Jyotsana Rai

A Catalogue of Calcareous Nannoplankton from India

Diamond Jubilee Special Publication

Birbal Sahni Institute of Palaeobotany
Lucknow
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Total number of genera 180; Total number of species 644

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FOREWORD

A vast palaeobotanical and palynological data acquired as a result of research activity of the Institute and other palaeobotanical centres in the country had accumulated in the form of isolated and scattered reports published in different journals during the last two decades. The need to assemble it at one place in the form of a catalogue was strongly felt. The painstaking collective research effort was assigned to a group of scientists at the Birbal Sahni Institute of Palaeobotany. The objective of the catalogue is to unify, update and incorporate information on the Indian fossil plants covering a period of about two decades beginning from the year 1971. Prior to this, a similar effort by the Birbal Sahni Institute of Palaeobotany had resulted in the publication of "A Catalogue of Indian fossil plants" by Drs RN Lakhanpal, HK Maheshwari and N Awasthi which covered a period from 1821-1970 and included information on fossil plant taxa with the exception of nannoplankton. In 1991, a catalogue was designed for a single volume publication but as the work was nearing completion, it was realized that a single volume would prove too unwieldy for handling. It was, therefore, decided to publish it in a series of 11 fascicules arranged chronologically or subject-wise. The Nannoplankton catalogue was listed Part 9. The taxonomic refinement at the Institute is a continuous process and there are several on-going programmes in this direction. Publication of this catalogue would prove useful to active researchers in palaeobotany and biostratigraphers engaged in earth science research. It is also hoped that the present catalogue documenting authentic palaeobotanical data would also serve as a reference volume which, I am sure, will form the basis for future interpretative researches. The enormity of data was a challenge. Electronic processing made it simple for handling the data.

I am happy to see this catalogue in this final form and I do hope that it would be found useful by students and scholars engaged in palaeobotanical researches as well as professionals dealing with hydrocarbon industry specially pertaining to deep sea drilling and explorations in which Indian oil industry is venturing. As a group effort we have benefitted by the expertise and help of several individuals.

October 16, 2007

Dr. N. C. Mehrotra
Director
Birbal Sahni Institute of Palaeobotany

PREAMBLE

Nannoplankton, a term having Greek root meaning dwarf, is the tiniest member of marine phytoplanktons flourishing in photic zone of modern oceans and pass through finest plankton mesh. Their freshwater equivalents are reported from some European lakes. Nannoplanktons are unicellular golden brown algae grouped in Haptophyta, which is characterised by bearing calcareous plates (scales) and are thus called calcareous nannoplanktons, coccolithophores or coccoliths. Nannofossil is a term generally used for their fossil counterparts. The widespread occurrence of individual species coupled with their astronomical abundance in fine-grained marine sediments, has made nannofossils ideal tools for long-range correlation and high-resolution biostratigraphy. Known from Late Triassic marine sediments as important constituent for rock builders. The term nannofossil has been used by some workers for tiny fossil remains, irrespective of their chemical composition. This is not followed in this catalogue.

Earlier, a catalogue was published in the year 1991 on nannoplankton records from India. After a gap of fifteen years, the venture in this direction is taken to incorporate earliest publication on nannofossil studies (Narasimhan 1963) to papers published till date so that complete data is available in one volume and provide convenience. Utmost care has been taken to publish records as complete as possible from India (1963 to 2006) including Abstracts.

The fundamental task of scanning through the literature and index cards preparation with a set proforma to maintain uniformity was carried out initially. Few publications were procured from other sources as well. The geographical boundaries covered are *sensu stricto* to the present Indian territories. However, by cross reference if I have come across of some publications from whose title it was evident that it might contain some nannofloral species description, are also incorporated in the bibliography.

The nannofossil taxa are arranged alphabetically in accordance with their generic names or Supra-generic names. Along with each genus, its author's name is given which is followed by the name of the family to which it belongs. No taxa for being *Nomina nuda*, is omitted (not named in

accordance with the ICBN) and has been mentioned along with the name of taxa. Under each genus its species are arranged alphabetically. Name of individual species is followed by its original author, followed by subsequent worker, date of publication, page number, reference to plate and figure, geological age with the name of the horizon in parenthesis, the locality and the name of the state in which it is situated. When a particular species has been again reported from the same or from some other localities, all such reports have been mentioned in chronological order along with relevant data.

The author takes this opportunity to express her gratitude to Dr Rahul Garg for his constant encouragement and valuable advice. Acknowledgement is extended to Drs Sameer Sarkar, Khowaja Ateequzzaman, Vandana Prasad, Vartika Singh, Abha Singh and Biswajeet Thakur for providing me various kinds of help.

Jyotsana Rai

CATALOGUE

AHMUELLERELLA (Gorka) Reinhardt, **AHMUELLERELLACEAE**

Ahmuellerella octoradiata Gorka) Reinhardt. Jafar 1982: 19, pl. 1, figs 13-14, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Chattopadhyay *et al*. 1983: 94, photograph 28 (1,?2,?3) MAASTRICHTIAN, Red Cherts from Wazeho area, Naga Hills, Nagaland; Acharyya *et al*. 1986: 4, pl. 1, fig. 8, MAASTRICHTIAN, Naga Hills Ophiolite, Chipur, northern Indo-Burmese Range; Singh 1990: 101, pl. 1, figs 4-7, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Kale and Phansalkar 1992: 86, pl. 1, fig. 1, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kumar and Saxena 1996: 110, pl. 5, fig. 25, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

?Ahmuellerella sp. Chattopadhyay *et al*. 1983: photograph 28 (3), MAASTRICHTIAN, Wazeho, Nagaland.

AMAUROLITHUS Gartner and Bukry, **CERATOLITHACEAE**

Amaurolithus primus (Bukry and Percival) Gartner and Bukry. Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

ANOPLOSOLENIA Deflandre, **CALCIOSOLENIACEAE**

Anoplosolenia brasiliensis (Lohmann) Deflandre In Grassé. Guptha *et al*. 1995: 565, pl. 2, fig. 8, RECENT, Arabian Sea.

ANSULASPHAERA Grün and Zweili, **ELLIPSAGELOSPHAERACEAE**

Ansulasphaera helvetica Grün and Zweili. Rai 2003: 286, pl. 1, figs 9A-B, 10, 11; pl. 3, fig. 11, EARLY CALLOVIAN, Jara Dome (Chari Formation), Kutch, western India; Upadhyay *et al*. 2005: 154-155, figs 4, 17-18, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya; Rai 2005: 72-73, LATE BATHONIAN, Kutch, Rajasthan and Karakoram; Rai *et al*. 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

ARCHAEZYGODISCUS Bown, **CHISTOZYGACEAE**

Archaezygodiscus kossenensis Bown. Rai *et al*. 2003: 53, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh

Himalaya; Rai *et al*. 2004: 774, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

ARKHANGELSKIELLA Vekshina, **ARKHANGELSKIELLACEAE**

Arkhangelskiella cymbiformis Vekshina. Acharyya *et al*. 1986: 4, pl. 1, figs 4, 7, MAASTRICHTIAN, Naga Hills Ophiolite, Salumi and Chipur, northern Indo-Burmese Range; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh 1990: 101-102, pl. 1, figs 8-7, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 1-2, CAMPANIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Rai *et al*. 2002: 53, EARLY CAMPANIAN (Lameta Formation), CC18/ UC 14 Nannofossil Zone, Chakrud, Near Zeerabad.

?Arkhangelskiella cymbiforms Vekshina. Singh and Singh 1991: 25, pl. 7, figs 3-6, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Arkhangelskiella obliqua Stradner, Acharyya *et al*. 1986: 4, pl. 2, fig. 8, LATEST CRETACEOUS, Naga Hills Ophiolite, Chipur, northern Indo-Burmese Range.

Arkhangelskiella sp. Raju 1970: 88, LATEST CRETACEOUS, Tiruttaraipundi Well, Cauvery Basin.

ASPIDOLITHUS Noël, **ARKHANGELSKIELLACEAE**

Aspidolithus parcus constrictus (Stradner) Noël. Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 3, CAMPANIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section, Manipur, northeast India and Mova Section.

Aspidolithus parcus parcus (Stradner) Noël. Kumar and Saxena 1996: 110, pl. 5, figs 28-30, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

AXOPODORHABDUS Wind and Wise in Wise and Wind, **PODORHABDACEAE**

Axopodorhabdus albianus (Black) Wind and Wise in Wise and Wind. Kale and Phansalkar 1992: 86, pl. 1, fig. 19, pl. 1I, fig. 7, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Axopodorhabdus cylindratus (Noël) Wind and Wise in Wise and Wind. Rai 2003: 286, pl. 2, fig. 1 A-B, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Axopodorhabdus rahla (Noël) Grün and Zweli. Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

BIANTHOLITHUS Bramlette and Martini, **DISCOASTERACEAE**

Biantholithus sparsus Bramlette and Martini. Jafar 1984: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar 1985: 172, fig. 21, PALAEOGENE, Mud Volcanoes, Baratang Island, Andamans; Jafar and Kapoor 1988: 116, pl. II, figs 10a-b, EARLIEST PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya; Jafar and Singh 1992: 412-413, fig. 53, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Saxena 1996: 727, pl. 1, figs 6, 56, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Garg and Jain 1996: 34, DANIAN, UmSohryngkew, Meghalaya, northeast India.

Biantholithus sp. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

BISCUTUM Black in Black and Barnes, **BISCUTACEAE**

Biscutum blackii Gartner. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Biscutum castrorum Black in Black and Barnes. Acharyya *et al*. 1984: 65, MAASTRICHTIAN, Naga Hills ophiolite, northern Indo-Burmese Range; Acharyya *et al*. 1986: 4, pl. 1, fig. 1, LATEST CRETACEOUS, Naga Hills Ophiolite, Salumi, northern Indo-Burmese Range.

Biscutum constans (Gorka) Black. Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya; Sinha and Dmitrenko 1983: 254, pl. 1, fig. 8; 255, pl. 3, fig. 3, UPPER CRETACEOUS (Sangchamalla Formation). Flysch, Malla Johar, Tethyan Himalaya; Jafar and Rai 1989: 359-360, fig. 7, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Rai *et al*. 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Biscutum ellipticum (Gorka) Grün. Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

Biscutum ?romeinii Perch-Nielsen. Garg and Jain 1996: 34, DANIAN, UmSohryngkew, Meghalaya, northeast India.

Biscutum supracretaceum (Reinhardt) Perch-Nielsen. Jafar and Rai 1989: 359-360, fig. 76, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Biscutum sp. Sinha and Dmitrenko 1983: 254, pl. 1, fig. 9; pl. 2, fig. 12, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethys Himalaya.

Biscutum spp. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills.

Biscutum sp. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

BLACKITES Hay and Towe, **RHABDOSPHAERACEAE**

Blackites crebra (Deflandre) Sherwood. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Blackites cf. B. gladius (Locker) Martini. Jafar and Rai, 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Blackites rectus (Deflandre) Stradner and Edwards. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 35, pl. 2, figs 34a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Blackites spinosus (Deflandre) Hay and Towe. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 27, pl. 8, figs 11, 18-19, 23-24, 30-31, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 35, pl. 2, fig. 35, pl. 3, figs 2-3, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 155, pl. 3, figs 10-11, pl. 4, fig. 19, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District Gujarat.

Blackites tenuis (Bramlette and Sullivan) Bybell. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi

Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 35, pl. 3, fig. 4, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 156, pl. 3, figs 5, 7, pl. 4, fig. 18, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Blackites spp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Blackites sp. 1 Jafar and Rai 1994: 35, pl. 2, figs 33a-c; pl. 3, figs 1a-c, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Blackites sp. 2 Jafar and Rai 1994: 35, pl. 2, fig. 36, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Blackites sp. 3 Jafar and Rai 1994: 35, pl. 2, fig. 37, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Blackites sp. 4 Jafar and Rai 1994: 35, pl. 2, figs 40-47, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Blackites sp. 5 Jafar and Rai 1994: 35, pl. 2, figs 1a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Blackites sp. Rai 1997: 156, pl. III, figs 6, 12, MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Blackites sp. Rai 1997: 156, pl. III, fig. 8, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

BRAARUDOSPHAERA Deflandre, **BRAARUDOSPHAERACEAE**

Braarudosphaera africana Stradner. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1980b: 9, pl. 5, figs 1-3, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Jain *et al*. 1983: 71, pl. 1, fig. 27, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Braarudosphaera bigelowii (Gran and Braarud) Deflandre. Narasimhan 1963: 112-113, pl. 11, fig. 4, EARLIEST PALAEOCENE, Langpar Stage, Khasi Hills, Assam; Pant and Mamgain 1969: 118-119, pl. 21, fig. 7, pl. 23, fig. 17, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi, Kutch District, Gujarat; Pant and Mathur 1973: 212, pl. 26H-I; pl. 27E, LATE EOCENE, Amravati River Section, 1/2 a km S 10°E of Bilod, Broach, Gujarat; Guptha 1976: 421, CRETACEOUS, TERTIARY, NEOGENE, Core from Continental slope off Bombay, Arabian Sea; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1978b: 53-54, LATE MIDDLE EOCENE, Vinjhan-Miani, Kutch District, Gujarat; Singh *et al*. 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh 1979b: 80, pl. 1, figs 57-59, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Singh 1980a: 9, pl. 5, fig. 5, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980b: 25, pl. 1, fig. 27, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat; Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya; Singh 1980c: 4, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Jain *et al*. 1981: 1, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jafar 1982b: 19-20, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jain *et al*. 1983: 71, pl. 1, figs 31-32, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Singh 1986: 148, pl. 1, figs 1-2 MIDDLE EOCENE (Fulra Limestone Formation, Babia Hill, Kutch District, western India; Jafar and Kapoor 1988: 116, pl. 1, fig. 14, EARLIEST PALAEOCENE, Basal Subathu of Dharampur

Shimla Himalaya; Singh 1990: 102, pl. 1, figs 11-12, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Singh and Singh 1991: 18, pl. 2, figs 6, 8, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Kale and Phansalkar; 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Singh and Singh 1991: 18, pl. 2, figs 6, 8, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Singh 1992: 412-413, figs 44-51, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia nala Section, Shimla Himalaya; Jafar and Rai 1994: 25-26, pl. 1, fig. 1, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Saxena and Misra 1994: 75, figs 7-8, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin; Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh 1998: 164, pl. 1, figs 1-2 (Sanu and Bandah formations), Kharatar Well-C, Jaisalmer, Rajasthan; Singh and Uddin 2000: 221, MIDDLE EOCENE-LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshvar formations), Dumas Well-A, Cambay Basin, Gujarat; Singh *et al*. 1998: 98, pl. 2, figs 1-5, Tarapur Shale, Singh *et al*. 1998: 96, pl. 2, figs 1-5, UPPER EOCENE (Tarapur Shale Formation), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat; Perch-Nielsen and Saxena 1998: 184-187, 189 pl. 1, fig. 25, pl. 2, fig. 54, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Braarudosphaera discula Bramlette and Riedel. Pant and Mamgain 1969: 119, pl. 21, fig. 5, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi, Kutch District, Gujarat; Pant and Mathur 1973: 211-212, pl. 27H, LATE EOCENE, Amravati River Section, 1/2 a km S 10° E of Bilod, Broach, Gujarat; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh *et al*. 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh 1979b: 80, pl. 1, figs 60-62, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Samkherjan area, Mikir Hi1ls, Assam; Singh *et al*. 1980: 3, figs 65, 79-80, LATE MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980a: 10, pl. 5, figs 4, 7, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Jain *et al*. 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin, Tamil Nadu; Jain *et al*. 1983: 71, pl. 1, figs 29-30, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin, Tamil Nadu; Singh and Singh 1986: 148, pl. 3, figs 3-4, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Fulra Limestone Formation), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 232, pl. 1, fig. 1, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 18, 20 pl. 2, figs 3-4, Rato nadi Section, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Kutch, Gujarat; Saxena 1996: 727, pl. 1, fig. 5, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Braarudosphaera lakhpatensis Singh. Singh 1980a n sp: 10, pl. 5, figs 8-15, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat.

Braarudosphaera tetralitha Vekshina. Acharyya *et al*. 1984: 65, CRETACEOUS, Naga Hills Ophiolite, northern Indo-Burmese Range; Acharyya *et al*. 1986: 4, TERMINAL CRETACEOUS, Naga Hills Ophiolite, northern Indo-Burmese Range.

Braarudosphaera turbinea Stradner. Jafar *et al*. 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Gujarat.

Braarudosphaera sp. Singh *et al*. 1980: 3, figs 77-78, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat.

Braarudosphaera sp. Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

Braarudosphaera sp. Jafar and Kapoor 1988: 116, pl. l, fig. 15, PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya, Himachal Pradesh.

Braarudosphaera sp. 1 Jain *et al*. 1983: 71, pl. 1, fig. 28, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin, Tamil Nadu.

Braarudosphaera sp. Perch-Nielsen and Saxena 1998: 184, pl. 1, fig. 27, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Braarudosphaera sp. Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

BRAMLETTEIUS Gartner, **COCCOLITHACEAE**

Bramletteius serraculoides Gartner. Jafar and Rai, 1984: 41, MIDDLE EOCENE (Harudi Formation), Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 32, pl. 1, figs 31a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

BROINSONIA Bukry, **ARKHANGELSKIELLACEAE**

Broinsonia enormis (Shumenko) Manivit. Jafar 1982b: 20, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Broinsonia parca (Stradner) Bukry. Jafar 1985: 170, fig. 1, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Rai *et al.* 2002: 53, EARLY CAMPANIAN, CC18/ UC 14 Nannofossil Zone (Lameta Formation), Chakrud, near Zeerabad.

Broinsonia signata (Noël) Noël. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Broinsonia sp. Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS (Sangchamalla Formation), Flysch sediments of Malla Johar, Tethyan Himalaya.

Broinsonia sp. Sinha and Dmitrenko 1983: 254, pl. 2, fig. 2, UPPER CRETACEOUS (Sangchamalla Formation), Flysch sediments of Malla Johar, Tethyan Himalaya.

CALCIDISCUS Kamptner, **COCCOLITHACEAE**

Calcidiscus kingi (Roth) Loeblich and Tappan. Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 24, pl. 6, figs 30-31, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Calcidiscus leptoporus (Murray and Blackman) Loeblich and Tappan. Wei and Srinivasan 1984: 350-351, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE, Jafarabad, Belapur, Diu, Mahuva, Bombay (Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Calcidiscus macintyrei (Bukry and Bramlette) Loeblich and Tappan. Wei and Srinivasan 1984: 351, MIOCENE, Great Nicobar Island; Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE, Jafarabad, Belapur, Diu, Mahuva, Bombay (Tapti, Bandra and Chinchini formations), Offshore Well SS -A, Bombay Offshore Basin.

Calcidiscus sp. Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

CALOLITHUS Noël, **WATZNAUERIACEAE**

Calolithus martelae Noël. Rai 2003: 286, pl. 1, figs 19 A-B, pl. 3, fig. 9, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

CALCULITES Prins and Sissingh in Sissingh, **CALYPTROSPHAERACEAE**

Calculites obscurus (Deflandre) Prins and Sissingh. Kumar and Saxena 1996: 110, pl. 5, fig. 26, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Calculites ovalis (Stradner) Prins and Sissingh. Singh 1990: 102, pl. 1, figs 18-19, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Kumar and Saxena 1996: 110, pl. 5, figs 11-12, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Calculites sp. Kumar and Saxena 1996: 110, pl. 5, figs 6, 17, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Calculites sp. Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

CALYCULUS Noël, **CALYCULACEAE**

Calyculus sp. Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

CAMPYLOSPHAERA Kamptner, **COCCOLITHACEAE**

Campylosphaera dela (Bramlette and Sullivan) Hay and Mohler. Singh and Singh 1986: 149, pl. 3, figs 12-13, MIDDLE EOCENE (Fulra Limestone Formation), Middle Eocene, Babia Hill, Kutch District, Gujarat.

CARINOLITHUS Prins in Grün, Prins and Zweili, **CREPIDOLITHACEAE**

Carinolithus fistulatus Prins. Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

CATINASTER Martini and Bramlette, **DISCOASTERACEAE**

Catinaster calyculus Martini and Bramlette. Singh 1979a: 232, pl. 2, fig. 1, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

CERATOLITHINA Martini, **CERATOLITHACEAE**

Ceratolithina sp. Jafar and Rai 1989: 359-360, fig. 61, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

CERATOLITHOIDES Bramlette and Martini, **CERATOLITHACEAE**

Ceratolithoides aculeus (Stradner) Prins and Sissingh. Jafar 1985: 170, figs 11-12, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Saxena and Misra 1995: 325, 327, pl. 1, figs 30-31, CAMPANIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 4, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India.

Ceratolithoides kamptneri Bramlette and Martini. Saxena and Misra 1995: 324-325, 327, pl. 1, figs 14-15, MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin.

? Ceratolithoides kamptneri Bramlette and Martini. Acharyya *et al*. 1986: 4, pl. 2, fig. 6, MAASTRICHTIAN, Naga Hills Ophiolite, Phokphur, northern Indo-Burmese Range.

CERATOLITHUS Kamptner, **CERATOLITHACEAE**

Ceratolithus cristatus Kamptner. Guptha 1976: 421, pl. 60, fig. 1, NEOGENE-RECENT, Core from continental slope off Bombay, Arabian Sea; Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment core from southeastern Arabian Sea.

Ceratolithus perch-nielsenae Guptha 1979b: 115-116, pl. 1, figs 1-2, UPPER PLEISTOCENE, Deep Sea Sediment core from southeastern, Arabian Sea.

Ceratolithus telesmus Norris. Guptha 1976: 421, PLIO-PLEISTOCENE to RECENT, Core from continental slope off Bombay, Arabian Sea.

Ceratolithus cf. C. primus Bukry and Percival. Singh 1980c: 38, pl. 1, fig. 1, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

?Ceratolithus sp. Singh 1979a: 231-232, pl. 1, figs 1-2, EARLY PLIOCENE (Round Formation), Archipelago Group, north-eastern Coast of Neill Island, Andaman.

