

Four new species and two new records of Odostomiinae (Gastropoda: Pyramidellidae) from Brazil

Alexandre Dias Pimenta

Departamento de Invertebrados, Museu Nacional, Universidade Federal do Rio de Janeiro. Quinta da Boa Vista, São Cristóvão, 20940-040 Rio de Janeiro, RJ, Brazil. E-mail: alexpim@mn.ufrj.br

ABSTRACT. Four new species of the pyramidellid Odostomiinae from Brazil are described: *Chrysallida conifera* **sp. nov.**, characterized by a small and regularly conical shell with prominent nodules; *Parthenina biumbilicata* **sp. nov.**, characterized by a deep and wide umbilicus and a regularly increasing aperture diameter at the protoconch, which bears a small circular umbilicus; *Eulimastoma franklini* **sp. nov.**, which is very similar to *Eulimastoma dydima* (Verrill & Bush, 1900) but has a prominent helicoid protoconch; *Eulimastoma exiguum* **sp. nov.**, similar to *Eulimastoma weberi* (Morrison, 1965) but without spiral ridges. *Fargoa diantophila* (Wells & Wells, 1961) and *Chrysallida nioba* (Dall & Bartsch, 1911) are reported from the southwestern Atlantic for the first time.

KEY WORDS. *Chrysallida*; *Eulimastoma*; *Fargoa*; *Parthenina*; West Atlantic.

Pyramidellidae Gray, 1840 (superorder Heterobranchia) comprises a large group of marine microgastropod, ectoparasitic on other invertebrates. The family is distributed worldwide, from coastlines to the deep sea, and is one of the largest mollusk families, with over 6,000 named species (PEÑAS & ROLÁN 1998) and more than 300 generic and subgeneric taxa (SCHANDER *et al.* 1999, 2003).

Despite these numbers, until the 1990s only 35 species were recorded from Brazil (RIOS 1994) and taxonomic revisions in the past ten years (PIMENTA *et al.* 2000, 2008, 2009, 2011 PIMENTA & ABSALÃO, 2001a,b, 2002, 2004a,b; ABSALÃO *et al.* 2003) have revealed around 30 new species, in addition to several new records of species originally described from northern localities in the western Atlantic, mainly the Caribbean region, totaling about 95 species of Pyramidellidae in more than 20 genera. Some of these species were listed and poorly characterized and illustrated by RIOS (2009).

The species of Odostomiinae, in particular, were revised in a series of papers (PIMENTA & ABSALÃO 2004b, PIMENTA *et al.* 2008, 2009), on *Eulimastoma* Bartsch, 1916, *Egila* Dall & Bartsch, 1904, *Ividia* Dall & Bartsch, 1904, *Folinella* Dall & Bartsch, 1904, *Oscilla* A. Adams, 1861, *Pseudoscilla* Boettger, 1901, *Boonea* Robertson, 1978, *Chrysallida* Carpenter, 1856, *Parthenina* Bucquos, Dautzenberg & Dollfus, 1883, *Ivara* Dall & Bartsch, 1903, *Fargoa* Bartsch, 1955, *Mumiola* A. Adams, 1863, *Odostomella* Bucquos, Dautzenberg & Dollfus, 1883, and *Trabecula* Monterosato, 1884.

Recent collection-based studies, as well as recent collections, led to the discovery of other species occurring in Brazil, belonging to some of the above-mentioned genera, including four new taxa, which are the scope of this paper.

MATERIAL AND METHODS

The taxonomic identifications were based on conchological comparisons with type material and/or original descriptions and illustrations. Each species was illustrated using scanning electron microscope (SEM) images. The abbreviation “m” refers to the depth (in meters) of the collecting locality.

The terminology used for protoconchs follows AARTSEN (1981, 1987), modified by LINDEN & EIKENBOOM (1992) and SCHANDER (1994).

Most of the material examined was obtained from oceanographic expeditions off southeast Brazilian coast; names of these expeditions, dates and collectors are summarized below: (MD 55 Cruise) this expedition was carried out by Research Vessel “Marion Dufresne” in 1987, and samples were dredged from southeastern Brazil (TAVARES 1999). All lots, from MD55, were collected by Philippe Bouchet, José Leal, and Bernard Métivier. For more details, see TAVARES (1999); (REVIZEE) “Programa de Avaliação do Potencial Sustentável de Recursos Vivos da Zona Econômica Exclusiva” (Program of Evaluation of the Sustainable Potential of Living Resources in the Economic Exclusive Zone), of the Ministério do Meio Ambiente, Brazilian Government; collectors: REVIZEE Central sta C1: Oceanographic Ship “Antares”; REVIZEE Central C5: supply boat N/RB “Astro Garoupa”; REVIZEE Sul: Oceanographic Vessel “Professor W. Besnard”; (PADCT) “Programa de Apoio ao Desenvolvimento Científico e Tecnológico”, carried out by Instituto Oceanográfico da Universidade de São Paulo (IOUSP), between November, 1997 and January, 1998; collector: Oceanographic Vessel “Professor W. Besnard”; (RAP Ilha Grande) Marine Rapid Assessment Protocol at Baía da Ilha Grande, Rio de

Janeiro, carried out by Universidade do Estado do Rio de Janeiro; (HAB) Projeto Habitats – “Heterogeneidade Ambiental da Bacia de Campos” (Habitats Project – Campos Basin Environmental Heterogeneity), carried out by CENPES/PETROBRAS. Collector: Research Vessel “Miss Emma McCall”.

Other abbreviations used through the text: IBUFRJ – Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro; MNHN – Muséum National d’Histoire Naturelle, Paris; MNRJ – Museu Nacional/Universidade Federal do Rio de Janeiro, Rio de Janeiro; MORG – Museu Oceanográfico “Eliézer de Carvalho Rios”, Fundação Oceanográfica do Rio Grande, Rio Grande; MZSP – Museu de Zoologia da Universidade de São Paulo, São Paulo; UERJ – Universidade do Estado do Rio de Janeiro; USNM – National Museum of Natural History, Washington, DC; ZMA – Zoölogisch Museum Amsterdam, Amsterdam.

