



Calliostoma frumari García, 2007 is a junior synonym of *Ancistrobasis costulata* (Watson, 1879) (Gastropoda: Seguenziidae)

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In an ongoing study on deep-water Vetigastropoda from SE-NE Brazil, the remarkably similar appearances of two supposedly unrelated species drew our attention. The description of *Calliostoma frumari* García, 2007 was based on four empty shells collected 37 km off Key West, Florida Keys, USA, by a private expedition. Watson's (1879) description of *Basilissa costulata*, a seguenziid species widely distributed in the Western Atlantic, was based on three empty shells collected by R/V Challenger (Fig. 1E–H) type locality Challenger sta. 24, 18°38'30"N, 65°05'30"W, off Culebra Island, St. Thomas, 713 m); the species was later transferred to the genus *Ancistrobasis* Dall, 1889. As we argue here, based on our examination of a substantial number of specimens (including types), both names were attributed to a single entity, which turns out to be a morphologically variable species.

Calliostoma frumari clearly does not belong in the genus *Calliostoma* Swainson, 1840, nor is it a calliostomatid. Its smooth protoconch is strikingly distinct from that of calliostomatids, which has a thickened apertural rim that usually produces a terminal varix, and is richly sculptured by numerous threads forming a net-like pattern of hexagons (e.g., Marshall 1995). Moreover, *C. frumari* presents the characteristic apertural denticles of the seguenziid genus *Ancistrobasis* and has an external nacreous gleam typical of seguenziid shells (Quinn 1979, 1983). In the description of *C. frumari*, García (2007) emphasized the many similarities between his newly described species and *A. costulata*, as well as its junior synonym *A. depressa* (Dall, 1889), which he regarded as valid. García stressed the larger size (up to 7.7 mm in diameter, versus 3.6–5.0 mm) and lower number of sculpture elements as the main distinctions between his newly introduced concept and the older taxa. However, as Quinn (1979) correctly remarked in his comprehensive study on several species of the Florida Straits, the type specimens on which Watson (1879) based the original description of *Ancistrobasis costulata* are juvenile shells, thus partially explaining the discrepancy in size. Except for the holotype, the remaining specimens in García's (2007) original description are around 5.0 mm in diameter. Several specimens examined herein attain larger sizes, especially the ones coming from the Marion Dufresne MD55 expedition, some of which can reach 7 mm in diameter (shell diameter = 5.9 ± 0.5 mm, according to Salvador *et al.* 2014).

As for the teleoconch sculpture elements, the original descriptions of both *A. costulata* and *C. frumari* were based on limited samples, which certainly hindered any further observations on variability. Quinn's (1979) account on *A. costulata* from Florida and the Yucatán Channel included only 8 specimens, and he did not mention any notable conchological variations. Salvador *et al.* (2014) analyzed a larger sample of *A. costulata* collected during the Marion Dufresne MD55 Expedition off SE Brazil (also examined herein), and although they did not discuss the variability of their material (apart from the coloration, see below), the two specimens they illustrated (their figs. 1–3) present some differences regarding the spacing of the ribs and cords and distinct shell height/width ratio.

A wide degree of conchological variation is present in the larger sample of *Ancistrobasis costulata* specimens examined herein: the outline of the specimens can be anywhere from distinctly wider than tall (H/D = 0.69) with more convex whorls (Fig. 2A, F) akin to the types (Fig. 1A–D), to roughly as tall as wide (H/D = 0.86) with straighter whorl profiles (Fig. 2H, I), much like *C. frumari* (Fig. 1G, H). The strength and number of ribs and cords are also variable from more numerous and delicate with angular nodules at the intersections (Fig. 2A, B) to fewer in number but stronger and wider, with large, rounded nodules at the intersections (Fig. 2H, I). In the present specimens, the protoconchs are smooth (Fig. 2E, L). By contrast, the initial teleoconch whorls were either only sculptured by axial ribs (Fig. 2E) or by a mixture of axial ribs and spiral cordlets producing a reticulate pattern (Fig. 2L). In all cases, they presented small superficial granules (Fig. 2L) that become obsolete toward the younger whorls. The original description of *A. costulata* also did not

mention any color variation. Indeed, as Watson (1879) remarked, some specimens are pure white with a nacreous gleam (Fig. 2A–D), but there are cream-colored forms as well (Fig. 2F–K). This was already pointed out by Salvador *et al.* (2014) and is reinforced here. The base is sculptured with a strong periumbilical spiral cord with well-marked nodules (Fig. 2D, H), followed by 10–11 spiral cords that become increasingly smoother towards the shell’s periphery in all specimens.

