



The genera *Bacteridium* Thiele, 1929 and *Careliopsis* Mörch, 1875 (Gastropoda: Pyramidellidae) from the east coast of South America

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KEY WORDS: Pyramidellidae, *Bacteridium*, *Careliopsis*, taxonomy, South America.

ABSTRACT *Bacteridium bermudensis* (Dall & Bartsch, 1911) and *Careliopsis styliiformis* (Mörch, 1875), originally described from the Caribbean region, are reported for the first time from the coast of Brazil. Previous reports of *Bacteridium reticulatum* (Dall, 1889) from the coast of Brazil were based on misidentifications of specimens of *B. bermudensis*, although *B. reticulatum* is indeed present along the coast. Reports of *Eulimella bermudensis* from the coasts of Argentina and Uruguay were based on misidentifications of *C. styliiformis*. *Bacteridium bartschi* (Dall & Bartsch, 1911) is synonymized with *B. bermudensis*; and *Bacteridium octona* (Guppy & Dall, 1897) with *B. reticulatum*, for which a lectotype is designated.

RIASSUNTO *Bacteridium bermudensis* (Dall & Bartsch, 1911) e *Careliopsis styliiformis* (Mörch, 1875), originariamente descritte per la Regione Caraibica, sono segnalate per la prima volta per le coste del Brasile. Sebbene presente anche sulle coste del Brasile, le precedenti segnalazioni di *Bacteridium reticulatum* (Dall, 1889) erano basate su errate identificazioni di esemplari di *Bacteridium bermudensis*. Le segnalazioni di *Eulimella bermudensis* per le coste dell'Argentina e dell'Uruguay erano basate su errate identificazioni di esemplari di *C. styliiformis*. *Bacteridium bartschi* (Dall & Bartsch, 1911) è posto in sinonimia con *B. bermudensis*, e *Bacteridium octona* (Guppy & Dall, 1897) con *B. reticulatum* per il quale è stato qui designato un lectotipo.

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INTRODUCTION

Although knowledge of the taxonomy of the family Pyramidellidae Gray, 1840 along the Mediterranean and Atlantic coasts of Europe and Africa has been growing in recent decades, with numerous contributions (e.g. MICALI, et al., 1993; NOFRONI & SCHANDER, 1994; NOFRONI & TRINGALI, 1995; PEÑAS & ROLÁN, 1997a, b, 1998, 1999a, b, c, 2000; PEÑAS et al., 1996, 1999; SCHANDER, 1994, 1995; VAN AARTSEN, 1977, 1981, 1987, 1994; VAN AARTSEN et al., 1998; WARÉN, 1991 and WILKE & VAN AARTSEN, 1998), the same cannot be said of the Atlantic coast of South America. Here, only two extensive investigations have been carried out, restricted to the coast of Argentina (CASTELLANOS, 1982; FARINATI, 1993). For the rest of the Atlantic coast of the continent, we have only general catalogues of mollusks that comment only occasionally and superficially on the pyramidellids (RIOS, 1985, 1994; DE JONG & COOMANS, 1988; MERLANO, & HEGEDEUS, 1994).

The Pyramidellidae is one of the least known marine mollusk families. Its taxonomy is much confused, with over 300 named supraspecific taxa (SCHANDER, 1994), which are often misemployed. There is no general consensus about the definitions and limits of most of the genera and subgenera.

This study deals with the taxonomy of the Brazilian species of *Bacteridium* Thiele, 1929 and *Careliopsis* Mörch, 1875, herein treated as genera as proposed by VAN AARTSEN (1994), SCHANDER (1994), and PEÑAS et al. (1996).

MATERIAL AND METHODS

The determination of the material was based on comparisons with type material and/or original descriptions and illustrations. The terminology used for the protoconchs is based on that proposed by VAN AARTSEN (1981, 1987) and modified by VAN DER LINDEN & EIKENBOOM (1992) and SCHANDER (1994). In the material examined, listed separately for each species, the number between brackets indicates the number of shells in each lot.

