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New Gastropods from the Tortuga Terrace, Dry Tortugas, Florida

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ABSTRACT Recent collecting on the Tortuga Terrace, south of the Dry Tortugas Islands, has yielded several large new species of gastropods, including *Chicoreus riverai* Petuch and Berschauer, new species (Muricidae), *Fasciolaria riverai* Petuch and Berschauer, new species (Fasciolariidae), and *Scaphella mercedesae* Petuch and Berschauer, new species (Volutidae). These additions to the Gulf of Mexico molluscan fauna are described here and the importance of the Tortuga Terrace as an evolutionary "Hot Spot" is discussed. Sanibel Island, Lee County, Florida" is designated as the type locality for *Fasciolaria tulipa* which had no official stated type locality.

KEY WORDS Gastropoda, Muricidae, Fasciolariidae, Volutidae, *Chicoreus*, *Fasciolaria*, *Scaphella*, *Chicoreus riverai*, *Fasciolaria riverai*, *Scaphella mercedesae*, Dry Tortugas, Florida Keys, Gulf of Mexico, Tortuga Terrace

INTRODUCTION

Although numerous new gastropods, including those in major families such as the Fasciolariidae, Muricidae, and Volutidae, have been described from the Gulf of Mexico over the past several years (shown in Petuch and Berschauer, 2025), ongoing collecting and research has led to the discovery of additional new species. As various deep-water areas around the Florida Keys are explored, entire new faunas are being brought to light, some containing large numbers of distinctive endemic taxa. One area of particular interest is the extreme southwestern edge of the West Florida Shelf, south of the Dry Tortugas Islands and the Tortugas Bank, which drops abruptly, at a steep angle, into the Straits of Florida. In the area directly south of Garden Island and the Tortugas Bank, the seafloor plunges from shallow depths (0-20 m) to depths of 100-200 m in just a few kilometers, which effectively isolates the shallow water shelf species and the deeper water marine communities both genetically and physically.

This steep bathymetric profile culminates in the deep-water Tortuga Terrace, a steplike feature that parallels the Florida Coral Reef Tract and Straits of Florida and is a western extension of the Florida Terrace (Figure 1). Captain Randy Rivera, a prominent Key West lobster fisherman, has set baited traps on this previously unexplored submarine terrace and has collected numerous new and unusual species from the 100 m depth range. Three of these, including a new *Chicoreus* (Muricidae), a new *Fasciolaria* (Fasciolariidae), and a new *Scaphella* (Volutidae), are described in the following sections. These bathymetrically-isolated endemic taxa, along with many others shown in Petuch and Berschauer (2025), indicate that the Tortuga Terrace area represents an evolutionary "Hot Spot" at the extreme southwestern edge of the Florida Keys and Western Florida Shelf. The holotypes of

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these three new gastropods are deposited in the molluscan collections of the Santa Barabara Museum of Natural History, Santa Barbara, California and bear SBMNH catalog numbers. These new Tortuga Terrace gastropods are described here.