TAXONOMY

Pyramidellidae Gray, 1840 Odostomiinae Pelseneer, 1928

Remarks. PIMENTA *et al.* (2009) provided a brief review of the use of the name Odostomiinae and of some genera included in this subfamily. Taxonomists working on Pyramidellidae (e.g., PIMENTA *et al.* 2009, LYGRE *et al.* 2011) generally agree that the classification of the family at the generic level requires an extensive revision based on anatomical, developmental and molecular studies, and that shell characters alone do not provide enough evidence to clearly recognize the definitions and limits among the more than 300 generic names. For those reasons, the generic classification used here should be considered provisional, awaiting revision of the taxa. Some genera, such as *Eulimastoma* and *Chrysallida* are used in *lato sensu*, and most generic allocations follow previous authors and/or are based on conchological similarities.

Fargoa Bartsch, 1955

Fargoa Bartsch, 1955: 80. Type species by original designation: *Fargoa calesi* Bartsch, 1955, Pliocene, St. Petersburg, Florida.

Fargoa diantophila (Wells & Wells, 1961)

Figs 1-6

Odostoma (*Chrysallida*) *diantophila* Wells & Wells, 1961: p. 152, figs 1-3.

Odostoma diantophila: Abbott, 1974: 293, fig. 3489.

Fargoa diantophila: Lyons, 1989: 29, pl. XII, fig. 8; Odé & Speers, 1972: 10; Robertson, 1978: 373, fig. 6; 1996: 17, figs 16-18; Odé, 1993: 29; Lee, 2009: 141, fig. 682; Tunnell Jr *et al.*, 2010: 265.

Type material. Holotype USNM 613499 (not examined).

Type locality. Beaufort, North Carolina, USA.

Material examined. BRAZIL, *Rio de Janeiro*: Ponta Grande, baía da Ilha Grande (RAP Ilha Grande sta 17, 23°0.544’S,

44°28.464’W, 8.5 m), 10 shells, 30/x/2003, UERJ 6224; Ponta Grande, baía da Ilha Grande (RAP Ilha Grande sta 17, 23°0.544’S, 44°28.464’W, 8.5 m), 2 shells, 30/x/2003, MNRJ 17257.

Geographic distribution. USA: Massachusetts, North Carolina, Florida, Texas (ROSENBERG 2009); Brazil: shallow waters off Rio de Janeiro state, southeast of Brazil (this study).

Remarks. PIMENTA *et al.* (2009) recognized only one species of *Fargoa* occurring on the Brazilian coast: *Fargoa bushiana* (Bartsch, 1909). After study of the malacological collection at the UERJ, *Fargoa diantophila* (Figs 1-6), originally described from the east coast of the United States, was recognized as occurring on the Brazilian coast. *Fargoa bushiana* and *F. diantophila* have very similar geographical distributions in the northwestern Atlantic, from Massachusetts to the Texas coast. *Fargoa buijsei* de Jong & Coomans, 1988, from the West Indies, is a synonym of *F. bushiana*, according to PIMENTA *et al.* (2009). In Brazil, while *F. bushiana* is widespread, from the northeast to southeast coasts (~ 2°S to ~28°S), the known distribution of *F. diantophila* was restricted, up to now, to the records presented here, from shallow waters in Ilha Grande Bay. The material studied here is very similar in dimensions, shape and sculpture to the original illustrations by WELL & WELLS (1961) and subsequent ones by LEE (2009) and TUNNELL JR *et al.* (2010). It has a minute, pupoid-shaped shell, a very immersed protoconch (Figs 3 and 4), identical sculpture (Figs 1-2 and 6), and fold at the columella (Fig. 6).

Chrysallida Carpenter, 1856

Chrysallida Carpenter, 1856: 170. Type species by original designation: *Chemnitzia communis* C.B. Adams, 1852. Recent, Mexico.

Chrysallida nioba (Dall & Bartsch, 1911)

Figs 7-12

Odostomia (*Chrysallida*) *nioba* Dall & Bartsch, 1911: 286.

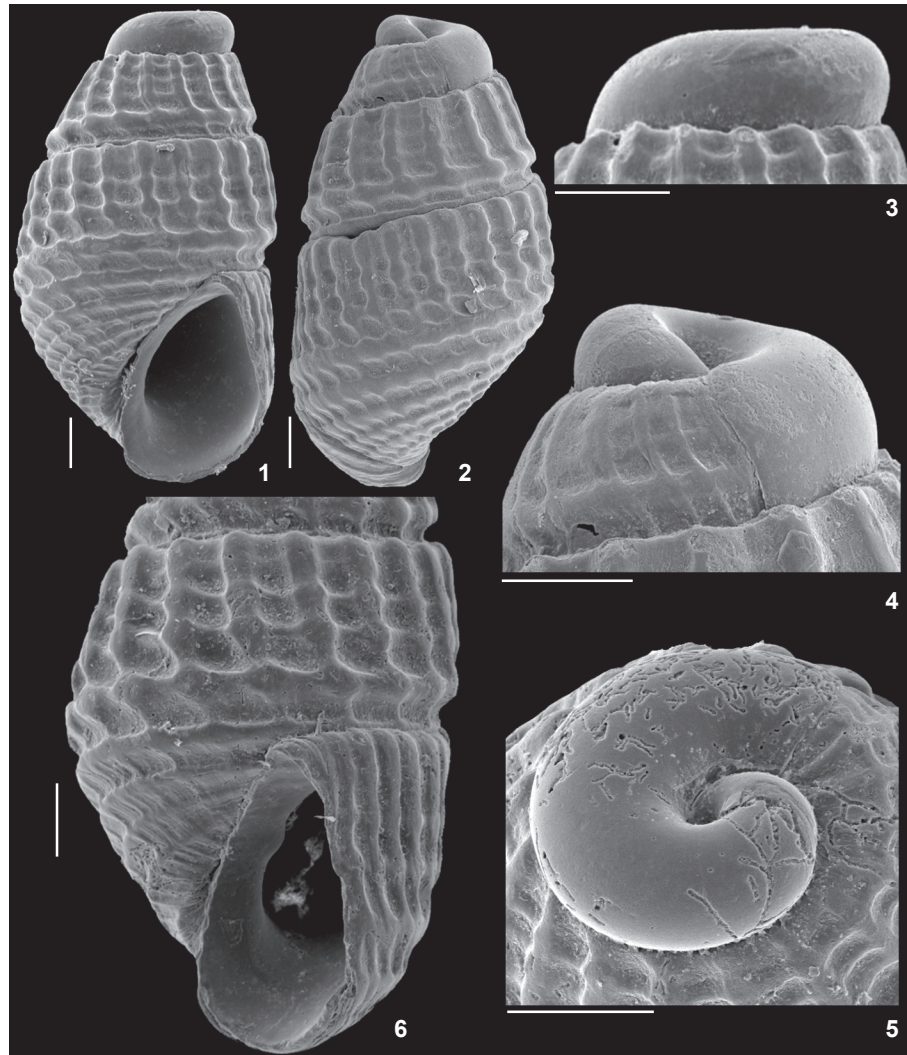
Chrysallida nioba: de Jong & Commans, 1988: 122, pl. 6, fig. 543; Redfern, 2001: 143, pl. 64, fig. 592A, B; Lee, 2009: 138, fig. 671.

