

Two species of columbellids of the genus *Alia* for the coast of Peru: *Alia unicolor* (Sowerby, 1832) and *Alia unifasciata* (Sowerby, 1832)

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Duas espécies de columbelídeos do gênero *Alia* para a costa do Peru: *Alia unicolor* (Sowerby, 1832) e *Alia unifasciata* (Sowerby, 1832)

Resumo: Este trabalho investigou os caenogastropódeos da família Columbellidae Swainson, 1840 pertencentes ao gênero *Alia* H. Adams & A. Adams, 1853 no litoral do Peru com base no estudo do material tipo depositado no “The Natural History Museum” e material coletado na zona infralitoral da costa do Peru e depositado na coleção malacológica “Carlos Alberto Arias Ávila”. O gênero *Alia* está representado por sete espécies. *Alia unifasciata* (G. B. Sowerby I, 1832) é a única espécie registrada para a costa do Peru. Atualmente, *Alia unicolor* (G. B. Sowerby I, 1832) é reconhecida como um sinônimo de *A. unifasciata*. Neste estudo, o material tipo e espécimes representativos de cada táxon foram estudados e ilustrados. Tal análise possibilitou reconhecer *A. unicolor* como uma espécie de Columbellidae válida para o Oceano Pacífico com base no estudo da morfologia da concha. O estudo do material tipo e material adicional mostrou que as mais óbvias características que distinguem *A. unicolor* da sua congênera são a presença de existência de voltas com um contorno mais convexo, sutura profunda, abertura alargada formando um ombro na região posterior e base columelar com uma visível curvatura. *Alia unifasciata* possui voltas subachatadas, sutura levemente marcada, abertura estreitada sem a formação de um ombro abapical e base columelar reta a suavemente curvada. *Alia unifasciata* também difere de *A. unicolor* devido a presença de uma faixa espiral subsutural esbranquiçada.

Palavras chave: Taxonomia, Mollusca, Neogastropoda, nomenclatura, Oceano Pacífico, águas rasas.

Abstract: This study investigated the caenogastropods of the family Columbellidae Swainson, 1840 belonging to the genus *Alia* H. Adams & A. Adams, 1853 in the littoral of the Peru based on the type material deposited in The Natural History Museum and material collected in the infralittoral zone off the coast of Peru and deposited in the Colección Malacológica Carlos Alberto Arias Ávila. The genus *Alia* is represented around the world by seven species. *Alia unifasciata* (G. B. Sowerby I, 1832) is the only species reported for the coast of Peru. Currently, *Alia unicolor* (G. B. Sowerby I, 1832) is considered as a synonym of *A. unifasciata*. Herein, the type material and representative specimens of each taxa have been studied and illustrated. Such examination made it possible to recognize *A. unicolor* as a valid columbellid species

for the Pacific Ocean base on the shell morphology. Examination of the type material and additional material examined have shown that the most obvious characters of *A. unicolor* that distinguish it from its sympatric congener *A. unifasciata* are whorls with a more convex contour, deep suture, wide aperture forming a shoulder in the posterior region and columellar base with conspicuous curvature. *Alia unifasciata* has subflattened whorls, a lightly printed suture, narrower aperture without the formation of an abapical shoulder and a straight to slightly curved columellar base. *Alia unifasciata* also differs from *A. unicolor* by the presence of a very clear characteristic whitish spiral band positioned in the subsutural region.

Key words: Taxonomy, Mollusca, Neogastropoda, nomenclature, Pacific Ocean, shallow waters.

Introduction

Marine gastropods of the family Columbellidae Swainson, 1840 are one of the most important groups of benthic mollusks off the coast of Peru (Alamo & Valdivieso 1997; Ramirez *et al.* 2003). Several publications report the occurrence of around 34 columbellid species found in many benthic communities in intertidal to subtidal environments of the Peruvian Sea (Keen 1971; Alamo & Valdivieso 1997; Ramirez *et al.* 2003). From the taxonomic standpoint, however, columbellids remain poorly studied and there are many gaps in basic knowledge on the richness of this family.

The genus *Alia* H. Adams & A. Adams, 1853 includes seven species of marine gastropods belonging to the family Columbellidae Swainson, 1840 (MolluscaBase 2019). Among the known species of *Alia*, some publications only recognize *Alia unifasciata* (G. B. Sowerby I, 1832), with occurrence in the Eastern Pacific (Forcelli 2000).

From the work by Chenu (1842), it was possible to rediscover taxonomic aspects also addressed by Dall (1909) in his "Report on a collection of shells from Perú, with a summary of the littoral marine Mollusca of the Peruvian zoological province" on the columbellid *Astyris unicolor* (Sowerby, 1832) (= *Columbella unicolor* Sowerby, 1832 - junior synonym of *A. unifasciata*). We therefore became interested in the taxonomic study of columbellids of the genus *Alia* of the Peruvian malacological province, which enabled the validation of a second species of *Alia* based on the images found in Chenu and remarks by Hidalgo as well as other authors. Furthermore, the study of photographs of the type material of *Alia* deposited in the Natural History Museum of the United Kingdom (NHMUK) was extremely important to verifying the consistency of the validation of the species discussed herein.

