



The family Elachisinidae (Mollusca, Rissooidea) in the temperate and tropical Atlantic

La familia Elachisinidae (Mollusca, Rissooidea) en el Atlántico templado y tropical

Emilio ROLÁN* and Serge GOFAS**

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RESUMEN

Se revisa el género *Elachisina* Dall, 1918 (Mollusca, Rissooidea) en el océano Atlántico, incluyendo aquellas especies que previamente habían sido situadas en otros géneros. En total, hay 4 especies ya conocidas (*E. floridana* (Rehder, 1943), del Caribe, *E. eritima* (Smith, 1891) de la Isla de Sta. Helena, *E. canarica* (Nordsieck y García-Talavera, 1979) (combinación nueva) de Canarias y *E. canaliculata* Rolán y Rubio, 2001, de las Islas de Cabo Verde), 7 que se describen como nuevas para la ciencia (*E. azoreana* n. sp., de las Azores, *E. tenuisculpta* n. sp., *E. pergrandis* n. sp., *E. pelorcei* n. sp., *E. senegalensis* n. sp., *E. gubbiolii* n. sp. y *E. catenata* n. sp., de la costa occidental africana) y una más que figuramos sin nombrarla por carecer de material suficiente. Las especies insulares son todas endemismos de sus respectivos arquipélagos y tienen una protoconcha pauciespiral, lo que sugiere un desarrollo no-planctotrófico. Cuatro de las seis especies de la costa africana tienen protoconcha multiespiral y probablemente un desarrollo planctotrófico, pero solo tres de ellas se han encontrado en un área geográfica amplia, desde Mauritania o Senegal hasta Angola. Teniendo en cuenta las nuevas especies aquí descritas, la provincia Oeste-Africana se presenta como un centro de mayor riqueza específica conocido para la familia.

ABSTRACT

The Atlantic species of the genus *Elachisina* Dall, 1918 (Mollusca, Rissooidea), including those hitherto placed in other genera, are revised. In total there are four previously known species (*E. floridana* (Rehder, 1943), from the Caribbean, *E. eritima* (Smith, 1891), from St. Helena Island, *E. canarica* (Nordsieck and Garcia-Talavera, 1979) (comb. nov.), from the Canary Islands and *E. canaliculata* Rolán and Rubio, 2001, from the Cape Verde Islands), besides seven species which are described as new to science (*E. azoreana* n. sp., from the Azores, *E. tenuisculpta* n. sp., *E. pergrandis* n. sp., *E. pelorcei* n. sp., *E. senegalensis* n. sp., *E. gubbiolii* n. sp. and *E. catenata* n. sp. from the West African coasts) and one more species which we figure without naming it awaiting appropriate material. The insular species are endemic of their respective archipelagoes, and have a paucispiral protoconch that suggests non-planktotrophic development. Four out of the six West African species have a multispiral protoconch and a probable planktotrophic development, but among them only three have been collected in an extensive geographical range from Mauritania or Senegal to Angola. Taking into account the new species described herein and current knowledge, West Africa appears as a center of high species richness for the family.

KEY WORDS: Rissooidea, *Elachisina*, new species, Atlantic, West Africa.

PALABRAS CLAVE: Rissooidea, *Elachisina*, especies nuevas, Atlántico, África occidental.

* Investigador del Museo de Historia Natural, Campus Universitario Sur, 15782, Santiago de Compostela.

** Dept. de Biología Animal, Facultad de Ciencias, Universidad de Málaga, E-29071 Málaga.

INTRODUCTION

The genus *Elachisina* was introduced by DALL (1918), and the taxon received several different interpretations reviewed in PONDER (1985a). In this latter work, the anatomy of the soft parts and the taxonomy of the known species were detailed and the new family Elachisinidae was proposed. This author presented the species which he considered within this genus, from the Caribbean, western North and Central America, and the Indo-Pacific. No species were reported from the Eastern Atlantic mainland coast, but *Rissoa eritima* Smith, 1890 from St Helena, was included in *Elachisina*. Two more species have been described more recently and will be considered here: *E. canarica* (Nordsieck and García-Talavera, 1979) from the Canary Islands, and *E. canaliculata* Rolán and Rubio, 2001, from the Cape Verde Islands.

From the material collected in several expeditions to West Africa by both authors, as well as from sediments sent to us by amateur collectors and from museum material, we have found several additional species of this genus. The present work results from the study of this material. The type material collected by E.R. is deposited in Museo Nacional de Ciencias Naturales, Madrid, and paratypes in several collections; that collected by S.G. is in the Muséum National d'Histoire Naturelle, Paris.

The genus has a fossil record in the West European Tertiary, going back to the

Eocene with *Elachisina minutissima* (Deshayes, 1861), *Elachisina loveni* (Bayan, 1873), (see Le Renard, on-line "fossils" database <http://www.somali.asso.fr/fossils>). Several other genera (*Entomope*, *Cirsope*, *Pseudocirsope*, *Lacunella*, *Dumasella*) are therein accepted as Elachisinidae. Representative species in the Neogene are *Elachisina moravica* (Rzehak, 1893) and *Pseudocirsope burdigalica* (Cossman and Peyrot, 1919) from the Miocene, but there are several other undescribed species (pers. comm. P. Lozouet, MNHN).

Abbreviations

AMNH American Museum of Natural History, New York
BMNH The Natural History Museum, London
MNCN Museo Nacional de Ciencias Naturales, Madrid
MNHN Muséum National d'Histoire Naturelle, Paris
CER private collection of Emilio Rolán
CFR private collection of Federico Rubio
CFG collection Franco Gubbioli
CJP private collection of Jacques Pelorce
CPR private collection of Peter Ryall
CWE private collection of Winfried Engl
spm specimen with soft parts
s empty shell
j juvenile
f fragment
sta. station (of a sampling cruise)
coll. in the collection of
leg. "legit", collected by

TAXONOMIC PART

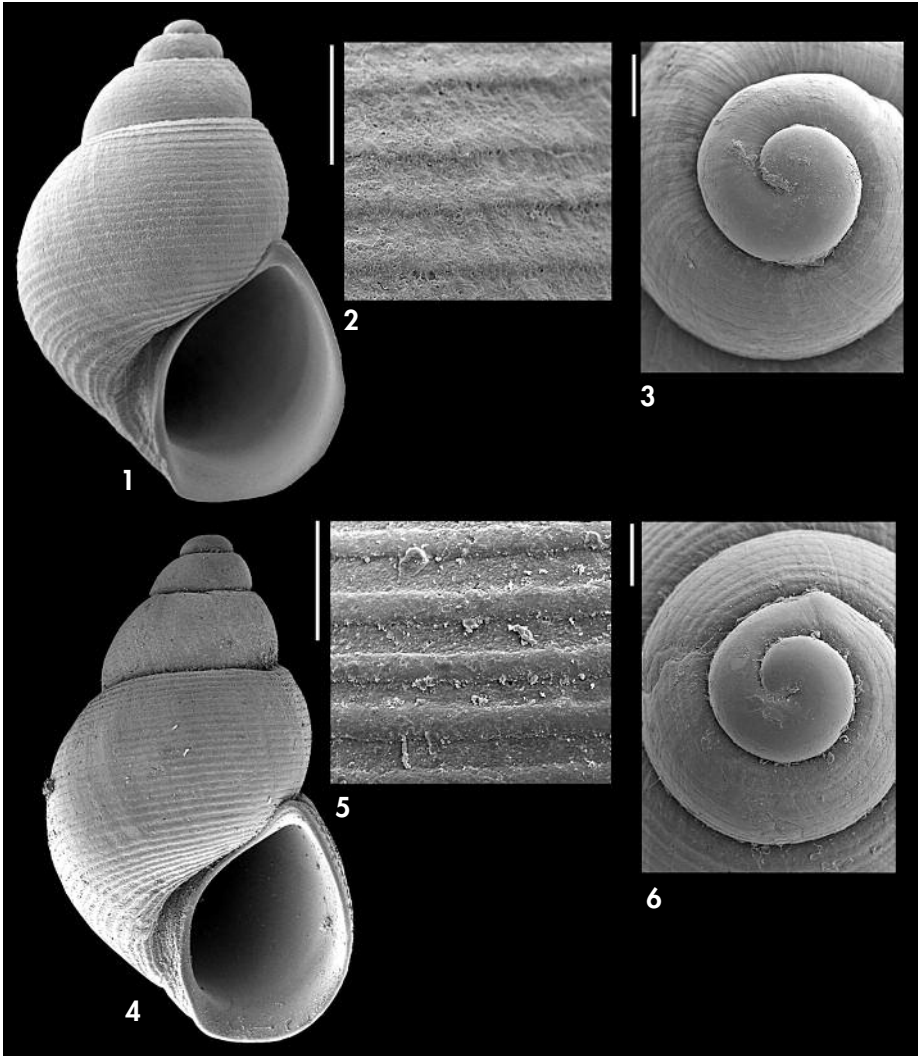
Family ELACHISINIDAE COMPLETA AUTOR Y AÑO

Genus *Elachisina* Dall, 1918

Type species: *Elachisina grippi* Dall, 1918; by original designation. Recent, western North America.

Elachisina floridana (Rehder, 1943) (Figs. 1-6)

Microdochus floridanus Rehder, 1943a p. 193-194, pl. 20, fig. 6 [Type locality: originally stated as Bonefish Key, Fla. corrected to Missouri Key in REHDER 1943b].



Figures 1-6. *Elachisina floridana* (Rehder, 1943). 1: paratype from Missouri Key, Florida, leg. B.R. Bales (MNHN; height 2.35 mm); 2: detail of the microsculpture of another paratype; 3: protoconch (same specimen as 2); 4: shell from Treasure Cove, Abaco, Bahamas, leg. C. Redfern (height 2.45 mm); 5: detail of the microsculpture (same shell as 4); 6: protoconch, same locality as 4, 5. Scale bars 100 μ m.

Figuras 1-6. Elachisina floridana (Rehder, 1943). 1: paratipo de Missouri Key, Florida, leg. B.R. Bales (altura 2.35 mm); 2: detalle de la microescultura de otro paratipo; 3: protoconcha (mismo ejemplar que 2); 4: concha de Treasure Cove, Abaco, Bahamas, leg. C. Redfern (altura 2.45 mm); 5: detalle de la microescultura (misma concha que 4); 6: protoconcha, misma localidad que 4, 5. Escalas 100 μ m.

Type material: Holotype in United States National Museum, not examined; paratypes in Los Angeles County Museum, Los Angeles; 8 spm, leg. B.R. Bales, in coll. Staadt, MNHN.

Other material examined: Bahamas: 9 s, Treasure Cove, Abaco, in beach drift, leg. C. Redfern 1981; 5 s, Treasure Cove, Abaco, in beach drift, leg. C. Redfern 1977; 2 spm collected alive, Treasure Cay, Bahamas, under stone in 1 m depth, leg. C. Redfern 1982.

