



The littoral species of the genus *Crisilla* Monterosato, 1917 (Caenogastropoda, Rissoidae) in Azores, Madeira, Selvagens and Canary Islands with notes on West African taxa and the description of four new species

Las especies litorales del género *Crisilla* Monterosato, 1917 en las islas Azores, Madeira, Salvajes y Canarias con notas sobre las especies del oeste de África y la descripción de cuatro especies nuevas

Joan Daniel OLIVER*, Emilio ROLÁN** and José TEMPLADO***

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ABSTRACT

The littoral species of the genus *Crisilla* Monterosato, 1917 from the Azores, Madeira, Selvagens and the Canary Islands are reviewed. Some species from the West African coasts have been also studied and the type species of this genus, the European *Crisilla semistriata* (Montagu, 1808), has been taken as reference. In total we have studied 19 species, of which 4 are described as new, 3 from the Canary Islands and 1 from Ghana in the Gulf of Guinea. Two of the species, *Crisilla quisquiliarum* (Watson, 1886) and *Crisilla ugesae* (Verduin, 1988), previously included in the genus *Setia* H. Adams & A. Adams, 1852 are here transferred to *Crisilla*. For each species a detailed description is given supported with SEM photographs, and data about its known distribution and bathymetric range are provided. The study concludes that, like *Alvania* Risso, 1826, the genus *Crisilla* seems to be polyphyletic and appear to represent some independent lines of transition between the species with thicker shell and well-marked sculpture (genus *Alvania*) to those with thinner shell and more or less smooth surface (genus *Setia*). Finally a key to adult shell of all the species that we consider belonging to the genus *Crisilla* is provided.

RESUMEN

Se revisan las especies litorales del género *Crisilla* Monterosato, 1917 en las islas Azores, Madeira, Salvajes y Canarias, así como en la costa del oeste africano. La especie tipo del género, *Crisilla semistriata* (Montagu, 1808), se incluye como referencia obligada. En total se han estudiado 19 especies, de las cuales 4 se describen como nuevas, 3 de las islas Canarias y una cuarta de Ghana en el Golfo de Guinea. Asimismo, dos de las especies, *Crisilla quisquiliarum* (Watson, 1886) y *Crisilla ugesae* (Verduin, 1988), previamente incluidas en el género *Setia* H. Adams & A. Adams, 1852 se transfieren a *Crisilla*. Para cada especie se aporta una detallada descripción (con las correspondientes fotos al SEM) y se dan los datos conocidos acerca de su distribución geográfica y rango batimétrico. El estudio concluye que, al igual que sucede con el género *Alvania* Risso,

*Alcorisa 83 – 12C, 28043 Madrid, Spain

**Museo de Historia Natural, Universidad, Parque Vista Alegre, 15782 Santiago de Compostela, Spain

***Museo Nacional de Ciencias Naturales (CSIC), José Gutiérrez Abascal 2, 28006 Madrid, Spain

1826, consideramos que *Crisilla* es un género polifilético que representa líneas independientes de transición entre las especies de concha más gruesa y escultura más pronunciada (las del género *Alvania*) y las de concha más delgada con la superficie más o menos lisa (las del género *Setia*). Finalmente, se aporta una clave dicotómica de todas las especies que consideramos pertenecientes al género *Crisilla*.

INTRODUCTION

The caenogastropod family Rissoiidae Gray, 1847 is a hyperdiverse group being one of the major families of microgastropods. This family have a worldwide distribution, from polar waters to the tropics, and from the intertidal to the bathyal bottoms (CRISCIONE ET AL., 2016). Representatives of this family are abundant in the North-East Atlantic and Mediterranean Sea (AVILA ET AL., 2012). The first comprehensive treatments of the family at the generic level (THIELE, 1929-1935; WENZ, 1938-1944; COAN, 1964; F. NORDSIECK, 1972) were based on shell characters, particularly sculpture, which could range from entirely smooth, slightly sculptured, to cancellate (ROMANI & SCUDERI, 2015). In the most recent comprehensive review of the group, PONDER (1985) arranged species in genera according to both anatomical and morphological criteria, and the family has recently been redefined by CRISCIONE ET AL. (2016) based on molecular data. Nevertheless, most of the a-taxonomy within the family still relies on shell morphology since soft parts are only known in a limited number of species.

Alvania Risso, 1826 (Gastropoda Rissoiidae) is a very speciose and catchall rissoid genus that embraces more than 150 species in the eastern Atlantic and Mediterranean Sea (MOLLUSCABASE, 2018). This genus-group has been taken in a broad sense and its intrageneric relationships are still largely unresolved without well-defined limits with respect to other close genera, such as *Onoba* H. Adams & A. Adams, 1852 or *Manzonina* Brusina, 1870. In fact, the genus *Alvania* is rendered polyphyletic in the molecular phylogeny provided by CRISCIONE ET AL. (2016) despite the

small number of *Alvania* species included in that study. Several attempts to separate uniform groups at genus-subgenus level within this polymorphic genus led to the description of several supraspecific taxa. Thus, MONTEROSATO (1884) introduced the taxa *Acinopsis* [type species *A. cancellata* (Da Costa, 1778)], *Actonia* [type species *A. testae* (Aradas & Maggiore, 1844)], *Acinus* [type species *A. cimex* (Linnaeus, 1858)], *Alvinia* [type species *A. weinkauffi* Weinkauff, 1868 ex Schwartz ms.], *Galeodina* [type species *A. carinata* (da Costa, 1778)]. Subsequent taxa were added by different authors, such as *Massotia* Bucquoy, Dautzenberg & Dollfus, 1884 [type species *A. lactea* (Michaud, 1830)], *Thapsiella* P. Fischer, 1885 [type species *A. rudis* (Philippi, 1844)], *Alvaniella* Sacco, 1895 ex Monterosato ms. [type species *A. scabra* (Philippi, 1844)], *Acinulus* L. Seguenza, 1903 ex Monterosato ms. [type species *A. cimicoides* (Forbes, 1844)], *Crisilla* Monterosato, 1917 [type species *A. semistriata* (Montagu, 1808)], *Alcidiella* Cossmann, 1921 [type species *A. spinosa* (Monterosato, 1890)], *Flemellia* F. Nordsieck, 1972 [type species *A. zelandica* (Montagu, 1815)], *Alvanolira* F. Nordsieck, 1972 (type species *Alvania lineata* Risso, 1826), or *Moniziella* F. Nordsieck, 1972 [type species *A. moniziana* (Watson, 1873)]. All these taxa are for the moment considered as synonyms of *Alvania* (see MOLLUSCABASE, 2018), except *Crisilla*, which was regarded as a subgenus of *Alvania* by PONDER (1985) and finally considered as a valid, separate genus by BOUCHET & WARÉN (1993). Besides, LOZOUET (1990), BOUCHET & WARÉN (1993) and GOFAS (2007) described within the *Alvania*-group the genera *Benthonellania* Lozou-

Table I. Species of *Crisilla* included in the World Register of Marine Species (MolluscaBase, 2018 plus *C. gaglinae* and *C. maculata*, included in this genus by APPOLLONI *ET AL.*, 2018) and their geographical distribution (ME: Mediterranean Sea, EA: continental European Atlantic coast, AA: continental West African coast, AZ: Azores Islands, MA: Madeira, SE: Selvagens Islands, CA: Canaries, CV: Cape Verde Islands; the letter B indicates bathyal species. The species treated in the present work are indicated in bold. *Crisilla angustostriata* is the only non Eastern Atlantic-Mediterranean species.

Tabla I. Especies del género Crisilla incluidas en el World Register of Marine Species (MolluscaBase, 2018, más C. gaglinae y C. maculata, incluidas en este género por APPOLLONI ET AL., 2018) y su distribución geográfica (ME: Mediterráneo, EA: costas continentales del Atlántico europeo, AA: costas continentales del oeste de África, AZ: Azores, MA: Madeira, SE: Salvajes, CA: Canarias, CV: islas de Cabo Verde; la letra B indica especie batial. Las especies estudiadas en el presente trabajo se indican en letra negrita. Crisilla angustostriata es la única especie del género que no está presente en las costas del Atlántico este o el Mediterráneo.

Species	ME	EA	AA	AZ	MA	SE	CA	CV
<i>C. chiarellii</i> (Cecalupo & Quadri, 1995)	X							
<i>C. beniamina</i> (Monterosato, 1884)	X							
<i>C. gaglinae</i> (Amati, 1985)	X							
<i>C. galvagni</i> (Aradas & Maggiore, 1844)	X							
<i>C. maculata</i> (Monterosato, 1869)	X							
<i>C. marioni</i> (Fasulo & Gaglini, 1987)	X							
<i>C. ramosorum</i> Oliver, Templado & Kersting, 2012	X							
<i>C. semistriata</i> (Montagu, 1808)	X	X						
<i>C. aartseni</i> (Verduin, 1984)	X	X						
<i>C. ovulum</i> Gofas, 2007		X B						
<i>C. fallax</i> Gofas, 1999			X					
<i>C. transitoria</i> Gofas, 1999			X					
<i>C. senegalensis</i> Rolán & Hernández, 2006			X					
<i>C. pastrema</i> (Gofas, 1990)				X				
<i>C. spadix</i> (Watson, 1897)					X			
<i>C. picta</i> (Jeffreys, 1867)					X	X	X	
<i>C. depicta</i> (Manzoni, 1868)					X	X	X	
<i>C. perminima</i> (Manzoni, 1868)					X	X		
<i>C. innominata</i> (Watson, 1897)					X	X		
<i>C. iunoniae</i> (Palazzi, 1989)					X	X		
<i>C. cristallinula</i> (Manzoni, 1868)					X	X	X	
<i>C. callosa</i> (Manzoni, 1868)							X	
<i>C. amphiglypha</i> Bouchet & Warén, 1993							X B	
<i>C. alvarezi</i> Templado & Rolán, 1994								X
<i>C. graxai</i> Templado & Rolán, 1994								X
<i>C. luquei</i> Templado & Rolán, 1994								X
<i>C. morenoi</i> Templado & Rolán, 1994								X
<i>C. ortei</i> Templado & Rolán, 1994								X
<i>C. vidali</i> Templado & Rolán, 1994								X
<i>C. angustostriata</i> Van der Linden, 2005								X

et, 1990 (type species *Benthonellania gofasi* Lozouet, 1990), *Gofasia* Bouchet & Warén, 1993 (type species *Gofasia josephinae* Bouchet & Warén, 1993) and

Porosalvania Gofas, 2007 (type species *Porosalvania solidula* Gofas, 2007), respectively, to include some deep-water species due the particular micro-sculp-

ture of their protoconchs and teleoconchs. Furthermore, GARILLI (2008) regarded *Galeodinopsis* Sacco, 1895 [type species *G. tiberiana* (Coppi, 1876)] as a valid genus for Oligocene-Recent taxa having a shell close to that of some *Alvania* species and showing *Manzoniana*-like combination of microsculptural characters.

In short, the supraspecific taxa *Onoba*, *Manzoniana*, *Cingula* J. Fleming, 1818, *Setia*, *Benthonellania*, *Crisilla*, *Gofasia*, *Porosoalvania* and *Galeodinopsis* are nowadays regarded as valid genera (MolluscaBase, 2018 and CLEMAM, 2017 databases) within the “*Alvania*-group” in Eastern Atlantic and Mediterranean waters. Among these taxa, *Crisilla* and *Manzoniana* are particularly species diverse in the Macaronesian archipelagos.

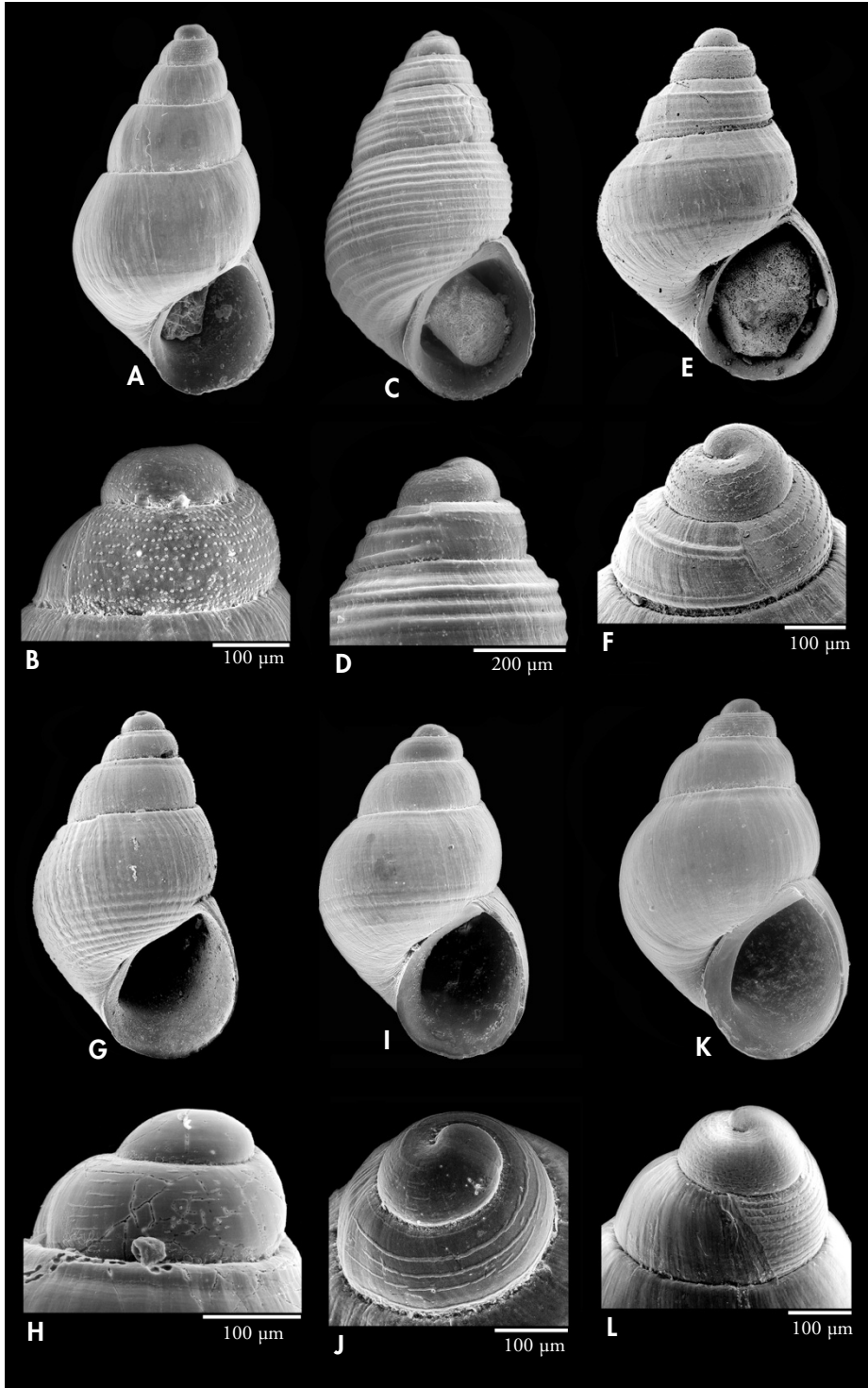
Anyway, the taxonomical state of the art concerning these generic taxa remains unresolved due to their imprecise limits and the existence of species with intermediate characters. Therefore, the taxonomy of this group needs reassessment based on additional data, including anatomical and genetic information. As pointed out by SCUDERI & AMATI (2012), the need of revisionary work is particularly obvious in the genus *Crisilla* Monterosato, 1917, a taxon showing unsolved nomenclatural issues along with uncertainty and difficulty in delimitation of its species.

In the present paper we focus on the littoral *Crisilla* species from Canary, Selvagens, Madeiran and Azorean Islands. We also studied some species from the West African coasts and use as reference the type species of this genus, the European *Crisilla semistriata*.

The genus *Crisilla* was erected by MONTEROSATO (1917) to separate from *Cingula* all the numerous Mediterranean and Macaronesian species morphologically similar to *C. semistriata*. Subsequently, the treatment of this supraspecific taxon has varied over time. VERDUIN (1984) did not consider *Crisilla* with generic value and included its species within the genus *Cingula*. It was treated as sub-genus of *Alvania* by PONDER (1985), but it was later given genus rank by BOUCHET & WARÉN (1993) based on the morphological homogeneity of shells among its species. They included in *Crisilla* some species whose shell is similar in shape to the type species (*C. semistriata*), which is usually semitransparent with brownish square blotches. One unusual feature shared by these species (according to BOUCHET & WARÉN, 1993) is the pair of subsutural furrows, also present in *Alvania zylensis* Gofas & Warén, 1982, species they believe that may belong to this group. Although this species meets several of the characters assigned to the genus *Crisilla*, due to the characteristic zig-zag pattern of the sculpture of its

(Right page) Figure 1. Iberian and Balearic species of *Crisilla*. A, B: *Crisilla maculata* (Monterosato, 1869): shell (1.9 mm), and protoconch (Favarix, Menorca, Balearic Islands); C, D: *Crisilla galvagni* (Aradas & Maggiore, 1844): shell (Menorca, Balearic Islands, 1.7 mm) and protoconch (Ibiza, Balearic Islands); E, F: *Crisilla beniamina* (Monterosato, 1884): shell (1.4 mm) and protoconch (Ibiza); G, H: *Crisilla marioni* Fasulo & Gaglini, 1987: shell (Menorca, 1.9 mm) and protoconch (Ibiza); I, J: *Crisilla ramosorum* Oliver, Templado & Kersting, 2012: shell (1.2 mm) and protoconch (Cabo de Palos, SE Spain); K, L: *Crisilla aartseni* (Verduin, 1984): shell (1.4 mm) and protoconch (Algeciras, Strait of Gibraltar).

(Página derecha) Figura 1. Especies ibéricas y baleares de *Crisilla*. A, B: *Crisilla maculata* (Monterosato, 1869): concha (1,9 mm) y protoconcha (Favarix, Menorca); C, D: *Crisilla galvagni* (Aradas & Maggiore, 1844): concha (Menorca, Islas Baleares, 1,7 mm) y protoconcha (Ibiza); E, F: *Crisilla beniamina* (Monterosato, 1884): concha (1,4 mm) y protoconcha (Ibiza); G, H: *Crisilla marioni* Fasulo & Gaglini, 1987: concha (Menorca, 1,9 mm) y protoconcha (Ibiza); I, J: *Crisilla ramosorum* Oliver, Templado & Kersting, 2012: concha (1,2 mm) y protoconcha (Cabo de Palos, SE España); K, L: *Crisilla aartseni* (Verduin, 1984): concha (1,4 mm) y protoconcha (Algeciras, Estrecho de Gibraltar).



protoconch we think it should be more related to species of *Benthonellania* or to one of the lineages of *Alvania*. TEMPLADO & ROLÁN (1994) provided a table indicating the distinguishing characteristics of the shell and soft parts to differentiate the genus *Crisilla* from *Alvania*, *Cingula*, *Setia* and *Obtusella* Cossmann, 1921 and described some new species from Cape Verde Islands. *Crisilla* is now considered as a valid separated genus in the current checklists and databases (CLEMAM, 2017; MolluscaBase, 2018) and up to 30 species are assigned to it, including *C. gagliniae* (Amati, 1985) and *C. maculata* (Monterosato, 1869) as recently suggested by APPOLLONI ET AL. (2018), all from the Eastern Atlantic and Mediterranean, except *Crisilla angustotriata* van der Linden, 2005 from the Indian Ocean (see Table I). All *Crisilla* species except *C. semistriata* and *C. transitoria* Gofas, 1999 have paucispiral protoconch, which is indicative of a non-planktotrophic larval development. Nine species of the genus are known in the Mediterranean (two of them also present in the European Atlantic), one is an Atlantic bathyal species, one is present in Azores Islands, nine in Madeira and/or Canary Islands, three are distributed along the continental coasts of West Africa, six were described from the Cape Verde Islands (TEMPLADO & ROLÁN, 1994), and one from Mozambique, Indian Ocean (VAN DER LINDEN, 2005).

MATERIAL AND METHODS

We have studied more than 3,000 shells belonging to species attributed to *Crisilla* coming from Azores, Selvagens, Madeira, Canaries and West African coast housed in several collections: those of the authors, malacological collections of some natural history museums (MNCN, MNHN, MHNS, BMNH), and some private collections of Anselmo Peñas (Vilanova i la Geltrú, Spain), Winfried Engl (Düsseldorf, Germany), Ramón Gómez (La Palma, Canary Islands), Juan Antonio Contr-

eras (Tenerife, Canary Islands). We also studied material of the type species of *Crisilla*, *C. semistriata*, mainly coming around Iberian Peninsula. Shells of Mediterranean species of *Crisilla* have been used for comparisons (Fig. 1) and to draw up the final key. The species from Cape Verde Islands are excluded because we consider that they may belong to another lineage (as we highlight below in the discussion) and will be studied in an ongoing paper.

The material studied was obtained by means of several procedures, mainly the sorting of different kinds of sediments (beached or taken by scuba diving and dredging), and the examination of residues of rock/algal wash.

Most photographs have been made in the SEM Service of the MNCN in Madrid (SEM FEI INSPECT and FEI QUANTA), and some others in the Centro de Apoyo Científico y Tecnológico a la Investigación (CACTI) of the Vigo University, and in the Centro de Apoyo Científico y Tecnológico a la Investigación (CACTUS) of the Santiago de Compostela University.

We consider *a priori* the following characters to include species in the genus *Crisilla*:

Size: between 1 and 3 mm.

Shell shape: pupoid; width somewhat more than half of its height; whorls moderately flat to convex, with a shallow suture slightly canalculated and with one or a pair of subsutural furrows. Aperture large, ovate-rounded, shorter than half of shell height, without a clear labial rib on outer lip with the exception of a few species: e.g. *C. transitoria*, *C. cristallinula*, and *C. semistriata* which may occasionally bear a single or double varix on the last whorl (Fig. 2J), internally smooth or with a weak denticulation.

Sculpture: spirally sculptured, without or with incipient axial ribs. Spiral sculpture mainly close to the suture and the base, consisting of narrow spiral furrows demarcating broad, flat spiral cords. One distinctive feature is the pair of subsutural furrows delimiting a well-marked interspace.

Microsculpture of dense growth lines without spiral elements.

Colour: shell usually translucent with a pale yellowish hue, often ornamented with spiral rows of red-brown square blotches.

Protoconch: multispiral or paucispiral, usually with very weak spiral elements and minute granules more or less arranged into blurry spiral lines.

Abbreviations:

AMNH American Museum of Natural History, New York

AMS Australian Museum, Sydney

NHMUK Natural History Museum United Kingdom, London (formerly British Museum of Natural History)

LMUB Laboratorio di Malacologia dell'Università di Bologna

MCM Museu Carlos Machado, Ponta Delgada

MHNS Museo de Historia Natural of the University of Santiago de Compostela (coll. E. Rolán)

MNHN Muséum National d'Histoire Naturelle, Paris

MNCN Museo Nacional de Ciencias Naturales (CSIC), Madrid

UAN Universidade Agostinho Neto, Luanda

USNM National Museum of Natural History, Smithsonian Institution, Washington DC.

SMNH Swedish Museum of Natural History, Stockholm

ZMA Zoologisch Museum, Amsterdam

CAP collection of Anselmo Peñas, Vilanova i la Geltrú, Spain

CJDO-JT collection of Joan Daniel Oliver and José Templado, Madrid, Spain

CMA collection of Monica Albuquerque, Portugal

CWE collection of Winfried Engl, Düsseldorf, Germany

CRG collection of Ramón Gomez, La Palma, Canary Islands

CJC collection of Juan Antonio Contreras, Tenerife, Canary Islands

ju juvenile shells

sh empty shells

sta. sampling station (of a research cruise)

> more than

SYSTEMATIC PART

Family RISSOIDAE Gray, 1847

Genus *Crisilla* Monterosato, 1917

Type species: *Turbo semistriatus* Montagu, 1808: 136 (by monotypy)

= *Crisillosetia* F. Nordsieck, 1972, Type species: *Setia (Crisillosetia) pseudocingulata* F. Nordsieck, 1972 (by original designation)

I. Species with multispiral protoconch

Only two known species of *Crisilla* have multispiral protoconch, the type species, *C. semistriata* and *Crisilla transitio-*

ria Gofas, 1999. A third undescribed species has been found in the coast of Ghana (W Africa) and is here described below.

Crisilla semistriata (Montagu, 1808) (Figures 2, 28A-B, 31A)

Turbo semistriatus Montagu, 1808: 136, pl. 21, fig. 5.

Cingula semistriata (Montagu): Fretter & Graham, 1978: 159-160, fig. 135; Verduin, 1984: 48, figs. 12, 43, 62.

Setia semistriata (Montagu): Rolán, 1983: 144.

Alvania semistriata (Montagu): Graham, 1988: 236, fig. 90.

Crisilla semistriata (Montagu): Warén, 1996: 226, fig. 12B, Scaperrotta *et al.*, 2011: 72, 166.
Turbo scriptus Adams, 1797 (fide Jeffreys, 1867: 48)
Cingula pulchra Johnston, 1828: 80 (fide Jeffreys, 1867: 48)
Rissoa marmorata Cantraine, 1842: 347 (fide Monterosato, 1884: 66)
Rissoa tristriata Thompson, 1840: 98, pl. 2, fig. 10 (fide Jeffreys, 1867: 48)
Rissoa subsulcata Philippi, 1844: 129 (fide Jeffreys, 1867: 48)
Phasianella exigua Brusina, 1865: 24 (fide Monterosato, 1884: 66)
Rissoa semistriata var. *pura* Jeffreys, 1867: 47
Rissoa aurita Monterosato, 1877: 35: Appolloni *et al.*, 2018: 42, fig. 13I, J
Cingula obesa Locard, 1891: 175.

Type locality: Southern Devonshire, British Isles.

Type material: Three syntypes of *Turbo semistriatus* in BMNH figured by OLIVER *ET AL.* (2017: fig. 69). Syntypes of *Cingula obesa*: MNHN-IM-2000-34362 Cherbourg (4 sh.); MNHN-IM-2000-34363 St. Malo (4 sh.); MNHN-IM-2000-34364 St. Brieuc (7 sh.); MNHN-IM-2000-34365 Concarneau (5 sh.); MNHN-IM-2000-34366 Glénans (5 sh.); MNHN-IM-2000-34367, Belle-Isle (4 sh.)