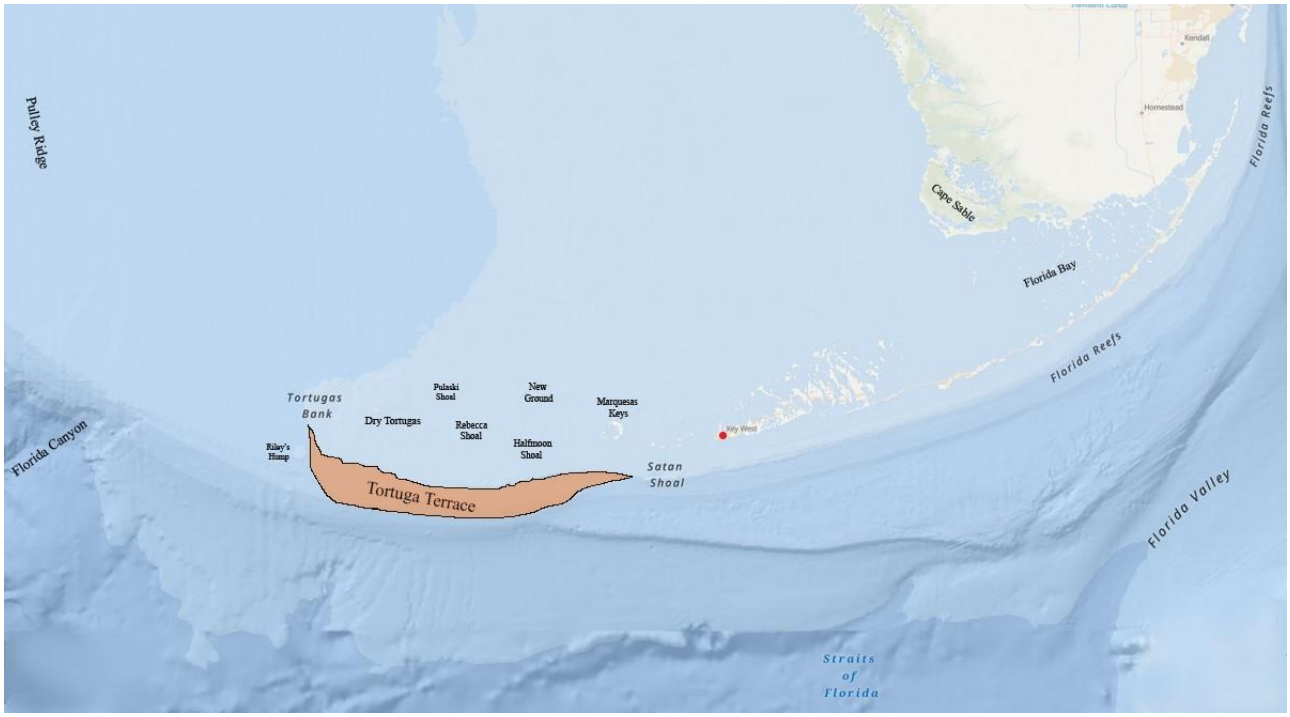

Figure 1. Map of the Dry Tortugas and southwestern edge of the West Florida Shelf, showing the Tortuga Terrace. This narrow deep-water shelf (orange color on the map) houses an unusually-rich molluscan fauna containing many new endemic species, three of which are described and illustrated in this paper. Key West is designated on the map for reference by the red circle.

SYSTEMATICS

Class	Gastropoda Cuvier, 1795
Subclass	Sorbeoconcha Ponder and Lindberg, 1997
Order	Prosobranchia Milne-Edwards, 1848
Infraorder	Neogastropoda Wenz, 1938
Superfamily	Muricoidea Rafinesque, 1815
Family	Muricidae Rafinesque, 1815
Subfamily	Muricinae Rafinesque, 1815
Genus	*Chicoreus* Montfort, 1810

Chicoreus riverai Petuch and Berschauer, new species
(Plate 1, Figures A-D)

Description. Shell small for genus, averaging 42 mm in length, with rounded, inflated body whorl and narrow, protracted spire; 3 rounded varices per whorl, with each varix bearing 6 flattened, closely-packed frondose spines; varical spine at shoulder largest and best-developed, projecting outward from shell body at acute angle; shoulder angled; body whorl between varices heavily ornamented with 6 very thin, prominent cords that align with frondose spines on varices; 2 large prominent riblike knobs present within intravarical areas; siphonal canal proportionally short, ornamented with 4 large, flattened frondose spines, with very small fifth spine present at anteriormost end of canal; aperture broadly oval, nearly circular, white within interior; base

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color of body whorl and penultimate spire whorls white or pale yellow-white, overlaid with broad longitudinal bands and stripes of darker tan-brown; thin dark brown band present along edge of previous varix; frondose varical spines and siphonal canal white or pale pinkish-white; protoconch and first 4 postnuclear whorls colored bright red-orange or deep cherry-red; protoconch proportionally large, rounded and globose, composed of 2 whorls.

Type Material. HOLOTYPE - length 43 mm, width 27 mm, from 100 m depth on the Tortuga Terrace, south of Garden Island, Dry Tortugas, SBMNH 235886; PARATYPES - length 43 mm, width 28 mm, same locality and depth as the holotype, in the research collection of the junior author; length 41 mm, width 25 mm, same locality and depth as the holotype, in the research collection of the senior author.

Type Locality. The type lot was collected in a baited lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe County, on the Tortuga Terrace, Florida.

Range. At present, known only from 90-150 m depths on the Tortuga Terrace, south of the Dry Tortugas, Florida.

Etymology. Named for Captain Randy Rivera, skipper of the lobster boat "*Ava Pilar*", Key West, Florida, who discovered the new Tortuga Terrance fauna and who generously donated the type specimens.

Discussion. Of the known Gulf of Mexico *Chicoreus* species, the new deep water Tortuga Terrace species is most similar to the shallow water *Chicoreus dilectus* (A. Adams, 1855), which inhabits Turtle Grass beds throughout the Florida Keys and the entire Carolinian Molluscan Province (Plate 1, Figures G, H). Although superficially similar, the Tortuga Terrace *C. riverai* differs from its widespread congener in being a smaller shell, averaging only 42 mm, as opposed to the 60 mm average length for *C. dilectus*. When comparing the shell profiles, the new species is a stockier and broader shell, being proportionally wider across the shoulder and is also much less elongated, having a proportionally shorter siphonal canal and lower spire. The angle of the varices of *C. riverai* are also more acute than that of *C. dilectus*, tapering rapidly to the siphonal region and producing a much larger frilled spine at the posterior end of each varix. This large posterior varical spine is larger than the other varical spines and projects farther away from the body whorl, giving the shell a distinctly wider appearance. The intervarical ribs on the new species are also proportionally much thinner and more delicate than those of *C. dilectus*, which typically has thicker and coarser ribs around the body whorl.

The most obvious difference between the two *Chicoreus* species is seen in the color of the protoconch and early whorls; in *C. riverai*, they are deep red-orange or cherry-red, while those of *C. dilectus* are a very pale tan or orangish-tan. In having the bright red protoconch and early whorls the new Tortuga Terrace species is also similar to the eastern Gulf of Mexico *C. rachelcarsonae* Petuch, 1987 (Plate 1, Figures E, F), which shares the vivid red coloring. The two species differ from each other in the number and development of the frondose varical spines; in *C. riverai*, there are 6 closely packed narrow spines, while in *C. rachelcarsonae*, there are 5 frondose spines which are proportionally more widely separated from each other. On the Tortuga Terrace, the two sibling species are occasionally collected together, but *C. rachelcarsonae* has a much wider range, being found throughout the eastern and northern Gulf of Mexico. *Chicoreus riverai*, on the other hand, appears to be endemic to the area of the Tortuga Terrace and Dry Tortugas.