?Ceratolithus sp. Singh 1980b: 38, pl. 1, fig. 2, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

CHIASMOLITHUS Hay, Mohler and Wade, **COCCOLITHACEAE**

Chiasmolithus californicus (Sullivan) Hay and Mohler. Jain *et al*. 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin.

Chiasmolithus consuetus (Bramlette and Sullivan) Hay and Mohler. Jain *et al*. 1983: 71, pl. 1, figs 10-11, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Singh 1983: 60, EARLY-MIDDLE EOCENE, Abhay-1 Well, Bengal Basin, West Bengal; Jafar and Rai 1994: 30, pl. 1, figs 30a-c, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Chiasmolithus danicus Zone (Brötzen) Hay and Mohler. Jain *et al*. 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Saxena and Adil 1986: 37, basal PALAEOCENE, Khasi and Jaintia Hills, Assam; Jafar and Singh 1992: 412-413, figs 39-41, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Chiasmolithus gigus Bramlette and Sullivan. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1980a: 4-5, pl. 1, figs 11-13, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat.

Chiasmolithus grandis (Bramlette and Riedel) Radomski. Srivastava 1981b: 204, text-fig. 1J, UPPER EOCENE, Light brown Calcareous Shale from top of Nummulitic Limestone near Ghour stream, Kutch District, Gujarat.

Chiasmolithus oamaruensis (Deflandre) Hay, Mohler and Wade. Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch; Srivastava 1981b: 204, text-fig. 1K, UPPER EOCENE, Light brown Calcareous Shale from top of Nummulitic Limestone near Ghour stream, Kutch District, Gujarat.

Chiasmolithus solitus (Bramlette and Sullivan) Hay and Mohler. Jain *et al.* 1983: 71, pl. 1, fig. 3, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Saxena 1996: 727, pl. 1, figs 9-11, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Chiasmolithus staurion (Bramlette and Sullivan) Bukry. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Chiasmolithus titus Gartner. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 22, pl. 5, figs 31-33, 38-40; pl. 6, figs 1-8, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 30, pl. 1, figs 27a-b, 28, 29a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Saxena 1996: 727, pl. 1, fig. 62, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 1997: 151, pl. 2, fig. 3, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Chiasmolithus titus? Gartner. Singh 1998: 164, pl. 1, figs 3-8 (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Chiasmolithus sp. 1 Jain *et al.* 1983: 71, pl. 1, fig. 4, LATE PALAEOCENE, 240 m deep borehole,

Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Chiasmolithus sp. Singh and Singh 1986: 149, pl. 3, figs 14-16, MIDDLE MIOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat.

Chiasmolithus sp. Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Chiasmolithus sp. Rai 1997: 152, pl. 1I, fig. 4, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

CHIASTOZYGUS Gartner, **CHIASTOZYGACEAE**

Chiastozygus amphipons (Bramlette and Martini) Gartner. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Chiastozygus litterarius (Gorka) Manivit. Jafar 1982: 20, pl. 1, fig. 32, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar and Rai 1989: 359-360, figs 32-34, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, pl. 1, figs 5-6, pl. 2, fig. 2, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Perch-Nielsen and Saxena 1998: 186, pl. 2, fig. 45, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Saxena and Misra 1995: 324, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Chiastozygus plicatus Gartner. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Chiastozygus platyrhethum Hill. Jafar and Rai 1989: 359-360, fig. 19, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Chiastozygus cf. Ch. tetragonothyrus Hill. Jafar and Rai 1989: 359-360, fig. 46, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Chiastozygus ultimus Perch-Nielsen. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Chiastozygus sp. 1 Jafar and Rai 1989: 359-360, fig. 26, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Chiastozygus sp. 2 Jafar and Rai 1989: 359-360, fig. 45, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Chiastozygus sp. Kumar and Saxena 1996: 110, pl. 5, fig. 35, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

CHIPHRAGMALITHUS Bramlette and Sullivan, **ZYGODISCACEAE**

Chiphragmalithus quadratus Bramlette and Sullivan. Narasimhan 1974-75: 208, CRETACEOUS-TERTIARY, Pondicherry.

CLATHROLITHUS Deflandre, **INCERTAE SEDIS**

Clathrolithus ellipticus Deflandre. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation, Babia Stage, Berwali Series), Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 30, pl. 3, fig. 34, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

COCCOLITHITES Kamptner, **COCCOLITHITEAE** Nomen nudum

Coccolithites turbatus Black. Acharyya *et al.* 1984: 65, MAASTRICHTIAN, Naga Hills Ophiolite, northern Indo-Burmese Range; Acharyya *et al.* 1986: 4, pl. 1, fig. 11, MAASTRICHTIAN, Naga Hills Ophiolite, Chirpur, northern Indo-Burmese Range.

Coccolithites spp. Kamptner. Narasimhan 1963: 112, pl. 11, fig. 3, MAASTRICHTIAN and DANIAN, Mahadek and Langpar Stages, Khasi Hills, Assam.

?Coccolithites sp. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat.

Coccolithites sp. Acharyya *et al.* 1986: 7, pl. 2, fig. 1, MAASTRICHTIAN, Naga Hills Ophiolite, Luthur, northern Indo-Burmese Range.

COCCOLITHUS Schwarz, **COCCOLITHACEAE**

Coccolithus andamanensis Singh 1979a: 226, pl. 1, figs 10-18, EARLY PLIOCENE (Round Formation), Archipelago Group, north-eastern Coast of Neill Island, Andaman.

Coccolithus eopelagicus (Bramlette and Riedel) Bramlette and Sullivan. Singh *et al.* 1980: 2, figs 1-11, LATE MIDDLE EOCENE (Fulra Limestone Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Jafar *et al.* 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Singh and Singh 1986: 149, pl. 5, figs 1-3, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 20, MIDDLE EOCENE (Fulra Limestone Formation), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 232, pl. 1, figs 2-3, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 23, pl. 6, figs 26-27, Rato nadi Section (Harudi and Fulra Limestone formations), LATE MIDDLE EOCENE or BARTONIAN, Kutch, Gujarat; Jafar and Rai 1994: 30, pl. 2, figs 2a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Singh 1998: 164, pl. 1, figs 11-14 (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Coccolithus cf. eopelagicus (Bramlette and Riedel) Bramlette and Sullivan. Pant and Mathur 1973: 211, pl. 27B, LATE EOCENE, Amravati River Section, 1/2 a km S 10° E of Bilod, Broach, Gujarat.

Coccolithus formosus (Kamptner) Okada and Bukry. *Coccolithus formosus* Subzone (Kamptner) Wise. Singh and Asad 1983: 56, LATE PALAEOGENE, Tarapur Well B-14-1, Bombay Offshore, Bombay; Singh and Singh 1986: 149-150, pl. 3, figs 17-18, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Coccolithus gigus Bramlette and Sullivan. Narasimhan 1974-75: 208, CRETACEOUS-TERTIARY, Pondicherry, south India.

Coccolithus grandis Bramlette and Riedel. Narasimhan 1963: 111, pl. 11, fig. 1, DANIAN, Langpar Stage, Khasi Hills, Assam.

?Coccolithus hoelvikensis Acharyya, Roy and Ghosh 1986: 4, MAASTRICHTIAN, Naga Hills Ophiolite, northern Indo-Burmese Range.

Coccolithus miopelagicus Bukry. Wei and Srinivasan 1984: 351-352, pl. 1, fig. 9; pl. 3, figs 7a-b, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar Islands; Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh, Srinivasan and Sharma 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Coccolithus pelagicus (Wallich) Schiller. Datta and Singh 1976: , pl. 1, figs 15-16; pl. 2, figs 1-3, LATE EARLY PLIOCENE, Borehole NN14, Bombay Offshore region; Guptha 1976: 421-422, PALAEOCENE to RECENT, Core from Continental slope off Bombay, Arabian Sea; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1978b: 53-54, LATE MIDDLE EOCENE, Vinjhan-Miani, Kutch District, Gujarat; Singh 1979b: 78, pl. 1, figs 7-14, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Mathur 1980b: 36, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman; Singh, Mathur and Srivastava 1980: 2, figs 12-21, 25-27, LATE MID-

DLE EOCENE (Fulra Limestone Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980a: 4, pl. 1, figs 1-5, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980 b: 21, pl. 1, figs 1-2, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat; Singh 1980c: 37-38, pl. 2, figs 25, 32-33, LATE EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Jain *et al.* 1981: 17, UPPER PALAEOCENE, borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, figs 12-13, UPPER PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner; Singh and Singh 1986: 150, pl. 4, figs 1-3, MIDDLE EOCENE or BARTONIAN (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 232, pl. 1, figs 6-7, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 23, pl. 6, figs 24-25, 28-29, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Saxena and Misra 1994: 75, fig. 10, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin; Saxena 1996: 727, pl. 1, fig. 25, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh, 1998: 164, pl. 1, fig. 9 (Sanu and Bandah formations), Kharatar Well-C, Jaisalmer, Rajasthan; Singh *et al.* 1998: 96, pl. 1, figs 27-28, MIDDLE-UPPER EOCENE (Kalol and Tarapur Shale formations), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat; Perch-Nielsen and Saxena 1998: 184, pl. 1, figs 12-13, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Singh *et al*. 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Coccolithus cf. pelagicus (Wallich) Schiller. Pant and Mathur 1973: 210-211, pl. 26 A, LATE EOCENE, Amravati River Section, 1/2 a km S 10°E of Bilod), Broach District, Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE-LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshwar formations), Dumas Well-A, Cambay Basin, Gujarat.

Coccolithus sp. Narasimhan 1963: 111, pl. 11, fig. 2, DANIAN, Langpar Stage, Khasi Hills, Assam.

Coccolithus sp. Pant and Mamgain, 1969: 124, pl. 24, figs 1-2, 9, 14-15; pl. 25, figs 2-7, 9-11, 13-16, 18-21; pl. 26, figs 1-9, 11-14, 16-22, JURASSIC, CENOMANIAN, MIDDLE EOCENE, Kirthar, OLIGOCENE, Kirthar, Buff coloured sandstone immediately underlying orbitoid bearing beds at Kilappatu (11°18': 79°09'), Tiruchirapalli District, Tamil Nadu.

Coccolithus sp. a Singh 1979b: 77, pl. 1, figs 1-2, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

Coccolithus sp. b Singh 1979b: 77, pl. 1, figs 3-4, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

Coccolithus sp. c Singh 1979b: 78, pl. 1, figs 5-6, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

Coccolithus sp. 1 Singh 1979a: 228, 230, pl. 1, figs 19-21, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

Coccolithus sp. 2 Singh 1979a: 230, pl. 1, figs 22-26, 28, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

Coccolithus sp. 3 Singh 1979a: 230-231, pl. 1, fig. 57, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

Coccolithus sp. Mathur 1980b: 38, pl. 1, figs 27-28, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman.

Coccolithus sp. 1 Singh 1980b: 21, pl. 1, figs 3-5, 7, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat.

Coccolithus sp. 2 Singh 1980b: 21-22, pl. 1, figs 8-10, 13-14, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat.

Coccolithus sp. 3 Singh 1980b: 22, pl. 1, figs 15-20, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat.

Coccolithus sp. Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

Coccolithus spp. Singh and Uddin, 2000: 221, MIDDLE EOCENE-LOWER MIOCENE, Dumas Well-A, Cambay Basin, Gujarat.

CONUSPHAERA Trejo, **CREPIDOLITHACEAE**

Conusphaera? sp. cf. C. mexicana Trejo. Singh 1987: 211, MIDDLE LATE JURASSIC, Subsurface of Banni Rann, Kutch District, Gujarat.

CORANNULUS Stradner, **CALYPTROSPHAERACEAE**

Corannulus germanicus Stradner. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat.

COROLLITHION Stradner, **STEPHANOLITHIACEAE**

Corollithion exiguum Stradner. Singh 1990: 104, pl. 3, figs 4-6, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Corollithion kennedyi Crux. Kale and Phansalkar 1992: 86, pl. 1, fig. 17, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Corollithion signum Stradner. Jafar 1982b: 20, pl. 1, fig. 27, LATE TURONIAN or LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, pl. 1, fig. 18, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Corollithion tortuosus Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

Corollithion sp. Jai Krishna *et al*. 1983: 792, LATE BATHONIAN (Lowermost Chari Formation), Kutch District, Gujarat.

CORONOCYCLUS Hay, Mohler and Wade, **COCCOLITHACEAE**

Coronocyclus nitescens (Kamptner) Bramlette and Wilcoxon. Wei and Srinivasan 1984: 35, pl. 3, figs la-b, MIOCENE, Colebrook Island, Andaman; Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 172, PALEOGENE, Mud Volcanoes, Baratang Island, Andamans; Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh and Uddin, 2000: 221, MIDDLE EOCENE-UPPER OLIGOCENE (Tarapur Shale and Dadhar formations), Dumas Well- A, Cambay Basin, Gujarat;

Singh, Srinivasan and Sharma 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Coronocyclus sp. Saxena, 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

CRETARHABDUS Bramlette and Martini, **PODORHABDACEAE**

Cretarhabdus conicus Bramlette and Martini. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Cretarhabdus crenulatus Bramlette and Martini. Jafar 1982b: 20, pl. 1, figs 12, 35, TURONIAN or LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar and Kapoor 1984: 42, LATEST MAASTRICHTIAN (Subathu Formation), around Dharampur, Shimla Hills; Jafar 1985: 170, figs 2-3, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Jafar and Kapoor 1988: 116, pl. 1, figs 29-30, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 5, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Cretarhabdus striatus (Stradner) Black. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Cretarhabdus sp. Jafar and Kapoor 1988: 116, pl. 1, fig. 28. LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Cretarhabdus ?sp. Singh 1998: 166, Sanu Formation, PALAEOCENE, pl. 2, fig. 2, Kharatar Well-C, Jaisalmer, Rajasthan.

CRIBROCENTRUM Perch-Nielsen, **PRINSIACEAE**

Cribrocentrum reticulatum Singh and Uddin, 2000: 221, MIDDLE EOCENE-LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshwar formations), Dumas Well-A, Cambay Basin, Gujarat.

CRIBROCORONA Perch-Nielsen, **PODORHABDACEAE**

Cribrocorona gallica (Stradner) Perch-Nielsen. Jafar 1985: 171, fig. 5, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Chungkham and Jafar 1998: 80, pl. 4, fig. 6, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung South Section and Mova Section, Manipur, northeast India.

CRIBROSPHAERELLA Deflandre in Piveteau, **PODORHABDACEAE**

Cribrosphaerella ehrenbergii (Arkhangelsky) Deflandre and Piveteau. Singh 1990: 103, pl. 2, figs 7-8, 10, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Jafar and Singh 1992: 412-413, fig. 65, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN age (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kumar and Saxena 1996: 110,

pl. 5, fig. 24, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 7-8, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Cribrosphaerella cf. C. ehrenbergii (Arkhangelsky) Deflandre and Piveteau. Saxena and Misra 1995: 324-325, 327, pl. 1, figs 9-10, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin.

Cribrosphaerella sp. Chattopadhyay *et al.* 1983: photograph 26(2), MAASTRICHTIAN, Ziphu, Nagaland.

CRUCIPLACOLITHUS Hay and Mohler in Hay, Mohler and Wade, **COCCOLITHACEAE**

Cruciplacolithus asymmetricus van Heck and Prins. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Cruciplacolithus sp. cf C. asymmetricus van Heck and Prins, Perch-Nielsen and Saxena 1998: 184, pl. 2, figs 37-40, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Cruciplacolithus edwardsii? Singh 1998: 164, pl. 1, fig. 17 (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Cruciplacolithus frequens (Perch-Nielsen) Romein. Jafar and Singh 1992: 412-413, fig. 36, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Cruciplacolithus intermedius van Heck and Prins. Jafar and Singh 1992: 412-413, fig. 35, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Cruciplacolithus primus Perch-Nielsen. Saxena and Misra 1994: 75, figs 2-4, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 184, pl. 1, figs 1-3, 32-33, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Cruciplacolithus tenuis (Stradner) Hay and Mohler. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Singh 1992: 412-413, figs 33-34, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN age (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Perch-Nielsen and Saxena 1998: 184, pl. 2, figs 52-53, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Cruciplacolithus? Singh 1998: 164, pl. 1, fig. 15 (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Cruciplacolithus sp. 1 Jafar and Singh 1992: 412-413, fig. 37, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Cruciplacolithus sp. 2 Jafar and Singh 1992: 412-413, fig. 38, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Cruciplacolithus sp. Saxena and Misra 1994: 75, figs 11-12, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin.

CRUCIRHABDUS (Prins ex Rood, Hay and Barnard) Bown, **PARHABDOLITHACEAE**

Crucirhabdus minutus Jafar. Rai *et al.* 2003: 53, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya; Rai *et al.* 2004: 776, fig. 5l, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

CURVIDISCOASTER Prins, **DISCOASTERACEAE**

Curvidiscoaster nobilis spp. nobilis (Martini). Bhandari *et al.* 1977: 125, PALAEOCENE-

EOCENE (Kargil Formation), Ladakh Molasse Group, Kargil area.

CYCLAGELOSPHAERA Noël, **COCCOLITHACEAE**

Cyclagelosphaera deflandrei (Manivit) Roth. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

Cyclagelosphaera margerelii Noël. Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Saxena and Misra 1995: 324-325, 327, pl. 1, fig. 33, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, figs 23, 34, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Upadhyay *et al*. 2005: 154-155, figs 4, 6, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya; Rai 2003: 286, pl. 1, fig. 8, pl. 3, fig. 8, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Cyclagelosphaera manivitae Rai 2005: 72-73, BATHONIAN-CALLOVIAN, Karakoram area.

Cyclagelosphaera reinhardtii (Perch-Nielsen) Romein. Jafar and Singh 1992: 412-413, figs 54-55, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN age (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Saxena and Misra 1994: 75, fig. 19, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin.

Cyclagelosphaera wiedmanii Reale and Monechi. Upadhyay *et al.* 2005: 154-155, figs 4, 10-11, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Cyclagelosphaera sp. Jai Krishna *et al.* 1983: 792, LATE BATHONIAN (Lowermost Chari Formation)), Kutch District, Gujarat.

CYCLICARGOLITHUS Bukry, **PRINSIACEAE**

Cyclicargolithus abisectus Sub Zone (Müller) Wise. Singh and Asad 1983: 56, LATE PALAEOGENE, Tarapur Well B-14-1, Bombay Offshore, Bombay; Saxena 1996: 727, pl. 1, figs 43-45, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Saxena 2000: 163, pl. 1, figs 20-21, PALEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Cyclicargolithus floridanus (Roth and Hay) Bukry. Wei and Srinivasan, 1984: 352, pl. 1, figs 7-8; pl. 3, figs 5a-b, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Jafar and Rai 1984: 41, MIDDLE EOCENE or BARTONIAN (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 172, fig. 19, PALAEOGENE, Mud Volcanoes, Baratang Island, Andamans; Jafar *et al*. 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Singh and Singh 1986: 150, pl. 14, figs 6-8, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 232, pl. 1, figs 8-10, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 22-23, pl. 6, figs 20-23, Rato nadi Section (Harudi and Fulra Limestone formations), LATE MIDDLE EOCENE or BARTONIAN, Kutch, Gujarat; Jafar and Rai 1994: 35, pl. 2, fig. 3, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Saxena 1996: 727, pl. 1, figs 52-53, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 1997: 155, pl. 1I, fig. 5, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District Gujarat; Singh 1998: 164, pl. 1, figs 19-20 (Bandah For-

mation), Kharatar Well-C, Jaisalmer, Rajasthan; Singh *et al.* 1998: 96, pl. 1, figs 29-32, MIDDLE-UPPER EOCENE (Kalol and Tarapur Shale formations), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE-UPPER OLIGOCENE (Tarapur Shale and Dadhar formations), Dumas Well-A, Cambay Basin, Gujarat; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Cyclicargolithus luminis Singh and Uddin, 2000: 221, MIDDLE EOCENE-LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshwar formations), Dumas Well-A, Cambay Basin, Gujarat.

Cyclicargolithus morismontium (Black) Perch-Nielsen. Saxena 1996: 727, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Cyclicargolithus sp. Saxena 1996: 727, pl. 1, fig. 3, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

CYCLOCOCCOLITHINA Wilcoxon, **COCCOLITHACEAE**

Cyclococcolithina formosa (Kamptner) Wilcoxon. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh, 1978b: 53-54, LATE MIDDLE EOCENE, Vinjhan-Miani, Kutch District, Gujarat; Singh *et al.* 1978: 346-347, LATE EOCENE, Near Tarkeshwar Village in a nala, Gujarat; Singh, Mathur and Srivastava 1980: 2, figs 22-24, LATE MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980a: 4, pl. 1, figs 6-10, 14-17, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980b: 22-23, pl. 1, figs 21-26, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat.

Cyclococcolithina gammation (Bramlette and Sullivan) Wilcoxon. Singh 1978a: 53-54, LATE MIDDLE EOCENE, Vinjhan-Maini, Kutch District, Gujarat; Singh 1980b: 23, pl. 1, figs 6, 11-12, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat.

Cyclococcolithina kingi Roth. Singh 1988: 232 and 234, pl. 1, figs 11-14, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat.

Cyclococcolithina sp. Singh, Mathur and Srivastava 1980: 2, figs 37, 39, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat.

CYCLOCOCCOLITHUS Kamptner, **COCCOLITHACEAE**

Cyclococcolithus formosus Kamptner. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar *et al.* 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Cyclococcolithus cf. gammation (Bramlette and Sullivan). Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner, Rajasthan.