Description: Shell (Figs. 1, 4) small, ovate-conical, solid, not transparent, with convex whorls separated by a deep, channelled suture. Protoconch (Figs. 3, 6) of a little more than one whorl with a diameter of 280-300 μm , depressed dome-shaped, and smooth. Teleoconch covered by numerous spiral grooves (Figs. 2, 5) which are about 8-10 very faint at the beginning and, in the last whorl, are about 30 up to the base and become stronger abapically. Spiral grooves about as wide as the interspaces, and rather smooth. Umbilicus narrow, bordered by a blunt keel and with small striae inside. Aperture piriform, with an angu-

lation in the adapical part, and with the abapical edge slightly protruding at the point where the umbilical keel meets the columella. Peristome continuous, with simple outer lip. Colour whitish. Dimensions up to 2.45 mm height.

Distribution: USA: Florida Keys, Louisiana; Mexico; Panama; Bermuda; Bahamas: Abaco and Grand Bahama Island; Brazil (see details in Malacolog database <http://erato.acnatsci.org/wasp/search.php/2200>)

Remarks: This taxon was described in a new genus *Microdochus* of the Rissoiidae, and later recognized as a species of *Elachisina* by PONDER (1985a).

Elachisina eritima (E. A. Smith, 1890) (Figs. 7-10)

Rissoa eritima E. A. Smith, 1890. *Proc. Zool. Soc. London*, 18: 289, fig. 40. [Type locality: St. Helena island].

Type material: 5 syntypes (Fig. 7) in BMNH.

Other material examined: St. Helena: 6 s, coll. Turton (MNHN); 1 j, off Jamestown 15° 54.5' S, 5° 42' W, leg. G. Kouyoumontzakis, Orstom (MNHN).

Description: Shell (Figs. 7, 8) small, ovate to ovate-conic, solid, opaque, with convex whorls. Protoconch (Fig. 10) of about one whorl and 1/8 more, light brown in colour, depressed dome-shaped, smooth, about 330 μm in diameter with a nucleus of 125 μm . Teleoconch covered by numerous fine spiral grooves (Fig. 9) which are about 11-13 at the beginning, 25 on the last spire whorl, and about 60 on the last whorl. Spiral grooves of similar size as interspaces, frequently with a thread in the interspaces. Umbilicus narrow, bordered by a sharp ridge and with fine commar-

ginal striae inside. Aperture almost semicircular, with a blunt angulation in the adapical part, and with the abapical edge slightly protruding at the point where the umbilical keel meets the columella. Peristome continuous, with simple outer lip. Colour whitish.

Dimensions: between 1.3 and 1.7 mm height.

Distribution: Only known from St. Helena. Supposedly endemic of this island.

Remarks: *E. eritima* differs from other Atlantic species by its characteristically globose shape.

Elachisina canarica (Nordsieck and García-Talavera, 1979) (Figs. 11-17)

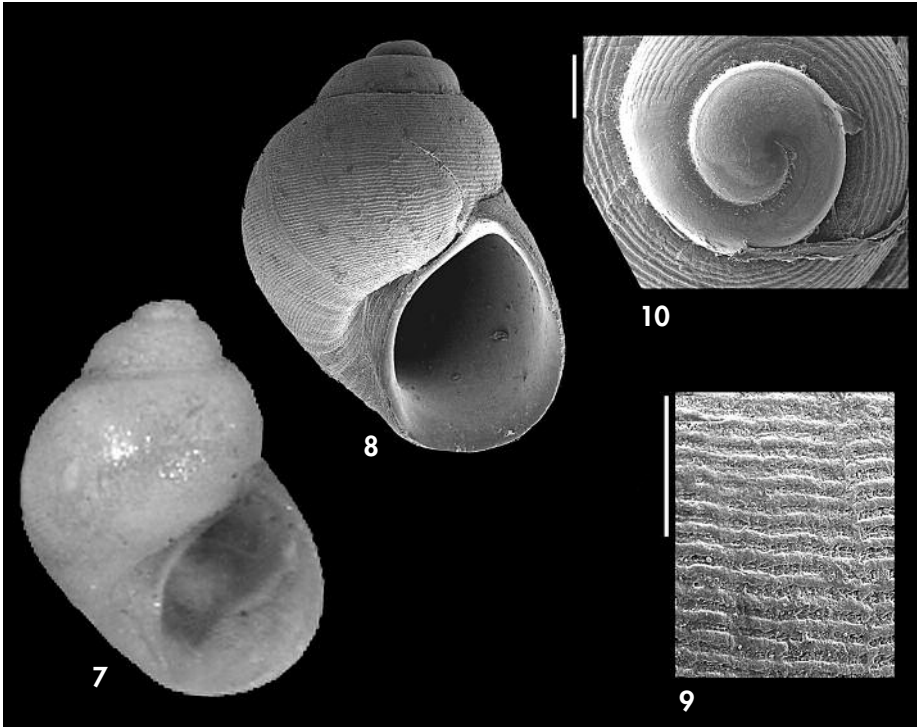
Cithna tenella canarica Nordsieck and García-Talavera, 1979. p. 289, pl. 11, fig. 1. [Type locality: Arrecife, Lanzarote I., Canary Is.].

Type material: In Museo de la Naturaleza y el Hombre, Santa Cruz de Tenerife, not examined.

Other material examined: Canary Islands: 3 spm, 3 s, La Restinga, El Hierro, 30 m (CWE).

Description: Shell (Figs. 11, 12) small, ovate to ovate-conic, solid, not transpa-

rent, with convex whorls. Protoconch (Fig. 15) of a little more than one whorl



Figures 7-10. *Elachisina eritima* (E.A. Smith, 1890). 7: syntype from St Helena (BMNH); 8: shell from St Helena, coll. Turton (MNHN; height 1.66 mm); 9: microsculpture of the same shell; 10: protoconch, same locality. Scale bars 100 μ m.

Figuras 7-10. *Elachisina eritima* (E.A. Smith, 1890). 7: sintipo de Santa Helena (BMNH); 8: concha de Santa Helena, coll. Turton (MNHN; altura 1.66 mm); 9: microescultura de la misma concha; 10: protoconcha, misma localidad. Escalas 100 μ m.

with a diameter of 360 μ m, light brown, depressed dome-shaped, and smooth. Teleoconch covered by numerous spiral grooves (Fig. 14) which are about 12-13 at the beginning and, in the last whorl, are about 48-50 up to the base. Umbilicus narrow, bordered by a sharp keel and with small striae inside. Aperture ovate-piriform, with an angulation in the adapical part, and with the abapical edge slightly protruding at the point where the umbilical keel meets the columella. Peristome continuous, with simple outer lip. Colour whitish.

Soft parts: The dry animal is apparently unpigmented with very evident and relatively large fecal pellets in its intestine. Operculum (Fig.13) paucispi-

ral, thin and transparent. Radula (Figs. 15, 16) as in other species of the genus (see PONDER, 1985).

Distribution: Only known from the Canary Islands.

Remarks: This taxon was described as subspecies of *Cithna tenella* Jeffreys, 1869, but is unrelated with this species now classified in the Rissoidae as *Benthonella tenella* (see BOUCHET AND WARÉN, 1993: 697-701).

It most resembles *E. azoreana* spec. nov. but is more solid and slender (H/D ratio 1.5 instead of 1.4). The Caribbean species *E. floridana* is larger, more slender, with one more whorl, a more tumid profile of the spire and a narrower umbilicus.

Elachisina azoreana spec. nov. (Fig. 17-19)

Type material: Holotype (Fig. 17) and 11 paratypes from type locality (MNHN).

Type locality: Vila do Porto (depth 6-9 m), Santa Maria, Azores Archipelago.

Etymology: The specific name is after the archipelago where the species was found.

Description: Shell (Fig. 17) small, ovate to ovate-conic, solid, opaque, with convex whorls. Protoconch (Fig. 18) of one whorl and $1/8$, transparent, dome-shaped, smooth, about 350 μm in diameter with a nucleus of 109 μm . Teleoconch covered by numerous spiral grooves which are about 11-13 at the beginning, 25 over the end of the spire and about 40 on the last whorl. Spiral grooves (Fig. 19) very shallow and narrow, with wider interspaces, and a small thread visible inside in some areas. Umbilicus narrow, with a faint rim situated well inside and terminating the spiral sculpture, then commarginal striae in its innermost part. Aperture piriform, with a blunt angulation in the adapical part, and with the abapical edge very slightly protruding at the

point where the umbilical keel meets the columella. Peristome continuous, with simple outer lip. Colour white.

Dimensions: Holotype 1.5 mm high and 1.1 mm in diameter.

Remarks: This species most resembles *E. canarica* but the latter is narrower, more solid, a little larger, and has a more distinct keel delimiting the umbilicus and protruding over the apertural edge. Also its microsculpture has microchannels in the interspaces between threads which are not seen in *E. azoreana*.

The general shell morphology, and particularly the conformation of the umbilical area, resemble very much *E. tenuisculpta* spec. nov. The main difference is in the paucispiral protoconch, but also the size is smaller and the spiral grooves are wider than in *E. tenuisculpta*.

Elachisina canaliculata Rolán and Rubio, 2001 (Figs. 21-25)

Elachisina canaliculata Rolán and Rubio, 2001. *Novapex*, 2(4): 133-136. [Type locality: Baía Teodora, North of Sal Rei, Boavista Island].

Type material: Holotype (Fig. 22) in MNCN (15.05/44327). Paratypes in MNHN (1), DBUA (1), CER (1), CFR (1).

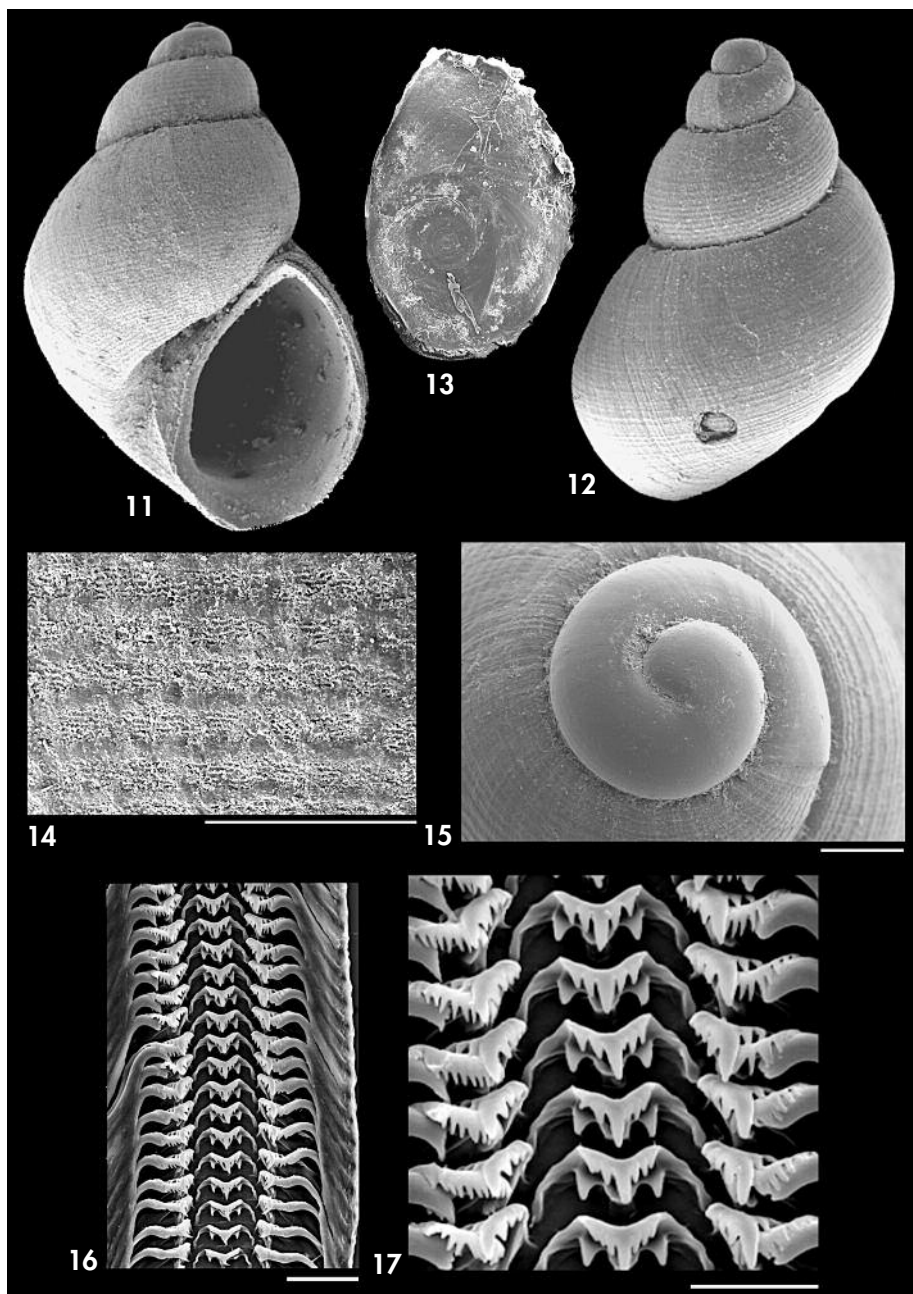
Other material studied: Cape Verde Archipelago: Sal: 1 s, Mordeira, 5 m (destroyed during the study). Boavista: 2 s, Sal Rei, 10 m; Santiago: 1 s, Praia, 8 m.