Abbreviations used in this paper: —Institutions: ANSP - Academy of Natural Sciences of Philadelphia, Philadelphia, USA; BMNH - British Museum of Natural History, London, UK; IBUFRJ - Instituto de Biologia / Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil; MNHN - Muséum National d'Histoire Naturelle, Paris, France; MORG - Museu Oceanográfico "Eliézer de Carvalho Rios", Fundação Oceanográfica do Rio Grande, Rio Grande, Brazil; USNM - National Museum of Natural History, Washington, USA; ZMA - Zoologisch Museum Amsterdam, Amsterdam, The Netherlands. —Expeditions: AMASSEDS: A Multidisciplinary Amazon Shelf Sediment Study, collector Research Vessel "Columbus Iseling"; PADCT - Programa de Apoio ao Desenvolvimento Científico e Tecnológico, collector Research Vessel "Prof. W. Besnard"; REVIZEE - REcursos Vivos da Zona Econômica Exclusiva, collector Research Vessel "Almirante Saldanha".

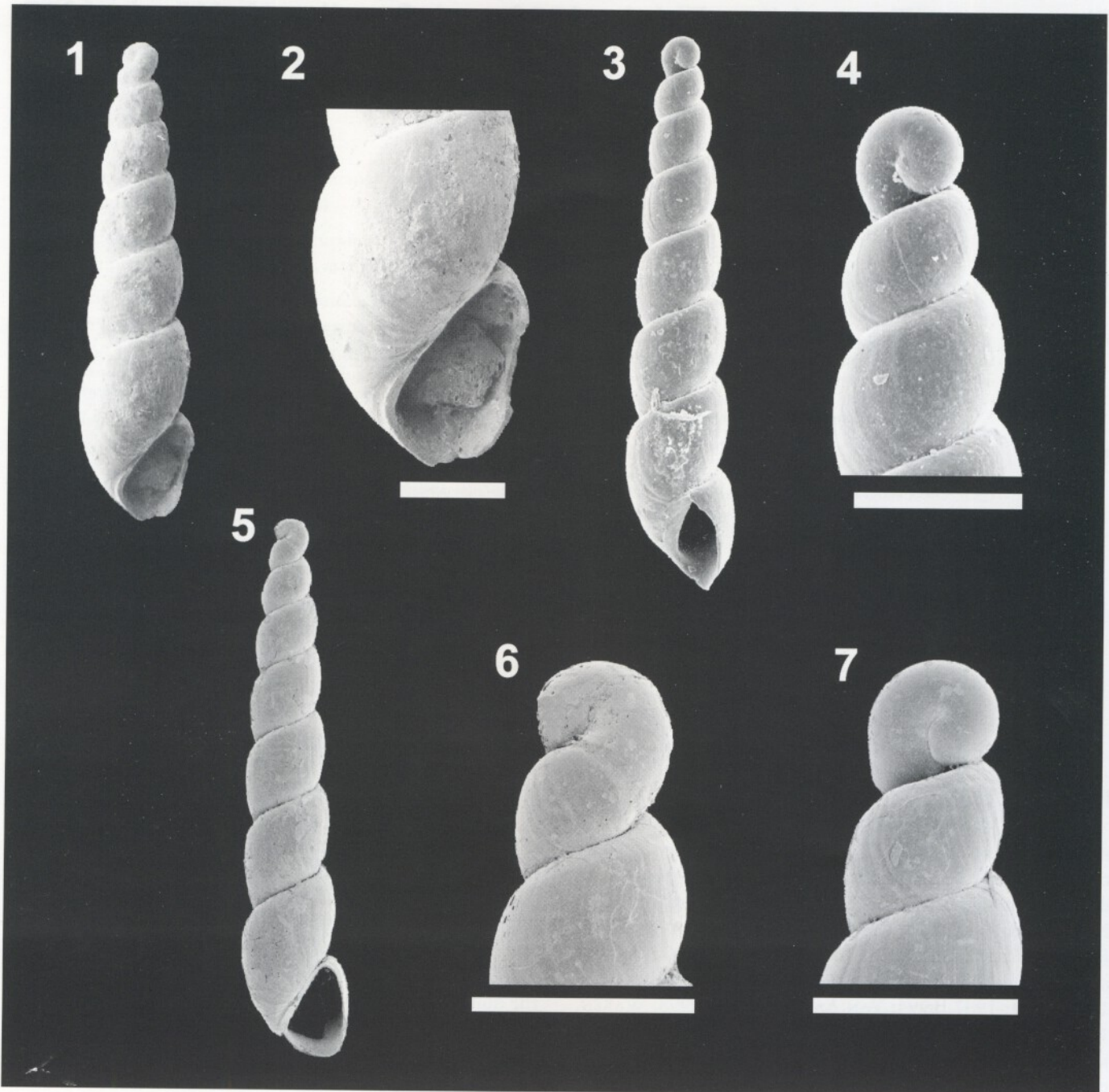


Fig. 1-7: *Bacteridium bermudensis* (Dall & Batsch, 1911). Figs. 1-2: holotype (USNM 221614, Bermuda), length: 1.7 mm; figs. 3-4: holotype of *Turbonilla bartschi* Aguayo & Rehder (USNM 420975, la Corriera, Cuba), length: 2.1 mm; figs. 5-7: shell from Praia de Jaguaribe, Pernambuco state, Brazil (MNHN), length: 2.2 mm. All scale bars: 200 μ m.

RESULTS AND REMARKS

Family Pyramidellidae Gray, 1840

Genus *Bacteridium* Thiele, 1929

Type species by original designation: *Eulimella* (*Bacteridium*) *praeclara* Thiele, 1929.

Diagnosis

Shell small, slender, translucent, smooth or with fine spiral

striae; whorls somewhat shouldered below sutures; without columellar fold; protoconch heterostrophic elevated of type A.