Material studied: Atlantic Ocean: S Galway (Ireland), beached, 50 sh (CJDO-JT); Playa Penarronda, Castropol (Asturias), >100 sh; Baiona (Galicia), 5 sh (CJDO-JT); Ría de Vigo (Galicia), 75 sh (MHNS); Carcavelos (Portugal), 65 sh (CJDO-JT); El Jadida, (Marruecos), beached, >50 sh (CJDO-JT). Strait of Gibraltar: Algeciras, 0-1 m, 6 sh (CJDO-JT); Trafalgar, beached, 8 sh (CJDO-JT); Getares, 0-1 m, 15 sh (CJDO-JT); Benú and El Hacho (Ceuta), beached, 2 sh (CJDO-JT). Mediterranean: Chafarinas Islands, 0-20 m, >250 sh (CJDO-JT); Alborán Island, 10 m, 1 sh (CJDO-JT); Alborán Island (sta. FIV305A), 33-49 m, 3 sh (MNCN); Alborán Island (sta. FIV308B1), 34 m, 1 sh (MNCN); La Herradura (Granada), 12-25 m, >200 sh (CAP); Punta de la Mona, Almuñecar (Granada), 25-48 m, 20 sh (CJDO-JT); Hormigas Islands (Murcia), 20-25 m, >30 sh (CJDO-JT); Cabo de Palos (Murcia), 0-20 m, 350 sh (CJDO-JT); Cullera (Valencia), 0-20 m, >300 sh (CJDO-JT); Denia (Valencia), 0-5 m, 75 sh (CJDO-JT); Jávea (Valencia), 0-5 m, 15 sh (CJDO-JT); Portitxol, Jávea (Valencia), 3 sh; Columbretes Islands, 20 m, >50 sh (CJDO-JT) and sta. FIII272B, 12 m, 5 sh (MNCN); Punta de la Foradada (Mallorca, Balearic Islands) sta. FIII185B, 22-24 m, 108 sh (MNCN); Bahía de Pollença (Mallorca, Balearic Islands), sta. FIII190B, 19-28 m, >100 sh (MNCN); Cabo del Pinar (Mallorca, Balearic Islands), sta. FIII191B, 19 m, 7 sh (MNCN); Illes des Porros (Mallorca, Balearic Islands), 20 m, 35 sh (CJDO-JT); Cabo Nati (Menorca, Balearic Islands), sta. FIII203B, 20 m, 2 sh (MNCN); Punta Na Gall (Menorca, Balearic Islands), 10 m, >50 sh (CJDO-JT); Favaritx (Menorca, Balearic Islands), beached, 3 sh (CJDO-JT); Cap de Cavalería (Menorca, Balearic Islands), 10-20 m, 25 sh (CJDO-JT); Espardel Island (Ibiza, Balearic Islands), sta. FIII240B, 35 m, 8 sh (MNCN); Bleda Mayor Island (Ibiza, Balearic Islands), sta. FIII258B, 45 m, 6 sh (MNCN); Cala Eubarca (Ibiza, Balearic Islands), sta. FIII263B1, 44 m, 12 sh (MNCN); S'Espartar (Ibiza, Balearic Islands), beached, 1 sh (CJDO-JT); Imperial Inlet (Cabrera, Balearic Islands), sta. FIII223B, 60 m, 2 sh (MNCN); L'Éstartit (Costa Brava), beached, 7 c (CJDO-JT); Medes Islands (Costa Brava), 10-20 m, 1 sh (CJDO-JT); Cala Montjoi (Costa Brava), beached, >30 sh (CAP); Colera (Costa Brava), beached, 18 sh (CAP); Sitges (Barcelona), beached, >100 sh (CAP); Vallcarca (Barcelona), beached, 1 sh (CAP).

Description: Because it is a common and well-known species on European coasts, it has been described in several publications (FRETTER & GRAHAM, 1978; VERDUIN, 1984; GRAHAM, 1988; GOFAS & OLIVER, 2011; SCAPERROTTA, BARTOLINI & BOGI, 2011). The description that follows is based on the material studied by us.

Shell oval-conic, opaque and not shiny when the periostracum is intact, but translucent when lacks of it. The adults with about 4 spiral whorls reach 2.5 mm in height and 1.3 mm in width (Figs. 2A, H, J). Profile of the spire from flat to flat-convex with suture scarcely

deep but, due the salience of the supra and infrasutural cords, presents a slightly canalculated appearance under high magnification (Fig. 2G). The ornamentation is formed by spiral cords and furrows crossed by growth lines and close-set weak ribs, which can be observed between the furrows under high magnification, giving a reticulate appearance to well preserved shells (Fig. 2B). In some shells, the cords placed in the middle of the spire are more obsolete or may even be absent. There is no umbilicus but the internal lip can be extended over a small sulcus.

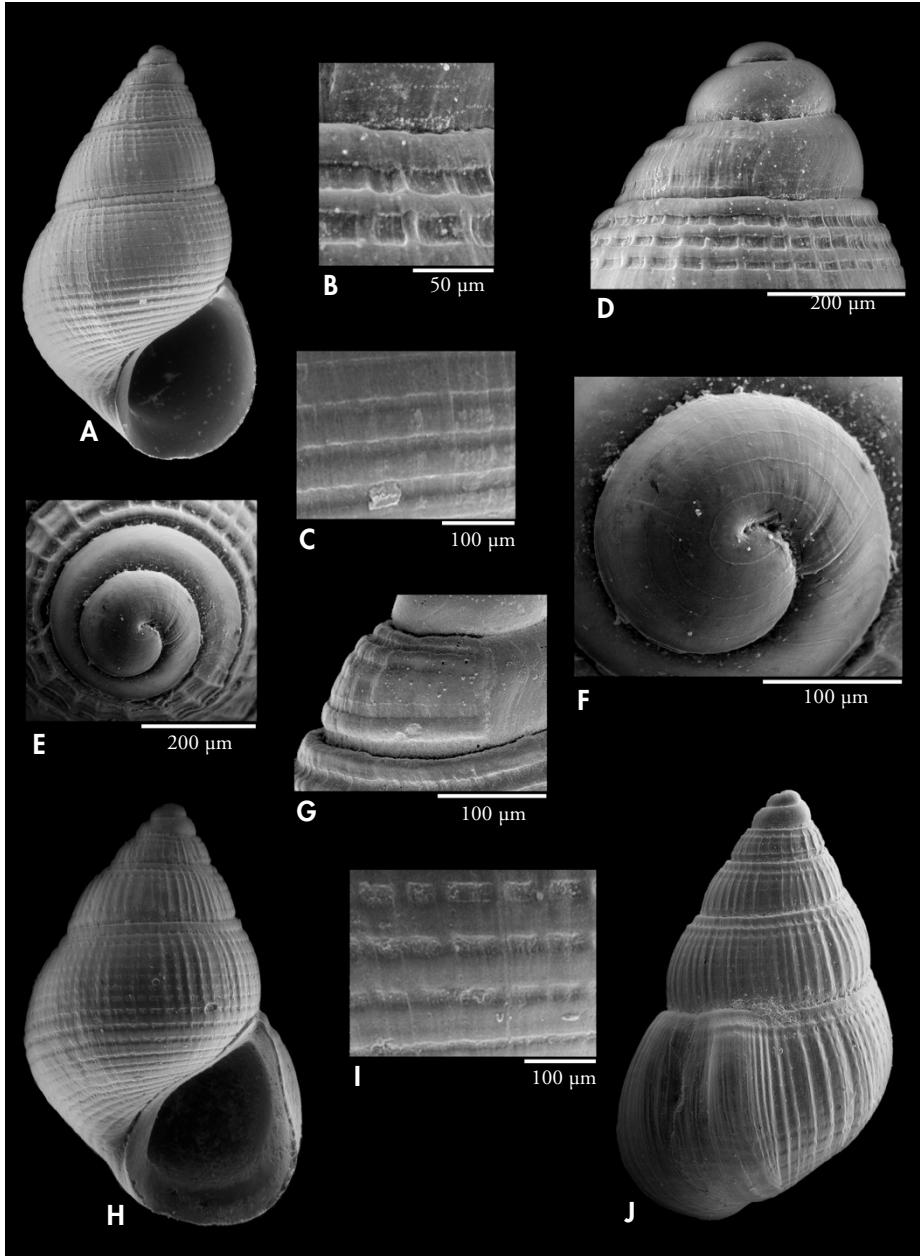


Figure 2. *Crisilla semistriata* (Montagu, 1808). A-C: shell (Menorca, Balearic Islands, 2.3 mm), detail of the microsculpture; D-F: apical and lateral view of the protoconch and detail of the protoconch I; G: detail of the suture (Denia, Alicante); H-J: shell (2.6 mm) and detail of the microsculpture (Chafarinas Islands, SW Mediterranean).

Figura 2. *Crisilla semistriata* (Montagu, 1808). A-C: concha (Menorca, Islas Baleares, 2,3 mm), detalles de su microescultura; D-F: protoconcha en vista apical y lateral y detalle de la protoconcha I; G: detalle de la sutura (Denia, Alicante); H-J: concha (2,6 mm) y detalle de la microescultura (islas Chafarinas, SO Mediterráneo).

The external lip is not usually thickened, except in larger shells, some of them with a slight varix (Fig. 2J). None of the studied shells had an internal dentition of the external lip. Background colour of the shell yellowish-white or red-brownish when the periostracum is present (Figs. 28A-B). There are two spiral rows of red-brownish blotches (Fig. 31A). The spots of the upper band can have a shape from rectangular to arrowhead, and those of the lower band is divided in two on the body whorl. The colour is more whitish than on the rest of the shell on the basal part (Figs. 28A-B and 31A). The external soft parts were described by JEFFREYS (1867); FRETTER & GRAHAM (1978), LUQUE (1984) and PONDER (1985) who provided some anatomical data.

Protoconch multispiral (Figs. 2 D,E), with a little more than 2 whorls and 370 μm in width. Embryonic protoconch (protoconch I) ornamented with 5 fine longitudinal slightly sinuous lines, separated by some small papillae (Fig. 2F). The rest of the protoconch

presents small granules grouped near the suture forming microcordlets. Details of the protoconch can also be seen in THIRIOT-QUIEVREUX & RODRIGUEZ BABÍO (1975).

Distribution: Throughout the Mediterranean (less frequent on the eastern basin according to BITLIS & ÖZTÜRK, 2016) and East Atlantic from Morocco northwards to Southern Scandinavia. The southern limit of its distribution is not known exactly. Although it has been mentioned in some Macaronesian islands (probably due to misidentifications) its presence in the islands has not been verified. It is a frequent species in shallow waters, although some shells have been recorded down to 100 m depth in the Atlantic.

Remarks: Some shells from Chafarinas Islands resemble those of *C. transitoria* having an incipient axial sculpture and more cyrtococonoid profile (Figs. 2H-J, 28A), but lack internal folds in the outer lip, present in the African species, and the protoconch also presents some differences.

Crisilla transitoria Gofas, 1999 (Figures 3-5, 28C-E)

Crisilla transitoria Gofas, 1999: 92-94, figs. 57-61.

Type locality: Corimba, province of Luanda (Angola), on shell gravel, 10-20 m depth.

Type material: holotype MNHN-IM-2000-34352 and 5 paratypes MNHN-IM-2000-34353), 5 paratypes (AMS), and 5 paratypes (UAN), all from type locality. Other 6 paratypes from Palmeirinhas, Buraco (Angola) (MNHN).

Material studied: Angola: Luanda, 60 m, 33 sh (MHNS); Buraco, 3 m, 7 sh (MHNS); Praia Santiago, intertidal, 15 sh (MHNS); Praia Amelia, 5 m, 33 sh (MHNS); Senegal: Dakar (Madeleines), 6-30 m, 15 sh; Dakar (Tacoma), 20 m, 1 sh (MHNS); Cap Vert, 15 m, 4 sh (MHNS). Ghana: Miamia, 37-39 m, 17 sh (MHNS). Gabon: Cape Esterias, beached, 150 sh (MHNS); Santa Clara, beached, 45 sh (MHNS). São Tomé and Príncipe: São Tomé, 2 sh (MHNS); Príncipe (Bonne de Joquei), 50 m, 32 sh (MHNS).

Description: A detailed description was provided by GOFAS (1999, original description).

Shells here studied translucent, oval, somewhat cyrtococonoid, with a little more than 4 whorls, reaching up to 2.3 x 1.3 mm. Profile of the spire flat-convex. Sculpture formed by spiral cords wider than the interspaces and weak but patent orthoconial axial ribs. Suprasutural and subsutural cords stronger than

the rest giving rise to a canaliculated suture which is best seen under magnification (Fig. 3E). The crossing points of ribs and cords are thickened (Fig. 3D). The lattice of axial ribs and ribs gives a reticulated appearance, making a difference from *C. semistriata*. Aperture oval, narrower in its upper part. External lip somewhat thickened, inside with about ten incipient but clear denticles (Figs. 3A-B). Yellow whitish background shell

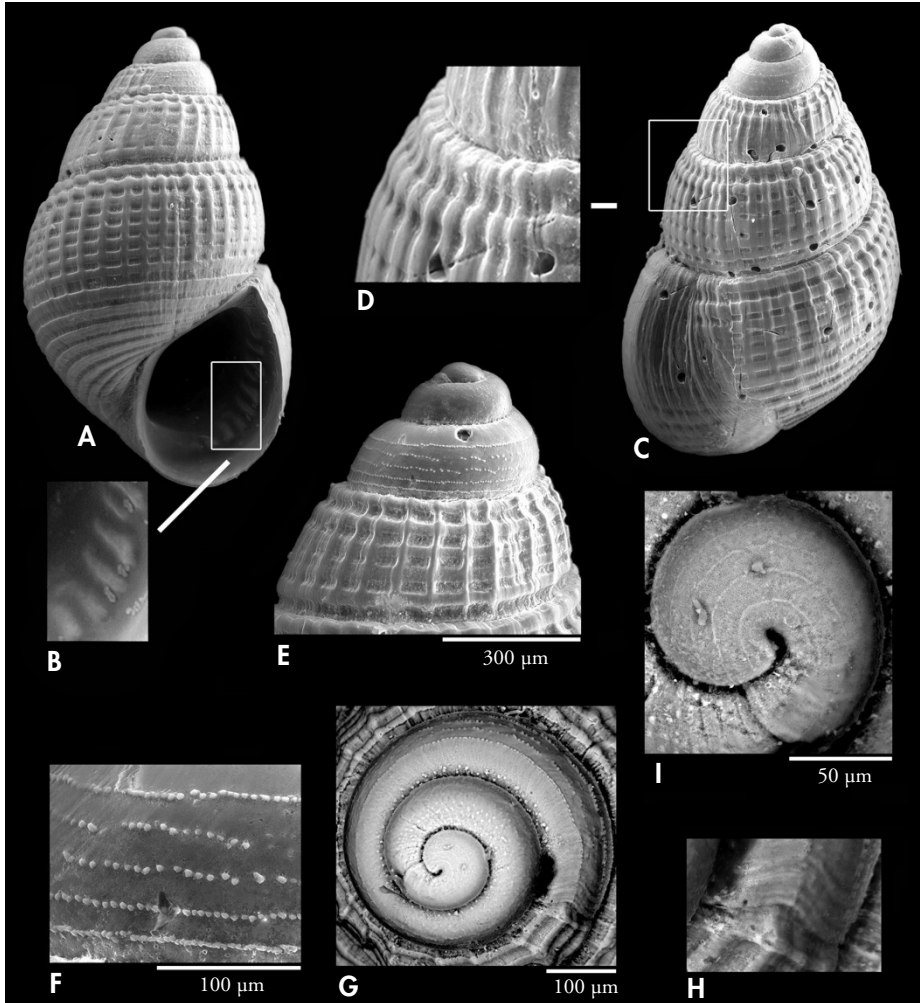


Figure 3. *Crisilla transitoria* Gofas, 1999, Luanda (Angola), 60 m. A, B: shell (1.9 mm) and detail of denticles inside outer lip; C, D: shell (1.8 mm) and detail of the subsutural spiral thread; E-I: protoconch and details.

Figura 3. Crisilla transitoria Gofas, 1999, Luanda (Angola), 60 m. A, B: concha (1,9 mm) y detalle de su dentición labial; C, D: concha (1,8 mm) y detalle del reborde subsutural; E-I: protoconcha y detalles de la misma.

colour with one large row of square subsutural patches and another of smaller suprasutural blotches divided in two on the body whorl (Fig. 29C). The basal area of the shell is more whitish than the rest.

Protoconch multispiral with 2.25 whorls reaching 270 μm in height and

350 μm in width. Protoconch I 140 μm wide with five spiral cordlets and a weak granulation in the interspaces (Figs. 3I, 4H-I). On the protoconch II the granules are irregularly arranged at first but later aligned in 4-5 rows (Figs. 3F and 4G-H). Transition between protoconch and teleoconch somewhat sinu-

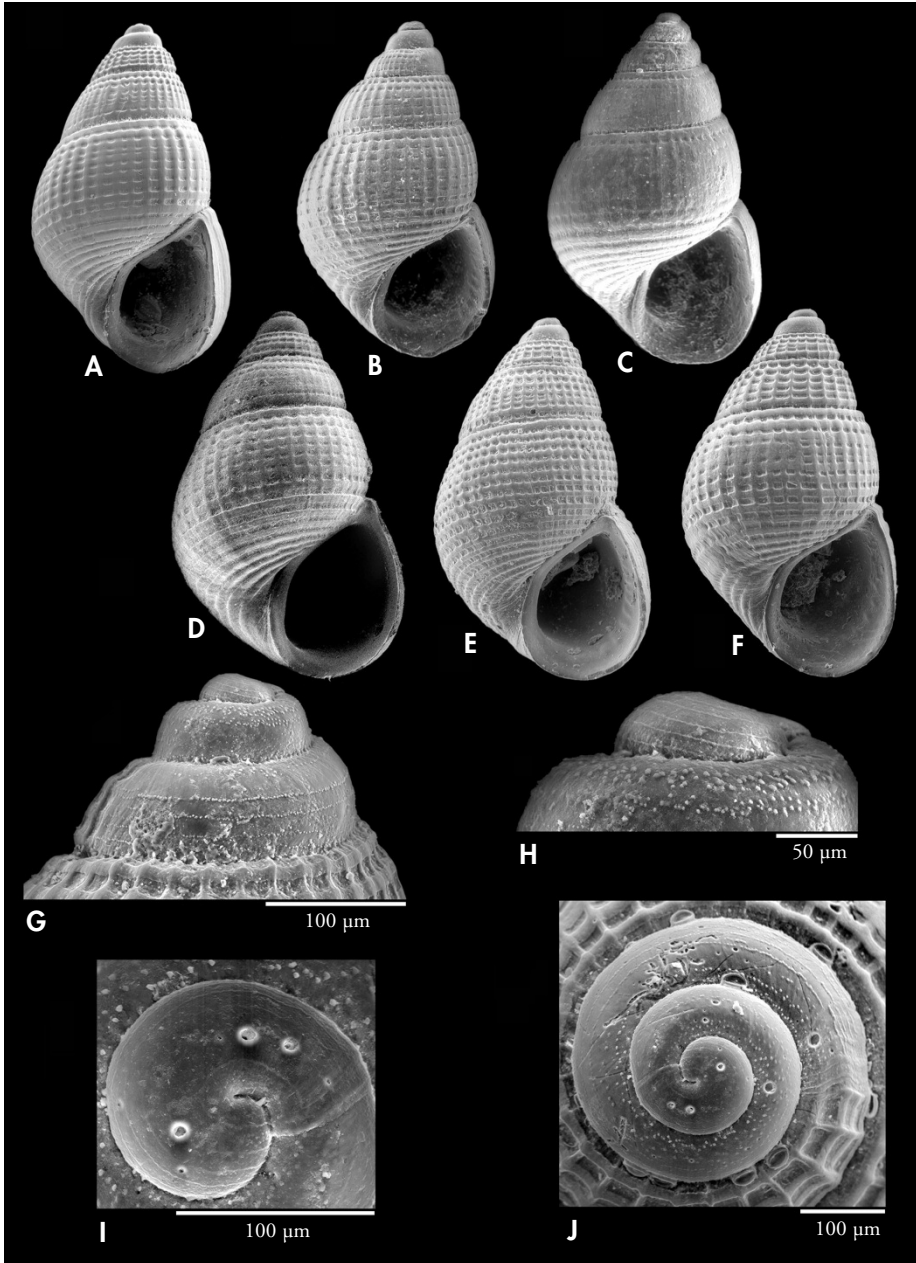


Figure 4. *Crisilla transitoria* Gofas, 1999 from several localities. A: shell, Miamia (Ghana) (2.1 mm); B, C: beached shells from Gabon (1.9 and 1.8 mm); D: shell from São Tomé (1.8 mm); E, F: shells (2.3 and 2.1 mm) from Madeleines, Dakar (Senegal), 6-30 m; G, H: protoconch and detail, Miamia (Ghana); I: embryonic whorls; J: apical view of the same protoconch.

Figura 4. *Crisilla transitoria* Gofas, 1999 de diversas localidades. A: concha, Miamia (Ghana) (2,1 mm); B, C: conchas (1,9 y 1,8 mm) Gabón, explayadas; D: concha (1,8 mm) Sao Tomé; E, F: conchas (2,3 y 2,1mm), Madeleines, Dakar, (Senegal), 6-30 m; G, H: protoconcha y detalle, Miamia (Ghana); I: protoconcha embrionaria; J: vista apical de la misma protoconcha.

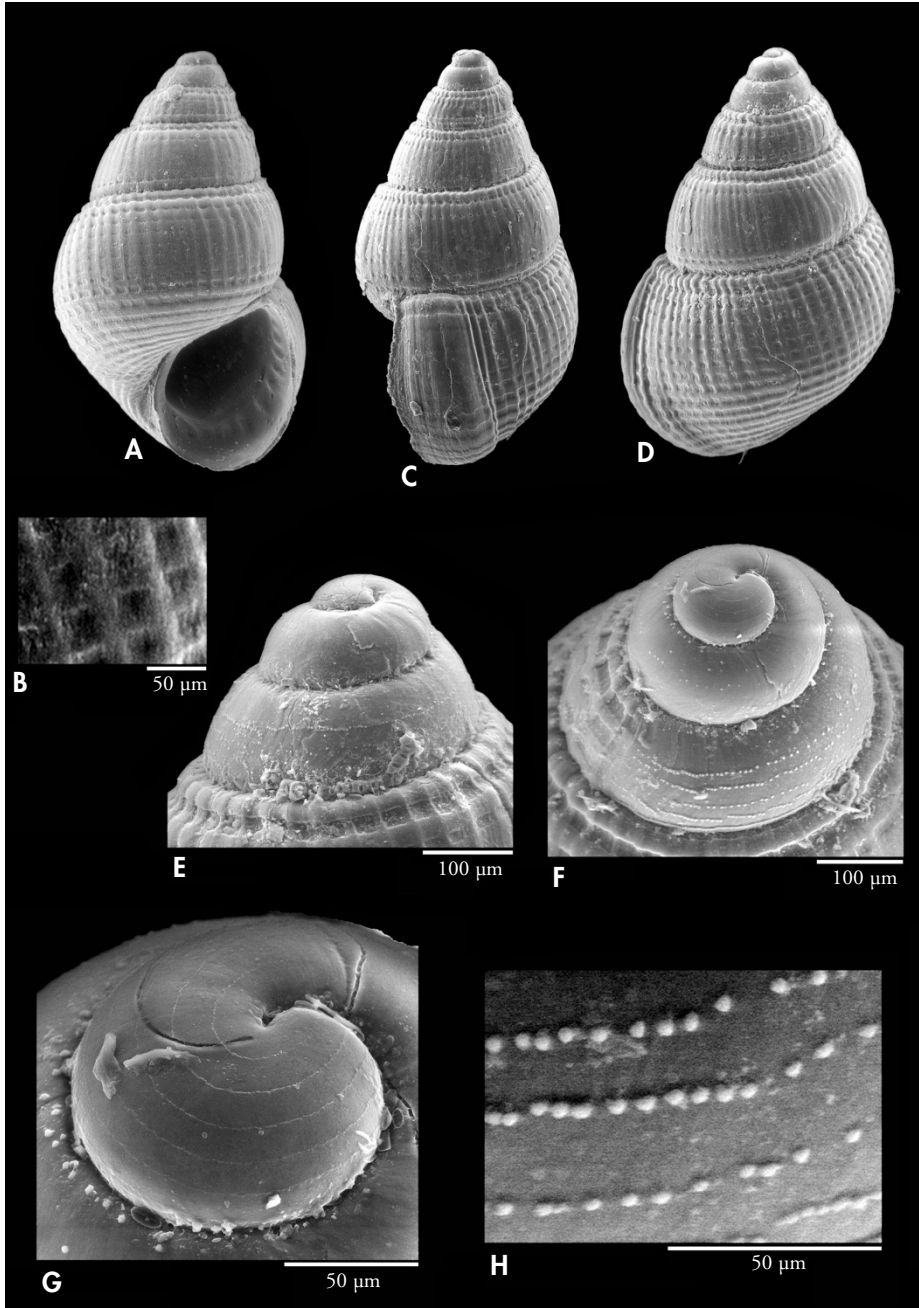


Figure 5. *Crisilla transitoria* Gofas, 1999, Bonne de Joquei (Principe Island). A: shell (1.8 mm); B: detail of the sculpture; C: shell (1.9 mm); D, E: shell (1.6 mm) and detail of its protoconch; F-H: apical view of the protoconch, embryonic protoconch and detail of its microsculpture.

Figura 5. Crisilla transitoria Gofas, 1999, Bonne de Joquei (Isla de Príncipe). A: concha (1,8 mm); B: detalle de la escultura; C: concha (1,9 mm); D, E: concha (1,6 mm) y detalle de su protoconcha; F-H: vista apical de la protoconcha, protoconcha embrionaria y detalle de su microescultura.

soidal and not as obvious as in other risoids with planktotrophic veliger (Figs. 3G-H).

Distribution: West African coasts from Senegal to Angola, including São Tomé and Príncipe. It is a coastal species found from the intertidal fringe down to 80 m depth.

Remarks: GOFAS (1999) emphasized the similarity of this species and *C. semistriata*, both in their morphology and habitat, but *C. transitoria* differs in having an incipient axial sculpture and more cyrtoconoid profile. Further, the geographic distribution of both species does not seem to overlap, but their range limits are not known with accu-

racy. GOFAS (1999) pointed out that this species has intermediate characters between typical *Crisilla* species and those of the lineages currently ascribed to *Alvania* (the specific epithet alludes to that). Further, we have also observed in the studied shells that the somewhat thickened outer lip presents weak folds internally (not indicated by GOFAS, 1999 in the original description). The studied shells from Gabon (Figs. 4B-C, 29D-E) differ slightly, because some of them are more conical than the typical form with a less marked axial sculpture. Anyway, since we observed shells with intermediate characters, we have considered all them belonging to the same species.

Crisilla monicae n. sp. (Figures 6, 29F-G)

Type locality: Miamia, Ghana: 37-39 m.

Type material: holotype MNCN 15.05/200026; paratypes MNHN IM-2014-7056.

Material studied: Miamia (Ghana), 37-39 m, 48 sh (includes the type material).

Etymology: The specific name is after Monica Albuquerque (Lisbon) who provides us material from the Selvagens Islands.

Description: Shell pupoid, oval-conical, quite solid, translucent, adult reaches 2.2 mm in height and 1.1 mm in width with somewhat more than three teleoconch whorls. Profile of the spire flat-convex (Figs. 6A and D). Entire surface furrowed by spiral cords wider than the interspaces and crossed by conspicuous axial ribs, somewhat opisthocline, similar in width to the interspaces, disappearing in the basal part of the body whorl (Figs. 6A-B and D). The upper cord forms a narrow subsutural rim (Fig. 6E). Suture slightly canalculated and a typical suprasutural depression characteristic of *Crisilla*. Aperture oval, somewhat narrower at the upper part. Outer lip thickened with denticular folds internally (see Fig. 6A). Yellowish background colour of the shell with two rows of reddish spots, the upper one subsutural. A reddish border of the inner lip is also seen.

Protoconch multispiral, with 2.25 whorls (Figs. 6C-G) and about 420 μ m in diameter. It seems somewhat eroded in the specimens studied, but some rows of small granules aligned in at the end

of the protoconch II can be seen ending into three irregular lines (Fig. 6C).

Distribution: Only known from empty shells found in the type locality (Miamia, Ghana).

Remarks: This new species is the third of the genus *Crisilla* known to have a multispiral protoconch. These three species show a more or less gradual transition between *Crisilla* species and those of one of the lineages currently ascribed to *Alvania*, being *C. transitoria* an intermediate link. This new species differs from *C. semistriata* and *C. transitoria* by its slightly smaller size, stronger sculpture and slightly opisthocline axial ribs. We include it in the genus *Crisilla* because it presents the characteristic pair of subsutural furrows. While *C. transitoria* has a wide geographical distribution in West African coasts, *C. monicae* n. sp., despite having a multispiral protoconch (indicating a planktotrophic larval development and consequently a potential high dispersal capacity) has only been found from one locality of the Gulf of Guinea.