Description: Shell (Figs. 21-23) small, ovoid, thin, somewhat transparent, with 2-3 whorls separated by a well defined suture. Protoconch (Figs. 23, 25) globose, smooth, with a little more than 1 whorl, and a maximum diameter difficult to be sized due to the gradual transition to the teleoconch (258 μm is mentioned in the original description). Nucleus of the protoconch 137 μm in diameter. Holotype with 3 slightly convex teleoconch whorls sculptured with spiral grooves (Fig. 24) which are almost canal-like, and cover the entire shell surface (numbering between 22-25 on the last whorl, with the final 3-4 grooves reaching into the umbi-

lical funnel). Umbilicus is narrow, with a faint rim situated well inside and terminating the spiral sculpture. Aperture oval, with an angulation in the adapical part, and with the abapical edge distinctly protruding at the point where the umbilical keel meets the columella. Peristome continuous, with simple outer lip. Central area of the columella curved and reflected towards the umbilicus.

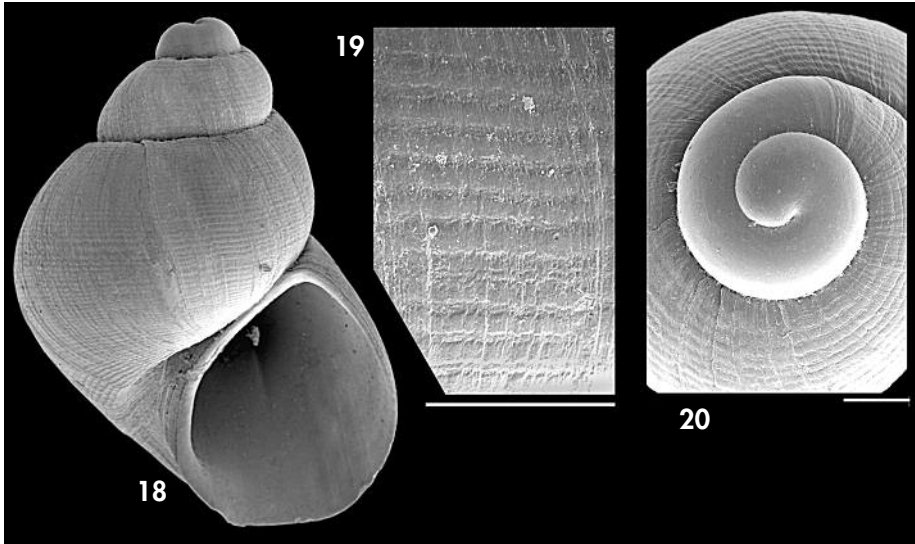
Dimensions: Holotype 1.9 mm in height.

Remarks: The widely spaced and sharply delimited grooves differentiate the present species from others in the genus *Elachisina*, particularly from *E.*



Figures 11-17. *Elachisina canarica* (Nordsieck and Garcia-Talavera, 1979). 11, 12: shells from La Restinga, Hierro (height 1.8 and 1.5 mm); 13: operculum (maximum diameter 0.6 mm). 14: microsculpture (same shell as 11); 15: protoconch, same locality; 16, 17: radula. Scale bars, 13-15: 100 μ m; 16, 17: 20 μ m.

Figuras 11-17. Elachisina canarica (Nordsieck y Garcia-Talavera, 1979). 11, 12: conchas de La Restinga, Hierro (altura 1,8 y 1,5 mm); 13: opérculo (diámetro máximo 0,6 mm). 14: microescultura (misma concha que 11). 15: protoconcha, misma localidad; 16, 17: radula. Escalas, 13-15: 100 μ m; 16-17: 20 μ m.



Figures 18-20. *Elachisina azoreana* spec. nov. 18: holotype from Santa Maria, Azores (MNHN; height 1.5 mm); 19: microsculpture of the holotype; 20: protoconch of a paratype. Scale bars 100 μ m.

Figuras 18-20. *E. azoreana*. 18: holotipo de Santa Maria, Azores (MNHN: altura 1,5 mm); 19: microescultura del holotipo; 20: protoconcha de un paratipo. Escalas 100 μ m.

canarica, *E. azoreana*, *E. pelorcei* and *E. senegalensis*. *Elachisina floridana* is larger, with more whorls, a more tumid profile of the spire and a narrower umbilicus. *Elachisina pergrandis* and *E. tenuisculpta*,

described below, have a protoconch with 2 whorls at least and have more numerous spiral grooves; the former also differs in having a nearly closed umbilicus in the adult stage.

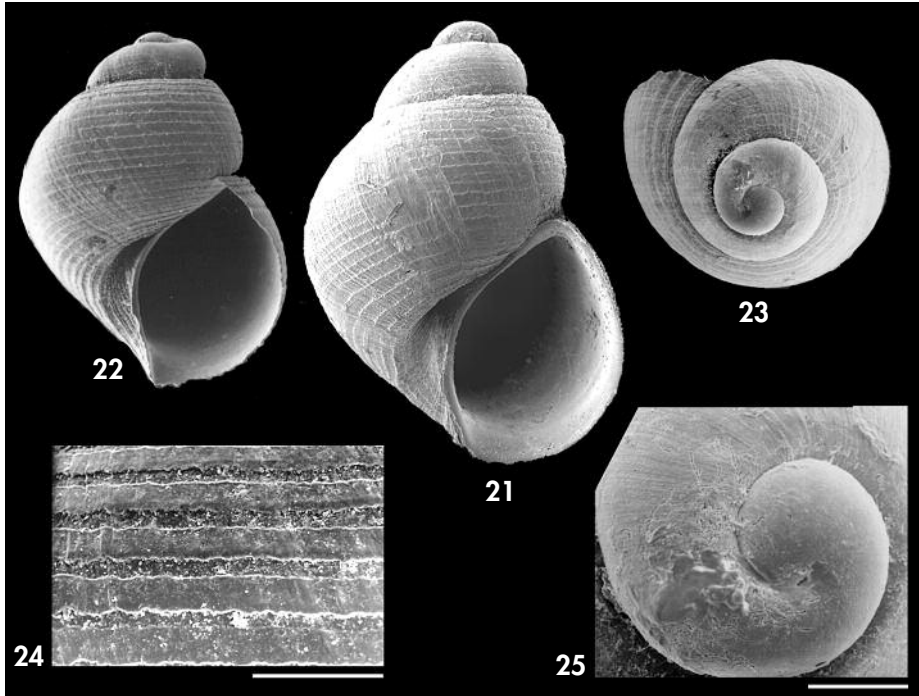
Elachisina tenuisculpta spec. nov. (Figs. 26-35)

Type material: Holotype (Fig. 26) deposited in MNHN. Paratypes: AMNH (1), BMNH (1), MNCN (1, Fig. 16, n° 15.05/46460) CER (50), CFR (1), CPR (1), all from the type locality.

Other material examined: Mauritania: 1 s, Baie de Cansado, 20° 50' N, 10 m (MNHN); 20 s, 10 j, 10 f, in intertidal sediments, Banc d'Arguin (CER); 2 s, intertidal, Baie de l'Etoile, Nouadhibou (CER). Senegal: 5 s, Dakar, on shipwreck "Le Tacoma", 15 m (CJP); 1 s, Grand Thiouriba, 40 m, (CJP); 1 s, 2 j, 2 f, Madeleines, Dakar, 6-14 m (CER). Guinea Bissau: 2 s, 2 f, S Ilha do Mel, Exp. "Chalgui II" sta. 7, 10° 41' N, 15° 44.5' W, 25 m (MNHN). Guinea Conakry: 1 j, W of Ile Kabak, "Sedigui I" sta. 154, 9° 18' N, 14° 00' W, 24 m (MNHN); 1 j, W Ile Tannah, "Sedigui I" sta. 80, 9° 12.3' N 13° 37' W, 16 m (MNHN); 1 j, W Rio Yomponi, "Sedigui II" sta. 688, 10° 24' N, 14° 50' W, 22 m (MNHN); 1 j, W Ouendi-Taboria, "Chalgui 7" sta. 41, 9° 55' N, 14° 17' W, 17 m (MNHN); 2 s (CFR). Ghana: 6 s, 2 j, Miamia, 38-40 m (CER); 3 s, 22 j, 14 f, Cape Three Points, 45-60 m (CER). Gabon: 5 c, between Mayumba and Konkouati, "Congo", sta. 796, 17-19 m (MNHN). Angola: near Ambrizete, 7° 07' S, 12° 21' E, 80 m (MNHN); 154 s, Praia Etambar, Luanda, beach (MNHN); 4 s, 3 j, Ilha de Luanda, 10-20 m (MNHN); 4 s, off Luanda, 80-100 m, (CER); more than 130 j, off Mussulo, 90-100 m (MNHN); 1 s, Santo Antonio, Benguela (MNHN); 3 s, Caotinha, Benguela, infralittoral (MNHN); 1 s, Santa Maria, Lucira, 40 m (MNHN); 3 s, 1 j, São Nicolau (MNHN); 5 s, 5j, Praia Amelia, Namibe, 40-60 m (MNHN).

Type locality: Banc d'Arguin, Mauritania.

Etymology: The specific name alludes to the very fine sculpture of the shell.



