

A Review of the Genus *Morum* (Gastropoda: Harpidae) in the Western Atlantic, with the Description of Two New Species from Brazil

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ABSTRACT Seven species of the moruminine harpid genus *Morum* (*sensu stricto*) are now known to occur within the Tropical Western Atlantic Region, with three species being restricted to the Caribbean Molluscan Province and four species being restricted to the Brazilian Molluscan Province. The Caribbean Molluscan Province contains *Morum oniscus*, *M. purpureum*, and *M. strombiforme*, while the Brazilian Molluscan Province contains *M. bayeri*, *M. berschaueri*, and two new species, *Morum damasoi* n. sp. and *Morum mariaodeteae* n. sp., which are described here.

KEY WORDS *Morum*, *Morum damasoi*, *Morum mariaodeteae*, Moruminae, Harpidae, Tropical Western Atlantic Region, Caribbean Molluscan Province, Brazilian Molluscan Province, Brazil

INTRODUCTION

The moruminine harpid genus *Morum* Röding, 1798 (*sensu stricto*) is widespread throughout the western Atlantic, ranging from Bermuda, southeastern Florida and the Florida Keys, south to southern Espirito Santo State, Brazil. Within this large biogeographical region, the *Morum* species are prominent members of their resident ecosystems and are classic indicators of shallow water tropical marine environments and coral reefs habitats. A recent comprehensive study on western Atlantic biogeography, undertaken by the senior author, has shown that this large region of tropical environments actually encompasses two molluscan faunal provinces; the Caribbean in the north and the Brazilian in the south (Petuch, 2013). The intervening Amazon River Delta acts as an ecological barrier to the molluscan faunas of the two provinces and has ensured the genetic isolation of the Caribbean and Brazilian faunas since at least the Pleistocene. Because of this, two separate and distinct *Morum* faunas have

evolved in the western Atlantic, with three species being known from the Caribbean Province and four species being known from the Brazilian Province.

Recently, the intrepid collector, explorer, and field worker, Damaso Monteiro, brought two new *Morum* species to our attention. These distinctive new harpids were collected in two relatively unexplored areas of Brazil; one from the coralline algal reefs of the northern coast, and one from the coral reef systems of the Abrolhos Platform along the south-central coast. These new species are described here and the known related Caribbean and Brazilian taxa are also discussed and illustrated as a baseline for comparison. Three other harpids are also present in the western Atlantic, but these are all members of the genus *Oniscidia* (= *Cancellomorum*) and will not be discussed in depth here along with the members of the genus *Morum sensu stricto*. The larger-shelled and more ornate genus *Oniscidia* is represented by the wide-ranging *Oniscidia dennisoni* (Reeve,

1842), which is found in both the Caribbean and Brazilian Provinces, by *Oniscidia lindae* (Petuch, 1987), which is confined to northern Colombia in the Caribbean Province, and by *Oniscidia matthewsi* (Emerson, 1967), which is confined to the northern part of the Brazilian Province.

The holotypes of the new *Morum* species are deposited in the molluscan collections of the Zoological Museum of the University of São Paulo and bear MZSP numbers. The known western Atlantic members of the harpid genus *Morum* are described below.

SYSTEMATICS

Class: Gastropoda

Subclass: Orthogastropoda

Superorder: Caenogastropoda

Order: Sorbeoconcha

Infraorder: Neogastropoda

Superfamily: Volutoidea

Family: Harpidae

Subfamily: Moruminae

Genus: *Morum* Röding, 1798

Diagnosis. Shells small for family and subfamily, roughly cone-shaped, with flattened or only slightly elevated spires; shells ornamented with variable numbers of low, rounded knobs, always arranged in spiral rows around the body whorl; apertures proportionally narrow, bordered by wide parietal shields along columellar side and by strong teeth along edge of labrum; parietal shields variable in color, ranging from white and pink to dark rose-violet, ornamented with very numerous small pustules.