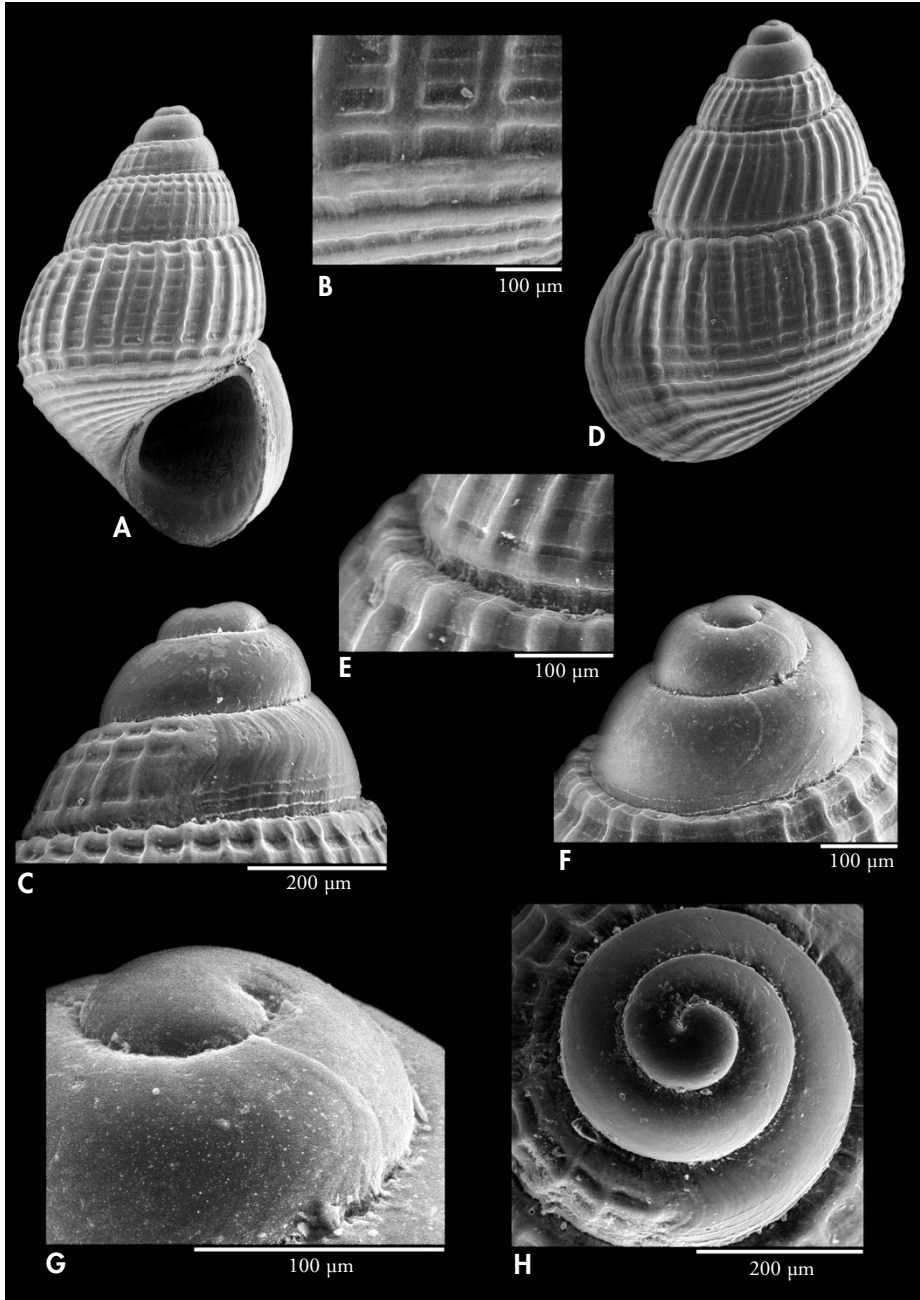


Figure 6. *Crisilla monicae* n. sp. (Miami, Ghana). A-C: shell (2.0 mm), detail of its microsculpture and protoconch, respectively; D-G: shell (1.9 mm), detail of its suture, lateral view of its protoconch and its embryonic shell; H: apical view of the protoconch.

Figura 6. *Crisilla monicae* n. sp. (Miami, Ghana). A-C: concha, (2,0 mm), detalle de su microescultura y protoconcha, respectivamente; D-G: concha, 1,9 mm, detalle de su sutura, vista lateral de su protoconcha y de su protoconcha embrionaria; H: vista apical de la protoconcha.

II. Species with paucispiral protoconch

II.1. *Alvania*-like species

Crisilla depicta (Manzoni, 1868) (Figures 7-8, 28H, 31C)

Rissoa depicta Manzoni, 1868a: 166; 1868b: 241, pl. 10, fig 4.

Rissoa punctifera Watson, 1873: 382.

Setia (*Crisilla*) *depicta* (Manzoni): F. Nordsieck & García-Talavera, 1979: 62.

Cingula depicta (Manzoni): Verduin, 1984: 65, figs. 31, 53, 80.

Crisilla depicta (Manzoni): Albuquerque *et al.*, 2009: 138-139; Segers *et al.*, 2009: 134-135, pl. 21, fig.9; Hernández *et al.*, 2011: 137, fig. 41 H-J.

Type locality: Tenerife.

Type material: A lectotype was designated by VERDUIN (1984) (NHMUK 1868.10.20.5) among shells from Tenerife collected by McAndrew. However this could be collateral material, not seen by Manzoni (1868) who wrote that the shells described in his paper were presented to him by McAndrew. Therefore, the type designation could be valid only if based on material returned to McAndrew after publication. This species has not been found among Manzoni's material, which otherwise is in MNHN.

Material studied: Madeira: Funchal, 5-10 m, 15 sh (MHNS); Reis Magos, 5-10 m, 55 sh (MHNS); Club Naval, 0-2 m, 40 sh (MHNS); Puerto Moniz, 2 m, 40 sh (MHNS); Madeira (without locality), 24 sh (CAP). Canary Islands: Gando (Gran Canaria), 48 m, 12 sh (MNCN 15.05/58957); Salema Beach (La Palma), 27 sh (CJDO-JT and CRG); Faro de Fuencaliente (La Palma), 2 sh (CRG); Barlovento (La Palma), 16 sh (CJDO-JT); Mar de las Calmas (El Hierro), 10-11 m, 17 sh (CJDO-JT); Punta de Teno (Tenerife), 4 sh (CJDO-JT); Barranco Chamorro (Tenerife), 4 sh (CJC); Arrecife (Lanzarote), beached, 4 sh (CJDO-JT); Famara (Lanzarote), beached, 4 sh (CJDO-JT); La Gomera, 4 sh (CAP).

Description: A description was provided by VERDUIN (1984) and by SEGERS *ET AL.* (2009), and the following description is based on the material examined by us.

Shell pupoid conical, solid, with a somewhat flat profile. Adult shells reach over 4.5 whorls, about 2 mm in height and almost 1 mm in width. The body whorl is just over 70% of the total height of the shell and the aperture occupies about 40%. Surface of the teleoconch with spiral grooves which define flat cords of even width. These cords are more evident at the basal part of the shell and weaker or almost absent in the rest (Figs. 7A and 8A-B). The furrow immediately above the aperture tends to be wider and deeper. Suture bounded by an upper, overhanging suprasutural rim and a lower sutural rim (Fig. 7E). Under the SEM, a microsculpture of minute cordlets is can be seen at the beginning of the teleoconch and especially on the first whorls (Fig. 7E-G).

Outer lip somewhat thickened in adult shells. Background colour horny yellowish with the base whitish, three rows of red-brown blotches, and a chestnut-brown apex (Figs. 28H and 31C).

Protoconch with about 1.5 whorls and 0.33 mm in diameter. Nucleus of about 0.1 mm. Sculpture of the protoconch of small tubercles arranged progressively in about eight or nine spiral cords (Figs 7B-E).

Distribution: *C. depicta* is widely distributed in Madeira, Selvagens and Canary Islands, mainly in shallow water, but empty shells have been found down to 50 m in depth.

Remarks: This species is quite variable (see Figs. 7-8). It somewhat resembles *Alvania euchila* (Watson, 1886) (see Figs. 8 E-H), endemic from Madeira, which is similar in size, also has a chestnut-brown tip of the embryonic shell and has a microsculpture of very fine strands, absent in other species of *Crisilla*. However the axial sculpture of

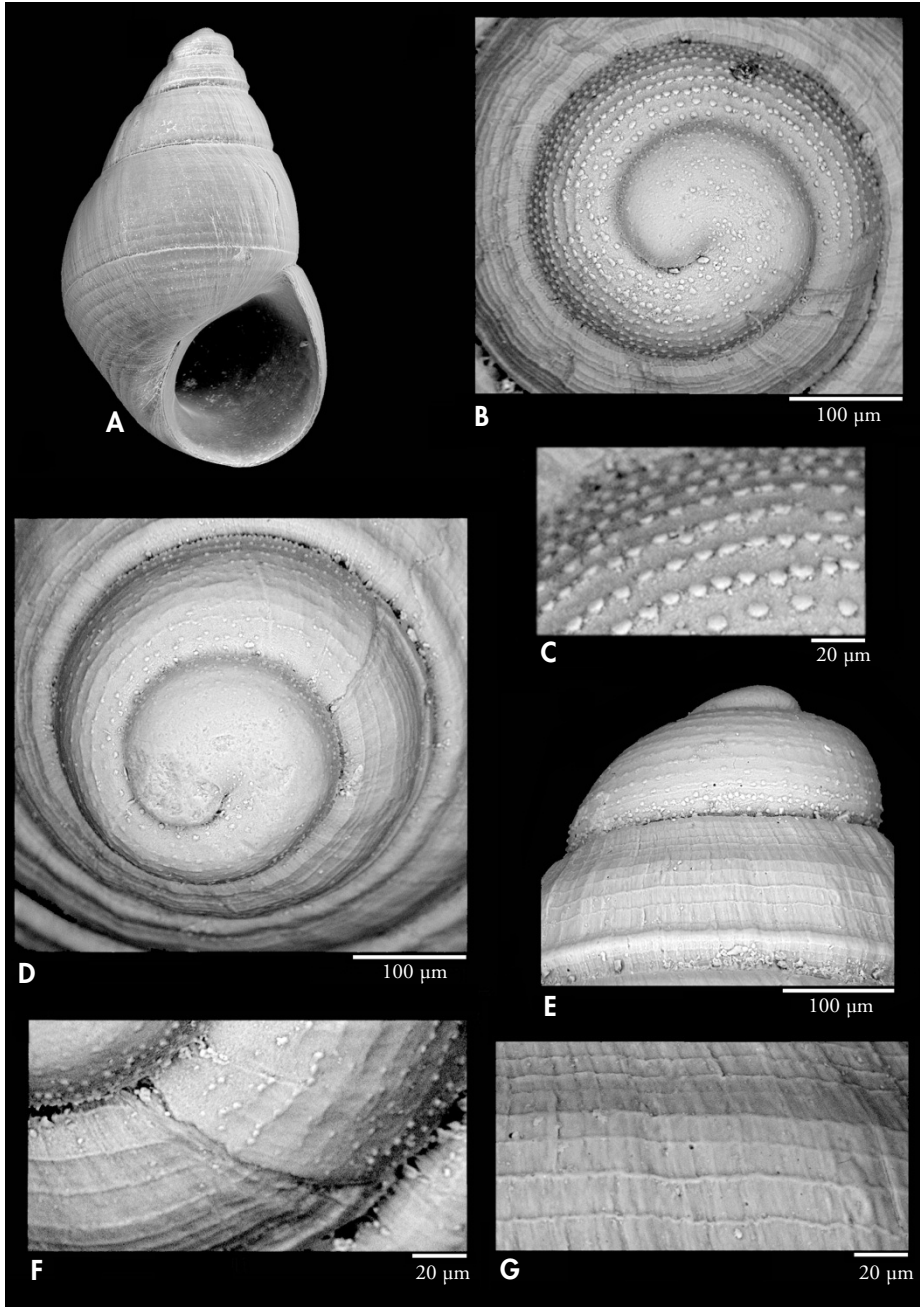


Figure 7. *Crisilla depicta* (Manzoni, 1868) from Playa Salema, La Palma (Canary Islands). A: beached shell (1.8 mm); B, C: protoconch and detail; D, E: somewhat eroded protoconch; F: detail of the protoconch-teleconch demarcation; G: microsculpture of the teleconch.

Figura 7. Crisilla depicta (Manzoni, 1868), Salema Beach, La Palma (islas Canarias). A: concha, explayada (1,8 mm); B, C: protoconcha y detalle; D, E: protoconcha algo erosionada; F: detalle de la transición entre protoconcha y teleconcha; G: microescultura de la teleconcha.

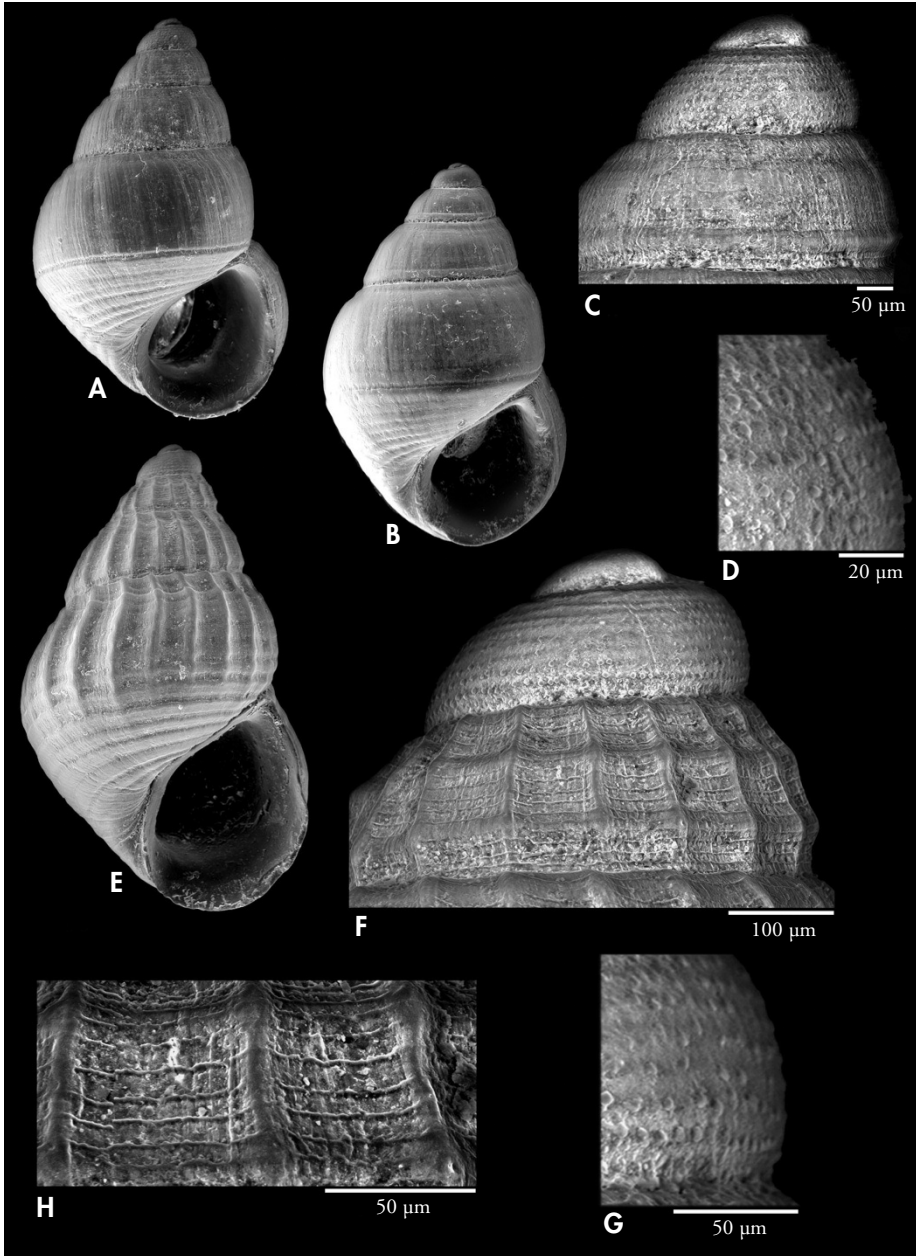


Figure 8. A-D. *Crisilla depicta* (Manzoni, 1868) from Madeira. A, B: shells (1.8 and 1.7 mm), Reis Magos; C, D: protoconch of the shell of figure A and detail of its microsculpture. E-H. *Alvania euchila* (Watson, 1886), Madeira. E: shell (2.1 mm); F, G: lateral view of its protoconch and detail of its microsculpture; H: detail of the microsculpture of the teleoconch.

Figura 8. A-D. *Crisilla depicta* (Manzoni, 1868) de Madeira. A, B: conchas (1,8 and 1,7 mm), Reis Magos; C, D: protoconcha de la concha de la figura A y detalle de su microescultura. E-H. *Alvania euchila* (Watson, 1886) de Madeira. E: concha (2,1 mm); F, G: vista lateral de su protoconcha y detalle de su microescultura; H: detalle de la microescultura de la teleoconcha.

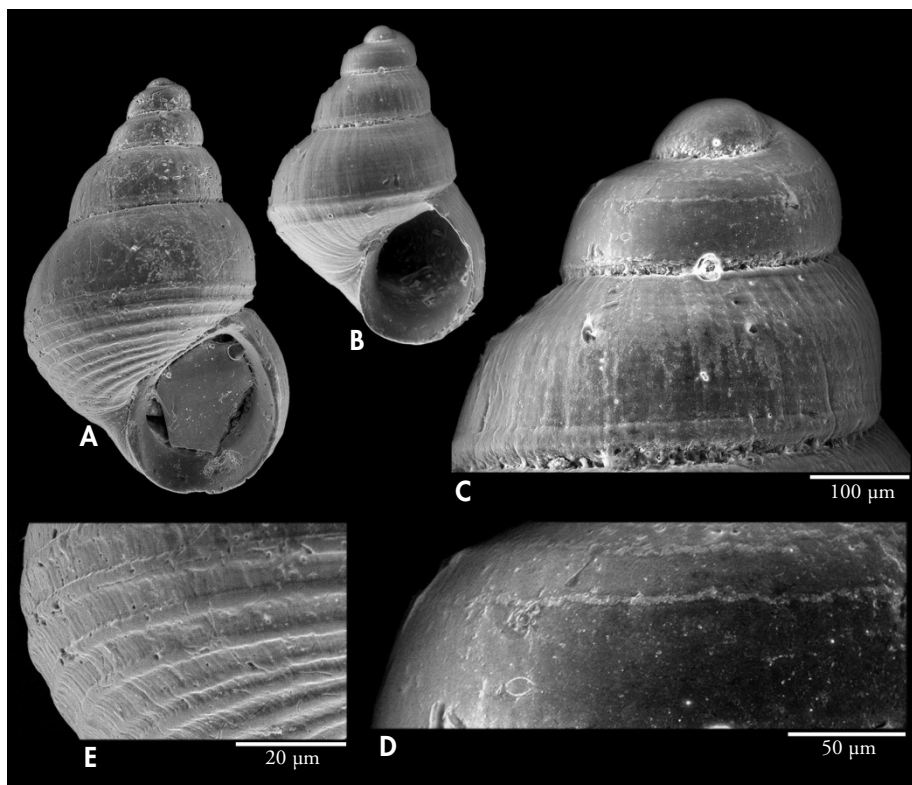


Figure 9. *Crisilla quisquiliarum* (Watson, 1886), Azores. A: shell (1.65 mm), São Miguel; B: juvenile shell (1.15 mm), São Miguel; C, D: its protoconch and detail of the microsculpture; E: detail of microsculpture of the shell of figure A.

Figura 9. *Crisilla quisquiliarum* (Watson, 1886), Azores. A: concha (1,65 mm), San Miguel; B: concha juvenil (1,15 mm), San Miguel; C, D: su protoconcha y detalle de su microescultura; E: detalle de la microescultura de la concha de la figura A.

A. euchila (absent in *C. depicta*) clearly distinguishes both. *Crisilla depicta* is also somewhat similar to *Alvania corneti* Hoenselaar & Goud, 1989 and *A. jacquesi* Hoenselaar & Goud, 1989 from Cape

Verde Islands. We keep *C. depicta* in the genus *Crisilla* due the absence of axial sculpture and because of the colour pattern of the shell with red-brown square blotches.

Crisilla quisquiliarum (Watson, 1886) comb. nov. (Figures 9, 28I, 31D)

Rissoa quisquiliarum Watson, 1886: 609, pl. 45, fig. 3.

Putilla (Varisetia) quisquiliarum (Watson): F. Nordsieck, 1972: 158-159.

"*Rissoa*" *quisquiliarum* Watson: Gofas, 1990: 103-104, fig. 28.

Rissoa (Setia) quisquiliarum Watson: Bouchet & Warén, 1993: 810, fig. 1569.

Setia cf. quisquiliarum (Watson): Frias Martins *et al.*, 2009: fig. 119; Hernández *et al.*, 2009: 127-128, fig. 38E.

Setia quisquiliarum (Watson): Ávila, 2000: 65; Engl *et al.*, 2009: 115-116, fig. 18; Hernández *et al.*, 2009: 127-128, fig. 38E.

Type locality: off Faial, Azores, off Faial, 38° 38' N, 28° 28' 30" W, 730-910 m.

Type material: Bouchet & Warén (1993: fig. 1569) and Gofas (1990: fig. 28) figured the holotype (NHMUK 1887.2.9.2014), from the Challenger Expedition, stn. 75.

Material studied: São Miguel (Azores), 18 m, 3 sh (MNCN).

Description: Shell somewhat solid reaching 1.65 x 0.92 mm with about five whorls, the last one notably enlarged (Figs. 9A-B). The profile of the spire is convex with an angle in the upper third. In the basal part of the shell there are a dozen of grooves that define flat cords barely protruding from the surface (Fig. 9E). Two of these cords run above the aperture lip insertion which causes that the suture present a slightly corrugated spectrum (Fig. 9A). Suture slightly canaliculated. Shell with a whitish background and reddish apex (Fig. 28I), with two bands of reddish spots, the upper one subsutural (Fig. 31D).

Paucispiral protoconch with almost imperceptible spiral microcordlets formed by the alignment of granules (Figs. 9C-D).

Distribution: Originally known from the Azores, it was subsequently cited in El Hierro (Canary Islands) (ENGL ET AL., 2009). It was described as a deep-water species, but some shells have been found nearshore.

Remarks: This species was described and illustrated by WATSON (1886) as *Rissoa quisquiliarum* and it is currently included in the genus *Setia*. GOFAS (1990) and BOUCHET & WARÉN (1993)

provided a photograph of the holotype. The shells studied by us in shallow waters from São Miguel (Azores) fit well the original description and pictures. The specimens studied here were collected in sediments about 20 m deep, while this species has generally been reported at depths below 200-300 m (WATSON, 1886; ENGL ET AL., 2009; FRIAS MARTINS ET AL., 2009) but shells are likely to be transported to considerable depths along the steep slopes of the islands. Notwithstanding, F. NORDSIECK (1982) and Gofas (com. pers. in BOUCHET & WARÉN, 1983) recorded it in shallow water at São Miguel and Terceira (Azores), respectively.

This species bears some resemblance to *C. depicta* due to its coloured apex and because the spiral sculpture is concentrated on the basal part of the shell (see remarks in the latter species). The sculpture of the shell is similar to those of the species of *Crisilla*, but it differs from these by having a wider last whorl. Anyway, we consider that this species fits better in the genus *Crisilla* than in *Setia* or *Alvania*, and we tentatively assign to *Crisilla*, but see the final discussion on the taxonomic identity of these three genera.

II.2. Typical *Crisilla* species

Crisilla picta (Jeffreys, 1867) (Figures 10, 28J, 31B)

Rissoa picta Jeffreys, 1867: 19: 435.

Auriconoba watsoni F. Nordsieck, 1972: 171 (unnecessary new name).

Cingula picta (Jeffreys, 1867): Verduin, 1984: 63.

Setia (Crisillosetia) picta (Jeffreys, 1867): F. Nordsieck, 1972: 164; F. Nordsieck & García-Talavera, 1979: 62.

Crisilla picta (Jeffreys, 1867): Albuquerque et al., 2009: 142-143; Segers et al., 2009: 136-137, plate 22, fig. 4; Hernández et al., 2011: 138, figs. 37S, 41 N-O.

Type locality: Madeira.

Type material: VERDUIN (1984) designed a lectotype (USNM 183126) on the basis of material from Madeira (without specifying locality).

Material studied: Madeira: Club Naval, 0-2 m, 34 sh (MHNS); Funchal, 5-10 m, 31 sh (MHNS); Reis Magos, 5-10 m, 110 sh (MHNS); Porto Moniz, 9 sh (MHNS); Madeira without locality, >50 sh, (CAP).

Canary Islands: Barlovento (La Palma), 1 m, 2 sh + 1 jv (CJDO-JT); Faro de Fuencaliente (La Palma), 2 sh (CRG); Salema Beach (Gran Canaria), 7 sh (CRG); Punta del Teno (Tenerife), 0-1 m, 1 jv (CJDO-JT); Famara beach (Lanzarote), 75 sh (CJDO-JT); Arrecife beach (Lanzarote), 1 sh (CJDO-JT).

Description: Descriptions of this species are provided by VERDUIN (1984) and SEGERS *ET AL.* (2009), and the following description is based on the material examined by us.

Shell almost transparent, with 5 whorls in adult specimens reaching up to 2 x 1 mm. The body whorl occupies about 70% of the total height while the aperture nearly 35% (Figs. 10A and D). Sculpture of weak spiral furrows, mainly on the last whorl (Fig. 10E). The suture is not canalliculate but has a weak subsutural rim and a very slight subsutural depression which can be seen in the early whorls. Colour of the shell yellowish horny, with a whitish base and three rows of dark red spots on the last whorl (Figs. 28J and 31B).

Paucispiral protoconch (Figs. 10B and F) with 1.25 whorls and about 320 μ m in diameter (nucleus just over 100 μ m). In the studied specimens its surface seems almost smooth (Fig. 10C).

Distribution: Recorded in Madeira (VERDUIN, 1984; SEGERS *ET AL.*, 2009), Selvagens (WATSON, 1873; ALBU-

QUERQUE *ET AL.*, 2009) and Canary Islands (El Hierro and Gran Canaria: VERDUIN, 1984; La Palma, Tenerife and Lanzarote: this paper). Known from intertidal down to 50 m in depth.

Remarks: The shape, size and solidity of the shells resemble those of the type species *C. semistriata*. Nevertheless it differs from the latter by its paucispiral protoconch and the weaker sculpture. Its non-pigmented apex differentiates it from *C. depicta*. No significant differences were detected between shells from the Canary, Madeira and Selvagens islands (see figs. 10A and D). In addition to the many individuals with normal colour pattern consisting of three rows of reddish-brown squares, we found three banded shells on which reddish-brown squares become continuous. SCUDERI & AMATI (2012) compared *C. picta* and *C. callosa* to the Mediterranean *C. galvagni* (Aradas et Maggiore, 1844), and noted that both Macaronesian species have thicker shells, more flattened whorls and base, and lack an umbilical chink.

Crisilla fallax Gofas, 1999 (Figures 11A-C)

Crisilla fallax Gofas, 1999: 94-95, figs. 62-63.

Type locality: South of Gorée (Senegal), 110-112 m depth.

Type material: holotype MNHN-IM-2000-34355 and 14 paratypes, MNHN-IM-2000-34356 all from type locality.

Material studied: Mauritania (without precise locality): 2 sh (MHNS).

Description: A detailed description was provided by GOFAS (1999, original description). Adult shells studied by us with about five whorls, reaching almost 2 mm in height and nearly 1.4 mm in width. The appearance is similar to that of *C. transitoria* but is less cyrtoconoid. Sculpture of spiral cords, similar in width to their interspaces, crossed by axial ribs of similar size which give to the surface a reticulated appearance (Fig. 11A). In the body whorl there are about ten cords above the aperture

being the subsutural somewhat more pronounced. Suture slightly canalliculate. The two studied shells were eroded and their original colour could not be appreciated.

