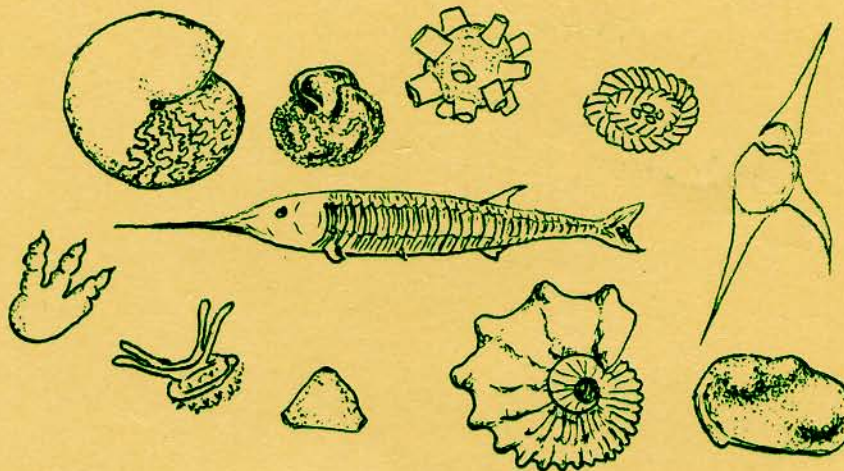


STRATIGRAPHIC RANGE OF CRETACEOUS MEGA- AND MICROFOSSILS OF BRAZIL

Edited by

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3.6. The Potiguar Basin

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CN= Calcareous nannofossils;
 F= Foraminifers; FI= Fishes; I= Invertebrates; P= Palynomorphs;
 PR= Plant remains; TF= Trace fossils

Characterization of the onshore part of the basin

The Potiguar Basin is situated in the Northeastern state of Rio Grande do Norte at the Equatorial Margin (Fig. 1). The onshore part has about 21,500km², but the major basin extension is offshore.

Among the many papers discussing the stratigraphic evolution of the basin, the comprehensive approach by Schaller and Sampaio in the late sixties (51) and by Souza (56), may be referred.

The sedimentary infill of the basin comprises sediments of the Continental, Transitional-Gulf and Marine supersequences. Only the latter crops out, whereas the sediments of the former two are known only from subsurface information.

The continental sediments of the Rift Sequence are composed of conglomerates, sandstones, siltstones and shales namely Pendência Formation (56). The microfloral and ostracod assemblages indicate a Rio da Serra through Aratu age (43).

The Pendência Formation is overlain by the fluvial and lacustrine sandstones of the Alagamar Formation of Alagoas age. These sediments constitute the transitional facies of the Transitional-Gulf Supersequence and may be correlated with the Evaporitic Sequence on the Eastern marginal basins. The upper contact with the sediments of the Marine Supersequence is unconformable.

The Cretaceous part of the Marine Supersequence is represented by the transgressive Açú and Jandaíra formations. The former was deposited in a deltaic environment during the Narrow Ocean Stage, and is Albian through Turonian in age (13, 56). It is composed of sands which distally grades into shales. Despite the different depositional environment, the unit may be correlated with the Angicos Member in the Sergipe-Alagoas Basin.

The Jandaíra Formation is built up of a thick carbonate sequence deposited in tidal flats, lagoons and shallow shelf environments (60). In the area of the Governador Dix-Sept Rosado city evaporitic beds interrupt the carbonate sequence (41). The evaporites and associated sedimentary structures like dissection cracks and hardgrounds, as well as the occurrence of the freshwater conchostracean *Estheria*, indicate a low sea-level event. The resulting unconformity characterizes the Turonian-Coniacian boundary, as suggested by paleontological evidences (6).

The Rio da Serra-Alagoas fossil assemblages

The knowledge of the Early Cretaceous nonmarine fossil assemblages is far to be complete, and only the microfossil assemblages are partly known. In a general way, assemblages are poor and their occurrence is restricted to shaly beds.

The palynomorph record of the Pendência Formation comes from dark shales rich on organic material. Rimulate pollen grains dominate the assemblage. Simple trilete spores genera as *Cicatricosisporites*, *Psilatriteles* and *Concavisporites* occur subordinate. Less common are dissacates represented by the genus *Vitreisporites*. *Dicheiropollis etruscus* occurs regularly but with low frequency.

The ostracod assemblages occur in isolated shaly layers. They exhibit low diversity, but high dominance. The Pendência Formation is characterized by species of the genus *Cypridea* (*Morininoides*) in its lower part of Rio da Serra age, whereas the upper part, Aratu in age, exhibits a monofauna of *Paracypridea elegans elegans* (U.M.Praça, verbal information).

The sediments of the transitional Alagamar Formation of Alagoas age, are characterized by the sporadic occurrence of ostracod species of the genera *Cytheridea* and *Hourcgia* (U.M.Praça, oral commun.). Among the palynomorphs, rimulate pollen grains with subordinate trilete spores continue to prevail. Tricolpate pollen grains appear for the first time in the Late Alagoas upper part of the formation.

(Late Early ?) Albian-Maastrichtian fossil assemblages

During Albian-Maastrichtian times the sediments of the Açú and Jandaíra formations of the Marine Supersequence were deposited. Their fossil assemblages exhibit a characteristic relative high dominance and low diversity, as a response to the paralic-shallow shelf depositional environment which prevailed on the onshore portion during most of the time. Concerning the invertebrate assemblages, diversity increases (with decreasing dominance) during Turonian times, from the Açú Formation up to the lower part of the Jandaíra Formation; the younger levels over again are characterized by relative high dominance and low diversity.

The fossil assemblages of this basin, together with those of the Sergipe-Alagoas Basin, are the most representative of the Brazilian marine Cretaceous. Notwithstanding their remarkable fossil abundance, the two basins differ considerably with respect to the specific composition, diversity and dominance.

Palynomorphs, calcareous nannofossils, and foraminifers, as well as molluscs (mainly bivalves, prosobranchiate gastropods, and rare cephalopods) and regular echinoids are among the best studied groups.

The invertebrate assemblages have been described mainly by Maury (31) and Beurlen, K. (5). Five main assemblages, Turonian through Maastrichtian in age, may be recognized.

The deltaic sediments of the Açú Formation bear the oldest known invertebrates. The assemblage, described for the first time by Duarte and Santos (21), is characterized by the typically paralic crustacean *Unusuropode castroi*. A (Early ?) Turonian age is suggested for the assemblage.

The transition of the deltaic clastic sedimentation of the Açú Formation to the shallow shelf carbonates of the Jandaíra Formation is defined by the *Lopha ramicola-Plagiostoma upanemensis* assemblage. A Turonian age, but somewhat younger than the previous one, is suggested for this assemblage.

