



## MIDDLE JURASSIC OSTRACODA FROM THE JAISALMER FORMATION, JAISALMER DISTRICT, RAJASTHAN, INDIA

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### ABSTRACT

Seventy-two ostracod species from the Fort and Kuldhara members of the Jaisalmer Formation, Jaisalmer District, Rajasthan, India are described and/or recorded. Thirteen species - *Bythocypris rajasthanensis*, *Cytherella jaisalmerensis*, *Cytherelloidea kuldharensis*, *Cytheropteron lellapadiensis*, *C. rajasthanensis*, *Galliaecytheridea grekoffi*, *Lophocythere mannikerii*, *Micropneumatocythere masurdiensis*, *M. rasilis*, *Monoceratina fortensis*, *M. parascrobiculata*, *Neocythere kuldharensis* and *Progonocythere tharensis* - are new. Forty-five species are assigned to already known taxa and fourteen species are left in open nomenclature.

Based on the distribution of ostracods, one zone is recognized for the beds of Fort Member and three zones for the beds of Kuldhara Member. These are, in ascending order, *Trichordis hadibhadungensis* Range Zone (Bajocian-Bathonian), *Majungaella perforata kachchhensis* - *Fastigatocythere fulcula* Concurrent Range Zone (early Callovian), *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone (mid-late Callovian), *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Interval Zone (mid-late Callovian).

The composition and age of the ostracod fauna and correlation of biostratigraphical zones with those of the Middle Jurassic of Mainland and Northern Island Belt of Kachchh are discussed. The proposed ostracod zones are also compared with foraminiferal zones established by Dave and Chatterjee (1996), for the Fort and Kuldhara members of the Jaisalmer Formation.

**Key words:** Ostracods, Fort Member, Kuldhara Member, Jaisalmer Formation, Rajasthan

### INTRODUCTION

The Jurassic of Jaisalmer District, Rajasthan has long been known to geologists. Considerable work has been done on their stratigraphy and palaeontology (ammonites, bivalves, gastropods, brachiopods, echinoids, holothurroids, corals, foraminifers, palynomorphs and charophytes) by Blanford (1877), Oldham (1886), La Touche (1902), Ghosh (1952), Sahni and Bhatnagar (1958), Swaminath *et al.* (1959), Subbotina *et al.* (1960), Verma (1982), Poddar (1964), Narayanan (1964), Srivastava (1966), Singh, S. N. and Jai Krishna (1969), Sigal *et al.* (1970), Shrivastava (1971), Lukose (1972), Das Gupta (1974, 1975), Pareek (1984), Bhatia and Mannikeri (1976, 1977), Bhatia (1977, 1978, 1980, 1984), Kachhara and Jodhawat (1982, 1999), Jai Krishna (1983, 1987), Kalia and Choudhary (1983), Dave and Chatterjee (1996), Singh, N.P. (1996, 1999), Bhandari (1999) and Kalita *et al.* (2002).

In so far as the ostracods from these beds are concerned, they were first described by Lyubimova *et al.* (1960) who recorded the following six species from the upper part of Jaisalmer Formation: *Cytherella* aff. *obscura* (generic name wrongly given as *Progonocythere*), *Progonocythere implicata*, *P. prolata*, *Progonocythere* sp. juv., *Progonocythere* sp. indet. and *Bythocythere* sp. juv. Subsequently, Singh and Jai Krishna (1969), in a short note on the Mesozoic of Jaisalmer District, listed six species from the Jaisalmer Formation. They are: *Cytherella* sp., *Cytherelloidea* sp., *Hutsonia* sp., *Neocythere* sp., *Schuleridea* sp. and *Veenia* sp. Singh, S. N. and Kulshreshtha (1973) described a new genus - *Pokornya*, with *P. kuldharensis* as the type species - from the Kuldhara Member of the Jaisalmer Formation. Bhatia and Mannikeri (1977) recorded the following fresh and brackish water ostracods in association with charophytes from the Fort Member of the Jaisalmer Formation: *Darwinula leguminella*, *Bisulcocypris* n. sp., *Amicytheridea* n. sp., *Citrella* n. sp., *Fastigatocythere* n. sp., *Lophocythere* (*Lophocythere*) n. sp.,

*Mandelstamia* n. sp., *Micropneumatocythere* n. sp., *Paracypris* n. sp., *Paralophocythere* n. sp., *Pichottia* n. sp. and *Pontocyprilla* n. sp. Kulshreshtha *et al.* (1985) recorded 34 species from the Kuldhara Member, Jaisalmer Formation. Of these the following 12 species are new: *Aphelocythere kuldharensis*, *Cytheropteron marusthalum*, *C. parvexa*, *Hutsonia simplex*, *Lophocythere denticulata*, *L. jaisalmerensis*, *Macrodentina gowdai*, *Neocythere rajasthanensis*, *Oligocythereis minuta*, *Orthonotacythere joshii*, *Pokornya sahnii* and *P. sureshi*. Other recorded species are: *Bairdia hilda* Jones, *B. jurassica* Jones, *Bairdia* sp. A, *Bairdia* sp. B, *Cytherella disjuncta* Lyubimova and Mohan, *C. obscura* Lyubimova and Mohan, *Cytherelloidea jugosa* (Jones), *Cytherelloidea* cf. *obliquocostata* van den Bold, *Fuhrbergiella* cf. *arens* Bate, *Glabellacythere reticulata* Whatley, *Krausella* sp., *Lophocythere acutiplicata* (Jones and Sherborn), *L. cruciata oxfordiana* Lutze, *Majungaella mundula* (Grekoff), *Monoceratina scrobiculata* Triebel and Bartenstein, *Paracypris contermia* Lyubimova and Mohan, *Pokornya kuldharensis* Singh and Kulshreshtha, *Procytherura tenuicostata* Whatley, *Progonocythere implicata* Lyubimova and Mohan, *P. laeviscula* Lyubimova and Mohan, *Veenia* sp. and *Uroleberis* sp. Mannikeri (1996) described two new genera *Jainiana* including two species, the genotype *J. retusa* (Grekoff) and *J. grekoffi* n. gen. and n. sp.; and *Bhatiana* including three species, the genotype *B. indica* n. gen. and n. sp., and two indeterminate species *Bhatiana* sp. A and *Bhatiana* sp. B from the Joyan, Fort and Badabag members of Jaisalmer Formation.

In contrast to the above cited works, ostracods from the Jurassic of the Kachchh basin are better known through the works of Lyubimova *et al.* (1960), Guha (1977), Neale and Singh (1986), Khosla *et al.* (1992, 1997, 2003a, b, c, 2004, 2005) and Khosla and Jakhari (1993, 1999).

With the intention of enhancing our knowledge of the Jurassic ostracods of Jaisalmer District, the first two authors

**Table 1: Jaisalmer Formation and integrated Foraminiferal and Ostracod Biostratigraphy.**

Formation	Members	Dave and Chatterjee, 1996		Present Work	
		Foraminiferal Zones	Characteristic Ammonites	Ostracod Zones	Age
<b>J A I S A L M E R</b>	Jajiya	4. <i>Epistomina mosquensis</i> Range Zone	<i>Subgrossuvaria aberrans</i>	<i>Majungaella perforata kachchhensis-Galliaecytheridea remota</i> Interval Zone	Mid-Late Callovian
	Kuldhar	3. <i>Tewaria kutchensis</i> Partial Range Zone	<i>Macrocephalites chariensis</i> , <i>Subkossmatia ramosa</i> , <i>S. opis</i> , & <i>Reineckia reissi</i>	<i>Majungaella perforata kachchhensis-Galliaecytheridea remota</i> Concurrent Range Zone	Early Callovian
		2. <i>Lenticulina discipiens</i> Range Zone	<i>Sivajicerus congener</i>	<i>Majungaella perforata kachchhensis-Fastigatocythere falcula</i> Concurrent Range Zone	
	Badabag Fort	1. <i>Tewaria</i> sp. - <i>Dorthia poddari</i> Assemblage Zone		<i>Trichordis hadibhadangensis</i> Range Zone	Bajocian - Bathonian
	Joyan Hamira				

along with Mr. Sanjay Dubey collected systematic samples from the Jaisalmer Formation in 1992-93. They yielded a rich and interesting assemblage comprising 72 species, including 13 new. The object of the paper is to place on record these species and give their brief systematics. Majority of the species have recently been described/recorded from the Middle Jurassic of Northern Island Belt, Kachchh (Khosla *et al.*, 2005). These are only illustrated in this paper.

### STRATIGRAPHY

The Jaisalmer Formation forms a part of the marine Mesozoic sequence of Jaisalmer District, Rajasthan. According to Das Gupta (1975), the Mesozoic of this basin is divisible, in ascending order, into following six formations: Lathi Formation, Jaisalmer Formation, Baisakhi Formation, Bhadasar Formation, Parihar Formation and Habur Formation (Fig. 1). Of these, the last two formations are Cretaceous in age, while the rest are of Jurassic age. Among the Jurassic, the Jaisalmer Formation is faunally very important and hence forms the subject matter of

our study. Das Gupta (1975) further subdivided the Jaisalmer Formation into five members. These, in ascending order, are: Hamira Member, Joyan Member, Fort Member, Badabag Member and Kuldhar Member. To these, Kachhara and Jodhawat (1982) on the basis of ammonite fauna added a new member, namely Jajiya Member, taken out from the Kuldhar Member.

Dave and Chatterjee (1996) proposed the integrated foraminiferal and ammonitic biostratigraphy of the Jurassic sediments of Jaisalmer District and recognized seven benthic foraminiferal zones. Of these, four zones are in the Jaisalmer Formation and three in the overlying Baisakhi and Bhadasar formations. Besides, the authors also recorded number of ammonite fossils from different horizons. The subdivisions of the Jaisalmer Formation, foraminiferal zones recognized in these and ammonite fauna are summarized in Table 1.

As stated earlier, abundant ostracods were found only in the Fort and Kuldhar members of the Jaisalmer Formation. Lithologically, the former is composed of hard, compact, yellow

**Table 2: Correlation of Ostracod Biostratigraphical Zonation of Middle Jurassic of Mainland and Northern Island Belt of Kachchh and Jaisalmer districts.**

Age	Kachchh District		Jaisalmer District
	Mainland	Northern Island Belt	
Mid-Late Callovian	<i>Majungaella perforata kachchhensis-Galliaecytheridea remota</i> Concurrent Range Zone	<i>Majungaella perforata kachchhensis-Galliaecytheridea remota</i> Concurrent Range Zone	<i>Majungaella perforata kachchhensis-Galliaecytheridea remota</i> Interval Zone
	<i>Majungaella perforata kachchhensis</i> Partial Range Zone		<i>Majungaella perforata kachchhensis-Galliaecytheridea remota</i> Concurrent Range Zone
Callovian		<i>Fastigatocythere mouwanaensis</i> Range Zone	
Late Bathonian-Early Callovian	<i>Progonocythere laeviscula</i> Range Zone	<i>Progonocythere laeviscula</i> Range Zone	<i>Majungaella perforata kachchhensis-Fastigatocythere falcula</i> Concurrent Range Zone
Bathonian		<i>Cytheropteron micropunctata</i> Range Zone	
Bajocian-Bathonian		<i>Trichordis hadibhadangensis</i> Range Zone	<i>Trichordis hadibhadangensis</i> Range Zone

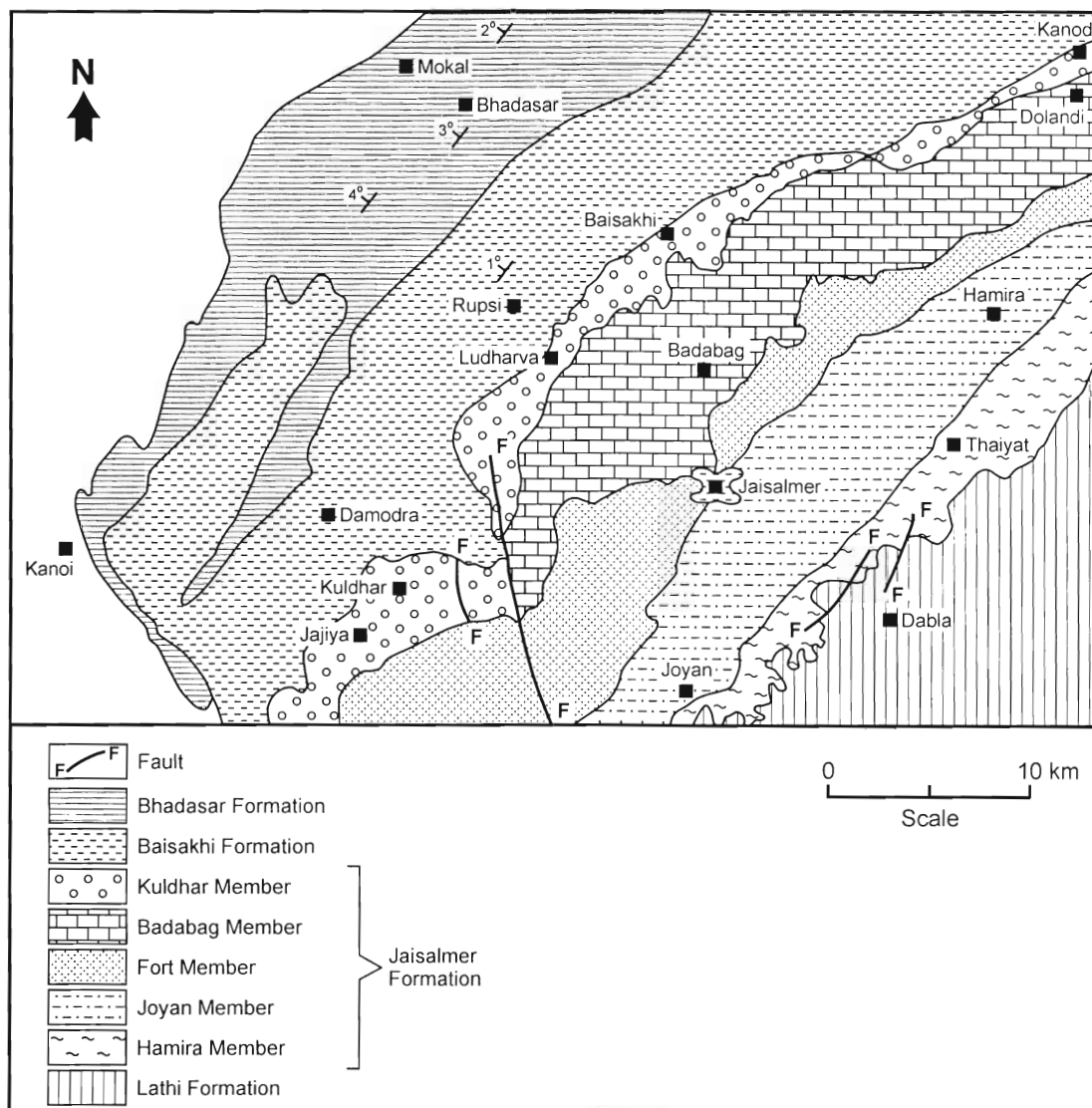


Fig. 1. Geological map of the Jaisalmer Formation, Jaisalmer, western Rajasthan (after Dave and Chatterjee, 1996).

fossiliferous sandy limestone with bands of marl and clay in the upper part and thick sandstone in the lower part, while the latter comprises yellow compact fossiliferous limestone and shale/clay with several golden and brown oolitic horizons and rich ammonites. Locations of different sections studied from the Fort and Kuldhar members are given below and also in Figs. 2-3.

#### Fort Member

Section FA: Escarpment of the fort hill, 1/2 km NW of Jaisalmer Railway Station.

Section FB: Escarpment of the fort hill, about 3/4 km WNW of Jaisalmer Railway Station.

Section FC: Escarpment of the fort hill, about 1 km WNW of Jaisalmer Railway Station.

Section FD: Escarpment at Kishanghat, north of Jaisalmer Fort.

Section FE: Near limekiln at the junction of Sam and Amarsagar roads.

Section FF: Near Chattaris of Vyas Family, 1/2 km SSW of Dedan Sar.

Section FG: Opposite to Indira Stadium / Town Hall, 3 km west

of Jaisalmer Fort.

Section FM: Escarpment of the fort hill about 1 km NNW of Jaisalmer Railway Station.

#### Kuldhar Member

Section KA: Western bank of Masurdi Nadi (stream), east of Khethari Talab (pond).

Section KB: Western bank of Masurdi Nadi, north of Khethari Talab.

Section KC: Western bank of Masurdi Nadi, about 1 km NNW of Khethari Talab.

Section KD: Eastern bank of Masurdi Nadi, about 1/2 km NW of Kuldhar Village.

Section KE: Western bank of Masurdi Nadi, 1/2 km NNW of Khethari Talab.

Section NL: Western bank of a tributary near Lellapadi, about 2 km WSW of Kuldhar Village.

#### BIOSTRATIGRAPHIC ZONATION

Based on the distribution of ostracods (Table 3), one zone is recognized for the beds of Fort Member and three for the

**Table 3: Distribution of Ostracods in the Fort and Kuldhar members, Jaisalmer Formation**

Name of Species	FORT MEMBER		KULDHAR MEMBER	
	<i>T. hadibhadangensis</i> Range Zone	<i>M. perforata kachchhensis</i> - <i>F. falcula</i> Concurrent Range Zone	<i>M. perforata kachchhensis</i> - <i>G. remota</i> Concurrent Range Zone	<i>M. perforata kachchhensis</i> - <i>G. remota</i> Interval Zone
<i>Acrocythere?</i> sp.	+			
<i>Anchistrocheles</i> sp.	+			
<i>Bairdoppilata jhuraensis</i> (Khosla <i>et al.</i> )	+			
<i>Bairdoppilata</i> sp. G	+			
<i>Bhatiana indica</i> Mannikeri	+			
<i>Bythocypris rajasthanensis</i> Khosla & Jakhar, n. sp.	+			
<i>Citrella belaensis</i> Khosla <i>et al.</i>	+			
<i>Cytherelloidea bhujensis</i> Khosla <i>et al.</i>	+			
<i>C. difficila</i> Lyubimova & Mohan	+			
<i>Cytheropteron micropunctata</i> Khosla <i>et al.</i>	+			
<i>Cytheropteron</i> sp. A	+			
<i>Eocytheridea?</i> sp.	+			
<i>Eucytherura</i> sp. B	+			
<i>Fastigatocythere befotakaensis</i> (Grekoff)	+			
<i>F. flebilis</i> Khosla & Darwin Felix	+			
<i>F. jaisalmerensis</i> Khosla & Jakhar, new name	+			
<i>F. indica</i> Khosla & Manisha Kumari	+			
<i>F. juglandica malgachica</i> (Grekoff)	+			
<i>Galliaecytheridea lodraniensis</i> Khosla & Manisha Kumari	+			
Genus A	+			
<i>Glabellacythere hussaini</i> Khosla <i>et al.</i>	+			
<i>G. mathuri</i> (Khosla <i>et al.</i> )	+			
<i>Lophocythere mannikerii</i> Khosla & Jakhar, n. sp.	+			
<i>L. vertipolycostata</i> Khosla & Manisha Kumari	+			
<i>Mandawacythere kachchhensis</i> Khosla <i>et al.</i>	+			
<i>Mandelstamia biswasi</i> Khosla <i>et al.</i>	+			
<i>M. kachchhensis</i> Khosla <i>et al.</i>	+			
<i>Monoceratina fortensis</i> Khosla & Jakhar, n. sp.	+			
<i>M. mouwanaensis</i> Khosla & Manisha Kumari	+			
<i>Morkhovenicythereis rectangularis</i> Khosla <i>et al.</i>	+			
<i>Paracypris kachchhensis</i> Khosla & Darwin Felix	+			
<i>P. mohani</i> Khosla <i>et al.</i>	+			
<i>Progonocythere jaisalmerensis</i> Khosla <i>et al.</i>	+			
<i>P. tharensis</i> Khosla & Jakhar, n. sp.	+			
<i>Theriosynoecum</i> sp.	+			
<i>Trichordis hadibhadangensis</i> Khosla <i>et al.</i>	+			
<i>Bairdoppilata badiensis</i> (Khosla <i>et al.</i> )	+	+		
<i>Bairdoppilata</i> sp. E	+	+		
<i>Cytherella disjuncta</i> Lyubimova & Mohan	+	+		
<i>C. jaisalmerensis</i> Khosla & Jakhar, n. sp.	+	+		
<i>C. kalajarensis</i> Khosla & Jakhar	+	+		
<i>C. obscura</i> Lyubimova & Mohan	+	+		
<i>Cytherelloidea badiensis</i> Khosla <i>et al.</i>	+	+		
<i>C. ipis</i> Grekoff	+	+		
<i>Fastigatocythere depressa</i> (Khosla <i>et al.</i> )	+	+		
<i>Neurocythere denticulata</i> (Kulshreshtha <i>et al.</i> )	+	+		
<i>Trichordis gujaratensis</i> Khosla <i>et al.</i>	+	+		
<i>Mandelstamia depecheae</i> Khosla <i>et al.</i>	+	+		+
<i>Cytherelloidea kuldharensis</i> Khosla & Jakhar, n. sp.	+	+		
<i>C. paradifficila</i> Khosla <i>et al.</i>	+	+		
<i>Cytheropteron lellapadiensis</i> Khosla & Jakhar, n. sp.	+	+		
<i>Fabanella</i> sp.	+	+		
<i>Fastigatocythere clavata</i> (Khosla <i>et al.</i> )	+	+		
<i>F. falcula</i> (Grekoff)	+	+		
<i>Fastigatocythere</i> sp. D	+	+		

