

**Review of the genus *Rhodea* (Gastropoda, Pulmonata, Subulinidae),
with description of two new species from Colombia**

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Two species of the poorly known genus *Rhodea* (Subulinidae) are described as new to science, viz. *Rhodea mariaalejandrae* spec. nov. from the mountains of S. Colombia and *R. moussoni* spec. nov., which was discovered in the Mousson collection, from N. Colombia. Notes on the other *Rhodea* taxa are added. Figures of the shells of all the known species are also provided.

Key words: Gastropoda, Pulmonata, Subulinidae, Obeliscinae, *Rhodea*, taxonomy, Colombia, Ecuador.

INTRODUCTION

The conspicuous shells of the neotropical subulinid genus *Rhodea* H. & A. Adams, 1855, are known from only a few specimens, deposited in museums worldwide. The first species of the genus was described by Pfeiffer (1846) as *Achatina californica*. It is somewhat similar in shell shape to species of the genus *Columna* Perry, 1811, from São Tomé Island. H. & A. Adams (1855) acknowledged a significant difference from *Columna* and established *Rhodea* as a subgenus of *Columna*. The etymology of the name *Rhodea* is unknown. Later on Dohrn (1875) accepted *Rhodea* as a separate genus, not closely related to the African *Achatina* Swainson, 1840, and *Columna*.

The description of the largest species in the genus, *Rhodea gigantea* Mousson, 1873, with its attractive shape, strongly keeled last whorl and strangely shaped aperture, raised the interest of the late 19th century malacologists. A sinistral species was described by Dohrn (1875a), two other species by Da Costa (1889), and three more by Jousseaume (1900). Only one description of a new *Rhodea* species was published during the entire twentieth century, i.e. *R. barcrofti* by H. A. Pilsbry, the publication of which appeared few months after his death in January 1958. This was probably the last molluscan species described by this well-known American malacologist, who contributed much to the knowledge of the genus in his Manual of Conchology (1906) by compiling the data on the eight species that were distinguished at that time. For some of the species we prefer to reproduce Pilsbry's descriptions, only adding new data.

Dohrn (1875a) recognized the close relationship of *Rhodea* with *Stenogyra* Shuttleworth, 1854, and *Obeliscus* Beck, 1837. Pilsbry (1906) adopted the same opinion. Recent authors (Parkinson, Hemmen & Groh, 1987; Schileyko, 1999) classify the genus with the Subulinidae Fischer & Crosse, 1877, Obeliscinae Thiele, 1931. Its distribution, which is restricted to NW. South America, suggests that *Rhodea* might represent an element of the ancient Gondwanaland fauna. More material with exact locality data is necessary to achieve a more comprehensive revision of the genus.

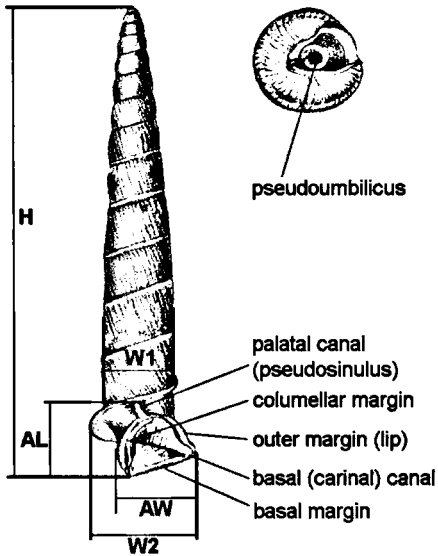


Fig. 1. *Rhodea* shell morphometry (Shell from Pilsbry, 1907: Plate 38, fig 17-18): H, shell height; W1, width of the last body whorl without carina; W2, shell width with the carina; AL, length of the aperture; AW, broadest width of the aperture.

While examining the material from many museums world-wide we found a single specimen from the Mousson collection in the Zoological Museum, Zürich, originating from Ocana in northern Colombia, and labeled as *Rhodea "obtusa"*. It turned out to belong to an undescribed species, which is described herein as *Rhodea moussoni* spec. nov.

Malacological studies in Colombia by native malacologists were scarce during the whole twentieth century. So far only about 3-4 dozen specimens of all *Rhodea* species were deposited in museums worldwide. The material that was collected recently by the third author is therefore very important. It enabled us to describe *Rhodea mariaalejandrae* spec. nov.

