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Ten New Cone Shells from Indonesia, the Marquesas Islands, Brazil, and Pacific Panama

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ABSTRACT Preliminary research for an upcoming book on the molluscan biogeography and biodiversity of tropical seas has uncovered ten new cone shells, all of which are highly restricted in their ranges and are considered to be important biogeographical index species. These new taxa encompass nine new species and one new subspecies and include: *Pionoconus easoni* new species (Marquesas Islands), *Poremskiconus tourosensis*, new species (Brazil), *Cylinder abbas johnabbasi*, new subspecies (Indonesia), *Jaspidiconus crabosi*, new species (Brazil), *Jaspidiconus icapui*, new species (Brazil), *Jaspidiconus itapua*, new species (Brazil), *Jaspidiconus joanae* new species (Brazil), *Jaspidiconus keppensi* new species, (Brazil), *Coltroconus bianchii*, new species (Minerva Seamount, Brazil), and *Ximeniconus gubernatrix*, new species (Pacific Panama).

KEY WORDS Conidae, *Pionoconus*, *Poremskiconus*, *Cylinder*, *Jaspidiconus*, *Ximeniconus*, Marquesas Islands, Indonesia, Brazil, Panama.

INTRODUCTION

While compiling biodiversity data for an upcoming book on marine molluscan biogeography ("Illustrated Guide to Marine Molluscan Biogeography: Tropical and Warm Temperate Areas"; Petuch, Berschauer, and Myers, in preparation), many important new biogeographical index mollusks, including ten previously-undescribed cone shells, were brought to our attention. Several inspired amateur malacologists, including Damaso Monteiro (Brazil and Portugal), John Abbas (Indonesia), Olivier Crabos (Brazil), and Marcus and Jose Coltro (Miami, Florida and Brazil), have accumulated these new species over the past few years and generously donated these to us to be added into our data banks. These undescribed cones came from four different oceanic regions and marine climates, including the Indonesian coral reef complexes, the isolated Marquesas Islands of the central Pacific, and the coralline algal banks, offshore seamounts, coastal sand flats of northern and central Brazil, and the multiple embayments and gulfs off the Pacific coast of Panama. Once described, these new taxa will be added to the new biogeography book and will be considered to be primary biogeographical indicator species.

The new taxa encompass nine new species and one new subspecies and include: (Conidae; Coninae) *Pionoconus easoni* new species (Nuku Hiva Is., Marquesas Islands), *Poremskiconus tourosensis* new species (northern Brazil), and *Cylinder abbas johnabbasi* new subspecies (Indonesia), and (Conidae; Conilithinae) *Jaspidiconus crabosi* new species (central Brazil), *Jaspidiconus icapui* new species (northern Brazil), *Jaspidiconus itapua* new species (central Brazil), *Jaspidiconus joanae* new species (northern Brazil), *Jaspidiconus keppensi* new species (central Brazil),

ISSN 0738-9388

Coltroconus bianchii (Minerva Bank, Brazil), and *Ximeniconus gubernatrix* (Pacific coast of Panama). These new cones are described in the subsequent sections of this paper. The holotypes are deposited in the following institutions, depending on country of origin: in the type collection of the Department of Malacology, Los Angeles County Museum of Natural History, Los Angeles, California (and bearing LACM catalog numbers); in the Zoology Department of the National Museum of Natural History, Paris, France (Museum National d'Histoire Naturelle; and bearing MNHN catalog numbers); and in the Zoological Museum of the University of Sao Paulo, Sao Paulo, Brazil (bearing MZSP catalog numbers).

SYSTEMATICS
Class Gastropoda
Subclass Sorbeoconcha
Order Prosobranchia
Infraorder Neogastropoda
Superfamily Conoidea
Family Conidae
Subfamily Coninae
Genus *Pionoconus* Moerch, 1852

Pionoconus easoni Petuch and Berschauer, new species
(Figures 1, 11 A-D)

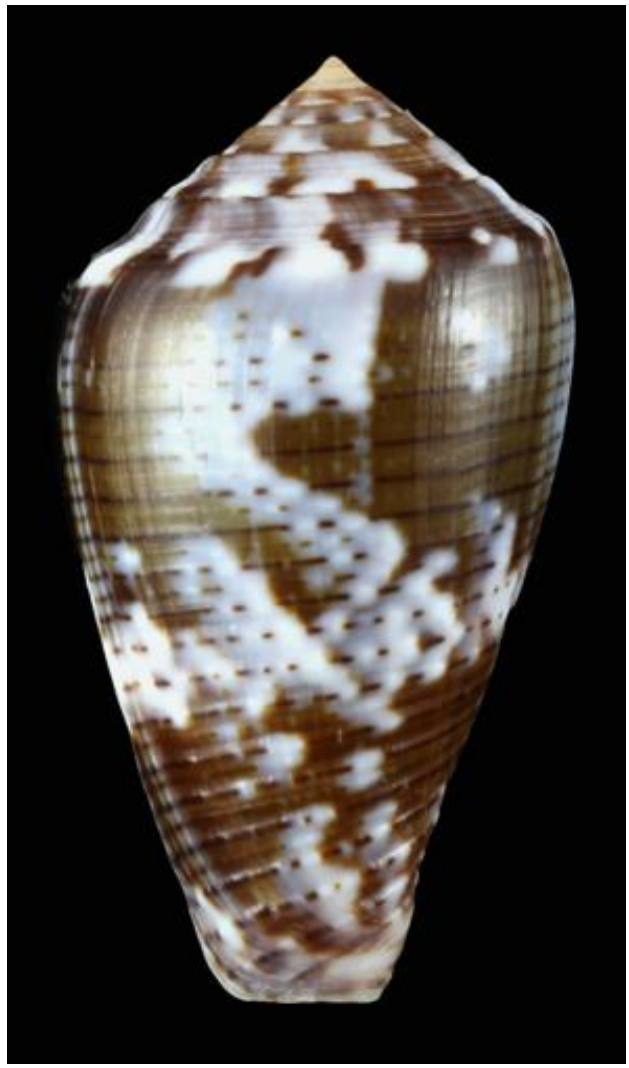

Figure 1. *Pionoconus easoni* n. sp. Holotype 30.0 mm.

