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New species and records of Cancellariinae (Caenogastropoda) from tropical America, together with a catalogue of Neogene to Recent species from this region

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In this catalog the Cancellariinae of the Central American Neogene assemblages are recorded, discussed and illustrated. This work has been greatly enriched by the study of Central American Pacific and Caribbean Neogene assemblages from previously unknown, undersampled or unpublished sites. Ten new species resulting from this research effort are described herein: *Cancellaria sepulcralis* nov. sp., *Pyruclia*? *schmidti* nov. sp., *Bivetopsia porvenirensis* nov. sp., *Hertleinia obeliscus* nov. sp., *Massyla gavilanensis* nov. sp., *Narona wiedenmeyeri* nov. sp., *Aphera bananensis* nov. sp., *Axelella casacantaurana* nov. sp., *Axelella nutrita* nov. sp. and *Ventrilia puntagavilanensis* nov. sp. Herein *Cancellaria coronadosensis* Durham, 1850 is considered a junior subjective synonym of *C. obesa* G.B. Sowerby I, 1832. *Cancellaria candida* is considered a *nomen dubium*. A catalogue of the Cancellariinae of the tropical American Neogene Gatunian Province is provided, including shallow-water Recent species found in the same geographic area, distinguishing between valid species and homonyms or junior subjective synonyms. The catalogue provides a full chresonymy for each specific taxon, the current cyronym, data on the type material and geographic and stratigraphic distribution. Geographic and stratigraphic charts are provided for all the major tropical American regions in order to make the geographic locations, age and chronostratigraphic relationship between the geological formations discussed easier to interpret.

KEY WORDS**:** Gastropoda, Cancellariinae, Central America, Gatunian province, Miocene, Pliocene, Catalogue, new taxa

Contents

Introduction

The gastropod family Cancellariidae Forbes & Hanley, 1851 was a characteristic and important constituent of Neogene Central American marine faunas and is highly endemic in the region, with a rapid turnover of species. It is also one of the gastropod groups with the highest number of paciphilic species (*sensu* Woodring, 1966), the importance of which was discussed by Landau *et al*. (2007, 2012a, 2012b) and Landau & Silva (2010). Today, cancellariids continue to be an important component in tropical American Pacific faunas, whereas in the Caribbean their numbers and diversity are greatly reduced.

Cancellariids have been described in most of the classic monographic works dealing with tropical American Neogene assemblages (*i.e.* Guppy, 1866; Gabb, 1873; Brown & Pilsbry, 1911; Pilsbry & Johnson, 1917; Maury, 1917, 1925; Olsson, 1922, 1932; Pilsbry, 1922; Mansfield, 1925; Woodring, 1928; Anderson, 1929; Weisbord, 1929; Vokes, 1938; Pilsbry & Olsson, 1941). Marks (1949) reviewed the family in the tropical American fossil assemblages, and listed 44 species, focusing on their generic assignments. Little more was added to our knowledge of the Neogene cancellariids in the next 15 years, after which further major contributions were made by Olsson (1964) in his monograph on the Pacific deposits of Ecuador and Woodring (1970) in his series on the Palaeontology of the Panama Canal Zone.

In more recent years, almost all the new taxa have been described in papers dealing exclusively with the family. The first contributions were a series of short papers by Petit (1970, 1976) describing new species from various fossil and Recent Caribbean assemblages. The landmark monograph on the Neogene Cancellariidae from the Dominican Republic by Jung & Petit (1990) was a huge leap forward, in which updated and detailed descriptions, discussions and illustrations of the protoconch morphology were given for twenty species occurring in the Dominican assemblages. This was followed by contributions on the Neogene cancellariids of Venezuela by Landau & Petit (1997) and Landau *et al*. (2007), and Panama by Landau *et al*. (2012a, 2012b).

Therefore, our knowledge of the family had increased dramatically in the last two decades. In comparison to Marks (1949), who listed 44 cancellariids for the tropical American Neogene, we list 154 valid species from the same geographic area.

The Cancellariidae of most of the more significant Neogene tropical American assemblages known to date have been described and are recorded in this work. Nevertheless, there are numerous less well known tropical American Neogene assemblages, which remain almost unknown, such as the late Miocene Caujarao and Urumaco formations of Venezuela and the early Piacenzian Río Banano Formation of Costa Rica. Most of the new species decribed herein are from such lesser known assemblages.

The present work is restricted to the subfamily Cancellariinae Forbes & Hanley, 1851. *Tritonoharpa* Dall, 1908 does occur in the Caribbean Neogene, but the fossil material needs revision and therefore the genus has been excluded from this work.

In order to make this catalogue as thorough and complete as possible, new material from previously poorly known and undersampled sites was collected and reviewed. Ten new species resulting from this research effort are described herein: *Cancellaria sepulcralis* nov. sp., *Pyruclia*? *schmidti* nov. sp., *Bivetopsia porvenirensis* nov. sp., *Hertleinia obeliscus* nov. sp., *Massyla gavilanensis* nov. sp., *Narona wiedenmeyeri* nov. sp., *Aphera bananensis* nov. sp., *Axelella casacantaurana* nov. sp., *Axelella nutrita* nov. sp. and *Ventrilia puntagavilanensis* nov. sp.

With this further contribution, we give an annotated catalogue of the Cancellariinae of the tropical American Neogene Gatunian Province, including Recent species found today in the same geographic area, distinguishing between valid species and homonyms or junior subjective synonyms. Geographic and stratigraphic charts are also given for the major tropical American regions covered in order to make the geographic locations, ages and chronostratigraphic relationships between the geological formations discussed easier to grasp.

Material and methods

The most important collections from tropical American Neogene deposits are present in the NMB (which also includes the repository of the molluscs collected during the 'Panama Paleontology Project' = PPP campaign) and BL collections. The first part of this work entailed combing through these collections for Cancellariinae and revising the subfamily. These collections include samples from almost all the classic Caribbean Neogene localities, as well as from lesser known assemblages. Further information on all NMB (including PPP) localities can be accessed through the Naturhistorisches Museum Basel website and link:

http://www.nmb.bs.ch/sammlungen/geowissenschaftliche-sammlung/palaeontologie-wirbellose-und-pflanzen/regionalsammlung-karibik.htm.

Several previously unknown species were identified, mainly from the less well-known deposits. Unfortunately, the material available was often sparse and poorly preserved, making specific assignment difficult, in which cases the identification is to genus level.

The results of this revision are presented in the Systematic palaeontology section of this paper. Only species which are described as new or commented on are listed in this part. Other new records are included in the distribution data under each species in the catalogue part of this work. All new species and most of the new records have been illustrated in the plates.

The second part of this work comprises a catalogue of all known fossil Cancellariinae from the tropical American Neogene, including Recent species with a fossil record. The species are arranged in alphabetic order of the *epitheton specificum*. Specific names considered valid by the authors are marked in bold italics, regular italics represent junior homonyms, synonyms or *nomina dubia*. The genus to which the species was originally ascribed follows the trivial name in brackets, followed by the author and date. For Recent species an original reference follows on the same line. Below the species name we have included a chresonymy for each taxon. For Recent species only references to fossil occurrences are listed. Below the chresonymy we supply the current Cyronym, information on the type material and finally all occurrences for the species accompanied by a reference for each record.

Part three of this work includes a chart listing all the valid species, arranged by genus, giving the chronological range of the taxa, with the range in the Caribbean illustrated in black and the Pacific in grey. Extant species are designated with a symbol indicating shallow and deep-water species. This is done to aid further interpretations on the assemblages, as deep water deposits are very poorly represented in the Caribbean Neogene assemblages.

In part four of this work we have provided geographic maps showing the geographic location of the fossiliferous outcrops and stratigraphic charts for each of the major tropical American Neogene regions. The material discussed here originated from a large number of geological formations throughout the tropical American region, ranging in age from the Miocene to latest Pleistocene. These summary charts are provided in order to make the geographic location, age and chronostratigraphic relationships between these formations easier to interpret.

As in the previous taxonomic works dealing with cancellariids (Landau *et al*., 2012a, b), we have adopted the recent recommendation of the International Commission on Stratigraphy – accepted by the IUGS on June 30, 2009 – on the redefinition of the Pleistocene (now including the Gelasian Stage/Age as its lowermost unit), and the concomitant formal redefinition of the base of the Quaternary System/Period (and thus the Neogene/Quaternary boundary) by the Monte San Nicola GSSP and thus to be coincident with the bases of the Pleistocene and Gelasian. The Plio-Pleistocene boundary is now pushed back to 2.59 Ma (Riccardi, 2009; Pilans & Gibbard, 2012).

Abbreviations

AMNH American Museum of Natural History, New York, USA.
ANSP Academy of Natural Sciences of Philadelphia, Philadelphia, USA.
BL Bernard Landau collection, Albufeira, Portugal.
CAS California Academy of Sciences, San Francisco, USA.
CMNH Cincinnati Museum of Natural History, Cincinnati, Ohio, USA.
MNRJ Museu Nacional, Río de Janeiro, Brazil.
MORG Museu Oceanográfico do Río Grande, Río Grande do Sul, Brazil.
MZUSP Museu de Zoologia da Universidade de São Paulo, Brazil.
NHMUK The Natural History Museum, London, United Kingdom.
NHMW Naturhistorisches Museum Wien, Austria.
NMB Naturhistorisches Museum Basel, Switzerland.
PPP Panama Paleontology Project, locality numbers given, specimens collected are part of the NMB collections.
PRI Paleontological Research Institute, Ithaca, USA.
REP Richard E. Petit collection, North Myrtle Beach, USA.
UF Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA.
UCMP University of California Museum of Paleontology, Berkeley, USA.
USNM United States National Museum of Natural History, Washington DC, USA.
YPM Peabody Museum of Natural History, Yale University, New Haven, USA.

Systematic palaeontology

Superfamily Cancellarioidea Forbes & Hanley, 1851
Family Cancellariidae Forbes & Hanley, 1851
Subfamily Cancellariinae Forbes & Hanley, 1851

Note – The classification adopted herein is according to Harasewych & Petit (1998) and Jung & Petit (1990). In this work we follow Landau & Silva (2010) and Landau *et al*. (2012a, 2012b) and elevate many subgeneric taxa to full genus.

Genus *Cancellaria* Lamarck, 1799

Cancellaria axelolssoni **Landau, Petit & Silva, 2012a**
Plate 1, fig. 12

Material – Two specimens: NMB H20133, height 33.4 mm, locality NMB 17454; NMB H20132, height 37.3 mm (incomplete), locality NMB 17447, both Río Banano south of Limón, Quitaría, 2.3 km southwest of railway bridge at Bomba, right bank, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.

***Cancellaria* cf. *barretti* Guppy, 1866**
Plate 1, figs 1, 2

Material – Two specimens: NMB H19983 (Pl. 1, fig. 1), height 20.8 mm; NMB H19984, height 15.3 mm (juvenile), locality NMB 13665; one specimen NMB H20045 (Pl. 1, fig. 2), locality 17529, both El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.

Comment – The shells from Venezuela are extremely high-spired, even more so than the holotype figured by Jung & Petit (1990; pl. 16, figs 1-4), and slightly more slender. Nevertheless, the rest of the shell characters correspond well to those of the species; the dense cancellate sculpture, barrel-shaped last whorl, and the very solid and clearly bifid adapical columellar fold. The protoconch of the specimens from the type locality, Bowden Formation of Jamaica, is not documented. It is well preserved in the smaller of the two shells from Venezuela (NMB H19984), and is multispiral, dome-shaped, consisting of three whorls with a very small nucleus.

***Cancellaria harrisi* Maury, 1917**
Plate 1, fig. 13

Material – Three specimens: NMB H20129 (Pl. 1, fig. 13), H20130-20131, maximum height 24.3 mm, locality NMB 17776, Río Banano south of Limón, Bomba, left bank, 700 m SW of railway bridge. Type locality of Río Banano Formation, blue sandy mudstone with sandy layers, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.

Comment – As discussed by Jung & Petit (1990, p. 98) *Cancellaria harrisi* Maury, 1917 tends to have a weakly angular shoulder on the last whorl, which has led to it being placed in the genus *Euclia* H. & A. Adams, 1854. However, the adapical fold is weakly bifid suggestive of placement within *Cancellaria* Lamarck, 1799. This is the first record for the species outside the Dominican Republic.

***Cancellaria sathra* Woodring, 1973**
Plate 1, figs 8-11

Material – One specimen NHMW 2011/0178/0024, ex BL coll. (Pl. 1, fig. 8), height
37.6 mm, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene. Two specimens: NHMW 2011/0178/0025-2011/0178/0026, ex BL coll. (Pl. 1, figs 9-10), maximum height 38.1 mm, Cerro Barrigón, Araya Peninsula, Sucre State, Venezuela. Aramina Formation, Cubagua Group, early Pliocene. One specimen NMB H20138 (Pl. 1, fig. 11) (incomplete, aperture damaged), height 28.2 mm, locality NMB 18095, Río Banano south of Limón, Bomba, left bank, 500 m SW of railway bridge, brownish-grey sandy mudstones with lenses and layers of molluscs, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.

Comment – The single specimen available from the upper Río Banano Formation has its aperture incomplete, but is characterized by a fine and evenly reticulate sculpture, the columellar folds are narrow and elevated, but clearly bifid. We consider this shell to represent a specimen of *Cancellaria sathra* Woodring, 1973. It differs from the type from the Gatun Formation of Panama in having a slightly less barrel-shaped last whorl. However, it is quite possible that the Costa Rican shell corresponds to a subadult judging from the large size of the specimens illustrated here from the early Pliocene of Venezuela (Pl. 1, figs 8, 9). The subadult shell illustrated from Venezuela (Pl. 1, fig. 10) is quite similar in shape and sculpture to the specimen from Costa Rica.

***Cancellaria sepulcralis* nov. sp.**
Plate 1, figs 3-6; Plate 6, fig. 7

Type material and dimensions – Holotype NMB H18498 (Pl. 1, fig. 3), height 31.6 mm, width 18.9 mm, locality NMB 12859; paratype 1 NMB H20084 (Pl. 1, fig. 5), height 32.5 mm, width 19.1 mm, locality NMB 17530; paratype 2 NMB H20085 (subadult, Pl. 1, fig. 4), height 24.8, width 10.0 mm, locality NMB 13665; paratype 3 NMB H20005, height 32.5 mm, width 19.0 mm (Pl. 1, fig. 6); paratype 4 NMB H18495, height 15.6mm (juvenile; Pl. 6, fig. 7), locality NMB 12854; Carrizal, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.

Other material – Ten specimens NMB H20086-20095; 27 specimens NMB H20096-
20122, maximum height 32.5 mm (almost all juvenile or damaged), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene; 19 specimens NMB H20006-20024, maximum height 24.0 mm (all incomplete and/or juveniles), locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene; four specimens NMB H20026-20029 (all severely damaged except NMB H20026), locality NMB 12854, at road Pueblo Cumarebo-Cumarebito, after El Busco de San Rafael. Brown siltstone with molluscs, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.

Diagnosis – A *Cancellaria* species with a medium-sized shell, with multispiral protoconch, tall scalate spire, sculpture finely reticulate on spire whorls, axial sculp-

ture absent and spiral sculpture poorly defined on last whorl, narrow aperture, bifid upper two folds and relatively well developed siphonal fasciole.

Locus typicus – Locality NMB 17530, 30 m west of Cemeterio, Carrizal, Falcón Province, Venezuela.

Stratum typicum – Mataruca Member, Caujarao Formation, late Miocene.

Derivatio nominis – From Latin *sepulcralis*, of a tomb, as it is found near the cemetery at Carrizal.

Description – Shell of medium size and thickness, fusiform, with scalate spire, finely reticulate sculpture on spire whorls, sculpture subobsolete on last whorl. Protoconch dome-shaped, consisting of about three smooth convex whorls, with small nucleus. Teleoconch consisting of six whorls, with periphery at abapical suture. Suture impressed. Spire whorls with numerous, close set, prosocline axial ribs, narrower that their interspaces. Spiral sculpture overruns axial ribs, consisting of six spiral cords separated by narrow interspaces. Last whorl globose, convex, moderately constricted at base, axial sculpture weakens rapidly on second half of penultimate whorl, absent on last whorl, spiral cords flattened and poorly delimited on last whorl. Aperture narrow, elongate, outer lip not thickened by varix, lirate within, damaged in all specimens; anal canal not developed; siphonal canal short, open, posteriorly recurved. Columella moderately excavated in mid-portion, bearing three oblique folds, upper two folds bifid; parietal callus thin, moderately expanded, well delimited; columellar callus thickened, apressed. Siphonal fasciole moderately developed, rounded, bordering small umbilical chink.

Discussion – We place this species in the genus *Cancellaria* based on the bifid adapical fold, although the last whorl on adult whorls tends to have subobsolete sculpture as in *Pyruclia*. The sculpture and shape of the shell of *Cancellaria sepulcralis* nov. sp. is similar to that of several Caribbean Neogene species tentatively ascribed to *Pyruclia* by Jung & Petit (1990), like *Pyruclia*? *uva* (Jung & Petit, 1990) from the Cercado Formation of the Dominican Republic and *Pyruclia*? *laevescens* (Guppy, 1866) from the Pliocene Bowden Formation of Jamaica, but these differ in the character of the columellar fold for the genus; *i.e.* narrower and usually not bifid. The series illustrated not only shows quite some variability as to the strength of the sculpture in *C. sepulcralis*, but also important changes in shape and sculpture with ontogeny, as the last whorl becomes barrel-shaped and the sculpture obsolete, or almost so on the last whorl. *Cancellaria kugleri* Rutsch, 1934 is similar in being a *Pyruclia*-like *Cancellaria*, but differs in having a larger and more fusiform shell, with a less stepped spire.

***Cancellaria* sp.**
Plate 2, fig. 1

Material – Seven specimens NMB H20139-20145, maximum height 21.5 mm, locality NMB 17758; two specimens NMB H20147-20148, maximum height 21.5 mm, locality NMB 17754, all damaged or incomplete, Punta Judas, west of Quepos, Nicoya Peninsula, Costa Rica (Pacific), Punta Judas Formation, late Miocene; two specimens NHMW 2011/0178/0027-2011/0178/0028, ex BL coll., maximum height 23.8 mm, same locality.

Comment – These small solid *Cancellaria* specimens are the most common cancellariid in the Punta Judas Formation but unfortunately all specimens are damaged. It is characterized by its strong, horizontally-elongated reticulate sculpture with small nodules formed at the intersections and in having three strong, elevated columellar folds, the adapical and mid-folds clearly bifid. The outer lip is non-varicose and strongly lirate within.

Genus *Bivetiella* Wenz, 1943

***Bivetiella dariena* (Toula, 1909)**
Plate 2, figs 6, 7

Material – Twenty specimens NMB H19985 (Pl. 2, fig. 6), H19986-20004, maximum height 24.1 mm (all incomplete and/or juveniles), locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.

Comment – As discussed by Landau *et al.* (2012b, p. 914) *Bivetiella dariena* (Toula, 1909) is a highly variable species. The material from Venezuela is poorly preserved, but fits within the range of variability for the species. The second columellar fold in the Venezuelan shells is very weakly bifid. The protoconch is multispiral, dome shaped, similar to that described by Landau *et al.* (2012b, p. 914) for the coeval Gatun Formation specimens.

Genus *Euclia* H. & A. Adams, 1853

***Euclia codazzii* (Anderson, 1929)**
Plate 2, fig. 13

Material – Four specimens NMB H20079 (Pl. 2, fig. 13), H20080-20082, maximum height 32.5 mm (all damaged and incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.

***Euclia* sp.**

Material – One specimen NMB H20146, height 22.9 mm, locality NMB 17765, Punta Judas, west of Quepos, Nicoya Peninsula, Costa Rica (Pacific), Punta Judas Formation, late Miocene.

Comment – A single worn specimen is unquestionably attributed to the genus *Euclia* and shows similarities to *E. maldonadoi* (Olsson, 1964) from the late Miocene Angostura Formation of Ecuador, although specific assignment is not possible as the shell is too badly preserved.

Genus *Pyruclia* Olsson, 1932

***Pyruclia cibarcola* (Anderson, 1929)**
Plate 3, fig. 1

Material – One specimen NMB H19982 (Pl. 3, fig. 1), height 24.2 mm, locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.

Comment – The specimen of *Pyruclia cibarcola* (Anderson, 1929) from the early Pliocene Tubará Formation of Colombia is characterized by its low pointed spire, axial sculpture that persists onto the penultimate whorl, and a last whorl with a prominent, high-placed shoulder, tapering towards the base. The protoconch of the specimen from the type locality is not documented, but it is relatively well preserved in the Venezuelan shell; multispiral, dome-shaped, consisting of about three whorls with a very small nucleus.

***Pyruclia* aff. *lacondamini* (Olsson, 1964)**
Plate 3, fig. 2

Material – Two specimens NMB H20053 (Pl. 3, fig. 2), H20054, maximum height 41.6 mm, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.

Comment – *Pyruclia* aff. *lacondamini* from the late Miocene Urumaco Formation of Venezuela seems to be more closely similar to Pacific Neogene Gatunian *Pyruclia* species than it does to those found on the Caribbean side. Only one of the two specimens from the Urumaco Formation present in the NMB collections is complete. It is characterized by its very solid shell, almost completely flattened spire, and the shoulder placed just below the suture. Although the surface is somewhat worn, it is likely that sculpture was only present on the very earliest teleoconch whorls. In shape it is somewhat reminiscent of *Pyruclia scheibei* (Anderson, 1929), but lacks the canaliculated suture. Based on shell characters, this specimen is closer to *Pyruclia lacondamini* (Olsson, 1964) from the late Miocene Picaderos Formation of Ecuador, but differs fundamentally from the holotype in having the shoulder set higher and in having an even more depressed spire.

***Pyruclia solida* (G.B. Sowerby I, 1832)**
Plate 3, fig. 3

Material – Six specimens NMB H20048 (Pl. 3, fig. 3), H20049-20052, 20057, maximum height 37.6 mm, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.

Comment – The shells from Río Codore are indistinguishable from Recent specimens of *Pyruclia solida*. The species is also present in late Miocene Pacific Gatunian assemblages.

***Pyruclia*? *schmidti* nov. sp.**
Plate 3, figs 4, 5

Type material and dimensions – Holotype NMB H20056 (Pl. 3, fig. 4), height 32.5 mm, width 19.0 mm; paratype 1 NMB H20055 (Pl. 3, fig. 5), height 32.6 mm, width 22.5 mm.

Diagnosis – A *Pyruclia*? species with a medium-sized shell, a tall spire and globose last whorl, in which the spire whorls have a densely and finely reticulated sculpture, which rapidly weakens on the penultimate whorl and is subobsolete on the last whorl; columella with three sharp, non-bifid folds.

Locus typicus – Locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela.

Stratum typicum – Urumaco Formation, late Miocene.

Derivatio nominis – Named after Olivier Schmidt, collection manager at the NMB for all his help and hard work in this and many other papers dealing with Caribbean gastropod assemblages.

Description – Shell of medium size and thickness, with relatively tall spire and globose last whorl. Protoconch not preserved. Teleoconch consists of six whorls, spire whorls convex, with periphery at abapical suture. Suture impressed. Sculpture on early whorls consists of very close-set, rounded, prosocline axial ribs, about 32 on fourth teleoconch whorl, overrun by six narrow spiral cords, roughly equal in width to interspaces; sculpture rapidly widens and weakens on penultimate whorl, becoming obsolete, or almost so, on last whorl. Last whorl globose, moderately constricted at base. Outer lip and

siphonal canal damaged. Columella straight, bearing three sharp folds, decreasing in strength abapically; parietal callus thickened, broadly expanded, well delimited; columellar callus thickened, closely adherent sealing umbilicus. Siphonal fasciole rounded, of moderate strength.

Discussion – The two specimens available are both incomplete and somewhat worn, but show clearly the unique characteristics of this species that warrant description. *Pyruclia*? *schmidti* nov. sp. belongs to a group of Caribbean Neogene cancellariids which were placed by Jung & Petit (1990) in the genus *Pyruclia* with some hesitation, as they differ from typical members of the genus in having the sculpture well developed persisting to the penultimate whorl. The new species has a sculptural density on the spire whorls of the shell intermediate between that of *Pyruclia*? *uva* (Jung & Petit, 1990) from the late Miocene of the Dominican Republic and *P.*? *laevescens* (Guppy, 1866) from the Pliocene Bowden Formation of Jamaica, and although the axial sculpture on the last whorl is subobsolete in the new species, it is still more strongly developed than in either of the other two, neither of which retain even a hint of axial ribs on the last whorl. Although the last whorl is damaged in the Venezuelan shells, it seems to be far more rounded than the very characteristic barrel-shaped last whorl of both *P.*? *uva* and *P.*? *laevescens*.

***Pyruclia scheibei* (Anderson, 1929)**
Plate 3, fig. 6

Material – One specimen NHMW 2011/0178/0029 (juvenile), ex BL coll. (Pl. 3, fig. 6), height 21.7 mm, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene.

Comment – The shell from Punta Gavilán represents a juvenile, but clearly shows the very wide sutural gutter characteristic to the species. The spiral sculpture is stronger than that seen in specimens from other localities, but might be a juvenile trait.

***Pyruclia lacondamini* (Olsson, 1964)**
Plate 3, figs 7, 8

Material – Five specimens: NMB H20149 (Pl. 3, fig. 7), height 60.7 mm; NMB H20150 (Pl. 3, fig. 8), height 50.5 mm; NMB H20151- 20152 (juveniles); NMB H20153 (spire fragment of very large specimen at least 70 mm in height), locality NMB 17766, Punta Judas, west of Quepos, Nicoya Peninsula, Costa Rica (Pacific), Punta Judas Formation, late Miocene; three specimens NHMW 2011/0178/0030-2011/0178/0032 (juveniles), ex BL coll., same locality.

Comment – *Pyruclia lacondamini* (Olsson, 1964) is characterized by its very large and solid shell, with axial sculpture only present on the very earliest whorls and a prominent shoulder placed below the suture. The shoulder becomes more prominent with ontogeny, forming a broad shallow-sloping sutural platform in the largest specimens.

Genus *Bivetopsia* Jousseaume, 1887

***Bivetopsia* cf. *herberti* (Landau, Petit & Silva, 2007)**
Plate 4, fig. 2

Material – One specimen NMB H20083 (Pl. 4, fig. 2), height 20.2 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.

Comment – The fragment at hand is impossible to identify with certainty, but seems to represent a *Bivetopsia* species very similar to, if not conspecific with, *Bivetopsia herberti* (Landau, Petit & Silva, 2007) described from the late early Miocene Cantaure Formation of Venezuela.

***Bivetopsia porvenirensis* nov. sp.**
Plate 4, fig. 5

Type material and dimensions – Holotype NMB H18825 (Pl. 4, fig. 5), height 23.9 mm, width 16.9 mm.

Diagnosis – A *Bivetopsia* species with a relatively squat, medium-sized shell, with a sculpture of prominent, narrow, wide-spaced axial ribs, last whorl globose, outer lip not flared abapically, columellar folds simple and with a well developed siphonal fasciole.

Locus typicus – Locality NMB 17526, Mesa de Cocodite. 100 m from foot of N scarp of Mesa de Cocodite, and 200 to 300 m south of Caserio El Porvenir, south-southwest of Buenevara, Paraguaná Peninsula, Falcón State, Venezuela. Recrystallized fossils from basal limestones at or shortly above the contact.

Stratum typicum – El Porvenir beds, middle Miocene.

Derivatio nominis – From the type locality of El Porvenir.

Description – Shell of medium size, solid, spire nontabulate, relatively depressed, last whorl strongly globose, sculpture cancellate, with predominantly axial component. Protoconch not preserved. Teleoconch consisting of about four relatively depressed, rounded whorls, with periphery at abapical suture. Suture sinu-

ous, impressed, narrowly canaliculate. Axial sculpture consisting of 11 sharp, elevated, sinuous, prosocline ribs, with 1-2 varices per whorl. Spiral sculpture consisting of five sharp cords, much narrower than their interspaces, overriding axial sculpture, forming small nodules at intersections, secondary sculpture absent. Last whorl about 77% of total height, evenly rounded, strongly constricted at base. Aperture about 46% of total height; outer lip evenly rounded, strongly and deeply lirate within, labral varix narrow, elevated, stromboid notch not evident, very weakly flared abapically; anal canal poorly developed; siphonal canal open, short, narrow, adaxially recurved; parietal and columellar callus reduced to very thin callus wash. Columella with three simple, elevated folds, adapical fold sub-horizontal, lower folds oblique, weakening abapically. Siphonal fasciole very prominent, rounded, bordering small umbilical chink.

Discussion – *Bivetopsia porvenirensis* nov. sp. illustrates clearly the convergence of shell characteristics between the genera *Bivetopsia* Jousseaume, 1887 and *Bivetiella* Wenz, 1943 discussed by Jung & Petit (1990, p. 107). We consider the most important feature distinguishing the two genera to be the character of the columellar folds, the mid and abapical folds in *Bivetiella* being bifid, or insipiently so, and simple in *Bivetopsia*. *Bivetopsia porvenirensis* is similar to *B. herberti* (Landau, Petit & Silva, 2007) but differs in being less stocky, in having more numerous axial ribs and in not having the abapical portion of the aperture strongly flared as it is in *B. herberti*. *Bivetopsia pachia* (Smith, 1940), relatively widespread in the Caribbean late Miocene to Pleistocene can immediately be distinguished by its divided spiral cords. *Bivetopsia moorei* (Guppy, 1866) from the Pliocene Bowden Formation of Jamaica is probably the most closely similar species, but differs in having a slightly more elevated spire, in not having clearly developed varices and in having the columellar callus more strongly developed.
The callus is almost completely absent in the Venezuelan shell, which is unusual for the genus. Unfortunately, the single specimen available does not give us any information as to the intraspecific variability.

Genus *Hertleinia* Marks, 1949

***Hertleinia obeliscus* nov. sp.**
Plate 4, figs 6-7

Type material and dimensions – Holotype NMB H18773 (Pl. 4, fig. 6), height 23.6 mm, width 7.9 mm, locality NMB 17529; paratype NMB H18499 (Pl. 4, fig. 7), height 17.9 mm, width 6.2 mm, locality NMB 13665.

Diagnosis – A *Hertleinia* species with a small shell with very delicate cancellate sculpture, which weakens abapically, subobsolete mid-whorl on penultimate and last whorls.

Locus typicus – San Rafael, 3.5 km SSW of Pueblo Cumarebo (same locality as El Busco loc. NMB 13665, but this name is non-geographical, and is unacceptable). Small outcrop among houses 100 m south of road at west end of San Rafael, Falcón Province, Venezuela.

Stratum typicum – Caujarao Formation, late Miocene.

Derivatio nominis – Latin from Greek ὀβελίσκος (*obeliskos*), an obelisk. A noun in apposition.

Description – Shell small for genus, slender, fusiform, with tall pointed spire. Protoconch small, dome-shaped, comprising two whorls with medium-sized nucleus. Teleoconch of six tall, weakly convex whorls, with periphery at abapical suture. Suture impressed. Sculpture on early whorls consisting of 12 prosocline narrow axial ribs, spiral sculpture of two flattened subsutural cords, followed by wider interspace, seven subequal cords below separated by narrow groove-like interspaces, cords do not overrun axial elements, sculpture weakening on last two teleoconch whorls, subobsolete mid-whorl. Last whorl 60% of total height, evenly convex, constricted at base. Aperture 40% of total height, elongate; outer lip not thickened, with broad, shallow stromboid notch abapically, bearing 11 weak denticles a short distance within; anal canal not developed; siphonal canal relatively long, open and slightly recurved; parietal callus not developed; columellar callus thin, slightly raised. Columella bearing one narrow, oblique fold centrally, two very close-set folds adapically. Siphonal fasciole weakly developed, rounded.

Discussion – The genus *Hertleinia* is exclusively tropical American, represented today by *Hertleinia mitriformis* G.B. Sowerby I, 1832, living off the Pacific coast of Panama. It is not a speciose genus, and *Hertleinia obeliscus* nov. sp. can be immediately distinguished by the nature of its sculpture, which is far finer and weaker than in any of its congeners. *Hertleinia angosturana* (Marks, 1949) from the late Miocene Angostura Formation of Ecuador is the most similar, but differs in its stronger sculpture, which persists throughout and its less slender outline with a shorter spire.

Genus *Massyla* H. Adams and A. Adams, 1854

***Massyla cubaguaensis* (Landau, Petit & Silva, 2007)**
Plate 4, fig. 8

Material – One specimen NMB H20059 (Pl. 4, fig. 8), height 21.2 mm, locality NMB 17530, Carrizal, 30 m W of Cementerio, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.

Comment – The specimen at hand fits perfectly within the variability of *Massyla cubaguaensis* from the early Pliocene Araya and Aramina formations of Venezuela.

***Massyla toulai* Landau, Petit & Silva, 2012**
Plate 4, figs 9, 10

Material – Ten specimens NMB H20060 (Pl. 4, fig. 9) H20061-20068, H18774 (Pl. 4, fig. 10), maximum height 19.8 mm, locality NMB 17530, Carrizal, 30 m W of Cementerio, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.

Comment – The specimens at hand show clearly the characteristics for the species; a small, very solid fusiform shell with fine sculpture and strong lirae within the thick outer lip. In the shells from Carrizal the spiral sculpture is predominant on the last whorl rather than the axial sculpture as in the Gatun specimens, but this feature is somewhat variable. The protoconch is similar to that described for the Gatun shells.

***Massyla gavilanensis* nov. sp.**
Plate 4, fig. 11

Type material and dimensions – Holotype NMB H18696 (Pl. 4, fig. 11), height 24.3 mm, width, 16.4 mm. Punta Gavilán, Zamora District, Falcón State, Venezuela.

Diagnosis – A *Massyla* species with a medium-sized shell with a short spire, inflated last whorl, sculpture finely reticulate with predominantly spiral component, very weak axial ribs, giving the surface a somewhat granulose appearance, large aperture and a short siphonal canal.

Locus typicus – Locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela.

Stratum typicum – Punta Gavilán Formation, early Pliocene.

Derivatio nominis – From type locality of Punta Gavilán.

Description – Shell of medium size and strength, spire short, last whorl inflated. Protoconch worn. Teleoconch consisting of four regularly convex whorls, periphery at abapical suture. Suture impressed, linear. Axial sculpture consisting of very weak, close- set, prosocline ribs. Spiral sculpture consisting of seven narrow spiral cords, slightly narrower than their interspaces, overrunning axial sculpture, forming small nodules at intersections, giving surface somewhat granulose appearance. Last whorl about 85% of total height, regularly convex, weakly constricted at base; bearing 16 primary cords. Aperture about 56% of total height, relatively large, ovate; outer lip not thickened by labral varix, convex, lirate within; siphonal canal open, short; parietal callus thickened, well delimited, not expanded; columellar callus thickened, erect, forming medial wall of umbilical chink. Two robust, oblique columellar folds, adapical fold strongest, a third fold poorly developed, bordering the siphonal canal. Siphonal fasciole poorly delimited, rounded, forming lateral border of umbilical chink.

Discussion – *Massyla gavilanensis* nov. sp. with its very weak spiral sculpture and narrow, close-set spiral cords is more similar to the Floridian Plio-Pleistocene *Massyla* species than it is to the tropical American Neogene congeners. It is most similar to *M. propevenusta* (Mansfield, 1930), but this species has a shell with even more convex whorls, the last whorl is more constricted at the base and the siphonal canal is longer. Of the tropical American Neogene species *M. emilyvokesae* (Landau & Petit, 1997), *M. lopezana* Jung & Petit, 1990, *M. cantaurana* (Landau & Petit, 1997) and *M. cubaguaensis* (Landau, Petit & Silva, 2007) all have prominent axial folds on the last whorl. *Massyla terryi* (Olsson, 1942) has a similar sculpture, but is immediately distinguished by its high spire and somewhat disjunct whorls, as well as having the last whorl more constricted at the base and a longer siphonal canal. *Massyla corpulenta* Landau, Petit & Silva, 2012 is a large shelled species from the late Miocene of the Bocas del Toro area, Panama, which differs not only in its size but also in having a different shell shape, with a taller spire and longer siphonal canal.

***Massyla terryi* (Olsson, 1942)**
Plate 4, fig. 12

Material – One specimen NMB H20047 (Pl. 4, fig. 12), height 26.3 mm, locality NMB 12045, Punta Gavilán, Zamora District, Falcón State, Venezuela, Punta Gavilán Formation, early Pliocene.

Comment – A single calcitic pseudomorph present from the Punta Gavilán outcrop probably represents *Massyla terryi* (Olsson, 1942), although the spire is lower than usual for the species.

Genus *Narona* H. Adams & A. Adams, 1854

***Narona wiedenmeyeri* nov. sp.**
Plate 4, figs 13, 14; Plate 5, figs 1, 2

Narona barystoma Woodring, 1970 – Landau & Petit, 1997, p. 148, pl. 1, fig. 4 (non Woodring, 1970).

Type material and dimensions – Holotype NHMW 2011/0178/0033, ex BL coll. (Pl. 4, fig. 13), height 21.0 mm, width 18.6 mm; paratype 1 NHMW 2011/0178/0034, ex BL coll. (Pl. 4, fig. 14), height 21.4 mm, width 9.7 mm; paratype 2 NHB H18977 (Pl. 5, fig.1), height 18.2 mm, locality NMB 17516; paratype 3

NHB H18976 (Pl. 5, fig 2), height 14.9 mm (subadult), locality NMB 17517, Casa Cantaure, Falcón Province, Venezuela.

Further material – Eighteen specimens, maximum height 20.9 mm, BL coll., Casa Cantaure, Falcón Province, Venezuela.

Diagnosis – A *Narona* species with a medium-sized shell with a multispiral protoconch, convex spire whorls, with last two adult whorls evenly rounded, axial sculpture subobsolete, spiral sculpture fine, two well developed narrow columellar folds, third insipient fold, well developed siphonal fasciole and umbilical chink.

Locus typicus – Casa Cantaure, exposures in the banks Quebrada Cantaure, Falcón Province, Venezuela.

Stratum typicum – Cantaure Formation, late early Miocene.

Derivatio nominis – Named after Felix Wiedenmeyer, palaeontologist at the NMB.

Description – Shell medium-sized, slender, fusiform, with tall pointed spire. Protoconch small, dome-shaped, comprising three whorls with small nucleus. Teleoconch of five tall, whorls, with periphery mid-whorl; early whorls angular, later whorls evenly convex. Suture impressed. Sculpture on first teleoconch whorl consists of ten narrow axial ribs and two sharp spiral cords; secondary threads appear in interspaces on second whorl, gaining in strength abapically; penultimate whorl with 15 rounded, narrow axial ribs and five primary spiral cords, with a single secondary cord of variable strength in most interspaces; varices placed at irregular intervals on last two whorls. Last whorl 67% of total height, evenly convex, constricted at the base, with axial sculpture irregular and subobsolete, spiral sculpture of weak, narrow, close-spaced cords of alternating strength. Aperture 46% of total height, ovate-subtrigonal; outer lip thickened by varix, lirate within; anal canal broad, rounded; siphonal canal relatively long, open, slightly recurved; parietal callus not developed; columellar callus thin, slightly raised. Columella bearing two well-developed folds, with third insipient fold bordering siphonal canal. Siphonal fasciole strongly developed, rounded, bordering narrow umbilical chink.

Discussion – Landau & Petit (1997) considered the early Miocene shells from Cantaure to be conspecific with those described by Woodring (1970) from the late Miocene Gatun Formation of Panama as *Narona barystoma* Woodring, 1970. Subsequently, the authors collected further material which shows this not to be the case. *Narona wiedenmeyeri* nov. sp. is hardly distinguishable from *N. barystoma* in the juvenile form, but differs significantly in the form of the last two adult whorls. Fully grown shells from Cantaure are almost twice as large as the largest specimens of *N. barystoma* and more fusiform, the last two teleoconch whorls are more regularly convex, the suture is not as deep as in *N. barystoma*, the axial ribs are well developed on the last whorl in *N. barystoma*, whereas the sculpture is more subdued, the axial ribs subobsolete in *N. wiedenmeyeri*, the columellar folds are finer and the siphonal fasciole is more strongly developed, resulting in a deeper umbilical chink. *Narona clavatula* (G.B. Sowerby I, 1832) found in the Pleistocene and Recent tropical American Pacific faunas is of equal size to the new Venezuelan species, but is distinguished by having strong axial sculpture developed throughout.

***Narona* cf. *clavatula* (G.B. Sowerby I, 1832)**
Plate 5, fig. 3

Material – One specimen NHMW 2011/0178/0035, ex BL coll. (Pl. 5, fig. 3), height 16.9 mm, locality NMB 15907, Río Gurabo of the northern Dominican Republic, Cercado Formation, late Miocene.

Comment – A single specimen is available from the Río Gurabo, ascribed to the late Miocene Cercado Formation. The Dominican shell is of a similar size to *N. clavatula* (G.B. Sowerby I, 1832) and *N. wiedenmeyeri* nov. sp., but is larger than *N. barystoma* Woodring, 1970. It differs from *N. clavatula* in having more numerous, less elevated axial ribs and differs from *N. wiedenmeyeri* nov. sp. in having the axial sculpture well developed throughout and having the siphonal fasciole less prominent and consequently the umbilical chink is absent. It seems likely that this is a further undescribed species, but we lack sufficient material to be certain, and that several closely related, but distinct, *Narona* species were present in the tropical American Neogene and not a single species as suggested by Landau & Petit (1997).

Genus *Aphera* H. Adams & A. Adams, 1854

***Aphera aphrodite* Landau, Petit & Silva, 2012**
Plate 5, fig. 5

Material – One specimen NMB H20025 (Pl. 5, fig. 5), height 14.9 mm, locality NMB 12854; one specimen NMB H20046, locality 17529, at road Pueblo Cumarebo-Cumarebito, after El Busco de San Rafael, Estado Falcón, Venezuela, Caujarao Formation, late Miocene; three specimens NMB H20073-20075, maximum height 17.8 mm, locality NMB 17530, Carrizal, 30 m W of Cementerio, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.
Comment – The single well-preserved specimen from Venezuela clearly shows the shell characters of *Aphera*

aphrodite: relatively small size, multispiral protoconch, evenly reticulate sculpture, strongly thickened parietal and columellar calluses, which developed into a small shield and very coarse labral denticles and columellar folds, with the second labral denticle more strongly developed. This is the first record for the species outside the middle-upper Miocene lower-upper Gatun Formation of Panama.

***Aphera bananensis* nov. sp.**
Plate 5, figs 6-8; Plate 6, fig. 8

Type material and dimensions – Holotype NMB H20134 (Pl. 5, fig. 6), height 14.6 mm, width 7.4 mm; paratype 1 NMB H20135 (Pl. 5, fig. 7; Pl. 6, fig. 8), height 11.2 mm, width 6.5 mm; paratype 2 NMB H20135, height 10.7 mm, width 5.5 mm; paratype 3; NMB H20135, height 14.7 mm, width 6.9 mm (aperture damaged), all locality NMB 17453; paratype 4 NMB H20123 (Pl. 5, fig. 8), height 12.8 mm, locality NMB 17774.

Diagnosis – An *Aphera* species with a small shell, with a paucispiral protoconch comprising one whorl, sculpture horizontally elongated, reticulate, lirae within the outer lip, axial folds on the parietal callus and two stout bifid columellar folds.

Locus typicus – Locality NMB 17453, Río Banano south of Limón, Bomba, right bank, about 500 m SW of railway bridge, locality NMB 17774, 600 m SW of bridge, Limón Basin, Costa Rica.

Stratum typicum – Upper Río Banano Formation, early Piacenzian, early late Pliocene.

Derivatio nominis – From type locality 'Río Banano' in Costa Rica.

Description – Shell small, very solid, elongate ovate, spire medium-high, conical, sculpture finely reticulate. Protoconch paucispiral, consisting of one smooth whorl, nucleus large, transition to teleoconch delimited by beginning of spiral sculpture. Teleoconch consisting of 3.5 whorls; spire whorls elevated, convex, with periphery at abapical suture. Suture impressed, linear. Axial sculpture consisting of relatively weak, narrow, close-set, prosocline ribs, about 30 on penultimate whorl, becoming more wide- spaced abapically. Spiral sculpture consisting of 6-7 flattened cords, overrunning the axial sculpture. Last whorl globose, elongate, 80% of total height, regularly convex, bearing 25-26 axial ribs and 17-18 spiral cords, forming horizontally-elongated reticulate sculpture. Aperture 58% of total height, elongate, outer lip greatly thickened, most of the thickening occurring inside the aperture, edge of outer lip bearing eight elongated lirae within; siphonal canal short, open; parietal and columellar calluses moderately to strongly thickened, moderately expanded, forming small parietal shield; elevated axial folds present on parietal callus overlying axial ribs. Columella with two strong bifid folds, the adapical subhorizontal, stout, adapical oblique, lower half of the bifid fold forming margin of siphonal canal; single stout tubercle present on columellar callus between upper and lower folds; no umbilicus.

