Seguenziidae (Gastropoda: Vetigastropoda) from SE Brazil collected by the Marion Dufresne (MD55) expedition

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Abstract

The present work deals with the vetigastropods of the family Seguenziidae collected by the Marion Dufresne (MD55) expedition in SE Brazil, reporting the occurrence of eight species. The following species have their geographical range extended: Ancistrobasis costulata, Carenzia carinata, Carenzia trispinosa, Hadroconus altus, Seguenzia elegans and Seguenzia formosa. Two new species, Halystina umberlee sp. nov. and Seguenzia triteia sp. nov., are described.

Key words: Deep-water, Halystina umberlee sp. nov., MD55 Expedition, Seguenzia triteia sp. nov., Seguenzioidae

Introduction

The cruise of the R/V Marion Dufresne (MD55), Terres Australes et Antarctiques Françaises, was a joint project of the Muséum National d’Histoire Naturelle (MNHN; Paris, France) and the Universidade Santa Úrsula (USU; Rio de Janeiro, Brazil), which took place during May and June, 1987 (Tavares 1999). The malacologists on board recovered a vast quantity of deep-water Mollusca from the southeastern Brazilian coast. Some material collected during this expedition has already been studied, resulting in numerous publications (e.g., Leal 1991; Simone & Cunha 2012; Cavallari et al. 2014). The present work continues these studies, dealing with the vetigastropod family Seguenziidae.

Recently, the study of this kind of material has increased in priority: a complete knowledge of the deep-water fauna became imperative for further environmental studies and possible legal protection, since the Brazilian government started the extraction of the “Pré-Sal” (pre-salt) level of petroleum, which is causing major disturbances in depths up to 2000 m off the SE Brazilian coast (Romero et al. 2011).

The Seguenziidae are a group of marine snails of worldwide distribution, mostly living in bathyal depths (between 200–1000 m) on fine sedimentary substrates. The family has a scarce but worldwide fossil record; the oldest known seguenziids stem from the Middle Paleocene of Greenland (Kollmann & Peel 1983), but there is also a doubtful record from the Late Cretaceous of Germany (Fischer 1992). They have been considered as either a vetigastropod taxon or an intermediate between Vetigastropoda and Caenogastropoda, showing a perplexing mixture of plesiomorphic and apomorphous characters (Haszprunar 1988; Hickman 1998). Seguenziids are common in collections of deep-water mollusks, but never in large numbers and almost never collected alive; therefore, their classification is almost completely based on shell characters (Quinn 1983b).

Material and methods

The specimens studied here are all empty shells collected by malacologists P. Bouchet, B. Métivier, and J. H. Leal during the MD55 expedition and are housed in the malacological collections of the MNHN and the Museu de Zoologia da Universidade de São Paulo (MZSP; São Paulo, Brazil). A complete list of the examined material

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follows each species description. We also present brief a description for each species in order to facilitate future comparative work. Images and measurements were obtained using a Zeiss AxioCam MRc 5 and Zeiss AxioVision SE64 Rel 4.8 imaging software. SEM examination was carried out at the MZSP. The following abbreviations are used throughout the text for shell measurements: H = shell length; D = shell greatest width; h = aperture height; d = aperture width.

Systematics

Family Seguenziidae
Genus Ancistrobasis Dall, 1889

Type species: Basilissa costulata Watson, 1879, by subsequent designation of Dall (1927) (Recent; Atlantic Ocean).

Ancistrobasis costulata (Watson, 1879)
(Figs. 1–3)

Basilissa costulata Watson, 1879: 600.

Type locality: The three juvenile syntypes (Watson 1879) stem from the H.M.S. Challenger Expedition Station 24 (25/iii/1873), off Culebra Island (Puerto Rico) and St. Thomas (United States Virgin Islands), ca. 710 m of depth.

Distribution: From Georgia, USA, to southern Brazil, ca. 27–1170 m depth (Rios 2009; Rosenberg et al. 2009). Records in Brazil: Rio de Janeiro, off Cabo Frio, 70 m, and off Rasa Island, 120 m; São Paulo, off Santos, 150 m; Rio Grande do Sul, off Tramandaí, 150 m (Rios 2009).

New occurrence: Off Espírito Santo, 250–940 m depth.

Description: Shell small, conical, relatively thick-walled. Color homogeneous white to beige, often with diffuse, darker blotches. Protoconch (~1 whorl) rounded, with pitted surface; transition visible as orthocline suture. Teleoconch sculpture (except whorl base) consisting of reticulate pattern of axial and spiral cords, with marked angular nodules at intersections. Base of body whorl sculptured by numerous (8–10) spiral ribs, which may be ornamented by nodules near umbilical periphery and peristome. Whorls slightly convex. Suture deep, well-marked. Aperture quadrangular, with strong columellar and strong basal teeth. Umbilicus wide, deep; umbilical crenae nodulose, well-marked, but not too strong.