Paucispiral protoconch (Fig. 11B) with somewhat more 1.5 whorls and 0.38 mm in diameter. Irregularly arranged granules can be seen on the surface of the protoconch of the two specimens studied (Fig. 11C) instead of arranged in spiral lines as GOFAS (1999) observed in the type specimens.

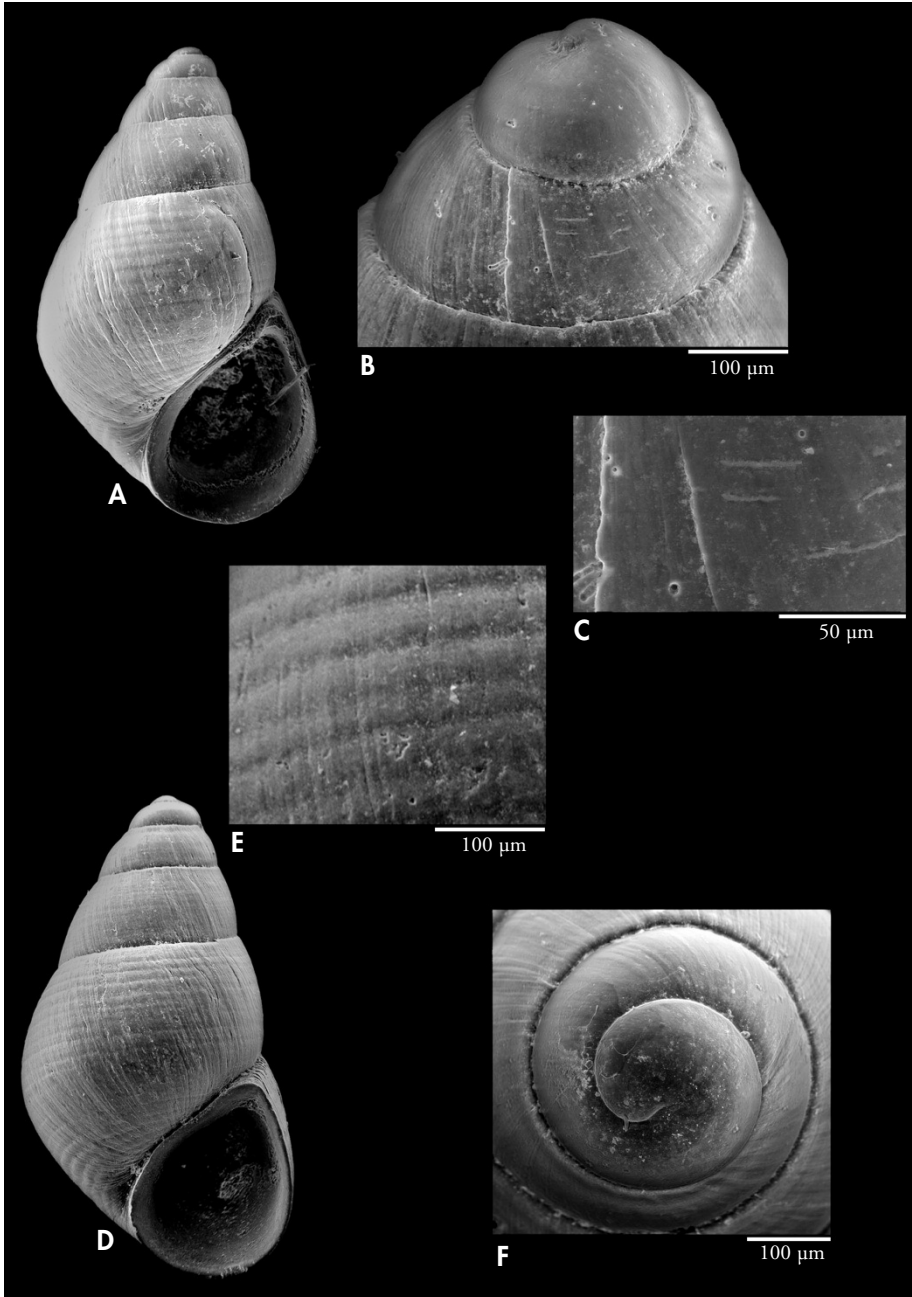


Figure 10. *Crisilla picta* (Jeffreys, 1867). A: shell (1.9 mm), from Madeira; B, C: its protoconch in lateral view and detail of its microsculpture; D: shell (1.9 mm), Lanzarote, Canary Islands; E: detail of its sculpture; F: its protoconch in apical view.

Figura 10. Crisilla picta (Jeffreys, 1867). A: concha (1,9 mm), Madeira; B, C: su protoconcha en visión lateral y detalle de su microescultura; D: concha (1,9 mm), Lanzarote; E: detalle de su escultura; F: vista apical de su protoconcha.

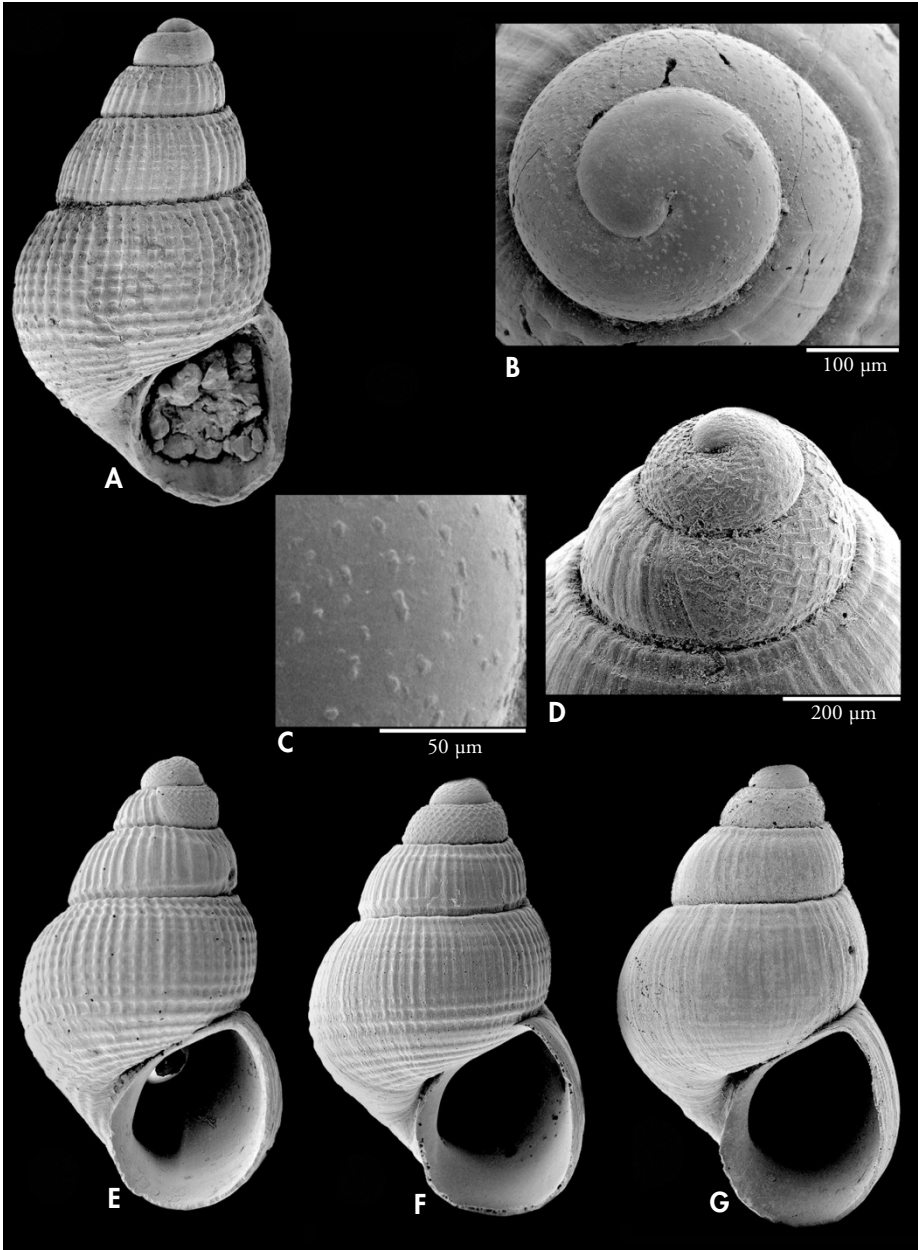


Figure 11. A-C. *Crisilla fallax* Gofas, 1999, Mauritania. A: shell (1.9 mm); B, C: apical view of its protoconch and detail of its microsculpture. D-G. *Alvania zylensis*. D: protoconch, Alboran Sea; E: shell (2.0 mm), Hormiga Island (SE Spain); F: shell (2.0 mm), Motril seamount (S Spain); G: shell (2.1 mm), Alboran Island.

Figura 11. A-C. *Crisilla fallax* Gofas, 1999, Mauritania. A: concha (1,9 mm); B, C: vista apical de su protoconcha y detalle de su microsculptura. D-G. *Alvania zylensis*. D: protoconcha, mar de Alborán. E: concha (2,0 mm), Isla Hormiga (SE España); F: concha (2,0 mm), Seco de Motril (Sur de España); G: concha (2,1 mm), Isla de Alborán.

Distribution: Previously known only from the type locality (outer shelf off Senegal), here we extend its geographic range northwards to Mauritania.

Remarks: GOFAS (1999) pointed out the similarity of this species with *C. transitoria* from which it is clearly distinguished by its paucispiral protoconch. Because of its sculpture, it also has a certain resemblance to *Alvania zylensis* Gofas & Warén, 1982 (Figs. 11E-G), a circalittoral species mainly restricted to the south of the Iberian Peninsula but it has also recorded

in the Tyrrhenian Sea (AMATI, 1985) and in Gorringer Bank (ÁVILA & MALAQUIAS, 2003). Nevertheless, the paucispiral protoconch of the latter species exhibits a characteristic zig-zag pattern of sculpture, similar to that of other *Alvania* species and this is why it is tentatively retained in that genus. However, this zig-zag pattern of the protoconch is also present in some species of the genus *Benthonellania* (OLIVER & ROLÁN, 2017) and therefore the generic significance of this character should be re-evaluated.

Crisilla callosa (Manzoni, 1868) (Figures 12-14, 29A, 31H)

Rissoa callosa Manzoni, 1868a: 166, 1868b, 241-242, pl. 10, fig. 3.

Cingula callosa (Manzoni): F. Nordsieck, 1972: 170.

Setia (*Crisillosetia*) *callosa* (Manzoni): F. Nordsieck & García-Talavera, 1979: 62.

Cingula callosa (Manzoni): Verduin, 1984: 64.

Crisilla callosa (Manzoni): Hernández *et al.*, 2011: 136-137, figs. 41 B-D.

Type locality: Tenerife (Canaries).

Type material: VERDUIN (1984) designated a lectotype (NHMUK 1868.10.20.6) among shells from Tenerife collected by McAndrew. However, as already mentioned for *C. depicta*, this could be collateral material, not seen by Manzoni (1868) and therefore, the type designation may not be valid. Verduin (1984) otherwise noted that the possible syntypes MNHN-IM-2000-34357 were mislabelled "Madeira".

Material studied (all from Canary Islands): Tenerife: Punta de Teno, 0-1 m, 6 sh (CJDO-JT); Fañabé, 27 m, 24 sh (MHNS); Barranco Chamorro, 4 sh (CJC); Gran Canaria: Gando, Pécio Ville, 12 sh (MNCN 15.05/58969); Taliarte harbour, 1 sh (MNCN 15.05/59329); Las Canteras Beach, intertidal, 80 sh + 5 jv (MHNS); El Hierro: Mar de las Calmas, 10-11 m, 6 sh (CJDO-JT); Los Dos Roques, intertidal, 2 sh (MHNS); La Restinga, 20-55 m, 2 sh (CJDO-JT); La Gomera: San Sebastián de la Gomera, 1 sh (CWE).

Description: This species has been described in detail by VERDUIN (1984).

The shells studied by us showed some variability (Figs. 12-14). Adult shells (Figs. 12A-B and 13 A, D and F) somewhat solid, with something more than four whorls, can reach up to 1.7 x 0.85 mm. The last whorl occupies about 70% of the total height, while the aperture exceeds 43%. Sculpture of about eighteen longitudinal cords in the body whorl, wider than their interspaces, being the suprasutural and subsutural more prominent than the rest (Fig. 12G). On the other hand, the cords in the middle area of the spire are usually less prominent (Fig. 12B). At high magnification, close lamellae can be observed in the interspaces (Fig. 12H). Shells translucent with a white-yellowish

background colour and a whitish apex and basal area; inner part of the outer lip with a reddish-brown hue by transparency (Fig. 29A). There are four spiral rows of reddish spots (Fig. 31H).

Paucispiral protoconch (Figs 12C-D, 13B and G) with 1.4 whorls, 0.32 mm in diameter and nucleus of 0.11 mm. Ornamentation of coarse granules arranged spirally, grouping progressively to form irregular cords (Figs. 12F, 13B and G-H).

Distribution: It was found in Tenerife, La Gomera, Gran Canaria and El Hierro Islands (Canaries). NORDSIECK (1972) and NORDSIECK & GARCÍA-TALAVERA (1979) mentioned *Crisilla callosa* in Madeira and Selvagens, but SEGERS *ET AL.* (2009) exclude its presence in these islands. It is a shallow-water species.

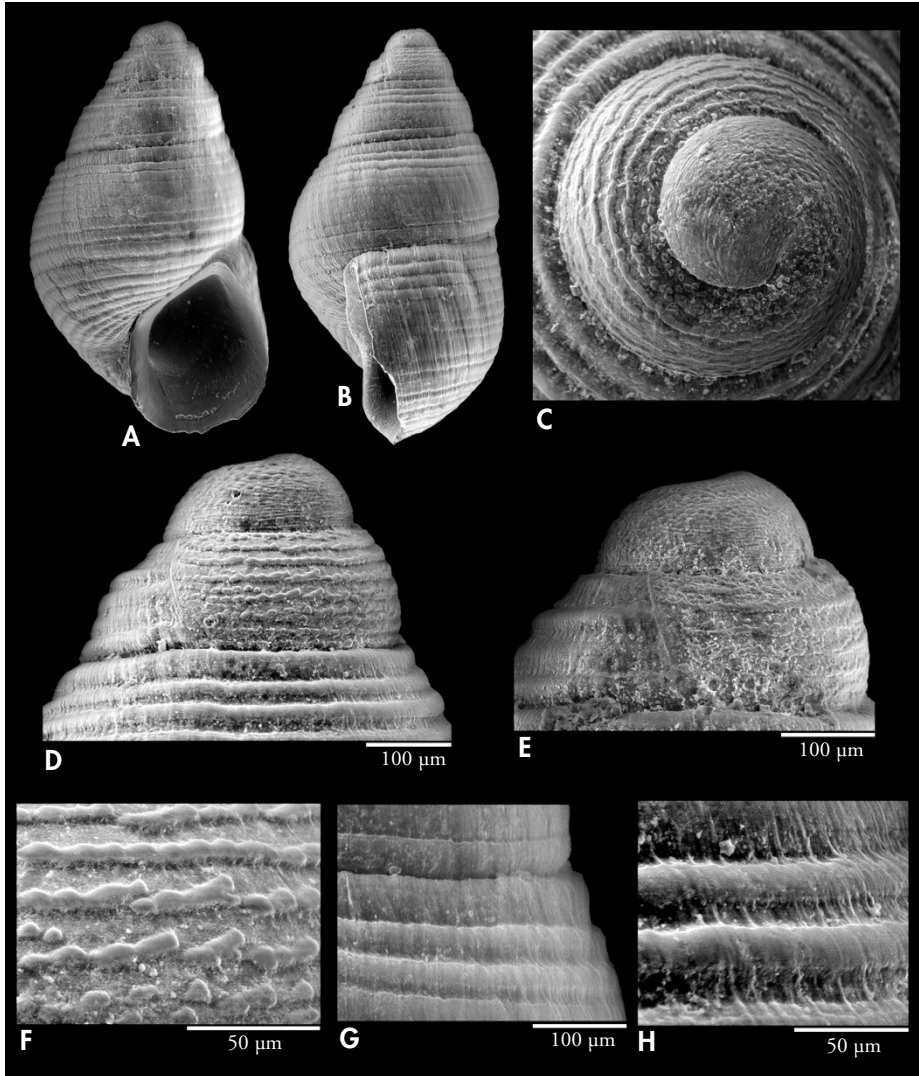


Figure 12. *Crisilla callosa* (Manzoni, 1868), Fañabé, Tenerife. A, B: shells (1.7 and 1.6 mm); C, D: protoconch of figure A; E: protoconch of figure B; F: microsculpture of the protoconch of figure D; G, H: detail of the microsculpture of the teleconch.

Figura 12. Crisilla callosa (Manzoni, 1868), Fañabé, Tenerife. A, B: conchas (1,7 y 1,6 mm); C, D: protoconcha de la figura A; E: protoconcha de la figura B; F: microescultura de la protoconcha de la figura D; G, H: detalle de la microescultura de la teleconcha.

Remarks: MANZONI (1868a, b) described and figured *Rissoa callosa* from shells collected by R. McAndrew in Canary Islands. After reviewing the material in NHMUK, VERDUIN (1984), designated as lectotype (possibly not

valid, see above) one shell coming from Tenerife, providing a photograph. This same author studied and illustrated shells from El Hierro Island (Canaries). Anyway, since the name *C. callosa* seems to group some cryptic species restricted

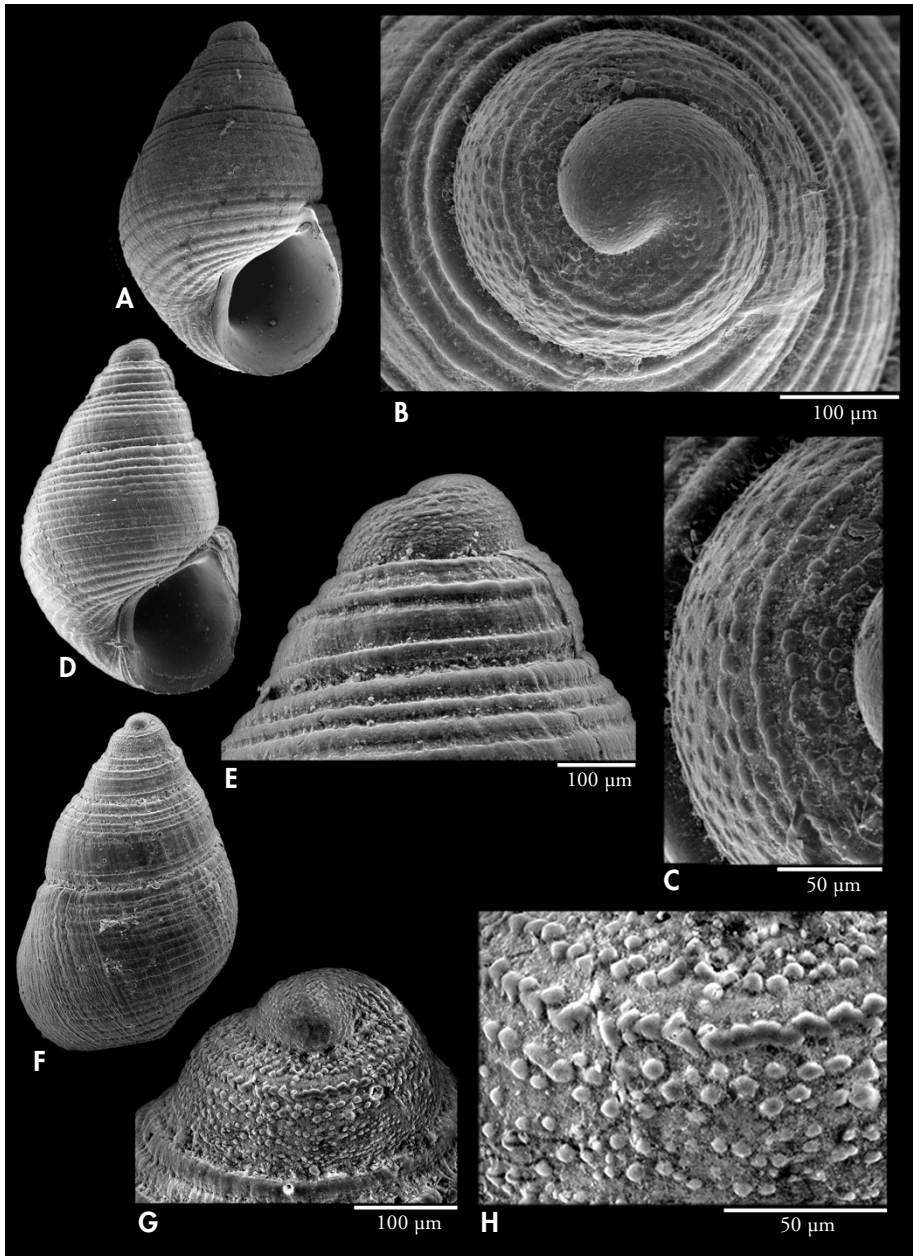


Figure 13. *Crisilla callosa* (Manzoni, 1868). A: shell (1.4 mm), Las Canteras, Gran Canaria; B, C: its protoconch and detail of the microsculpture; D: shell (1.6 mm), Gando, Gran Canaria; E: its protoconch; F: shell (1.4 mm), La Restinga, El Hierro; G, H: its protoconch and detail of its microsculpture.

Figura 13. Crisilla callosa (Manzoni, 1868). A: concha (1,4 mm), Las Canteras, Gran Canaria; B, C: su protoconcha y detalle de su microescultura; D: concha, (1,6 mm), Gando, Gran Canaria; E: su protoconcha; F: concha (1,5 mm), La Restinga, El Hierro; G, H: su protoconcha y detalle de su microescultura.

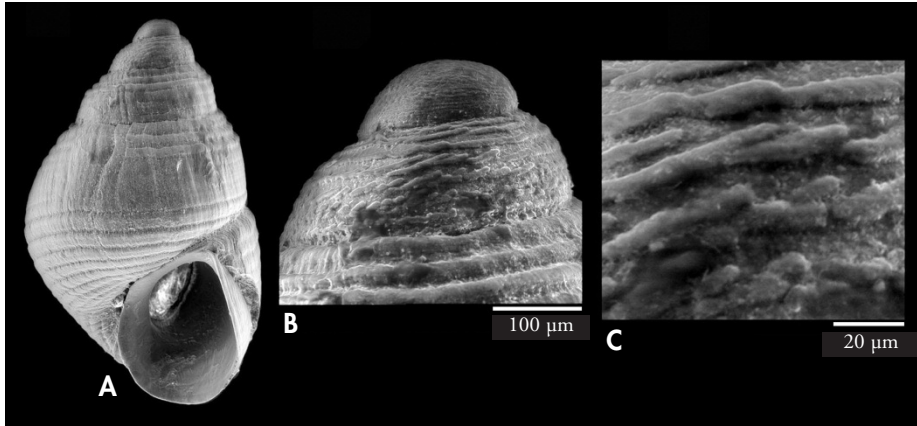


Figure 14. *Crisilla* cf. *callosa* (Manzoni, 1868), Fañabé, Tenerife. A: shell (1.4 mm); B: protoconch of the shell; C: detail of the microsculpture.

Figura 14. Crisilla cf. *callosa* (Manzoni, 1868), Fañabé, Tenerife. A: concha (1,4 mm); B: protoconcha; C: detalle de su microescultura.

to some of the islands (two which are described below as new species) the records of this species should be taken with caution. In addition to the two new species described below, one of the shells found in Tenerife also seems somewhat different (Figs. 14 A-C) and we keep it as *Crisilla* cf. *callosa*. SCUDERI & AMATI (2012) pointed out that *C. callosa* and *C.*

picta are very similar to each other, however both species were well distinguished by VERDUIN (1984), and therefore treated as separated species in the European Register of Marine Species (GOFAS *ET AL.*, 2001). The sculpture of *C. callosa* is stronger and covers the entire shell, including protoconch (almost smooth in *C. picta*, see figs. 10B-C and F).

Crisilla difficilis n. sp. (Figure 15, 29B-D, 31G)

Type locality: Lanzarote, Famara Beach, Canary Islands, beached.

Type material: Holotype (Fig. 15A) in MNCN (15.05/200027); 1 paratype MNHN-IM-2014-7057 and 10 paratypes in MHNS.

Other material studied (all from Canaries): Famara Beach (Lanzarote), beached, > 150 sh (CJDO-JT); Matagorda (Lanzarote), beached, 5 sh (CJDO-JT); Las Canteras Beach (Gran Canaria), intertidal, 1 sh (MHNS).

Etymology: The specific name comes from the Latin word *difficilis*, alluding to the difficult diagnosis of the species of this group, sometimes only differentiated from details observed through SEM.

Description: Shell pupoid conical (Figs. 15A-D), quite solid, which can reach 1.8 x 1 mm with 4.75 whorls. Aperture relatively small, which slightly exceeds 35% of the height. Surface with weak furrows which delimit narrow spiral cords of variable width (Figs. 15J-K), between 40 and 50 on the body whorl and between 10 and 20 on the

penultimate whorl. The upper spiral cord is somewhat more pronounced and forms a subsutural rim. At high magnification, very tight lamellae can be seen on the cords (Fig. 15I). Shell colour yellowish, whitish towards the base, with four spiral rows of reddish spots (Figs. 29B-D and 15G). The upper subsutural row consists of wide square blotches,

and the lower one near the base of more diffuse spots. Inside of the outer lip reddish by transparency.

Paucispiral protoconch of 1.5 whorls (Figs. 15E-G) and 0.33 mm in width (nucleus of 0.92 mm). Sculpture of very irregular and elongated opisthocline strokes that tend to converge into spiral cords (Fig. 15G). On the basal part of the protoconch, there are irregular granules roughly aligned (Fig. 15H).

Distribution: Mainly found in Lanzarote; only one shell collected in Gran

Canaria (Canary Islands). All shells were found beached.

Remarks: This new species is quite similar to *C. callosa* with which it may have previously been confused. It is distinguished from the latter by having a greater number of spiral cords, narrower and less pronounced. The sculpture of the protoconch also differs in both species. In the new species there are irregular granules roughly aligned in its basal part while in *C. callosa* the microsculpture is more developed and the granules are thicker.

Crisilla javieri n. sp. (Figures 16-17, 29E-G, 31I)

Type locality: Salema Beach, La Palma, Canary Islands.

Type material: Holotype (Fig. 16A) in MNCN (15.05/200028); 2 paratypes MNHN-IM-2014-7058 and 5 paratypes in MHNS.

Other material studied (all from Canary Islands): Salema Beach (La Palma), beached, 85 sh (CJDO-JT) and 7 sh (CRG); Faro de Fuencaliente (La Palma), 2 sh (CRG); Barlovento (La Palma), 1 m, 1 sh (CJDO-JT); Los Cascajos (La Palma), 20-40 m, 2 sh (CJDO-JT); La Restinga (El Hierro), 20-55 m, 2 sh (CWE); Baja de las Machas (Tenerife), intertidal, 2 sh (CJC); Barranco Chamorro (Tenerife), intertidal, 1 sh (CJC).

Etymology: The specific name is after Javier Oliver, son of the first author in recognition of his cooperation in the sampling for micromolluscs.

Description: Shell pupoid conical of flat-convex profile (Figs. 16A-B and 17A-C and G-H), somewhat solid, which can exceed four whorls and reach 1.7 × 1 mm. The last whorl occupies just over 70% of the total height, while the aperture barely reaches 40%. Ornamentation of spiral grooves that delimit flat cords of uneven width, about 25 furrows in the body whorl. The subsutural furrows and those of the basal area of the shell are wider and deeper. Suture canaliculated (Fig. 16G), with a subsutural cord usually more marked. The furrows are profusely crossed by fine lamellae (Fig. 16H). Outer lip thickened with six or seven denticular folds inside. Shell whitish, translucent, with reddish blotches arranged spirally in three clear rows (Fig. 29E-G), the lower two sometimes divided (Fig. 31I). In some specimens a fourth row

of spots appears in the basal area bordering the inner lip.