Description. Shell small for genus, averaging around 30 mm, cylindrical, stocky, with slightly convex sides, widest at area immediately anterior of shoulder angle; shoulder sharply angled, bordered by large, broad, rounded carina; spire low, broadly pyramidal, with spire whorls always being slightly indented and subcanaliculate; body whorl smooth and shiny, ornamented with 12-14 small, low, evenly-spaced, thin spiral cords around anterior half; spire whorls ornamented with 4 thin spiral cords; shell color dark khaki-brown, overlaid with 18-20 dark brown, widely-spaced spiral lines; khaki-brown base color also overlaid with scattered large light blue longitudinal patches and flammules, arranged in zig-zag fashion or in widely-separated rectangular blotches; light blue zig-zag flammules marked with rows of dark brown and white dots and dashes that correspond to dark brown lines on khaki-brown areas; anterior tip of body whorl white; spire whorls dark brown, marked with very numerous, evenly-spaced light blue crescent-shaped flammules; edge of shoulder carina marked with conspicuous band of alternating dark brown and light blue patches; aperture proportionally

ISSN 0738-9388

narrow, widening slightly toward anterior end; interior of aperture white; early whorls and protoconch colored pale tan-orange; protoconch exserted, mammilate, composed of 2 whorls; periostracum thin, smooth, and translucent.

Type Material. HOLOTYPE - length 30.0 mm, width 16.2 mm, MNHN IM-2000-33809; from Taioha'e Bay, Nuku Hiva Island, Marquesas Islands, French Polynesia (Figure 11 A, B); OTHER MATERIAL EXAMINED - lengths 35 mm and 28 mm, from the same locality as the holotype, in the research collection of the senior author; length 29 mm, from the same locality as the holotype, in the research collection of the junior author; length 27 mm, from the same locality as the holotype, in the collection of Robert L. Eason, Sr. (Paris, Tennessee, USA).

Type Locality. Found under dead coral on a reef platform in Taioha'e Bay, Nuku Hiva Island, Marquesas Islands, French Polynesia.

Distribution. At present, known only from the Marquesas Islands, French Polynesia.

Ecology. At Taioha'e Bay on Nuku Hiva Island, *Pionoconus easoni* inhabits coral rubble areas on carbonate platforms, in the intertidal zone and in shallow subtidal depths (1 - 2 m). Belonging to a piscivorous genus, the new species is assumed to be a predator on small blennioid and gobioid fishes. More exploration in the Marquesas may show that this new species is widely distributed on other islands, such as Fatu Hiva, Hiva Oa, and Eiao.

Etymology. Named for Robert L. Eason, Sr. of Paris, Tennessee, USA, avid amateur naturalist and malacologist, who assisted the senior author with field work in the Ten Thousand Islands of Florida.

Discussion. On Nuku Hiva Island, this new endemic Marquesan *Pionoconus* species is sympatric with *Pionoconus catus* (Hwass, 1792) (Figure 11 E, F) and the two species may be competing for the same fish prey. A similar situation, where two small *Pionoconus* species occur together in the same habitat, is seen in the Philippines, Thailand, and Melanesia. Here, the widespread Indo-Pacific *P. catus* is sympatric with the similar-sized *P. decurtatus* (Dautzenberg, 1910) and the two sibling species often occur side-by-side on intertidal reef flats (E.J. Petuch, personal observation; as seen at Rossel Island, Louisiade Archipelago, Papua-New Guinea). Likewise in Tanzania and Kenya, the small *Pionoconus striolatus* (Kiener, 1845) is also found on exposed reef flats living sympatrically with *P. catus*, as is the similar *P. vinctus* (A. Adams, 1855) along the northern Australian coast. This biogeographical pattern of a wide-ranging species (*P. catus*) living together with a geographically-restricted species (*P. easoni*, *P. decurtatus*, *P. vinctus*, and *P. striolatus*) is now known to occur at several areas of the Indo-Pacific Region, including East Africa, the Indonesian-Malaysian Archipelago, northern Australia, Melanesia, and the isolated Marquesas Islands.

In shape, size, and basic color pattern, *Pionoconus easoni* is most similar to the Indonesian, Philippine, and Melanesian *P. decurtatus*, but differs in being a more darkly-colored shell with larger dark brown areas on the body whorl, in having fewer and more widely-spaced dark brown spiral lines on the body whorl, in having a more darkly-colored spire with a dark brown base color marked with numerous pale blue crescent-shaped flammules, and in having the shoulder carina marked with a conspicuous band of alternating dark brown and pale blue checkers. The new species is also similar in appearance to the northern Australian *P. vinctus* in having the prominent dark brown spiral lines on the body whorl, but differs in being a smaller and stockier shell and in having large light blue longitudinal flammules.

ISSN 0738-9388

Although occurring together with *P. catus* on Nuku Hiva (Figure 11 E, F), the new species can be easily separated from its sibling species by having a much more slender and distinctly cylindrical shell. The sympatric *P. catus* has a much broader and more pyriform shell with a proportionally much wider shoulder, which tapers abruptly to the anterior tip. As in *P. easoni*, *P. catus* has numerous raised spiral cords around the anterior half of the body whorl, but these are proportionally much larger and coarser than those seen on the new Marquesan species. In *P. easoni*, these cords are smooth and adherent to the body whorl, while those of *P. catus* are characteristically heavily ornamented with large raised pustules and are always more prominently raised.

Pionoconus easoni is the newest member of a morphologically closely-knit Indo-Pacific radiation that includes nine other species: *P. decurtatus* (Dautzenberg, 1910) (Philippines, Indonesia, and Melanesia), *P. vinctus* (A. Adams, 1855) (northern Australia); *P. striolatus* (Kiener, 1845) (East Africa, Indian Ocean); *P. koukae* (Monnier, Limpalaer, and Robin, 2013) (Oman); *P. nigropunctatus* (Sowerby II, 1858) (Red Sea); *P. nigropunctatus elatensis* (Wils, 1971) (Gulf of Aqaba); *P. simonis* (Bozzetti, 2010), (SE Madagascar); *P. rouxi* Monnier, Limpalaer, and Robin, 2013) (northwestern Australia); and *P. morrisoni* (Raybaudi Massilia, 1991) (Ashmore Reef and Cartier Islands, Australia). This species group of small, stocky reef-dwelling taxa is now known to range from the Red Sea and eastern Africa to the Marquesas Islands, extreme eastern Polynesia. The type lot of *P. easoni* was purchased from Rika Goethaels and Fernand DeDonder, Peutie, Belgium, from a small mixed collection of *P. catus* and *P. easoni* that had been commercially collected on Nuku Hiva.

Genus *Poremskiconus* Petuch, 2013

Poremskiconus tourosensis Petuch and Berschauer, new species
(Figures 2, 11 G, H)

Figure 2. *Poremskiconus tourosensis* n.sp. Holotype 16.7 mm.

Description. Shell small for genus, averaging 18 mm, stocky, slightly rotund, with distinctly convex sides; shoulder sharply angled, bordered with wide rounded carina; spire low, broadly subpyramidal, with early whorls projecting and exserted; spire whorls obsoletely scalariform, with indented sutures; body whorl smooth and polished, ornamented with 6-8 large spiral cords

ISSN 0738-9388

around anterior end; spire whorls smooth, ornamented with extremely faint small spiral threads; body whorl color bright orange red, overlaid with large white patches and zig-zag flammules, primarily arranged around mid-body; spire whorls white, marked with large, evenly-spaced and widely-separated orange-red flammules; edge of shoulder carina marked with row of small alternating white and reddish-tan spots, producing checkered pattern; aperture narrow throughout, slightly arcuate; interior of aperture uniformly pale orange red; protoconch and early whorls bright red; protoconch mammilate, composed of two whorls.