Measurements (in mm): 6–6½ whorls, H = 4.4 ± 0.3, D = 5.9 ± 0.5, h = 1.6 ± 0.2, d = 2.4 ± 0.3.

Material examined: Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°59’S 37°50’W, 295 m, MNHN, 8 shells, MZSP 116288, 2 shells (MD55, sta. DC75, 27/v/1987); 18°59’S 37°48’W, 607–620 m, MNHN, 9 shells, MZSP 116289, 4 shells (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 shell (MD55, sta. DC28, 14/v/1987); Columbia Bank, 20°44’S 32°08’W, 250–300 m, MNHN, 1 shell (MD55, sta. DC48, 19/v/1987).

Remarks: The present specimens compare well to Ancistrobasis costulata from the North Atlantic. Previous Brazilian records are from Rio de Janeiro, São Paulo and Rio Grande do Sul states (Rios 2009). The present records expand the known distribution of this species in Brazil ca. 450 km northward to Espírito Santo state. Ancistrobasis costulata has lately (e.g., Rosenberg 2013) been considered to represent a synonym of A. reticulata (Philippi, 1844), a species originally described from fossil material from the Pliocene of Italy (Philippi 1844; Quinn 1983b). We consider that simply synonymizing these species without a thorough revision of both fossil and recent taxa, is problematic and, thus, we prefer a more conservative classification of the present material.
FIGURES 1–6. Ancistrobasis and Carenzia from the MD55 expedition. 1–3. Ancistrobasis costulata from Espírito Santo; 1. MNHN (MD55 sta DC75, H = 4.0 mm), apertural view; 2. MNHN (MD55 sta DC73), protoconch detail under SEM (scale bar = 0.1 mm); 3. Same, lateral view under SEM (H = 2.8 mm). 4–6. Carenzia carinata from Espírito Santo; 4. MNHN (MD55 sta DC70), apertural view (H = 2.0 mm); 5. Same, apical view under SEM (D = 3.5 mm); 6. Same, protoconch detail under SEM (scale bar = 0.1 mm).
Genus *Carenzia* Quinn, 1983a

**Type species:** *Seguenzia carinata* Jeffreys, 1877, by original designation (Recent; Atlantic Ocean).

*Carenzia carinata* (Jeffreys, 1877)

(Figs. 4–6)

Synonymy see Quinn (1983a). Complement: *Seguenzia carinata*: Rios, 1975: 32 (fig. 102); Rios, 1985: 33 (fig. 139); Rolán, 2005: 49 (fig. 113).

*Carenzia carinata*: Quinn, 1983a: 356 (figs. 1–7); Haszprunar, 1988: fig. 2Q (*sensu* Kano, 2007); Rios, 1994: 45 (pl. 14, fig. 153); Gofas et al., 2001: 184; Rios, 2009: 73 (textfig.); Rosenberg et al., 2009: 622; Segers et al., 2009: 5.

**Type locality:** Valorous station 13, North Atlantic; 56°01′N 34°42′W, 1263 m (Quinn 1983a).

**Distribution:** Amphi-Atlantic distribution, from the northern end of the Mid-Atlantic Ridge to the Canary Islands and from Florida, USA to the northeastern Brazilian coast; 732–2311 m depth (Quinn 1983a; Rios 2009; Rosenberg et al. 2009).

**New occurrence:** Southeastern Brazil, from Espírito Santo to Rio de Janeiro, 790–3450 m depth.

**Description:** Shell small, broadly conical (nearly twice as wide as tall), strongly keeled, relatively thick-walled. Color homogeneous white to cream. Protoconch (~1 whorl) rounded, bulging, with pitted surface; transition visible as orthocline suture. Teleoconch smooth, except for strong spiral cord at periphery forming distinct keel and usually weaker median spiral cord on each whorl; both cords may bear rounded nodules, especially on last two whorls; nodules expanding axially toward adjacent cords, forming faint axial ribs, particularly on first two whorls. Basal portion of body whorl usually smooth, except for 1–2 very thin spiral threads near peripheral keel, and faint axial growth lines. Upper portion of whorls (above median cord) convex, and lower portion concave, resulting in a step-like profile. Suture shallow, but well-marked. Aperture quadrangular, acuminate toward peripheral keel, with strong columellar tooth. Umbilicus wide (1/4–1/5 of shell diameter), deep; umbilical periphery usually rounded and smooth, except for small nodules near the peristome.