Cyclococcolithus kingi Roth. Jafar and Rai, 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar *et al*. 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Jafar and Rai 1994: 30, 32, pl. 2, figs 8, 9a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 2002: 153, RUPELIAN, Maniara Fort Formation, NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Cyclococcolithus leptoporus (Murray and Blackman) Kamptner. Jafar 1972: 33, HOLOCENE, Oolitic Calcareous Sand (Relict), off the coast of Bombay; Guptha 1976: 422, pl. 60, fig. 2, MIOCENE-RECENT, Core from Continental slope off Bombay, Arabian Sea; Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment

core from southeastern Arabian Sea; Singh, Srinivasan and Sharma 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Cyclococcolithus macintyrei Bukry and Bramlette. Singh *et al*. 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Cyclococcolithus protoannulus Gartner n. comb. Rai 1997: 151, pl. 1, figs 14, 16, pl. 1V, fig. 5, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District Gujarat; Singh *et al*. 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Cyclococcolithus sp. Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat.

Cyclococcolithus sp. Srivastava 1981b: 204, text-fig. 11, UPPER EOCENE, Light brown calcareous Shale from top of Nummulitic Limestone near Ghour Stream, Kutch District, Gujarat.

Cyclococcolithus sp. Datta and Singh: 1976, pl. 1, figs 11, 14, LATE EARLY PLIOCENE, Subsurface Formation, NN 14, Bombay Offshore region.

Cyclococcolithus sp. b Datta and Singh: 1976, pl. 2, figs 4-5a, LATE EARLY PLIOCENE, Subsurface Formation, NN 14, Bombay Offshore region.

CYCLOLITHELLA Haq, **COCCOLITHACEAE**

Cyclolithella pakistanika Haq. Singh 1979b: 78, pl. 1, figs 19-22, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Singh *et al.* 1980: 2, figs 28-36, 38, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat.

Cyclolithella? robusta (Bramlette and Sullivan) Radomski. Jain *et al*. 1983: 71, pl. 1, figs 7-8, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Cyclolithella robusta? (Bramlette and Sullivan) Strandner. Singh and Singh, 1986: 150, pl. 4, figs 9-11, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Fulra Limestone Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 24, pl. 6, figs 36-37, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Cyclolithella sp. Singh 1979b: 78, figs 23-25, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

Cyclolithella sp. Jafar, Rai and Vimal, 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

CYCLOLITHUS Kamptner *ex*: Deflandre in Piveteau (invalid), **COCCOLITHACEAE**

Cyclolithus? robustus Bramlette and Sullivan, Narasimhan 1974: 208, CRETACEOUS-TERTIARY, Pondicherry, south India.

Cyclolithus sp. 1 Singh 1979a: 222-223, pl. 1, figs 34-35, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

Cyclolithus sp. 2 Singh 1979a: 223-225, pl. 1, figs 32-33, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

CYLINDRALITHUS Bramlette and Martini, **STEPHANOLITHIACEAE**

Cylindralithus sp. aff. C. serratus Bramlette and Martini. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

DAKTYLETHRA Gartner in Gartner and Bukry, **CALYPTROSPHAERACEAE**

Daktylethra punctulata Gartner. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 28, pl. 3, figs 23a-b, 24, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Daktylethra sp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Daktylethra sp. Jafar and Rai 1994: 28, pl. 3, figs 25a-b, LATE MIDDLE EOCENE or BARTONIAN

(Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

DEFLANDRIUS Bramlette and Martini, **PREDISCOSPHAERACEAE**

Deflandrius cretaceus (Arkhangelsky) Bramlette and Martini. Acharyya *et al.*1986: 4, pl. 2, figs 4-5, MAASTRICHTIAN (Naga Hills Ophiolite), Chipur and Salumi, Northern Indo-Burmese Range.

Deflandrius spinosus Bramlette and Martini. Chattopadhyaya *et al.* 1983: photograph 27(3), MAASTRICHTIAN, Ziphu, Nagaland.

DIAZMATOLITHUS Noël, **CREPIDOLITHACEAE**

Diazmatolithus lehmanii Noël. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

Diazmatolithus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (lowermost Chari Formation), Kutch District, Gujarat.

Diazmatolithus sp. Jai Krishna 1983: 792, MIDDLE JURASSIC (lowermost Chari Formation), Kutch District, Gujarat.

DICTYOCOCCITES Black, **PRINSIACEAE**

Dictyococcites antarcticus Haq. Saxena 1996: 727, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Dictyococcites bisecta Singh 1998: 164, pl. 1, figs 21-22 (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Dictyococcites bisectus (Hay, Mohler and Wade) Bukry and Percival. Singh and Singh 1986: 150, pl. 5, figs 2, 4, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Fulra Limestone Formation), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 234, pl. 1, fig. 15, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District; Gujarat; Singh and Singh 1991: 23, pl. 6, figs 26-27, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Dictyococcites hesslandi? (Haq) Haq and Lohmann Singh, Porwal and Uddin 1998: 98, pl. 2, figs 19-20, UPPER EOCENE (Tarapur Shale Formation), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat.

Dictyococcites productus (Kamptner) Backman. Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Dictyococcites cf. D. productus (Kamptner) Backman. Jafar and Singh 1992: 412-413, fig. 8, EARLY MIOCENE (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Dictyococcites sp. Jafar and Singh 1992: 412-413, figs 9-10, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

DISCOASTER Tan Sin Hok, **DISCOASTERACEAE**

Discoaster adamanteus Bramlette and Wilcoxon. Mathur and Mathur 1980: 54, pl. 1, fig. 31, LATE OLIGOCENE-LOWERMOST MIOCENE (Port Blair Formation), Pirthi nala Section, northern part of south Andaman; Wei and Srinivasan 1984: 349, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Singh and Jafar 1995: 191-192, pl. 3, fig. 1, LATE MIOCENE (Sawai Bay Formation), Discoaster berggrenii Subzone (CN9A), Discoaster quinqueramus Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster andamanensis Singh and Vimal 1976-79: 38, pl. 1, figs 1-2, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast Mudstone, Archipelago Group, Northeastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, northeastern Coast of Neill Island, Andaman.

Discoaster archipelagoensis Singh and Vimal 1976: 38-39, pl. 2, figs 9, 11-12; pl. 3, figs 1-2, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast Mudstone, Archipelago Group, Northeastern Coast of Neill Island, Andaman; Pant and Misra 1976: 209, pl. 1, fig. 6, EARLY MIOCENE-PLIO-PLEISTOCENE, Archipelago Group (Muralat Chalk Formation), Wilson Island, Ritchie's Archi-

pelago, Andaman; Singh 1976: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman.

Discoaster aster Bramlette and Riedel. Pant and Mangain 1969: 115, pl. 19, fig. 4; pl. 30, fig. 5; pl. 22, figs 3-4; pl. 23, figs 1-2, 16, KIRTHAR, MIDDLE EOCENE, About 3 km S 70° W of Dedhapur (23°46": 68°42'30"), Kutch, About 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch, about 2.2 km S 80° W of Waghopadar, Kutch District, Gujarat; Pant and Mathur 1973: pl. 26G; pl. 27A, LATE EOCENE, Amravati River Section, 1/2 a km S 10° E of Bilod, Broach, Gujarat; Singh *et al.* 1980: 2, figs 40-41; 3, figs 44-46, LATE MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rakhadi River Section, Harudi, Kutch District, Gujarat.

Discoaster asymmetricus Gartner in Martini. Datta and Singh 1976: 44, pl. 1, figs 4-5, LATE EARLY PLIOCENE, Subsurface Formation, NNI4, Bombay Offshore region; Singh 1979a: 232-233, pl. 2, figs 2-3, EARLY PLIOCENE (Round Formation), Archipelago Group, Northeastern Coast of Neill Island, Andaman.

Discoaster aulakos Gartner. Singh 1980c: 38, pl. 1, figs 3-12, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

Discoaster barbadiensis Tan Sin Hok. Pant and Mangain 1969: 116, pl. 19, figs 5-7; pl. 23, figs 11-12; pl. 39, figs 5a-b, EOCENE, about 3 km S 70° W of Dedhapur (23°46'30": 68°42'30", about 1.6 km north of Harudi (23°30'30": 68°41'00'), about 2.2 km S 80° W of Waghopadar, Kutch District, Gujarat; Pant and Mathur 1973: pl. 26C, F; pl. 27D, LATE EOCENE, Amravati River Section, ½ a km S 10° E of Bilod, Broach, Gujarat; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1978b: 53-54, LATE MIDDLE EOCENE, Vinjhan-Miani, Kutch District, Gujarat; Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh 1979b: 80, pl. 1, figs 36-44, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Singh *et al*. 1980: 3, figs 45-50, LATE MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980b: 23-24, pl. 1, fig. 28, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat; Singh 1980a: 6, pl. 2, figs 12-13, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980c: 38, pl. 1, figs 13-14, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), Discoaster saipanensis Zone, Mikir Hills, Assam; Srivastava 1981b: 204, text-fig. lA, UPPER EOCENE, Light brown calcareous Shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat; Singh and Asad 1983: 56, LATE PALAEOGENE, Tarapur Well B-14-1, Bombay Offshore, Bombay; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner, Rajasthan; Jafar *et al*. 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Gujarat; Singh and Singh 1986: 151, pl. 4, figs 12-13, 15-16 MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 234, pl. 1, fig. 20, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 25, pl. 6, fig. 42, Rato nadi Section (Harudi and Fulra Limestone formations), LATE MIDDLE EOCENE or BARTONIAN, Kutch, Gujarat; Jafar and Singh 1992: 412-413, figs 17-18, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Jafar and Rai 1994: 32, pl. 2, figs 13-18, 22-23, 27, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Singh and Jafar 1995: 191-192, pl. 1, fig. 1, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu,

Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 1997: 154, pl. 1, figs 8, 10, 18, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1998: 164, pl. 1, fig. 23 (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Discoaster bergenii Knüttel *et al*. Singh and Jafar 1995: 192-193, pl. 1, figs 4-5, 8, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster berggrenii Bukry. Singh and Vimal 1976: 39, pl. 1, figs 4-5, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast Mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, Northeastern Coast of Neill Island, Andaman; Mathur 1980b: 35, pl. 1, figs 1-4, LATE MIOCENE (Round Formation), Neill Domal Structure in the Nipple Hill area, Neill Island, Andaman; Singh and Jafar 1995: 191-192, pl. 1, figs 2-3, 6-7, 9a-c, 10a-b; pl. 3, figs 2-4, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster cf. D. berggrenii Bukry. Pant and Bandhopadhyaya 1972: 75, pl. 1, figs 1, 6, MIOCENE, Muralak Chalk, Ritchie's Archipelago, Andaman.

Discoaster bifax Bukry. Datta and Singh 1976: 44-45, pl. 1, fig. 7, LATE EARLY PLIOCENE, NN 14, Subsurface Formation, Bombay Offshore region.

Discoaster binodosus Martini. Pant and Mamgain 1969: 117, pl. 20, figs 1, 6; pl. 23, figs 3-4, 7-8, KIRTHAR MIDDLE EOCENE, about 1.6 km north of Harudi (23°30'30": 68°41'00") Kutch District, Gujarat; Singh *et al.* 1980: 3, fig. 76, LATE MIDDLE EOCENE (Fulra Limestone Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980a: 6-7, pl. 2, figs 9-11; pl. 4, figs 3-6, 8, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Srivastava 1981b: 204, text-fig. 1B, UPPER EOCENE, Light brown calcareous Shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 234, pl. 2, fig. 1, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 25-26, pl. 7, fig. 8, Rato nadi Section, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Kutch, Gujarat; Jafar and Rai 1994: 32, pl. 2, figs 24-26, 28, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discoaster blackstockae Bukry. Singh and Jafar 1995: 193, pl. 1, fig. 11, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster bolli Martini and Bramlette. Singh, 1980c: 38-39, pl. 1, figs 15-17, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

Discoaster braarudii Bukry. Mathur 1980b: 36, pl. 1, figs 13-14, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman.

Discoaster bramlettei Martini. Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoaster saipanensis* Zone, Mikir Hills, Assam.

Discoaster brouweri Tan Sin Hok emend. Bramlette and Riedel. Pant and Bandhopadhyaya 1972: 75, pl. 1, figs 2-3, 5, 8, MIOCENE, Muralak Chalk, Ritchie's Archipelago, Andaman; Datta and Singh 1976: 45, pl. 1, figs 1-3, LATE EARLY PLIOCENE, Subsurface Formation, NN 14, Bombay Offshore region; Singh and Vimal 1976: 39, pl. 1, fig. 3, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast Mudstone, Archipelago Group, north-eastern Coast of Neill Island, Andaman; Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment Core from southeastern Arabian Sea; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, Northeastern Coast of Neill Island, Andaman; Mathur 1980b: 36, LATE MIOCENE (Round Formation), Neill Domal Struc-

ture in the Nipple Hill area, Neill Island, Andaman; Singh 1980c: 39, pl. 1, figs 18-19, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Wei and Srinivasan 1984: 352, pl. 2, fig. 2, MIOCENE, Colebrook Island, Andaman; Singh and Jafar 1995: 193-195, pl. 1, figs 12, 13a-b, 14; pl. 3, figs 5-6, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster calcaris Gartner. Singh 1980c: 39, pl. 1, fig. 20, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Singh and Jafar 1995: 195-196, pl. 1, fig. 15a-b, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster challangeri Bramlette and Riedel. Pant and Bandhopadhyaya 1972: 75, pl. 1, fig. 7, MIOCENE, Muralak Chalk, Ritchie's Archipelago, Andaman; Pant and Misra 1976: 209-210, EARLY MIOCENE-PLIO-PLEISTOCENE, Archipelago Group (Muralat Chalk Formation), Wilson Island, Ritchie's Archipelago, Andaman; Singh 1980c: 40, pl. 1, figs 21-22, MIOCENE-EARLY PLIOCENE, Tarapur Well Bombay Offshore; Mathur 1981: 22, MIDDLE MIOCENE, Borehole in Kadiali area, southern Saurashtra; Wei and Srinivasan 1984: 352, pl. 4, fig. 12, MIOCENE, Great Nicobar Island; Singh and Jafar 1995: 196, pl. 1, figs 16-18, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster challengeri neillensis Singh and Vimal 1976: 39-40, pl. 4, figs 3-7, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, Northeastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, Northeastern Coast of Neill Island, Andaman; Singh 1980c: 39, pl. 1, fig. 23, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

Discoaster decorus (Bukry) Bukry. Singh and Jafar 1995: 196-198, pl. 1, figs 19-21, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster deflandrei Bramlette and Riedel. Singh and Vimal 1976: 41, pl. 1, figs 8-9, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, Northeastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1980a: 3, figs 51-58, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980c: 39-40, pl. 1, figs 24-27, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Mathur 1981: 22, MIDDLE MIOCENE, Borehole in Kadiali area, southern Saurashtra; Wei and Srinivasan 1984: 352-353, pl. 1, figs 7, 9-10; pl. 4, fig. 1, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Singh and Singh 1986: 151, pl. 4, figs 17, 19, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Jafar and Singh 1992: 412-413, fig. 19, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Singh and Jafar 1995: 198, pl. 2, fig. 1, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Discoaster diastypus Bramlette and Sullivan. Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoaster saipanensis* Zone, Mikir Hills, Assam.

Discoaster distinctus Martini. Singh *et al*. 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala; Singh 1979b: 89, pl. 1, figs 30-34, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Jafar and Rai 1984: 41, BARTONIAN, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE or BARTONIAN (Harudi Forma-

tion), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 26, pl. 7, figs 7, 15, Rato nadi Section (Harudi and Fulra Limestone formations), LATE MIDDLE EOCENE or BARTONIAN, Kutch, Gujarat; Jafar and Rai 1994: 32, pl. 2, fig. 5, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 154, pl. 1I, fig. 11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District Gujarat.

Discoaster divaricatus Hay. Wei and Srinivasan 1984: 353, pl. 2, fig. 3; pl. 4, fig. 2, MIOCENE, Colebrook Island, North Passage Island, Andaman.

Discoaster druggi Bramlette and Wilcoxon. Wei and Srinivasan 1984: 353, pl. 2, fig. 8; pl. 4, fig. 7, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar.

Discoaster elegans Bramlette and Sullivan. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 26, pl. 7, figs 11-12, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Discoaster exilis Martini and Bramlette. Singh 1979a: 233, pl. 2, fig. 5, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1980c: 40, pl. 2, fig. 2, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Wei and Srinivasan 1984: 353, pl. 4, fig. 10, MIOCENE, Great Nicobar Island.

Discoaster extensus Bramlette and Wilcoxon. Singh and Vimal 1976: 41, pl. 1, figs 6-7, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Mathur and Mathur 1980: 54, pl. 1, fig. 33, LATE OLIGOCENE (Port Blair Formation), Pirthi nala Section, northern part of south Andaman; Singh 1980c: 40, pl. 2, fig. 3, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

Discoaster gemmeus Strander. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin.

Discoaster gemmifer Stradner. Pant and Mamgain 1969: 116-117, pl. 20, figs 2, 4; pl. 23, figs 5-6, MIDDLE EOCENE, KIRTHAR, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat; Saurashtra; Wei and Srinivasan 1984: 352-353, pl. 2, figs 7, 9-10; pl. 4, fig. 1, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Singh and Singh 1986: 151, pl. 4, figs 17, 19, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat.

Discoaster hamatus Martini and Bramlette. Pant and Bandhopadhyaya 1972: 75, pl. 1, figs 4, 9, MIOCENE, Muralak Chalk, Ritchie's Archipelago, Andaman; Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

Discoaster helianthus Bramlette and Sullivan. Jain *et al.* 1983: 72, pl. 1, fig. 15, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Discoaster icarus Stradner. Singh and Jafar 1995: 198, pl. 2, fig. 2, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster indica Singh and Vimal 1976: 41-42, pl. 4, figs 1-2, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1976: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman.

Discoaster intercalaris Bukry. Singh and Vimal 1976: 42, pl. 2, figs 1-3, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Pant and Misra 1976: 209, pl. 1, fig. 3, EARLY MIOCENE-PLIO-PLEISTOCENE, Archipelago Group (Muralat Chalk Formation), Wilson Island, Ritchie's Archipelago, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Mathur 1980b: 36, LATE MIOCENE (Round Formation), Neill

Domal structure in the Nipple Hill area, Neill Island, Andaman; Singh 1980c: 40, pl. 1, fig. 28, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Wei and Srinivasan 1984: 353-354, pl. 4, fig. 13, MIOCENE, Great Nicobar Island; Singh and Jafar 1995: 198-200, pl. 2, fig. 3, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Discoaster kuepperi Stradner. Saxena 2000: 163, pl. 1, fig. 15, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Discoaster kugleri Martini and Bramlette. Singh 1980c: 40, pl. 1, fig. 29, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Wei and Srinivasan 1984: 354, pl. 4, figs 6, 9, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Mathur 1981: 22, MIDDLE MIOCENE, Borehole in Kadiali area, southern Saurashtra; Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

Discoaster lodoensis Bramlette and Riedel. Singh 1978a: 87-88, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980a: 7, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoaster saipanensis* Zone Mikir Hill, Assam; Srivastava 1981b: 204, text-fig. lC, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat; Singh 1983: 60, EARLY-MIDDLE EOCENE, Abhay-l Well, Bengal Basin, West Bengal; Saxena 2000: 163, pl. 1, fig. 19, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Discoaster loeblichii Bukry. Mathur 1980b: 36, pl. 1, fig. 15, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman; Singh 1980c: 40, pl. 1, fig. 30, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

Discoaster mediosus Bramlette and Sullivan. Jain *et al*. 1983: 72, pl. 1, fig. 16; LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Discoaster mirus Deflandre in Deflandre and Fert. Jafar and Rai 1984: 41, BARTONIAN, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 34, pl. 2, figs 10-11, 21, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discoaster multiradiatus Bramlette and Riedel. Datta and Singh 1976: 45, pl. 1, fig. 8, LATE EARLY PLIOCENE, Subsurface Formation, NN14, Bombay Offshore region; Jain *et al*. 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al*. 1983: 72, pl. 1, fig. 14, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Srivastava 1981b: 204, text-fig. 1F, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat.

Discoaster neillensis Singh 1979a: 225, pl. 1, figs 36-38, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman.

Discoaster neohamatus Bukry and Bramlette. Singh and Jafar 1995: 200, pl. 2, fig. 4, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster nodifer (Bramlette and Riedel) Bukry. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 34, pl. 2, fig. 29, LATE MIDDLE EOCENE OR BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discoaster obtusus Gartner. Mathur and Mathur 1980: 54, pl. 1, fig. 32, LATE OLIGOCENE-LOWERMOST MIOCENE (Port Blair Formation), Pirthi nala Section, northern part of south Andaman; Wei and Srinivasan 1984: 354, pl. 2, fig. 6; pl. 4, figs 4-5, MIOCENE, Colebrook Island, North Passage Island, Andaman; Rai 1997: 155, pl. 1I, fig. 12, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Discoaster ornatus Stradner. Pant and Mamgain, 1969: 115-116, pl. 20, fig. 3; pl. 23, fig. 9, KIRTHAR, MIDDLE EOCENE, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat; Jafar and Rai 1984: 41, MIDDLE EOCENE or BARTONIAN (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner, Rajasthan; Jafar and Rai 1994: 34, pl. 2, fig. 20, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discoaster pentaperforatus Singh and Jafar 1995: 200-201, pl. 3, figs 7-8, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster pentaradiatus Tan Sin Hok emend. Bramlette and Riedel. Singh and Vimal 1976: 42, pl. 1, fig. 10, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastem Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1980c: 40-41, pl. 1, fig. 31, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Mathur 1980b: 36, pl. 1, fig. 17, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman; Singh and Jafar 1995: 201, pl. 2, figs 6-7, pl. 3, fig. 9, LATE MIOCENE, Sawai Bay Formation, *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman; Saxena 1996: 728, pl. 1, fig. 12, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Discoaster plebeius Martini. Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoaster saipanensis* Zone, Mikir Hills, Assam.