Discussion. A survey of the genus *Morum* (*sensu stricto*) in the western Atlantic (taken from Petuch, 2013) has shown that there are two separate species complexes within the region, with each complex being confined to a separate molluscan faunal province. The Caribbean

Province (Bermuda and the Bahamas, south to Suriname) is now known to house a complex of three species, including *Morum oniscus* (Linnaeus, 1767), *Morum purpureum* Röding, 1798, and *Morum strombiforme* (Reeve, 1842). The Brazilian Province (the Amazon River mouth south to Cabo Frio, Rio de Janeiro State) houses a complex of four species, including *Morum bayeri* Petuch, 2001, *Morum berschaueri* Petuch and Myers, 2015, and two previously undescribed species, here named *Morum damasoii* and *Morum mariaodeteae*. These seven western Atlantic species, along with the three western Atlantic *Oniscidia* species, altogether, represent the largest fauna of the Harpidae known from any single biogeographical region in the Atlantic and Eastern Pacific Oceans. The known species of western Atlantic moruminine harpids are listed here by their resident biogeographical provinces.

CARIBBEAN MOLLUSCAN PROVINCE SPECIES

Morum oniscus (Linnaeus, 1767)
(Figure 1A, B)

Synonyms. *Cypraea conoidea* Scopoli, 1786; *Oniscia quadriseriata* Menke, 1830; *Oniscia triseriata* Menke, 1830. This species was originally named in the genus *Strombus*.

Diagnosis. Shell of average size for genus, roughly cone-shaped, with flattened spire; shoulder sharply-angled, slightly rounded, bordered with 8-10 knobs; body whorl ornamented with 4 widely-spaced rows of large rounded knobs, with one below shoulder, one around mid-body, one around anterior end, and one small row around base of siphonal canal; parietal shield proportionally large, well-developed, adherent, extending over at least half of shell base; parietal shield covered with very numerous tiny rounded pustules; labrum

thickened, smooth, with inner edge being lined by 12-14 large teeth; shell color white, covered with numerous dark brown speckles and small flammules, with largest and darkest flammules being on spire whorls; aperture and parietal shield pure white; protoconch white, projecting and mammilate, composed of 3 whorls.

Distribution. This small harpid ranges from Bermuda to southeastern Florida (Palm Beach County) and the Florida Keys, throughout the Bahamas and the entire Caribbean Sea Basin, south to the Lesser Antilles and Barbados. The species is absent from the Gulf of Mexico. The presence of *Morum oniscus* in southern Florida represents the only occurrence of this species in the Carolinian Molluscan Province (see Petuch, 2013).

Discussion. *Morum oniscus* is the most frequently-encountered moruminine harpid in the Caribbean region, being a well-known resident of most shallow water coral reef areas from Palm Beach County, Florida to Barbados. The species has been found to be especially common in the northern Caribbean and the Bahamas, and is abundant on outer islands such as the Abacos and Eleuthera. Farther south in the Caribbean area, *Morum oniscus* is less common, possibly due to competition with its sympatric congeners *M. purpureum* and *M. strombiforme*.

Morum purpureum Röding, 1798
(Figure 1E, F, G)

Synonym. *Oniscia lamarcki* Deshayes, 1844

Diagnosis. Shell of average size for genus, roughly cone-shaped, with a flattened spire; shoulder sharply-angled, bordered by 8-9 large, rounded knobs; body whorl ornamented with 3 widely-spaced rows of large rounded knobs, with one below shoulder, one around mid-body,

and one around anterior end; parietal shield proportionally large, well-developed, adherent, extending over at least half of shell base; parietal shield covered with very numerous tiny rounded pustules; labrum thickened, smooth, with inner edge being lined by 10-12 very large teeth; shell color pale tan to dark brown, covered with numerous large dark brown patches and flammules; spire whorls colored dark brown; parietal shield and labrum bright pink or deep rose-purple; protoconch pale tan, projecting and mammilate, composed of 3 whorls.

Distribution. The range of the species is known to extend from southeastern Florida (Palm Beach County), southward across the Bahamas Platforms, the entire Antillean Arc, throughout the entire Caribbean Sea Basin, and southward to Barbados. The species is absent from the Gulf of Mexico and from the island of Bermuda.