**Measurements (in mm):** 4¾–6¼ whorls, H = 1.8 ± 0.1, D = 3.1 ± 0.9, h = 0.75 ± 0.1, d = 1.0 ± 0.1.

**Material examined:** Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°59′S 37°47′W, 1540–1550 m, MNHN, 34 shells, MZSP 116278, 15 shells (MD55, sta. DC70, 26/v/1987); 19°00′S 37°48′W, 950–1050 m, MNHN, 6 shells, (MD55, sta. DC72, 27/v/1987); 19°01′S 37°47′W, 1500–1575 m, MNHN, 1 shell, (MD55, sta. CB79, 28/v/1987); 19°08′S 37°34′W, 3450 m, MNHN, 2 shells, MZSP 116276, 1 shell (MD55, sta. DS66, 25/v/1987); 19°40′S 37°48′W, 790–940 m, MNHN, 17 shells, MZSP 116275, 9 shells (MD55, sta. CB77, 27/v/1987); Rio de Janeiro: E of Cabo de São Tomé, 21°25′S 39°56′W, 1400–1420 m, MNHN, 5 shells, MZSP 116277, 4 shells (MD55, sta. DS05, 09/v/1987); E of Cabo Frio, 22°50′S 40°15′W, 1835–1872 m, MNHN, 1 shell, (MD55, sta. SY03, 09/v/1987); S of Cabo Frio, 24°12′S 42°15′W, 1555 m, MNHN, 2 shells, (MD55, sta. CB108, 02/vi/1987).

**Remarks:** This species was reported by Clarke (1961) from the southeastern Atlantic, but this record was considered doubtful by subsequent authors (Laubier & Bouchet 1976; Quinn 1983a). The new records expand the range of this species more than 1,000 km southward, from NE to SE Brazil.

*Carenzia trispinosa* (Watson, 1879)

(Figs. 7–8)


*Carenzia trispinosa*: Quinn, 1983a: 358 (figs. 8–12); Rios, 1994: 45 (pl. 14, fig. 154); Rios, 2009: 73 (textfig.); Rosenberg et al., 2009: 622.

**Type locality:** Challenger station 120; 8°37′S 34°28′W, 1115 m (Quinn 1983a).

**Distribution:** Western Atlantic Ocean, from North Carolina, USA, to Argentina, off Rio de la Plata, 684–2360 m depth (Quinn 1983a; Rios 2009).
FIGURES 7–12. *Carenzia* and *Hadrocomus* from the MD55 expedition. 7–8. *Carenzia trispinosa* from Espírito Santo; 7. MNHN (MD55 sta CB77), apertural view (H = 3.6 mm); 8. MNHN (MD55 sta DC70), protoconch detail under SEM (scale bar = 0.1 mm); 9–12. *Hadrocomus altus* from Rio de Janeiro; 9. MNHN (MD55 sta CB99), apertural view (H = 6.0 mm); 10. Same, umbilical view under SEM (D = 7.1 mm); 11. Same, protoconch detail under SEM (scale bar = 0.1 mm); 12. same, apical, slightly umbilical view under SEM.
**New occurrence:** Southeastern Brazil, from Espírito Santo to Rio de Janeiro, 1540–1872 m depth.

**Description:** Shell small, broadly conical (1.1 times as wide as tall), keeled, relatively delicate. Color nacreous white to creamy. Protoconch slightly less than one whorl, rounded, bulging, with smooth surface; transition indistinct, but probably congruent with beginning of medial spiral cord on first teleoconch whorls. First 2–3 teleoconch whorls sculptured by smooth medial spiral cord, becoming nodulose on later whorls; remaining whorls also sculptured by strong nodulose spiral cord at periphery, forming distinct keel; nodules expanding axially toward adjacent cords, forming faint axial ribs especially on three last whorls. Basal portion of body whorl usually smooth except for very delicate sinuous growth lines and strong spiral cord, forming subsutural carina and producing distinct concave zone adjacent to peripheral keel. Whorls convex. Suture shallow, but well-marked. Aperture quadrangular, with strong columellar tooth and two labral sinuses: a moderately deep subsutural and a shallower one adjacent to columellar region. Umbilicus moderately wide (1/5 of shell diameter), deep; umbilical periphery smooth, well-marked.

**Measurements (in mm):** 6–6 ¼ whorls, H = 3.3 ± 0.3, D = 3.8 ± 0.33, h = 1.3 ± 0.2, d = 1.5 ± 0.2.

**Material examined:** BRAZIL: Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°59’S 37°47’W, 1540–1550 m, MNHN, 6 shells, MZSP 116290, 2 shells (MD55, sta. DC70, 26/v/1987); 19°01’S 37°47’W, 1500–1575 m, MNHN, 7 shells, MZSP 116291, 2 shells (MD55, sta. CB79, 28/v/1987); 19°40’S 37°48’W, 790–940 m, MNHN, 1 shell, (MD55, sta. CB77, 27/v/1987); Rio de Janeiro: E of Cabo Frio, 22°50’S 40°15’W, 1835–1872 m, MNHN, 1 shell, (MD55, sta. SY03, 09/v/1987); S of Cabo Frio, 24°12’S 42°15’W, 1555 m, MNHN, 1 shell, (MD55, sta. CB108, 02/vi/1987).