<i>Micropneumatocythere rasilis</i> Khosla & Jakhar, n. sp.	+		
<i>Monoceratina parascrobiculata</i> Khosla & Jakhar, n. sp.	+		
<i>Neurocythere kuldharensis</i> Khosla & Jakhar, n. sp.	+		
<i>N. whatleyi</i> (Khosla & Jakhar)	+		
<i>Oligocythereis minuta</i> Kulshreshtha <i>et al.</i>	+		
<i>Trichordis devexa</i> (Grekoff)	+		
<i>T. jaisalmerensis</i> (Kulshreshtha <i>et al.</i> )	+		
<i>T. praetexta</i> Grekoff	+		
<i>Cytheropteron rajasthanensis</i> Khosla & Jakhar, n. sp.	+	+	
<i>Paracypris contermia</i> Lyubimova & Mohan	+	+	
<i>Majungaella perforata kachchhensis</i> Khosla <i>et al.</i>	+	+	+
<i>Galliaecytheridea grekoffi</i> Khosla & Jakhar, n. sp.	+		+
<i>G. remota</i> Grekoff		+	
<i>Micropneumatocythere masurdiensis</i> Khosla & Jakhar, n. sp.		+	
<i>Protobuntonia</i> sp.		+	
<i>Cytheropteron</i> sp. B			+
<i>Cytheropteron</i> sp. C			+

beds of Kuldhara Member. These are described in the sequel:

***Trichordis hadibhadangensis* Range Zone** (Fig. 4)

The zone covers the Fort Member of Jaisalmer Formation, which forms the escarpments on which the Jaisalmer Fort stands. It is characterized by the restricted occurrence of *Trichordis hadibhadangensis* Khosla *et al.* because of which it is named as such. Other prominent restricted ostracods are: *Bairdoppilata jhuraensis* (Khosla *et al.*), *Bhatiana indica*

Mannikeri, *Bythocypris rajasthanensis* Khosla and Jakhar, n. sp., *Citrella belaensis* Khosla *et al.*, *Cytherelloidea bhujensis* Khosla *et al.*, *C. difficila* Lyubimova and Mohan, *Cytheropteron micropunctata* Khosla *et al.*, *Fastigatocythere befotakaensis* (Grekoff), *F. flebilis* Khosla and Darwin Felix, *F. indica* Khosla and Manisha Kumari, *F. jaisalmerensis* Khosla and Jakhar, new name, *F. juglandica malgachica* (Grekoff), *Galliaecytheridea lodraniensis* Khosla and Manisha Kumari, *Glabbellacythere hussaini* Khosla *et al.*, *G. mathuri* (Khosla *et*

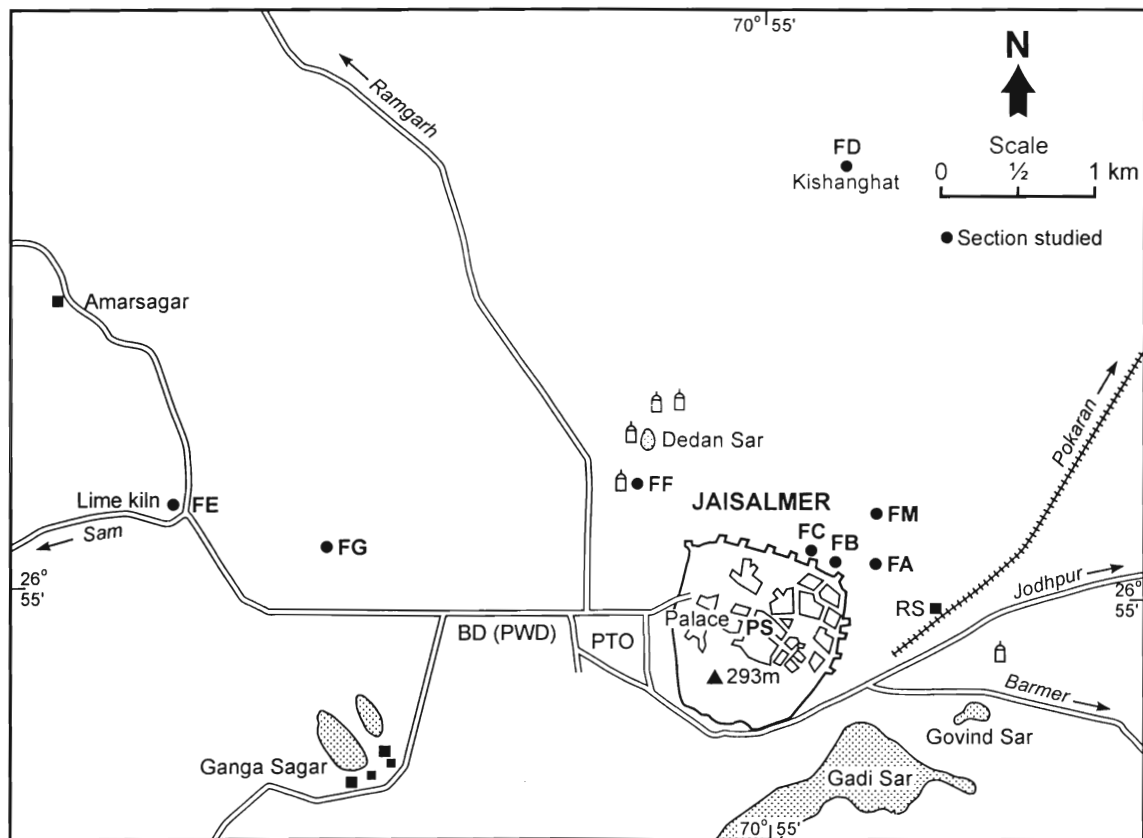


Fig. 2. Index map of Jaisalmer showing location of sections in the Fort Member.

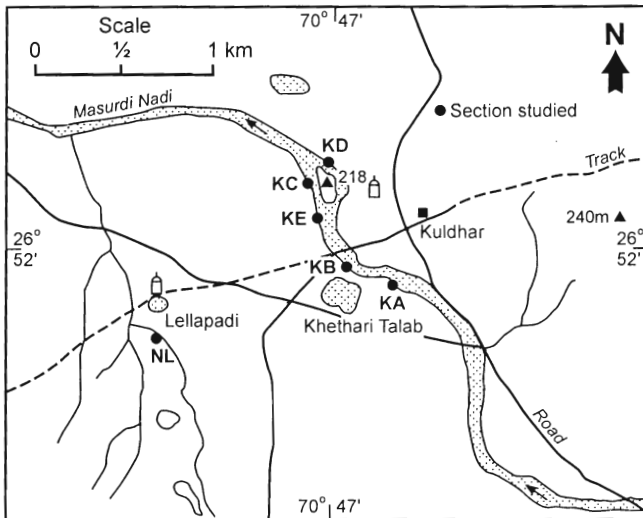


Fig. 3. Index map showing location of sections studied in the Kuldhar Member.

*al.*), *Lophocythere mannikerii* Khosla and Jakhar, n. sp., *L. vertipolycostata* Khosla and Manisha Kumari, *Mandawacythere kachchhensis* Khosla *et al.*, *Mandelstamia biswasi* Khosla *et al.*, *M. kachchhensis* Khosla *et al.*, *Monoceratina fortensis* Khosla and Jakhar, n. sp., *M. mouwanaensis* Khosla and Manisha Kumari, *Morkhovenicythereis rectangularis* Khosla *et al.*, *Paracypris kachchhensis* Khosla and Darwin Felix, *P. mohani* Khosla *et al.*, *Progonocythere jaisalmerensis* Khosla *et al.* and *P. tharensis* Khosla and Jakhar, n. sp. Besides ostracods, the zone is also rich in bivalves, brachiopods, echinoids and foraminifers. In so far as ammonites are concerned they have not been recorded from the Fort Member.

***Majungaella perforata kachchhensis* - *Fastigatocythere falcula* Concurrent Range Zone** (Fig. 5)

The zone covers basal limestone and marl of the Kuldhar Member. It is characterized by the concurrent occurrence of

*Majungaella perforata kachchhensis* Khosla *et al.* and *Fastigatocythere falcula* (Grekoff). Other prominent restricted ostracod species are: *Cytherelloidea kuldharensis* Khosla and Jakhar, n. sp., *C. paradifficila* Khosla *et al.*, *Cytheropteron lellapadiensis* Khosla and Jakhar, n. sp., *Fastigatocythere clavata* (Khosla *et al.*), *Galliaecytheridea grekoffi* Khosla and Jakhar, n. sp., *Micropneumatocythere rasilis* Khosla and Jakhar, n. sp., *Monoceratina parascrobiculata* Khosla and Jakhar, n. sp., *Neurocythere kuldharensis* Khosla and Jakhar, n. sp., *N. whatleyi* (Khosla and Jakhar), *Oligocythereis minuta* Kulshreshtha *et al.*, *Trichordis devexa* (Grekoff), *T. jaisalmerensis* (Kulshreshtha *et al.*) and *T. praetexta* Grekoff

***Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone** (Fig. 5)

The zone covers middle shale/clay beds of the Kuldhar Member. It is characterized by the concurrent occurrence of *Majungaella perforata kachchhensis* Khosla *et al.* and *Galliaecytheridea remota* Grekoff. Other restricted ostracod species are: *Micropneumatocythere masurdiensis* Khosla and Jakhar, n. sp. and *Protobuntonia* sp.

***Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Interval Zone** (Fig. 5)

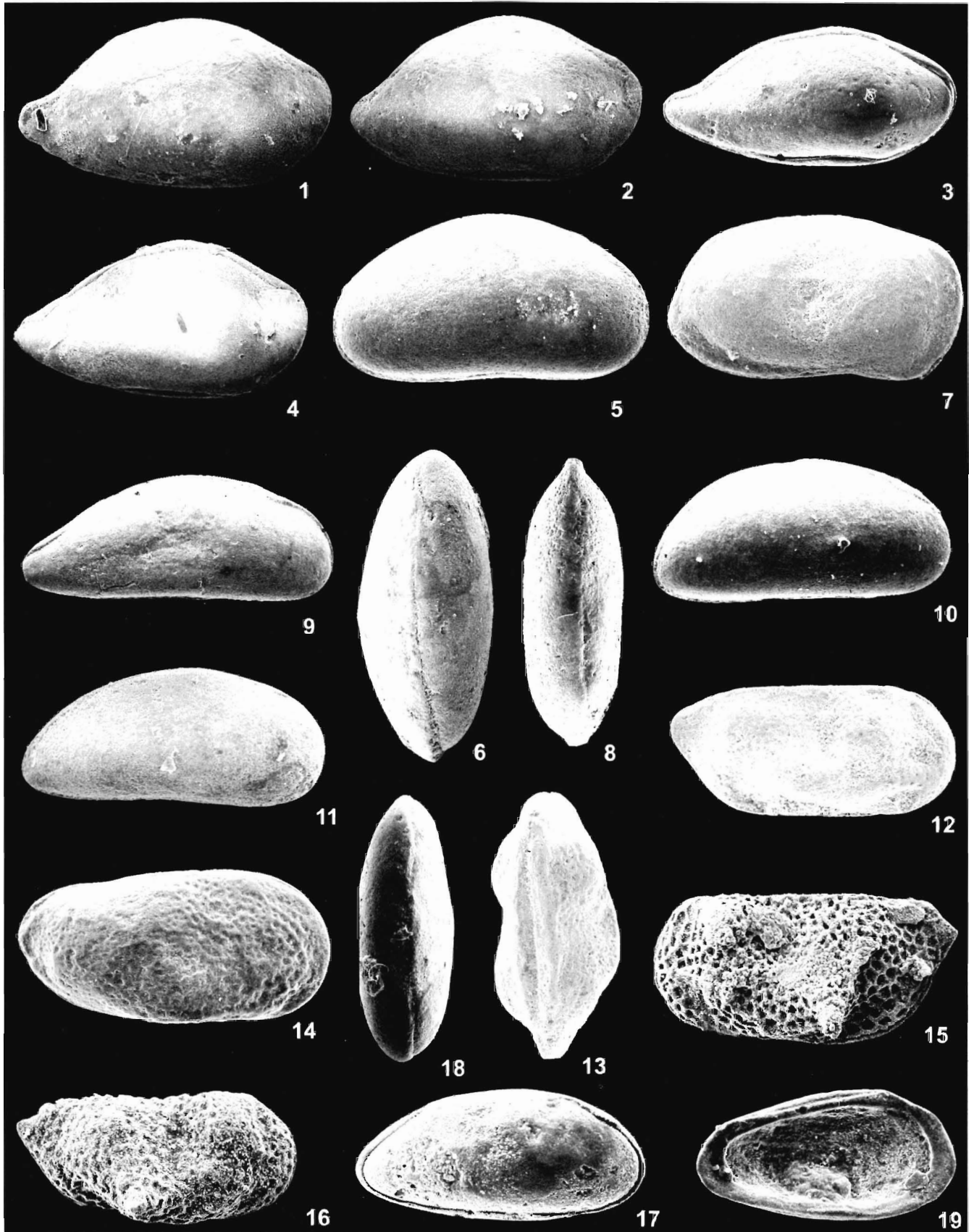
The zone covers top shale/clay beds of the Kuldhar Member and represent the interval between the Last Appearance Datum (LAD) of *Galliaecytheridea remota* Grekoff and LAD of *Majungaella perforata kachchhensis* Khosla *et al.*

**CORRELATION**

A correlation of the above described ostracod zones for the Fort and Kuldhar members of Jaisalmer District with those of the Middle Jurassic of Mainland and Northern Island Belt, Kachchh is given in Table 2. The zones - *Trichordis hadibhadangensis*, *Cytheropteron micropunctata*, *Progonocythere laeviscula*, *Fastigatocythere mouwanaensis*, *Majungaella perforata kachchhensis* - *Galliaecytheridea*

**EXPLANATION OF PLATE I**

1. *Bairdoppilata badiensis* (Khosla *et al.*)  
A carapace (SUGDMF No. 896), right valve view, x 72.
2. *Bairdoppilata jhuraensis* (Khosla *et al.*)  
A carapace (SUGDMF No. 897), right valve view, x 79.
3. *Bairdoppilata* sp. E  
A carapace (SUGDMF No. 898), right valve view, x 76.
4. *Bairdoppilata* sp. G  
A carapace (SUGDMF No. 899), right valve view, x 64.
- 5-6. *Bythocypris rajasthanensis* Khosla and Jakhar, n. sp.  
5, holotype (SUGDMF No. 900), a carapace, right valve view, x 88.  
6, paratype (SUGDMF No. 901), a carapace, dorsal view, x 88.
- 7-8. *Anchistrocheles* sp. B  
7, a carapace (SUGDMF No. 902), right valve view, x 69.  
8, a carapace (SUGDMF No. 903), dorsal view, x 79.
9. *Paracypris contermia* Lyubimova and Mohan  
A carapace (SUGDMF No. 904), right valve view, x 66.
10. *Paracypris kachchhensis* Khosla and Darwin Felix  
A carapace (SUGDMF No. 905), right valve view, x 92.
11. *Paracypris mohani* Khosla *et al.*  
A carapace (SUGDMF No. 906), right valve view, x 97.
- 12-13. *Monoceratina fortensis* Khosla and Jakhar, n. sp.  
12, holotype (SUGDMF No. 907), a carapace, right valve view, x 96.  
13, paratype (SUGDMF No. 908), a carapace, dorsal view, x 91.
14. *Monoceratina mouwanaensis* Khosla and Manisha Kumari  
A carapace (SUGDMF No. 909), right valve view, x 94.
- 15-16. *Monoceratina parascrobiculata* Khosla and Jakhar, n. sp.  
15, holotype (SUGDMF No. 910), a left valve, lateral view, x 85.  
16, paratype (SUGDMF No. 911), a right valve, lateral view, x 74.
- 17-19. *Galliaecytheridea grekoffi* Khosla and Jakhar, n. sp.  
17, holotype (SUGDMF No. 912), a carapace, right valve view, x 112.  
18, paratype I (SUGDMF No. 913), a carapace, dorsal view, x 109.  
19, paratype II (SUGDMF No. 914), a left valve, internal view, x 122.



*remota* – were originally described from Kachchh by Khosla *et al.* (1997, 2005) as assemblage zones, however, herein these are more appropriately designated as range zones.

A comparison of the proposed ostracod zones with foraminiferal zones established by Dave and Chatterjee (1996) from Jaisalmer District has already been given in Table 1.

### COMPOSITION AND AGE OF OSTRACOD FAUNA

The ostracod fauna of the Fort and Kuldhar members of Jaisalmer Formation comprises 72 species. These belong to eleven families: twenty-four species to the family Progonocytheridae, eleven species to the family Cytherellidae, nine species to the family Cytheruridae, eight species to the family Cytherideidae, six species to the family Bairdiidae, three species each to the family Paracypridae, family Bythocytheridae and family Loxoconchidae, two species to the family Trachyleberididae, one species each to the family Linnocytheridae and family Protocytheridae. One species is indeterminate. An analysis of these is given below zone wise:

#### *Trichordis hadibhadangensis* Range Zone

In all 48 species occur in this zone.

Nine species are left in open nomenclature. Eight of these are confined to the Fort Member and one extends to the Kuldhar Member. *Bairdoppilata* sp. E has been earlier recorded from the *Fastigatocythere mouwanaensis* Range Zone (Callovian, Khosla *et al.*, 2005) of Bela Island, Rann of Kachchh.

Five species are new. Four of these are confined to the Fort Member and one extends to the Kuldhar Member.

Three species - *Bhatiana indica* Mannikeri, *Fastigatocythere jaisalmerensis* Khosla and Jakhar, new name and *Progonocythere jaisalmerensis* Khosla *et al.* – have been described from the Fort Member of Jaisalmer Formation (Mannikeri, 1996; Khosla *et al.*, 2003c). Besides, *P. jaisalmerensis* also occurs in the *Trichordis hadibhadangensis* Range Zone (Bajocian-Bathonian, Khosla *et al.*, 2005), Sadhara Dome, Pachchham Island, Kachchh.

One species - *Neurocythere denticulata* (Kulshreshtha *et al.*) – has been described from the Kuldhar Member, Jaisalmer Formation. The species also occurs in the *Progonocythere laeviscula* Range Zone (late Bathonian-early Callovian, Khosla *et al.*, 1997) of Habo Dome, Mainland Kachchh.