Epibenthic organisms, such as bivalves, prosobranchiate gastropods and regular echinoids characterize the lower part of the Jandaíra Formation up to the gypsum layers at the Governador Dix-Sept Rosado town. Big-sized species of *Tylostoma* (*T. brasiliensis* and *T. crandalli*) may dominate. Species of *Nerinea*, mainly *N. upanemensis*, and *Trochactaeon* (*T. elongatus* and *T. tinocoi*) are also common. The specific composition and the greater diversification of this assemblage suggest a shallow neritic environment. Environmental changes are suggested by the massive occurrence of *Ostrea mossoroensis* on many levels. The section is Turonian in age, as indicated by the scarce occurrence of species of the cephalopod genera *Coilopoceras*, *Mammites* and *Hoplitoides* and of *Mytiloides labiatus*.

The forth assemblage characterizes the layers above the gypsum layers up to the limestone quarry near Mossoró. Fragments of species of the ammonite genus *Protexanites*, indicating a Coniacian age for these levels have, been found there (34). Big-sized species of *Inoceramus* constitute the most distinguishing feature of this assemblage (4). Big-sized inoceramids have also been described by Maury from the locality of João Câmara (ex Baixa Verde) (31); according Beurlen, K. (4), they exhibit the same Senonian morphologic character and probably are of the same age. *Ostrea pendenciana* is very common on some levels, indicating several environmental shifts during Coniacian times. Besides the bivalves, the echinoid *Catapygus mossoroensis*, common at some localities, is the only to deserve notice.

The youngest outcropping levels, near the coastline, are supposed to be of Campanian to Early Maastrichtian age according recent micropaleontological studies of Viviers and Regali (64). Some ammonite fragments, probably related to *Sphenodiscus* and *Pachydiscus*, were found by Kegel (27) and Oliveira (36); their occurrence suggest a Late Cretaceous transgressive episode. Bivalves, gastropods and echinoids. The echinoid species *Spatangus baixadoleitensis*, *Lovenilampus baixadoleitensis* and *Breynella baixadoleitensis* characterize the assemblage, with subordinate bivalves and gastropods.

Foraminifers are the best known microfossil group. Agglutinated forms, mainly represented by species of the genera *Reophax*, *Cribratina* and *Thomasinella*, characterize the upper levels of the Açú Formation, deposited in a paralic environment.

The lower part of the Jandaíra Formation bears a relative poor microfossil assemblage; the ostracod *Brachycythere sapucariensis* is the most common species. The levels characterized by big-sized species of *Inoceramus* exhibit an almost monospecific fauna of *Siphogenerinoides*.

Only the near-shore younger levels exhibit a more diversified fauna, with both planktonic and benthonic foraminifers. The former are dominated by species of *Heterohelix*, *Globotruncanita*, *Globotruncana*, *Rosita*, *Rugoglobigerina* and *Globigerinelloides*. The Buliminacea dominate the benthic assemblage, mainly represented by species of *Afrolivina*, *Praebulimina* and *Siphogenerinoides*.

Miliolid-rich levels from Turonian through Early Campanian times confirm several regressive events during this time interval.

Calcareous nannofossils are poorly represented on the onshore portion of the basin. Notwithstanding this, the succession of the assemblages is very similar to that of the offshore part (46, 65).

The palynomorph record of the Açú Formation is characterized by the first appearance of elaterate triporate pollen grains. The most common species are *Elateroplicites africaensis*, *Elaterocolpites castelaini*, *Classopolis major*, *Triorites africaensis* and *Hexaporotricolpites coronatus*. The palynomorph assemblages of the Jandaíra Formation is very poor.

TAXONOMIC LIST OF IDENTIFIED SPECIES OF POTIGUAR BASIN

1. Palynomorphs

- Aequitriradites* sp. (43)
Afropollis *jardinus* Doyle et alii, 1982 (19,25,26,43)
Afropollis *operculatus* Doyle et alii, 1982 (19)
Afropollis *zonatus* Doyle et alii, 1982 (19)
Applanopsis *dampieri* (Balme) Doring, 1962 (43)
Applanopsis *trilobatus* (Balme) Doring, 1962 (43)
Araucariacites *australis* Cookson, 1947 (29,43)
Araucariacites aff. *A. guianensis* Stover, 1964 (2,17)
Ariadnaesporites *spinosus* Hills, 1967 (29)
Caytonipollenites sp. (43)
Cedripites ? sp. (43)
Cicatricosisporites *avnimelechi* Horowitz, 1970 (43)
Cicatricosisporites *microstriatus* Jardiné & Magloire, 1965
 (25,43)
Cicatricosisporites *nuni* Horowitz, 1970 (43)
Classopollis *major* Groot & Groot, 1962 (29)
Classopollis spp. (29,43)
Concavisporites sp. (43)
Coronifera *oceanica* Cookson & Eisenack, 1958 (43)
Cretacaeiporites *mulleri* Herngreen, 1973 (17,29)
Cretacaeiporites *polygonalis* Herngreen, 1973 (2,29)
Cretacaeisporites *scabratus* Herngreen, 1973 (17,29)
Dicheiropollis *etruscus* Trevisan, 1971 (43)
Elaterocolpites *castelaini* Jardiné & Magloire, 1965 (29)
Elaterosporites *klaszi* (Jardiné & Magloire) Jardiné, 1967 (29)
Ephedripites *ambiguus* Hedlung, 1966 (17,29)
Ephedripites *pentacostatus* Regali & alii, 1974 (29)
Ephedripites *subtilis* Regali & alii, 1974 (29)
Equisetosporites *leptomatus* Lima, 1980 (2,17,30)
Eucommiidites *troedsonii* (Erdtman) Hughes, 1961 (20,30)
Exesipollenites *tumulus* Balme, 1957 (43)
Gabonispors *vigourouxii* Boltenhagen, 1967 (2,29) -
Galeacornea *causea* Stover, 1963 (29)
Gnetaceapollenites *diversus* Stover, 1964 (29)
Gnetaceapollenites *multilineatus* Stover, 1964 (17,29)
Gnetaceapollenites *undulatus* (Regali, Uesugui & Santos, 1974)
 Lima, 1980 (17,30)
Hexaporotricolpites *coronatus* Jardiné et alii, 1970 (17,25)
Hexaporotricolpites *emelianovi* Boltenhagen, 1967 (17,29)
Hexaporotricolpites *lamellaferus* Jardiné et alii, 1970 (17,29)
Hexaporotricolpites *mulleri* Herngreen, 1975 (25,29)
Hexaporotricolpites *potonieii* Boltenhagen, 1959 (25,29)
Inaperturopollenites *simplex* Regali et alii, 1974 (43)
Inaperturopollenites *turbatus* Balme, 1957 (43)
Leptolepidites *major* Couper, 1953 (43)
Matonisporites sp. SCI 56 (26,43)
Palaeohystrichophora *infusurioides* Deflandre, 1935
Paludites *mamelonatus* Lima, 1979 (29)
Pemphixipollenites *inequixinus* Stover, 1974
Penetetrapites sp.
Perotrilites *pannucous* Brenner, 1963 (17,29)
Perotrilites sp. (29,43)
Pilosisporites sp. (43)
Psilatrilites sp. (43)
Raistrickia *obtusispina* Rouse, 1959 (26)
Retimonocolpites *peroreticulatus* Brenner, 1963 (26,43)