Figures 21-25. *Elachisina canaliculata* Rolán and Rubio, 2001. 21: holotype from Sal, Cape Verde Islands (MNCN; height 1.9 mm) 22, 23: paratype, same locality (MNHN, height 1.3 mm); 24: microsculpture (same paratype as 22, 23). 25: protoconch, same paratype. Scale bars 100 μ m.

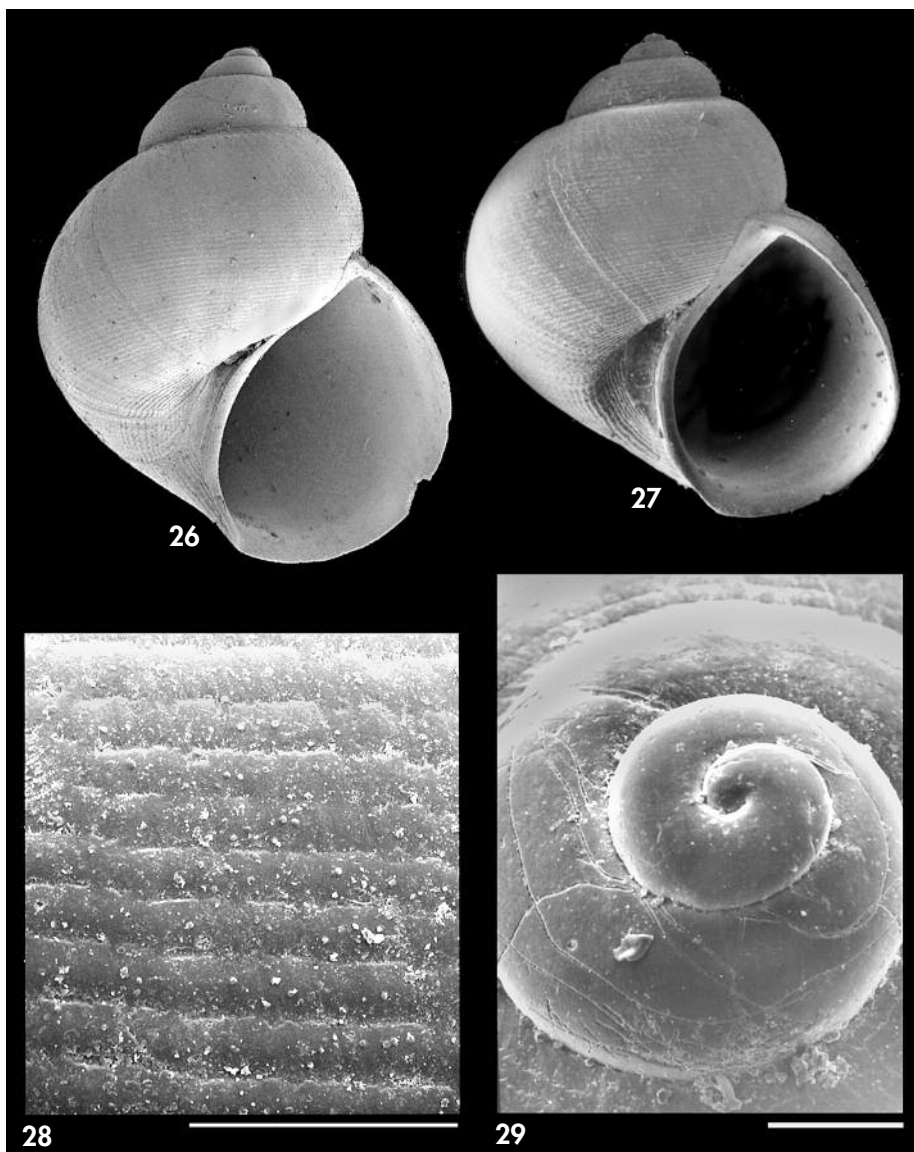
Figuras 21-25. Elachisina canaliculata Rolán y Rubio, 2001. 21: holotipo de Sal, Islas de Cabo Verde (MNCN; altura 1,9 mm) 22, 23: paratipo, misma localidad (MNHN, altura 1,3 mm); 24: microescultura (mismo paratipo que 22, 23). 25: protoconcha, mismo paratipo. Escalas 100 μ m.

Description: Shell (Figs. 26, 27, 30, 32, 34-35) small, fragile, ovate to ovate-conic, with convex whorls and a deep suture. Protoconch of the type material (Fig. 29) with 2 whorls, dome-shaped, smooth, with a diameter of about 340 μ m and a very small nucleus of about 35 μ m. Protoconch (Figs. 29, 31, 33) in Angolan shells a little larger with 460 μ m and between 2 $\frac{1}{4}$ and 2 $\frac{1}{2}$ whorls. Teleoconch of 2-2 $\frac{1}{4}$ convex whorls, transparent in fresh shells, sculptured with very numerous weak spiral grooves (Fig. 28), which are 10-12 in the beginning of the teleoconch, 15-18 in the second whorl and about 65-70 in the last whorl. There are about 35-40 between the suture and the insertion of the peristome, 25-30 between there and the umbilicus border and 8-12 inside the umbilicus). Spiral grooves 4 times narrower

than interspaces, being slightly stronger near the umbilicus, and frequently very attenuated or almost disappeared on the upper part of the last whorl in adult shells. Umbilicus narrow, hardly developed in juvenile shells; with a faint rim situated well inside and terminating the spiral sculpture, then commarginal striae in its innermost part. Aperture ovate-piriform, with a blunt angulation in the adapical part, and with the abapical edge protruding at the point where the umbilical keel meets the columella. Peristome continuous, with simple outer lip. Colour white.

Dimensions: The holotype has 2.2 mm in height x 1.8 mm in diameter. The largest shell reaches 3.0 mm in height.

Distribution: Known from Mauritania to Angola, having been collected

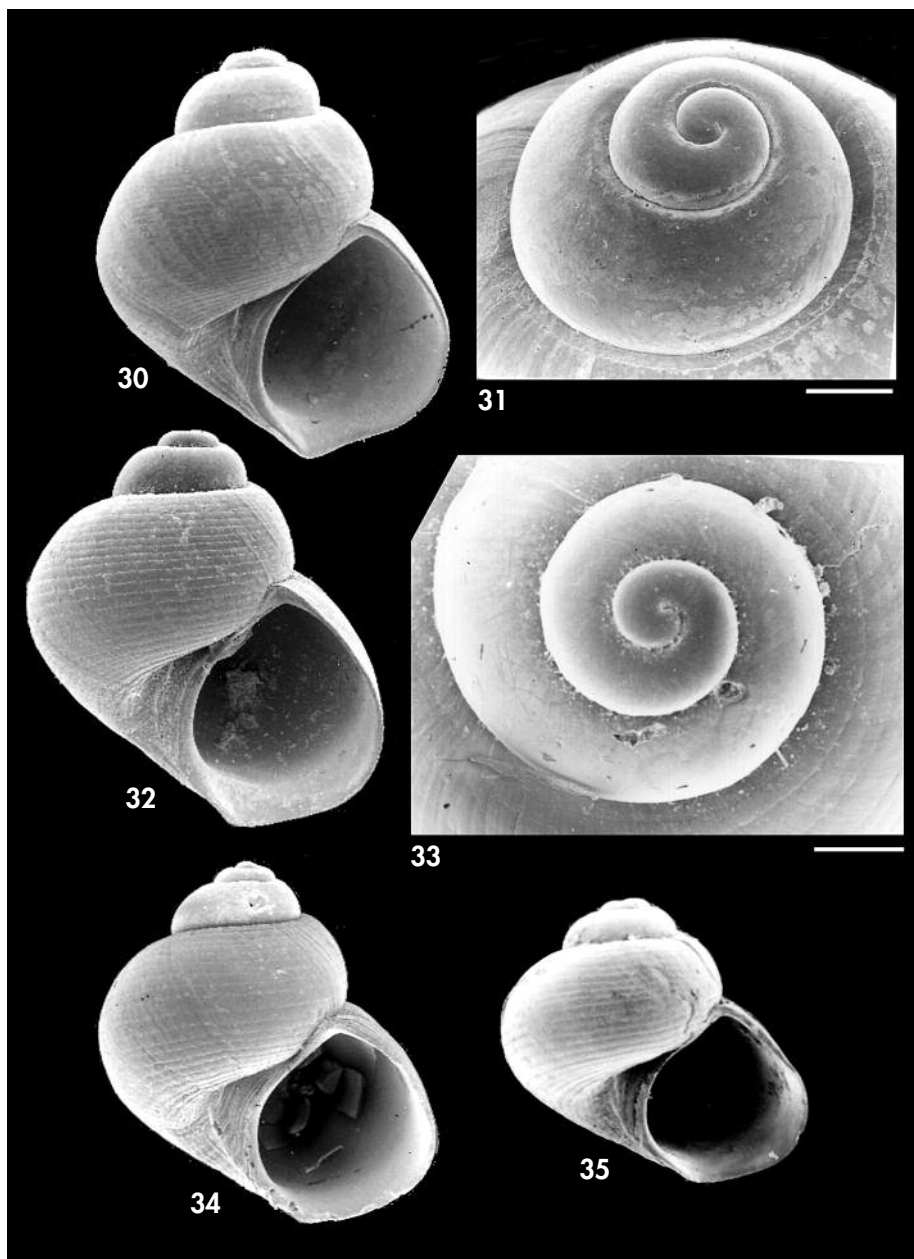


Figures 26-29. *Elachisina tenuisculpta* spec. nov. 26: holotype from Banc d'Arguin, Mauritania (MNHN; height 2.2 mm); 27: paratype, same locality (MNCN; height 2.0 mm); 28: microsculpture of the holotype. 29: protoconch of a paratype, same locality (CER). Scale bars 100 μ m.

Figuras 26-29. Elachisina tenuisculpta spec. nov. 26: holotipo de Banc d'Arguin, Mauritania (MNHN; altura 2,2 mm); 27: paratipo, misma localidad (MNCN; altura 2,0 mm); 28: microescultura del holotipo. 29: protoconcha de un paratipo, misma localidad (CER). Escalas 100 μ m.

from Baie de l'Etoile in Nouadhibou to Banc d'Arguin, and also in Senegal, Guinea Bissau and Angola.

Remarks: We have found some differences between the shells from Mauritania and Senegal and those from Ghana



Figures 30-35. *Elachisina tenuisculpta* spec. nov. 30: shell from Miamia, Ghana (CER, height 1.15 mm); 31: protoconch, same locality, 32: shell from Guinea Conakry, trawled 60-80 m (CFR; height 1.09 mm); 33: protoconch of another shell from Guinea Conakry; 34-35: shells from off Luanda, 80-100 m, Angola (CER; height 1.19 and 0.86 mm). Scale bars 100 μ m.

Figuras 30-35. Elachisina tenuisculpta spec. nov. 30: concha de Miamia, Ghana (CER, altura 1,15 mm); 31: protoconcha, misma localidad, 32: concha de Guinea Conakry, rastreada en 60-80 m (CFR; altura 1,09 mm); 33: protoconcha de otra concha de Guinea Conakry; 34-35: conchas de frente a Luanda, 80-100 m, Angola (CER; altura 1,19 y 0,86 mm). Escalas 100 μ m.

to Angola. The specimens from the type locality are a little larger, the number of the spiral grooves is higher and the protoconch has 2 spiral whorls, whereas those from Angola have $2\frac{1}{4}$ or more whorls and, as a consequence, a larger diameter. Anyway, shells from Senegal also had a protoconch similar to those from Angola, so that we considered that these differences could correspond to intraspecific variability of a species with a large distribution range. Therefore, we have included all of them in the same taxon.