Type Material. HOLOTYPE - length 16.7 mm, width 9.3 mm, MZSP 135606; from off the coast of Touros, Rio Grande do Norte State, Brazil; OTHER MATERIAL EXAMINED - length 18 mm, from the same depth and locality as the holotype, in the research collection of the senior author; length 18 mm, from the same depth and locality as the holotype, in the research collection of the junior author.

Type Locality. Collected by divers, from 10 - 15 m depth, on a coralline algal sea floor off Touros, Rio Grande do Norte State, Brazil.

Distribution. At present, known only from the coralline algal reefs off Touros, Rio Grande do Norte State, Brazil.

Ecology. The new species lives among and beneath coralline algal rhodoliths (coral-like masses formed by the red coralline algae *Lithothamnion*, *Lithophyllum*, and *Sporolithon*) in depths of 10 to 15 m.

Etymology. Named for the city of Touros, Rio Grande do Norte State, Brazil, the locality where this new species was first collected.

Discussion. *Poremskiconus tourosensis* is morphologically closest to *P. mauricioi* (Coltro, 2004) from northeastern Brazil (Piaui and Ceara States), but differs in being a smaller, more slender shell with a proportionally higher spire and in lacking the prominent and conspicuous dark brown and white flammules seen on the spire and shoulder carina of *P. mauricioi*. The new species also differs from the variably-colored *P. mauricioi* (which comes in red, brown, yellow, and green color morphs) in being relatively invariant in color, exhibiting only a red or red-orange base color.

This distinctive bright red algal reef-dwelling species is the newest member of a remarkable species radiation of *Poremskiconus* that is restricted to northern Brazil (Maranhao, Piaui, Ceara, and Rio Grande do Norte States; the Cearaian Subprovince of the Brazilian Molluscan Province). Some of the other members of this northern Brazilian species complex include the recently-described *Poremskiconus fonsecai* Petuch and Berschauer, 2016, *P. smoesi* Petuch and Berschauer, 2016, *P. mariaodeteae* Petuch and Myers, 2014, and the previously-discussed *P. mauricioi* (*see* Petuch and Berschauer, 2016 for a partial overview of the genus in northern Brazil).

Genus *Cylinder* Montfort, 1810

Cylinder abbas johnabbasi Petuch and Berschauer, new subspecies
(Figures 3, 12 A, B)

Description. Shell of average size for genus, fusiform and elongated, inflated, with slightly convex sides; spire proportionally low, broadly subpyramidal; shoulder sharply-angled, edged with small, slightly-raised carina; body whorl smooth, with silky texture; body whorl white, completely overlaid with dense dark brown netted pattern, composed of interconnected

ISSN 0738-9388

small triangles, ovals, and amorphous shapes; some larger amorphous nettings anastomosing into larger irregular shapes or into elongated longitudinal zig-zag patterns that extend for entire length of shell; 2 thin bands of small brown or tan patches extend around body whorl, with both arranged on either side of mid-body line; spire whorls white, covered with irregular zig-zag lines and scattered small brown patches; early whorls exserted, red-orange in color; aperture proportionally wide, white within.

Type Material. HOLOTYPE - length 55.0 mm, width 27.5 mm, LACM 3499; from off the coast of Pangandaran, Java Island, Indonesia; OTHER MATERIAL EXAMINED - lengths 55 mm and 72 mm, from the same locality as the holotype, in the research collection of the senior author; 5 specimens, lengths 59 mm to 76 mm, from the same locality as the holotype, in the research collection of the junior author.

Type Locality. The new subspecies was collected in fishermen's nets ("tango nets"), from a muddy black sand sea floor, in 10-12 m depth off the mouth of the Cainjong River, which empties into the western bay of Pangandaran, Java, Indonesia (John Abbas, personal communication).

Distribution. At present, known only from Java and Bali Islands, Indonesia, but may be present on other neighboring Indonesian islands.

Ecology. The new subspecies lives on organic-rich muddy black sand sea floors, in 10 - 12 m depths, near the mouths of silt-laden rivers.

Etymology. Named for John Abbas of Djakarta, Java, Indonesia, inspired amateur naturalist, photographer, and exploratory malacologist, whose discoveries have added much to our knowledge of the Indonesian malacofauna, both marine and terrestrial.

Figure 3. *Cylinder abbas johnabbasi* n.ssp. Holotype 55.0 mm.

Discussion. This new taxon is proposed as a geographically-isolated subspecies of *Cylinder abbas* (Hwass, 1792) (Figure 12 C). The nominate subspecies, *abbas abbas*, is confined to Sri Lanka and southeastern India and differs from the Indonesian *abbas johnabbasi* in being a much less elongated and more compact and truncated shell, in having a much finer and more

ISSN 0738-9388

regular netted pattern, and in having a much more darkly-colored shell, with larger and more prominent brown patches arranged in two rows. The netted pattern of *abbas johnabbasi* is composed of larger triangles and ovals than those seen on *abbas abbas* and these often coalesce to form elongated zebra stripes or zig-zags. This type of variable net pattern is never seen on the nominate subspecies.

Hwass originally designated the type locality of *Cylinder abbas* as "East Indies", which is far too vague and could refer to any area from India to Indonesia. The neotype specimen of *C. abbas* (shown here on Figure 12 D) also had no type locality designation, but is obviously a typical Sri Lankan specimen. For the sake of taxonomic clarity, we here designate the type locality of *Cylinder abbas abbas* as "Trincomalee, Sri Lanka", a well-known area where classic specimens of the nominate subspecies have been collected for decades. The 2004 tsunami resulted in the death of many of the Sri Lankan commercial shell collectors and the nominate subspecies is now rarely offered for sale.

Subfamily Conilithinae
Genus *Jaspidiconus* Petuch, 2004

Jaspidiconus crabosi Petuch and Berschauer, new species
(Figures 4, 12 E, F)

Description. Shell of average size for genus, subcylindrical, broad across shoulder; spire proportionally high, pyramidal, distinctly scalariform; shoulder sharply angled, edged with thin, blade-like carina; spire whorls slightly indented and canaliculated; body whorl polished and shiny, sculptured with 2 types of ornamentation; posterior half of body whorl sculptured with 6 large, evenly-spaced spiral cords that are ornamented with large bead-like pustules; anterior half of body whorl sculptured with 12 smaller, flatter, and smoother spiral cords that lack large pustules; shell color uniform pale violet purple overlaid with widely scattered small, thin brown longitudinal flammules and small brown spots; edge of shoulder carina marked with row of tiny, widely-spaced brown dots; spire whorls paler whitish-lavender in color; aperture proportionally narrow, widening toward anterior end; aperture white, becoming pale purple within interior.