Retimonocolpites sp. 2 (26)
Reyrea polymorphus Herngreen, 1973 (44)
Sergipea crassiverrucata Regali, 1987 (42)
Sergipea naviformis Regali
Sergipea simplex Regali, 1987 (42)
Sergipea variverrucata Regali et alii, 1974 (42,44)
Steevesipollenites giganteus Regali et alii, 1974 (29)
Steevesipollenites grambasti Azema & Boltenhagen, 1974 (2,17)
Steevesipollenites nativensis Regali et alii, 1974 (29)
Steevesipollenites pigmeus Azema & Boltenhagen, 1974 (2,17)
Stellatopollis barghoornii Doyle et alii, 1975 (18,44)
Striopollenites dubious Jardiné & Magloire, 1965 (26,29)
Trichodinium sp.
Tricolpites microstriatus Jardiné & Magloire, 1965 (26,29)
Tricolpites tienabaensis Jardiné & Magloire, 1965 (26,29)
Tricolpites sp. SCI 107 (26)
Tricolpites sp. SCI 257 (26)
Tricolpites sp. SCI 426 (26)
Triorites africaensis Jardiné & Magloire, 1965 (29)
BVitreisporites pallidus (Reissinger) Nilsson, 1958

2. Nannofossils

Ahmuellerella octoradiata (Gorka) Reinhardt, 1964 (38,55)
Arkhangelskiella cymbiformis Vekshina, 1959 (7,23,38)
Aspidolithus parvus constrictus (Hattner et alii) Perch-Nielsen, 1984 (38)
Axopodorhabdus albianus (Black) Wind & Wise, 1974 (46,59)
Calculites obscurus (Deflandre) Prins & Sissingh, 1977 (38)
Chiasozygus litterarius (Gorka) Manivit, 1971 (38)
Cretarhabdus conicus Bramlette & Martini, 1964 (7,55)
Cretarhabdus crenulatus Bramlette & Martini, 1964 (55)
Cretarhabdus decorus (Deflandre) Bramlette & Martini, 1964 (7)
Cribrosphaerella ehrenbergii (Arkhangelsky) Deflandre, 1952 (55,59)
Eiffellithus eximius (Stover) Perch-Nielsen, 1968 (55,58)
Eiffellithus turriseiffeli (Deflandre) Reinhardt, 1965 (55)
Eprolithus floralis Stover, 1966 (23,55)
Gartnerago obliquum (Stradner) Reinhardt, 1970 (58,59)
Glaukolithus diplogrammus (Deflandre) Reinhardt, 1964 (38)
Lithastrinus grillii Stradner, 1962 (23,55,59)
Manivitella pemmatoidea (Deflandre in Manivit) Thierstein, 1971 (55,58)
Marthasterites furcatus (Deflandre), 1959 (55,59)
Microrhabdulus stradneri Bramlette & Martini, 1964 (7)
Micula staurophora (Gardet) Stradner, 1963 (58)
Nannoconus truitti Brönnimann, 1955 (38)
Petrobrasiella venata Troelsen & Quadros, 1971 (46)
Predicosphaera cretacea (Arkhangelsky) Gartner, 1968 (23,55)
Quadrum nitidum (Martini) Prins & Perch-Nielsen, 1977 (23)
Quadrum trifidum (Stradner) Prins & Perch-Nielsen, 1977 (38)
Rhagodiscus angustus (Stradner) Reinhardt, 1971 (38)
Rhagodiscus splendens (Deflandre) Verbeek, 1977 (38)
Stoverius achylosus (Stover) Perch-Nielsen, 1984 (46,59)
Tranolithus exiguus Stover, 1966 (38,40)
Tranolithus phacelosus Stover, 1966 (38)
Vagalapilla matalosa (Stover) Thierstein, 1973 (38,55)
Watznaueria barnesae (Black) Perch-Nielsen, 1968 (55)
Zeugrabdotos embergeri (Noel) Perch-Nielsen, 1984 (38)
Zygodiscus spiralis Bramlette & Martini, 1964 (7)

3. Foraminifers

- Allomorphina cretacea* Reuss, 1851 (15)
Afrobolivina afra Reyment, 1959 (45)
Ammobaculites sp. (15)
Archaeoglobigerina blowi Pessagno, 1967 (48)
Archaeoglobigerina cretacea d'Orbygni, 1840 (48)
Bathysiphon sp. 1 (15)
Bathysiphon sp. 2 (15)
Bathysiphon sp. 3 (15)
Buliminella gabonica de Klasz & Rérat, 1962 (28)
Cribratina sp. (15)
Dorothia oxycona (Reuss, 1860) (15)
Epistomina sp. 1 (15)
Epistomina sp. 2 (15)
Favusella washitensis (Carsey, 1926) (11)
Gavelinella sp. (15)
Gansserina gansseri (Bolli, 1951) (48)
Globigerinelloides bentonensis (Morrow, 1934) (11)
Globigerinelloides caseyi (Bolli, Loeblich & Tappan, 1957) (45)
Globigerinelloides ultramicra (Subbotina, 1949) (11)
Globotruncana bulloides Vogler, 1941 (48)
Globotruncanita subspinosa (Pessagno, 1960) (48)
Hedbergella angolae Caron, 1978 (12)
Hedbergella delrioensis Carsey, 1926 (47)
Hedbergella gorbachikae Longoria, 1974 (11)
Hedbergella lybica Barr, 1972 (3)
Hedbergella simplex (Morrow, 1934) (11)
Hedbergella planispira (Tappan, 1940) (47)
Hedbergella aff. *H. trocoidea* (Gandolfi, 1942) (11)
Heterohelix reussi (Cushman, 1938) (11)
Hormosina sp. (15)
Lenticulina sp. (15)
Neobulimina subregularis de Klasz, Magn & Rrat, 1963 (62)
Nezzazzata sp. (33)
Praebulimina aff. *P. bantu* de Klasz, Magn & Rrat, 1963 (62)
Praebulimina aff. *P. crassa* de Klasz, Magn & Rrat, 1963 (62)
Reophax sp. (15)
Rosita fornicata (Plummer, 1931) (48)
Rotalipora appenninica (Renz, 1936) (47)
Rugoglobigerina rugosa (Plummer, 1927) (48)f
Siphogenerinoides bramlettei (Cushman, 1946) (52)
Siphogenerinoides clavata Chenouad, de Klasz & Meijer, 1960 (16)
Siphogenerinoides dentata Chenouad, de Klasz & Meijer, 1960 (16)
Thomasinella punica Schlumberger, 1893 (1)
Trocholina sp. (33)
Whiteinella aprica (Loeblich & Tappan, 1961) (47)
Whiteinella archaeocretacea Pessagno, 1967 (47)
Whiteinella baltica Douglas & Rankin, 1969 (47)
Whiteinella brittonensis (Loeblich & Tappan, 1961) (47)

4. Invertebrates

COELENTERATA (SCLERACTINIA)

- Astrocoenia* sp. (22)