Discussion – By virtue of its paucispiral protoconch, *Aphera bananensis* nov. sp. can only be confused with the living *A. lindae* Petuch, 1987. However, this species differs in having a finer reticulate sculpture, more numerous lirae within the outer lip and much finer columellar folds. Unfortunately, *A. lindae* is known only from the holotype and possibly a fossil shell from the early Pleistocene Gelasian upper Escudo de Veraguas Formation of Escudo de Veraguas Island, Bocas del Toro, Panama (Landau *et al*., 2012a). However, neither specimen has the parietal callus developed into a shield. A feature of these Plio-Pleistocene Caribbean *Aphera* species *A. bananensis* and *A. lindae* is that they have weaker dentition on the outer lip than do the stratigraphically older species such as *A. islacolonis* (Maury, 1917), *A. trophis* Landau, Petit & Silva, 2012 and *A. aphrodite* Landau, Petit & Silva, 2012.

Genus *Axelella* Petit, 1988

***Axelella casacantaurana* nov. sp.**
Plate 5, fig. 10

Type material and dimensions – Holotype NHMW 2011/0178/0036, ex BL coll. (Pl. 5, fig. 10), height 16.2 mm, width 10.6 mm; paratype 1 NHB H18969, height 9.8 mm (juvenile), locality NMB 17520.

Diagnosis – An *Axelella* species with a rather large, solid shell, with sculpture consisting of narrow predominant axial ribs overrun by narrow spiral cords, a small aperture, and a prominent siphonal fasciole, resulting in a relatively wide and deep umbilicus.

Locus typicus – Casa Cantaure, 300 m SSE of the new (1952) Casa Cantaure; exposures in the banks of Quebrada Cantaure, Falcón Province, Venezuela.

Stratum typicum – Cantaure Formation, late early Miocene.

Derivatio nominis – From the type locality, Casa Cantaure.

Description – Shell large for genus, very solid, scalate. Protoconch not preserved. Four preserved teleoconch whorls, convex, with periphery just below mid-height. Suture undulating, canaliculate. Axial sculpture consisting of seven very strong, elevated, rounded, prosocline

ribs, roughly half the width of their interspaces. Spiral sculpture on spire whorls consisting of five narrow, elevated, evenly spaced primary cords, overrunning axial sculpture, one secondary spiral thread in each interspace from second preserved whorl, with several weaker cords above shoulder. Last whorl 68% of total height, canaliculate at suture, rounded at periphery, hardly constricted at base; bearing seven strong, rounded axial ribs and nine narrow spiral cords, a secondary spiral thread present in each interspace. Aperture subtrigonal, small, 42% of total height; outer lip greatly thickened by labral varix, rounded at shoulder, bearing one adapical and six lower elongated denticles a short distance within aperture, denticles weakening abapically; siphonal canal short, open, slightly recurved; parietal and columellar calluses strongly thickened, poorly expanded, with edge well delimited and erect, bearing several weak parietal folds. Columella with three broad horizontal folds, the adapical one being larger, weakening abapically. Siphonal fasciole very strongly developed, rounded, bearing spiral cords, forming lateral border of wide, deep, smooth umbilicus.

Discussion – *Axelella casacantaurana* nov. sp. is rather large for the genus, with a wider and deeper umbilicus than any of its tropical American congeners. *Axelella emblema* Jung & Petit, 1990 from the early Miocene Baitoa Formation of the Dominican Republic also has a well developed siphonal fasciole and umbilicus, but it is narrower than in *A. casacantaurana*. Moreover, the Dominican species has more angular whorls and a less canaliculate suture. *Axelella cativa* Landau, Petit & Silva, 2012 from the late Miocene Gatun Formation of Panama is very similar in shape and sculpture, but is smaller shelled, with a smaller aperture, much more strongly developed apertural armature, and has almost no siphonal fasciole.

***Axelella* sp.**
Plate 5, fig. 11

Material – One specimen NMB H20058 (Pl. 5, fig. 11), height 8.7 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, Mataruca Member, Caujarao Formation, late Miocene, Falcón Province, Venezuela.

Comment – Unfortunately this single specimen of an *Axelella* species is incomplete, but it probably represents an undescribed species. It is characterized by having a multispiral tall dome-shaped protoconch, six elevated narrow axial ribs and a deep suture. Similar to the Recent tropical American Pacific *Axelella funiculata* (Hinds, 1843), it differs in having a taller protoconch, with at least one extra protoconch whorl, and a deeper suture.

***Axelella nutrita* nov. sp.**
Plate 5, figs 13, 14; Plate 6, fig. 9

Type material and dimensions – Holotype NHMW 2011/0178/0037, ex BL coll. (Pl. 5, fig. 13; Pl. 6, fig. 9), height 13.1 mm, width 7.6 mm; paratype 1 NHMW 2011/0178/0038, ex BL coll. (Pl. 5, fig. 14), height 11.1 mm, width 6.9 mm.

Diagnosis – An *Axelella* species with a medium-sized shell with very convex whorls, axial sculpture relatively subdued for genus, globose last whorl, ovate aperture, and poorly developed parietal and columellar calluses.

Locus typicus – Coastal exposure next to 'blue house'(GPS coordinates N08º 08' 39.23", W82º 52' 24.98"), Burica Peninsula, Panama.

Stratum typicum – Armuelles Formation, Charco Azul Group, Pleistocene.

Derivatio nominis – From the Latin *nutrio*, for well-nourished, reflecting well rounded shape of shell.

Description – Shell small, spire short. Protoconch naticoid, consisting of three smooth whorls with very small nucleus, well delimited from teleoconch. Teleoconch consisting of three strongly and evenly convex whorls, with periphery below mid-height, subsutural area convex, poorly delimited from rest of shell. Suture undulating, deeply impressed. Axial sculpture consisting of prosocline, rounded ribs, about half the width of their interspaces, 13 on penultimate whorl. Spiral sculpture on spire whorls consisting of five narrow, elevated, evenly spaced primary cords, overrunning axial sculpture, with single secondary thread intercalated between primary cords in some interspaces from second whorl, plus five weaker cords on convex subsutural area. Last whorl globose, 78% of total height, rounded at periphery placed mid-whorl, hardly constricted at base, bearing nine rounded axial ribs and 12 narrow spiral cords, secondary spiral thread intercalated only mid-portion. Aperture ovate, 44% of total height; outer lip regularly convex, not thickened by labral varix, bearing a weak apical denticle and eight lirae below starting a short distance within aperture and extending deeply within. Columella bearing three folds, adapical fold delimiting medial edge of siphonal canal, parietal and columellar calluses slightly thickened, not expanded, sharp edged. Siphonal fasciole rounded, poorly delimited from base, bearing spiral cords, bordering small umbilical chink.

Discussion – The shell of *Axelella nutrita* nov. sp. is characterized by its very rounded whorls and rather subdued axial sculpture in comparison to its congeners. The living Caribbean *Axelella smithii* (Dall, 1888) is the most similar species, but differs in having less evenly and less strongly rounded whorls, in having the axial sculpture slightly more strongly developed and, whilst the parietal

callus is weakly developed, it expands further over the ventrum than in *A. nutrita*. In the new species the suture is very deeply impressed, giving the whorls a somewhat disjunct appearance, which is not the case in *A. smithii*. *Axelella emblema* Jung & Petit, 1990 from the Miocene of the Dominican Republic is similar in size and shape, also with the columellar callus hardly expanded, but has less numerous and more strongly developed axial ribs and more angular whorls, as well as being more constricted at the base, having the siphonal fasciole more strongly developed and a more prominent umbilical chink. The living tropical American Pacific *Axelella campbelli* (Shasky, 1961) and *A. funiculata* (Hinds, 1843), the fossil *A. thisbe* (Olsson, 1964) from the late Miocene to mid late Pliocene Esmeraldas Beds of Ecuador, *A. yara* Landau & Petit, 1997 from the early Miocene Cantaure Formation of Venezuela and the late Miocene *A. panamica* (Petit, 1976) and *A. cativa* Landau, Petit & Silva, 2012 from the Gatun Formation of Panama can immediately be distinguished from *A. nutrita* in having more elongate fusiform shells with much more prominent axial sculpture.

Genus *Agatrix* Petit, 1967

Agatrix agathe **Landau, Petit & Silva, 2012**
Plate 5, fig. 15

Material – Paratype 4 NMB H20038 (Pl. 5, fig. 15), height 11.2 mm; paratype 5 NMB H20039, height 11.5 mm, locality NMB 17529 (= El Busco, loc. NMB 13665) San Rafael, 3.5 km SSW of Pueblo Cumarebo, Falcón State, Venezuela. Caujarao Formation, late Miocene.

Comment – Landau, Petit & Silva (2012b, p. 927) pointed out that the shells of the Miocene *A. agathe* have a teleoconch almost identical to that of the Pliocene to Recent *A. epomis* (Woodring, 1928), but differ from the latter in their protoconch characteristics, having a multispiral rather than paucispiral protoconch.

Genus *Ventrilia* Jousseaume, 1887

Ventrilia insulare **(Pilsbry & Johnson, 1917)**
Plate 6, figs 1, 2

Material – One specimen, NMB H18500 (Pl. 6, fig. 2), height 27.6 mm (incomplete), locality NMB 13112, 50 m west of Carrizal cemetery, Carrizal, east of La Vela, Falcón State, Venezuela, Caujarao Formation, late Miocene; two specimens NHMW 2011/0178/0039-2011/0178 /0040, ex BL coll., maximum height 30.1 mm (Pl. 6, fig. 1), López Section, Río Yaque del Norte, Dominican Republic, ?Cercado Formation, late Miocene.

Comment – Jung & Petit (1990, p. 114) noted that the exact locality of the holotype and only specimen known to that date was unknown. The senior author found two further specimens along the López Section of the Río Yaque del Norte in beds of probable late Miocene Cercado age. A further fragment which matches closely in sculpture is present in the NMB collections from the roughly coeval Caujarao Formation of Venezuela.

Ventrilia rucksorum **Petuch, 1994**
Plate 6, fig. 3

Material – One specimen, NMB H18705, height 42.1 mm, locality NMB 17531; one specimen NHMW 2011/0178/0018, ex BL coll. (Pl. 6, fig. 3), height 48.3 mm, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene.

Comment – In the shell from Punta Gavilán both the axial and spiral sculpture are obsolete, except at the shoulder, where they produce a short spine. The strength of the sculpture is somewhat variable in this species, as discussed in Landau *et al*. (2007).

Ventrilia puntagavilanensis **nov. sp.**
Plate 6, fig. 4

Type material and dimensions – Holotype NMB H18706 (Pl. 6, fig. 4), height 45.9 mm, width 30.6 mm. Punta Gavilán, Zamora District, Falcón State, Venezuela.

Diagnosis – A medium sized *Ventrilia* species, with a predominantly spiral sculpture composed of strap-like cords divided into three groups, without secondary spirals, axial sculpture very weak, aperture obscured by matrix; umbilicus wide.

Locus typicus – Locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela.

Stratum typicum – Punta Gavilán Formation, early Pliocene.

Derivatio nominis – From Punta Gavilán, the type locality.

Description – Shell of medium size, spire strongly scalate, last whorl globose. Protoconch not preserved. 3.5 teleoconch whorls preserved, spire whorls convex, with periphery just above the abapical suture. Suture deeply canaliculate. Sculpture on early whorls consists of rounded, opisthocline axial ribs, overrun by five spiral cords, roughly equal in width to interspaces, forming small tubercles at the intersections; axial sculpture rapidly weakens on last whorl and ribs become widely spaced, spiral cords strap like, raised. Last whorl globose, with deep sutural gutter, delimited by elevated

shoulder cords, crossed by axial ribs as narrow lamellae, whorl convex below shoulder, not constricted at base; cords on last whorl arranged in three groups separated by slightly wider interspace; abapical group of three cords forming shoulder, mid-group consisting of six cords, abapical group more oblique, five cords covering base. Aperture obscured by matrix; umbilicus wide, partly obscured by callus, bearing prominent cords within.

Discussion – Although represented by a single imperfect specimen, this species merits description as it is quite distinct, with a sculpture of strap-like cords arranged in three sets. In the Caribbean Neogene assemblages it can only be compared with *Ventrilia druidi* (Olsson & Petit, 1964), but differs in having a larger, more fusiform shell, the sutural gutter is deeper and narrower, and in details of the strap like sculpture; the adapical group in *V. druidi* is composed of finer coalescent cords, whereas in *V. puntagavilanensis* the adapical group consists of three discrete cords. Moreover, *V. druidi* has irregular secondary spiral sculpture, absent in the new Venezuelan species.

Catalogue of the Cancellariinae of the tropical American Neogene Gatunian Province, including Recent species found in the same geographic area.

Note – The following genera were not included as they are either marginal in their distribution to the study area or deep-water, with no fossil record: *Pseudobabylonella* Brunetti, della Bella, Forli & Vecchi, 2009, *Brocchinia* Jousseaume, 1887b, *Crawfordina* Dall, 1919, *Gergovia* Cossmann, 1899, *Iphinopsis* Dall, 1924. *Microcancilla* Dall, 1924 and *Solatia* Jousseaume, 1887b.

-- Species-group taxa

Bold = valid species.
Regular = homonyms or junior subjective synonyms.

acalypta (*Cancellaria*) Woodring, 1970.

Cancellaria acalypta Woodring, 1970, p. 341, pl. 53, figs 1, 2.
Cancellaria? *acalypta* Woodring – Landau *et al.*, 2012b, p. 913, figs 4.4-4.6.

Cyronym – Cancellaria? *acalypta*, generic placement uncertain.
Type – Holotype USNM 645730; paratype CAS 71723, locality 136a, Transithmian Highway, Cativa, Panama, lower Gatun Formation, middle Miocene.
Occurrence – Middle Miocene, lower Gatun Formation, Panama; late Miocene, middle and upper Gatun Formation (Woodring, 1970; Landau *et al*., 2012b).

acuminata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 53; 1832b, fig. 5.

Comment – Junior subjective synonym of *Cancellaria obesa* G.B. Sowerby I, 1832 (Keen, 1971).
Types – Three syntypes, NHMUK 1968264, Guacomayo, Central America (= Mexico).

acuticarinata (*Cancellaria*) Weisbord, 1929.

Cancellaria epistomifera var. *acuticarinata* Weisbord, 1929, p. 51, pl. 6, fig. 7.
Cancellaria epistomifera acuticarinata Weisbord – Landau & Silva, 2010, p. 97, pl. 19, fig. 8.
Cancellaria acuticarinata Weisbord – Marks, 1949, p. 459 (list).

Cyronym – Euclia acuticarinata.Type – Holotype PRI 22948, near Tubará, Atlantico Department, Colombia, probably early Pliocene.
Occurrence – Early Pliocene?, Colombia (Weisbord, 1919).
Comment – Possibly conspecific with *Euclia codazzii* (Anderson, 1929) (Landau & Silva, 2010).

affinis (*Cancellaria*) C.B. Adams, 1852a, p. 356.

Comment – Junior subjective synonym of *Cancellaria ventricosa* Hinds, 1843 (Keen, 1971).
Type – Lectotype MCZ 186403, Panama.

affinis (*Cancellaria*) Reeve, 1856, pl. 9, figs 39a–b.

Comment – Junior subjective synonym of *Cancellaria indentata* G.B. Sowerby I, 1832 (Keen, 1971).
Type – Syntype NHMUK 1966241 (also a syntype of *C. cremata* Hinds, 1843), unstated locality.

agassizii (*Cancellaria*) Dall, 1889, p. 130, pl. 35, fig. 4.

Cyronym – Agatrix agassizii.
Type – Lectotype, USNM 93711, 25 fms., Gulf of Mexico.
Occurrence – Recent, Carolinas to Gulf of Mexico, shallow water, 33 to 91 m.

agathe (*Agatrix*) Landau, Petit & Silva, 2012.

Agatrix aff. *epomis* (Woodring) – Landau *et al*., 2012a, p.

333, figs 8.9-8.11.
Agatrix agathe Landau, Petit & Silva, 2012b, p. 927, figs 4.21-4.25.

Cyronym – Agatrix agathe.
Types – Holotype NMB H19651, locality PPP 00379 (5NMB 17851), northwest side of Bruno Bluff, Valiente Peninsula, Bocas del Toro, Panama, Nancy Point Formation, Messinian, late Miocene; paratype 1 NHMW 2011/0177/0033, ex. BL coll.; paratype 2. NHMW 2011/0177/0034, ex. BL coll., quarry behind Las Lomas, Cativa, middle Gatun Formation, late Miocene; paratype 3 NMB H19952, locality NMB 18360, Isla Payardí, east of Cativa, Colón, upper Gatun Formation, late Miocene; paratype 4 NMB H20038; paratype 5 NMB H20039, height 11.5 mm, locality NMB17529 (= El Busco, loc. NMB 13665) San Rafael. 3.5 km SSW of Pueblo Cumarebo, Falcón State, Venezuela, Caujarao Formation, late Miocene.
Occurrence – Late Miocene, middle and upper Gatun Formation, Nancy Point Formation, Panama (Landau *et al*., 2012b).

alacertata (*Euclia*) Landau, Petit & Silva, 2012.

Cancellaria dariena Toula – Brown & Pilsbry, 1911 (in part), p. 345, fig. 4 only.
Euclia alacertata Landau, Petit & Silva, 2012b, p. 915, figs 51.-5.8, 7.3.

Cyronym – Euclia alacertata.
Types – Holotype NHMW 2011/0177/0015, ex BL coll.; paratype 1-5 NHMW 2011/0177/0016-2011 /0177/0020, ex BL coll., canal bank of third lock, Panama Canal, Canal Zone, Panama, middle-upper Gatun Formation, late Miocene.
Occurrence – Late Miocene, middle-upper Gatun Formation, Panama (Landau *et al.,* 2012b).

albida (*Cancellaria*) Hinds, 1843, p. 47; 1844b, p. 42, pl. 12, figs 9–10.

Cancellaria (*Cancellaria*) *darwini* Petit – Aguilar & Fischer, 1986, p. 226, pl. 2, fig. 23. (not *C. darwini* Petit, 1970).

Cyronym – Cancellaria albida.
Types – Three syntypes, NHMUK 1966422, Bay of Guayaquil, Panama, and Veragua, from seven to twenty-three fathoms.
Occurrence – Pleistocene, upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (Aguilar & Fischer, 1986; NHMW 2011/0178/0001, ex BL coll., Pl. 2, fig. 2); Recent, Mexico to Peru, relatively shallow water, 10 to 128 m.

alvesi (*Gerdiella*) Lima, Barros & Petit, 2007, p. 100, figs 1-5.

Cyronym – Gerdiella alvesi.
Types – Holotype MZUSP 78932; 1 paratype ANSP 413550; 3 paratypes MORG 50.688; 2 paratypes MNRJ 10718; 4 paratypes MZUSP 78933. All from type locality off northeastern Brazil, 690 m.
Occurrence – Recent, known only from the type locality.

angosturana (*Cancellaria*) Marks, 1949.

Cancellaria (*Hertleinia*) *angosturana* Marks, 1949, p. 463 pl. 78, figs 1-2; Olsson, 1964, p. 125, pl. 37, fig. 12.
Cancellaria (*Hertleinia*) *angosturana* Marks – Jung & Petit, 1990, p. 108, pl. 23, figs 6-8.
Hertleinia angosturana Marks – Landau *et al*., 2012a, p. 322, figs 5.7-5.15.

Cyronym – Hertleinia angosturana.
Types – Holotype PRI 20387; paratype 1, CAS 71597 (*ex* SU 7964), Angostura Cave on Río Santiago, Esmeraldas Province, Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Marks, 1949; Olsson, 1964); early Pliocene, Cayo Agua Formation, Cayo Agua Island, Bocas del Toro, Panama (Landau *et al*., 2012a).

anomoia (*Cancellaria*) Woodring, 1970.

Cancellaria rowelli Dall – Olsson, 1922, p. 256, pl. 6, fig. 7 (not *C. rowelli* Dall, *in* Guppy & Dall, 1896); Weisbord, 1929, p. 50, pl. 6, figs 9-10 (not *C. rowelli* Dall, *in* Guppy & Dall, 1896]);Marks, 1949, p. 460 (list in part; Costa Rican and Colombian material only).
Cancellaria (*Cancellaria*) *anomoia* Woodring, 1970, p. 334, pl. 52, figs 1-2.
Cancellaria anomoia Woodring – Landau *et al*., 2012a, p. 312, figs 1.3-1.14, 7.8-9; Landau *et al*., 2012b, p. 908.

Cyronym – Cancellaria anomoia.
Type – Holotype USNM 645712, Payardi Island, east of Cativa, Panama, lower Gatun Formation, late Miocene.
Occurrence – Late Miocene, upper Gatun Formation (Woodring, 1970; Landau *et al*., 2012b), Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama, Caujarao Formation, Venezuela (NMB H18494, H18497, Pl. 1, fig. 7); early Pliocene, Cayo Agua Formation, Cayo Agua Island, Bocas del Toro, Panama (Landau *et al*., 2012a), Tubará Formation, Colombia (Weisbord, 1929); Pliocene (undetermined), Caribbean, Costa Rica (Woodring, 1970); late Pliocene, upper Río Banano Formation, Costa Rica (Landau *et al.,* 2012b).

aphrodite (*Aphera*) Landau, Petit & Silva, 2012.

Aphera islacolonis (Maury) – Woodring, 1970, p. 344, pl. 56, figs 1, 2 (not *A. islacolonis* Maury, 1917).
Aphera aphrodite Landau, Petit & Silva, 2012b, p. 925, figs 6.13-6.17, 7.6.

Cyronym – Aphera aphrodite.

Types – Holotype NHMW 2011/0177/0030, ex BL coll.; paratype 1 NHMW 2011/0177/0031, ex BL coll., locality TU 961, Cativa, Panama, middle Gatun Formation, late Miocene; paratype 2, NMB H19722, locality PPP 00227 (= NMB 17645); paratype 3, NMB H19727, locality PPP 01035 (= NMB 18260); paratype 4, NMB H19729, locality PPP 01078 (= NMB 18325); paratype 5, NMB H19754, locality PPP 00220 (= NMB 17638); paratype 6, NMB H19940, locality PPP 00488 (= NMB 17869).
Occurrence – Middle Miocene, lower Gatun Formation; late Miocene, middle and upper Gatun Formation, Panama (Landau *et al*., 2012b), Mataruca Member, Caujarao Formation, Venezuela (NMB H20025, Pl. 5, fig. 5).

apimela (*Cancellaria*) Woodring, 1970.

Cancellaria (*Cancellaria*) *apimela* Woodring, 1970, p. 337, pl. 52, figs 5-6.
Cancellaria apimela Woodring – Landau *et al*., 2012a, p. 312, figs 1.1-1.2; Landau *et al*., 2012b, p. 909.

Cyronym – Cancellaria apimela.
Type – Holotype USNM 645720, Caribbean coast east of San Miguel (Río Miguel), station 25 plus 120 metres, Panama, upper Gatun Formation, late Miocene.
Occurrence – Middle Miocene, Valiente Formation, Popa Island, Bocas del Toro (Landau *et al*., 2012a); late Miocene, upper Gatun Formation, Panama (Woodring, 1970; Landau *et al*., 2012b).

auriculaperta (*Cancellaria*) Vokes, 1938.

Cancelaria [sic] *laevescens* Guppy, 1910, p. 6 (list); Guppy, 1913, p. 4 (list).
Cancellaria (*Cancellaria*) *auriculaperta* Vokes, 1938, p. 22, figs 19-20.
Cancellaria (*Pyruclia*) *auriculaperta* Vokes – Jung & Petit, 1990, p. 100.
Cancellaria auriculaperta Vokes – Marks, 1949, p. 459 (list).

Cyronym – Pyruclia auriculaperta.
Type – Holotype AMNH 24665, Springvale, Trinidad, Springvale Formation, early Pliocene.
Occurrence – Early Pliocene, Springvale Formation, Trinidad (Vokes, 1938).

axelolssoni (*Cancellaria*) Landau, Petit & Silva, 2012.

Cancellaria mauryae Olsson, 1922 (in part), p. 82 (not Dominican material).
Cancellaria axelolssoni Landau, Petit & Silva, 2012a, p. 317, figs 3.6-3.12, 7.15-7.16.

Cyronym – Cancellaria axelolssoni.
Types – Holotype NMB H19541; paratype 1 NMB H19542, paratype 2 NMB H19543, locality PPP 02236 (= NMB 18733); paratype 3 NMB H19544, paratype 4 NMB H19545, locality PPP 00347 (= NMB 17904); paratype 5 NMB H19546, locality PPP 00345 (= NMB 7830),unnamed promontory between Tiburon and Piedra Roja Points,W side of Cayo Agua Island, Cayo Agua Formation, Zanclean, Pliocene; paratype 6 NMB H19547, locality PPP 00338 (= NMB 17827), east tip Tiburon Point, Cayo Agua Island, Cayo Agua Formation, Zanclean, Pliocene.
Occurrence – Early Pliocene, Cayo Agua Formation, Cayo Agua Island, Bocas del Toro, Panama (Landau *et al*., 2012a); late Pliocene, upper Río Banano Formation, Costa Rica (NMB H20133, Pl. 1, Fig 12).

bahia (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Tribia*) *bahia* Pilsbry & Olsson, 1941, p. 24, pl. 3, fig. 3.

Cyronym – Agatrix bahia.
Type – The holotype is unnumbered and could not be located. It is not in the ANSP collections (G. Rosenberg personal communication), Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

bajonensis (*Cancellaria*) Jung & Petit, 1990.

Cancellaria epistomifera Guppy – Maury, 1917 (in part), p. 63, pl. 10, figs 3, 4. (not 5 = *Bivetiella epistomifera* Guppy, 1876); Maury 1925b, pl. 9, fig. 11 (not *C. epistomifera* Guppy, 1876).
Cancellaria (*Bivetiella*) *bajonensis* Jung & Petit, 1990, p. 106, pl. 22, figs 1–7, pl. 26, figs 1–3.

Cyronym – Bivetiella bajonensis.
Type – Holotype NMB H17314, locality NMB 16923, Arroyo Bajón, Río Mao, Dominican Republic, Cercado Formation, late Miocene.
Occurrence – Late Miocene, Cercado Formation, Dominican Republic (Jung & Petit, 1990).

balboae (*Cancellaria*) Pilsbry, 1931, p. 439, pl. 41, figs 7–8.

Cancellaria harrisi Maury – Li, 1930, p. 272, pl. 7, fig. 62 (not Maury, 1917).

Cyronym – Euclia balboae.
Comment – May be a slender form of *Euclia cassidiformis* (G.B. Sowerby I, 1832) (Verhecken, 1985).
Types – Holotype is AMNH 269087, 10-40 m, off La Boca, Panama Bay, Panama. Paratype, ANSP 107154, Panama, on shore.
Occurrence – Recent, Panama, shallow water,10-40 m.
Comment – Sometimes considered to be a form of *Euclia cassidiformis* (G.B. Sowerby I, 1832) (*e.g*. Verhecken, 1985, p. 5) but a recent molecular study shows considerable separation between the two and they are separable species.

bananensis (*Aphera*) nov. sp.

Aphera bananensis Landau, Petit, Etter & Silva (this paper), p. 203, Pl. 5, figs 6-8, Pl. 6, fig. 8.

Cyronym – Aphera bananensis.
Types – Holotype NMB H20134; paratype 1 NMB H20135; paratype 2 NMB H20135; paratype 3 NMB H20135, all locality NMB 17453; paratype 4 NMB H20123, locality NMB 17774, Río Banano south of Limón, Bomba, 500-600 m southwest of bridge, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
Occurrence – Late Pliocene, upper Río Banano Formation, Costa Rica (this paper).

barretti (*Cancellaria*) Guppy, 1866.

Cancellaria barretti Guppy, 1866, p. 289, pl. 17, fig. 11; Guppy, 1867, p. 157 (list, in part); Guppy, 1874, p. 438 (list, in part); Dall, 1903, p. 1583 (list, in part).
Cancellaria (*Cancellaria*) *barretti* Guppy – Woodring, 1928 (in part), p. 219, pl. 12, (not fig. 6); Marks, 1949, p. 459 (list); Jung & Petit, 1990, p. 117, pl. 16, figs 1-4.
Not *Cancellaria barretti* Guppy – Guppy, 1866, p. 286 (list, not p. 289); Guppy, 1867, p. 157 (list, in part); Guppy, 1876, p. 520; Maury, 1917, p. 226, pl. 36, fig. 1; Pilsbry, 1922, p. 332; Maury, 1925b, pl. 9, fig. 17; Ramírez, 1950, p. 22, pl. 3, fig. 3; Ramírez, 1956, p.12, 18, 19. (all = *C. mauryae* Olsson, 1922).
Not *Cancellaria barretti* Guppy – Engerrand & Urbina, 1910, p. 125.
Not *Cancellaria barretti* Guppy – Olsson, 1922, p. 81, pl. 6, fig. 6 [= ? *Bivetiella dariena* (Toula, 1909)].
Not *Cancellaria* (*Cancellaria*) *barretti* Guppy – Woodring, 1928 (in part), p. 219, pl. 12, fig. 6 (= *C. isabelae* Landau, Petit & Silva, 2012).
Not *Cancellaria* (*Cancellaria*) *barretti* Guppy – Tucker & Wilson, 1932, p. 8, pl. 3, fig. 3.
Not *Cancellaria barreti* [*sic*] Guppy – Gómez & Valerio, 1971, p. 44, fig. 3 (= *C. petiti* Olsson, 1967).

Cyronym – Cancellaria barretti.
Type – Holotype NHMUK G 64069; Bowden, Jamaica, Bowden Formation, Pliocene.
Occurrence – Pliocene, Bowden Formation, Jamaica (Jung & Petit, 1990).

barystoma (*Cancellaria*) Woodring, 1970.

Cancellaria (*Narona*) *barystoma* Woodring, 1970, p. 342, pl. 53, figs 5, 6.
Narona barystoma Woodring – Landau *et al*., 2012b, p. 925.
Not *Narona barystoma* Woodring – Landau & Petit, 1997, p. 148, pl. 1, fig. 4, 6 (= *Narona wiedenmeyeri* nov sp.).

Cyronym – Narona barystoma.
Type – Holotype USNM 645732. 100 m north of Transisthmian Highway, 75 m west of road to refinery site on Payardi Island, Cativa, Panama, lower Gatun Formation, middle Miocene.
Occurrence – Middle Miocene, lower Gatun Formation, Panama; late Miocene, middle and upper Gatun Formation, Panama (Woodring, 1970; Landau *et al*., 2012b).

bayeri (*Admetula*) Petit, 1976, p. 38, pl. 1, fig. 4.

Cyronym – Admetula bayeri.
Type – Holotype USNM 747977, off Yucatan Peninsula, Mexico, 585-591 m.
Occurrence – Recent, known only from the Gulf of Mexico type locality, deep water, 585-591 m.

beata (*Cancellaria*) Jung, 1965.

Cancellaria (*Bivetiella*) *beata* Jung, 1965, p. 554, pl. 75, figs 12-14.

Cyronym – Bivetiella beata.
Types – Holotype NMB H13767; paratypes PRI 27430, PRI 27431; paratypes also in NHMUK and USNM, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Jung, 1965); late Miocene, Caujarao Formation, Venezuela (NMB H19835, locality NMB 13665).

beatrix (*Admete*) Olsson, 1964.

Admete (*Bonellitia*) *beatrix* Olsson, 1964, p. 128, pl. 22, fig. 9.
Agatrix beatrix Olsson – Landau *et al*., 2012a, p. 333, figs 8.12-8.15.

Cyronym – Agatrix beatrix.
Types – Holotype USNM 644118; paratype 1, USNM 644119, Punta Gorda, Esmeraldas Province, Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964); Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a).

bradleyi (*Cancellaria*) Nelson, 1870.

Cancellaria bradleyi Nelson, 1870, p. 192, pl. 6, figs 8–9.
Cancellaria (*Cancellaria*) *bradleyi* Nelson – Olsson, 1932, p. 156, pl. 17, figs 6, 8; Marks, 1949, p. 459 (list).

Cyronym – Cancellaria bradleyi.
Type – Lectotype YPM IP031754; paralectotypes IP031383. IP031754, IP000521. Quebrada Tucillal, Peru, Tumbes Formation, late Miocene.
Occurrence – Late Miocene, Tumbes Formation, Peru (Olsson, 1932).

brasiliensis (*Axelella*) Verhecken, 1991, p. 549, figs 5–6.

Cyronym – Pseudobabylonella brasiliensis.
Type – Holotype MNHN (unnumbered), off Brazil, 682 m.
Occurrence – Recent, known only from the holotype, 18°58 S, 37°49 W., 682 m, deep water. This is not an *Axelella*. It can now be placed in the newly named *Pseudobabylonella* Brunetti, della Bella, Forli & Vecchi, 2009. This genus restricted to deeper waters is excluded from this work.

brevis (*Cancellaria*) G.B. Sowerby I, 1832a, p. 52; 1832b, fig. 33.

Cyronym – Ventrilia brevis.
Types – Three syntypes NHMUK 1964452. One specimen obviously added later as it was described from only two specimens, one from Puerto Portreo (Costa Rica) and the other from St. Elena (Ecuador).
Occurrence – Recent, Mexico to Ecuador, shallow water to 20 m.

bulbulus (*Cancellaria*) G.B. Sowerby I, 1832a, p. 55.

Cancellaria (*Peruclia* [*sic*]) *bulbulus* Sowerby – Pilsbry & Olsson, 1941, p. 24.

Cyronym – Pyruclia bulbulus.
Types – Three syntypes NHMUK 1964462. One specimen obviously added later as it was described from only 'two young specimens … at Real Llejos' (Nicaragua).
Occurrence – Pliocene (undetermined), Jama Formation, Ecuador (Pilsbry & Olsson, 1941); Recent, Mexico to Peru, shallow water to 37 m.

bullata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 51; 1832b, fig. 35.

Cyronym – Ventrilia bullata.
Types – Four syntypes NHMUK 1964447, 'Payta (= Paita, Peru) and Gulf of Nocoiya (= Nicoya, Costa Rica)', in 12 fathoms.
Occurrence – Pleistocene, Charco Azul Group, Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0002, ex BL coll., Pl. 6, fig. 5); late Pleistocene, Los Angeles County, California (Willett, 1937); Recent, Mexico to Peru, offshore at depths to 82 m.

bullbrooki (*Cancellaria*) Mansfield, 1925, p. 31, pl. 5, fig. 3.

Cancellaria bullbrooki Mansfield, 1925, p. 31, pl. 5, fig. 3; Marks, 1949, p. 459 (list).

Cyronym – Narona bullbrooki.
Type – Holotype USNM 352663, Guaico-Tamana road, 2 miles east of mile 13 from junction with East Main Road, Trinidad, Miocene.
Occurrence – Miocene, Trinidad.
Comment – Marks misspelled as *bulbrooki* in 1949.

campbelli (*Trigonostoma*) Shasky, 1961, p. 20, pl. 4, fig. 5.

Cyronym – Axelella campbelli.
Types – Holotype CAS-IZ 64611.00, 30-50 fathoms off Cabo Haro, Sonora, Mexico. Paratypes in San Diego Natural History Museum. Present location of paratypes in Shasky collection unknown.
Occurrence – Recent, off western Mexico to Costa Rica, 80-91 m depth.

canae (*Perplicaria*) Jung & Petit, 1990.

Perplicaria canae Jung & Petit, 1990, p. 112, pl. 25, figs 9–15; pl. 26, figs 12–14

Cyronym – Perplicaria canae.
Types – Holotype NMB H17330; paratype 1 NMB H17331, locality TU 1230, Río Cana, east bank, just above ford at Caimito on Los Quemados-Sabaneta Road, Dominican Republic, Cercado Formation, late Miocene.
Occurrence – Late Miocene, Cercado Formation, Dominican Republic (Jung & Petit, 1990).

candida (*Cancellaria*) G.B. Sowerby I, 1832b, fig. 1.

Types and Comment – Provenance unknown (see Hemmen, 2007). Although listed by Petit & Harasewych (2005) as Panamic-Pacific, we have not included it in the list of valid Panamic-Pacific species.
There are two 'possible syntypes' in NHMUK 1968403. The original figure does not match well and looks more like *Cancellaria ventricosa* Hinds. In describing the latter species, Hinds compared it with *C. candida* and mentioned only differences in secondary sculpture and the number of columella folds, a number that is sometimes different depending on age of specimens and their orientation. Verhecken (1985, p. 5) suggested that *C. candida* is an albino variety of *C. reticulata* (Linné, 1767). Photographs of the possible syntypes of *C. candida* agree extremely well with white specimens of *C. reticulata* recently obtained from the Gulf of Mexico. Due to the questionable status of these 'possible syntypes' and their failure to exactly match the original figure, we consider that *C. candida* should be treated as a *nomen dubium*.
Occurrence – Listed by Petit & Harasewych (2005, p. 35) as 'Recent? Panamic-Pacific' as the 'possible syntypes' are *Cancellaria sensu stricto*. Although *C. candida* was stated by Sowerby to be from Polynesia, the nominotypical genus/subgenus occurs only in the Tertiary of the southern United States and the area covered by this report.

cantaurana (*Cancellaria*) Landau & Petit, 1997.

Cancellaria (*Massyla*) *cantaurana* Landau & Petit, 1997,

p. 147, pl. 1, figs 2a-b.

Cyronym – Massyla cantaurana.
Type – Holotype NMB H17788, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Landau & Petit, 1997).

capeloi (*Cancellaria*) Landau, Petit & Silva, 2007.

Cancellaria (*Cancellaria*) *capeloi* Landau, Petit & Silva, 2007, p. 29, figs 1-6; Landau & Silva, 2010, p. 96, pl. 19, figs 3-4.

Cyronym – Cancellaria capeloi.
Types – Holotype MOBR-M-3359 (EDIMAR coll.); paratype 1 (BL coll.); paratype 2 MOBR-M-3360 (EDIMAR coll.); paratype 3, UF 116699; paratype 4 (BL coll.), Cañon de las Calderas, Cubagua Island, Nueva Esparta State, Venezuela, Araya Formation, Cubagua Group, early Pliocene.
Occurrence – Early Pliocene, Araya and Aramina Formations, Venezuela (Landau *et al.,* 2007; Landau & Silva, 2010).

casacantaurana (*Axelella*) nov. sp.

Axelella casacantaurana Landau, Petit, Etter & Silva (this paper), p. 203, Pl. 5, fig. 10.

Cyronym – Axelella casacantaurana.
Types – Holotype NHMW 2011/0178/0036, ex BL coll.; paratype 1 NHB H18969, locality NMB 17520, Casa Cantaure, 300 m SSE of the new (1952) Casa Cantaure; exposures in the banks of unnamed Quebrada Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (this paper).

casicalva (*Cancellaria*) Marks, 1949.

Cancellaria (subgenus?) *casicalva* Marks, 1949, p. 464, pl. 78, figs 3, 10.

Cyronym – Pyruclia? *casicalva.*
Types – Holotype PRI 20388; paratype 1 PRI 20389; paratype 2 CAS 71598, locality I. P. C. 1464, Jerusalém sector, northernmost Guayas Province, Daule Basin, Ecuador, late Miocene.
Occurrence – Late Miocene, Daule Formation, southern Ecuador (Marks, 1941).

cassidiformis (*Cancellaria*) G.B. Sowerby I, 1832a, p. 53; 1832b, fig. 22.

Cancellaria (*Euclia*) *cassidiformis* Sowerby – Pilsbry & Olsson, 1941, p. 24.

Cancellaria (*Euclia*) *codazzii* Anderson – Aguilar & Fischer, 1986, p. 226, pl. 3, fig. 24. [not *E. codazzii* (Anderson, 1929)].

Cyronym – Euclia cassidiformis.
Types – Four syntypes, MNHUK 1964453, Panama.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson*,* 1941); late Pliocene, Charco Azul Group, Penita Formation, Burica Peninsula, Panama (NHMW 2011/0178/0003, ex BL coll.); Pleistocene, Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0004, ex BL coll.); Pleistocene (indet.) of Lower California (Dall, 1918); upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (Aguilar & Fischer, 1986; (NHMW 2011/ 0178/0005, ex BL coll., Pl. 4, fig. 1); Recent, Panamic-Pacific, intertidal to 37 m.

cativa (*Axelella*) Landau, Petit & Silva, 2012.

Axelella cativa Landau, Petit & Silva, 2012b, p. 926, figs 6.18-6.20.

Cyronym – Axelella cativa.
Type – Holotype NHMW 2011/0177/0032, ex BL coll., locality TU 961, Cativa, Panama, middle Gatun Formation, late Miocene.
Occurrence – Late Miocene, middle Gatun Formation, Panama (Landau *et al*., 2012b).

centrota (*Cancellaria*) Dall, 1896, p. 13; 1908, p. 295, pl. 1, fig. 8.

Type – USNM 122996, 66 fathoms, near Cocos Island, Gulf of Panama.
Cyronym – Sveltia centrota.
Occurrence – Pleistocene, Charco Azul Group, Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0006, ex BL coll., Pl. 5, fig. 16); Recent, off Baja California to Cocos Island and to the Galapagos Islands at depths of 60–200 m.

cerithea (*Cancellaria*) Olsson, 1964.

Cancellaria (?) *cerithea* Olsson, 1964, p. 125, pl. 22, figs 4, 4a.

Cyronym – Cancellaria (?) *cerithea*, generic placement uncertain.
Type – Holotype USNM 643880, Punta Gorda, northwestern Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson*,* 1964).

charapota (*Cancellaria*) Olsson, 1942.

Cancellaria (*Bivetopsis*) *charapota* Olsson, 1942, p. 60, pl.

8, fig. 3.
Cancellaria (*Bivetopsia*) *charapota* Olsson – Marks, 1949, p. 459 (list).

Cyronym – Bivetopsia charapota.
Type – Holotype PRI 4043, Punta Charapota, between Manta and Bahia, Manabi Province, west coast Ecuador, middle Miocene?
Occurrence – ?Middle Miocene, Ecuador (Olsson, 1942).

chrysostoma (*Cancellaria*) G.B. Sowerby I, 1832a, p. 54; 1833, fig. 39.

Types – Three syntypes, MNHUK 196442, Panama and Santa Elena.
Cyronym – Bivetopsia chrysostoma.
Occurrence – Recent, Panama to Peru, shallow water 12 to 15 m.

cibarcola (*Cancellaria*) Anderson, 1929.

Cancellaria cibarcola Anderson, 1929, p. 116, pl. 14, figs 1–3; Marks, 1949, p. 459 (list).
Not *Cancellaria* (*Pyruclia*) *cibarcola cibarcola* Anderson – Woodring, 1970 (in part), p.338, pl. 53, figs 8, 10-12 (= *Pyruclia tweedledee* Landau, Petit & Silva, 2012b).
Not *Cancellaria* (*Pyruclia*) *cibarcola cibarcola* Anderson – Woodring, 1970 (in part), p.338, pl. 52, figs 9, 10 (= *Pyruclia tweedledum* Landau, Petit & Silva, 2012b).

Cyronym – Pyruclia cibarcola.
Type – Holotype CAS 4643, locality CAS locality 325-A, near Cibarco, Departamento del Atlántico, Colombia, Tubará Formation, early Pliocene.
Occurrence – Late Miocene, Mataruca Member, Caujarao Formation, Venezuela (NMB H19982, Pl. 3, fig. 1); early Pliocene, Tubará Group, northern Colombia (Anderson, 1929).

cingulata (*Gerdiella*) Olsson & Bayer, 1972, p. 879, figs 7–9.

Cyronym – Gerdiella cingulata.
Type – Holotype USNM 796731, south of Jamaica, 17°42.5N, 77°58'W, 549–530 m.
Occurrence – Recent, at type locality and from 400 fms, 130 miles ESE of New Orleans, Louisiana.

clarki (*Perplicaria*) Smith, 1947, p. 55, pl. 2, fig. 9.