**Remarks:** Some specimens show several (7–8) thin axial threads on the basal portion of the last whorl. The strength and quantity of the nodules is also very variable among specimens. The new records are within the known distribution.

**Genus Hadroconus Quinn, 1987**

**Type species:** Basilissa alta Watson, 1879, by original designation (Recent; Atlantic Ocean).

**Hadroconus altus** (Watson, 1879)

(Figs. 9–12)


**Type locality:** NW of St. Thomas, Virgin Islands, Challenger station 24, 18°30’30”N 65°05’30”W, 713 m (Quinn 1987).

**Distribution:** Western Atlantic Ocean, from Texas, USA, to NE Brazil, 500–2360 m depth (Quinn 1987; Rios 2009; Rosenberg et al. 2009).

**New occurrence:** Southeastern Brazil, from Espírito Santo to Rio de Janeiro, 610–4192 m depth.

**Brief description:** Shell small, conical (1.2 times as wide as tall), carinated, relatively thick-walled. Color iridescent under homogeneous white to cream porcelaneous layer. Protoconch (~1 whorl), smooth, prominent, rounded; transition indistinct. Teleoconch sculptured by 12–15 spiral threads, usually more conspicuous near suture; threads near suture presenting strong, axially elongated nodules, expanding to middle portion of whorls in different degrees, forming faint, sinuous axial ribs in some specimens. Sculpture on adapical portion of body whorl similar to that on opposite side, without nodules. Whorls slightly convex, becoming somewhat concave near suture. Aperture rectangular, acuminate toward carina, with weakly demarcated columellar tooth. Umbilicus wide (1/4–1/5 of shell diameter), deep; umbilical periphery angular, bearing strong nodules.

**Measurements (in mm):** 7½ –8½ whorls, H = 5.3 ± 0.38, D = 6.55 ± 0.22, h = 1.5 ± 0.22, d = 2.45 ± 0.29.

**Material examined:** Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°55’S 37°49’W, 1200–1500 m, MNHN, 1 shell, (MD55, sta. CP68, 26/v/1987); 18°58’S 37°48’W, 682 m, MNHN, 2 shells, (MD55, sta. SY74, 27/v/1987); 18°58’S 37°49’W, 637 m, MNHN, 4 shells, (MD55, sta. CB76, 27/v/1987);
18°59'S 37°47'W, 1540–1550 m, MNHN, 10 shells, MZSP 116281, 3 shells (MD55, sta. DC70, 26/v/1987); 19°00'S 37°48'W, 950–1050 m, MNHN, 8 shells, MZSP 116284, 5 shells, (MD55, sta. DC72, 27/v/1987); 19°01'S 37°47'W, 1500–1575 m, MNHN, 3 shells, MZSP 116283, 2 shells (MD55, sta. CB79, 28/v/1987); 19°40'S 37°48'W, 790–940 m, MNHN, 15 shells, MZSP 116282, 3 shells (MD55, sta. CB77, 27/v/1987); off Linhares, N of Dogareessa Bank, 20°02'S 33°27'W, 4185–4192 m, MNHN, 2 shells, (MD55, sta. CP62, 23/v/1987);

Rio de Janeiro: E of Cabo de São Tomé, 21°25'S 39°56'W, 1400–1420 m, MNHN, 2 shells, (MD55, sta. DS05, 09/v/1987); 21°36'S 39°58'W, 1190–1205 m, MNHN, 5 shells, MZSP 116287, 3 shells (MD55, sta. CB99, 23/v/1987); S of Cabo Frio, 23°46'S 42°10'W, 610 m, MNHN, 1 shell, (MD55, sta. CB105, 02/vi/1987); 23°54'S 42°10'W, 830 m, MNHN, 1 shell, (MD55, sta. CB106, 02/vi/1987); 24°00'S 42°14'W, 1020 m, MNHN, 6 shells, MZSP 116286, 3 shells (MD55, sta. CB107, 02/vi/1987).

Remarks: The present specimens compare well with Hadroconus altus, a well-known species from the North Atlantic. This species shows a high degree of conchological variation in overall shell shape and sculpture (Quinn 1987), which can also be seen in the present material. The new records extend the distribution of H. altus ca. 1,700 km to the south, and its bathymetric range ca. 2,000 m, down to 4,192 m.

