

Three new deep-water species of mollusks (Gastropoda: Calliostomatidae, Cystiscidae) from the southeastern Gulf of Mexico

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ABSTRACT. Three new gastropod species from deep-water, southeastern Gulf of Mexico are described: *Calliostoma frumari* in the family Calliostomatidae; and *Canalispira kerni* and *C. lipei* in the family Cystiscidae. They are compared with their congeners.

INTRODUCTION

Deep-water dredgings in the Gulf of Mexico have brought to light a number of new species of small cryptic mollusks that have been described in recent years. While these species were collected due to the availability of grants and research ships, amateur collectors have also been doing their part with perhaps less sophisticated methods, such as making fishermen aware of the smaller, less marketable species, or by the collector himself, who spends time and money to go after the deeper-water material.

Two of the new species treated in this study, *Calliostoma frumari* and *Canalispira kerni* are the result of private deep-water dredging operations off the southwestern coast of Key West, Florida by Frank Frumar, an ardent shell collector and dredging enthusiast, and Steve Kern, a commercial lobster fisherman from Key West, Florida, owner of the dredging boat. Specimens of the third species, *Canalispira lipei*, were obtained by Robert Lipe, of St. Petersburg, Florida by contacting fishermen who operated in the Yucatán area.

The genus *Canalispira* was poorly understood by the malacological community until Coover & Coover (1995) published their monograph on marginelliform gastropods. The genus was further readdressed by McCleery & Wakefield (2007) when the authors also described three new species. Until recently only two western Atlantic species had been assigned to *Canalispira*: *Hyalina styria* var. *minor* Dall, 1927, inhabiting deep water off Georgia and northeastern Florida, and *Prunum hoffi* Moolenbeek & Faber 1991, found in the island of Saba, Netherland Antilles. Since then, five new species of *Canalispira* have been described: the Cuban species *Osvaldoginella gomezi* Espinosa and Ortea, 1997: 141-145, later placed in *Canalispira* by McCleery and Wakefield (2007: 2); *C. aurea* García, 2006, dredged in Bahía de Campeche, Mexico; and the Central American species *C.*

phantasia McCleery & Wakefield, 2007, *C. ornata* McCleery & Wakefield, 2007, and *C. fluctuata* McCleery & Wakefield, 2007. *Canalispira kerni* n. sp. is only the second species assigned to this genus to be found in the United States. The second *Canalispira* described here, *C. lipei*, has originally appeared in publications as "*Volvarina*" sp. (Lipe & Sunderland, 1991:15), and "*Marginella*" sp. (Lipe, 1991: 14, pl. 7, figs 8 and 9; and back cover). In both publications the stated locality is "Florida". However, this is in error (Robert Lipe, pers. comm.), as the confirmed locality for the species is off Contoy Light, northeastern Yucatán Peninsula, Mexico. The corrected locality appears in an errata sheet sent by Mr. Lipe with later copies of his booklet *Marginellas*.

The genus *Calliostoma* has not seen the surge of publications that *Canalispira* has received. Since Quinn's publication in 1992 in which he described 27 new species of western Atlantic *Calliostoma sensu lato*, only *Calliostoma magaldii* Caldini & Prado, 1998, a species from Chubut Province, Argentina, has been described. Presumably, the new species proposed here may have been overlooked because of its small size and deep-water habitat.

Abbreviations

ANSP: Academy of Natural Sciences, Philadelphia, Pennsylvania, U.S.A.

EFG: author's collection

USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

SYSTEMATICS

Superfamily **TROCHOIDEA** Rafinesque, 1815

Family **CALLIOSTOMATIDAE** Thiele, 1924

Subfamily **CALLIOSTOMATINAE** Thiele, 1924

Tribe **Calliostomatini** Thiele, 1924

Genus *Calliostoma* Swainson, 1840

Type species *Trochus conulus* Linnaeus, 1758 (by subsequent designation Herrmannsen, 1846).

Calliostoma frumari n. sp.

Figs 1-4

Type material. Holotype ANSP 416230 width 7.7 mm, height 5.8 mm (Figs 1-4), 1 paratype EFG 28090; 1 paratype USNM 1106892; 1 paratype Frank Frumar coll., 1 paratype Steve Kern coll.

