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LUNULITIFORM CHEILOSTOME BRYOZOANS FROM THE MIOCENE SEQUENCES OF WESTERN KACHCHH, GUJARAT

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ABSTRACT

Four species of lunulitiform cheilostome bryozoans, important as "sand fauna", are described from the Miocene rocks of western Kachchh Gujarat. Among them two species, *Discoporella misrai* and *Anoteropora rajnathi*, described by Tewari *et al.* (1960) from the ("Gaj") Burdigalian (Chhasra Formation) of Kachchh, are redescribed with designation of their Neotype. Two other species, *Anoteropora* aff. *latiriostris* Silén, 1947 and *A. cookae* n. sp. are described. Variability of linear zooecial dimensions, both within and among colonies, has been studied.

Key words: Bryozoa, Cheilostomata, lunulitiform, Miocene, Kachchh

INTRODUCTION

Bryozoans are commonly sessile benthic colonial organisms, but among them free-living forms exist that dwell on sandy substrate. These are thimble or disc-shaped lunulitiform growth aspects acquired by many taxa.

The Tertiary sequences (Table 1) are developed in the western part of Kachchh, Gujarat with its major part occurring in the offshore region extending up to the present continental shelf. The unique feature of this area is a complete preservation of a condensed section of rock sequences ranging from Paleocene to Pliocene developed within a 900 meter thick section exposed in the western part of onland Kachchh (Biswas, 1992).

Table 1: Tertiary stratigraphy of Kachchh (after Biswas, 1992).

AGE	FORMATION	LITHOLOGY
Middle Miocene-Pliocene	SANDHAN --Unconformity--	Sandstones, minor limestones and shales.
Early Miocene (Burdigalian)	CHHASRA	Silty shales and impure limestones.
Early Miocene (Aquitanian)	KHARI NADI --Unconformity--	Variegated siltstones and sandstones.
Oligocene (Rupelian-Chattian)	MANIYARA FORT --Unconformity--	Foraminiferal limestones, shales, coral bioherms and lumpy claystones.
Middle to early L. Eocene (Lutetian-Bartonian)	FULRA	Dense foraminiferal limestones.
Early Middle Eocene (Lutetian)	HARUDI --Unconformity --	Claystones/limestones, coquina, etc.
L. Palaeocene to E. Eocene (Thanetian-Ypresian)	NAREDI --Unconformity --	Claystones, limestones and gypseous shales.
Late Palaeocene (Thanetian)	MATANOMADH --Unconformity--	Volcanoclastics, shales and sandstones.
(Maastrichtian-Danian)	DECCAN TRAP	Basalt

The Lower Miocene (Aquitanian and Burdigalian) sequences, represented by the Khari Nadi and Chhasra Formations (Biswas, 1992), contain sandy substrates in patches that supported cheilostome bryozoan species with lunulitiform growth aspects. Tewari *et al.* (1960) reported two species, viz. *Discoporella misrai* and *Anoteropora rajnathi* from the ("Gaj") Burdigalian (Chhasra Formation) of Kachchh. In this paper these two species are redescribed along with their Neotype designation. Two other species, *Anoteropora* aff. *latiriostris* Silén, 1947 and *A. cookae* n. sp., are described from these rocks for the first time. These four species contribute about five per cent of cheilostome colonies of the Kachchh bryofauna, and their abundance and taphonomic aspects serve as important tool for paleoecological interpretation.

Geological map of the area with location of samples is given in Fig. 1 and lithologs of some important sections yield-

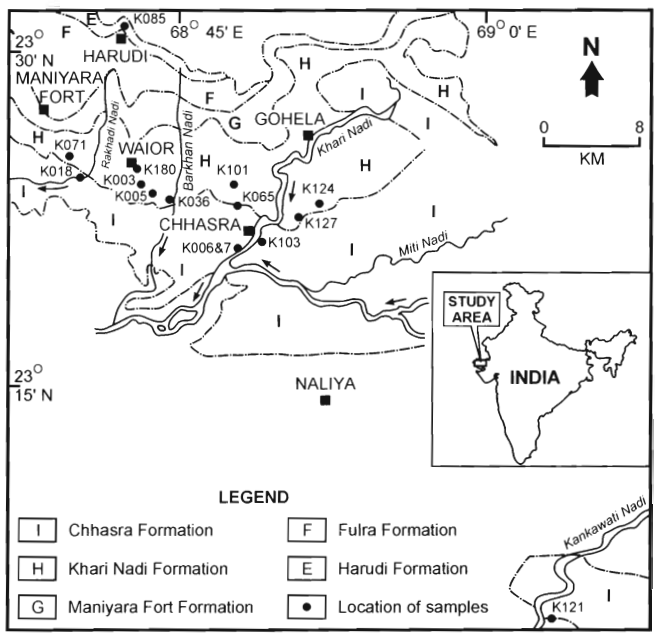

Fig. 1. Geological map of western Kachchh (after Biswas, 1992) showing the location of samples containing lunulitiform colonies.

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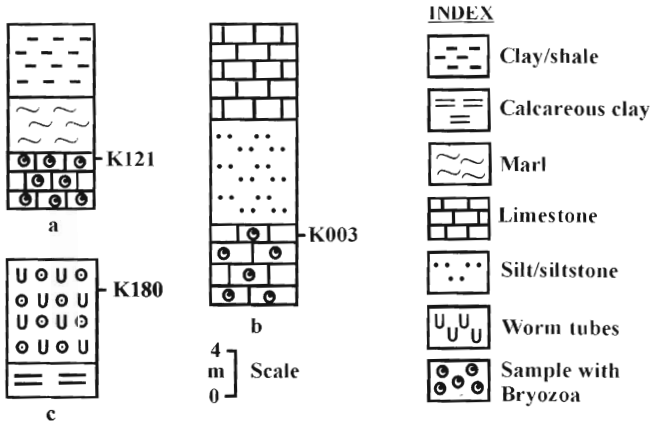


Fig. 2. Lithologs of some important sections yielding lunulitiform bryozoan colonies.
a. Kankawati River section, Vinjhan (Chhasra Fm.); b. Waior stream, Waghot (Khari Nadi Fm.); c. Waior stream, Waior (Khari Nadi Fm.).

ing lunulitiform bryozoan colonies are shown in Fig. 2. Samples of the Khari Nadi Formation from Waior, Waghot and Haripar villages, Rakhadi Nadi and Barkhan stream sections, and those of the Chhasra Formation near Chedopadi, Laiyari, Rampar and Vinjhan (Kankawati river section) villages and Chhasra cliff section have yielded lunulitiform bryozoan colonies. The outcrop of bioturbated sandy shale near the Waior village (fig. 2c) with crab burrows has preserved the largest concentration of such colonies.

Usual practice of cleaning of bryozoan colonies including the use of an ultrasonic cleaner was followed. For systematic classification Bassler (1953) along with the revision (Working list for Treatise) suggested by Gordon (2005) has been used. For preliminary identification of individual taxon comparison has been made with published work of Canu and Bassler (1927), Cook (1966), Cook and Chimonides (1994), d'Orbigny (1852), Hayward and Cook (1979 and 1983), Lagaaij (1952), Silén (1947) and Tewari *et al.* (1960). Paratype specimens, description and illustrations were sent to Dr. P. E. Bock of Deakin University, Burwood, Australia for his comments. Dr. Bock has noted that the material was examined by Dr. P. L. Cook also. For scanning electron microscopy, the specimens were photographed at 10 kv after coating with gold. Measurements of various parameters of adult zooecia (excluding the ancestrular part) viz., zooecial length (Lz), zooecial width (wz), apertural height (ha), apertural width (wa), height of avicularium (Lav), width of avicularium (wav), height of ovicell (hov) and width of ovicell (wov) were carried out with a WILD MMS 235 digital measuring unit fitted to a WILD M3C microscope. Arithmetic mean ($\bar{x}$), observed range (OR), standard deviation (s) and corrected coefficient of variation (V_c) were calculated following standard formulae given by Simpson *et al.* (1963). As there is smaller number of individuals in some colonies V_c was calculated for all sets. For study of intercolonial variability (I_v) the means of parameters ($\bar{x}$) were taken as individual measurements.