Three species - *Cytherella disjuncta* Lyubimova and Mohan, *C. obscura* Lyubimova and Mohan and *Cytherelloidea*

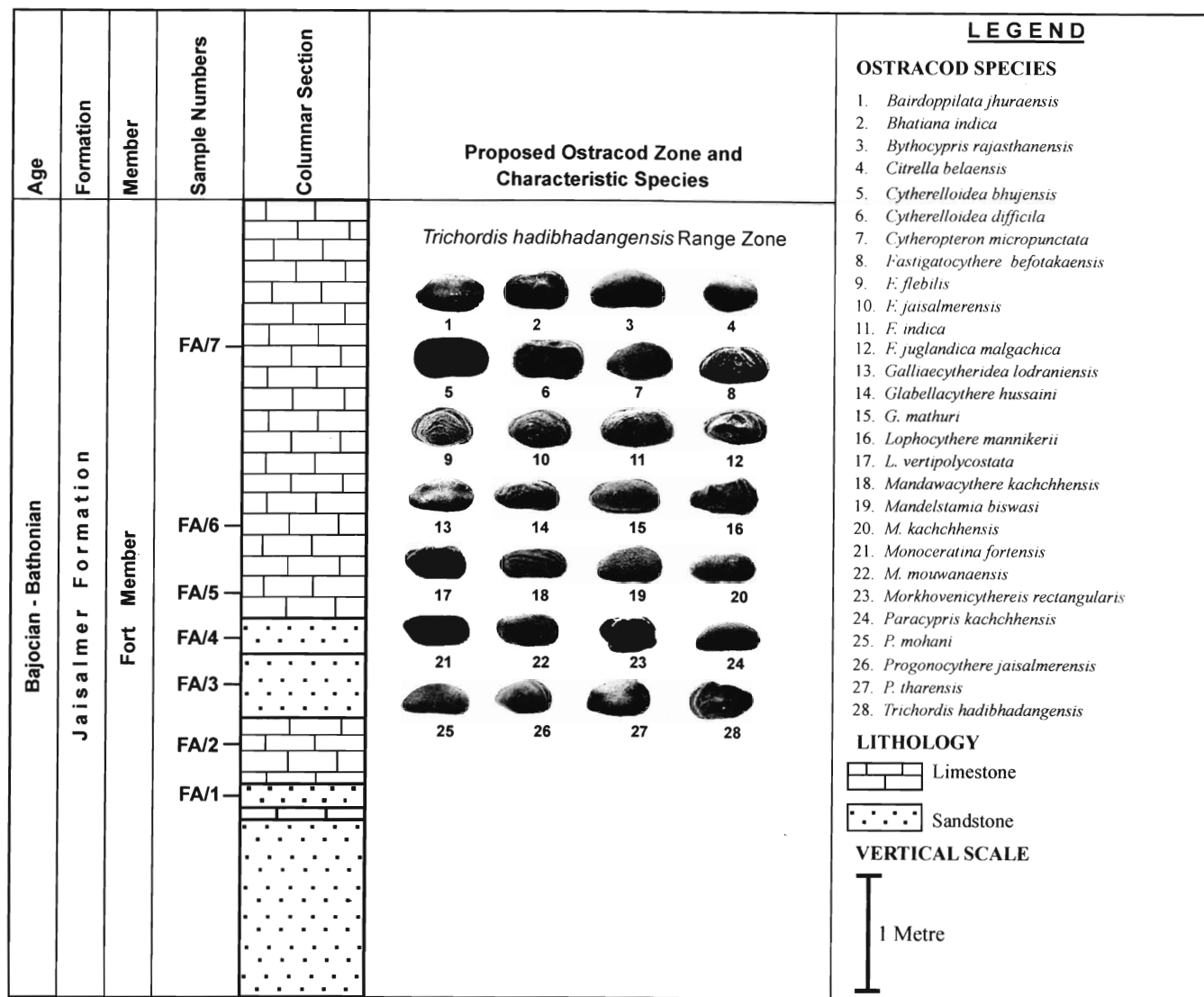


Fig. 4. Stratigraphical succession of FA Section, escarpment of the fort hill, 1/2 km NNW of Jaisalmer Railway Station.



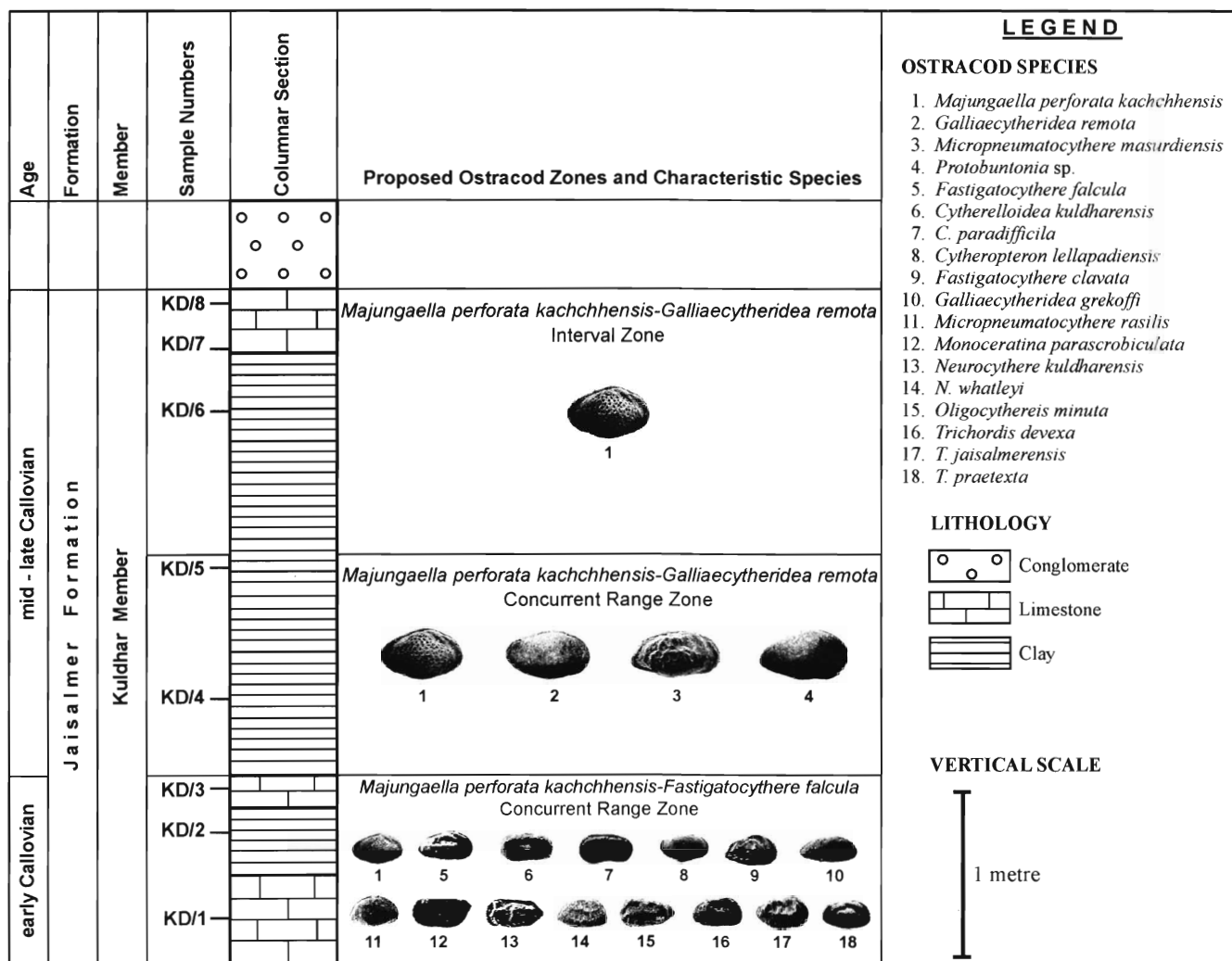


Fig. 5. Stratigraphical succession of the KD Section, eastern bank of Masurdi Nadi, about 1/2km NW of Kuldhar Village.

*difficila* Lyubimova and Mohan - have been described from the Middle Jurassic of Kachchh and Jaisalmer. The types of these species are from Khawda, Kachchh.

Three species - *Fastigatocythere indica* Khosla and Manisha Kumari, *Galliaecytheridea lodraniensis* Khosla and Manisha Kumari and *Monoceratina mouwanaensis* Khosla and Manisha Kumari - have been previously described from the *Progonocythere laeviscula* Range Zone of Bela Island, Rann of Kachchh (Khosla *et al.*, 2005).

Two species - *Fastigatocythere flebilis* Khosla and Darwin Felix and *Paracypris kachchhensis* Khosla and Darwin Felix - have so far been described from the *Trichordis hadibhadangensis* Range Zone of Khadir Island (Khosla *et al.*, 2005).

Seven species - *Cytheropteron micropunctata* Khosla *et al.*, *Mandelstamia biswasi* Khosla *et al.*, *M. kachchhensis* Khosla *et al.*, *Glabellacythere hussaini* (Khosla *et al.*), *Mandawacythere kachchhensis* Khosla *et al.*, *Morkhovenicythereis rectangularis* Khosla *et al.* and *Paracypris mohani* Khosla *et al.* - have been previously described from Bela and Khadir islands. The first 3 species are from *Trichordis hadibhadangensis* and *Cytheropteron micropunctata* (Bathonian, Khosla *et al.*, 2005) Range zones, next 3 are from the *Progonocythere laeviscula* Range Zone,

while the last is a long-ranging form (Khosla *et al.*, 2005).

Three species - *Citrella belaensis* Khosla *et al.*, *Lophocythere vertipolycostata* Khosla and Manisha Kumari and *Trichordis hadibhadangensis* Khosla *et al.* - have been previously described from the Northern Island Belt, Rann of Kachchh. The first 2 are long-ranging, while the third is confined to the *Trichordis hadibhadangensis* Range Zone (Khosla *et al.*, 2005).

Five species - *Cytherelloidea badiensis* Khosla *et al.*, *Fastigatocythere depressa* (Khosla *et al.*), *Glabellacythere mathuri* (Khosla *et al.*), *Mandelstamia depecheae* Khosla *et al.* and *Trichordis gujaratensis* Khosla *et al.* - have been originally described from the *Progonocythere laeviscula* Range Zone of Habo Dome, Mainland Kachchh (Khosla *et al.*, 1997). They occur by and large in the equivalent horizon at other localities (Khosla *et al.*, 2004, 2005).

One species - *Cytherella kalajarensis* Khosla and Jakhar - was originally described from the *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone (mid-late Callovian, Khosla *et al.*, 1997) of Habo Dome. The species has been also recorded from the equivalent horizon in Jhura Dome, Mainland Kachchh (Khosla *et al.*, 2004).

Two species - *Cytherelloidea bhujensis* Khosla *et al.* and *Majungaella perforata kachchhensis* Khosla *et al.* - are long-

ranging forms. They were described from *Progonocythere laeviscula* Range Zone to *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone of Habo Dome (Khosla *et al.*, 1997).

Two species - *Bairdoppilata badiensis* (Khosla *et al.*) and *B. jhuraensis* (Khosla *et al.*) - were described from the basal part of *Progonocythere laeviscula* Range Zone of Jhura Dome (Khosla *et al.*, 2004).

One species - *Cytherelloidea ipis* (Grekoff) - characteristic of the Early Callovian of Madagascar has been recorded from the *Progonocythere laeviscula* Range Zone of Mainland Kachchh (Khosla *et al.*, 1997, 2004).

One species - *Fastigatocythere juglandica malgachica* (Grekoff) - extends from Bajocian to Late Bathonian, while another species - *Fastigatocythere befotakaensis* (Grekoff) - extends from Mid/Late Bathonian to Callovian. The types of both these species are from the Majunga Basin, Madagascar (Grekoff, 1963).

From the foregoing analysis, it may be inferred that though some species are either left in open nomenclature or are new, a great majority of the species have been described and/or recorded from *Trichordis hadibhadangensis*, *Cytheropteron micropunctata* and *Progonocythere laeviscula* Range zones, ranging from Bajocian to Early Callovian age. The predominant occurrence of species such as - *Cytheropteron micropunctata*, *Fastigatocythere befotakaensis*, *F. flebilis*, *F. juglandica malgachica*, *Mandelstamia biswasi*, *M. kachchhensis*, *Paracypris kachchhensis*, *Progonocythere jaisalmerensis* and *Trichordis hadibhadangensis* - characteristic of *Trichordis hadibhadangensis* Range Zone in the Northern Island Belt, Rann of Kachchh suggest a Bajocian to Bathonian age for the zone under discussion.

#### ***Majungaella perforata kachchhensis* - *Fastigatocythere falcata* Concurrent Range Zone**

Thirty-one species occur in this zone.

Three species are left in open nomenclature. One of these extends from the Fort Member.

Eight species are new. One of these extends from the Fort Member.

Ten species - *Bairdoppilata badiensis* (Khosla *et al.*), *Cytherella disjuncta* Lyubimova and Mohan, *C. kalajarensis*

Khosla and Jakhar, *C. obscura* Lyubimova and Mohan, *Cytherelloidea badiensis* Khosla *et al.*, *C. ipis* Grekoff, *Fastigatocythere depressa* (Khosla *et al.*), *Mandelstamia depecheae* Khosla *et al.*, *Neurocythere denticulata* (Kulshreshtha *et al.*) and *Trichordis gujaratensis* Khosla *et al.* - extend from the *Trichordis hadibhadangensis* Range Zone and their age significance has already been discussed.

Two species - *Oligocythereis minuta* Kulshreshtha *et al.* and *Trichordis jaisalmerensis* (Kulshreshtha *et al.*) - have been described from the Kuldhar Member of Jaisalmer Formation. The latter species has been also recorded from the Middle Jurassic of Kachchh (Khosla *et al.*, 1997, 2005).

One species - *Majungaella perforata kachchhensis* Khosla *et al.* - is long ranging and extends from *Progonocythere laeviscula* Range Zone to *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone in Habo Dome (Khosla *et al.*, 1997).

One species - *Paracypris contermia* Lyubimova and Mohan - has been widely recorded from the Middle Jurassic of Kachchh and Jaisalmer. Its types are from Khawda, Pachchham Island, Kachchh.

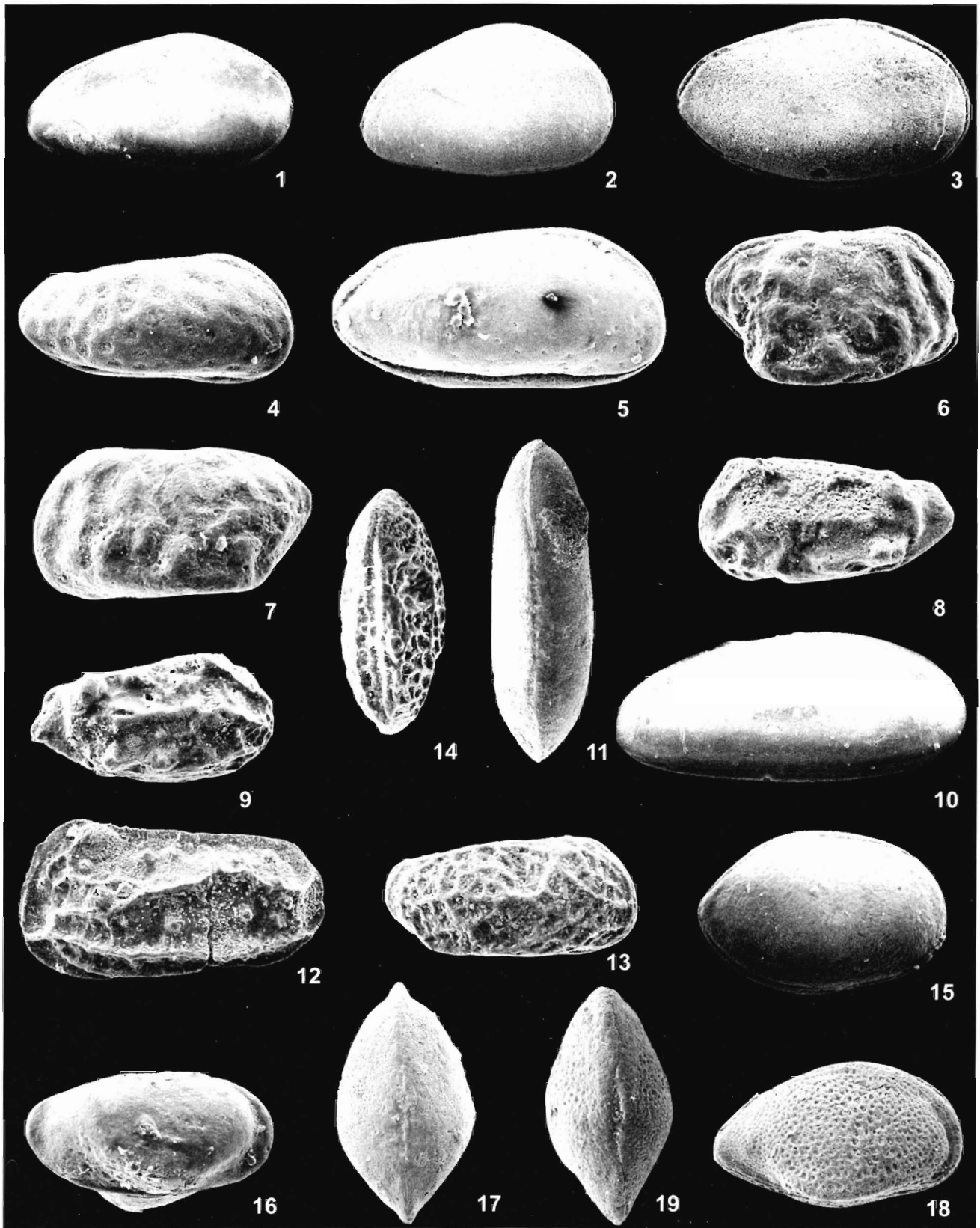
Three species - *Cytherelloidea paradifficila* Khosla *et al.*, *Fastigatocythere clavata* (Khosla *et al.*) and *Neurocythere whatleyi* (Khosla and Jakhar) - have been described from the *Progonocythere laeviscula* Range Zone of Habo Dome, Mainland Kachchh (Khosla *et al.*, 1997).

Three species - *Fastigatocythere falcata* (Grekoff), *Trichordis devexa* (Grekoff), and *T. praetexta* Grekoff - have been originally described from the Majunga Basin, Madagascar. *T. praetexta* extends from Mid-Late Bathonian to Callovian, while other two occur in the Callovian. *T. devexa* is characteristic of the Middle Callovian. All these species occur restricted in the *Progonocythere laeviscula* Range Zone of Mainland Kachchh (Khosla *et al.*, 1997).

Although the nominative species of *Progonocythere laeviscula* Range Zone recognized from Mainland and Rann of Kachchh, Kachchh has not been found in the *Majungaella perforata kachchhensis* - *Fastigatocythere falcata* Concurrent Range Zone at Kuldhar, a majority of other ostracod species recorded from the latter zone have been previously described and/or recorded from the former zone, particularly from its upper part which abounds in *Majungaella perforata kachchhensis*

### EXPLANATION OF PLATE II

- |  |   |
|--|---|
| 1-2. <i>Galliaecytheridea lodraniensis</i> Khosla and Manisha Kumari<br>1, a male carapace (SUGDMF No. 915), right valve view, x 80.<br>2, a female carapace (SUGDMF No. 916), right valve view, x 84. | 10, a carapace (SUGDMF No. 924), left valve view, x 81.<br>11, a carapace (SUGDMF No. 925), dorsal view, x 64.  |
| 3. <i>Galliaecytheridea remota</i> (Grekoff)<br>A female carapace (SUGDMF No. 917), right valve view, x 80.  | 12. <i>Acrocythere?</i> sp.<br>A left valve (SUGDMF No. 926), lateral view, x 175.  |
| 4. <i>Glabbellacythere hussaini</i> Khosla <i>et al.</i><br>A carapace (SUGDMF No. 918), right valve view, x 96.   | 13-14. <i>Eucytherura</i> sp. B<br>13, a carapace (SUGDMF No. 927), right valve view, x 134.<br>14, a carapace (SUGDMF No. 928), dorsal view, x 124.  |
| 5. <i>Glabbellacythere mathuri</i> (Khosla <i>et al.</i> )<br>A carapace (SUGDMF No. 919), right valve view, x 100.  | 15. <i>Citrella belaensis</i> Khosla <i>et al.</i><br>A female carapace (SUGDMF No. 929), right valve view, x 127.  |
| 6-7. <i>Morkhovenicythereis rectangularis</i> Khosla <i>et al.</i><br>6, a carapace (SUGDMF No. 920), right valve view, x 124.<br>7, a carapace (SUGDMF No. 921), left valve view, x 134.              | 16-17. <i>Cytheropteron lellapadiensis</i> Khosla and Jakhar, n. sp.<br>16, holotype (SUGDMF No. 930), a carapace, right valve view, x 82.<br>17, paratype (SUGDMF No. 931), a carapace, dorsal view, x 92. |
| 8-9. <i>Oligocythereis minuta</i> Kulshreshtha <i>et al.</i><br>8, a carapace (SUGDMF No. 922), left valve view, x 160.<br>9, a carapace (SUGDMF No. 923), right valve view, x 144.                    | 18-19. <i>Cytheropteron micropunctata</i> Khosla <i>et al.</i><br>18, a carapace (SUGDMF No. 932), right valve view, x 115.<br>19, a carapace (SUGDMF No. 933), dorsal view, x 115.                         |
| 10-11. <i>Eocytheridea?</i> sp.  |   |



and *Fastigatocythere falcula* in Kachchh. On the basis of occurrence of characteristic Callovian species viz. *Cytherelloidea ipis* Grekoff, *Fastigatocythere falcula* (Grekoff) and *Trichordis devexa* (Grekoff), an early Callovian age is assigned to the *Majungaella perforata kachchhensis* - *Fastigatocythere falcula* Concurrent Range Zone.

***Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone**

Six species occur in this zone.

One species is left in open nomenclature and two species are new.

Two species - *Majungaella perforata kachchhensis* Khosla *et al.* and *Paracypris contermia* Lyubimova and Mohan - extend from the underlying zone and their age significance has already been discussed.

One species - *Galliaecytheridea remota* Grekoff - originally described from the Middle and Late Callovian of Madagascar (Grekoff, 1963) is characteristic of equivalent horizon - *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone - in Mainland and Northern Island Belt, Kachchh (Khosla *et al.* 1997, 2005).

The *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone of Kuldhar, Jaisalmer is assigned a Mid-Late Callovian age.

***Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Interval Zone**

Five species occur in this zone.

Two species are left in open nomenclature and one species is new.

Two species - *Majungaella perforata kachchhensis* Khosla *et al.* and *Mandelstamia depecheae* Khosla *et al.*, - extend from the underlying zones. They are characteristic Callovian forms.

Like the underlying zone, the *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Interval Zone is also assigned a Mid-Late Callovian age.

### SYSTEMATIC PALAEONTOLOGY

The authors have assigned ostracod genera to the families following original designations proposed by their respective authors or Grekoff (1963), Dépêche (Dépêche *et al.*, 1987), Whatley and Ballent (1996, 2004), Whatley and Boomer (2000), Whatley *et al.* (2001) and Prof. Whatley (personal communication). The families have been arranged as per classification adopted in the Treatise on Invertebrate Paleontology, Part Q, Ostracoda by Moore and Pitrat (1961). The diagnosis and description are given only for new species. Brief morphological comments are given under the heading "Remarks" in species left in open nomenclature or where taxonomic changes have been proposed. Routine descriptions have been omitted for sake of brevity in already known and established species in which cases only synonymies, material and dimensions are given. All the illustrated specimens are in the collection of the Micropalaeontological Laboratory of the Department of Geology, Mohanlal Sukhadia University, Udaipur, Rajasthan and they are designated by SUGDMF No. 896 to 1009 in the text and the plate explanations.

*Subclass Ostracoda* Latreille, 1806

*Order Podocopa* Müller, 1894

*Suborder Podocopa* Sars, 1866

*Superfamily Bairdiacea* Sars, 1866

*Family Bairdiidae* Sars, 1888

*Subfamily Bairdiinae* Sars, 1888

*Genus Bairdoppilata* Coryell, Sample and Jennings, 1935

*Bairdoppilata badiensis* (Khosla, Jakhar and Mohammed, 2004)

(Pl. I, fig. 1)

*Bairdia* sp. A Khosla and Jakhar, 1999, p. 45, pl. 3, fig. 9.

*Bairdia badiensis* Khosla, Jakhar and Mohammed, 2004, pp. 23-24, pl. 1, figs. 2-3.

*Bairdoppilata badiensis* (Khosla, Jakhar and Mohammed), - Khosla *et al.*, 2005, p. 32, pl. 1, fig. 1.

*Material*: 18 carapaces and 8 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 896), length 0.82, height 0.45, width 0.38.

*Bairdoppilata jhuraensis* (Khosla, Jakhar and Mohammed, 2004)

(Pl. I, fig. 2)

*Bairdia jhuraensis* Khosla, Jakhar and Mohammed, 2004, p. 24, pl. 1, figs. 4-5.

*Bairdoppilata jhuraensis* (Khosla, Jakhar and Mohammed), - Khosla *et al.*, 2005, p. 32, pl. 1, fig. 2.

*Material*: 13 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 897), length 0.70, height 0.40, width 0.33.

*Bairdoppilata* sp. E

(Pl. I, fig. 3)

*Bairdoppilata* sp. E Khosla *et al.*, 2005, p. 32, pl. 1, fig. 3.

*Material*: 5 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 898), length 0.72, height 0.34, width 0.29 mm.

*Bairdoppilata* sp. G

(Pl. I, fig. 4)

*Material*: 1 carapace.

*Remarks*: The species is characterized by an elongate-subdeltoid outline in lateral view; left valve larger than right valve, overlapping along dorsal and ventral margins; dorsal margin convex; ventral margin straight; anterior margin downwardly rounded; anterodorsal angle above mid-height; posterior margin drawn out and sharply angulated below mid-height; valve surface smooth.

*Bairdoppilata* sp. G differs from *Bairdoppilata* sp. E recorded in this work in having posterior end sharply angulated below mid-height, which is rounded in the latter species.

*Dimensions* (mm): A carapace (SUGDMF No. 899), length 0.86, height 0.46, width 0.40.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sample No. FA/7.

*Subfamily Bythocypridinae* Maddocks, 1969

*Genus Bythocypris* Brady, 1880

*Bythocypris rajasthanensis* Khosla and Jakhar, n. sp.

(Pl. I, figs. 5-6)

*Material*: 28 carapaces and 1 valve.

*Etymology*: After the district of Jaisalmer.

*Diagnosis*: A species of *Bythocypris* characterized by reniform outline in lateral view; dorsal margin symmetrically convex; anterior and posterior ends broadly rounded; ventral margin slightly concave.

*Holotype*: Pl. I, fig. 5.

*Description*: Carapace reniform in lateral outline and

biconvex in the dorsal; greatest height and width at middle; greatest length below mid-height; left valve slightly larger than right valve, overlapping along anterodorsal and ventral margins; dorsal margin symmetrically convex; ventral margin slightly concave; anterior and posterior margins broadly rounded; valve surface smooth; internal characters not known.

*Dimensions* (mm): Holotype (SUGDMF No. 900), a carapace, length 0.67, height 0.37, width 0.30. Paratype (SUGDMF No. 901), a carapace, length 0.67, height 0.37, width 0.34.

*Remarks:* *Bythocypris rajasthanensis* Khosla and Jakhar, n. sp. resembles *Bythocypris* sp. recorded from the Callovian-Oxfordian of the Hamakhtesh Hagadol Section, Southern Israel by Rosenfeld and Honigstein (1991) in overall lateral outline but differs in having broadly rounded posterior margin, which is comparatively narrowly rounded in *Bythocypris* sp.

*Type Locality:* Section FF, near Chattaris of Vyas Family, 1/2km SSW of Dedan Sar.

*Type Horizon:* Yellow fossiliferous limestone (Sample No. FF/1), Fort Member (Bajocian-Bathonian), Jaisalmer Formation.

*Occurrence:* *Trichordis hadibhadangensis* Range Zone, Sections FF and FM.

*Genus* *Anchistrocheles* Brady and Norman, 1889

*Anchistrocheles* sp. B

(Pl. I, figs. 7-8)

*Material:* 3 carapaces.

*Remarks:* The species has following characteristics: Carapace subreniform in lateral outline, with greatest height posterior to middle; anterior and posteroventral marginal regions compressed; left valve slightly larger than right valve, overlapping along anterodorsal, posterodorsal and mid-ventral margins; dorsal margin weakly arched; ventral distinctly concave at anterior 1/3rd of length; anterior bluntly rounded; posterior steeply sloping down for upper 2/3rd of height, lower 1/3rd rounded; valve surface marked by a shallow, median, vertical sulcus, rest of the area smooth.

The present species differs from *Anchistrocheles* sp. recorded from the Middle Jurassic of Jumara Dome, Mainland Kachchh by Khosla and Jakhar (1999) in lack of distinct spines along posteroventral and anterior margins as observed in the latter species.

*Dimensions* (mm): A carapace (SUGDMF No. 902), length 0.80, height 0.45, width 0.29. A carapace (SUGDMF No. 903), length 0.70, height 0.37, width 0.27.

*Occurrence:* *Trichordis hadibhadangensis* Range Zone, Sections FB and FF.

*Superfamily* *Cypridacea* Baird, 1845

*Family* *Paracyprididae* Sars, 1923

*Genus* *Paracypris* Sars, 1866

*Paracypris contermia* Lyubimova and Mohan, 1960

(Pl. I, fig. 9)

*Paracypris contermia* Lyubimova and Mohan, in Lyubimova *et al.*, 1960, pp. 22-23, pl. 2, fig. 2. – Guha, 1977, p. 86, pl. 3, fig. 19. – Kulshreshtha *et al.*, 1985, p. 125, figs. 5.14, 5.17. – Neale and Singh, 1986, p. 363. – Khosla *et al.*, 1997, p. 36, pl. 7, fig. 16. – Khosla and Jakhar, 1999, p. 45, pl. 3, fig. 7. – Khosla *et al.*, 2005, p. 33, pl. 1, fig. 5.

*Material:* 4 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 904), length 0.88, height 0.37, width 0.22.

*Paracypris kachchhensis* Khosla and Darwin Felix, 2005

(Pl. I, fig. 10)

*Paracypris kachchhensis* Khosla and Darwin Felix, 2005, p. 33, pl. 1,

figs. 6-7.

*Material:* 9 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 905), length 0.61, height 0.29, width 0.29.

*Paracypris mohani* Khosla, Darwin Felix and

Manisha Kumari, 2005

(Pl. I, fig. 11)

*Paracypris mohani* Khosla, Darwin Felix and Manisha Kumari, in Khosla *et al.*, 2005, pp. 33-35, pl. 1, figs. 8-9.

*Material:* 8 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 906), length 0.59, height 0.26, width 0.22.

*Superfamily* *Cytheracea* Baird, 1850

*Family* *Bythocytheridae* Sars, 1866

*Genus* *Monoceratina* Roth, 1928

*Monoceratina fortensis* Khosla and Jakhar, n. sp.

(Pl. I, figs. 12-13)

*Material:* 26 carapaces and 7 valves.

*Etymology:* After Jaisalmer Fort.

*Diagnosis:* A species of *Monoceratina* characterized by subrhomboidal outline in lateral view; a median vertical sulcus bounded by a rib-like prominent swelling on its anterior, ventral and posterior sides.

*Holotype:* Pl. I, fig. 12.

*Description:* Carapace subrhomboidal in lateral outline, greatest height equal both in anterior and posterior halves. Overlap indistinct. Dorsal and ventral margins straight and parallel; anterior margin broad and evenly rounded; posterior margin drawn out in a subdorsal caudal process. In dorsal view carapace biconvex with a prominent median constriction; posterior end compressed. Valve surface marked by a vertical sulcus, extending down from mid-dorsal to median region, bounded by a rib-like prominent swelling on its anterior, ventral and posterior sides; rest of the area faintly pitted.

*Dimensions* (mm): Holotype (SUGDMF No. 907) a carapace, length 0.56, height 0.29, width 0.24. Paratype (SUGDMF No. 908) a carapace, length 0.56, height 0.25, width 0.22.

*Remarks:* This species resembles *Monoceratina vulsa* (Jones and Sherborn, 1888) recorded widely from the Middle Jurassic of Europe and other parts of the world in overall shape and surface ornamentation. The latter species, however, unlike the present species, has coarsely punctate ornament. The species also resembles *Monoceratina mouwanaensis* Khosla and Manisha Kumari, 2005, from the Jurassic of Mouwana Hill, Bela Island, Rann of Kachchh and also recorded herein this work from the Fort Member, Jaisalmer in overall appearance. The latter species, however, lacks a rib-like prominent swelling bounding median vertical sulcus on its anterior, ventral and posterior sides.

*Type Locality:* Section FM, escarpment of the fort hill about 1km NNW of Jaisalmer Railway Station.

*Type Horizon:* Shale bed (Sample No. FM/5), Fort Member (Bajocian-Bathonian), Jaisalmer Formation.

*Occurrence:* *Trichordis hadibhadangensis* Range Zone, Section FM.

*Monoceratina mouwanaensis* Khosla and

Manisha Kumari, 2005

(Pl. I, fig. 14)

*Monoceratina mouwanaensis* Khosla and Manisha Kumari, in Khosla *et al.*, 2005, pp. 35-36, pl. 1, figs. 12-13.

*Material:* 6 carapaces and 1 valve.

*Dimensions* (mm): A carapace (SUGDMF No. 909), length

0.62, height 0.32, width 0.22.

*Monoceratina parascrobiculata* Khosla and Jakhar, n. sp.  
(Pl. I, figs. 15-16)

*Material*: 18 valves.

*Etymology*: From Greek, meaning as in parallel; with reference to its resemblance with *Monoceratina scrobiculata* Triebel and Bartenstein, 1938.

*Diagnosis*: A subrhomboidal species of *Monoceratina* characterized by dense reticulate ornamentation over entire valve surface; a median vertical sulcus; and a large backwardly tapering spine in posteroventral region.

*Holotype*: Pl. I, fig. 15.

*Description*: Carapace subrhomboidal in lateral outline, with greatest height posterior to middle. Dorsal margin medially concave in right valve and straight in left valve; ventral margin partially obscured by overhanging surface ornamentation in right valve and straight, slightly converging in left valve; anterior margin broad and evenly rounded; posterior margin drawn out in an angulated, subdorsal caudal process. Valve densely reticulate over entire valve surface and with a median vertical sulcus, extending down from mid-dorsal to median region, and two nodes each on its anterior and posterior sides, posteroventral node being produced in a prominent backwardly tapering spine.

*Dimensions* (mm): Holotype (SUGDMF No. 910), a left valve, length 0.67, height 0.32. Paratype (SUGDMF No. 911), a right valve, length 0.70, height 0.34.

*Remarks*: The species resembles *Monoceratina scrobiculata* Triebel and Bartenstein, 1938, in shape and overall ornamentation but differs in being densely reticulated over entire valve surface. *M. scrobiculata*, unlike our species, has smooth caudal process. Besides a specimen illustrated by Whatley *et al.* (2001, pl. 1, fig. 3) from the Callovian, Oxford clay of Southern England exhibits a prominent eye tubercle and at least three distinct ribs in posterodorsal region.

*Type Locality*: Section KC, western bank of Masurdi Nadi, about 1km NNW of Khethari Talab.

*Type Horizon*: Clay bed (Sample No. KC/7), Kuldhar Member (early Callovian), Jaisalmer Formation.

*Occurrence*: *Majungaella perforata kachchhensis* - *Fastigatocythere falcula* Concurrent Range Zone, Sections KA, KC and KD.

Family **Cytherideidae** Sars, 1925

Subfamily **Cytherideinae** Sars, 1925

Genus **Galliaecytheridea** Oertli, 1957

*Galliaecytheridea grekoffi* Khosla and Jakhar, n. sp.  
(Pl. I, figs. 17-19)

*Material*: 13 carapaces and 5 valves.

*Etymology*: In honour of Dr. N. Grekoff in recognition of his contributions to the Jurassic ostracods of the Majunga Basin, Madagascar.

*Diagnosis*: A small, elongate-subovate species of *Galliaecytheridea* characterized by distinctly arched dorsal margin; weakly convex ventral margin; narrowly rounded posterior margin below mid-height; and smooth valve surface.

*Holotype*: Pl. I, fig. 17.

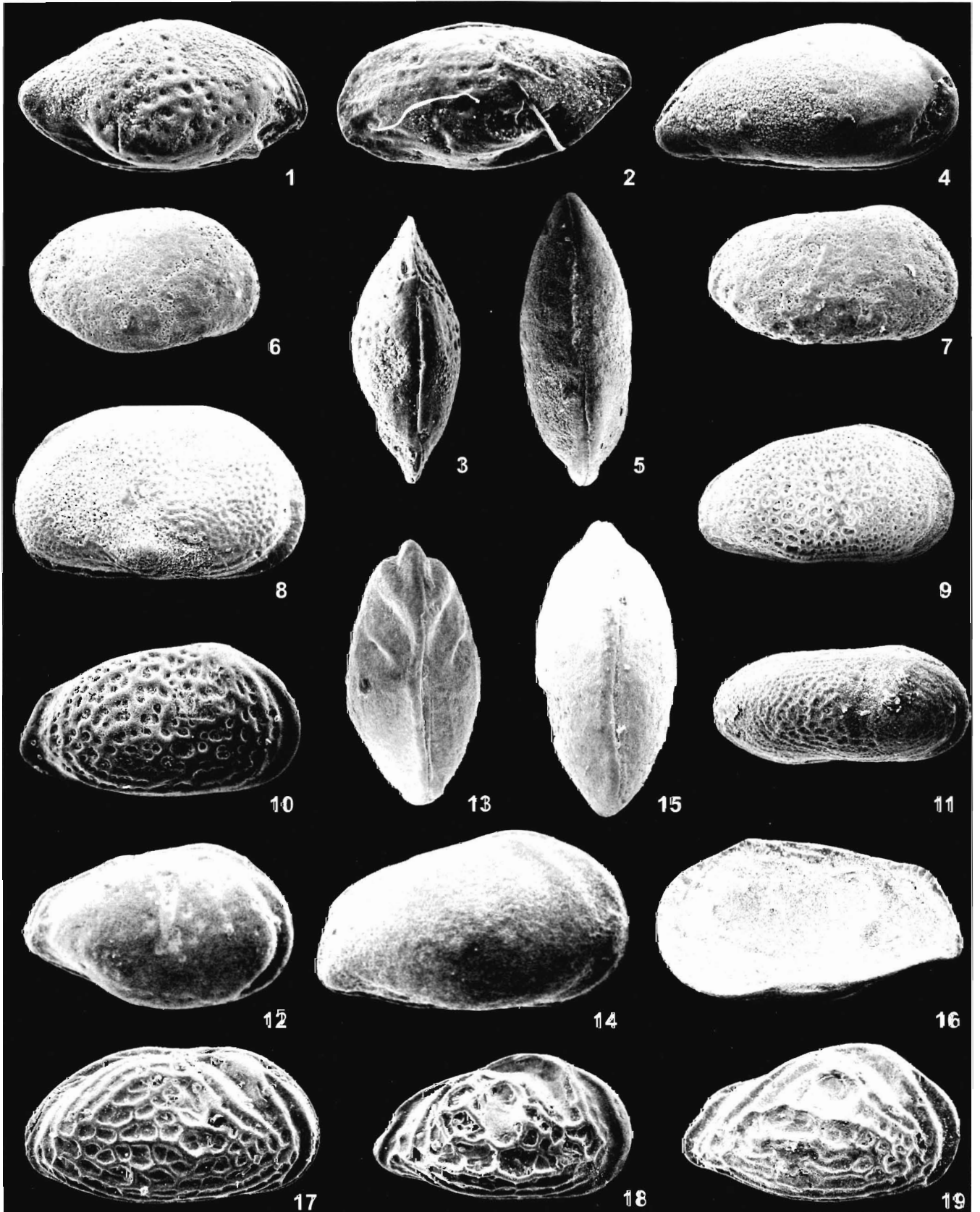
*Description*: Carapace small, elongate-subovate in lateral outline and biconvex in the dorsal; greatest height and width near middle. Left valve larger than right valve and except mid-dorsal region distinctly overlapping all along margin; dorsal margin arched; ventral margin weakly convex; anterior margin broadly rounded, apex at mid height; posterior margin narrowly rounded below mid-height. Valve surface smooth. Inner lamella of moderate width; line of concrescence and inner margin coincide; selvage peripheral. Hinge antimerodont.

*Dimensions* (mm): Holotype (SUGDMF No. 912), a carapace, length 0.48, height 0.24, width 0.18. Paratype I (SUGDMF No. 913), a carapace, length 0.46, height 0.24, width 0.18. Paratype II (SUGDMF No. 914), a left valve, length 0.40, height 0.21.

