatley & Bajpai, 2000a
<i>Cypris subglobosa</i> Sowerby	<i>Paracyprretta subglobosa</i> (Sowerby) Whatley <i>et al.</i> 2003a
Bhatia and Rana (1984)	
<i>Mongolianella hislopi</i> (Jones)	<i>Mongolianella</i> sp. Khosla & Nagori (this work)
<i>Cyprois</i> sp.	<i>Cypria cyrtionidion</i> Whatley & Bajpai, 2000a
<i>Metacypris strangulata</i> (Jones)	i. <i>Paracandona firmamentum</i> Whatley & Bajpai, 2000a (Figs. 4-5)
	ii. <i>Frambocythere tumiensis anjarensis</i> Bhandari & Colin, Whatley & Bajpai, 2005 (Fig. 7)
	iii. <i>Gomphocythere strangulata</i> (Jones) Whatley <i>et al.</i> 2002a (Figs. 8-9)
Bhatia <i>et al.</i> (1990a and 1996)	
<i>Frambocythere tumiensis tumiensis</i> (Helmdach)	<i>Frambocythere tumiensis anjarensis</i> Bhandari & Colin, Whatley & Bajpai, 2005
<i>Cytheridella strangulata</i> (Jones)	<i>Gomphocythere strangulata</i> (Jones) Whatley <i>et al.</i> 2002a
<i>Candona altanulaensis</i> Szczecchura and Blaszyk	<i>Eucypris pelagicos</i> Whatley & Bajpai, 2000a
<i>Candoniella</i> cf. <i>C. altanica</i> (Stankovitch)	? <i>Moenocypris hunteri</i> (Jones) Whatley <i>et al.</i> 2003b
<i>Mongolocypris longa</i> (Hou)	<i>Limnocypridea ecephymatos</i> Whatley and Bajpai, 2000b
<i>Leiria jonesi</i> (Bhatia and Rana)	<i>Paracyprretta jonesi</i> Bhatia and Rana; Bajpai & Whatley, 2001
<i>Mongolianella palmosa</i> Mandelstam	<i>Mongolianella</i> sp. Khosla & Nagori (this work)

species recorded by the previous workers have been revised in recent years. Their current taxonomy is given in table 1. The genus *Leiria*, to which Bhatia *et al.* (1996) transferred their species, *Paracyprretta jonesi*, is junior synonym of *Cetacella* Martin, 1958 (Bajpai and Whatley, 2001, p. 101).

PALAEOECOLOGY

The ostracod genera from the Inter-trappean beds of Takli are *Darwinula* (1.89%), *Limnocythere* (11.29%), *Frambocythere* (22.29%), *Gomphocythere* (11.66%), *Paracyprretta* (2.56%), *Zonocypris* (3.7%), *Cypridopsis* (3.79%), *Mongolianella* (7.49%), *Eucypris* (5.22%), *Candona* (0.95%), *Cyclocypris* (12.24%), *Cypria* (14.99%), *Talicypridea* (0.66%) and *Cyprois* (1.23%). Whatley and Bajpai (2005) have recently discussed at length aspects of the palaeoecology of non-marine Ostracoda from Upper Cretaceous Inter-trappean deposits and the Lameta Formation of Peninsular India and these have been utilized here in our interpretations. Accordingly, the above stated genera can be grouped in two ecologies: i. non-swimming, endobenthonic or epibenthonic walkers/crawlers, which includes *Darwinula*, *Limnocythere*, *Frambocythere*, *Gomphocythere* and *Candona*; ii. swimming, varying from moderate to very active swimmers, they are *Paracyprretta*, *Zonocypris*, *Cypridopsis*, *Mongolianella*, *Eucypris*, *Cyclocypris*, *Cypria*, *Talicypridea* and *Cyprois*.

Among the first group, *Limnocythere*, *Frambocythere* and *Gomphocythere* belong to the family Limnocytheridae. McKenzie (1971, p. 273) suggests that some species of *Limnocythere* may be endobenthonic, spending part of the day within the sediment and part on it, while *Gomphocythere* and *Frambocythere* are clearly epibenthonic walkers/crawlers. Although some species of *Limnocythere* have been recorded from temporary pools, most members of the family require permanent waters. *Darwinula* lives in permanent water bodies, mainly in ponds and lakes but it also occurs in streams. The genus *Candona* ranges from freshwater to mildly saline oligohaline waters. Most live in marshes, ponds or lakes and coastal lagoons but some can also tolerate slow flowing rivers

and streams.

Among the second group, the genus *Mongolianella* is morphologically very similar to *Herpetocypris* Brady and Norman, which is probably a good guide to its ecology. The latter genus occurs most commonly in lakes, ponds and even fast flowing streams, but only those replete with weeds. The genus *Paracyprretta* is well known as a good swimmer at the present day. The genus *Talicypridea* also probably swam efficiently but not well. The genus *Cypridopsis* is mainly found in permanent lakes and ponds; much more rarely in rivers and streams. Some modern species of *Cyclocypris* occur in temporary ponds, and others in only shallow permanent waters that may range from small ponds to large lakes. Recent species of *Cypria* e.g. *C. ophthalmica* (Jurine), an almost universally distributed in Northern Hemisphere freshwater and oligohaline species is an excellent example of the genus requiring permanent water. The genus *Eucypris* mostly lives in temporary pools that dry out in the summer months, the species being represented then by desiccation resistant eggs that hatch with rains. The adult ostracod and juvenile stages are, therefore, often only found in the winter or in the rainy season. Most species of *Cyprois* live in temporary environments and are often only present in the winter or rainy season.

From the ecological data given above, it is evident that except for the genera *Eucypris* and *Cyprois*, which are indicative of temporary pool environment, all other genera are suggestive of existence of permanent waters during the deposition of Inter-trappean beds at Takli. In similar instances, Whatley and Bajpai (2005) have explained that it is probable that *Eucypris* and *Cyprois* that prefer temporary waters, lived around the margins of ponds and lakes in area that dried out in the dry season, while other taxa requiring permanent waters would then retreat to the deeper parts of the water body.

AGE AND AFFINITY OF OSTRACOD FAUNA

The non-marine Inter-trappean beds of Peninsular India have been assigned a Late Cretaceous, Maastrichtian age based on localities whose absolute age is known from radiometric

Table 2. Distribution of ostracod species in the Lameta Formation and Inter-trappean beds.

Ostracod Species	Lameta Formation (Infra-trappean) and Inter-trappean beds											
	Nagpur	Chandrapur	Chhindwara	Mandla	Jabalpur	Gulbarga	Kachchh	Kota	Asifabad			
	Maharashtra		Madhya Pradesh			Karnataka	Gujarat	Rajasthan	A. P.			
	Takli	Dongargaon	Mohgaon-Haveli	Mohgaonkala	Phulsagar	Jabalpur Cantonment	Chandarki	Yanagundi	Anjar	Lakshmipur	Kora	Mamoni
<i>Candona amosi</i> Whatley, Bajpai and Srinivasan	+					+	+	+				
<i>Cyclocypris amphibolos</i> Whatley, Bajpai and Srinivasan	+	+	+					+				+
<i>Cyprina cyrtoides</i> Whatley and Bajpai	+	+	+	+			+	+	+	+		
<i>Cypridopsis elachistos</i> Whatley, Bajpai and Srinivasan	+			+								
<i>C. hyperecypthos</i> Whatley and Bajpai	+	+						+	+	+	+	+
<i>Cyprois rostellum</i> Whatley and Bajpai	+		+							+	+	
<i>Darwinula torpedo</i> Whatley, Bajpai and Srinivasan	+		+			+		+				
<i>Eucypris intervolcanus</i> Whatley and Bajpai	+			+	+				+	+	+	
<i>E. pelagicos</i> Whatley and Bajpai	+	+		+	+				+	+	+	
? <i>E. verruculosa</i> Whatley, Bajpai and Srinivasan	+						+					
<i>Eucypris</i> sp.	+											
<i>Frambocythere tumiensis anjarensis</i> Bhandari and Colin	+	+	+				+	+	+			+
<i>Gomphocythere falsicarinata</i> (Whatley and Bajpai)	+	+							+	+		
<i>G. paucisulcatus</i> Whatley, Bajpai and Srinivasan	+	+		+					+			
<i>G. whatleyi</i> n. sp.	+			+					+			
<i>Limnocythere deccanensis</i> Khosla, Nagori and Mohabey	+	+	+		+							
<i>Mongolianella cylindrica</i> (Sowerby)	+				+	+	+	+	+	+	+	+
<i>M. subarcuata</i> Whatley, Bajpai and Whittaker	+											+
<i>Mangolianella</i> sp.	+											
<i>Paracyprina jonesi</i> Bhatia and Rana	+	+	+			+	+	+	+	+		+
<i>Talicypridea?</i> sp.	+										+	
<i>Zonocypris gujaratensis</i> Bhandari and Colin	+		+						+			
<i>Z. labyrinthicos</i> Whatley, Bajpai and Srinivasan	+			+								
<i>Z. spirula</i> Whatley and Bajpai.	+	+	+					+	+	+	+	