Paucispiral protoconch (Figs. 16C-D and 17D-E, I-J) of somewhat less than one whorl and a half, reaching 340 μm of width (nucleus 125 μm). Ornamentation of coarse granules, more or less rounded, some of them, thicker, joining to form a spiral cord (Fig. 16F) in the upper third.

Distribution: Only found in the western Canary Islands, subtidal; some shells have been found down to 55 m in depth.

Remarks: This species is also very similar to *C. callosa* and *C. difficilis* n. sp. from which it is mainly differentiated by the sculpture of the protoconch, by having incipient folds inside the inner lip, and by the spiral cords which are fewer and coarser.

Crisilla innominata (Watson, 1897) (Figures 18-19, 29H-I, 31J)

Rissoa concinna (Monterosato, 1869) sensu Watson, 1873: 381, pl. 35, fig. 19 [misidentification].

Rissoa (Cingula) innominata Watson, 1897: 309, pl. 19, 20.

Setia innominata (Watson): Verduin, 1988: 25, figs. 29, 33, 37.

Type locality: Madeira (without specifying locality).

Type material: VERDUIN (1988) designated as lectotype a shell from Madeira (NHMUK 198321).

Material studied: Madeira: Club Naval, 0-2 m, 17 sh (MHNS); Reis Magos, 5-10 m, 18 sh (MHNS); Puerto Moniz, 2 m, 35 sh (MHNS); Funchal, 5-10 m, 7 sh (MHNS). Canary Islands: Pecio Ville, Gando (Gran Canaria), 48 m, 9 sh + 3 jv (MNCN); Alcalá (Tenerife), 1 sh (CJC).

Description: A detailed description was provided by VERDUIN (1988).

Shell studied by us fairly solid, large specimens with a little more than 4.5 whorls reaching up to 1.6 x 0.9 mm. The body whorl occupies between 70 and 75 % of the total height. Profile of the shell quite convex, although in some shells the upper part of the whorls can be somewhat flat. It has about fifteen somewhat uneven shallow furrows that delimit flat cords of similar width. These cords are more evident in the upper part of the whorls and in the basal area of the shell (Figs. 18A-B and F, 19A-C). Usually the furrows are not visible in the central part of the whorls. A thicker spiral cord in the upper third of the whorls causes a slight angulation (Figs. 18G and 19H). Suprasutural and subsutural cords also thicker leading a canalculated suture (Fig. 19J). Shell whitish, semitransparent, with four bands of reddish spots in the body whorl (Figs. 29H-I and 31J), one subsutural more evident, two more diffuse in the middle, and the fourth at the base.

Paucispiral protoconch of 1.5 whorls and about 320 µm (diameter of the nucleus slightly less than 100 µm). Ornamentation

somewhat variable (Figs. 18C-D and G, 19D-H). There are irregular granules densely arranged all over the surface of the nucleus (Figs. 18D and G, Figs. 19F-G). On further whorls of the protoconch, the granules become aligned into spirals. In some protoconchs at first these granules are fused in a crude and irregular way, but towards the end of the protoconch they form about five irregular cords (Figs. 19E and I).

Distribution: Known from Madeira and Canary Islands, from intertidal down to 55 m, but mainly as empty shells.

Remarks: The shell profile and details of the sculpture of the protoconch of *C. innominata* show some variability (see Figs. 18-19 and 29H-I) and we cannot rule out that we are facing more than one species. This species has a resemblance to the Mediterranean species *C. beniamina* and *C. ramosorum*, but is larger than both, with a more convex profile and a more marked suture in *C. beniamina* (Fig. 30C), while *C. ramosorum* Oliver, Templado & Kersting, 2012, is more squat with the weakest sculpture. The sculpture of the protoconch it is also different in *C. innominata*.

Crisilla postrema (Gofas, 1990) (Figures 20, 29J, 31M)

Alvania (*Crisilla*) *postrema* Gofas, 1990: 114-116, figs. 8, 24-27.

Alvania postrema Gofas: Hoenselaar & Goud, 1998): 99.

Crisilla postrema Gofas: Frias Martins *et al.*, 2009: fig. 120.

Crisilla cf. postrema Gofas: Frias Martins *et al.*, 2009: figs. 121-122.

Type locality: Ilhéu de Vila Franca, São Miguel, Azores.

Type material: holotype MNHN-IM-2000-34358 and numerous paratypes MNHN-IM-2000-34359. Other paratypes in MCM, IICT, SMNH, ZMA, all from type locality.

Material studied (all from Azores): unknown locality, São Miguel, 18 m, 15 sh + 20 jv (CJDO-JT); San Roque, São Miguel, beached, 3 sh (CJDO-JT); Ponta Delgada, São Miguel, beached, 30 sh (CJDO-JT); Praia da Victoria, Terceira, beached, 20 sh (CJDO-JT); Biscoitos, Terceira, 2 m, 30 sh (CJDO-JT); Faial harbour, >50 sh (MNCN 15.05/59308, 15.05/59686).

Description: A detailed description was provided by GOFAS (1990, original description). Adult shells here studied

with about four convex whorls and up to 1.4 x 0.8 mm. The last whorl occupies three-quarters of the overall height and

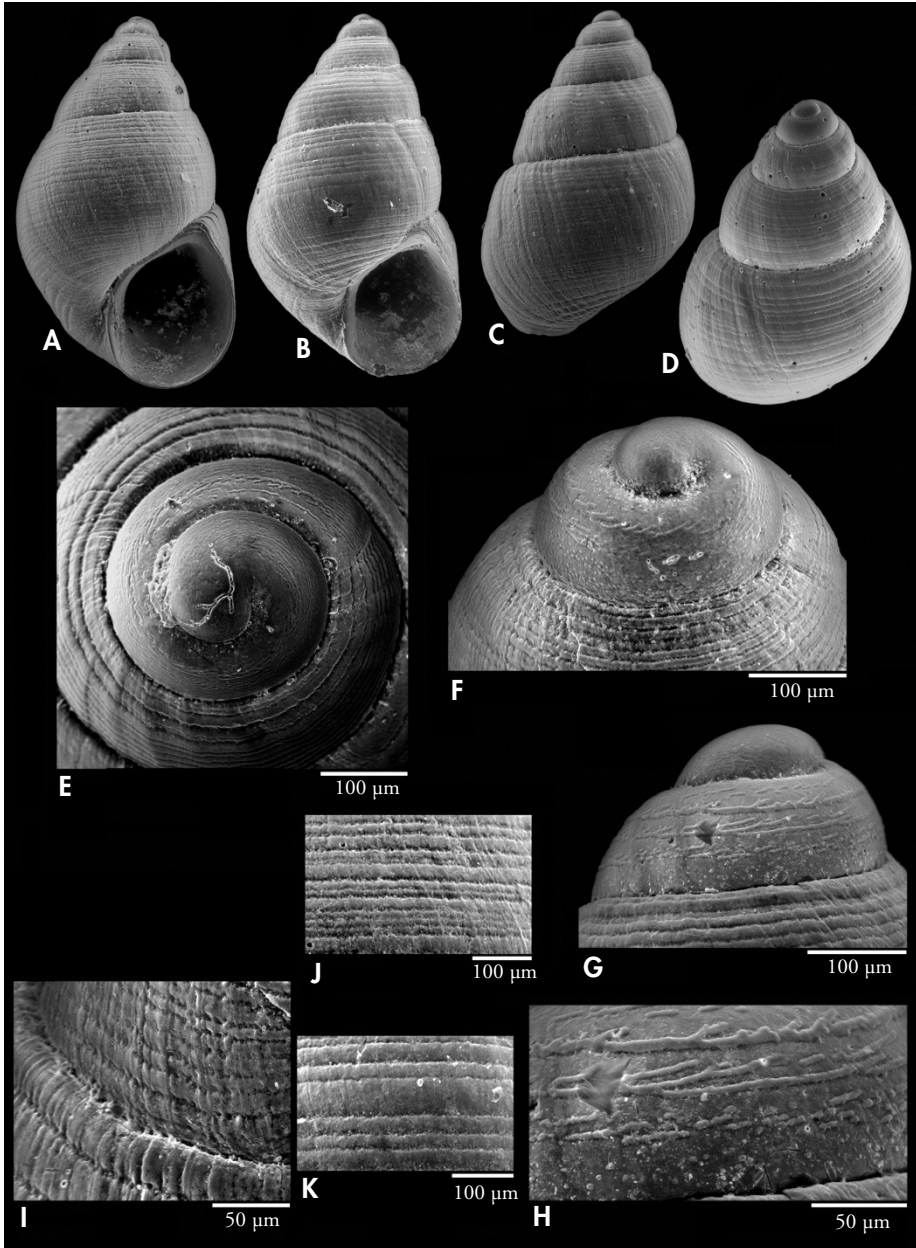


Figure 15. *Crisilla difficilis* n. sp. A: holotipo (1.8 mm), Famara Beach, Lanzarote; B, C: paratipos (1.8 and 1.5 mm), from type locality; D: concha (1.5 mm), Playa de Las Canteras, Gran Canaria; E-H: protoconchas y detalle de su microescultura; I: detalle de la sutura; J, K: detalle de la escultura de la teleoconcha.

Figura 15. *Crisilla difficilis* n. sp. A: holotipo (1,8 mm), Famara Beach, Lanzarote; B, C: paratipos (1,8 y 1,5 mm), de la localidad tipo; D: concha (1,5 mm), Playa de Las Canteras, Gran Canaria; E-H: protoconchas y detalle de su microescultura; I: detalle de la sutura; J, K: detalle de la escultura de la teleoconcha.

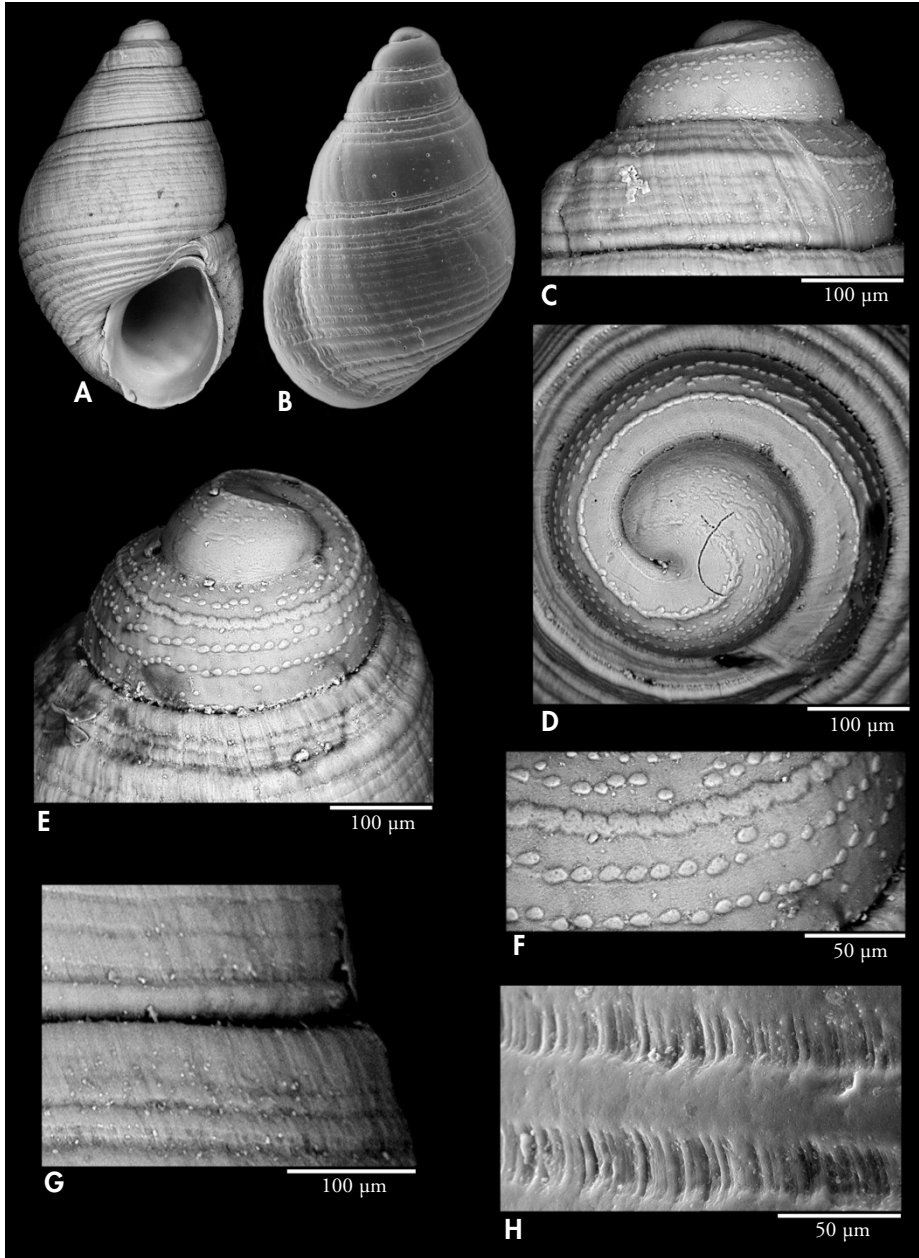


Figure 16. *Crisilla javieri* n. sp., La Palma, Canary Islands. A: holotype (1.7 mm), Salema Beach; B: paratype (1.5 mm), type locality; C: protoconch of the holotype; D, E: protoconch of two paratypes; F: detail of microsculpture of the protoconch; G, H: detail of the suture and microsculpture of the teleoconch.

Figura 16. Crisilla javieri n. sp., La Palma, Islas Canarias. A: holotipo (1,7 mm), Playa Salema; B: paratipo (1,5 mm), localidad tipo; C: protoconcha del holotipo; D, E: protoconchas de dos paratipos; F: detalle de la microescultura de la protoconcha; G, H: detalle de la sutura y de la microescultura de la teleoconcha.

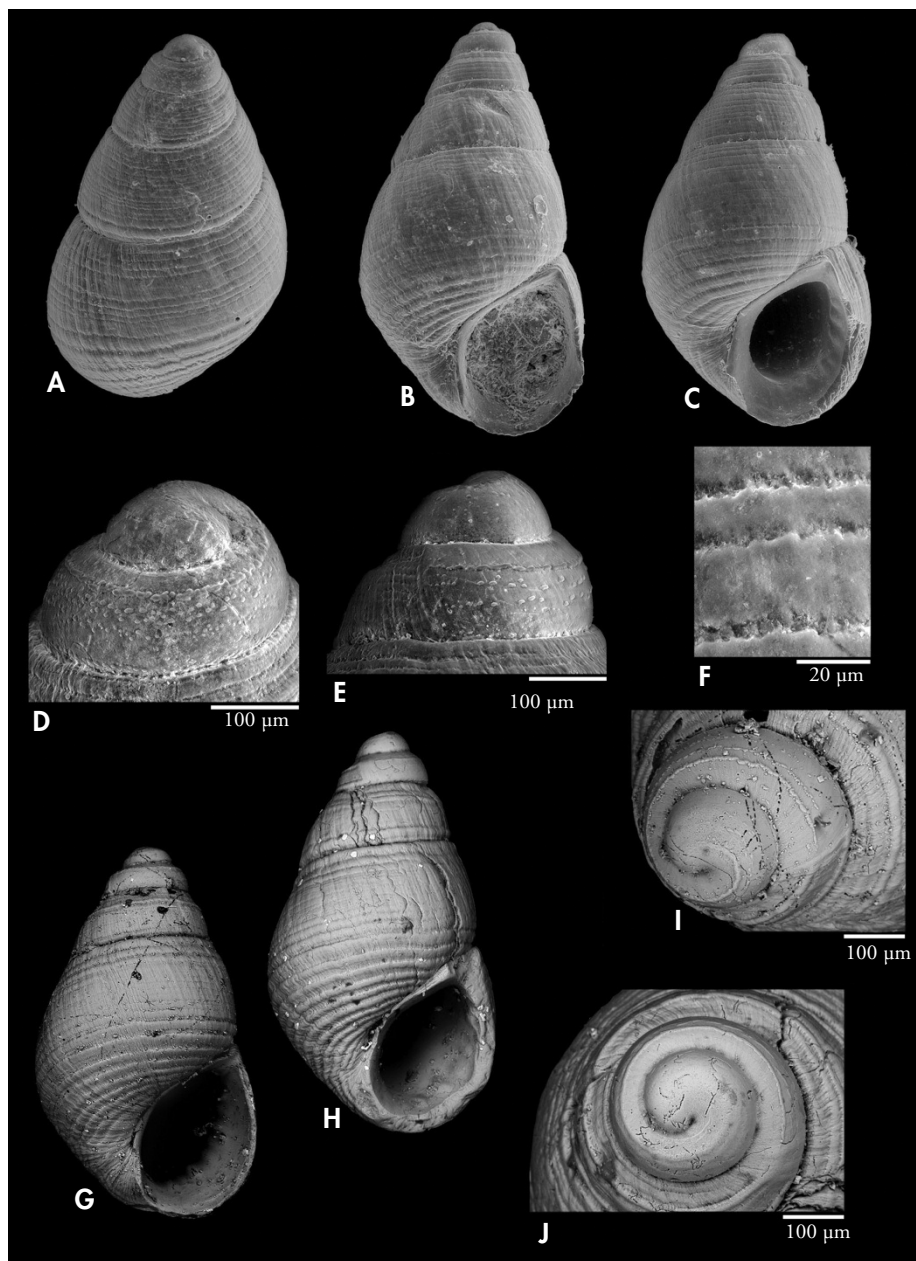


Figure 17. *Crisilla javieri* n. sp., Canary Islands. A-C: shells (1.4, 1.5 and 1.6 mm respectively, from El Hierro; D, E: protoconchs; F: detail of the microsculpture of the shell; G: shell (1.4 mm) from Baja de las Machas, Tenerife; H: shell (1.5 mm) from Barranco Chamorro, Tenerife; I: protoconch of the shell of figure G; J: protoconch of the shell of figure H.

Figura 17. *Crisilla javieri* n. sp., Islas Canarias. A-C: conchas (1,4, 1,5 y 1,6, mm respectivamente) de El Hierro; D, E: protoconchas; F: detalle de la microescultura de la concha; G: concha (1,4 mm) de Baja de las Machas, Tenerife; H: concha (1,5 mm) de Barranco Chamorro, Tenerife; I: protoconcha de la concha de la figura G; J: protoconcha de la concha de la figura H.

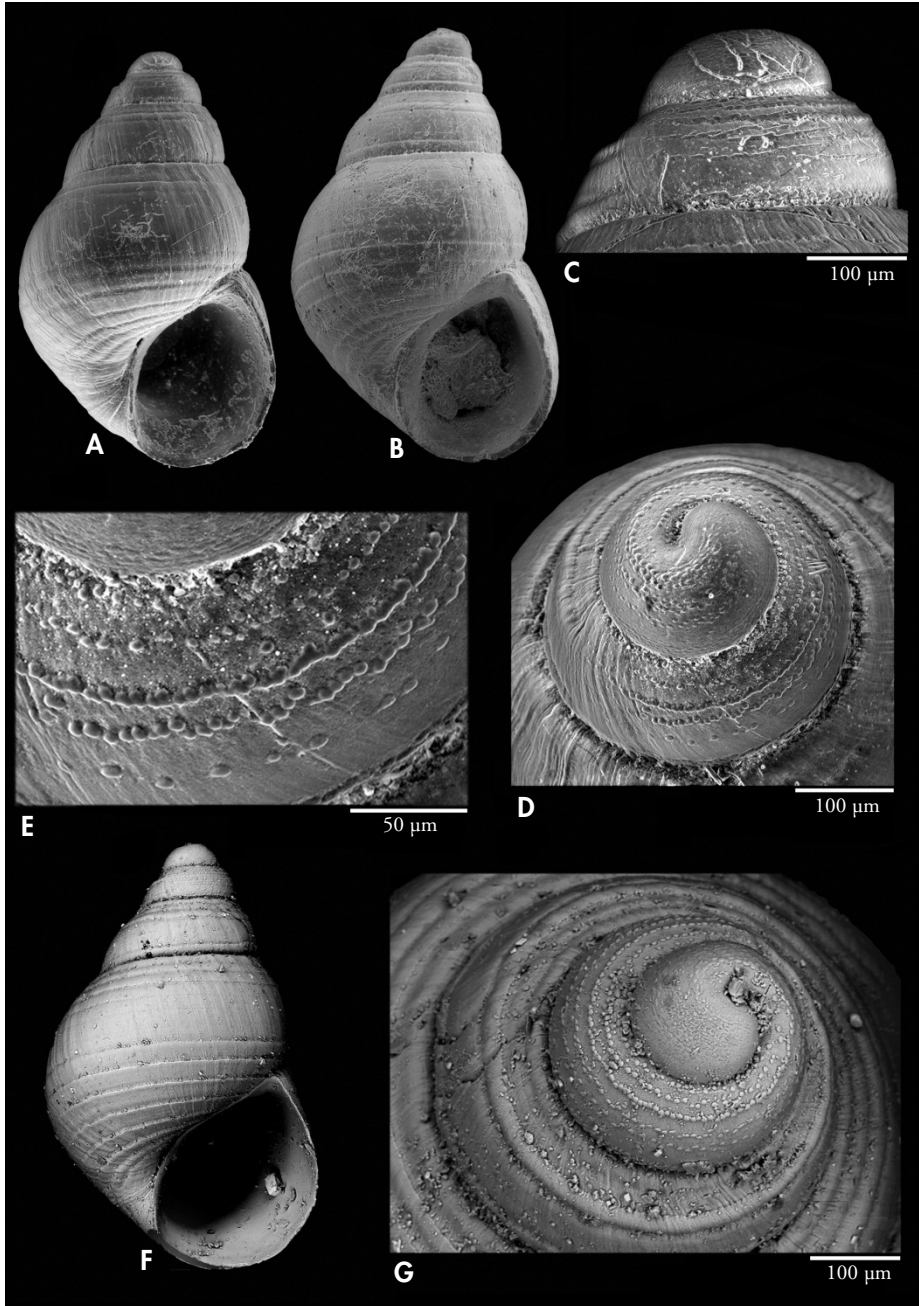


Figure 18. *Crisilla innominata* (Watson, 1897) from Canaries. A, B: shells (1.4 and 1.6 mm), Gando, Gran Canaria; C: protoconch of the shell of figure A; D, E: protoconch and detail of its microsculpture; F: shell (1.47 mm), Las Machas, Tenerife; G: its protoconch.

Figura 18. *Crisilla innominata* (Watson, 1897) de Canarias. A, B: conchas (1,4, y 1,6 mm), Gando, Gran Canaria; C: protoconcha de la concha de la figura A; D, E: protoconcha y detalle de su microscultura; F: concha (1,47 mm), Las Machas, Tenerife; G: su protoconcha.

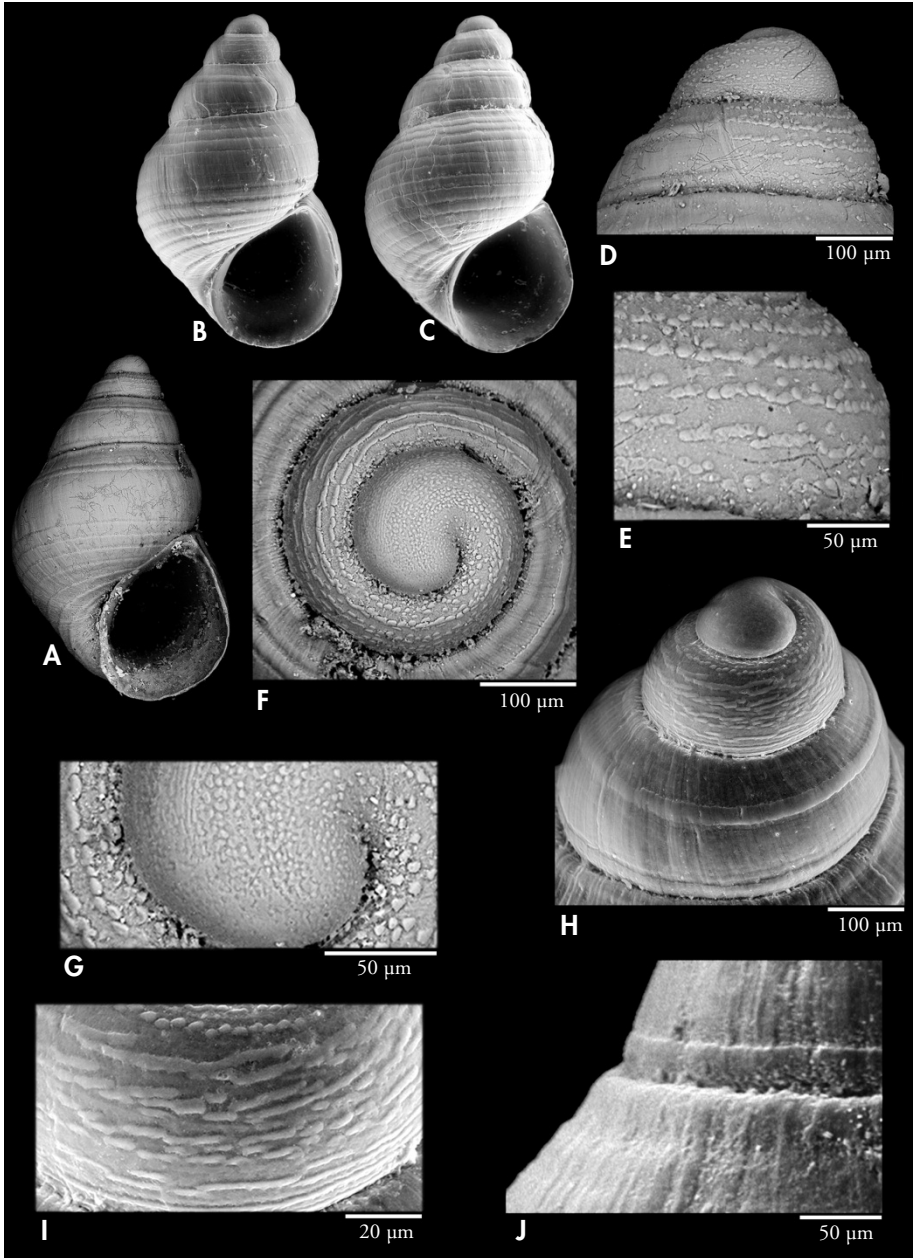


Figure 19. *Crisilla innominata* (Watson, 1897), Madeira. A-C: shells (1.6, 1.4 and 1.4 mm, respectively), Puerto Moniz; D, E: lateral view of the protoconch and detail of the microsculpture from shell of figure A; F, G: apical view of the protoconch and detail of its microsculpture from the same shell; H, I: protoconch and detail of microsculpture of the shell in figure B; J: detail of the suture. *Figura 19. Crisilla innominata* (Watson, 1897), Madeira. A-C: conchas (1,6, 1,4 y 1,4 mm, respectivamente), Puerto Moniz; D, E: vista lateral de la protoconcha y detalle de la microescultura de la concha de la figura A; F, G: vista apical de la protoconcha y detalle de la microescultura de la misma concha; H, I: protoconcha y detalle de la microescultura de la concha de la figura B; J: detalle de la sutura.