Repository: The Holotype, two Neotypes and the described and illustrated specimen (of *Anoteropora* aff. *latiriostris* Silén, 1947) are preserved in the Central Fossil Repository Unit of the Geological Survey of India (GSI), Kolkata – 700 016, India and the paratypes with additional material of these taxa are available in the museum of the Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur 721 302, India.

SYSTEMATIC DESCRIPTION

Class **Gymnolaemata** Allman, 1852
Order **Cheilostomata** Busk, 1852
Suborder **Neocheilostomina** d'Hondt, 1985
Infraorder **Flustrina** Smitt, 1868
Superfamily **Calloporoidea** Norman, 1903
Family **Cupuladriidae** Lagaaij, 1952
Genus ***Discoporella*** d'Orbigny, 1852

Discoporella misrai Tewari, Bhargava and Tandon, 1960
(Pl. I, figs. 1-3; Pl. II, fig. 1)

Discoporella misrai Tewari, Bhargava and Tandon, 1960, p.234, pl. 46, figs. 1-4 and pl. 47, fig. 2.

Material Examined: Neotype-GSI Type No. 21174; from the ochre-colored marlite of the Kankawati River section at Vinjhan (Chhasra Formation). Paratypes-K121/033/002-21; K003/033/001-3; K005/033/001; K007/033/001-15; K036/033/001-40; K065/033/001; K071/033/001;K101/033/001-110; K124/033/001-10; K143/033/001-2; K158/033/001-2; K180/033/001-7.

Dimensions of Neotype (in mm): Lz - $\bar{x}$ = 0.402, 0.370 - 0.425; wz - $\bar{x}$ = 0.297, 0.263 - 0.294; ha - $\bar{x}$ = 0.291, 0.245 - 0.333; wa - $\bar{x}$ = 0.185, 0.158 - 0.205; Lav - $\bar{x}$ = 0.2, 0.177 - 0.219 and wav - $\bar{x}$ = 0.195, 0.182 - 0.209 (N = 10).

Age: lower Miocene (Aquitanian-Burdigalian).

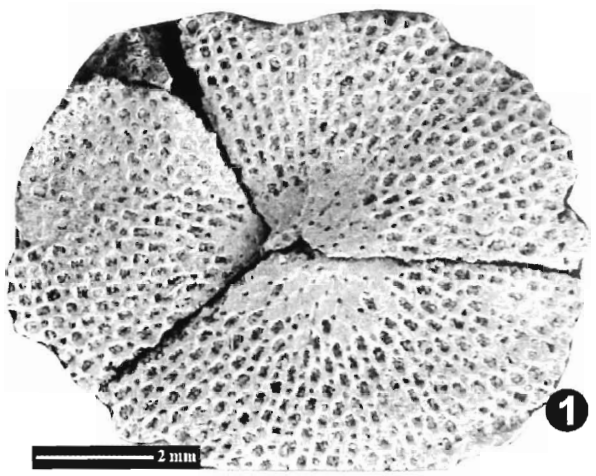
Description: Small to medium-sized free-living lunulitiform colonies, orbicular in outline; diameter ranging from 5.5mm to 11.5mm. Zooecia budded radially from ancestrula; ancestrula

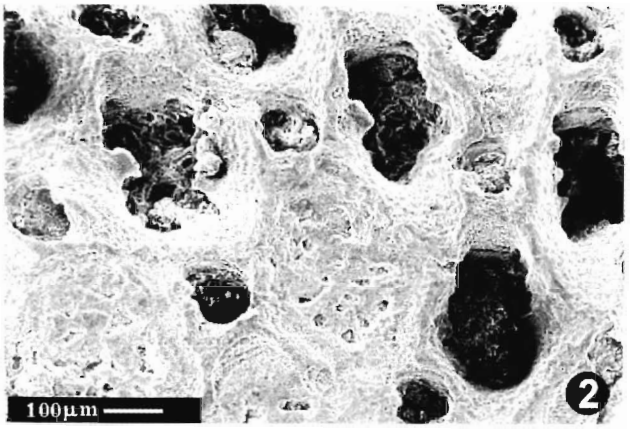
EXPLANATION OF PLATE I

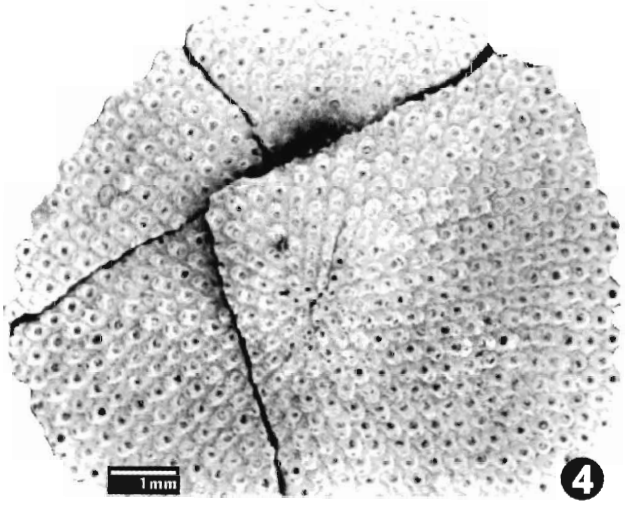
1-3. ***Discoporella misrai*** Tewari, Bhargava and Tandon. GSI Type No. 21174.
1. General aspect of the colony.
2. Details of autozooecia and avicularia.
3. Dorsal face showing radial tubercles and shallow sutures.

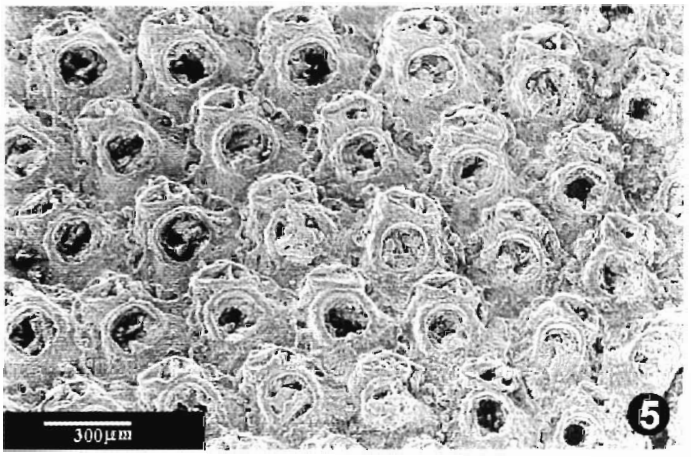
4-6. ***Anoteropora rajnathi*** Tewari, Bhargava and Tandon. GSI Type No.21191
4. General aspect.
5. Details of areolar tissue, avicularia with pivots.
6. Close-up of a zooecium showing porous plate closing the orifice (indicated by arrow) and avicularium.