Genus Halystina Marshall, 1991

Type species: Halystina caledonica Marshall, 1991, by original designation (Recent; New Caledonia).

Halystina umberlee sp. nov. (Figs. 13–18)


Type locality: Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 19°00'S 37°48'08'''W, 950–1050 m depth (MD55, sta. DC72, 27/v/1987).

Distribution: Off southeastern Brazil, from Espírito Santo to Rio de Janeiro, at 950–1550 m depths.

Etymology: The specific epithet is in apposition named after Umberlee, a fictional goddess of the deep sea from the Faerûnian pantheon of the Forgotten Realms campaign setting of the Dungeons & Dragons role-playing game.

Diagnosis: Overall shell profile markedly rounded, roughly as wide as tall; spire slightly step-like, region below suture markedly concave. Body whorl broad. Teleoconch sculpture delicate and narrowly spaced. Spiral cords faint, giving whorls a more convex profile.

Description: Shell small (height 2mm), rounded, conical to turbinate (roughly as wide as tall), relatively thick-walled; spire short, height 1/2 of shell height, spire angle 80°; color nacreous glossy white. Protoconch (~1 whorl, 0.28 mm) bulbous, with pitted, irregular surface, not too prominent; transition visible as thin orthocline line. Teleoconch of circa 4 whorls, with well-marked, but not particularly deep suture. Outline concave between cords, but with an overall convex profile; region slightly below suture markedly concave; sculpture consisting of delicate but well-marked spiral cordlets crossed by axial threads, forming a delicate reticulate pattern; disposition of axial threads alternating between prosoconlve, orthocline and opisthocline between cords along the shell’s longitudinal axis, constituting an overall continuous sigmoid pattern; spiral sculpture becoming gradually weaker toward basal region of last whorl. Body whorl base sculptured by 10–12 spiral cords, with axial threads also present between cords. Umbilical region smooth, edge rounded but thick and well-marked. Aperture quadrangular, height 1/2 shell height, with three labral sinuses: a deep, large (1/5 of whorl height) subsutural sinus; a small (1/6 of aperture height), very shallow sinus in medial region of outer lip; and a relatively large (nearly same size as subsutural) sinus on basal region of aperture, congruent with umbilical carina. Umbilicus narrow (diameter 1/7 of shell diameter), deep.

Measurements (in mm): Holotype: 4½ whorls, H = 1.78; D = 1.75; h = 0.71; d = 0.64. Paratypes: MZUSP 116292 (n = 12), 4½–5 whorls, H = 1.96 ± 0.1, D = 1.88 ± 0.05, h = 0.71 ± 0.2, d = 0.65 ± 0.18; MNHN IM-2000-27538 (n = 21), 4½–5¼ whorls, H = 1.95 ± 0.17, D = 1.86 ± 0.1, h = 1.04 ± 0.08, d = 0.82 ± 0.07; MNHN IM-2000-27539, 4½ whorls, H = 1.64, D = 1.66, h = 0.93, d = 0.69.
Material examined: Types.

Discussion: The present specimens fit well in the genus Halystina, described by Marshall (1991) and corresponding to the Seguenzia Group III sensu Quinn (1983b). The genus is known almost exclusively from the South Pacific, with a single species, H. simplex (Barnard, 1963), occurring off Cape Point, South Africa (Marshall 1991; Poppe et al. 2006). The genus is diagnosed by its small size, overall rounded shell profile, with flat-sided whorls and finely granulate protoconch (Marshall 1991) and is probably related to the very similar genus Halystes Marshall, which differs almost exclusively by its much larger size (Marshall 1988).

The present specimens are reminiscent of most of its congeners, but can be diagnosed by its more rounded overall profile, with a broader body whorl and a more step-like spire, a distinct concave region below the suture, fainter spiral cords (which gives the whorls a more convex profile) and its more delicate and narrowly spaced teleoconch sculpture. The present record greatly expands the distribution of the genus Halystina to western South Atlantic waters.

Halystina umberlee is most similar to H. vaubani Marshall, 1991, but can be distinguished by its broader body whorl, more delicate teleoconch sculpture and fainter spiral cords. Halystina umberlee can be distinguished from H. siberatensis (Thiele, 1925), H. caledonica Marshall, 1991 and H. globulus Poppe, Tagaro & Dekker, 2006 by its more rounded profile, more convex whorls and more step-like spire. Finally, it can be easily differentiated from H. simplex and H. carinata Marshall, 1991, which have more angular shell profiles similar to specimens of Seguenzia Jeffreys, 1876.