Figure 4. *Jaspidiconus crabosi* n.sp. Holotype 20.6 mm.

ISSN 0738-9388

Type Material. HOLOTYPE - length 20.6 mm, width 11.4 mm, MZSP 135600; found on sand flats along the shoreline of Boipeba Island, Bahia State, Brazil; OTHER MATERIAL EXAMINED - lengths 19 mm and 22 mm, from the same locality as the holotype, in the research collection of the senior author; length 17.6 mm, from the same locality as the holotype, in the research collection of the junior author.

Type Locality. Found dead on sand flats off the shoreline of Boipeba Island, Bahia State, Brazil.

Distribution. At present, known only from the coastal areas of Boipeba Island, south of Todos os Santos Bay, Bahia State, Brazil.

Ecology. Although collected in a freshly dead condition, the type lot was found along a stretch of sand beach near large extensive sand flats. The new species is most probably an inhabitant of open clean sand sea floors, in intertidal depths.

Etymology. Named for Olivier Crabos, Salvador, Bahia State, Brazil, inspired amateur malacologist who has discovered several new cone shells while collecting in unexplored areas along the Bahia coastline.

Discussion. Of the known Brazilian Province *Jaspidiconus* species, *J. crabosi* is morphologically most similar to *J. ogum* Petuch and Myers, 2014 from Itaparica Island in Todos os Santos Bay, but differs in being a much stockier and more inflated shell that is wider across the shoulder. The pustulated cords on the body whorl of the new species are also proportionally thinner and farther apart, with the pustules being smaller and more numerous. The split sculpture pattern of *J. crabosi*, with pustulated cords on the posterior of the body whorl and smoother non-pustulated cords on the anterior half, is distinctive and is not seen on *J. ogum*. The characteristic pale purple or violet shell color of the new species is also not seen on *J. ogum*, which are most often bright orange, yellow, orange-tan, or reddish-orange.

Jaspidiconus icapui Petuch and Berschauer, new species
(Figures 5, 12 G, H)

Description. Shell of average size for genus, rotund and stocky, subturbinate, with inflated body whorl and rounded sides; spire proportionally high and elevated, pyramidal;

Figure 5. *Jaspidiconus icapui* n.sp. Holotype 15.1 mm.

ISSN 0738-9388

shoulder sharply-angled, edged with thin carina; body whorl smooth and polished, sculptured with 10-12 widely-separated, shallow incised sulci around anterior two-thirds; body whorl base color pale cream-tan or yellowish-tan, overlaid with 2 bands of widely-separated rectangular or oval light brown patches, one around mid-body and one around the anterior end; spire whorls cream-tan, marked with large, conspicuous amorphous dark orange-tan flammules; protoconch and early whorls pale orange; aperture proportionally narrow, widening toward anterior end, pale tan within interior.

Type Material. HOLOTYPE - length 15.1 mm, width 11.4 mm, MZSP 135601; from off Icapui, Ceara State, Brazil; OTHER MATERIAL EXAMINED - lengths 16 mm and 18 mm, from the same locality as the holotype, in the research collection of the senior author; length 17.6 mm, from the same locality as the holotype, in the research collection of the junior author.

Type Locality. The type lot was dredged from 30-40 m depths off Icapui, Ceara State, Brazil.

Distribution. At present, known only from the deeper offshore waters of Ceara State, Brazil.

Ecology. The new species was collected on a coralline algal rubble and carbonate sand sea floor, at 30 - 40 m depths.

Etymology. Named for the city of Icapui, Ceara State, Brazil, the locality from which the new species was first collected. The taxon is a noun in apposition, based upon a Native American place name.

Discussion. Of the known northern Brazilian *Jaspidiconus* species, *J. icapui* is morphologically similar only to *J. damasomonteiroi* Petuch and Myers, 2014, from the deep water coralline algal bioherms off Ceara State and the Canopus Bank (for a discussion of Brazilian *Jaspidiconus* species, *see* Petuch and Myers, 2014). The new species differs from its deeper water congener in being a much smaller shell with a more rotund and turnip-like shape, and in being a smoother and much less sculptured shell that lacks the large and heavy pustules found on *J. damasomonteiroi*.

Jaspidiconus itapua Petuch and Berschauer, new species
(Figures 6, 13 A, B)

Description. Shell of average size for genus, cylindrical, with straight sides that curve inward abruptly at anterior end; shoulder sharply-angled with thin, blade-like carina; shoulder carina sculptured with 14-16 now, undulating knobs; spire elevated and pyramidal; body whorl smooth and polished, ornamented with 16-18 very thin and faintly-impressed spiral sulci, which become increasingly stronger and better-developed toward the anterior end; shell base color orange or orange-tan, overlaid with variable amounts of large darker orange or tan amorphous flammules; pale whitish-orange or white band present just anterior of the mid-body line on body whorl; spire whorls whitish-orange or whitish-yellow, marked with irregularly-spaced dark orange oval-shaped flammules; early whorls and protoconch pale orange; aperture proportionally narrow, flaring widely toward the anterior end; interior of aperture bright orange or orange-tan.

Type Material. HOLOTYPE - length 14.4 mm, width 8.0 mm, MZSP 135602; from Farol de Itapua, Itapua, Bahia State, Brazil; OTHER MATERIAL EXAMINED - 3 specimens, lengths 18 mm - 21 mm, from the same locality of the holotype, in the research collection of the senior author; lengths 16.7 mm and 12.7 mm,

ISSN 0738-9388

from the same locality as the holotype, in the research collection of the junior author.

Type Locality. Collected on the beach at the Farol de Itapua, Itapua, Bahia State, Brazil.

Distribution. At present, known only from the area around Itapua, Bahia State, Brazil.

Figure 6. *Jaspidiconus itapua* n.sp. Holotype 14.4 mm.

Ecology. Although collected as dead beach specimens, the type lot most probably lived on the shallow (1 - 3 m) coarse quartz sand sea floor immediately offshore of the Itapua Lighthouse (Farol de Itapua). *Jaspidiconus itapua* occurs together sympatrically with the much larger *J. josei* Petuch and Berschauer, 2016 along the Itapua coast.

Etymology. Named for the city of Itapua, Bahia State, Brazil, the locality from which the first specimens of this new species where collected. The taxon is a noun in apposition, based upon a Native American place name.