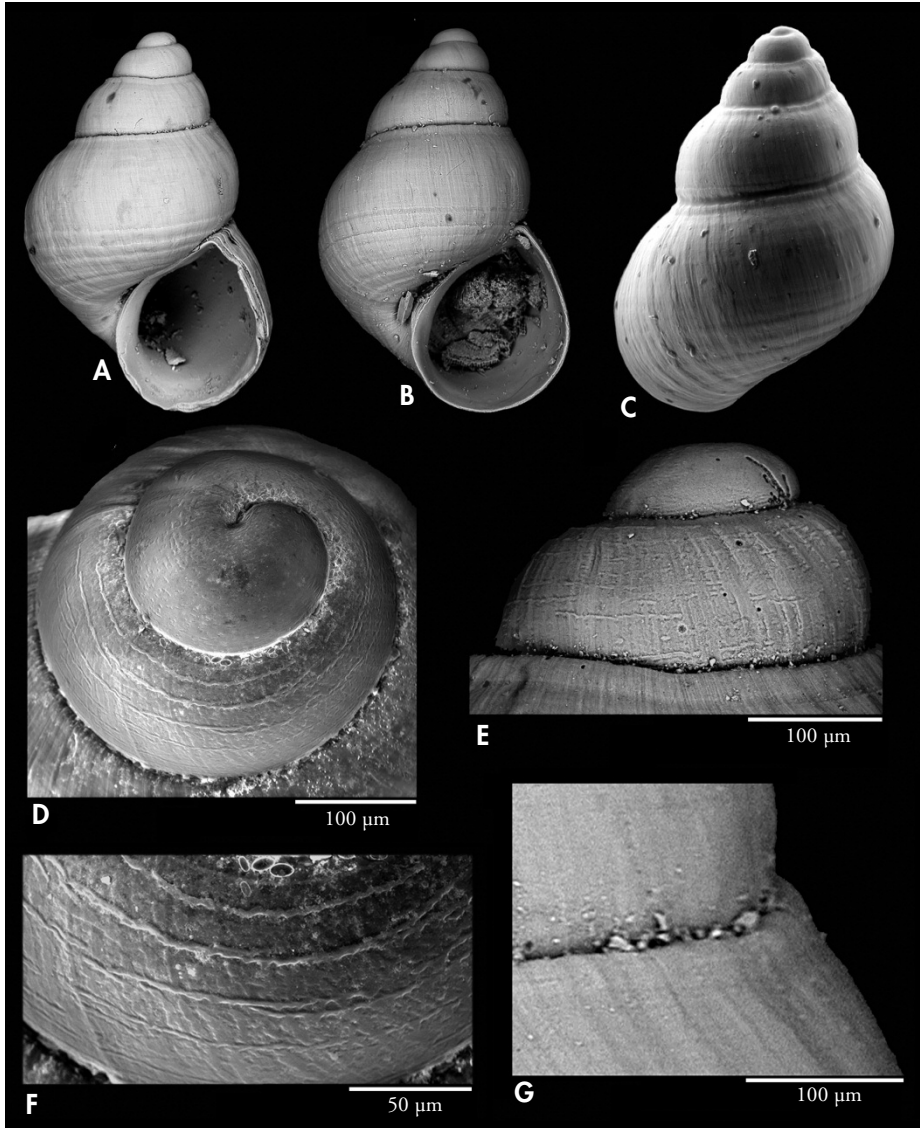


Figure 20. *Crisilla postrema* (Gofas, 1990), Azores Islands. A and C: shell (1.4 mm), unknown locality, São Miguel; B: shell (1.4 mm), from Biscoitos, Terceira; D-F: protoconchs and detail of the microsculpture; G: detail of the suture.

Figura 20. *Crisilla postrema* (Gofas, 1990), Islas Azores. A y C: concha (1,4 mm), localidad indeterminada, San Miguel; B: concha (1,4 mm) de Biscoitos, Terceira; D-F: protoconchas y microesultura; G: detalle de la sutura.

the aperture 45%. Aperture not thickened, smooth inside. Sculpture formed by shallow furrows which delimit at the base of the shell about seven weak cords

(Figs. 20A-C). There is a subsutural rim (Fig. 20G). Background colour of the shell whitish of pale yellowish, semi-transparent, with spiral rows of reddish

spots, the subsutural of quadrangular blotches more intense than the others (Figs. 29J and 31M). In the basal zone the speckles are less defined.

Protoconch with one whorl and a half and somewhat more than 300 μm of width. Sculpture of thin and irregular spirals strands distributed over its surface without apparent order in some stretches. On some protoconchs, these granules are fused to form irregular cords in the adapical part of the last protoconch whorl (Figs. 20D-F).

Distribution: Supposedly endemic from Azores Islands but HOENSELAAR &

GOUD (1998) mention two shells near Porto Santo, Madeira. We have not examined this material. It is mainly a shallow water species but FRIAS MARTINS *ET AL.* (2009) recorded some dubious shells down to 360 m in depth.

Remarks: The sculpture of its protoconch as well as its general appearance are more reminiscent of the Mediterranean species *C. ramosorum* than any of the Macaronesian species we have studied. The most similar Macaronesian species is *C. iunoniae* but it is more oval and differs clearly by the sculpture of its protoconch.

II.3. *Setia*-like species

Crisilla ugesae (Verduin, 1988) comb. nov. (Figs. 21, 29K-L, 31P)

Setia ugesae Verduin, 1988: 31, figs. 36, 32, 40.

Setia ugesae Verduin: Albuquerque *et al.*, 2009: 126-127.

Type locality: El Hierro (Canary Islands).

Type material: Holotype (not studied) in RMNH.

Material studied: Selvagens Islands: 7 sh (CMA). Canary Islands: Mar de las Calmas (El Hierro), 10-11 m, 11 sh (CJDO-JT); Punta de la Restinga (El Hierro), 17-20 m, 11 sh (CJDO-JT).

Description: A detailed description was provided by VERDUIN (1988, original descriptions).

Shells here studied pupoid oval (Fig. 21A), fragile, with about four whorls reaching up to 1.3 x 0.7 mm. The last whorl occupies somewhat more than 70% of the total and the aperture about 45%. Outer lip rather thin. Surface smooth; with faint spiral lines seen only under high magnification. There is a subsutural rim characteristic of the species of *Crisilla* (Figs. 21E-G). Yellowish shell with four spiral rows of large reddish spots (Figs. 29K-L and 31P).

Paucispiral protoconch with 1.5 apparently smooth whorls (Figs. 21B and H). Only in very well preserved shells can the surface be seen somewhat irregularly rough on the early part (Fig. 21C). A very thin spiral cord appears in some of the specimens studied (Figs. 21B and D).

Distribution: Only empty shells are known from El Hierro (Canary Islands)

and Selvagens Islands, from shallow-water down to 20 m in depth.

Remarks: VERDUIN (1988) described *Setia ugesae* from specimens collected in El Hierro Island (Canaries). He highlighted the absence of ornamentation of its shell, except for the presence of very fine and dense spiral striations at the base of the shell, which supported its inclusion in the genus *Setia*. Nevertheless the detailed examination of the shell reveals its resemblance to other species of *Crisilla*, such as *C. innominata*, *C. postrema*, *C. perminima* or *C. spadix*, all of them with a weak spiral sculpture. Therefore we consider that it should be better included in the latter genus. The specimens here studied from Selvagens Islands coincide with the original description of this species, although they present a fourth row of brown spots on the base. ALBUQUERQUE *ET AL.* (2009) had already recorded this species in the Selvagens Islands.

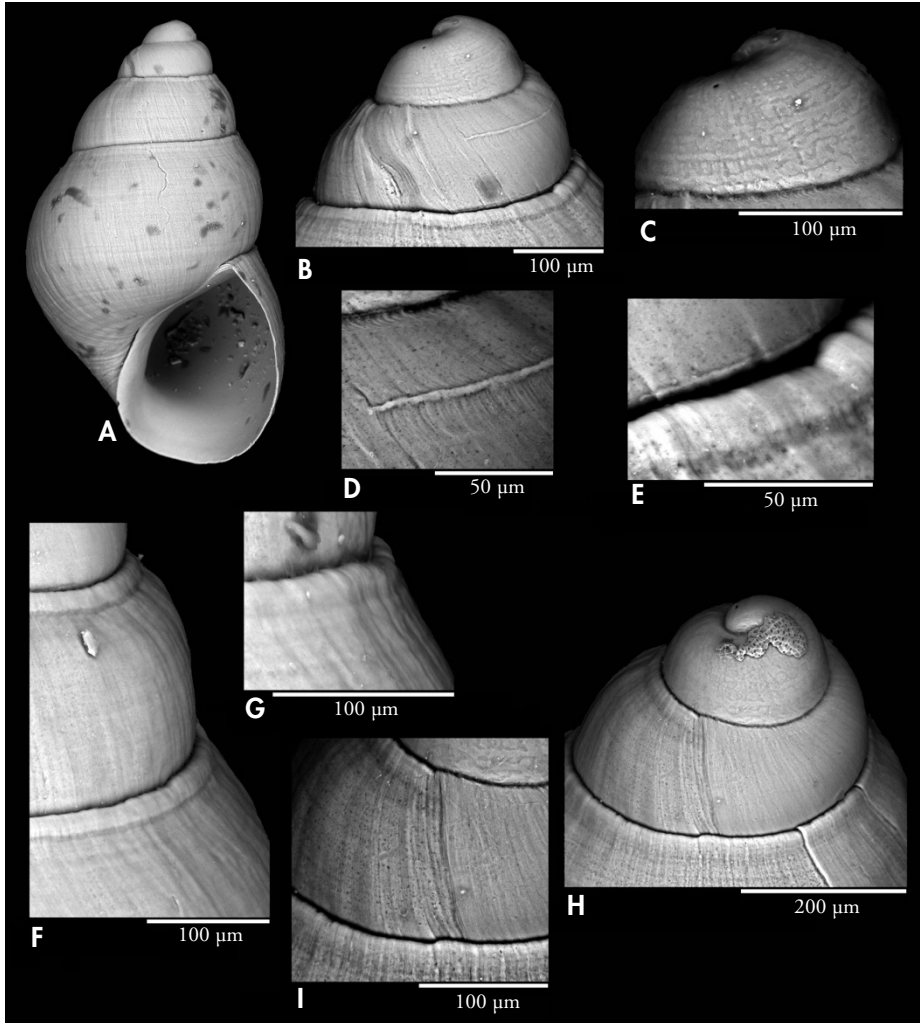


Figure 21. *Crisilla ugesae*, Selvagens Islands. A: shell (1.3 mm); B-D: protoconch and detail of its sculpture; E-G: details of the subsutural rim; H, I: protoconch and detail of the protoconch-teleoconch transition.

Figures 21. Crisilla ugesae, Islas Salvajes. A: concha (1,3 mm); B-D: protoconcha y detalle de su escultura; E-G: detalles del reborde subsutural; H, I: protoconcha y detalle de la transición protoconcha-teleoconcha.

Crisilla iunoniae (Palazzi, 1988) (Figures 22, 30A-C, 31Q)

Alvania iunoniae Palazzi, 1988: 21, figs. 1, 6.

Setia lidyae Verduin, 1988: 29, figs. 30, 34, 38.

Setia iunoniae (Palazzi): Goud, 1999: 69-70; Segers *et al.*, 2009: 135-136, plate 22, fig. 1.

Type locality: Funchal Bay, Madeira.

Type material: Holotype (LMUB n° 007059). *Setia lidyae*: Holotype and 8 paratypes in ZMA (Moll n° 388016) (type locality: Ponta da Calheta, Portosanto Is., Madeira).

Material studied: Madeira: Reis Magos, 5-10 m, 25 sh (MHNS); Funchal, 5-10 m, 5 sh (MHNS); Puerto Moniz, 2 m, 26 sh (MHNS); Club Naval, 0-2 m, 4 sh (MHNS); Porto Santo, 12 m, 2 sh (CAP). Canary Islands: Famara (Lanzarote), beached, 4 sh (CJDO-JT); Matagorda (Lanzarote), beached, 4 sh (CJDO-JT); Arrecife (Lanzarote), beached, 1 jv (CJDO-JT); Playa Salema (La Palma), beached, 19 sh (CJDO-JT); Salema Beach (La Palma), 1 sh (CRG); Barlovento (La Palma), 1 m, 12 sh + 6 jv (CJDO-JT); Punta del Teno (Tenerife), 0-1 m, 2 sh (CJDO-JT); Fañabé (Tenerife), 27 m, 4 sh (MHNS); Las Canteras (Gran Canaria), 1-2 m, 12 sh + 1 jv (MHNS); Pecio Ville, Gando (Gran Canaria), 48 m, 5 sh (MNCN); Pecio coreano, Puerto Taliarte (Gran Canaria), 4 sh (MHNS).

Description: Shells here studied fragile, conical-oval, with something more than 3 convex whorls and up to 1.2 x 0.67 mm. Last whorl occupies 80% of height and the aperture is relatively large (Fig. 22A, E and J). There are some rather weak, equidistant spiral grooves on the basis delimiting wide, slightly prominent cords. There is a subsutural cord and, below, several cordlets only seen at high magnification (Fig. 22D). The sculpture is least noticeable in the central area of the whorls. Shells translucent, with a yellowish hue and whitish base (Fig. 30A-C). There are four spirals of reddish spots, the lower one more diffuse (Fig. 31Q).

Paucispiral protoconch (Figs. 22B, F and I) sculptured with about nine parallel furrows which delimit flat cords (Figs. 22B-C and F-G). Near the nucleus, the furrows are not yet delimited, appearing as imperceptible incisions (Fig. 22I).

Distribution: Madeira, Selvagens and Canary Islands (Tenerife, Gran Canaria, Lanzarote and La Palma). Subtidal; some shells were found down to 60 m depth.

Remarks: VERDUIN (1988) described *Setia lidyae* only a few days after PALAZZI (1988) had described *Alvania iunoniae*. GOUD (1999) noted that both taxa corresponded to the same species, provided evidence for priority of the specific name given by Palazzi, but included it in the genus *Setia*. This species can be confused with *C. spadix* and *C. perminima* but differs from the first by having grooves in the protoconcha instead of spiral cords in addition by its different colour pattern. *S. perminima* also differs in the colour pattern of the shell, having wide brown-reddish bands instead of spots and dark colour in the inner lip of the aperture. Moreover, the spiral sculpture on the basis of the shells is generally somewhat more developed in *C. iunoniae*.

Crisilla perminima (Manzoni, 1868) (Figures 23, 30E, 31R)

Rissoa (Setia) perminima Manzoni, 1868a: 167; 1868b: 244, pl. 10, fig. 8

Setia perminima (Manzoni): F. Nordsieck, 1972: 161.

Cingula perminima (Manzoni): Verduin, 1984: 68, figs. 35, 54, 83.

(not) *Crisilla perminima* (Manzoni): Tisselli & Giunchi, 2005: 39-40.

Type locality: Canary Islands, here restricted to Salema Beach, La Palma, by neotype designation.

Type material: according to Amati (pers. com.), types of this species are reported as missing in MNHN where some other types of that Manzoni paper are still. Thus, we designated here as neotype MNHN-IM-2000-34360 one shell (1.2 mm in length) from Salema Beach, La Palma, Canary Islands (Figs. 23B-E).

Material studied: Madeira: unknown locality, 12 sh (CAP); Puerto Moniz, 3 m, 1 sh (MHNS). Canary Islands: Famara (Lanzarote), 9 sh (CJDO-JT); Matagorda (Lanzarote), 2 sh (CJDO-JT); Playa Salema (La Palma), 18 sh (CJDO-JT); Barlovento (La Palma), 1 m, 8 sh (CJDO-JT); Punta del Teno (Tenerife), 0-2 m, 3 sh (CJDO-JT); Fabañé (Tenerife), > 30 sh (CAP); Las Canteras Beach (Gran Canaria), intertidal, 1 sh (MHNS); Pecio Ville, Gando (Gran Canaria), 48 m, 5 sh (MNCN 15.05/58957); Puerto Santiago (La Gomera), 10 m, 1 sh (MHNS); Mar de las Calmas (El Hierro), 10-11 m, 2 sh (CJDO-JT).

Description: Descriptions of this species were provided by VERDUIN (1984) and SEGERS ET AL. (2009).

Shell ovoid (Figs. 23A-B and F-G), not exceeding 1.2 mm x 0.6 mm. The body whorl encompasses about 80% of the

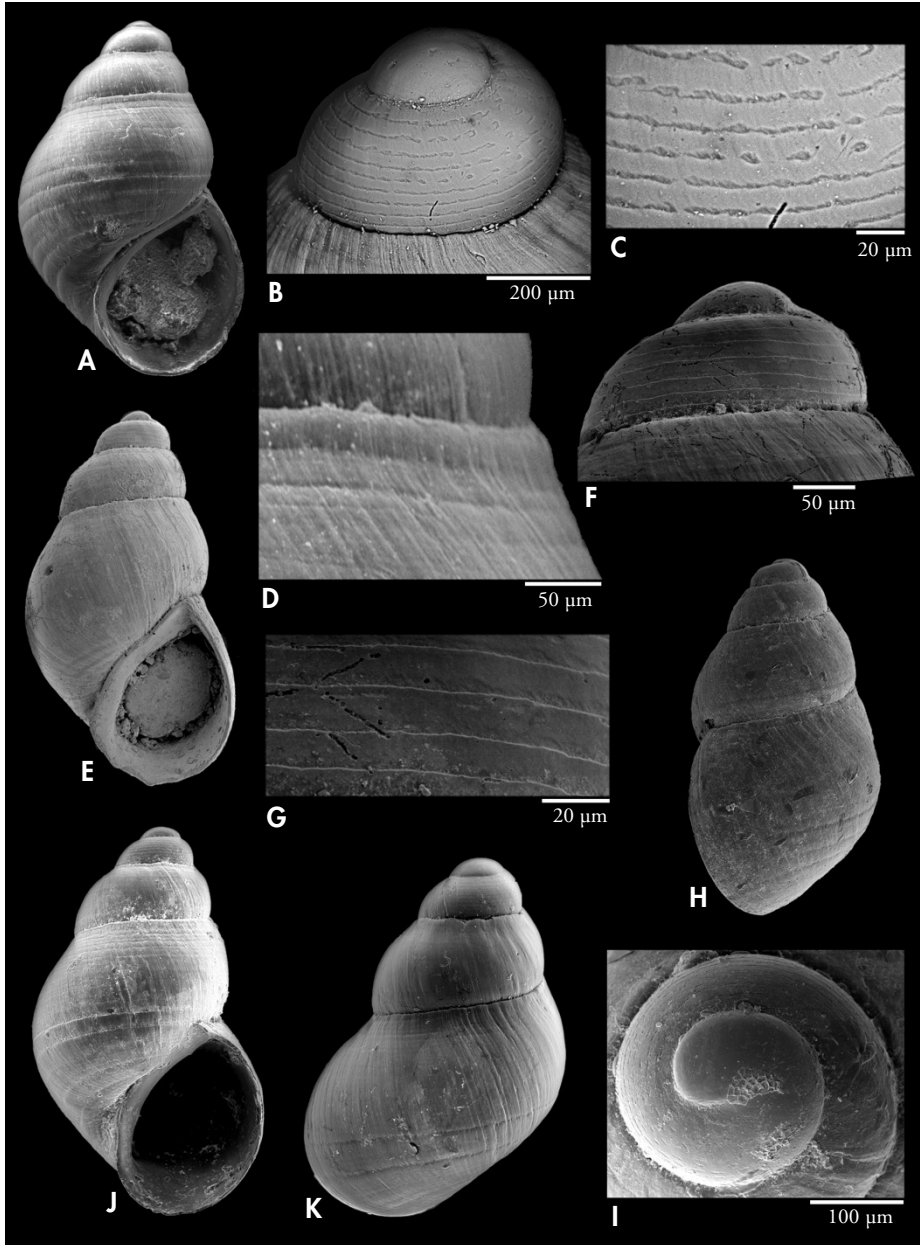


Figure 22. *Crisilla iunoniae* (Palazzi, 1989). A: shell (1.2 mm), Salema Beach, La Palma, Canaries; B, C: its protoconch and detail of its microsculpture; D: detail of the suture; E: shell (1.1 mm), Las Canteras, Gran Canaria; F, G: protoconch and microsculpture; H: shell (1.2 mm), Las Canteras, Gran Canaria; I: its protoconch; J, K: shells (1.4 and 1.1 mm), Reis Magos, Madeira.

Figura 22. Crisilla iunoniae (Palazzi, 1989). A: concha, 1,2 mm, Playa Salema, La Palma, Canarias; B, C: su protoconcha y detalle de su microescultura; D: detalle de la sutura; E: concha (1,1 mm), Las Canteras, Gran Canaria; F, G: protoconcha y microescultura; H: concha (1,2 mm), Las Canteras, Gran Canaria; I: su protoconcha; J, K: conchas, (1,4 y 1,1 mm), Reis Magos, Madeira.

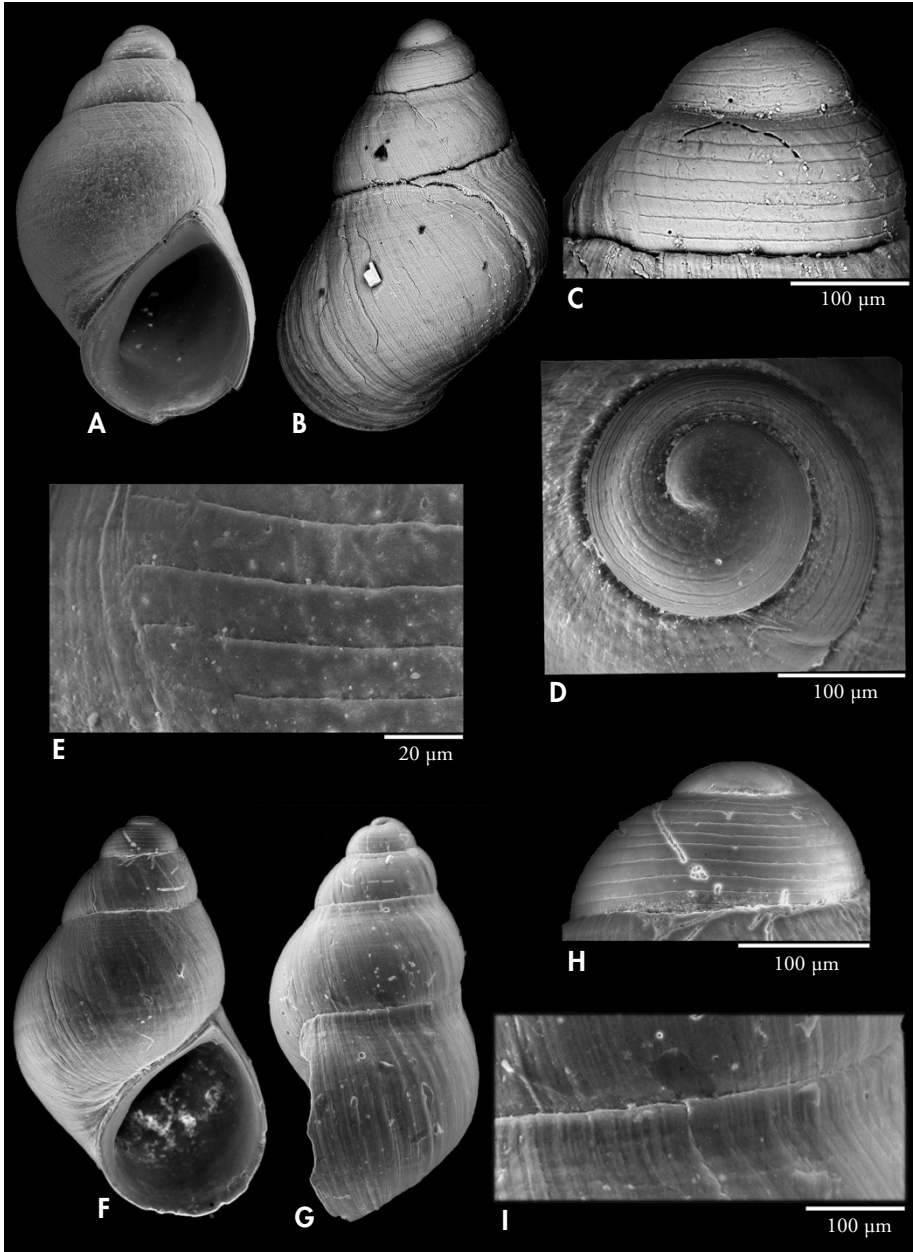


Figure 23. *Crisilla perminima* (Manzoni, 1868). A, B: shells (1.1 and 1.2 mm), Salema Beach, La Palma, Canarias; C-E: protoconch and detail of its microsculpture (figures B-E correspond to the shell designated as neotype); F, G: shell (1.1 mm), Madeira; H: its protoconch; I: detail of the microsculpture of the suture and subsutural area, Madeira.

Figura 23. *Crisilla perminima* (Manzoni, 1868). A, B: conchas (1,1 y 1,2 mm), Playa Salema, La Palma, Canarias; C-E: protoconcha y detalle de su microescultura (las figuras B-E corresponden a la concha designada como neotipo); F, G: concha (1,1 mm), Madeira; H: su protoconcha; I: detalle de la microsculptura entre la sutura y zona subsutural, Madeira.

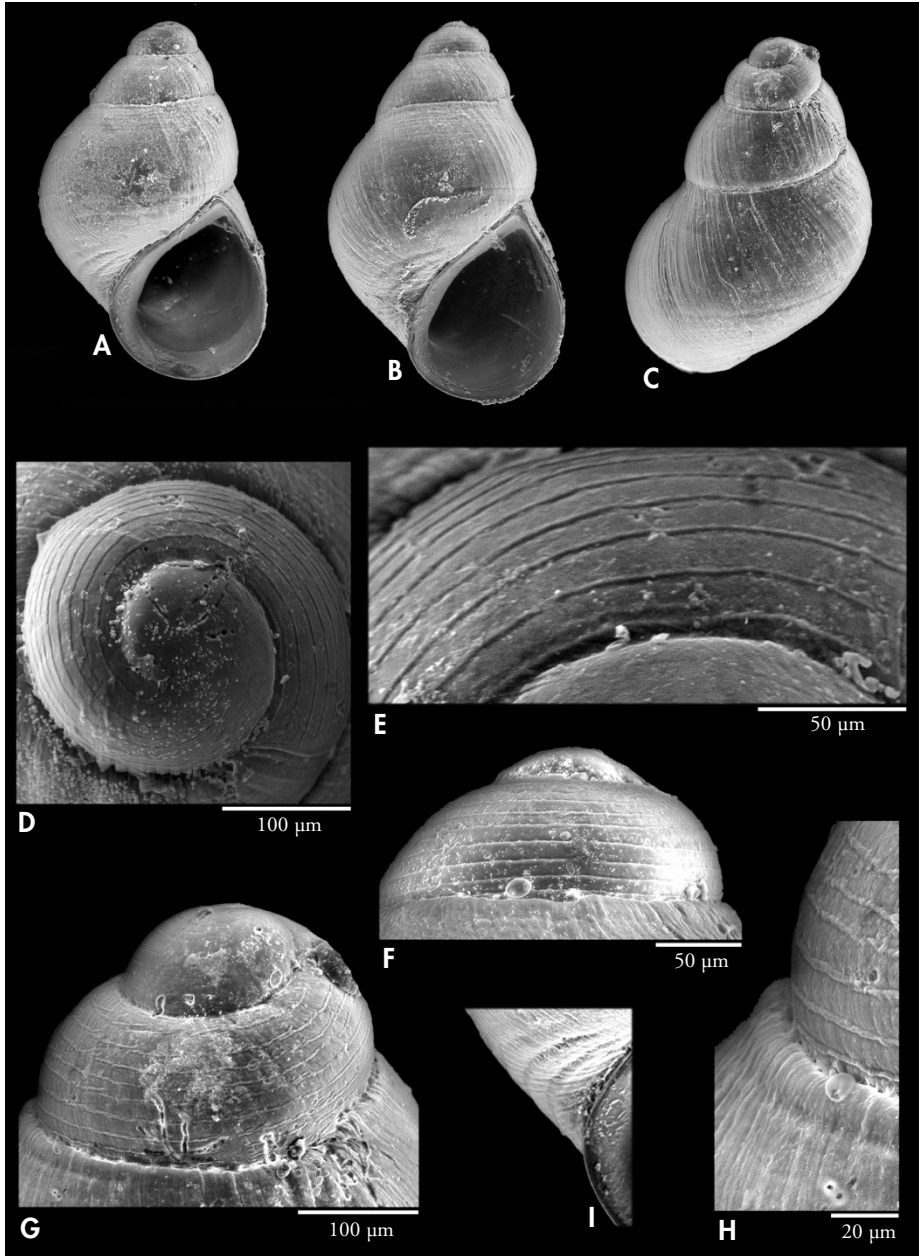


Figure 24. *Crisilla spadix* (Watson, 1897), Madeira. A-C: shells (1.05, 1.1 and 1.0 mm, respectively), Reis Magos; D, E: protoconch and detail of its microsculpture, from shell of the figure A; F: protoconch of the shell of figure B; G, H: protoconch and detail of its microsculpture; I: detail of the basal grooves.