+ Ostracode Present

dates obtained on the basalt flows that constrain them. Most modern studies on the age of the Deccan Traps, based on radiometric analyses, indicate that the volcanic activity was initiated during the Maastrichtian, at about 68 My and ceased during the early Palaeocene at around 60 My, with the major pulse at 65 My (Duncan and Pyle, 1988; Sahni and Bajpai, 1988; Venkatesan *et al.*, 1996; Bajpai and Prasad, 2000; Whatley and Bajpai, 2000a *et seq.*; Bajpai and Whatley, 2001; Whatley *et al.*, 2002a *et seq.*).

The ostracod fauna of the Inter-trappean beds of Takli is strongly reminiscent of the ostracod assemblages described from the Inter-trappean beds from different sections in central and western India. Of the 24 species recorded from Takli, 13 species are common with those of Anjar (Bhandari and Colin, 1999; Khosla and Nagori, 2005), 8 species are common with those of Lakshmipur (Whatley and Bajpai, 2000a) and 10 species are common with those of Kora (Bajpai and Whatley, 2001), all in Kachchh District, Gujarat; 5 species are common with those of Chandarki and 8 species are common with those of Yanagundi, both in Gulbarga District, Karnataka (Whatley, *et al.*, 2002a); 5 species are common with those of Mamoni in Kota District, Rajasthan (Whatley *et al.*, 2003a); 4 species are common with those of Phulsagar, Mandla District (Bajpai *et al.*, 2004), 7 species are common with those of Mohgaon-Kalan (Whatley, *et al.*, 2002b) and 9 species are common with those of Mohgaon-Haveli, Sausar Taluka (Khosla and Nagori, 2007),

all in Madhya Pradesh; and 4 species are common with those of Asifabad, Andhra Pradesh (Bhatia *et al.* 1990a, 1996). Similarly, the ostracode fauna of Takli also shows affinity with those of the Lameta Formation of Jabalpur, Madhya Pradesh (Khosla and Sahni, 2000) and Nand-Dongargaon Basin, Chandrapur, Maharashtra (Udhoji and Mohabey, 1996; Khosla *et al.*, 2005) and 4 and 10 species are common with them respectively. The distribution of the above cited ostracod species in the Inter-trappean beds and the Lameta Formation in different sections is summarized in Table 2.

SYSTEMATIC PALAEONTOLOGY

Subclass Ostracoda Latreille, 1806

Order Podocopina Müller, 1894

Superfamily Darwinulacea Brady and Norman, 1889

Family Darwinulidae Brady and Norman, 1889

Genus Darwinula Brady and Robertson, 1885

Darwinula torpedo Whatley, Bajpai and Srinivasan, 2002
(Pl. I, figs. 1-3)

Darwinula torpedo Whatley, Bajpai and Srinivasan, 2002a, pp. 165-166, pl. 1, figs. 1-7. - Khosla and Nagori, 2007, p-211, pl. 1, fig. 1.

Material: 20 carapaces/valves.

Remarks: *Darwinula torpedo* has been described from the Inter-trappean beds of Yanagundi in Gulbarga District by Whatley *et al.* (2002a). The species also occurs in the Inter-trappean beds of Mohgaon-Haveli, in Sausar Taluka,

Chhindwara District (Khosla and Nagori, 2007). It is a medium sized species characterized by elongate, subcylindrical lateral outline; anterior margin narrowly rounded, with apex below mid-height; posterior margin more broadly rounded to subtruncate, apex at or above mid-height; dorsal margin straight to very gently convex; ventral margin slightly concave; valve surface smooth

Dimensions (mm): A carapace (SUGDMF No. 1056), length 0.92, height 0.42, width 0.32. A carapace (SUGDMF No. 1057), length 0.81, height 0.37, width 0.29. A carapace (SUGDMF No. 1058), length 0.87, height 0.40, width 0.3.

Superfamily **Cytheracea** Baird, 1850

Family **Limnocytheridae** Klie, 1938

Subfamily **Limnocytherinae** Klie, 1938

Genus **Limnocythere** Brady, 1868

Limnocythere deccanensis Khosla, Nagori and Mohabey, 2005

Limnocythere bhatiai Bajpai, Mohabey, Kapoor and Sharma, 2004, p. 150, pl. 1, figs. 1-r; pl. 2, figs. a-b.

Limnocythere deccanensis Khosla, Nagori and Mohabey, 2005, pl. 1, figs. 1-2. - Khosla and Nagori, 2007, p-215, pl. 1, fig. 6-9.

Material: 119 carapaces/valves.

Remarks: The species was originally described as *Limnocythere bhatiai* by Bajpai *et al.*, (2004) from the Inter-trappean of Phulsagar in Mandla District. The specific name is invalid as it is preoccupied by *Limnocythere bhatiai* Mathur, 1972 (pp. 394-395, figs. 2a-c) described from the Tatrot Formation, Upper Siwalik, near Pinjaur, Haryana. The specific name *Limnocythere deccanensis* Khosla, Nagori and Mohabey, 2005 described from the Late Cretaceous (Maastrichtian) Lameta Formation of Dongargaon, Chandrapur District though junior synonym of *Limnocythere bhatiai* Bajpai *et al.*, 2004 was regarded as valid for the species under discussion by Khosla and Nagori (MS). This view has been adopted herein.

Subfamily **Timiriaseviinae** Mandelstam, 1960;

emend Colin and Danielopol, 1980

Genus **Frambocythere** Colin, 1980

Frambocythere tumiensis anjarensis Bhandari and Colin, 1999 (Pl. I, figs. 4-7)

Frambocythere tumiensis anjarensis Bhandari and Colin, 1999, pp. 12-13, pl. 1, figs. 1-10. - Whatley *et al.*, 2002a, pp.166-168, pl. 1, figs. 8-9. - Khosla *et al.*, 2005, p. 137, pl. 1, figs. 3-4. - Khosla and Nagori, 2005, p. 574, pl. 1, fig. 4. - Khosla and Nagori, 2007, p-215, pl. 1, fig. 10-12.

Frambocythere sp. cf. *F. tumiensis anjarensis* Bhandari and Colin. - Whatley *et al.*, 2003a, pp. 78-79, pl. 1, figs. 10-11.

Material: 235 carapaces/valves.

Remarks: The subspecies was initially described from the Inter-trappean beds of Anjar in Kachchh District by Bhandari and Colin (1999). It has subsequently been recorded from the Inter-trappean beds of Chandarki and Yanagundi in Gulbarga District (Whatley *et al.*, 2002a), Mamoni in Kota District (Whatley *et al.*, 2003a), Mohgaon-Haveli, in Sausar Taluka, Chhindwara District (Khosla and Nagori, 2007) and the Lameta Formation of Dongargaon, Chandrapur District (Khosla *et al.*, 2005). The subspecies differs from *Frambocythere tumiensis lakshmiiae* Whatley and Bajpai (2000a) described from the Inter-trappean beds of Lakshmipur in Kachchh District in its normal overlap, i.e. left valve larger than right valve, which is reverse, i.e. right larger than left valve, in the latter species.