Discussion. Of the known northern and northeastern Brazilian *Jaspidiconus* species, *J. itapua* only resembles *J. damasoi* (Cossignani, 2007) from the coralline algal sea floors off Ceara State (*see* Petuch, 2013:145-148). Both species share the same bright orange and orange-tan shell colors and faintly-incised spiral sulci, but *J. itapua* differs from *J. damasoi* in being a broader, less elongated shell with a much lower spire, in having straighter sides, and in having the distinctive undulating shoulder coronations and coronated carina.

Jaspidiconus joanae Petuch and Berschauer, new species
(Figures 7, 13 C, D)

Description. Shell of average size for genus, biconical, with stocky body whorl and broad shoulder area; spire high and elevated, distinctly pyramidal, slightly scalariform; shoulder sharply-angled, edged with sharp, blade-like carina; shoulder carina ornamented with 16-18 low, flattened undulating coronations; body whorl shiny and polished, sculptured with 15 deeply-incised spiral sulci, forming large, wide flattened cords between pairs of sulci; some cords ornamented with scattered large rounded pustules, most often best developed at posterior end of body whorl; body whorl color white, often overlaid with large tan or tan-orange, irregular, amorphous longitudinal flammules; many specimens pure white, without colored

flammules; spire whorls white, with scattered small pale-tan-orange triangular flammules; edge of shoulder carina marked with row of small orange-tan dots, with each dot being found between pair of undulating coronations on carina; early whorls and protoconch pure white; aperture proportionally wide, pure white within interior.

Figure 7. *Jaspidiconus joanae* n.sp. Holotype 16.5 mm.

Type Material. HOLOTYPE - length 16.5 mm, width 8.9 mm, MZSP 135603; from off Rio do Fogo, Rio Grande do Norte State, Brazil; OTHER MATERIAL EXAMINED - four specimens, lengths 11 mm to 18 mm, from the same locality as the holotype, in the research collection of the senior author; lengths 13.4 mm and 13.0 mm, from the same locality as the holotype, in the research collection of the junior author.

Type Locality. Offshore of Rio do Fogo, Rio Grande do Norte State, Brazil.

Distribution. Known only from the Rio di Fogo area of Rio Grande do Norte State, Brazil.

Ecology. The new species prefers clean carbonate sand pockets between coralline algal knolls and banks, in 3 - 10 m depths.

Etymology. Named for Joana Fonseca de Silva, of Lisboa, Portugal, who assisted her father, Francisco Fonseca da Silva, in collecting shells along the unexplored areas of Rio Grande do Norte State.

Discussion. Of the known northern Brazilian *Jaspidiconus* species, *J. joanae* is similar only to *J. damasomonteiroi* Petuch and Myers, 2014 from Ceara State and the offshore Canopus Bank, but differs in being consistently a smaller, stockier, more turbinate, and less elongated shell, in being a less-ornamented species, having fewer and smaller pustules on the body whorl, and in being a much paler-colored shell, having a pure white base color with scattered pale tan flammules, lacking the vibrant pink, salmon, and yellow base colors of *J. damasomonteiroi*.

Jaspidiconus keppensi Petuch and Berschauer, new species
(Figures 8, 13 E, F)

Description. Shell small for genus, stocky, wide across shoulder; spire elevated, pyramidal, slightly stepped and scalariform; shoulder

ISSN 0738-9388

sharply-angled, edged with thin rounded carina; shoulder carina ornamented with 18-20 small rounded beads, producing coronated spire whorls; body whorl shiny, ornamented with 15-16 low, flattened, almost obsolete spiral cords; some cords have scattered small, low pustules; shallow incised sulci present between low spiral cords on body whorl; spire whorls slightly canaliculated due to raised coronated edge of carina; body whorl color pale violet or pale blue, overlaid with large brown amorphous flammules that are arranged in 2 rows, one around anterior tip and one around posterior end; early whorls and protoconch pale yellow-tan; clear unmarked band and row of darker brown patches both present around mid-body area; spire whorls pale violet-white, marked with scattered irregular small brown flammules; row of tiny thin brown flammules present along edge of suture; aperture narrow, widening toward anterior end; interior of aperture dark brown.

Type Material. HOLOTYPE - length 14.9 mm, width 8.3 mm, MZSP 135604; offshore of Alcobaca, Bahia State, Brazil; OTHER MATERIAL EXAMINED - length 15 mm, from the same locality as the holotype, in the research collection of the senior author.

Type Locality. The new species was collected in coral rubble and sand, in 2 m depth, off Alcobaca, Abrolhos Platform, Bahia State, Brazil.

Distribution. Presently known only from the Alcobaca area of the Abrolhos Platform, Bahia State, Brazil.

Ecology. *Jaspidiconus keppensi* prefers coarse carbonate sand, mixed with coral rubble, in 1 - 5 m depths, on reef platforms along the western side of the Abrolhos Platform.

Figure 8. *Jaspidiconus keppensi* n.sp. Holotype 14.9 mm.

Etymology. Named for Marc Keppens of Gavere, Belgium, inspired amateur malacologist and avid student of the Conidae.

Discussion. With its coronated spire whorls and shoulder carina, along with its corded body whorl sculpture, *Jaspidiconus keppensi* is morphologically closest to only one central Brazilian cone; *J. poremskii* Petuch and Myers, 2014 from the mouth of Todos os Santos Bay, south of Salvador. The new Abrolhos Platform

ISSN 0738-9388

species differs from its northerly congener in being a much stockier, more compact, and less elongated shell with more rounded sides. The incised sulci and spiral cords are also better-developed, stronger, and more numerous on *J. keppensi* than on the smoother *J. poremskii*. Characteristically, *J. poremskii* has a bright orange or orange-red shell color with scattered white and yellow markings. The new species, on the other hand, is consistently a pale lavender color, overlaid with large dark brown patches, and has never been collected in any other base color.

Genus *Coltroconus* Petuch, 2013

Coltroconus bianchii Petuch and Berschauer, new species
(Figures 9, 13 G, H)

Description. Shell tiny, of average size for genus, slender, elongated, with slightly convex sides; shoulder sharply angled, edged with row of 12 very large rounded knobs that extend beyond carinal area; spire elevated, pyramidal, distinctly scalariform and stepped; spire whorls heavily coronated; body whorl ornamented with 15-16 very large, raised spiral cords that are heavily pustulose, giving shell rough appearance; body whorl base color bright orange, overlaid with scattered small white patches and dots and often with wide white band around the mid-body; spire whorls white with scattered small dark orange patches; early whorls and protoconch pale yellow-white; protoconch proportionally very large, round, mammilate, composed of 2 whorls; aperture narrow, pale orange within interior.

Type Material. HOLOTYPE - length 11.2 mm, width 5.8 mm, MZSP 135605; Minerva Seamount, Bahia, Brazil; OTHER MATERIAL EXAMINED - lengths 9 mm and 8 mm, from the same locality as the holotype, in the research collection of the senior author; lengths 7.4 mm and 8.9 mm, from the same locality as the holotype, in the research collection of the junior author.