Type locality. 24°14'N, 82°09'W; approximately 37 kms southwest of KeyWest, Florida, in 200 m.

Distribution. Known only from the type locality

Description. Holotype 7.7 mm in width (Figs 1-4), light in weight, strong, widely umbilicate, widely trochoid (width/ height ratio 0.75). Protoconch translucent white, smooth, of about one whorl. Teleoconch of 6 whorls; first whorl with carinated shoulder; shoulder narrowing on second whorl, disappearing on later whorls; profile of whorls slightly convex in early whorls, becoming progressively straight. Suture channeled, bordered on both sides by rows of bead. Axial sculpture appearing immediately after termination of protoconch; about 29 slightly nodulose axial threads on first whorl; nodes becoming stronger, forming well-defined rounded beads on following whorls; axial ornamentation increasing in number on later whorls; approximately 62 axially aligned rows of beads on last whorl. First spiral pattern showing as nodulose carina on first whorl; a second abapical thread appearing towards end of first whorl; three adapical axial nodes showing obvious spiral alignment by middle of second whorl; second whorl terminating with 5, evenly spaced spiral rows of beads; number of rows remaining constant on following 3 whorls; rows increasing incrementally in size abapically; sixth narrower cord appearing abapically on last whorl, creating slight carina at base of shell; a thin spiral thread appearing between fourth and fifth cord; all shell beads connected by spiral thread only. Base of shell only slightly convex at border, becoming concave approximately mid-way to umbilical area (Fig 2), ornamented with 9 spiral cords; peripheral cords slightly nodulose, nodes increasing in strength on subsequent cords. Periphery of umbilicus delineated by a wide, strong cord of axially elongated beads (Fig. 3); umbilicus wide, 24% of maximum shell diameter, smooth within, funnel-shaped, deep, reaching apical whorl. Aperture sub-quadrate; lip thin;

columella with one prominent denticle at periphery of umbilicus and a second, smaller denticle slightly posterior to elongated umbilical beads (fig. 3). Shell nacreous.

Discussion. Marshall (1995: 385) established the value of the development of early spiral ornamentation in Calliostomatidae in discriminating species-group taxa. The ontogeny of spiral elements in *Calliostoma frumari* have been carefully described above. The new species has 5 primary cords from second to fifth whorls, with a sixth primary cord at the periphery of the last whorl. The thin thread showing between the fourth and fifth spiral cords on the last whorl is not consistent with ornamentation of the paratypes and seems to be of sub-specific value.