Discussion. As “*Morum oniscus purpureum*”, this taxon is the type species of the genus *Morum*. Although originally considered to be a form or subspecies of the common, widespread *M. oniscus*, *M. purpureum* can be seen to be morphologically distinct, having stronger, better-developed, and proportionally-smaller dorsal knobs, in having only three rows of knobs and not four rows as in *M. oniscus*, and in being a much more colorful shell, with dark brown spire whorls and a bright pinkish-lavender or purple parietal shield and labrum. *Morum purpureum* has a range similar to that of *M. oniscus*, but is most frequently-encountered in the southeastern Caribbean area, primarily on the Dutch Caribbean Islands of Aruba, Bonaire, and Curaçao. Very dark specimens, with intense purple parietal shields, are known from Martinique and Guadeloupe Islands.

Morum strombiforme (Reeve, 1842)
(Figure 1C, D)

Diagnosis. Shell of average size for genus, roughly cone-shaped, with elevated spire and sloping spire whorls; shoulder sharply-angled, slightly rounded, bordered with 8-10 knobs; body whorl ornamented with 4 widely-spaced rows of large rounded knobs, with one below shoulder, one around mid-body, one around anterior end, and one small row around base of siphonal canal; rows of knobs and intercalated areas ornamented with 8-10 large, raised spiral cords; parietal shield proportionally large, well-developed, adherent, extending over at least half of shell base; parietal shield covered with very numerous tiny rounded pustules; labrum thickened, smooth, with inner edge being lined by 12-14 large teeth; shell color dirty white or pale tan, covered with very numerous dark brown speckles and small flammules, with largest and darkest flammules being on spire whorls; spiral cords of body whorl marked with evenly-spaced dark brown or blackish-brown dots, giving shell a heavily mottled appearance; aperture and parietal shield pure white; protoconch white, projecting and mammilate, composed of 3 whorls.

Distribution. The range of *Morum strombiforme* extends from the eastern half of the Yucatan Peninsula of Mexico, eastward along the coasts of Honduras, Nicaragua, Costa Rica, and Panama, and also throughout the Greater Antilles and the Virgin Islands. The species is most frequently collected along the coast of Honduras and the Bay Islands of Roatan, Guanaja, and Utila. Records of *Morum strombiforme* from Brazil are based on misidentified specimens of *M. bayeri* and *M. berschaueri* and the species does not occur within the Brazilian Province.

Discussion. This uncommon species has a smaller range than does its closely-related congener, *Morum oniscus*, being most frequently-encountered in the western Caribbean region, from eastern Quintana Roo and Belize to Honduras. *Morum strombiforme* differs from *M. oniscus* in being a larger and more elongated shell with a much higher and more protracted spire and in having distinctly sloping spire whorls. *Morum strombiforme* is also a much more heavily-sculptured shell, being ornamented with numerous very strong, raised spiral cords that overlap onto the rows of rounded knobs, giving the shell a rougher appearance. While *Morum oniscus* is generally a pale-colored or white shell with scattered tiny brown dots, *Morum strombiforme* is consistently a much darker-colored shell, being covered with dense clumps of large dark brown or black dots and large amorphous dark brown flammules. In this last character, *M. strombiforme* somewhat resembles the dark-colored *M. bayeri* from Brazil, leading to the erroneous assumption that this species was also present in the Brazilian Province (discussed next).

BRAZILIAN MOLLUSCAN PROVINCE SPECIES

Morum bayeri Petuch, 2001
(Figure 2A, B)

Diagnosis. Shell of average size for genus, roughly cone-shaped, with slightly elevated spire and sloping spire whorls; rounded, bordered with 10-12 low, undulating knobs; body whorl ornamented with 4 widely-spaced rows of large rounded knobs, with one below shoulder, one around mid-body, and one around anterior end; rows of knobs and intercalated areas ornamented with numerous fine, raised spiral cords and faint grooves, giving shell a rough appearance; parietal shield proportionally

large, well-developed, adherent, extending over at least half of shell base; parietal shield covered with very numerous tiny rounded pustules; labrum thickened, smooth, with inner edge being lined by 16-18 large, elongated teeth that extend onto the base of the labrum; shell color variable, being pale yellow-tan or dark ochre yellow, densely covered with numerous large black amorphous flammules, dots, and blotches, mostly concentrated in areas between rows of knobs; flammules, extend onto spire whorls; aperture and parietal shield pure white; protoconch pale yellow-tan, projecting and mammilate, composed of 3 whorls.