Remarks

The genus *Bacteridium* was introduced by THIELE (1929) as a subgenus of *Eulimella* Forbes & MacAndrew, 1846, to include *Eulimella* (*Bacteridium*) *praeclara*, the type species of the subgenus. The taxon *Bacteridium* was later raised to genus level (PENAS et al., 1996).



WARÉN (1995) created the new pyramidelloidean family Ebalidae to include some genera previously assigned to the Pyramidellidae: *Ebala* Gray, 1847; *Henrya* Bartsch, 1947; and *Murchisonella* Mörch, 1875. These genera are characterized by a "jaw apparatus" quite distinct from that of other pyramidellid genera (WARÉN, 1995). VAN AARTSEN (1995) showed that *Ebala* should be replaced by *Anisocycla* Monterosato, 1880, and that the new family created by WARÉN (1995) should then be renamed Anisocyclidae VAN AARTSEN, 1995.

Certain genera belonging to the family Pyramidellidae, such as *Bacteridium*, lack the "jaw apparatus" and cannot be distinguished from the genera included in Ebalidae (=Anisocyclidae) by shell morphology alone (WARÉN, 1995).

In the absence of soft parts of the specimens examined for this study, we believe that it is better to include them in *Bacteridium*, because of the similarity between them and the type species of this genus.

***Bacteridium bermudensis* (Dall & Bartsch, 1911) comb. nov. (Figs. 1-7)**

Turbonilla (Careliopsis) bermudensis Dall & Bartsch, 1911: 279, pl. 35, fig. 4.

Turbonilla (Careliopsis) bartschi Aguayo & Rehder, 1936: 267, pl. 24, fig. 7; new synonymy.

Careliopsis octona sensu: De Jong & Coomans (1988: 131, pl. 21, fig. 680); Merlano, & Hegedeus (1994: 236, pl. 69, fig. 943).