Type material. 6 syntypes USNM 223284 (examined through photographs).

Type locality. Bermuda.

Material examined. WEST INDIES: Aruba, 15 shells, F. Veberne *leg.*, ZMA; Curaçao, 4 shells, de Jong *leg.*, ZMA; BRAZIL: *Rio de Janeiro*: (HAB 16 sta F5, 22°17’20.854’S, 40°6’42.755’W, 140 m), 1 shell, 05/vii/2009, MNRJ 16289; (REVIZEE Central sta C1-D3, 22°52’S, 41°09’W, 80 m), 22 shells, 23/ii/1996, IBUFRJ 11333; (REVIZEE Central sta C1-D3, 22°52’S, 41°09’W, 80 m), 4 shells, 23/ii/1996, MNRJ 17164.

Geographic distribution. USA: Florida, Louisiana; ABC Islands; Bermuda (ROSENBERG 2009); Brazil: 80 to 140 m deep off Rio de Janeiro southeast of Brazil (this study).



Figures 1-6. *Fargoa dianthophila*, UERJ 6224: (1-2) whole shell, length: 0,9 mm; (3-5) protoconch; (6) last whorl. Scale bars: 100 μ m.

Remarks. *Chrysallida nioba* (Figs 7-12) was not illustrated with the original description. The type series contains six syntypes, one of which is illustrated in Figure 12. The subsequent records of this species from different localities in the Caribbean and the United States east coast are somewhat unclear. Although the drawing provided by DE JONG & COOMANS (1988) of shells from the West Indies does not allow recognition of the characteristics of the shell, examination of the ZMA collection confirms its occurrence at Aruba.

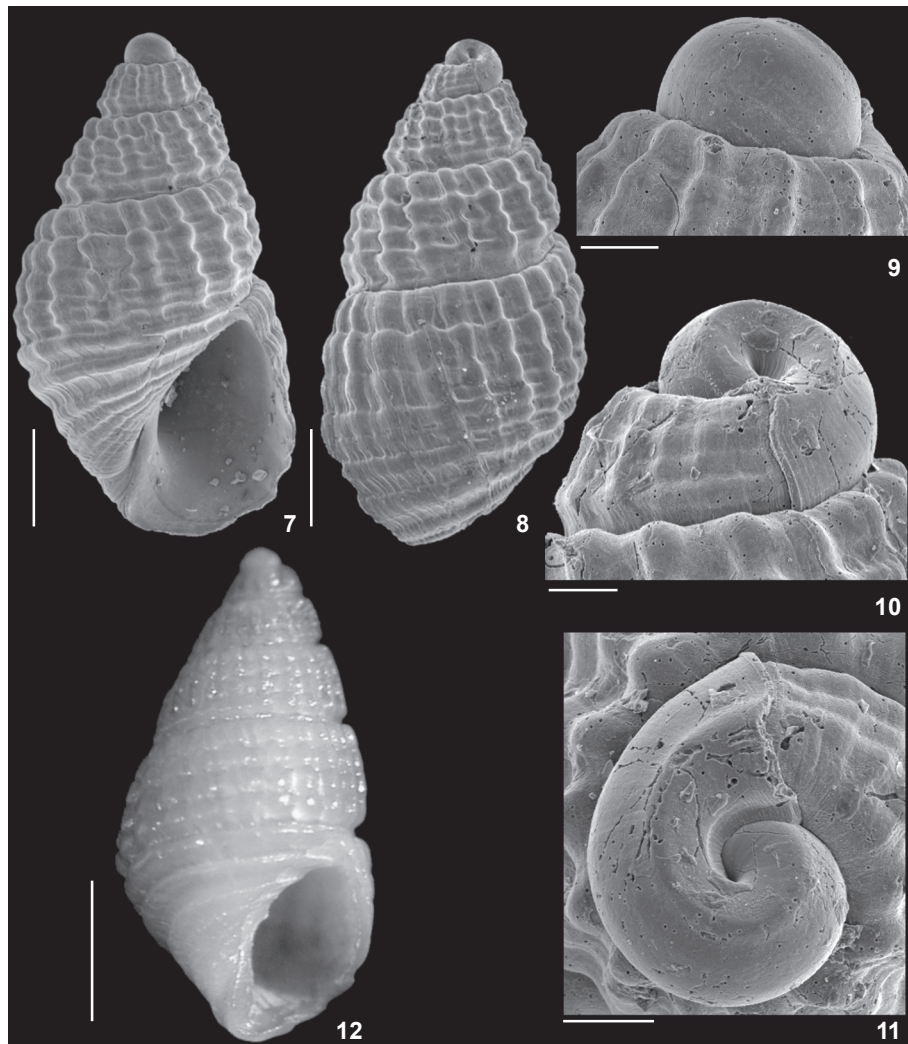
LEE (2009) presented a photograph of a shell very similar shape that to that of *C. nioba* noted a possible synonymy between *C. nioba*, *Boonea seminuda* (C.B. Adams, 1839) and *Odostomia toyatani* Henderson & Bartsch, 1914. Actually, *B. seminuda* and *Odostomia (Chrysallida) toyatani* were synonymized by ROBERTSON (1978), but *C. nioba* must be considered a

distinct species since it has a distinct protoconch, with immersed nucleus (Figs 9-11), while in the protoconch of *B. seminuda* the nucleus is visible; also, the shell shape and sculpture are different, more elongated and without smooth spiral cords above the suture as occurs in *B. seminuda*.