Distribution. The range of the species is known to extend around the “nose” of Brazil, occurring in the States of Rio Grande do Norte, Paraibo, Pernambuco, Alagoas, and Sergipe. The species may also extend along northern Bahia State, but records from there need confirmation.

Discussion. Because of its dark-colored shell and slightly raised spire whorls, the Brazilian *Morum bayeri* has often been confused with the western Caribbean *M. strombiforme* (Figure 1E, F). The Brazilian endemic species differs from its Caribbean congener in having a stockier, more truncated, and more rounded shell outline, in having lower and less-elevated spire whorls, in having a much darker shell color, being yellow with large black flammules, and in having more numerous and better-developed labral teeth, which extend across the entire base of the labrum. Some specimens of *M. bayeri*, such as the holotype, are mostly a deep yellow-ochre color with only scattered black speckles and flammules while others are almost entirely black.

Morum berschaueri Petuch & Myers, 2015
(Figure 2C, D)

Diagnosis. Shell of large for genus, averaging 35 mm, roughly cone-shaped, with slightly elevated spire and stepped spire whorls; shoulder sharply-angled, slightly bordered with 10-11 large, prominent, pointed knobs; body whorl ornamented with 3 widely-spaced rows of large rounded knobs, with one below shoulder, one around mid-body, one around anterior end; rows of knobs and intercalated areas ornamented with numerous large, undulating, raised spiral cords, giving shell a rough appearance; parietal shield proportionally large, well-developed, adherent, extending over at least half of shell base; parietal shield covered with very numerous tiny rounded pustules; labrum thickened, smooth and shiny, with inner edge being lined by 12-14 proportionally-small teeth; shell color dirty white or pale yellow-white, covered with very numerous dark tan speckles, primarily on rows of large knobs, on large spiral cords, and on suture of spire whorls; aperture and parietal shield pure white; protoconch white, projecting and mammilate, composed of 3 whorls.

Distribution. Confirmed records of this rare shell are known only from the southern half of Espirito Santo State, Brazil, particularly in the Guarapari area. The species may extend southward into northern Rio de Janeiro State. A dwarf form, measuring only around 19 mm in length, has been collected in northern Espirito Santo State and southernmost Bahia State. Further study may show that this represents yet another new species of Brazilian *Morum*.

Discussion. *Morum berschaueri* is the largest-known member of its genus, being almost twice as large as *M. oniscus* and one-third larger than the next largest species, *M. strombiforme*. Besides its size, *M. berschaueri* differs from its

congeners in having pointed shoulder knobs that project posteriorward and produce a distinct coronated effect.

Morum damasoi Petuch & Berschauer, new
subspecies
(Figures 2E, F; 3E, F)

Description. Shell small for genus, averaging only 17.5 mm, distinctly cone-shaped, with straight sides and flattened spire whorls; shoulder sharply-angled, bordered with 9-10 small, sharp knobs; body whorl ornamented with 8 large, evenly-spaced spiral cords, with cord around anterior end being largest best-developed; large spiral cords ornamented with 8-10 small, rounded beads, giving shell surface a pebbled appearance; areas between cords heavily ornamented with numerous fine raised spiral threads; parietal shield proportionally large, well-developed, adherent, extending over at least half of shell base; parietal shield covered with very numerous tiny rounded pustules; labrum thickened, smooth, with inner edge being lined by 18-20 small teeth; shell color yellow-white, covered with very numerous black dots, speckles, and small flammules, with largest and darkest flammules being on spire whorls; black flammules arranged in longitudinal rows and often encircle rounded beads on spiral cords; aperture and parietal shield white; protoconch pale yellow, projecting and mammilate, composed of 3 whorls.

Type Material. HOLOTYPE -- length 17.5 mm, width 11.5 mm, 20 m depth off Coroa Vermelha, Abrolhos Platform, Brazil, MZSP 150893; OTHER MATERIAL EXAMINED -- length 18 mm, width 12 mm, from the same locality and depth as the holotype, in the research collection of the senior author; length 18 mm, from the same locality and depth as the holotype, in the Damaso Monteiro collection.

Type Locality. 20 m depth in coral rubble, off Coroa Vermelha, Abrolhos Platform, southern Bahia State, Brazil.