Material and Methods

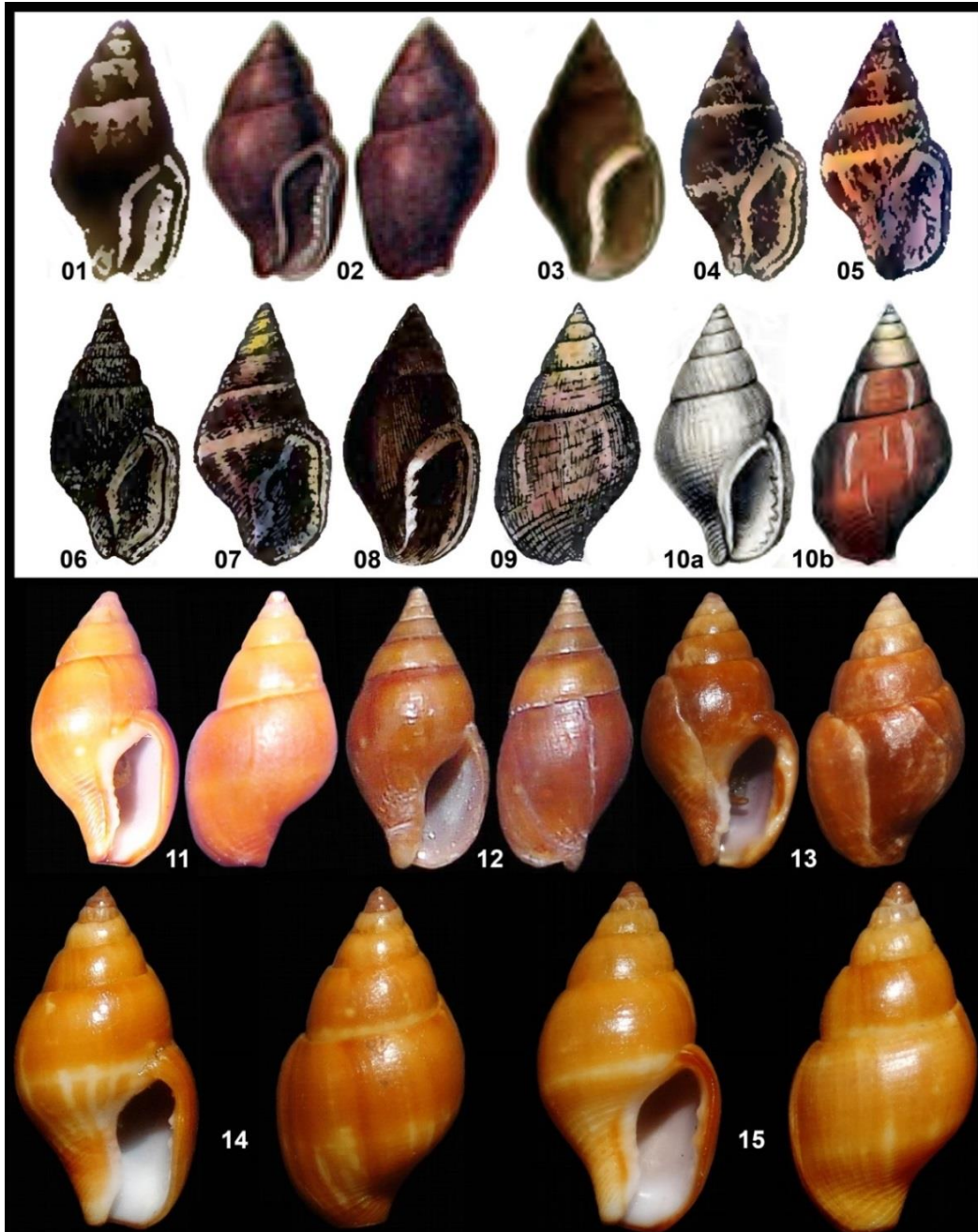
The sampling of the individuals studied here was carried out in March 1986, February 1992 and March 1992, using a dredge sampler for collection in the infralittoral zone off the coast of Peru. Samples were collected directly at the shore level of the beaches as beached material. In the laboratory, the samples were sieved (mesh size: 0.5 mm) and sorted under a stereomicroscope. All specimens were preserved in 70% ethanol.

Identification of the material was performed under a stereomicroscope to the specific level. Individuals were also studied based on photographs. The columbellids analyzed are deposited in the following scientific collections: Colección Malacológica Carlos Alberto Arias Ávila (CAAA), Lima, Perú; The Natural History Museum (NHMUK), London, Great Britain. Other abbreviations used: BM[NH] = British Museum of Natural History – actually NHMUK; H = length; MNHN = Muséum National d'Histoire Naturelle (MNHN), Paris, France; USNM = National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; W = width.