GASTROPODA

- Aporrhais mauryae* Beurlen, 1964 (5)
Cerithium mirimense Jenkins, 1913 (32)
Clava (Ochetoclava) aglaiae Maury, 1934 (32)
Cylichna delicia Maury, 1925 (31)
Drepanocheilus baixaleitensis (Maury, 1934) (5)
Lunatia scalata Beurlen, 1964 (5)
Monroea mossoroensis Beurlen, 1964 (5)
Nerinea (Aphanoptyxis) mauryae (Beurlen, 1964) (5,6)
Nerinea (Gonzagia) brasiliana Maury, 1925 (31)
Nerinea (Gonzagia) coutinhoi Maury, 1934 (5,32)
Nerinea (Nerinea) biplicata Beurlen, 1964 (5)
Nerinea upanemensis Beurlen, 1964 (5)
Ostoma assuana (Maury, 1925) (5)
Pirazus rioassuanus (Maury, 1925) (5)
Plesioptygmatis mossoroensis (Beurlen, 1964) (6)
Polynices mauryae Beurlen, 1964 (5)
Pterocerella ? mossoroensis Beurlen, 1964 (5)
Ptygmatis baixadoleitensis (Maury, 1934) (5)
Ptygmatis riograndensis (Maury, 1934) (5)
Ptygmatis rosadoi (Beurlen, 1964) (5,6)
Tibia upanemensis Beurlen, 1964 (5)
Trochacteon elongatus Beurlen, 1964 (5)
Trochacteon silvai (Maury, 1925) (5)
Trochacteon tinocoi Beurlen, 1964 (5)
Turritella euphrosynes Maury, 1934 (32)
Turritella independenciae Beurlen, 1964 (5)
Turritella natalensis Jenkins, 1913 (32)
Turritella rioassuana Maury, 1925 (31)
Turritella rosadoi Beurlen, 1967 (6)
Turritella thaliae Maury, 1934 (32)
Tylostoma brasilianum Maury, 1925 (5,31)
Tylostoma crandalli Maury, 1925 (5,31)
Tylostoma rochai von Ihering, 1907 (5)

BIVALVIA

- Anomia barbadinhica* Maury, 1925 (31)
Anomia cf. A. subquadrata Stanton (6)
Arca (Barbatia) camurupimensis Maury, 1934 (32)
Arca (Barbatia) mossoroensis Maury, 1934 (32)
Brachidontes arvoredensis (Maury, 1934) (6,32)
Brachidontes axistriatus (Beurlen, 1964) (5)
Cardium endymionis Maury, 1934 (5,6,32)
Cardium itapassarocanum Maury, 1934 (32)
Cardium jenkinsi Maury, 1934 (32)
Corbula mossoroensis Beurlen, 1964 (5)
Cyprimeria riograndensis Maury, 1934 (32)
Fimbria maiae (Maury, 1934) (32)
Fimbria mauryae (Beurlen, 1964) (5)
Inoceramus baixaverdensis Maury, 1925 (31)
"Isocardia" brasiliensis Beurlen, 1964 (5)
Isognomon arvoredense (Maury, 1934) (5)
Laternula livistriata Beurlen, 1964 (5)
Lima apodiensis Beurlen, 1964 (5,6)
Lopha mesenterica (Morton) (6)
Lopha plicatuliformis Beurlen, 1967 (6)
Lopha ramicola Beurlen, 1964 (5)
Modiolus camurupimicus (Maury, 1934) (32)

- Mytiloides labiatus* (von Schlotheim, 1813) (5,24)
Mytilus rosadoi Oliveira in Duarte & Santos, 1962 (21)
Ostrea crenulata Beurlen, 1964 (5)
Ostrea jacobi Beurlen, 1964 (5)
Ostrea lagoapiatensis Maury, 1934 (32)
Ostrea mossoroensis Beurlen, 1964 (5)
Ostrea pendenciana Maury, 1925 (31)
Parmicorbula assuana Beurlen, 1964 (5)
Pholadomya baixaleitensis Maury, 1934 (32)
Plagiostoma upanemensis Beurlen, 1964 (5)
Plicatula independenciae Beurlen, 1964 (5)
Plicatula cf. *P. mullicaensis* Weller, 1907 (5)
Psilomya aracatiensis Beurlen, 1964 (5)
Pteria camurupimica Maury, 1934 (32)
Pteria mossoroensis Maury, 1934 (32)
Pycnodonta cascudo Beurlen, 1967 (6)
Trachycardium amphitrites (Maury, 1925) (5)
Trachycardium perinfaustum (Maury, 1925) (5)
Trachycardium riograndensis (Maury, 1925) (5)
Venericardia mossoroensis Maury, 1934 (32)

CEPHALOPODA

- Coilopoceras luciano* Oliveira, 1969 (37)
Gauthiericeras ? sp. (34)
Hoplitoides sp. A (5)
Hoplitoides sp. B (5)
Hypophylloceras sp. (5)
Mammites jacobi Beurlen, 1964 (5)
Pachydiscus sp. (36)
Protexanites (*Protexanites*) aff. *P. (P.) bourgeoisianus*
 (d'Orbigny, 1850) (34)
Sphenodiscus sp. (36)

CRUSTACEA (MALACOSTRACA)

- Unusuropode castroi* Duarte & Santos, 1962 (21)

ECHINOIDEA

- Coenholectypus serialis* sp. (5,66)
Goniopygus durandi Peron & Gauthier (66)
Mecasterourneli (Agassiz & Desor, 1847) (9,66)
Mecaster texanum (Roemer) (31,66)
 ? *Mecaster* sp. (32,66)
Petalobrissus aff. *setifensis* (Coquand in Cotteau, 1866)
 - (31,32,66)
Petalobrissus cubensis (Weisbord, 1934) (5,66)
Phymosoma aff. *major* Coquand (49,66)
Pyorhynchus sp. (32,66)
Rosadosoma riograndensis (Maury, 1925) (31,49,66)

5. Vertebrates

PISCES

- Coelodus rosadoi* Santos, 1963 (50)
 ? *Lepidotes dixseptiensis* Santos, 1963 (50)
 ? *Therrihas castellanoi* Santos in Duarte & Santos, 1962 (21)

TETRAPODA (REPTILIA)

- Apodichelys luciano* Price, 1954 (39)

6. Plantae

- Acicularia* cf. *A. elongata* Carozzi, 1947 (57)
Archaeolithothamnium sp. (57)
Bouenia hochstetteri Toulou, 1883 (57)
Cayeuxia jandairensis Srivastava, 1982 (57)
Cayeuxia cf. *C. septata* Bakalavoa, 1975 (57)
Coccolobites ? *riograndensis* Maury, 1925 (31)
Girvanella sp. (57)
Heteroporella potiguarensis Srivastava, 1982 (57)
Leguminosites ? *vireti* Maury, 1925 (31)
Lithocodium aggregatum Elliot, 1956 (57)
Lithophyllum sp. (57)
Marinella lugeoni Pfender, 1939 (57)
Neomeris cretacea Steinmann, 1899 (57)
Ovulites cf. *O. mailloensis* Massieux, 1966 (57)
Permocalculus cf. *P. irenae* Elliot, 1958 (57)
Platypodium ? sp. (31)
Sideroxylon ? *baixaverdensis* Maury, 1925 (31)
Solenopora sp. (57)