Distribution. Known only from coral reef areas on the Abrolhos Platform off southern Bahia State, south central Brazil.

Etymology. Named for Damaso Monteiro of Fortaleza, Brazil and Oporto, Portugal, who discovered this new species, and the following species, while exploring the northern and central coasts of Brazil. The taxon honors his many important contributions to Brazilian malacology.

Discussion. *Morum damasoi* is the smallest of the known western Atlantic *Morum* species and is less than half the length of its Brazilian congener, *M. berschaueri*. This new species also differs from the other six western Atlantic species in being the only one that lacks the three or four rows of large knobs on the body whorl, having instead eight large beaded cords that encircle the shell. This character, along with the flat spire and sharply-edged shoulder, readily separate *M. damasoi* from any other known *Morum* species.

Morum mariaodeteae Petuch &
Berschauer, new subspecies
(Figures 3A, B; 3C, D)

Description. Shell small for genus, averaging only 18 mm, oval in shape, with rounded sides; spire only slightly elevated; shoulder rounded, bordered with 10-11 low, flattened knobs; body whorl ornamented with 4 widely-spaced rows of large rounded knobs, with one along shoulder, one below shoulder, one around mid-body, and one around anterior end; rows of knobs and intercalated areas heavily ornamented with numerous strong raised spiral cords and threads; parietal shield proportionally large, well-

developed, adherent, extending over at least half of shell base; parietal shield white or pale pinkish-white, covered with very numerous fine rounded pustules; labrum thickened, smooth, with inner edge being lined by 15-16 small teeth, which often extend onto base of labrum; shell color pale cream-tan, covered with very numerous light brown and tan speckles and large dark brown flammules, which often arranged in longitudinal zebra-striped pattern; protoconch pink, projecting and mammilate, composed of 3 whorls.

Type Material. HOLOTYPE -- 18.5 mm, width 12 mm, in rock rubble off Camocim, Ceará State, Brazil, MZSP 150894; OTHER MATERIAL EXAMINED -- length 19 mm, from the same locality and depth as the holotype, in the research collection of the senior author; length 18 mm, from the same locality and depth as the holotype, in the research collection of the junior author; length 19 mm, from the same locality and depth as the holotype, in the Damaso Monteiro collection.

Type Locality. In coralline algal rubble, 35 m depth off Camocim, Ceará State, Brazil.

Distribution. Known only from coralline algal reefs along the States of Maranhao, Piaui, and Ceará, northern Brazil.

Etymology. Named for Maria Odete Monteiro of Oporto, Portugal, mother of Damaso Monteiro.

Discussion. Of the known northern Brazilian *Morum* species, *M. mariaodeteae* most closely resembles *M. bayeri* from northeastern Brazil, but differs in having a smaller shell with a more rounded profile, in being a lighter-colored shell that lacks any black mottling, in having light brown zebra-patterned longitudinal flammules, in having proportionally-larger and better-produced rows of knobs on the body whorl, and in having a proportionally-larger protoconch with a distinctive pink color.