Stylopsis resticula sensu: Mello (1990: 40, fig. 4); Vokes & Vokes (1983: 32, pl. 22, fig. 3); Rios (1994: 189, pl. 62, fig. 881); Barros (1994: 109, fig. 3k).

Types and type locality

Holotype: USNM 221614, Bermuda; holotype of *Turbonilla bartschi* Aguayo & Rehder, 1936, USNM 420975, La Corra, Cuba, P. J. Bermudez coll.

Material examined

The types above and: —West Indies: ZMA, [15] Aruba, F. Verbene coll.; —Brazil: MNHN, [2] off Recife, Pernambuco State, 1984-89, Maestrati coll.; MNHN, [4] Praia de Jaguaribe, Itamaracá, Pernambuco State, 1984-89, Maestrati coll.; MNHN, [4] Cabo, Pernambuco State, 1984-89, Maestrati coll.; MORG 25780, [1] Abrolhos, Bahia State (5 m), L. Barcellos coll.; MZUSP 30902, [1] Barra do Saí, Rio de Janeiro State.

Diagnosis

Shell very small, elongated and slender. Protoconch of type A, elevated. Teleoconch with about six whorls with convex profiles. Axial and spiral sculpturing absent. Sutures deeply impressed. Base elongated, aperture pyriform, inner lip slightly curved and somewhat projected into the base. Length of holotype 1.8 mm.

Remarks

DALL & BARTSCH (1911) originally placed *Bacteridium bermudensis* (figs. 1-7) in the genus *Turbonilla* Risso, 1826. In

other works, the species has been allocated to the genera *Eulimella* (by CASTELLANOS, 1982; ZAFFARONI, 1989; FARINATI, 1993) and *Careliopsis* (by DE JONG & COOMANS, 1988; MERLANO & HEGEDEUS, 1994). Nevertheless, the species fits better in the description of the genus *Bacteridium* Thiele, 1931, being very similar to the type species of this taxon, *Eulimella (Bacteridium) praeclara* Thiele, 1925: 256, fig. 242.

The specimens studied by CASTELLANOS (1982), ZAFFARONI (1989), and FARINATI (1993) are not *B. bermudensis*, but *Careliopsis styliformis* (Möorch, 1875) (see discussion of next genus).

DALL & BARTSCH (1911) reported the existence of "...about 19 somewhat sinuous, slender, depressed, rounded, spiral threads..." in the shell of *B. bermudensis*. Despite the eroded state of the holotype of *B. bermudensis* (fig. 1), its surface has less eroded regions (fig. 2), making it clear that the species does not have such ornamentation. Examination of 15 specimens from Aruba and others from the northeast coast of Brazil (fig. 5-7), all identical to the holotype of *B. bermudensis*, revealed smooth shells, confirming the absence of spiral sculpture.

DE JONG & COOMANS (1988) illustrated two specimens allocated to the genus *Careliopsis*. The specimen named *C. octona* Guppy & Dall, 1897 (p. 131, pl. 21, fig. 680) is actually a specimen of *B. bermudensis*, and the other, named *C. bermudensis* (p. 131, pl. 21, fig. 681) is *Bacteridium resticulum* (see below). MERLANO & HEGEDEUS (1994: p. 236, pl. 69, figs. 943 and 944) made similar misidentifications in treating material from the Caribbean coast of Colombia.

The holotype of *Turbonilla bartschi* Aguayo & Rehder, 1936 (fig. 3-4) is identical to the holotype of *B. bermudensis*, and *T. bartschi* should therefore be considered its junior synonym.

VOKES & VOKES (1983) illustrated specimens of *B. bermudensis* identified as *Stylopsis resticula* Dall, 1889, from the Yucatan Peninsula, and RIOS (1994), MELLO (1990), and BARROS (1994) did the same for specimens from the northeast coast of Brazil. All the specimens illustrated are smooth and identical to the type of *B. bermudensis*. The type of *S. resticula* (see discussion below) has spiral striae and larger dimensions than *B. bermudensis*.