Cyronym – Perplicaria clarki.
Type – Holotype UF 174280.
Occurrence – Recent, intertidal to shallow water, Mexico to Ecuador.
clathrata (*Cancellaria*) A. Adams, 1855, p. 123. Recent, Panamic-Pacific.
Comment – Junior homonym of *Cancellaria clathrata*, Lamarck, 1822 (= *C. jayana* Keen, 1958).

clavatula (*Cancellaria*) G.B. Sowerby I, 1832a, p. 52; 1832b, fig. 12.

Cyronym – Narona clavatula.
Type – Syntype, NHMUK 1966306, Panama and Peru, 7 fathoms.
Occurrence – Basal Pliocene, Los Angeles County, California (Grant & Gale, 1931); Pleistocene, Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0007, ex BL coll.); upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0008, ex BL coll., Pl. 5, fig. 4); Recent, Mexico to Peru, shallow water to 64 m.

coatesi (*Ventrilia*) Landau, Petit & Silva, 2012.

Cancellaria (*Trigonostoma*) aff. *Cancellaria bullata* Sowerby – Toula, 1911, p. 507, pl. 30, fig. 10.
Trigonostoma cf. *T. insulare* (Pilsbry and Johnson) – Woodring, 1970, p. 345.
Ventrilia coatesi Landau, Petit & Silva, 2012b, p. 927, figs 6.23-6.31.

Cyronym – Ventrilia coatesi.
Types – Holotype NHMW 2011/0177/0035, ex BL coll.; paratype 1 NHMW 2011/0177/0036, ex BL coll.; paratype 2 NHMW 2011/0177/0037, ex BL coll., canal bank of third lock, Panama Canal, Canal Zone, Panama, middle-upper Gatun Formation, late Miocene.
Occurrence – Late Miocene, middle-upper Gatun Formation, Canal Zone, Panama (Landau *et al*., 2012b).

codazzii (*Cancellaria*) Anderson, 1929.

Cancellaria codazzii Anderson, 1929, p. 116, pl. 14, figs 4-7; Marks, 1949, p. 459 (list);Barrios, 1960, p. 291, pl. 11, fig. 5.
Cancellaria karsteni Anderson, 1929, p. 114, pl. 10, figs 7-9; Marks, 1949, p. 460 (list). *Cancellaria hettneri* Anderson, 1929, p. 114, pl. 10, figs 5-6; Marks, 1949, p. 460 (list). *Cancellaria* (*Euclia*) cf. *codazzii* Anderson – Jung, 1969, p. 541, pl. 58, fig. 8.
Cancellaria (*Euclia*) *codazzii* Anderson – Woodring, 1970, p. 339, pl. 54, figs 3, 4, 7, 8,11, 12; Pitt & Pitt, 1993, p. 6, pl. 2, fig. 10; Landau *et al*., 2007, p. 36, figs 26-28.
Euclia codazzii (Anderson). Landau & Silva, 2010, p. 97, pl. 19, fig. 7; Landau *et al*., 2012a, p. 319, figs 4.1-4.5; Landau *et al*., 2012b, p. 917.
Not *Cancellaria* (*Euclia*) *codazzii* Anderson – Aguilar & Fischer, 1986, p. 226, pl. 3, fig.24 [= *E. cassidiformis* (G.B. Sowerby I, 1832)].

Cyronym – Euclia codazzii.
Type – Holotype CAS 4645, locality between Chorrera and Cibarco, Departamento del Atlántico, Colombia, Tubará Formation, early Pliocene.
Occurrence – Middle Miocene, lower Gatun Formation,

Canal Zone, Panama (Woodring, 1970; Landau *et al*., 2012b); late Miocene, middle and upper Gatun Formation, Canal Zone, Panama (Woodring, 1970; Landau *et al*., 2012b), Caujarao Formation, Venezuela (NMB H19836-19837, Pl. 2, fig. 13); early Pliocene, Araya Formation, Cubagua Island, Venezuela (Landau *et al*., 2007; Landau & Silva, 2010); Tubará Group, northern Colombia (Anderson, 1929); Melajo Clay Member of Springvale Formation, Trinidad (Jung, 1969); Cayo Agua Formation, Cayo Agua Island, Bocas del Toro, Panama (Landau *et al*., 2012a).

colombiana (*Cancellaria*) Olsson, 1942.

Cancellaria colombiana Olsson, 1942, p. 63, pl. 9, fig. 4.

Cyronym –?*Sveltia colombiana*.
Type – Holotype PRI 4047, upper Las Perdices shales, Puerto Colombia, Atlantico Department, Colombia, Las Perdices Formation, early Miocene.
Occurrence – Early Miocene, Las Perdices Formation, Colombia (Olsson, 1942).

cominella (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Cancellaria*) *cominella* Pilsbry & Olsson, 1941, p. 23, pl. 3, fig. 7.

Cyronym – Euclia cominella.
Type – Holotype ANSP 13643, Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

coronadosensis (*Cancellaria*) Durham, 1950.

Cancellaria coronadosensis Durham 1950, p. 102, pl. 26, figs 2, 8; Schneider, 1999, figs 11, 12.

Types – Holotype UCMP 30465, 2 paratypes UCMP 3582 & 3584, all Isla Coronados, Gulf of California. late Pleistocene.
Occurrence – Late Pleistocene at the type locality and in a late Pleistocene terrace near Santa Ynez Bay, B.C.S., Mexico.
Comment – Considered herein a junior subjective synonym of *Cancellaria obesa* G.B. Sowerby I, 1832.

corpulenta (*Massyla*) Landau, Petit & Silva, 2012.

Massyla corpulenta Landau, Petit & Silva, 2012a, p. 323, figs 6.3-6.7.

Cyronym – Massyla corpulenta.
Types – Holotype NMB H19626, locality PPP 01883 (= NMB 18771); paratype 1 NMB H19669, locality PPP 02197 (= NMB 18696), late Miocene, Messinian, Nancy Point Formation, Finger Island, west of finger, Valiente Peninsula, Bocas del Toro, Panama. *Occurrence* – Late Miocene, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a).

corrosa (*Cancellaria*) Reeve, 1856, pl. 14, fig. 64.

?*Cancellaria* (*Cancellaria*) *decussata* Sowerby – Aguilar & Fischer, 1986, p. 226, pl. 2, fig. 26 (not *C. decussata* G.B. Sowerby I, 1832).

Cyronym – Cancellaria corrosa.
Type – Holotype NHMUK 1968408, no locality stated.
Occurrence – Pleistocene, upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (Aguilar & Fischer, 1986; NHMW 2011/0178/0041, ex BL coll., Pl. 2, fig. 3); Recent, western Mexico to Panama, from about 73 m.

corrugata (*Cancellaria*) Hinds, 1843, p. 48; 1844b, p. 42, pl. 12, figs 1–2.

Cyronym – Massyla corrugata.
Type – NHMUK 1879.2.26.118 here selected as lectotype. Keen (1966, p. 271) mentioned two syntypes, of which this was the smaller. The larger 'syntype' was stated to be from the Cuming collection but Hinds in 1843 described a shell from the Belcher collection. Although this numbered specimen should be the holotype, it is designated as a lectotype as the other specimen has been considered a syntype. Type locality, Bay of Guayaquil.
Occurrence – Recent, western Mexico to Ecuador, shallow water, 0 to 31 m.

cossmanni (*Cancellaria*) Olsson, 1922.

Cancellaria cossmanni Olsson, 1922, p. 253, pl. 6, figs 9, 11.
Cancellaria (*Cancellaria*) *cossmanni* Olsson – Marks, 1949, p. 459 (list).

Types – Lectotype PRI 20966; syntype PRI 20968, Río Banano, Limón Province, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
Comment – Junior homonym of *Cancellaria cossmanni* Morlet, 1888, renamed *C. petiti* Olsson, 1967.

couvana (*Cancellaria*) Vokes, 1938.

Cancellaria (*Cancellaria*) *couvana* Vokes, 1938, p. 20, fig. 21.
Cancellaria couvana Vokes – Marks, 1949, p. 460 (list).

Type – Holotype AMNH 24667, Springvale, Trinidad, Springvale Formation, early Pliocene.
Occurrence – See *Euclia montserratensis* (Maury, 1925).
Comment – Junior subjective synonym of *Euclia montserratensis* (Maury, 1925) (Landau *et al*., 2007; Landau & Silva, 2010).

cremata (*Cancellaria*) Hinds, 1843, p. 48; 1844b, p. 42.

Cancellaria (*Euclia*) *cremata* Hinds – Pilsbry & Olsson, 1941, p. 24.

Cyronym – Bivetia cremata.
Types – Four syntypes in 2 lots, NHMUK 1966241 & NHMUK 1968401. Type locality, Bay of Panama, 4 to 10 fathoms.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941); Recent, Mexico and Panama, shallow water to 15 m.
Comment – The relationship of this taxon to *C. indentata* G.B. Sowerby I, 1832 needs to be critically examined.

cubaguaensis (*Cancellaria*) Landau, Petit & Silva, 2007.

Cancellaria (*Massyla*) *cubaguaensis* Landau, Petit & Silva, 2007, p. 38, figs 38-44.
Massyla cubaguaensis Landau, Petit & Silva – Landau & Silva, 2010, p. 98, pl. 20, figs 3-4.

Cyronym – Massyla cubaguaensis.
Types – Holotype MOBR-M-3363 (EDIMAR coll.); paratype1 MOBR-M-3364 (EDIMAR coll.); paratype 2, UF 116701, Cañon de las Calderas, Cubagua Island, Nueva Esparta State, Venezuela, Araya Formation, Cubagua Group, early Pliocene.
Occurrence – Late Miocene, Mataruca Member, Caujarao Formation, Venezuela (NMB H20059, Pl. 4, fig. 8); early Pliocene, Araya and Aramina Formations, Venezuela (Landau *et al*., 2007; Landau & Silva, 2010); Punta Gavilán Formation, Falcón Province, Venezuela (NMB H19843-19844; Punta Gavilán).

cumingiana (*Cancellaria*) Petit de la Saussaye, 1844, pl. 112.

Cancellaria (*Ovilia*?) *cumingiana* Petit – Pilsbry & Olsson, 1941, p. 24.
Massyla cumingiana (Petit de la Saussaye, 1844) – Landau *et al*., 2012a, p. 323, figs 5.17-5.24, 9.3; Landau *et al*., 2012b, p. 921, figs 6.3-6.4.

Cyronym – Massyla cumingiana.
Types – Two syntypes, NHMUK 1966441, Payta (Peru).
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a), Gatun Formation, Darien, Panama (Landau *et al*., 2012b); Pliocene (undetermined), Jama Formation, Ecuador (Pilsbry & Olsson, 1941); Pleistocene, Armuelles Formation, Burica Peninsula, Panama (Landau *et al*., 2012a; NHMW 2011/0176/0002, ex BL coll., Pl. 4, fig. 13); Recent, West Mexico to Peru, 240-1,000 ft.

dariena (*Cancellaria*) Toula, 1909.

darienensis (*Cancellaria*) Toula – Cossmann 1913, p. 51 (emendation of *dariena*).
Cancellaria dariena Toula, 1909, p. 703, pl. 28, fig. 2; Anderson, 1929, p. 115.
Cancellaria dariena trachyostraca Brown & Pilsbry, 1911, p. 345, figs 1-2.
Cancellaria epistomifera Guppy – Cossmann, 1913, p. 53, pl. 4, figs 5, 6; Marks, 1949, p. 460 (list in part, Panama material only) (not *C. epistomifera* Guppy, 1876).
Uxia miocaenica Cossmann, 1913, p. 54, pl. 4, figs 11, 12.
Cancellaria (*Cancellaria*) *dariena* Toula – Marks, 1949, p. 460 (list); Olsson, 1964, p. 118.
Cancellaria (*Uxia*) *miocaenica* (Cossmann) – Marks, 1949, p. 460 (list).
Cancellaria (*Cancellaria*) *epistomifera dariena* Toula – Woodring, 1970 (in part), p. 337, pl. 52, figs 15-16 (narrow form), figs 17-18 (inflated form).
Bivetiella dariena Toula – Landau *et al*., 2012b, p. 914, figs 4.8-4.14.
Not *Cancellaria dariena* Toula – Weisbord, 1929, p. 50, pl. 6, fig. 8 [= *Euclia leuzingeri* (Rutsch, 1934)].

Cyronym – Bivetiella dariena.
Types – *Cancellaria dariena* Toula, 1909, holotype NHMW 1933/0018/0201, construction site for the middle watergate of the Panama channel near Gatun, Canal Zone, Panama; *Uxia miocaenica* Cossmann, 1913, holotype coll. de l'École des Mines, Monkey Hill, Canal Zone, Gatun Formation, late Miocene.
Occurrence – Middle Miocene, lower Gatun Formation, Panama (Landau *et al*., 2012b); late Miocene, middle and upper Gatun Formation, Panama (Toula, 1909, Brown & Pilsbry, 1911; Cossmann, 1913; Woodring, 1970, Landau *et al*., 2012b); Mataruca Member, Caujarao Formation, Venezuela (NMB H19985, Pl. 2, fig 6), Picaderos Formation, Ecuador (Olsson, 1964); early Pliocene, Tubará Formation, Colombia (Anderson, 1929); Punta Gavilán Formation, Venezuela (NMB 18703, Pl. 2, fig. 7).
Comment – The records for the species given by Anderson (1929) and Olsson (1964) have not been confirmed.

darwini (*Cancellaria*) Petit, 1970, p. 85, pl. 1, figs 4a–c.

Not *Cancellaria* (*Cancellaria*) *darwini* Petit – Aguilar & Fischer, 1986, p. 226, pl. 2, fig. 23 (= *C. albida* Hinds, 1843).

Cyronym – ?*Cancellaria darwini*, generic placement uncertain.
Types – Holotype AMNH 154677, 170-200 m, off Isla Santa Cruz, Galapagos Islands. Paratypes are in the USNM, CAS, and in the Petit collection.
Occurrence – Recent, Galapagos Islands, 170-200 m.

decaptyx (*Cancellaria*) Brown & Pilsbry, 1911.

Cancellaria decaptyx Brown & Pilsbry, 1911, p. 346, pl. 24, figs 5-6.
Cancellaria (*Narona*) *decaptyx* Brown & Pilsbry – Marks, 1949, p. 460 (list); Woodring, 1970, p. 342.

Narona decaptyx (Brown and Pilsbry) – Landau *et al*., 2012a, p. 328, figs 6.19-6.24, 9.9-9.10; Landau *et al*., 2012b, p. 925.

Cyronym – Narona decaptyx.
Type – Holotype ANSP 1701. Gatun Locks excavation, Canal Zone, Panama, middle Gatun Formation, late Miocene.
Occurrence – Late Miocene, middle Gatun Formation, Canal Zone, Panama (Brown & Pilsbry, 1911; Woodring, 1970; Landau *et al*., 2012b); Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a).

decussata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 55; 1832b, fig. 8.

Cancellaria (*Cancellaria*) *decussata* Sowerby – Pilsbry & Olsson, 1941, p. 21.
Not *Cancellaria* (*Cancellaria*) *decussata* Sowerby – Aguilar & Fischer, 1986, p. 226, pl. 2, fig. 26 (= *C. corrosa* Reeve, 1856).

Cyronym – Cancellaria decussata.
Type – Syntype NHMUK 1968418, type locality 'Panama and Portrero, ten to thirteen fathoms'.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941); late Pliocene, Charco Azul Group, Penita Formation, Burica Peninsula, Panama (NHMW 2011/0178/0009, ex BL coll., Pl. 2, fig. 4); Recent, western Mexico to Ecuador, 5 to 80 m.

deroyae (*Agatrix*) Petit, 1970, p. 85, pl. 1, fig. 3a, b.

Not *Cancellaria* (*Agatrix*) *deroyae* Petit – Aguilar & Fischer, 1986, p. 226, pl. 2, fig. 12. (= *C. urceolata* Hinds, 1843).

Cyronym – Admetula deroyae.
Types – Holotype, AMNH 154676, 150 m off Isla Santa Cruz, Galapagos Islands. Paratypes, 1 USNM 679537, 1 AMNH 222561, 2 Petit collection.
Occurrence – Recent, known only from the Galapagos Islands from 170 to 200 m.

diadela (*Cancellaria*) Woodring, 1970.

Cancellaria (*Pyruclia*) *diadela* Woodring, 1970, p. 338, pl. 53, figs 7, 9.

Types – Holotype USNM 645724, Caribbean coast east of San Miguel (Río Miguel) station 25, plus 600 metres, Panama, upper Gatun Formation, late Miocene.
Occurrence – See under *Pyruclia scheibei* (Anderson, 1929).
Comment – Junior subjective synonym of *Pyruclia scheibei* (Anderson, 1929) (Landau *et al*., 2007; Landau & Silva, 2010).

dilatata (*Bivetiella*) Landau, Petit & Silva, 2012.

Bivetiella dilatata Landau, Petit & Silva, 2012b, p. 915, figs 4.15-4.20.

Cyronym – Bivetiella dilatata.
Type – Holotype NMB H19955, paratype 1 NMB H19956, both locality PPP 01723 (= NMB 18510), Río Turquesa, Darien, Gatun Formation, probably late Miocene.
Occurrence – Middle-late Miocene, Buenaventura adentro beds, Venezuela (NMB H18842, Pl. 2, figs 8-9); late Miocene, Gatun Formation, Darien, Panama (Woodring, 1970; Landau *et al*., 2012b).

dinota (*Cancellaria*) Woodring, 1970.

Cancellaria (*Euclia*) *dinota* Woodring, 1970, p. 340, pl. 54, figs 1, 2, pl. 56, figs 5, 6.
Euclia dinota Woodring – Landau *et al*., 2012b, p. 918.

Cyronym – Euclia dinota.
Type – Holotype USNM 645728, 100 m north of Transisthmian Highway, 75 m west of road to refinery site on Payardi Island, Cativa, Panama, lower Gatun Formation, middle Miocene.
Occurrence – Middle Miocene, lower Gatun Formation, Panama; late Miocene, middle and upper Gatun Formation, Panama (Woodring, 1970; Landau *et al*., 2012b).

dolioides (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Cancellaria*) *dolioides* Pilsbry & Olsson, 1941, p. 22, pl. 3, fig. 5.

Cyronym – Euclia dolioides.
Type – Holotype ANSP 79883 (originally 13643), Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).
Comment – In 1941 the ANSP number 13643 was inadvertently assigned to both *C. dolioides* and *C. cominella*. This duplication was not noticed until the 1990s at which time the holotype of *C. dolioides* was assigned the number ANSP 79883.

ecuadoriana [*sic*] (*Trigonostoma*) Pilsbry & Olsson, 1941.

Trigonostoma ecuadoriana Pilsbry & Olsson, 1941, p. 25, pl. 3, figs 8–9; pl. 5, fig. 2.

Cyronym – Ventrilia ecuadoriana.
Type – Holotype ANSP 13646, Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

elata (*Cancellaria*) Hinds, 1843, p. 48; 1844b, p. 42, pl. 12, figs 3–4.

Type – Holotype, NHMUK 1879.2.26.120, Panama, 30 fathoms.
Comment – Described from a single broken or deformed specimen, it has been questionably placed in the synonymy of *Narona clavatula* (G.B. Sowerby I, 1832) but it could also be the closely related *N. exopleura* (Dall, 1908). This taxon is here considered to be a *nomen dubium* until specimens of related species are physically compared with the type.

elegantula [*sic*] (*Trigonostoma*) Smith, 1947, p. 54, pl. 2, fig. 3.

Cyronym – Ventrilia elegantula.
Type – Holotype UF 174292. Type locality, Perlas Islands, Panama.
Occurrence – Recent, western Mexico to Ecuador, intertidal to 20 m.

ellipsis (*Cancellaria*) Pilsbry, 1922.

Cancellaria ellipsis Pilsbry, 1922, p. 333, pl. 22, figs 8, 9; Marks, 1949, p. 460 (list).

Types – Holotype and paratype ANSP 2909, Santo Domingo, exact locality not known.
Occurrence – See under *Aphera islacolonis* (Maury, 1917).
Comment – Junior subjective synonym of *Aphera islacolonis* (Maury, 1917) (Jung & Petit, 1990).

emblema (*Axelella*) Jung & Petit, 1990.

Axelella emblema Jung & Petit, 1990, p. 114, pl. 27, figs 16–19, pl. 27, figs 16–19.

Cyronym – Axelella emblema.
Types – Holotype NMB H17335; paratype 1, NMB H17336; paratype 2, NMB H17339, locality NMB 16942, López Section on Río Yaque del Norte, Dominican Republic, Baitoa Formation, early Miocene.
Occurrence – Early Miocene, Baitoa Formation, Dominican Republic (Jung & Petit*,* 1990).

emilyvokesae (*Cancellaria*) Landau & Petit, 1997.

Cancellaria (*Charcolleria*) *emilyvokesae* Landau & Petit, 1997, p. 147, pl. 1, fig. 1a, b.

Cyronym – Massyla emilyvokesae.
Type – Holotype NMB H17787, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Landau & Petit, 1997).

emydis (*Cancellaria*) Dall & Ochsner, 1928.

Cancellaria emydis Dall & Ochsner, 1928, p. 105, pl. 2, fig. 7.

Types – Holotype CAS 2916, Paratype CAS 2917, Albemarle Island, Galapagos, Pleistocene.
Occurrence – Pleistocene (undetermined), Galapagos (Dall & Ochsner, 1928).
Comment – A junior subjective synonym of *C. gemmulata* G.B. Sowerby I, 1832.

epistomifera (*Cancellaria*) Guppy, 1876.

Cancellaria moorei Guppy, 1866, p. 286 (list, in part; not p. 289); Guppy, 1867, p. 157 (list, in part); Gabb, 1873, p. 236; Guppy, 1876, p. 520; Dall, 1903, p. 1583 (list, in part).
Cancellaria epistomifera Guppy, 1876, p. 520, pl. 28, fig. 9; Maury, 1917 (in part), p. 63, pl. 10, fig. 5 (not figs 3, 4 = *Bivetiella bajonensis* Jung & Petit, 1990); Pilsbry, 1922, p. 333, pl. 22, fig. 13; Pflug, 1961, p. 52, pl. 14, figs 1-9; Ramírez, 1950, p. 22, pl. 3, fig. 4; Ramírez, 1956, p. 12, 18, 19, 23.
Cancellaria (*Bivetiella*) *epistomifera* Guppy – Marks, 1949, p. 460 (list in part, Dominican material only); Jung & Petit, p. 104, pl. 21, figs 1-11.
Not *Cancellaria epistomifera* Guppy – Cossmann, 1913, p. 53, pl. 4, figs 5, 6 [=*Bivetiella dariena* (Toula, 1909)].
Not *Cancellaria* (*Cancellaria*) *epistomifera* Guppy – Jung, 1965, p. 548, pl. 75, figs 1, 2. (= *C. jungi* Landau & Petit, 1997).

Cyronym – Bivetiella epistomifera.
Type – Lectotype NHMUK G 83955, Yaque River, type locality not restricted (see Jung & Petit, 1990, p. 105).
Occurrence – Early Miocene, Baitoa Formation; late Miocene, Cercado Formation; early
Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990).

epomis (*Tribia*) Woodring, 1928.

Tribia epomis Woodring, 1928, p. 223, pl. 12, fig. 10.
Cancellaria (*Tribia*?) *epomis* Woodring – Marks, 1949, p. 460 (list).
Agatrix epomis (Woodring). Petit, 1976, p. 38, pl. 1, fig. 3; Hemmen, 2007, p. 131, unnumbered fig.; Landau *et al*., 2012a, p. 331, figs 8.1-8.8, 9.11-9.12.
Not *Agatrix epomis* (Woodring) – Petuch, 1981, p. 333, figs 79-80 (= *Axelella smithii* Dall, 1888).
Not *Agatrix* aff. *epomis* (Woodring) – Landau *et al*., 2012a, p. 333, figs 8.9-8.11 (= *Agatrix agathe* Landau *et al*., 2012b).

Cyronym – Agatrix epomis.
Type – Holotype USNM 747976, Bowden, Jamaica, Bowden Formation, Pliocene.
Occurrence – Early Pliocene, Cayo Agua Formation, Bocas del Toro, Panama (Landau *et al.,* 2012a); Pliocene (undetermined), Bowden Formation, Jamaica (Woodring, 1928); early Pleistocene, Gelasian, Moin Formation, Costa Rica (Landau *et al*., 2012a), upper Escudo de Veraguas Formation, Bocas del Toro, Panama (Landau

et al., 2012a); Recent, 60-68 meters off coast of Venezuela (Petit, 1976).

esmeralda (*Cancellaria*) Olsson, 1964.

Cancellaria (*Cancellaria*) *esmeralda* Olsson, 1964, p. 119, pl. 21, figs 6, 6a, b.

Cyronym – Euclia esmeralda.
Type – Holotype USNM 643864; paratype unnumbered, Quebrada Camarones, Punta Gorda, northwestern Ecuador, Esmeraldas Beds, Onozole Formation.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

euclethra (*Cancellaria*) Maury, 1925.

Cancellaria euclethra Maury, 1925b, p. 188, pl. 9, fig. 13.

Cyronym – Cancellaria euclethra, type material too fragmentary for generic assignment.
Type – Plastotype PRI 29378, Río Pirabas, Pirabas Formation, early Miocene.
Occurrence – Early Miocene, Pirabas Formation, Brazil (Maury, 1925b).

exopleura (*Cancellaria*) Dall, 1908, p. 294.

Cyronym – Narona exopleura.
Types – Lectotype USNM 96638, Panama Bay, 47 fms; 1 paralectotype USNM 46286, Payta, Peru; 1 paralectotype MCZ 27926.
Ocurrence – Recent, Mexico to Peru, shallow water, 11 to 128 m.

fragosa (*Cancellaria*) Olsson, 1964.

Cancellaria (*Pyruclia*) *fragosa* Olsson, 1964, p. 123, pl. 21, fig. 8.

Cyronym – Bivetiella fragosa.
Type – Holotype USNM 643873, Telembi, Río Cayapas, northwestern Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

frizzelli (*Cancellaria*) Marks, 1949.

Cancellaria (*Bivetiella*) *frizzelli* Marks, 1949, p. 462, pl. 78, fig. 5.

Cyronym – Bivetiella frizzelli.
Types – Holotype PRI 20384, locality I.P.C. 1437; paratype CAS 71599, locality I.P.C. 1457, near village of Jerusalém, northernmost Guayas Province, Daule Basin, Ecuador, late Miocene.
Occurrence – Late Miocene, Daule Formation, southern Ecuador (Marks, 1949).

funiculata (*Cancellaria*) Hinds, 1843, p. 48; 1844, p. 43, pl. 12, figs 5–6.

Cyronym – Axelella funiculata.
Type – Location of type unknown. Described from a single specimen from 7 fathoms in the Gulf of Magdalena, California (= Baja California, Mexico).
Occurrence – Pleistocene, Charco Azul Group, Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0010, ex BL coll.); upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0011, ex BL coll., Pl. 5, fig. 12); Recent, western Mexico to Colombia in shallow water, 3-5 m.

gabbiana (*Cancellaria*) Pilsbry & Johnson, 1917.

Cancellaria gabbiana Pilsbry & Johnson, 1917, p. 163; Pilsbry, 1922, p. 334, pl. 22, fig. 12; Marks, 1949, p. 460 (list).
Cancellaria (*Bivetiella*) *gabbiana* Pilsbry & Johnson – Jung & Petit, 1990, p. 103, pl. 19, figs 9-15.

Cyronym – Bivetiella gabbiana.
Type – Lectotype ANSP 3288, no locality given by Pilsbry & Johnson (1917), restricted to locality NMB 16938, López Section of Río Yaque del Norte, Dominican Republic, Baitoa Formation, early Miocene (Jung & Petit, 1990, p. 104).
Occurrence – Early Miocene, Baitoa Formation, Dominican Republic (Jung & Petit, 1990).

gavilanensis (*Massyla*) nov. sp.

Massyla gavilanensis Landau, Petit, Etter & Silva (this paper) p. 201, Pl. 4, fig. 11.

Cyronym – Massyla gavilanensis.
Types – Holotype NMB H18696, locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela, Punta Gavilán Formation, early Pliocene.
Occurrence – Early Pliocene, Punta Gavilán Formation, Venezuela (this paper).

gemmulata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 55; 1832b, fig. 7.

Cyronym – Cancellaria gemmulata.
Types – Two syntypes, NHMUK 1966429, 'Sinu Nocoiya, Americae Centralis' (= Gulf of Nicoya, Costa Rica), dredged but depth not stated.
Occurrence – Pleistocene, upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0012, ex BL coll.); Recent, Gulf of California to Peru and the Galapagos Islands in depths to 73 m.

gerda (*Gerdiella*) Olsson & Bayer, 1972, p. 877, figs 1–3.

Cyronym – Gerdiella gerda.
Type – Holotype USNM 706734, Straits of Florida, deep water, 648-622 m.
Occurrrence – Recent, known only from the Straits of Florida, deep water 648-864 m. *Comment s – Gerdiella* was placed in the synonymy of *Mericella* by Verhecken & Bozetti (2006, p. 17) but that synonymy was rejected by Lima *et al*. (2007, p. 99-100) who gave a discussion of the differences.

gladiator (*Cancellaria*) Petit, 1976, p. 35, pl. 1, fig. 2.

Cyronym – Sveltia gladiator.
Types – Holotype USNM 760634, Academy Bay, Isla Santa Cruz, Galapagos Islands, 200 m. Paratypes, 1 adult & 4 juveniles in Petit collection, all from type locality.
Occurrence – Recent, Galapagos Islands, deep water, 200 m.

goniostoma (*Cancellaria*) G.B. Sowerby I, 1832a, p. 51; 1833, fig. 43.

Cyronym – Ventrilia goniostoma.
Type – Holotype NHMUK 1964345, off Conchagua, El Salvador, 8 fathoms.
Occurrence – Northern Gulf of California to Ecuador, shallow water to 25 m.
Comments – 'Syntypes' have been listed for this species (Hemmen, 2007, p. 155) but it was described from a single specimen making syntypes impossible. The 'syntypes' he lists are for *C. rigida* Sowerby, a synonym.

guppyi (*Cancellaria*) Gabb, 1873.

Cancellaria guppyi Gabb, 1873, p. 236; Maury, 1917, p. 228, pl. 10, figs 7, 8; Pilsbry, 1922, p. 333, pl. 22, fig. 7; Marks, 1949, p. 460 (list); Ramírez, 1956, p. 21, pl. 3, fig. 12.
?*Cancellaria guppyi* Gabb – Anderson, 1929, p. 118.
Cancellaria (*Cancellaria*) *guppyi* Gabb – Jung & Petit, 1990, p. 94, pl. 15, figs 1-11, pl. 20, figs 1-3.

Cyronym – Cancellaria guppyi.
Type – Lectotype ANSP 2990, Bluff 1, Cercado de Mao, Dominican Republic, Cercado
Formation; early Pliocene (see Jung & Petit, 1990, p. 94).
Occurrence – Late Miocene, Cercado Formation; early Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990); ?early Pliocene, Tubará Formation, Colombia (Anderson, 1929).
Comment – We cannot confirm Anderson's (1929) record for the early Pliocene Tubará Formation of Colombia, which has no illustration.

gurabis (*Cancellaria*) Maury, 1917.

Cancellaria (*Ventrilia*) *gurabis* Maury, 1917, p. 65, pl. 10, fig. 11.
Trigonostoma gurabis Maury – Marks, 1949, p. 460 (list).
Trigonostoma (*Ventrilia*) *gurabis* Maury – Jung & Petit, 1990, p. 113, pl. 27, figs 1-12, pl. 29, figs 1-4.

Cyronym – Ventrilia gurabis.
Type – Holotype PRI 28668, Río Gurabo at Los Quemados, Dominican Republic, Gurabo Formation, early Pliocene.
Occurrence – Early Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990).

haemastoma (*Cancellaria*) G.B. Sowerby I, 1832a, p. 54; 1833, fig. 40.

Cyronym – Bivetopsia haemastoma.
Types – Five syntypes, NHMUK 1964448, Galapagos Islands, 10-16 fathoms.
Occurrence – Recent, known only from Galapagos Islands, intertidal to 16 fathoms.

harpiformis (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Euclia*) *harpiformis* Pilsbry & Olsson, 1941, p. 23, pl. 3, figs 1-2.

Cyronym – Euclia harpiformis.
Type – Holotype ANSP 13644, Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

harrisi (*Cancellaria*) Maury, 1917.

Cancellaria harrisi Maury, 1917, 64, pl. 10, figs 9, 10; Marks, 1949, p. 460 (list).
Cancellaria (*Cancellaria*) *harrisi* Maury – Jung & Petit, 1990, p. 97, pl. 17, figs 1-13, pl. 20, figs 4-6.
Not *Cancellaria harrisi* Maury – Li, 1930, p. 272, pl. 7, fig. 62. [= *C. balboae* Pilsbry, 1931; Recent]

Cyronym – Cancellaria harrisi.
Type – Holotype PRI 28667, Río Cana at Caimito, restricted to locality TU 1230, Río Cana, Dominican Republic, Cercado Formation, late Miocene (see Jung & Petit, 1990, p. 98).
Occurrence – Late Miocene, Cercado Formation; early Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990); late Pliocene, upper Río Banano Formation, Costa Rica (NMB H20129, Pl. 1, fig 13).

hartti (*Cancellaria*) Maury, 1925.

Cancellaria hartti Maury, 1925b, p. 184, pl. 9, fig. 19.

Cyronym – Cancellaria hartti, type material too fragmentary for generic assignment.
Type – Plastotype PRI 29378, Río Pirabas, Pirabas Formation, early Miocene.
Occurrence – Early Miocene, Pirabas Formation, Brazil (Maury, 1925b).

harzhauseri (*Cancellaria*) Landau, Petit & Silva 2012.

Cancellaria harzhauseri Landau *et al*., 2012b, p. 909, figs 3.1-3.10, 7.1.

Cyronym – Cancellaria harzhauseri
Types – Holotype NHMW 2011/0177/0001, ex BL coll., paratypes 1-6 NHMW 2011/0177/0002- 2011/0177 /0007, ex BL coll., quarry behind Las Lomas, Cativa, Panama, middle Gatun Formation, late Miocene.
Occurrence – Late Miocene, middle and upper Gatun Formation, Panama (Landau *et al*., 2012b).

herberti (*Cancellaria*) Landau, Petit & Silva 2007.

Cancellaria (*Bivetopsia*) *herberti* Landau *et al.,* 2007, p. 35, figs 23-25.

Cyronym – Bivetopsia herberti.
Types – Holotype MOBR-M-3419 (EDIMAR coll.); paratype 1 (BL coll.), NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Landau *et al*., 2007).

hettneri (*Cancellaria*) F.M. Anderson, 1929.

Cancellaria hettneri Anderson, 1929, p. 114, pl. 10, figs 5, 6; Marks, 1949, p. 460 (list).

Type – Holotype CAS 4290, horizon P, north slope of Tubará mountain, Departamento del Atlántico, Colombia, Tubará Formation, early Pliocene.
Occurrence – See under *Euclia codazii* (Anderson, 1929).
Comment – Junior subjective synonym of *Euclia codazii* (Anderson, 1929) (Landau *et al*., 2007; Landau & Silva, 2010).

hidalgoi (*Narona*) Jousseaume, 1887a, p. 164, fig. 3

Types – Four syntypes MNHN (unnumbered) from unknown locality.
Comment – These are beachworn specimens of *Narona clavatula* G.B. Sowerby I, 1832 (Keen, 1971).

hodsonae (*Cancellaria*) Landau & Petit, 1997.

Cancellaria (*Cancellaria*) aff. *rowelli* Dall – Jung, 1965, p. 551, pl. 75, figs 7, 8.
Cancellaria (*Cancellaria*) *hodsonae* Landau & Petit, 1997, p. 145.

Cyronym – Cancellaria hodsonae.
Type – Holotype NMB H13761; paratype, NMB H13762, NMB locality 17516, series of arroyos about 500m south of "Casa Cantaure", 14km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Jung, 1965; Landau & Petit, 1997).

hoerlei (*Trigonostoma*) Olsson, 1967.

Trigonostoma (*Extractrix*) *hoerlei* Olsson, 1967, p. 24, pl. 8, figs 6, 6a; Jung, 1977, p. 847, figs 1-2.
Extractrix hoerlei Olsson – Petuch, 1994, p. 220, pl. 89, figs C, D.

Cyronym – Trigonostoma hoerlei.
Type – Holotype USNM 645162; paratype PRI 27540, Acline, Kissimmee, Osceola County, Florida, Pinecrest Beds, late Pliocene.
Occurrence – Early Pliocene, Punta Gavilán Formation, Venezuela (Jung, 1977); late Pliocene, Pinecrest Beds, Florida (Olsson, 1967).

imperialis (*Cancellaria*) Michelin, 1832, (unnumbered page), pl. 16.

Type – Location of type material unknown. Described from an unknown location.
Comment – The quality of Michelin's original colored figure makes it possible to identify it as a junior subjective synonym of *Euclia cassidiformis* (G.B. Sowerby I, 1832).

indentata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 54; 1832b, figs 9, 10.

Cyronym – Bivetia indentata.
Types – Two syntypes, NHMUK 1966425, Panama.
Occurrence – Pleistocene, Charco Azul Group, Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0013, ex BL coll.); upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0014, ex BL coll., Pl. 2, fig. 11); Recent, Gulf of California to Peru, relatively shallow water to 110 m.

inquilinus (*Cancellaria*) Jung & Petit, 1990.

Cancellaria (*Sveltia*) *inquilinus* Jung & Petit, 1990, p. 102, pl. 19, figs 1–8; pl. 20, figs10–12.

Cyronym – Sveltia inquilinus.
Type – Holotype NMB H17309, locality TU 1227, Arroyo Zalaya, Dominican Republic, Gurabo Formation, early Pliocene.
Occurrence – Early Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990).

insularis (*Cancellaria*) Pilsbry & Johnson, 1917.

Cancellaria brevis Sowerby. Gabb, 1873, p. 236 (not *C. brevis* G.B. Sowerby I, 1832a).
Cancellaria (*Trigonostoma*) *insularis* Pilsbry & Johnson,

1917, p. 163; Pilsbry, 1922, p. 334, pl. 22, fig. 11.
Trigonostoma insularis Pilsbry & Johnson –Marks, 1949, p. 460 (list).
Trigonostoma (*Ventrilia*?) *insularis* Pilsbry & Johnson – Jung & Petit, 1990, p. 113, pl. 27, figs 13-15.

Cyronym – Ventrilia? *insularis.*
Type – Holotype ANSP 2928, Santo Domingo, exact locality and stratigraphic position unknown (see Jung & Petit, 1990, p. 114).
Occurrence – Late Miocene, Cercado Formation, Dominican Republic (NHMW NHMW 2011/0178/0039, ex BL coll., Pl. 6, fig. 1), Mataruca Member, Caujarao Formation, Venezuela (NMB H18500, Pl. 6, Fig. 2).

isabelae (*Cancellaria*) Landau, Petit & Silva, 2012.

Cancellaria (*Cancellaria*) *barretti* Guppy – Woodring, 1928 (in part), pl. 12, fig. 6 (not *C. barretti* Guppy, 1866).
Cancellaria isabelae Landau *et al*., 2012a, p. 315, figs 2.14-2.20, 7.13-7.14.

Cyronym – Cancellaria isabelae.
Types – Holotype NMB H19526; paratypes 1-3 NMB H19527-H19529, paratype 9 NMB NMB H19530, locality PPP 01910 (= NMB 18772); paratype 10 NMB H19531, locality PPP 00326 (= NMB 17822), north side of Nispero Point; paratypes 4-8 NMB H19532- H19536, locality PPP 02234 (= NMB 18731), 400 m from Nispero Point; all Cayo Agua Island, Cayo Agua Formation, Zanclean, Pliocene.
Occurrence – Early Pliocene, Zanclean, Cayo Agua Formation; Pliocene, Bowden Formation, Jamaica, Pliocene (Landau *et al*., 2012a).

islacolonis (*Cancellaria*) Maury, 1917.

Cancellaria (*Aphera*) *islacolonis* Maury, 1917, p. 65, pl. 10, figs 12, 12a, b; ?Olsson,1922, p. 86, pl. 6, fig. 12; Marks, 1949, p. 460 (list); Ramírez, 1956, p. 19, 22, pl. 2, figs 4, 5, pl. 4, figs 1, 2.
Cancellaria ellipsis Pilsbry, 1922, p. 333, pl. 22, figs 8, 9; Marks, 1949, p. 460 (list).
?*Aphera islacolonis* (Maury) – Perrilliat, 1973, p. 27, pl. 12, figs 3-8; Jung & Petit, 1990, p. 65, pl. 10, figs 12, 12a–b.
Not *Aphera islacolonis* (Maury) – Woodring, 1970, p. 344, pl. 56, figs 1, 2. (= *A. aphrodita* Landau *et al*., 2012b).
Not *Aphera islacolonis* (Maury) – Petuch, 1981, p. 333, figs 81, 85 (= *A. lindae* Petuch, 1987).

Cyronym – Aphera islacolonis.
Types – Lectotype PRI 28960; paralectotype 1 PRI 28669; paralectotype 2 PRI 289670, Maury's Bluff 2, on Río Mao, Dominican Republic, Cercado Formation, late Miocene. *Occurrence* – Early Miocene, Baitoa Formation; late Miocene, Cercado Formation (Jung & Petit, 1990); ?Uscari Formation, Costa Rica (Olsson, 1922); early Pliocene, Gurabo Formation, Mao Adentro Limestone, Dominican Republic (Jung & Petit, 1990); ?late Pliocene, Agueguexquite Formation (Perrilliat, 1973).
Comment – In view of the numerous *Aphera* species described recently from the tropical American Neogene we cannot confirm the records outside the Dominican Republic.

jadisi (*Cancellaria*) Olsson, 1964.

Cancellaria (*Massyla*) *jadisi* Olsson, 1964, p. 123, pl. 21, fig. 7.

Cyronym – Massyla jadisi.
Type – Holotype USNM 643874, Telembi, Río Cayapas, northwestern Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

jayana (*Cancellaria*) Keen, 1958, p. 249, pl. 30, fig. 5.

Cyronym – Bivetia jayana.
Types – Holotype CAS 64595; 1 paratype CAS 32543; 2 paratypes CAS 64596; all off Balboa, Panama in 10 fathoms.
Occurrence – Recent, from Mexico to Panama, shallow water to 75 m.

jipijapana (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Cancellaria*) *jipijapana* Pilsbry & Olsson, 1941, p. 22, pl. 4, figs 1, 4.

Cyronym – Euclia jipijapana.
Type – Holotype ANSP 13647, Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

jumala (*Admete*) Olsson, 1964. Pliocene, Ecuador.

Admete (*Marksella*) *jumala* Olsson, 1964, p. 127, pl. 22, figs 3, 3a–c.

Cyronym – Marksella jumala.
Types – Holotype USNM 644115; paratype 1 USMN 644116; paratype 2 USMN 644117, Punta Gorda, northwestern Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

juncta (*Cancellaria*) Jung & Petit, 1990.

Cancellaria (*Cancellaria*) *juncta* Jung & Petit, 1990, p. 96, pl. 16, figs 10–16.

Cyronym – Cancellaria juncta.
Type – Holotype NMB H17297, locality TU 1358, Río Gurabo, upper part of Cercado Formation, late Miocene.

Occurrence – Late Miocene, Cercado Formation, Dominican Republic (Jung & Petit, 1990).

jungi (*Cancellaria*) Landau & Petit, 1997.

Cancellaria (*Cancellaria*) *epistomifera* Guppy – Jung, 1965, p. 548, pl. 75, figs 1, 2 [not *Bivetiella epistomifera* (Guppy, 1876)].
Cancellaria (*Bivetiella*) *jungi* Landau & Petit, 1997, p. 146.

Cyronym – Bivetiella jungi.
Type – Holotype NMB H13757, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Jung, 1965; Landau & Petit, 1997).

karsteni (*Cancellaria*) F.M. Anderson, 1929.

Cancellaria karsteni Anderson, 1929, p. 114, pl. 10, figs 7-9; Marks, 1949, p. 460 (list).

Type – Holotype CAS 4630, paratype CAS 4631, horizon P, at the north end of Tubará mountain, Departamento del Atlántico, Colombia, Tubará Formation, early Pliocene.
Occurrence – See under *Euclia codazii* (Anderson, 1929).
Comment – Junior subjective synonym of *Euclia codazii* (Anderson, 1929) (Landau *et al*., 2007; Landau & Silva, 2010).

kugleri (*Cancellaria*) Rutsch, 1934.