Genus Seguenzia Jeffreys, 1876

Type species: Seguenzia formosa Jeffreys, 1876, by monotypy (Recent; Atlantic Ocean) (see Marshall 1983 for more details on the priority of the name).

Seguenzia elegans Jeffreys, 1885
(Figs. 19–21)

Seguenzia elegans Jeffreys, 1876: 201 [nomem nudum].
Seguenzia elegans Jeffreys, 1885: 42 (pl. 5, fig. 1–1a); Clarke, 1959: 232; Clarke, 1961: 350 (pl. 2, figs. 5, 7; pl. 3, fig. 5); Abbott, 1974: 38; Gofas et al., 2001: 184, Segers et al., 2009: 5.
Seguenzia cf. elegans: Quinn, 1983b: 728 (figs. 5, 26).

Type locality: Porcupine Expedition, 1870, Atl. St. 16, 17, 17a, off the coast of Portugal, 740–1095 fathoms (ca. 1350–2000 m depth) (Jeffreys 1885).

Distribution: North Atlantic: Bay of Biscay, off Portugal (Jeffreys 1885); off Bermuda (Clarke 1959); off Yucatan, Mexico (Quinn 1983b). South Atlantic: Cape Basin and Argentine Basin (Clarke 1961).

New occurrence: Southeastern Brazil, Espírito Santo, from 1540 to 3450 m depths.

Description: Shell small, conical, relatively thin-walled, with stepped spire. Color translucent to nacreous glossy white. Protoconch (~1 whorl) prominent, bulbous, microporous; transition to teleoconch sometimes visible as an orthocline line, but not always well-marked. Teleoconch sculpture (except whorl base) consisting of strong spiral cords, with well-marked axial threads and very fine spiral threads between cord and suture; spire whorls bearing two visible spiral cords: a weaker subsutural one, and a stronger supramedian that produces a distinct keel; a third strong cord (though weaker than the supramedian) can be observed emerging below the abapical suture. Distance between axial riblets roughly equal to three times rib width; axial threads prosocone above median keel and opisthocline below it, creating a continuous sigmoid pattern. Whorl base sculptured by 8–10 spiral cords; axial threads between cords, becoming fainter toward umbilicus. Whorls slightly concave between spiral cords, but with overall rounded profile. Suture obscured by subsutural spiral cord. Aperture rounded quadrangular, with well-marked callus, strong columellar tooth, and three labral sinuses: a deep subsutural sinus; a shallow sinus in peripheral part of basal region of aperture; and a very shallow sinus in palatal region of aperture, corresponding to the umbilical carina. Umbilicus narrow, deep, with well-marked (stronger than adjacent spiral cords) but smooth edge.
FIGURES 19–24. Seguenzia from the MD55 expedition. 19–21. Seguenzia elegans from Espírito Santo; 19. MNHN (MD 55 sta DC70), apertural view (H = 2.8 mm); 20. Same, lateral view under SEM; 21. Same, protoconch detail under SEM (scale bar = 0.1 mm); 22–24. Seguenzia formosa from Espírito Santo; 22. MNHN (MD55 sta DC70), apertural view (H = 3.3 mm); 23. MNHN (MD55 sta DC72), slightly lateral view under SEM (H = 3.4 mm); 24. Same, protoconch detail under SEM (scale bar = 0.1 mm).
Measurements (in mm): 5¾–6¾ whorls, H = 2.7 ± 0.27; D = 2.50 ± 0.18; h = 1.37 ± 0.18; d = 1.02 ± 0.14.

Material examined: Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°59’S 37°47’W, 1540–1550 m, MNHN, 11 shells, MZSP 116279, 5 shells (MD55, sta. DC70, 26/v/1987); 19°08’S 37°34’W, 3450 m, MNHN, 1 shell (MD55, sta. DS66, 25/v/1987).

Remarks: Specimens of *S. elegans* can be easily distinguished by their overall roundish profile and numerous and closely-packed spiral cords on the basal portion of the whorls. The species has an amphi-Atlantic distribution, but this is the first record from southern Brazilian waters.

**Seguenzia formosa** Jeffreys, 1876

(Figs. 22–24)

*Seguenzia formosa* Jeffreys, 1876: 200; Jeffreys, 1885: 42; Quinn, 1983b: 728 (figs. 6, 17, 23).

*Seguenzia lineata*: Rios, 2009: 72 (textfig.).


Type locality: Valorous Expedition, North Atlantic, 1450 fathoms (ca. 2650 m depth) (Jeffreys 1876).

Distribution: Morocco, Cape Verde, off USA to Brazil, ca. 80–3700 m depth (Jeffreys 1885; Rosenberg et al. 2009). In Brazilian waters: off Pernambuco state, ca. 640–1235 m depth (Watson 1879); off Cabo de Santa Marta, Santa Catarina state, and off Tramandai, Solídão and Bojuru, Rio Grande do Sul state (Rios 2009).