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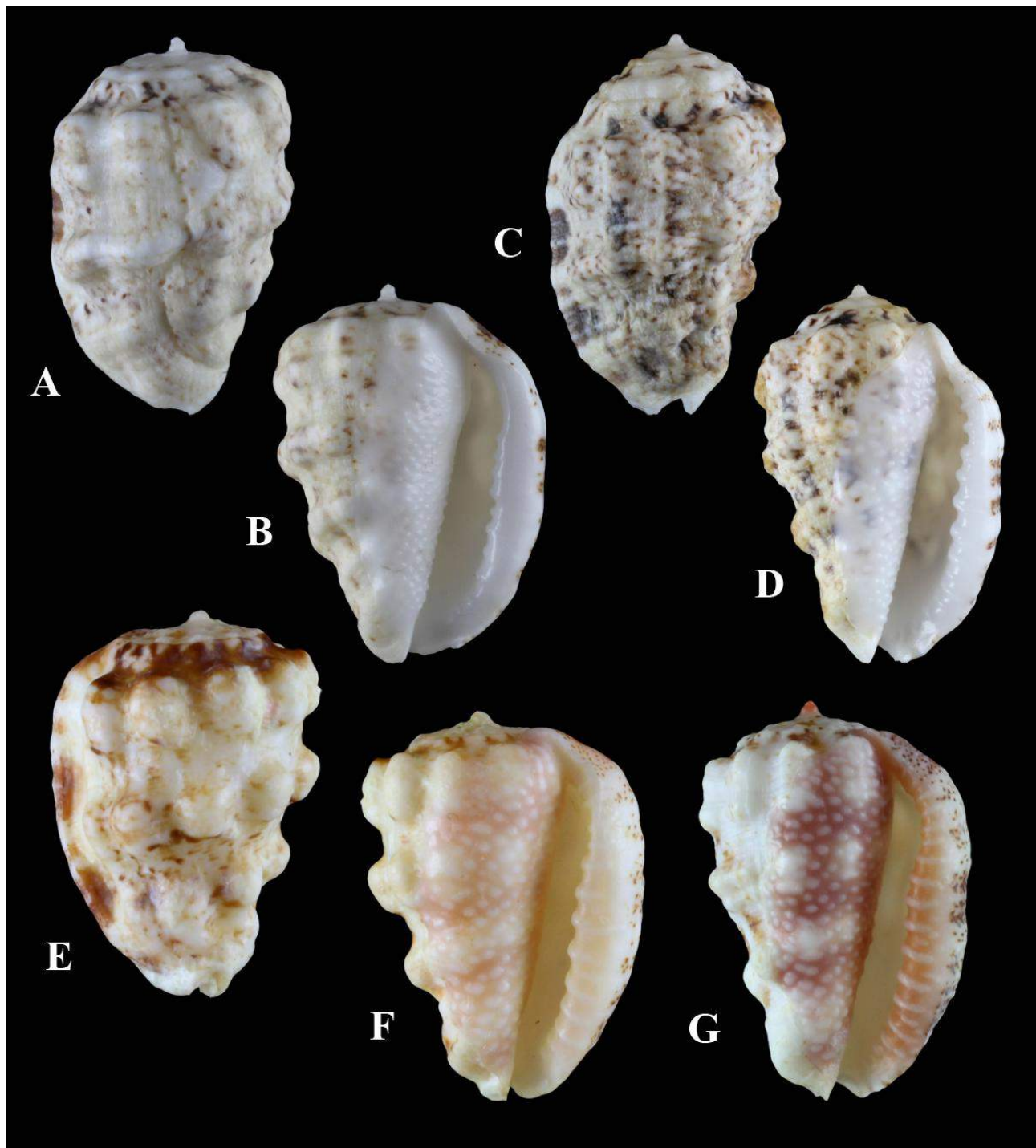


Figure 1. *Morum* Species from the Caribbean Molluscan Province.

A, B = *Morum oniscus* (Linnaeus, 1758), length 25 mm, in sand and coral rubble, 1 m depth off Cape Eleuthera, Eleuthera Island, Exuma Sound, Bahamas; **C, D** = *Morum strombiforme* (Reeve, 1842), length 28 mm, found fresh dead on the beach, Playa del Carmen, Quintana Roo State, eastern Yucatan Peninsula, Mexico; **E, F** = *Morum purpureum* Röding, 1798, length 23 mm, under coral rubble, 2 m depth off Malmok, Aruba (*Morum lamarcki* (Deshayes, 1844) is a synonym); **G** = *Morum purpureum* Röding, 1798, length 24 mm, under coral rubble, 9-12 m, Curaçao.