Discoaster pseudovariabilis Martini and Worsley. Singh and Jafar 1995: 201, pl. 2, figs 11, 12a-b, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster quinqueramus Gartner. Singh 1980c: 41, pl. 1, figs 32-33, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Singh and Jafar 1995: 201-202, pl. 2, figs 8-9, pl. 3, fig. 10, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster raoi Singh and Vimal 1976: 42, pl. 2, figs 4-7, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman.

Discoaster rotans Stradner. Mathur 1980b: 36, pl. 1, fig. 16, LATE MIOCENE (Round Formation), Neill Domal structure In the Nipple Hill area, Neill Island, Andaman.

Discoaster rugosus Hojjatzadeh. Wei and Srinivasan 1984: 349, MIOCENE, Colebrook Island, Andaman.

Discoster saipanensis Bramlette and Riedel. Pant 1966: 42, Kutch District, Gujarat; Pant and Mamgain 1969: 117-118, pl. 19, figs 1-3; pl. 23, figs 10, 13, MIDDLE EOCENE; NARI, OLIGOCENE, KIRTHAR, about 1.6 km north of Harudi (23°30'30": 68°41'00'), Waghopadar (23°28'30": 68°45'00"), Kutch District, Gujarat; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1978b: 53-54, LATE MIDDLE EOCENE, Vinjhan-Miani, Kutch District, Gujarat; Singh 1978c: 21, LATE EARLY EOCENE-LATE EOCENE (considered reworked in PLIOCENE-EARLY MIOCENE assemblage), Tarapur Well H-12-1, Bombay Offshore; Singh *et al*. 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh 1979b:

89-90, pl. 45-51, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Singh *et al.* 1980: 3, figs 59-63, LATE MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980b: 24, pl. 1, fig. 30, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat; Singh 1980c: 41, pl. 1, fig. 34, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Singh 1980a: 6, pl. 1I, figs 14-15, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoaster saipanensis* Zone, Mikir Hills, Assam; Srivastava 1981b: 204, text-fig. 1E, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section. Kutch District, Gujarat; Jafar *et al.* 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal and Tarkeshwar Town, Gujarat; 1986b: MIDDLE EOCENE, Kutch, western India; Singh and Singh 1986: 151, pl. 4, figs 20-22, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 234, pl. 2, figs 2-4, LATE MIDDLE EOCENE or BARTONIAN (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 26, pl. 7, fig. 9, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 34, pl. 2, fig. 19, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 154, pl. 2, figs 6-7, pl. 4, fig. 11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1998: 164, pl. 1, figs 24, 32, 34 (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Discoaster cf. saipanensis Bramlette and Riedel. Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner, Rajasthan.

Discoaster salisburgensis Stradner. Datta and Singh 1976: 45, pl. 1, fig. 10, LATE EARLY PLIOCENE, Subsurface Formation, NN14, Bombay Offshore region.

Discoaster saundersi Hay. Wei and Srinivasan 1984: 349, MIOCENE, Colebrook Island, Andaman.

Discoaster stellulus Gartner. Wei and Srinivasan 1984: 349, MIOCENE, North Passage Island, Andaman.

Discoaster sublodoensis Bramlette and Sullivan. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1980a: 7-8, pl. 4, fig. 7, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Srivastava 1981b: 204, text-fig. 1D, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat.

Discoaster surculus Martini and Bramlette. Mathur 1980b: 35, pl. 1, figs 5-7, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman; Singh and Jafar 1995: 202, pl. 2, fig. 13; pl. 3, fig. 11, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster tanii Bramlette and Riedel. Singh 1978c: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoster saipanensis* Zone, Mikir Hills, Assam; Singh and Singh 1986: 151, pl. 4, fig. 27, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh 1988: 234, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Jafar and Rai 1994: 34, pl. 2, fig. 30, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discoaster tani nodifer Bramlette and Riedel. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1978b: 53-54, LATE MIDDLE EOCENE, Vlnjhan-Miani, Kutch District, Gujarat; Singh 1980a: 8, pl. 4, figs 9-15, 18-20, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980b: 24-25, pl. 1, fig. 29, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vlnjhan-Miani area, Kutch District, Gujarat; Jafar 1986b: MIDDLE EOCENE, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 234, pl. 2, fig. 13, LATE MIDDLE EOCENE or BARTONIAN (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 26-27, pl. 7, fig. 19, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Discoaster tani nodifer? Singh 1998: 164, pl. 1, figs 25-27 (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Discoaster sp. cf. D. tani nodifer Bramlette and Riedel. Wei and Srinivasan 1984: 354-355, pl. 4, fig. 8, MIOCENE, Colebrook Island, Andaman.

Discoaster toralus Ellis, Lohmann and Wray. Singh and Jafar 1995: 202, pl. 2, fig. 14, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster trinidadensis Hay Singh and Vimal 1976: 43, pl. 1, fig. 11, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island Andaman: Singh 1980c: 41, pl. 2, figs 3-8, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore.

Discoaster trinus Stradner. Datta and Singh 1976: 46, pl. 1, fig. 6, LATE EARLY PLIOCENE, Subsurface Formation, NN14, Bombay Offshore region; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh, Mathur and Srivastava 1980: 3, fig. 64, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980a: 8, pl. 4, fig. 17, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Singh 1980b: 25, pl. 1, fig. 31, LATE MIDDLE EOCENE (Fulra Limestone Formation), Vinjhan-Miani area, Kutch District, Gujarat; Singh and Singh 1986: 151, pl. 4, fig. 23, MIDDLE EOCENE or BARTONIAN (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat.

Discoaster variabilis Martini and Bramlette. Singh and Vimal 1976: 43, pl. 3, figs 5-7, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Pant and Misra 1976: 209, pl. 1, figs 1-2, EARLY MIOCENE-PLIO-PLEISTOCENE, Archipelago Group (Muralat Chalk Formation), Wilson Island, Ritchie's Archipelago, Andaman; Singh 1976: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Mathur 1980b: 36, pl. 1, figs 8-12, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman; Singh 1980c: 41-42, pl. 2, figs 9-14, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore; Mathur 1981: 22, MIDDLE MIOCENE, Borehole in Kadiali area, southern Saurashtra; Wei and Srinivasan 1984: 355, pl. 4, fig. 11, MIOCENE, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Singh and Jafar 1995: 202-203, pl. 2, figs 15a-b, 16-17, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoster variabilis sastri sub sp. Singh and Vimal 1976: 43-44, pl. 3, figs 3-4, LATE MIOCENE-EARLY PLIOCENE, Eastern Coast mudstone, Archipelago Group, North-eastern Coast of Neill Island, Andaman; Singh 1979a: 224, EARLY PLIOCENE (Round Formation), Archipelago Group, North- eastern Coast of Neill Island, Andaman.

Discoaster woodringi Bramlette and Riedel. Datta and Singh 1976: pl. 1, fig. 9, LATE EARLY PLIOCENE, Subsurface Formation, NN14, Bombay Offshore region.

Discoaster sp. Pant and Mathur 1973: pl. 27F, LATE EOCENE, Amravati River Section, ½ a km S 10° E of Bilod, Broach, Gujarat.

Discoaster Narasimhan 1974-75: 208, CRETACEOUS-TERTIARY, Pondicherry, south India.

Discoaster sp. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat.

Discoaster sp. Singh 1979b: 79, pl. 1, fig. 35, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

Discoaster sp. Mathur 1980b: 38, pl. 1, figs 18-19, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman.

Discoaster sp. 1 Singh 1980a: 8, pl. 4, figs 16, 21-22, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat.

Discoaster spp. Wei and Srinivasan 1984: 349, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar.

Discoaster sp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Discoaster sp. Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman.

Discoaster sp. Jafar 1985: 172, fig. 25, PALAEOGENE, Mud Volcanoes, Baratang Island, Andaman.

Discoaster sp. Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

Discoaster sp. Singh and Singh 1986: 150-151, pl. 4, fig. 14, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat.

Discoaster sp. a Singh and Singh 1991: 26, pl. 7, figs 13-14, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Discoaster sp. b Singh and Singh 1991: 26, pl. 7, fig. 18, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Discoaster sp. c Singh and Singh 1991: 18, pl. 7, fig. 19, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Discoaster sp. Jafar and Singh 1992: 412-413, fig. 2, EARLY MIOCENE (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Discoaster sp. 1 Singh and Jafar 1995: 203, pl. 3, fig. 12, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster sp. 2 Singh and Jafar 1995: 203, pl. 2, fig. 18, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster sp. 3 Singh and Jafar 1995: 203, pl. 3, fig. 19a-b, LATE MIOCENE (Sawai Bay Formation), *Discoaster berggrenii* Subzone (CN9A), *Discoaster quinqueramus* Zone (NN 11), East Coast and Nipple Hill Sections, Neill Island, Andaman.

Discoaster spp. Acharyya, Roy and Ghosh 1986: 4, pl. 1, fig. 10, MAASTRICHTIAN, Naga Hills Ophiolite, Pukhpur, Northern Indo-Burmese Range.

Discoaster spp. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Discoaster sp. Jafar and Rai 1994: 34, pl. 2, fig. 12, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discoaster sp. Rai 1997: 155, pl. 1I, fig. 9, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District Gujarat.

Discoaster sp. Singh 1998: 164, pl. 1, fig. 28 (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Discoaster sp. Singh 1998: 164, pl. 1, fig. 29 (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Discoaster sp. Singh, Srinivasan and Sharma 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

DISCOASTEROIDES Bramlette and Sullivan, **DISCOASTERACEAE**

Discoasteroides cf. megastypus Bramlette and Sullivan. Pant and Mathur 1984: 42, PALAEOCENE-LOWER EOCENE (Kapuradi Formation), Greenish grey clays of Ganga subsurface, Barmer District, Rajasthan.

DISCOLITHINA Loeblich and Tappan, **PONTOSPHAERACEAE**

Discolithina multipora (Kamptner) Martini. Wei and Srinivasan 1984: 355, pl. 4, figs 18a-c, Colebrook Island, Andaman.

Discolithina segmentata Stover. Jafar *et al.* 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Discolithina spp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Discolithina sp. 1 Jafar and Rai 1994: 34, pl. 3, fig. 8, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Discolithina sp. 2 Jafar and Rai 1994: 35, pl. 3, fig. 9, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

DISCOLITHUS Kamptner ex Deflandre, **PONTOSPHAERACEAE**

Discolithus theta Black in Black and Barnes. Acharyya *et al.* 1986: pl. 1, fig. 5; pl. 2, fig. 3, MAASTRICHTIAN, Naga Hills Ophiolite, Luthur and Salumi, Northern Indo-Burmese Range.

Discolithus Tewari, 1969: 123, Contact of Krol B and C Stage, Krol, Lesser Himalaya.

Discolithus sp. indet Singh 1977: 332, pl. 1, figs 2-5, OXFORDIAN, Subsurface of Banni Rann, 13 Miles SW of Godpur Village, Kutch District, Gujarat.

Discolithus sp. 1 Singh 1979a: 226, pl. 1, figs 39-41, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman.

Discolithus sp. Singh, Mathur and Srivastava 1980: 3, figs 42-43, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat.

Discolithus sp. Chattopadhyaya *et al.* 1983: photograph 29(2-3), MAASTRICHTIAN, Wazeho and Pukhpur, Nagaland.

Discolithus sp. Acharyya *et al.* 1986: 4, pl. 1, fig. 6, MAASTRICHTIAN, Naga Hills Ophiolite, Wazeho, Northern Indo-Burmese Range.

DISCORHABDUS Noël, **BISCUTACEAE**

Discorhabdus ignotus (Gorka) Perch-Nielsen. Singh 1990: 105, pl. 3, figs 7, 9, 11, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin.

Discorhabdus jungii Noël. Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

Discorhabdus longicornis Medd. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Discorhabdus patulus (Deflandre) Noël. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Discorhabdus striatus Moshkovitz and Ehrlich. Upadhyay *et al*. 2005: 154-155, figs 4, 20a-b, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Discorhabdus sp. Sinha 1975: 72, pl. 1, fig. 2, CRETACEOUS, Krol B horizon, Krol Series, Shimla area, Lesser Himalaya.

Discorhabdus sp. Jai Krishna, Singh, Howard and Jafar 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Discorhabdus sp. Upadhyay, Rai and Sinha 2005: 154-155, figs 4, 21A-D, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Discorhabdus sp. Rai 2003: 286, pl. 1, fig. 15, EARLY CALLOVIAN or MIDDLE JURASSIC, Jara Dome (Chari Formation), Kutch, western India.

DODEKAPODORHABDUS Perch-Nielsen, **PODORHABDACEAE**

Dodekapodorhabdus noeliae Perch-Nielsen. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

EIFFELLITHUS Reinhardt, **EIFFELLITHACEAE**

Eiffellithus eximius (Stover) Perch-Nielsen. Jafar 1982a: 20, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar 1982b: 15, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar

1985: 171, fig. 6, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Singh. 1998: 166, PALAEOCENE (Sanu Formation), pl. 2, figs 24-28, Kharatar Well-C, Jaisalmer, Rajasthan; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 9, CAMPANIAN, Kanghui and Hundung North Lower Band Section, Manipur, northeast India; Rai *et al.* 2002: 53, EARLY CAMPANIAN (Lameta Formation), CC18/ UC 14 Nannofossil Zone, Chakrud, near Zeerabad.

Eiffellithus gorkae Reinhardt. Jafar and Kapoor 1988: 116, pl. 1, figs 23-24, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya; Jafar and Singh 1992: 412-413, fig. 62, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Eiffellithus parallelus Perch-Nielsen, Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Eiffellithus regularis? (Gorka) Perch-Nielsen. Singh 1990: 102, pl. 1, figs 15-16, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin.

Eiffellithus trabeculatus (Gorka) Reinhardt and Gorka. Jafar 1982b: 20, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Eiffellithus turriseiffeli (Deflandre in Deflandre and Fert) Reinhardt. Jafar 1982b: 20-21, pl. 1, figs 8, 25, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar and Kapoor 1984: 42, LATEST MAASTRICHTIAN (Subathu Formation), around Dharampur, Shimla Hills; Jafar 1985: 171, fig. 7, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Singh 1990: 102-103, pl. 1, figs 10, 13-14, 17, 20-21; pl. 2, figs 1-2, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Kale and Phansalkar 1992: 86, pl. 1, figs 7-8; pl. 1I, fig. 3, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Saxena and Misra 1995: 324-325, 327, pl. 1, figs 6-8, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, figs 7, 27, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 10, SANTONIAN, Kanghui Section, Manipur, northeast India; Perch-Nielsen and Saxena 1998: 186, pl. 2, fig. 49, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

?Eiffellithus turriseiffeli (Deflandre) Reinhardt. Acharyya *et al*. 1986: 4, MAASTRICHTIAN, Naga Hills Ophiolite, Northern Indo-Burmese Range.

Eiffellithus sp. Singh 1998: 166, pl. 2, fig. 29, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Eiffellithus sp. Kumar and Saxena 1996: 110, pl. 5, fig. 10, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

ELLIPSAGELOSHAERA Noël, **ELLIPSAGELOSHAERACEAE**

Ellipsagelosphaera britannica (Stradner) Perch-Nielsen. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Kale and Phansalkar 1992: 86, pl. 1, figs 12-13; pl. 1I, fig. 5, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly Dis-

trict, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Ellipsagelosphaera communis (Reinhardt) Perch-Nielsen. Singh 1987: 21, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Jafar and Rai 1989: 359-360, figs 62, 66-67, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Ellipsagelosphaera fossacincta Black. Jafar and Rai 1989: 359-360, fig. 69, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Ellipsagelosphaera? leucasi Noël. Singh 1977: 332, pl. 1, figs 7-8, OXFORDIAN, subsurface Banni Rann, 13 miles SW of Godpur Village, Kutch District, Gujarat.

Ellipsagelosphaera sp. Jafar and Rai 1989: 359-360, fig. 68, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

ELLIPSOLITHUS Sullivan, **INCERTAE SEDIS**

Ellipsolithus macellus Zone (Bramlette and Sullivan) Sullivan. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills.

Ellipsolithus subdistichus Zone Roth and Hay in Hay, Mohler and Roth *et al.* Raju 1970: EARLY OLIGOCENE, parts of Cambay Basin and Cauvery Basin.

EMILIANIA Hay and Mohler in Hay, Mohler and Wade, **PRINSIACEAE**

Emiliania huxleyi (Lohmann) Hay and Mohler. Guptha 1976: 422, pl. 60, fig. 3, HOLOCENE, Core from continental slope off Bombay, Arabian Sea.

EPROLITHUS Stover, **POLYCYCLOLITHACEAE**

Eprolithus antiquus Perch-Nielsen**.** Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

Eprolithus floralis (Stradner) Stover. Jafar and Rai 1989: 359-360, fig. 77, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, pl. 1, figs 22-25; pl. 1I, fig. 6, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu; Rai *et al.* 2002: 53, EARLY CAMPANIAN (Lameta Formation), CC18/ UC 14 Nannofossil Zone, Chakrud, near Zeerabad; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

Eprolithus? sp. Singh 1998: 166, pl. 2, figs 33-34, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

ERICSONIA Black, **COCCOLITHACEAE**

Ericsonia cava (Hay and Mohler) Perch-Nielsen. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor 1988: 116, pl., figs 1-2, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Ericsonia eopelagica (Bramlette and Riedel). Jafar and Singh 1992: 412-413, fig. 20, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Ericsonia fenestrata (Deflandre and Fert) Stradner and Edwards. Rai 1997: 153, pl. 1I, fig. 1, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Ericsonia formosa (Kamptner) Haq. Singh 1988: 234, pl. 1, figs 4-5, LATE MIDDLE EOCENE (Fulra

Limestone Formation), Berwali River Section, Kutch District, Gujarat; Jafar and Rai 1994: 32, pl. 2, figs 1a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Singh and Singh 1991: 23, pl. 6, figs 32-33, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Saxena 1996: 728, pl. 1, fig. 24, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 1997: 153, pl. 1, figs 13, 15, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation) Dumas Well-A, Cambay Basin, Gujarat.

Ericsonia muiri (Black) Roth. Singh *et al*. 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh 1998: 164, pl. 1, figs 30-31, BARTONIAN (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Ericsonia cf. E. ovalis Black. Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner; Rai 1997: 153, pl. 1, fig. 14, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Ericsonia robusta? (Bramlette and Sullivan) Perch-Nielsen. Singh 1998: 166, pl. 2, figs 1-4, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Ericsonia subpertusa Hay and Mohler. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor 1988: 116, pl. 1, fig. 8, LATE PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya; Perch-Nielsen and Saxena 1998: 184, 189, pl. 1, figs 18-21, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Ericsonia subpertusa ? Hay and Mohler Singh 1998: 166, pl. 21, figs 5-8, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Ericsonia sp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Ericsonia sp. Jafar and Rai 1994: 32, pl. 2, figs 7a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Ericsonia sp. 1 Rai 1997: 153, pl. 1, fig. 17, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District Gujarat.

Ericsonia sp. 2 Rai 1997: 154, pl. 1, fig. 18, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Ericsonia spp. Jafar 1984: 42-43, CAMPANIN-DANIAN, Mud Volcanoes, Baratang Island, Andaman.

Ericsonia spp. Jafar 1985: 172, fig. 22, PALAEOCENE, Mud Volcanoes, Baratang Island, Andaman.

Ericsonia spp. Jafar, Rai and Vimal 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

ETHMORHABDUS Noël, **PODORHABDACEAE**

Ethmorhabdus gallicus Noël. Jafar and Saxena, 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Sub-surface of Banni Raan, Kutch District, Gujarat; Rai 2003: 286, pl. 1, figs 13A-B, 14, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai *et al*. 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Ethmorhabdus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Ethmorhabdus sp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

FASCICULITHUS Bramlette and Sullivan, **FASCICULITHACEAE**

Fasciculithus janii Perch-Nielsen. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Fasciculithus tympaniformis Hay & Mohler in Hay *et al.* Saxena 2000: 163, pl. 1, fig. 7, PALEOGENE

(Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

FAVICONUS Bralower in Bralower *et al.*, **NANNOCONACEAE**

Faviconus multicolumnatus Bralower in Bralower *et al.* Rai 2003: 286, pl. 2, figs 7A-B, 8-9, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

FAVOCENTRUM Black, **PODORHABDACEAE**

Favocentrum hilli Black. Acharyya *et al*. 1986: 4, pl. 2, fig. 7, MAASTRICHTIAN, Naga Hills Ophiolite, Maya, Northern Indo-Burmese Range.

FUTYANIA Varol, **FASCICULITHACEAE**

Futyania sp. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

GAARDERIA Kleijne, **RHABDOSPHAERACEAE**

Gaarderia corolla Guptha *et al.* 1995: 565, pl. 2, fig. 4, RECENT SEDIMENTS, Arabian Sea.

GARTNERAGO Bukry, **ARKHANGELSKIELLACEAE**

Gartnerago nanum Thierstein. Kale and Phansalkar 1992: 86, pl. 1, figs 2-3, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Gartnerago obliquum (Stradner) Noël. Jafar 1982b: 21, pl. 1, figs 1-4, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, pl. 1, fig. 4; pl. 1I, fig. 1, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Saxena and Misra 1995: 325, 327, pl. 1, figs 3-4, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, fig. 14, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Gartnerago segmentatum (Stover, 1966) Thierstein. Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Gartnerago striatum (Stradner) Forchheimer. Jafar and Rai 1989: 359-360, fig. 59, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Gartnerago sp. Saxena and Misra 1994: 75, figs 23-24, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin.

GEPHYROCAPSA Kamptner, **PRINSIACEAE**

Gephyrocapsa aperta Kamptner. Guptha 1976: 422, EARLY PLEISTOCENE-?LATE PLEISTOCENE, Core from continental slope off Bombay, Arabian Sea.

Gephyrocapsa carribbeanica Boudreaux and Hay. Guptha 1976: 423, PLEISTOCENE, Core from continental slope off Bombay, Arabian Sea: Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea sediment core from southeastern Arabian Sea.