New occurrence: Southeastern Brazil, from Espírito Santo to Rio de Janeiro, 295–3450 m depth.

Description: Shell small, conical, relatively thick-walled, with stepped spire. Color nacreous glossy white. Protoconch (~1 whorl) prominent, bulbous, microporous. Teleoconch sculpture (except whorl base) consisting of very strong spiral cords (only a single one visible on early whorls), with widely spaced axial threads and very fine spiral threads between spiral cords and suture; spire whorls bearing two visible spiral cords: a weaker subsutural one, and a stronger supramedian that produces a distinct keel; axial threads prosocline above median keel and opisthocline below it, creating a continuous sigmoid pattern. Whorl base sculptured by 6–8 spiral cords; axial threads between cords. Whorls strongly concave between cords and suture, with overall angular shell profile. Suture obscured by subsutural carina. Aperture quadrangular, with a strong columellar tooth and three labral sinuses: a deep subsutural sinus; a shallow sinus in peripheral part of basal region of aperture; and a very shallow sinus in palatal region of aperture, corresponding to the carina. Umbilicus imperforate, resulting in a strengthened and sinuous columellar region.

Measurements (in mm): 6¼–7½ whorls, H = 3.25 ± 0.15; D = 2.7 ± 0.09; h = 1.34 ± 0.44; d = 1.16 ± 0.12.

Material examined: Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 18°55’S 37°49’W, 1200–1500 m, MNHN, 2 shells, (MD55, sta. CP68, 26/v/1987); 18°58’S 37°48’W, 682 m, MNHN, 18 shells, (MD55, sta. SY74, 27/v/1987); 18°59’S 37°47’W, 1540–1550 m, MNHN, ~400 shells, MZSP 116293, ~100 shells (MD55, sta. DC70, 26/v/1987); 18°58’S 37°49’W, 637 m, MNHN, 40 shells, (MD55, sta. CB76, 27/v/1987); 19°00’S 37°48’W, 950–1050 m, MNHN, 113 shells, (MD55, sta. DC72, 27/v/1987); 18°59’S 37°48’W, 607–620 m, MNHN, 8 shells, (MD55, sta. DC73, 27/v/1987); 19°01’S 37°47’W, 1500–1575 m, MNHN, 83 shells, MZSP 116294, 22 shells (MD55, sta. CB79, 28/v/1987); 19°01’S 37°29’W, 3420–3442 m, MNHN, 1 shell, (MD55, sta. CP65, 25/v/1987); 19°08’S 37°34’W, 3450 m, MNHN, 18 shells, (MD55, sta. DS66, 25/v/1987); 19°13’S 37°33’W, 3450 m, MNHN, 8 shells (MD55, sta. SY67, 25/v/1987); E of mouth of Rio Doce, 19°34’S 38°55’W, 340–360 m, MNHN, 86 shells, MZSP 116298, 14 shells (MD55, sta. CB92, 29/v/1987); 19°36’S 38°53’W, 640 m, MNHN, 1 shell (MD55, sta. CB93, 30/v/1987); continental slope of Abrolhos, 19°40’S 37°48’W, 790–940 m, MNHN, 38 shells, MZSP 116295, 14 shells, (MD55, sta. CB77, 27/v/1987); Rio de Janeiro: E of Cabo de São Tomé, 21°25’S 39°56’W, 1400–1420 m, MNHN, 2 shells, (MD55, sta. DS05, 09/v/1987); E of Cabo Frio, 22°50’S 40°15’W, 1835–1872 m, MNHN, 2 shells, (MD55, sta. SY03, 09/v/1987); S of Cabo Frio, 23°41’S 42°06’W, 430–450 m, MNHN, 30 shells, MZSP 116297, 10 shells (MD55, sta. CB104, 01/vi/1987); 23°46’S 42°10’W, 610 m, MNHN, 11 shells, (MD55, sta. CB105, 02/vi/1987); 23°54’S 42°10’W, 830 m, MNHN, 5 shells, (MD55, sta. CB106, 02/vi/1987).
FIGURES 25–28. Seguenzia triteia sp. nov.; 25. Holotype MNHN IM-2000-27536, apertural view (H = 3.3 mm, D = 2.4 mm);
26–28. Paratype MNHN IM-2000-27540 (H = 3.1 mm, D = 2.2 mm); 26. Lateral view under SEM; 27. Protoconch detail under SEM (scalme bar = 0.1 mm); 28. Umbilical view under SEM.
Remarks: The present specimens closely resemble *S. formosa*, mainly by their teleoconch sculpture and imperforate umbilicus, with a sinuous columellar region of the aperture. Moreover, they compare especially well to *S. formosa* var. *lineata* Watson, 1879, but the distinction between subspecies is unclear and this classification is avoided here until these taxa are properly revised. The present records fill the gap in the distribution of this species. Some previous authors (see synonymy above) have usually identified Brazilian specimens of *S. formosa* as two similar fossil species: *S. monocingulata* Seguenza (Pliocene, Italy) and *S. hapala* Woodring (Miocene, Jamaica). *Seguenzia formosa* could represent a synonym of *S. monocingulata*, but here we prefer a more conservative classification until a thorough revision of these species is conducted.