Results

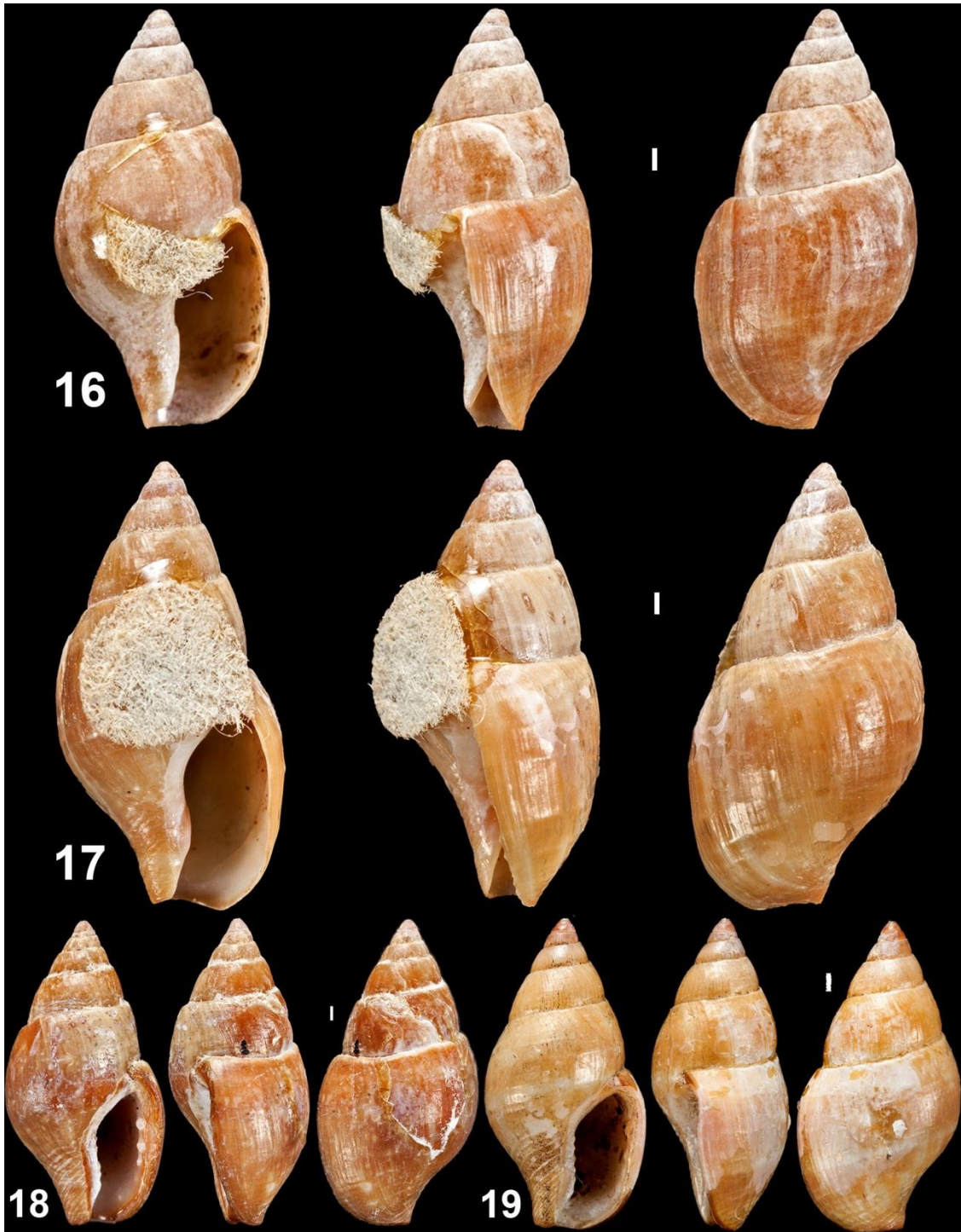
Alia unicolor (Sowerby 1832)
Figures 1–19

Astyris unicolor (Sowerby, 1832) — Dall (1909: 168, 217); Gigoux (1934: 278).
Columbella unicolor Sowerby, 1832 — De Lamarck (1844: 282); Sowerby (1847: 133, fig. 129); Reeve (1859: fig. 105); Dall (1909: 168, 217); Gigoux (1934: 278).
Columbella unicolor G.B. Sowerby — Müller *et al.* (1836: 91).
Columbella (Alia) unicolor Sowerby, 1832 — Hidalgo (1893: 354).
Mitrella unicolor (Sowerby, 1832) — Mogollón *et al.* (1999: 53, fig. 6j); Thorsson & Monsecour (2006: 15, figs A–B).



Figures 1–15. Specimens of *Alia unicolor*: 1. *Columbella unicolor* – Sowerby (1847: pl. XXXIX, fig. 129); 2. *Columbella unicolor* – Chenu (1842: pl. 24, figs 1–2); 3. *Columbella sordida* – Orbigny (1847: lam. 77, fig. 2); 4. *Columbella unicolor* – Reeve (1859: pl. XIX, fig. 105); 5. *Columbella unifasciata* – Reeve (1859: pl. XIX, fig. 107); 6. *Columbella unifasciata* – Tryon (1883: pl. 47, fig. 40); 7. *Columbella unicolor* – Tryon (1883: pl. 47, fig. 41); 8. *Columbella sordida* – Tryon (1883: pl. 47, fig. 42); 9. *Columbella castanea* – Tryon (1883: pl. 47, fig. 43); 10. *Columbella castanea* – Gould (1856: 10a, pl. 19, 339–339a; 10b, pl. 19. 339b); material examined: 11. CAAA 406 (H = 9.7 mm, W = 5 mm); 12. CAAA 688 (H = 7.4 mm, W = 3.4 mm); 13. CAAA 628 (H = 11.9 mm, W = 7.1 mm); 14. CAAA 628 (H = 8.9 mm, W = 5.0 mm); 15. CAAA 628 (H = 10.3 mm, W = 5.4 mm).

Type material: *Columbella unifasciata* Sowerby, 1832, syntype registration number - NHMUK 1966317. Locality: Valparaiso, under stones at low water. Hugh Cuming collection. Galapagos Islands (Sowerby 1832: 119, 1847: 133, fig. 129; Reeve 1859: fig. 105).



Figures 16–19. Four syntypes of *Alia unicolor*. 16–18. Shells in ventral, lateral and dorsal views (NHMUK 1966317); 19. Shell in ventral, lateral and dorsal views (grouped under the syntype of *Columbella unifasciata* (NHMUK 1967941). Scale bars: 1 mm.