Dimensions (mm): A female carapace (SUGDMF No.1059), length 0.39, height 0.23, width 0.32. A female carapace (SUGDMF No. 1060), length 0.39, height 0.21, width 0.32. A male carapace (SUGDMF No. 1061), length 0.35, height 0.19, width 0.24. A male carapace (SUGDMF No. 1062), length 0.35, height 0.19, width 0.26.

Genus **Gomphocythere** Sars, 1924

Gomphocythere falsicarinata (Whatley and Bajpai, 2000)

(Pl. I, figs. 8-9)

Limnocythere falsicarinata Whatley and Bajpai, 2000a, p. 390, pl. 1, figs. 1-5. - Khosla *et al.*, 2005, p. 137, pl. 1, figs. 5-6. - Khosla and Nagori, 2005, p. 574, pl. 1, fig. 1.

Material: 11 carapaces/valves.

Remarks: The species was originally described as *Limnocythere falsicarinata* by Whatley and Bajpai (2000a) from the Inter-trappean beds of Lakshmipur in Kachchh District. However on the basis of its strong resemblance with *Gomphocythere strangulata* (Jones, 1860) in overall outline and presence of two sulci, a weaker one in anteromedian region and a stronger one in median region, and a pronounced ventro-lateral rib resembling a false keel, it is herein transferred to the genus *Gomphocythere*. The present species has a smooth valve surface, which is distinctly reticulated in *G. strangulata*. *G. falsicarinata* also occurs at Anjar, Kachchh (Khosla and Nagori, 2005) and the Lameta Formation, Dongargaon in Chandrapur District (Khosla *et al.*, 2005).

Dimensions (mm): A left valve (SUGDMF No. 1063), length 0.92, height 0.51. A carapace (SUGDMF No. 1064), length 0.87, height 0.48, width 0.50.

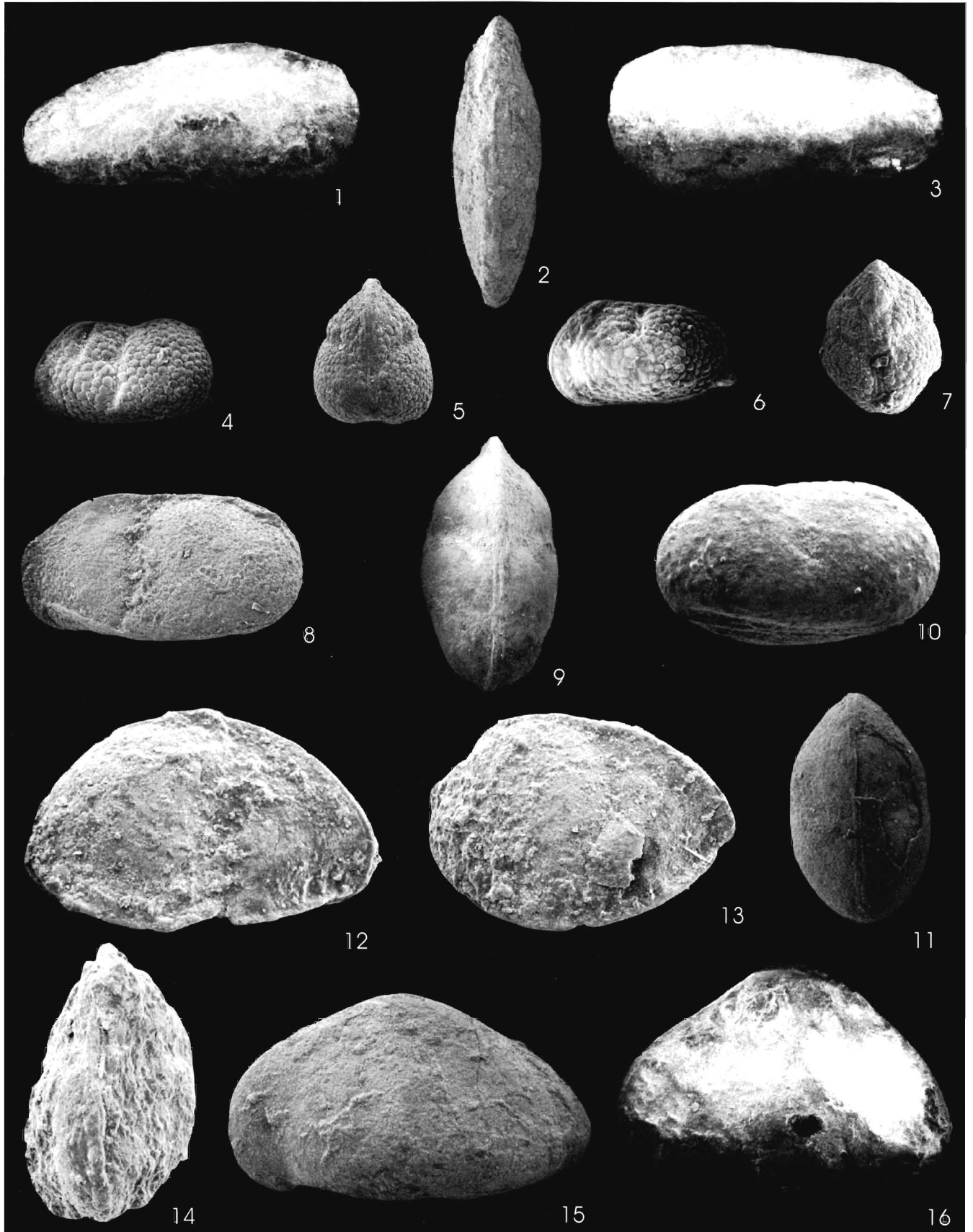
Gomphocythere paucisulcatus Whatley,

Bajpai and Srinivasan, 2002

(Pl. I, figs. 10-11)

EXPLANATION OF PLATE I

- | | |
|---|--|
| 1-3. <i>Darwinula torpedo</i> Whatley, Bajpai and Srinivasan | 9, a carapace (SUGDMF No. 1064), dorsal view, x 55. |
| 1, a carapace (SUGDMF No. 1056), left valve view, x 67; | 10-11. <i>Gomphocythere paucisulcatus</i> Whatley, Bajpai and Srinivasan, 2002 |
| 2, a carapace, dorsal view (SUGDMF No. 1057), x 68; | 10. a carapace (SUGDMF No. 1065), right valve view, x 103. |
| 3, a carapace (SUGDMF No. 1058), right valve view, x 71. | 11. a carapace (SUGDMF No. 1066), dorsal view, x 76. |
| 4-7. <i>Frambocythere tumiensis anjarensis</i> Bhandari and Colin | 12-14. <i>Gomphocythere whatleyi</i> new species |
| 4, a female carapace (SUGDMF No. 1059), left valve view, x 85; | 12, a right valve (SUGDMF No. 1067), lateral view, x 81; |
| 5, a female carapace (SUGDMF No. 1060), dorsal view, x 72; | 13, a right valve (SUGDMF No. 1068), lateral view, x70; |
| 6, a male carapace (SUGDMF No. 1061), left valve view, x 100; | 14, a carapace (SUGDMF No. 1069), dorsal view, x 80. |
| 7, a male carapace (SUGDMF No. 1062), dorsal view, x 83. | 15-16. <i>Paracyprretta jonesi</i> Bhatia and Rana |
| 8-9. <i>Gomphocythere falsicarinata</i> (Whatley and Bajpai) | 15, left valve (SUGDMF No. 1070), lateral view, x 39. |
| 8, a left valve (SUGDMF No. 1063), lateral view, x 57; | 16, a carapace (SUGDMF No. 1071), left valve view, x 38. |



Gomphocythere? sp. 1 Bhandari and Colin, 1999, p. 13, pl. 1, figs. 11-13.

Gomphocythere paucisulcatus Whatley, Bajpai and Srinivasan, 2002b, pp.107-109, pl. 1, figs. 1-6. – Khosla *et al.*, 2005, p. 137, pl. 1, figs. 7-8. – Khosla and Nagori, 2005, p. 574, pl. 1, fig. 3.