Chrysallida conifera sp. nov.

Figs 13-18

Type material. Holotype MNRJ 16300. Paratypes (one shell in each lot). MNRJ 16301 continental shelf of Bacia de Campos, Rio de Janeiro state (HAB 16 sta G3, 22°3'41.0"S, 40°10'5.38"W, 75 m), 06/vii/2009; IBUFRJ 19203, continental shelf of Bacia de Campos, Rio de Janeiro state (HAB 16 sta G3, 22°3'41.0"S, 40°10'5.38"W, 75 m), 06/vii/2009; MNRJ 16302 type locality; MNRJ 16303, continental shelf of Bacia de Cam-



Figures 7-12. *Chrysallida nioba*: (7-8, 12) whole shells, respective lengths: 2.68, 2.68, 3.5 mm; (9-11) protoconch. (7-11) IBUFRJ 11333; (12) syntype USNM 223284. Scale bars: (7-8, 12) 500 μ m; (9-11) 100 μ m.

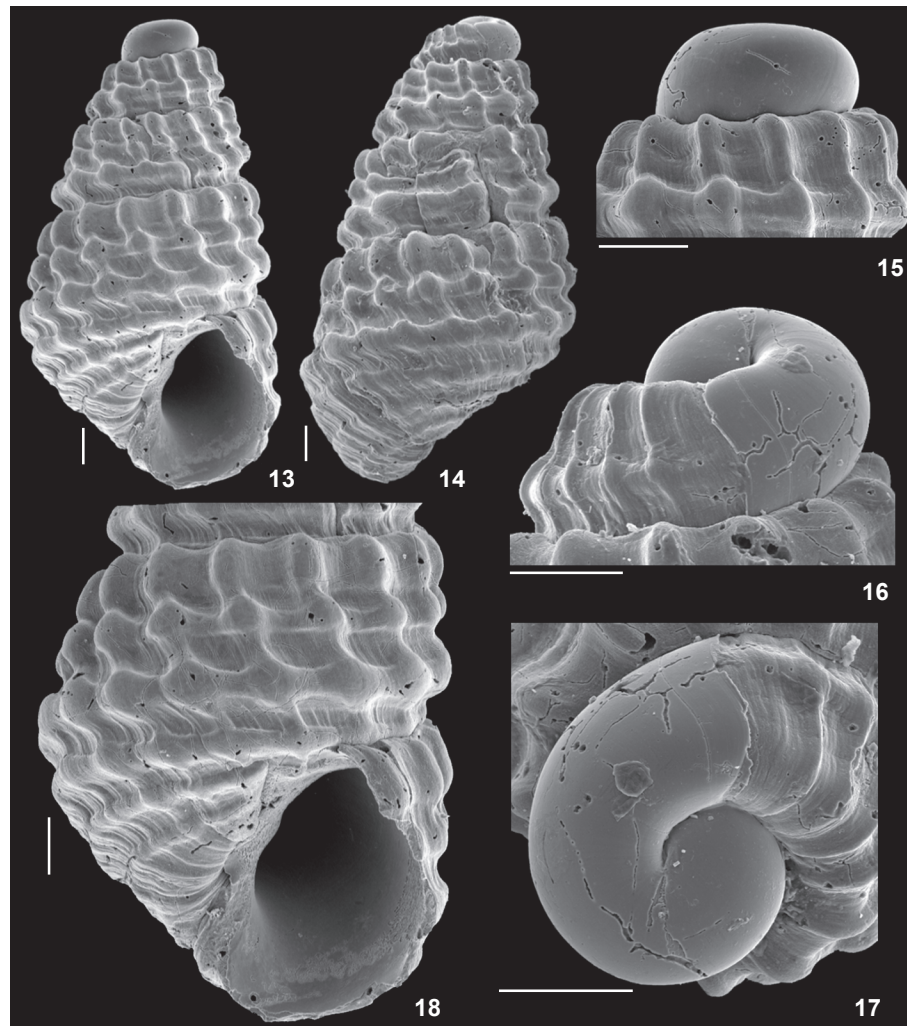
pos, Rio de Janeiro state (HAB 16 sta B3, 22°59'43"S, 41°21'13"W, 77 m), 02/vii/2009; MZSP 99920 (REVIZEE Sul sta 6653, 25°43.5'S, 46°2.5'W, 155 m); MZSP 99921 (REVIZEE Sul sta 6662, 24°00.95'S, 43°55.54'W, 135 m); MZSP 99923 (REVIZEE Sul sta 6666, 24°17.13'S, 44°12.15'W, 163 m); MZSP 99924 (REVIZEE Sul sta 6666, 24°17.13'S, 44°12.15'W, 163 m).

Type locality. Continental shelf of Campos Basin, Rio de Janeiro state, southeast of Brazil (HAB 16 sta C3, 22°46'49"S, 41°3'16"W, 78 m).

Diagnosis. Small, conical shaped shell with pronounced spiral rows of nodules.

Description. Shell conical, color white. Teleoconch with up to four whorls, strictly straight in profile. Suture somewhat deep, straight. Protoconch heterostrophic, with ~1 smooth

whorl, oriented in the opposite direction to the teleoconch axis, with no visible nucleus. Axial ribs markedly prosocline; 15 ribs on last whorl of holotype; interspaces about as wide as ribs, bearing microscopic axial growth lines. Spiral sculpture formed by three spiral cords per whorl, of same width as axial ribs, forming rounded nodules when crossing them, adapical row of nodules somewhat axially elongate; two adapical spiral cords somewhat closer to each other than the abapical cord, below which there is a moderately wide suprasutural spiral channel; additional fourth abapical spiral nodulose cord located on periphery of last whorl, smaller than other cords; base rhomboid with two low spiral cords and axial growth lines. Aperture rhomboid, tending to pyriform. Columella obliquely straight, with obsolete fold. Outer lip thin. No umbilical fissure.