Gephyrocapsa oceanica Kamptner. Guptha 1976: 423, pl. 60, fig. 4, LOWER PLEISTOCENE, Core Deep Sea Sediment core from southeastern Arabian Sea.

GEPHYRORHABDUS Hill, **RETICAPSOIDEAE**

Gephyrorhabdus coronadventis (Reinhardt) Hill. Jafar and Rai 1989: 359-360, figs 17-18, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Gephyrorhabdus decorus (Deflandre and Fert) Hill. Jafar and Rai 1989: 359-360, fig. 25, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

GLAUKOLITHUS Reinhardt, **ZYGODISCACEAE**

Glaukolithus compactus (Bukry) Perch-Nielsen. Jafar and Kapoor 1988: 116, pl. 1, fig. 27, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Glaukolithus diplogrammus (Deflandre) Reinhardt. Jafar and Rai 1989: 359-360, figs 30, 52-54, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Singh 1990: 101, pl. 1, fig. 3, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Singh 1998: 166, pl. 2, figs 35-38, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan; Kale *et al*.: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

GRANTARHABDUS Black, **RETICAPSOIDEAE**

Grantarhabdus meddii Black. Jafar and Rai 1989: 359-360, figs 21, 47, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

HAQUIS Roth, **ELLIPSAGELOSPHAERACEAE**

Haquis circumradiatus (Stover) Roth. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

HAYASTER Bukry, **INCERTAE SEDIS**

Hayaster perplexux (Bramlette and Riedel) Bukry. Wei and Srinivasan 1984: 355, pl. 4, fig. 17, MIOCENE, Colebrook Island, Andaman.

HAYESITES Manivit, **POLYCYCLOLITHACEAE**

Hayesites albiensis Manivit. Kale and Phansalkar 1992: 86, pl. 1, fig. 27, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Hayesites albiensis? Manivit. Singh 1990: 103-104, pl. 2, figs 11-12, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin.

HAYOCOCCUS Jafar, **NANNOPROBLEMATICA**

Hayococcus floralis Jafar. Rai, Upadhyay and Sinha 2003: 53, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya; Rai *et al*. 2004: 776, figs 5g, i-j, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

HELICOPONTOSPHAERA Hay and Mohler in Hay, Mohler and Wade, **HELICOSPHAERACEAE**

Helicopontosphaera kamptneri Hay and Mohler. Guptha 1976: 423, pl. 60, fig. 5, LATE MIOCENE-EARLY PLIOCENE, Core from continental slope off Bombay, Arabian Sea; Guptha 1979b: 116, UPPER PLEISTOCENE, Deep Sea Sediment core from southeastern Arabian Sea; Mathur 1980b: 36, LATE MIOCENE (Round Formation), Neill Domal Structure in the Nipple Hill area, Neill Island, Andaman.

Helicopontosphaera? selli Bukry and Bramlette. Datta and Singh 1976, pl. 2, figs 6-7, LATE EARLY PLIOCENE, Subsurface Formation, Thanjavur Well-A, Bombay offshore region.

Helicopontosphaera sp. Singh 1979b: 79, pl. 1, figs 6-29, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

Helicopontosphaera sp. Mathur 1980b: 36, pl. 1, figs 20-21, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman.

HELICOSPHAERA Kamptner, **HELICOSPHAERACEAE**

Helicosphaera ampliaperta Bramlette and Wilcoxon. Wei and Srinivasan 1984: 355, pl. 1, figs 4-5; pl. 3, figs 3a-c, MIOCENE, Colebrook Island, North Passage Island, Andaman; Singh 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Helicosphaera carterii (Wallich) Kamptner ex Jafar and Martini. Singh 1979a: 23, pl. 1, figs 3-9, EARLY PLIOCENE (Round Formation), Archipelago Group, North-eastern Coast of Neill Island, Andaman; Wei and Srinivasan 1984: 355-356, pl. 1, figs 1-2; pl. 3, figs 2a-c, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Jafar and Singh 1992: 412-413, figs 3-4, EARLY MIOCENE (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Helicosphaera compacta Bramlette and Wilcoxon. Jafar and Rai. 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar, Rai and Vimal 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Singh 1988: 234, pl. 2, figs 7-9, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Jafar and Rai 1994: 34, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Helicosphaera euphratis Haq. Wei and Srinivasan 1984: 356, pl. 1, fig. 3; pl. 3, figs 4a-c, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Jafar *et al.* 1985: 47, MIDDLE-LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Helicosphaera heezenii Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Helicosphaera intermedia Martini. Saxena 1996: 728, pl. 1, figs 38-39, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh *et al*. 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Helicosphaera kamptneri Hay and Mohler in Hay *et al*. Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Helicosphaera neolophota Bukry. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Helicosphaera obliqua Bramlette and Wilcoxon. Saxena 1996: 728, pl. 1, figs 32-34, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Helicosphaera perch-nielseniae Haq. Saxena 1996: 728, pl. 1, figs 29-30, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Helicosphaera reticulata Bramlette and Wilcoxon. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Helicosphaera recta (Haq) Jafar and Martini. Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Helicosphaera recta? (Haq) Jafar and Martini. Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation) Dumas Well-A, Cambay Basin, Gujarat.

Helicosphaera salebrosa Perch-Nielsen. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Helicosphaera scissura Miller. Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Helicosphaera sellii Bukry and Bramlette. Saxena 1996: 728, pl. 1, fig. 31, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Helicosphaera seminulum Bramlette and Sullivan. Saxena 1996: 728, pl. 1, figs 16-18, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Helicosphaera seminulum? Bramlette and Sullivan. Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation) Dumas Well-A, Cambay Basin, Gujarat.

Helicosphaera sp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Helicosphaera sp. Jafar and Singh 1992: 412-413, fig. 5, EARLY MIOCENE (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Helicosphaera sp. Jafar and Rai 1994: 34, pl. 2, figs 32a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Helicosphaera sp. Singh and Uddin, 2000: 221, MIDDLE EOCENE-LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshwar formations) Dumas Well-A, Cambay Basin, Gujarat.

Helicosphaera sp. Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

HELIOLITHUS Bramlette and Sullivan, **HELIOLITHACEAE**

Heliolithus riedelii Bramlette and Sullivan. Rajagopalan 1966: 21, PALAEOCENE (Pondicherry Formation), Pondicherry, south India; Rajagopalan, 1968: 127, PALAEOCENE (Pondicherry Formation), Pondicherry, south India.

Heliolithus? cf. H. kleinpelli? Sullivan. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Heliolithus sp. a Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat.

HELIORTHUS Brönnimann and Stradner, **ZYGODISCACEAE**

Heliorthus ? fallax Brönnimann and Stradner. Datta and Singh 1976: pl. 2, fig. 15, LATE EARLY PLIOCENE, Subsurface Formation, NN14, Bombay Offshore region.

HEMIPODORHABDUS Black, **HELIOLITHACEAE**

Hemipodorhabdus decorus Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

HEXALITHUS Gardet, **POLYCYCLOLITHACEAE**

Hexalithus sp. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

Hexalithus sp. Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

HEXAPODORHABDUS Noël. **AXOPODORHABDACEAE**

Hexapodorhabdus cuvillieri Noël. Rai 2003: 286, pl. 3, fig. 5, EARLY CALLOVIAN or MIDDLE

JURASSIC (Chari Formation), Jara Dome, Kutch, western India.

HOLODISCOLITHUS Roth, **CALYPTROSPHAERACEAE**

Holodiscolithus macroporus (Deflandre) Roth. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 22, pl. 5, figs 22-23, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 28, pl. 3, fig. 22, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

HORNIBROOKINA Edwards, **PRINSIACEAE**

Hornibrookina edwarsii? Perch-Nielsen. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Hornibrookina sp. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills.

Hornibrookina? sp. 1 Jafar and Kapoor, 1988: 119, LATE DANIAN, pl. 1, figs 3a-c, Basal Subathu of Dharampur, Shimla Himalaya.

Hornibrookina sp. 2 Jafar and Kapoor 1988: 119, LATE DANIAN, pl. 1 figs 6a-b, Basal Subathu of Dharampur, Shimla Himalaya.

Hornibrookina sp. 3 Jafar and Kapoor, 1988: 119, LATE DANIAN, pl. 1, figs 7a-b, Basal Subathu of Dharampur, Shimla Himalaya.

ISTHMOLITHUS Deflandre, **ZYGODISCACEAE**

Isthmolithus recurvus Zone Deflandre. Raju 1970: 104, LATE EOCENE, parts of Cambay Basin and Cauvery Basin; Srivastava, 1981b: 204, UPPER EOCENE, Ghour Stream, Kutch District, Gujarat.

LAGUNCULA Black, **INCERTAE SEDIS**

Laguncula sp. Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

LANTERNITHUS Stradner, **CALYPTROSPHAERACEAE**

Lanternithus duocavus Locker. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Lanternithus minutus Stradner. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh, 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 22, pl. 5, figs 17-18, 24, 27-28, 34-35, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 28, pl. 3, figs 26, 27a-b, 28, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 151, pl. 2, fig. 18, pl. 4, fig. 17, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh and Uddin, 2000: 221, MIDDLE-LATE EOCENE (Tarapur Shale Formation) Dumas Well-A, Cambay Basin, Gujarat; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Lanternithus spp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Lanternithus sp. Jafar, Rai and Vimal 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Lanternithus sp. 1 Jafar and Rai 1994: 28, pl. 3, figs 29a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Lanternithus sp. 2 Jafar and Rai 1994: 28, pl. 3, figs 30a-b, 31a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Lanternithus sp. 3 Jafar and Rai 1994: 28, pl. 3, figs 32a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Lanternithus sp. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

LITHASTRINUS Stradner, **POLYCYCLOLITHACEAE**

Lithastrinus floralis Stradner. Jafar 1982b: 21, pl. 1, figs 23-24, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Lithastrinus sp. Singh 1998: 166, pl. 2, figs 39-40, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

LITHOSTROMATION Deflandre, **LITHOSTROMATIONACEAE**

Lithostromation perdurum Deflandre. Pant and Misra 1976: 210, EARLY MIOCENE-PLIO-PLEISTOCENE, Archipelago Group (Muralat Chalk Formation), Wilson Island, Ritchie's Archipelago, Andaman.

Lithostromation simplex (Klumpp) Bybell. Jafar and Rai. 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 32, pl. 2, fig. 31, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 155, pl. 1II, fig. 3, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Lithostromation sp. Pant and Mathur 1973: 213, pl. 27G, LATE EOCENE Amravati River Section, 1/2 a km S l0° E of Bilod, Broach, Gujarat.

LITHRAPHIDITES Deflandre, **MICRORHABDULACEAE**

Lithraphidites alatus Thierstein in Roth and Thierstein. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Lithraphidites acutus Verbeek and Manivit in Manivit *et al.* Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Lithraphidites carniolensis Deflandre. Sinha 1975: 75, CRETACEOUS, Krol B Horizon, Krol Series, Shimla area, Lesser Himalaya; Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysh sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya; Jafar 1982b: 21, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, NarmadaValley; Sinha and Dmitrenko, 1983: 255, pl. 3, fig. 9, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya; Jafar and Kapoor 1988: 116, pl. 1, fig. 25, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Lithraphidites carniolensis carniolensis Deflandre. Singh 1990: 103, pl. 2, figs 5, 6, 9, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin;

Lithraphidites carniolensis serratus Shumenko. Saxena and Misra 1995: 324-325, 327, pl. 1, figs 1-2, CAMPANIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Chungkham and Jafar 1998: 80, pl. 4, fig. 11, CAMPANIAN, Kanghui Section, Manipur, northeast India.

Lithraphidites helicoideus (Deflandre) Deflandre. Jafar and Kapoor 1984: 42, LATEST MAASTRICHTIAN (Subathu Formation), around Dharampur, Shimla Hills.

Lithraphidites quadratus Bramlette and Martini. Jafar and Kapoor 1984: 42, LATEST CRETACEOUS (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor 1988: 116, pl. 1, fig. 26, CRETACEOUS, Basal Subathu of Dharampur, Shimla Himalaya; Saxena and Misra 1995: 324-325, 327, pl. 1, figs 11-13, 18, MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Lithraphidites sp. Sinha and Dmitrenko 1983: 255, pl. 3, figs 5, 7, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya.

LOPHODOLITHUS Deflandre in Deflandre and Fert, **ZYGODISCACEAE**

Lophodolithus renifomis Bramlette and Sullivan. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch, Gujarat; Singh 1980a: 9, pl. 2, fig. 6, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat.

Lophodolithus? sp. Singh 1979b: 78, pl. 1, figs 15-18, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam.

LOTHARINGIUS Noël, **EIFFELLITHACEAE**

Lotharingius crucicentralis (Medd) Grün and Zweili, Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Rai 2003: 286, pl. 1, figs 6A-B, 7, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Upadhyay *et al.* 2005: 154-155, figs 4, 16A-B, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Lotharingius sigillatus (Stradner) Prins in Grün and Zweili. Rai 2003: 286, pl. 3, fig. 12, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

LOXOLITHUS Noël. **ZYGODISCACEAE**

Loxolithus armilla (Black and Barnes) Noël. Jafar and Rai 1989: 359-360, fig. 35, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Jafar 1982b: 21, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Loxolithus armilla? (Black and Barnes) Noël. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

LUCIANORHABDUS Deflandre, **CALYPTROSPHAERACEAE**

Lucianorhabdus cayeuxii Deflandre. Narasimhan 1963: pl. 12, fig. 8, DANIAN Langpar Stage 125, Khasi Hills, Assam; Sinha 1975: 75, CRETACEOUS, Krol B Horizon, Krol Series, Shimla area, Lesser Himalaya; Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya; Jafar 1982b: 21-22, pl. 1, fig. 9, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Sinha and Dmitrenko 1983: 254, pl. 2, fig. 3, UPPER CRETACEOUS, Flysch, Malla Johar, Tethyan Himalaya; Jafar 1985: 170, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Kumar and Saxena 1996: 110, pl. 5, fig. 31, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Lucianorhabdus maleformis Reinhardt. Jafar 1985: 170, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman.

MANIVITELLA Thierstein, **ELLIPSAGELOSPHAERACEAE**

Manivitella pemmatoidea (Deflandre) Thierstein. Jafar 1985: 171, fig. 10, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Jafar and

Rai 1989: 359-360, figs 12, 55, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kumar and Saxena 1996: 110, pl. 5, fig. 13, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Chungkham and Jafar 1998: 80, pl. 4, fig. 12, LATE CAMPANIAN, Kanghui Section, Manipur, northeast India. Chungkham and Jafar 1998: 80, pl. 4, fig. 12, LATE CAMPANIAN, Kanghui Section, Manipur, northeast India.

MARKALIUS Bramlette and Martini, **ELLIPSAGELOSPHAERACEAE**

Markalius circumradiatus (Stover) Perch-Nielsen. Jafar 1982b: 22, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Markalius inversus (Deflandre in Deflandre and Fert) Bramlette and Martini. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, fig. 9, UPPER PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor 1988: 116, pl. 1, fig. 11, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Markalius? inversus (Deflandre) Bramlette and Martini. Acharyya *et al*. 1986: 4, pl. 1, fig. 3, MAASTRICHTIAN, Naga Hills Ophiolite, Chipur, Northern Indo-Burmese Range.

MARTHASTERITES Deflandre, **INCERTAE SEDIS**

Marthasterites furcatus (Deflandre) Stradner. Narasimhan 1963: 114, pl. 12, fig. 6, DANIAN (Langpar Stage), Khasi Hills, Assam; Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya; Jafar 1982a: 15, LATE TURONIAN (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Singh 1990: 105, pl. 3, figs 19, 23, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Saxena and Misra 1995: 324-325, 327, pl. 1, fig. 34, SANTONIAN-Base of CAMPANIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Rai *et al.* 2002: 53, EARLY CAMPANIAN (Lameta Formation), CC18/UC 14 Nannofossil Zone, Chakrud, near Zeerabad.

Marthasterites inconspicuous Deflandre. Narasimhan 1963: 114, pl. 12, fig. 7, DANIAN, Langpar Stage, Khasi Hills, Assam.

?Marthasterites inconspicuous Deflandre. Acharyya *et al*. 1986: 4, pl. 1, fig. 2, MAASTRICHTIAN, Naga Hills Ophiolite, Ziphur, Northern Indo-Burmese Range.

Marthasterites tribrachiatus (Bramlette and Riedel) Deflandre. Narasimhan 1963: 113, pl. 12, fig. 5, MAASTRICHTIAN, Mahadek Stage, Khasi Hills, Assam.

MICRANTHOLITHUS Deflandre in Deflandre and Fert, **BRAARUDOSPHAERACEAE**

Micrantholithus aequalis Sullivan. Singh *et al.* 1980: 3, figs 72-75, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Jafar and Rai 1994: 26, pl. 1, figs 12a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus anglosus Stradner in Stradner and Papp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 20, pl. 2, figs 5, 7, 9, 12, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 26, pl. 1, figs 4-5, LATE MIDDLE

EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus cf. angulosus Stradner in Stradner and Papp. Pant and Mamgain 1969: 121, pl. 21, fig. 6, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat.

Micrantholithus attenuatus Bramlette and Sullivan. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, figs 34-35, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 20, pl. 3, figs 2-5, 12-13, 17, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Kutch, Rato nadi Section, Gujarat.

Micrantholithus basquensis Martini. Singh 1979b: 80, pl. 1, fig. 56, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Singh *et al*. 1980: 3, figs 70-71, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat.

Micrantholithus bulbosus Bouché. Jafar and Rai 1994: 26, pl. 1, figs 21-22a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus cf. M. concinnus Bramlette and Sullivan. Pant and Mamgain 1969: 120, pl. 22, fig. 2, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat.

Micrantholithus crenulatus Bramlette and Sullivan. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh *et al.* 1980: 3, figs 68-69, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Singh 1980c: 42, pl. 2, fig. 21, MIOCENE-EARLY PLIOCENE, Tarapur Well, Bombay Offshore: Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 2, pl. 2, figs 10-11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Micrantholithus crenulatus ? Bramlette and Sullivan. Singh. 1998: 166, pl. 2, figs 9-10, BARTONIAN (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Micrantholithus entaster Bramlette and Sullivan. Saxena 1996: 728, pl. 1, fig. 12, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Micrantholithus flos Deflandre in Deflandre and Fert. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, fig. 33, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 20, pl. 2, figs 8-11, 15-16, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Singh. 1998: 166, pl. 2, fig. 11, BARTONIAN (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan; Rai 1997: 150, pl. 1, fig. 6, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Micrantholithus flos? Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat.

Micrantholithus inaequalis Martini. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 26, pl. 1, figs 10a-b, 11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus lateralis Sullivan. Jafar and Rai 1994: 26, pl. 1, fig. 16, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone for-

mations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus proceras Bukry and Bramlette. Jafar and Rai 1994: 26, pl. 1, figs 6a-b, 7, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus ornatus Sullivan. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Kutch District, Gujarat.

Micrantholithus cf. M. ornatus Sullivan. Jafar and Rai 1994: 26, pl. 1, fig. 8, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus parisiensis Bouché. Jafar 1984: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 172, PALAEOCENE, Mud Volcanoes, Baratang Island, Andaman; Rai 1997: 150, pl. 1, fig. 3, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Micrantholithus pinguis Bramlette and Sullivan. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al*. 1983: 72, pl. 1, figs 22-23, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1986: 148, pl. 3, figs 5-6, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 20-21, pl. 4, figs 2-3, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 26, pl. 1, fig. 9, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 150, pl. 1, fig. 5, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Micrantholithus procerus Bukry and Bramlette. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 4, figs 4-9, 13-14, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 25-26, pl. 1, fig. 1, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nala Section, southwestern Kutch, western India; Rai 1997: 150, pl. 1, figs 12-15, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Micrantholithus vesper Deflandre. Pant and Mamgain 1969: 120-121, pl. 21, fig. 1; pl. 22, figs 18-19; pl. 23, figs 10-11, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat; Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, figs 18-21, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 4, figs 15, 20, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat; Saxena 2000: 163, pl. 1, fig. 17, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Micrantholithus spp. Mathur 1980a: 86, UPPER EOCENE (Kopili Formation), *Discoaster saipanensis* Zone, Mikir Hills, Assam.

Micrantholithus sp. 1 Jain *et al.* 1983: 72, pl. 1, fig. 17, LATE PALAEOCENE 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Micrantholithus sp. 2 Jain *et al.* 1983: 72, pl. 1, fig. 24, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Micrantholithus sp. 3 Jain *et al.* 1983: 72, pl. 1, fig. 25, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Micrantholithus sp. 4 Jain *et al.* 1983: 72, pl. 1, fig. 26, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin.

Micrantholithus spp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Micrantholithus sp. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Micrantholithus sp. Jafar and Kapoor 1988: 116, pl. 1, fig. 16, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Micrantholithus sp. Jafar and Singh 1992: 412-413, fig. 52, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Micrantholithus sp. 1 Jafar and Rai 1994: 26, pl. 1, figs 2-3, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus sp. 2 Jafar and Rai 1994: 26, pl. 1, fig. 15, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus sp. 3 Jafar and Rai 1994: 26-27, pl. 1, figs 18-19, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Micrantholithus sp. Perch-Nielsen and Saxena 1998: 184, pl. 1, figs 26, 34-35, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Micrantholithus sp. Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat.

MICHAELSARSIA Gran, emend. Manton *et al.*, **SYRACOSPHAERACEAE**

Michaelsarsia adriaticus Guptha *et al.* 1995: 565, pl. 2, fig. 3, RECENT SEDIMENTS, Arabian Sea.

MICRORHABDULUS Deflandre, **MICRORHABDULACEAE**

Microrhabdulus attenuatus (Deflandre) Deflandre. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Microrhabdulus belgicus Hay and Towe. Jafar 1982b: 22, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Microrhabdulus decoratus Deflandre. Kale and Phansalkar 1992: 86, pl. 1, fig. 29, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Saxena and Misra 1995: 324-325, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Microrhabdulus orbitosus Shumenko. Sinha 1975: 72, pl. 3, fig. 1, CRETACEOUS, Krol B Horizon, Krol Series, Shimla area, Lesser Himalaya.