Thus, *B. bermudensis* is now considered to occur in Bermuda (type locality), the Yucatan Peninsula (VOKES & VOKES, 1993), Cuba (AGUAYO & REHDER, 1936), Aruba (DE JONG & COOMANS, 1988), the Caribbean region of Colombia (MERLANO & HEGEDEUS, 1994), and the northeast coast of Brazil (MELLO, 1990; RIOS, 1994; BARROS, 1994).

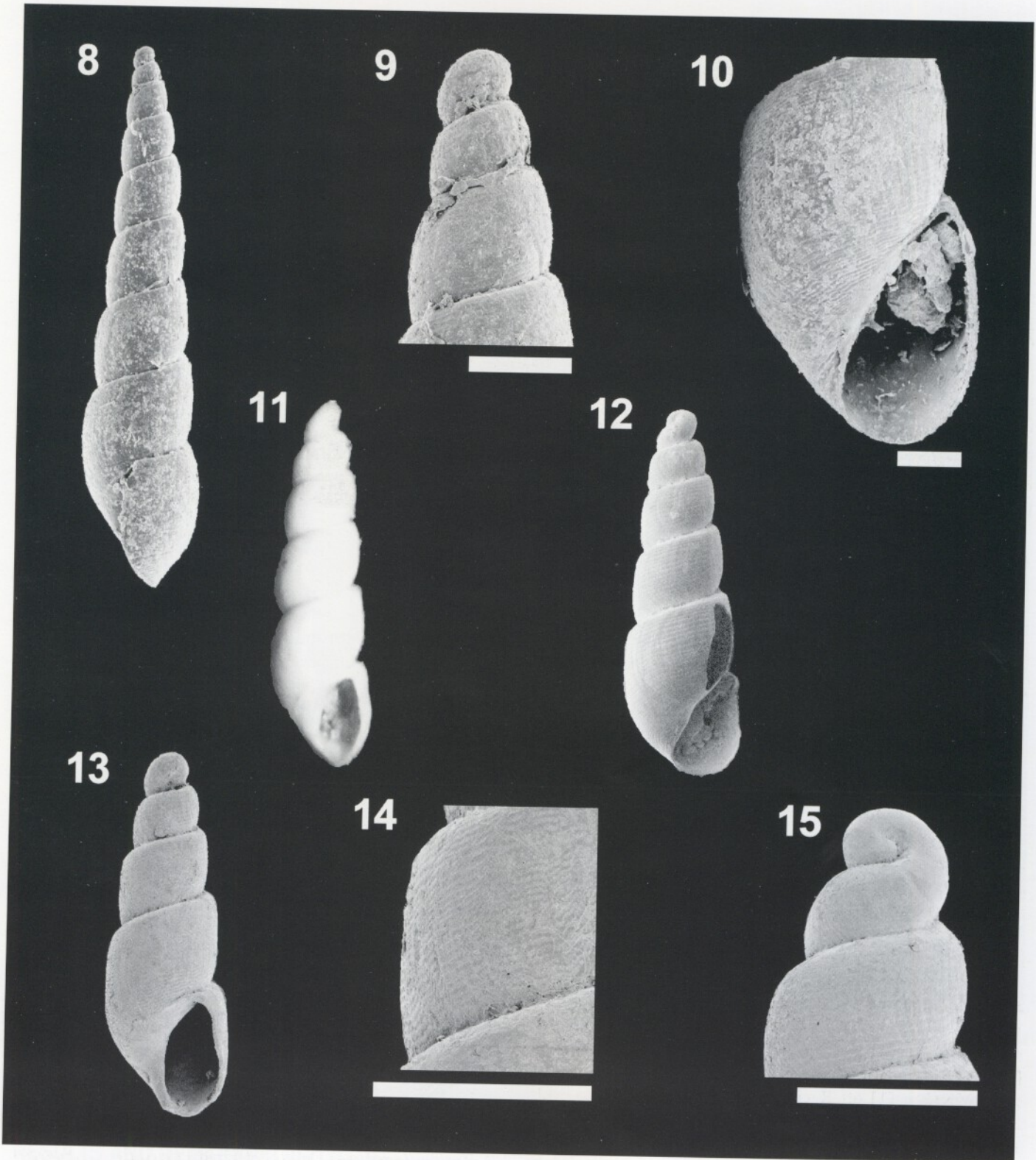
***Bacteridium resticulum* (Dall, 1889) comb. nov. (Figs. 8-15)**