Cancellaria kugleri Rutsch, 1934, p. 90, pl. 8, figs 3, 4.
Cancellaria (*Cancellaria*) *sp.* Landau *et al*., 2007, p. 32, figs 7-16.
Cancellaria (*Cancellaria*) *sp.* Landau & Silva, 2010, p. 96, pl. 19, fig. 5.

Cyronym – Cancellaria kugleri.
Types – Holotype NMB H1928; paratype H1929, Punta Gavilán, Falcón Province, Venezuela, Punta Gavilán Formation, early Pliocene.
Occurrence – Early Pliocene, Punta Gavilán Formation, Venezuela (Rutsch, 1934); Araya Formation, Cubagua Island, Aramina Formation, Araya Peninsula, Venezuela (Landau *et al*, 2007; Landau & Silva, 2010).

lacondamini (*Cancellaria*) Olsson, 1964.

Cancellaria (*Pyruclia*) *lacondamini* Olsson, 1964, p. 121, pl. 21, figs 1, 1a–c.

Cyronym – Pyruclia lacondamini.
Type – Holotype USNM 644111, Barro Colorado, Río Santiago, northwestern Ecuador, Picaderos Formation, late Miocene.
Occurrence – Late Miocene: Punta Judas Formation, Costa Rica (NMB H20149-H20150, Pl. 3,figs 7, 8); Picaderos Formation, Ecuador (Olsson, 1964).

laevescens (*Cancellaria*) Guppy, 1866.

Cancellaria laevescens Guppy, 1866, p. 289, pl. 17, fig. 12; Guppy, 1867. p. 157 (list, in part); Guppy, 1874. p. 438 (list, in part); Dall, 1903, p. 1583 (list, in part); Maury, 1920, p. 69 (in part).
Cancellaria (*Cancellaria*) *laevescens* Guppy – Woodring, 1928, p. 220, pl. 12. figs 7-8.
Cancellaria (*Cancellaria*) *lavescens* [*sic*] Guppy – Marks, 1949, p. 460 (list).
Cancellaria (*Pyruclia*?) *laevescens* Guppy – Jung & Petit, 1990, p. 117, pl. 18, fig. 10-12. Not *Cancellaria laevescens* Guppy – Guppy, 1866, p. 286 (list; not p. 289); Guppy, 1867, p. 157 (list, in part); Gabb, 1873, p. 236 (list); Guppy, 1876, p. 520; Maury, 1917, p. 64. pl. 10, fig. 6; Pilsbry, 1922, p. 333 (all = *Pyruclia*? *uva* Jung & Petit, 1990).
Not *Cancelaria* [*sic*] *laevescens* Guppy – Guppy, 1910, p. 6; Guppy, 1913, p. 4 [= *Pyruclia auriculaperta* (Vokes, 1938)].
Not *Cancellaria laevescens* Guppy – Hubbard, 1920. p. 157, pl. 24, figs 5, 6 [= *Pyruclia portoricana* (Maury, 1920)]; Li, 1930, p. 272, pl. 8, fig. 63. [= *Pyruclia bulbulus* (G.B. Sowerby, I, 1832)].

Cyronym – Pyruclia? *laevescens.*
Type – Holotype NHMUK 64070, Bowden, Jamaica, Bowden Formation, Pliocene.
Occurrence – Pliocene (undetermined), Bowden Formation, Jamaica (Guppy, 1866; Woodring, 1928).

larkinii (*Cancellaria*) Nelson, 1870.

Cancellaria larkinii Nelson, 1870, p. 192, pl. 6, fig. 7.
Cancellaria (*Euclia*) *larkinii* Nelson – Olsson, 1932, p. 158, pl. 17, figs 5, 7; Marks, 1949, p. 460 (list).

Cyronym – Euclia larkinii.
Types – Syntypes YPM IP031384, IP031385, IP031386, IP000522. Quebrada Tucillal, Peru, Tumbes Formation, late Miocene.
Occurrence – Late Miocene, Tumbes Formation, Peru (Nelson, 1870; Olsson, 1932).

laurettae (*Cancellaria*) Petit & Harasewych, 1998, p. 115, figs 1–4.

Cyronym – Euclia laurettae.
Types – Holotype USNM 880277, 10 paratypes: 1 USNM 880278, 1 LACM 2815, 1 ANSP 401180, 1 AMNH 292527, 6 paratypes in private collections of Petit, Garcia and Ernest. All off Isla Montuosa, Golfo de Chuiriqui, Panama, 270-360 m.
Occurrence – Recent, Panama, deep water, 100-360 m.

lavelana (*Cancellaria*) H.K. Hodson, *in* Hodson & Hodson, 1931.

Cancellaria lavelana H.K. Hodson, *in* Hodson & Hodson, 1931, p. 44, pl. 24, fig. 12; Marks, 1949, p. 460 (list).
Not *Cancellaria* (*Cancellaria*?) *lavelana* H.K. Hodson – Jung, 1965, p. 550, pl. 75, figs 5-6 (= *Bivetiella lugogonzalezorum* Landau, Petit & Silva, 2007).

Cyronym – Massyla lavelana.
Type – Holotype PRI 24123, 2.3 km east and 750 m north of La Vela del Coro lighthouse, Colina District, Falcón Province, Venezuela, upper middle Miocene.
Occurrence – Middle Miocene, La Vela, Venezuela (H.K. Hodson, *in* Hodson & Hodson, 1931).

leuzingeri (*Cancellaria*) Rutsch, 1934.

Cancellaria dariena Toula – Weisbord, 1929, p. 50. pl. 6, fig. 8 [not *Bivetiella dariena* (Toula, 1909)].
Cancellaria reticulata leuzingeri Rutsch, 1934, p. 89, pl. 7, figs 10-11, pl. 8, figs 1, 2, 5.
Cancellaria (*Euclia*) *leuzingeri* Rutsch – Landau *et al*., 2007, p. 37, figs 29-31.
Euclia leuzingeri (Rutsch) – Landau & Silva, 2010, p. 97, pl. 19, fig. 9; Landau *et al*., 2012a, p. 321, figs 4.6-4.21, 9.1-9.2.

Cyronym – Euclia leuzingeri.
Types – Holotype NMB H1926; paratype 1 H1925; paratype 2 H1924, Punta Gavilán, Falcón Province, Venezuela, Punta Gavilán Formation, early Pliocene.
Occurrence – Late Miocene, Nancy Point Formation, Bocas del Toro, Panama (Landau *et al*., 2012a); early Pliocene, Cayo Agua Formation, Cayo Agua Island, Bocas del Toro, Panama (Landau *et al*., 2012a); Punta Gavilán Formation, Falcón Province (Rutsch, 1934), Araya Formation, Cubagua Island, Aramina Formation, Araya Peninsula, Venezuela (Landau *et al*., 2007, Landau & Silva, 2010); Tubará Formation, Colombia (Weisbord, 1929).

lindae (*Aphera*) Petuch, 1987, 109, pl. 13, fig. 11.

Cyronym – Aphera lindae.
Type – Holotype USNM 784467, off St. James, Barbados, 200 m.
Occurrence – ?Early Pleistocene, Gelasian, upper Escudo de Veraguas Formation, Escudo de Veraguas Island, Bocas del Toro, Panama (Landau *et al*., 2012a); Recent, known only from the holotype.

lipara (*Cancellaria*) Woodring, 1970.

Cancellaria (*Cancellaria*) *epistomifera lipara* Woodring, 1970, p. 337, pl. 52, figs 7, 8 (not *Cancellaria lipara* Woodring, 1951).

Type – Holotype USNM 645719, Caribbean coast east of San Miguel (Río Miguel) station 4 plus 12 metres, Panama, upper Gatun Formation, late Miocene.
Comment – Junior homonym of *Cancellaria lipara* Woodring, 1951. Renamed *C. sathra* Woodring, 1973.

lopezana (*Cancellaria*) Jung & Petit, 1990.

Cancellaria (*Massyla*) *lopezana* Jung & Petit, 1990, p.109, pl. 23, figs 12–18.

Cyronym – Massyla lopezana.
Type – Holotype NMB H17323, López Section of Río Yaque del Norte, Dominican Republic, Baitoa Formation, early Miocene.
Occurrence – Early Miocene, Baitoa Formation, Dominican Republic (Jung & Petit, 1990).

losquemadica (*Cancellaria*) Maury, 1917.

Cancellaria (*Narona*) *losquemadica* Maury, 1917, 66, pl. 10, fig. 13.
Cancellaria (*Tribia?*) *losquemadica* Maur – Marks, 1949, p. 460 (list).
Agatrix losquemadica Maury – Jung & Petit, 1990, p. 115, pl. 28, figs 1-10, pl. 29, figs 5-8.

Cyronym – Agatrix losquemadica.
Type – Holotype PRI 28671, Río Gurabo at Los Quemados, Dominican Republic, restricted to locality NMB 15863 lower part of Gurabo Formation (late Miocene; see Jung & Petit, 1990, p. 115).
Occurrence – Late Miocene, lowest Gurabo Formation, Dominican Republic (Jung & Petit, 1990).

lugogonzalezorum (*Cancellaria*) Landau, Petit & Silva 2007.

Cancellaria (*Cancellaria*?) *lavelana* H.K. Hodson – Jung, 1965, p. 550, pl. 75, figs 5-6 [not *Massyla lavelana* (H.K. Hodson, *in* Hodson & Hodson, 1931)].
Cancellaria (*Bivetiella*) *lugogonzalezorum* Landau, Petit & Silva 2007, p. 33, figs 17-19.

Cyronym – Bivetiella lugogonzalezorum.
Types – Holotype MOBR-M-3361 (EDIMAR coll.); paratype1 MOBR-M-3362 (EDIMAR coll.); paratype 2, UF 116700; paratype 3 (BL coll.), NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Landau *et al*., 2007).

lyrata (*Cancellaria*) Adams & Reeve, 1850, p. 42, pl. 10, fig. 4. Recent, ? Panamic-Pacific

Types – No types have been recognized. Type locality, China Sea.
Comment – Recognized as early as 1861 (Crosse) as a junior synonym of *Cancellaria funiculata* Hinds, 1843 (now in *Axelella*).

maldonadoi (*Cancellaria*) Olsson, 1964.

Cancellaria (*Euclia*) *maldonadoi* Olsson, 1964, p. 122, pl.

21, figs 5, 5a.

Cyronym – Euclia maldonadoi.
Type – Holotype USNM 643871, Angostura Cave, Río Santiago, northwestern Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

marksi (*Cancellaria*) Olsson, 1964.

Cancellaria (*Hertleinia*) *marksi* Olsson, 1964, p. 125, pl. 37, fig. 6.

Cyronym – Hertleinia marksi.
Type – Holotype USNM 643876, Quebrada Camarones, northwestern Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene to mid late Pliocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

mauryae (*Cancellaria*) Olsson, 1922.

Cancellaria barretti Guppy, 1866, p. 286 (list; not p. 289); Guppy, 1867, p. 157 (list; in part); Guppy, 1876, p. 520; Maury, 1917, p. 62, pl. 10, fig. 1; Maury, 1925b, pl. 9, fig. 17; Pilsbry, 1922, p. 332. Not Guppy, 1866.
Cancellaria reticulata Linné – Gabb, 1873, p. 236.
Cancellaria mauryae Olsson, 1922 (in part, not Bocas material), p. 82, pl. 6, fig. 5; Marks, 1949, p. 460 (list).
Cancellaria (*Cancellaria*) *mauryae* Olsson – Jung & Petit, 1990, p. 95, pl. 15, figs 12-19.
Not *Cancellaria mauryae* Olsson, 1922 (Bocas material), p. 82. [= *C. axelolssoni* Landau, Petit & Silva, 2012a].

Cyronym – Cancellaria mauryae.
Type – PRI 28661, exact locality unknown, restricted to locality NMB 16927 (Arroyo Bajón), Río Mao, Cercado Formation, late Miocene (see Jung & Petit, 1990, p. 96).
Occurrence – Late Miocene, Cercado Formation, Dominican Republic (Jung & Petit, 1990).

mediamericana (*Cancellaria*) Petuch, 1998, p. 35, figs 31–32.

Cyronym – Cancellaria mediamericana.
Types – Holotype CMNH 47341, 2 paratypes CMNH 47342, all from beach, Barra de Wawa, Miskito Coast, Nicaragua.
Occurrence – Recent, Nicaragua and Honduras, shallow water (depth not determined). Specimens in R.E. Petit collection from 20 to 30 m depth.

metuloides (*Cancellaria*) Olsson, 1964.

Cancellaria (*Cancellaria*) *metuloides* Olsson, 1964, p.119, pl. 37, figs 7, 7a.

Cyronym – Cancellaria metuloides.
Type – Holotype USNM 643883, Telembi, Río Cayapas, northwestern Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

milleri (*Trigonostoma*) Burch, 1949, p. 3, text-figs.

Cyronym – Trigonostoma milleri.
Types – Holotype USNM 600660, 1 paratype CAS 64474, 1 paratype CAS 65586. A paratype is also in LACM and there are possibly others. A probable paratype, from the Burch collection, is CAS 85613. All beach collected from Tambor, near Puntarenas, Costa Rica.
Occurrence – Pleistocene, upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0015, ex BL coll., Pl. 6, fig. 6); Recent, from Gulf of California to Panama and the Galapagos Islands, shallow water to 80 m.

miocaenica (*Cancellaria*) Cossmann, 1913.

Uxia miocaenica Cossmann, 1913, p. 54, pl. 4, figs 11, 12.
Cancellaria (*Uxia*) *miocaenica* (Cossmann) – Marks, 1949, p. 460 (list).

Comment – Junior subjective synonym of *Bivetiella dariena* (Toula, 1909) (Landau *et al*., 2012b).

miranda (*Cancellaria*) Jung & Petit, 1990.

Cancellaria (*Hertleinia*) *miranda* Jung & Petit, 1990, p. 107, pl. 23, figs 1–5; pl. 26, figs 4–7.

Cyronym – Hertleinia miranda.
Type – Holotype NMB H17319, locality NMB 15903, Río Gurabo, Dominican Republic, upper Cercado Formation, late Miocene.
Occurrence – Late Miocene, upper Cercado Formation, Dominican Republic (Jung & Petit, 1990).

mixta (*Cancellaria*) Landau, Petit & Silva 2012.

Cancellaria mixta Landau *et al*., 2012b, p. 909, figs 3.11-3.19, 7.2.

Cyronym – Cancellaria mixta.
Types – Holotype NHMW 2011/0177/0008, ex BL coll. paratypes 1-4 NHMW 2011/0177/0009- 2011/0177/0012, ex BL coll., quarry behind Las Lomas, Cativa, Panama, middle Gatun Formation, late Miocene; paratypes 5-9 NMB H19874-19878, locality PPP 01078 (= NMB 18325); paratypes 10-13 NMB H19858-19861, locality PPP 01034 (= NMB 18258).
Occurrence – Late Miocene, middle and upper Gatun Formation, Panama (Landau *et al.,* 2012b).

mitriformis (*Cancellaria*) G.B. Sowerby I, 1832a, p. 51;

1832b, fig. 14.

Cancellaria sowerbyi Bellardi, 1841, p. 232. Unnecessary new name for *C. mitriformis* G.B. Sowerby I, 1832, thought to be preoccupied by *C. mitraeformis* Brocchi, 1814.

Cancellaria sowerbyi Crosse, 1861, p. 242. Unnecessary new name for '*C. mitraeformis* [*sic*] Sowerby', not *C. mitraeformis* Brocchi, 1814.

Cyronym – Hertleinia mitriformis.
Type – Holotype NHMUK 1964451, Panama.
Occurrence – Recent, Panamic-Pacific, Nicaragua to Peru, intertidal to 37 m.

montserratensis (*Cancellaria*) Maury, 1925.

Cancellaria montserratensis Maury, 1925a, p. 346, pl. 35, figs 6, 8; Rutsch, 1942, p. 163, pl. 9, fig. 7; Marks, 1949, p. 460 (list).

Cancellaria epistomifera Guppy – Maury, 1925a, p. 345, pl. 35, fig. 7.

Cancellaria springvalensis Mansfield, 1925, p. 31, pl. 2, fig. 12; Marks, 1949, p. 460 (list).

Cancellaria (*Cancellaria*) *couvana* Vokes, 1938, p. 20, fig. 21.

Cancellaria couvana Vokes – Marks, 1949, p. 460 (list).

Cancellaria (*Euclia*) *montserratensis* Maury – Jung, 1969, p. 539, pl. 58, figs 6-7; Landau *et al*., 2007, p. 37, figs 32-34

Euclia montserratensis (Maury) – Landau & Silva, 2010, p. 97, pl. 19, fig. 10.

Cyronym – Euclia montserratensis.
Types – Lectotype PRI 1046; paralectotype PRI 1044, Spingvale, quarry in a spur of the Montserrat range, Trinidad, Springvale Formation, early Pliocene.
Occurrence – Early Pliocene, Araya Formation, Cubagua Island; Aramina Formation, Araya Peninsula, Venezuela (Landau *et al*., 2007; Landau & Silva, 2010), Punta Gavilán Formation, Falcón Province, Venezuela (NMB H18698, Pl. 2, fig. 12; H19842); Tubará Group, northern Colombia (Anderson, 1929; Barrios, 1960); Savaneta Glauconitic Sandstone Member and Melajo Clay Member of Springvale Formation, Trinidad (Maury, 1925a; Mansfield, 1925; Vokes, 1938; Rutsch, 1942; Jung, 1969).

moorei (*Cancellaria*) Guppy, 1866.

Cancellaria moorei Guppy, 1866, p.289, pl. 17, fig. 7; Guppy, 1867, p. 157 (list, in part); Guppy, 1874, p. 438 (list, in part); Dall, 1903, p. 1583 (list, in part).

Cancellaria (*Bivetopsia*) *moorei* Guppy – Woodring, 1928, p. 222, pl. 12, fig. 9; Jung & Petit, 1990, p. 118, pl. 22, figs 8-11.

?*Cancellaria moorei* (?) Guppy – Anderson, 1929, p. 117.

Cancellaria (*Bivetopsia*?) *moorei* Anderson – Marks, 1949, p. 460 (list).

Cyronym – Bivetopsia moorei.
Type – Lectotype NHMUK G 64068, Bowden, Jamaica, Bowden Formation, Pliocene. *Occurrence* – ? Early Pliocene, Tubará Formation, Colombia (Anderson, 1929); Pliocene (undetermined), Bowden Formation, Jamaica.
Comment – We cannot confirm Anderson's (1929) record for the early Pliocene Tubará Formation of Colombia, which has no illustration, but it is more likely to be *Bivetopsia pachia* (Smith, 1940), which is abundant in the early Pliocene Venezuelan assemblages and have many species in common (Landau *et al*., 2007; Landau & Silva, 2010).

multiplicata (*Cancellaria*) Lesson, 1841, p. 37. Recent, ? Panamic-Pacific.

Comment – Junior subjective synonym of *Bivetopsia chrysostoma* (G.B. Sowerby I, 1832) (Lesson, 1842). Junior homonym of *Cancellaria multiplicata* Lea, 1833.

nancellaria (*Cancellaria*) Woodring, 1970.

Cancellaria (subgenus ?) *nancellaria* Woodring, 1970, p. 341, pl. 53, figs 3, 4.

Cancellaria? *nancellaria* Woodring – Landau *et al*., 2012b, p. 913.

Cyronym – Cancellaria? *nancellaria*, generic placement uncertain.
Type – Holotype USNM 645731, locality 147b (of Woodring, 1970), Panama Railroad, about 3,500 feet southeast of Gatun railroad station, Canal Zone, Panama, middle Gatun Formation.
Occurrence – Late Miocene, middle and upper Gatun Formation, Panama (Woodring, 1970).

nutrita (*Axelella*) nov. sp.

Axelella nutrita Landau, Petit, Etter & Silva (this paper) p. 204, Pl. 5, figs 13-14, Pl. 6, fig. 9.

Cyronym – Axelella nutrita.
Types – Holotype NHMW 2011/0178/0037, ex BL coll.; paratype 1 NHMW 2011/0178/0038, ex BL coll., coastal exposure next to 'blue house', Burica Peninsula, Panama, Armuelles Formation, Charco Azul Group, Pleistocene.
Occurrence – Pleistocene, Armuelles Formation Formation, Charco Azul Group, Costa Rica (this paper).

obeliscus (*Hertleinia*) nov. sp.

Hertleinia obeliscus Landau, Petit, Etter & Silva (this paper) p. 200, Pl. 4, figs 6-7.

Cyronym – Hertleinia obeliscus.
Types – Holotype NMB H18773, locality NMB 17529; paratype 1 NMB H18499, locality NMB 13665, San Rafael, 3.5 km SSW of Pueblo Cumarebo. Small outcrop among houses 100 m south of road at west end of San

Rafael, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
Occurrence – Late Miocene, Caujarao Formation, Venezuela (this paper).

obesa (*Cancellaria*) G.B. Sowerby I, 1832a, p. 52; 1832b, figs 3–4.

Cyronym – Cancellaria obesa.
Type – Lectotype NHMUK 1964342, Gulf of Dulce, Costa Rica.
Occurrence – Recent, intertidal to 90 m, Gulf of California to Peru and the Galapagos Islands. Pleistocene, Baja California, Mexico.

obtusa (*Cancellaria*) Deshayes, 1830, p. 187.

Cyronym – Massyla obtusa.
Type – Holotype, NHMUK 1964454, unknown locality.
Occurrence – Recent, Peru, shallow water to 20 m.

ovata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 53; 1832b, fig. 2.

Cyronym – Cancellaria ovata.
Types – Four syntypes NMHUK 1964449, Santa Elena, Colombia [*sic* = Ecuador], 8 to 10 fathoms.
Occurrence – Pleistocene (?), Galapagos Islands (fide Garcia-Talavera, 1993); Recent: Perlas Islands, Panama Bay to Ecuador and the Galapagos Islands, 30-120 m.
Comments – The Pacific species of *Cancellaria* sensu stricto require study and reevaluation. Here *C. ovata* is considered to differ from *C. obesa* by having a reduced or absent constriction of the body whorl behind the siphonal fasciole.

pachia (*Cancellaria*) Smith, 1940.

Cancellaria (*Bivetopsia*) *moorei pachia* Smith, 1940, p. 45 pl. 2, fig. 2.
Cancellaria (*Bivetopsia*) *pachia* M. Smith – Landau *et al*., 2007, p. 35, figs 20-22.
Bivetopsia pachia (M. Smith) – Landau & Silva, 2010, p. 97, pl. 19, fig. 6; Landau *et al*., 2012a, p. 322, figs 5.1-5.6; Landau *et al*., 2012b, p. 920, figs 6.1-6.2.
Not *Bivetopsia pachia* (M. Smith) – Petuch, 1994, p. 222, pl. 90, fig. C [? = *B. rugosa* (Lamarck, 1822)].

Cyronym – Bivetopsia pachia.
Type – Holotype FMNH UF 1319. Dyke near Belle Glade, Florida. Plio-Pleistocene (assigned incorrectly to Miocene by Smith, 1940).
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a), upper Gatun Formation, Panama (Landau *et al*., 2012b), Mataruca Member, Caujarao Formation, Venezuela (NMB H18491, Pl. 4, fig. 3); early Pliocene, Araya Formation, Cubagua Island; Aramina Formation, Araya Peninsula, Venezuela (Landau *et al*., 2007, Landau & Silva, 2010), Punta Gavilán Formation, Falcón Province, Venezuela (NMB H18695, Pl. 4, fig. 4, NMB H19841); Plio-Pleistocene, Florida (Smith, 1940).

pacifica (*Cancellaria*) Pilsbry & Olsson, 1941, p. 23, pl. 3, fig. 4.

Comment – Junior homonym of *C. pacifica* Anderson, 1905. Renamed *C. surpacifica* Olsson, 1967.

pajana (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Narona*) *pajana* Pilsbry & Olsson, 1941, p. 25, pl. 3, fig. 6.

Cyronym – Narona? *pajana.*
Type – Holotype ANSP 14485, type incomplete, Punta Blanca, Jama Bay, Ecuador, Canoa Formation, Pliocene.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

panamica (*Olssonella*) Petit, 1976.

Olssonella panamica Petit, 1976, p. 35, pl. 2, fig. 1.
Axelella panamica (Petit) – Landau *et al*., 2012b, p. 927.

Cyronym – Axelella panamica.

Type – Holotype USNM 220090, locality TU 757, hillslope on south side of Transisthmian Highway at junction of road to Refinería Panamá, just east of Cativa, Colon, Panamá, Gatun Formation, middle-late Miocene.
Occurrence – Late Miocene, middle and upper Gatun Formation, Canal Zone, Panama (Petit, 1976; Landau *et al*., 2012b).

paraguanensis (*Cancellaria*) H.K. Hodson, *in* Hodson & Hodson, 1931.

Cancellaria paraguanensis H.K. Hodson, *in* Hodson & Hodson, 1931, p. 44, pl. 24, fig. 10; Marks, 1949, p. 460 (list).
Cancellaria (subgenus?) *paraguanensis* H.K. Hodson – Jung, 1965, p. 555, pl. 75, figs 15-16.

Cyronym – Cancellaria paraguanensis.
Type – Holotype PRI 24122, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Jung, 1965).

peninsularis (*Cancellaria*) Olsson, 1942.

Cancellaria (*Calcarata*) *peninsularis* Olsson, 1942, p. 62, pl. 11, fig. 9.

Cyronym – Sveltia peninsularis.
Type – Holotype PRI 4046, Quebrada Peñitas, Puntarenas Province, Costa Rica, Charco Azul Group, Penita Formation, late Pliocene.
Occurrence – Late Pliocene, Penita Formation, Charco Azul Group (Olsson, 1942).

penita (*Cancellaria*) Olsson, 1942.

Cancellaria (*Cancellaria*) *penita* Olsson, 1942, p. 59, pl. 8, figs 4, 8.

Cyronym – Cancellaria penita.
Type – Holotype PRI 4042, Quebrada Peñitas, Puntarenas Province, Costa Rica, Charco Azul Group, Penita Formation, late Pliocene.
Occurrence – Late Pliocene, Penita Formation, Charco Azul Group (Olsson, 1942).

perdiciana (*Cancellaria*) Olsson, 1942.

Cancellaria (*Charcolleria*) *perdicana* Olsson, 1942, p. 61, pl. 8, fig. 5; Marks, 1949, p. 460 (list).

Cyronym – Massyla perdicana.
Type – Holotype PRI 4044, upper Las Perdices shales, Puerto Colombia, Colombia, Las Perdices Formation, early Miocene.
Occurrence – Early Miocene, Las Perdices Formation, Colombia (Olsson, 1942).

peruana (*Aphera*) Nelson, 1870.

Aphera peruana Nelson, 1870, p. 190, pl. 6, fig. 3; Jung & Petit, 1990, p. 111, pl. 24, figs 10-13.
Cancellaria (*Aphera*) *peruana* Nelson – Spieker, 1922, p. 42, pl. 4, fig. 13; Olsson, 1932, p. 163; Marks, 1949, p. 460 (list).

Cyronym – Aphera peruana.
Type – Holotype YPM IP000545, Quebrada Tucillal at Zorritos, northern Peru, Tumbes Formation, late Miocene.
Occurrence – ? Early Miocene, Zorritos Formation, Peru (Olsson, 1932); late Miocene, Tumbes Formation, Peru (Olsson, 1932).

petiti (*Cancellaria*) Olsson, 1967.

Cancellaria cossmanni Olsson, 1922, p. 253, pl. 6, figs 9, 11; Marks, 1949, p. 459 (list) (not *C. cossmanni* Morlet, 1888, p. 209, pl. 9, figs 10, 10a, b).
? *Cancellaria* (*Cancellaria*) *cossmanni* Olsson – Anderson, 1929, p. 117.
Cancellaria (*Cancellaria*) *petiti* Olsson, 1967, p. 44 (new name for *C. cossmanni* Olsson, 1922, *non* Morlet, 1888).
Cancellaria barreti [*sic*] Guppy – Gómez & Valerio, 1971, p. 44, fig. 3 (not *C. barretti* Guppy, 1866).
Cancellaria cossmanni Olsson – Gómez & Valerio, 1971, p. 44, fig. 4.
Cancellaria (*Cancellaria*) *petiti* Olsson – Jung & Petit, 1990, p. 117, pl. 16, figs 5-9.
Cancellaria petiti Olsson – Landau *et al*., 2012a, p. 313, figs 2.1-2.13, 7.12.
Not *Cancellaria* (*Cancellaria*) *cossmanni* Olsson – Oinomikado, 1939, p. 623, pl. 29, fig. 17 (? = juvenile *Distorsio* Röding, 1798).

Cyronym – Cancellaria petiti.
Type – Lectotype PRI 20966, Río Banano, Limón Province, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
Occurrence – Middle Miocene, Valiente Formation, Popa Island, Bocas del Toro, Panama (Landau *et al*., 2012a); late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a); early Pliocene, Cayo Agua Formation, Cayo Agua Island, Bocas del Toro, Panama (Landau *et al*., 2012a), ?Tubará Formation, Colombia (Anderson, 1929); late Pliocene, upper Río Banano Formation, Costa Rica (Olsson, 1922; Gómez & Valerio, 1971; Jung & Petit, 1990).

petuchi (*Cancellaria*) Harasewych, Petit & Verhecken, 1992, p. 47, figs 9–10, 14–16.

Cyronym – Cancellaria petuchi.
Types – Holotype MORG 28660, 3 paratypes MNHN, all from NE. of Vitóia, E.S., Brazil in 34 m; 59 additional paratypes in various institutions as listed in original description.
Occurrence – Recent, known only from Brazil, 0 to 40 m.

pilula (*Cancellaria*) Landau, Petit & Silva, 2012.

Cancellaria pilula Landau, Petit & Silva, 2012a, p. 313, figs 1.15-1.22, 7.10-7.11.

Cyronym – Cancellaria pilula.
Types – Holotype NMB H19501; paratype 1 NMB H19502, locality PPP 02212 (= NMB 18711), Finger Island; paratypes 2-6 NMB H19503 - H19507, locality PPP 02206 (= NMB 18705), south coast, approximately 1.5 km southwest of Punta de Toro, small island 50 m west off coast, 50 m east of PJ2241, Valiente Peninsula; paratype 7 NMB H19508, locality PPP 02207 (= NMB 18706), south coast, about 1.5 km southwest of Punta de Toro, small island 50 m west of coast; paratypes 8-9 NMB H19509 and H19510 (juveniles), locality PPP 00191 (= NMB 17629), Finger Island, west of south tip of Cayo Toro, Valiente Peninsula, Nancy Point Formation, Messinian, late Miocene.
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a).

pirabensis (*Cancellaria*) Maury, 1925b.

Cancellaria pirabensis Maury, 1925b, p. 186, pl. 9, fig. 7.

Cyronym – Type material too fragmentary for generic assignment.
Type – Plastotype PRI 29366. Río Pirabas, Pirabas Formation, early Miocene.
Occurrence – Early Miocene, Pirabas Formation, Brazil (Maury, 1925b).

plectilis (*Cancellaria*) Jung & Petit, 1990.

Cancellaria (*Bivetopsia*) *plectilis* Jung & Petit, 1990, p.107, pl. 22, figs 12–15.

Cyronym – Bivetopsia plectilis.
Types – Holotype NMB H17317; paratype 1 NMB H17318, locality TU 1354, Cañada de Zamba, Río Cana, Dominican Republic, Gurabo Formation, early Pliocene.
Occurrence – Early Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990).

plummeri (*Cancellaria*) Olsson, 1922.

Cancellaria plummeri Olsson, 1922, p. 85, pl. 6, figs 2-3.
Trigonostoma plummeri Olsson – Marks, 1949, p. 460 (list).
Ventrilia plummeri Olsson – Landau *et al*., 2012a, p. 333, figs 8.16-8.23.

Cyronym – Ventrilia plummeri.
Type – Holotype PRI 20960, Toro Cays, Bocas del Toro, Panama, Miocene.
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Olsson, 1922; Landau *et al*., 2012a).

portoricana (*Cancellaria*) Maury, 1920.

Cancellaria laevescens Guppy – Hubbard, 1920. p. 157, pl. 24, figs 5, 6.
Cancellaria laevescens portoricana Maury, 1920, p. 69, pl. 7, fig. 10.

Cyronym – Pyruclia? *portoricana.*
Type – Holotype AMNH Fl 22529, Quebradillas, Puerto Rico, late Miocene or early Pliocene.
Occurrence – Late Miocene or early Pliocene, Quebradillas Formation, Puerto Rico (Hubbard, 1920; Maury, 1920).

porvenirensis (*Bivetopsia*) nov. sp.

Bivetopsia porvenirensis Landau, Petit, Etter & Silva (this paper) p. 199, Pl. 4, fig. 5.

Cyronym – Bivetopsia porvenirensis.
Types – Holotype NMB H18825, El Porvenir, south-southwest of Buenevara, Paraguaná Peninsula, Falcón State, Venezuela.
Occurrence – Middle Miocene, El Porvenir beds, Venezuela (this paper).

praeindentata (*Cancellaria*) Maury, 1925.

Cancellaria praeindentata Maury, 1925b, p. 188, pl. 9, fig. 14.

Cyronym – Type material too fragmentary for generic assignment.
Type – Plastotype PRI 29373. Río Pirabas, Pirabas Formation, early Miocene.
Occurrence – Early Miocene, Pirabas Formation, Brazil (Maury, 1925b).

pulchra (*Cancellaria*) G.B. Sowerby I, 1832a, p. 50; 1833, fig. 37.

Cyronym – Bivetiella pulchra.
Types – Lectotype NHMUK 1964343, 3 paralectotypes NHMUK 1964344, all Sanctae Elenae (= Santa Elena, Ecuador), 8 to 10 fathoms. Lectotype segregated by the late A.A. Olsson and here so designated.
Occurrence – Pleistocene, upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0016, ex BL coll., Pl. 2, fig. 10); late Pleistocene, Isla Coronados, Gulf of California; (Emerson & Hertlein, 1964); Recent, Mexico to Ecuador and Galapagos Islands, 10 to 120 feet.

puntagavilanensis (*Ventrilia*) nov. sp.

Ventrilia puntagavilanensis Landau, Petit, Etter & Silva (this paper) p. 205, Pl. 6, fig. 4.

Cyronym – Ventrilia puntagavilanensis.
Types – Holotype NMB H18706, locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela, Punta Gavilán Formation, early Pliocene.
Occurrence – Early Pliocene, Punta Gavilán Formation, Venezuela (this paper).

pycta (*Cancellaria*) Olsson, 1964.

Cancellaria (*Pyruclia*) *pycta* Olsson, 1964, p. 122, pl. 21, figs 3, 3a.

Cyronym – Pyruclia pycta.
Type – Holotype USNM 643869, Telembi, Río Cayapas, northwest Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

pygmaea (*Cancellaria*) C.B. Adams, 1852a, p. 360; 1852b, p. 136.

Cyronym – Ventrilia pygmaea.
Type – Holotype MCZ 186415, Taboga (island in Panama Bay), habitat unknown.

Occurrence – Recent, known only from Panama Bay, at unknown depths.

pyrum (*Cancellaria*) Adams & Reeve, 1850, p. 42, pl. 10, fig. 16.

Types – Four probable syntypes NHMUK 1968268, 'China Seas'.
Comment – Junior subjective synonym of *Pyruclia bulbulus* (G.B. Sowerby I, 1832) Verhecken, 1985).

reticulata (*Voluta*) Linné, 1767, p. 1190.

Cyronym – Cancellaria reticulata.
Type – Linnaeus' only cited figure for this species is Argenville (1742, pl. 20, fig. M). A single specimen is in the Linnean collection, 0010702, which, according to Dodge (1955, p. 91) 'may be taken as the ostensible holotype'. Linné gave no locality.
Occurrence – Late Pleistocene, La Isabella Formation, Dominican Republic (NHMW 2011/0178/0017, ex BL coll.); Recent, North Carolina to Texas and Puerto Rico, shallow water to 73 m.

rigida (*Cancellaria*) G.B. Sowerby I, 1832a, p. 53; 1833, fig. 41.

Types – Two syntypes, NHMUK 1964445, Puerto Portrero (Costa Rica).
Comment – Subjective synonym of *Ventrilia goniostoma* (G.B. Sowerby I, 1832) (Keen, 1971).

rosewateri (*Cancellaria*) Petit, 1983, p. 250, figs 1A–D.

Cyronym – ?*Cancellaria rosewateri*, generic placement uncertain.
Type – Holotype USNM 811465, 200 fathoms 90 miles SSW of Pascagoula, Mississippi. Paratype USNM 811464, 200 fathoms, 95 miles SSE of Mobile, Alabama.
Occurrence – Recent, known only from Gulf of Mexico, 360–580 m.

rowelli (*Cancellaria*) Dall in Guppy & Dall, 1896.

Cancellaria rowelli Dall, *in* Guppy & Dall, 1896, p. 307, pl. 29, fig. 1; Maury, 1917, p. 63, pl. 10, fig. 2; Pilsbry, 1922, p. 333.
? *Cancellaria* (*Cancellaria*) cf. *rowelli* Dall – Olsson, 1932, p. 156.
Cancellaria (*Cancellaria*) *rowelli* Dall – Marks, 1949, p. 460 (list in part; Dominican material only); Jung & Petit, 1990, p. 98, pl. 18, figs 1-6, pl. 20, figs 7-9.
Not *Cancellaria rowelli* Dall –Olsson, 1922, p. 256, pl. 6, fig. 7 (= *C. anomoia* Woodring, 1970).
Not *Cancellaria rowelli* Dall – Weisbord, 1929, p. 50, pl. 6, figs 9-10 (= *C. anomoia* Woodring, 1970).
Not *Cancellaria* (*Cancellaria*) aff. *rowelli* Dall – Jung, 1965, p. 551, pl. 75, figs 7, 8 (= *C. hodsonae* Landau & Petit, 1997).

Cyronym – Cancellaria rowelli.
Type – Holotype USNM 113762, Potrero, Río Amina, Dominican Republic, not restricted (see Jung & Petit, 1990, p. 99).
Occurrence – Early Miocene, Baitoa Formation, Dominican Republic (Jung & Petit, 1990).

rucksorum (*Ventrilia*) Petuch, 1994.

Ventrilia kissimmeensis Petuch, 1994, p. 350, pl. 89, fig. B.
Ventrilia rucksorum Petuch, 1994, p. 351, pl. 88, fig. K.
Trigonostoma (*Ventrilia*) *rucksorum* (Petuch) – Landau *et al*., 2007, p. 40, figs 47-48; Landau & Silva, 2010, p. 99, pl. 20, fig. 7.

Cyronym – Ventrilia rucksorum.
Types – Holotype *V. rucksorum* UF 66417, Ruck's Pit, Fort Drum, Okeechobee County, Florida, USA, Nashua Formation, early Pleistocene; holotype *V. kissimmeensis* UF 66418, Kissimmee River dig at Okeetantie, Okeechobee, Okeechobee County, Florida, USA, Pinecrest Beds, late Pliocene.
Occurrence – Early Pliocene, Araya Formation, Cubagua Island, Venezuela (Landau *et al*., 2007a; Landau & Silva, 2010); Punta Gavilán Formation, Falcón, Venezuela (NHMW 2011/0178/0018, ex BL coll., Pl. 6, fig. 3); Springvale Formation, Trinidad (NHMW 2011/0178/0019, ex BL coll.); early Pleistocene, Nashua Formation, Florida (Petuch, 1994).

rugosa (*Cancellaria*) Lamarck, 1822, p. 115.

Cyronym – Bivetopsia rugosa.
Types – Two syntypes MHNG 1097/92, unknown locality.
Occurrence – Recent, West Indies, in shallow water to 35 feet.

sacellum (*Trigonostoma*) Petit, 1976.

Trigonostoma (*Ventrilia*) *sacellum* Petit, 1976, p. 42, pl. 2, fig. 4.
Ventrilia sacellum (Petit) – Landau *et al*., 2012b, p. 928.

Cyronym – Ventrilia sacellum.
Types – Holotype USNM 220092. Paratype 1, USNM 254602, locality TU 958, hillslope east of road from Boyd-Roosevelt Highway to Refinería Panamá, about 500 m north of junction at Cativa, Colon, Panamá, Gatun Formation, middle-late Miocene.
Occurrence – Late Miocene, upper Gatun Formation, Canal Zone, Panama (Petit, 1976; Landau *et al*., 2012b).

santa (*Gerdiella*) Olsson & Bayer, 1972, p. 877, figs 4–6.

Cyronym – Gerdiella santa.

Type – Holotype USNM 706733, Straits of Florida, 733–897 m.
Occurrence – Recent, Straits of Florida, deep-water 516–897 m.

santiagensis (*Cancellaria*) Marks, 1949.

Cancellaria (*Bivetiella*) *santiagensis* Marks, 1949, p. 462, pl. 78, fig. 6.

Cyronym – Bivetiella santiagensis.
Types – Holotype PRI 20385; paratype CAS 71600 locality I. P. C. 21105; Angostura Cave on the Santiago River, Esmeraldas Province, northern Ecuador.
Occurrence – Late Miocene, Angostura Formation, northern Ecuador (Marks, 1949).

sathra (*Cancellaria*) Woodring, 1973.

Cancellaria dariena Toula – Brown & Pilsbry, 1911 (in part), p. 345, fig. 3 only. *Cancellaria* (*Cancellaria*) *epistomifera lipara* Woodring, 1970, p. 337, pl. 52, figs 7, 8. (not *Cancellaria lipara* Woodring, 1951).
Cancellaria (*Cancellaria*) *epistomifera sathra* Woodring, 1973, p. 481 (n.nov. for *C. lipara* Woodring, 1970 *non* 1951).
Cancellaria sathra Woodring – Landau *et al*., 2012b, p. 911, figs 3.20-3.23, 4.1-4.3.

Cyronym – Cancellaria sathra.
Type – Holotype USNM 645719, Caribbean coast east of San Miguel (Río Miguel) station 4 plus 12 metres, Panama, upper Gatun Formation, late Miocene.
Occurrence – Late Miocene, upper Gatun Formation, Panama (Woodring, 1970, 1973; Landau *et al*., 2012b); early Pliocene, Punta Gavilán Formation, Falcón Province, Venezuela (NMB H19845, NHMW 2011/0178/0024, ex BL coll., Pl. 1, fig. 8), Aramina Formation, Araya Peninsula, Venezuela (NHMW 2011/0178/0025-2011/0178/0026, ex BL coll., Pl. 1, figs 9, 10); late Pliocene, upper Río Banano Formation, Costa Rica (NMB H20138, Pl. 1, fig 11).

scalatella (*Cancellaria*) Guppy, 1873.

Cancellaria scalatella Guppy, 1873, p. 78, pl. 2, fig. 4.
Cancellaria (*Trigonostoma*) *scalatella* Guppy – Dall, 1903, p. 1583 (list).
Trigonostoma scalatella Guppy – Woodring, 1928, p. 224, pl. 13, fig. 1; Marks, 1949, p. 460 (list).

Cyronym – Axelella scalatella.
Type – Lectotype USNM 115474, paralectotype, Bowden, Jamaica, Bowden Formation, Pliocene.
Occurrence – Pliocene (undetermined), Bowden Formation, Jamaica (Guppy, 1873; Woodring, 1928); Recent, 40-80 m off Surinam and French Guyana (Verhecken, 1984).

scheibei (*Cancellaria*) F.M. Anderson, 1929.

Cancellaria scheibei Anderson, 1929, p. 115, pl. 10, figs 1-4.
Cancellaria (*Pyruclia*) *diadela* Woodring, 1970, p. 338, pl. 53, figs 7, 9.
Cancellaria (*Pyruclia*) *scheibei* Anderson – Marks, 1949, p. 460 (list); Landau *et al*., 2007, p. 37, figs 35-37.
Pyruclia scheibei (Anderson) – Landau & Silva, 2010, p. 98, pl. 20, figs 1-2; Landau *et al*., 2012b, p. 918.

Cyronym – Pyruclia scheibei.
Type – Holotype CAS 4627, CAS locality 306, near Usiacuri, Colombia; paratype CAS 4628, CAS locality 304, near Santa Rosa, Colombia, Tubará Formation, early Pliocene.
Occurrence – Late Miocene, upper Gatun Formation, Panama (Woodring, 1970; Landau *et al*., 2012b), Caujarao Formation, Venezuela (NMB H19838-19840, locality NMB 17529); early Pliocene, Araya Formation, Cubagua Island; Aramina Formation, Araya Peninsula, Venezuela (Landau *et al*., 2007; Landau & Silva, 2010), Punta Gavilán Formation, Falcón Province, Venezuela (NMB H19846, NHMW 2011/0178/0029, ex BL coll., Pl. 3, fig. 6); Tubará Group, northern Colombia (Anderson, 1929).

schmidti (*Pyruclia*?) nov. sp.