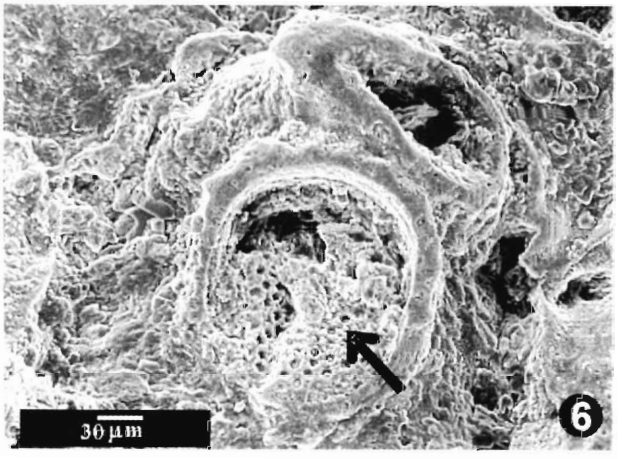
Plate I











small, oval in outline. Autozooecia oblong, cryptocyst thick, depressed; more prominent in zooecia of later generations and at peripheries of the colony. Zooecia of first three to four generations are closed by plates that somewhat resemble a cribrimorph frontal (Pl. I, Fig. 2). Opesia oblong, entire, opesial rim dentate. Lateral walls thick, of medium height; zooecial boundaries of adjacent zooecia fused. Avicularia vicarious, thick, subcircular to subsquarish in outline; placed distal to zooecia; opesia of avicularium entire. Dorsal surface tuberculate; rectangular series with deep sutures depicting zooecial outline; surface granular, pitted and consisting of six to eight small rounded, radial tubercles; septulae large, numerous, uniporous. Ovicells not observed.

Remarks: When compared with type description and illustrations, the present taxon shows a high degree of resemblance with *Discoporella misrai* Tewari, Bhargava and Tandon, 1960 (p.234, pl. 46, Figs. 1-4 and pl. 47, Fig. 2.) reported from the early Miocene ('Gaj') Chhasra Formation near the Vinjhan village of Kachchh. Dr. Phil E. Bock (pers. comm., 2003) on examining the material of the present taxon has recommended its placement under *Discoporella misrai* Tewari, Bhargava and Tandon, 1960. The type and paratype specimens of Tewari *et al.* (1960) being misplaced (Prof. M. P. Singh, pers. comm., 2003), a Neotype for this species is designated and preserved at the Central Fossil Repository of GSI, Kolkata. While this species was so far known only from the Burdigalian stage ('Gaj' Chhasra Formation *see* Tewari *et al.*, 1960), in the present collection 128 of 180 colonies was collected from the Aquitanian stage (Khari Nadi Formation) also, increasing thereby its lower range of occurrence.

Distribution: 128 colonies from the Khari Nadi Formation; 11 from the marlite exposures near the Waghot village, 50 from the Barkhan River section, 10 from weathered outcrops west of the Rakhadi River bridge near Naniber, 10 from marlite horizon near the Waior village, 24 from impure fossiliferous limestone horizon north of the Haripar village, 21 from argillites near the Haripar village and 2 colonies from ochreous claystone horizon near the Lakhapar village. From the Chhasra Formation 29 colonies from the type locality (near Kankawati River section near Vinjhan) and 23 colonies from the outcrops near Laiyari - Rampur cart road.

Variability: APPENDIX A includes data on intra- and intercolonial (I_v) variability of nine colonies. The zooecial and apertural parameters (Lz, wz, ha and wa) are highly variable within the colonies than those among the colonies. However, the V_c of avicularial parameters (Lav and wav) are low and comparable both within and among colonies indicating their low variability.

Infraorder **Ascophorina** Levinsen, 1909
"Grade" **Lepraliomorpha** Gordon, 1989
Superfamily **Mamilloporoidea** Canu and Bassler, 1927
Family **Mamilloporidae** Canu and Bassler, 1927
Genus ***Anoteropora*** Canu and Bassler, 1927

Anoteropora rajnathi Tewari, Bhargava and Tandon, 1960
(Pl. I, figs. 4-6)

Anoteropora rajnathi Tewari, Bhargava and Tandon, 1960, p.234-235, pl. 46, figs. 5-6 and pl. 47, figs. 1, 3-5.

Material Examined: Neotype-GSI Type No. 21191; from the impure fossiliferous limestone of the Khari Nadi Formation on the eastern scarp of the Waior stream west of Waghot. Paratypes-K180/032/001 to K180/032/031; K071/032/001 to K071/032/022 K036/032/001 to K036/032/003; K018/032/001; K101/032/001.

Dimensions of Neotype (in mm): Lz - $\bar{x}$ = 0.311, 0.278 - 0.341; wz - $\bar{x}$ = 0.334, 0.244 - 0.402; ha - $\bar{x}$ = 0.185, 0.177 - 0.204; wa - $\bar{x}$ = 0.195, 0.172 - 0.216; Lav - $\bar{x}$ = 0.207, 0.187 - 0.219 and wav - $\bar{x}$ = 0.095, 0.080 - 0.111 (N = 15).

Type horizon and locality: The impure fossiliferous limestone horizon of the Khari Nadi Formation on the eastern scarp of the Waior stream towards the Chedopadi village, west of the Waghot village.

Age: lower Miocene (Aquitanian-Burdigalian).

Description: Small to medium-sized free-living, lunulitiform colonies with orbicular outline and diameter ranging from 6.2 mm to 11.0 mm. Zooecia budded radially from subcentrally placed ancestrula. Ancestrula small, rounded with a small proximal cryptocyst; lacking avicularia. Zooecia subrectangular with a small granular proximal cryptocyst and surrounded by a thick areolar tissue with six to eight large areolae; areolar pores prominent in late astogenetic stage. Orifice round; closed in zooecia of early astogenetic stage in some colonies by a porous plate (Pl. I, fig. 6). In later stages

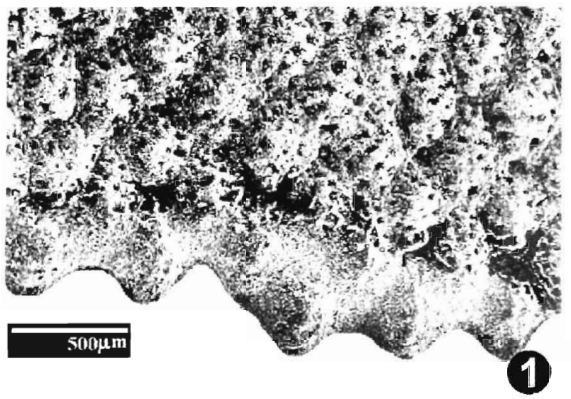
EXPLANATION OF PLATE II

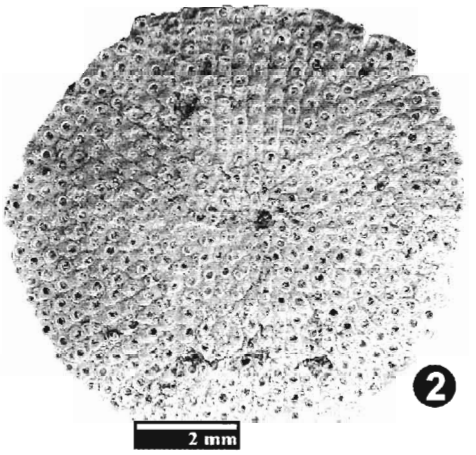
1. ***Discoporella misrai*** Tewari, Bhargava and Tandon. GSI Type No. 21174. Part of the dorsal face showing numerous coarsely porous small mounds with deep sutures.