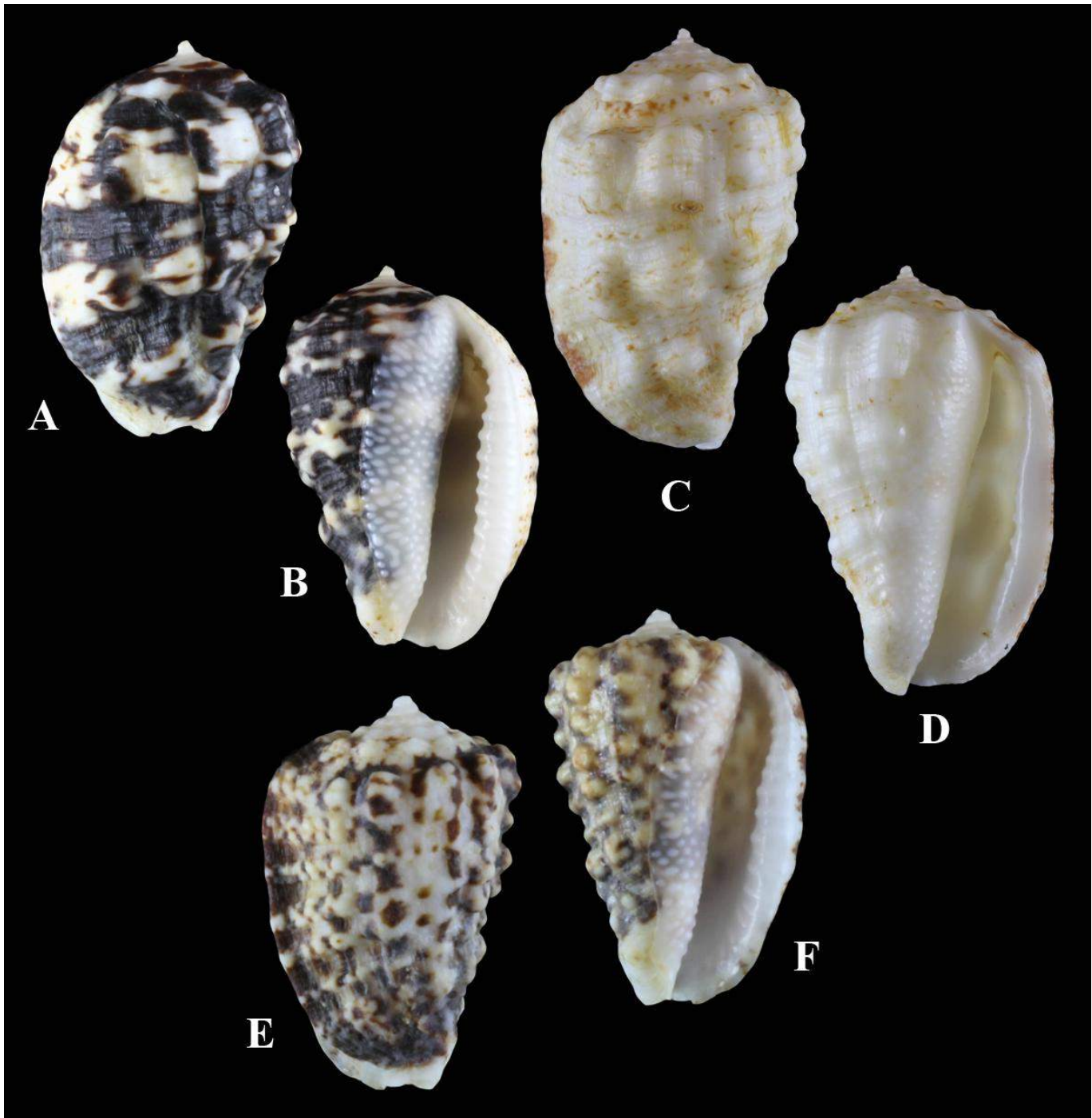


Figure 2. *Morum* Species from the Brazilian Molluscan Province.

A, B = *Morum bayeri* Petuch, 2001, length 23 mm, in coralline algae, 3 m depth off Rio do Fogo, Rio Grande do Norte State, Brazil; **C, D** = *Morum berschaueri* Petuch and Myers, 2015, length 36 mm, dredged from 20 m depth in the Guarapari Channel, Guarapari, Espírito Santo State, Brazil; **E, F** = *Morum damasoi* Petuch and Berschauer, new species, holotype, length 17.5 mm, in coral rubble, 20 m depth off Coroa Vermelha, Abrolhos Platform, southern Bahia State, Brazil.