MICULA Vekshina, **POLYCYCLOLITHACEAE**

Micula concava (Stradner) Bukry. Singh 1990: 104, pl. 2, figs 13-15, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin.

Micula decussatea Vekshina. Jafar and Kapoor 1984: 42, LATEST MAASTRICHTIAN (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor 1988: 116, pl. 1, figs 33a-b, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya; Singh 1990: 104, pl. 2, figs 16-20, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Saxena and Misra 1994: 75: fig. 18, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin; Saxena and Misra 1995: 324-325, 327, pl. 1, figs 5, 36, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, fig. 18, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 186, pl. 2, figs 50, 56, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Micula murus (Martini) Bukry. Jafar 1985: 170, fig. 16, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Jafar and Kapoor 1984: 42, LATEST MAASTRICHTIAN (Subathu Formation), around Dharampur, Shimla Hills, Jafar and Kapoor 1988: 116, pl. 1, fig. 34, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya; Jafar and Singh 1992: 412-413, figs 56-57, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Saxena and Misra 1994: 75, fig. 15, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin; Saxena and Misra 1995: 324-325, 327, pl. 1, figs 21-23, MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 13-17, MAASTRICHTIAN, Kanghui Section, Manipur, northeast India; Perch-Nielsen and Saxena 1998: 186, pl. 2, figs 47-48, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Raju *et al.* 1994: 42, LATEST MAASTRICHTIAN to Zone NP1 (Razole Formation), Krishna-Godavari Basin.

Micula praemurus (Bukry) Stradner and Steinmetz. Saxena and Misra 1995: 324-325, 327, pl. 1, figs 11-13, MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 18, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India.

Micula prinsii Perch-Nielsen. Jafar 1985: 170, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Garg and Jain 1996: 34, TERMINAL MAASTRICHTIAN, UmSohryngkew, Meghalaya, northeast India.

Micula staurophora (Gardet) Stradner. Sinha 1975: 74, CRETACEOUS, Krol B Horizon, Krol Series, Shimla area, Lesser Himalaya; Jafar 1985: 170, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Acharyya, Roy and Ghosh 1986: 4, MAASTRICHTIAN, Naga Hills Ophiolite, Northern Indo-Burmese Range.

Micula swastika (Prins) Stradner and Steinmetz. Jafar and Singh 1992: 412-413, fig. 58, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Chungkham and Jafar 1998: 80, pl. 4, figs 19-20, CAMPANIAN, Kanghui Section and MAASTRICHTIAN, Mova Section, Manipur, northeast India.

Micula sp. Jafar 1985: 170, fig. 17, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman.

Micula sp. Jafar and Kapoor 1988: 116, pl. 1, fig. 32, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Micula sp. Jafar and Singh 1992: 412-413, figs 59-61, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Micula sp. Saxena and Misra 1994: 75, figs 16-17, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin.

Micula sp. Chungkham and Jafar 1998: 80, pl. 4, figs 21-22, MAASTRICHTIAN, Kanghui and Mova Sections, Manipur, northeast India.

Micula sp. Perch-Nielsen and Saxena 1998: 184, pl. 2, figs 60, 62-67, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

MITROLITHUS Deflandre in Deflandre and Fert, **INCERTAE SEDIS**

Mitrolithus sp. Tewari 1969: 123, contact of Krol B and C stages, Krol, Lesser Himalaya.

NANINFULA Perch- Nielsen, **INCERTAE SEDIS**

Naninfula? hexaporus Rai 1997: 158, pl. 1I, fig. 17, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

NANNOCONUS Kamptner, **NANNOCONACEAE**

Nannoconus regularis Deres and Acheriteguy. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Nannoconus truitti Brönnimann. Jafar and Rai 1989: 359-360, fig. 62, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Nannoconus truitti rectangularis Deres and Acheriteguy. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Nannoconus sp. Tewari 1969: 123, Contact of Krol B and C stages, Krol, Lesser Himalaya.

NANNOTETRASTER Martini and Stradner, **INCERTAE SEDIS**

Nannotetraster cf. concavus Stradner in Martini and Stradner. Pant and Mamgain 1969: 118, pl. 22, figs 5-6, SENONIAN (Ariyalur Group), Buff coloured sandstone immediately underlying orbitoid-bearing beds at Kilappatu (11°18': 79°00'), Tiruchirapalli District, Madras.

NEOANGULOLITHINA Guptha, **CERATOLITHACEAE**

Neoangulolithina qasimii Guptha 1979: 116, pl. 1, fig. 3, UPPER PLEISTOCENE, Deep Sea sediment core from southeastern Arabian Sea.

NEOBISCUTUM Varol, **NANNOCONACEAE**

Neobiscutum sp. Perch-Nielsen and Saxena 1998: 184, 189, pl. 2, figs 43-44, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

NEOCHIASTOZYGUS Perch-Nielsen, **ZYGODISCACEAE**

Neochiastozygus concinnus (Martini) Perch-Nielsen. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor, 1988: 116, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Neochiastozygus chiastus (Bramlette & Sullivan) Perch-Nielsen. Saxena 2000: 163, pl. 1, fig. 10, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Neochiastozygus distentus (Bramlette and Sullivan) Perch-Nielsen. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills.

Neochiastozygus imberei Haq and Lohmann. Jafar and Kapoor 1988: 116, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Neochiastozygus jaisalmerensis Singh. 1998: 153, 164, pl. 2, figs 12-15, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Neochiastozygus modestus Perch-Nielsen. Jafar and Kapoor 1988: 11, pl. 1, figs 5a-b, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Neochiastozygus cf N. modestus Perch-Nielsen. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Neochiastozygus perfectus Perch-Nielsen. Perch-Nielsen and Saxena 1998: 184, 189, pl. 1, figs 22-24, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Neochiastozygus sp. Perch-Nielsen and Saxena 1998: 184, 189, pl. 1, figs 4-7, pl. 2, fig. 46, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

NEOCOCCOLITHES Sujkowski, **NANNOCONACEAE**

Neococcolithes? erraticus Rai 1997: 158, pl. 1I, fig. 15, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

NEPHROLITHUS Gorka, **PODORHABDACEAE**

Nephrolithus frequens Gorka. Chattopadhyay *et al.* 1983: photograph 29 (1), MAASTRICHTIAN, Pukhpur, Nagaland; Acharyya *et al.* 1986: 4, pl. 2, fig. 2, MAASTRICHTIAN, Naga Hills Ophiolite, Pukhpur, Northem Indo-Burmese Range.

Nephrolithus? gorka Acharyya, Roy and Ghosh 1984: 65, MAASTRICHTIAN, Naga Hills Ophiolite, Northern Indo-Burmese Range; Acharyya *et al.* 1986: 4, MAASTRICHTIAN (Naga Hills Ophiolite), Northern Indo-Burmese Range.

OBLIQUIPITHONELLA Keupp in Keupp and Mutterlose, **NOELAERHABDACEAE**

Obliquipithonella sp. Rai *et al.* 2004: 776, fig. 5c, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

OCTOLITHUS Romein, **CALYPTROSPHAERACEAE**

Octolithus sp. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills.

Octolithus? spp. Jafar and Kapoor 1988: 116, pl. 1, figs 18-19, LATE MAASTRICHTIAN, Basal Subathu of Dharampur, Shimla Himalaya.

OOLITHOTUS Reinhardt, in Cohen and Reinhardt, **CALCIDISCACEAE**

Oolithotus antillarum Guptha, Mohan and Muralinath 1995: 565, pl. 2, fig. 5, RECENT, Arabian Sea.

Oolithotus fragillis var. cavum Guptha, Mohan and Muralinath 1995: pl. 2, fig. 6, Arabian Sea.

ORASTRUM Wind and Wise, **CALYPTROSPHAERACEAE**

Orastrum campanensis (Cepek) Wind and Wise. Saxena and Misra 1995: 324-325, 327, pl. 1, figs 26-27, CAMPANIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, figs 21-22, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin

ORTHOPITHONELLA Keupp in Keupp and Mutterlose, **CALCIODINELLACEAE**

Orthopithonella geometrica (Jafar) Janofske. Rai *et al.* 2003: 53, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya; Rai *et al.* 2004: 774, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

Orthopithonella misurinae Janofske. Rai *et al.* 2004: 776, fig. 5a-b, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

ORTHORHABDUS Bramlette and Wilcoxon, **INCERTAE SEDIS**

Orthorhabdus serratus Bramlette and Wilcoxon. Wei and Srinivasan 1984: 356, pl. 4, figs 19a-b, MIOCENE, Colebrook Island, Great Nicobar Island, Andaman and Nicobar.

ORTHOZYGUS Bramlette and Wilcoxon, **CALYPTROSPHAERACEAE**

Orthozygus aureus (Stradner) Bramlette and Wilcoxon. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Orthozygus macroporus (Deflandre). Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 28, 30 pl. 3, figs 17-18, 19a-b, 20a-b, 21, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 152, pl. 3, figs 1-2, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

PARHABDOLITHUS Deflandre, **CREPIDOLITHACEAE**

Parhabdolithus bitraversus Stover. Jafar 1982b: 22, pl. 1, figs 16-18, 31, LATE CRETACEOUS (Sanu Formation) (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Parhabdolithus embergeri (Noël) Stradner. Jafar 1985: 171, fig. 4, CRETACEOUS, Mud Volcanoes, Baratang Island, Andamans; Chungkham and Jafar 1998: 80, pl. 4, fig. 23, SANTONIAN, Kanghui Section, Manipur, northeast India.

PEDINOCYCLUS Bukry and Bramlette, **COCCOLITHACEAE**

?Pedinocyclus ganeshi n. sp. Singh and Singh 1991: 24, pl. 6, figs 9-16, Rato nadi Section (Harudi and Fulra Limestone formations), LATE MIDDLE EOCENE or BARTONIAN, Kutch, Gujarat.

PEMMA Klumpp, **BRAARUDOSPHAERACEAE**

Pemma angulatum Martini. Srivastava 1981b: 204, text-fig. 1H, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone near Ghour Stream, Kutch District, Gujarat; Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat; Singh and Singh 1986: 148-149, pl. 3, fig. 7, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Saxena 2000: 163, pl. 1, fig. 6, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Pemma cf. P. angulatum Rai 1997: 150, pl. 1, figs 7, 12, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Pemma basquensis (Martini) Báldi-Beke. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1991: 27, pl. 1, figs 13a-b (Harudi Formation), LATE MIDDLE EOCENE or BARTONIAN, Rato nala Section, southwestern Kutch, western India; Jafar and Rai 1994: 27, pl. 1, figs 13a-b, 23-24, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 151, pl. 1, fig. 8, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District Gujarat; Singh and Uddin, 2000: 221, MIDDLE-UPPER EOCENE (Tarapur Shale Formation) Dumas Well-A, Cambay Basin, Gujarat; Rai 2002: 153, RUPELIAN, Maniara Fort Formation, NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Pemma basquense crasum (Bouchè). Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 4, figs 16-19, 21-28, pl. 5, figs 1-3, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Pemma bulbosus (Bouchè). Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Pemma lateralis (Sullivan). Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Pemma papillatum Martini. Pant and Mamgain 1969: 122, pl. 21, fig. 1; pl. 24, figs 1-2, 7-8, 12-13, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat; Pant and Mathur 1973: 212-213, pl. 26 E; pl. 27 I, LATE EOCENE, Amravati River Section 1/2 a km S 10° E of Bilod, Broach, Gujarat; Singh 1979b: 82, pl. 1, figs 52-55, LATE MIDDLE EOCENE-EARLY LATE EOCENE (Kopili Formation), Mikir Hills, Samkherjan area, Assam; Singh *et al.* 1980: 3, figs 66-67, LATE MIDDLE EOCENE (Harudi Formation), Rakhadi River Section, Harudi, Kutch District, Gujarat; Srivastava 1981b: 204, text-fig. 1G, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone, near Ghour Stream, Kutch District, Gujarat; Singh 1983: 60, EARLY-MIDDLE EOCENE, Abhay-1 Well, Bengal Basin, West Bengal; Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1986: 149, pl. 3, figs 8-9, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh, 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 5, figs 6, 15, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 27, pl. 1, figs 1a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 151, pl. 1, fig. 4; pl. 1V, figs 1-2, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE - LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshwar forma-

tions), Dumas Well-A, Cambay Basin, Gujarat; Saxena 2000: 163, pl. 1, fig. 18, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Pemma rotundum Klummp. Pant and Mamgain 1969: pl. 21, figs 2-4; pl. 22, figs 20-21, MIDDLE EOCENE, Kirthar, about 1.6 km North of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat; Singh and Singh 1986: 149, pl. 3, figs 10-11, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 5, figs 7-9, 12, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Pemma serratum (Chang) Bybell and Gartner. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 5, figs 10-11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Rai 1997: 151, pl. 1, fig. 11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat.

Pemma stradneri (Chang). Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 21, pl. 5, figs 13-14, 16, 19, 20-21, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Singh and Uddin, 2000: 221, MIDDLE EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat; Singh *et al.* 1998: 98: pl. 2, figs 21-23, MIDDLE EOCENE (Kalol Formation), Chanasma Well B, Mehsana Block, Cambay Basin, Gujarat.

Pemma spp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Pemma spp. Jafar *et al.* 1985: 47, LATE PRIABONIAN, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Gujarat.

Pemma spp. Singh and Singh 1987: 203, MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Pemma sp. Singh and Singh 1991: 22, pl. 4, figs 10-12, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Pemma sp. 1 Jafar and Rai 1994: 27, pl. 1, figs 14a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Pemma sp. 2 Jafar and Rai 1994: 27, pl. 1, figs 25-26, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Pemma sp. Singh, Porwal and Uddin 1998: 98, pl. 2, figs 30-32, MIDDLE EOCENE (Kalol Formation), Chanasma Well B, Mehsana Block, Cambay Basin, Gujarat.

Pemma sp. Rai 1997: 151, pl. 1, fig. 10, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District Gujarat.

Pemma spp. Singh and Singh 1987: 203, MIDDLE EOCENE (BARTONIAN) (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

PEDINOCYCLUS Bukry and Bramlette, **COCCOLITHACEAE**

Pedinocyclus? sp. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

PERISSOCYCLUS Black, **PODORHABDACEAE**

Perissocyclus sp. Jafar and Rai 1989: 359-360, fig. 24, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

PLACOZYGUS Hoffmann, **ZYGODISCACEAE**

Placozygus fibuliformis (Reinhardt) Hoffmann. Jafar and Rai 1989: 359-360, fig. 27, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Placozygus sigmoides (Bramlette and Sullivan) Romein. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around

Dharampur, Shimla Hills; Jafar and Kapoor 1988: 116, pl. 1, fig. 4, EARLY PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya; Saxena and Misra 1994: 75, fig. 13, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 184, 189, pl. 2, figs 36, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

PODORHABDUS Noël, **PODORHABDACEAE**

Podorhabdus albianus Black. Jafar 1982b: 22, pl. 1, fig. 34, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Podorhabdus grassei Noël emend. Wise and Wind in Wind and Wise. Rai 2003: 286, pl. 1, figs 16A-B, 17A-B, 18, 20, 21A-B; pl. 3, fig. 7, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Podorhabdus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Podorhabdus sp. Rai 2003: 286, pl. 2, figs 2A-B, 3, EARLY CALLOVIAN (MIDDLE JURASSIC) (Chari Formation), Jara Dome, Kutch, western India.

POLYCYCLOLITHUS Forchheimer, **POLYCYCLOLITHACEAE**

? Polycyclolithus sp. Acharyya *et al.* 1986: 4, LATEST CRETACEOUS, Naga Hills Ophiolite, northern Indo-Burmese Range.

POLYPODORHABDUS Noël, **PODORHABDACEAE**

Polypodorhabdus escaigii Noël. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Polypodorhabdus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Polypodorhabdus sp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

PONTOSPHAERA Lohmann, **PONTOSPHAERACEAE**

Pontosphaera alboranensis Lohmann. Guptha 1976: 423, pl. 60, fig. 8, QUATERNARY, Core from Continental slope off Bombay, Arabian Sea.

Pontosphaera enormis (Locker) Perch-Nielsen. Saxena 2000: 163, pl. 1, figs 4-5, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Pontosphaera multipora? (Kamptner) Roth. Singh *et al.* 1998: 96, pl. 2, figs 14-16, UPPER EOCENE (Tarapur Shale Formation), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat.

Pontosphaera aff. pauciforata Kamptner. Guptha 1976: 424, pl. 60, fig. 7, QUATERNARY, Core from continental slope off Bombay, Arabian Sea.

Pontosphaera plana (Bramlette and Sullivan) Haq. Jafar and Kapoor 1988: 116, pl. 1, figs 20a-b, 21, EARLIEST PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya.

Pontosphaera sp. Guptha 1976: 424, pl. 60, fig. 6, QUATERNARY, Core from continental slope off Bombay, Arabian Sea.

Pontosphaera spp. Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment core from southeastern Arabian Sea.

Pontosphaera sp. Singh *et al.* 1998: 96, pl. 2, figs 14-16, UPPER EOCENE (Tarapur Shale Formation), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat.

Pontosphaera sp. Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

PREDISCOSPHAERA Vekshina, **PREDISCOSPHAERACEAE**

Prediscosphaera columnata (Stover) Bukry. Jafar 1982b: 22, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and

Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Prediscosphaera cretacea (Arkhangelsky) Gartner. Jafar 1982b: 22, pl. 1, figs 10-11, 33, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar 1985: 170, fig. 8, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Jafar and Rai 1989: 359-360, figs 2-3, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Singh 1990: 104, pl. 3, figs 1-3, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Saxena and Misra 1994: 75, fig. 14, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin; Saxena and Misra 1995: 324-325, 327, pl. 1, fig. 29, CAMPANIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, fig. 9, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 24, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Prediscosphaera grandis Perch-Nielsen. Jafar and Singh 1992: 41-413, figs 63-64, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN age (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Prediscosphaera ponticula (Bukry) Perch-Nielsen. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Prediscosphaera spinosa (Bramlette and Martini) Gartner. Jafar 1982b: 23, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Prediscosphaera cf. P. spinosa (Bramlette and Martini) Gartner. Jafar and Rai 1989: 359-360, fig. 6, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Prediscosphaera sp. Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 1-2, CAMPANIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section, Manipur, northeast India.

PRINSIOSPHAERA Jafar, **SCHIZOSPHAERELLACEAE**

Prinsiosphaera triassica Jafar. Rai, Upadhyay and Sinha 2004: 776, figs 5d, f, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

PRINSIUS Hay and Mohler, **PRINSIACEAE**

Prinsius bisulcus (Stradner) Hay and Mohler. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar and Kapoor, 1988: 116, pl. 1, figs 9a-c, LATEST PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya; Jafar and Singh 1992: 412-413, fig. 32, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN age (Subathu

Formation), Koshalia-Nala Section, Shimla Himalaya.

Prinsius dimorphosus (Perch-Nielsen) Perch-Nielsen. Saxena and Misra 1995, figs 5-6, 9, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 184, 189, pl. 1, figs 10-11, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Prinsius martini (Perch-Nielsen) Haq. Perch-Nielsen and Saxena 1998: 184, pl. 1, figs 15-17, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Prinsius tenuiculus? (Okada and Thierstein) Perch-Nielsen. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Prinsius sp. Perch-Nielsen and Saxena 1998: 184, pl. 1, figs 1-3, 32-33, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

PROCULITHUS Medd, **CREPIDOLITHACEAE**

Proculithus spp. Jafar and Saxena 1984: 7, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

PYROCYCLUS Hay and Towe, **COCCOLITHACEAE**

Pyrocyclus orangensis? (Bukry) Backman. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 24, pl. 6, figs 17-19, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

QUADRUM Prins and Perch-Nielsen in Manivit *et al.* **POLYCYCLOLITHACEAE**

Quadrum gartneri Prins and Perch-Nielsen in Manivit *et al.* Jafar 1982b: 23, pl. 1, fig. 15, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Saxena and Misra 1995: 324-325, SANTONIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Quadrum gothicum (Deflandre) Prins and Perch-Nielsen. Saxena and Misra 1995: 325, CAMPANIAN-base of MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Singh 1998: 166, pl. 2, figs 41-43, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan; Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 26-27, CAMPANIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section, Manipur, northeast India.

Quadrum nitidum (Martini) Prins and Perch-Nielsen. Jafar 1985: 170, fig. 15, CRETACEOUS. Mud Volcanoes, Baratang Island, Andaman.

Quadrum sissinghii Singh 1998: 166, pl. 2, figs 44-45, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Quadrum trifidum (Stradner) Prins and Perch-Nielsen. Jafar 1985: 170, figs 69-70, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Jafar and Singh 1992: 412-413, figs 39-41, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 29-30, CAMPANIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section, Manipur, northeast India.

Quadrum sp. Singh 1998: 166, pl. 2, figs 46-47, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

Quadrum sp. Kumar and Saxena 1996: 110, pl. 5, figs 19-20, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

RADIOLITHUS Stover, **POLYCYCLOLITHACEAE**

Radiolithus planus Stover. Jafar and Rai 1989: 359-360, figs 22-23, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE

ALBIAN to EARLY-MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Radiolithus? pseudoliasicus Rai 1997: 156, pl. 1II, fig. 4, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Radiolithus sp. Singh 1998: 166, pl. 2, figs 48-49, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan.

REINHARDITES Perch-Nielsen, **ZYGODISCACEAE**

Reinhardites anthophorus (Deflandre) Wise and Wind. Jafar 1985: 171, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Kumar and Saxena 1996: 110, pl. 5, figs 32-33, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 31, SANTONIAN-CAMPANIAN, Kanghui, Hundung South Section, Manipur, north-east India.