Material: 53 carapaces.

Remarks: *Gomphocythere paucisulcatus* was described from the Inter-trappean beds of Mohagaonkala (Mohgaon-Kalan) in Chhindwara District by Whatley *et al.*, (2002b), who also included *Gomphocythere?* sp. 1 Bhandari and Colin, 1999, recorded from the Inter-trappean of Anjar, Kachchh District, in this species. It is a medium sized species having subfusiform outline in dorsal view, almost equally acuminate at both ends and with a very slight median sulcus. Ornamentation comprises large reticulae having 1 to 4 secondary puncta within fossae. The species also occurs in the Lameta Formation Dongargaon, Chandrapur District (Khosla *et al.*, 2005).

Dimensions (mm): A carapace (SUGDMF No. 1065), length 0.51, height 0.29, width 0.32. A carapace (SUGDMF No. 1066), length 0.58, height 0.31, width 0.34.

Gomphocythere whatleyi n. sp.

(Pl. I, figs. 12-14)

Indct. *Limnocythereinae* sp. 1 Bhandari and Colin, 1999, p. 10, pl. 1, fig. 14.

Limnocythere sp. Whatley, Bajpai and Whittaker, 2002, p. 165, pl. 1, fig. 1. – Khosla and Nagori, 2005, p. 574, pl. 1, fig. 2.

Material: 59 carapaces/valves.

Etymology: In honour of Prof. R. C. Whatley, Institute of Earth Sciences, University of Wales, Aberystwyth SY23 3DB, U.K. in recognition of his contribution to the non-marine ostracods of Inter-trappean of India.

Diagnosis: A large, smooth species of *Gomphocythere* characterized by subovate lateral outline; surface marked by a vertical sulcus and a ventral carina overhanging the margin.

Holotype: Pl. I, fig. 12.

Description: Carapace subovate in lateral outline, with greatest height near middle and length below mid-height. Dorsal margin strongly arched merging with ends; ventral margin gently convex, obscured by overhanging surface carina; anterior margin narrowly rounded, posterior margin subangulate; anterior and posterior apices below mid-height. In dorsal view carapace biconvex, with maximum width posterior to middle; anterior end pointed, posterior rounded. Valve surface marked by a vertical sulcus, dividing carapace in two unequal halves, a distinct carina extending from anteroventral end to posteroventral end overhanging the margin, rest of the area smooth.

Dimensions (mm): A right valve (SUGDMF No. 1067), length 0.81, height 0.51. A right valve (SUGDMF No. 1068), length 0.82, height 0.55. A carapace (SUGDMF No. 1069), length 0.65, height 0.50, width 0.39.

Discussion: The species resembles *Gomphocythere falsicarinata* (Whatley and Bajpai, 2000) described from the Inter-trappean beds of Lakshmipur in Kachchh District and also recorded herein in surface ornamentation but differs in its subovate outline, which is subrectangular in the latter species.

Type Locality: Cliff section of an abandoned Gitti Khadan (Quarry), near Ramdeo Temple, at Takli, in Nagpur, Maharashtra.

Type horizon: White sandy marl, Inter-trappean bed, Late Cretaceous, Maastrichtian.

Occurrence: Inter-trappean of Anjar, Kachchh and Nagpur.

Superfamily Cypridacea Baird, 1845

Family Cyprididae Baird, 1845

Subfamily Cypridinae Baird, 1845

Genus Paracyprretta Sars, 1924

Paracyprretta jonesi Bhatia and Rana
(Pl. I, figs. 15-16)

Paracyprretta jonesi Bhatia and Rana, 1984, pp. 30-33, pl. 2, figs. 1-3. – Udhoji and Mohabey, 1996, p. 413, pl. 2, figs. 4-6. – Bajpai and Whatley, 2001, pp. 95-96, pl. 1, figs. 2, 4. – Whatley *et al.*, 2002, p. 166-168, pl. 1, figs. 8-9. – Whatley *et al.*, 2003c, p. 1293-1294, pl. 2, figs. 14, 17. Khosla and Nagori, 2007, pp.215-217, pl. 1, fig. 13-16, fig. 1-3.

Leiria jonesi (Bhatia and Rana). – Bhatia *et al.* 1996, p. 340, pl. 3, fig. 7.

Altanicypris sp. Sahni and Khosla, 1994, p. 458, figs. 2 n-p.

Altanicypris bhatiai Khosla and Sahni, 2000, pp. 58-59, pl. 1, figs. a-g. *Paracyprretta bhatiai* (Khosla and Sahni). – Whatley and Bajpai, 2000b, pp. 174-176, pl. 1, figs. 1-3.

Non *Paracyprretta bhatiai* (Khosla and Sahni). Whatley *et al.*, 2002a, p. 173, pl. 3, figs. 1-5. Whatley *et al.*, 2002b, p. 109, pl. 2, figs. 10.

Material: 27 carapaces/valves.

Remarks: The species was originally described from the Inter-trappean beds of Gitti Khadan, in Nagpur (Bhatia and Rana, 1984). It was subsequently recorded from Kora, Kachchh District (Bajpai and Whatley, 2001), Chandarki, Gulbarga District, (Whatley *et al.*, 2002) and Mohgaon-Haveli, in Sausar Taluka, Chhindwara District (Khosla and Nagori, 2007).

Whatley *et al.* (2003c) reviewed the systematics of three species of the genus *Paracyprretta* from the Inter-trappean beds of India. These species are (i) *Paracyprretta subglobosa* (Sowerby in Malcolmson, 1840) based on the study of Malcolmson's type collection from the Sichel Hills housed in the Natural History Museum, London, (ii) *Paracyprretta elizabethae* Whatley, Bajpai and Whittaker, 2003 from Kora and Anjar (both in Kachchh District) and Chandarki (in Gulbarga District) and *Paracyprretta jonesi* Bhatia and Rana, 1984, from Chandarki. According to these authors *P. jonesi* differs from *P. elizabethae* in its greater tumidity as seen in dorsal view and in its more laterally compressed and projecting anterior margin in the same view. As against these, *P. elizabethae* is notably less inflated and is more gracile and regularly fusiform in dorsal and ventral views, with the anterior margin much less strongly laterally compressed. However, in its punctuate ornament and the orientation of the puncta parallel to the ventral margin ventrally *P. jonesi* resembles *P. elizabethae*. *P. jonesi* is also very similar in dorsal and ventral views to *P. subglobosa* but in that species the ornament is papillate and is not oriented parallel to the ventral margin.

Whatley *et al.* (2003c) placed *Paracyprretta bhatiai* (Khosla and Sahni, 2000) within the synonymy of *P. jonesi*. In our opinion the forms described as *Paracyprretta bhatiai* by Whatley *et al.* (2002a, pl. 3, figs. 1-5; 2002b, pl. 2, fig. 10) are not *P. jonesi* but should be included in *P. elizabethae*.

Paracyprretta jonesi in the Inter-trappean beds of Takli shows considerable variation in length-height ratio. Most of the specimens are quite high (Pl. I, fig. 16), while some are more elongate (Pl. I, fig.15). Both the variants are kept together in one species till good populations of the two are found.

Dimensions (mm): A left valve (SUGDMF No. 1070), length 1.71, height 1.04. A carapace (SUGDMF No. 1071), length 1.68, height 1.23, width 0.74.

Genus Zonocypris Müller, 1898

Zonocypris gujaratensis Bhandari and Colin, 1999
(Pl. II, figs. 1-2)

Zonocypris gujaratensis Bhandari and Colin, 1999, p. 17, pl. 2, figs. 1-4.
– Khosla and Nagori, 2005, p. 576, pl. 1, fig. 18. Khosla and Nagori, 2007, p-217, pl. 2, fig. 6.

Material: 17 carapaces/valves.

Remarks: *Zonocypris gujaratensis* has been recorded from the Inter-trappean of Anjar, in Kachchh District (Bhandari and Colin, 1999; Khosla and Nagori, 2005) and Mohgaon-Haveli, in Sausar Taluka, Chhindwara District (Khosla and Nagori, 2007). The species is inflated, biconvex in dorsal outline and ornamented by concentrically arranged spiral ribs in which initial coils are very angular and transversely elongated.