*Remarks*: *Galliaecytheridea grekoffi* Khosla and Jakhar, n. sp. differs from *Galliaecytheridea lodraniensis* Khosla and Manisha Kumari, 2005 described from the Middle Jurassic of Bela Island, Rann of Kachchh and also recorded in this work in

### EXPLANATION OF PLATE III

- 1-3. *Cytheropteron rajasthanensis* Khosla and Jakhar, n. sp.  
1, holotype (SUGDMF No. 934), a carapace, right valve view, x 154.  
2, paratype I (SUGDMF No. 935), a carapace, left valve view, x 162.  
3, paratype II (SUGDMF No. 936), a carapace, dorsal view, x 150.
- 4-5. *Cytheropteron* sp. A  
4, a carapace (SUGDMF No. 937), right valve view, x 110.  
5, a carapace (SUGDMF No. 938), dorsal view, x 112.
6. *Cytheropteron* sp. B  
A female carapace (SUGDMF No. 939), right valve view, x 87.
7. *Cytheropteron* sp. C  
A carapace (SUGDMF No. 940), right valve view, x 102.
8. *Theriosynoecum* sp.  
A carapace (SUGDMF No. 941), right valve view, x 66.
9. *Mandelstamia biswasi* Khosla *et al.*  
A carapace (SUGDMF No. 942), right valve view, x 83.
10. *Mandelstamia depecheae* Khosla *et al.*  
A right valve (SUGDMF No. 943), lateral view, x 93.
11. *Mandelstamia kachchhensis* Khosla *et al.*  
A carapace (SUGDMF No. 944), right valve view, x 83.
- 12-13. *Progonocythere jaisalmerensis* Khosla *et al.*  
12, holotype (SUGDMF No. 738), a female carapace, right valve view, x 115.  
13, paratype (SUGDMF No. 945), a male carapace, dorsal view, x 95.
- 14-16. *Progonocythere tharensis* Khosla and Jakhar, n. sp.  
14, holotype (SUGDMF No. 946), a carapace, right valve view, x 76.  
15, paratype I (SUGDMF No. 947), a carapace, dorsal view, x 73.  
16, paratype II (SUGDMF No. 948), a right valve, internal view x 73.
17. *Fastigatocythere befotakaensis* (Grekoff)  
A carapace (SUGDMF No. 949), right valve view, x 69.
18. *Fastigatocythere clavata* (Khosla *et al.*)  
A right valve (SUGDMF No. 950), lateral view, x 96.
19. *Fastigatocythere depressa* (Khosla *et al.*)  
A right valve (SUGDMF No. 951), lateral view, x 76.



being more elongate and less high. Besides dorsal margin in the present species is arched, while in *G. lodraniensis* strongly convex with an angulation.

*Type Locality*: Section KC, western bank of Masurdi Nadi, about 1km NNW of Khethari Talab.

*Type Horizon*: Clay bed (Sample No. KC/7), Kuldhar Member (early Callovian), Jaisalmer Formation.

*Occurrence*: *Majungaella perforata kachchhensis* – *Fastigatocythere falcula* Concurrent Range Zone, Sections KA and KC; *Majungaella perforata kachchhensis* – *Galliaecytheridea remota* Concurrent Range Zone and *Majungaella perforata kachchhensis* – *Galliaecytheridea remota* Interval Zone, Section KB.

*Galliaecytheridea lodraniensis* Khosla and Manisha Kumari, 2005  
(Pl. II, figs. 1-2)

*Galliaecytheridea lodraniensis* Khosla and Manisha Kumari, in Khosla *et al.*, 2005, p. 37, pl. 2, figs. 1-4.

*Material*: 22 carapaces and 26 valves.

*Dimensions* (mm): A male carapace (SUGDMF No. 915), length 0.61, height 0.30, width 0.31. A female carapace (SUGDMF No. 916), length 0.56, height 0.32, width 0.31.

*Galliaecytheridea remota* Grekoff, 1963  
(Pl. II, fig. 3)

*Galliaecytheridea remota* Grekoff, 1963, pp. 1745-46, pl. 6, figs. 152-155. – Khosla *et al.*, 2005, p. 37, pl. 2, fig. 5.

*Pirileberis remota* (Grekoff). – Khosla *et al.*, 1997, p. 28, pl. 6, figs. 13-15. – Khosla and Jakhar, 1999, p. 45, pl. 3, fig. 4.

*Material*: 102 carapaces and 7 valves.

*Dimensions* (mm): A female carapace (SUGDMF No. 917), length 0.69, height 0.42, width 0.32.

*Genus Glabellacythere* Wienholz, 1967

*Glabellacythere hussaini* Khosla, Darwin Felix and Manisha Kumari, 2005  
(Pl. II, fig. 4)

*Glabellacythere hussaini* Khosla, Darwin Felix and Manisha Kumari, in Khosla *et al.*, 2005, pp. 37-38, pl. 2, figs. 7-9.

*Material*: 2 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 918), length 0.53, height 0.26, width 0.27.

*Glabellacythere mathuri* (Khosla, Jakhar and Mohammed, 1997)  
(Pl. II, fig. 5)

*Mesocytheridea? mathuri* Khosla, Jakhar and Mohammed, 1997, pp. 26-28, pl. 6, fig. 16, pl. 7, figs. 1-2.

*Glabellacythere mathuri* (Khosla, Jakhar and Mohammed). – Khosla *et al.*, 2005, p. 38, pl. 2, fig. 10.

*Material*: 2 carapaces and 3 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 919), length 0.62, height 0.32, width 0.30.

*Genus Morkhovenicythereis* Gründel, 1975

*Morkhovenicythereis rectangularis* Khosla, Manisha Kumari and Darwin Felix, 2005  
(Pl. II, figs. 6-7)

*Morkhovenicythereis rectangularis* Khosla, Manisha Kumari and Darwin Felix, in Khosla *et al.*, 2005, pp. 38-39, pl. 2, figs. 12-14.

*Material*: 26 carapaces and 7 valves.

*Dimensions* (mm): A carapace, (SUGDMF No. 920), length 0.37, height 0.22, width 0.27. A carapace, (SUGDMF No. 921), length 0.38, height 0.22, width 0.25.

*Genus Oligocythereis* Sylvester-Bradley, 1948  
*Oligocythereis minuta* Kulshreshtha,

Singh and Tewari, 1985

(Pl. II, figs. 8-9)

*Oligocythereis minuta* Kulshreshtha, Singh and Tewari, 1985, pp. 148-49, figs. 4.1- 4.6.

*Material*: 13 carapaces 7 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 922), length 0.30, height 0.16, width 0.14. A carapace (SUGDMF No. 923), length 0.32, height 0.17, width 0.13.

*Subfamily Schulerideinae* Mandelstam, 1959

*Genus Eocytheridea* Bate, 1963

*Eocytheridea? sp.*

(Pl. II, figs. 10-11)

*Material*: 2 carapaces.

*Remarks*: The species is characterized by elongated-subovate carapace in lateral outline and compressed, biconvex in the dorsal; greatest height a little over half of length anterior to middle; overlap indistinct; dorsal margin asymmetrically convex; ventral weakly convex; anterior broadly rounded; posterior less so; valve surface smooth.

The species resembles *Eocytheridea? sp.* recorded from the Middle Jurassic of Western Australia by Malz and Oertli (1993) in overall appearance, but differs in being much bigger in size, having indistinct overlap and in outline of the anterior margin. The Australian species has 0.56mm length and 0.26mm height and its anterior margin is comparatively more steeply sloping down.

*Dimensions* (mm): A carapace (SUGDMF No. 924), length 0.80, height 0.34, width 0.29. A carapace (SUGDMF No. 925), length 0.96, height 0.38, width 0.30.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sample No. FA/4.

*Genus Fabanella* Martin, 1961

*Fabanella sp.*

(Pl. VI, fig. 17)

*Material*: 1 carapace.

*Remarks*: The species has following characteristics: Carapace elongate in lateral outline and biconvex in the dorsal; greatest height about 2/5th of length posterior to middle; overlap indistinct; dorsal and ventral margins nearly straight; anterior margin evenly rounded; posterior margin sloping down from 1/4th of length in upper part and rounded in the lower; valve surface smooth.

The species resembles *Fabanella boloniensis* (Jones, 1880) from early Purbeckian of France in overall shape but differs in having posterior margin gently sloping down from 1/4 of length in upper part and rounded in the lower and smooth valve surface. As against this *F. boloniensis* has narrowly rounded posterior margin near mid-height; ventral margin anteriorly concave and feebly punctate valve surface.

*Dimensions* (mm): A carapace (SUGDMF No. 1008), length 0.53, height 0.22, width 0.22.

*Occurrence*: *Majungaella perforata kachchhensis* – *Fastigatocythere falcula* Concurrent Range Zone, Sample No. KA/2.

*Family Cytheruridae* Müller, 1894

*Subfamily Cytherurinae* Sars, 1925

*Genus Acrocythere* Neale, 1960

*Acrocythere? sp.*

(Pl. II, fig. 12)

*Acrocythere? sp.* Khosla, Jakhar and Mohammed, 1997, p. 32, pl. 7, fig. 6.

*Material*: 2 valves.



*Dimensions* (mm): A left valve (SUGDMF No. 926), length 0.32, height 0.24.

*Genus Eucytherura* Müller, 1894

*Eucytherura* sp. B

(Pl. II, figs. 13-14)

*Material*: 5 carapaces.

*Remarks*: The species has the following characteristics: Carapace elongate subrectangular in lateral outline and biconvex in the dorsal; valves produced in a small wing-like extension ventrally; greatest height about half the length at anterior cardinal angle; overlap indistinct; dorsal margin straight, slightly sloping down posteriorly; ventral margin partially obscured, otherwise straight; anterior margin evenly rounded; posterior margin with an indistinct caudal process in upper half; valve surface reticulate and with a median depression in upper half.

The species resembles *Eucytherura oxfordiana* Rosenfeld and Honigstein (in Rosenfeld *et al.*, 1987) from the Kidod Formation of the Majdal Shams area, Mount Hermon, Golan Heights, Israel in overall shape and ornamentation. The latter species, however, differs from the present species, in having more height, three longitudinal ribs and relatively low posteroventral node. As against these our species, besides surface reticulation, has a median depression in upper half.

*Dimensions* (mm): A carapace (SUGDMF No. 927), length 0.35, height 0.16, width 0.15. A carapace (SUGDMF No. 928), length 0.38, height 0.18, width 0.14.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sample No. FA/4.

*Subfamily Cytheropterinae* Hanai, 1957

*Genus Citrella* Oertli, 1959

*Citrella belaensis* Khosla, Manisha Kumari and Darwin Felix, 2005

(Pl. II, fig. 15)

*Citrella belaensis* Khosla, Manisha Kumari and Darwin Felix, in Khosla *et al.*, 2005, p. 41, pl. 3, figs. 1-3.

*Material*: 80 carapaces and 17 valves.

*Dimensions* (mm): A female carapace (SUGDMF No. 929), length 0.37, height 0.24, width 0.19.

*Genus Cytheropteron* Sars, 1866

*Cytheropteron lellapadiensis* Khosla and Jakhar, n. sp.

(Pl. II, figs. 16-17)

*Material*: 5 carapaces.

*Etymology*: After the village of Lellapadi, Jaisalmer.

*Diagnosis*: A species of *Cytheropteron* characterized by elongate-subrhomboidal outline in lateral view and biconvex in the dorsal, anterior and posterior ends compressed, pointed; valves inflated ventrally and produced in a moderately wide wing-like expansion in median region overhanging margin; valve surface smooth.

*Holotype*: Pl. II, fig. 16.

*Description*: Carapace small, elongate-subrhomboidal in lateral outline, with greatest height a little over half of length at middle; valves inflated ventrally and produced in a moderately wide wing-like expansion in median region, overhanging margin. Overlap indistinct. Dorsal margin gently arched converging posteriorly; ventral margin obscured medially, otherwise straight; anterior margin broad, evenly rounded; posterior margin narrow, upturned, rounded above mid-height. In dorsal view carapace biconvex, with maximum width posterior to middle, anterior and posterior ends compressed, former being more. Valve surface smooth. Internal characters not known.

*Dimensions* (mm): Holotype (SUGDMF No. 930), a carapace, length 0.56, height 0.32, width 0.34. Paratype (SUGDMF No. 931), a carapace, length 0.51, height 0.29, width 0.30.

*Remarks*: The species resembles *Cytheropteron devai* (Khosla, Jakhar and Mohammed, 1997) from the Jurassic of the Habo Dome, Mainland Kachchh in overall appearance. The latter species, however, differs in having more height, broader ventral expansion and faintly reticulate valve surface. *C. sajjaniae* (Khosla, Jakhar and Mohammed, 1997) also from the Jurassic of the Habo Dome differs from the present species in having a prominent ventrolateral wing swinging backwardly and sparse reticulation.

*Type Locality*: Section NL, western bank of a tributary near Lellapadi, about 2km WSW of Kuldhhar Village.

*Type Horizon*: Fossiliferous limestone (Sample No. NL/2), Kuldhhar Member (early Callovian), Jaisalmer Formation.

*Occurrence*: *Majungaella perforata kachchhensis* – *Fastigatocythere falcula* Concurrent Range Zone, Section NL.

*Cytheropteron micropunctata* Khosla, Darwin Felix and Manisha Kumari, 2005

(Pl. II, figs. 18-19)

*Cytheropteron micropunctata* Khosla, Darwin Felix and Manisha Kumari, in Khosla *et al.*, 2005, pl. 3, figs. 6-9.

*Material*: 2 carapaces.

*Dimensions* (mm): A carapace (SUGDMF No. 932), length 0.40, height 0.27, width 0.24. A carapace (SUGDMF No. 933), length 0.40, height 0.28, width 0.22.

*Cytheropteron rajasthanensis* Khosla and Jakhar, n. sp.

(Pl. III, figs. 1-3)

*Material*: 6 carapaces.

*Etymology*: After the state of Rajasthan.

*Diagnosis*: A small elongate-subovate species of *Cytheropteron* characterized by moderate ventrolateral wing-like extension; anterior and posterior ends compressed, pointed in dorsal outline; surface sparsely reticulated, disposed in horizontal rows.

*Holotype*: Pl. III, fig. 1.

*Description*: Carapace small, elongate-subovate in lateral outline, with greatest height about half of length at middle; valves inflated ventrally and produced in a moderate wing-like expansion. Left valve slightly overlapping right valve along anterior and ventral margins. Dorsal margin convex; ventral margin obscured medially, otherwise also convex; anterior margin narrowly rounded; posterior margin drawn out in a caudal process at mid-height or slightly above it. In dorsal view carapace biconvex, with maximum width slightly anterior to middle, both ends pointed. Valve surface sparsely reticulated, arranged in more or less horizontal rows. Internal characters not known.

*Dimensions* (mm): Holotype (SUGDMF No. 934), a carapace, length 0.35, height 0.20, width 0.19. Paratype I (SUGDMF No. 935), a carapace, length 0.34, height 0.18, width 0.15. Paratype II (SUGDMF No. 936), a carapace, length 0.34, height 0.18, width 0.16.

*Remarks*: The species resembles *Cytheropteron lellapadiensis* Khosla and Jakhar, n. sp. described herein this work in overall shape but differs in having sparsely reticulated valve surface, disposed in horizontal rows. As against this *C. lellapadiensis* has smooth valve surface. *Cytheropteron devai* (Khosla, Jakhar and Mohammed, 1997) also differs from the present species in having more height and broader ventral

expansion, overhanging margin. *C. sajjaniae* (Khosla, Jakhar and Mohammed, 1997) differs in having a prominent ventrolateral wing swinging backwardly.

*Type Locality*: Section KB, western bank of Masurdi Nadi, north of Khethari Talab.

*Type Horizon*: Gypsiferous clay (Sample No. KB/1), Kuldhar Member (mid-late Callovian), Jaisalmer Formation.

*Occurrence*: *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone, Section KB.

*Cytheropteron* sp. A  
(Pl. III, figs. 4-5)

*Material*: 3 carapaces.

*Remarks*: Carapace elongate-subtriangular in lateral view, with greatest height about half of length anterior to middle; valves somewhat inflated ventrally; left valve slightly larger than right valve, overlapping along posterodorsal and ventral margins. Dorsal margin convex, sloping down posteriorly; posterior cardinal angle weakly observable; ventral margin straight; anterior margin broad, evenly rounded; posterior margin straight, sloping down in upper 2/3rd part and narrowly rounded in lower part. In dorsal view carapace biconvex, maximum width near middle, posterior end compressed. Valve surface smooth. Internal characters not known. The species differs from *Cytheropteron micropunctata* Khosla, Darwin Felix and Manisha Kumari, 2005, recorded above in shape and surface ornamentation.

*Dimensions* (mm): A carapace (SUGDMF No. 937), length 0.51, height 0.26, width 0.19. A carapace (SUGDMF No. 938), length 0.50, height 0.26, width 0.19.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sample No. FA/4.

*Cytheropteron* sp. B  
(Pl. III, fig. 6)

*Material*: 5 carapaces.

*Remarks*: This species is subrhomboidal in lateral outline,

with greatest height at anterior cardinal angle; dorsal margin slightly concave anteriorly otherwise straight and horizontal; ventral margin weakly convex, sloping posteriorly; anterior margin obliquely rounded; posterior drawn out in short caudal process at mid-height; valve surface smooth. The species differs from *Cytheropteron* sp. C described in this work in shape.

*Dimensions* (mm): A female carapace (SUGDMF No. 939), length 0.48, height 0.32, width 0.34.

*Occurrence*: *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Interval Zone, Sample No. KB/8.

*Cytheropteron* sp. C  
(Pl. III, fig. 7)

*Material*: 4 carapaces.

*Remarks*: This species is subrhomboidal in lateral outline, with greatest height posterior to middle; valve inflated ventrally obscuring that margin; dorsal margin nearly straight; anterior margin obliquely rounded; posterior drawn out in short caudal process at mid-height; valve surface smooth. The species resembles *Cytheropteron devai* (Khosla, Jakhar and Moharomed, 1997) from the Jurassic of the Habo Hill, Kachchh in overall shape but differs in the absence of distinct ventral wing-like expansion and faint surface pits.

*Dimensions* (mm): A carapace (SUGDMF No. 940), length 0.45, height 0.26, width 0.26.

*Occurrence*: *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Interval Zone, Sample No. KB/8.

*Family* **Limnocytheridae** Klie, 1938 (in Moore and Pitrat, 1961)

*Genus* **Theriosynoecum** Branson, 1936

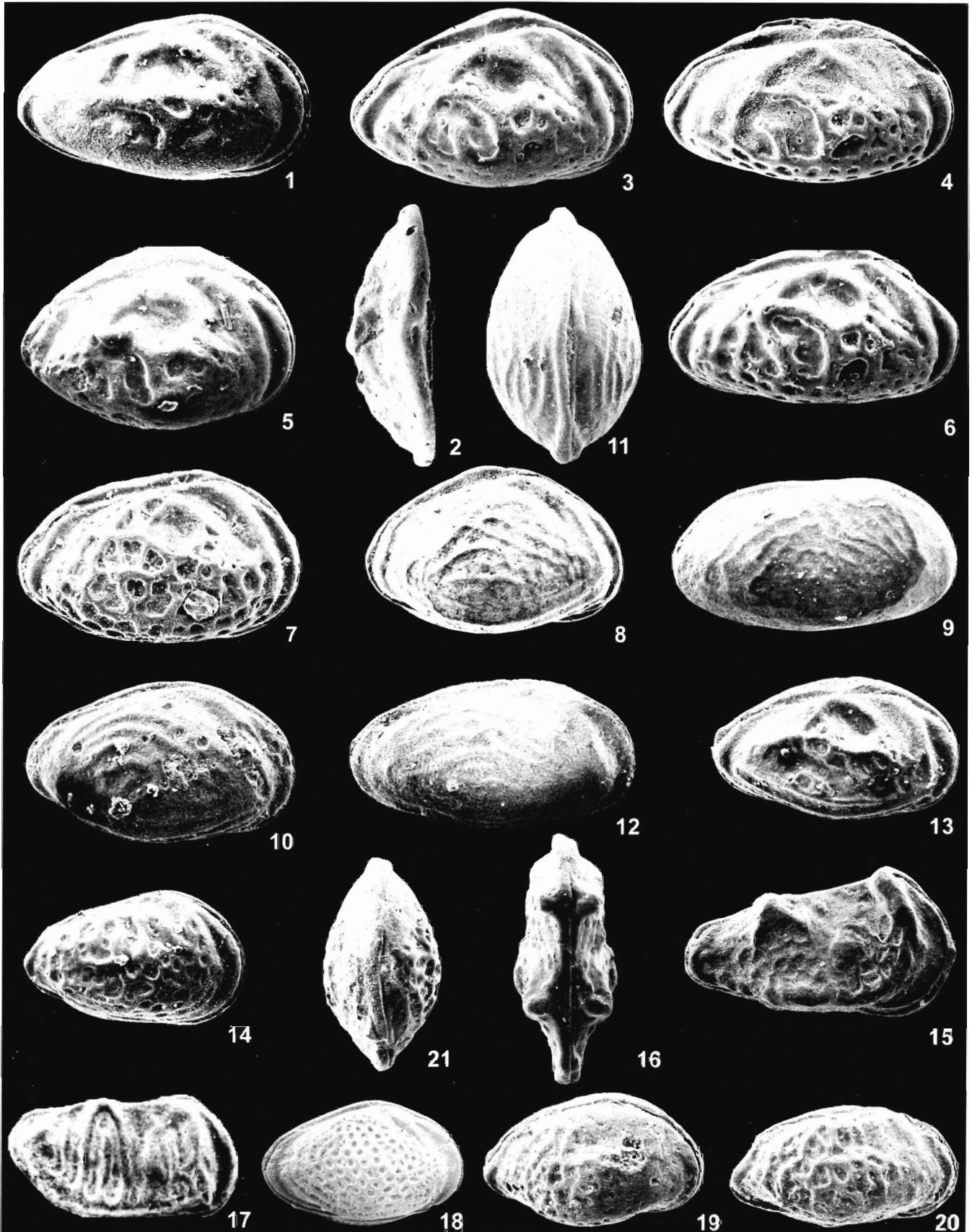
*Theriosynoecum* sp.  
(Pl. III, fig. 8)

*Material*: 1 carapace.