Turbonilla resticula Dall, 1889: 338.

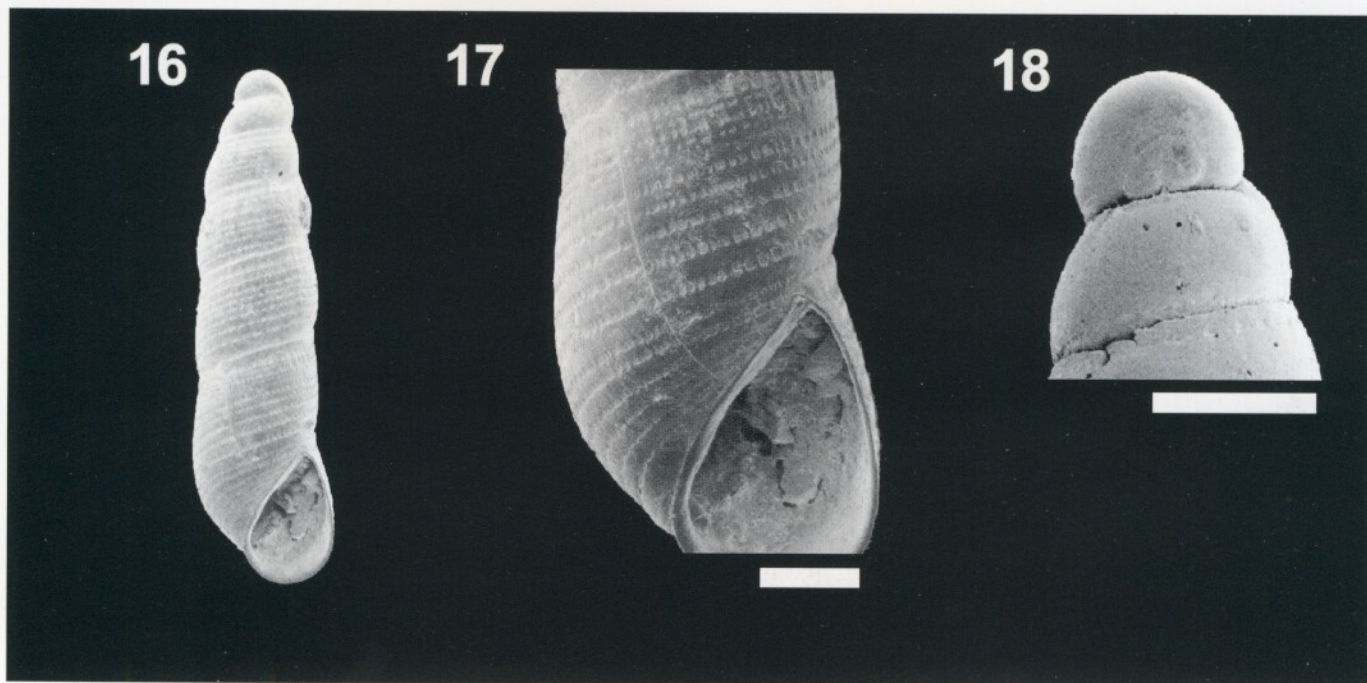
Turbonilla (Stylopsis) octona Guppy & Dall, 1897: 317, pl. 27, fig. 8; new synonymy.

Stylopsis resticula: Abbott (1974: 291).