RETICAPSA Noël, **PODORHABDACEAE**

Reticapsa sp. 1 Jafar and Rai 1989: 359-360, fig. 39, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Reticapsa sp. 2 Jafar and Rai 1989: 359-360, fig. 60, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

RETICULOFENESTRA Hay, Mohler and Wade, **PRINSIACEAE**

Reticulofenestra bisecta (Hay, Mohler and Wade) Roth. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1980a: 5, pl. 1, figs 18-20, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Jafar, Rai and Vimal 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Saxena 1996: 728, pl. 1, figs 19-20, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Reticulofenestra coenura (Reinhardt) Roth. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Reticulofenestra dictyoda dictyoda (Deflandre in Deflandre and Fert) Stradner in Snadner and Edwards. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat.

Reticulofenestra dictyoda (Deflandre in Deflandre and Fert) Stradner in Snadner and Edwards. Jafar and Singh 1992: 412-413, figs 3, 16, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Reticulofenestra hampdenensis Edwards. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Reticulofenestra haqii Backman. Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Reticulofenestra minuta Roth. Saxena 1996: 728, pl. 1, fig. 7, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Reticulofenestra cf. R. minuta Roth. Jafar and Rai 1994: 35, pl. 2, fig. 4, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 155, pl. 1I, fig. 2, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat.

Reticulofenestra oulchyensis (Bouchè) Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Reticulofenestra placomorpha (Kamptner) Stradner in Haq. Singh *et al.* 1978: 346-347, LATE

EOCENE, near Tarkeshwar Village in a nala, Gujarat.

Reticulofenestra pseudogammation (Bouchè) Aubry. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat.

Reticulofenestra pseudoumbilica (Gartner) Gartner. Wei and Srinivasan 1984: 356, pl. 3, figs 6a-b, MIOCENE, Colebrook Island, Andaman and Nicobar.

Reticulofenestra pseudoumbilicus (Gartner) Gartner. Saxena 1996: 728, pl. 1, figs 4, 54-55, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Tapti, Bandra and Chinchini formations), Bombay, Offshore Well SS-A, Bombay Offshore Basin.

Reticulofenestra reticulata (Gartner and Smith) Roth and Thierstein. Jafar 19B4b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 172, fig. 18, PALAEOCENE, Mud Volcanoes, Baratang Island, Andaman; Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Reticulofenestra scrippsae (Bukry and Percival) Roth. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Reticulofenestra umbilica (Levin) Martini and Ritzkowski. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1980a: 5, pl. 1, figs 1-2, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat; Jafar I984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 172, PALAEOGENE, Mud Volcanoes, Baratang Island, Andaman; Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Singh and Singh 1986: 150, pl. 4, figs 4-5, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 234, pl. 1, figs 16-19, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 25, pl. 6, figs 38-39, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Singh 1998: 166, pl. 2, figs 16-17, BARTONIAN (Bandah Formation), Kharatar Well-C, Jaisalmer, Rajasthan; Singh and Uddin, 2000: 221, MIDDLE-UPPER EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat; Saxena 2000: 163, pl. 1, figs 14, 22, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, Helicosphaera reticulata Zone, Kachchh.

Reticulofenestra sp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Reticulofenestra sp. Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner, Rajasthan.

Reticulofenestra spp. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

Reticulofenestra sp. Singh 1988: 234, pl. 3, figs 24-27, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat.

Reticulofenestra sp. 1 Jafar and Singh 1992: 412-413, fig. 11, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Reticulofenestra sp. 2 Jafar and Singh 1992: 412-413, figs 12-13, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Reticulofenestra sp. 3 Jafar and Singh 1992: 412-413, figs 14-15, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Reticulofenestra sp. Saxena 1996: 728, pl. 1, fig. 14, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Reticulofenestra sp. Singh and Uddin 2000: 221, MIDDLE EOCENE-LOWER MIOCENE (Tarapur Shale, Dadhar and Tarkeshwar formations), Dumas Well-A, Cambay Basin, Gujarat.

Reticulofenestra sp. Singh 1998: 164, BARTONIAN (Bandah Formation), pl. 2, fig. 18, Kharatar Well-C, Jaisalmer, Rajasthan.

Reticulofenestra sp. Singh *et al.* 1998: 96, pl. 1, figs 1-26, MIDDLE-UPPER EOCENE (Kalol and Tarapur Shale formations), Chanasma Wells B and C, Mehsana Block, Cambay Basin, Gujarat.

RHABDOSPHAERA Haeckel, **RHABDOSPHAERACEAE**

Rhabdosphaera clavigera Guptha *et al.* 1995: 567, pl. 2, fig. 10, RECENT, Arabian Sea.

Rhabdosphaera cf. R. gladius Locker. Jafar and Rai 1994: 35, pl. 2, fig. 39, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Rhabdosphaera inflata Bramlette and Sullivan. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 235, pl. 2, figs 14-16, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 27, pl. 8, figs 6-7, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Rhabdosphaera cf. inflata Bramlette and Sullivan. Pant and Mamgain, 1969: 123-124, pl. 22, fig. 8; pl. 24, fig. 5, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat.

Rhabdosphaera morionum (Deflandre) Bramlette and Sullivan. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 27, pl. 8, figs 8-10, 14-15, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Rhabdosphaera perlonga (Deflandre) Bramlette and Sullivan. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 27, pl. 8, figs 16-17, 25-26, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Rhabdosphaera tenuis Bramlette and Sullivan. Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 27, pl. 8, figs 12-13, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Rhabdosphaera sp. Srivastava 1981a: 35, UPPER EOCENE, Upper part of Nummulitic Limestone, Kutch District, Gujarat.

Rhabdosphaera sp. Pant and Mamgain 1969: 123, pl. 22, fig. 7; pl. 24, figs 3-4, 6, MIDDLE EOCENE, Kirthar, about 1.6 km north of Harudi (23°30'30": 68°41'00"), Kutch District, Gujarat.

Rhabdosphaera sp. Srivastava 1981b: 204, text-fig. 11, UPPER EOCENE, Light brown calcareous shale from top of Nummulitic Limestone near Ghour Stream, Kutch District, Gujarat.

RHAGODISCUS Reinhardt, **RHAGODISCACEAE**

Rhagodiscus angustus (Stradner) Reinhardt. Jafar and Rai 1989: 359-360, figs 8, 31, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Rhagodiscus asper (Stradner) Reinhardt. Jafar and Rai 1989: 359-360, figs 15-16, 38, 70-75, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; *Kale et al*. 2000: 216-218, EARLY MID-

DLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Rhagodiscus granulatus Perch-Nielsen. Acharyya *et al.* 1984: 65, LATEST CRETACEOUS, Naga Hills Ophiolite, Northern Indo-Burmese Range; Acharyya *et al.* 1986: 4, pl. 1, fig. 9, LATEST CRETACEOUS, Naga Hills Ophiolite, Luthur, northern Indo-Burmese Range.

Rhagodiscus splendens (Deflandre) Verbeek. Jafar and Rai 1989: 359-360, figs 13-14, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Singh 1990: 104, pl. 3, figs 14-18, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Rhagodiscus sp. Jafar and Rai 1989: 359-360, fig. 9, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

RHOMBOLITHION Black, **STEPHANOLITHIACEAE**

Rhombolithion asymmetricus n. comb. Jafar and Saxena. 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Rhombolithion bifurcatum (Noël) Grün and Zweili. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Rhombolithion sp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

ROTELAPILLUS Noël, **STEPHANOLITHIACEAE**

Rotelapillus aff. R. radians Noël. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

Rotelapillus sp. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

SCAPHOLITHUS Deflandre in Deflandre and Fert, **CALCIOSOLENIACEAE**

Scapholithus fossilis Deflandre. Jafar 1982b: 23, pl. 1, fig. 26, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Scapholithus rhombiformis Hay and Mohler. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat: Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Jafar and Rai 1994: 28, pl. 2, figs 6a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Scapholithus sp. Acharyya *et al.* 1986: 7, pl. 2, fig. 9, LATEST CRETACEOUS, Naga Hills Ophiolite, Wazeho, Northern Indo-Burmese Range.

SCHIZOSPHAERELLA Deflandre and Dangeard, **SCHIZOSPHAERELLACEAE**

Schizosphaerella punctulata Deflandre and Dangeard. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Schizosphaerella sp. Jai Krishna. Singh, Howard and Jafar 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Schizosphaerella sp. Upadhyay *et al.* 2005: 154-155, figs 4, 22A-B, BATHONIAN-CALLOVIAN,

Undifferentiated sedimentaries, Karakoram Himalaya.

SCYPHOSPHAERA Lohmann, **PONTOSPHAERACEAE**

Scyphosphaera amphora Deflandre. Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment core from southeastern Arabian Sea.

Scyphosphaera apsteinii Lohmann. Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment core from southeastern Arabian Sea.

Scyphosphaera globulata Bukry and Percival. Mathur 1980b: 36, pl. 1, figs 23-24, LATE MIOCENE (Round Formation), Neill Domal Structure in the Nipple Hill area, Neill Island, Andaman.

Scyphosphaera lagena Kamptner. Mathur 1980b: 36, pl. 1, figs 25-26, LATE MIOCENE (Round Formation), Neill Domal Structure in the Nipple Hill area, Neill Island, Andaman.

Scyphosphaera prolonga Guptha *et al.* 1995: 565, RECENT SEDIMENTS, Arabian Sea.

Scyphosphaera pulchera Guptha *et al.* 1995: 565 RECENT SEDIMENTS, Arabian Sea.

Scyphosphaera variabilis Guptha *et al.* 1995: 565, RECENT SEDIMENTS, Arabian Sea.

Scyphosphaera spp. Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

SERIBISCUTUM Filewicz *et al.* in Wise and Wind, **BISCUTACEAE**

Seribiscutum primitivum (Thierstein) Filewicz *et al.* in Wise and Wind. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al*. 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

SINGHOSPHAERA Jafar and Saxena nom. nud.

Singhosphaera indica Jafar and Saxena 1984: 76, LATE BATHONIAN (Jumara Formation), Kutch District, Gujarat.

SPHENOLITHUS Deflandre in Grassè, **SPHENOLITHACEAE**

Sphenolithus belemnos Bramlette and Wilcoxon. Saxena 1996: 728, pl. 1, figs 28, 35, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Sphenolithus capricornutus Bukry and Percival. Singh and Singh 1987: 203, MIDDLE EOCENE (Fulra Limestone Formation), Rato nadi Section, Kutch Disrict, Gujarat; Singh and Singh 1991: 27-28, pl. 8, figs 22, 29, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Sphenolithus celsus Haq. Saxena 1996: 728, pl. 1, figs 8, 15, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Sphenolithus conicus Bukry. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Gujarat; Jafar and Singh 1992: 412-413, figs 6-7, EARLY MIOCENE (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Saxena 1996: 728, pl. 1, figs 46-47, EOCENE-EARLY PLEISTOCENE, Bombay (Jafarabad, Belapur, Diu, Mahuva, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Sphenolithus ciperoensis Bramlette & Wilcoxon. Saxena 2000: 163, pl. 1, figs 1-2, PALEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Sphenolithus dissimilis Bukry and Percival. Saxena 1996: 728, pl. 1, fig. 61, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Sphenolithus distentus Martini. Mathur and Mathur 1980: 54, pl. 1, fig. 29, MIDDLE OLIGOCENE-LATE OLIGOCENE (Port Blair For-

mation), Pirthi nala Section, northern part of south Andaman.

Sphenolithus furcatolithoides Locker. Jafar and Rai 1984: 41, MIDDLE EOCENE or BARTONIAN (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 235, pl. 3, fig. 1, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 28, pl. 8, figs 20-21, 27-28, Rato nadi Section, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Kutch, Gujarat; Jafar and Rai 1994: 35-36, pl. 3, figs 10a-b, 11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Sphenolithus heteromorphus Deflandre. Wei and Srinivasan 1984: pl. 2, fig. 1; pl. 4, figs 15a-c, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Saxena 1996: 728, pl. 1, figs 42, 49, 57-60, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh, Srinivasan and Sharma 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Sphenolithus moriformis (Brönnimann and Stradner) Bramlette and Wilcoxon. Wei and Srinivasan 1984: 356-357, pl. 2, fig. 4; pl. 4, fig. 16, MIOCENE, Colebrook Island, North Passage Island, Great Nicobar Island, Andaman and Nicobar; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat: Singh 1988: 235, pl. 3, figs 2-5, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 28, pl. 9, figs 5-8, 10-11, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Saxena 1996: 728, pl. 1, figs 50-51, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Sphenolithus obtusus Bukry. Singh and Singh 1991: 28, pl. 9, figs 17, 19-22, 26-27, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Singh and Uddin, 2000: 221, MIDDLE-UPPER EOCENE (Tarapur Shale Formation), Dumas Well-A, Cambay Basin, Gujarat.

Sphenolithus predistentus Bramlette and Wilcoxon. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 36, pl. 3, figs 12a-b, 13-14, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Saxena 1996: 728, pl. 1, figs 36-37, 40-41, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Rai 2002: 153, RUPELIAN, Maniara Fort Formation, NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Sphenolithus pseudoradians Bamlette and Wilcoxon. Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 28, pl. 9, figs 3-4, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat.

Sphenolithus radians Deflandre in Grassè. Singh and Singh 1986: 152, pl. 4, figs 24-26, MIDDLE EOCENE (Fulra Limestone Formation), Babia Hill, Kutch District, Gujarat; Singh 1988: 235, pl. 3, figs 15-16, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Jafar and Singh 1992: 412-413, figs 23-27, LATE YPRESIAN (Subathu Formation), Koshalia-nala Section, Shimla Himalaya.

Sphenolithus spiniger Bukry. Jafar and Rai. 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi and Fulra Limestone for-

mations), Rato nadi Section, Kutch District, Gujarat; Singh 1988: 235, pl. 3, figs 17-23, LATE 51; MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat; Singh and Singh 1991: 28, pl. 9, figs 12-14, 15-16, Rato nadi Section (Harudi and Fulra Limestone formations), LATE MIDDLE EOCENE or BARTONIAN, Kutch, Gujarat; Jafar and Rai 1994: 36, pl. 3, figs 15-16, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin; Saxena 2000: 163, pl. 1, figs 3, 11-12, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Sphenolithus tribulosus Roth. Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Sphenolithus sp. Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman.

?Sphenolithus sp. Pant and Mathur 1984: 42, LOWER EOCENE, Fuller's Earth deposits of Indo Ka Bala in Kolayat Taluka, Bikaner, Rajasthan.

Sphenolithus sp. Jafar 1985: 172, PALAEOGENE, Mud Volcanoes, Baratang Island, Andaman.

Sphenolithus spp. Saxena 1986: MIDDLE MIOCENE, Bassein area, Bombay Offshore.

Sphenolithus sp. Jafar and Kapoor 1988: 116, pl. 1, figs 22a-b, LATE DANIAN, Basal Subathu of Dharampur, Shimla Himalaya.

Sphenolithus sp. 1 Jafar and Singh 1992: 412-413, fig. 28, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Sphenolithus sp. 2 Jafar and Singh 1992: 412-413, figs 29-30, LATE YPRESIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya.

Sphenolithus sp. Saxena 1996: 728, pl. 1, figs 26-27, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

Sphenolithus sp. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

STAUROLITHITES Caratini, **AHMUELLERELLACEAE**

Staurolithites laffittei Cartini. Saxena and Misra 1995: 324-325, 327, pl. 1, figs 16-17, 35, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, fig. 16, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Staurolithites sp. Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya.

Staurolithites sp. Sinha and Dmitrenko. 1983: 254, pl. 1, fig. 11, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya.

STAURORHABDUS Noël. **AHMUELLERELLACEAE**

Staurorhabdus quadriarcullus (Noël) Noël. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

STEPHANOLITHION Deflandre, **STEPHANOLITHIACEAE**

Stephanolithion bigoti Deflandre. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

Stephanolithion bigotii Deflandre. Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

Stephanolithion bigotii ssp. Deflandre **bigotii** Rood and Barnard. Rai 2003: 290, pl. 2, figs 10, 11A-B, 16, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Stephanolithion bigotii ssp. Deflandre **maximum** Rood and Barnard. Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Stephanolithion hexum Rood and Barnard. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat; Jafar and Saxena 1984: 76, MIDDLE

JURASSIC (Jumara Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Rai 2003: 290, pl. 2, figs 12, 15, 18, 20A-B, 21, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India; Rai, *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Stephanolithion octum (Rood and Barnard) Perch-Nielsen. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat; Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), District, Gujarat; Singh 1988: 235, pl. 3, figs 15-16, LATE MIDDLE EOCENE (Fulra Limestone Formation), Berwali River Section, Kutch District, Gujarat.

Stephanolithion speciosum Deflandre and Fert **ssp. octum** Rood and Barnard. Rai 2003: 286, pl. 2, fig. 17, EARLY CALLOVIAN (MIDDLE JURASSIC), Jara Dome (Chari Formation), Kutch, western India.

Stephanolithion speciosum Deflandre and Fert **ssp. speciosum**. Rood and Barnard. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Rai 2003: 290, pl. 2, fig. 19, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Stephanolithion speciosum Deflandre and Fert. Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Stephanolithion sp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

STOVERIUS Perch-Nielsen, **STEPHANOLITHIACEAE**

Stoverius achylosus (Stover) Perch-Nielsen. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

Stoverius baldiae (Stradner and Adamiker) Perch-Nielsen. Jafar and Rai 1989: 359-360, figs 4-5, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

STRADNERIA Reinhardt, **RETICAPSOIDEAE**

Stradneria crenulata (Bramlette and Martini) Noël. Jafar and Rai 1989: 359-360, figs 36-37, 58, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Jafar and Singh 1992: 412-413, figs 66-68, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Saxena and Misra 1994: 75, figs 20-21, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin; Kumar and Saxena 1996: 110, pl. 5, fig. 25, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin; Perch-Nielsen and Saxena 1998: 189, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

STRADNERLITHUS Black, **STEPHANOLITHIACEAE**

Stradnerlithus comptus Black. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Stradnerlithus hexaporus Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Stradnerlithus octoporus n. comb. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Stradnerlithus octoradiatus Medd. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Stradnerlithus tortuosus Noël Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

STRIATOCOCCUS Prins, Nomen nudum, **ELLIPSAGELOSPHAERACEAE**

Striatococcus cf. S. nebulosus Prins. Jafar and Saxena, 1984: 16, LATE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Striatococcus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

SYRACOSPHAERA Lohmann, **PONTOSPHAERACEAE**

Syracosphaera labrosa Bukry and Bramlette. Mathur and Mathur 1980: 54, pl. 1, fig. 30, UPPER MIDDLE EOCENE-OLIGOCENE (Port Blair Formation), Pirthi nala Section, northern part of south Andaman; Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat.

Syracosphaera pulchra Lohmann. Guptha 1976: 424, pl. 60, fig. 9, QUATERNARY, Core from continental slope off Bombay, Arabian Sea.

TEGUMENTUM Thierstein in Roth and Thierstein, **CHIASTOZYGACEAE**

Tegumentum stradneri Thierstein in Roth and Thierstein. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

TERGESTIELLA Kamptner, **ELLIPSAGELOSPHAERACEAE**

Tergestiella margereli (Noël) Reins. Sinha 1975: 72, pl. 2, figs 1-3, UPPER JURASSIC-CRETACEOUS, Krol B Horizon, Krol Series, Shimla, Lesser Himalaya.

TETRALITHUS Gardet, **NANNOPROBLEMATICA**

Tetralithus cassianus Jafar. Rai *et al.* 2003: 53, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya; Rai *et al.* 2004: 776, fig. 5h, LATE TRIASSIC or NORIAN-RHAETIAN, Lamayuru Complex, Neo-Tethyan sediments, Indus-Tsangpo Suture Zone, Ladakh Himalaya.

TETRAPODORHABDUS Black, **PODORHABDACEAE**

Tetrapodorhabdus decorus (Deflandre in Deflandre and Fert) Wind and Wise in Wise and Wind. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu.

THORACOSPHAERA Schiller, **THORACOSPHAERACEAE**

Thoracosphaera deflandrei Kamptner. Jafar and Singh 1992: 412-413, fig. 43, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Thoracosphaera heimi (Lohmann) Kamptner. Guptha 1976: 424, pl. 60, fig. 10, QUATERNARY, Core from continental slope off Bombay, Arabian Sea; Guptha 1979b: 115, UPPER PLEISTOCENE, Deep Sea Sediment Core from southeastern Arabian Sea; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman.

Thoracosphaera operculata Bramlette and Martini. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, figs 1-2, LATE PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 170, fig. 24, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Jafar and Kapoor 1988: 116, pl. 1, fig. 13, EARLIEST PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya; Saxena and Misra 1995: 325, MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation),

Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

Thoracosphaera cf. T. operculata Bramlette and Martini. Acharyya *et al.* 1986: 7, pl. 2, fig. 11, LATEST CRETACEOUS, Naga Hills Ophiolite, Luthur, Northern Indo-Burmese Range; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Thoracosphaera saxea Stradner. Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 170, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman: Jafar and Kapoor 1988: 116, pl. 1, fig. 12, LATE PALAEOCENE, Basal Subathu of Dharampur, Shimla Himalaya; Jafar and Singh 1992: 412-413, fig. 42, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Singh *et al.* 2000: 347, EARLY NEOGENE, John Lawrence Island, Andaman; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Thoracosphaera cf. Th. saxea Stradner. Pant and Mamgain 1969: 122-123, pl. 25, figs 1, 8, 12, 17; pl. 26, figs 10-15, CENOMANIAN, Uttatur Group, EOCENE-OLIGOCENE, Nari, about 1 km east of Kalpadi (11°11'30": 78°55'00"), Tiruchiraplli District, Madras, about 3 km S 70° W of Dedhapur (23°46'00": 68°42'30") Kutch District, Gujarat, Lakhpat Fort (23°49'30": 68°27'00") Kutch District, Gujarat, about 1.6 km south of Khari (23°41'30": 68°28'00"), Kutch District, Gujarat; Jafar and Rai 1994: 36, pl. 3, fig. 7, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Thoracosphaera spinosa Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

Thoracosphaera tarapurensis Datta and Singh 1976: pl. 2, figs 2-10, 12-13; pl. 3, fig. 3, LATE EARLY PLIOCENE, Subsurface Formation, NN14 Bombay Offshore region.