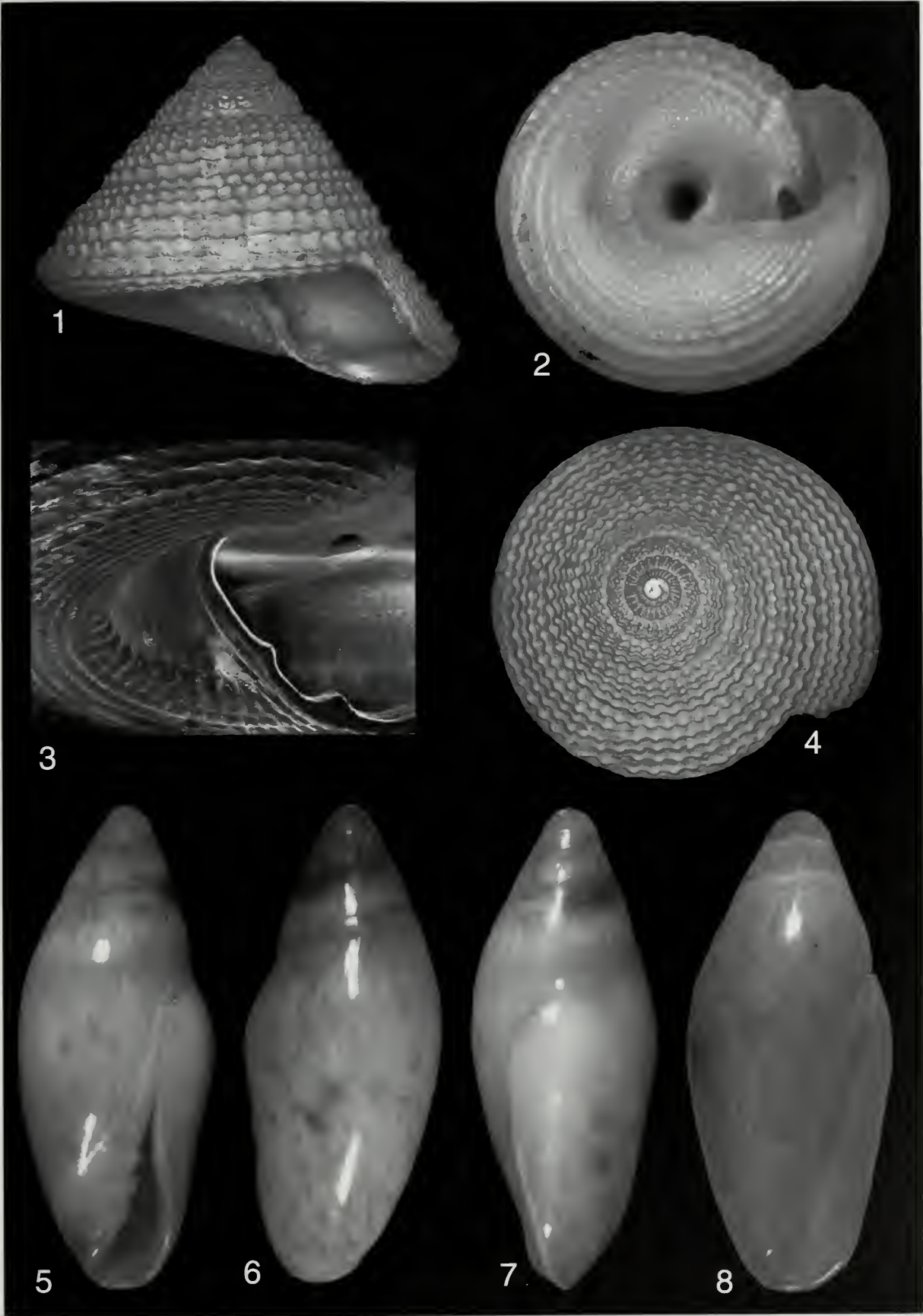
The nacreous shell, widely trochoid shape, and large umbilicus separate this species from other western Atlantic *Calliostoma*. Two American species are somewhat similar. *Calliostoma aulicum* Quinn, 1992, a species from the Caribbean coast of Panama, has a narrower umbilicus (17%- 20% of maximum shell diameter), grows to 16.1 mm in width, has different markings, and a spiral ornamentation of 2 to 3 spiral cords on first two whorls, increasing to 10 to 12 on last, abapical three strongest. *Calliostoma argentum* Quinn, 1992, which inhabits Yucatán waters, also has a narrower umbilicus (14%- 17% of maximum shell diameter), grows to 28.2 mm, has a light tan shell with pale orange-brown patches and spots on periphery, and a spiral sculpture of 2 to 3 spiral cords on first two whorls, increasing to 9 to 11 on last whorl.

The widely trochoid profile, the nacreous shell, the strong denticles in the aperture, and large umbilicus of *Calliostoma frumari* have strong similarity to characters of *Ancistrobasis costulata* (Watson, 1859), and *A. depressa* (Dall, 1889) species inhabiting the Florida Straits and the Yucatán Channel. *A. costulata* grows to only 3.6 mm and has a more globose shell. *A. depressa* grows to 5 mm and has a width/ length ratio of 0.5. Both species have approximately twice as many spiral cords on whorls and have been assigned to Seguenziidae (Quinn, 1979: 50).

Etymology. Named for Mr. Frank Frumar, of Kirkwood, Missouri who, together with Steve Kern, collected the shells and donated the type material.

Figures 1-8

1-4. *Calliostoma frumari* n. sp. Florida. 24°14'N, 82°02'W; approximately 37 kms southwest of KeyWest, 200 m. Holotype ANSP 416230, width 7.7 mm, height 5.8 mm. 5-8. *Canalispira kermi* n. sp. Florida. 24°14'N, 82°02'W; approximately 37 kms southwest of KeyWest, 200 m. 5-7. Holotype ANSP 416231, length 5.1 mm, width 2.1 mm. 8. Paratype USNM 1106893, length 5.0 mm, width 2.1 mm.