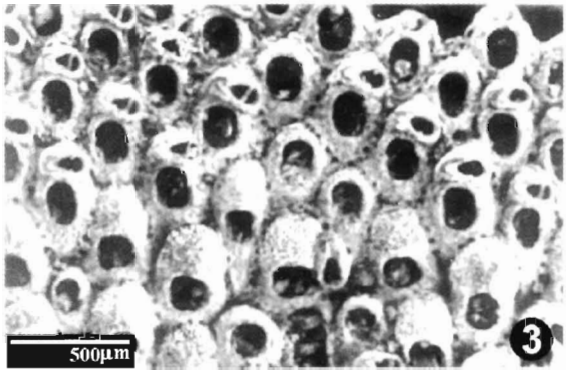
2-6. ***Anoteropora*** aff. ***latirostris*** Silén. GSI Type No. 21192.
2. General aspect of the colony.
3. Autozooecia and ovicellate zooecia with variable disposition of avicularium.
4. Details of cardelles, autozooecia with transverse avicularium and ovicellate zooecia with longitudinally disposed avicularium.
5. Details of narrow cryptocyst, porous ovicells and avicularia.
6. Dorsal face showing numerous coarsely porous small mounds with deep sutures.

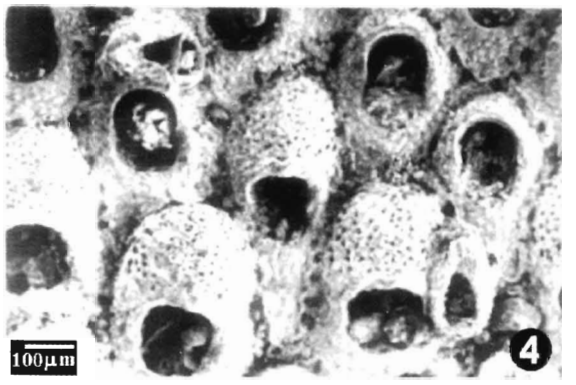
7-8. ***Anoteropora cookae*** n. sp. GSI Type No. K60/822.
7. General aspect of the colony showing well-rounded zooecia with regularly distributed areolae and occasional avicularia.
8. Details of dorsal face.

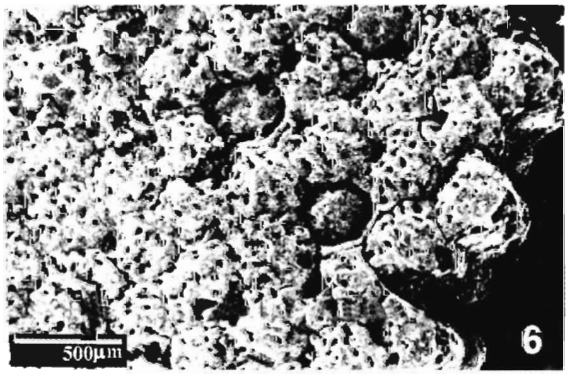
Plate II

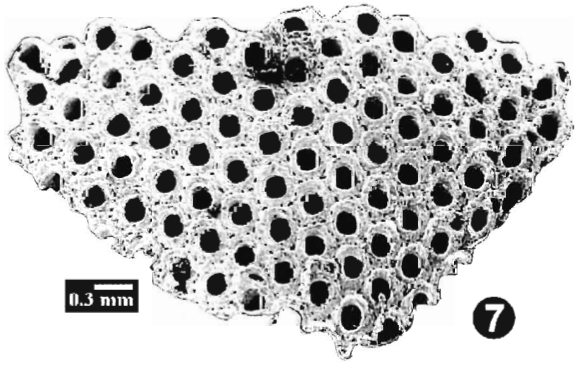


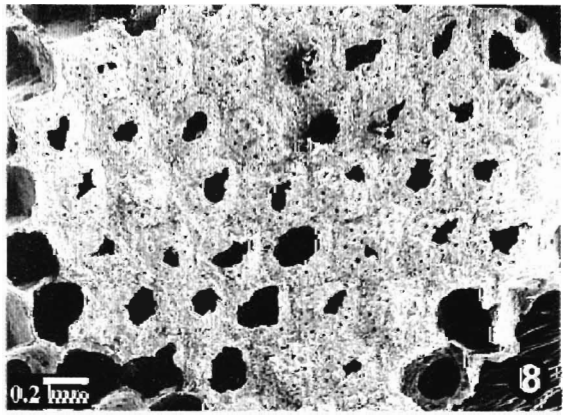












orificial rim raised; cardelle indistinct. Avicularia drop-shaped, transverse, distal to zooecia and confluent with distal orificial rim; opesia of avicularium entire with a slender pivot; rostral sides raised thick; distal ends of avicularia blunt with acute palate. Ovicells not observed. Dorsal surface with numerous small mounds, coarsely porous with deep sutures; septulae large numerous, uniporous and rounded.

Remarks: When compared with type description and illustrations, this taxon shows a high degree of resemblance with *Anoteropora rajnathi* Tewari, Bhargava and Tandon, 1960 (p.234-235, pl. 46, figs. 5-6 and pl. 47, figs. 1, 3-5) reported from the ('Gaj') Chhasra Formation near the Vinjhan village of Kachchh. Dr. P. E. Bock of Australia (pers. comm., 2002), on examining the paratype specimens of the present collection, has also agreed to the speciation. The original type and paratype specimens of Tewari *et al.* (1960), being misplaced (Prof. M. P. Singh, pers. comm., 2003), a Neotype for this species is designated and preserved at the Central Fossil Repository of GSI, Kolkata. However, the present material has larger dimensions of avicularia. *Anoteropora* aff. *latirostris* from Early Miocene (Aquitanian-Burdigalian) of Kachchh has porous ovicells. *Anoteropora cookae* from the same horizon has a very narrow cryptocyst and rarely occurring avicularium, and but lacks thick areolar tissue and ovicell. Tewari *et al.* (1960) reported this taxon only from the Burdigalian stage (Chhasra Formation) whereas 67 of 71 colonies in the present collection come from the Aquitanian stage (Khari Nadi Formation) increasing thereby its lower range of occurrence.

Distribution: Sixty-three colonies from the Khari Nadi Formation; seven near the Waghot village, 26 from weathered outcrops west of Road Bridge over the Rakhadi River near Naniber, 30 colonies from the argillite horizon near the Waior village. 4 colonies from the Kankawati river section of the Chhasra Formation near the Vinjhan village.

Variability: APPENDIX B shows the variation statistics of ten colonies of *Anoteropora rajnathi*. As indicated by high and somewhat inconsistent V_c values, the zooecial (Lz and wz), apertural (ha and wa) and avicularial (Lav and wav) parameters within colonies are highly variable and are not comparable. Except the length and width of zooecia (Lz and wz) all other parameters among the colonies (V_c values of I_v data) show high degree of variability.

Anoteropora aff. *latirostris* Silén, 1947

(Pl. II, figs. 2-6)

Anoteropora latirostris Silén, 1947, p. 58, pl.5, figs. 25-27 and 49-50. -Cook, 1966: p. 210 - Hayward and Cook, 1979, p. 103 and 1983, p. 127 - Cook and Chimonides, 1994 (23), p. 54-56, figs. 1c and 2e-f.

Material Examined:

Described specimen: GSI Type No. 21192; from argillite outcrop of the Khari Nadi Formation near the Waior village-Other specimens: K003/034/002; K018/034/001-4; K071/034/001-2; K180/034/002-55; K127/034/001-2 and K121/034/001.