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Superfamily Buccinoidea Rafinesque, 1815
Family Fasciolariidae Gray, 1853
Subfamily Fasciolariinae Gray, 1853
Genus *Fasciolaria* Lamarck, 1799

Fasciolaria riverai Petuch and Berschauer, new species
(Plate 2, Figures A-D)

Description. Shell very large for its genus, averaging around 235 mm in length, with some specimens exceeding 270 mm, thin and delicate, very elongated with narrow fusiform body whorl; spire very elevated, elongate and protracted, equal in length to body whorl; shell shiny and polished, especially on ventral side of shell; suture of whorls ornamented with 2 or 3 very large, prominent beaded cords; area immediately adjacent to suture cords with single smaller cord and 2 deeply-incised spiral grooves; siphonal canal elongated, proportionally narrow and slender; shoulders of whorls rounded, sloping, and almost obsolete; aperture proportionally large, broadly oval and flaring; spire whorls and body whorl base color dark blood red or reddish-brown with scattered small patches and amorphous flammules of pink or pinkish-tan; body whorl with 2 wide bands of pink or pinkish-tan, one just posterior to mid-body and other anterior of mid-body; spire whorls with one band around mid-body of each whorl; red and pink base color of body whorl overlaid with 25-28 thin, evenly-spaced dark brown lines; smaller secondary lines sometimes present between pair of primary lines; large beaded cords around suture area marked with evenly-spaced alternating red and white checkers; siphonal canal ornamented with 23-27 large raised cords; siphonal canal colored dark brown, with raised cords being dark red or reddish-brown; columellar fasciole bright orange; interior of aperture pale orange-white with large longitudinal bands of pale orange; sculptured with very numerous fine, closely-packed ribs; edge of aperture marked with numerous black toothlike serrations, with each corresponding to individual dark brown lines; protoconch and first 3 postnuclear whorls dark orange-brown in color, sculptured with numerous very fine spiral threads; protoconch proportionally large, bulbous, composed of one and one-half whorls

Type Material. HOLOTYPE - length 218 mm, width 77 mm, from 100 m depth on the Tortuga Terrace, south of Garden Island, Dry Tortugas, SBMNH 235885; PARATYPES - length 231 mm, width 79 mm, from the same locality and depth as the holotype, in the research collection of the junior author; length 250 mm, width 90 mm, from the same locality and depth as the holotype, in the collection of the senior author.

Type Locality. Collected in a baited lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe County, on the Tortuga Terrace, Florida.

Range. At present known only from 90-150 m depths on the Tortuga Terrace, south of the Dry Tortugas, Florida.

Etymology. Named for Captain Randy Rivera, skipper of the lobster boat "*Ava Pilar*", Key West, Florida, who discovered the new Tortuga Terrance fauna and who generously donated the type specimens.

Discussion. With the discovery of *Fasciolaria riverai*, the Gulf of Mexico is now known to house 6 species of True Tulip Shells of the genus *Fasciolaria* (s.s.). These include: 1. *Fasciolaria bullisi* Lyons, 1972 (deep water throughout the Gulf of Mexico basin); 2. *F. bittneri* Petuch and Berschauer, 2023 (Florida Keys); 3. *F. riverai* Petuch and Berschauer, new species (Tortuga Terrace, Dry Tortugas), 4. *F. haleyi* Petuch and Berschauer, 2023 (Yucatan, Mexico); 5. *F. ixchel* Petuch and Berschauer, 2024 (Isla Mujeres and Contoy, Yucatan, Mexico); and 6. the widespread Caribbean-Gulf of Mexico *F. tulipa* (Linnaeus,

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1758) (Plate 4). With the exception of the new species, all of these are illustrated and discussed in Petuch and Berschauer, 2025.

Of these, the new species is most similar to the widespread deep water (200-300 m depths) *Fasciolaria bullisi* (Plate 2, Figure F), especially in having a similar large size, and in having a very elongated body whorl and with high, elevated spire whorls and a long, narrow siphonal canal. Although similar in overall general morphology, *Fasciolaria riverai* differs from the deep-water *F. bullisi* in having an intense blood red base shell color, larger size, and in having the two or 3 large, beaded cords and incised sulci around the sutural area. Large specimens of the shallow water *Fasciolaria tulipa* may superficially resemble *F. riverai*, especially large, red-colored individuals (Plate 2, Figure E). The extremely high and protracted spire of *F. riverai*, along with its slenderer shell shape, high polish, lack of ribbed sculpture on the body whorl, and light-weight delicate shell, readily separates the two congeneric species. Since *Fasciolaria tulipa* had no official stated type locality, we here designate "Sanibel Island, Lee County, Florida" as the type locality, based upon the specimen illustrated here.