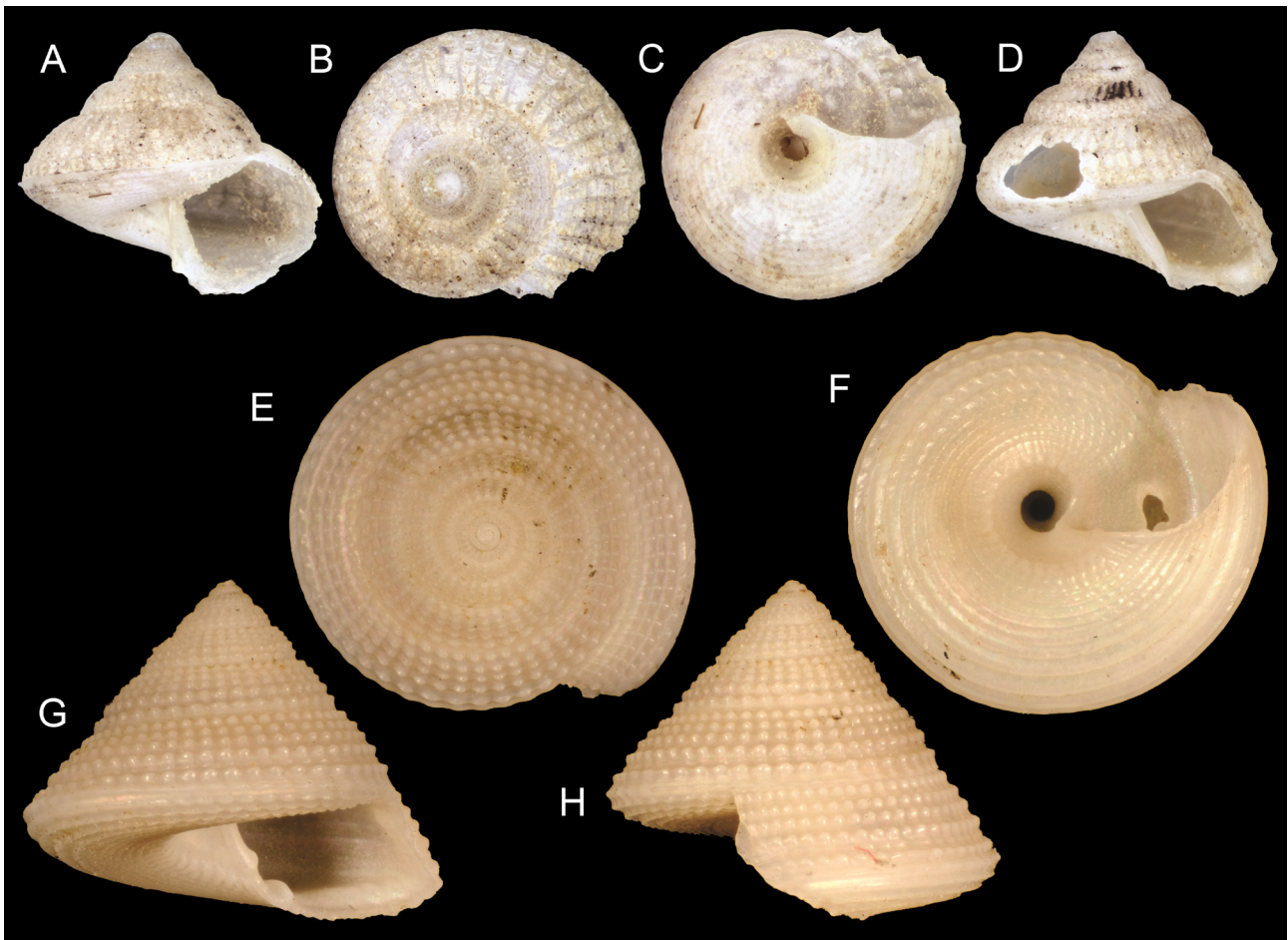


FIGURE 1: A–D. *Ancistrobasis costulata* (Watson, 1879) Syntypes. NHMUK 1887.2.9.355–357. E–H. *Calliostoma frumari* E. F. García, 2007 Holotype ANSP 416230 (H 5.8, D 7.7 mm); E, B. apical view; F, C. umbilical view; G, A, D. apertural view; H. lateral view.