Dimensions of the described specimen (in mm): Autozooecia: Lz - $\bar{x}$ = 0.337, 0.297 - 0.375; wz - $\bar{x}$ = 0.321, 0.293 - 0.361; ha - $\bar{x}$ = 0.219, 0.202 - 0.238 and wa - $\bar{x}$ = 0.208, 0.184 - 0.219 (N = 10). Avicularia: Lav - $\bar{x}$ = 0.242 0.197 - 0.278 and wav - $\bar{x}$ = 0.142, 0.127 - 0.157 (N = 20). Ovicellate zooecia: Lz - $\bar{x}$ = 0.45, 0.395 - 0.541; wz - $\bar{x}$ = 0.342, 0.300 - 0.399; ha - $\bar{x}$ = 0.184, 0.172 - 0.197; wa - $\bar{x}$ = 0.22, 0.205 - 0.243; hov - $\bar{x}$ = 0.174, 0.155 - 0.205 and wov - $\bar{x}$ = 0.257, 0.228 - 0.281 (N = 10).

Age: lower Miocene (Aquitanian-Burdigalian).

Description: Small to medium-sized free-living, lunulitiform colonies with orbicular outline and diameter ranging from 6.2 mm to 15.4 mm. Zooecia budded radially from ancestrula; ancestrula rounded to oval in outline; zooecia subrectangular or subsquarish, a small granular proximal cryptocyst with areolae. Interzooecial area wide, zooecia separated by deep grooves. Orifice circular; orificial rim raised in late astogenetic stages, often with two cardelles projected upward. Avicularia transverse, appearing regularly from the first generation, recumbent on adjacent distal zooid, drop-shaped, confluent with the distal orificial rim; avicularial opesia entire with a thin slender pivot; rostral sides raised; distally acute. Ovicellate zooecia generally appear from the fourth astogenetic stage and have a well-developed granular cryptocyst with or without avicularia. Ovicells globose, hyperstomial, coarsely porous and becoming recumbent on adjacent distal zooecia. Avicularia of ovicellate zooecia interzooecial, similar in morphology as that belonging to autozooecia, longitudinal in disposition, attached to lateral margin of orifice and ovicell with acute tips pointing distally. Dorsal surface depicting zooecial outline, with small mounds; granular and pitted; sutures shallow. Observed from dorsal face, lateral walls medium, septulae large, round and uniporous.

Remarks: The present taxon shows a great degree of similarity with *Anoteropora latirostris* Silén, 1947 described and illustrated by Cook and Chimonides (1994, p.54-56, figs. 1c, 2e-f; table - 1) from the Indian Ocean and other Tertiary localities. But the species described by them from the Indian Ocean in general, and those from the Eocene (?) of Sind, NW India in particular, have dimensions of orifice smaller and ovicells much larger than the present taxon. The zooecia of the present taxon are much longer than wide and are separated by wide deep groves whereas *A. latirostris* has much wider zooecia with shallow sutures. Dr. P. E. Bock of Australia (pers. comm., 2002), on examining the paratype specimens belonging to this taxon, commented that *Anoteropora* aff. *latirostris* is the best identification for this species. *A. rajnathi* and *A. cookae* from Kachchh lack ovicellate zooecia.

Distribution: Thirty-four colonies from the Khari Nadi Formation; 18 colonies from outcrop near the Waior village, 3 colonies from marlite horizon near the Waghot village, 8

colonies from the Rakhadi River section, 5 colonies from weathered outcrops west of the bridge over the Rakhadi River near Naniber. 5 colonies from the Chhasra Formation near the Chhasra village.

Variability: Since there are large number of ovicellate zooecia in this taxon, the variation data for both autozooecia and ovicellate zooids for ten colonies are shown in APPENDIX C. The V_c values of Lz, wz, Lav and wav, both within and among the colonies are high and are not comparable. However, the dimensions of ha and wa are less variable within the colonies (V_c values of A-J) when compared to those among the colonies (V_c values of I_v data). Though the same trend is observed in ovicellate zooecia, the length (Lz) is less variable among the colonies than those within the colonies.

Anoteropora cookae n. sp.

(Pl. II, figs. 7-8)

Material Examined: Holotype-GSI Type No. K60/822; from argillite outcrop of the Khari Nadi Formation near the Waior village. Paratypes-K003/035/001-2; K006/035/001-5; K007/035/001; K021/035/001-2; K036/035/001; K127/035/001-3; K153/035/001; K180/035/002-14 and K101/035/001.

Dimensions of holotype (in mm): Lz - $\bar{x}$ = 0.361, 0.269-0.395; wz - $\bar{x}$ = 0.342, 0.312 - 0.366; ha - $\bar{x}$ = 0.234, 0.224 - 0.249 and wa - $\bar{x}$ = 0.177, 0.165-0.190 (N = 15). Avicularia: L - $\bar{x}$ = 0.244, 0.219-0.265 and wav - $\bar{x}$ = 0.149, 0.146 - 0.153 (N = 3).

Type horizon and locality: The ochreous limestone horizon of the Khari Nadi Formation on the roadside outcrop near the Waior village on the way to the Ukir village.

Age: lower Miocene (Aquitanian-Burdigalian).

Derivation of name: Named in honour of Ms. Patricia L. Cook, former associate, museum of Victoria, Melbourne, Australia for her outstanding contribution on free-living bryozoans.

Diagnosis: Colonies free-living, lunulitiform, medium-sized; zooecia circular with very narrow and indistinct cryptocyst surrounded by 8-10 areolae. Orifice circular; cardelle not preserved. Avicularia rare; when present transverse, drop-shaped in outline with complete opesia. Ovicells not observed.

Description: Small to medium-sized free-living lunulitiform colonies with orbicular outline and diameter ranging from 7.7 mm to 12.6 mm. Zooecia, budded radially from ancestrula, circular in outline; small narrow or indistinct cryptocyst with eight to ten areolae; zooecial boundary distinct, interzooecial area narrow with shallow suture; septulae small, numerous, round, uniporous. Orifice circular in outline, without cardelle. Avicularia sparsely occurring at the middle of colonies or along the periphery in groups; drop-shaped, transverse in disposition, distal to zooecia and confluent with the orificial margin. Opesia of avicularia entire; median pivot preserved at places; rostrum indistinct; mandibles acute. Ovicells not observed. Dorsal surface depicting zooecial outline, small raised mounds, granular and pitted, suture shallow.

Remarks: Circular zooecia with very narrow cryptocyst surrounded by 8-10 areolae and sparsely occurring avicularia are distinctive characters that separate the present Kachchh taxon from all other species of *Anoteropora* Canu and Bassler, 1927 reported so far. Cook and Chimonides reported *Anoteropora inarmata* (1994, p. 56-57, fig. 2b), a species without avicularia from Zanzibar. All other species of *Anoteropora* reported so far has numerous avicularia. Dr. P. E. Bock of Australia (pers. comm., 2002), on examining the paratype specimens belonging to this taxon, has also agreed to the designation of a new species. Håkansson (pers. comm., 2005) suggested the generic placement of this taxon under *Selenariopsis* Maplestone of the family Eurystomellidae Levinsen, 1909. But the dissimilarities in aspects of zooecia and avicularia are quite apparent when the figured species of the genus *Selenariopsis* in the Bryozoa homepage (www.civgeo.rmit.edu.au/bryozoa/cheilostomata/eurystomellidae/selenariopsis.html) are compared with the features of the Kachchh species.

Distribution: Twenty-eight colonies from the Khari Nadi Formation; two from the type locality, two from the marlite horizon of the Waior stream section near the Waghot village, two from the Barkhan River section, and seven from the argillites near the Haripar village. Seven colonies from the Kankawati River section of the Chhasra Formation near the Vinjhan village.