Superfamily	Volutoidea Rafinesque, 1815
Family	Volutidae Rafinesque, 1815
Subfamily	Scaphellinae Rafinesque, 1815
Genus	*Scaphella* Swainson, 1832

Scaphella mercedesae Petuch and Berschauer, new species
(Plate 3, Figures A-D)

Description. Shell of normal size for genus, averaging 110 mm in length, smooth and polished, with 6-10 low, very faint cords and fine spiral threads around anterior end of body whorl; shell proportionally narrow and elongated, with rounded, very sloping shoulder and straight sides; spire elevated and protracted; shell base color white, overlaid with 11-13 rows of evenly-spaced dark brown rounded rectangles arranged in checkered pattern; 2 rows of elongated rounded rectangle along subsutural area often fuse into single row of large, elongated rectangles; aperture uniformly narrow; interior of aperture pale yellow-orange; columella with 4 large, evenly-spaced pale orange folds; fasciole and anterior tip dark orange; protoconch large, bulbous and rounded, projecting posteriorly, colored dark orange-brown; first postnuclear whorl sculptured with 25-28 thin longitudinal ribs and 8-10 thin spiral cords.

Type Material. HOLOTYPE - length 119 mm, width 43 mm, SBMNH 235887; PARATYPES - length 114 mm, width 40 mm, same locality and depth as the holotype, in the research collection of the junior author; length 118 mm, width 43 mm, same locality and depth as the holotype, in the research collection of the senior author.

Type Locality. Collected in a baited lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe County, on the Tortuga Terrace, Florida.

Range. At present known only from 90-150 m depths on the Tortuga Terrace, south of the Dry Tortugas, Florida.

Etymology. Named for Mercedes Rojas Hernandez of Miami, Florida, mother of Capt. Randy Rivera.

Discussion. This new Tortuga Terrace volute represents an isolated bathymetric species that occurs in much deeper water than the shallow water *Scaphella elizabethae*. This genetic isolation has led to the development of several shell characters that have diverged from the morphology of its closest congener, *Scaphella elizabethae*. Classic *S. elizabethae*, (as described and illustrated by Petuch and Sargent, 2011: 63, 149), which lives in 10-20 m depths around the Dry Tortugas (Plate 3, Figures E, F),

has a pale yellow or yellow-white base color, which is overlaid with 10-12 widely-spaced oval or slightly rectangular reddish brown spots. *Scaphella mercedesae* (Plate 3, Figures A-D) is quite different in color and color pattern, typically having a white base color with 11-13 rows of dark brown or blackish-brown that are much more closely packed together. The shallow water *elizabethae* has an inflated body whorl and a distinctly angled shoulder, while *mercedesae* is a far more slender and elongated shell with straight sides and no distinct shoulder development on the body whorl.

The spire whorls of the new species are also much more elevated and protracted than the spire whorls of the shallow water species *elizabethae*, which more closely resemble the lower spired morphology seen on *S. junonia* (Lamarck, 1822) from western Florida (ranging from the Ten Thousand Islands to Cedar Key; Petuch and Berschauer, 2025). The most distinctive difference between the two species is seen in the shape and size of the protoconchs: in *elizabethae*, the protoconch is proportionally low, rounded, and dome-shaped, essentially adherent to the first postnuclear whorl; in *mercedesae* the protoconch is proportionally larger and distinctly rounded and knob-shaped, protruding well beyond the first postnuclear whorl (Plate 5, Figures G and H). The postnuclear sculpture of *mercedesae* is also much finer than that seen on the shallow water *elizabethae*, approaching that seen on the Yucatan Peninsula species *S. stimpsonorum* Cossignani and Allary, 2019 (Petuch and Berschauer, 2025 for a review of the Yucatan Peninsula volute species).

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We thank Captain Randy Rivera, of Key West, Florida, for the donation of the type specimens of the new *Chicoreus* and *Fasciolaria* species and the new *Scaphella* species and for his invaluable help with our research on the Tortuga Terrace malacofauna. We also thank Douglas Shelton for sharing macrophotos of *Scaphella stimpsonorum.*