Material examined: 52 specimens (sps) — CAAA 628, Islas Los Chimus, Samanco, Prov. Santa, Región Ancash (09°20.7' S, 78°25.5' W), depth of 15 to 20 m, remains of seashells and gravel, collector Valentín Mogollón Avila (25/09/1997); 4 sps — CAAA 405, Playa Las Conchitas, Ancón, Prov. Lima, Región Lima Metropolitana (11°44.5' S, 77°11.6' W), Thrown by the sea, collector Carlos A. Arias Ávila (15/03/1986); 3 sps — CAAA 406, Bahía Independencia, Prov. Pisco, Región

Ica (14°15.0' S, 76°14.0' W), depth of 7 m, collector Carlos A. Arias Ávila (02/02/1992); 2 sps — CAAA 688, Huaynuna, Prov. Casma, Región Ancash (09°20.7' S, 78°25.5' W), Rocky intertidal, collector Valentín Mogollón Avila (12/12/1992); 2 sps — CAAA 1787, Islas Lobos de Tierra, Prov. Lambayeque, Región Lambayeque (06°26.0' S, 80°51.0' W), depth of 15 to 20 m, collector Valentín Mogollón Avila (21/04/2002).

Original description: *Columbella unicolor*. Col. testâ ovatae, medio ventricosâ, castaneâ; anfractibus 5, lævibus; suturâ profundiusculâ; aperturâ latiusculâ, ad basin subeffusâ; canali brevissimâ; labio externo extûs subincrassato, intûs denticulis obsoletiusculis nonnullis: long, 4/10, lat. 2/10 poll. Hab. ad Insulas Gallapagos. (Hood's Island.) (Sowerby 1832: 119).

Characterization: Shell reaching total length 12 mm and 7 mm width, stout, broadly biconic, smooth, brown to orange-brown with thin line of lighter color can be seen on whorl last. Protoconch white, glossy, smooth, blunt, dome-shaped, with 1.50 to 1.75 whorls. Spire conical, slightly acute, about 40% of shell length. Teleoconch with about 5 stout, moderately convex whorls. Axial sculpture consisting of obscure axial growth lines. Spiral sculpture consisting of obscure spiral lines. Suture incised, deep, channeled. First teleoconch whorls gradually increasing in size, except last whorl which is broad, inflated, globose, about 60% of shell length. Last whorl globose sculptured with obscure axial lines. Base imperforate, strongly conical and very contracted. Aperture trapezoidal, slightly enlarged above, about 1/2 of shell length. Parietal region straight to slightly concave, smooth, glazed. Outer lip moderately thin to thickened, slightly curved, smooth within or with about 5 denticles that do not reach the edge. Inner lip thin, weakly reflected on siphonal canal and parietal region, with about 5 to 6 denticles. Anal notch narrow, shallow. Siphonal canal short, open ornamented by indistinct or about 12 moderately developed spiral lines.

Type locality: Galapagos Islands (Sowerby 1832: 119).

Bathymetric and geographic distribution: Between the intertidal and subtidal rocky zones and among the remains of seashells; Chiloé Island, Chile, Peru (Chimbote Bay), Yacila, Paita (Mogollón *et al.* 1999) to Galápagos Islands (Dall 1909; Alamo & Valdivieso 1987).

Alia unifasciata (Sowerby 1832)

Figures 20–30

Alia unicolor (Sowerby, 1832) — Strebel (1905: 634, taf. 23, fig. 36a-c); Forcelli (2000: fig. 275).

Alia unifasciata (Sowerby, 1832) — Forcelli (2000: 98, fig. 275).

Astyris unifasciata (Sowerby, 1832) — Dall (1909: 217); Gigoux (1934: 278).

Columbella unifasciata Sow. — De Lamarck (1844: 287).

Col. unifasciata Sowerby — Sowerby (1847: 133, fig. 130).

Columbella unifasciata Sowerby — Reeve (1859: fig. 107).

Columbella unifasciata Sowerby, 1832 — Dall (1909: 217); Gigoux (1934: 278); Thorsson & Monsecour (2006: 17, fig. A–B).

Columbella (Alia) unifasciata Sowerby, 1832 — Hidalgo (1893: 354, 554); Kobelt (1897: 107, taf. 15, figs 8–9).