*Remarks*: The species has following characteristics: Carapace hemispherical in lateral outline, with greatest height about 2/3rd of length at middle; overlap indistinct; dorsal margin arched; ventral margin obscured medially by ventrolateral

#### EXPLANATION OF PLATE IV

- 1-7. *Fastigatocythere falcula* (Grckoff)  
1-2, *Fastigatocythere falcula* (Grckoff) s.s.  
1, a male carapace (SUGDMF No. 952), right valve view, x 83.  
2, a female left valve (SUGDMF No. 953), dorsal view, x 82.  
3-5, *Fastigatocythere falcula* (Grckoff) Morphotype A  
3, a female carapace (SUGDMF No. 954), right valve view, x 80.  
4, a male carapace (SUGDMF No. 955), right valve view, x 81.  
5, a female carapace (SUGDMF No. 956), right valve view, x 82.  
6, *Fastigatocythere falcula* (Grckoff) Morphotype B  
A male carapace (SUGDMF No. 957), right valve view, x 80.  
7, *Fastigatocythere falcula* (Grckoff) Morphotype C  
A male carapace (SUGDMF No. 958), right valve view, x 85.  
8. *Fastigatocythere flebilis* Khosla and Darwin Felix  
A carapace (SUGDMF No. 959), right valve view, x 89.  
9. *Fastigatocythere indica* Khosla and Manisha Kumari  
A male carapace (SUGDMF No. 960), right valve view, x 104.  
10-12. *Fastigatocythere jaisalmerensis* Khosla and Jakhar, new name  
10, a female carapace (SUGDMF No. 961), right valve view, x 100.  
11, a female carapace (SUGDMF No. 962), dorsal view, x 98.  
12, a male carapace (SUGDMF No. 963), right valve view, x 98.  
13. *Fastigatocythere juglandica malgachica* (Grckoff)  
A male carapace (SUGDMF No. 964), right valve view, x 98.  
14. *Fastigatocythere* sp. D  
A carapace (SUGDMF No. 965), right valve view, x 85.  
15-16. *Lophocythere mannikerii* Khosla and Jakhar, n. sp.  
15, holotype, (SUGDMF No. 966), a carapace, right valve view, x 77.  
16, paratype, (SUGDMF No. 967), a carapace, dorsal view, x 75.  
17. *Lophocythere vertipolycostata* Khosla and Manisha Kumari  
Paratype V (SUGDMF No. 713), a carapace, right valve view, x 93.  
18. *Majungaella perforata kachchhensis* Khosla et al.  
A female carapace (SUGDMF No. 968), right valve view, x 66.  
19-21. *Micropneumatocythere masurdiensis* Khosla and Jakhar, n. sp.  
19, holotype, (SUGDMF No. 969), a female carapace, right valve view, x 85.  
20, paratype I, (SUGDMF No. 970), a male carapace, dorsal view, x 84.  
21, paratype II, (SUGDMF No. 971), a male carapace, right valve view, x 80.



swelling, otherwise straight; anterior end broadly rounded and compressed; posterior end narrow and bluntly rounded. Valve surface ornamented by concentrically arranged fine reticulation and a mid-ventral node.

The species resembles *Theriosynoecum tenuimarginata* (Oertli, 1956) from the Bathonian of France in overall lateral outline and reticulate ornamentation but differs in the presence of mid-ventral node overhanging the margin.

*Dimensions* (mm): A carapace (SUGDMF No. 941), length 0.82, height 0.50, width 0.41.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sample No. FA/4.

*Family* **Loxoconchidae** Sars, 1925

*Subfamily* **Mandelstaminae**, Whatley and Moguilevsky, 1998

*Genus* **Mandelstamia** Lyubimova, 1955

*Mandelstamia biswasi* Khosla, Manisha Kumari and Darwin Felix, 2005  
(Pl. III, fig. 9)

*Mandelstamia biswasi* Khosla, Manisha Kumari and Darwin Felix, in Khosla *et al.*, 2005, pp. 43-45, pl. 3, figs. 16-17.

*Material*: 57 carapaces and 9 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 942), length 0.58, height 0.26, width 0.26.

*Mandelstamia depecheae* Khosla, Jakhar and Mohammed, 1997  
(Pl. III, fig. 10)

*Mandelstamia* sp.: Dépêche, in Dépêche *et al.*, 1987, p. 237, pl. 6, fig. 7.  
*Mandelstamia depecheae* Khosla, Jakhar and Mohammed, 1997, pp. 30-32, pl. 5, figs. 8-10. – Khosla and Jakhar, 1999, p. 45, pl. 2, fig. 6. – Khosla *et al.*, 2005, p. 45, pl. 3, fig. 18.

*Material*: 10 carapaces and 31 valves.

*Dimensions* (mm): A right valve (SUGDMF No. 943), length 0.56, height 0.32.

*Mandelstamia kachchhensis* Khosla, Manisha Kumari and Darwin Felix, 2005  
(Pl. III, fig. 11)

*Mandelstamia kachchhensis* Khosla, Darwin Felix and Manisha Kumari, in Khosla *et al.*, 2005, p. 45, pl. 4, figs. 1-2.

*Material*: 30 carapaces and 1 valve.

*Dimensions* (mm): A carapace (SUGDMF No. 944), length 0.58, height 0.29, width 0.22.

*Family* **Progonocytheridae** Sylvester-Bradley, 1948

*Genus* **Progonocythere** Sylvester-Bradley, 1948

*Progonocythere jaisalmerensis* Khosla, Jakhar, Nagori and Darwin Felix, 2003c  
(Pl. III, figs. 12-13)

*Progonocythere jaisalmerensis* Khosla, Jakhar, Nagori and Darwin Felix, 2003c, p. 173, pl. 1, figs. 7-8; fig. 3c. – Khosla *et al.*, 2005, p. 46, pl. 4, figs. 3-4.

*Material*: 79 carapaces and 26 valves.

*Dimensions* (mm): Holotype (SUGDMF No. 738), a female carapace, length 0.54, height 0.40, width 0.35. Paratype (SUGDMF No. 945), a male carapace, length 0.65, height 0.35, width 0.32.

*Progonocythere tharensis* Khosla and Jakhar, n. sp.  
(Pl. III, figs. 14-16)

*Material*: 29 carapaces and 10 valves.

*Etymology*: After the Thar Desert, western Rajasthan.

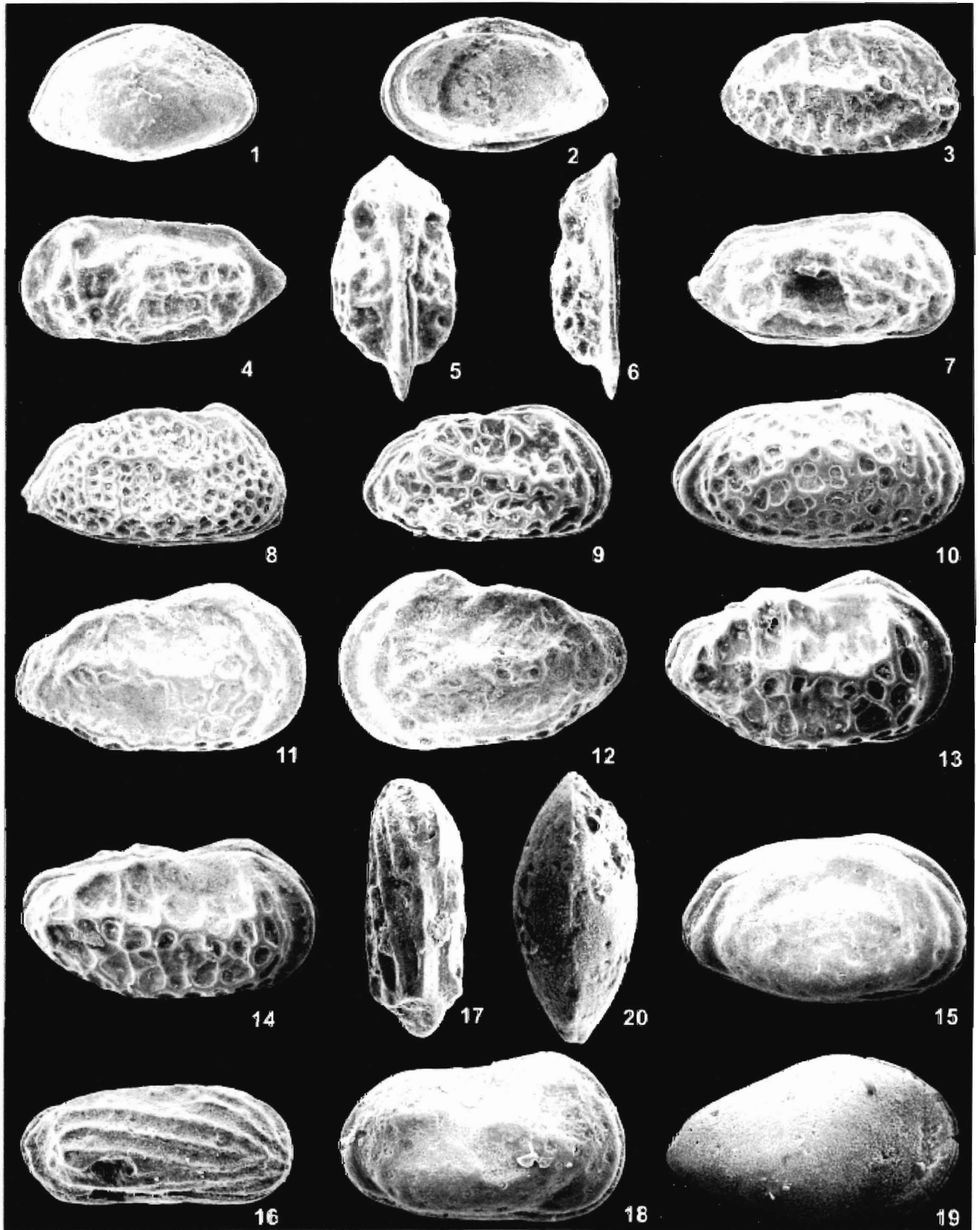
*Diagnosis*: An elongate-subquadrate species of *Progonocythere* characterized by straight dorsal margin sloping down backwardly; narrow posterior margin, straight in upper 2/3 part and rounded in the lower; an indistinct anterodorsal furrow.

*Holotype*: Pl. III, fig. 14.

*Description*: Carapace subquadrate in lateral outline, with greatest height at anterior cardinal angle. Left valve indistinctly overlaps right valve. Dorsal margin straight, sloping down posteriorly; ventral margin obscured by ventrolateral inflation; anterior margin broadly rounded; posterior margin narrow, straight in upper 2/3rd part and rounded in the lower. In dorsal view carapace biconvex, anterior end somewhat compressed, maximum width slightly anterior to middle. Valve surface with an indistinct anterodorsal furrow; otherwise smooth. Inner lamella of moderate width; line of concrescence and inner margin coincide; selvage peripheral. Hinge entomodont; in right valve it comprises crenulate anterior and posterior terminal teeth connected by a median loculate groove, broadening anteriorly.

## EXPLANATION OF PLATE V

- 1-2. *Micropneumatocythere rasilis* Khosla and Jakhar, n. sp.  
1, holotype (SUGDMF No. 972), a carapace, right valve view, x 131.  
2, paratype (SUGDMF No. 973), a right valve, internal view, x 123.
3. *Neurocythere denticulata* (Kulshreshtha *et al.*)  
A carapace (SUGDMF No. 974), right valve view, x 105.
- 4-7. *Neurocythere kuldharensis* Khosla and Jakhar, n. sp.  
4, holotype (SUGDMF No. 975), a carapace, left valve view, x 107.  
5, paratype I (SUGDMF No. 976), a carapace, dorsal view, x 115.  
6, paratype II (SUGDMF No. 977), a left valve, dorsal view, x 115.  
7, paratype III (SUGDMF No. 978), a carapace, right valve view, x 109.
8. *Neurocythere whatleyi* Khosla and Jakhar  
A carapace (SUGDMF No. 979), right valve view, x 93.
9. *Trichordis devexa* (Grekoff)  
A carapace (SUGDMF No. 980), right valve view, x 80.
10. *Trichordis gujaratensis* Khosla *et al.*  
A female carapace (SUGDMF No. 981), right valve view x 78.
- 11-12. *Trichordis hadibhadangensis* Khosla *et al.*  
11, a male carapace (SUGDMF No. 982), right valve view, x 77.  
12, a female left valve (SUGDMF No. 983), lateral view, x 80.
- 13-14. *Trichordis jaisalmerensis* (Kulshreshtha *et al.*)  
13, a female carapace (SUGDMF No. 984), right valve view, x 73.  
14, a male carapace (SUGDMF No. 985), right valve view, x 73.
15. *Trichordis praetexta* Grekoff  
A female carapace (SUGDMF No. 986), right valve view, x 83.
- 16-17. *Mandawacythere kachchhensis* Khosla *et al.*  
16, a carapace (SUGDMF No. 987), right valve view, x 86.  
17, a carapace (SUGDMF No. 988), dorsal view, x 85.
18. *Bhatiana indica* Mannikeri  
A carapace (SUGDMF No. 989), right valve view, x 85.
- 19-20. *Protobuntonia* sp.  
19, a carapace (SUGDMF No. 990), right valve view, x 98.  
20, a carapace (SUGDMF No. 991), dorsal view, x 84.



*Dimensions* (mm): Holotype (SUGDMF No. 946), a carapace, length 0.78, height 0.46, width 0.38. Paratype I (SUGDMF No. 947), a carapace, length 0.78, height 0.39, width 0.38. Paratype II (SUGDMF No. 948), a right valve, length 0.86, height 0.46.

*Remarks:* *Progonocythere tharensis* Khosla and Jakhar, n. sp. differs from other species of the genus described from western India in having straight dorsal and posterior margins and an indistinct anterodorsal furrow. As against these *Progonocythere laeviscula* Lyubimova and Mohan, 1960, has elongate-subovate outline with narrowly rounded posterior end and a distinct median vertical sulcus; *Progonocythere sadharaensis* Khosla *et al.*, 2003c, has a wide anterodorsal furrow, a prominent swelling posterior to it, protruding as a node over mid-dorsal margin in right valve; and *Progonocythere jaisalmerensis* Khosla *et al.*, 2003c has two narrow vertical sulci in anterodorsal and dorsomedian regions.

*Type Locality:* Section FD, escarpment at Kishanghat, north of Jaisalmer Fort.

*Type Horizon:* Yellow fossiliferous limestone (Sample No. FD/8), Fort Member (Bajocian-Bathonian), Jaisalmer Formation.

*Occurrence:* *Trichordis hadibhadangensis* Range Zone, Sections FA, FB, FC, FD, FE, FG and FM.

*Genus Fastigatocythere* Wienholz, 1967

*Fastigatocythere befotakaensis* (Grekoff, 1963)

(Pl. III, fig. 17)

*Progonocythere befotakaensis* Grekoff, 1963, p. 1733, pl. 3, figs. 77–80; pl. 8, figs. 215, 217. – Guha, 1977, p. 88, pl. 2, figs. 12a, b, 13.

*Fastigatocythere befotakaensis* (Grekoff). – Wienholz, 1967, p. 25. – Mannikeri, 1981, in Bhatia, 1984, p. 3. – Khosla *et al.*, 2005, p. 46, pl. 4, fig. 8; fig. 6a.

*Batella befotakaensis* (Grekoff). – Khosla *et al.*, 1997, pp. 12–14, pl. 2, figs. 10–13. – Khosla and Jakhar, 1999, p. 45, pl. 1, fig. 8.

*Material:* 208 carapaces and 51 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 949), length 0.80, height 0.42, width 0.43.

*Fastigatocythere clavata* (Khosla, Jakhar and

Mohammed, 1997)

(Pl. III, fig. 18)

*Batella clavata* Khosla, Jakhar and Mohammed, 1997, p. 14, pl. 2, figs. 14–16; pl. 3, fig. 1. – Khosla and Jakhar, 1999, p. 45, pl. 1, fig. 10.

*Fastigatocythere clavata* (Khosla, Jakhar and Mohammed) – Khosla *et al.*, 2005, p. 49, pl. 4, fig. 13.

*Material:* 1 carapace and 19 valves.

*Dimensions* (mm): A right valve (SUGDMF No. 950), length 0.50, height 0.30.

*Fastigatocythere depressa* (Khosla, Jakhar and

Mohammed, 1997)

(Pl. III, fig. 19)

*Batella depressa* Khosla, Jakhar and Mohammed, 1997, pp. 14–15, pl. 3, figs. 2–6. – Khosla and Jakhar, 1999, p. 45, pl. 1, fig. 9.

*Fastigatocythere depressa* (Khosla, Jakhar and Mohammed) – Khosla *et al.*, 2005, p. 49, pl. 4, fig. 14.

*Material:* 22 carapaces and 37 valves.

*Dimensions* (mm): A right valve (SUGDMF No. 951), length 0.68, height 0.38.

*Fastigatocythere falcula* (Grekoff, 1963)

(Pl. IV, figs. 1–7)

*Progonocythere falcula* Grekoff, 1963, pp. 1735–1737, pl. 4, figs. 88–91.

*Batella falcula* (Grekoff). – Khosla *et al.*, 1997, pp. 15–16, pl. 3, figs. 7–10.

*Material:* 394 carapaces and 292 valves.

*Remarks:* The present species was originally described as *Progonocythere falcula* by Grekoff (1963) from the middle Callovian of the Majunga Basin, Madagascar and subsequently transferred to the genus *Batella* by Khosla *et al.* (1997). Very recently, Khosla *et al.* (2005), following Whatley (personal communication), transferred the species earlier described under genera *Amicytheridea*, *Batella* and *Habocythere* from the Habo Dome, Mainland Kachchh (Khosla *et al.*, 1997) to the genus *Fastigatocythere*. Hence accordingly, the species *Progonocythere falcula*, is herein assigned to the latter genus. The species has following characteristics: carapace elongate-subtriangular, subpyriform in lateral outline, with greatest height at anterior cardinal angle. Left valve larger than right valve, overlapping it prominently along dorsal margin. Dorsal margin straight, sloping down posteriorly, in some forms margin umbonate in middle or anterior to middle; ventral margin obscured by ventrolateral inflation; anterior margin broad, obliquely rounded; posterior margin narrow, concave in upper part and rounded in the lower. In dorsal view carapace biconvex, with maximum width near middle or posterior to it. Valve surface ornamented by a large subovate to subrounded depression in dorsomedian region; an anterodorsal furrow and a marginal ridge in front of it extending down from ocular region; a median transverse wavy ridge; a depression posteroventral to it, which varies from a short transverse curve to typically horseshoe-shaped; and reticulations over rest of the area; 18–19 anterior marginal pore canals; hinge entomodont, anteromedian element in left valve comprising two teeth.