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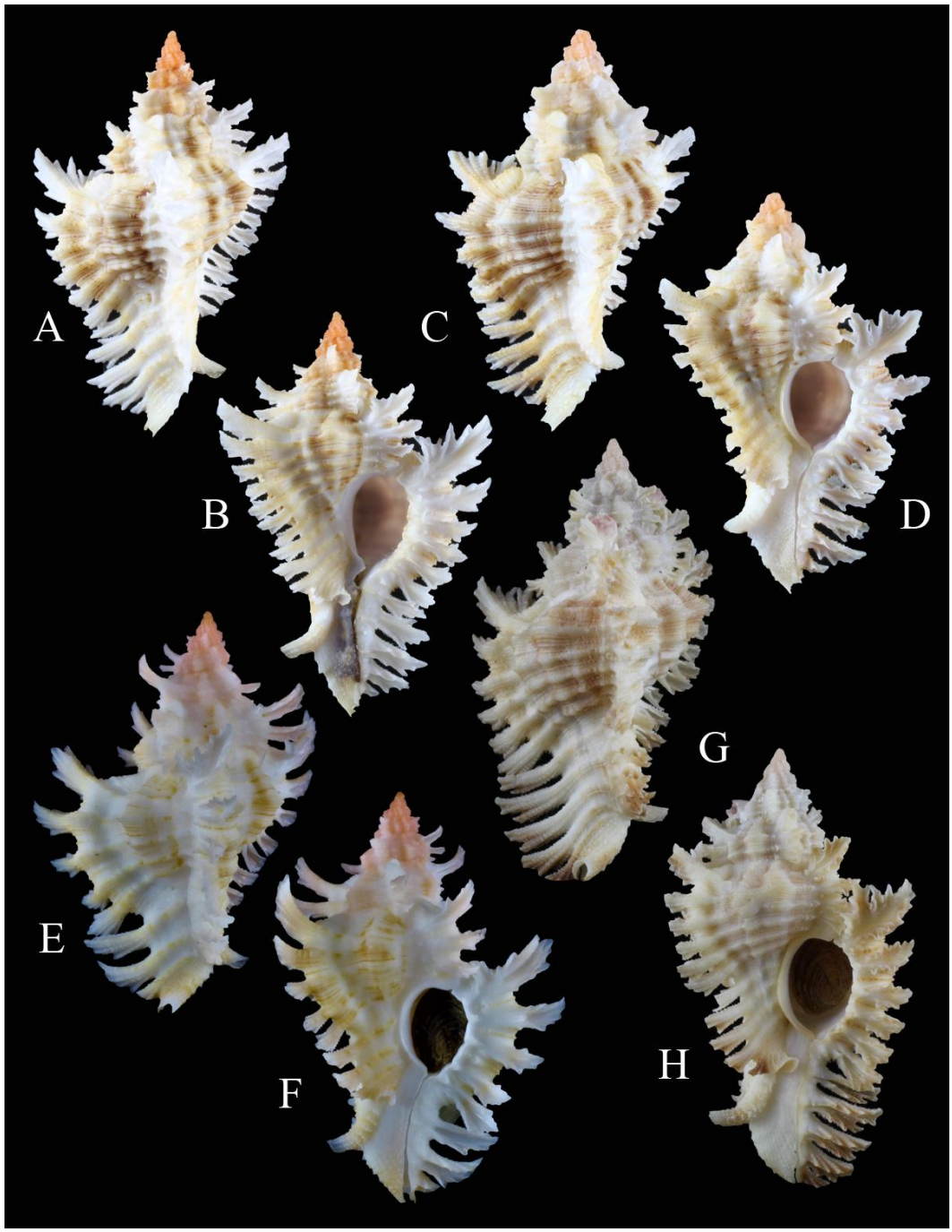

Plate 1. *Chicoreus* muricids from the eastern Gulf of Mexico.
A, B= *Chicoreus riverai* Petuch and Berschauer, new species, holotype, length 42 mm, from a lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe County, Florida; **C, D=** *Chicoreus riverai* Petuch and Berschauer, new species, paratype, length 41 mm, from a lobster trap set in 100 m depth off Garden Key, Dry Tortugas, Monroe County, Florida (Berschauer research collection); **E, F=** *Chicoreus rachelcarsonae* Petuch, 1987, length 40 mm, dredged from coralline algal beds in 150 m depth west of Tampa, Florida (illustrated for comparison with *Chicoreus riverai*); **G, H=** *Chicoreus dilectus* (A.Adams, 1855), length 51 mm, in Turtle Grass, 1 m depth off Rabbit Key, Ten Thousand Islands, Monroe County, Florida (illustrated for comparison with *Chicoreus riverai*).

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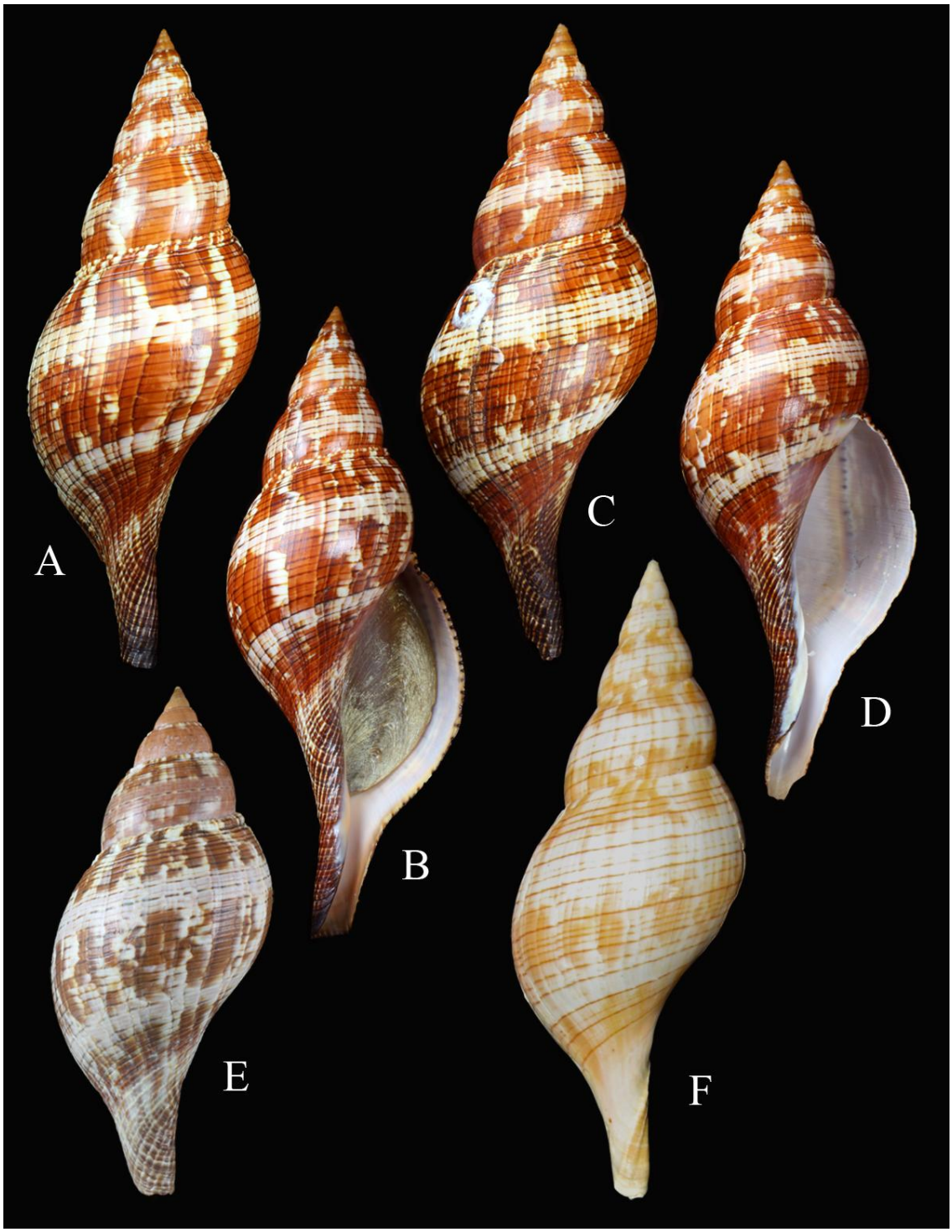