Elachisina pergrandis spec. nov. (Figs. 36-40)

Type material: Holotype (Fig. 36), deposited in MNHN and 22 paratypes: 2 s, Cabo Ledo, Luanda, 10-40 m (MNHN); 20 s, 2 j, Corimba Bay, 10-20 m (MNHN), Angola. Other paratypes: MNCN(1, n° 15.05/46461), CER (3), from type locality.

Other material examined: Senegal: 1 s, 13° 54' N, 16° 49' W, 7 m (MNHN). Guinea Conakry: W of Ouendi-Taboria, "Chalgui 7" sta. 41, 9° 55' N, 14° 17' W (MNHN). Ivory Coast: 7 s, region of Abidjan (MNHN). Ghana: 3 s, 10 j, Cape Three Points, 35-65 m; 5 j, Miamia, 38-40 m; 3 j, Miamia, 35 m; 1 s, 2 j, 1 f, Miamia, 45-50 m. Angola: 6 j, Ambrizete, Bango lighthouse, 07° 20.19' S, 12° 55.09' E, intertidal (MNHN); 2 j, Corimba Bay, 10-20 m (MNHN).

Type locality: Palmeirinhas, Luanda, Angola.

Etymology: The specific name alludes to being one of the largest species in the genus.

Description: Shell (Figs. 36, 37, 39) relatively large for the genus, ovate-conic, quite solid, with convex whorls. Protoconch (Fig. 40) of about 2 whorls, dome-shaped, smooth. Teleoconch of a little more than three whorls; these whorls are convex, shiny, opaque, and sculptured with some weak spiral grooves, sometimes interrupted so as to form a dashed pattern, and separated from each other by intervals 10 times as large as the grooves (Fig. 38). These are about 10 in the beginning of the teleoconch, 12 in the subsequent whorl and 14 on the last spire whorl. The last whorl has about 20-22 grooves, 14 in the subsutural area, very closely set, whereas the abapical area has a set of deeper furrows separating flat, blunt spiral cords around the umbilical chink. There is only a very narrow chink in place of the umbilicus. Aperture ovate piriform, with an angulation in the adapical part, and with the abapical edge strongly pro-

Elachisina tenuisculpta resembles *E. catenata* spec. nov. which also has a multispiral protoconch and a globose shape, but the latter differs by a characteristic sculpture of spiral rows of pits. *Elachisina pergrandis* spec. nov. is also globose and also has a multispiral protoconch, but has much narrower and ragged spiral furrows, and a nearly closed umbilicus in the adult.

E. azoreana, *E. canarica*, *E. senegalensis* spec. nov. and *E. pelorcei* spec. nov. are smaller, more elongate, with fewer spiral grooves and have a paucispiral protoconch.

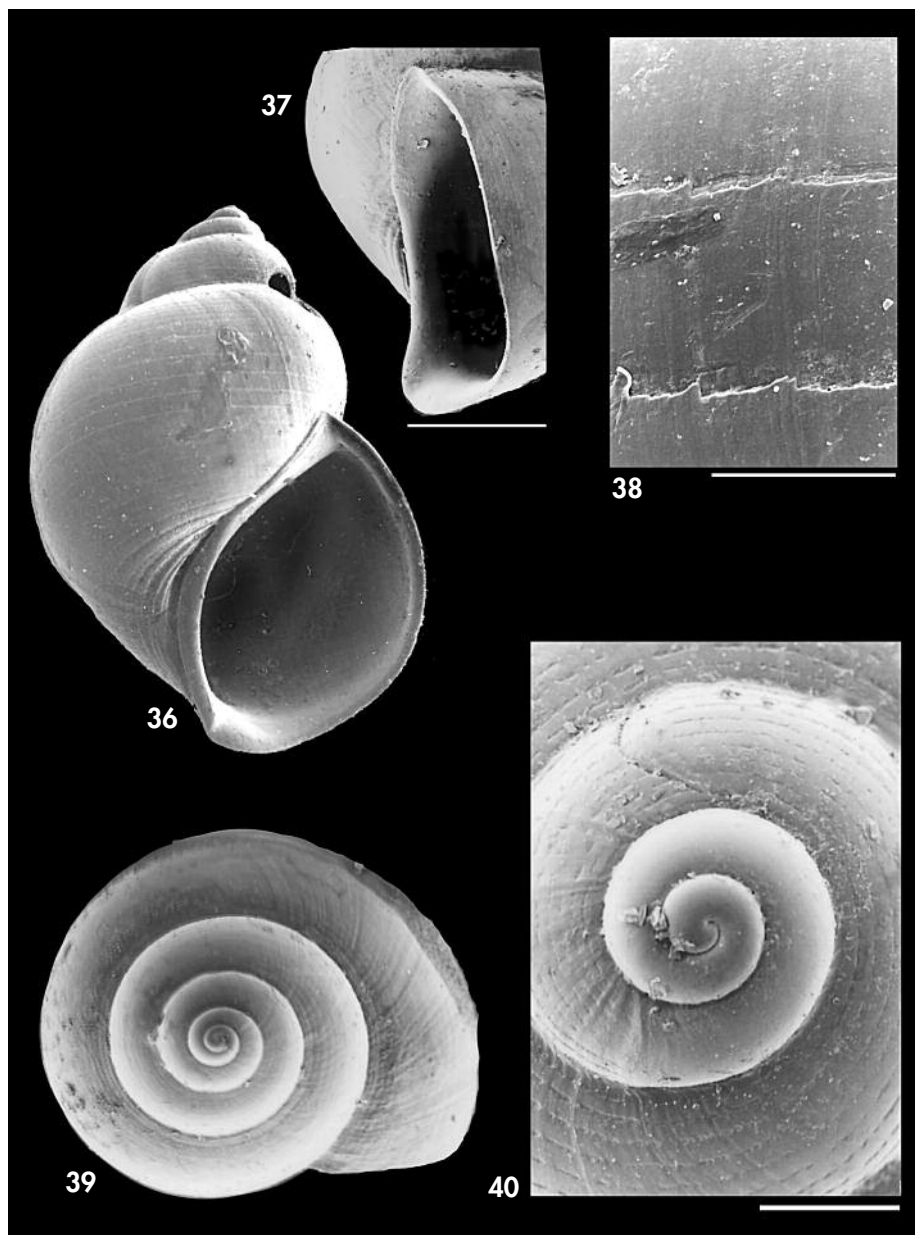
truding at the abapical termination of the columella. Peristome continuous, with simple outer lip, slightly notched in the adapical angle (Fig. 36-37).

Dimensions: The holotype is 4.2 mm in height and 2.8 mm in width; the largest shells reach 4.5 mm in height.

Distribution: Known from Ghana to Luanda, Angola.

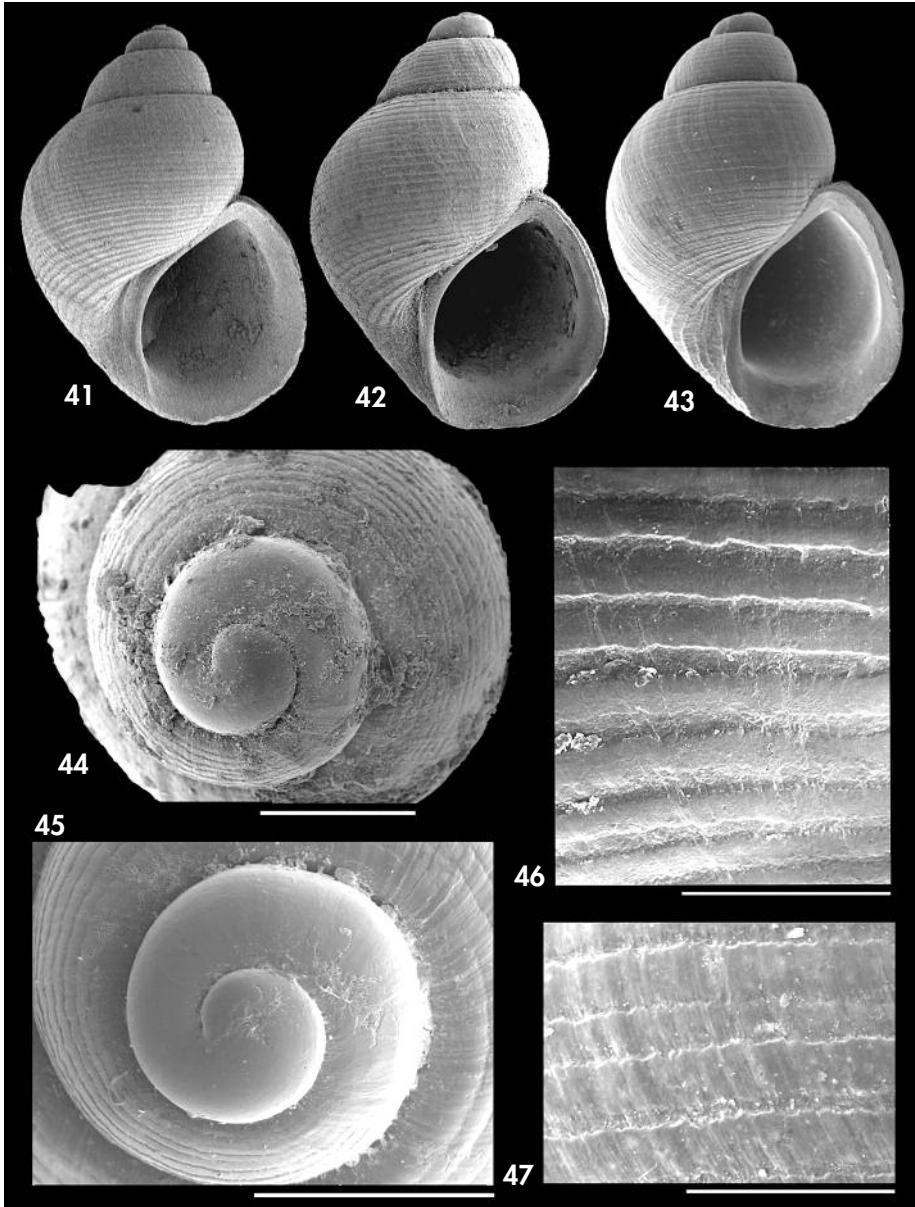
Remarks: This species resembles slightly *E. bakeri* (Strong, 1938) but the latter is more elongate, the sutures are not so deep, the spiral grooves are always more regular and the interspaces not so wide in the middle of the whorls.

Among the other East Atlantic species with multispiral protoconch, *E. tenuisculpta* spec. nov. and *E. catenata* spec. nov. differ in having a definite umbilicus, and *E. gubbiolii* spec. nov. in being more solid, more conical, with a peripheral angulation on the body whorl.