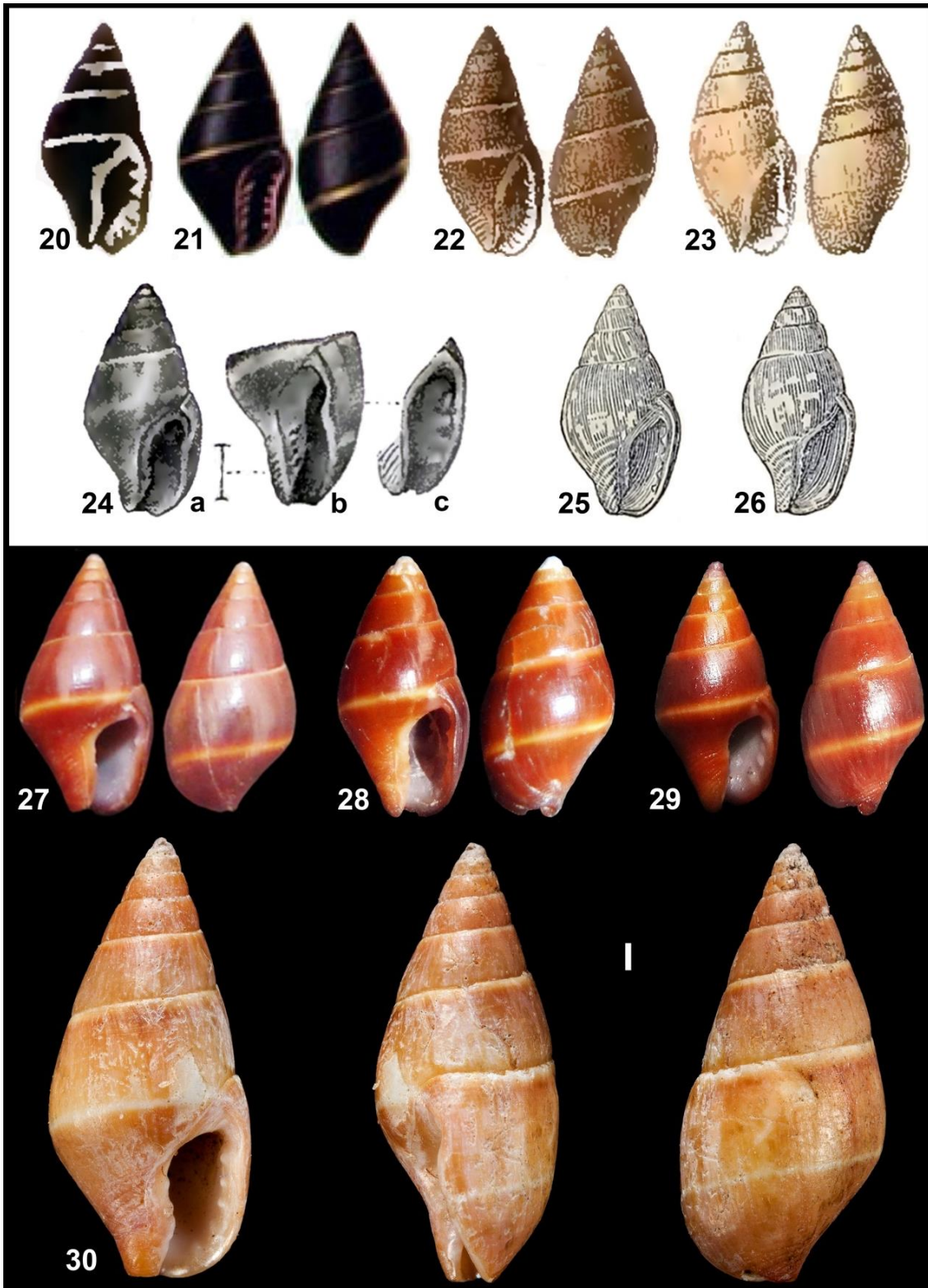
C. unizonalis, Gray in Beechey — Sowerby (1847: 133).

Columbella unizonalis Gray — Gray (1889: 129).

Columbella sordida d'Orb. — Orbigny (1835-1845: 430, pl. 77, figs 2–4).

Mitrella unifasciata (Sowerby, 1832) — Mogollón *et al.* (1999: 53, fig. 6i).

Type material: *Columbella unifasciata* Sowerby, 1832, syntype registration — NHMUK 1967941. Of the two syntype specimens, one corresponds to *Columbella unicolor* Sowerby, 1832. Locality: Valparaiso, under stones at low water. Hugh Cuming collection. Compare with the image of the specimen corresponding to *Columbella unifasciata* Sowerby I, 1832 MNHN syntype (Thorsson & Monsecour 2006).



Figures 20–30. Shells of *Alia unifasciata*: **20.** *Columbella unifasciata* – Sowerby (1847: pl. XXXIX, fig. 130); **21.** *Columbella unifasciata* – Chenu (1842: fig. 13–14, pl. 20); **22.** *Columbella (Alia) unifasciata* – Kobelt (1897: taf. 15, figs 8–9); **23.** *Columbella (Alia) unifasciata* – Kobelt (1897: taf. 15, figs 10–11); **24.** *Columbella (Alia) unifasciata* – Strebel (1905: taf. 23, fig. 36a-c); **25.** *Astyris caletae* sp nov. – Preston (1915: pl. VI, fig. 1); **26.** *Astyris lioneli* sp nov. – Preston (1915: pl. VI, fig. 3); material examined: **27.** CAAA 432 (H = 8.7 mm, W = 4.5 mm); **28.** CAAA 438 (H = 9.1 mm, W = 4.8 mm); **29.** CAAA 627 (H = 7.2 mm, W = 3.6 mm); **30.** Syntype (NHMUK 1967941). **Scale bar:** 1 mm.

Material examined: 4 sps — CAAA 627, Islas Los Chimus, Samanco, Prov. Santa, Región Ancash (09°20.7' S, 78°25.5' W), depth of 15 a 20 m, remains of seashells and gravel, collector Valentín

Mogollón Avila (25/09/1997); 4 sps — CAAA 431, Pisco, Prov. Pisco, Región Ica (13°41' S, 76°18' W), in the stomach contents of "Peje Sapo" (*Sicyases sanguineus*), collector Carlos A. Arias Ávila (10/06/1975); 5 sps — CAAA 432, Bahía Independencia, Prov. Pisco, Región Ica (14°15.0' S, 76°14.0' W), depth of 7 m, collector Carlos A. Arias Ávila (02/02/1992); 2 sps — CAAA 438, Playa Las Conchitas, Ancón, Prov. Lima, Región Lima Metropolitana (11°44.5' S, 77°11.6' W), Thrown by the sea, collector Carlos A. Arias Ávila (15/03/1986); 1 sps — CAAA 1806, Pisco, Prov. Pisco, Región Ica (13°41' S, 76°18' W), accompanying fauna in the extraction of *Stramonita chocolata* (Duclos, 1832), collector Carlos A. Arias Ávila (18/02/2012); 1 sps — CAAA 1812, Pucusana, Prov. Lima, Región Lima Metropolitana (12°28.7' S, 76°47.8' W), depth of 18 m, collector Carlos A. Arias Ávila (16/03/1992); 1 sps — CAAA 1880, Tortugas, Casma, Prov. Casma, Región Áncash (09°21.6' S, 78°24.5' W), rocky intertidal, collector Mario Peña Gonzales (11/08/1995).