Thoracosphaera cf. Th. tuberosa Jafar and Rai 1994: 36, pl. 3, fig. 6, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat.

Thoracosphaera sp. Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat.

Thoracosphaera sp. Singh 1980a: 6, pl. 3, figs 1, 3, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat.

Thoracosphaera sp. Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya.

Thoracosphaera sp. Sinha and Dmitrenko 1983: 255, pl. 2, fig. 5, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya.

Thoracosphaera spp. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat.

Thoracosphaera sp. Jafar 1985: 170, fig. 23, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman.

Thoracosphaera sp. Perch-Nielsen and Saxena 1998: 189, DANIAN, PLK-A Well, Krishna-Godavari Basin, southern India.

Thoracosphaera spp. Jafar *et al.* 1985: 47, LATEST EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Gujarat.

Thoracosphaera sp. I Acharyya *et al.* 1986: 7, pl. 2, fig. 10, MAASTRICHTIAN, Naga Hills Ophiolite, Phokphur, Northern Indo-Burmese Range.

Thoracosphaera sp. II Acharyya *et al.* 1986: 7, pl. 2, fig. 12, LATEST CRETACEOUS, Naga Hill Ophiolite, Luthur, Indo-Burmese Range.

Thoracosphaera sp. 1 Rai 2003: 286, pl. 2, figs 4A-B, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Thoracosphaera sp. 2 Rai 2003: 286, pl. 2, fig. 13, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Thoracosphaera sp. 3 Rai 2003: 286, pl. 2, fig. 14, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Thoracosphaera sp. Saxena and Misra 1994: 75, figs 25-26, DANIAN, Supratrappean sediments, Razole area, Krishna-Godavari Basin

TOWEIUS Hay and Mohler, **PRINSIACEAE**

Toweius eminens (Bramlette and Sullivan) Perch-Nielsen. Jafar 1984b: 42-43, CAMPANIAN-DANIAN, Mud Volcanoes, Baratang Island, Andaman; Jafar 1985: 172, fig. 20, PALAEOGENE, Mud Volcanoes, Baratang Island, Andaman.

Toweius gammation (Bramlette and Sullivan) Romein. Saxena 1996: 728, pl. 1, fig. 13, EOCENE-EARLY PLEISTOCENE (Jafarabad, Belapur, Diu, Mahuva, Bombay, Tapti, Bandra and Chinchini formations), Offshore Well SS-A, Bombay Offshore Basin.

TRANOLITHUS Stover, **ZYGODISCACEAE**

Tranolithus exiguus Stover. Jafar 1982b: 23, pl. 1, figs 19, 29-30, LATE CRETACEOUS (Nimar Formation), chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kumar and Saxena 1996: 110, pl. 5, figs 3-5, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Tranolithus gabalus Stover. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kumar and Saxena 1996: 110, pl. 5, figs 1-2, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Tranolithus manifestus Stover. Kumar and Saxena 1996: 110, pl. 5, fig. 8, LATE SANTONIAN-EARLY CAMPANIAN (Chintalapalli Shale Formation), Kaikalur Well-A, Krishna-Godavari Basin.

Tranolithus phacelosus Stover. Kale and Phansalkar 1992: 86, pl. 1, fig. 21, pl. 2, figs 14-15, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Tranolithus orionatus (Reinhardt) Perch-Nielsen. Jafar 1982b: 23, pl. 1, figs 20-21, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India.

TRIBRACHIATUS Shamrai, **DISCOASTERACEAE**

Tribrachiatus contortus (Stradner) Bukry. Saxena 2000: 163, pl. 1, fig. 16, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

Tribrachiatus orthostylus Shamrai, Saxena 2000: 163, pl. 1, figs 8-9, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

TRIQUETRORHABDULUS Martini, **TRIQUETRORHABDULACEAE**

Triquetrorhabdulus carinatus Martini. Mathur and Mathur 1980: 54, pl. 1, fig. 28, LATE OLIGOCENE-LOWERMOST MIOCENE (Port Blair Formation), Pirthi nala Section, northern part of south Andaman; Rai 2002: 153, RUPELIAN, Maniara Fort Formation, NP 22-23, *Helicosphaera reticulata* Zone, Kachchh.

Triquetrorhabdulus inversus Bukry and Bramlette. Singh *et al.* 1978: 346-347, LATE EOCENE, near Tarkeshwar Village in a nala, Gujarat; Singh 1978a: 87-88, LATE MIDDLE EOCENE, Lakhpat, Kutch District, Gujarat; Singh 1980a: 10, pl. 3, figs 2, 4-5, LATE MIDDLE EOCENE (Fulra Limestone Formation), Lakhpat, Kutch District, Gujarat.

TRISCUTUM Dockerill, **MAZAGANELLACEAE**

Triscutum beaminsterensis Dockerill. Rai 2003: 286, pl. 2, fig. 12, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

TROCHOASTER Klumpp, **LITHOSTROMATIONACEAE**

Trochoaster simplex? Klumpp. Mathur 1980b: 36, pl. 1, fig. 22, LATE MIOCENE (Round Formation), Neill Domal structure in the Nipple Hill area, Neill Island, Andaman.

TRUNCATOSCAPHUS Rood, Bernard and Hay, **STEPHANOLITHIACEAE**

Truncatoscaphus senarius (Wind and Wise in Wise and Wind) Perch-Nielsen. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

TUBIRHABDUS Prins ex Rood, Hay and Barnard, **AHMUELLERELLACEAE**

Tubirhabdus patulus Prins ex Rood, Barnard and Hay. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

Tubirhabdus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Tubirhabdus sp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

UMBELLOSPHAERA Paasche in Markali and Paasche, **INCERTAE SEDIS**

Umbellosphaera irregularis Paasche. Guptha 1976: 424-425, pl. 60, fig. 11, QUATERNARY, Core from continental slope off Bombay, Arabian Sea; Guptha *et al.* 1995: 565, pl. 1, figs 10-12, RECENT SEDIMENTS, Arabian Sea.

Umbellosphaera tenuis Kamptner. Gupta 1976: 42, QUATERNARY, Core from continental slope off Bombay, Arabian Sea; Guptha *et al.* 1995: 565, pl. 1, figs 10-12, RECENT SEDIMENTS, Arabian Sea.

UMBLICOSPHAERA Lohmann, **COCCOLITHACEAE**

Umblicosphaera mirabilis Lohmann. Guptha 1976: 425, pl. 60, fig. 12, QUATERNARY, Core from continental slope off Bombay, Arabian Sea.

VAGALAPILLA Bukry, **AHMUELLERELLACEAE**

Vagalapilla matalosa (Stover) Thierstein. Jafar 1982b: 23, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Vagalapilla gausorhethium Hill. Jafar and Rai 1989: 359-360, figs 20, 48-51, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

VEKSHINELLA Loeblich and Tappan, **AHMUELLERELLACEAE**

Vekshinella stradneri Rood, Barnard and Hay. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

WATZNAUERIA Reinhardt, **ELLIPSAGELOSPHAERACEAE**

Watznaueria barnesae (Black) Perch-Nielsen. Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya; Jafar 1982b: 23, pl. 1, figs 1, 5-7, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Sinha and Dmitrenko 1983: 254, pl. 1, figs 1-3, 7, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya; Jafar and Kapoor 1984: 42, LATEST CRETACEOUS (Subathu Formation), around Dharampur, Shimla Hills; Jafar 1985: 170, fig. 9, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Jafar and Kapoor 1988: 116, pl. 1, figs 35-41, LATEST CRETACEOUS or LATE ALBIAN (Dalmiapuram Forma-

tion), Grey Shale Member, Cauvery Basin; Jafar and Rai 1989: 359-360, figs 40, 65, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Singh 1990: 103, pl. 2, figs 3-4, Thanjavur Well-A, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur area, Cauvery Basin; Jafar and Singh 1992: 412-413, figs 71-74, reworked nannofossils of LATE MAASTRICHTIAN-DANIAN (Subathu Formation), Koshalia-Nala Section, Shimla Himalaya; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Saxena and Misra 1994: 75, fig. 22, LATE MAASTRICHTIAN, Infratrappean sediments, Razole area, Krishna-Godavari Basin; Saxena and Misra 1995: 325, SANTONIAN-MAASTRICHTIAN (Narsapur Claystone Formation), Krishna-Godavari Basin; Singh 1998: 166, pl. 2, figs 50-53, Sanu Formation, PALAEOCENE, Kharatar Well-C, Jaisalmer, Rajasthan; Chungkham and Jafar 1998: 71-72, 80, pl. 4, fig. 32, SANTONIAN-MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, north-east India; Perch-Nielsen and Saxena 1998: 184, pl. 2, figs 41-42, 51, 59, MAASTRICHTIAN, PLK-A Well, Krishna-Godavari Basin, southern India; Kale *et al.*: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu; Rai 2003: 286, pl. 1, figs 5A-B, pl. 3, fig. 3, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India; Upadhyay *et al.* 2005: 154-155, figs 4, 7, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Watznaueria bayacki Jafar and Saxena 1984: 76. MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Watznaueria biporta Bukry. Sinha and Dmitrenko 1980: 33, UPPER CRETACEOUS, Flysch sediments of Malla Johar, Tethyan Zone of Kumayun Himalaya: Sinha and Dmitrenko 1983: 254, pl. 1, fig. 6; 255, pl. 2, fig. 11, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya; Jafar and Rai 1989: 359-360, fig. 64, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Upadhyay *et al.* 2005: 154-155, figs 4, 1A-B, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Watznaueria britannica (Stradner) Reinhardt. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Rai 2003: 286, pl. 1, figs 2-4, pl. 3, fig. 10, EARLY CALLOVIAN, Jara Dome (Chari Formation), Kutch, western India; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India; Upadhyay *et al.* 2005: 154-155, figs 4, 19A-B, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya; Rai 2005: 72-73, BATHONIAN-OXFORDIAN, Indian Subcontinent.

Watznaueria communis Reinhardt. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Upadhyay *et al.* 2005: 154-155, figs 4, 9, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Watznaueria fossacincta (Black) Bown in Bown and Cooper. Rai 2003: 286, pl. 3, fig. 4, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Upadhyay *et al.* 2005: 154-155, figs 4, 2A-B, 5A-B, 12A-B, 13, 14A-B, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Watznaueria leucasii Noël. Rai 2003: 286, pl. 3, fig. 6, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Watznaueria manivitae Bukry. Rai 2003: 286, pl. 1, figs 1A-B, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Upadhyay *et al.* 2005: 154-155, figs 4, 3A-B, 8, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Watznaueria ovata Bukry. Jafar 1982b: 23, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Rai 2003: 286, pl. 3, fig. 1, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai 2003: 110, MIDDLE ALBIAN (Umia Formation), Bhuj Member, Roadside opposite Jakh Temple, Kutch, western India; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Watznaueria strigosa Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Watznaueria sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Watznaueria sp. Sinha and Dmitrenko 1983: 254, pl. I, figs 4-5; pl. 2, figs 6, 13, UPPER CRETACEOUS (Sangchamalla Formation), Flysch, Malla Johar, Tethyan Himalaya.

Watznaueria spp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Watznaueria sp. Jafar and Rai 1989: 359-360, fig. 63, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Watznaueria sp. Upadhyay *et al.* 2005: 154-155, figs 4, 15, BATHONIAN-CALLOVIAN, Undifferentiated sedimentaries, Karakoram Himalaya.

Watznaueria sp. 1 Rai 2003: 286, pl. 2, fig. 5, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Watznaueria sp. 2 Rai 2003: 286, pl. 3, fig. 2, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India.

Watznaueria spp. Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

WISEORHABDUS Bukry, **TRIQUETRORHABDULACEAE**

Wiseorhabdus inversus Bukry. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar and Rai 1994: 36, pl. 3, figs 5a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Rai 1997: 156, pl. 3, fig. 9, LATE MIDDLE EOCENE or BARTONIAN (Harudi Formation), Rato nadi Section, Kutch District, Gujarat.

ZEUGRHABDOTUS Reinhardt, **ZYGODISCACEAE**

Zeugrhabdotus acanthus Reinhardt. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Zeugrhabdotus embergeri (Noël) Perch-Nielsen. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Jafar and Rai 1989: 359-360, figs 10-11, 56-57, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin; Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations),

Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Zeugrhabdotus erectus (Deflandre) Reinhardt. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat; Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat; Rai 2003: 286, pl. 2, fig. 6A-B, EARLY CALLOVIAN (Chari Formation), Jara Dome, Kutch, western India; Rai *et al.* 2005: 40, LATE CALLOVIAN (Chari Formation), Nongypsiferous Shales, Jara Dome, Kutch.

Zeugrhabdotus noeliae? Rood, Hay and Barnard. Singh 1987: 211, MIDDLE-LATE JURASSIC, Subsurface of Banni Raan, Kutch District, Gujarat.

Zeugrhabdotus sallilum (Noël) Rood, Barnard and Hay. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

Zeugrhabdotus theta (Black in Black and Barnes) Black. Kale and Phansalkar 1992: 86, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse, Trichinopoly District, Tamil Nadu; Kale *et al.* 2000: 216-218, EARLY MIDDLE ALBIAN to EARLY MIDDLE TURONIAN, Uttatur Group (Dalmiapuram Grey Shale and Dalmiapuram Reefoidal Limestone formations), Terani (Mines) to Garudamangalam Traverse and Karai to Kulkalnattum Traverse and Kallakuddi quarry, Trichinopoly District, Tamil Nadu.

Zeugrhabdotus sp. Jai Krishna *et al.* 1983: 792, MIDDLE JURASSIC (Lowermost Chari Formation), Kutch District, Gujarat.

Zeugrhabdotus spp. Jafar and Saxena 1984: 76, MIDDLE JURASSIC (Jumara Formation), Kutch District, Gujarat.

ZYGODISCUS Bramlette and Sullivan, **ZYGODISCACEAE**

Zygodiscus crux (Deflandre and Fert) Noël. Singh 1990: 105, pl. 3, figs 8, 10, 12-13, 20-22, 24, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin.

Zygodiscus deflandrei Bukry. Jafar and Kapoor 1984: 42, LATEST CRETACEOUS (Subathu Formation), around Dharampur, Shimla Hills.

Zygodiscus diplogrammus (Deflandre and Fert) Gartner. Jafar 1982b: 23, pl. 1, fig. 28, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar 1985: 171, CRETACEOUS, Mud Volcanoes, Baratang Island, Andaman; Chungkham and Jafar 1998: 80, pl. 4, fig. 33, CAMPANIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section, Manipur, northeast India.

Zygodiscus plectopons Bramlette and Sullivan. Singh and Singh 1987: 203, MIDDLE EOCENE (Fulra Limestone Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 29, pl. 9, figs 24-25, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Kutch, Gujarat.

Zygodiscus ponticulus (Deflandre) Reinhardt. Singh 1990: 100, pl. 1, figs 1-2, LATE CRETACEOUS or CAMPANIAN-MAASTRICHTIAN, Thanjavur Well-A, Thanjavur area, Cauvery Basin.

Zygodiscus spiralis Bramlette and Martini. Jafar 1982b: 23-24, pl. 1, fig. 3, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley; Jafar and Kapoor 1984: 42, LOWER PALAEOCENE (Subathu Formation), around Dharampur, Shimla Hills; Acharyya *et al.* 1984: 65, LATEST CRETACEOUS, Naga Hills Ophiolite, Northern Indo-Burmese Range; Jafar and Kapoor 1988: 116, pl. 1, fig. 17, LATEST CRETACEOUS, Basal Subathu of Dharampur, Shimla Himalaya; Chungkham and Jafar 1998: 71-72, 80, pl. 4, figs 34-35, CAMPANIAN and MAASTRICHTIAN, Kanghui, Hundung North Upper and Lower Band, Hundung South Section and Mova Section, Manipur, northeast India.

Zygodiscus? spiralis Bramlette and Martini. Acharyya *et al.* 1986: 4, pl. 1, figs 3, 12, LATEST CRETACEOUS, Naga Hills Ophiolite, Luthur, Northern Indo-Burmese Range.

Zygodiscus xenotus (Stover) Hill. Jafar 1982b: 24, pl. 1, fig. 22, LATE CRETACEOUS (Nimar Formation), Chikli and Sitapuri, Narmada Valley.

Zygodiscus sp. 1 Jafar and Rai 1989: 359-360, fig. 28, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

Zygodiscus sp. 2 Jafar and Rai 1989: 359-360, fig. 29, LATE ALBIAN (Dalmiapuram Formation), Grey Shale Member, Cauvery Basin.

ZYGOLITHUS Kamptner ex Matthes. **ZYGODISCACEAE**

Zygolithus concinnus Martini. Jain *et al.* 1981: 17, UPPER PALAEOCENE, Borehole about 100 m deep, Vriddhachalam-Pallakolai Road in Gopurapuram Village, Cauvery Basin; Jain *et al.* 1983: 71, pl. 1, figs 5-6, UPPER PALAEOCENE, 240 m deep borehole, Gopurapuram Village, NE Vriddhachalam, Cauvery Basin; Sinha 1975: 72, pl. 1, fig. 1, CRETACEOUS, Krol B Horizon, Krol Series, Shimla area, Lesser Himalaya.

Zygolithus erectus Deflandre. Singh 1977: 331-332, pl. 1, fig. 1, LATE JURASSIC, Banni Raan, 13 Miles SW of the Godpur Village, Kutch District, Gujarat.

Zygolithus junctus Bramlette and Sullivan. Narasimhan 1974-75: 208, CRETACEOUS-TERTIARY, Pondicherry, south India.

Zygolithus penticulus? Chattopadhyay *et al.* 1983: 94, LATEST CRETACEOUS, Red cherts from Wazeho area, Naga Hills.

Zygolithus protenus Bramlette and Sullivan. Narasimhan 1974-75: 208, CRETACEOUS-TERTIARY, Pondicherry, south India.

Zygolithus sp. Sinha 1975: 72, pl. 3, fig. 2, CRETACEOUS, Krol B Horizon, Krol Series, Shimla area, Lesser Himalaya.

Zygolithus sp. indet Noël. Singh 1977: 332, pl. 1, fig. 7, OXFORDIAN, Subsurface of Banni Rann, 13 miles SW of the Godpur Village, Kutch District, Gujarat.

Zygolithus sp. Acharyya *et al.* 1986: 4, LATEST CRETACEOUS, Naga Hills Ophiolite, Northern Indo-Burmese Range.

ZYGRHABLITHUS Deflandre, **CALYPTROSPHAERACEAE**

Zygrhablithus bijugatus (Deflandre in Deflandre and Fert) Deflandre. Jafar and Rai 1984: 41, MIDDLE EOCENE (Harudi Formation), Babia Stage, Berwali Series, Ratchelo nala Section, Kutch District, Gujarat; Jafar *et al.* 1985: 47, LATE EOCENE, Tapti Series, Pellatispira beds, Ghalha nala and Kusumba Tal, Tarkeshwar Town, Surat, Gujarat; Singh and Singh 1987: 203, MIDDLE EOCENE (Harudi Formation), Rato nadi Section, Kutch District, Gujarat; Singh and Singh 1991: 22, pl. 5, figs 25-26, 29-30, 36-37, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch, Gujarat; Jafar and Rai 1994: 30, pl. 3, figs 33, 35, 36a-b, 38a-b, 39a-b, 40, 41a-b, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nala Section, southwestern Kutch, Gujarat; Saxena 1996: 728, EOCENE-EARLY PLEISTOCENE (Tapti, Bandra and Chinchini formations), Jafarabad, Belapur, Diu, Mahuva, Bombay, Offshore Well SS-A, Bombay Offshore Basin; Rai 1997: 151, pl. 2 figs 13-14; pl. 4, fig. 16, LATE MIDDLE EOCENE or BARTONIAN (Harudi and Fulra Limestone formations), Rato nadi Section, Kutch District, Gujarat; Singh 1998: 166, pl. 2, figs 20-21, PALAEOCENE (Sanu Formation), Kharatar Well-C, Jaisalmer, Rajasthan; Rai 2002: 153, RUPELIAN (Maniara Fort Formation), NP 22-23, *Helicosphaera reticulata* Zone, Kachchh; Saxena 2000: 163, pl. 1, fig. 13, PALAEOGENE (Razole, Palakollu, Pasarlapudi and Vadaparru formations), Krishna-Godavari Basin.

?Zygrhablithus intercisus (Deflandre) Deflandre. Chattopadhyay *et al.* 1983: photograph 27 (1), LATEST CRETACEOUS, Pukhpur, Nagaland; Acharyya, *et al.* 1986: 4, LATEST CRETACEOUS (Naga Hills Ophiolite), Northern Indo-Burmese Range.

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Calcareous nannofossils, the tiniest marine algal group include coccoliths and related genera called nannoliths. The calcareous dinoflagellates are often found intimately associated with them. The study of this rare microfossil group which has an applied usage in precise dating of marine sediments of oil bearing horizons is least covered in India. Nannofossils are known to occur from Late Triassic to present day oceanic realm. Records of these are scattered in various scientific journals and need for a catalogue was felt and this catalogue is a sequel to an earlier catalogue (Rai, 1991).

In this catalogue all published calcareous nannofossil records from various basins of India are incorporated with their taxonomic citations. The catalogue contains 180 genera and 644 species including calcareous dinoflagellate genus *Thoracosphaera*.

The present catalogue will help in deducing vertical and horizontal distribution of each nannotaxa, provide occurrences of each nannotaxa in different basins and speak about nannofossil bearing horizons in India. This will be of special help to Oil companies making drilling operations in India.