Pyruclia? *schmidti* Landau, Petit, Etter & Silva (this paper) p. 198, Pl. 3, figs 4-5.

Cyronym – Pyruclia? *schmidti.*
Types – Holotype NMB H20056; paratype 1 NMB H20055, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.
Occurrence – Late Miocene, Urumaco Formation, Venezuela (this paper).

schucherti (*Cancellaria*) Olsson, 1932.

Cancellaria (–) *schucherti* Olsson, 1932, p. 162, pl. 17, figs 3–4; Marks, 1949, p. 460 (list).
Cancellaria (*Cancellaria*) *obesa schucherti* Olsson – Pilsbry & Olsson, 1941, p. 21.

Cyronym – Pyruclia schucherti.
Types – Holotype YPM IP000511; paratypes IP031387, IP031388, IP031389, Quebrada Tucillal, Peru, Tumbes Formation, late Miocene.
Occurrence – Late Miocene, Tumbes Formation, Peru (Olsson, 1932); Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941).

semota (*Cancellaria*) Jung, 1969.

Cancellaria (*Narona*) *semota* Jung, 1969, p. 541, pl. 58, figs 4–5.

Cyronym – Narona semota.

Type – USNM 645498, Melajo River Area, USGS locality 21178, Trinidad, Melajo Clay member Springvale Formation, early Pliocene.
Occurrence – Early Pliocene, Springvale Formation, Trinidad (Jung, 1969).

sepulcralis (*Cancellaria*) nov. sp.

Cancellaria sepulcralis Landau, Petit, Etter & Silva this paper (p. 196), Pl. 1, figs 3-6, Pl. 6, fig. 7.

Cyronym – Cancellaria sepluchrum.
Types – Holotype NMB H18498, locality NMB 12859; paratype 1 NMB H20084, locality NMB 17530; paratype 2 NMB H20085; paratype 3 NMB H20005, locality NMB 13665; paratype 4 NMB H18495, locality NMB 12854, 30 m west of Cemeterio, Carrizal, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.
Occurrence – Late Miocene, Mataruca Member, Caujarao Formation, Venezuela (this paper).

serramata (*Cancellaria*) Olsson, 1967.

Cancellaria (*Euclia*) *serrata* Olsson, 1964, p. 122, pl. 28, fig. 8.
Cancellaria (*Euclia*) *serramata* Olsson, 1967, p. 44 (*n. nov.* for *C. serrata* Olsson, 1964, *non* Bronn, 1831).

Cyronym – Bivetia serramata.
Type – Holotype USNM 643872, Quebrada Camarones, northwestern Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene to mid late Pliocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

serrata (*Cancellaria*) Olsson, 1964.

Comment – Junior homonym of *Cancellaria serrata* Bronn, 1831, renamed *C. serramata* Olsson, 1967.

smithii (*Cancellaria*) Dall, 1888, p. 70, fig. 292.

Cyronym – Axelella smithii.
Types – Two syntypes USNM 83543, off Cape Hatteras, North Carolina, in 49 fathoms. *Occurrence* – Late Pliocene, Waccamaw Formation, South Carolina (REP coll.); Recent, North Carolina to Gulf of Mexico and Venezuela, depths of 10 to 140 feet.

solida (*Cancellaria*) G.B. Sowerby I, 1832a, p. 50; 1832b, fig. 6. Recent, Panamic-Pacific. Shallow water, 10-37 m.

Cancellaria (*Peruclia* [sic]) *solida* Sowerby – Pilsbry & Olsson, 1941, p.24.
Cancellaria (*Pyruclia*) *solida* Sowerby – Olsson, 1964, p.120, pl. 21, fig. 2.

Cyronym – Pyruclia solida.
Types – Four syntypes NHMUK 1968671.
Occurrence – Late Miocene, Urumaco Formation, Venezuela (NMB H20048, Pl. 3, fig. 3); Tuira Formation, Darien, Panama (NMB H19834, locality PPP 01168 = NMB 18549); Pliocene (undetermined), Jama Formation, Ecuador (Pilsbry & Olsson, 1941; Olsson, 1964); late Pliocene, Charco Azul Group, Penita Formation, Burica Peninsula, Panama (NHMW 2011/0178/0020, ex BL coll.).

spatiosa (*Cancellaria*) Nelson, 1870.

Cancellaria spatiosa Nelson, 1870, p. 191.
Cancellaria (*Pyruclia*) *spatiosa* Nelson – Olsson, 1932, p. 161, pl. 17, figs 1, 2; Marks, 1949, p. 460 (list).

Cyronym – Pyruclia spatiosa.
Types – Lectotype YPM IP000523; paralectotypes IP031390, IP031391, IP031392, Quebrada Tucillal, Peru, Tumbes Formation, late Miocene.
Occurrence – Late Miocene, Tumbes Formation, Peru (Olsson, 1932).

springvaleensis (*Cancellaria*) Mansfield, 1925.

Cancellaria springvaleensis Mansfield, 1925, p. 31, pl. 2, fig. 12; Marks, 1949, p. 460 (list).

Type – Holotype USNM 352662, near Couva, Trinidad, Springvale Formation, early Pliocene.
Comment – Junior subjective synonym of *Euclia montserratensis* (Maury, 1925).

stri (*Cancellaria*) Landau, Petit & Silva, 2012.

Cancellaria stri Landau, Petit & Silva, 2012a, p. 315, figs 3.1-3.5

Cyronym – Cancellaria stri.
Types – Holotype, NMB H19540, locality PPP 02187 (= NMB 18686), height 29.2 mm, early Pleistocene, Gelasian, upper Escudo de Veraguas Formation, Escudo de Veraguas Island, south coast, 100 m west of PJ2222, Bocas del Toro, Panama.
Occurrence – Early Pleistocene, Gelasian, upper Escudo de Veraguas Formation, Bocas del Toro, Panama. (Landau *et al*., 2012a).

strongi (*Cancellaria*) Shasky, 1961, p. 19, pl. 4, fig. 4.

Cyronym – Agatrix strongi.
Type – Holotype CAS 64047, Gulf of California, 35 fathoms.
Occurrence – Recent, western Mexico, 20 to 90 fathoms.

subobtusa (*Cancellaria*) Crosse, 1863, pl. 2, fig. 9 (as var. of *C. cumingiana* Petit de la Saussaye).

Type – Syntype NMW 1955.158.02198, Payta, Peru.
Comment – Probably junior subjective synonym of *Massyla cumingiana* (Petit de la Saussaye, 1844) (Landau *et al*., 2012a).

subtilicancellata (*Cancellaria*) Maury, 1925.

Cancellaria subtilicancellata Maury, 1925b, p. 190, pl. 9, fig. 5.

Cyronym – Type material too fragmentary for generic assignment.
Type – Río Pirabas, Pirabas Formation, early Miocene. We were unable to trace the holotype
Occurrence – Early Miocene, Pirabas Formation, Brazil (Maury, 1925b).

surpacifica (*Cancellaria*) Olsson, 1967.

Cancellaria (*Euclia*) *pacifica* Pilsbry & Olsson, 1941, p. 23, pl. 3, fig. 4 (not *C. pacifica* Anderson, 1905).
Cancellaria (*Euclia*) *surpacifica* Olsson, 1967, p. 44 (n.nov. for *C. pacifica* Pilsbry & Olsson, 1941)

Cyronym – Euclia surpacifica.
Type – Holotype ANSP 13645, Puerto Jama, Jama Bay, Ecuador, Jama Formation, Pliocene.
Occurrence – Pliocene (undetermined), Jama Formation, Ecuador (Pilsbry & Olsson, 1941).

sursalta (*Cancellaria*) Marks, 1949.

Cancellaria (*Cancellaria*) *sursalta* Marks, 1949, p. 461, pl. 78, fig. 4.

Cyronym – Cancellaria sursalta.
Types – Holotype PRI 20391, two paratypes PRI 20392 and CAS 71601, Zacachún corehole, depth 140-150 feet, Zacachún sector, Guayas Province, Progreso Basin, southwestern Ecuador, early Miocene.
Occurrence – Early Miocene, Ecuador (Marks, 1949).

tapeina (*Cancellaria*) Woodring, 1970.

Cancellaria (*Cancellaria*) *tapeina* Woodring, 1970, p. 335, pl. 51, figs 8, 9.
Cancellaria tapeina Woodring – Landau *et al*., 2012a, p. 319, figs 3.15-3.19; Landau *et al*., 2012b, p. 913.

Cyronym – Cancellaria tapeina.
Type – Holotype USNM 645714, Caribbean coast east of San Miguel (Río Miguel) station 25 plus 120 metres, Panama, upper Gatun Formation, late Miocene.
Occurrence – Middle Miocene, Valiente Formation, Valiente Peninsula, Bocas del Toro (Landau *et al*., 2012a); late Miocene, upper Gatun Formation, Panama (Woodring, 1970; Landau *et al*., 2012b).

telemba (*Cancellaria*) Olsson, 1964.

Cancellaria (subgenus?) sp. Marks, 1949, p. 464, pl. 78, fig. 9.
Cancellaria (*Pyruclia*) *telemba* Olsson, 1964, p. 121, pl. 21, fig. 4.

Cyronym – Pyruclia telemba.
Type – Holotype USNM 643867, Telembi, Río Cayapas, northwestern Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

tenera (*Cancellaria*) Philippi, 1848, p. 24.

Cyronym – Ventrilia tenera.
Type – Location of type unknown. Type locality: Yucatan.
Occurrence – Pliocene and Pleistocene of the Carolinas and Florida (Petuch, 1994); Recent, South Carolina to Yucatan, 10 to 100 fathoms. In the Florida fossil literature species in this group have been referred to *tenera* or given new names. A major revision is required to determine the validity and range of the nomina.

terryi (*Cancellaria*) Olsson, 1942.

Cancellaria (*Charcolleria*) *terryi* Olsson, 1942, p. 62, pl. 8, fig. 1.
Cancellaria (*Charcolleria*) sp. – Olsson, 1964, p. 124, pl. 22, fig. 1.
Cancellaria (*Charcolleria*) *terryi* Olsson – Olsson, 1964, p. 124, pl. 22, fig. 2; Jung, 1965, p. 556, pl. 75, figs 17-19; Woodring, 1970, p. 343, pl. 54, figs 5, 6, 9, 10; Landau *et al*., 2007, p. 40, figs 45-46.
Charcolleria terryi Olsson – Landau & Silva, 2010a, p. 99, pl. 20, figs 5-6.
Massyla terryi Olsson – Landau *et al*., 2012b, p. 921.

Cyronym – Massyla terryi.
Type – Holotype PRI 4045, Quebrada Penitas, Puntarenas Province, Costa Rica, Charco Azul Group, Penita Formation, late Pliocene.
Occurrence – ATLANTIC: early Miocene, Cantaure Formation, Venezuela (Jung, 1965); middle Miocene, lower Gatun Formation, Panama; late Miocene, middle and upper Gatun Formation, Panama (Woodring, 1970; Landau *et al*., 2012b); early Pliocene, Araya Formation, Cubagua Island, Venezuela, Punta Gavilán Formation, Venezuela (NMB H20047, Pl. 4, fig. 12); (Landau *et al*., 2007; Landau & Silva, 2010). PACIFIC: late Miocene to mid late Pliocene, Esmeraldas beds, Onozole Formation, Ecuador (Olsson, 1964); late Pliocene, Charco Azul Group, Penita Formation, Costa Rica (Olsson, 1942).

tessellata (*Cancellaria*) G.B. Sowerby I, 1832a, p. 51; 1832b, figs 20, 20*.

Cyronym – Aphera tessellata.

Types – Four syntypes NHMUK 1966428, Central America.
Occurrence – Late Pliocene, Burica Formation, PPP 00564 (= NMB 18071) Río San Bartolo, Burica Peninsula, Panama (NMB H19832-19833); Pleistocene, upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (NHMW 2011/0178/0021, ex BL coll., Pl. 5, fig. 9); Recent, Gulf of California to Peru, shallow water, 10 to 15 m.

thisbe (*Trigonostoma*) Olsson, 1964.

Trigonostoma thisbe Olsson, 1964, p. 126, pl. 22, fig. 6.

Cyronym – Axelella thisbe.
Type – Holotype USNM 643879, Quebrada Camarones, northwestern Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

toroensis (*Cancellaria*) Olsson, 1922.

Cancellaria toroenis Olsson, 1922, p. 84, pl. 6, fig. 4.
Trigonostoma toroenis Olsson – Marks, 1949, p. 460 (list).
Ventrilia toroenis Olsson – Landau *et al*., 2012a, p. 335, fig. 8.24.

Cyronym – Ventrilia toroenis.
Type – Holotype PRI 20961, Toro Cays, Bocas del Toro, Panama, Miocene.
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Olsson, 1922; Landau *et al*., 2012a).

torula (*Cancellaria*) Weisbord, 1962.

Cancellaria torula Weisbord, 1962, p. 398, pl. 40, figs 9–11.
Type – Holotype PRI 26323, lower Mare Formation at W-13, on hillside above west bank of Quebrada Mare Abajo.
Comment – Considered a *nomen dubium* by Landau *et al*. (2007, p. 32).

toulai (*Massyla*) Landau, Petit & Silva, 2012.

Massyla toulai Landau, Petit & Silva, 2012b, p. 921, figs 6.5-6.12.

Cyronym – Massyla toulai.
Types –. Holotype NHMW 2011/0177/0026, ex BL coll.; paratypes 1-3 NHMW 2011/0177/0027-2011/ 0177/0029, ex BL coll., locality TU 961, Cativa, Panama, middle Gatun Formation, late Miocene; paratype 4 NMB H19939, locality PPP 00226 (= NMB 17644); paratype 5 NMB H19951, locality PPP 03216 (= NMB 18985).
Occurrence – Late Miocene, middle and upper Gatun Formation, Panama (Landau *et al.,* 2012b), Mataruca Member, Caujarao Formation, Venezuela (NMB H20060, H18774, Pl. 4, figs 9, 10).

trema (*Cancellaria*) Olsson, 1932.

Cancellaria (*Narona*) *trema* Olsson, 1932, p. 162, pl. 15, figs 11–12; Marks, 1949, p. 460 (list).

Cyronym – Narona trema.
Types – Holotype PRI 2273; paratype PRI 2274, Quebrada Tucillal at Zorritos, Peru, Tumbes Formation, late Miocene.
Occurrence – Late Miocene, Tumbes Formation, Peru (Olsson, 1932).

triangularis (*Cancellaria*) Nelson, 1870.

Cancellaria triangularis Nelson, 1870, p. 191, pl. 6, fig. 10.
Cancellaria (*Euclia*) *triangularis* Nelson – Olsson, 1932, p. 158, pl. 18, figs 1, 2; Marks, 1949, p. 460 (list).

Cyronym – Euclia triangularis.
Types – Holotype YPM IP000524, Quebrada Tucillal at Zorritos, Peru, Tumbes Formation, late Miocene.
Occurrence – Late Miocene, Tumbes Formation, Peru (Olsson, 1932).

triumpha (*Trigonostoma*) Olsson, 1964.

Trigonostoma triumpha Olsson, 1964, p. 126, pl. 22, figs 7, 7a.

Cyronym – Ventrilia triumpha.
Type – Holotype USNM 643878, Punta Gorda, northwestern Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

trochilia (*Cancellaria*) Olsson, 1964.

Cancellaria (*Calcarata*?) *trochilia* Olsson, 1964, p. 125, pl. 22, figs 5, 5a–b.

Cyronym – Sveltia trochilia.
Type – Holotype USNM 644113, Punta Gorda, northwest Ecuador, Esmeraldas Beds, Onozole Formation, late Miocene to mid late Pliocene.
Occurrence – Late Miocene to mid late Pliocene, Esmeraldas Beds, Onozole Formation, Ecuador (Olsson, 1964).

trophis (*Aphera*) Landau, Petit & Silva, 2012.

Aphera trophis Landau, Petit & Silva, 2012a, p. 325, figs 6.8-6.11.

Cyronym – Aphera trophis.
Type – Holotype NMB H19627, locality PPP 02232 (=

NMB 18730), height 11.1 mm, Nispero Point; Cayo Agua Island, Cayo Agua Formation, Zanclean, early Pliocene.
Occurrence – Early Pliocene, Zanclean, Cayo Agua Formation, Bocas del Toro (Landau *et al*., 2012a).

tuberculosa (*Cancellaria*) G.B. Sowerby I, 1832a, p. 51; 1833, fig. 36.

Cyronym – Ventrilia tuberculosa.
Types – Three syntypes NHMUK 1964461, Iquiqi.
Occurrence – Pleistocene, Chile (Herm, 1969); Recent, Mexico to Chile and the Galapagos Islands, 13-150 m.

tweedledee (*Pyruclia*) Landau, Petit & Silva, 2012.

Cancellaria (*Pyruclia*) *cibarcola cibarcola* Anderson. Woodring, 1970 (in part), p. 338, pl. 53, figs 8, 10-12.
Pyruclia tweedledee Landau, Petit & Silva, 2012b, p. 919, figs 5.15-5.23, 7.5.

Cyronym – Pyruclia tweedledee.
Types – Holotype NMB H19897; paratype 1 NMB H19897, locality PPP 01305 (= NMB 18389); paratype 2 NHMW 2011/0177/0023, ex BL coll.; paratype 3 NHMW 2011/0177/0024, ex BL coll.; paratype 4 NHMW 2011/0177/0025, ex BL coll., locality TU 961, Cativa, Panama, middle Gatun Formation, late Miocene; paratype 4 NMB H19862; paratype 5 NMB H19863, locality PPP 01034 (= NMB 18258); paratype 6 NMB H19966; paratype 7 NMB H19967, locality PPP 01565 (= NMB 18503).
Occurrence – Middle Miocene, lower Gatun Formation, Panama; late Miocene, middle and upper Gatun Formation, Panama (Landau *et al*., 2012b).

tweedledum (*Pyruclia*) Landau, Petit & Silva, 2012.

Cancellaria (*Pyruclia*) *cibarcola cibarcola* Anderson – Woodring, 1970 (in part), p. 338, pl. 52, figs 9, 10.
Pyruclia tweedledum Landau, Petit & Silva, 2012b, p. 919, figs 5.9-5.14, 7.4.

Cyronym – Pyruclia tweedledum.
Types – Holotype NHMW 2011/0177/0021, ex BL coll.; paratype 1 NHMW2011/0177/0022, ex BL coll., locality TU 961, Cativa, Panama, Gatun Formation, late Miocene; paratype 2 NMB H19857, locality PPP 00229 (= NMB 17647).
Occurrence – Late Miocene, upper Gatun Formation, Panama (Landau *et al*., 2012b).

umbilicata (*Cancellaria*) Lesson, 1842, p. 203.

Type – Lost (personal comunication to REP from P. Bouchet, MNHN).
Comment – Nomen dubium (Petit & Harasewych, 2005).

uniplicata (*Cancellaria*) G.B. Sowerby I, 1832b, fig. 13.

Comment – Junior subjective synonym of *Hertleinia mitriformis* (G.B. Sowerby I, 1832a).

urceolata (*Cancellaria*) Hinds, 1843, p. 47; 1844b, p. 41, pl. 12, figs 7–8.

Cancellaria (*Cancellaria*) *urceolata* Hinds – Pilsbry & Olsson, 1941, p. 21.
Cancellaria (*Agatrix*) *deroyae* Petit – Aguilar & Fischer, 1986, p. 226, pl. 2, fig. 12 [not *A. deroyae* (Petit, 1970)]

Cyronym – Cancellaria urceolata.
Types – Four syntypes NHMUK 1966242, Mexico and Costa Rica, 7–14 fathoms.
Occurrence – Pliocene (undetermined), Canoa Formation, Ecuador (Pilsbry & Olsson, 1941); Pleistocene (undetermined), Armuelles Formation, Burica Peninsula, Panama (NHMW 2011/0178/0022, ex BL coll.); upper Montezuma Formation, Nicoya Peninsula, Puntarenas Province, Costa Rica (Aguilar & Fischer, 1986; NHMW 2011/0178/0023, ex BL coll., Pl. 2, fig. 5); Recent, Gulf of California to Ecuador and the Galapagos Islands, shallow water to 73 m.

urumacoensis (*Cancellaria*) H.K. Hodson, *in* Hodson & Hodson, 1931.

Cancellaria urumacoensis H.K. Hodson, *in* Hodson & Hodson, 1931, p. 45, pl. 18, figs 2–3; Marks, 1949, p. 460 (list).

Cyronym – Pyruclia? *urumacoensis.*
Type – Holotype PRI 24098, paratype PRI 24099, Río Codore, 4.9 km north and 3,8 km west of Urumaco, Democracia District, Falcón Province, Venezuela, upper middle Miocene.
Occurrence – Middle Miocene, Urumaco, Venezuela (H.K. Hodson, *in* Hodson & Hodson, 1931).

uva (*Cancellaria*) Jung & Petit, 1990.

Cancellaria laevescens Guppy – Guppy, 1866, p. 286 (list; not p. 289); Guppy, 1867, p. 157 (list, in part); Gabb, 1873, p. 236 (list); Guppy, 1876, p. 520; Maury, 1917. p. 64. pl. 10. fig. 6; Pilsbry, 1922, p. 333.
Cancellaria (*Pyruclia*?) *uva* Jung & Petit, 1990, p.101, pl. 18, figs 7–9.

Cyronym – Pyruclia? *uva.*
Types – Holotype NMB H17305; paratype 1 NMB H17306; paratype 2 NMB H17307, locality NMB 17275, Río Yaque del Norte, near mouth of Arroyo López, Dominican Republic, unnamed formation, late Miocene.
Occurrence – Late Miocene, unnamed formation, Dominican Republic (Jung & Petit, 1990).

valientensis (*Admetula*) Landau, Petit & Silva, 2012.

Admetula valentiensis Landau, Petit & Silva, 2012a, p. 329, figs 7.1-7.7

Cyronym – Admetula valientensis.
Types – Holotype NMB H19635, locality PPP 02189 (= NMB 18688), banana-shaped island at northern end of Nancy Point; paratype 1 NMB H19636, locality PPP 02206 (= NMB 17851), small island 50 m west off coast approximately 1.5 km southwest of Punta de Toro; paratype 2-4 NMB H19637- H19639, locality PPP 02195 (= NMB 18694), Chong Point, northeast of PJ2231; paratype 5 NMB H19640, locality PPP 00397 (= NMB 17859), tip of Chong Point, Bocas del Toro, Panama, Nancy Point Formation, Messinian, late Miocene.
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Bocas del Toro, Panama (Landau *et al*., 2012a).

venezuelana (*Cancellaria*) H. K. Hodson, *in* Hodson & Hodson, 1931.

Cancellaria venezuelana H.K. Hodson, *in* Hodson & Hodson, 1931, p. 45, pl. 23, figs 1, 4; Marks, 1949, p. 460 (list).

Cyronym – Euclia venezuelana.
Type – Holotype PRI 24114, paratype PRI 24116, Río Codore, 4.9 km north and 3,8 km west of Urumaco, Democracia District, Falcón Province, Venezuela, late middle Miocene.
Occurrence – Middle Miocene, Urumaco, Venezuela (H.K. Hodson, *in* Hodson & Hodson, 1931); late Miocene, Caujarao Formation, Venezuela (NMB H19847, locality NMB 13665).
ventrilia (*Ventrilia*) Jousseaume, 1887a, p. 164, text-fig. 2. Recent, Caribbean.

Comment – Junior subjective synonym of *Trigonostoma tenerum* (Philippi, 1848).

ventricosa (*Cancellaria*) Hinds, 1843,p. 47; 1844b, p. 41, pl. 12, figs 11–12.

Cancellaria (*Cancellaria*) *ventricosa* Hinds – Pilsbry & Olsson, 1941, p. 21.

Cyronym – Cancellaria ventricosa.
Types – Four syntypes NHMUK 1966243, western Mexico.
Occurrence – Pliocene (undetermined), Jama Formation, Ecuador (Pilsbry & Olsson, 1941); Recent, Baja California, Mexico to Panama, shallow water to 180 m.

vossi (*Admetula*) Petit, 1976, p. 39, pl. 1, fig. 5.

Cyronym – Admetula vossi.
Type – Holotype USNM 747978, S. of Grand Bahama Island, Bahamas, 622-695 m.
Occurrence – Known only from the type locality.

werenfelsi (*Cancellaria*) Jung, 1965.

Cancellaria (*Euclia*) *werenfelsi* Jung, 1965, p. 552, pl. 75, figs 9-11.

Cyronym – Euclia werenfelsi.
Types – Holotype NMB H13761; paratypes PRI 27428, PRI 27429; paratypes also in NHMUK and USNM, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Jung, 1965).

wiedenmeyeri (*Narona*) nov. sp.

Narona barystoma Woodring, 1970 – Landau & Petit, 1997, p. 148, pl. 1, fig. 4 (*non* Woodring, 1970).
Narona wiedenmeyeri Landau, Petit, Etter & Silva (this paper) p. 201, Pl. 4, figs 13-14, Pl. 5, figs 1-2.

Cyronym – Narona wiedenmeyeri.
Types – Holotype NHMW 2011/0178/0033, ex BL coll.; paratype 1 NHMW 2011/0178/0034, ex BL coll.; paratype 2 NHB H18977, locality NMB 17516; paratype 3 NHB H18976, locality NMB 17517, Casa Cantaure. 300 m south-southeast of the new (1952) Casa Cantaure; exposures in the banks of unnamed Quebrada Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (this paper).

wigginsi (*Cancellaria*) Emerson & Hertlein, 1964.

Cancellaria (*Aphera*) *wigginsi* Emerson & Hertlein, 1964, p. 362, fig. 5d–e.

Cyronym – Aphera wigginsi.
Type – Holotype CAS 38554.01, loc. 38554 (CAS), west side of Isla Monserrate, Baja California, Mexico, Pleistocene.
Occurrence – Pleistocene, Mexico (Emerson & Hertlein, 1964).

woodringi (*Trigonostoma*) Jung, 1965.

Trigonostoma woodringi Jung, 1965, p. 557, pl. 76, figs 1-2.

Cyronym – Ventrilia woodringi.
Type – Holotype NMB H13774, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Jung, 1965).

xenia (*Cancellaria*) Olsson, 1964.

Cancellaria (*Cancellaria*) *xenia* Olsson, 1964, p.119, pl. 21, fig. 9.

Cyronym – Cancellaria xenia.
Type – Holotype USNM 643863, Telembi, Río Cayapas, northwestern Ecuador, Angostura Formation, late Miocene.
Occurrence – Late Miocene, Angostura Formation, Ecuador (Olsson, 1964).

yara (*Axelella*) Landau & Petit, 1997.

Axelella yara Landau & Petit, 1997, p. 148, pl. 1, fig. 3a, b.

Cyronym – Axelella yara.
Type – Holotype NMB H17785, NMB locality 17516, series of arroyos about 500 m south of 'Casa Cantaure', 14 km west of Pueblo Nuevo, Paraguaná Peninsula, Falcón, Venezuela, Cantaure Formation, late early Miocene.
Occurrence – Early Miocene, Cantaure Formation, Venezuela (Landau & Petit, 1997).

yolandia (*Cancellaria*) Pilsbry & Olsson, 1941.

Cancellaria (*Cancellaria*) *yolandia* Pilsbry & Olsson, 1941, p.21, pl. 4, fig. 3.

Cyronym – Cancellaria yolandia.
Type – Holotype ANSP 13648, Punta Borracho, Jama Bay, Ecuador, Jama Formation, Pliocene.
Occurrence – Pliocene (undetermined), Jama Formation, Ecuador (Pilsbry & Olsson, 1941).

yoyottei (*Sveltia*) Petit & Harasewych, 2011.

Sveltia yoyottei Petit & Harasewych, 2011, p. 72, figs 1-3.

Cyronym – Sveltia yoyottei.
Type – Holotype MNHN 23684, off Pointe de la Grande Vigie, north Grande Terre, Guadeloupe, French West Indies, in 300 m. Recent.
Occurrence – Recent, known only from the holotype.

zahni (*Cancellaria*) Böse, 1910.

Cancellaria zahni Böse, 1910, p. 239, pl. 13, fig. 16.
Cancellaria (*Calcarata*) *zahni* Böse – Perrilliat, 1973, p. 26, pl. 12, figs 1-2.
Sveltia zahni Böse – Landau *et al*., 2012a, p. 329, figs 6.25-6.28.

Cyronym – Sveltia zahni.
Types – Lost (see Landau *et al*., 2012a).
Occurrence – Late Miocene, Messinian, Nancy Point Formation, Valiente Peninsula, Bocas del Toro, Panama (Landau *et al*., 2012a); late Pliocene, Agueguexquite Formation, Santa Rosa, Veracruz, 2.9-2.5 Ma (Böse, 1910; Perrilliat, 1973).

zalayana (*Admetula*) Jung & Petit, 1990.

Admetula zalayana Jung & Petit, 1990, p. 116, pl. 29, figs 9–12.

Cyronym – Admetula zalayana.
Type – Holotype NMB H17343, locality TU 1227, Arroyo Zalaya, Dominican Republic, Gurabo Formation, early Pliocene.
Occurrence – Early Pliocene, Gurabo Formation, Dominican Republic (Jung & Petit, 1990).

zapoteca (*Cancellaria*) Böse, 1910.

Cancellaria zapoteca Böse, 1910, p. 240, pl. 13, fig. 17.
Cancellaria (*Bonellitia*) *zapoteca* Böse – Perrilliat, 1973, p. 26, pl. 11, figs 13-20.

Cyronym – Admetula zapoteca.
Types – Probably lost (see Landau *et al*., 2012a).
Occurrence – Late Pliocene, Agueguexquite Formation, Mexico (Böse, 1910; Perrilliat, 1973).

Stratigraphic distribution of Cancellariinae within the Neogene Gatunian palaeobiogeographic province

We follow the method used in Jackson *et al*. (1996) for recording stratigraphic distribution of the species. Stratigraphic resolution varies greatly amongst regions and the occurrences are recorded as follows (eM) early Miocene, (mM) middle Miocene, (lM) late Miocene, (eP) early Pliocene, (lP) late Pliocene, (ePl) early Pleistocene, (lPl) late Pleistocene and (R) Recent. In cases of uncertain age assignment (*e.g*. early or middle Miocene), we record species as being present in each interval.

As can be seen from the distribution data below, the number of cancellariids present in the Caribbean fauna today is greatly depauperated compared to that present in the Caribbean during the Neogene. Several genera present in shallow water Neogene Caribbean assemblages, such as *Admetula* and *Sveltia*, are today restricted to deep waters. For extant species, under the column headed 'recent habitat', a white arrow pointing upwards marked with an S signifies species living in less than 200 m depth, those with a dark arrow pointing downwards, marked with a D live a depths greater than 200 m.

Landau *et al*. (2012a, b) discussed the importance of cancellariids as a typical group of paciphilic gastropods, paciphiles being groups that disappeared from the Caribbean during or after the closure of the Central American Seaway, but are still present on the Pacific side of the Isthmus of Panama. These groups therefore underwent a range contraction following the uplift of the Isthmus of Panama, becoming restricted to the Pacific side of their original wider distribution in the Neogene, which was throughout the Gatunian paleobiogeographic province (see Vermeij & Petuch, 1986; Landau *et al*., 2008).

As with the cancellariids from the Bocas del Toro area of Panama (see Landau *et al*., 2012a), and Gatun Formation of Panama (see Landau *et al*., 2012b) the ecostratigraphic model proposed by Landau *et al*. (2009) was applied to all Gatunian cancellariids. As can be seen in the distribution data given below the vast majority of cancellariids, and almost all species belonging within paciphilic genera, disappeared at the end of GNPMU1 (Gatunian Neogene Paciphile Molluscan Unit 1). One species within the paciphile genus *Pyruclia* survived into GNPMU2 and none were present in GNPMU3. In each of the distribution charts given below the boundaries between GNPMU1 and 2, and between GNPMU2 and 3 are marked by a grey vertical line.

-- Genus-group taxa

Admetula Cossmann, 1889, p. 228. Table 1. Type species, by original designation, *Cancellaria evulsa* (Solander, 1766) (= *Buccinum evulsum* Solander, 1766). Eocene, England.

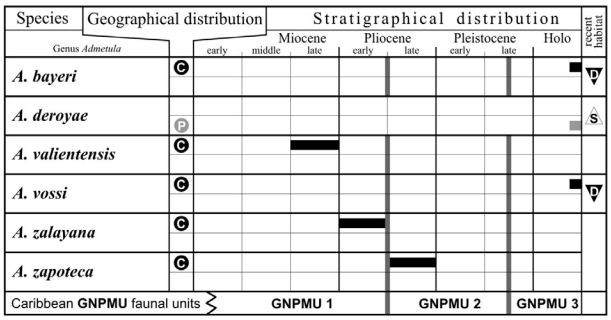


Table 1. Genus *Admetula* Cossmann, 1889.

Agatrix Petit, 1967, p. 218. Table 2. Type species, by original designation, *Cancellaria agassizii* Dall, 1889. Recent, western Atlantic.

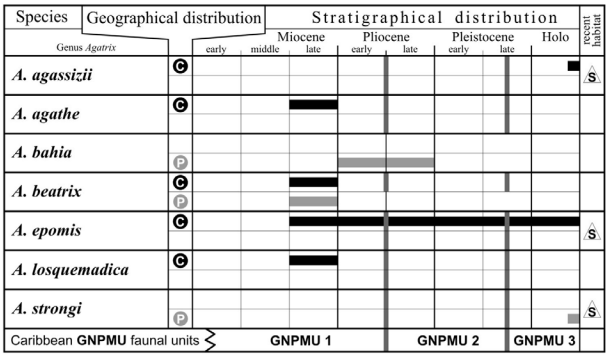


Table 2. Genus *Agatrix* Petit, 1967.

Aphera H. Adams & A. Adams, 1854, p. 277. Table 3. Type species, by monotypy, *Cancellaria tessellata* Sowerby, 1832. Recent, Panamic-Pacific.

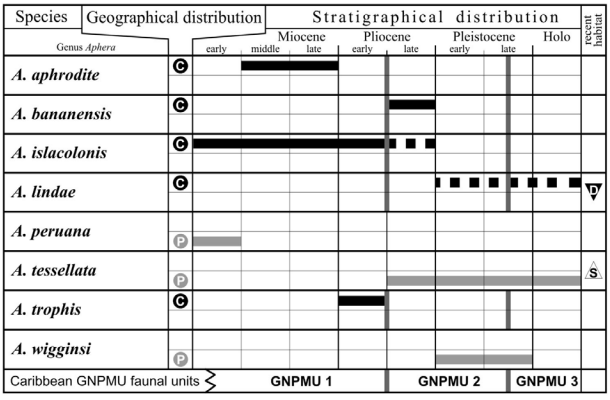


Table 3. Genus *Aphera* H. Adams & A. Adams, 1854.

Axelella Petit, 1988, p. 130. Table 4. Type species, by original designation of *Olssonella* Petit, 1970, *Cancellaria smithii* Dall, 1888. Recent, western Atlantic.

Replacement name for *Olssonella* Petit, 1970 (non Glibert & van de Poel, 1967).

Axelella 'Petit de la Saussaye' – Ardovini & Cossignani, 2004, p. 35 (error for *Axelella* R.E. Petit).

Olssonella Petit, 1970, p. 83. Type species, by original designation, *Cancellaria smithii* Dall, 1888.

Recent, Caribbean. Not *Olssonella* Glibert & van de Poel, 1967. Renamed *Axelella* Petit, 1988

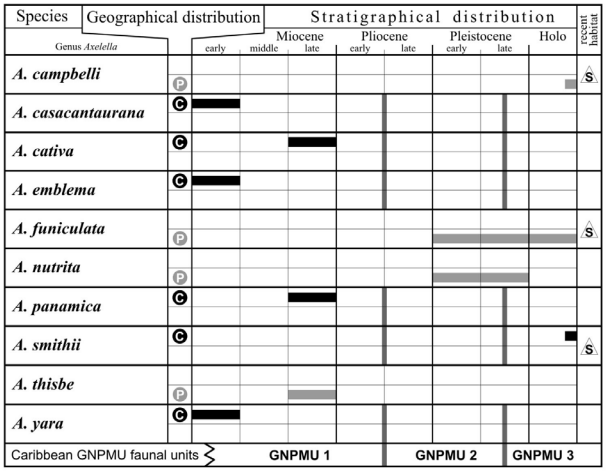


Table 4. Genus *Axelella* Petit, 1988.

Bivetia Jousseaume, 1887b, p. 193. Table 5. Type species, by original designation, *Cancellaria similis* Sowerby, 1833. Recent, northwest Africa. This usage and designation is invalid due to the prior (by one month) monotypic usage of *Bivetia* in the binomen *Bivetia mariei* Jousseaume.

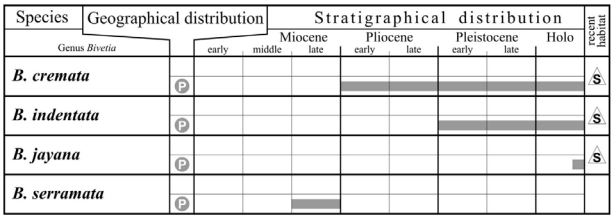


Table 5. Genus *Bivetia* Jousseaume, 1887b.

Bivetiella Wenz, 1943, p. 1356. Table 6. Type species, by original designation of *Bivetia* Jousseaume, 1887b, *Cancellaria similis* Sowerby, 1833. Recent, northwest Africa. Replacement name for *Bivetia* Jousseaume, 1887b, p. 193, non 1887a, p. 163.

Bivetiella Marks, 1949, p. 456. Type species, by original designation, *Cancellaria similes* Sowerby, 1833. Recent, northwest Africa. This is a junior objective synonym and a junior homonym of *Bivetiella* Wenz, 1943.

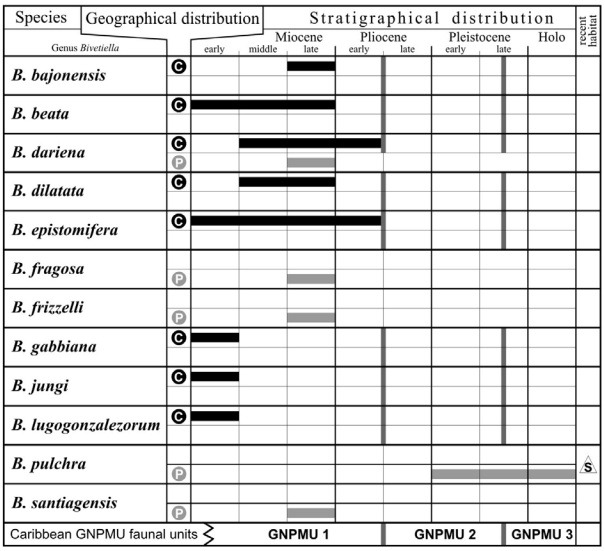


Table 6. Genus *Bivetiella* Wenz, 1943.

Bivetopsia Jousseaume, 1887b, p. 193. Table 7. Type species, by subsequent designation of Cossmann (1888, p. 784), *Cancellaria chrysostoma* Sowerby, 1832. Recent, Panamic-Pacific.

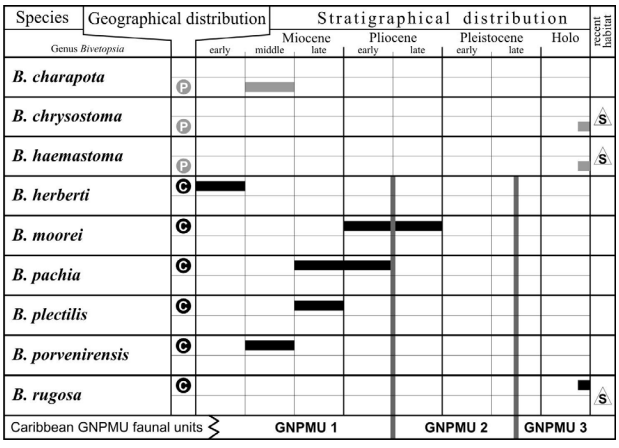


Table 7. Genus *Bivetopsia* Jousseaume, 1887b.

Bivetopsis Jousseaume [unnecessary emendation of *Bivetopsia* by Cossmann (1899, p. 9)].

Cancellaria Lamarck, 1799, p. 71. Table 8a, 8b. Type species, by monotypy, *Voluta reticulata* Linné, 1767. Recent, Caribbean.

Euclia H. Adams & A. Adams, 1854, p. 277. Table 9. Type species, by subsequent designation of Cossmann (1899, p.1 0), *Cancellaria cassidiformis* Sowerby, 1832. Recent, Panamic- Pacific.

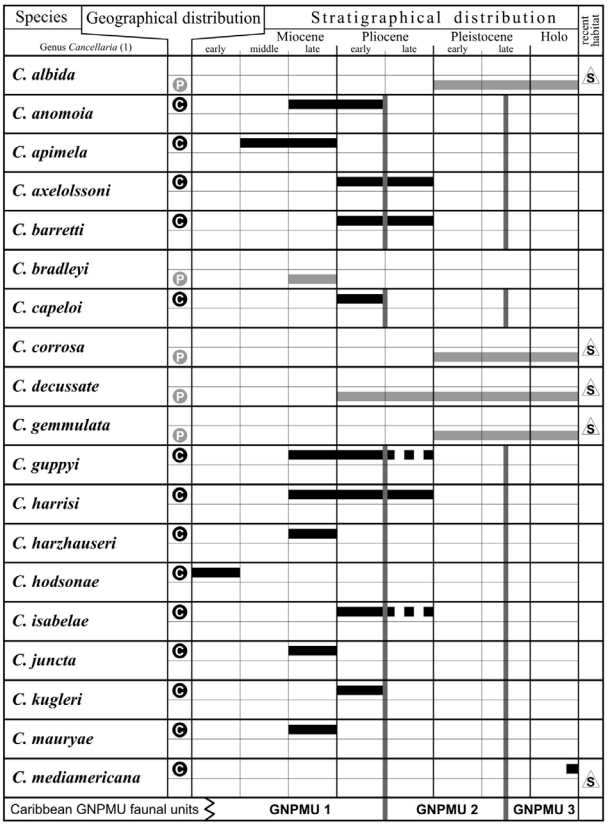


Table 8a. Genus *Cancellaria* Lamarck, 1799.

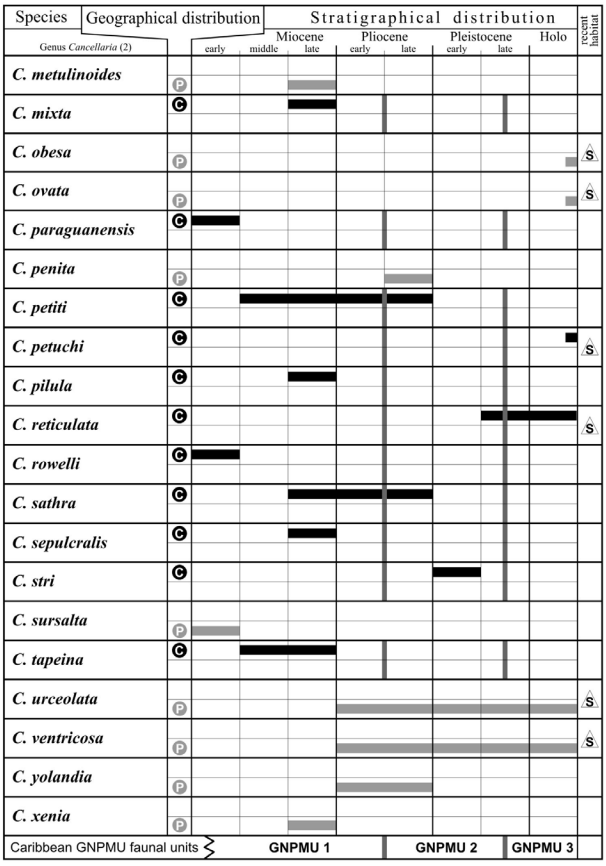


Table 8b. Genus *Cancellaria* Lamarck, 1799 (continued).

Heteroeuclia Rovereto, 1899, p. 103 (unnecessary replacement name for *Euclia* H. Adams & A. Adams, 1854, which Rovereto considered to be preoccupied by *Euclea* Hübner, 1816, and *Euclea* Newman, 1842).