Original description: *Columbella unifasciata*. Col. testâ oblongo-pyramidali, lævi, castaneo-nigricante; anfractibus 6, medio spiraliter albido unifasciatis tenifasciatis; aperturâ breviusculâ; peritremate intus denticulis nonnullis: long, 4/10, lat. 2/10 poll. Hab. ad Valparaíso. Found under stones at low wáter (Sowerby 1832: 114).

Characterization: Shell small, reaching total length 9.1 mm and 4.8 mm width, biconical, shining, smooth, reddish-brown, with a whitish band surrounding the last whorl and subsutural region; bluish-white interior. Protoconch whitish, glossy, smooth with 1.5 to 1.75 whorls. Spire moderately acute and high, about 1/2 to 3/4 of shell length. Teleoconch with about 6 very slightly convex whorls. Axial sculpture consisting of indistinct growth marks. Spiral sculpture consisting of indistinct striae spiral. Suture incised. Teleoconch whorls gradually increasing in size. Last whorl oval, about 1/3 to 1/2 of shell length. Base imperforate, strongly conical, very contracted. Aperture rhomboidal, enlarged above, about 1/3 of shell length. Parietal region slightly concave, smooth. Outer lip moderately thickened, slightly curved, with about 4 to 5 small denticles that do not reach the edge. Inner lip thin, smooth, very slightly convex and reflected on siphonal canal. Parietal region very thin and slightly concave. Anal notch narrow, shallow. Siphonal canal short, open ornamented by indistinct spiral threads.

Type locality: Valparaíso (Sowerby 1832: 114).

Bathymetric and geographic distribution: Between the intertidal and subtidal rocky zones and among the remains of seashells; Southern Peru with occurrence from Valparaíso, Chile (Dall 1909) to Los Chimús, Ancash, Peru (Alamo & Valdivieso 1997; Mogollón *et al.* 1999).

Remarks: The original descriptions of *Columbella unifasciata* and *C. unicolor* were written in Latin and based on shells deposited in the Cuming Collection (Sowerby 1832: 114 and 119, respectively). Many subsequent studies addressing these species did not offer more complete conchological characterizations and, in some cases, only compiled the original description while providing additional information on habitat and/or type material.

Sowerby (1832) described the shell morphology and color of *Columbella unifasciata* as pyramidal oblong (Figure 20) and dark brown, respectively. Müller & Wiegmann (1836: 83, 91) discussed *C. unifasciata* and *C. unicolor* but only presented a compilation of the original descriptions. Orbigny (1835–1845) referenced *Columbella sordida* d'Orb. (Figure 3) in Latin and French mentioning that the habitat of the species is associated with sandy substrate between 10 and 12 meters deep surrounding Arica, Islay and Callao, Peru, where it is common. The shell illustrated by Orbigny (1835–1845: Lam. 77, fig. 2) shares considerable similarity with the figure by Sowerby concerning the species *Columbella unicolor*.

Columbella unizonalis Gray, 1839 was described without including any illustration of the species. However, the following description by the author allows us to recognize it as *Alia unifasciata* (Sowerby, 1832): "Shell ovate, lanceolate, smooth, dark chocolate brown; spire conical, acute, as long as the mouth; whorls convex, last with a central white band and spirally

striated in front. Mouth ovate; outer lip simple, sinuous, inner lip simple, slightly thickened; throat smooth. Axis four lines. Operculum thin, pellucid. Inhab. Arica, coast of Perú".

De Lamarck (1844: 282 and 287) also wrote about *C. unifasciata* and *C. unicolor* both in Latin and French compiling the original descriptions. This author recognized *Columbella unicolor* Sowerby in the French text as having small, short and reddish aperture; and *Columbella unifasciata* Sowerby by the presence of small, subquadrangular, purplish white aperture and a narrow, yellowish-white band on the center of the last whorl. Later, Sowerby (1847: *Columbella unicolor*: 133, pl. XXXIX, fig. 129; *Columbella unifasciata*: 133, pl. XXXIX, fig. 130) provided illustrations of both species and also descriptions in English similar to the original descriptions. Sowerby (1847) featured *C. unicolor* (Figure 1) and *C. unifasciata* (Figure 20) in having, respectively: "Shell ovate, ventricose in the middle, chestnut colour; volutions 5, smooth, suture rather deep; aperture rather broad, sub-effuse anteriorly; canal very short: outer lip thickened externally, with a few obsolete teeth within"; and "Shell oblong, pyramidal, smooth, chestnut black, volutions 6, whit a whitish spiral band in the middle; aperture rather short, outer lip with a few small teeth within".

Reeve (1859: *C. unicolor*: 38, Lam XIX, fig. 105; *C. unifasciata*: 38, Lam XIX, fig. 107) also characterized *C. unicolor* and *C. unifasciata* in Latin and English without presenting many descriptive differences in relation to the original description. Reeve (1859) characterized the first species basically by the yellowish brown, inflated shell, well-marked suture, large and denticulated aperture (Figure 4); and the second species as having yellowish brown color with a band and shorter apertura. This author considered both species very similar conchologically, expressing doubts regarding the validity of *Columbella unicolor*. Sowerby and Reeve stated that *Columbella unicolor* has an inflated shell, deep or impressed suture and large aperture. The same authors also recognized similarity in the subsutural band and short aperture in *Columbella unifasciata*.

According to Tryon (1883: 116, pl. 47, figs 40–44), *Columbella (Alia) unifasciata* has "Shell ovate, smooth, with revolving striae at the base of the body-whorl: chocolate, with or without a lighter band on the periphery; chocolate or chestnut-color within the aperture. Length, 12 mill". This author considered *Columbella unicolor* Sowerby (Figure 7), *Columbella unizonalis* Gray, *Columbella sordida* Orbigny (Figure 8) and *Columbella castanea* (Figure 9) to be synonyms of *C. (Alia) unifasciata*. As mentioned, the original descriptions of *C. unifasciata* and *C. unicolor* are related to material from the Cuming collection (Figures 25-29).