Finally, *Ancistrobasis costulata* has been considered a junior synonym of *Ancistrobasis reticulata* (Philippi, 1844), a fossil taxon described from the Pliocene of Italy (Philippi 1844; Quinn 1983). Salvador *et al.* (2014) disagreed with this, stating that synonymizing these species without a thorough revision of both fossil and recent taxa would be problematic, a position that we still endorse. Given the great variability of *A. costulata*, we agree with Quinn’s (1979) opinion that Dall’s (1889) *A. depressa* (syntypes USNM 94944) is a junior synonym of *A. costulata*, since there are no significant morphological differences.

Abbreviations. MNHN, Muséum national d’Histoire naturelle (Paris, France); MZSP, Museu de Zoologia da Universidade de São Paulo (São Paulo, Brazil); NHMUK, Natural History Museum (London, UK); USNM, Smithsonian National Museum of Natural History (Washington, D.C., USA).

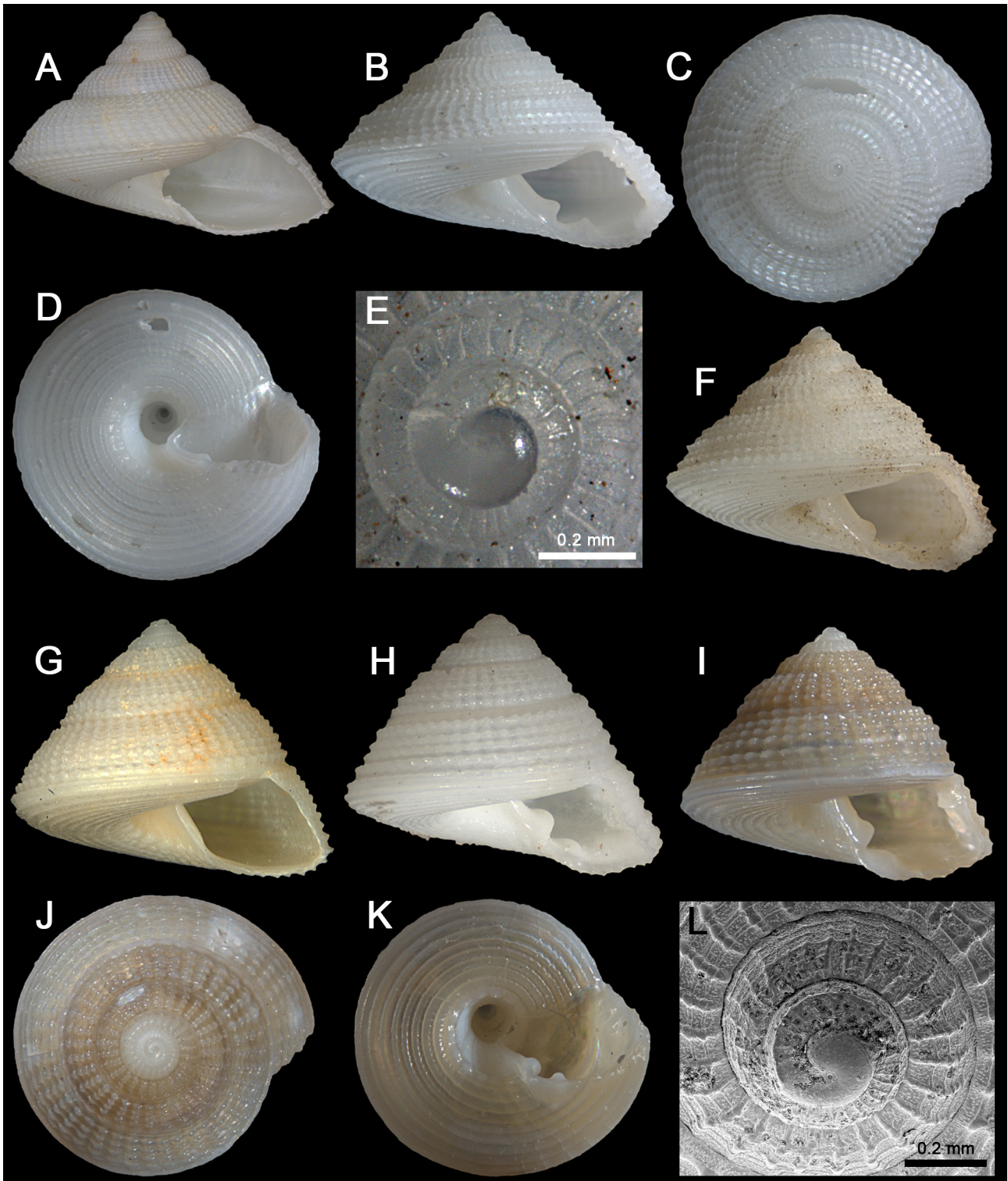


FIGURE 2: *Ancistrobasis costulata* (Watson, 1879) morphotypes; **A.** MNHN unnumbered, MD55 specimen from Espírito Santo (MD55 sta. CB78, H 4.5, D 6.6 mm), apertural view; **B–E.** MZSP 70312, from Canopus; **B.** apertural view (H 3.4, D 5.0 mm); **C.** apical view; **D.** umbilical view; **E.** protoconch detail; **F.** MZSP 93485, from Canopus, apertural view (H 3.5, D 4.8 mm); **G.** MNHN unnumbered, MD55 specimen from Espírito Santo, apertural view (H 4.0, D 5.0 mm). **H.** MZSP 70313, from Canopus, apertural view (H 3.5, D 4.1 mm); **I–K.** same, specimen #2; **I.** apertural view (H 3.4, D 4.2 mm); **J.** apical view; **K.** umbilical view; **L.** same, specimen #4, protoconch detail under SEM.