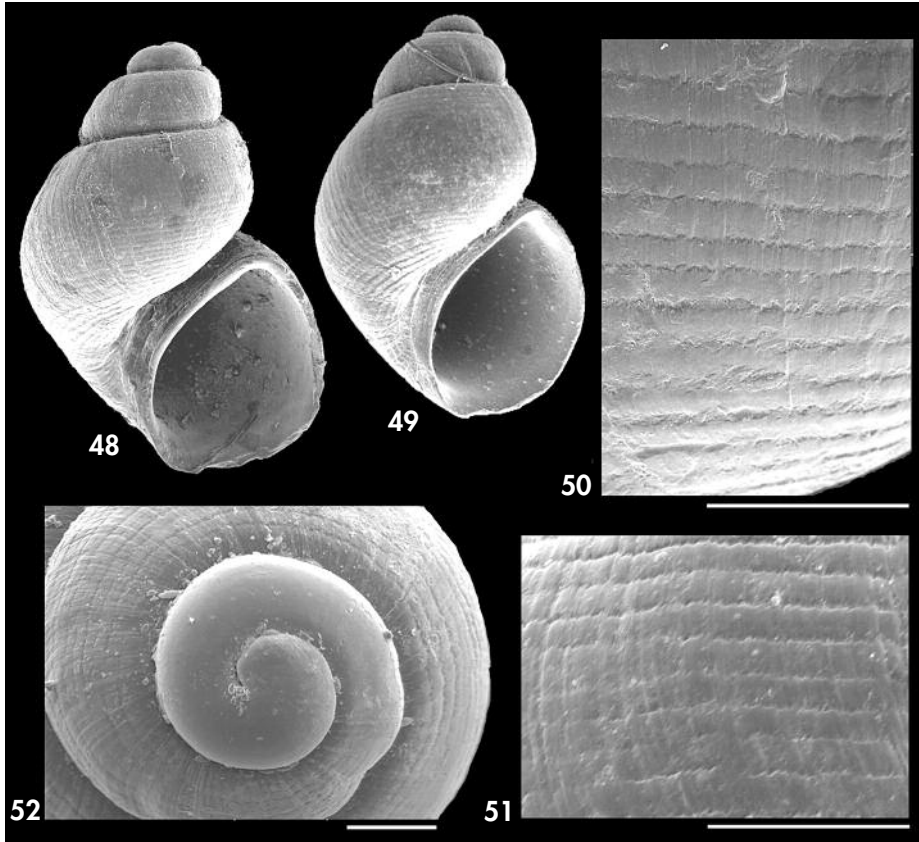
Figures 36-40. *Elachisina pergrandis* spec. nov. 36: holotype from Palmeirinhas, Luanda, Angola (MNHN; height 4.2 mm); 37: detail of the aperture of the holotype; 38: microsculpture of the holotype; 39: apical view of a paratype (CER; maximum diameter 3.0 mm); 40: protoconch, same paratype as 39. Scale bars, 37: 1mm, 38: 100 μ m, 40: 200 μ m.

Figuras 36-40. Elachisina pergrandis spec. nov. 36: holotipo de Palmeirinhas, Luanda, Angola (MNHN; altura 4,2 mm); 37: detalle de la abertura del holotipo; 38: microescultura del holotipo; 39: vista apical de un paratipo (CER; diámetro máximo 3,0 mm); 40: protoconcha, mismo paratipo que 39. Escalas, 37: 1mm, 38: 100 μ m, 40: 200 μ m.



Figures 41-47. *Elachisina pelorcei* spec. nov. 41: holotype from Petit Thiouriba, Dakar, Senegal (MNHN; height 1.6 mm); 42: paratype from Les Madeleines, Dakar, Senegal (MNCN; height 1.7 mm); 43: paratype from Grand Thiouriba (CER; height 1.7 mm); 44: protoconch of a juvenile from Petit Thiouriba (CER); 45: protoconch of a shell from Grand Thiouriba (CJP); 46, 47: microsculpture (same paratype as 42). Scale bars, 44, 45: 200 μ m; 46, 47: 100 μ m.

Figuras 41-47. Elachisina pelorcei spec. nov. 41: holotipo de Petit Thiouriba, Dakar, Senegal (MNHN; altura 1,6 mm); 42: paratipo de Les Madeleines, Dakar, Senegal (MNCN; altura 1,7 mm); 43: paratipo de Grand Thiouriba (CER; altura 1,7 mm); 44: protoconcha de un juvenil de Petit Thiouriba (CER); 45: protoconcha de una concha de Grand Thiouriba (CJP); 46, 47: microescultura (mismo paratipo que 42). Escalas, 44, 45: 200 μ m; 46, 47: 100 μ m.



Figures 48-52. *Elachisina senegalensis* spec. nov. 48: paratype from La Tacoma, Dakar (MNCN; height 1.4 mm); 49: holotype from Cap Vert, Dakar, Senegal (MNHN; height 1.2 mm); 50-51: microsculpture (same paratype as 48); 52: protoconch of another paratype from La Tacoma (CER). Scale bars 100 μ m.

Figuras 48-52. Elachisina senegalensis spec. nov. 48: paratipo de La Tacoma, Dakar (MNCN; altura 1,4 mm); 49: holotipo de Cap Vert, Dakar, Senegal (MNHN; altura 1,2 mm); 50-51: microescultura (mismo paratipo que 48); 52: protoconcha de otro paratipo de La Tacoma (CER). Escalas 100 μ m.

Elachisina pelorcei spec. nov. (Figs. 41-47)

Type material: Holotype (Fig. 41) deposited in MNHN (from Dakar, Petit Thiouriba, 33 m). Paratypes: in AMNH (1 s, Petit Thiouriba, 33 m, exCJP); BMNH (1, Dakar, Les Madeleines, 6-14 m), MNCN (1 s, n° 15.05/46362, Dakar, Les Madeleines, 7-13 m, exCJP), CER (1 s, Dakar, Grand Thiouriba, 40 m; 2 s, Petit Thiouriba, 33 m, exCJP; 14 s, Les Madeleines, 6-14 m); CJP (7 s, Grand Thiouriba, 40 m; 2 s, 1 j, Dakar, Goute Teni M'Both, 25 m; 4 s, Petit Thiouriba, 33 m; 2 s, Dakar, Almadies, 20-25 m), CFR (1, Les Madeleines, 6-14 m) and CPR (1, les Madeleines, 6-14 m).

Other material examined: Senegal: 1 s, 30 m, Les Madeleines (broken during the study); 6 s, 1 j, 1 f, Petit Thiouriba, 35 m (CER).

Type locality: Dakar, Senegal.

Etymology: The species is named after Jacques Pelorce, French malacologist who collected the first material of this species, and donated sediments where other shells were found.

Description: Shell (Figs. 41-43) very small, ovate to ovate-conic, relatively solid, with convex whorls. Protoconch (Figs. 44-45) of a little more than one smooth, shining whorl, dome-shaped in form and with a maximum diameter of about 280-295 μm and a nucleus with 106 μm . Teleoconch with 2 or 2 $\frac{1}{4}$ convex whorls, the first with 15 spiral grooves, and the last whorl with about 28. Spiral grooves even, with regular interspaces (Figs. 46-47), stronger near the abapical part and extending into the umbilicus. Umbilicus small, bearing inside a sharp ridge which terminates the external spiral sculpture. Aperture ovate-piriform, with a blunt angulation in the adapical part, and with the abapi-

cal edge very slightly protruding at the point where the umbilical keel meets the columella. Peristome continuous, with an internal thickening of the outer lip, and a beveled edge.

Dimensions: The holotype is 1.6 mm in height and 1.2 mm in width.

Distribution: Only known from Dakar, Senegal.

Remarks: *Elachisina azureana*, *E. canarica* and *E. tenuisculpta* also have a paucispiral protoconch but have more fragile shells, with spiral sculpture more dense and with smaller grooves and wider umbilicus.

E. senegalensis, which is the most similar species and lives sympatrically, will be discussed below.

Elachisina senegalensis spec. nov. (Figs. 48-52)

Type material: Holotype (Fig. 49) deposited in MNHN (Cap Vert, Dakar, Senegal). Paratypes: AMNH (1 s, Dakar, shipwreck of "La Tacoma", 15 m, exCJP), BMNH (1, Dakar, Les Madeleines, 6-14 m), MNCN (1 s, n° 15.05/46463, "La Tacoma", Fig. 48, ex CJP); in CER (1 s, "La Tacoma"; 12 s, Les Madeleines, 6-14 m); in CJP (2 s, "La Tacoma", 15 m, 3 s, Les Madeleines, 7-13 m,), CFR (1, Les Madeleines, 6-14 m), and CPR (1, Les Madeleines, 6-14 m).

Other material examined: Senegal: 1 s (broken during the study), "La Tacoma", 15 m; 4 f, Les Madeleines, 6-14 m (CER); 1 s, Dakar, on shipwreck, 12 m (CER); 2 j, Dakar, Tiwe, 35 m, (CER).

Type locality: Dakar, Senegal.

Etymology: The species is named after the area where it was collected.

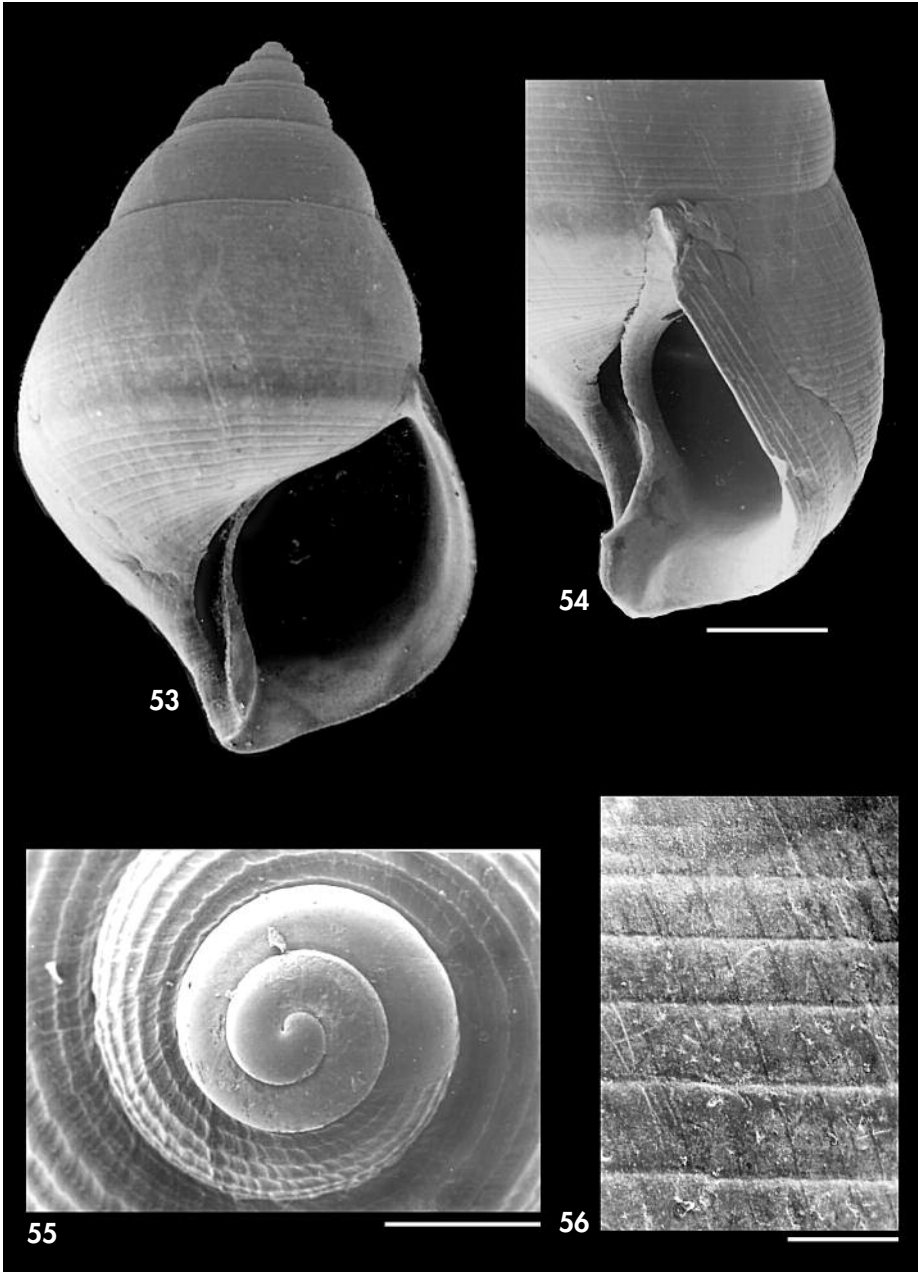
Description: Shell (Figs. 48-49) very small, ovate to ovate-elongate, fragile, with convex whorls. Protoconch (Fig. 52) of a little more than one whorl, smooth and shiny, dome-shaped in form, and a maximum diameter of about 270 μm . Teleoconch with 2 or 2 $\frac{1}{4}$ convex whorls, the first with about 12 spiral grooves, the last whorl with about 33. Spiral grooves (Figs. 50, 51) even, with regular interspaces, a little stronger towards the abapical part and extending into the umbilicus. Umbilicus small, bearing inside a sharp ridge which terminates the external spiral sculpture, and with fine commarginal striae further inside. Aperture ovate-piriform, with an angulation in the adapical part, and with the abapical edge protruding at the point where the umbilical keel meets the columella.