_Seguenzia triteia_ sp. nov.
(Figs. 25–28)


**Type locality:** Brazil: Espírito Santo: off São Mateus, continental slope of Abrolhos, 19°01’S 37°47’W, 1500–1575 m (MD55, sta. CB79, 28/v/1987).

**Distribution:** Southeastern Brazil, off Espírito Santo state.

**Etymology:** The specific epithet is in apposition, and is derived from Greek mythology. Triteia, daughter of Triton, was a haliad (sea nymph) priestess of Athena, from the town of Triteia in Achaea, Greece; her son with the war god Ares, named Melanippos, gave his mother’s name to the city.

**Diagnosis:** Spire narrow. Teleoconch sculptured by numerous spiral cords with very strong axial ribs between them; whorl base with same sculpture pattern.

**Description:** Shell small (height 3.3 mm), conical (1.5 taller than wide), relatively thick-walled; spire tall, prominent, height 2/3 of shell height, spire angle 60°; color nacreous glossy white. Protoconch (~1 whorl, 0.3 mm) prominent, bulbous, with pitted, irregular surface; protoconch-teleoconch transition well-marked as a distinct change in sculpture. Teleoconch of 6½ whorls, with inconspicuous suture; sculpture consisting of very strong spiral cords crossed by widely-spaced strong axial ribs, with very fine spiral threads between cords; spire whors bearing 2–3 conspicuous spiral cords, a stronger, median one that forms a well-marked carina; axial ribs prosocline above spiral cord and orthocline (on first teleoconch whors) to opistocline below it. Whorl base sculpture similar, with spiral cords decreasing in strength and becoming more narrowly spaced towards umbilical region. Whorls concave between cords, but with overall convex whorl profile somewhat angulated at second spiral cord. Aperture rounded-trapezoid, height 1.4 of shell height, roughly as high as wide, with a columellar tooth and three labral sinuses: a very deep subsutural sinus and two adjacent and shallower sinuses, one on lowermost portion of columellar region of aperture and the other on peripheral part of basal region. Umbilicus imperforate.

**Measurements (in mm):** Holotype: 7½ whors, H = 3.3; D = 2.4; h = 1.2; d = 1.0. Paratypes: MZSP 116280, 7½–7.7 whors, H = 2.9 ± 0.5; D = 2.2 ± 0.2; h = 0.9 ± 0.1; d = 0.9 ± 0.2.

**Material examined:** Types.

**Remarks:** The present specimens, despite having the overall shell morphology of _Seguenzia_, can be easily distinguished from all its congeners by its marked teleoconch sculpture, with conspicuous spiral cords and very strong axial sculpture. The other diagnostic features of _Seguenzia triteia_ sp. nov. include a narrower spire and having on the whorl’s basal region the same kind of sculpture as the remainder of the teleoconch. The single most similar species to _S. triteia_ is _S. levii_ Marshall, 1991 from New Caledonia, which also bears a very strong teleoconch sculpture; nevertheless, _S. triteia_ can be easily distinguished from this species by its smaller size and its more regular and delicate teleoconch sculpture.

**Discussion**

With the present records, there is a total of 10 seguenziid species known in Brazilian waters. The other previously known species, not found in the present material, are _Ancistrobasis zumbii_ Lima, Christoffersen & Barros, 2013,
currently known only from off Alagoas state, northeastern Brazil (Lima et al. 2013), and Basilissa discula (Dall, 1889), currently known from Texas, USA, to Rio de Janeiro state, Brazil (Rios 2009).

According to Quinn (1983b), most Atlantic seguenziids are rather provincial in distribution, occurring on a single side of the ocean and usually within one or two basins. Nevertheless, most species reported here show a very broad geographical distribution. Seguenziids are often represented only by empty shells (Quinn 1983b), which precludes a more refined taxonomy. Moreover, studies of South American, especially Brazilian, seguenziids are very scarce. Perhaps, when anatomical and molecular data becomes available, the South Atlantic seguenziids will prove to be more diverse and endemic, as seen, for instance, in the South Pacific (Marshall 1991).

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