Plate 2. *Fasciolaria* species from the eastern Gulf of Mexico.
A, B= *Fasciolaria riverai* new species, holotype, length 220 mm, from a lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe County, Florida; **C, D=** *Fasciolaria riverai* new species, paratype (Berschauer research collection), 226 mm, from a lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe County, Florida; **E=** *Fasciolaria tulipa* (Linnaeus, 1758), length 124.4 mm, low tide at Sanibel Island, Lee County, Florida; **F=** *Fasciolaria bullisi* Lyons, 1972, length 159 mm, dredged from 250 m depth off Quintana Roo State, Yucatan Peninsula, Mexico.

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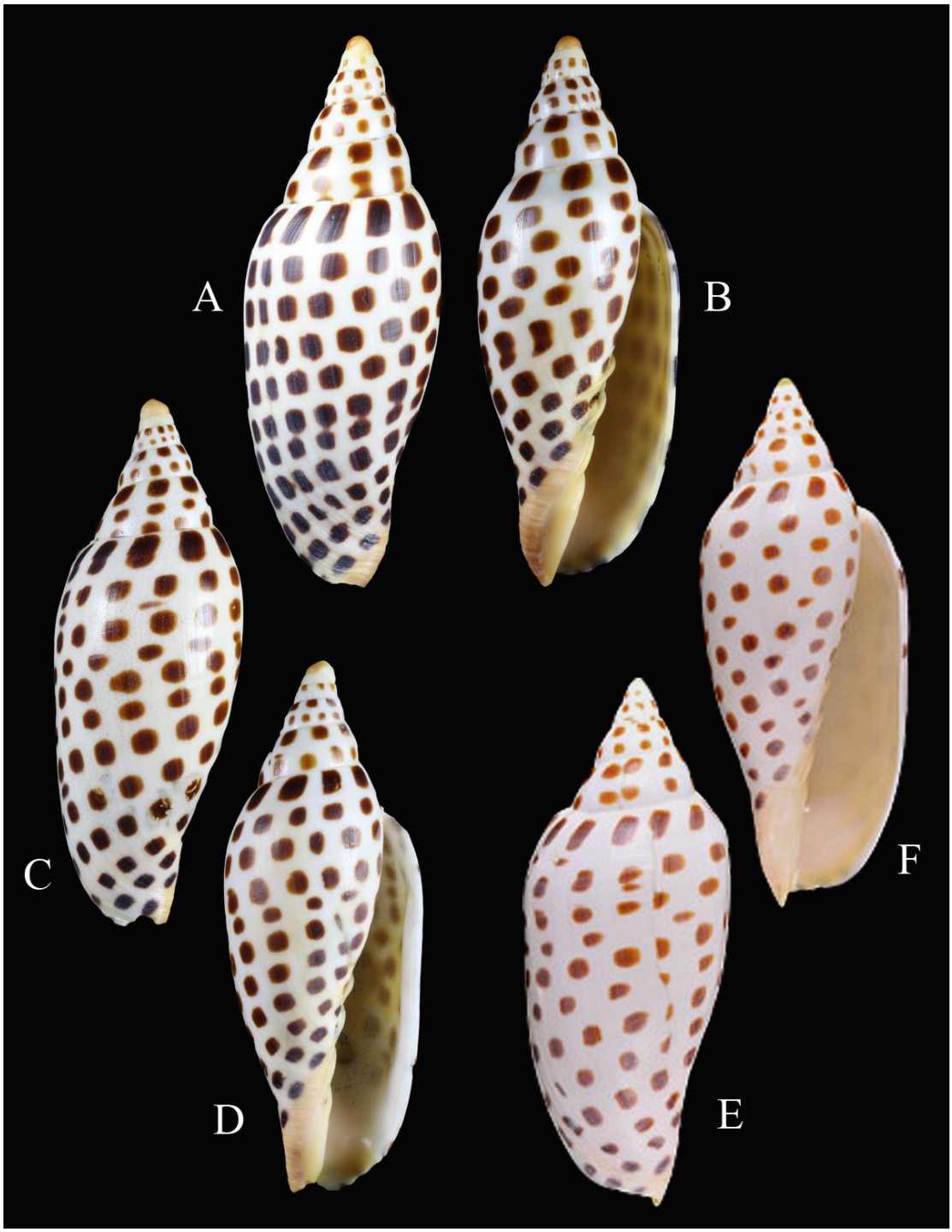