The species may be divided into four morphotypes on the basis of lateral outline and shape of the posteroventral depression. These might represent separate subspecies but they are retained in the single species at the present. These morphotypes are:

*Fastigatocythere falcula* (Grekoff) s.s.

(Pl. IV, figs. 1–2)

This morphotype is characterized by subtriangular lateral outline; left valve moderately overlapping right valve along dorsal and anterior margins; posteroventral depression slightly upwardly convex; rest of the area with a very few pits.

*Dimensions* (mm): A male carapace (SUGDMF No. 952), length 0.66, height 0.38, width 0.36. A female left valve (SUGDMF No. 953), length 0.61, height 0.40.

*Fastigatocythere falcula* (Grekoff) Morphotype A

(Pl. IV, figs. 3–5)

This morphotype is subtriangular in lateral outline in females, with dorsal margin umbonate at middle or anterior to middle, while in males elongate-subpyriform; posteroventral depression smooth, horseshoe-shaped; rest of the area in ventral half moderately pitted.

*Dimensions* (mm): A female carapace (SUGDMF No. 954), length 0.66, height 0.42, width 0.40. A male carapace (SUGDMF No. 955), length 0.67, height 0.38, width 0.35. A female carapace (SUGDMF No. 956), length 0.62, height 0.45, width 0.38.

*Fastigatocythere falcula* (Grekoff) Morphotype B

(Pl. IV, fig. 6)

This morphotype is elongate-subpyriform in lateral outline; posteroventral depression horseshoe-shaped, subdivided into two parts by an inclined ridge; rest of the area moderately pitted.

*Dimensions* (mm): A male carapace (SUGDMF No. 957), length 0.69, height 0.39, width 0.32.

*Fastigatocythere falcula* (Grekoff) Morphotype C  
(Pl. IV, fig. 7)

This morphotype is elongate-subpyriform in lateral outline; posteroventral horseshoe-shaped depression with prominent reticulation.

*Dimensions* (mm): A male carapace (SUGDMF No. 958), length 0.61, height 0.37, width 0.40.

*Occurrence*: *Majungaella perforata kachchhensis* – *Fastigatocythere falcula* Concurrent Range Zone, Sections KA, KC, KD, KE and NL.

*Fastigatocythere flebilis* Khosla and Darwin Felix, 2005  
(Pl. IV, fig. 8)

*Fastigatocythere flebilis* Khosla and Darwin Felix, in Khosla *et al.*, 2005, pp. 49-50, pl. 5, figs. 1-3; fig. 6b.

*Material*: 18 carapaces and 2 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 959), length 0.54, height 0.37, width 0.34.

*Fastigatocythere indica* Khosla and  
Manisha Kumari, 2005  
(Pl. IV, fig. 9)

*Fastigatocythere indica* Khosla and Manisha Kumari, in Khosla *et al.*, 2005, p. 50, pl. 5, figs. 4-6; fig. 6c.

*Material*: 2 carapaces.

*Dimensions* (mm): A male carapace (SUGDMF No. 960), length 0.51, height 0.29, width 0.30.

*Fastigatocythere jaisalmerensis*  
Khosla and Jakhar, new name  
(Pl. IV, figs. 10-12)

*Jainiana grekoffi* Mannikeri, 1996, pp. 398-400, pl. 1, figs. 4a-c; pl. 2, figs. 1a-c.

*Material*: 4 carapaces.

*Remarks*: The species was originally described as *Jainiana grekoffi* by Mannikeri (1996) from the Fort Member, Jaisalmer. According to Whatley (personal communication to the first author) the genus *Jainiana* is junior synonym of *Fastigatocythere*. Accordingly the species *Jainiana grekoffi* Mannikeri, 1996 is transferred to *Fastigatocythere* but the name *Fastigatocythere grekoffi* Brenner and Oertli, 1976, is already preoccupied. Therefore a new specific name *Fastigatocythere jaisalmerensis* is proposed for *Jainiana grekoffi* Mannikeri.

The species is characterized by elongate-subovate outline in lateral view; dorsal margin evenly arched; ventral margin strongly convex; anterior margin broadly rounded; posterior margin somewhat narrowly rounded; valve surface ornamented by faint curved ribs.

*Dimensions* (mm): A female carapace (SUGDMF No. 961), length 0.48, height 0.34, width 0.30. A female carapace (SUGDMF No. 962), length 0.49, height 0.32, width 0.30. A male carapace (SUGDMF No. 963), length 0.54, height 0.29, width 0.32.

*Fastigatocythere juglandica malgachica* (Grekoff, 1963)  
(Pl. IV, fig. 13)

*Progonocythere juglandica malgachica* Grekoff, 1963, pp. 1731-32, pl. 3, figs. 56-62; pl. 8, fig. 216.

*Fastigatocythere juglandica malgachica* (Grekoff) – Wienholz, 1967, p. 25. – Khosla *et al.*, 2005, p. 51, pl. 5, fig. 9.

*Habocythere malgachica* (Grekoff). – Khosla *et al.*, 1997, p. 18, pl. 4, figs. 2-6.

*Material*: 682 carapaces and 113 valves.

*Dimensions* (mm): A male carapace (SUGDMF No. 964), length 0.48, height 0.29, width 0.30.

*Fastigatocythere* sp. D  
(Pl. IV, fig. 14)

*Material*: 7 carapaces and 2 valves.

*Remarks*: The species has following characteristics: carapace small, subtriangular in lateral outline, with greatest height at anterior cardinal angle; left valve slightly larger than right valve, overlapping along anterior and ventral margins; dorsal margin straight, sloping down posteriorly; ventral margin obscured by ventrolateral inflation; anterior margin obliquely rounded; posterior much narrow, concave in upper part and rounded in the lower. Valve surface reticulated, reticulation meshes in upper half vertically disposed, an anterodorsal furrow and a marginal rib in front of it. The species is assigned to the genus *Fastigatocythere* Weinholz, 1967 on the basis of overall surface ornamentation and shape. It differs from the known species of the genus in having vertically disposed reticulation in upper half.

*Dimensions* (mm): A carapace (SUGDMF No. 965), length 0.48, height 0.29, width 0.23.

*Occurrence*: *Majungaella perforata kachchhensis* – *Fastigatocythere falcula* Concurrent Range Zone, Sample No. KA/1.

*Genus Lophocythere* Sylvester-Bradley, 1948

*Lophocythere mannikerii* Khosla and Jakhar, n. sp.  
(Pl. IV, figs. 15-16)

*Bhatiana* sp. A Mannikeri, 1996, pp. 402-403, pl. 1, fig. 2; pl. 2, fig. 4.

*Material*: 21 carapaces and 3 valves.

*Etymology*: In honour of Professor M. S. Mannikeri in recognition of his contributions to the Jurassic ostracods of Jaisalmer.

*Diagnosis*: A species of *Lophocythere* characterized by an elongate-subquadrate outline in lateral view; dorsal and ventral margins converging posteriorly; valve surface marked by a subcentral tubercle; a thick rib extending down from ocular region up to posteroventral region; a prominent inverted V-shaped node at posterodorsal region; and faint reticulation.

*Holotype*: Pl. IV, fig. 15.

*Description*: Carapace elongate-subquadrate in lateral outline, with greatest height about half of length at anterior cardinal angle. Left valve slightly larger than right valve, overlapping along anterior and posterior margins. Dorsal and ventral margins partially obscured by overhanging surface ornamentation, otherwise straight, converging posteriorly; anterior margin broad and evenly rounded; posterior margin much narrow, bluntly rounded at mid-height. In dorsal view carapace spindle-shaped, ends compressed, posterior being more than the anterior; maximum width slightly posterior to middle. Valve surface marked by a subcentral tubercle; a thick rib extending downwards from ocular region parallel to anterior margin, in anteroventral region it turns posteriorly overhanging ventral margin, runs up to posteroventral region; a prominent inverted V-shaped node at posterodorsal region; and except for anterior margin faint reticulation over rest of the area. Internal characters not known.

*Dimensions* (mm): Holotype (SUGDMF No. 966), a carapace, length 0.66, height 0.37, width 0.29. Paratype I (SUGDMF No. 967), a carapace, length 0.64, height 0.39, width 0.27.

*Remarks*: The species was described as *Bhatiana* sp. A by Mannikeri (1996) from the Fort Member near Jaisalmer town. However, on the basis of elongate-subquadrate shape and ornamentation comprising a carina like thick rib extending down from ocular region along anterior and ventral margins; an inverted v-shaped node in posterodorsal region and

reticulation, it is herein transferred to the genus *Lophocythere*. The species differs from *Lophocythere vertipolycostata* Khosla and Manisha Kumari (in Khosla *et al.*, 2003a) described from the middle Jurassic of Northern Island Belt, Rann of Kachchh and Jaisalmer in lack of 7-8 vertical ribs.

*Type Locality*: Section FG, opposite to Indira Stadium / Town Hall, 3km west of Jaisalmer Fort.

*Type Horizon*: Soft fossiliferous limestone (Sample No. FG/2), Fort Member (Bajocian-Bathonian), Jaisalmer Formation.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sections FA, FC, FD, FF, FG and FM.

*Lophocythere vertipolycostata* Khosla  
and Manisha Kumari, 2003  
(Pl. IV, fig. 17)

*Lophocythere vertipolycostata* Khosla and Manisha Kumari, in Khosla *et al.*, 2003a, pp. 72-73, pl. 3, figs. 1-8; figs. 3A-B. – Khosla *et al.*, 2005, p. 54, pl. 6, fig. 3.

*Material*: 37 carapaces and 2 valves.

*Dimensions* (mm): A carapace (SUGDMF No. 713), length 0.45, height 0.26, width 0.14.

*Genus Majungaella* Grekoff, 1963

*Majungaella perforata kachchhensis* Khosla,  
Jakhar and Mohammed, 1997  
(Pl. IV, fig. 18)

*Majungaella perforata kachchhensis* Khosla, Jakhar and Mohammed, 1997, p. 19, pl. 4, figs. 12-14. – Khosla and Jakhar, 1999, p. 45, pl. 2, fig. 2. – Khosla *et al.*, 2005, p. 54, pl. 6, fig. 4.

*Material*: 149 carapaces and 168 valves.

*Dimensions* (mm): A female carapace (SUGDMF No. 968) length 0.58, height 0.38, width 0.32.

*Genus Micropneumatocythere* Bate, 1963

*Micropneumatocythere masurdiensis*  
Khosla and Jakhar, n. sp.  
(Pl. IV, figs. 19-21)

*Material*: 11 carapaces.

*Etymology*: After the Masurdi Nadi, Kuldhara, Jaisalmer.

*Diagnosis*: A species of *Micropneumatocythere* characterized by elongate-subovate outline in lateral view; valves considerably inflated ventrally; surface distinctly reticulated and with a shallow depression in dorsomedian

region.

*Holotype*: Pl. IV, fig. 19.

*Description*: Carapace elongate-subovate in lateral outline, with greatest height anterior to middle; valves considerably inflated ventrally in females and less so in males; left valve moderately overlaps right valve along dorsal and anterior margins; dorsal margin arched; ventral margin obscured by ventrolateral inflation; anterior margin very obliquely rounded; posterior margin much narrower, concave in upper part and rounded in the lower. In dorsal view carapace biconvex, with maximum width slightly posterior to middle. Valve surface distinctly reticulated and with a shallow depression in dorsomedian region. Internal characters not known.

*Dimensions* (mm): Holotype (SUGDMF No. 969), a female carapace, length 0.48, height 0.30, width 0.22. Paratype I (SUGDMF No. 970), a male carapace, length 0.51, height 0.27, width 0.26. Paratype II (SUGDMF No. 971), a male carapace, length 0.50, height 0.29, width 0.27.

*Remarks*: This species resembles *Micropneumatocythere laevireticulata* Rosenfeld and Honigstein, 1991 from the Callovian-Oxfordian of Hammakhtesh Hagadol section, southern Israel in overall shape and ornamentation but differs in having a shallow depression in dorsomedian region and distinct reticulation. As against these *M. laevireticulata* is weakly reticulated, sometimes appearing smooth. The species also resembles *Micropneumatocythere convexa* Bate, 1963, an early Bajocian species of England, in shape and reticulate ornamentation but it is readily differentiated by its shallow depression.

*Type Locality*: Section KB, western bank of Masurdi Nadi, north of Khethari Talab.

*Type Horizon*: Gypsiferous clay (Sample No. KB/1), Kuldhara Member (mid-late Callovian), Jaisalmer Formation.

*Occurrence*: *Majungaella perforata kachchhensis* - *Galliaecytheridea remota* Concurrent Range Zone, Section KB.

*Micropneumatocythere rasilis* Khosla and Jakhar, n. sp.  
(Pl. V, figs. 1-2)

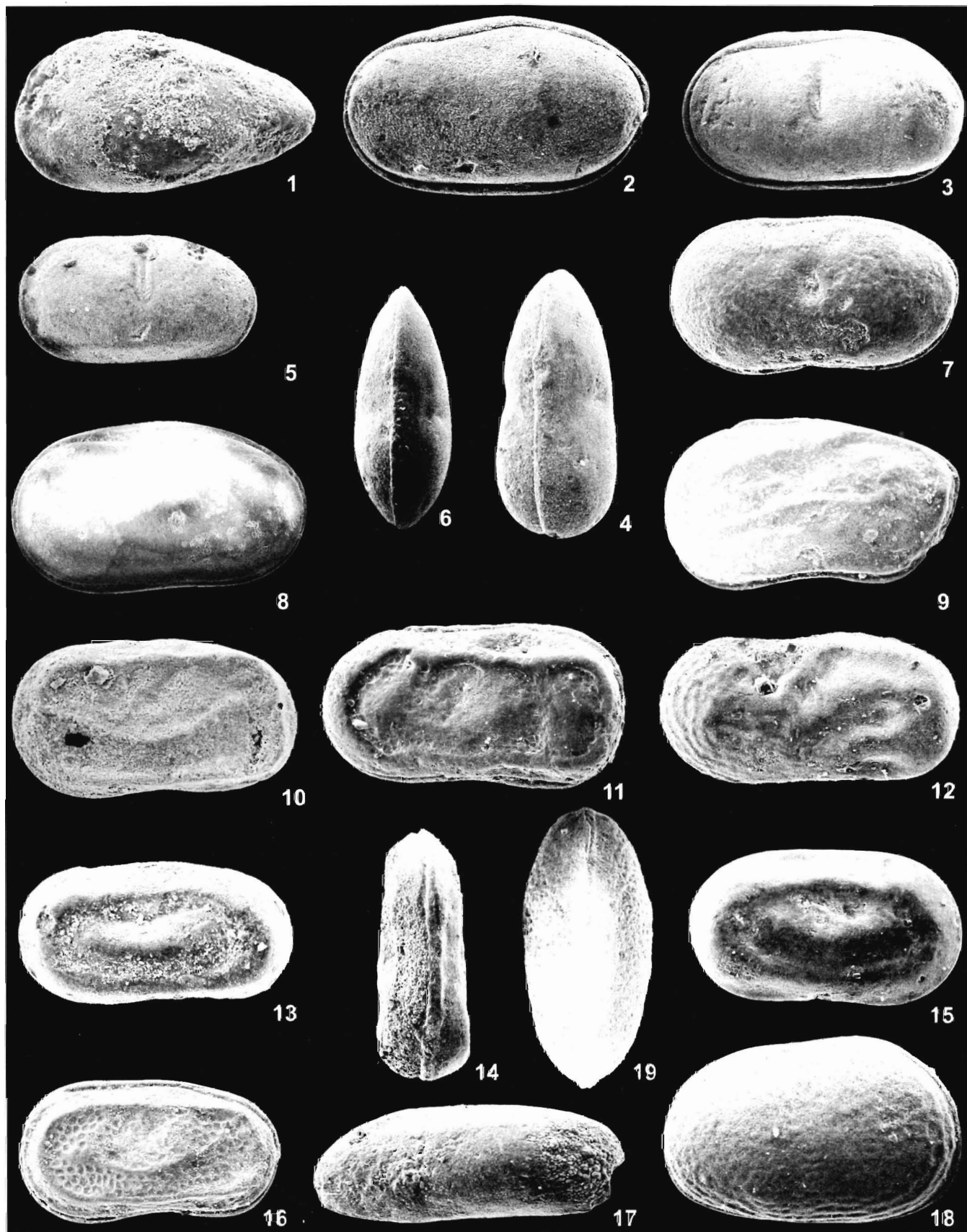
*Material*: 7 carapaces and 3 valves.

*Etymology*: From Latin *rasilis*, meaning smoothed; with

## EXPLANATION OF PLATE VI

1. *Protobuntonia* sp.  
A carapace (SUGDMF No. 992), left valve view, x 97.
2. *Cytherella disjuncta* Lyubimova and Mohan  
A carapace (SUGDMF No. 993), left valve view, x 79.
- 3-6. *Cytherella jaisalmerensis* Khosla and Jakhar, n. sp.  
3, holotype (SUGDMF No. 994), a carapace, left valve view, x 80.  
4, paratype I (SUGDMF No. 995), a carapace, dorsal view, x 80.  
5, paratype II (SUGDMF No. 996), left valve, lateral view, x 85.  
6, paratype III (SUGDMF No. 997), a carapace, dorsal view, x 85.
7. *Cytherella kalajarensis* Khosla and Jakhar  
A carapace (SUGDMF No. 998), left valve view, x 76.
8. *Cytherella obscura* Lyubimova and Mohan  
A carapace (SUGDMF No. 999), left valve view, x 74.
9. *Cytherelloidea badiensis* Khosla *et al.*  
A carapace (SUGDMF No. 1000), left valve view, x 86.
10. *Cytherelloidea bhujensis* Khosla and Jakhar  
A left valve (SUGDMF No. 1001), lateral view, x 110.
11. *Cytherelloidea difficila* Lyubimova and Mohan  
A carapace (SUGDMF No. 1002), left valve view, x 71.
12. *Cytherelloidea ipis* Grekoff  
A carapace (SUGDMF No. 1003), left valve view, x 78.
- 13-15. *Cytherelloidea kuldharensis* Khosla and Jakhar, n. sp.  
13, holotype (SUGDMF No. 1004), a left valve, lateral view, x 88.  
14, paratype I (SUGDMF No. 1005), a carapace, dorsal view, x 81.  
15, paratype II (SUGDMF No. 1006), a right valve, lateral view, x 82.
16. *Cytherelloidea paradifficila* Khosla *et al.*  
A carapace (SUGDMF No. 1007), left valve view, x 80.
17. *Fabanella* sp.  
A carapace (SUGDMF No. 1008), right valve view, x 111.
- 18-19. **Genus A**  
18, a carapace (SUGDMF No. 1009), right valve view, x 117.  
19, a carapace (SUGDMF No. 1010), dorsal view, x 108.





reference to smooth surface.

**Diagnosis:** A species of *Micropneumatocythere* characterized by ovate outline in lateral view; valves inflated ventrally; dorsal margin symmetrically arched; posterior margin sloping in upper part and anteriorly inclined in the lower; valves surface smooth.

**Holotype:** Pl. V, fig. 1.

**Description:** Carapace subovate in lateral outline, with greatest height at middle; valves inflated ventrally; left valve slightly overlaps right valve along dorsal and anterior margins; dorsal margin symmetrically arched; ventral margin obscured by ventrolateral inflation; anterior margin obliquely rounded; posterior margin sloping down in upper part and anteriorly inclined in the lower. Valve surface smooth. Inner lamella of moderate width; line of concrescence and inner margin coincide; selvage peripheral; Hinge in right valve comprises two terminal teeth connected by a median groove widening towards anterior.

**Dimensions (mm):** Holotype (SUGDMF No. 972), a carapace, length 0.32, height 0.26, width 0.22. Paratype (SUGDMF No. 973), a right valve, length 0.35, height 0.22.

**Remarks:** The species resembles *Micropneumatocythere masurdiensis* Khosla and Jakhar, n. sp. described herein this work in overall shape but differs in having smooth surface, symmetrically arched dorsal margin and outline of the posterior margin. The species also differs from *Micropneumatocythere laevireticulata* Rosenfeld and Honigstein, 1991 from the Callovian-Oxfordian of southern Israel in details of lateral outline and devoid of reticulation.

**Type Locality:** Section KC, western bank of Masurdi Nadi, about 1 km NNW of Khethari Talab.

**Type Horizon:** Clay bed (Sample No. KC/3), Kuldhar Member (early Callovian), Jaisalmer Formation.

**Occurrence:** *Majungaella perforata kachchhensis* – *Fastigatocythere falcata* Concurrent Range Zone, Sections KA and KC.