Peristome continuous, with simple outer lip. Columella slightly curved, the columellar edge of the aperture tending to separate from the preceding whorl in adults.

Dimensions: Holotype is 1.2 mm in height and 0.8 mm in width. Some shells can get 1.4 mm of maximum dimension.

Distribution: Only known from Dakar, Senegal.

Remarks: *Elachisina canarica* and *E. azureana* are a little larger and more solid; also they have the protoconch wider, and have more spiral grooves. *E. pelorcei* is larger, more solid, and globose, with wider grooves, the umbilicus is more definite and the body whorl does not tend to separate from the previous whorl. Both species are found together, without intergrades.



Figures 53-56. *E. gubbiolii* spec. nov. 53: holotype from Dahkla, Sahara (MNCN; height 5.4 mm); 54: side view of the aperture of a paratype (CER; scale bars 1 mm); 55: protoconch of a paratype (MNHN; scale bar 200 µm); 56: microsculpture of the holotype. Scale bars 100 µm.

Figuras 53-56. E. gubbiolii spec. nov. 53: holotipo de Dahkla, Sahara (MNCN; altura 5,4 mm); 54: vista lateral de la abertura de un paratipo (CER; barra de escala 1 mm); 55: protoconcha de un paratipo (MNHN; barra de escala 200 µm); 56: microescultura del holotipo. Escalas 100 µm.

Elachisina gubbiolii spec. nov. (Figs. 53-56)

Type material: Holotype (Fig. 53) deposited in MNCN (n° 15.05/46464). Paratypes: in MNHN (1, Fig. 55), CER (1, Fig. 54) and CFG (4), all from type locality and ex CFG.

Other material examined: Only known from the type material.

Type locality: Dakhla, Sahara, 50-60 m.

Etymology: The specific name is after Franco Gubbioli, of Malaga, Spain, who provided the material of this species.

Description: Shell (Fig. 53) relatively large for the genus, ovate-conic, solid, with early spire whorls convex, the penultimate whorl only slightly convex and the body whorl bluntly angled at the periphery. Protoconch (Fig. 55) of 2 whorls, dome-shaped, smooth, with a small nucleus of about 56 μm and a diameter of about 375 μm . Teleoconch of about 4 whorls sculptured with weak spiral grooves, the first with about 5, stronger and wider grooves, the following with 6 grooves, then with an increasing number of grooves in the following. Spiral grooves on the first teleoconch whorl crossed by some folds which parallel the prosocline growth lines; spirals becoming weaker and narrower (about 1/15 of intervals) on the last whorl. There are about 32 grooves, 16 of them between the suture and the insertion of the aperture, and the remainder abapically to these; both groups separated by a smooth band, which is coincident with a weak peripheral angle. Spiral grooves fainter near the umbilicus, and are separated by larger interspaces in the upper

part of the whorls (Fig. 56). Umbilicus narrow and deep, bordered by a sharp ridge overhanging an inner furrow. Aperture rhomboid, with a sharp angle in the adapical part, and with the abapical edge sharply protruding and notched at the termination of the columella (Fig. 54). Columella strongly twisted, almost vertical on its lower part.

Dimensions: The holotype is 5.4 mm in height and 3.5 mm in width. The largest shells can reach 7 mm in maximum dimension.

Distribution: Only known from the type locality.

Remarks: *E. gubbiolii* spec. nov. is distinctive, and differs from the other living species of the genus by its larger size, the peripheral angulation, the suture less deep and, over all, by its very protruding columella and basal notch similar to a siphonal canal. It resembles the fossil species *Pseudocirsope burdigalica* (Cossman and Peyrot, 1919), from the Miocene of Aquitaine Basin, France but the latter differs in a definitely stouter outline.

Elachisina catenata spec. nov. (Figs. 57-63)

Type material: Holotype (Fig. 57) and 10 paratypes from the type locality, deposited in MNHN. Other paratypes: in MNCN (1, n° 15.05/46465, from Cacuo, Angola); from Miamia, Ghana: in AMNH (1), CER (6, Figs. 58, 59), CFR (1) and CPR (1).

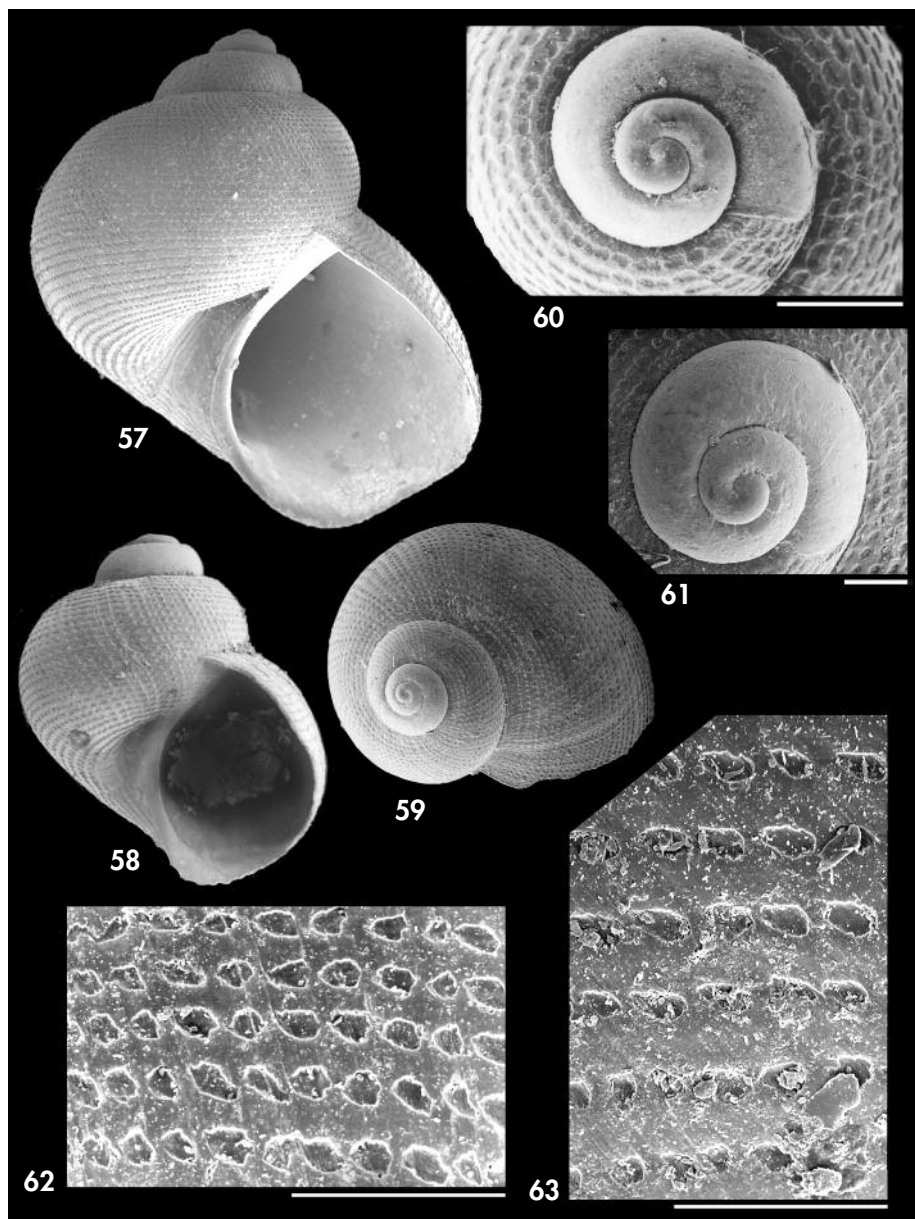
Other material examined: Ivory Coast: 2 s, Abidjan (MNHN). Ghana: 32 s, 28 j, 25 f, Cape Three Points, 35-65 m (CER); 9 s, 30 j, 8 f, Miamia, 45-50 m (CER); 1 s, Miamia, 35-40 m (CER). Angola: 1 s, Ambrizete, 07° 00' S, 12° 20' E, 60 m (MNHN); 4 s, Luanda, Corimba Bay, 10-20 m (MNHN); 1 j, off Mussulo, 50-70 m (MNHN); 10 j, 4 f, off Mussulo, 90-100 m (MNHN); 1 s, Palmeirinhas, 10 m.

Type locality: Mussulo, Luanda province, Angola.

Etymology: The specific name alludes the spiral sculpture which appears like formed by chains.