Hertleinia Marks, 1949, p. 457. Table 10. Type species, by original designation, *Cancellaria mitriformis* Sowerby, 1832. Recent, Panamic-Pacific.

Marksella Olsson, 1964, p. 127. Table 11. Type species, by original designation, *Admete* (*Marksella*) *jumala* Olsson, 1964. Pliocene, Ecuador.

Massyla H. Adams & A. Adams, 1854, p. 278. Table 12. Type species, by monotypy, *Cancellaria corrugata* Hinds, 1843. Recent, Panamic-Pacific.

Masslya 'Adams' – Cossmann 1899, p. 39; Kojumdgieva & Strachimirov, 1960, p. 165 (error for *Massyla* H. Adams & A. Adams).

Charcolleria Olsson, 1942, p. 61. Type species, by original designation, *Cancellaria* (*Charcolleria*) *perdiciana* Olsson, 1942. Miocene, Colombia.

Narona H. Adams & A. Adams, 1854, p. 277. Table 13. Type species, by subsequent designation of Jousseaume (1887b, p. 222), *Cancellaria clavatula* Sowerby, 1832. Recent, Panamic- Pacific.

Panarona Petit, 1975, p. 387. Type species, by original designation, *Cancellaria clavatula* Sowerby, 1832. Recent, Panamic-Pacific (an unnecessary name which is a junior objective synonym of *Narona*).

Perplicaria Dall, 1890, p. 90. Table 14. Type species, by monotypy, *Perplicaria perplexa* Dall, 1890. Pliocene, Florida, U.S.A.

Pyruclia Olsson, 1932, p. 160. Table 15. Type species, by original designation, *Cancellaria solida* Sowerby, 1832. Recent, Panamic-Pacific.

Peruclia – Pilsbry & Olsson, 1941, p. 24 (error for *Pyruclia* Olsson, 1932).

Sveltia Jousseaume, 1887b, p. 214. Table 16. Type species, by original designation, '*Sveltia varicose* Brocc.' (= *Voluta varricosa* Brocchi, 1814). Pliocene, Italy.

Trigonostoma Blainville, 1827, p. 652. Table 17. Type species, by monotypy, *Delphinula trigonostoma* Lamarck, 1822 (? = *Buccinum scalare* Gmelin, 1791). Recent, Indo-Pacific. The status of the genus *Extractrix* Korobkov, 1955, p. 138 [type species, by original designation, *Pseudomalaxis extractrix* (Boettger, 1906) (= *Discohelix extractrix* Boettger, 1906] is debateable.

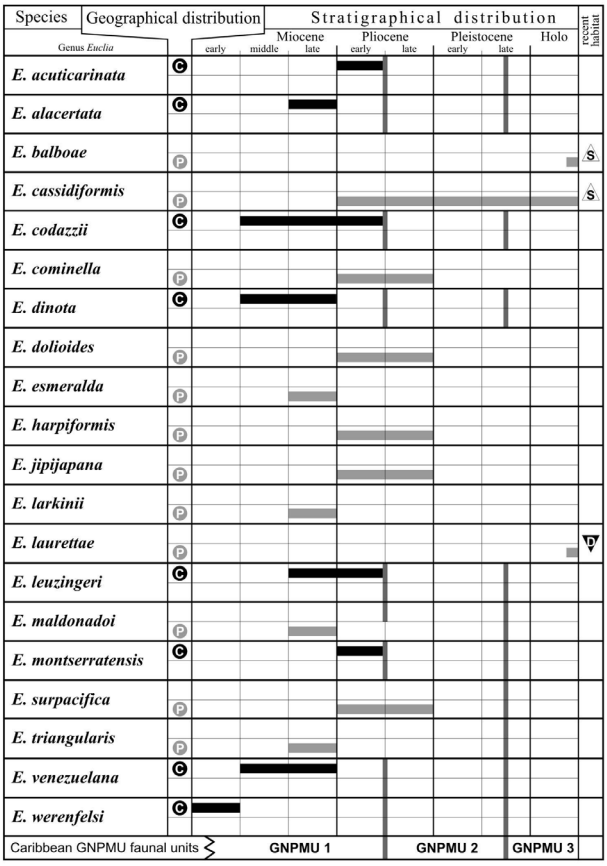


Table 9. Genus *Euclia* H. Adams & A. Adams, 1854.

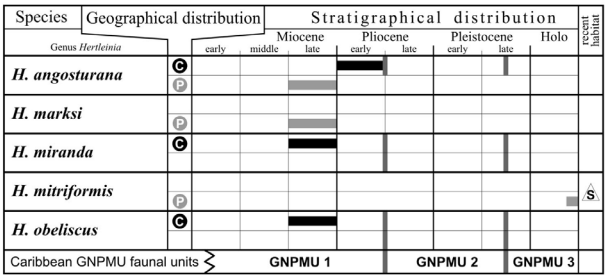


Table 10. Genus *Hertleinia* Marks, 1949.

Its species may only form a morphological but not necessarily a monophyletic group and might simply represent uncoiled species of *Trigonostoma*.

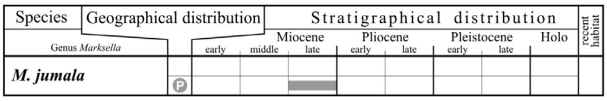


Table 11. Genus *Marksella* Olsson, 1964.

Ventrilia Jousseaume, 1887a, p. 164. Table 18. Type species, by monotypy, *Ventrilia ventrilia* Jousseaume, 1887 (= *Cancellaria tenera* Philippi, 1848). Recent, Caribbean.

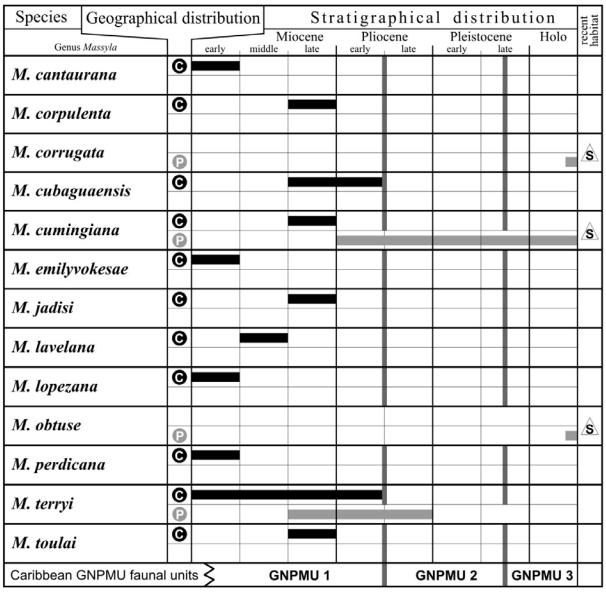


Table 12. Genus *Massyla* H. Adams & A. Adams, 1854.

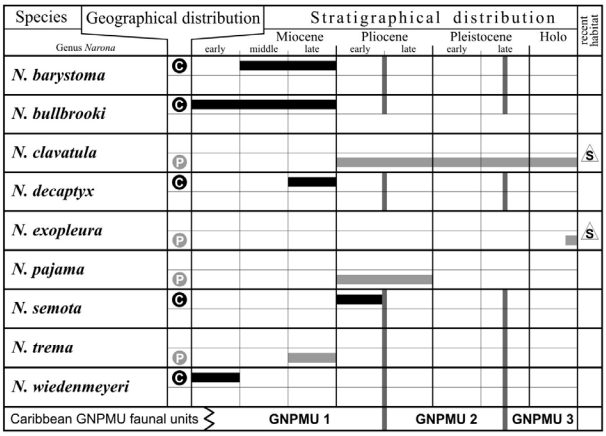


Table 13. Genus *Narona* H. Adams & A. Adams, 1854.

Ventrillia 'Jousseaume' – Fulton, 1922, p. 27 (error for *Ventrilia* Jousseaume).

Generic placement unclear: ***Cancellaria s.l.*** (Table 19).

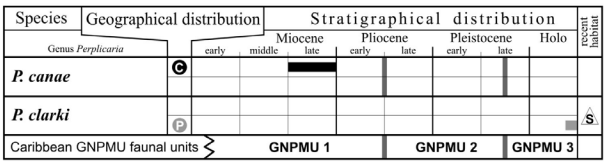


Table 14. Genus *Perplicaria* Dall, 1890.

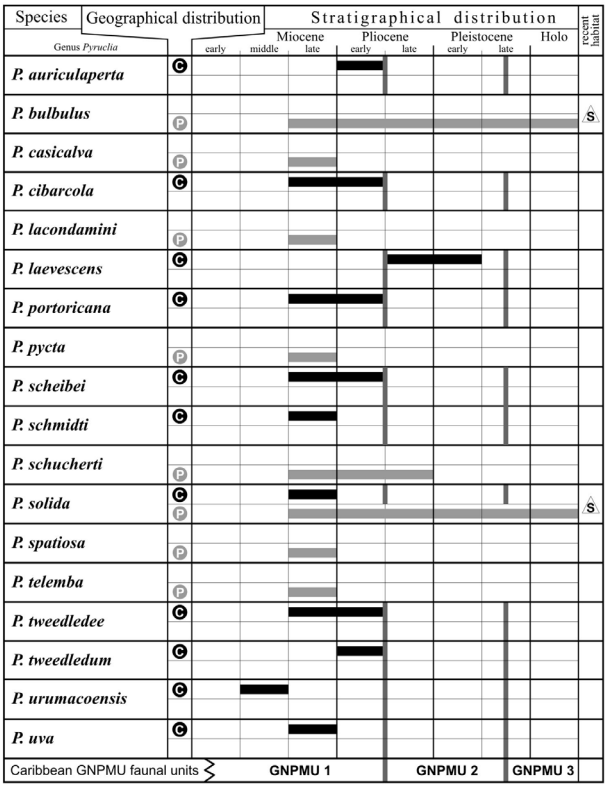


Table 15. Genus *Pyruclia* Olsson, 1932.

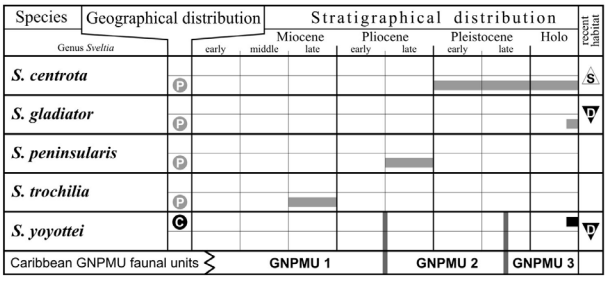


Table 16. Genus *Sveltia* Jousseaume, 1887b.

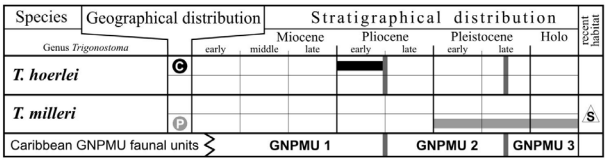
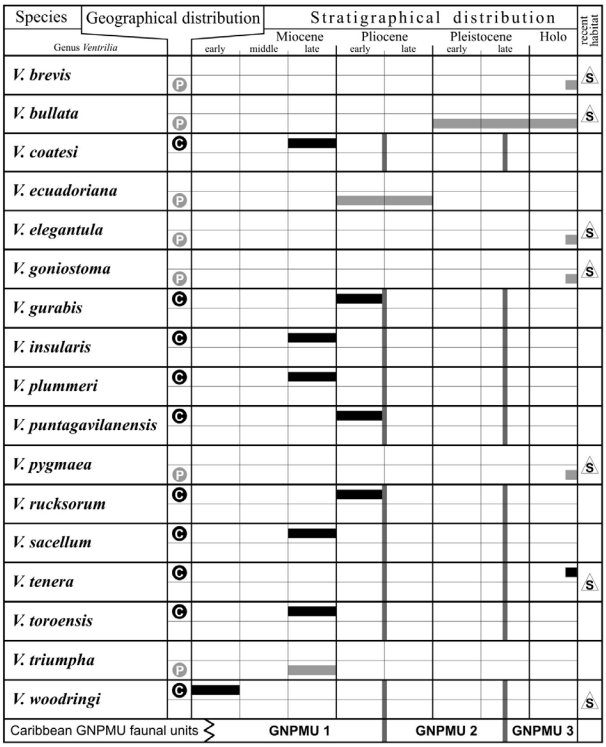


Table 17. Genus *Trigonostoma* Blainville, 1827.



Tabel 18. Genus *Ventrilia* Jousseaume, 1887a.

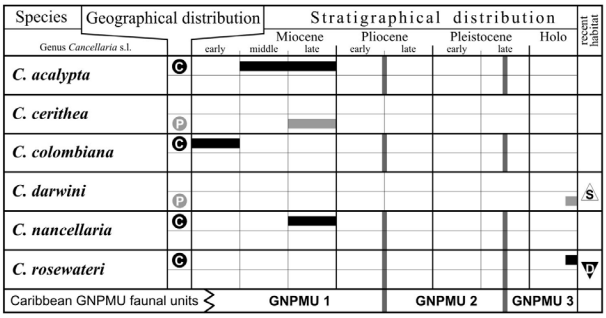


Table 19. Genus *Cancellaria s.l.*

Geologic and stratigrafic charts

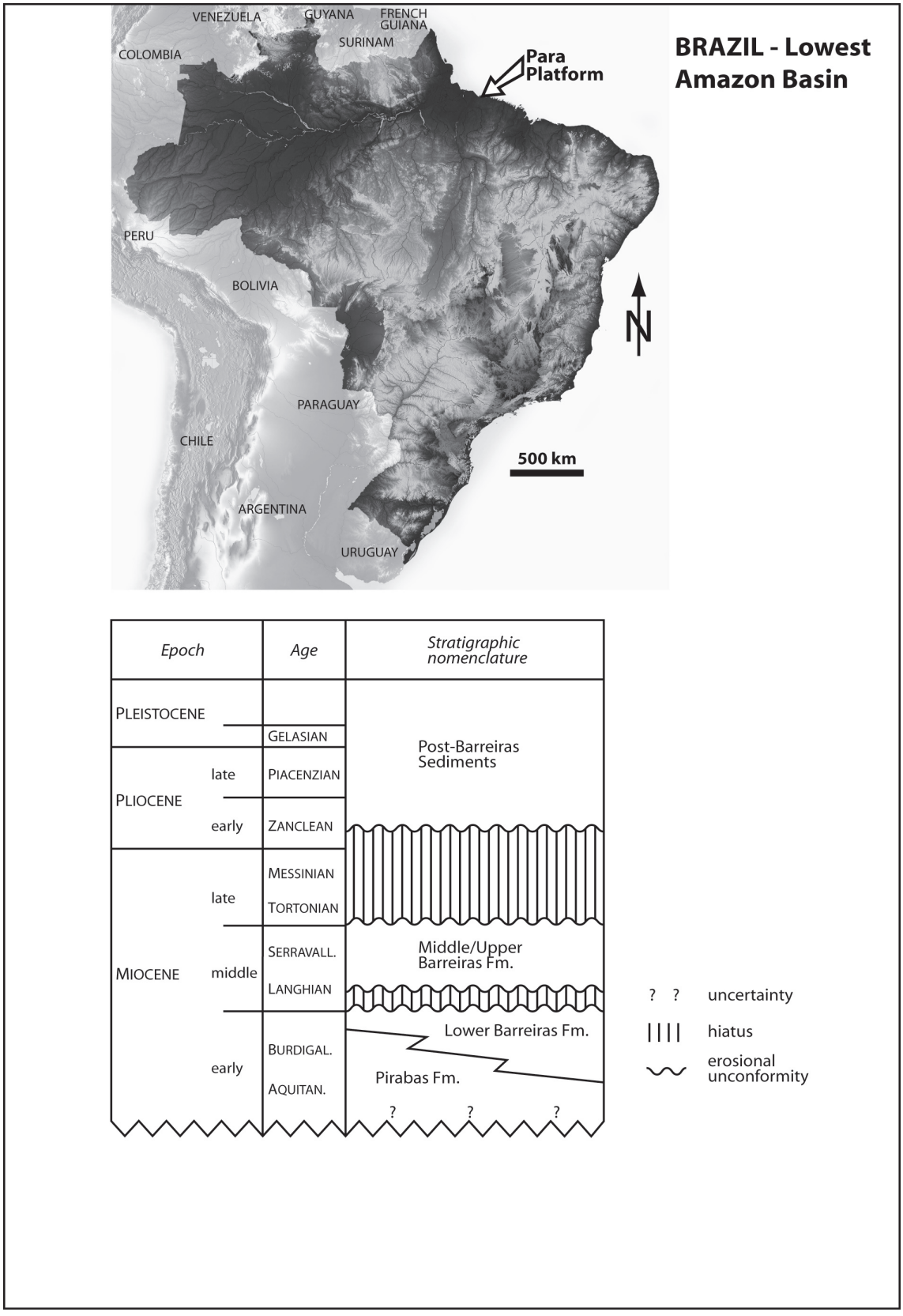


Chart 1. Brasil.
Neogene stratigraphy and location of the Pará Platform in Brazil. Stratigraphy after Rosetti, 2001 and Rosetti & Valeriano, 2007. Relief maps from: Maps-For-Free.com.

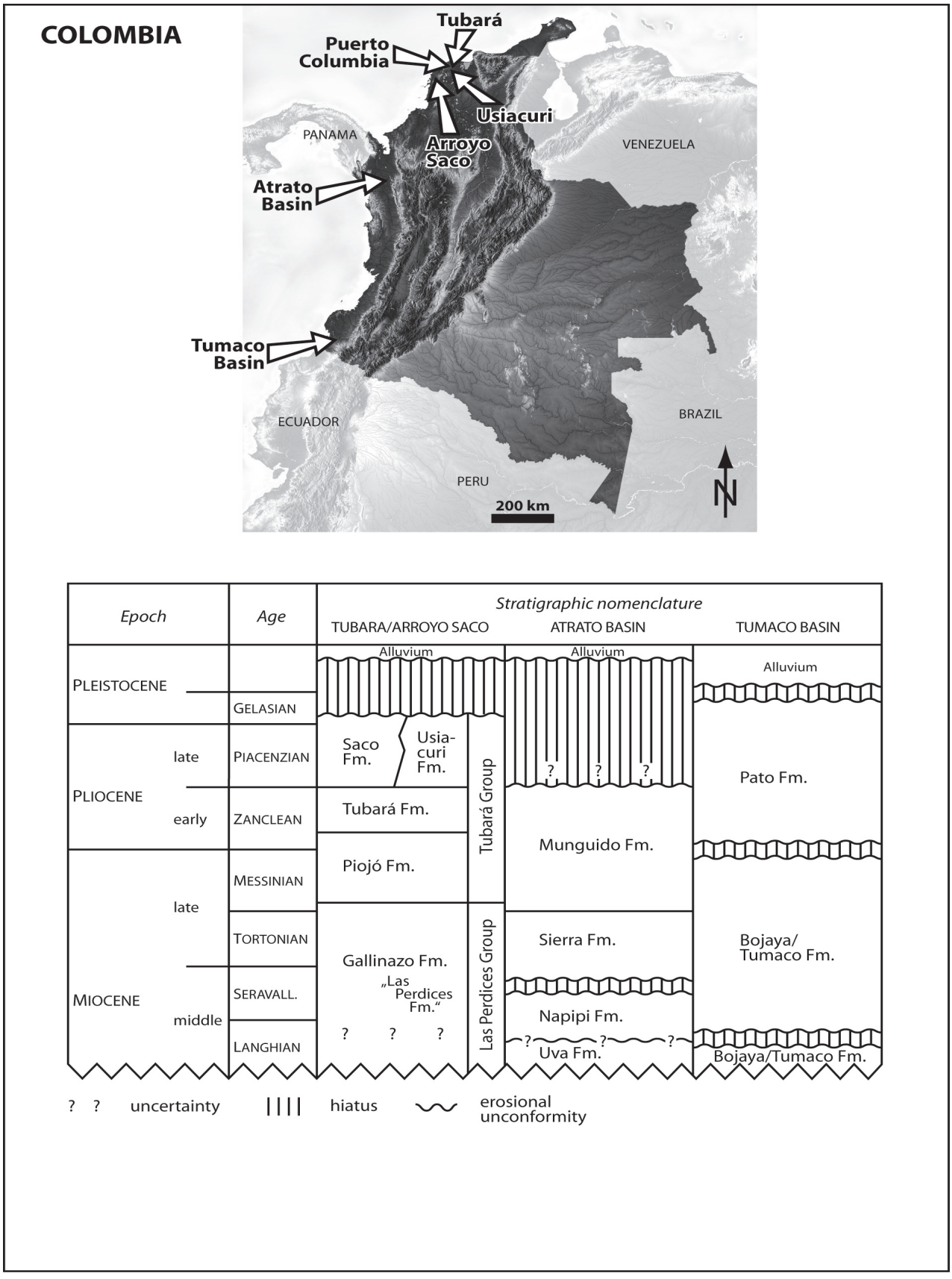


Chart 2. Colombia.
Neogene stratigraphy and location of major outcrops/sedimentary basins in western Colombia. Stratigraphy after Bürgl *et al*., 1955; Bürgl, 1961; Duque-Caro, 1990; de Porta, 2003; Marcaillou & Collot, 2008. Relief maps from: Maps-For-Free.com.

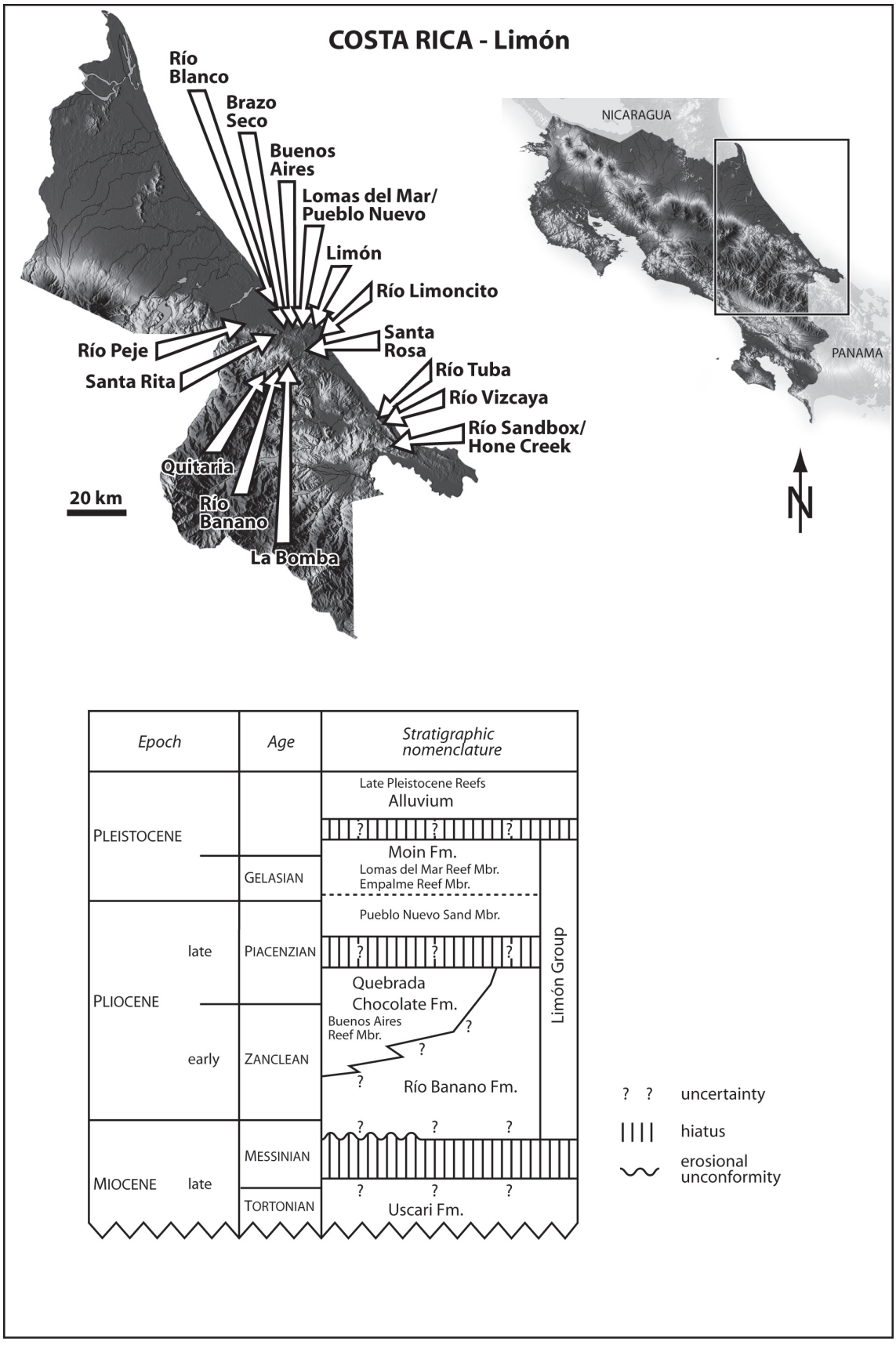


Chart 3. Costa Rica – Limón Province.
Neogene stratigraphy and location of major outcrops in the Limón Province of Costa Rica. Stratigraphy after Coates *et al*., 1992; Coates, 1999; McNeill *et al*.; 2000. Relief maps from: Maps-For-Free.com.

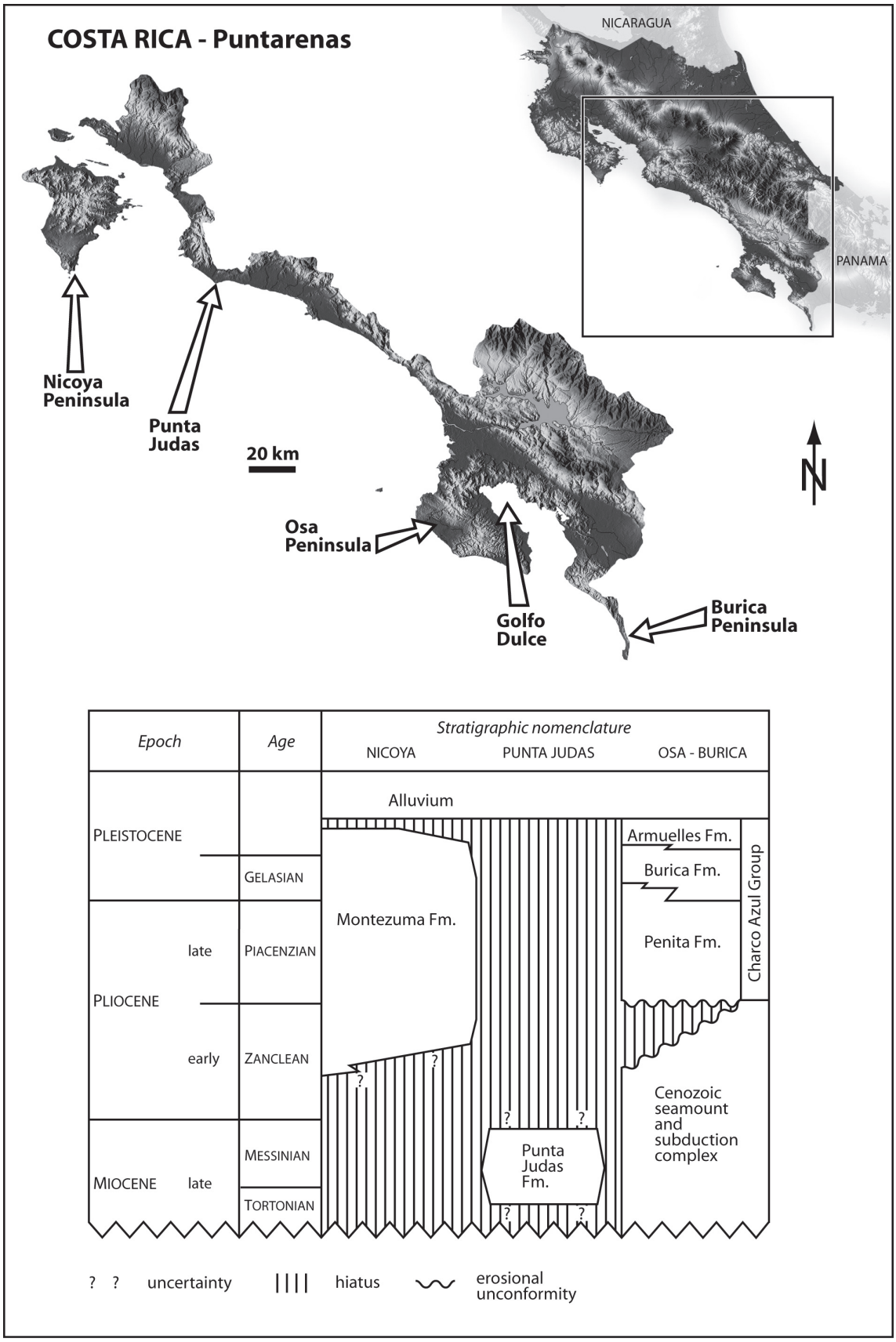


Chart 4. Costa Rica – Puntarenas Province.

Neogene stratigraphy and location of major outcrops in the Puntarenas Province of Costa Rica. Stratigraphy after Baumgartner *et al*., 1984; Coates *et al*., 1992; Krawinkel & Seyfried, 1996; Cotton 1999; Aguilera Socorro *et al*., 2011. Relief maps from: Maps-For- Free.com.

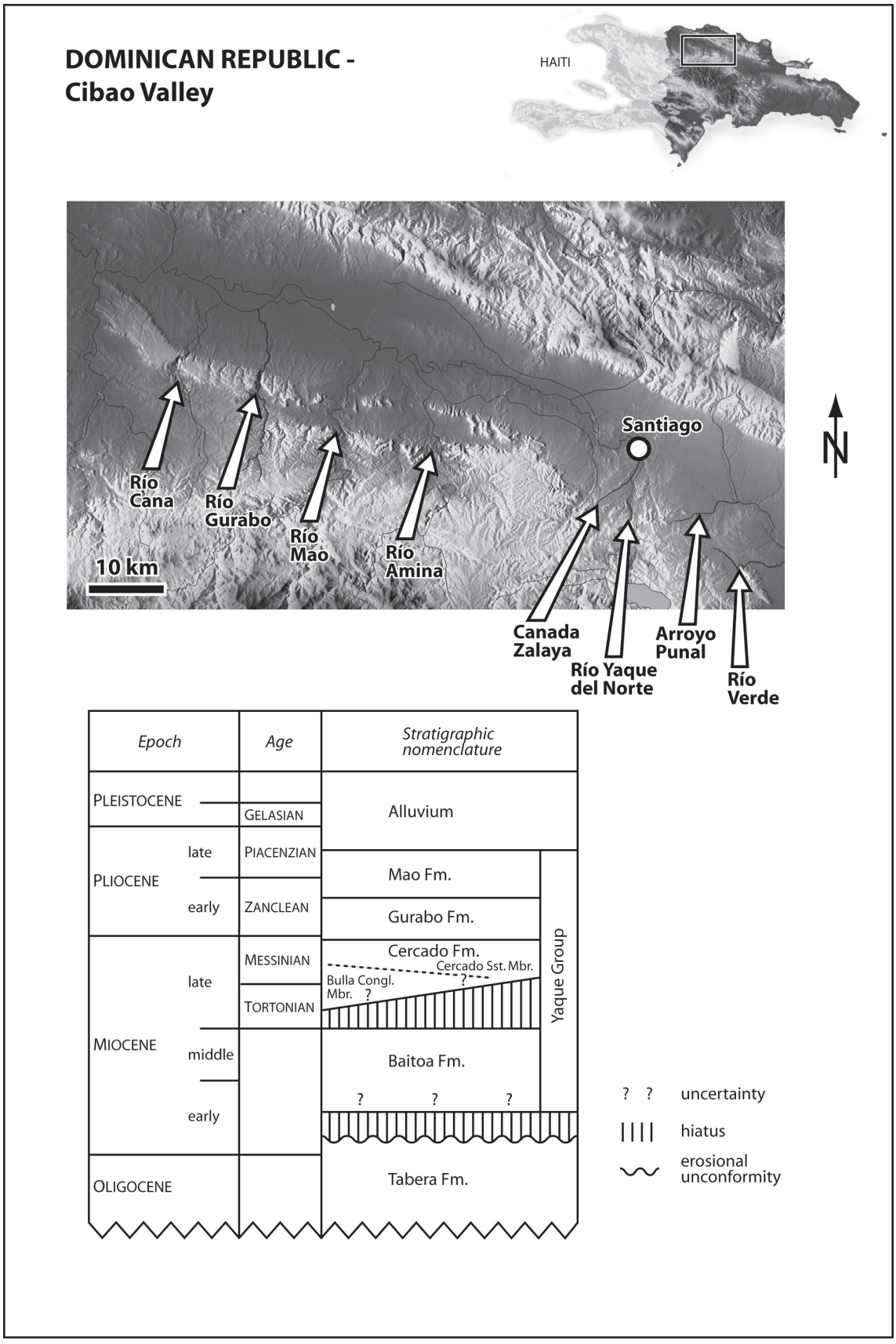


Chart 5. Dominican Republic – Cibao Valley.
Neogene stratigraphy and location of major outcrops in the Cibao Valley of the Dominican Republic. Stratigraphy after Saunders *et al*., 1986; McNeill *et al*., 2012. Relief maps from: Maps-For-Free.com.

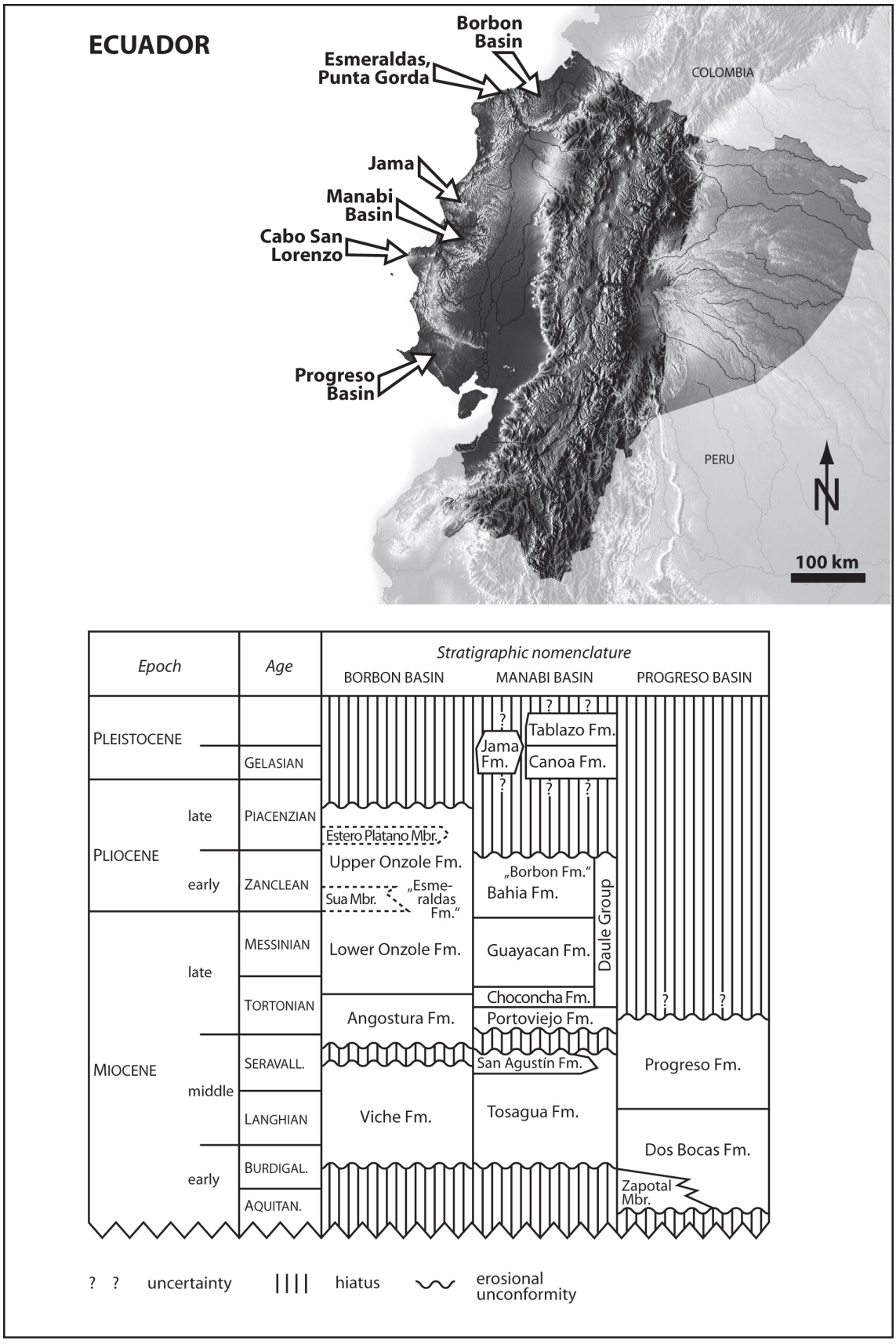
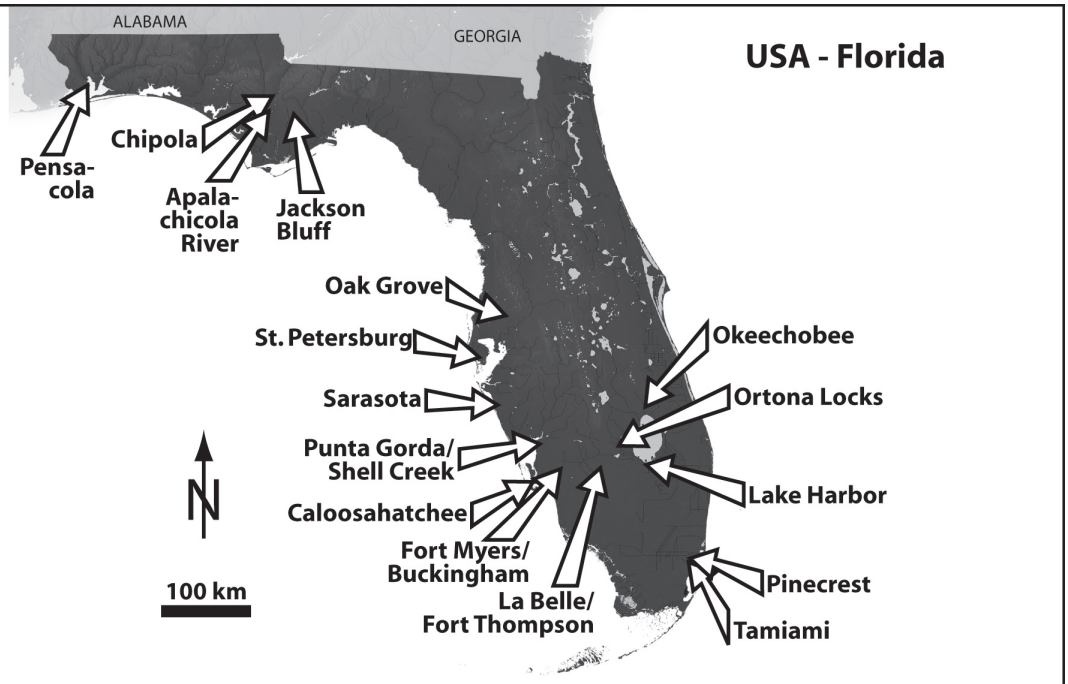


Chart 6. Ecuador.

Neogene stratigraphy and location of major outcrops in the western Part of Ecuador. Stratigraphy after Whittaker, 1988; Cantalamessa *et al*., 2005; di Celma *et al*., 2005; Cantalamessa *et al*., 2007; di Celma *et al*., 2010. Relief maps from: Maps-For-Free.com.



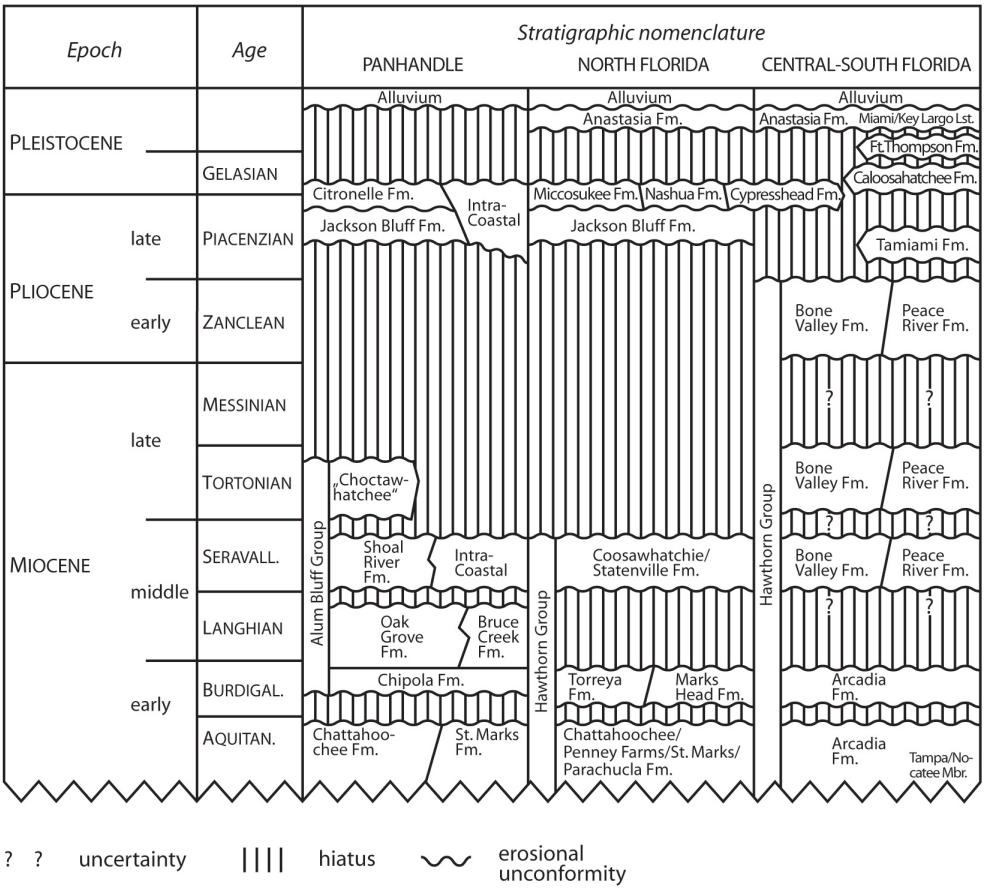


Chart 7. Florida.

Neogene stratigraphy and location of major outcrops in Florida, USA. Stratigraphy after Randazzo, 1997. Relief maps from: Maps-For-Free.com.