Figura 24. Crisilla spadix (Watson, 1897), Madeira. A-C: conchas (1,05, 1,1 y 1,0 mm respectivamente), Reis Magos; D, E: protoconcha y detalle de su microescultura, de la concha de la figura A; F: protoconcha de la concha de la figura B; G, H: protoconcha y detalle de su microescultura; I: detalle de los surcos basales.

height and aperture nearly 50%. Three very basal furrows delimit weak cords, wider than the interspaces. There is a mild subsutural rim (Fig. 23I). Several negligible striae can be seen at high magnification in the subsutural area. The colour of the shells is characteristic, being chestnut brown (including the inner lip) with two wide whitish stripes on the body whorl, one at the base and the other in the middle zone (Figs. 30E and 31R).

Paucispiral protoconch of about 1.4 whorls and 250 μm in diameter (nucleus 70 μm). Its sculpture consists of seven or eight equally spaced spiral grooves (Figs. 23C-H).

Distribution: Madeira, Selvagens and Canary islands, mainly in shallow waters.

Remarks: *C. perminima* has been confused with *C. spadix* (see remarks under that species) since VERDUIN (1988) suggested that the latter taxon could be a junior synonym of the former. TISELLI & GIUNCHI (2005) recorded this species in Sardinia (western Mediterranean Sea) and considered the possibility that the species was introduced by shipping. These Mediterranean shells are slightly larger than those of *C. perminima* from Canary Islands (1.4 mm vs. 1.2 mm), their whorls are more convex and the reddish-brown colour of the inner lip cannot be seen. This is why we think that the Mediterranean specimens may belong to another species.

Crisilla spadix (Watson, 1897) (Figures 24, 30F, 31S)

Rissoa spadix Watson, 1897: 311.

Rissoa perminima authors non Manzoni, 1868.

Type locality: Porto Santo, Madeira.

Type material: possible syntypes in BMNH, listed by VERDUIN (1988).

Material studied (all from Madeira): Reis Magos, 5-10 m, 8 sh (MHNS); Club Naval, 0-2 m, 1 sh (MHNS); Porto Moniz, 3 m, 1 sh (MHNS); Madeira without specific locality, 43 sh (CAP).

Description: The shell is very similar to that of *C. perminima*, pupoid with somewhat more than 3 whorls and up to 1.1 x 0.58 mm. The last whorl and aperture are large (Figs. 24A-C). There are three very weak basal furrows that delimit cords, also weak, somewhat wider than the interspaces (Fig. 24I). The subsutural rim is conspicuous (Fig. 24H). Some negligible subsutural striae can be observed at high magnification. Whitish shell with discontinuous and wide, poorly defined reddish bands (Fig. 30F), one subsutural and the other two very close together (Fig. 31S). Umbilical area and inner lip reddish brown.

Paucispiral protoconch with 1.25 whorls and about 270 μm in diameter

(nucleus around 90 μm). Sculpture of about eight equidistant cordlets which delimit flat spiral bands of similar width (Figs. 24D-H).

Distribution: Madeira and Selvagens Islands, subtidal.

Remarks: As previously stated, this species has been confused with *C. perminima* (see remarks in this species) and VERDUIN (1988) and SEGERS *ET AL.* (2009) considered both taxa as synonyms. However, both species are distinguished by the sculpture of their protoconchs (spiral grooves in *C. perminima*, spiral cords in *C. spadix*) and details of their colour pattern. As an example, PALAZZI (1988, fig. 5) erroneously illustrated a protoconch of *C. spadix* as *C. perminima*.

Crisilla indispecta n. sp. (Figures 25, 30I-J, 31T)

Type locality: Salema Beach, La Palma, Canary Islands.

Type material: Holotype (Fig. 26A) MNCN 15.05/200029; paratypes MNHN-IM-2014-7059 (Fig. 26B) and in MHNS.

Other material studied (all from La Palma Island, Canaries): La Fajana Beach, Barlovento, 1 sh (CJDO-JT).

Etymology: The specific name derives from the Latin *in* a negative prefix, and the participle of the verb *dispicio* which means “see clearly” as it is the case of the present species without any obvious distinguishing characters.

Description: Shell quite fragile, with about four relatively convex whorls, reaching something more than 1.3 x 0.7 mm (holotype 1.3 x 0.77 mm). Surface smooth (Figs. 25A-B) except for a couple of very weak spiral incisions in the basal area. Under high magnification, very weak subsutural cordlets can be seen (Fig. 25G). Suture canalculated bordered by a weak subsutural rim. Shells semitransparent with five spiral rows of reddish specks on the body whorl (Figs. 30I-J), three above the insertion of the upper lip and two below (Fig. 31T). Basal area, inner lip and external outer lip also reddish.

Paucispiral protoconch with about 1.7 whorls and 0.3 mm in diameter (nucleus 0.1 mm). The nucleus of the protoconch is almost smooth (Fig. 25D), and towards the end of the first half-whorl appear punctate incisions aligned leading to about ten spiral striae which delimit flat spiral cords and of similar width (Figs. 25E-F).

Distribution: Only known from La Palma Island, Canaries, subtidal.

Remarks: Despite the small number of shells studied, we consider that it is a new species. It may not be rare but it could be confused with species of the genus *Setia*. Due to its size and colour it can be confused with *Setia jansseni* Verduin, 1984 and *Setia miae* Verduin, 1988. The former is known from Selvagens Islands and from only one shell from Canaries (VERDUIN, 1984). According to the SEM photograph in ALBUQUERQUE *ET AL.* (2009, p. 125), its protoconch has few weak and irregular cords instead of the high number of spiral grooves of the protoconch of *C. indispecta* n. sp. On the other hand, *Setia maiiae* is distinguished from this new species by having a more convex spiral profile, not having grooves in the base and by lack of sculpture in its protoconch (VERDUIN, 1988, figs. 31a-c). *Crisilla indispecta* belongs to the group of smaller *Crisilla* that includes *C. postrema*, *C. iunoniae*, *C. perminima* y *C. spadix*. From all of them, it is distinguished by the colour pattern of its shell. The protoconch of *C. perminima* also presents spiral grooves but in small number and with wider interspaces.

Crisilla senegalensis Rolán & Hernández, 2006 (Figure 26, 30G-H)

Crisilla senegalensis Rolán & Hernández, 2006: 144-146, figs. 1-2, 24-28.

Type locality: Dakar, Senegal, 30 m depth.

Type material: holotype (MNCN 15.05/46997) (ROLÁN & HERNÁNDEZ (2006) fig. 24; Fig. 26A herein), paratypes in AMNH/2; MHNS/24; CFS/1; CJH/2; MNHN-IM-2014-7060/2, ROLÁN & HERNÁNDEZ (2006) figs 1-2; USNM/2).

Material examined: holotype and 24 paratypes (sh) from the type locality (MHNS).

Description: According to ROLÁN & HERNÁNDEZ (2006) the shell is very small (holotype 1.09 x 0.69 mm, other shells smaller, of about 0.80 mm high), ovoid elongate, fragile, last whorl representing 3/4 or more of its height (Figs. 26A-C). The teleoconch has nearly whorls in largest

specimens (only two in the smaller ones), slightly convex and rounded on the periphery of the last whorl. Suture well marked. The whorls apparently are smooth but, under high magnification, prosocline growth lines and tiny spiral threads can be seen (Figs. 26D-E). Aper-

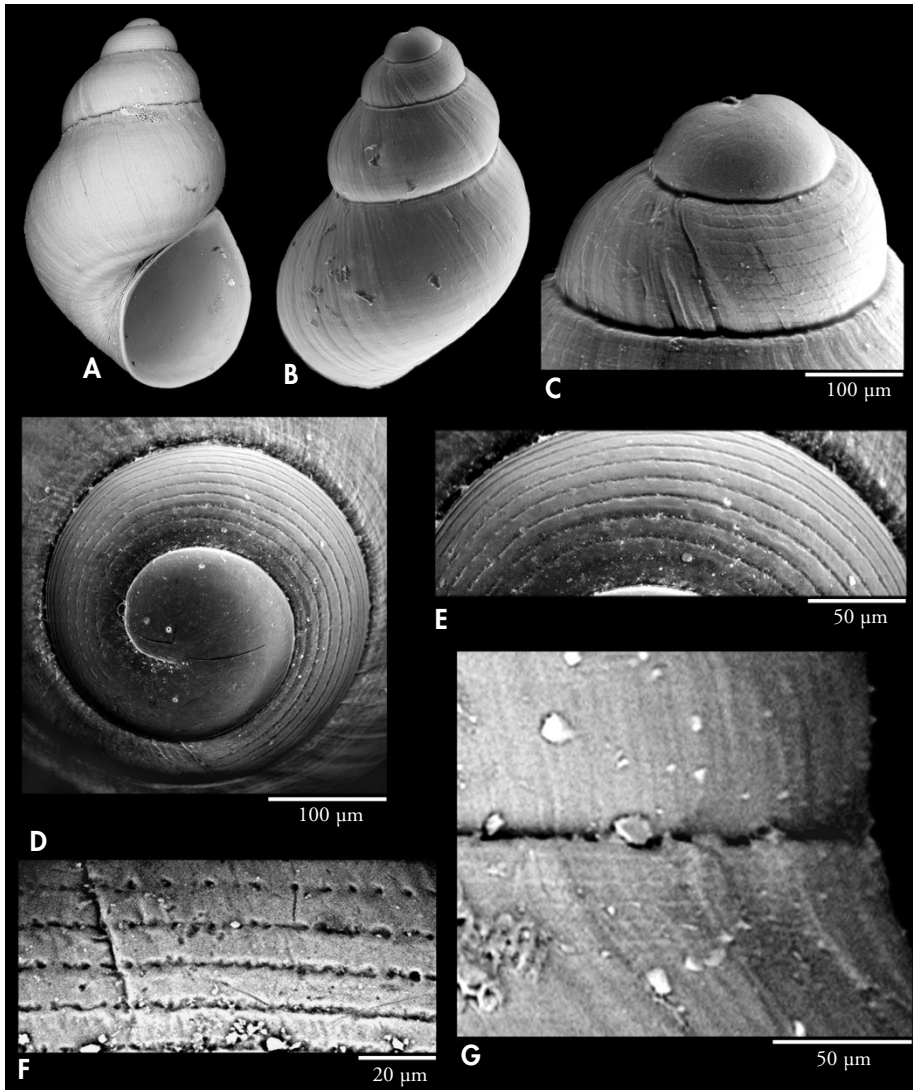


Figure 25. *Crisilla indispecta* n. sp., Salema Beach, La Palma, Canary Islands. A: holotype (1.3 mm); B: one of the paratypes (1.1 mm); C, D: protoconchs of the paratype and the holotype, respectively; E, F: microsculpture and detail of the protoconch of the holotype; G: detail of the suture and the subsutural area.

Figura 25. *Crisilla indispecta* n. sp., Playa Salema, La Palma, Islas Canarias. A: holotipo (1,3 mm); B: uno de los paratipos (1,1 mm); C, D: protoconchas del paratipo y holotipo respectivamente; E, F: microescultura y detalle de la protoconcha del holotipo; G: detalle de la sutura y del área subsutural.

ture ovoid with thin peristome. Columella curved and opisthocline. Brownish colour, sometimes with white stripes on the last whorl (Fig. 30G-H).

Protoconch light brown, like the teleoconch, with 1.25 smooth whorls and about 330 μm in diameter (nucleus about 100 μm). Sculpture of about nine

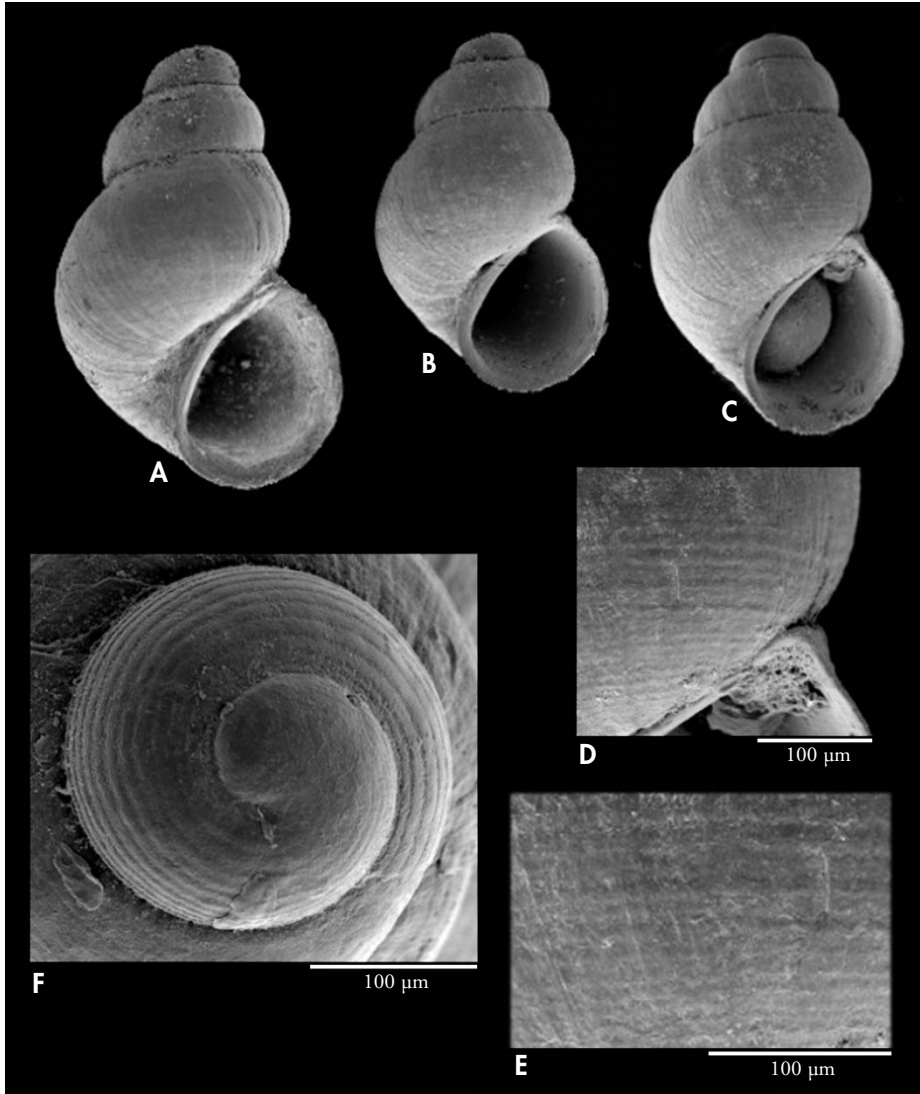


Figure 26. *Crisilla senegalensis*, Dakar, Senegal. A: holotype (1.06 mm); B, C: two of the paratypes figured in ROLÁN & HERNÁNDEZ (2006) (0.87 and 0.93 mm); D, E: detail of the microsculpture; F: protoconch.

Figura 26. Crisilla senegalensis, Dakar, Senegal. A: holotipo (1,06 mm); B, C: dos de los paratipos figurados en ROLÁN & HERNÁNDEZ (2006) (0,87 y 0,93 mm); D, E: detalle de la microescultura; F: protoconcha.

spiral cords wider than the interspaces (Fig. 26F).

Distribution: Only known from Dakar, Senegal.

Remarks: This species resembles some of the Cape Verde species attrib-

uted to this genus by TEMPLADO & ROLÁN (1994), such as *C. alvarezii* and *C. morenoi*. Both differ mainly by the sculpture of the protoconch, stronger in the former and with small punctuated incisions in the second.

Crisilla cristallinula (Manzoni, 1868) (Figure 27, 30K, 31N)

Rissoa cristallinula Manzoni, 1868a: 165; 1868b: 239-240, pl. 10, fig. 2.

Cingula cristallinula (Manzoni): Verduin, 1984: 67.

Onoba cristallinula (Manzoni): F. Nordsieck & García-Talavera, 1979: 64.

Crisilla cristallinula (Manzoni): Hoenselaar & Hoenselaar, 1994: 196-197, figs. 1, 3; Segers *et al.*, 2009: 134, pl. 22, fig. 2; Hernández *et al.*, 2011: 137, fig. 41 E-G.

Type locality: Canary Islands.

Type material: three syntypes MNHN-IM-2000-34361; VERDUIN (1984, fig. 34) redescribed the species and figured one of syntypes.

Material studied (all from Canary Islands): Las Canteras Beach (Gran Canaria), 15 sh (MHNS); Taliarte Harbour, Pecio coreano (Gran Canaria), 3 sh (MNCN 15.05/59300); Puerto Aguinaga (Gran Canaria), 2 sh (MHNS); Santiago Beach, 35 m (La Gomera), 34 sh (MHNS); Puerto Santiago (La Gomera), 10 m, 4 sh (MHNS); Fañabé (Tenerife), 27 m, 33 sh (MHNS); Barranco Chamorro (Tenerife), 2 sh (CJC); Fañabé (Tenerife), 50 sh (CAP); El Socorro (Tenerife), 108 m, 11 sh (MHNS).

Description: A description of this species was provided by VERDUIN (1984).

Shell somewhat fragile, almost transparent and colourless (Fig. 30K and 31N), with four whorls, reaching up to 1.5 x 0.6 mm. The body whorl occupies about 70% of the total height, while aperture encompasses nearly 40% (Figs. 27A-B). Outer lip somewhat thickened. Sculpture of almost equidistant furrows demarcating spiral cords wider than the furrows (Fig. 27H). These cords (about sixteen) are visible only in the body whorl. In the first whorls there is only one spiral groove near the suture (Fig. 27C) and a wide suprasutural furrow can be observed (Fig. 27G).

Paucispiral protoconch (Figs. 27D-F) with approximately 1.25 whorls and 310 μm in diameter (nucleus about 125 μm). The sculpture of the protoconch consists

of about six fine spiral microcordlets (Fig. 27F).

Distribution: Madeira, Selvagens and Canary Islands, mainly circalitoral-bathyal, known between 10 and 820 m deep as empty shells (HOENSELAAR & HOENSELAAR, 1994; SEGERS *ET AL.*, 2009).

Remarks: HOENSELAAR & HOENSELAAR (1994) illustrated and pointed out the differences with the Mediterranean *Crisilla marioni* (Fasulo & Gaglini, 1987) ex Monterosato ms., species with which it had been previously related by VERDUIN (1984) who identified it as *Cingula substriata* (Philippi, 1844). In fact, *C. cristallinula* differs from *C. marioni* in lacking the pair of subsutural grooves that characterizes this genus and presents a wide suprasutural furrow (Fig. 27G), but like the latter its shell lacks any pigmentation. Therefore, the inclusion of this species in the genus *Crisilla* is questionable.

DISCUSSION AND CONCLUSIONS

Among the littoral material studied assigned to the genus *Crisilla* from the Macaronesian archipelagos (excluding Cape Verde islands) and West African coasts, 19 species have been recognised, of which 4 are described as new, three from the Canary Islands and one from Ghana (Gulf of Guinea). Two species, *C. quisquiliarum* and *C. ugesae*, previously included in the genus *Setia* are here transferred to *Crisilla* because of their

greater resemblance to other species of this genus.

Crisilla quisquiliarum was described as a deep-water species generally reported at depths below 200-300 m (WATSON, 1886; ENGL *ET AL.*, 2009; FRIAS MARTINS *ET AL.*, 2009), but we found some shells at 18 m in depth at São Miguel (Azores). Likewise, *Crisilla fallax* was only previously collected on the outer shelf of Senegal and we report

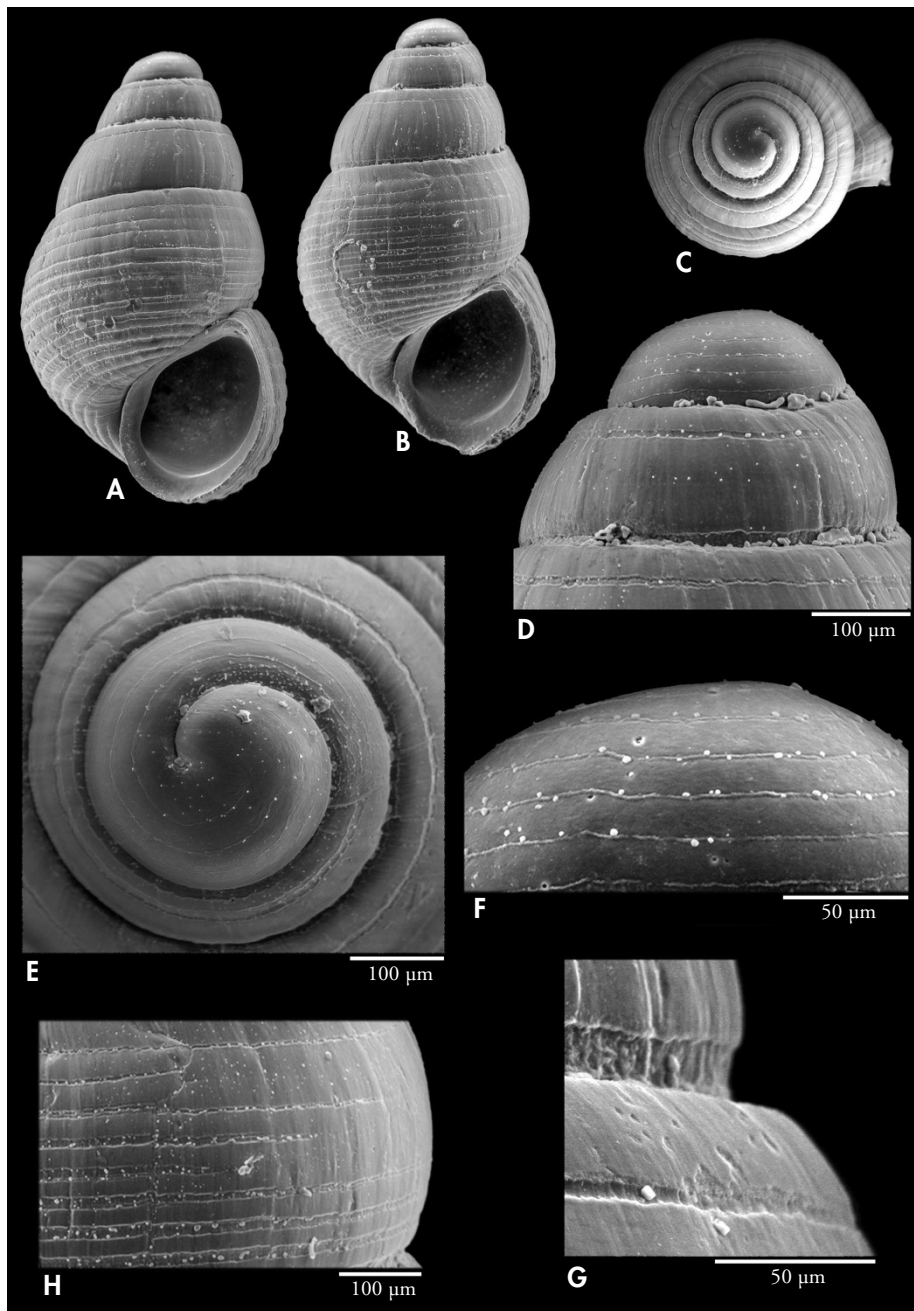


Figure 27. *Crisilla cristallinula* (Manzoni, 1868), Fañabé, Tenerife. A, B: shells (1.5 and 1.4 mm); C: apical view of the shell of figure B; D-F: protoconch and detail of its microsculpture; G, H: microsculpture of the teleconch and detail of the suture.

Figura 27. Crisilla cristallinula (Manzoni, 1868), Fañabé, Tenerife. A, B: conchas (1,5 y 1,4 mm); C: vista apical de la concha de la figura B; D-F: protoconcha y detalle de su microsculptura; G, H: microsculptura de la teleconcha y detalle de la sutura.

here two shells from shallow water in Mauritania. As well, *C. crystallinula* has been reported in a wide bathymetric range (between 10 and 820 m depth: HOENSELAAR AND HOENSELAAR, 1994; SEGERS ET AL., 2009) and we have found it in littoral bottoms from Canary Islands. On the other hand, two bathyal species of *Crisilla*, *C. amphiglypha* Bouchet & Warén, 1993 (known from off Canaries and Morocco) and *Crisilla ovulum* Gofas, 2007 (common on Seine and Josephine seamounts), have not been found in the littoral material studied by us.

The taxon *C. callosa* seems to group some cryptic species restricted to particular islands (two of them described below as new species), therefore the previous records of this species should be taken with caution. In fact, the new species *C. javieri* seems to replace *C. callosa* in La Palma Island, while *C. difficilis* replaces it in Lanzarote Island. In addition to the two new species mentioned, one of the shells found in Tenerife also seems somewhat different (Figs. 14 A-C) and we keep it provisionally as *Crisilla cf. callosa*.

Interestingly, the two hitherto known species of *Crisilla* with multispiral protoconch (and supposedly planktotrophic development), have a wide geographical distribution on the continental mainland: the type species *C. semistriata* and its close relative *C. transitoria*. The first one is known north of the 20° N (north of Mauritania) and the second one south of Senegal to Angola. Anyway, the precise southern and northern limits of distribution (respectively) of both species are not known. Curiously, the third species (here described as new), also with supposedly planktotrophic development, *C. monicae*, has been only found in one locality in Ghana. The remaining studied species have paucispiral protoconchs (indicative of non-planktotrophic development) and are mainly restricted to the Macaronesian archipelagos, except for *C. senegalensis*, known from Dakar (Senegal) and *C. fallax* from off Senegal and Mauritania. A similar pattern is

shown by the species of *Manzonina*, with the type species, *M. crassa* (Kanmacher, 1798), with supposedly planktotrophic development, is distributed along the continental mainland and the genus is particularly diverse in the Macaronesian archipelagos and seamounts. As commented by AVILA ET AL. (2012), speciation in both genera may have occurred from an ancestral planktotrophic species that, after having reached the distant islands or seamounts, evolved towards loss of planktotrophy. This promotes the increase of the number of non-planktotrophic species with a restricted range of distribution and a predominance of non-planktotrophs in islands and seamounts.