Chenu (1842) (Figures 2 and 21) reaffirms the shell morphology described by Sowerby. The images provided by Chenu (1842) and Sowerby (1847) have affinity with the descriptions by Sowerby (1832) for *C. unicolor* and *C. unifasciata*. The figure of *Columbella sordida* Orbigny (1847) (Figure 3) corresponds to *C. unicolor*. In the image reproduced by Tryon, the shell of *Columbella sordida* has more vigorous columellar teeth (Figure 8). The images of Reeve (Figures 4–5) and Tryon (Figures 6–7), the shells of *Columbella sordida* are very similar to each other.

De Lamarck (1844) refers to *Columbella unicolor* as having one color, while *Columbella unifasciata* is described as having a dark brown color decorated in the center of the whorl by a narrow yellowish white zone. Reeve (1859) describes the coloration of *Columbella unicolor* as being chocolate to brown. It is noteworthy that the light bands observed in the images for Reeve and Tryon are not uniform. In living individuals, there are thick, non-uniform bands that can be considered natural ornamentation (Figures 14–15).

Hidalgo (1893: 355) only recognized the following references for *Columbella (Alia) unifasciata* Sowerby: Thes. Conch. *Columbella*, pl. xxxix. f. 130 (*Columbella unifasciata* Sowerby); Z. P; Part ii. p. 114; Gray in Beechey (*Columbella unizonalis*); and also the following publications for *Columbella (Alia) unicolor* Sowerby: Orbigny, Voy. Amer. merid., Moll., lam. 77, figures 2 y 3. (*Columbella sordida*): Z. P. II. 119 (*Columella unicolor* Sowerby); Thes. Conch, *Columbella*, pl. xxxix. f. 129 (*Columella unicolor* Sowerby); Reeve, Conch Icon., *Columbella*, fig. 105; Tryon. Man. Conch, lam. 47, fig. 41 (*Columbella unifasciata*); Reeve, Conch. Icon., *Collumbella*, fig. 107 (*Columbella unifasciata*); Tryon. Man. Conch, lám. 47, fig. 40 (*Columbella*

unifasciata). According to Hidalgo (1893), *Columbella (Alia) unifasciata* Sowerby occurs in Valparaíso y Coquimbo and República de Chile; and *Columbella (Alia) unicolor* Sowerby occurs in Peru. Reeve and Tryon confused this species with *Columbella unifasciata* Sowerby, which is smaller, less globose and more pointed columbellid. Lamy (1903) reinforces Hidalgo's remarks.

In a description in Latin, Kobelt (1897) writes "Anfractus 7 convexi, sutura lineari discreti, ultimus spirae altitudinem aequans, zonula lutescente pallida subsuturali saepe insignis, basi leviter spiraliter sulcatus" for *Columbella (Alia) unifasciata* Sowerby, 1832, on which the arrangement of the whorls and suture reflect specimens of *Alia unifasciata* (Sowerby, 1832), as shown in **Figures 27** and **29**.

According to Kobelt, *Columbella ebumum* Philippi, 1868 from the Strait of Magellan can be considered a variety of *Columbella sordida*.

Strebel (1905) recognized *Columbella unicolor* Sowerby as a having larger, wider shell and light brown coloration; and *Columbella unifasciata* (**Figure 24a–c**) as having a smaller shell and shiny, dark color. The material from the Hamburg Museum (Strebel 1905: 634) does not have an exact location, but corresponds to *Alia unicolor*. The author mentioned two other shells (not illustrated) with a brown color and bright, narrow band in the middle region of the last whorl. Regarding *Columbella ebumum* Philippi, the same author indicated that its description fit the shell morphology of *Columbella unifasciata*. Based on this statement, it is not possible to accept *Columbella ebumum* Philippi, 1868. Moreover, Strebel illustrated a specimen that corresponds to *Alia unifasciata*. Strebel also noted that shells of *Columbella sordida* had more affinity to *Alia unicolor*.

Dall (1909) recognized *Astyris unicolor* Sowerby 1832 from Chiloé Island through Chile and Peru (Chimbote Bay) and the Galapagos Islands dredged from Callao harbor at depths of about 4.5 m near San Lorenzo Island. Dall (1909) also characterized *Astyris unicolor* superficially as having "shell very small, ovate, smooth with revolving striae near the canal; color chocolate or chestnut brown, with or without a lighter band revolving on the periphery; aperture brownish within; outer lip and pillar with a few obscure denticles in the adult; length about 12 mm". Additionally, Strebel (1905) and Carcelles (1950) reported *Astyris unicolor* from southern Argentina. For the synonym of *Alia unifasciata*, mentioned the holotype of the following species and their references: *Columbella unifasciata* Sowerby, 1832. Comm. Sci. Corr. Proc. Zool. Soc. London 2: 114 (Valparaiso, Chile; holotype, BM[NH] 1967.9.41); *Columbella unicolor* Sowerby, 1832. Comm. Sci. Corr. Proc. Zool. Soc. London 2: 119 (Galapagos Islands; holotype BM[NH]); and *Columbella unizonalis* Gray, 1839. Zool. Capt. Beechey's Voyage: 129 (Arica, Perú; holotype BM[NH]).