Figures 13-18. *Chrysallida conifera*, holotype: (13-14) whole shell, length: 1.35 mm; (15-17) protoconch; (18) last whorl. Scale bars: 100 μ m.

Dimensions. Holotype with four teleoconch whorls; height 1.35 mm; width 0.8 mm; protoconch width: 260 μ m.

Etymology. *conifer*, L. = cone bearing. This species is named after its strictly conical shell shape.

Geographic distribution. Continental shelves of Rio de Janeiro and São Paulo states, southeast of Brazil; 75 m to 163 m deep.

Remarks. *Chrysallida conifera* (Figs 13-17) somewhat resembles young specimens of *Chrysallida gemmulosa*, with a similar protoconch and general sculpture pattern, i.e., three nodulose spiral cords per whorl. However, the nodules of *C. gemmulosa* are axially arranged in a nearly orthocline direction, while in *C. conifera* they are prosocline (Figs 13-14 and 18); the whorl outline is slightly convex in *C. gemmulosa* and rectilinear in *C. conifera* (Figs 13-14). The main difference is at the base, which is elongate and ornamented with six or seven

smooth spiral cords in *C. gemmulosa*, while in *C. conifera* there are three somewhat nodulose spiral cords (Fig. 18).

Chrysallida conifera is also somewhat similar to the illustration of *Chrysallida cancellata* (d'Orbigny, 1841) from the West Indies in DE JONG & COOMANS (1988: pl. 19, fig. 645). However, the original figure of the latter in d'ORBIGNY (1841: tab. XVII, figs 1-3), as well as examination of several specimens from the West Indies (ZMA collection; Aruba, West Indies, F. Veberne coll.), revealed shells with strongly convex whorl profiles and a rather ovoid last whorl, while *C. conifera* has a regularly flat whorl profile and a somewhat squarish last whorl (Figs 13-14 and 18). *Chrysallida nioba* Dall & Bartsch, 1911 (Figs 7-11) is also similar to *C. conifera*, with very similar general shell sculpture. However, *Chrysallida conifera* has a more rectilinear outline of the whorls, truncate apex and squarish last whorl with a rhomboid base, while in *C. nioba* the spire is more acute and

the last teleoconch whorl is more inflated and wide, with a somewhat elongate rounded base.

Eulimastoma Bartsch, 1916

Odostomia (*Eulimastoma*) Bartsch, 1916: 73. Type species by original designation: *Odostomia* (*Scalenostoma*) *dotella* Dall & Bartsch, 1909.

Eulimastoma exiguum sp. nov.

Figs 19-24

Eulimastoma cf. *weberi*: Pimenta & Absalão, 2004b: 168, fig. 5C-G.

Type material. Holotype: MNRJ 16308; paratypes: MNRJ 16309, type locality [2 shells]; MNHN IM-2012-6, MD55 sta CB96, east of Cabo de São Tomé, north coast of Rio de Janeiro state (21°31'S, 40°08'W, 300 m), 31/v/1987 [7 shells]; MZSP 105121, MD55 sta CB96, east of Cabo de São Tomé, north coast of Rio de Janeiro state (21°31'S, 40°08'W, 300 m), 31/v/1987 [4 shells]; IBUFRJ 12678, REVIZEE Central sta C5-52C (21.767°S, 40,083°W, 450 m), 21/vii/2001 [9 shells].

Type locality. Continental shelf of Campos Basin, Rio de Janeiro state, southeast of Brazil; HAB 17 sta I3 (21°23'33.709"S, 40°15'43.349"W, 88 m).

Diagnosis. Small shell, without sculpture, with a spiral channel above suture and a marked spiral keel at periphery of base.

Description. Shell conical, color white. Teleoconch with up to 3.75 whorls almost straight in profile, slightly concave on last whorl; penultimate whorl with deep abapical channel, above suture, in a V-shaped outline; whorls gradually increase in width giving rise to a scaled shell shape. Suture deep, straight, covered by thin spiral callus. Protoconch heterostrophic with ~1 smooth whorls oriented in the opposite direction to the teleoconch axis, with no visible nucleus. Sculpture absent, except for growth lines and very thin spiral incisions irregularly spaced, almost inconspicuous. Base rounded, marked at adapical periphery by a well marked spiral keel. Aperture obliquely ovoid. Columella obliquely arcuate, without fold. Outer lip thin. Umbilicus as a very narrow fissure.

Dimensions. Holotype with 3.75 teleoconch whorls; height 1.3 mm; width 0.6 mm; protoconch width: 432 mm.

Geographic distribution. Continental shelf and slope of north coast of Rio de Janeiro state, southeast of Brazil; 88 m to 450 m deep.

Etymology. *exiguus*, L. = poor, scanty. This species is named after its lack of shell sculpture.

Remarks. Shells of *Eulimastoma exiguum* were illustrated by PIMENTA & ABSALÃO (2004b) but named *Eulimastoma* aff. *weberi* (Morrison, 1965). In that paper, the authors were not confident in recognizing a different taxon, because of the little material available. Examination of material collected from the MD55 and Habitats expeditions allowed the conclusion that this is a new species, distinct from *E. weberi*.

Both species have small shells with a scaled teleoconch whorl and somewhat similar channeled suture, but *E. weberi* has distinct spiral cords above and below the suture, while in *E. exiguum*, this sculpture is absent (Figs 19-20 and 24).

Eulimastoma franklini sp. nov.

Figs 25-30

Eulimastoma aff. *didyma*: Pimenta & Absalão, 2004b: 166, fig. 4J-K.

Type material. Holotype: MNRJ 17168; paratypes: UERJ 3330, type locality [3 shells]; MNRJ 17167, type locality [2 shells]; MNHN IM-2012-7, type locality [1 shell]; UERJ 3339, RAP Ilha Grande sta 15 (23°3.762'S, 44°36.038'W, 7 m), Ponta Grande, Timuiba, Paraty, 19/xi/2003, [5 shells]; MNRJ 17169, Enseada de Dois Rios, Ilha Grande, 19-20/xi/1996 [4 shells].

Type locality. Ponta Grande, Ilha Grande Bay, South coast of Rio de Janeiro state, southeast of Brazil; Ilha Grande RAP Ilha Grande sta 25 (23°5.098'S, 44°18.603'W, 17 m).