Seven species of *Crisilla* are shared by Madeira and Selvagens Islands (*Crisilla picta*, *C. depicta*, *C. crystallinula*, *C. innominata*, *C. iunoniae*, *C. perminima* and *C. spadix*), of which only *C. spadix* seems to be exclusive of these islands, while the other six are also present in the Canary Islands (see Table II). Besides HOENSELAAR & GOUD (1998) recorded two intertidal shell of the Azorean *C. postrema* near Porto Santo, Madeiran Archipelago. Further, *C. callosa* and three of the new species here described (*C. javierii*, *C. difficilis* and *C. indispecta*) seem to be exclusive from some of the Canary Islands, while *C. ugesae* may be also present in Selvagens (ALBUQUERQUE ET AL., 2009). After this study, up to 14 species of *Crisilla* are present in Canary Islands, 9 of them previously recorded by HERNÁNDEZ ET AL. (2011). On the other hand, two species are known from Azores, *Crisilla postrema*, frequent in littoral bottoms but with a wide bathymetric range, and *C. quisquiliarum* mainly in the outer shelf. Otherwise CORDEIRO & AVILA (2015) included *C. iunoniae* in their checklist of the Rissoiidae species reported from the Azores based on unpublished data from Hoenselaar and Goud. Anyway, all this information should be considered incomplete due to the small size of these species and the fragmentary nature of the material studied by us and by other authors. The species from Cape Verde

Table II. Species studied in the present paper (the European *C. semistriata* excluded) indicating their known geographical distribution. WA: mainland West African coast, AZ: Azores, MD: Madeira, SG: Selvagens, Lan: Lanzarote, Fue: Fuerteventura, Gc: Gran Canaria, Go: Gomera: Pa: La Palma, El Hierro; X: shells here studied, R: data from bibliographic references with photograph, r: bibliographic references without photograph (References, 1: VERDUIN, 1984; 2: VERDUIN, 1988; 3: HOENSELAAR, 1994; 4: SEGERS *ET AL.*, 2009; 5: ALBUQUERQUE *ET AL.*, 2009; 6: HOENSELAAR & GOUD, 1998; 7: ENGL *ET AL.*, 2009). The species marked with an asterisk have a broad bathymetric distribution and have been found in the coastal material studied here. References within brackets (R5) indicate that the species has been cited under another name.

Tabla II. Especies estudiadas en el presente trabajo (con exclusión de la especie europea C. semistriata) con indicación de su distribución geográfica conocida. WA: costas continentales de África occidental, AZ: Azores, MD: Madeira, SG: Salvajes, Lan: Lanzarote, Fue: Fuerteventura, Gc: Gran Canaria, Go: Gomera: Pa: La Palma, El Hierro; X: especies presentes en el material estudiado, R: datos procedentes de referencias bibliográficas que incluyen una fotografía, r: referencias bibliográficas que no incluyen una fotografía (Referencias, 1: VERDUIN, 1984; 2: VERDUIN, 1988; 3: HOENSELAAR, 1994; 4: SEGERS ET AL., 2009; 5: ALBUQUERQUE ET AL., 2009; 6: HOENSELAAR & GOUD, 1998; 7: ENGL ET AL., 2009). Las especies marcadas con un asterisco presentan un rango batimétrico amplio y han sido encontradas en el material litoral estudiado. Las referencias entre paréntesis (R5) indican que la especie ha sido citada con otro nombre.

Species	WA	AZ	MD	SG	Canary Islands						
					Lan	Fue	Ten	Gc	Go	Pa	Hie
<i>Crisilla picta</i>			X	R5	X	R7	X			X	r1
<i>Crisilla callosa</i>							X	X	X		X
<i>Crisilla depicta</i>			X	R4,5	X		X	X	X	X	R1
<i>Crisilla cristallinula*</i>			R4	r3	r3		X	X	X	r3	
<i>Crisilla perminima</i>			X	R1?	X		X	X	X	X	X
<i>Crisilla quisquiliarum*</i>		X									R7
<i>Crisilla innominata</i>			X	R4			X	X			r2
<i>Crisilla spadix</i>			X	(R5)							
<i>Crisilla iunoniae</i>			X	(R5)	X		X	X		X	
<i>Crisilla postrema</i>		X	r6?								
<i>Crisilla ugesae</i>				X							X
<i>Crisilla difficilis</i> n. sp.					X			X			
<i>Crisilla javieri</i> n. sp.							X			X	X
<i>Crisilla indispecta</i> n.sp.										X	
<i>Crisilla senegalensis</i>	X										
<i>Crisilla transitoria</i>	X										
<i>Crisilla fallax*</i>	X										
<i>Crisilla monicae</i> n. sp.	X										

Islands will be studied in an ongoing paper because we consider they may belong to other lineages as we have commented in the introduction).

The species here considered belonging to the genus *Crisilla* have been previously given different generic placements, namely *Rissoa*, *Setia*, *Cingula* or

Alvania. As already noted in the introduction, within the rissoids some genera of the so called “*Alvania*-group”, such as *Onoba*, *Manzonina*, *Cingula*, *Setia*, *Benthonellania*, *Crisilla*, *Gofasia*, *Porosoalvania* and *Galeodinopsis* (see WoRMS, 2018 and CLEMAM, 2017 data bases) are nowadays regarded as valid, however, as

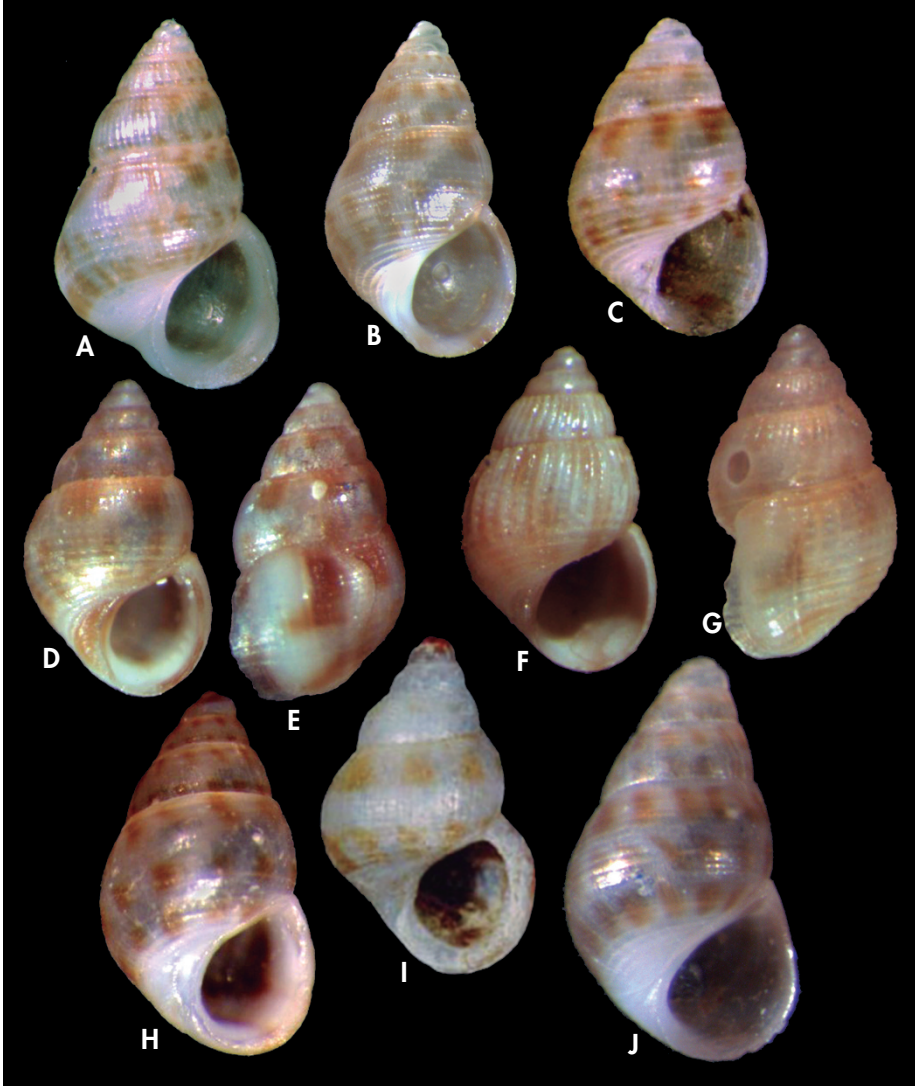


Figure 28. Shells of different species of the genus *Crisilla*. A: *Crisilla semistriata* (2.8 mm), Chafarinas Islands, SW Mediterranean; B: *Crisilla semistriata* (2.6 mm), Menorca, Balearic Islands; C: *Crisilla transitoria* (1.8 mm), Gabon, W Africa; D, E: *Crisilla transitoria* (2.1 mm), Bonne de Joquei, Principe Island, off W Africa; F, G: *Crisilla monicae* n. sp., paratype (2.2 mm), Miamia, Ghana, W Africa; H: *Crisilla depicta* (1.8 mm), La Palma, Canary Islands; I: *Crisilla quisquiliarum* from off Vila Franca do Campo, São Miguel, Azores, (taken from fig. 119 in FRIAS MARTINS ET AL., 2009); J: *Crisilla picta* (1.8 mm), Funchal, Madeira.

Figura 28. Conchas de diferentes especies del género *Crisilla*. A: *Crisilla semistriata* (2,8 mm), islas Chafarinas; B: *Crisilla semistriata* (2,6 mm), Menorca, Baleares; C: *Crisilla transitoria* (1,8 mm), Gabón, oeste de África; D, E: *Crisilla transitoria* (2,1 mm), Bonne de Joquei, Príncipe, oeste de África; F, G: *Crisilla monicae* n. sp., paratipo (2,2 mm), Miamia, Ghana, oeste de África; H: *Crisilla depicta* (1,8 mm), La Palma, Canarias; I: *Crisilla quisquiliarum*, frente a Vila Franca do Campo, San Miguel, Azores, (tomada de la fig. 119 en FRIAS MARTINS ET AL., 2009); J: *Crisilla picta* (1,8 mm), Funchal, Madeira.

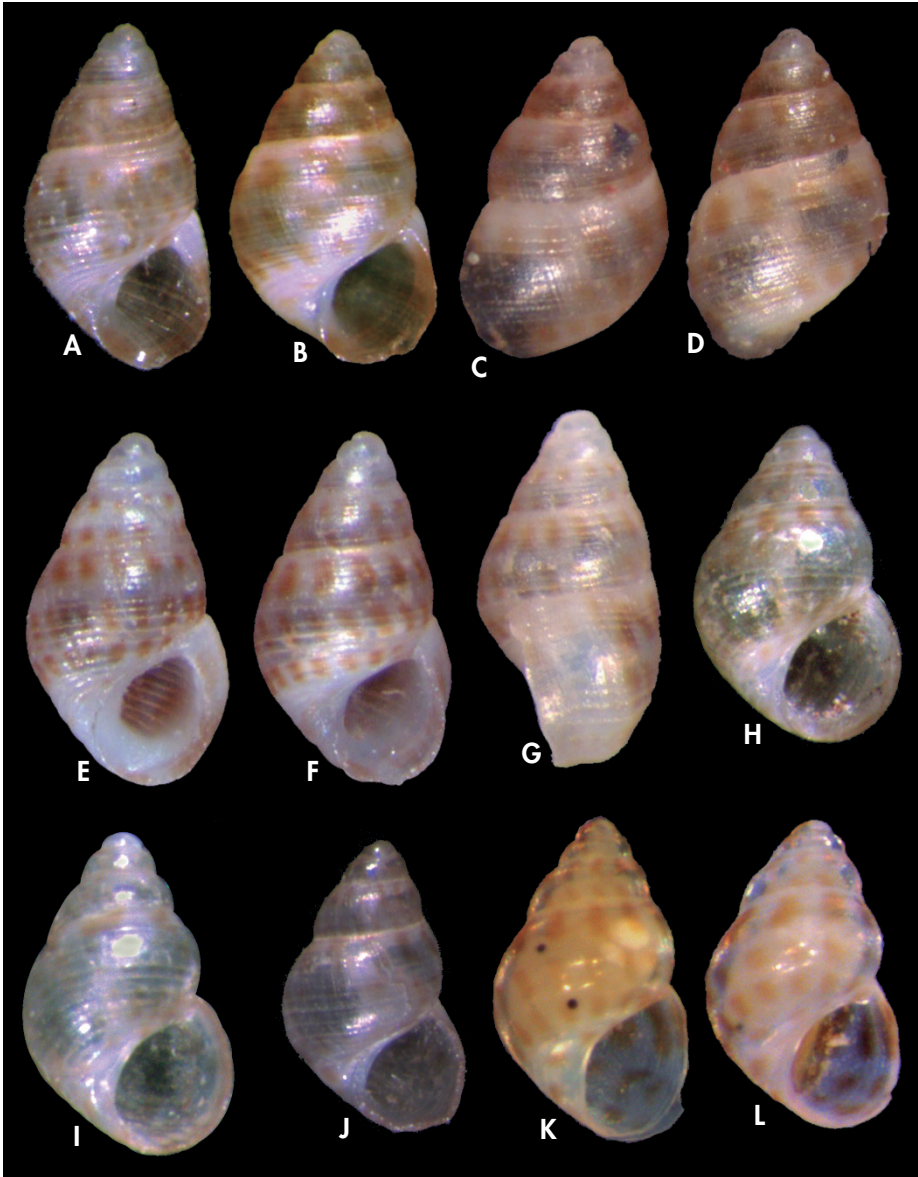


Figura 29. Shells of different species of the genus *Crisilla*. A: *Crisilla callosa* (1.7 mm), Tenerife, Canary Islands; B-D: *Crisilla difficilis* n. sp., paratype (1.5 mm), Tamara, Lanzarote, Canary Islands; E-G: *Crisilla javieri* n. sp., paratype (1.9 mm), Salema Beach, La Palma, Canary Islands; H, I: *Crisilla innominata* (1.4 mm), Porto Moniz, Madeira; J: *Crisilla postrema* (1.5 mm), São Miguel, Azores; K: *Crisilla ugesae* (1.5 mm), Selvagens Islands; L: *Crisilla ugesae* (1.3 mm), Selvagens Islands.

Figure 29. Conchas de diferentes especies del género *Crisilla*. A: *Crisilla callosa* (1,7 mm), Tenerife; B-D: *Crisilla difficilis* n. sp., paratipo (1,5 mm), Lanzarote; E-G: *Crisilla javieri* n. sp., paratipo (1,9 mm), La Palma, Canarias; H, I: *Crisilla innominata* (1,4 mm), Porto Moniz, Madeira; J: *Crisilla postrema* (1,5 mm), San Miguel, Azores; K: *Crisilla ugesae* (1,5 mm), islas Salvajes; L: *Crisilla ugesae* (1,3 mm), islas Salvajes.

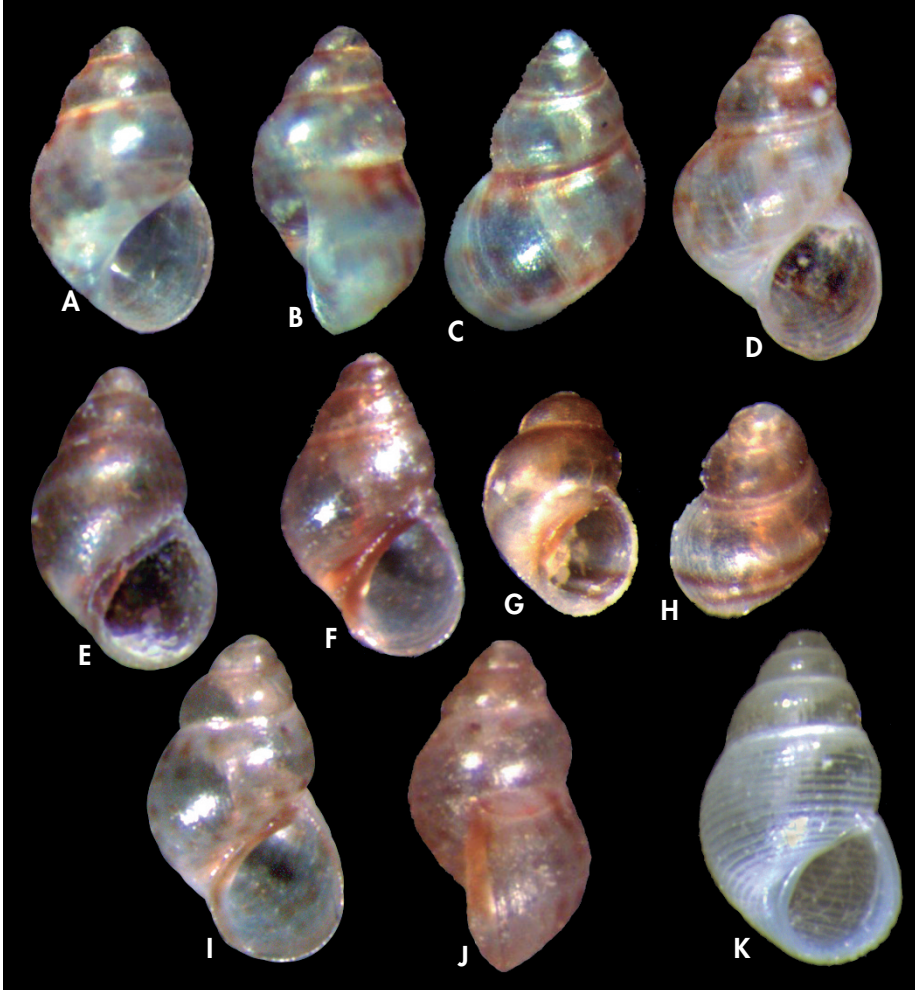


Figura 30. Shells of different species of the genus *Crisilla*. A-C: *Crisilla iunoniae* (1.4 mm), La Palma, Canary Islands; D: *Crisilla beniamina* (1.2 mm), Ibiza, Balearic Islands; E: *Crisilla perminima* (1.1 mm), La Palma, Canary Islands; F: *Crisilla spadix* (1.2 mm), Reis Magos, Madeira Island; G, H: *Crisilla senegalensis*, paratype (0.9 mm), Dakar, Senegal, W Africa; I, J: *Crisilla indispecta* n. sp., holotype (1.3 mm), Salema Beach, La Palma, Canary Islands; K: *Crisilla cristallinula* (1.4 mm), Tenerife, Canary Islands.

Figure 30. Conchas de diferentes especies del género *Crisilla*. A-C: *Crisilla iunoniae* (1,4 mm), La Palma, Canarias; D: *Crisilla beniamina* (1,2 mm), Ibiza; E: *Crisilla perminima* (1,1 mm), La Palma; F: *Crisilla spadix* (1,2 mm), Reis Magos, Madeira; G, H: *Crisilla senegalensis*, paratipo (0,9 mm), Dakar, Senegal; I, J: *Crisilla indispecta* n. sp., holotipo (1,3 mm), La Palma, Canarias; K: *Crisilla cristallinula* (1,4 mm), Tenerife, Canarias.

pointed out by GARILLI & PARRINELLO (2014) because of the high degree of diversification and confusion caused by convergence in shell characters, most of

these genera are difficult to define. Like *Alvania*, the genus *Crisilla* seems to be polyphyletic and appears to represent independent lines of transition between

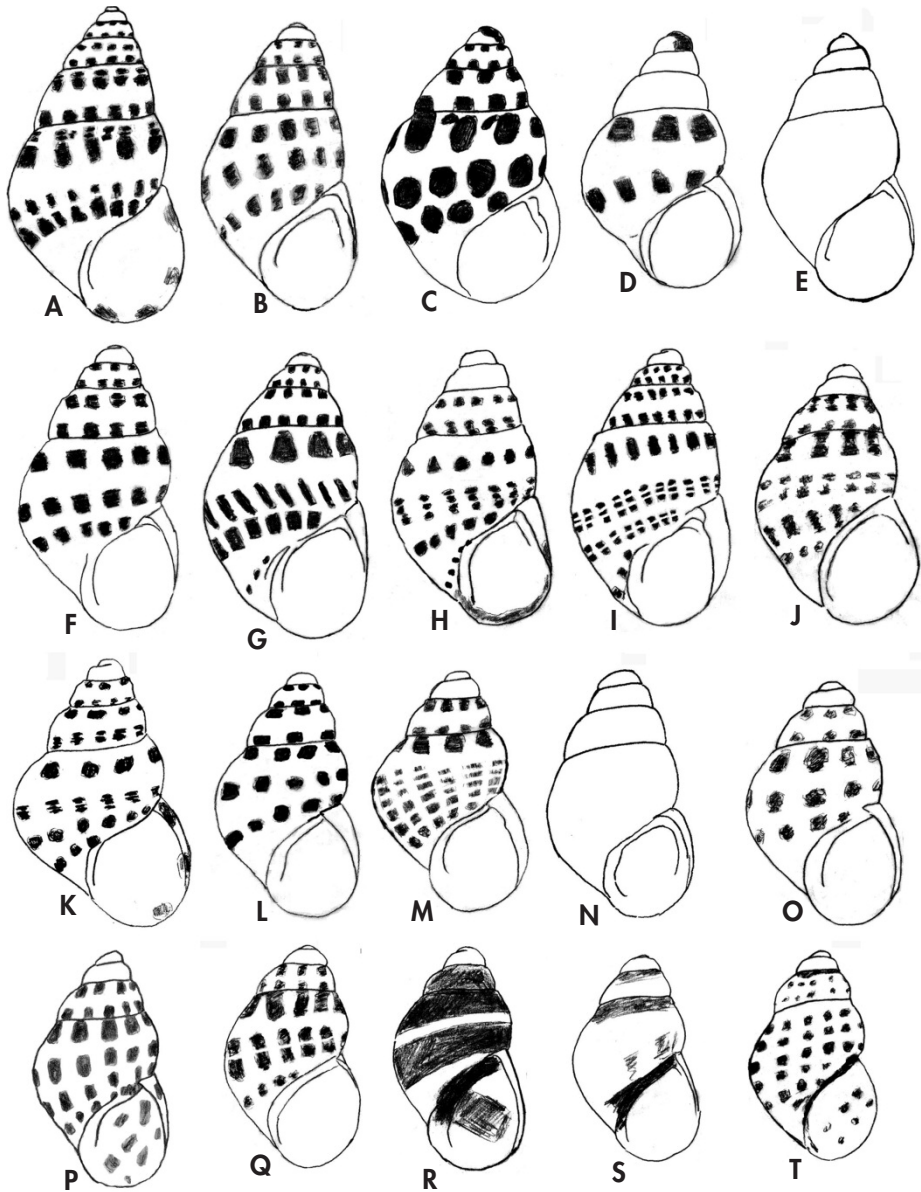


Figure 31. Schematic pattern of the red-brownish blotches in different species of *Crisilla*; A: *C. semistriata*; B: *C. picta*; C: *C. depicta*; D: *C. quisquiliarum*; E: *C. marioni*; F: *C. galvagni*; G: *C. difficilis* n. sp.; H: *C. callosa*; I: *C. javieri* n. sp.; J: *C. innominata*; K: *C. beniamina*; L: *C. ramosorum*; M: *C. postrema*; N: *C. cristallinula*; O: *C. aartseni*; P: *C. ugesae*; Q: *C. iunoniae*; R: *C. perminima*; S: *C. spadix*; T: *C. indispecta* n. sp.

Figura 31. Esquema del patrón de disposición de las manchas morrón rojizas en diferentes especies de *Crisilla*. A: *C. semistriata*; B: *C. picta*; C: *C. depicta*; D: *C. quisquiliarum*; E: *C. marioni*; F: *C. galvagni*; G: *C. difficilis* n. sp.; H: *C. callosa*; I: *C. javieri* n. sp.; J: *C. innominata*; K: *C. beniamina*; L: *C. ramosorum*; M: *C. postrema*; N: *C. cristallinula*; O: *C. aartseni*; P: *C. ugesae*; Q: *C. iunoniae*; R: *C. perminima*; S: *C. spadix*; T: *C. indispecta* n. sp.

the species with thicker shell and well-marked sculpture (genus *Alvania*) to those with thinner shell and more or less smooth surface (genus *Setia*). Consequently the origin of all these taxa and

their possible phyletic relationships are still to be defined.

Finally, a key to adult shell of all the species that we consider belonging to the genus *Crisilla* is provided below:

1. - Multispiral protoconch 2
 - paucispiral protoconch 4
2. - Outer lip internally without denticulation *Crisilla semistriata*
 - Outer lip internally with weak denticulation 3
3. - Oval shell with orthocone ribs on the body whorl, not distinctly more raised than the spiral cords *Crisilla transitoria*
 - Oval-conic shell with opisthocone ribs on the body whorl, distinctly raised above the spiral cords *Crisilla monicae*
4. - Transparent shell without coloured spots or stripes 5
 - Shell with coloured spots or stripes 6
5. - Sculpture slightly reticulated due to the presence of weak axial ribs. Mediterranean *Crisilla marioni*
 - Without axial ribs. Macaronesian Islands *Crisilla cristallinula*
6. - Shell smooth or with very weak spiral cords only visible at very high magnification (*Setia*-like species) 7
 - Shell with spiral cords sometimes only at the base 12
7. - Cyrtocoenoid shell without any sculpture 8
 - Oval Shell sometimes with very a weak sculpture at the base 9
8. - Colourless outer lip. Protoconch with distinct spiral cords. Strait of Gibraltar *Crisilla aartseni*
 - Coloured outer lip. Protoconch smooth or with obsolete sculpture. Selvagens and El Hierro Islands *Crisilla ugesae*
 - Reddish apex, sculpture of the protoconch with granules. Central and Western Mediterranean *Crisilla maculata*
9. - Shell brownish or with wide chestnut-brown stripes 10
 - Shell without brownish stripes and chestnut-brown inner lip 11
10. - Shell with wide chestnut-brown stripes. Protoconch with spiral grooves. Macaronesian Islands *Crisilla perminima*
 - Shell brownish Protoconch with very narrow spiral cords. Senegal *Crisilla senegalensis*
11. - Shell with five spiral rows of reddish specks in the body whorls, without basal grooves. La Palma Island (Canaries) *Crisilla indispecta* n. sp.
 - Shell with wide, discontinuous and poorly defined reddish stripes, with three weak basal furrows. Madeira and Selvagens Islands *Crisilla spadix*
12. - Shell with reddish apex 13
 - Shell without coloured apex 14
13. - Shell not pupoid with spiral sculpture limited to the basal area. Azores and El Hierro Islands *Crisilla quisquiliarum*
 - Pupoid shell with weak spiral sculpture all over its surface. Widely distributed in the Macaronesian Islands *Crisilla depicta*

14. - Sculpture of spiral cords crossed by axial ribs giving a reticulated appearance. Senegal and Mauritania *Crisilla fallax*
 - Sculpture without reticulated appearance 15
15. - Patent spiral sculpture 16
 - Spiral sculpture obsolete only visible at high magnification 19
16. - Spiral grooves in the whole shell of equal width or somewhat wider than the cords that delimit. Mediterranean *Crisilla galvagni*
 - Spiral grooves narrower than the cords that delimit 17
17. - More than ten unequal spiral cords in body whorl above the aperture. Protoconch with coarse granules irregularly fused that become spiral cords in the upper third *Crisilla difficilis* n. sp.
 - About ten equal spiral cords in body whorl above the aperture. Protoconch with granules that may be fused becoming regular spiral cords 18
18. - Protoconch with coarse granules densely arranged spirally, grouping progressively to form irregular cords. Outer lip internally without denticular folds . . . *Crisilla callosa*
 - Protoconch with granules spirally aligned and interspaces clearly visible. Outer lip internally with weak denticular folds *Crisilla javieri* n. sp.
19. - Conical shell with somewhat flat profile. Very weak spiral grooves only visible at high magnification. Protoconch without apparent sculpture *Crisilla picta*
 - Oval Shell with somewhat convex whorls. Clear spiral cords. Protoconch with sculpture 20
20. - Adult shell more than 2 mm high with raised spire. Eastern Mediterranean *Crisilla chiarelli*
 - Pupoid adult shell less than 2 mm high 21
21. - Spiral cords from the beginning of the teleococonch 22
 - Without spiral cords in their first whorls of the teleococonch 23
22. - Profile of the shell somewhat flat in the the upper part. Spiral grooves evident over the entire surface of the body whorl *Crisilla innominata*
 - Somewhat convex whorls. Smooth-looking body whorl with very weak cords in the upper part *Crisilla beniamina*
23. - Protoconch with spiral grooves *Crisilla iunoniae*
 - Protoconch with spiral cords 24
24. - Spiral grooves over the entire body whorl but usually only visible in its upper part. Three rows of reddish spots. Mediterranean *Crisilla ramosorum*
 - Patent spiral grooves over the entire body whorl. Reddish spots aligned in somewhat diffuse rows. Azores Islands *Crisilla postrema*

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