Dimensions (mm): A carapace (SUGDMF No. 1072), length 0.32, height 0.23, width 0.26. A carapace (SUGDMF No. 1073), length 0.32, height 0.23, width 0.26.

Zonocypris labyrinthicos Whatley
Bajpai and Srinivasan, 2002
(Pl. II, figs. 3-4)

Zonocypris labyrinthicos Whatley, Bajpai and Srinivasan, 2002b, p. 111, pl. 2, figs. 3-9.

Material: 18 carapaces/valves.

Remarks: *Zonocypris labyrinthicos* has so far been described only from the Inter-trappean of Mohagaonkala (Mohagaon-Kalan) in Chhindwara District (Whatley *et al.*, 2002b). It is a small, rather elongate species, characterized by a concentrically spiral ornament which arises from a smooth or virtually so central locus.

Dimensions (mm): A carapace (SUGDMF No. 1074), length 0.40, height 0.21, width 0.29. A carapace (SUGDMF No. 1075), length 0.39, height 0.19, width 0.29.

Zonocypris spirula Whatley and Bajpai, 2000
(Pl. II, figs. 5-6)

Zonocypris spirula Whatley and Bajpai, 2000a, pp. 396-397, pl. 3, figs. 1-7, 9. - Whatley *et al.*, 2002a, p. 173, pl. 3, figs. 6-7. - Whatley *et al.*, 2002, p. 168, pl. 1, figs. 11-12. – Khosla *et al.*, 2005, p. 139, pl. 1, figs. 13-14. - Khosla and Nagori, 2005, p. 576, pl. 1, fig. 19. Khosla and Nagori, 2007, p-217, pl. 2, fig. 4-5.

Material: 4 carapaces/valves.

Remarks: The species has been recorded from the Inter-trappean beds of Lakshmipur (Whatley and Bajpai, 2000a), Kora (Whatley *et al.*, 2002) and Anjar (Khosla and Nagori, 2005) all in Kachchh District, Yanagundi in Gulbarga District (Whatley *et al.*, 2002a), Mohgaon-Haveli, in Sausar Taluka, Chhindwara District (Khosla and Nagori 2007) and the Lameta Formation of Dongargaon, Chandrapur District (Khosla *et al.*, 2005). Ornamentation comprising a single rib spirally coiled about mid-valve, initial coil somewhat angular, the remainder more or less circular, and strongly tumid, fusiform dorsal outline are the diagnostic characters of this species.

Dimensions (mm): A carapace (SUGDMF No. 1076), length 0.35, height 0.23, width 0.35. A carapace (SUGDMF No. 1077), length 0.37, height 0.24, width 0.37.

Subfamily Cypridopsinae Kaufmann, 1900

Genus Cypridopsis Brady, 1868

Cypridopsis elachistos Whatley
Bajpai and Srinivasan, 2002
(Pl. II, figs. 7-8)

Cypridopsis elachistos Whatley, Bajpai and Srinivasan, 2002b, pp. 109-111, pl. 1, figs. 7-13; pl. 2, figs. 1-2.

Material: 22 carapaces/valves.

Remarks: *Cypridopsis elachistos* has so far been described

from the Inter-trappean of Mohagaonkala (Mohagaon-Kalan) in Chhindwara District, Madhya Pradesh by Whatley *et al.* (2002b). It is a small, smooth or minutely punctate, very globular species with left valve larger than right valve and overlapping considerably around the entire periphery.

Dimensions (mm): A carapace (SUGDMF No. 1078), length 0.48, height 0.35, width 0.45. A carapace (SUGDMF No. 1079), length 0.47, height 0.34, width 0.44.

Cypridopsis hyperectyphos Whatley and Bajpai, 2000
(Pl. II, fig. 9)

Cypridopsis hyperectyphos Whatley and Bajpai, 2000a, pp. 397-398, pl. 4, figs. 4-10. - Bajpai and Whatley, 2001, p. 96, pl. 1, figs. 6-8. - Whatley *et al.*, 2002a, p. 174, pl. 3, figs. 11-13. – Whatley *et al.*, 2003a, p. 80, pl. 1, figs. 12-13. – Khosla *et al.*, 2005, p. 141, pl. 2, figs. 3-4. Khosla and Nagori, 2005, p. 574, pl. 1, fig. 17.

Material: 18 carapaces/valves.

Remarks: The species has been widely recorded from the Inter-trappean beds of Lakshmipur (Whatley and Bajpai, 2000a), Kora (Bajpai and Whatley, 2001) and Anjar (Khosla and Nagori, 2005) all in Kachchh District, Yanagundi in Gulbarga District (Whatley *et al.*, 2002a), Mamoni in Kota District (Whatley *et al.*, 2003a) and the Lameta Formation of Dongargaon, Chandrapur District (Khosla *et al.*, 2005). The species is readily differentiated from other species of *Cypridopsis* by its strongly inflated and almost circular outline in dorsal and ventral views.

Dimensions (mm): A carapace (SUGDMF No. 1080), length 0.56, height 0.44, width 0.48.

Subfamily Herpetocypridinae Kaufmann, 1900

Genus Mongolianella Mandelstam in Galeeva, 1955

Mongolianella cylindrica (Sowerby in Malcolmson, 1840)
(Pl. II, figs. 10-11)

Cypris cylindrica Sowerby in Malcolmson, 1840, pl. XLVII, fig. 2.

Mongolianella sp. Mathur and Verma, 1988, p. 172, pl. 1, figs. 5a, b. – Bhatia *et al.*, 1990b, p. 118, pl. 1, fig. 6.

Candonianella altanica (Stankevitch, in Stankevitch and Sochava). – Bhatia *et al.*, 1990b, p. 118, pl. 1, fig. 11.

Mongolianella palmosa Mandelstam. – Sahni and Khosla, 1994, p. 458, figs. 2q, r. – Khosla and Sahni, 2000, p. 59, figs. 3k, l; 4a-c. (non *Mongolianella palmosa* Mandelstam in Galeeva, 1955, p. 46, pl. 11, fig. 2).

?*Moenocypris* sp. Bhandari, 1998, p. 8, pl. 2, fig. 11.

Mongolianella cylindrica (Sowerby). - Whatley and Bajpai, 2000a, pp. 403-404, pl. 6, figs. 1-8. - Bajpai and Whatley, 2001, pp. 103-104, pl. 3, figs. 6, 9. - Whatley *et al.*, 2002a, pp. 176-177, pl. 4, fig. 10. - Whatley *et al.*, 2003a, pp. 80-83, text-fig. 1,1-4. - Whatley *et al.*, 2003b, pp. 82-83, figs. 2L-O, Q, R; 3A-L. Bajpai *et al.*, 2004, pp. 154-155, pl. 2, figs. n-o. - Khosla and Nagori, 2005, p. 576, pl. 1, fig. 9.

Material: 36 carapaces/valves.

Remarks: The types of the species were described from Inter-trappean of the Sichel Hills in Nutnoor (or Hutnoor), Andhra Pradesh by Sowerby (in Malcolmson, 1840). The reported occurrence of the species from the freshwater pool at Nagpur by Baird (1859) is based on wrong identification (Whatley *et al.* 2003b). The species also occurs in the Inter-trappean of Lakshmipur (Whatley and Bajpai, 2000a), Kora (Bajpai and Whatley, 2001), Anjar (Khosla and Nagori, 2005), all in Kachchh District, Chandarki and Yanagundi in Gulbarga District (Whatley *et al.* 2002a) and Kota (Whatley *et al.* 2003a). It is a large to very large, elongate, subrectangular to subcylindrical bean-shaped species with left valve overlapping right valve strongly around the free margins. Anterior margin narrowly rounded; posterior margin bluntly pointed; both

margins with apices at mid-height. Dorsal margin straight; ventral margin with shallow oral incurvature. Greatest length and width medianly; greatest height anteriorly.