Material examined. Types: *Calliostoma frumari*: USA: Florida: 37 km off Key West, 24°14'N, 82°09'W, 200 m, Holotype ANSP 416230 (Fig. 1E–H). *Ancistrobasis costulata*: Puerto Rico: Saint Thomas, off Culebra Island, R/V Challenger Sta. 24 (25/iii/1873), Syntypes NHMUK 1887.2.9.355 (Fig. 1A–D), 1 sh; NHMUK 1887.2.9.356, 1 sh; NHMUK 1887.2.9.357, 1 sh. *Ancistrobasis depressa*: Mexico: Yucatán Strait, Blake R/V, 1170 m, Syntypes USNM 94944, 3 sh. **Additional material:** Brazil: Ceará: 120 miles off Fortaleza, Canopus Bank, 02°14'25"S, 38°22'50"W, MZSP 70312, 260 m, 2 sh (viii/2004) Fig. 2B–E; MZSP 70313, 260 m, 9 sh (viii/2004) Fig. 2H–K; MZSP 88200, 240–260 m, 1 sh (viii/2004); MZSP 88206, 240–260 m, 1 sh (viii/2004); MZSP 88210, 240–260 m, 3 sh (viii/2004); MZSP 94233, 260 m, 2 sh (xi/2005); MZSP 93485, 200 m, 2 sh (2005) Fig. 2F; MZSP 112575, 260 m, 1 sh (2005); MZSP 121947, 260 m, 2 sh (2005); MZSP 122375, 240 m, 2 sh (2005); MZSP 122376, 240 m, 1 sh (2005); MZSP 131041, 200 m, 2 sh (2005). Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°58'S, 37°48'W, 1,200 m, MNHN, 1 sh (MD55, sta. CB78, 27/v/1987) Fig. 2A; 18°59'S 37°50'W, 295 m, MNHN, 8 shells Fig. 2G, MZSP 116288, 2 sh (MD55, sta. DC75, 27/v/1987); 18°59'S 37°48'W, 607–620 m, MNHN, 9 shells, MZSP 116289, 4 sh (MD55, sta. DC73, 27/v/1987); 19°40'S 37°48'W, 790–940 m, MNHN, 1 shell (MD55, sta. CB77, 27/v/1987); Montague Bank, 20°26'S 36°41'W, 525–600 m, MNHN, 1 sh (MD55, sta. DC28, 14/v/1987); Columbia Bank, 20°44'S 32°08'W, 250–300 m, MNHN, 1 sh (MD55, sta. DC48, 19/v/1987).

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