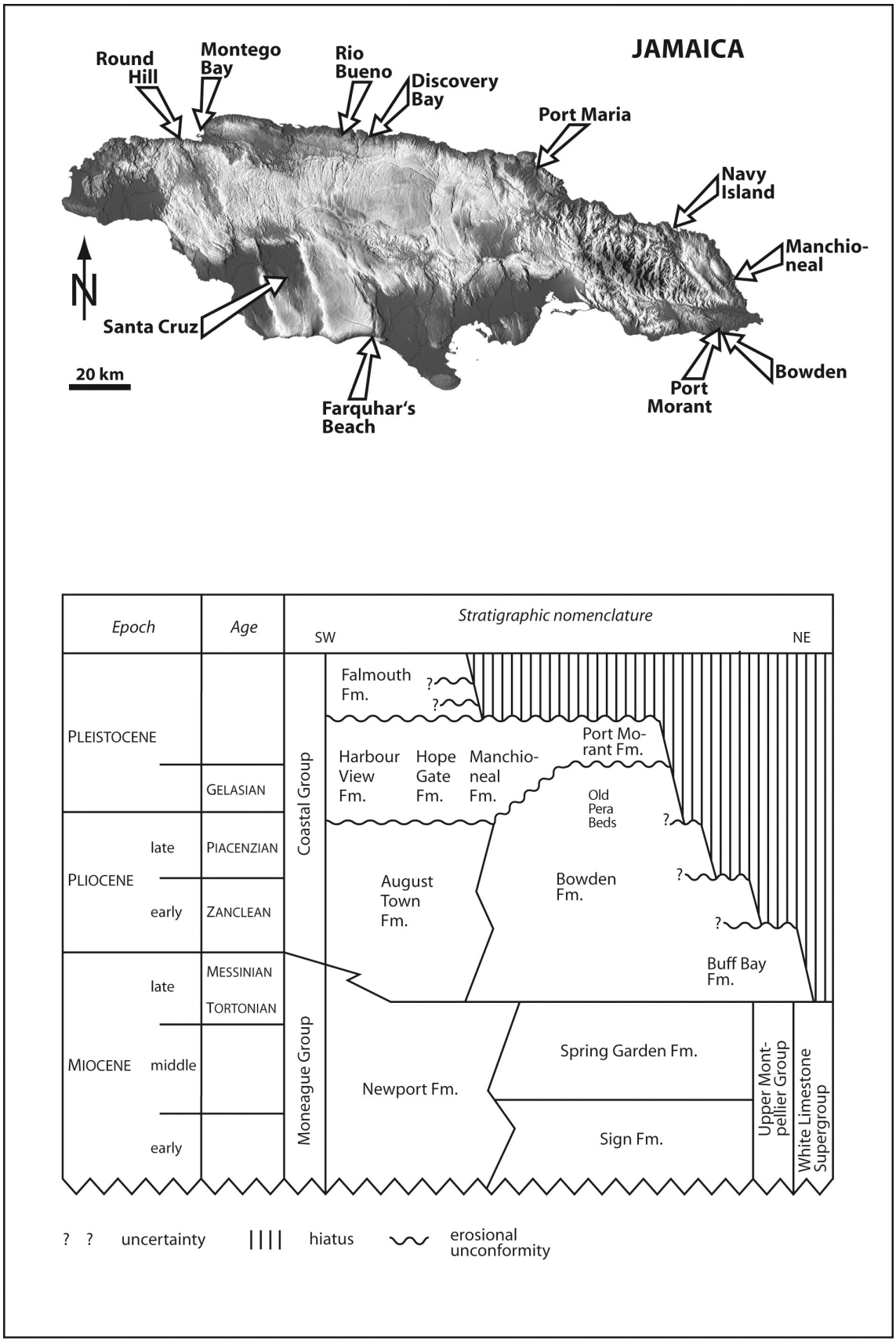


Chart 8. Jamaica.

Neogene stratigraphy and location of major outcrops in Jamaica. Stratigraphy after Robinson, 1994; Budd & McNeill, 1998. Relief maps from: Maps-For-Free.com.

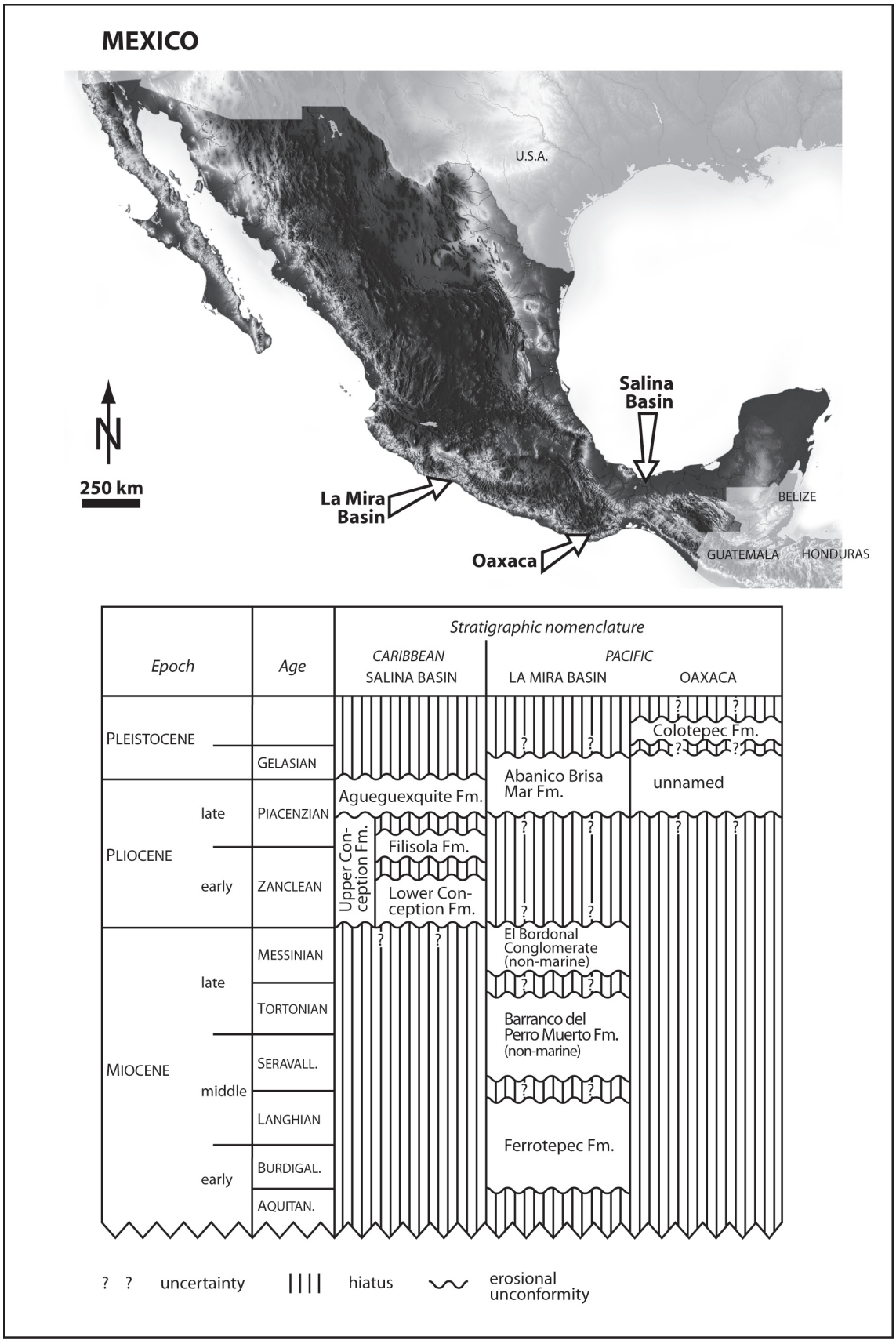


Chart 9. Mexico.

Neogene stratigraphy and location of fossiliferous Neogene basins in Mexico. Stratigraphy after Akers, 1979; Durham *et al*., 1981; Cotton, 1999. Relief maps from: Maps-For-Free.com.

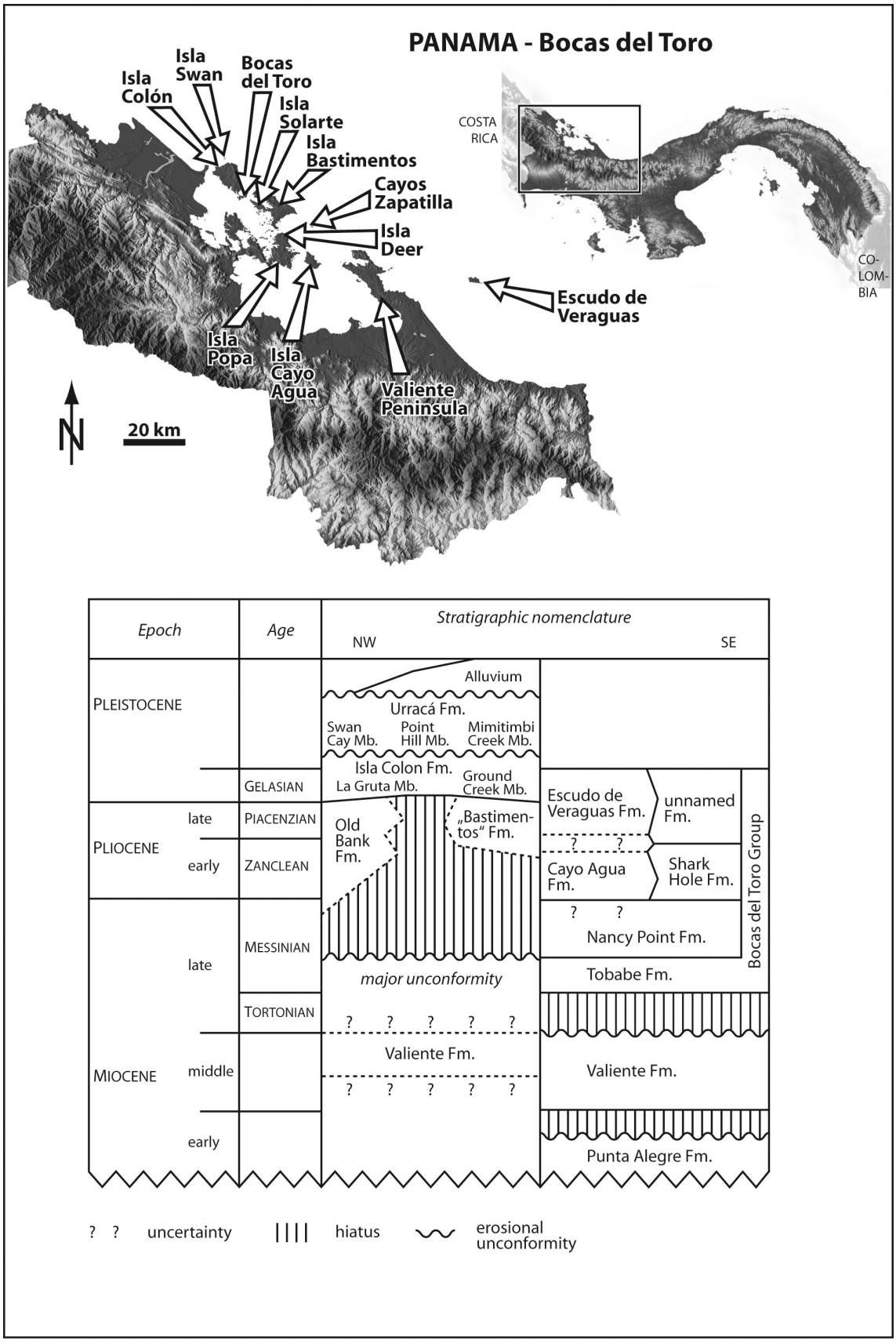


Chart 10. Panama – Bocas del Toro Province.

Neogene stratigraphy and location of major outcrops in the Bocas del Toro Province and Ngöbe-Buglé Territory of Panama. Stratigraphy after Coates, 1999; Coates *et al*., 2003; Coates *et al*., 2005; McNeill *et al*., in press. Relief maps from: Maps-For-Free.com.

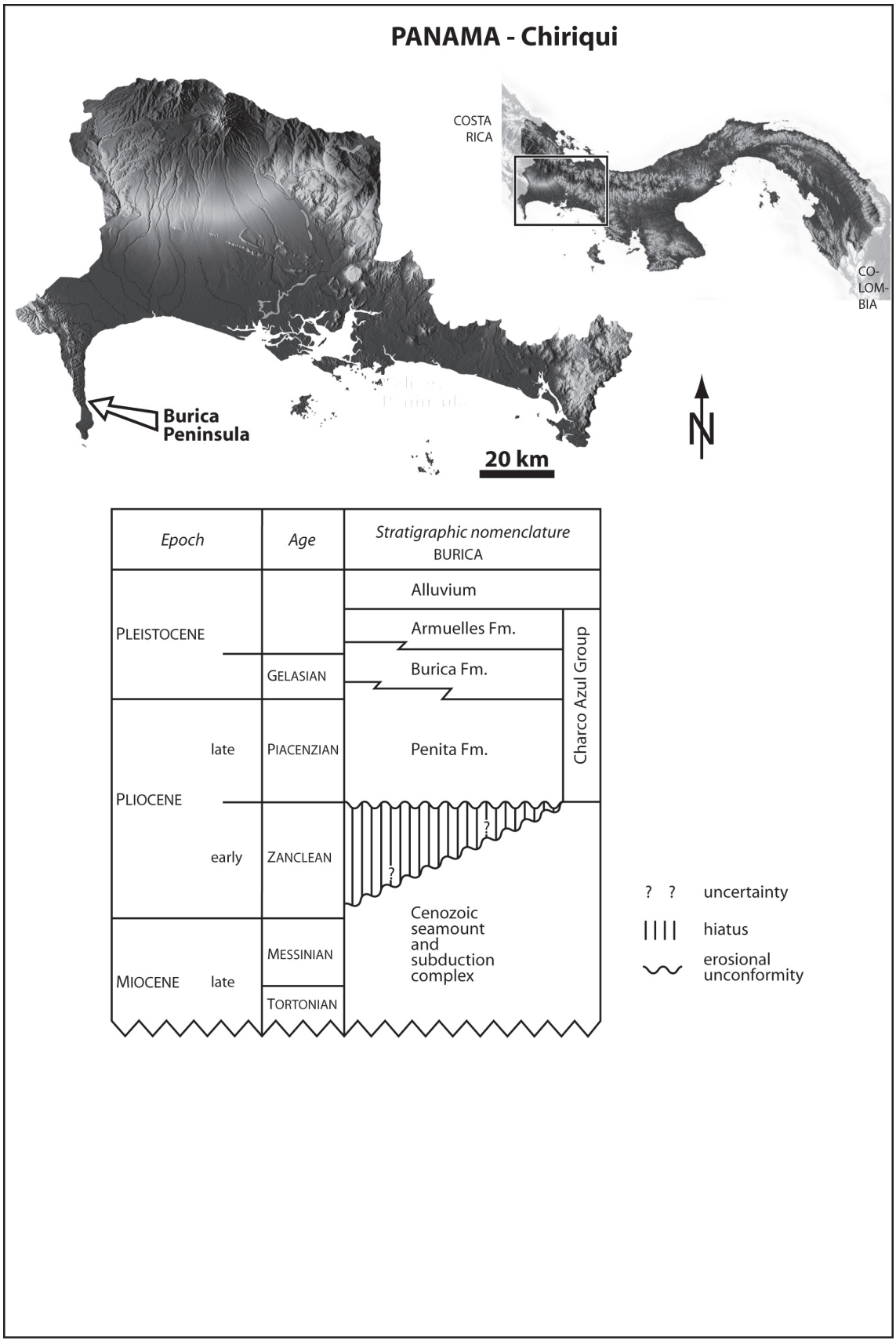


Chart 11. Panama – Chiriqui Province.

Neogene stratigraphy and location of major outcrops in the Chiriqui Province of Panama. Stratigraphy after Coates *et al*., 1992; Cotton, 1999. Relief maps from: Maps-For- Free.com.

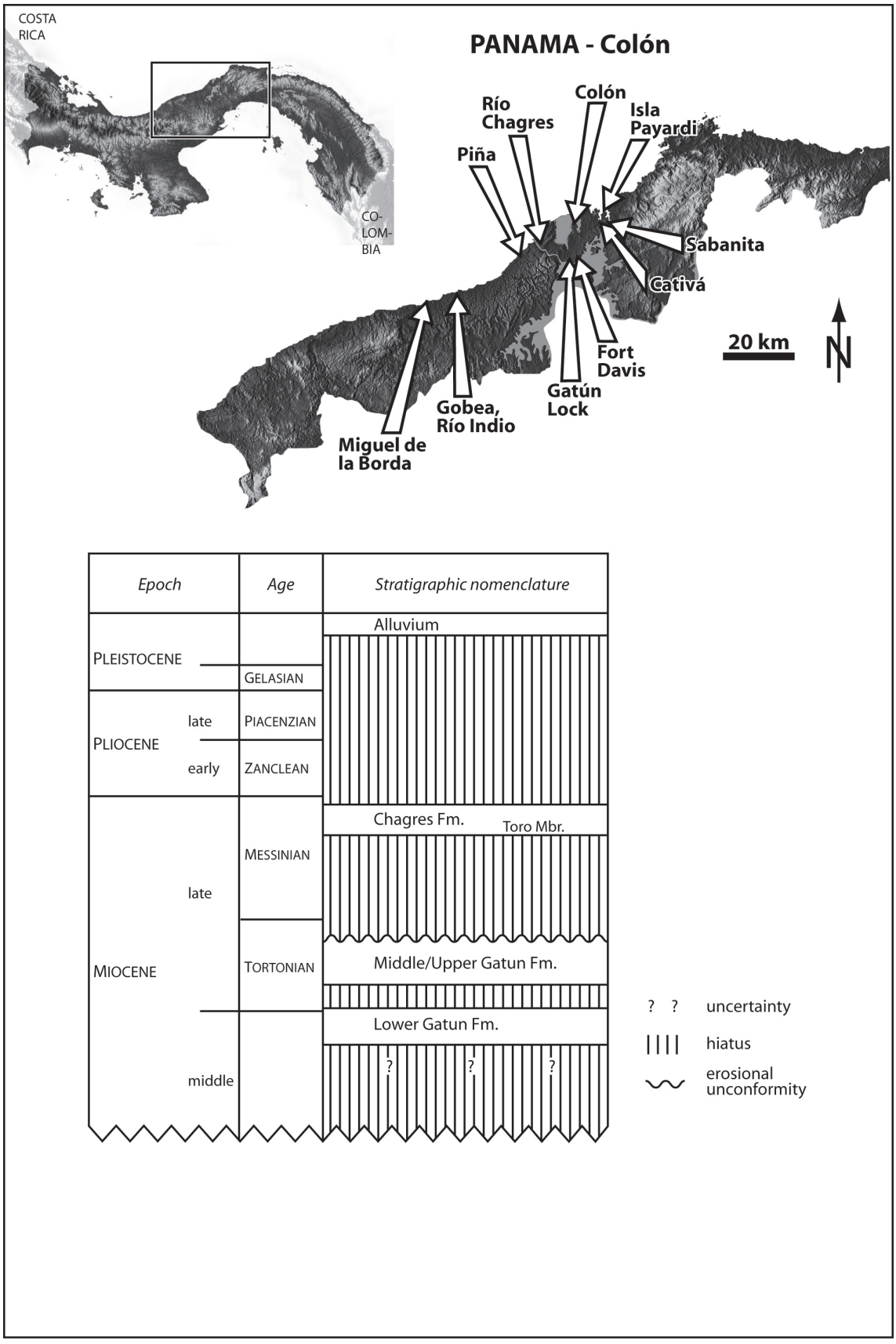


Chart 12. Panama – Colón Province.
Neogene stratigraphy and location of major outcrops in the Colón Province of Panama. Stratigraphy after Coates, 1999; Kirby *et al*., 2008. Relief maps from: Maps-For- Free.com.

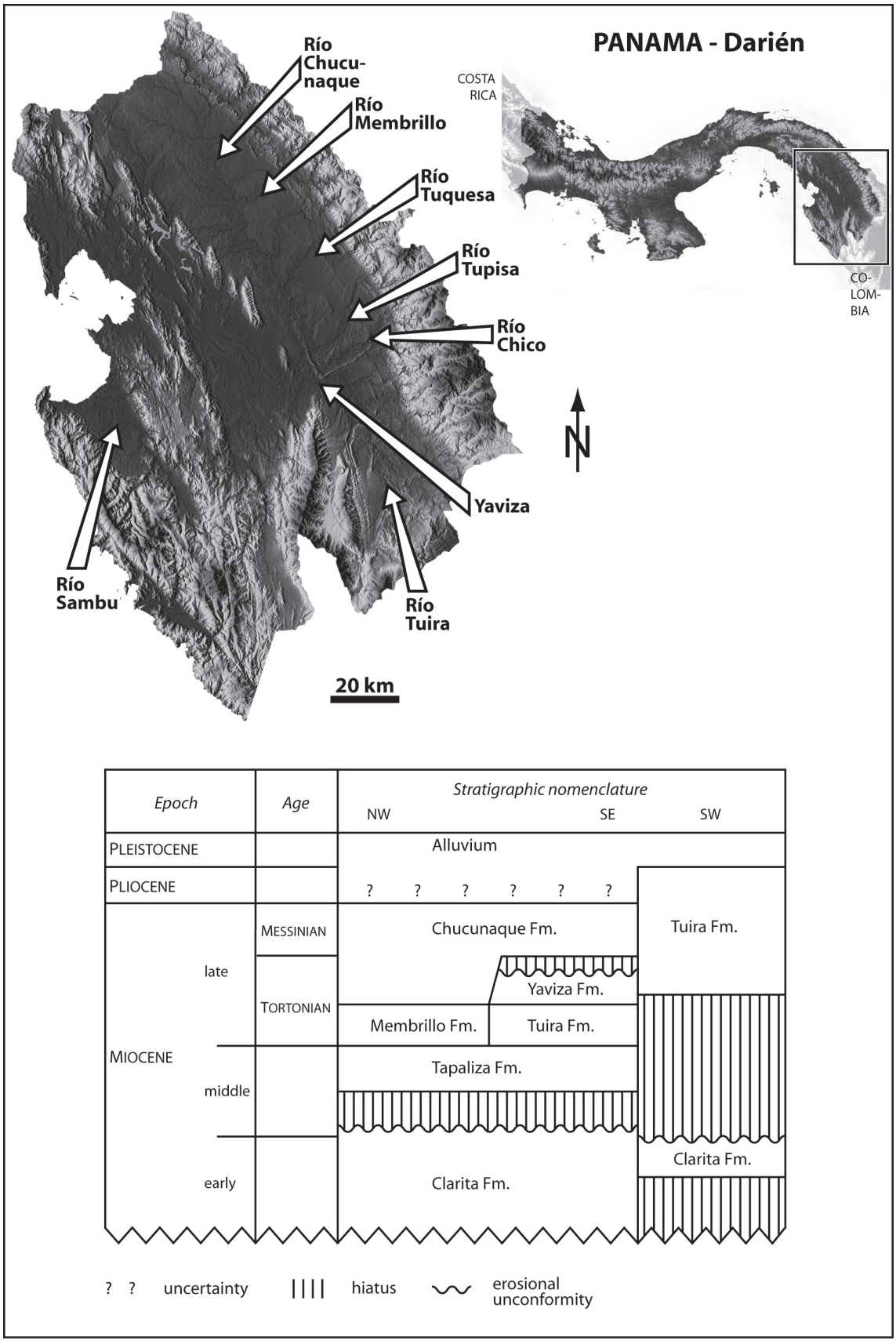
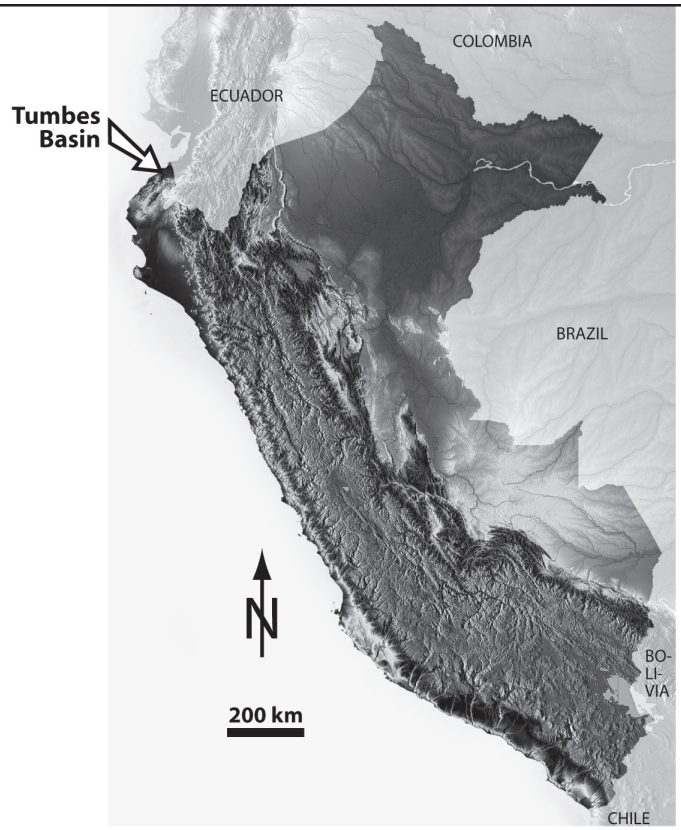


Chart 13. Panama – Darién Province.
Neogene stratigraphy and location of major outcrops in the Darién Province of Panama. Stratigraphy after Coates, 2004. Relief maps from: Maps-For-Free.com.



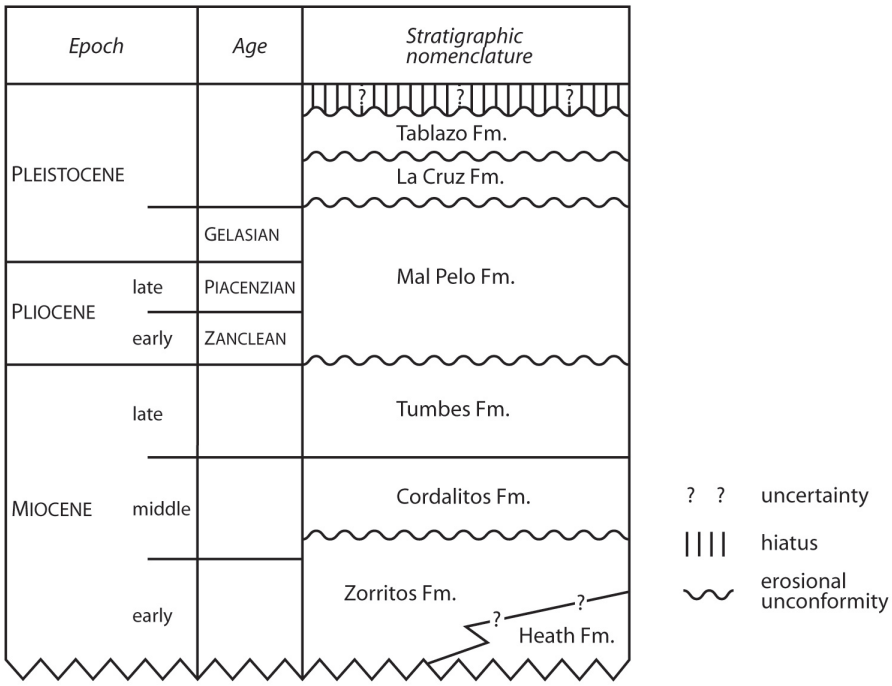


Chart 14. Peru.
Neogene stratigraphy and location of the Tumbes Basin in northwestern Peru. Stratigraphy after Higley, 2004; Vega *et al*., 2005; Witt & Burgois, 2010. Relief maps from: Maps-For-Free.com.

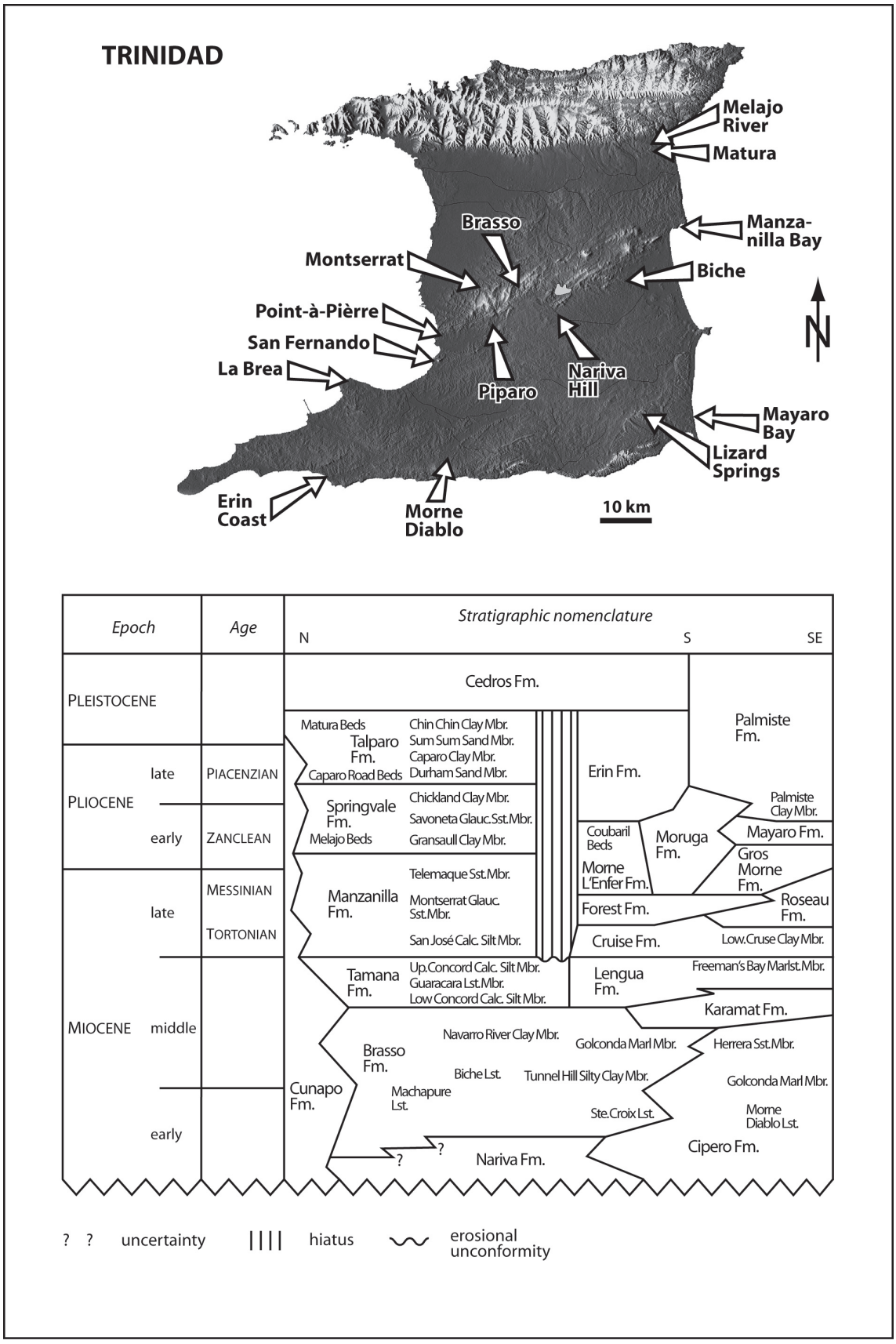


Chart 15. Trinidad.

Neogene stratigraphy and location of major outcrops in Trinidad. Stratigraphy after Donovan, 1994; Saunders, 1996. Relief maps from: Maps-For-Free.com.

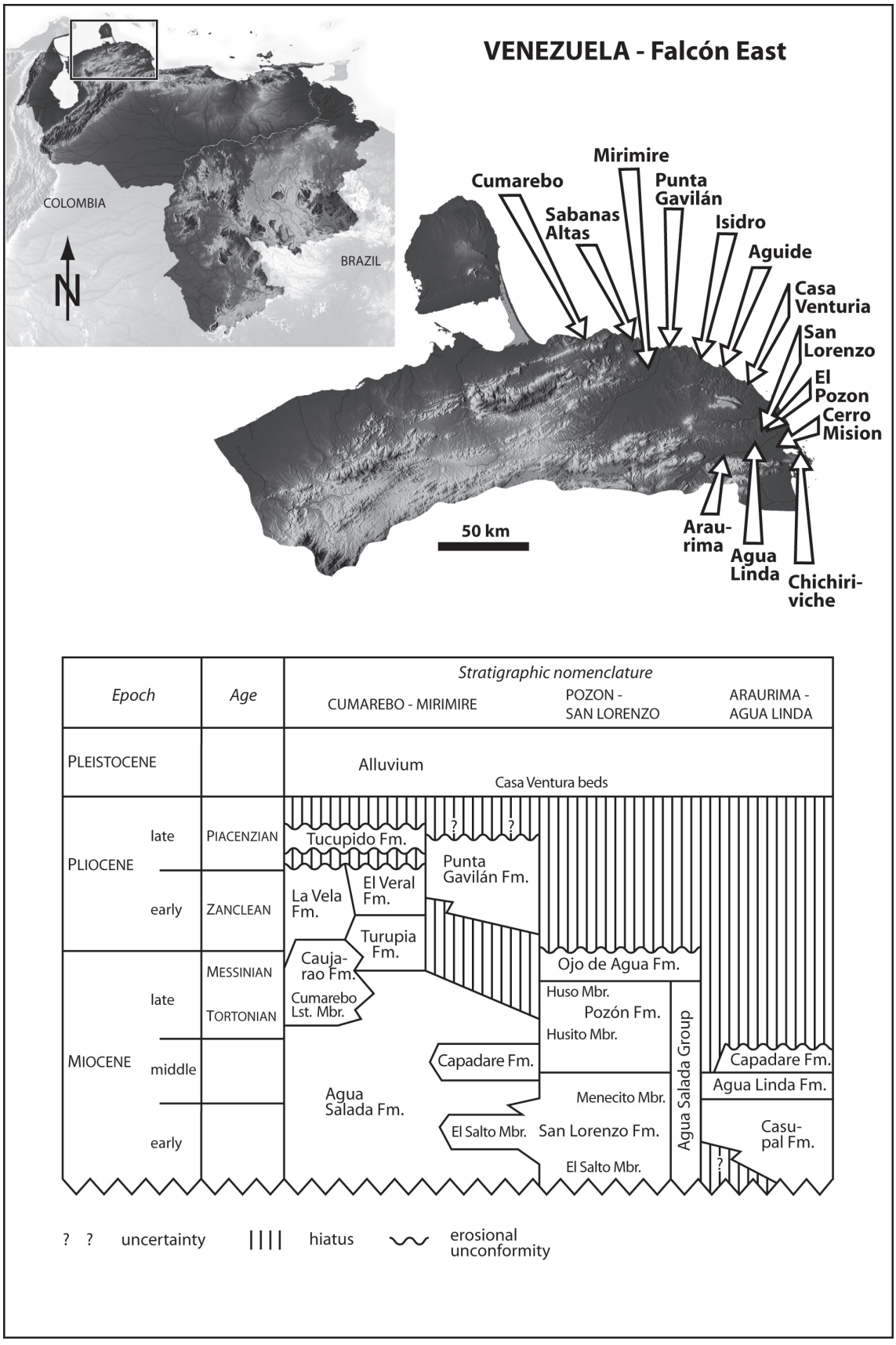


Chart 16. Venezuela – Falcón East.
Neogene stratigraphy and location of major outcrops in the eastern part of Falcon State of Venezuela. Stratigraphy after Lexico, 1997. Relief maps from: Maps-For-Free.com.

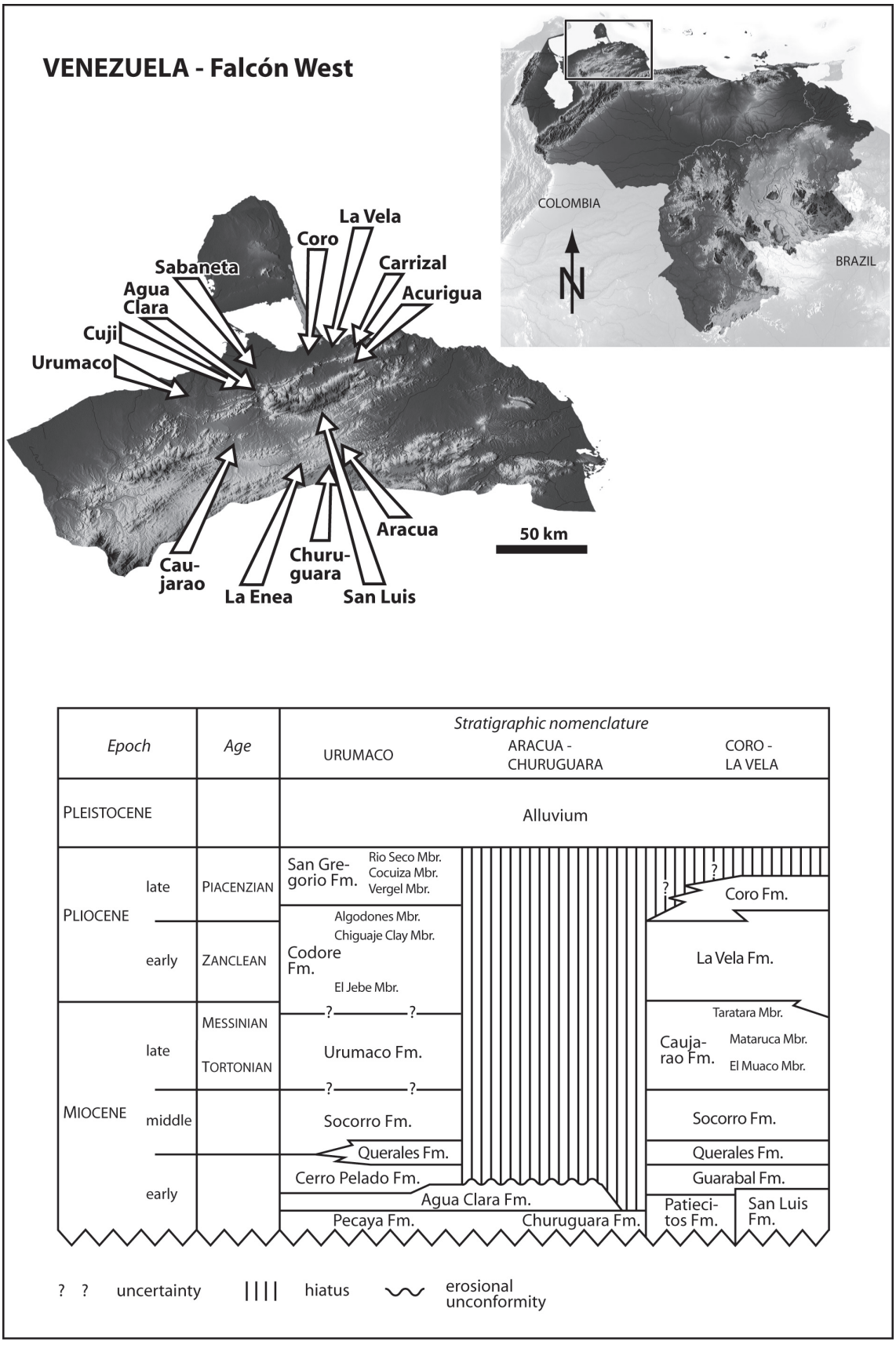


Chart 17. Venezuela – Falcón, Paraguaná Peninsula.
Neogene stratigraphy in the Paraguaná Peninsula of Falcon State of Venezuela. Stratigraphy after Lexico, 1997. Relief maps from: Maps-For-Free.com.

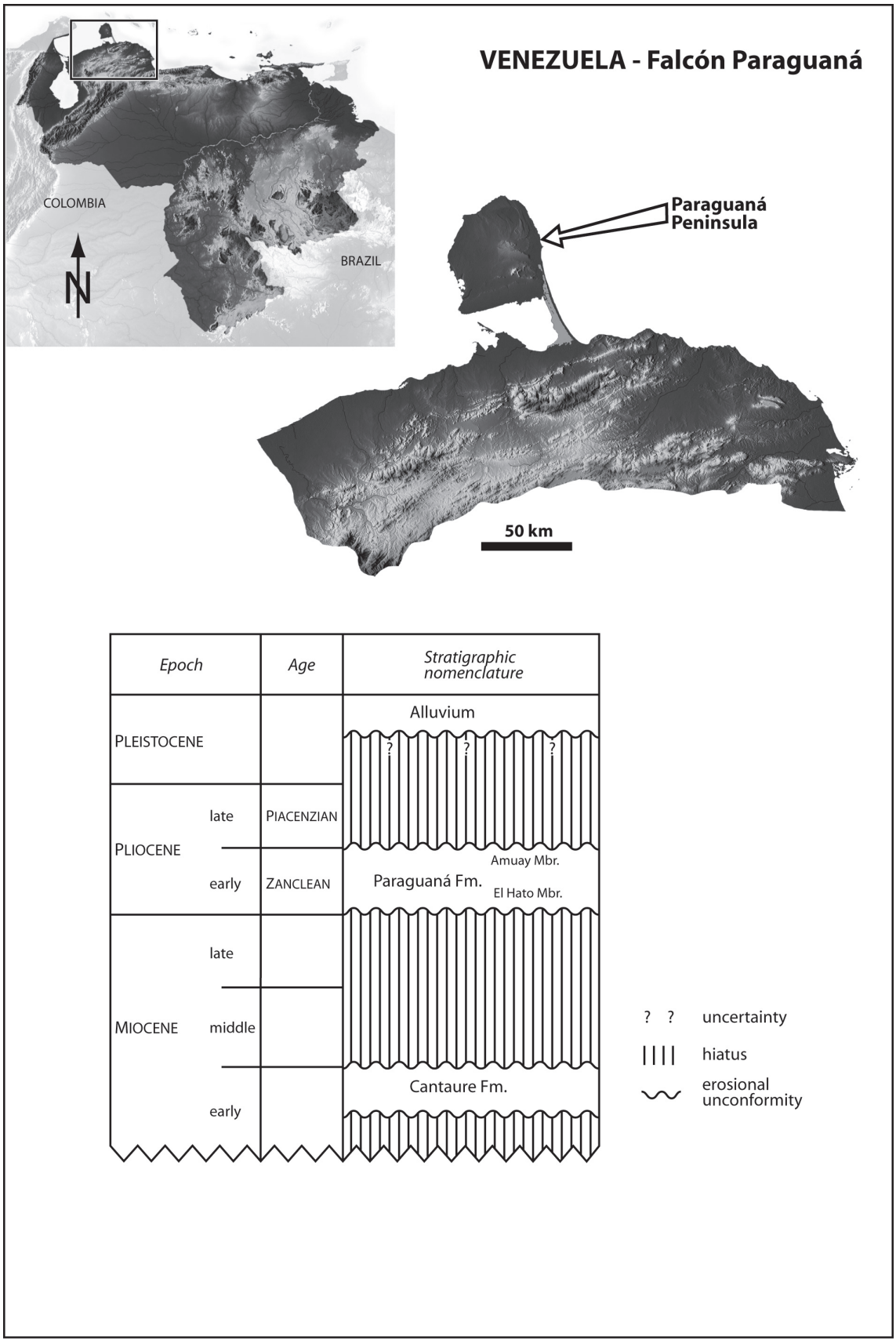


Chart 18. Venezuela – Falcón West-Central.
Neogene stratigraphy and location of major outcrops in the western and central part of Falcon State of Venezuela. Stratigraphy after Lexico, 1997. Relief maps from: Maps-For- Free.com.

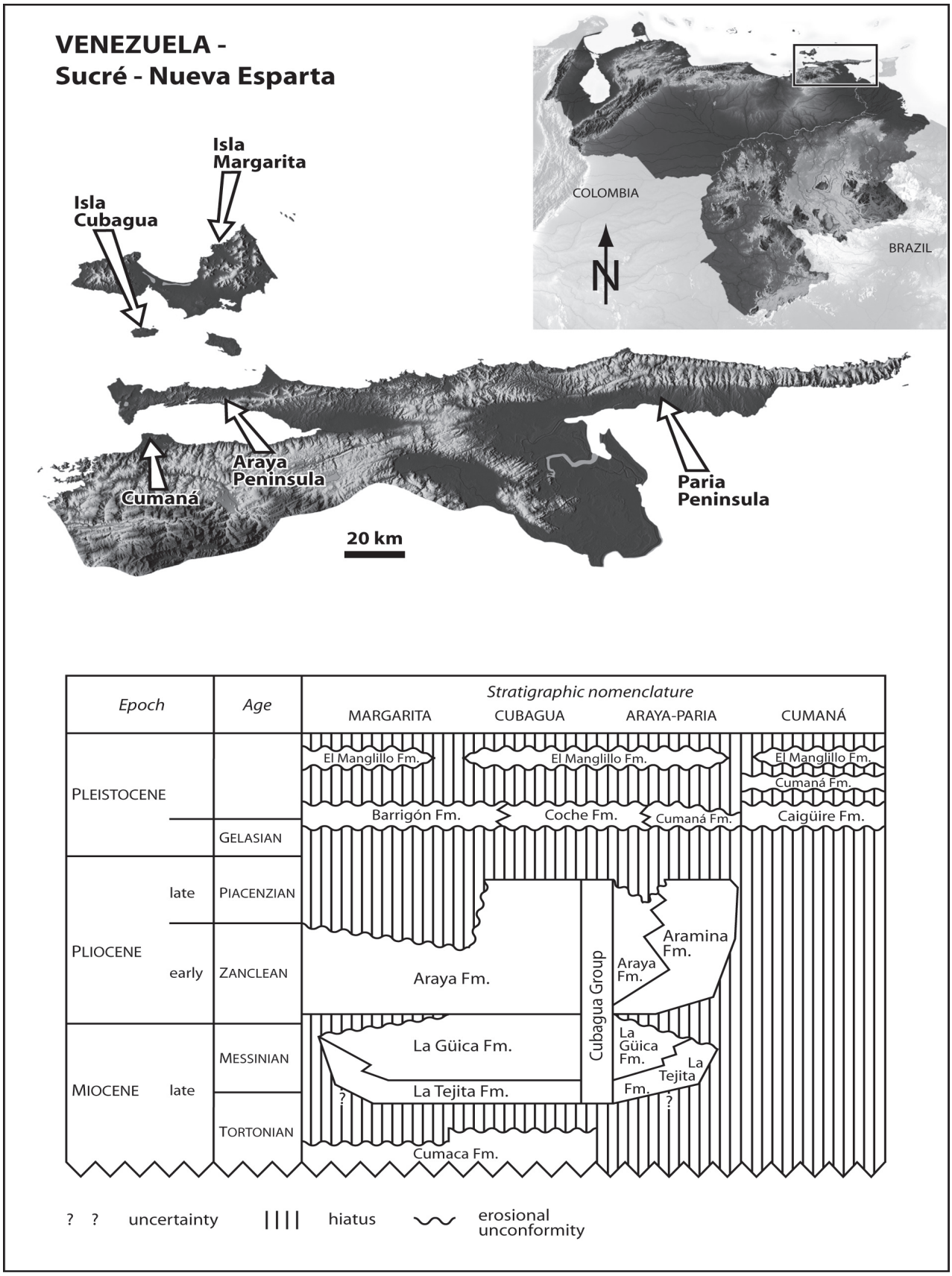


Chart 19. Venezuela – Sucre and Nueva Esparta States.
Neogene stratigraphy and location of major outcrops in the Sucré and Nueva Esparta States of Venezuela. Stratigraphy after Macsotay *et al*., 1995; Lexico, 1997. Relief maps from: Maps-For-Free.com.