Figure 9. *Coltroconus bianchii* n.sp. Holotype 11.2 mm.

Type Locality. The new *Coltroconus* was dredged, by an exploratory petroleum research vessel, at 120 m depth on the Minerva Seamount (16 degrees 59 minutes 48 seconds S, 37 degrees 33 minutes 07 seconds W), due

ISSN 0738-9388

north of the Abrolhos Platform, Bahia State, Brazil.

Distribution. Known only from the Minerva Seamount, to which the new species is endemic.

Ecology. *Coltroconus bianchii* prefers sea floors composed of fine carbonate muds mixed with coral rubble, in depths of 100 - 200 m.

Etymology. Named for Alex Bianchi, who first collected this tiny cone and recognized it as new, while dredging on the Minerva Seamount.

Discussion. This new Minerva Seamount endemic is most similar to *Coltroconus delucai* (Coltro, 2004) from the Abrolhos Islands, having the same general size, shell shape, and coronated spire ornamentation. *Coltroconus bianchii*, however, differs from its Abrolhos congener in being a bright orange shell, as opposed to the deep blood red color of *C. delucai*, in having a much higher, scalariform spire, and in having a heavily pustulated body whorl.

Genus *Ximeniconus* Emerson and Old, 1962

Ximeniconus gubernatrix Petuch and Berschauer, new species
(Figures 10, 13 I, J)

Description. Shell small for genus, averaging 24 mm, stocky and pyriform, wide across shoulder, with rounded convex sides; shoulder slightly rounded but angled, with sloping subsutural area; spire high and elevated, acutely subpyramidal and pagodiform; spire whorls slightly indented and canaliculate; body whorl smooth and shiny, with 10 widely-spaced, faintly-incised thin spiral sulci around anterior half; spire whorls smooth and polished; base color of body whorl pale salmon-orange overlaid with proportionally very large, closely-packed dark orange-brown amorphous longitudinal flammules; base color pattern and large flammules overlaid with 18 - 20 evenly-spaced spiral rows of small reddish-brown dots and dashes; pale salmon-orange marked with large, irregularly-spaced amorphous brown patches and 2 rows of small reddish-brown dots, one around edge of suture and one along edge

Figure 10. *Ximeniconus gubernatrix* n.sp. Holotype 22.3 mm.

ISSN 0738-9388

of shoulder; early whorls and protoconch pale salmon-orange; aperture proportionally narrow, white becoming pale salmon or yellow deep within interior.

Type Material. HOLOTYPE - length 22.3 mm, width 10.8 mm, LACM 3500; from sand flats off Gobernadora Island, Gulf of Montijo, Veraguas Province, Panama; OTHER MATERIAL EXAMINED - lengths 22 mm and 30 mm, from the same locality as the holotype, in the research collection of the senior author.

Type Locality. On sand flats at low tide, southern coast of Gobernadora Island, Gulf of Montijo, Veraguas Province, Panama.

Distribution. At present, known only from the Gulfs of Chiriqui and Montijo, Pacific Panama, but the species may also extend southward to the Perlas Islands and Gulf of Panama.

Ecology. The new Panamanian species prefers intertidal sand flats in quiet, protected areas within bays and coastal lagoons.

Etymology. Named as the Latin equivalent of the Spanish "Gobernadora" (Women Governor), in reference to Gobernadora Island, the type locality.

Discussion. This new species of *Ximeniconus* has been collected and sold by commercial shell dealers for years as "*Conus ximenes*" or "*Conus perplexus*", primarily because of its spotted color pattern and its small size. *Ximeniconus gubernatrix* is morphologically closest to *X. ximenes* (Gray, 1839), but differs in being a much smaller, stockier, and more pyriform shell. *Ximeniconus ximenes* is a much larger, more distinctly cylindrical and elongated shell that has a pale violet or pure white base color, and never exhibits the pale salmon-orange base color seen on the new species. The interior of the aperture of *X. ximenes* is a pale violet color, while that of *X. gubernatrix* is a pale salmon or yellowish-orange. The large brown patches and flammules that dominate the color pattern of the new species are never as large or prominent on *X. ximenes*, which often is devoid of any brown patches. In respect to these dark color patches, *X. gubernatrix* is similar to *X. mahogani* (Reeve, 1843), but can easily be separated from that species by being a much stockier and more truncated shell with a proportionally shorter and less elongated body whorl.

The gastropod fauna of the Panamanian coast, from the Gulf of Chiriqui to the Gulf of Panama and the Perlas Islands, is known for its high percentage of regional endemism. Other Panamanian endemics that occur in the same areas as *Ximeniconus gubernatrix* include the cassid *Cypraecassis wilmae*, the olivids *Americoliva truncata* and *Americoliva olssoni*, the cypraeids *Pseudozonaria aequinoctialis* and *Talostolida panamensis* (also Galapagos), and the conids *Globiconus baccatus* and *Dauciconus fenzani* (deep water Gulf of Chiriqui). *Ximeniconus ximenes* is a widespread species, ranging from the outer coast of Baja California and the Gulf of California, Mexico south to northern Peru, but seems to be relatively uncommon, or absent, in the Gulfs of Chiriqui and Montijo. Here, in the quiet sheltered intertidal areas between islands, the widespread *X. ximenes* appears to be replaced by the endemic *X. gubernatrix*. Although the spotted Panamic cones of the genera *Ximeniconus*, *Perplexiconus*, and *Globiconus* were discussed and illustrated in detail by Tucker (2016), no shells similar to *X. gubernatrix* were mentioned and, apparently, the new species has previously been overlooked.