Dimensions (mm): A carapace (SUGDMF No. 1081), length 1.01, height 0.44, width 0.35. A carapace (SUGDMF No. 1082), length 1.00, height 0.42, width 0.34.

Mongolianella subarcuata Whatley
Bajpai and Whittaker, 2003
(Pl. II, figs. 12-14)

?*Mongolianella* sp. B, Bajpai and Whatley, 2001, pp.104-105, pl. 3, fig. 11.

Mongolianella subarcuata Whatley, Bajpai and Whittaker, 2003a, pp. 83, text-fig. 1; 5-12.

Material: 34 carapaces/valves.

Remarks: The species has been described from the Inter-trappean of Mammoni in Kota District (Whatley *et al.*, 2003a). It is a small species characterized, especially in the left valve, by its subarcuate shape; anterior margin narrowly and asymmetrically rounded; posterior margin with rather down turned apex below mid-height. *Mongolianella subarcuata* also occurs at Kora (Bajpai and Whatley, 2001).

Dimensions (mm): A carapace (SUGDMF No. 1083), length 0.48, height 0.23, width 0.27. A carapace (SUGDMF No. 1084), length 0.52, height 0.29, width 0.29. A carapace (SUGDMF No. 1085), length 0.50, height 0.29, width 0.27.

Mongolianella sp.
(Pl. II, fig. 15)

Mongolianella hislopi Bhatia and Rana, 1984, p. 33, pl. 2, fig. 11 (Non *Cypris hislopi* Jones, 1860, p. 187, pl. 10, fig. 71)

Mongolianella palmosa Mandelstam in Galceva. – Bhatia *et al.*, 1990a, pp. 47-48, pl. 2, fig. 8. – Bhatia *et al.*, 1996, p. 306, pl. 2, fig. 8. (non, *Mongolianella palmosa* Mandelstam in Galceva.1955, p. 46, pl. 11, fig. 2).

Material: 9 carapaces/valves.

Remarks: Bhatia and Rana (1984) recorded this species from the Inter-trappean beds of Gitti Khadan, Nagpur and assigned it to *Mongolianella hislopi* (Jones), however, subsequently Bhatia *et al.* (1990a) transferred it to *Mongolianella palmosa* Mandelstam. According to Prof. R. C. Whatley (personal communication), who examined the type material of *M. palmosa* with Dr. Janina Szczchura of Poland, Indian form is not conspecific with *M. palmosa* and it comes within the range of variation of *Mongolianella cylindrica*

(Sowerby). Incidentally Whatley and Bajpai (2000a), Bajpai and Whatley (2001) and Whatley *et al.* (2002a, 2003a, 2003b) included only the form described as *M. palmosa* by Sahni and Khosla (1994) and Khosla and Sahni (2000) from type section of the Lameta Formation of Jabalpur in the synonymy of *Mongolianella cylindrica* (Sowerby) and excluded *M. palmosa* described by Bhatia *et al.* (1990a; 1996) from *M. cylindrica*. The specimens recorded herein by the present authors from Takli are identical with the form described by Bhatia *et al.* (1990a, pl. 2, fig. 8; 1996, pl. 2, fig. 8). Our specimens clearly differ from *M. cylindrica* described by Whatley and Bajpai (2000a), Bajpai and Whatley (2001) and Whatley *et al.* (2002a, 2003a, 2003b) in shape and size. They are quite robust, 1.5 times larger in size, with strongly convex dorsal margin, and ventrally subangulate posterior margin. In our opinion these specimens are distinct from *M. cylindrica* and might belong to a new species. We would, however, defer to erect a new species till better-preserved material is found.

Dimensions (mm): A carapace (SUGDMF No. 1086), length 1.50, height 0.69, width 0.64.

Subfamily **Eucypridinae** Bronstein, 1947
Genus **Eucypris** Vavra, 1891

Eucypris intervalcanus Whatley and Bajpai, 2000
(Pl. II, figs. 16-17)

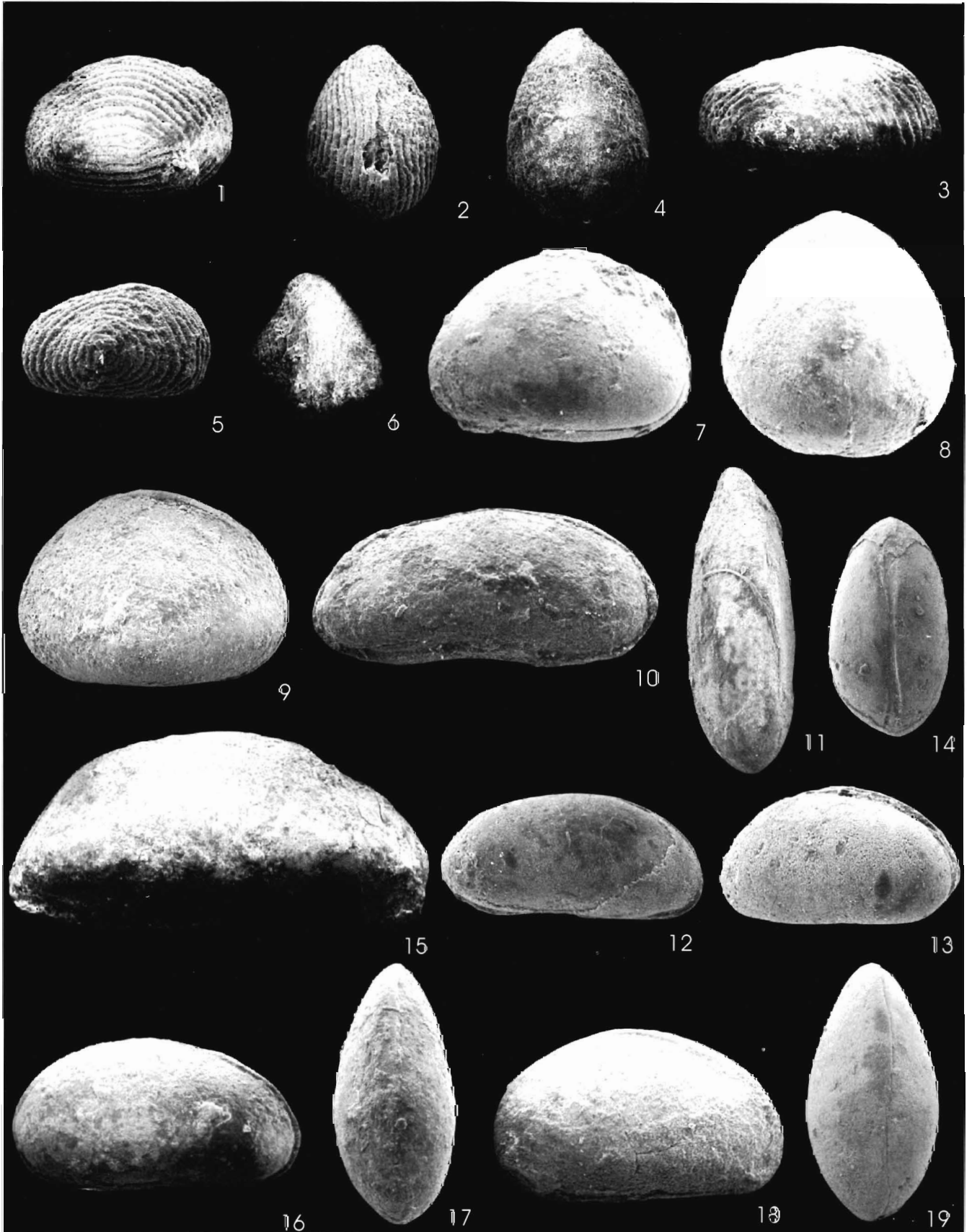
Eucypris intervalcanus Whatley and Bajpai, 2000a, p. 402, pl. 5, figs. 16-19. – Bajpai and Whatley, 2001, p. 103, pl. 3, figs. 4,7. – Whatley *et al.*, 2002a, p. 177, pl. 4, fig. 11. Whatley *et al.*, 2002b, p. 112, pl. 2, fig. 12. – Bajpai *et al.*, 2004, pp. 154, pl. 2, fig. m. – Khosla and Nagori, 2005, p. 574, pl. 1, fig. 11.