7. Trace Fossils

- Thalassinoides* ? sp. A (35)
Thalassinoides ? sp. B (35)

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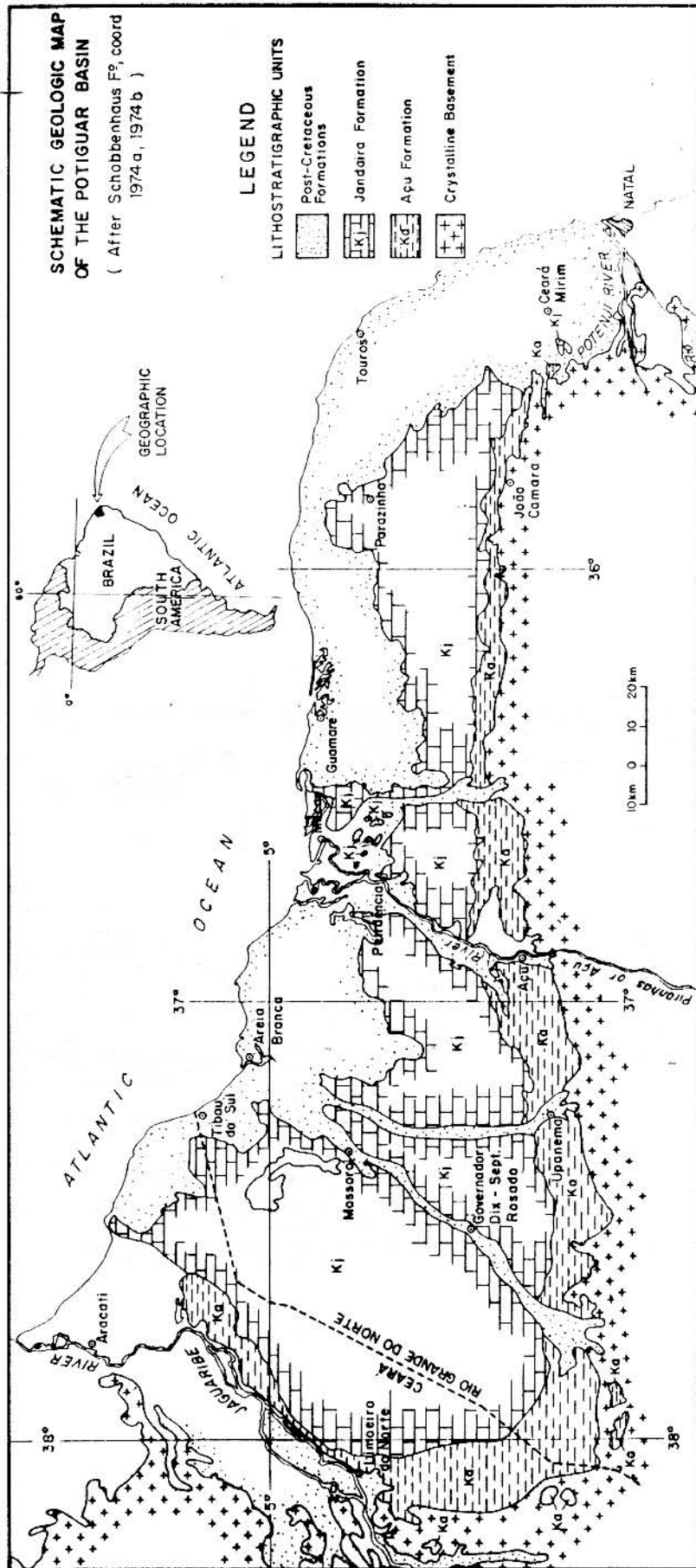
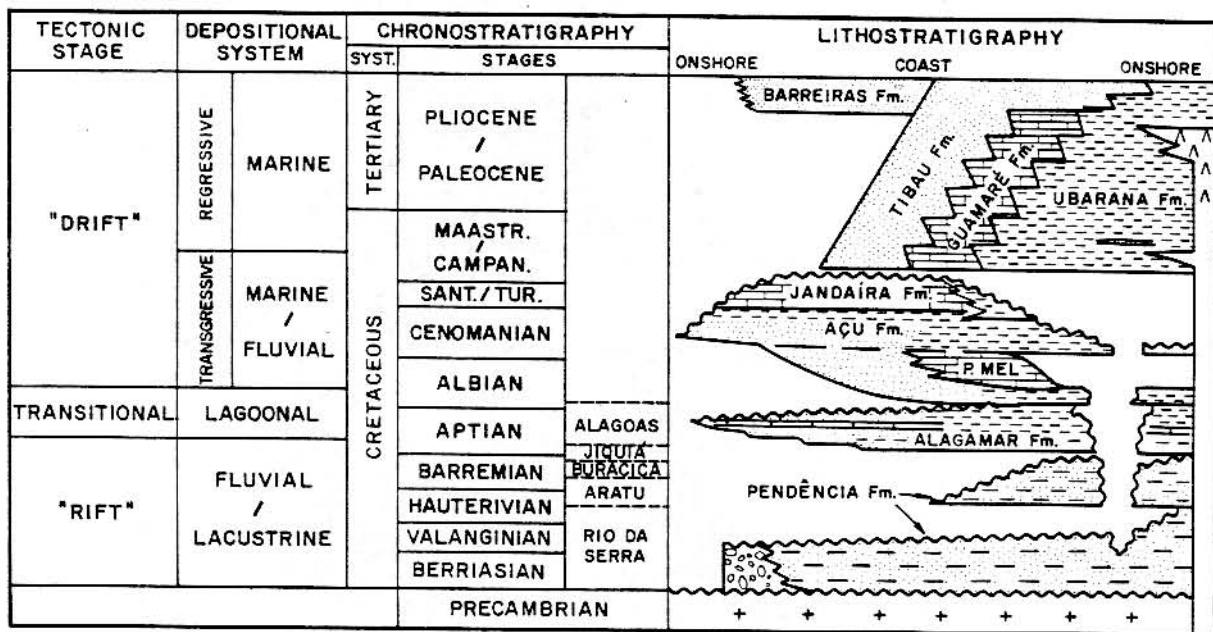
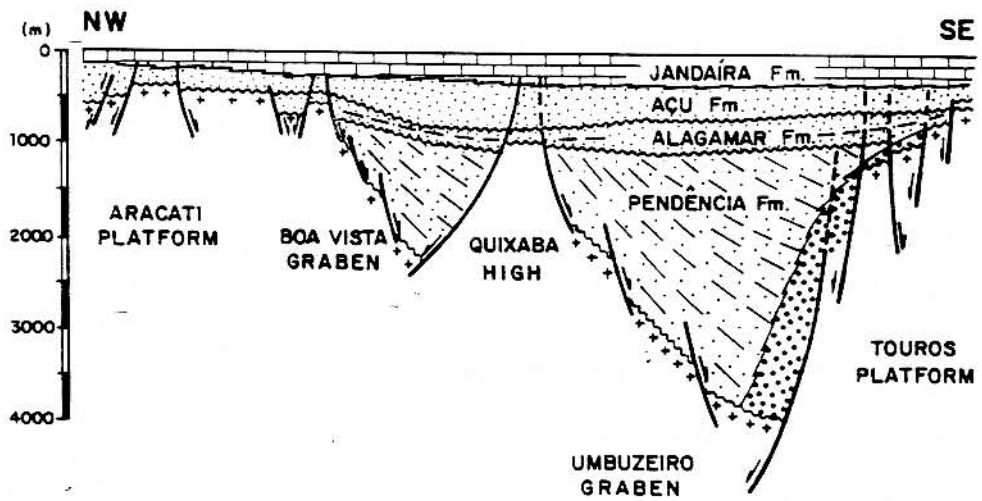