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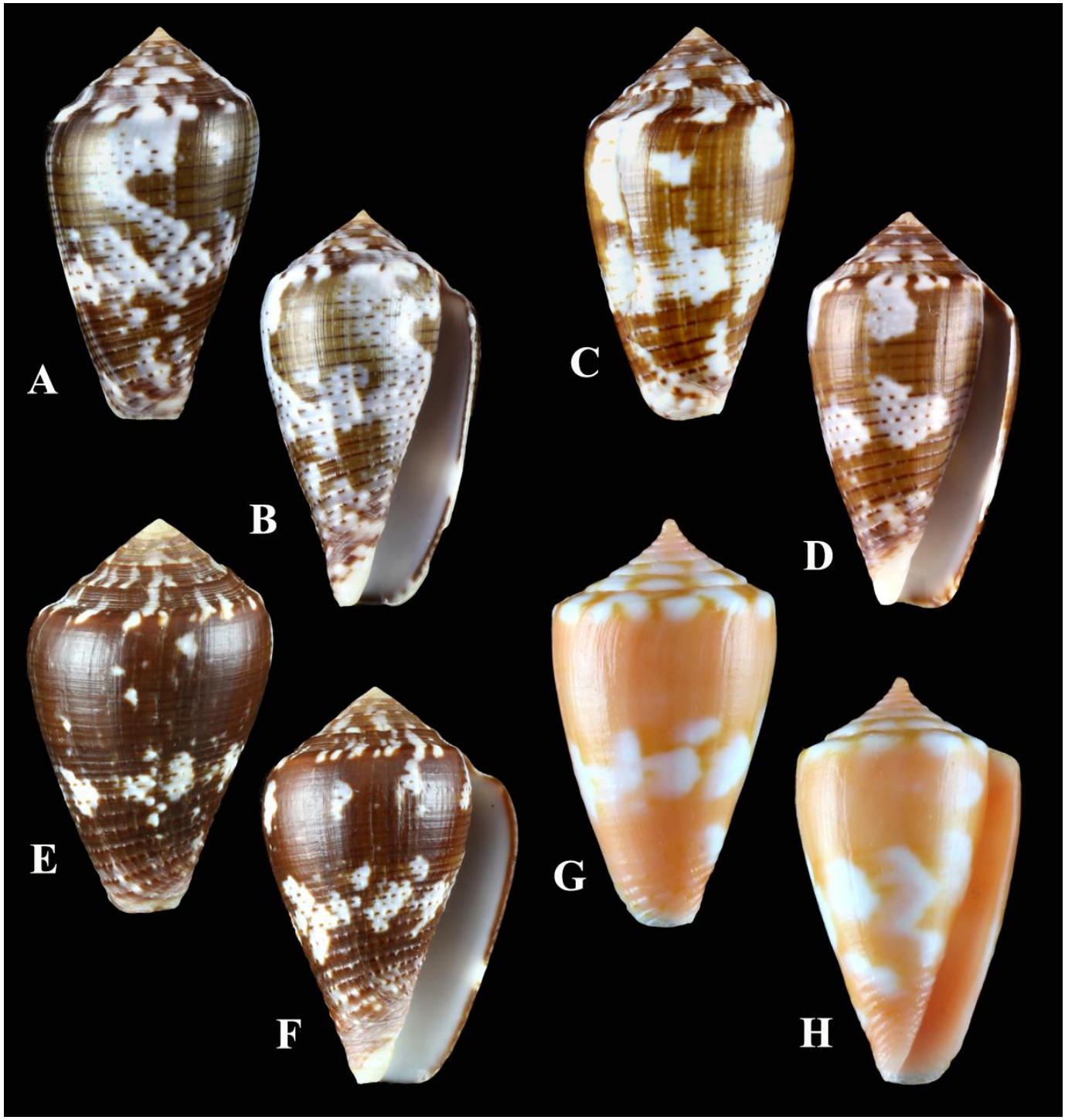

Figure 11. New Species of *Pionoconus* and *Poremskiconus*. A, B = *Pionoconus easoni* Petuch and Berschauer, new species. Holotype, length 30.0 mm, NMNH IM-2000-33809. Taioha'e Bay, Nuku Hiva Island, Marquesas Islands. **C, D =** *Pionoconus easoni* Petuch and Berschauer, new species, length 29.1 mm, Taioha'e Bay, Nuku Hiva Island, Marquesas Islands. Specimen from the Berschauer collection. **E, F =** *Pionoconus catus* (Hwass, 1792), length 34 mm, Taioha'e Bay, Nuku Hiva Island, Marquesas Islands. Specimen in the Petuch collection; for comparison with the sympatric *Pionoconus easoni*. **G, H =** *Poremskiconus tourosensis* Petuch and Berschauer, new species. Holotype, length 16.7 mm, MZSP 135606. 10-15 m depth off Touros, Rio Grande do Norte State, Brazil.

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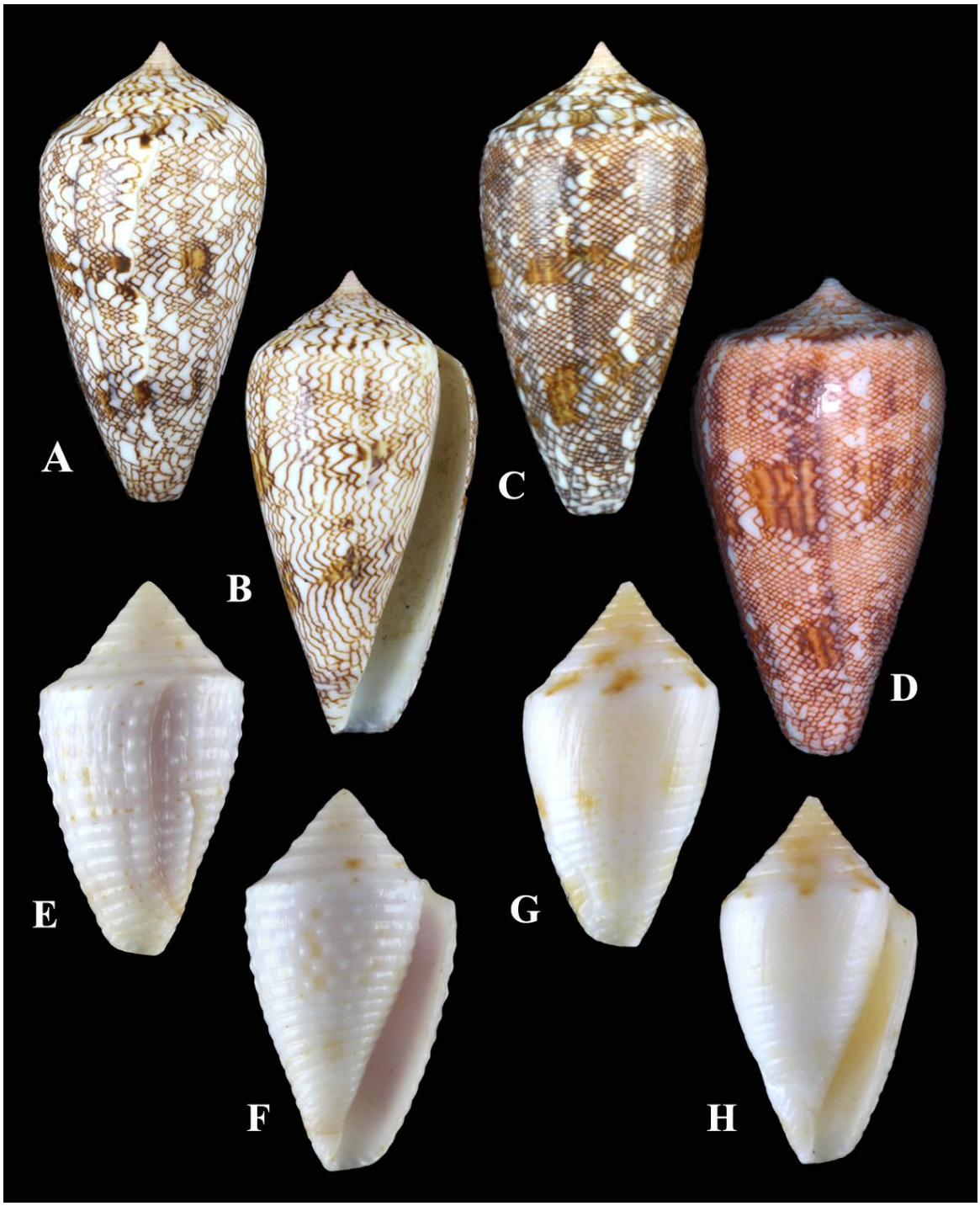