Plate 3. *Scaphella* species from the eastern Gulf of Mexico.
A, B= *Scaphella mercedesae* Petuch and Berschauer, new species, holotype, length 119 mm, from a lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe, Florida; **C, D=** *Scaphella mercedesae* Petuch and Berschauer, new species, paratype (Berschauer research collection), length 114 mm, from a lobster trap set in 100 m depth southwest of Garden Key, Dry Tortugas, Monroe, Florida; **E, F=** *Scaphella elizabethae* Petuch and Sargent, 2011, holotype, length 106.8 mm, 7 m depth northwest of Garden Key, Dry Tortugas, Monroe County, Florida, USNM 1152529, National Museum of Natural History, Smithsonian Institution, Washington, D.C. (illustrated for comparison with the new bathymetric species).

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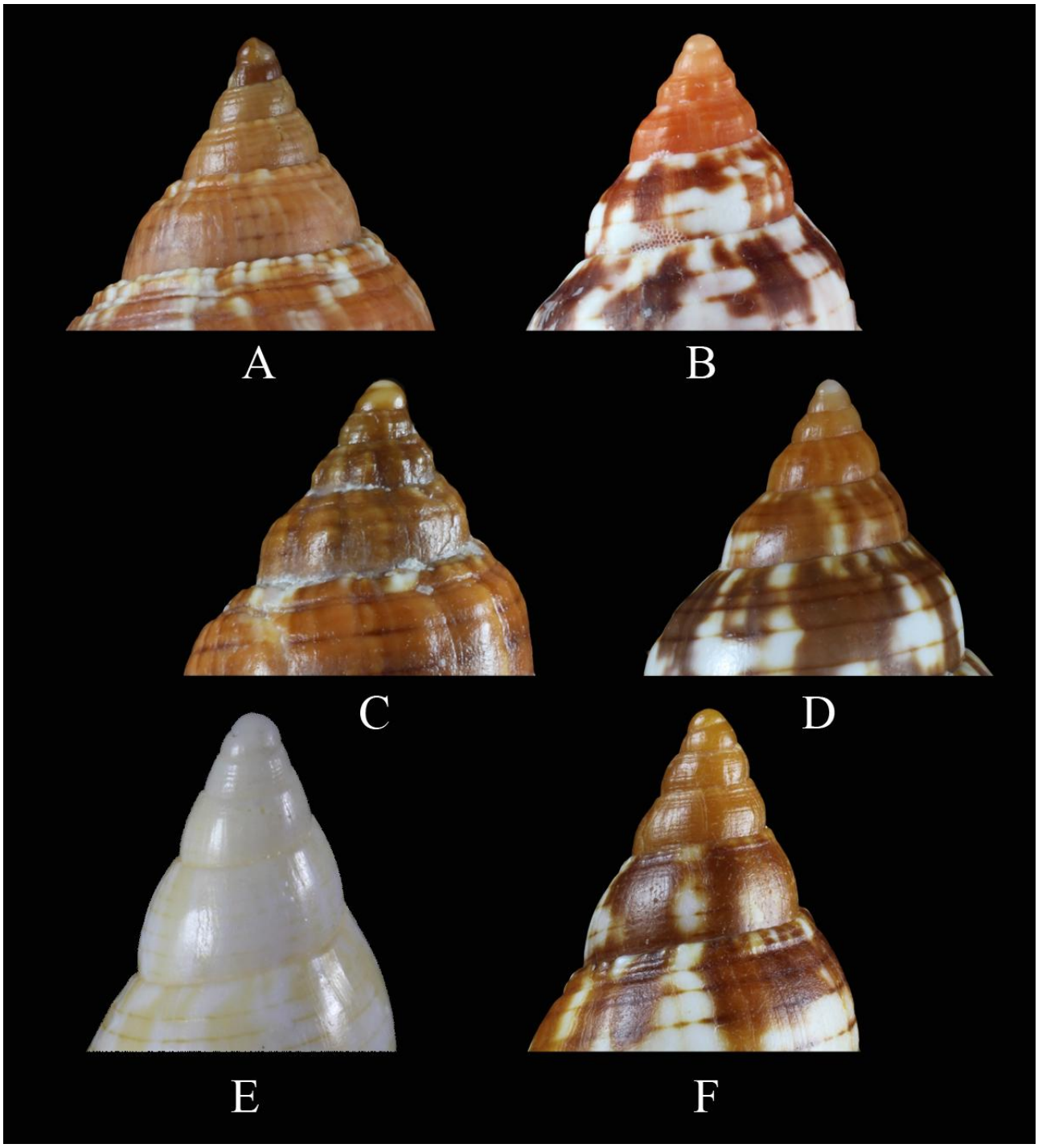

Plate 4. Comparison of *Fasciolaria* protoconchs.
A= *Fasciolaria tulipa*, from Turtle Key, Ten Thousand Islands; **B=** *Fasciolaria bittneri*, from the Dry Tortugas; **C=** *Fasciolaria ixchel*, from Isla Mujeres, Yucatan; **D=** *Fasciolaria haleyi*, from off Contoy Light, Yucatan; **E=** *Fasciolaria bullisi*, from eastern Yucatan; **F=** *Fasciolaria riverai* from Tortuga Terracce (protoconch of holotype). These Gulf endemic sibling species all have very different protoconch structures and early whorl sculpture patterns and form a remarkable evolutionary radiation that has only recently been recognized (see Petuch and Berschauer, 2024).