Superfamily **MURICOIDEA** Rafinesque, 1815

Family **CYSTISCIDAE** Stimpson, 1865

Subfamily **PERSICULINAE** Covert & Covert, 1995: 70

Genus *Canalispira* Jousseaume, 1875

Type species: *C. olivellaeformis* Jousseaume, 1875; original designation

Canalispira kerni n. sp.

Figs 5-9

Type material. Holotype ANSP 416231 length 5.1 mm, width 2.1 mm (Figs 5-7, 9), 1 paratype USNM 1106893 (Fig. 8); 1 paratype EFG 28089; 3 paratypes Frank Frumar coll., 1 paratype Steve Kern coll.

Type locality. 24°14'N, 82°09'W; approximately 37 kms southwest of Key West, Florida, 200 m.

Distribution. Known only from the type locality

Description. Holotype 5.1 mm in length (Figs 5-7, 9); shell strong, smooth, highly polished, cylindrical-biconic (width/ length ratio 0.41). Spire 1.84 mm in length (36% of shell length). Protoconch dome-shaped, translucent white, of approximately one whorl, covered by glaze. Teleoconch of approximately 3.25 whorls; early whorls almost straight-sided; last whorl slightly swollen adaperturally at shoulder (Fig 6). Suture adpressed, barely discernible through an over-glaze. Aperture elongate, 3.26 mm in length (64% of shell length), with deep, narrow posterior notch; posterior half of aperture narrow, expanding anteriorly, more so starting at middle of aperture, reaching near twice the mid-apertural width at anterior end (Fig. 9). Outer lip without exterior varix, smooth within, thickened posteriorly, becoming thinner as aperture expands; outer edge slightly incurved at middle. Parietal callus wash thin, narrow posteriorly, widely expanding anteriorly starting at level of first columellar plication. Anterior half of columella with three evenly-spaced plications of almost equal strength (Fig. 9); anterior plication extending over callused area. Shell ivory; surface marked with irregularly distributed, axially-oriented, yellowish flammules; flammules covering from suture to anterior end; somewhat larger maculations appearing at mid-body, insinuating formation of a band.

Discussion. The six paratypes of the new species conform in characters with those of the holotype;

however, the yellowish markings are difficult to see in some specimens due to fading.

Of the seven western Atlantic species assigned to *Canalispira*, *C. kerni* n. sp. is most similar to *Canalispira minor* (Dall, 1927) (Figs 10-12), a species inhabiting deep water off the east coast of the United States; however, the latter is smaller, relatively wider (width/ length ratio 0.43), lacks the swollen area at the shoulder of the last whorl (Fig 11), and is solid white. The “numcrous specimens” inspected by Dall are “very uniform in character” (1927:46). Dall’s specimens were collected in more than twice the depth of *Canalispira kerni*. Although Dall (1927: 46) and Kaicher (card No. 6204) establish the length of the syntype (USNM 107982, Figs 10-12) as 6 mm, the SEM image of the syntype shows a length of 4.6 mm.

The Central American species *Canalispira phantasia* McCleery & Wakefield, 2007, *C. ornata* McCleery & Wakefield, 2007, and *C. fluctuata* McCleery & Wakefield, 2007 live in shallow water (1–15 m), grow to less than 4 mm in length, have four columellar plications, have a width/ length ratio of 0.47 to 0.50, and are differently marked. *Canalispira gomezi* (Espinosa & Ortea, 1997), a relatively deep-water species from northern Cuba, grows to 3 mm, has a shorter apex, and is differently marked. *Canalispira hoffi* (Moolenbeek & Faber 1991) from Saba, Dutch West Indies, grows to 3.6 mm, has 4 columellar plication, is proportionately wider, and has different markings. *Canalispira aurea* García, 2006 from Bahía de Campeche, southwestern Gulf of Mexico, is proportionately wider, has a shorter spire, four columellar plications, and is differently colored.