Variability: Thirteen colonies from the type locality were chosen to study the variability of zooecial parameters of this new species, and the data are noted in APPENDIX D. In general zooecial dimensions (Lz and wz) within colonies (A-M) are highly variable. Those for apertures (ha and wa) are comparatively less variable. Intracolonial variability of avicularial parameters (Lav and wav) is not comparable which may be due to smaller number of individuals measured in some colonies (D, K, L and M). However, the intercolonial variability (V_c values of I_v data) for all parameters is low and comparable.

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APPENDIX

A. Variability of zooecial parameters of *Discoporella misrai*. Colony Index: A - K121; B, C and D - K036; E - K124; F - K158; G - K103; H and I - K180. [Abbreviations: N - number of observations; OR - observed range; $\bar{x}$ - mean; s - standard deviation; V_c - corrected coefficient of variation; I_v - intercolonial variability; Lz - zooecial length; wz - zooecial width; ha - apertural height; wa - apertural width; Lav - height of avicularium; wav - width of avicularium; hov - height of ovicell and wov - width of ovicell. All measurements are in mm.]

Parameters	Colony	N	OR	$\bar{x}$	s	V_c
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.370-0.425	0.402	0.019	4.84
	B	12	0.329-0.410	0.378	0.028	7.56
	C	12	0.336-0.455	0.391	0.042	10.96
	D	12	0.338-0.468	0.399	0.044	11.25
Lz	E	10	0.345-0.411	0.375	0.023	6.28
	F	10	0.352-0.509	0.404	0.048	12.17
	G	10	0.344-0.429	0.377	0.028	10.36
	H	10	0.336-0.488	0.416	0.074	18.23
	I	12	0.318-0.453	0.394	0.052	13.47
	I_v	9	0.377-0.416	0.393	0.013	3.39
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.263-0.294	0.297	0.016	5.52
	B	12	0.253-0.322	0.297	0.021	7.22
	C	12	0.224-0.319	0.265	0.031	11.94
	D	12	0.272-0.402	0.318	0.038	12.19
wz	E	10	0.243-0.294	0.266	0.018	6.93
	F	10	0.249-0.353	0.291	0.033	11.62
	G	10	0.241-0.344	0.300	0.033	11.27
	H	10	0.265-0.348	0.293	0.028	9.79
	I	12	0.228-0.344	0.269	0.032	12.14
	I_v	9	0.265-0.318	0.288	0.017	6.06
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.245-0.333	0.291	0.027	9.51
	B	12	0.260-0.307	0.285	0.015	5.37
	C	12	0.256-0.358	0.297	0.036	12.37
	D	12	0.219-0.336	0.289	0.038	13.42
ha	E	10	0.243-0.314	0.278	0.020	7.37
	F	10	0.267-0.348	0.307	0.024	8.01
	G	10	0.199-0.293	0.252	0.025	10.17
	H	10	0.249-0.399	0.315	0.059	19.19
	I	12	0.205-0.351	0.281	0.044	15.98
	I_v	9	0.252-0.315	0.288	0.017	6.06
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.158-0.205	0.185	0.014	7.75
	B	12	0.172-0.216	0.192	0.014	7.44
	C	12	0.146-0.209	0.175	0.017	9.91
	D	12	0.176-0.263	0.208	0.027	13.25
wa	E	10	0.173-0.219	0.193	0.013	6.9
	F	10	0.155-0.191	0.175	0.012	7.03
	G	10	0.161-0.209	0.183	0.016	8.96
	H	10	0.183-0.249	0.205	0.019	9.5
	I	12	0.146-0.191	0.155	0.013	8.56
	I_v	9	0.155-0.208	0.185	0.015	8.33

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.177-0.219	0.200	0.012	6.15
	B	12	0.169-0.219	0.187	0.014	7.64
	C	12	0.177-0.219	0.207	0.013	6.41
	D	12	0.146-0.224	0.188	0.021	11.4
Lav	E	10	0.177-0.219	0.196	0.012	6.27
	F	10	0.153-0.180	0.167	0.009	5.52
	G	10	0.191-0.219	0.204	0.010	5.02
	H	10	0.168-0.219	0.206	0.015	7.46
	I	12	0.170-0.205	0.190	0.009	4.83
	I_v	9	0.167-0.207	0.194	0.012	6.35

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.182-0.209	0.195	0.009	4.73
	B	12	0.155-0.199	0.168	0.013	7.9
	C	12	0.177-0.199	0.190	0.008	4.3
	D	12	0.161-0.209	0.175	0.014	8.16
wav	E	10	0.177-0.202	0.190	0.007	3.77
	F	10	0.146-0.161	0.152	0.007	4.72
	G	10	0.169-0.199	0.185	0.010	5.54
	H	10	0.175-0.205	0.192	0.009	4.8
	I	12	0.146-0.172	0.155	0.010	6.58
	I_v	9	0.152-0.195	0.178	0.015	8.66

B. Variability of zooecial parameters of *Anoteropora rajnathi*. [Colony Index: A - K003, B to I - K180 and J - K036. For abbreviations see A.]

Parameters	Colony	N	OR	$\bar{x}$	S	V_c
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	15	0.278-0.341	0.311	0.014	4.57
	B	12	0.246-0.341	0.306	0.026	8.67
	C	12	0.235-0.356	0.289	0.033	11.66
	D	13	0.242-0.351	0.286	0.038	13.54
	E	10	0.297-0.370	0.321	0.024	7.66
Lz	F	12	0.286-0.464	0.356	0.054	15.48
	G	10	0.243-0.339	0.295	0.027	9.38
	H	12	0.291-0.369	0.325	0.025	7.85
	I	10	0.296-0.369	0.325	0.026	8.20
	J	10	0.287-0.367	0.322	0.023	7.32
	I_v	10	0.286-0.356	0.313	0.02	6.55

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	15	0.172-0.216	0.195	0.012	6.26
	B	12	0.162-0.212	0.186	0.016	8.78
	C	12	0.131-0.183	0.152	0.014	9.40
	D	13	0.191-0.224	0.207	0.009	4.43
	E	10	0.191-0.216	0.202	0.008	4.06
wa	F	12	0.175-0.241	0.208	0.017	8.34
	G	10	0.183-0.205	0.193	0.009	4.79
	H	12	0.192-0.234	0.211	0.010	4.83
	I	10	0.190-0.228	0.203	0.011	5.55
	J	10	0.191-0.202	0.197	0.004	2.08
	I_v	10	0.152-0.211	0.195	0.016	8.41

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	15	0.244-0.402	0.334	0.039	11.87
	B	12	0.322-0.363	0.338	0.011	3.32
	C	12	0.263-0.385	0.318	0.037	11.87
	D	13	0.322-0.388	0.356	0.024	6.87
	E	10	0.336-0.409	0.370	0.023	6.37
wz	F	12	0.301-0.395	0.346	0.029	8.55
	G	10	0.292-0.353	0.320	0.019	6.08
	H	12	0.304-0.385	0.360	0.028	7.94
	I	10	0.314-0.360	0.338	0.015	4.55
	J	10	0.304-0.351	0.326	0.014	4.40
	I_v	10	0.318-0.370	0.341	0.016	4.81

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	15	0.177-0.204	0.185	0.006	3.29
	B	12	0.183-0.224	0.200	0.012	6.12
	C	12	0.176-0.192	0.185	0.005	2.76
	D	13	0.190-0.214	0.202	0.007	3.53
	E	10	0.184-0.219	0.205	0.012	6.00
ha	F	12	0.202-0.265	0.241	0.016	6.77
	G	10	0.172-0.199	0.188	0.009	4.91
	H	12	0.199-0.219	0.209	0.008	3.90
	I	10	0.184-0.224	0.202	0.012	6.09
	J	10	0.256-0.271	0.261	0.005	1.96
	I_v	10	0.185-0.241	0.208	0.023	11.33

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	15	0.187-0.219	0.207	0.011	5.40
	B	12	0.219-0.289	0.260	0.021	8.24
	C	12	0.217-0.260	0.238	0.015	6.43
	D	13	0.216-0.270	0.245	0.019	7.90
	E	10	0.250-0.287	0.270	0.014	5.31
Lav	F	12	0.224-0.314	0.274	0.025	9.31
	G	10	0.213-0.256	0.233	0.013	5.72
	H	12	0.238-0.282	0.260	0.015	5.88
	I	10	0.212-0.275	0.248	0.018	7.44
	J	10	0.227-0.271	0.246	0.013	5.42
	I_v	10	0.207-0.274	0.248	0.018	7.44

C. Variability of zooecial parameters of both autozooecia and ovicellate zooecia of *Anoteropora* aff. *latirostris*. [Colony Index: A to E - K180, F - K127, G to H - K071 and I to J - K018. For abbreviations, see A.]