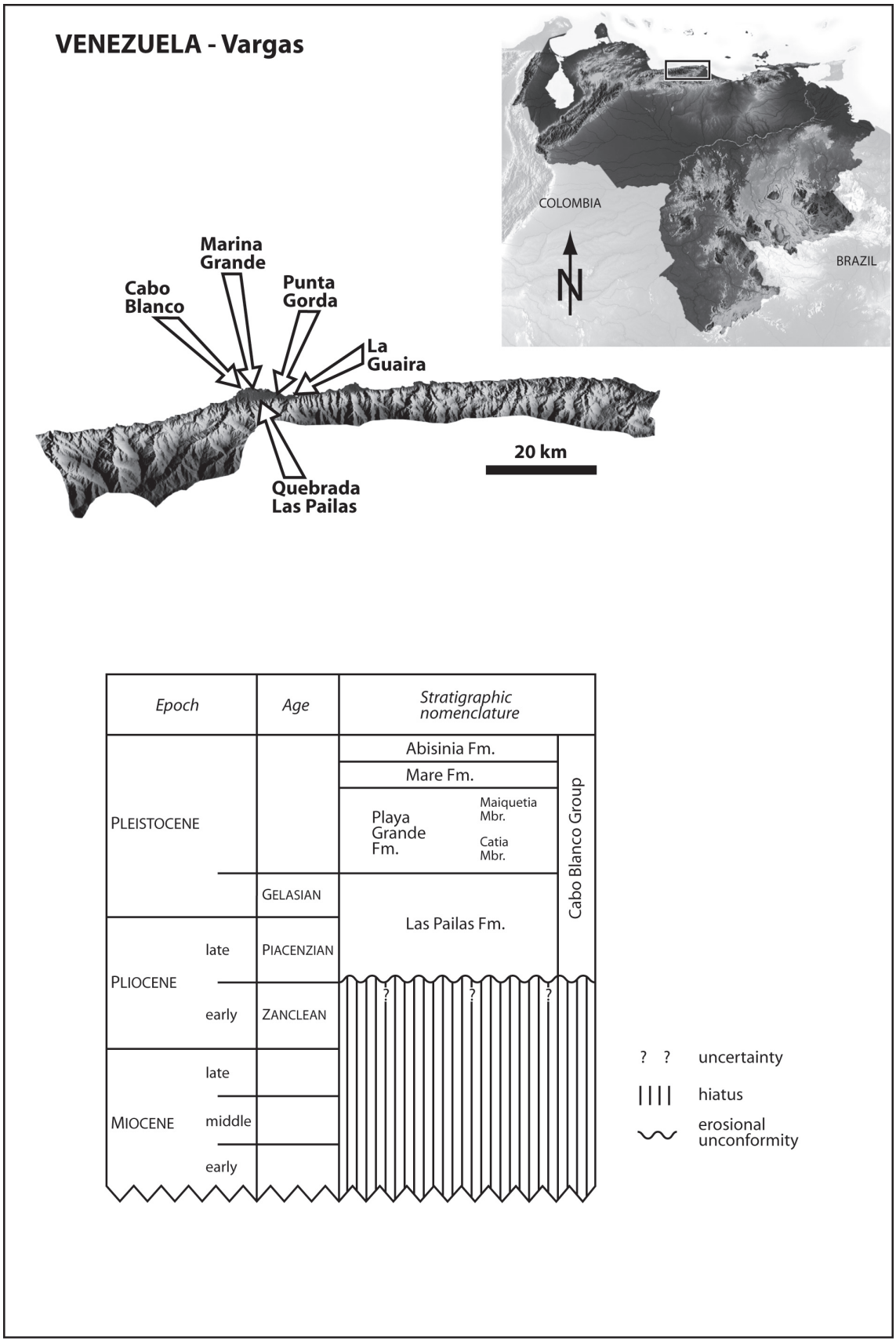


Chart 20.

Neogene stratigraphy and location of major outcrops in the Vargas State of Venezuela. Stratigraphy after Lexico, 1997. Relief maps from: Maps-For-Free.com.

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Plate 1.

1. *Cancellaria* cf. *barretti* Guppy, 1866, NMB H19983, height 20.8 mm, locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.
2. *Cancellaria* cf. *barretti* Guppy, 1866, NMB H20045, height 20.2 mm, locality NMB 17529 (= El Busco, loc. NMB 13665) San Rafael. 3.5 km SSW of Pueblo Cumarebo, Falcón State, Venezuela; Caujarao Formation, late Miocene.
3. *Cancellaria sepulcralis* nov. sp. **Holotype** NMB H18498, height 31.6 mm, locality NMB 12859, Carrizal, 50 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
4. *Cancellaria sepulcralis* nov. sp. **Paratype 2** NMB H20085, height 24.8 mm (juvenile), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
5. *Cancellaria sepulcralis* nov. sp. **Paratype 1** NMB H20084, height 32.5 mm, locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
6. *Cancellaria sepulcralis* nov. sp. **Paratype 3** NMB H20005, height 32.4 mm, locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.
7. *Cancellaria anomoia* Woodring, 1970, NMB H18697, height 17.6 mm, locality NMB 17529 (= El Busco, loc. NMB 13665) San Rafael. 3.5 km SSW of Pueblo Cumarebo, Falcón State, Venezuela; Caujarao Formation, late Miocene.
8. *Cancellaria sathra* Woodring, 1973, NHMW 2011/0178/0024, ex BL coll., height 37.6 mm, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene.
9. §*Cancellaria sathra* Woodring, 1973, NHMW 2011/0178/0025, ex BL coll., height 38.1 mm, Cerro Barrigón, Araya Peninsula, Sucre State, Venezuela. Aramina Formation, Cubagua Group, early Pliocene.
10. *Cancellaria sathra* Woodring, 1973, NHMW 2011/0178/0026, ex BL coll., height 26.6 mm, Cerro Barrigón, Araya Peninsula, Sucre State, Venezuela. Aramina Formation, Cubagua Group, early Pliocene.
11. *Cancellaria sathra* Woodring, 1973, NMB H20138, height 28.2 mm, locality NMB 18095, Río Banano south of Limón, Bomba, left bank, 500 m SW of railway bridge, brownish-grey sandy mudstones with lenses and layers of molluscs, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
12. *Cancellaria axelolssoni* Landau, Petit & Silva, 2012, NMB H20133, height 33.4 mm, locality NMB 17454, Río Banano south of Limón, Bomba, left bank, 700 m SW of railway bridge. Type locality of Río Banano Formation, blue sandy mudstone with sandy layers, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
13. *Cancellaria harrisi* Maury, 1917, NMB H20129, height 24.3 mm, locality NMB 17776, Río Banano south of Limón, Bomba, left bank, 700 m SW of railway bridge. Type locality of Río Banano Formation, blue sandy mudstone with sandy layers, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.

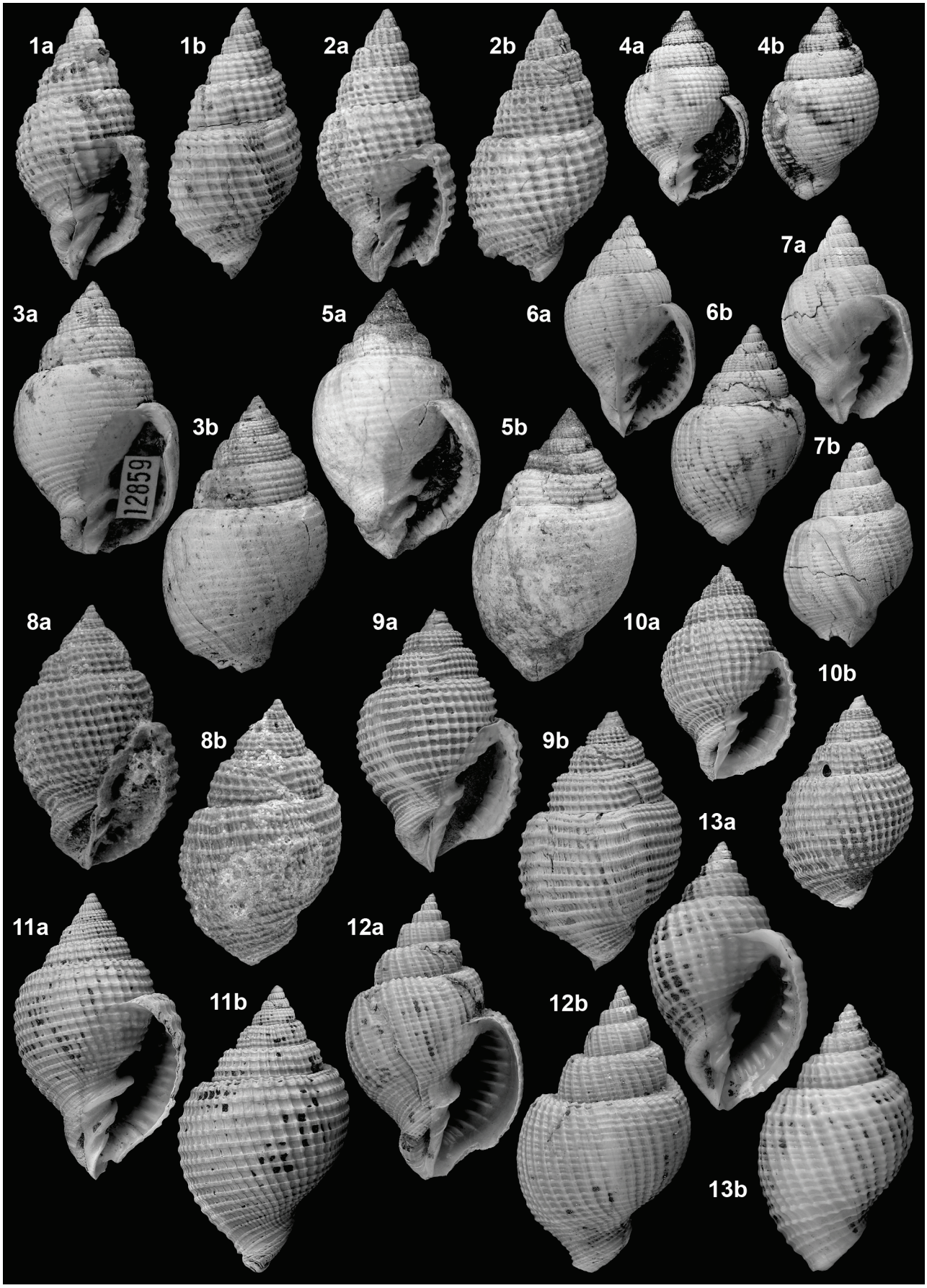
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Plate 1.

Plate 2.

1. *Cancellaria sp.*, NHMW 2011/0178/0027, ex BL coll., height 23.8 mm, Punta Judas, west of Quepos, Nicoya Peninsula, Costa Rica (Pacific), Punta Judas Formation, late Miocene.
2. *Cancellaria albida* Hinds, 1843, NHMW 2011/0178/0001, ex BL coll., height 21.1 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
3. *Cancellaria corrosa* Reeve, 1856, NHMW 2011/0178/0041, ex BL coll., height 18.6 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
4. *Cancellaria decussata* G.B. Sowerby I, 1832, NHMW 2011/0178/0009, ex BL coll., height 28.1 mm, Quebrada el Higo, Burica Peninsula, Puntarenas Province, Costa Rica, Penita Formation, Charco Azul Group, late Pliocene.
5. *Cancellaria urceolata* Hinds, 1843, NHMW 2011/0178/0023, ex BL coll., height 28.2 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
6. *Bivetiella dariena* (Toula, 1909), NMB H19985, height 24.1 mm, locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Mataruca Member, Caujarao Formation, late Miocene.
7. *Bivetiella dariena* (Toula, 1909), NMB H18703, height 20.9 mm, locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela, Punta Gavilán Formation, early Pliocene.
8. *Bivetiella dilatata* Landau, Petit & Silva, 2012, NMB H18839, height 33.4 mm, locality NMB 17527, Mesa de Cocodite, 100 m from foot of north scarp of Mesa de Cocodite, and 50 to 100 m west of a reservoir (tanque) to the south-southeast of Buenevara, Paraguaná Peninsula, Falcón Province, Venezuela, Buenaventura Adentro beds, middle-late Miocene.
9. *Bivetiella dilatata* Landau, Petit & Silva, 2012, NMB H18842, height 15.3 mm (subadult), locality NMB 17527, Mesa de Cocodite, 100 m from foot of noth scarp of Mesa de Cocodite, and 50 to 100 m west of a reservoir (tanque) to the south-southeast of Buenevara, Paraguaná Peninsula, Falcón Province, Venezuela, Buenaventura Adentro beds, middle-late Miocene.
10. *Bivetiella pulchra* (G.B. Sowerby I, 1832), NHMW 2011/0178/0016, ex BL coll., height 25.6 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
11. *Bivetia indentata*, (G.B. Sowerby I, 1832), NHMW 2011/0178/0014, ex BL coll., height 28.2 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
12. *Euclia montserratensis* (Maury, 1925), NMB H18698, height 27.2 mm, locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela, Punta Gavilán Formation, early Pliocene. Calcitic pseudomorph.
13. *Euclia codazzii* (Anderson, 1929), NMB H20079, height 32.5 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.

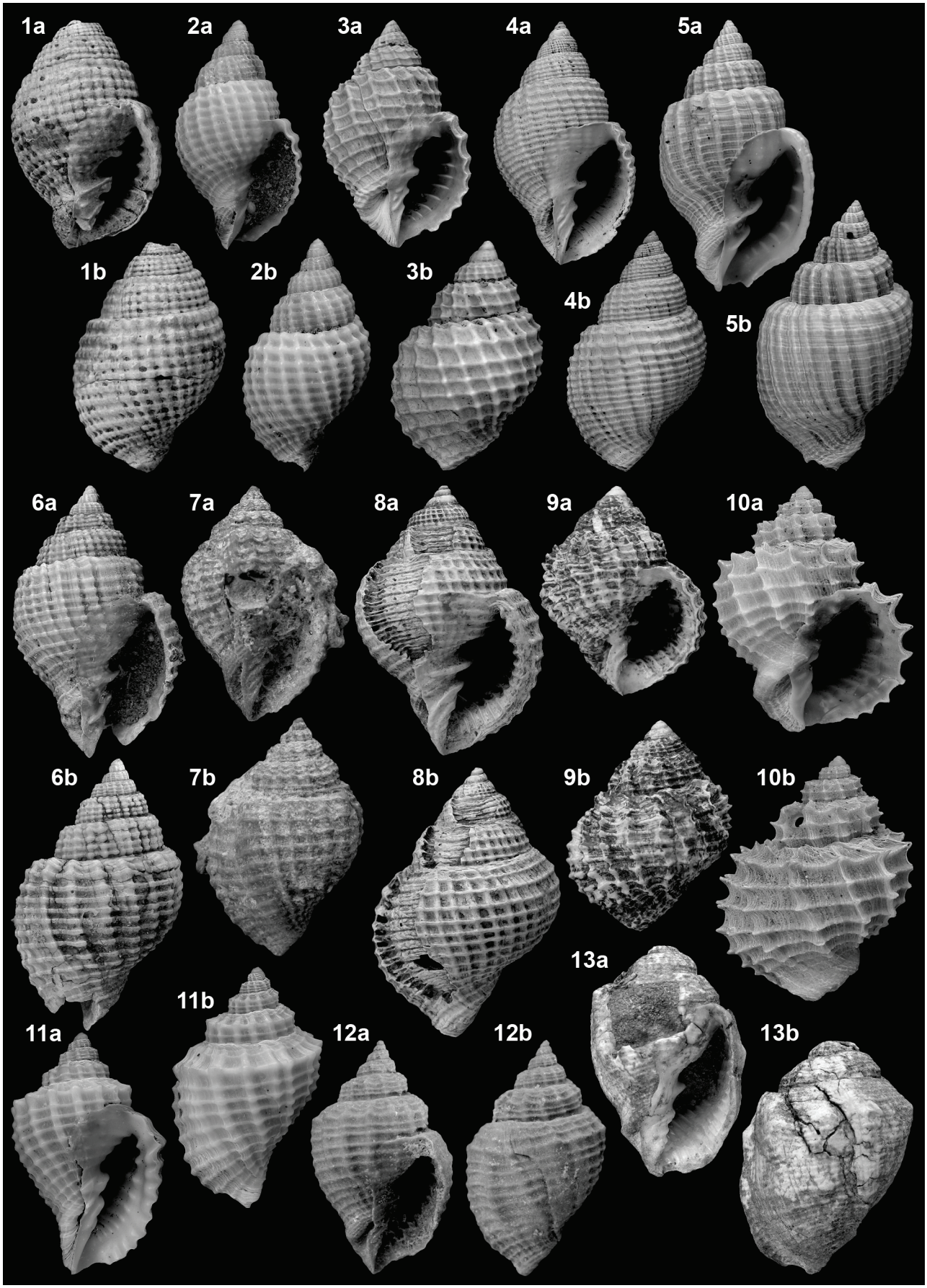
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Plate 2.

Plate 3.

1. *Pyruclia cibarcola* (Anderson, 1929), NMB H19982, height 24.2 mm, locality NMB 13665, El Busco de San Rafael, about 3.4 km SW of Pueblo Cumarebo, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.
2. *Pyruclia* aff. *lacondamini* (Olsson, 1964), NMB H20053, height 41.6 mm, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.
3. *Pyruclia solida* (G.B. Sowerby I, 1832), NMB H20048, height 37.6 mm, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.
4. *Pyruclia*? *schmidti* nov. sp. **Holotype** NMB H20056, height 32.5 mm, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.
5. *Pyruclia? schmidti* nov. sp. **Paratype 1** NMB H20055, height 32.6 mm, locality NMB 13359, west of Río Codore, little north of Mamón Field, North Urumaco, Venezuela, Urumaco Formation, late Miocene.
6. *Pyruclia scheibei* (Anderson, 1929), NHMW 2011/0178/0029, ex BL coll., height 21.7 mm, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene. Calcitic pseudomorph.
7. *Pyruclia lacondamini* (Olsson, 1964), NMB H20149, height 60.7 mm, locality NMB 17766, Punta Judas, west of Quepos, Nicoya Peninsula, Costa Rica (Pacific), Punta Judas Formation, late Miocene.
8. *Pyruclia lacondamini* (Olsson, 1964), NMB H20150, height 50.5 mm, locality NMB 17766, Punta Judas, west of Quepos, Nicoya Peninsula, Costa Rica (Pacific), Punta Judas Formation, late Miocene.

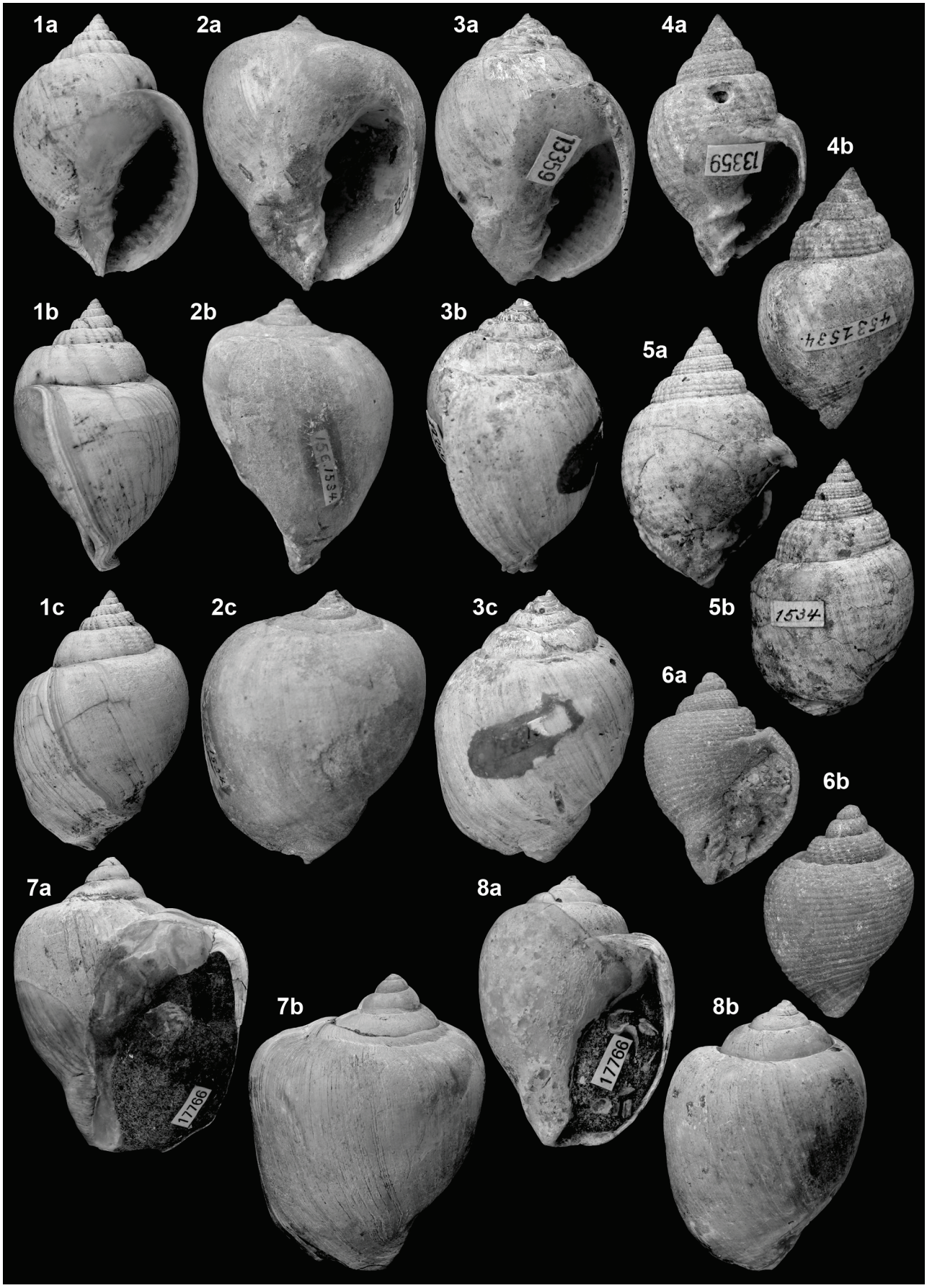
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Plate 3.

Plate 4.

1. *Euclia cassidiformis* (G.B. Sowerby I, 1832), NHMW 2011/0178/0005, ex BL coll., height 32.3 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
2. *Bivetopsia* cf. *herberti* (Landau, Petit & Silva, 2007), NMB H20083, height 20.2 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
3. *Bivetopsia pachia* (Smith, 1940), NMB H18491, height 22.5 mm (incomplete), locality NMB 12859, Carrizal, 50 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
4. *Bivetopsia pachia* (Smith, 1940), NMB H18695, height 21.7 mm, locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela, Punta Gavilán Formation, early Pliocene. Calcytic pseudomorph.
5. *Bivetopsia porvenirensis* nov. sp. **Holotype** NMB H18825, height 23.9 mm, Locality NMB 17526, Mesa de Cocodite. 100 m from foot of N scarp of Mesa de Cocodite, and 200 to 300 m south of Caserio El Porvenir, south-southwest of Buenevara, Paraguaná Peninsula, Falcón State, Venezuela, El Porvenir beds, middle Miocene. Calcitic pseudomorph.
6. *Hertleinia obeliscus* nov. sp. **Holotype** NMB H18773, height 23.6 mm, locality NMB 17529, San Rafael, 3.5 km SSW of Pueblo Cumarebo. Small outcrop among houses 100 m south of road at west end of San Rafael, Falcón Province, Venezuela, Caujarao Formation, late Miocene. Stripes seen in photograph have been drawn onto the shell with indelible pen.
7. *Hertleinia obeliscus* n. sp. **Paratype 1** NMB H18499, height 17.9 mm, locality NMB 13665, San Rafael, 3.5 km SSW of Pueblo Cumarebo. Small outcrop among houses 100 m south of road at west end of San Rafael, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
8. *Massyla cubaguaensis* (Landau, Petit & Silva, 2007), NMB H20059, height 21.2 mm, locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
9. *Massyla toulai* Landau, Petit & Silva, 2012, NMB H20060, height 19.8 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
10. *Massyla toulai* Landau, Petit & Silva, 2012, NMB H18774, height 16.1 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
11. *Massyla gavilanensis* nov. sp. **Holotype** NMB H18696, height 24.3 mm, locality NMB 17531 Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene. Calcitic pseudomorph.
12. *Massyla terryi* (Olsson, 1942), NMB H20047, height 26.3 mm, locality NMB 12045 Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene. Calcitic pseudomorph.
13. *Massyla cumingiana* (Petit de la Saussaye, 1844), NHMW 2011/0176/0002, ex BL coll., height 30.3 mm, Río Rabo de Puerco, Burica Peninsula, Panama, Armuelles Formation, Charco Azul Group, Pleistocene.
14. *Narona wiedenmeyeri* nov. sp. **Holotype** NHMW 2011/0178/0033, ex BL coll., height 21.0 mm, Casa Cantaure. 300 m south-southeast of the new (1952) Casa Cantaure; exposures in the banks of unnamed Quebrada Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.
15. *Narona wiedenmeyeri* nov. sp. **Paratype 1** NHMW 2011/0178/0034, ex BL coll., height 21.4 mm, Casa Cantaure. 300 m south-southeast of the new (1952) Casa Cantaure; exposures in the banks of unnamed Quebrada Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.

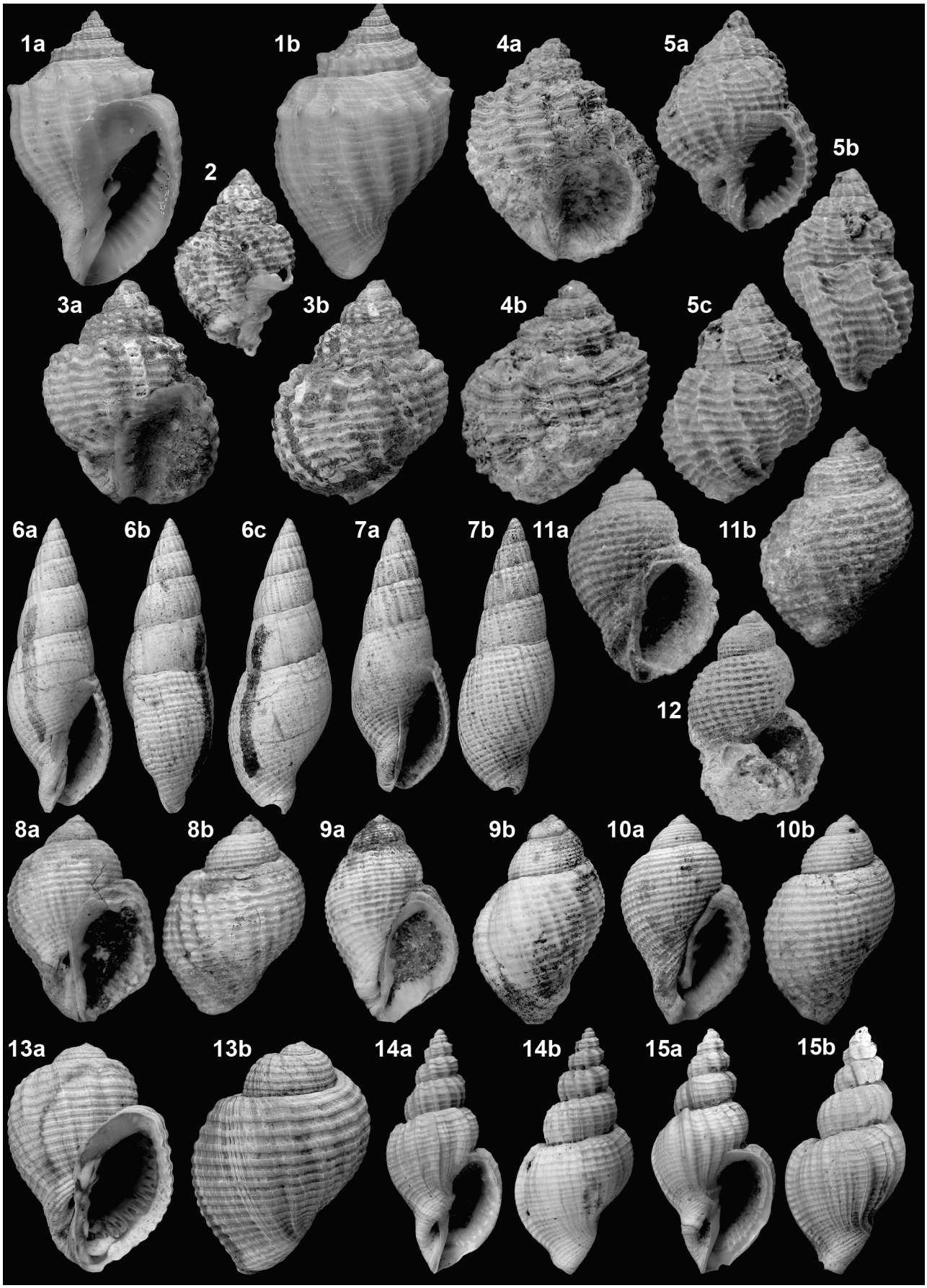
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Plate 4.

Plate 5.

1. *Narona wiedenmeyeri* nov. sp. **Paratype 2** NMB H18977, height 18.2 mm, locality 17516, Casa Cantaure, 300 m south-southeast of the new (1952) Casa Cantaure; exposures in the banks of unnamed Quebrada Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.
2. *Narona wiedenmeyeri* nov. sp. **Paratype 3** NMB H18976, height 14.9 mm, locality 17517, Casa Cantaure, 450 m south of Casa Cantaure; on the south slope of Loma Barbasco, Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.
3. *Narona* cf. *clavatula* (G.B. Sowerby I, 1832), NHMW 2011/0178/0035, ex BL coll., height 16.9 mm, locality NMB 15907, Río Gurabo, Dominican Republic, Cercado Formation, late Miocene.
4. *Narona clavatula* (G.B. Sowerby I, 1832), NHMW 2011/0178/0008, ex BL coll., height 22.2 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
5. *Aphera aphrodite* Landau, Petit & Silva, 2012, NMB H20025, height 14.9 mm, locality NMB 12854, at road Pueblo Cumarebo-Cumarebito, after El Busco de San Rafael. Brown siltstone with molluscs, Estado Falcón, Venezuela, Caujarao Formation, late Miocene.
6. *Aphera bananensis* nov. sp., **Holotype** NMB H20134, height 14.6 mm, width 7.4 mm, locality NMB 17453, Río Banano south of Limón, Bomba, right bank, about 500 m southwest of railway bridge, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
7. *Aphera bananensis* nov. sp., **paratype 1** NMB H20135, height 11.2 mm, width 6.5 mm, locality NMB 17453, Río Banano south of Limón, Bomba, right bank, about 500 m southwest of railway bridge, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
8. *Aphera bananensis* nov. sp., **paratype 4** NMB H20123, height 12.8 mm, locality NMB 17774, Río Banano south of Limón, Bomba, 600 m southwest of bridge, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene.
9. *Aphera tessellata* (G.B. Sowerby I, 1832), NHMW 2011 / 0178 /0021, ex BL coll., height 12.4 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
10. *Axelella casacantaurana* nov. sp. **Holotype** NHMW 2011/0178/0036, ex BL coll., height 16.2 mm, Casa Cantaure. 300 m south-southeast of the new (1952) Casa Cantaure; exposures in the banks of unnamed Quebrada Cantaure, Falcón Province, Venezuela, Cantaure Formation, late early Miocene.
11. *Axelella* sp. NMB H20058, height 8.7 mm (incomplete), locality NMB 17530, Carrizal, 30 m W of Cementerio, steeply W dipping shale between limestones of the Mataruca Member, Falcón Province, Venezuela, Caujarao Formation, late Miocene.
12. *Axelella funiculata* Hinds, 1843, NHMW 2011/0178/0011, ex BL coll., height 8.5 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
13. *Axelella nutrita* nov. sp. **Holotype** NHMW 2011/0178/0037, ex BL coll., height 13.1 mm, coastal exposure next to 'blue house', Burica Peninsula, Panama, Armuelles Formation, Charco Azul Group, Pleistocene.
14. *Axelella nutrita* nov. sp. **Paratype 1** NHMW 2011/0178/0038, ex BL coll., height 11.1 mm, coastal exposure next to 'blue house', Burica Peninsula, Panama, Armuelles Formation, Charco Azul Group, Pleistocene.
15. *Agatrix agathe* Landau, Petit & Silva, 2012, **paratype 4** NMB H20038, height 11.2 mm; locality NMB 17529 (= El Busco, loc. NMB 13665) San Rafael. 3.5 km SSW of Pueblo Cumarebo, Falcón State, Venezuela; Caujarao Formation, late Miocene.
16. *Sveltia centrota* (Dall, 1896), NHMW 2011/0178/0006, ex BL coll., height 21.3 mm, from rodolite layer 1 km south of 'blue house', Burica Peninsula, Panama, Armuelles Formation, Charco Azul Group, Pleistocene.

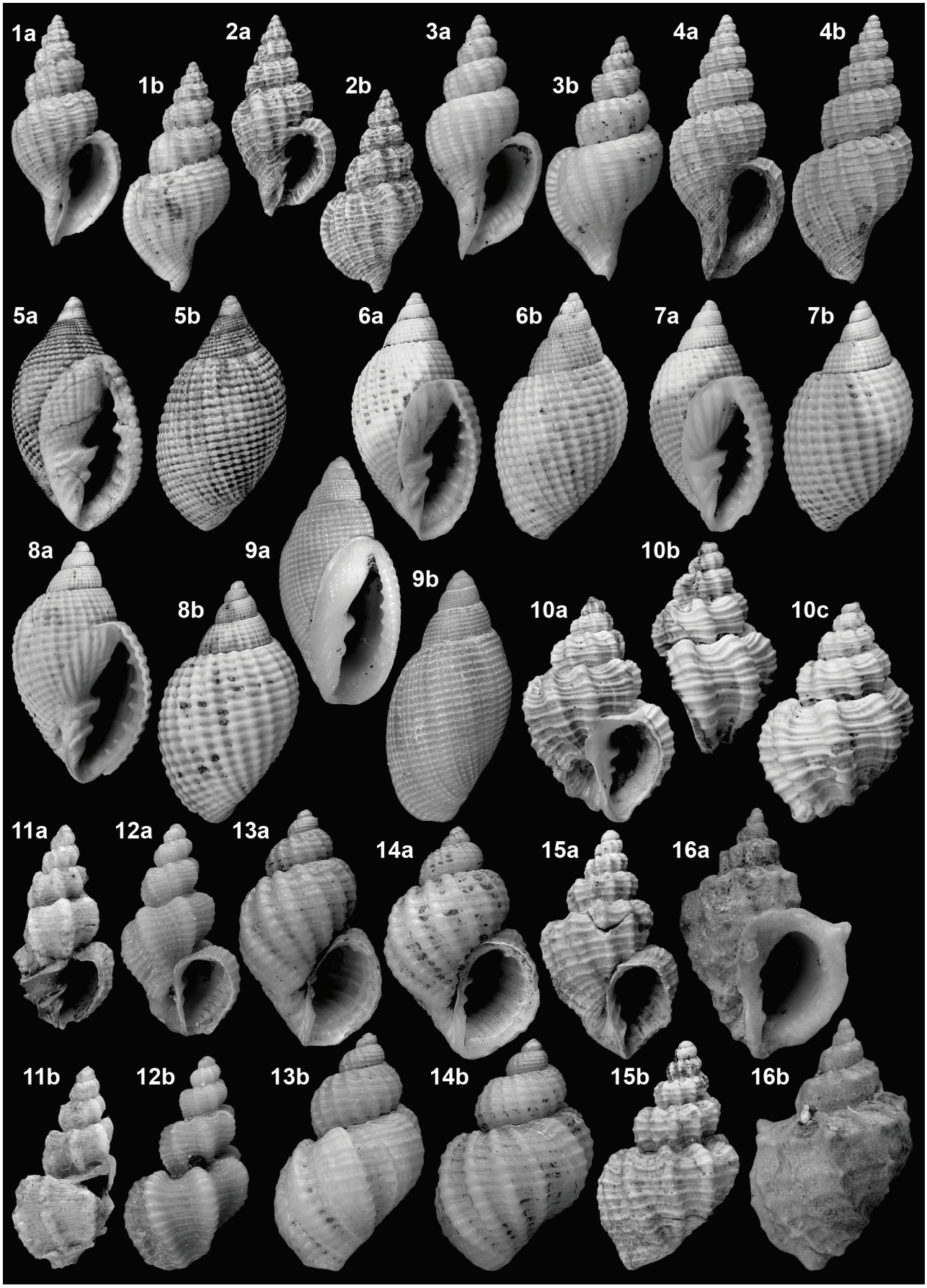
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Plate 5.

Plate 6.

1. *Ventrilia insulare* (Pilsbry & Johnson, 1917), NHMW 2011/0178/0039, ex BL coll., height 30.1 mm, López Section, Río Yaque del Norte, Dominican Republic, ?Cercado Formation, late Miocene.
2. *Ventrilia insulare* (Pilsbry & Johnson, 1917), NMB H18500, height 27.6 mm (incomplete), locality NMB 13112, 50 m west of Carrizal cemetery, Carrizal, east of La Vela, Falcón State, Venezuela, Caujarao Formation, late Miocene.
3. *Ventrilia rucksorum* Petuch, 1994, NHMW 2011/0178/0018 ex BL coll., height 48.3 mm, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene. Calcitic pseudomorph.
4. *Ventrilia puntagavilanensis* nov. sp. **Holotype** NMB H18706, height 45.9 mm, Locality NMB 17531, Punta Gavilán, Zamora District, Falcón State, Venezuela. Punta Gavilán Formation, early Pliocene. Calcitic pseudomorph.
5. *Ventrilia bullata* (G.B. Sowerby I, 1832), NHMW 2011/ 0178/0002, ex BL coll., height 29.4 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
6. *Trigonostoma milleri* Burch, 1949, NHMW 2011/0178/0015, ex BL coll., height 18.7 mm, Playa Cocalito, Nicoya Peninsula, Puntarenas Province, Costa Rica, Upper Montezuma Formation, late early to late Pleistocene.
7. *Cancellaria sepulcralis* nov. sp. **Paratype 4** NMB H18495, height 15.8 mm, locality NMB 12854, at road Pueblo Cumarebo-Cumarebito, after El Busco de San Rafael, Falcón Province, Venezuela, Mataruca Member, Caujarao Formation, late Miocene. Detail of protoconch.
8. *Aphera bananensis* nov. sp., **paratype 1** NMB H20135, height 11.2 mm, width 6.5 mm, locality NMB 17453, Río Banano south of Limón, Bomba, right bank, about 500 m southwest of railway bridge, Limón Basin, Costa Rica, upper Río Banano Formation, early Piacenzian, early late Pliocene. Detail of protoconch.
9. *Axelella nutrita* nov. sp. **Holotype** NHMW 2011/0178/0037, ex BL coll., height 13.1 mm, coastal exposure next to 'blue house', Burica Peninsula, Panama, Armuelles Formation, Charco Azul Group, Pleistocene. Detail of protoconch.

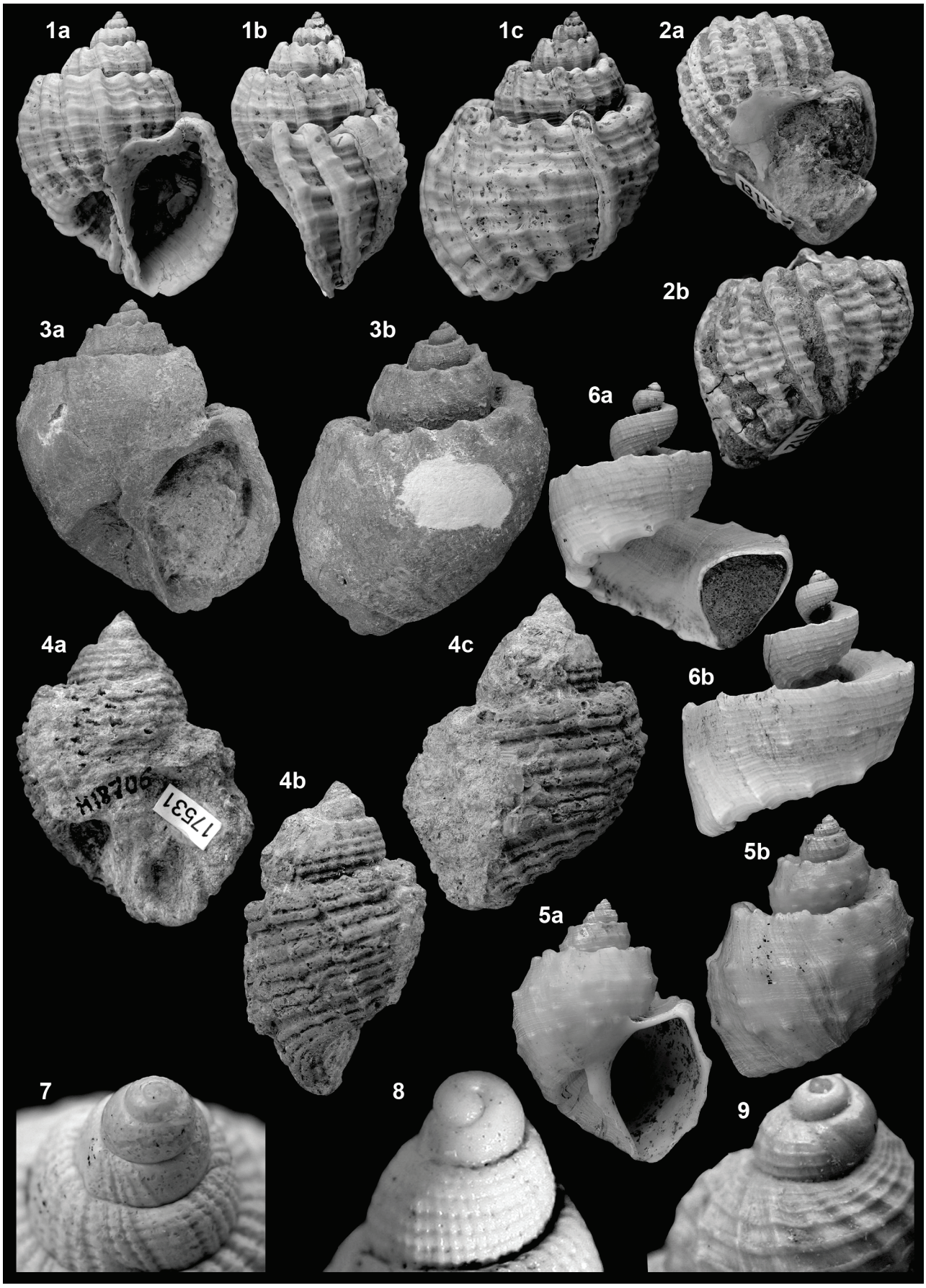

Plate 6.