Careliopsis bermudensis sensu: De Jong & Coomans (1988: 131, pl. 21, fig. 681); Merlano & Hegedeus (1994: 236, pl. 66, fig. 944).



Figs. 8-15: *Bacteridium resticulum* (Dall, 1889). Figs. 8-10: lectotype (USNM 53555, Florida, U. S. A.), length: 3.7 mm); fig. 11: holotype of *Turbonilla octona* Guppy & Dall (USNM 107178, Ditrupa bed, Trinidad), length: 1.3 mm); fig. 12: shell from Bahama Islands (ANSP 151874), length: 1.4 mm); figs. 13-15: shell from off Recife, pernambuco State, Brazil (MNHN), length: 1.1 mm. All scale bars: 200 μ m.



Figs. 16-18: *Careliopsis styliiformis* (Mörch, 1875). Figs. 16-17: Shell from off Espírito Santo State, Brazil (IBUFRJ 8834), length: 2.5 mm; fig. 18: protoconch of shell form off Amapá State, Brazil. All scale bars: 200 μ m.

Types and type locality

Lectotype (here designated) USNM 53555, sand flats between tides, Florida, U.S.A.; 2 paralectotypes USNM, sand flats between tides, Florida, U.S.A.; holotype and 5 paratypes of *Turbonilla octona*: USNM 107078, Ditrupa bed, Trinidad.

Material examined

The types and: —Bahamas Islands: ANSP 151847, [2] Andros Island, Bahama Islands, 1930, M. Black coll. (Percy Sladen Expedition); —Brazil: MNHN, [1] Praia da Conceição, Pernambuco State, 1984-89, Maestrati coll.; MNHN, [1] Praia de Jaguaribe, Pernambuco State, 1984-89, Maestrati coll.; MNHN, [1] off Recife, Pernambuco State, 1984-89, Maestrati coll.; IBUFRJ 10364, [1] Bacia de Campos, Rio de Janeiro State # 2B (22° 15' 02" S / 040° 19' 39" W, 100 m), ii/1998, "Astro Garoupa" coll.

Diagnosis

Shell very small, elongated. Protoconch of type A, elevated. Teleoconch with six whorls with convex profiles, slightly shouldered below each suture. Axial sculpturing absent. Spiral sculpturing consisting of very fine wavy lines. Sutures deeply impressed. Base elongated, aperture pyriform, inner lip

somewhat projected over the base. Length of lectotype 3.7 mm.

Remarks

Bacteridium resticulum (figs. 8-15) was originally described from three shells placed in the genus *Turbonilla* (Dall, 1889). The shell figured in this study is herein designated as the lectotype (fig. 8-10). This species differs from *B. bermudensis* in its larger dimensions, especially its width; its more strongly shouldered whorls; and in the spiral lines, absent in *B. bermudensis*.

In previous works, *B. resticulum* has been allocated to the genus *Stylopsis* A. Adams, 1860 (ABBOTT, 1974, as a subgenus of *Pyramidella* Lamarck, 1799; VOKES & VOKES, 1983; RIOS, 1994). Our reasons for transferring the species to the genus *Bacteridium* are based on the original description of *Stylopsis*, which states "... shell opaque, smooth, plain whorls...". The types of *B. resticulum* are not smooth and have a translucent surface, with slightly convex whorls, being similar to the type species of the genus *Bacteridium*.

The holotype of *Turbonilla octona* Guppy & Dall, 1897 (fig. 11), described from the Miocene of Trinidad, is identical to *B. resticulum* and should be considered a junior synonym.



The specimens illustrated by DE JONG & COOMANS (1988) and MERLANO & HEGEDEUS (1994) and named *Careliopsis bermudensis*, are actually *B. resticulum*.