Parameters	Colony	N	OR	$\bar{x}$	s	V_c
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.297-0.375	0.337	0.024	7.29
	B	6	0.351-0.410	0.380	0.030	8.22
	C	10	0.290-0.321	0.303	0.013	4.39
	D	7	0.312-0.370	0.329	0.022	6.92
Lz	E	10	0.235-0.312	0.265	0.020	7.73
(auto-	F	10	0.250-0.331	0.286	0.023	8.24
zooecia)	G	10	0.278-0.322	0.299	0.015	5.14

	H	6	0.249-0.414	0.299	0.060	20.90
	I	8	0.301-0.348	0.329	0.015	4.70
	J	9	0.309-0.355	0.328	0.016	5.01
	I_v	10	0.265-0.380	0.316	0.030	9.73

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.395-0.541	0.45	0.043	9.79
	B	10	0.404-0.641	0.489	0.077	16.14
	C	5	0.432-0.534	0.477	0.038	8.36
	D	5	0.476-0.571	0.507	0.038	7.87
Lz	E	10	0.392-0.487	0.438	0.034	7.95
(ovicellate	F	5	0.455-0.484	0.412	0.015	3.82
zooecia)	G	12	0.432-0.537	0.468	0.032	6.98
	H	5	0.439-0.502	0.472	0.024	5.34
	I	6	0.410-0.519	0.487	0.041	8.76
	J	5	0.407-0.516	0.461	0.054	12.29
	I_v	10	0.412-0.507	0.466	0.026	5.72

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.338-0.410	0.379	0.022	5.95
	B	6	0.333-0.351	0.341	0.009	2.75
	C	10	0.293-0.361	0.321	0.021	6.70
	D	7	0.309-0.366	0.335	0.018	5.56
wz	E	10	0.289-0.395	0.319	0.029	9.31
(auto-	F	10	0.297-0.329	0.312	0.012	3.94
zooecia)	G	10	0.271-0.319	0.300	0.013	4.44
	H	6	0.290-0.351	0.310	0.023	7.73
	I	8	0.319-0.382	0.349	0.021	6.20
	J	9	0.314-0.351	0.334	0.013	4.00
	I_v	10	0.300-0.379	0.330	0.022	6.83

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.300-0.399	0.342	0.038	11.39
	B	10	0.309-0.377	0.348	0.026	7.65
	C	5	0.246-0.375	0.301	0.047	16.39
	D	5	0.287-0.344	0.31	0.023	7.79
wz	E	10	0.293-0.373	0.332	0.027	8.33
(ovicellate	F	5	0.341-0.360	0.347	0.011	3.33
zooecia)	G	12	0.250-0.374	0.295	0.036	12.33
	H	5	0.272-0.307	0.288	0.013	4.74
	I	6	0.297-0.395	0.351	0.032	9.49
	J	5	0.329-0.377	0.349	0.025	7.24
	I_v	10	0.295-0.351	0.326	0.024	7.54

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.202-0.238	0.219	0.011	5.15
	B	6	0.183-0.191	0.187	0.004	2.23
	C	10	0.161-0.199	0.183	0.011	6.16
	D	7	0.199-0.222	0.214	0.012	5.80
ha	E	10	0.175-0.192	0.183	0.005	2.80
(auto-	F	10	0.118-0.216	0.184	0.026	14.48
zooecia)	G	10	0.183-0.209	0.196	0.007	3.66

	H	6	0.180-0.212	0.196	0.013	6.91
	I	8	0.213-0.235	0.223	0.008	3.69
	J	9	0.213-0.234	0.226	0.008	3.64
	I_v	10	0.183-0.226	0.201	0.017	8.67

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.172-0.197	0.184	0.008	4.45
	B	10	0.162-0.191	0.177	0.008	4.63
	C	5	0.161-0.187	0.174	0.012	7.24
	D	5	0.187-0.214	0.201	0.011	5.74
ha	E	10	0.161-0.187	0.171	0.007	4.19
(ovicellate	F	5	0.202-0.205	0.203	0.001	0.52
zooecia)	G	12	0.149-0.180	0.167	0.010	6.11
	H	5	0.172-0.187	0.179	0.005	2.93
	I	6	0.177-0.212	0.191	0.013	7.09
	J	5	0.184-0.196	0.191	0.006	3.30
	I_v	10	0.167-0.203	0.183	0.018	10.08

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.184-0.219	0.208	0.011	5.42
	B	6	0.175-0.177	0.176	0.001	0.60
	C	10	0.149-0.183	0.164	0.009	5.62
	D	7	0.177-0.192	0.183	0.005	5.80
wa	E	10	0.175-0.192	0.183	0.005	2.80
(auto-	F	10	0.177-0.199	0.189	0.007	3.79
zooecia)	G	10	0.169-0.212	0.179	0.013	7.44
	H	6	0.169-0.192	0.182	0.008	4.58
	I	8	0.197-0.216	0.207	0.006	2.99
	J	9	0.190-0.213	0.200	0.008	4.11
	I_v	10	0.164-0.208	0.187	0.013	7.12

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.205-0.243	0.22	0.011	5.12
	B	10	0.180-0.224	0.197	0.014	7.28
	C	5	0.165-0.195	0.182	0.012	6.92
	D	5	0.183-0.206	0.192	0.009	4.92
wa	E	10	0.175-0.216	0.191	0.011	5.90
(ovicellate	F	5	0.209-0.219	0.216	0.006	2.92
zooecia)	G	12	0.190-0.212	0.202	0.006	3.03
	H	5	0.180-0.206	0.190	0.010	5.52
	I	6	0.205-0.243	0.223	0.011	5.14
	J	5	0.191-0.224	0.207	0.016	8.11
	I_v	10	0.182-0.216	0.202	0.013	6.60

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	20	0.197-0.278	0.242	0.024	10.04
	B	10	0.168-0.235	0.209	0.022	10.79
	C	15	0.191-0.279	0.246	0.029	11.98
	D	12	0.194-0.271	0.239	0.021	8.97
Lav	E	20	0.180-0.256	0.219	0.024	11.09
(auto-	F	13	0.217-0.271	0.247	0.017	7.01
zooecia)	G	22	0.197-0.249	0.222	0.014	6.37

	H	11	0.202-0.278	0.250	0.021	8.59
	I	14	0.184-0.241	0.209	0.016	7.79
	J	11	0.161-0.234	0.209	0.019	9.29
	I_v	10	0.209-0.247	0.229	0.016	7.16