Astyris caletae Preston, 1915 (**Figure 25**) is recognized as *Alia unifasciata* at several malacological sites (e.g., World Register of Marine Species). Preston (1915) described *Astyris caletae* as having "Shell somewhat radiiform, solid, reddish-chestnut flecked and transversely banded, especially on the last whorl below the periphery, with yellow; whorls seven, regularly increasing, the first six smooth, but for indistinct transverse growth lines, the last bearing a number of revolving lirae at the base; suture impressed, very narrowly margined with white below; columella slightly callously thickened, bearing about six weak plaits; labrum thickened, of a darker chestnut colour than the remainder of the shell, broadly and shallowly notched above, bearing five pinkish denticles on the inner margin; aperture subrectangular; canal short and somewhat broad. Alt., 8.5 mm.; diam. maj., 4.5 mm.; diam. min., 3.75 mm". The mention of the "flecked" (mottled, speckled) color is not typical of *Alia unifasciata* but of *Mitrella gutatta* (Sowerby, 1832). *Astyris caletae* fits the concept of the shell morphology of *Alia unicolor* because it has a well-marked suture and may present a band and light spots as natural decorations as seen in **Figures 13–15**. On the other hand, *Astyris caletae* Preston, 1915 has less convex teleoconch whorls. *Astyris lioneli* sp. nov. (**Figure 26**) has "Shell allied to *A. caletae* Preston, but differing from that species in its much smaller size and narrower form, and in having one whorl less; it has but three weak plaits on the columella, and the labrum is quite destitute of denticulation within. Alt., 6.5 mm; diam. maj., 3.5 mm; diam. min., 2,75 mm". This specimen could be an individual with a shell not yet fully developed. Both *Alia unicolor* and

Alia unifasciata vary from 3 to 5 in the number of teeth in the columellar lip. There is no additional information or photograph of the material type of *Astyris lioneli* Preston, 1915 to analyze the possibility of synonymy with *Alia unicolor* or *Alia unifasciata*.

Radwin (1977) subdivided Columbelloidea into the subfamilies Columbelloidea and Pyrenoidae based on various aspects including radular characters. The author positioned *Alia* in Columbelloidea and *Mitrella* in Pyrenoidae. Radwin (1977) considered *Alia unifasciata* to be “prevalent on the Pacific coast of South America, with an apparent range from Callao, Perú to the Straits of Magellan”. According to the author, a specimen from Rio de Janeiro, Brazil served as the basis of *Columbella castanea* Gould, 1851, a junior synonym. Tryon (1883: 116, fig. 43) illustrated *Columbella castanea* Gray (Figure 9) with strong clear spiral lines. On the other hand, such sculpture is not conspicuous in the description “Shell small, solid, smooth, shining, elongated-ovate, pale chestnut colour, with sometimes a pale girdle about the middle of the last whorl, a few revolving striae about the base, and occasionally a few indistinct ridges about the body of the whorl. Whorls seven, regularly convex, the last rather more than two-thirds the length of the shell, tapering to base; upper margin of the whorls terminating abruptly in a delicate shoulder, dropping into a deep canaliculate suture. Aperture narrow-ovate; outer lip somewhat sinuous posteriorly, striated within; columella with a callus rising like a wall; rostrum very short, truncated; peristome of both margins coloured rich brown; interior porcelain-white.” and illustration by Gould (1852: 269, 1856: 10, figs 339a–b; Figure 10).

Radwin (1977) recognized *Columbella castanea* Gould to be a synonym of *Alia unifasciata*. The images provided by Tryon and Gould, including the figure of a specimen from Rio de Janeiro, Brazil (Radwin 1977: Figure 10 – USNM 18240) correspond to the typical shell morphology of *Alia unicolor*. Indeed, *Columbella castanea* Gould (Figures 9–10) should be recognized as *Alia unicolor*.

Mogollón *et al.* (1999) points out that *Alia unifasciata* is easily identified by the dark brown color interrupted by light spiral line on the periphery of the last whorl from the middle of the outer lip to the upper part of the aperture. The author also describes the polished, shiny surface, slightly convex to flat whorls, slightly carinated aperture and non-incisive suture as determining characteristics of the species. Indeed, the bands observed on the teleoconch whorls of the images (Mogollón 1999: 53, fig. 6i) and photographs (Figures 27–29) of *Alia unifasciata* are very well defined in the subsutural region mainly due to the yellowish white coloration.

Thorsson & Monsecour (2006: 15, fig. a–b) refers to *Alia unifasciata* as *Columbella unifasciata* Sowerby I, 1832 (BMNH - syntype) and *Mitrella* sp. (Thorsson & Monsecour 2006: 16, fig. a–b) from *Columbella unifasciata* Sowerby I, 1832 (MNHN – syntype). The specimen cited as *Columbella unifasciata* Sowerby I, 1832 (BMNH – syntype) has all the characteristics indicated by Sowerby (1844) for *Columbella unicolor* Sowerby and is therefore recognized as *Alia unicolor*. The photograph presented by Thorsson & Monsecour (2006: fig. a) matches the syntype specimen (NHMUK 1966317) of *Columbella unifasciata* Sowerby, 1832 (Figure 30). The difference from the previous species resides in the fact that the specimen of *Columbella unifasciata* Sowerby I, 1832 (MNHN – syntype) (presented as *Mitrella* sp.) is actually *Alia unifasciata*.

In this study, we reinforce the conchological differentiation between *Alia unicolor* (Figures 11–19) and *A. unifasciata* (Figures 27–30) based on the study of the type material and additional material examined. The most obvious characters of *A. unicolor* that distinguish it from its sympatric congener *A. unifasciata* are whorls with a more convex contour, deep suture, wide aperture forming a shoulder in the posterior region and columellar base with conspicuous curvature. *Alia unifasciata* has subflattened whorls, a lightly printed suture, narrower aperture without the formation of an abapical shoulder and a straight to slightly curved columellar base. *Alia unifasciata* also differs from *A. unicolor* by the presence of a very clear characteristic whitish spiral band positioned in the subsutural region.

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