Figure 1



Modified from Bertoni et alii (1989)

Figure 2



From Bertani et alii (1981)

Figure 3

EARLY CRETACEOUS TAXA PALYNOMORPHS POTIGUAR BASIN	NEOCOMIAN TO EARLIEST ALBIAN					ALBIAN (PARS)
	BRAZILIAN LOCAL STAGES					
	RIO DA SERRA	ARATU	BURACICA	JIQUEIA	ALAGOAS	
<i>Aequitriradites</i> sp. (44)						
<i>Afropollis</i> <i>jardinus</i> (18,25,26,44)						
<i>Afropollis</i> <i>operculatus</i> (19)						
<i>Afropollis</i> <i>zonatus</i> (19)						
<i>Applanopsis</i> <i>dampiere</i> (44)	-----	-----				
<i>Applanopsis</i> <i>trilobtus</i> (44)	-----	-----				
<i>Araucariacites</i> <i>australis</i> (44)						
<i>Caytonipollenites</i> sp. (44)						
<i>Cedripites</i> ? sp. (44)						
<i>Cicatricosisporites</i> <i>avnmelechi</i> (44)						
<i>Cicatricosisporites</i> <i>microstriatus</i> (25,44)						
<i>Cicatricosisporites</i> <i>nuni</i> (44)						
<i>Classopollis</i> spp. (44)						
<i>Concavisporites</i> sp. (44)						
<i>Coronifera</i> <i>oceanica</i> (44)						
<i>Dicheiropollis</i> <i>etruscus</i> (44)						
<i>Equisetosporites</i> <i>leptomatus</i> (2,17,30)						
<i>Eucommiidites</i> <i>troeldssonii</i> (20,30)						
<i>Exesipollenites</i> <i>tumulus</i> (44)						
<p>————— common</p>						

EARLY CRETACEOUS TAXA PALYNOMORPHS POTIGUAR BASIN	NEOCOMIAN TO EARLIEST ALBIAN					ALBIAN (PARS)
	BRAZILIAN LOCAL STAGES					
	RIO DA SERRA	ARATU	BURACICA	JQUIÁ	ALAGOAS	
<i>Gnetaceapollenites undulatus</i> (17,30)					—	
<i>Inaperturopollenites simplex</i> (44)					—	
<i>Inaperturopollenites turbatus</i> (44)					—	
<i>Leptolepidites major</i> (44)						
<i>Matonisporites</i> sp. SCI 56 (26,44)					—	
<i>Paludites mamelonatus</i> (29)					—	
<i>Penetetrapites</i> sp.					—	
<i>Perotrilites</i> sp. (44)					—	
<i>Pilosisorites</i> sp. (44)					—	
<i>Psilatriteles</i> sp. (44)					—	
<i>Raistrickia obtusispina</i> (26)					—	
<i>Retimonocolpites peroreticulatus</i> (26,44)					—	
<i>Retimonocolpites</i> sp. 2 (26)					—	
<i>Reyrea polymorphus</i> (44)					—	
<i>Sergipea crassiverrucata</i> (42)					—	
<i>Sergipea naviformis</i> (42,44)					—	
<i>Sergipea simplex</i> (42)					—	
<i>Sergipea variverrucata</i> (42,44)					—	
<i>Stellatopollis barghoornii</i> (18,44)					—	
— common						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">PALYNOMORPHS POTIGUAR BASIN</p>	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
Araucariacites australis (29)						
Araucariacites aff. A. quianensis (2,17)	-----	-----				
Ariadnaesporites spinosus (29)		-----	-----	-----		
Classopollis spp. (29)	-----	-----				
Classopollis major (29)	-----					
Cretacaeiporites mulleri (17,29)	-----	-----	-----			
Cretacaeiporites polygonalis (2,29)	-----	-----	-----	-----		
Cretacaeiporites scabratus (17,29)	-----	-----	-----	-----		
Elaterocolpites castelaini (29)	-----	-----	-----	-----		
Elaterosporites klaszi (29)	-----	-----	-----	-----		
Ephedripites ambiguus (17,29)	-----	-----	-----	-----		
Ephedripites pentacostatus (29)	-----	-----	-----	-----		
Ephedripites subtilis (29)	-----	-----	-----	-----		
Gabonisoris vigourouxii (2,29)	-----	-----	-----	-----		
Galeacornea causea (29)	-----	-----	-----	-----		
Gnetaceapollenites diversus (29)	-----	-----	-----	-----		
Gnetaceapollenites multilineatus (17,29)	-----	-----	-----	-----		
Hexaporotricolpites coronatus (17,25)	-----	-----	-----	-----		
Hexaporotricolpites emelianovi (17,29)	-----	-----	-----	-----		
Hexaporotricolpites lamellaferus (17,29)	-----	-----	-----	-----		
<p>----- common</p>						

LATE CRETACEOUS TAXA PALYNOMORPHS POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
<i>Hexaporotricolpites mulleri</i> (25,29)			-	-		
<i>Hexaporotricolpites potonieii</i> (25,29)	-----					
<i>Perotrilites pannuceus</i> (17,29)	-----					
<i>Perotrilites</i> sp. (29,44)	-----					
<i>Pemphixipollenites inequixinus</i>	_____					
<i>Palaeochystrichophora infusorioides</i>	-----	---	---			
<i>Steevesipollenites giganteus</i> (29)	---					
<i>Steevesipollenites grambasti</i> (2,17)	-----					
<i>Steevesipollenites nativensis</i> (29)		_____				
<i>Steevesipollenites pigneus</i> (2,17)	-----					
<i>Striopollenites dubious</i> (26,29)	-----					
<i>Tricolpites microstriatus</i> (26,29)	---	_____				
<i>Tricolpites tienabaensis</i> (26,29)				---		
<i>Tricolpites</i> sp. SCI 107 (26)				---		
<i>Tricolpites</i> sp. SCI 257 (26)				---		
<i>Tricolpites</i> sp. SCI 427 (26)		_____				
<i>Triorites africaensis</i> (29)	_____					
----- common						