The species illustrated by VOKES & VOKES (1983) and RIOS (1994) are *B. bermudensis* (see above). However, *B. resticulum* does occur on the Brazilian coast, according to some shells collected on the coasts of the states of Pernambuco and Rio de Janeiro (fig. 13-15). Although these specimens have fewer whorls, they are very similar in proportions, shape, and sculpturing to the types of *B. resticulum*.

The first report of *B. resticulum* was from the coast of Florida, its type locality. The present report is the southernmost record of this species, which is also present in the Bahamas, the Caribbean region of Colombia (DE JONG & COOMANS, 1988), and in the Miocene deposits of Trinidad (GUPPY & DALL, 1897).

Genus *Careliopsis* Mörch, 1875

Type species by monotypy: *Monoptygma (Careliopsis) styliformis* Mörch, 1875.

Diagnosis

Shell small, with fine spiral cords and ribs somewhat distinct; protoconch heterostrophic, of type B tending to A.

Remarks

The genus *Careliopsis* was introduced by MÖRCH (1875) as a subgenus of *Monoptygma* A. Adams, 1851, to include the species *M. (C.) styliformis*. The first illustration of this species was apparently by THIELE (1929). We follow VAN AARTSEN (1994) in considering *Careliopsis* as a genus-level taxon.

Careliopsis styliformis (Mörch, 1875) (Figs. 16-18)

Monoptygma (Careliopsis) styliformis Mörch, 1875: p. 169; Thiele (1929: p. 256, fig. 243).

Eulimella bermudensis sensu: Castellanos (1982: p. 77, fig. 13); Zaffaroni (1989: p. 123, fig. 1); Farinati (1994: p. 307, fig. 19).

Turbonilla (Careliopsis) styliformis: Vokes & Vokes (1983: pl. 31, fig. 15).

Types and type locality

Type not located; St. Thomas.

Material examined

—North America: USNM 87269, [1], Sarasota Bay, Florida, Hemphil coll.; —Brazil: IBUFRJ 10496, [2] off Amapá State, AMASSEDs expedition; MORG 16516, [1] Foz do Amazonas (100 m), x/1970; IBUFRJ 8834, [1] REVIZEE # VV22 (20° 22' S / 040° 05' W, 33 m), 27/ii/1996; —Argentina: MACN 28872, [2] Mar del Plata, Provincia de Buenos Aires, R. Bidart leg.

Diagnosis

Shell small, with five whorls which cease to increase in diameter in the third/fourth whorl; Protoconch of type A, with

about two whorls, both partially immersed in the first teleoconch whorl; Spiral sculpturing present over the entire surface of the teleoconch and consisting of cords of irregular width, the spaces between them are crossed by very fine axial ribs which become stronger below the sutures of some shells; at low magnification, the sculpturing appears as spiral lines of microscopic points; Base elongated, imperforate, aperture pyriform, without columellar fold.

Remarks

CASTELLANOS (1982), ZAFFARONI (1989), and FARINATI (1993) provided illustrations of *Careliopsis styliformis*, identified as *Eulimella (Careliopsis) bermudensis*, from the coasts of Argentina and Uruguay. Examination of the holotype of *B. bermudensis* (see above) revealed that the species illustrated by CASTELLANOS, ZAFFARONI, and FARINATI was a different species. The species reported from Argentina and Uruguay is actually *Careliopsis styliformis*, which differs from *B. bermudensis* in the presence of both axial and spiral sculpturing and in its larger dimensions.

In Brazil, *C. styliformis* (fig. 16-18) was collected in the states of Amapá, Espírito Santo, and São Paulo. The species shows some degree of intraspecific variation, especially in the strength of the axial ribs, which may be nearly absent in some specimens.

Careliopsis styliformis is now considered to occur in Florida, St. Thomas (the type locality), the Yucatan Peninsula (VOKES & VOKES, 1983), the northern and southeastern coasts of Brazil, and the coasts of Argentina (CASTELLANOS, 1982; FARINATI, 1993) and Uruguay (ZAFFARONI, 1989). It probably occurs along the entire Brazilian coast.

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