Diagnosis. Protoconch helicoidal with ~2.25 whorls; base with two spiral ridges at adapical periphery.

Description. Shell small, conical, color white. Teleoconch with up to four whorls rectilinear in profile. Suture deep, straight. Protoconch heterostrophic helicoidal, with ~2.25 smooth whorls oriented ~80° to teleoconch axis. Sculpture absent, except for one spiral ridge at abapical region of each whorl, above suture. Base straight, marked at adapical periphery by three spiral ridges. Aperture rhomboid tending to pyriform. Columella obliquely arcuate, with a distinct fold. Outer lip thin. Umbilicus as a very narrow fissure.

Dimensions. Holotype with four teleoconch whorls; height 1.4 mm; width 0.8 mm; protoconch width: 210 mm.

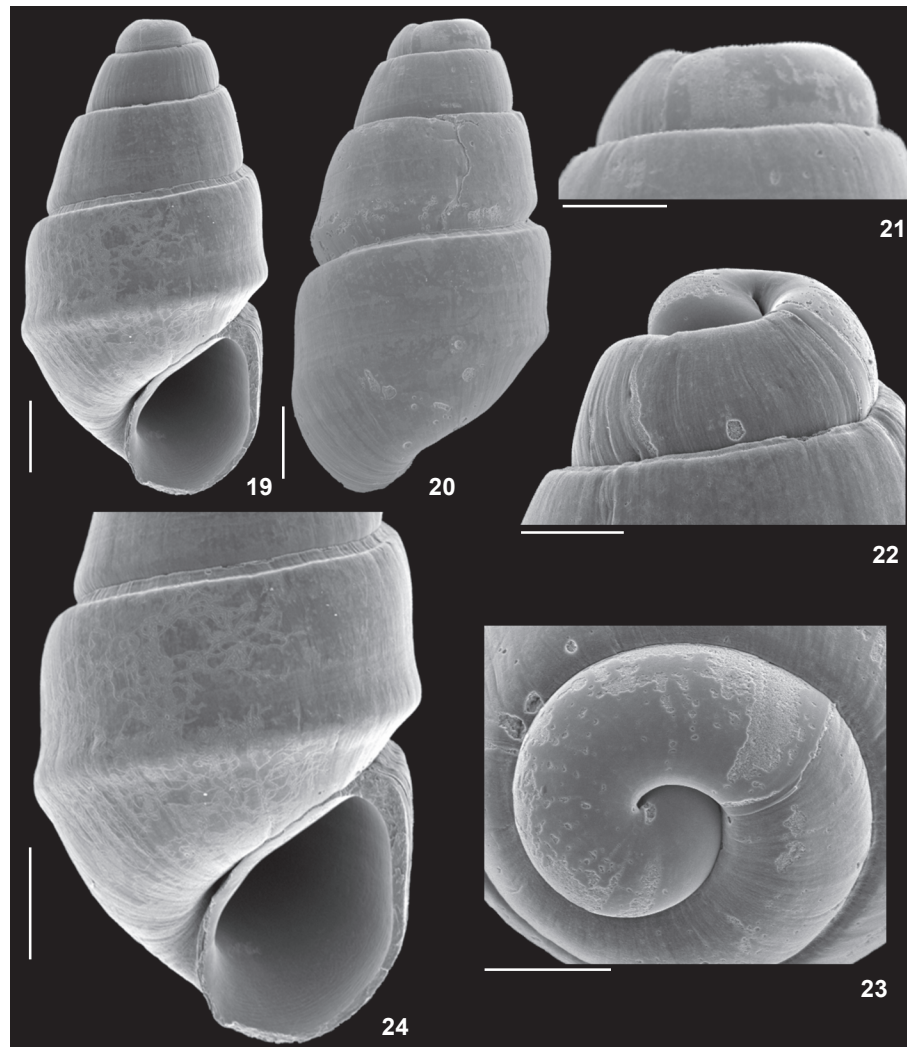
Geographic distribution. Known only for shallow waters (7 m to 17 m deep) at Ilha Grande bay, south coast of Rio de Janeiro state, southeast of Brazil.

Etymology. This species is named after in honor of Dr. Franklin Noel dos Santos, Brazilian malacologist, who took part at RAP Ilha Grande project, in the malacological team.

Remarks. Shells of *Eulimastoma franklini* were illustrated by PIMENTA & ABSALÃO (2004b) but termed *Eulimastoma* aff. *didymum*. The authors recognized a single difference from *E. didymum* in the protoconch shape, but because of the little material available, decided not to describe it.

Examination of new material, also collected at Ilha Grande, allowed the recognition of a new species. *Eulimastoma franklini* (Figs 25-30) is indeed very similar to *E. didymum* in shell shape and teleoconch sculpture. Both species have regular conical shells, with a straight whorl outline and a wide spiral cord above the suture.

The main difference that clearly distinguishes the two species is the type of protoconch, concerning its orientation to the teleoconch axis. Although it is not visible in the eroded holotype, *E. didymum* has an upturned protoconch according



Figures 19-24. *Eulimastoma exiguum*. (19-20) whole shell, lengths: 1.3mm; (21-23) protoconch; (24) last whorl. (19, 22, 24) holotype; (20-21, 29) paratype MNRJ 16309. Scale bars: (10-20, 24) 200 μ m; (21-23) 100 μ m.

to its original description (Verrill & Bush, 1900) and as also illustrated by WISE (1996) in specimens from Texas and by PIMENTA & ABSALÃO (2004b) in specimens from southeast Brazil. In *E. franklini*, the protoconch is oriented about 80° to the teleoconch axis (Figs 27-29).

PIMENTA & ABSALÃO (2004b) described intraspecific variation in *E. dydima* regarding the expression of the subsutural spiral cord, and the presence of spiral striae at the base, from smooth bases to those covered by several grooves. In *E. franklini*, on the other hand, all shells studied have smooth bases (Fig. 30) and lack the subsutural spiral cord on the teleoconch whorls (Figs 25-26 and 30).