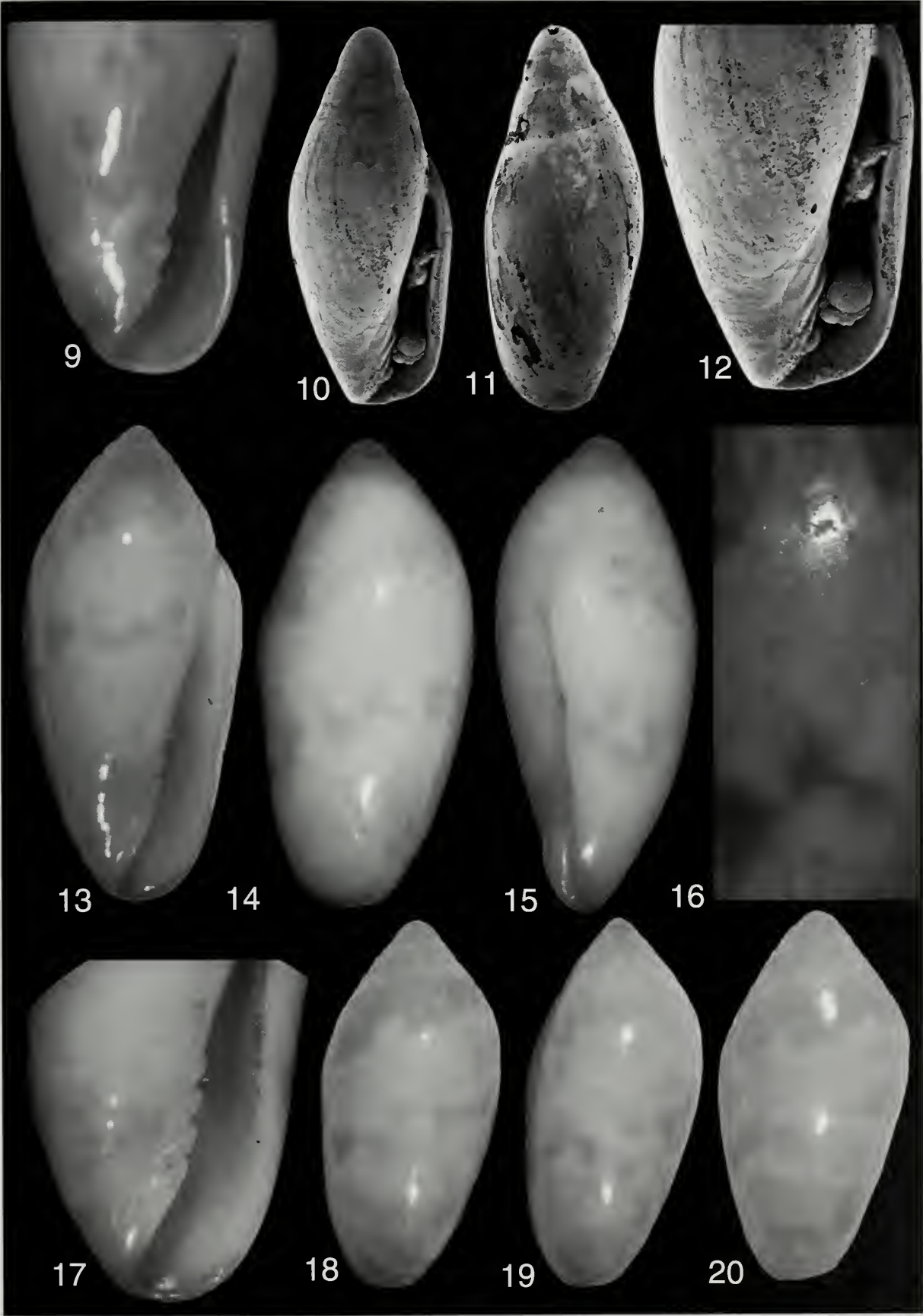
Two species of *Dentimargo* may be confused with *Canalispira kerni* because of their cylindrical-biconic shape and small size: *Dentimargo idiochila* (Schwengel, 1942), a Floridian species, has four large columellar plications and a solid coloration with a white subsutural band; and *Dentimargo smithii* (A. E. Verrill, 1885) also has four columellar plications, is brownish in color, and is proportionately wider. Moreover, these two taxa lack the deeply channeled posterior sulcus characteristic of *Canalispira*.