**Genus *Neurocythere*** Whatley, 1970

*Neurocythere denticulata* (Kulshreshtha,

Singh and Tewari, 1985)

(Pl. V, fig. 3)

*Lophocythere denticulata* Kulshreshtha, Singh and Tewari, 1985, pp. 138-140, figs. 8.8-8.12.

*Nophrecythere denticulata* (Kulshreshtha, Singh and Tewari). – Khosla *et al.*, 1997, p. 20, pl. 5, figs. 1-2.

**Material:** 10 carapaces and 36 valves.

**Remarks:** The species was originally described as *Lophocythere denticulata* by Kulshreshtha *et al.* (1985) and thereafter, transferred to *Nophrecythere* by Khosla *et al.* (1997). However, according to Whatley and Ballent (2004) the genus *Nophrecythere* Grunzel, 1975 is junior synonym of *Neurocythere* Whatley, 1970. The species is therefore assigned herein to the latter genus.

**Dimensions (mm):** A carapace (SUGDMF No. 974) length 0.42, height 0.26, width 0.24.

*Neurocythere kuldharensis* Khosla and Jakhar, n. sp.

(Pl. V, figs. 4-7)

**Material:** 3 carapaces and 1 valve.

**Etymology:** After the village of Kuldhar, Jaisalmer District.

**Diagnosis:** A small subrectangular species of *Neurocythere* characterized by drawn out posterior margin at mid-height; surface ornamented by four longitudinal ribs in median and posterior regions with inter-costal reticulation; a

depression in anteroventral region.

**Holotype:** Pl. V, fig. 4.

**Description:** Carapace subrectangular in lateral outline, with greatest height at anterior cardinal angle. Left valve slightly larger than right valve, overlapping along dorsal and ventral margins. Anterior margin broad obliquely rounded; posterior margin drawn out, subrounded at mid-height; dorsal and ventral margins straight and parallel. In dorsal view carapace biconvex, posterior end conspicuously compressed, maximum width posterior to middle. Surface of each valve ornamented by four longitudinal ribs in median and posterior regions; a depression in anteromedian region; a vertical rib descending downwards from ocular region; intercostal region with network type reticulation; rest of the area along dorsal, anterior and posterior margins smooth. Hinge entomodont.

**Dimensions (mm):** Holotype (SUGDMF No. 975), a carapace, length 0.46, height 0.22, width 0.22. Paratype I (SUGDMF No. 976), a carapace, length 0.41, height 0.22, width 0.22. Paratype II (SUGDMF No. 977), a left valve, length 0.41, height 0.22. Paratype III (SUGDMF No. 978), a carapace, length 0.46, height 0.23, width 0.22.

**Remarks:** *Neurocythere kuldharensis* Khosla and Jakhar, n. sp. resembles *Neurocythere acuticaudata* Whatley, Balent and Armitage, 2001 described from the Callovian, Oxford Clay of southern England in overall lateral outline including presence of a sharp caudal process along the posterior margin. The present species, however, differs in surface ornamentation from *N. acuticaudata*, which is characterized by the coalescence of the ventrolateral, median and dorsal ribs at anterior 1/3 of length; a circular triangular area surrounded by ribs immediately anteroventral to this coalescence, and a vertical anastomosing rib uniting dorsal and median rib at 2/3 of length.

**Type Locality:** Section KC, western bank of Masurdi Nadi, about 1 km NNW of Khethari Talab.

**Type Horizon:** Clay bed (Sample No. KC/7), Kuldhar Member (early Callovian), Jaisalmer Formation.

**Occurrence:** *Majungaella perforata kachchhensis* – *Fastigatocythere falcata* Concurrent Range Zone, Sample No. KC/7.

*Neurocythere whatleyi* (Khosla and Jakhar, 1997)

(Pl. V, fig. 8)

*Lophocythere* 323b Grekoff, 1963, p. 1730, pl. 2, fig. 48.

*Nophrecythere whatleyi* Khosla and Jakhar, in Khosla *et al.*, 1997, pp. 20-22, pl. 5, figs. 6-7. – Khosla and Jakhar, 1999, p. 45, pl. 2, fig. 5. *Neurocythere whatleyi* (Khosla and Jakhar). – Khosla *et al.*, 2005, p. 55, pl. 6, fig. 8.

**Material:** 4 carapaces and 3 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 979), length 0.54, height 0.30, width 0.24.

**Genus *Trichordis*** Grekoff, 1963

*Trichordis devexa* (Grekoff, 1963)

(Pl. V, fig. 9)

*Lophocythere devexa* Grekoff, 1963, pp. 1729-30, pl. 2, figs. 49-52.

*Trichordis (Paratrachordis) devexa* (Grekoff). – Khosla and Jakhar, 1993, p. 149, figs. 5.1-5. – Khosla *et al.*, 1997, pl. 6, fig. 8. – Khosla and Jakhar, 1999, p. 45, pl. 3, fig. 2.

*Trichordis devexa* (Grekoff). – Khosla *et al.*, 2005, pp. 55-56, pl. 6, fig. 11.

**Material:** 13 carapaces and 12 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 980), length 0.59, height 0.35, width 0.29.

*Trichordis gujaratensis* Khosla, Jakhar

and Mohammed, 1997

(Pl. V, fig. 10)

*Trichordis (Trichordis) gujaratensis* Khosla, Jakhar and Mohammed, 1997, pp. 24–26, pl. 6, figs. 3–5. – Khosla and Jakhar, 1999, p. 45, pl. 2, fig. 8.

*Trichordis gujaratensis* Khosla, Jakhar and Mohammed. – Khosla *et al.*, 2005, p. 56, pl. 6, fig. 13.

**Material:** 29 carapaces and 19 valves.

**Dimensions (mm):** A female carapace (SUGDMF No. 981), length 0.69, height 0.38, width 0.37.

*Trichordis hadibhadangensis* Khosla, Darwin

Felix and Manisha Kumari, 2005

(Pl. V, figs. 11–12)

*Trichordis hadibhadangensis* Khosla, Darwin Felix and Manisha Kumari, in Khosla *et al.*, 2005, p. 56, pl. 6, figs. 14–17.

**Material:** 125 carapaces and 27 valves.

**Dimensions (mm):** A male carapace (SUGDMF No. 982), length 0.70, height 0.40, width 0.34. A female left valve (SUGDMF No. 983), length 0.66, height 0.42.

*Trichordis jaisalmerensis* (Kulshreshtha,

Singh and Tewari, 1985)

(Pl. V, figs. 13–14)

*Lophocythere jaisalmerensis* Kulshreshtha, Singh and Tewari, 1985, pp. 140–142, figs. 3.7, 3.10–3.12.

*Nophrecythere jaisalmerensis* (Kulshreshtha, Singh and Tewari). – Khosla *et al.*, 1997, p. 20, pl. 5, figs. 3–5. – Khosla and Jakhar, 1999, p. 45, pl. 2, fig. 4.

*Trichordis jaisalmerensis* (Kulshreshtha, Singh and Tewari). – Khosla *et al.*, 2005, pp. 56–57, pl. 7, fig. 1.

**Material:** 63 carapaces and 62 valves.

**Dimensions (mm):** A female carapace (SUGDMF No. 984), length 0.74, height 0.44, width 0.37. A male carapace (SUGDMF No. 985), length 0.77, height 0.43, width 0.36.

*Trichordis praetexta* Grekoff, 1963

(Pl. V, fig. 15)

*Trichordis praetexta* Grekoff, 1963, p. 1742, figs. 109–123; pl. 9, figs. 227–229.

*Trichordis (Trichordis) praetexta* Grekoff. Khosla *et al.*, 1997, p. 26, pl. 6, figs. 6–7.

**Material:** 101 carapaces and 108 valves.

**Dimensions (mm):** A female carapace (SUGDMF No. 986), length 0.64, height 0.39, width 0.37.

**Family Protocytheridae** Lyubimova, 1955

**Genus Mandawacythere** Bate, 1975

*Mandawacythere kachchhensis* Khosla, Manisha Kumari

and Darwin Felix, 2005

(Pl. V, figs. 16–17)

*Mandawacythere kachchhensis* Khosla, Manisha Kumari and Darwin Felix, in Khosla *et al.*, 2005, p. 57, pl. 7, figs. 2–3.

**Material:** 7 carapaces.

**Dimensions (mm):** A carapace, (SUGDMF No. 987), length 0.58, height 0.24, width 0.22. A carapace, (SUGDMF No. 988), length 0.59, height 0.26, width 0.24.

**Family Trachyleberididae** Sylvester-Bradley, 1948

**Genus Bhatiana** Mannikeri, 1996

*Bhatiana indica* Mannikeri, 1996

(Pl. V, fig. 18)

*Bhatiana indica* Mannikeri, 1996, pp. 401–402, pl. 1, figs. 1a–b; pl. 2, figs. 3a–c.

**Material:** 16 carapaces and 7 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 989), length 0.61, height 0.35, width 0.32.

**Genus Protobuntonia** Grekoff, 1954

*Protobuntonia* sp.

(Pl. V, figs. 19–20; Pl. VI, fig. 1)

**Material:** 4 carapaces.

**Remarks:** The species has following characteristics: Carapace subtriangular in lateral outline and biconvex in the dorsal; valves slightly inflated ventrally; greatest height and width anterior to middle. Overlap indistinct. Dorsal and ventral margins straight, converging posteriorly; anterior margin broad and evenly rounded; posterior margin 1/3rd of the anterior, rounded at mid-height. Valve surface with a faint downwardly curved rib near ventral margin giving it an angulated look, otherwise smooth. Internal characters not known.

The species resembles *Protobuntonia numidica* Grekoff (in Cheylan *et al.*, 1954), a Santonian species from Algeria, in overall shape but differs in having smooth surface. As against this *P. numidica* is distinctly punctate with compressed ends.

**Dimensions (mm):** A carapace (SUGDMF No. 990), length 0.56, height 0.32, width 0.27. A carapace (SUGDMF No. 991), length 0.62, height 0.38, width 0.29. A carapace (SUGDMF No. 992), length 0.59, height 0.34, width 0.24.

**Occurrence:** *Majungaella perforata kachchhensis* – *Galliaecytheridea remota* Concurrent Range Zone, Sample No. KB/1.

**Suborder Platycopa** Sars, 1866

**Family Cytherellidae** Sars, 1866

**Genus Cytherella** Jones, 1849

*Cytherella disjuncta* Lyubimova and Mohan, 1960

(Pl. VI, fig. 2)

*Cytherella disjuncta* Lyubimova and Mohan, in Lyubimova *et al.*, 1960, p. 16, pl. 1, figs. 2a–c. – Kulshreshtha *et al.*, 1985, p. 125, figs. 1.7, 1.8, 1.16, 1.19, 1.20. – Khosla *et al.*, 1997, p. 8, pl. 1, fig. 1. – Khosla *et al.*, 2005, p. 61, pl. 7, fig. 9.

**Material:** 19 carapaces and 15 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 993), length 0.72, height 0.42, width 0.29.

*Cytherella jaisalmerensis* Khosla and Jakhar, n. sp.

(Pl. VI, figs. 3–6)

**Material:** 3 carapaces and 27 valves.

**Etymology:** After the district of Jaisalmer.

**Diagnosis:** A species of *Cytherella* characterized by elongate-subrectangular outline in lateral view and somewhat wedge shaped in the dorsal; surface marked by a vertical slit-like median sulcus.

**Holotype:** Pl. VI, fig. 3.

**Description:** Carapace elongate-subrectangular in lateral view, with height almost equal in anterior and posterior halves. Right valve larger than left valve and except for posteroventral region overlaps prominently all along margin. Dorsal and ventral margins nearly straight and parallel; anterior margin evenly rounded; posterior margin leaning down in upper part and rounded in the lower. In dorsal view adult carapace somewhat wedge shaped, with maximum width near posterior end gradually narrowing towards the anterior; in molts carapace biconvex, with maximum width slightly posterior to middle, both anterior and posterior ends pointed. Surface of each valve marked by a median slit-like, vertical sulcus, otherwise smooth. Internal characters not known.

**Dimensions (mm):** Holotype (SUGDMF No. 994), a carapace, length 0.66, height 0.37, width 0.29. Paratype I (SUGDMF No. 995), a carapace, length 0.64, height 0.35, width 0.30. Paratype II (SUGDMF No. 996), a left valve, length 0.53,

height 0.29. Paratype III (SUGDMF No. 997), a carapace, length 0.54, height 0.32, width 0.24.

**Remarks:** The present species resembles *Cytherella kalajarensis* Khosla and Jakhar (in Khosla *et al.*, 1997) from the Jurassic of Habo Dome, Mainland Kachchh in having median depression. The latter species, however, unlike the former species, is characterized by the presence of a subovate median depression, ventral margin distinctly concave medially, slight overlap and biconvex dorsal outline, with both anterior and posterior ends pointed.

**Type Locality:** Section KA, western bank of Masurdi Nadi, east of Khethari Talab.

**Type Horizon:** Shale bed (Sample No. KA/4), Kuldhar Member (early Callovian), Jaisalmer Formation.

**Occurrence:** *Trichordis hadibhadangensis* Range Zone, Section FA; *Majungaella perforata kachchhensis* – *Fastigatocythere falcu* Concurrent Range Zone, Sections KA, KC and KD.

*Cytherella kalajarensis* Khosla and Jakhar, 1997  
(Pl. VI, fig. 7)

*Cytherella kalajarensis* Khosla and Jakhar, in Khosla *et al.*, 1997, p. 8, pl. 1, figs 2-3. – Khosla and Jakhar, 1999, p. 45, pl. 1, fig. 1. – Khosla *et al.*, 2005, p. 61, pl. 7, fig. 10.

**Material:** 17 carapaces and 28 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 998), length 0.70, height 0.40, width 0.26.

*Cytherella obscura* Lyubimova and Mohan, 1960  
(Pl. VI, fig. 8)

*Cytherella obscura* Lyubimova and Mohan, in Lyubimova *et al.*, 1960, pp. 15–16, pl. 1, figs. 1a–b. – Kulshreshtha *et al.*, 1985, p. 125, figs. 1.14, 1.15, 1.18. – Khosla *et al.*, 1997, pp. 8-9, pl. 1, fig. 5. – Khosla and Jakhar, 1999, p. 45, pl. 1, fig. 2. – Khosla *et al.*, 2005, pp. 61-62, pl. 7, fig. 12.

*Cytherella rannensis* Neale and Singh, 1986, p. 353, pl. 1, figs. 10–11.

**Material:** 61 carapaces and 34 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 999), length 0.74, height 0.42, width 0.30.

**Genus *Cytherelloidea* Alexander, 1929**

*Cytherelloidea badiensis* Khosla,  
Jakhar and Mohammed, 2004  
(Pl. VI, fig. 9)

*Cytherelloidea* sp. cf. *C. atlantolevantiana* Khosla, Jakhar and Mohammed, 1997, p. 10, pl. 1, figs. 12-13 (Not *Cytherelloidea atlantolevantiana* Rosenfeld and Honigstein, in Rosenfeld *et al.*, 1987, pl. 1, figs. 7-8).

*Cytherelloidea badiensis* Khosla, Jakhar and Mohammed, 2004, p. 23, pl. 1, fig. 1. – Khosla *et al.*, 2005, p. 62, pl. 7, fig. 13.

**Material:** 4 carapaces and 1 valve.

**Dimensions (mm):** A carapace (SUGDMF No. 1000), length 0.64, height 0.35, width 0.19.

*Cytherelloidea bhujensis* Khosla,  
Jakhar and Mohammed, 1997  
(Pl. VI, fig. 10)

*Cytherelloidea bhujensis* Khosla, Jakhar and Mohammed, 1997, p. 9, pl. 1, figs 7-8.

**Material:** 1 carapace and 3 valves.

**Dimensions (mm):** A left valve (SUGDMF No. 1001), length 0.48, height 0.27.

*Cytherelloidea difficila* Lyubimova and Mohan, 1960  
(Pl. VI, fig. 11)

*Cytherelloidea difficila* Lyubimova and Mohan, in Lyubimova *et al.*, 1960, p.18, pl. 1, figs. 4a, b.

**Material:** 66 carapaces and 4 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 1002), length 0.80, height 0.45, width 0.35.

*Cytherelloidea ipis* Grekoff, 1963  
(Pl. VI, fig. 12)

*Cytherelloidea ipis* Grekoff, 1963, p. 1722, pl. 1, figs. 16–17. – Khosla *et al.*, 1997, p. 10, pl. 1, fig. 11. – Khosla *et al.*, 2005, p. 62, pl. 7, fig. 15.

**Material:** 4 carapaces and 3 valves.

**Dimensions (mm):** A carapace (SUGDMF No. 1003), length 0.72, height 0.35, width 0.26.

*Cytherelloidea kuldharensis* Khosla and Jakhar, n. sp.  
(Pl. VI, figs. 13-15)

**Material:** 4 carapaces and 8 valves.

**Etymology:** After the village of Kuldhar, Jaisalmer.

**Diagnosis:** A species of *Cytherelloidea* characterized by elongate-subrectangular outline in lateral view and wedge-shaped in the dorsal; surface ornamented by a prominent rib all along margin and a thick, median transverse rib.

**Holotype:** Pl. VI, fig. 13.

**Description:** Carapace elongate-subrectangular in lateral outline, with greatest height at anterior 1/4th of length. Right valve slightly larger than left valve. Dorsal margin weakly arched, sloping down posteriorly; ventral margin slightly concave medially; anterior margin evenly rounded; posterior margin somewhat narrow, sloping in upper half and rounded in the lower. In dorsal view carapace wedge-shaped, with maximum width near posterior end. Valve surface ornamented by a prominent rib all along margin and a thick, median transverse rib; rest of the area smooth. Internal characters not known.

**Dimensions (mm):** Holotype (SUGDMF No. 1004), a left valve, length 0.58, height 0.29. Paratype I (SUGDMF No. 1005), a carapace, length 0.59, height 0.33, width 0.23. Paratype II (SUGDMF No. 1006), a right valve, length 0.62, height 0.35.

**Remarks:** *Cytherelloidea kuldharensis* Khosla and Jakhar, n. sp. resembles *Cytherelloidea paradifficila* Khosla, Jakhar and Mohammed, 1997 from the Jurassic of the Habo Dome, Mainland Kachchh in overall shape and ornamentation. The latter species, however, differs from the present species in having comparatively thinner marginal and median ribs and distinct in between reticulation.

**Type Locality:** Section KC, western bank of Masurdi Nadi, about 1km NNW of Khethari Talab.

**Type Horizon:** Clay bed (Sample No. KC/4), Kuldhar Member (early Callovian), Jaisalmer Formation.

**Occurrence:** *Majungaella perforata kachchhensis* – *Fastigatocythere falcu* Concurrent Range Zone, Sections KA, KC, KE and NL.

*Cytherelloidea paradifficila* Khosla,  
Jakhar and Mohammed, 1997  
(Pl. VI, fig. 16)

*Cytherelloidea paradifficila* Khosla, Jakhar and Mohammed, 1997, pp. 10–11, pl. 1, figs. 16–17. – Khosla and Jakhar, 1999, p. 45, pl. 1, fig. 4. – Khosla *et al.*, 2005, p. 62, pl. 7, fig. 16.

**Material:** 2 carapaces and 1 valve.

**Dimensions (mm):** A carapace (SUGDMF No. 1007), length 0.61, height 0.34, width 0.20.

**Genus A**

(Pl. VI, figs. 18-19)

**Material:** 2 carapaces.

**Remarks:** Carapace subquadrate in lateral outline, with greatest height at anterior cardinal angle; left valve slightly

larger than right valve, overlapping along anterior margin; dorsal margin straight, sloping down posteriorly; ventral margin weakly convex; anterior margin broad and obliquely rounded; posterior somewhat narrowly rounded; in dorsal view carapace biconvex, with maximum width anterior to middle; valve surface faintly pitted and with 2-3 fine ribs near anterior and ventral peripheries. The species could not be assigned to any known genus hence left in open nomenclature.

*Dimensions* (mm): A carapace (SUGDMF No. 1009), length 0.48, height 0.30, width 0.22. A carapace (SUGDMF No. 1010), length 0.50, height 0.32, width 0.24.

*Occurrence*: *Trichordis hadibhadangensis* Range Zone, Sample No. FA/4.

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