In Brazil, *E. franklini* and *E. didymum* occur at the same localities, on the southeast coast. Both species were collected in

Ilha Grande Bay, but while *E. franklini* is only known from Ilha Grande Bay, *E. didymum* was found in localities on the northeast and north coast of Brazil, up to ~3°N (PIMENTA & ABSALÃO 2004b).

Parthenina

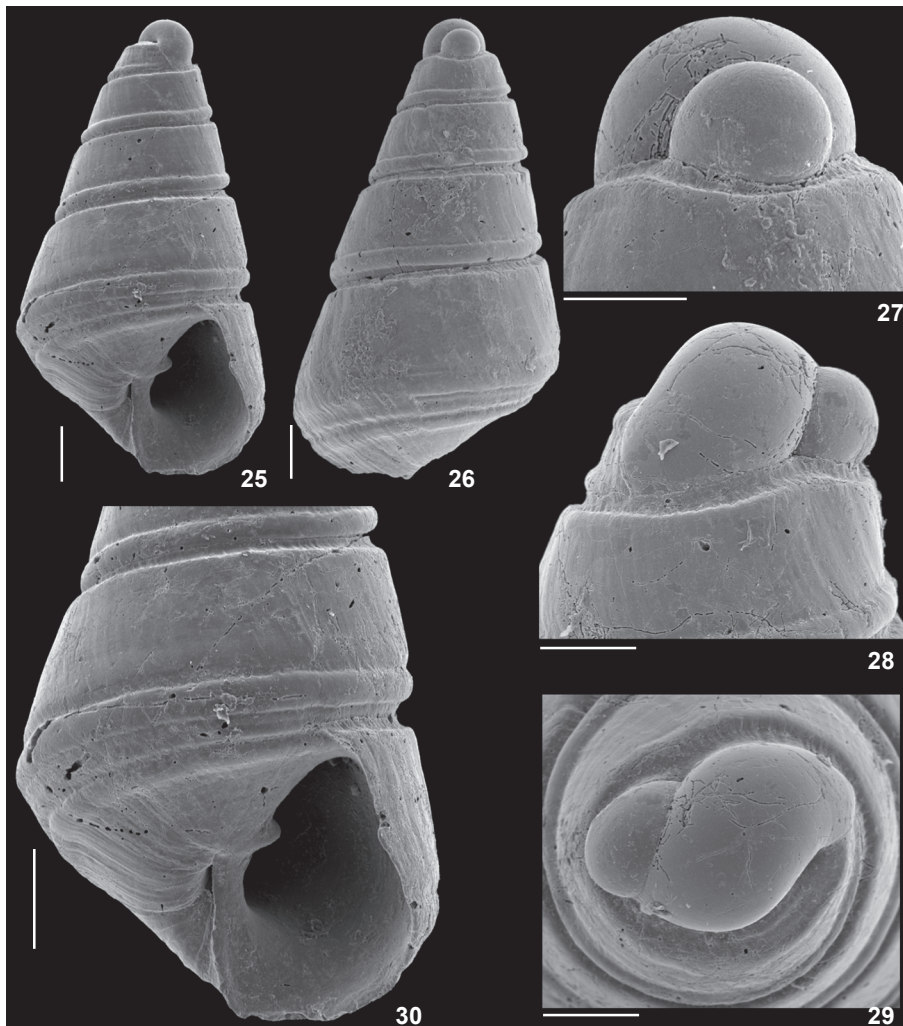
Bucquoy, Dautzenberg & Dollfus, 1883

Parthenina Bucquoy, Dautzenberg & Dollfus, 1883. Type species by monotypy: *Turbo interstinctus* Montagu.

Parthenina biumbilicata sp. nov.

Figs 31-36

Type material. Holotype: MORG 50990, REVIZEE Central sta D3; paratypes: MNRJ 16306, HAB 16 sta H4 (21°42'49"S,



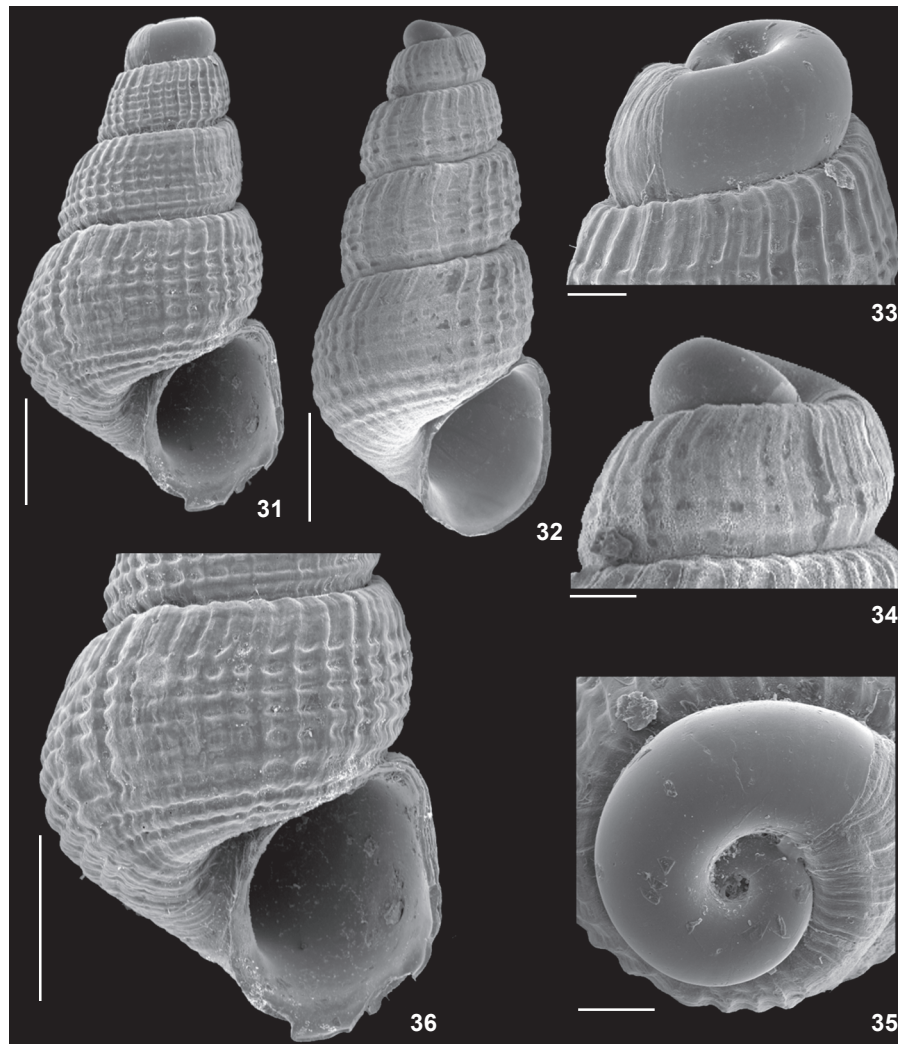
Figures 25-30. *Eulimastoma franklini*. (25-26) whole shell, lengths: 1.4 mm; (27-29) protoconch; (30) last whorl. (25-30) holotype. Scale bars: (25-26, 30) 200 μ m; (27-29) 100 μ m.