There is a Floridian *Volvarina*, *V. redfieldii* (Tryon, 1882) that resembles the new species, but the former grows to 8 mm, has four columellar plications, and has a solid coloration.

Etymology. Name for Mr. Steve Kern, of Key West, Florida, who, together with Frank Frumar, collected the shells and donated the type material.

Figures 9-20

9. *Canalispira kerni* n. sp., apertural view **10-12.** *Canalispira minor* (Dall, 1927), Albatross sta. 2668, off Georgia, 30°58'N, 79°38'W, 538 m. Syntype USNM 107982, length 4.6 mm, width 2 mm. **13-20.** *Canalispira lipei* n. sp. Mexico. ENE of Contoy Light, northeastern Yucatán Peninsula, 100-130 m. **13-17.** Holotype ANSP 416232, length 6.2 mm, width 2.7 mm. **18.** Paratype 1 EFG 28088, length 5.9 mm, width 2.7 mm. **19.** Paratype USNM 1106894, length 6.1 mm, width 2.7 mm. **20.** Paratype 7, Robert Lipe coll., length 5.4 mm, width 2.8 mm.



Canalispira lipei n. sp.

Figs 13-20

Type material. Holotype ANSP 416232 length 6.2 mm, width 2.7 mm (Figs 13-17), 1 paratype (paratype 1, Fig 18) FFG 28088, 1 paratype (paratype 2, Fig 19) USNM 1106894; 5 paratypes (paratypes 4-7; paratype 7, Fig 20) Robert Lipe coll, 3 paratypes (paratypes 9-11) Phillip Clover coll.

Type locality. ENE of Contoy Light, northeastern Yucatán Peninsula, E. Mexico, 75-130 m.

Distribution. Known only from the type locality

Description. Holotype 6.2 mm in length (Figs 13-17), thick, shiny, conically oblong (width/ length ratio 0.35), slightly depressed dorso-ventrally (2.7 mm in width vs. 2.5 mm in height). Protoconch paucispiral, dome-shaped, ivory white. Teleoconch ivory white, ornamented with a yellowish-orange webbing pattern, sometimes creating triangular shapes with angle pointed adaperturally, and irregular, larger maculations that tend to form bands at shoulder and at mid-body (Fig 16). Aperture ivory white, tinged with yellowish-orange at tip of anterior notch (Fig 17), approximately two thirds of shell length, narrow posteriorly, conspicuously widening after midsection. Outer lip without varix, slightly thickened posteriorly, thinning as aperture expands, slightly incurved at midsection; posterior notch deep, narrow. Columella with 4 simple, evenly spaced, oblique plications (Fig 17); first plication slightly weaker, positioned about midsection on parietal wall; anterior plication longest, continuing to, and blending into, anterior end of aperture.

Discussion. The pattern of maculation of each of the 11 specimens studied is different (Figs 18-20); however, all other characters of the holotype are present in the paratypes. Their average length is 5.76 mm; the smallest, paratype 7 (Fig 20), measures 5.4 mm; the largest, paratype 9, measures 6.6 mm. Their width is rather consistent at approximately 2.7 to 2.8 mm.

Of the 7 western Atlantic species assigned to *Canalispira*, the new species has the most affinity with *C. aurea* García, 2006, a species that inhabits Bahía de Campeche, southwestern Gulf of Mexico; however, the latter is solid orange in coloration with a thin white band by the suture, is smaller, is generally wider (width/ length ratio 0.52) and has differently structured columellar plications. *Canalispira hoffi* (Moolenbeck & Faber, 1991) grows to only 3.6 mm, is wider (width/ length ratio 0.5), has brown-tented markings, and apertural denticles. *Canalispira phantasia* McCleery & Wakefield, 2007, *C. ornata* McCleery & Wakefield, 2007, and *C. fluctuata* McCleery & Wakefield, 2007 live in shallow water

(1-15 m), grow to less than 4 mm in length, and are differently marked.

Etymology. Named for Robert Lipe, of St. Petersburg, Florida, a marginelliform enthusiast, author of the booklet *Marginellas*, and donor of the holotype and two paratypes.

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