Material: 30 carapaces/valves.

Remarks: The species was originally described from the Inter-trappean of Lakshmipur in Kachchh District (Whatley and Bajpai, 2000a). It has been subsequently recorded from the Inter-trappean of Kora (Bajpai and Whatley, 2001) and Anjar (Khosla and Nagori, 2005) both also in Kachchh District, Mohagaonkala (Mohgaon-Kalan) in Chhindwara District (Whatley *et al.*, 2002b), and Yanagundi in Gulbarga District (Whatley *et al.*, 2002a). It is a large species characterized by subovate outline in lateral view and fusiform in the dorsal; anterior margin narrowly rounded; posterior margin broadly rounded; dorsal margin posteriorly inclined; ventral margin slightly concave. Greatest length at about mid-height; greatest height and width medianly. Left valve larger than right valve

EXPLANATION OF PLATE II

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| <p>1-2. Zonocypris gujaratensis Bhandari and Colin
1, a carapace (SUGDMF No. 1072), right valve view, x 119.
2, a carapace (SUGDMF No. 1073), dorsal view, x 119.</p> <p>3-4. Zonocypris labyrinthicos Whatley, Bajpai and Srinivasan,
3, a carapace (SUGDMF No. 1074), right valve view, x 112.
4, a carapace (SUGDMF No. 1075), dorsal view, x 95.</p> <p>5-6. Zonocypris spirula Whatley and Bajpai
5, a carapace (SUGDMF No. 1076), right valve view, x 100.
6, a carapace (SUGDMF No. 1077), dorsal view, x 76.</p> <p>7-8. Cypridopsis elachistos Whatley, Bajpai and Srinivasan
7, a carapace (SUGDMF No. 1078), right valve view, x 102.
8, a carapace (SUGDMF No. 1079), dorsal view, x 98.</p> <p>9. Cypridopsis hyperectyphos Whatley and Bajpai
A carapace (SUGDMF No. 1080), right valve view, x 89.</p> <p>10-11. Mongolianella cylindrica (Sowerby)</p> | <p>10, a carapace (SUGDMF No. 1081), right valve view, x 63.
11, a carapace (SUGDMF No. 1082), dorsal view, x 58.</p> <p>12-14. Mongolianella subarcuata Whatley, Bajpai and Whittaker
12, a carapace (SUGDMF No. 1083), right valve view, x 102.
13, a carapace (SUGDMF No. 1084), left valve view, x 84.
14, a carapace (SUGDMF No. 1085), dorsal view, x 82.</p> <p>15. Mongolianella sp.
A carapace (SUGDMF No. 1086), right valve view, x 52.</p> <p>16-17. Eucypris intervalcanus Whatley and Bajpai
16, a carapace (SUGDMF No. 1087), right valve view, x 73.
17, a carapace (SUGDMF No. 1088), dorsal view, x 65.</p> <p>18-19. Eucypris pelagicos Whatley and Bajpai
18, a carapace (SUGDMF No. 1089), right valve view, x 51.
19, a carapace (SUGDMF No. 1090), dorsal view, x 52.</p> |
|--|--|



overlapping all along the free margins.

Dimensions (mm): A carapace (SUGDMF No. 1087), length 0.73, height 0.40, width 0.32. A carapace (SUGDMF No. 1088), length 0.74, height 0.42, width 0.34.

Eucypris pelascigos Whatley and Bajpai, 2000
(Pl. II, figs. 18-19)

Candona altanulaensis Szczechura and Blaszyk. - Bhatia, Prasad and Rana, 1990a, pl. 3, fig. 3. - Bhatia *et al.*, 1996, p. 302, pl. 3, fig. 3. (Not *Candona altanulaensis* Szczechura and Blaszyk, 1970, p. 114, pl. 29, figs. 2, 4).

Eucypris pelascigos Whatley and Bajpai, 2000a, pp. 400-402, pl. 5, figs. 7-15. - Bajpai and Whatley, 2001, pp. 102-103, pl. 2, fig. 15; pl. 3, figs. 1-3. - Whatley *et al.*, 2002b, pp. 111-112, pl. 2, fig. 11. - Bajpai *et al.*, 2004, pp. 152-154, pl. 2, figs. k-l. - Khosla *et al.*, 2005, p. 143, pl. 3, figs. 2-3. - Khosla and Nagori, 2005, p. 574, pl. 1, fig. 12.

Material: 10 carapaces/valves.

Remarks: This species has been previously recorded from the Inter-trappean beds of Lakshmipur (Whatley and Bajpai, 2000a), Kora (Bajpai and Whatley, 2001) and Anjar (Khosla and Nagori, 2005) all in Kachchh District, Mohagaonkala (Mohgaon-Kalan) in Chhindwara District (Whatley *et al.*, 2002b) and the Lameta Formation of Dongargaon, Chandrapur District (Khosla *et al.*, 2005). Whatley *et al.* (2002b) also assigned *Candona altanulaensis* recorded by Bhatia *et al.* (1990a and 1996) from the Inter-trappean beds of Takli, Nagpur to *Eucypris pelascigos*. It is a very large species with distinctly umbonate dorsal margin at mid-length and anteroventral angulation in the left valve where it pronouncedly overlaps the right valve

Dimensions (mm): A carapace (SUGDMF No. 1089), length 1.06, height 0.63, width 0.51. A carapace (SUGDMF No. 1090), length 0.94, height 0.51, width 0.45.

?Eucypris verruculosa Whatley, Bajpai and Srinivasan, 2002
(Pl. III, figs. 1-2)

?Eucypris verruculosa Whatley, Bajpai and Srinivasan, 2002a, p. 177, pl. 4, figs. 8,9, 12-19. - Whatley *et al.*, 2003b, pp. 81-82, figs. 2J-K.

Material: 15 carapaces/valves.

Remarks: The species has so far been described from the Inter-trappean Chandarki in Gulbarga District (Whatley *et al.*, 2002a) and the Sichel Hills (Whatley *et al.*, 2003b). It is a large to very large species with very well rounded anterior margin. Acuminate towards the posterior, which is narrowly rounded.

Dimensions (mm): A female right valve (SUGDMF No. 1091), length 0.82, height 0.52. A male right valve (SUGDMF No. 1092), length 0.89, height 0.47.

?Eucypris sp.

(Pl. III, figs. 3-4)

Material: 10 carapaces.

Remarks: The species is very similar to *?Eucypris verruculosa* Whatley, Bajpai and Srinivasan, 2002 but is almost half of its size.

Dimensions (mm): A carapace (SUGDMF No. 1093), length 0.45, height 0.30, width 0.27. A carapace (SUGDMF No. 1094), length 0.45, height 0.30, width 0.27.

Family **Candonidae** Daday, 1900

Subfamily **Candoninae** Daday, 1900

Genus **Candona** Baird, 1845

Candona amosi Whatley, Bajpai and Srinivasan, 2002
(Pl. III, figs. 5-7)

Candona cf. *sinensis* Ho in Hou *et al.* - Bhandari and Colin, 1999, p. 13, pl. 2, fig. 7 (Non *Candona* (*Candona*) *sinensis* Ho in Hou *et al.*, 1978, p. 160, pl. 7, figs. 34-54). - Khosla and Nagori, 2005, p. 574, pl. 1, fig. 8.

Candona ? sp. Bajpai and Whatley, 2001, p. 102, pl. 2, fig. 13.

Candona amosi Whatley, Bajpai and Srinivasan, 2002a, pp. 178-180, pl. 4, figs. 20-22; pl. 5, figs. 1-2.

Material: 10 carapaces/valves.

Remarks: *Candona amosi* has been described from the Inter-trappean of Yanagundi in Gulbarga District by Whatley *et al.* (2002a) who also included the forms *Candona* cf. *sinensis* Bhandari and Colin, 1999 and *Candona*? sp Bajpai and Whatley, 2001 recorded from Anjar and Kora respectively, both in Kachchh District in this species. It is a large species with well-rounded end margins, both apices below mid-height; greatest height in the posterior third; ventral margin weakly concave.