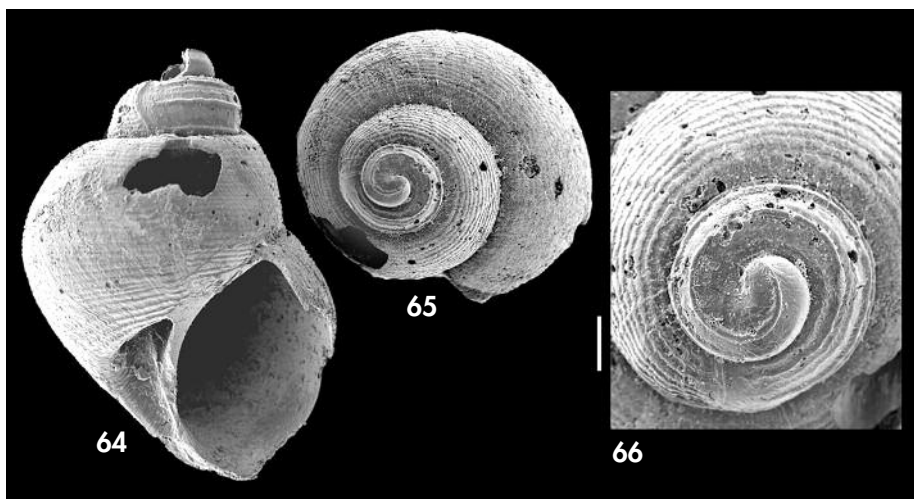
Description: Shell (Figs. 57-59) small, fragile, ovate to ovate-conic, umbilicate. Protoconch (Figs. 60-61) of a little more than 2 whorls which are dome-shaped and smooth, with 396 μm of diameter

and a nucleus of 54 μm . Teleoconch of about 2-2 1/2 whorls, uniformly convex, with deeply impressed suture, sculptured with numerous, weak, spiral grooves. In first whorl there are 7 rows of irregu-



Figures 57-63. *Elachisina catenata* spec. nov. 57: holotype from Mussulo, Angola (MNHN; height 2.1 mm); 58: paratype from Miaamia, Ghana (CER; height 1.3 mm); 59: paratype, same locality (CER; maximum diameter 1.8 mm); 60: protoconch of another paratype from Miaamia; 61: protoconch (same paratype as 59). 62: microsculpture (same paratype as 58); 63: microsculpture of the holotype. Scale bars 100 μ m.

Figuras 57-63. Elachisina catenata spec. nov. 57: holotipo de Mussulo, Angola (MNHN; altura 2,1 mm); 58: paratipo de Miaamia, Ghana (CER; altura 1,3 mm); 59: paratipo, misma localidad (CER; diámetro máximo 1,8 mm); 60: protoconcha de otro paratipo de Miaamia; 61: protoconcha (mismo paratipo que 59); 62: microescultura (mismo paratipo que 57); 63: microescultura del holotipo. Escalas 100 μ m.



Figures 64-66. *Elachisina* sp. 64-65: shell from Palmeira, Cape Verde Islands (CER; height 1.83 mm); 66: protoconch. Scale bar 100 μ m.

Figuras 64-66. *Elachisina* sp. 64-65: concha de Palmeira, Islas de Cabo Verde (CER; altura 1.83 mm); 66: protoconcha. Escala 100 μ m.

lar, discrete pits (Figs. 62, 63); there are about 30 spiral grooves in the last whorl, and the pits become sunken inside the grooves. Umbilicus deep, not very wide, with fainter spiral grooves extending inside; the innermost part fluted by commarginal striae. Aperture ovate piriform, with a blunt angulation in the adapical part, and with the abapical edge hardly protruding at the point where the columella terminates. Peristome continuous, slightly prominent in the abapical part.

Dimensions: The holotype is 2.13 mm in height by 2.00 mm in diameter. The material from Ghana is of smaller size, with about 1.2-1.4 mm of maximum dimensions.

Distribution: Known from the Ivory Coast and Ghana to Angola.

Remarks: The present species differs from those previously mentioned by its globose form, by the absence of an umbilical keel, and especially by its distinctive sculpture of spiral discontinuous grooves formed by small pits.

Elachisina sp. (Figs. 64-66)

Material examined: 1 s, dredged in Palmeira, 30 m.

Description: Shell (Figs. 64, 65) small, ovate to ovate-conic, narrowly umbilicate, whorls convex sculptured with numerous, weak, spiral grooves. Protoconch (Fig. 66) with a little more than one whorl, dome-shaped, with a prominent cord running from the nucleus, and several ones which appear immediately after. Teleoconch similar to other of the genus.

Dimensions: 1.4 in height and 1.0 mm in width.

Distribution: Only known from Cape Verde archipelago, from where it is probably an endemic species.

Remarks: The sculpture of the protoconch separates this species from the other within the genus, which always have a smooth surface. We prefer not to name this species, considering that only a single, damaged shell is available.

Table I. Main characters for differentiation between the species presented in this work. Canal.: canaliculate.

Tabla I. Principales caracteres para la diferenciación entre las especies estudiadas en este trabajo. Canal.: acanalada.

	<i>floridana</i>	<i>eritima</i>	<i>canarica</i>	<i>azoreana</i>	<i>canaliculata</i>	<i>tenuisculpta</i>	<i>pergrandis</i>	<i>peloraei</i>	<i>senegolensis</i>	<i>gubbioli</i>	<i>catemata</i>	
Protoconch whorls	1 1/8	1 1/8	1 1/8 brown	1 1/8 brown	1 1/16	2	2	1 1/8	1 1/8	2 1/16	2 1/8	1
Protoconch sculpture	0	0	0	0	0	0	0	0	0	0	0	cords
µm of the nucleus of protoconch	120	125	91	109	120	34	40	106	85	56	54	110
µm on the protoconch	325	333	360	350	258	337-460	426	290	269	375	396	392
Teleoconch grooves	canal.	simple with a thread inside	simple with several threads	simple	canal.	simple very narrow	irregular very narrow	simple	simple	simple very narrow	formed by pits	simple
Number of striae in last whorl up to insertion of aperture	15	25	26	30	12	40	26	15	20	16	13	20
Shell	robust	robust	robust	medium	medium	fragile	medium	robust	medium	robust	fragile	fragile
Maximum size in mm	2.45	1.7	1.8	1.5	2.2	3.0	4.5	1.6	1.4	7.0	2.1	1.3

DISCUSSION AND CONCLUSIONS

In the present work 12 species of the genus *Elachisina* are recorded from the Atlantic Ocean, of which only four were previously known: *Elachisina floridana* is the species present in the West Atlantic coast; *E. eritima* from Santa Helena Island is the only one known since the 19th century; *E. canarica* from the Canaries and *E. canaliculata* from the Cape Verde archipelago were described more recently. Seven species are described in the present work as new for science, and one more is kept unnamed until better material is obtained.

Three more species of the Atlanto-Mediterranean area have been suggested as belonging to *Elachisina*, or the Elachisinidae. One is *Elachisina versiliensis*

Warén, Carrozza and Rocchini, 1990, a junior synonym of *Laeviphitus verduini* van Aartsen, Bogi and Giusti, 1989. This species has a strongly cancellate protoconch (see BOUCHET AND WARÉN, 1993: 705) reminiscent of the Nystiellinae (Epitoniidae) and very different from the planktotrophic protoconch type found in the Atlantic species of *Elachisina*. Moreover, it lacks the characteristic ridge bordering the umbilicus in all the species we have seen. For these reasons *Laeviphitus* was suggested in the original publication as a member of the Epitoniidae. This was rebutted by OKUTANI, FUJIKURA AND SASAKI (1993) who described an additional species from a bathyal site off Japan and found a taenioglossate radula. WARÉN AND BOUCHET (2001) described another species *L. desbryueresi*

Table II. Distribution of the species of *Elachisina* from West African coast. Car: Caribbean; Azo: Azores; Can: Canary; CV: Cape Verde Islands; SH: Santa Helena; Sah: Sahara; Mau: Mauritania; Sen: Senegal; GC: Guinea Conakry; Gha: Ivory Coast and Ghana; Gui: Gulf of Guinea; Ang: Gabon and Angola.

Table II. Distribución de las especies de *Elachisina* en la costa occidental africana. Car: Caribe; Azo: Azores; Can: Canarias; CV: Cabo Verde; SH: Santa Helena; Sah: Sáhara; Mau: Mauritania; Sen: Senegal; GC: Guinea Conakry; Gha: Costa de Marfil y Ghana; Gui: Golfo de Guinea; Ang: Gabón y Angola.

	Car	SH	Can.	CV	Aço	Sah	Mau	Sen	GC	Gha	Gui	Ang
<i>E. floridana</i>	*											
<i>E. eritima</i>		*										
<i>E. canarica</i>			*									
<i>E. canaliculata</i>				*								
<i>E. azoreana</i> n. sp.					*							
<i>E. tenuisculpta</i> n. sp.							*	*	*	*		*
<i>E. pergrandis</i> n. sp.									*	*		*
<i>E. pelorcei</i> n. sp.								*				
<i>E. gubbiolii</i> n. sp.						*						
<i>E. catenata</i> n. sp.										*		*
<i>E. senegalensis</i> n. sp.								*				
<i>E. sp.</i>				*								

from the Mid Atlantic ridge and figured the taenioglossate radula. They also formally exclude it from Epitoniidae but agree that, awaiting an anatomical study, the systematic position of *Laeviphitus* remains uncertain.

"*Cingula*" *globuloides* Warén, 1972, from the Boreal North Atlantic, was transferred to *Elachisina* by WARÉN (1996). This is biogeographically discrepant with all the other *Elachisina*, restricted to tropical and warm temperate waters. The shell of "*C.*" *globuloides* lacks the characteristic umbilical rim, and generic placement is pending confirmation with data on the living animals or radula.

Although most of the species have a similar aspect, some characters were found diagnostic with respect to the other congeneric. Some of these characters are summarized in the Table I.

The sizes of distribution ranges appear to be very uneven among the different species, although future records may extend the current ranges.

The five insular species are reported only from the respective islands or archipelagoes and are probably

endemic. From their paucispiral protoconch with about 1 whorl, they are inferred to have non-planktotrophic larval development. These are *E. eritima* from St. Helena, *E. canarica* from the Canaries; *E. canaliculata* and *Elachisina* sp from Cape Verde archipelago; *E. azoreana* from the Azores.

There are three species which appear very localized on the mainland coast. *Elachisina gubbiolii*, recorded from the Sahara coast, can be inferred to have planktotrophic development and its apparently small range may be either an artifact due to sampling bias and rarity, or the result of ecological restriction (VERMEIJ, 1989). The two sympatric species *E. pelorcei* and *E. senegalensis* are restricted to the Dakar area. This small stretch of coastline is one of the few extensive sites with a rocky shore to be found on the West African coast, usually overcast with sediments. In this respect, it is ecologically an island and this is reflected in the local species richness and occurrence of short-range endemics (particularly spectacular in the genus *Conus*, see PIN AND LEUNG-TAK, 1995).

The other species (*E. tenuisculpta* and *E. pergrandis*) are known from larger areas along the West African coast as can be expected from their pattern of planktotrophic larval development. There is nevertheless a large gap in the Gulf of Guinea, which may reflect either a poor sampling in that area, or an adverse influence of the Niger Delta on marine communities.

The distribution area of the species is summarized in Table II.

Taking into account the new species described herein, West Africa appears as a center of high species richness for the family. This point must nevertheless be qualified, because Elachisinids are rather featureless gastropods. Species-rich areas such as the Indo-West Pacific may harbour even more species, either undescribed or misplaced in other molluscan families.

The habitat and mode of life of *Elachisina* species remains elusive. The West African species described here were never found alive, although some species being represented by a rather large number of shells, and other groups in the same samples were represented by a fair number of living specimens. Judging from the observations in the

Caribbean, species of *Elachisina* may live under rocks, in crevices. This is consistent with the lack of colour pattern on the shells of all species. In West Africa however, the sampling of subtidal rock was underrepresentative, because of the lack of visibility and the lack of infrastructure for scuba-diving.

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