EARLY CRETACEOUS TAXA NANNOFOSSILS POTIGUAR BASIN	NEOCOMIAN TO EARLIEST ALBIAN					ALBIAN (PARS)
	BRAZILIAN LOCAL STAGES					
	RIO DA SERRA	ARATU	BURACICA	JQUIÁ	ALAGOAS	
<i>Axopodorhabdus albianus</i> (46,59)						—
<i>Chiastozygus litterarius</i> (38)						
<i>Cretarhabdus conicus</i> (7,55)						
<i>Cretarhabdus crenulatus</i> (55)						
<i>Cribrosphaerella ehrebergii</i> (55,59)						—
<i>Eiffellithus turriseiffeli</i> (55)						—
<i>Eprolithus floralis</i> (23,55)						
<i>Glaukolithus diplogrammus</i> (38)						
<i>Nannoconus truitti</i> (38)						
<i>Prediscosphaera cretacea</i> (23,55)						—
<i>Rhagodiscus angustus</i> (38)						
<i>Rhagodiscus splendens</i> (38)						
<i>Stoverius achylosus</i> (46,59)						
<i>Tranolithus exiguus</i> (38,40)						—
<i>Tranolithus phacelosus</i> (38)						—
<i>Vagalapilla matalosa</i> (38,55)						
<i>Watznaueria barnesae</i> (55)						
<i>Zeugrabdotos embergeri</i> (38)						
— common						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">NANNOFOSSILS POTIGUAR BASIN</p>	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
<i>Ambullerella octoradiata</i> (38,55)			—			
<i>Arkhangelskiella cymbiformis</i> (7,23,38)					—	
<i>Aspidolithus parvus constrictus</i> (38)					—	
<i>Axopodorhabdus albianus</i> (46,59)	—					
<i>Calculites obscurus</i> (38)					—	
<i>Chiastozygus litterarius</i> (38)					—	
<i>Cretarhabdus conicus</i> (7,55)					—	
<i>Cretarhabdus crenulatus</i> (55)					—	
<i>Cretarhabdus decorus</i> (7)					—	
<i>Cribrosphaerella ehrenbergii</i> (55,59)					—	
<i>Eiffellithus eximius</i> (55,58)		—				
<i>Eiffellithus turri eiffeli</i> (55)	—					
<i>Eprolithus floralis</i> (23,55)	—			—		
<i>Gartnerago obliquum</i> (58,59)	—					
<i>Glaukolithus diplogrammus</i> (38)					—	
<i>Lithastrinus grillii</i> (23,55,59)			—			
<i>Manivitella permatoidea</i> (55,58)					—	
<i>Marthasterites furcatus</i> (55,59)					—	
<i>Microrhabdulus stradneri</i> (7)					—	
<i>Micula staurophora</i> (58)			—			
<p>————— common</p>						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">NANNOFOSSILS POTIGUAR BASIN</p>	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
Nannoconus truitti (38)	—					
Petrobrasiella venata (46)	—	—	—	—		
Prediscosphaera cretacea (23,55)	—					
Quadrum nitidum (23)					—	—
Quadrum trifidum (38)					—	—
Rhagodiscus angustus (38)						
Rhagodiscus splendens (38)						
Stoverius achylosus (46,59)	—	—	—	—		
Tranolithus exiguus (38,40)	—	—	—	—		
Tranolithus phacelosus (38)	—	—	—	—		
Vagalapilla matalosa (38,55)	—	—	—	—	—	—
Watznaueria barnesae (55)	—	—	—	—		
Zeugrabdotos embergeri (38)	—	—	—	—		
Zygodiscus spiralis (7)					—	—
<p style="text-align: center;">— common</p>						

LATE CRETACEOUS TAXA FORAMINIFERA POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
Allomorphina cretacea (15)					—	—
Afrobolivina afra (45)					—	
Ammobaculites sp. (15)	— — —					
Archaeoglobigerina blowi (48)					—	—
Archaeoglobigerina cretacea (48)					—	—
Bathysiphon sp. 1 (15)	—					
Bathysiphon sp. 2 (15)	—					
Bathysiphon sp. 3 (15)	—					
Buliminella gabonica (28)					—	
Cribratina sp. (15)	—					
Dorothia oxycona (15)	—					
Epistomina sp. 1 (15)	—					
Epistomina sp. 2 (15)	—					
Favusella washitensis (11)	— — —					
Gavelinella sp. (15)						—
Gansserina gansseri (48)						—
Globigerinelloides bentonensis (11)	—					
Globigerinelloides ultramicra (11)					—	—
Globotruncana bulloides (48)					— — —	—
Globotruncanita subspinosa (48)					—	—
— common						

LATE CRETACEOUS TAXA FORAMINIFERA POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
<i>Hedbergella angolae</i> (12)	—					
<i>Hedbergella delrioensis</i> (47)	—	—				
<i>Hedbergella lybica</i> (3)	—					
<i>Hedbergella simplex</i> (11)	—	—				
<i>Hedbergella planispira</i> (47)	—	—				
<i>Hedbergella</i> aff. <i>H. trocoidea</i> (11)	—					
<i>Heterohelix reussi</i> (11)		—				
<i>Hormosina</i> sp. (15)						—
<i>Lenticulina</i> sp. (15)	—					
<i>Neobulimina subregularis</i> (62)					—	
<i>Nezzazzatta</i> sp. (33)	—					
<i>Præbulimina</i> aff. <i>P. bantu</i> (62)	—				—	
<i>Præbulimina</i> aff. <i>P. crassa</i> (62)					—	
<i>Rosita fornicata</i> (48)				—	—	—
<i>Reoplax</i> sp. (15)	—					
<i>Rotalipora appenninica</i> (47)	—					
<i>Rugoglobigerina rugosa</i> (48)					—	—
<i>Siphogenerinoides bramlettei</i> (52)					—	
<i>Siphogenerinoides clavata</i> (16)					—	
<i>Siphogenerinoides dentata</i> (16)					—	
— common						

LATE CRETACEOUS TAXA INVERTEBRATES POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
COELENTERATA (SCLERACTINIA)						
<i>Astrocoenia</i> sp. (22)		—				
GASTROPODA						
<i>Aporrhais mauryae</i> (5)		—				
<i>Cerithium mirimense</i> (32)			—	—		
<i>Clava (Ochetoclava) aglaiae</i> (32)					—	—
<i>Cylichna delicia</i> (31)		—				
<i>Drepanocheilus baixaleitensis</i> (5)					—	—
<i>Lunatia scalata</i> (5)		—				
<i>Monroea mossoroensis</i> (5)			—			
<i>Nerinea (Aphanoptyxis) mauryae</i> (5,6)			—			
<i>N. (Gonzagia) brasiliana</i> (31)			—			
<i>N. (G.) coutinhoi</i> (5,32)			—			
<i>N. (Nerinea) biplicata</i> (5)		—				
<i>N. upanemensis</i> (5)		—				
<i>Ostostoma assuana</i> (5)			—			
<i>Pirazus rioassuanus</i> (5)			—			
<i>Plesioptygmatis mossoroensis</i> (6)			—			
<i>Polynices mauryae</i> (5)		—				
<i>Pterocerella ? mossoroensis</i> (5)		—				
<p>———— common</p>						