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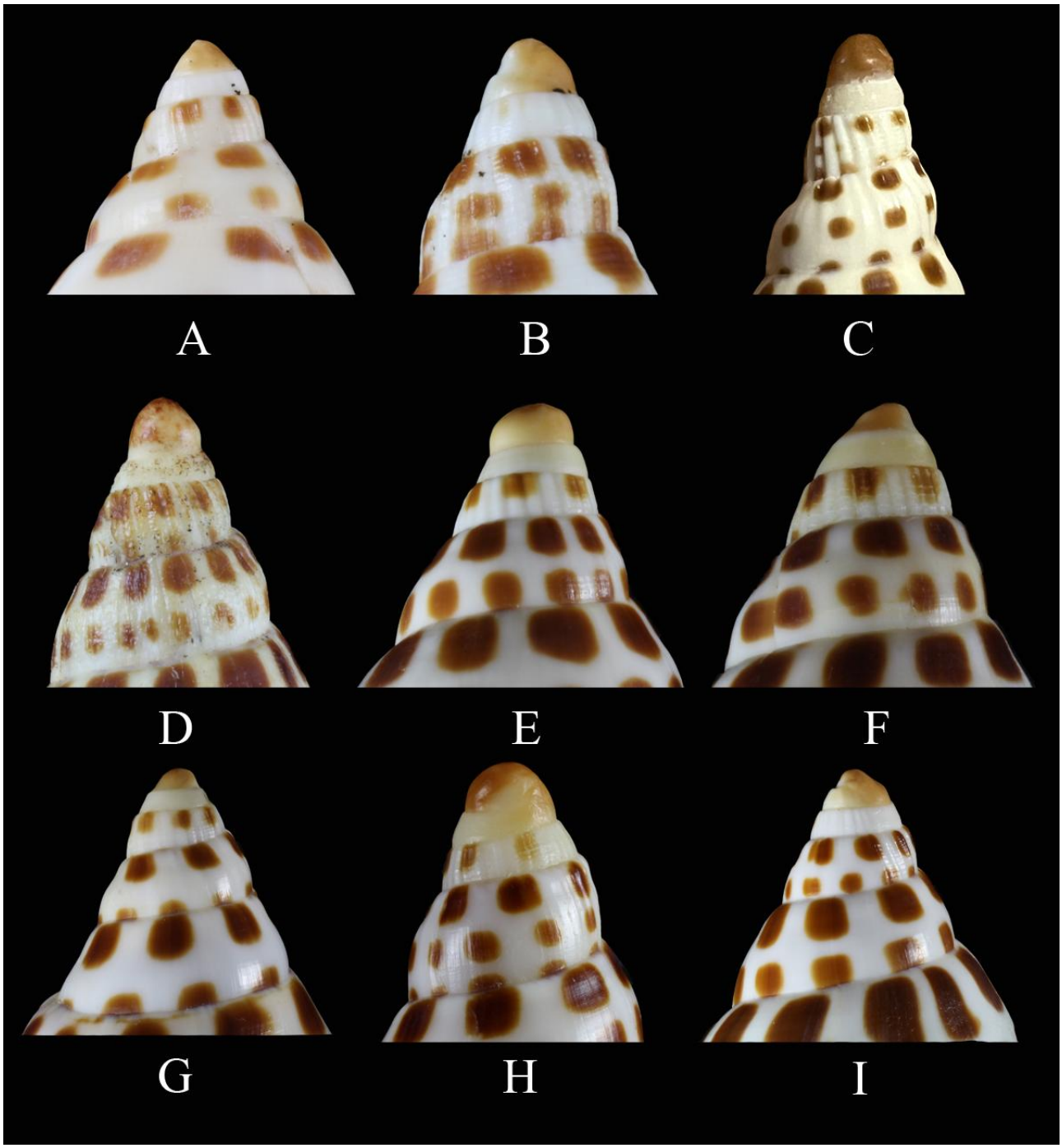

Plate 5. Comparison of *Scaphella* protoconchs.
A= *Scaphella butleri* from Campeche Bank, Yucatan, Mexico; **B=** *Scaphella curryi* from Vera Cruz, Mexico; **C=** *Scaphella stimpsonorum* Cossignani & Allary, 2019 from off Isla Contoy, Quintana Roo, Mexico; **D=** *Scaphella johnstonae* from off Mobile Bay, Alabama; **E=** *Scaphella junonia* from Marco Island, Florida; **F=** *Scaphella sheltoni* from Cape Canaveral, Florida; **G=** *Scaphella glicksteinorum* from Big Pine Key, Florida; **H=** *Scaphella mercedesae* from Tortuga Terrace, Florida; **I=** *Scaphella elizabethae* from Dry Tortugas, Florida.