Figure 12. New Species of *Cylinder* and *Jaspidiconus*. A, B = *Cylinder abbas johnabbasi* Petuch and Berschauer, new subspecies. Holotype, length 55.0 mm, LACM 3499. Pangandaran, Java, Indonesia. **C** = *Cylinder abbas abbas* (Hwass, 1792), length 42.1 mm, Trincomalee, Sri Lanka. Specimen from the Berschauer collection, for comparison with *Cylinder abbas johnabbasi*. **D** = *Cylinder abbas abbas* (Hwass, 1792), neotype, length 60.5 mm. Trincomalee, Sri Lanka is here designated as the type locality of *Cylinder abbas* (Hwass, 1792). **E, F** = *Jaspidiconus crabosi* Petuch and Berschauer, new species. Holotype, length 20.6 mm, MZSP 135600. Ilha Boipeba, Bahia State, Brazil. **G, H** = *Jaspidiconus icapui* Petuch and Berschauer, new species. Holotype, length 15.1 mm, MZSP 135601. 30-40 m depth off Icapui, Ceara State, Brazil.

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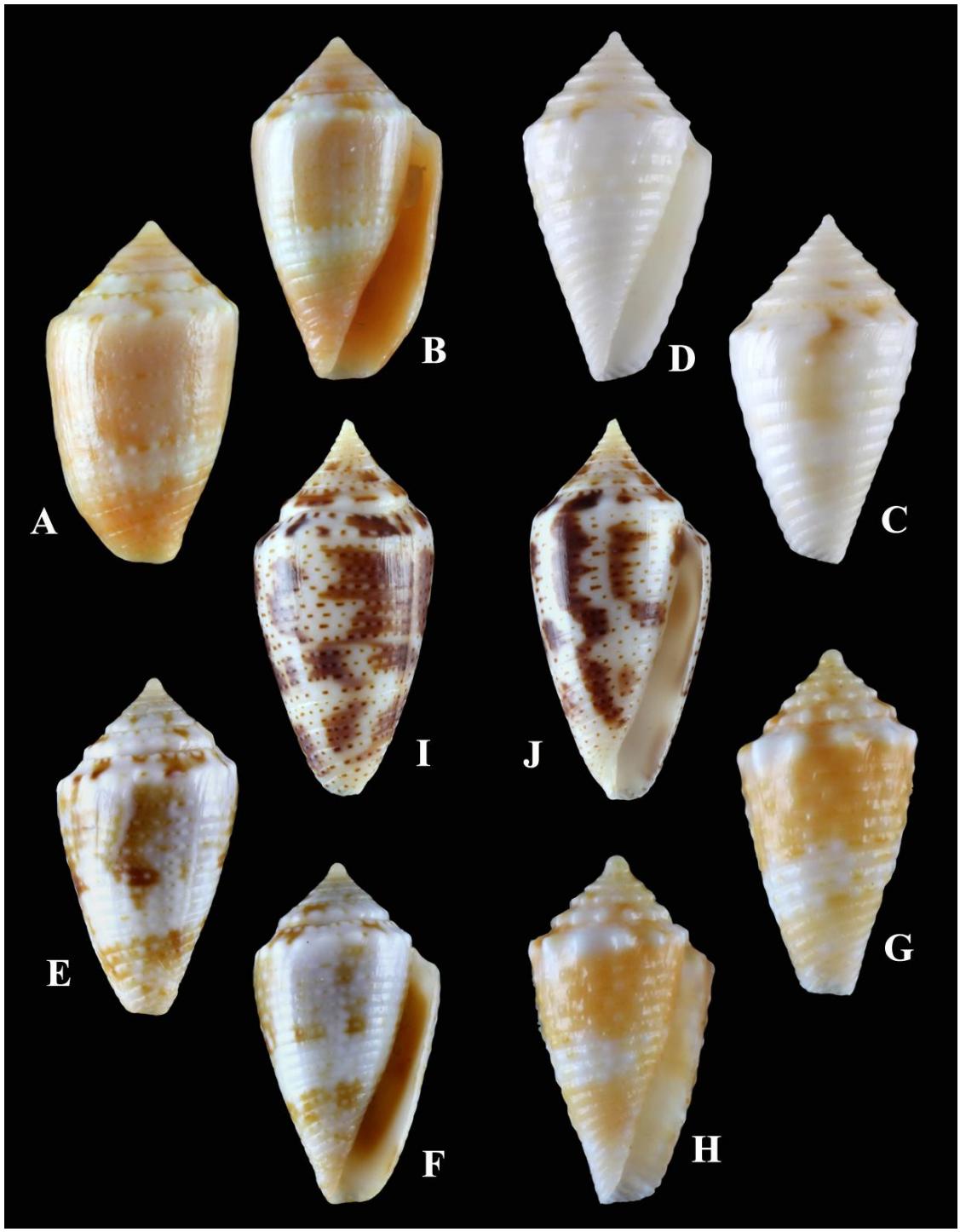

Figure 13. New Species of *Jaspidiconus* and *Coltroconus*. A, B = *Jaspidiconus itapua* Petuch and Berschauer, new species. Holotype, length 14.4 mm, MZSP 135602. Farol de Itapua, Bahia State, Brazil. **C, D =** *Jaspidiconus joanae* Petuch and Berschauer, new species. Holotype, length 16.5 mm, MZSP 135603. Rio do Fogo, Rio Grande do Norte State, Brazil. **E, F=** *Jaspidiconus keppensi* Petuch and Berschauer, new species. Holotype, length 14.9 mm, MZSP 135604. Alcobaca, Bahia State, Brazil. **G, H =** *Coltroconus bianchii* Petuch and Berschauer, new species. Holotype, length 11.2 mm, MZSP 135605. 120 m depth on Minerva Seamount, Bahia State, Brazil. **I, J =** *Ximeniconus gubernatrix* Petuch and Berschauer, new species. Holotype, length 22.3 mm, LACM 3500. On sand flats at low tide, south coast of Gobernadora Island, Gulf of Montijo, Veraguas Province, Panama.