Dimensions (mm): A carapace (SUGDMF No. 1095), length 0.69, height 0.35, width 0.39. A carapace (SUGDMF No. 1096), length 0.68, height 0.37, width 0.39. A carapace (SUGDMF No. 1097), length 0.77, height 0.39, width 0.42.

Subfamily **Cyclopyridinae** Zenker, 1854

Genus **Cyclopypris** Brady and Norman, 1889

Cyclopypris amphibolos Whatley,

Bajpai and Srinivasan, 2002;

(Pl. III, figs. 8-10)

Cyclopypris amphibolos Whatley, Bajpai and Srinivasan, 2002a, pp. 182-184, pl. 6, figs. 6-18. - Whatley *et al.*, 2002, pp. 170-172, pl. 2, figs. 12-15. - Whatley *et al.*, 2003a, p. 84, pl. 1, figs. 8-9. - Khosla *et al.*, 2005, pp. 143-144, pl. 3, figs. 7-8. Khosla and Nagori, 2007, p-219, pl. 3, fig. 8-11.

Material: 129 carapaces/valves.

EXPLANATION OF PLATE III

- | | |
|--|---|
| 1-2. <i>?Eucypris verruculosa</i> Whatley, Bajpai and Srinivasan
1, a female right valve (SUGDMF No. 1091), lateral view, x 73;
2, a male right valve (SUGDMF No. 1092), lateral view, x 76. | 9, a carapace (SUGDMF No. 1099), left valve view, x 93.
10, a carapace (SUGDMF No. 1100), dorsal view, x 84. |
| 3-4. <i>Eucypris</i> sp.
3, a carapace (SUGDMF No. 1093), right valve view, x 76.
4, a carapace (SUGDMF No. 1094), dorsal view, x 73. | 11-12. <i>Cyprina cyrtonidion</i> Whatley and Bajpai
11, a carapace (SUGDMF No. 1101), right valve view, x 78.
12, a carapace (SUGDMF No. 1102), dorsal view, x 79. |
| 5-7. <i>Candona amosi</i> Whatley, Bajpai and Srinivasan
5, a carapace (SUGDMF No. 1095), right valve view, x 80.
6, a carapace (SUGDMF No. 1096), dorsal view, x 74.
7, a carapace (SUGDMF No. 1097), left valve view, x 80. | 13-14. <i>Talicypridea</i> ? sp
13, a left valve (SUGDMF No. 1103), lateral view, x 67;
14, a right valve (SUGDMF No. 1104), lateral view, x 63. |
| 8-10. <i>Cyclopypris amphibolos</i> Whatley, Bajpai and Srinivasan
8, a carapace (SUGDMF No. 1098), right valve view, x 98. | 15-16. <i>Cyprois rostellum</i> Whatley and Bajpai
15, a carapace (SUGDMF No. 1105), right valve view, x 77.
16, a carapace (SUGDMF No. 1106), dorsal view, x 73. |



Remarks: The species has previously been recorded from the Inter-trappean beds of Yanagundi in Gulbarga District (Whatley *et al.*, 2002a, 2002), Kora in Kachchh District (Bajpai and Whatley, 2001) and Mamoni in Kota District (Whatley *et al.*, 2003a), Mohgaon-Haveli, in Sausar Taluka, Chhindwara District (Khosla and Nagori, 2007) and the Lameta Formation of Dongargaon, Chandrapur District (Khosla *et al.*, 2005). Its diagnostic characters are: Medium sized; irregularly subovate in lateral outline and regularly fusiform in the dorsal; anterior margin broad, symmetrically rounded; posterior margin more narrowly rounded; dorsal margin convex anterodorsally but straighter, sloping posteriorly; ventral margin slightly concave; surface with numerous minute papillae.

Dimensions (mm): A carapace (SUGDMF No. 1098), length 0.61, height 0.44, width 0.45. A carapace (SUGDMF No. 1099), length 0.58, height 0.42, width 0.44. A carapace (SUGDMF No. 1100), length 0.61, height 0.44, width 0.45.

Genus *Cypria* Zenker, 1854

Cypria cyrtonidion Whatley and Bajpai, 2000

(Pl. III, figs. 11-12)

Cypriois sp. Bhatia and Rana, 1984, p. 33, pl. 2, fig. 12. – Mathur and Verma, 1988, p. 173, pl. 1, figs. 1-2.

Cypria cyrtonidion Whatley and Bajpai, 2000a, p. 404, pl. 6, figs. 9-14. – Bajpai and Whatley, 2001, pp. 101-102, pl. 2, figs. 7-9. – Whatley *et al.*, 2002a, p. 184, pl. 6, fig. 19. – Whatley *et al.*, 2002b, pp. 112-113, pl. 2, fig. 13. – Khosla *et al.*, 2005, p. 144, pl. 3, figs. 9-10. – Khosla and Nagori, 2005, p. 574, pl. 1, fig. 10.

Material: 158 carapaces/valves.

Remarks: The species has been widely recorded from the Inter-trappean beds of Lakshimpur (Whatley and Bajpai, 2000a), Kora (Bajpai and Whatley, 2001) and Anjar (Khosla and Nagori, 2005) all in Kachchh District, Yanagundi and Chandarki in Gulbarga District (Whatley *et al.*, 2002a), Mohagaonkala (Mohagaon-Kalan) in Chhindwara District (Whatley *et al.*, 2002b) and the Lameta Formation of Dongargaon, Chandrapur District (Khosla *et al.*, 2005). Besides, Whatley *et al.* (2002a and b) assigned *Cypriois* sp. recorded from the Inter-trappean beds of Nagpur by Bhatia and Rana (1984) and Kota by Mathur and Verma (1988) to this species.

Dimensions (mm): A carapace (SUGDMF No. 1101), length 0.55, height 0.40, width 0.31. A carapace (SUGDMF No. 1102), length 0.53, height 0.39, width 0.29.

Family *Ilyocyprididae* Kaufmann, 1900

Subfamily *Cyprideinae* Martin, 1940

Genus *Talicypridea* Khand, 1977

Talicypridea? sp.

(Pl. III, figs. 13-14)

Talicypridea? sp. Bajpai and Whatley, 2001, p. 108, pl. 3, fig. 12.

Material: 7 carapaces/valves.

Remarks: The species has been previously recorded the Inter-trappean beds of Kora by Bajpai and Whatley (2001) in Kachchh District. It is a large subovate, smooth species questionably assigned to *Talicypridea* with bluntly pointed posterior margin and broadly rounded anterior margin; anteroventral beak not visible.

Dimensions (mm): A left valve (SUGDMF No. 1103), length 0.97, height 0.58. A right valve (SUGDMF No. 1104), length 0.89, height 0.52.

Family *Notodromadidae* Kaufmann, 1900

Genus *Cypriois* Zenker, 1854

Cypriois rostellum Whatley and Bajpai, 2000

(Pl. III, figs. 15-16)

Cypriois rostellum Whatley and Bajpai, 2000a, p. 406, pl. 6, figs. 15-19. – Bajpai and Whatley, 2001, pp. 108-109, pl. 4, figs. 4-10. – Khosla and Nagori, 2007, p. 220, pl. 3, fig. 14-15.

Material: 13 carapaces/valves.

Remarks: *Cypriois rostellum* has been previously recorded from the Inter-trappean of Lakshimpur (Whatley and Bajpai, 2000a) and Kora (Bajpai and Whatley, 2001), both in Kachchh District and Mohgaon-Haveli, in Sausar Taluka, Chhindwara District (Khosla and Nagori, 2007).

It is a large, smooth species of *Cypriois* with anterior margin more narrowly rounded than posterior and short, straight dorsal margin inclined towards the posterior from a mid-dorsal umbo. Anterior cardinal angle pronounced and produced as a thin ridge.

Dimensions (mm): A carapace (SUGDMF No. 1105), length 0.73, height 0.55, width 0.45. A carapace (SUGDMF No. 1106), length 0.735, height 0.55, width 0.45.

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