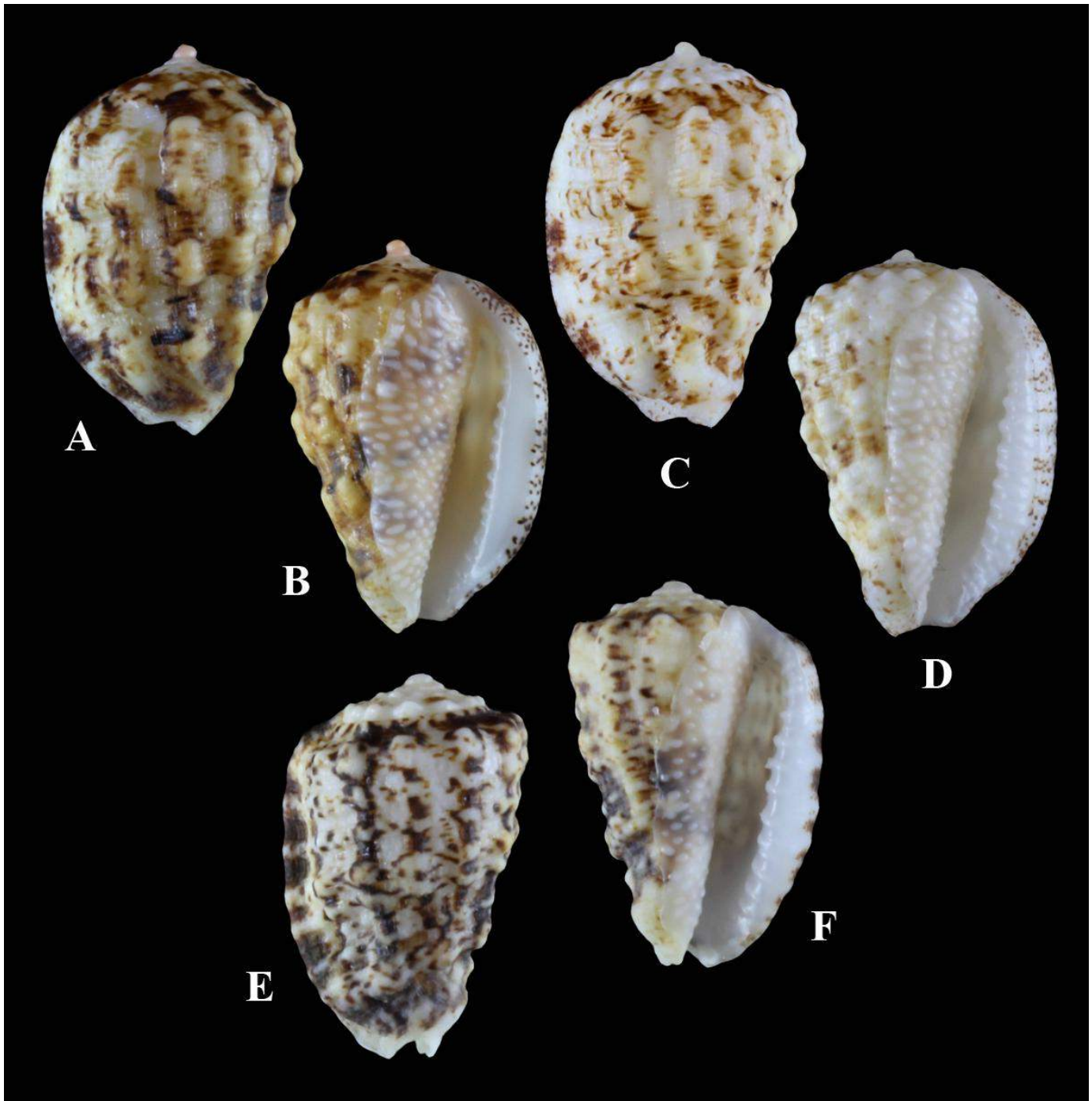


Figure 3. New *Morum* Species from the Brazilian Molluscan Province.

A, B = *Morum mariaodeteae* Petuch and Berschauer, new species, holotype, length 18.5 mm, found in coralline algal rubble, 35 m depth off Camocim, Ceará State, Brazil; **C, D** = *Morum mariaodeteae* Petuch and Berschauer, new species, length 18 mm, in coralline algal rubble, 35 m depth off Camocim, Ceará State, Brazil (Berschauer Collection); **E, F** = *Morum damasoi* Petuch and Berschauer, new species, length 18 mm, in coral rubble, 20 m depth off Coroa Vermelha, Abrolhos Platform, southern Bahia State, Brazil (Petuch Collection).