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	20	0.127-0.157	0.142	0.01	7.13
	B	10	0.085-0.143	0.115	0.015	13.34
	C	15	0.104-0.143	0.124	0.013	10.65
	D	12	0.096-0.150	0.125	0.015	12.25
wav	E	20	0.101-0.131	0.114	0.009	7.99
(auto-	F	13	0.102-0.148	0.128	0.013	10.35
zooecia)	G	22	0.096-0.133	0.115	0.010	8.79
	H	11	0.102-0.139	0.120	0.013	11.08
	I	14	0.114-0.146	0.126	0.009	7.27
	J	11	0.102-0.140	0.124	0.015	12.37
	I_v	10	0.114-0.128	0.124	0.008	6.61

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.155-0.205	0.174	0.018	10.60
	B	10	0.161-0.229	0.186	0.022	12.12
	C	5	0.140-0.216	0.175	0.029	17.4
	D	5	0.175-0.205	0.194	0.011	5.95
hov	E	10	0.170-0.213	0.183	0.015	8.40
(ovicellate	F	5	0.189-0.221	0.202	0.016	8.31
zooecia)	G	12	0.175-0.216	0.196	0.012	6.25
	H	5	0.191-0.238	0.209	0.019	9.54
	I	6	0.177-0.227	0.209	0.020	9.96
	J	5	0.187-0.234	0.214	0.024	11.77
	I_v	10	0.174-0.209	0.194	0.014	7.39

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.228-0.281	0.257	0.019	7.57
	B	10	0.238-0.323	0.274	0.029	10.84
	C	5	0.250-0.287	0.265	0.014	5.54
	D	5	0.205-0.257	0.227	0.022	10.17
wov	E	10	0.229-0.292	0.259	0.021	8.31
(ovicellate	F	5	0.235-0.278	0.262	0.023	9.23
zooecia)	G	12	0.267-0.360	0.299	0.026	8.87
	H	5	0.227-0.307	0.261	0.029	11.66
	I	6	0.278-0.377	0.324	0.035	11.25
	J	5	0.322-0.366	0.351	0.025	7.48
	I_v	10	0.227-0.351	0.278	0.035	12.90

D. Variability of zooecial parameters of *Anoteropora cookae* n. sp.
[Colony Index: All colonies from K180. For abbreviations, see A.]

Parameters	Colony	N	OR	$\bar{x}$	s	V_c
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	20	0.314-0.448	0.384	0.044	11.60
	B	13	0.301-0.505	0.399	0.066	16.86
	C	10	0.309-0.378	0.351	0.021	6.13
	D	10	0.359-0.432	0.391	0.025	6.55
	E	15	0.274-0.399	0.350	0.031	9.00
	F	15	0.274-0.414	0.342	0.039	11.59
Lz	G	15	0.296-0.409	0.361	0.037	10.42
	H	20	0.275-0.498	0.352	0.058	16.68
	I	19	0.296-0.412	0.360	0.036	10.13
	J	12	0.311-0.429	0.368	0.044	12.20
	K	12	0.306-0.396	0.362	0.033	9.30
	L	15	0.301-0.395	0.365	0.027	7.52
	M	11	0.341-0.492	0.414	0.048	11.86
	I_v	13	0.342-0.414	0.369	0.021	5.80

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	20	0.332-0.432	0.380	0.03	7.99
	B	13	0.333-0.410	0.360	0.025	7.08
	C	10	0.309-0.352	0.337	0.017	5.17
	D	10	0.309-0.421	0.344	0.041	12.21
	E	15	0.263-0.344	0.310	0.023	7.54
	F	15	0.307-0.389	0.348	0.023	6.72
wz	G	15	0.307-0.389	0.359	0.023	6.51
	H	20	0.300-0.453	0.376	0.034	9.15
	I	19	0.275-0.377	0.333	0.028	8.52
	J	12	0.292-0.353	0.324	0.018	5.67
	K	12	0.334-0.355	0.343	0.006	1.78
	L	15	0.312-0.366	0.340	0.017	5.08
	M	11	0.316-0.385	0.342	0.019	5.68
	I_v	13	0.310-0.380	0.346	0.019	5.59

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	20	0.224-0.265	0.243	0.01	4.16
	B	13	0.219-0.271	0.243	0.017	7.13
	C	10	0.209-0.249	0.233	0.015	6.60
	D	10	0.231-0.272	0.244	0.012	5.04
	E	15	0.221-0.250	0.237	0.009	3.86
	F	15	0.205-0.241	0.226	0.012	5.39
ha	G	15	0.228-0.267	0.242	0.010	4.20
	H	20	0.202-0.243	0.224	0.009	4.09
	I	19	0.212-0.249	0.231	0.009	3.95
	J	12	0.213-0.243	0.229	0.010	4.46
	K	12	0.219-0.256	0.237	0.009	3.87
	L	15	0.224-0.249	0.234	0.007	3.04
	M	11	0.205-0.231	0.219	0.008	3.73
	I_v	13	0.219-0.244	0.234	0.008	3.48

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	20	0.176-0.224	0.191	0.010	5.30
	B	13	0.158-0.212	0.183	0.013	7.24
	C	10	0.168-0.199	0.190	0.012	6.44
	D	10	0.180-0.204	0.191	0.007	3.76
	E	15	0.151-0.184	0.165	0.012	7.39
	F	15	0.161-0.187	0.174	0.008	4.67
wa	G	15	0.169-0.190	0.178	0.006	3.43

	H	20	0.155-0.199	0.177	0.011	6.29
	I	19	0.161-0.194	0.18	0.008	4.50
	J	12	0.161-0.193	0.179	0.009	5.13
	K	12	0.170-0.191	0.182	0.007	3.92
	L	15	0.165-0.190	0.177	0.009	5.17
	M	11	0.161-0.197	0.182	0.009	5.05
	I_v	13	0.174-0.191	0.181	0.008	4.50

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.235-0.294	0.273	0.016	5.93
	B	8	0.235-0.289	0.263	0.019	7.45
	C	5	0.221-0.246	0.231	0.010	4.54
	D	4	0.231-0.265	0.244	0.015	6.53
	E	8	0.184-0.275	0.248	0.028	11.64
	F	9	0.202-0.268	0.244	0.022	9.26
Lav	G	8	0.234-0.294	0.271	0.020	7.61
	H	10	0.231-0.265	0.252	0.010	4.06
	I	11	0.216-0.272	0.249	0.014	5.75
	J	6	0.212-0.256	0.241	0.015	6.48
	K	4	0.205-0.263	0.237	0.027	12.10
	L	3	0.219-0.265	0.244	0.023	10.01
	M	2	0.304-0.305	0.304	0.003	1.04
	I_v	13	0.231-0.304	0.254	0.008	3.21

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A	10	0.131-0.180	0.166	0.014	8.64
	B	8	0.117-0.161	0.138	0.016	11.95
	C	5	0.113-0.140	0.123	0.011	9.39
	D	4	0.131-0.146	0.140	0.006	4.55
	E	8	0.117-0.148	0.138	0.011	8.22
	F	9	0.126-0.158	0.146	0.010	7.64
wav	G	8	0.126-0.158	0.143	0.010	7.21
	H	10	0.126-0.168	0.146	0.012	8.42
	I	11	0.126-0.159	0.142	0.010	7.20
	J	6	0.136-0.161	0.150	0.010	6.94
	K	4	0.146-0.155	0.152	0.004	2.79
	L	3	0.146-0.153	0.149	0.004	2.85
	M	2	0.168-0.172	0.170	0.003	1.87
	I_v	13	0.123-0.170	0.146	0.008	5.58

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