40°10'21"W, 97 m), [1 shell]; MNRJ 16307, HAB 16 sta F3 (22°7'39"S, 40°18'53"W, 72 m), [1 shell]; MORG 50991, REVIZEE Central sta C1-D1 (22°48'S, 41°09'1"W, 69 m), 23/02/96 [1 shell]; UERJ 3334, RAP Ilha Grande sta 3, [1 shell]; UERJ 3348, RAP Ilha Grande sta 15, [2 shells]; UERJ 3332, RAP Ilha Grande sta 25 (23°5.098'S, 44°18.603'W, 17 m), Ilha Queimada Grande, 31/x/2003, [1 shell]; UERJ 6192, RAP Ilha Grande sta 9 (23°9.101'S, 44°32.238'W, 19 m), Parcel dos Meros, 18/xi/2003, [1 shell].

Type locality. Continental shelf of north of Rio de Janeiro state, southeast of Brazil REVIZEE Central sta C1-D3 (22°52'S, 41°09'W, 80 m).

Diagnosis. Shell with deep, wide umbilicus; teleoconch sculpture of very thin and close together sinoidal axial ribs; protoconch with regularly increasing aperture diameter and with small circular umbilicus.

Description. Shell conical, color white. Teleoconch with up to four whorls slightly convex in profile. Suture somewhat deep and slightly sinoidal, crenulated by projection of axial ribs summits. Protoconch heterostrophic with ~1.5 smooth whorls oriented in the opposite direction to the teleoconch axis, with no visible nucleus and small circular umbilicus. Axial ribs prosocline, slightly sinoidal, very closed each other, living very narrow interspaces; ~40 ribs on last whorl of holotype. Spiral sculpture formed by four to five strong spiral cords, of same width as axial ribs, located at ~2/3 abapical region of each whorl, forming small nodules when crossing axial ribs; adapical ~1/3 of whorl with very evanescent spiral cords; additional abapical spiral nodulose cord located on periphery of last whorl; base somewhat rounded with three low spiral cords and axial growth lines. Aperture ovoid. Columella obliquely curved, with-



Figures 31-36. *Parthenina biumbilicata*. (31-32) whole shell, respective lengths: (31) 2.35 mm, (32) 2.41 mm; (33-35) protoconch; (36) last whorl. (31, 33, 35-36) holotype; (32, 34) paratype MORG 50991. Scale bars: (31-32, 36) 500 μ m; (33-35) 100 μ m.

out fold. Outer lip thin. Umbilicus wide, deep and circular.

Dimensions. Holotype with 3.5 teleoconch whorls; height 2.35 mm; width 1.2 mm; protoconch width: 370 μ m.

Geographic distribution. Continental shelf of Rio de Janeiro state, southeast of Brazil; 17 m to 97 m deep.

Etymology. This species is named after its conspicuous umbilicus at both last teleoconch whorl and at protoconch.

Remarks. *Parthenina* was used by AARTSEN *et al.* (2000) as a subgenus of *Chrysallida* to include species with small shells ornamented with sinuous axial ribs crossed by weaker spiral cords, restricted to the lower (abapical) region of the teleoconch whorl. Many species with this same sculpture pattern were considered by LINDEN & EIKENBOOM (1992) and by PEÑAS & ROLÁN (1998) as *Chrysallida lato sensu*. SCHANDER *et al.* (2003) consid-

ered *Parthenina* at the full genus rank, after including three species from the eastern Atlantic in a molecular phylogenetic analysis.

PIMENTA *et al.* (2009) followed SCHANDER *et al.* (2003) in considering *Parthenina* at the genus rank, and listed two taxa from Brazil: *Parthenina varia* (Odé, 1993) and *Parthenina cf. interspatiosa* (Linden & Eikenboom, 1992). This latter taxon was considered by PIMENTA *et al.* (2009) to have a somewhat dubious taxonomic status, due to its identical shell morphology to specimens from the eastern Atlantic and the lack of biological data to consider them co-specific.

Parthenina biumbilicata has a teleoconch sculpture of sinuous axial ribs and weak spiral cords (Figs 31-36), but the spiral cords are also present on the adapical $\sim 2/3$ of the teleoconch

whorl, though as very tiny cords. The most similar taxon from the western Atlantic is that recorded by PIMENTA *et al.* (2009) as *P. cf. interspatiosa*, but *P. biumbilicata* has more numerous axial ribs which are closer together. The number of spiral cords is also higher in *P. biumbilicata*, four to five, while in *P. cf. interspatiosa* there are only one or two.

Compared to the European *Parthenina* species described by AARTSEN *et al.* (2000) and those included in *Chrysallida sensu lato* by LINDEN & EIKENBOOM (1992) and PEÑAS & ROLÁN (1998), *P. biumbilicata* has some similarity with *C. juliae* (de Folin, 1872), mainly due to the axial ribs close together, but *P. biumbilicata* is wider and more conical and the axial ribs do not continue over the base (Fig. 36) as in the redescription of *C. juliae* by LINDEN & EIKENBOOM (1992). In addition, the umbilicus of *P. biumbilicata* is wider and deeper (Fig. 36).

REDFERN (2001) illustrated a very similar shell from Abaco, Bahamas, named *Chrysallida* sp. It has the same conical shell shape, teleoconch sculpture and pronounced umbilicus.

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