LATE CRETACEOUS TAXA INVERTEBRATES POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
<i>Ptygmatis baixadoleitensis</i> (5)					—	—
<i>P. riograndensis</i> (5)					—	—
<i>P. rosadoi</i> (5,6)		—				
<i>Tibia upanemensis</i> (5)		—				
<i>Trochacteon elongatus</i> (5)		—				
<i>T. silvai</i> (5)		—				
<i>T. tinocoi</i> (5)		—				
<i>Turritella euphrosynes</i> (32)					—	—
<i>T. independenciae</i> (5)		—				
<i>T. natalensis</i> (32)			—	—		
<i>T. rioassuana</i> (31)			—	—		
<i>T. rosadoi</i> (6)			—	—		
<i>T. thaliae</i> (32)					—	—
<i>Tylostoma brasiliarum</i> (5,31)		—				
<i>T. crandalli</i> (5,31)		—				
<i>T. rochai</i> (5)		—				
BIVALVIA						
<i>Anomia barbadinhica</i> (31)			—			
<i>A. cf. A. subquadrata</i> (6)		—				
<i>Arca (Barbatia) camurupimensis</i> (32)			—			
— common						

LATE CRETACEOUS TAXA INVERTEBRATES POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
<i>Arca</i> (<i>Barhatia</i>) <i>mossoroensis</i> (32)						
<i>Brachidontes</i> <i>arvoredensis</i> (6,32)						
<i>B. axistriatus</i> (5)						
<i>Cardium</i> <i>endymionis</i> (5,6,32)						
<i>C. itapassarocanum</i> (32)					—————	—————
<i>C. jenkinsi</i> (32)					—————	—————
<i>Corbula</i> <i>mossoroensis</i> (5)						
<i>Cyprimeria</i> <i>riograndensis</i> (32)					—————	—————
<i>Fimbria</i> <i>maiae</i> (32)					—————	—————
<i>F. mauryae</i> (5)						
<i>Inoceramus</i> <i>baixaverdensis</i> (31)					—————	—————
" <i>Isocardia</i> " <i>brasiliensis</i> (5)						
<i>Isognomon</i> <i>arvoredense</i> (5)					—————	—————
<i>Laternula</i> <i>linistriata</i> (5)					—————	—————
<i>Lima</i> <i>apodiensis</i> (5,6)						
<i>Lopha</i> <i>mesenterica</i> (6)						
<i>L. plicatuliformis</i> (6)						
<i>L. ramicola</i> (5)						
<i>Modiolus</i> <i>camurupimicus</i> (32)						
<i>Mytiloides</i> <i>labiatus</i> (5,24)						
————— common						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">— INVERTEBRATES POTIGUAR BASIN</p>	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
<i>Mytilus rosadoi</i> (21)						
<i>Ostrea crenulata</i> (5)						
<i>O. jacobi</i> (5)						
<i>O. lagoapiatensis</i> (32)						
<i>O. mossoroensis</i> (5)						
<i>O. pendenciana</i> (31)						
<i>Parmicorbula assuana</i> (5)						
<i>Pholadomya baixaleitensis</i> (32)						
<i>Plagiostoma upanemensis</i> (5)						
<i>Plicatula independenciae</i> (5)						
<i>P. cf. P. mullicaensis</i> (5)						
<i>Psilomya aracatiensis</i> (5)						
<i>Pteria camurupimica</i> (32)						
<i>P. mossoroensis</i> (32)						
<i>Pycnodonta cascudo</i> (6)						
<i>Trachycardium amphitrites</i> (5)						
<i>T. perinfaustum</i> (5)						
<i>T. riograndensis</i> (5)						
<i>Venericardia mossoroensis</i> (32)						
<p>————— common</p>						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">INVERTEBRATES POTIGUAR BASIN</p>	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
CEPHALOPODA						
Coilopoceras lucianoï (37)						
Gauthiericeras ? sp. (34)						
Hoplitoides sp. A (5)						
Hoplitoides sp. B (5)						
Hypophylloceras sp. (5)						
Mammites jacobï (5)						
Pachydiscus sp. (36)						
Protexanites (Protexanites) aff. P. (P.) bourgeoisianus (34)						
Sphenodiscus sp. (36)						
CRUSTACEA (MALACOSTRACA)						
Unusuropode castroi (21)						
ECHINOIDEA						
Coenholectypus serialis gp. (5,66)						
Goniopygus durandi (66)						
Mecaster fourneli (9,66)						
M. texanum (31,66)						
? Mecaster sp. (32,66)						
Petalobrissus cubensis (5,66)						
P. aff. setifensis (31,32,66)						
<p>————— common</p>						

LATE CRETACEOUS TAXA INVERTEBRATES POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
Phymosoma aff. major (49,66)						
Pyorhynchus sp. (32,66)						
Rosadosoma riograndensis (31,49,66)						

—— common

LATE CRETACEOUS TAXA VERTEBRATES POTIGUAR BASIN	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
PISCES						
<i>Coelodus rosadoi</i> (50)		—				
? <i>Lepidotes dixseptiensis</i> (50)		—				
? <i>Tharrhias castellanoi</i> (21)		—				
REPTILIA						
<i>Apodichelys lucianoi</i> (39)		—				
<hr style="width: 50%; margin-left: 0;"/> common						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">— PLANTAE POTIGUAR BASIN</p>	CENOMANIAN	TURONIAN	CONIACIAN	SANTONIAN	CAMPANIAN	MAASTRICHTIAN
Acicularia cf. <i>A. elongata</i> (57)						
Archaeolithothamnium sp. (57)						
Bouenia hochstetteri (57)						
Cayeuxia jandairensis (57)						
C. cf. <i>C. septata</i> (57)						
Coccolobites ? riograndensis (31)						
Girvanella sp. (57)						
Heteroporella potiguarensis (57)						
Leguminosites ? vireti (31)						
Lithocodium aggregatum (57)						
Lithophyllum sp. (57)						
Marinella lugeoni (57)						
Neomeris cretacea (57)						
Ovulites cf. <i>O. mailloensis</i> (57)						
Permocalculus cf. <i>P. irenae</i> (57)						
Platypodium ? sp. (31)						
Sideroxylon ? baixaverdensis (31)						
Solenopora sp. (57)						
<p>———— common</p>						

<p style="text-align: center;">LATE CRETACEOUS TAXA</p> <p style="text-align: center;">TRACE FOSSILS POTIGUAR BASIN</p>	<p>CENOMANIAN</p>	<p>TURONIAN</p>	<p>CONIACIAN</p>	<p>SANTONIAN</p>	<p>CAMPANIAN</p>	<p>MAASTRICHTIAN</p>
<p>Thalassinoides ? sp. A (35)</p>						
<p>Thalassinoides ? sp. B (35)</p>						

— common