MATERIALS AND METHODS

We studied material from the following institutional collections: Academy of Natural Sciences, Philadelphia, USA (ANSP); British Museum (Natural History), London, England (BMNH); Florida Museum of Natural History, Gainesville, USA (FLMNH); Field Museum of Natural History, Chicago, USA (FMNH); Museum of Natural History, Humboldt University, Berlin (HMB); Hungarian Natural History Museum, Budapest (HNHM); Muséum National D'Histoire Naturelle, Paris, France (MNHN); Natal Museum, Durban, South Africa (NMSA); National Natural History Museum Naturalis, Leiden, The Netherlands (NNHM); The Slovak Museum of Nature Protection and Speleology, Liptovský Mikuláš, Slovakia (SMOPa); Zoological Museum, Zürich, Switzerland (ZMZ); Zoological State Collection München, Germany (ZSM). The material in the Senckenberg Museum, Frankfurt, Germany (SMF) was not studied directly, but its morphometric data and localities were provided by Dr. R. Janssen.

Specimens from the following private collections was also studied: Charles J. Geerts, Brussels, Belgium; Jozef Grego (JGB), Banská Bystrica, Slovakia; Christa & Jens Hemmen, Wiesbaden, Germany (CJH); Harry G. Lee, Jacksonville, Florida USA (HGL); Jozef Šteffek, Banská Štiavnica, Slovakia; David Jimenez Pedreno, Spain; Zoltán Peter Eröss, Budapest, Hungary.

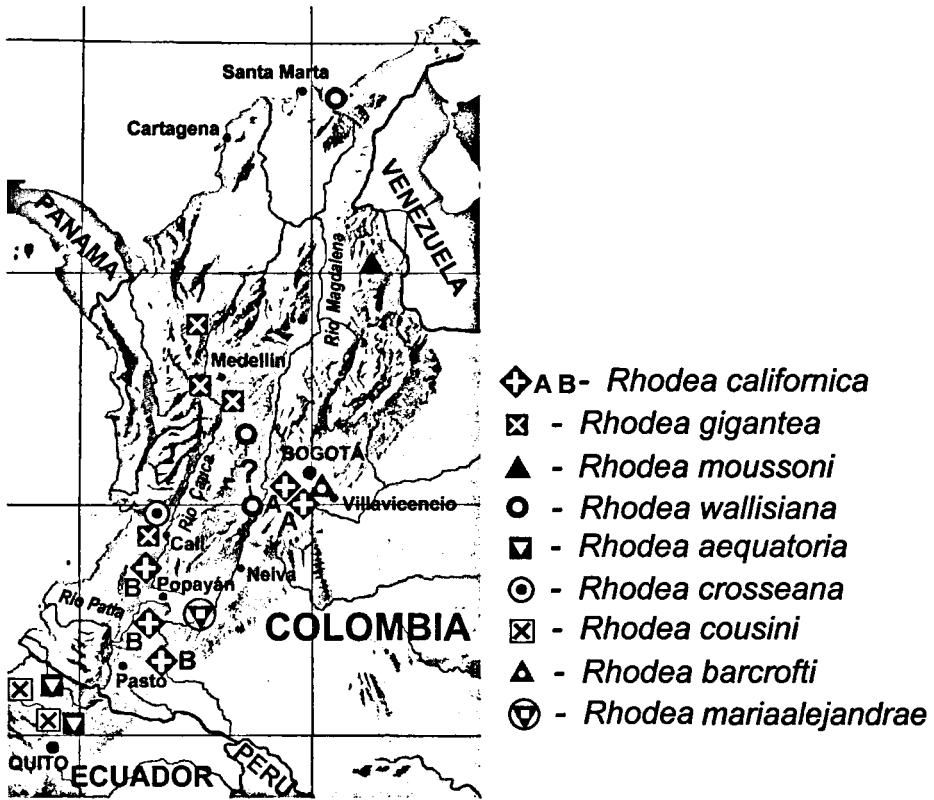


Fig. 2. Records of *Rhodea californica* form A and B, *R. gigantea*, *R. wallisiana*, *R. crosseana*, *R. aequatoria*, *R. cousini*, *R. barcrofti*, *R. mariaalejandrae* spec. nov., and *R. moussoni* spec. nov.

Abbreviations for measurements (fig. 1): AL, length of aperture from pseudosinulus parallel to shell axis to end of basal lip; AW, broadest width of aperture; H, shell height, i.e. the longest distance of the shell, from protoconch to end of basal lip; W1, width of body whorl without carina; W2, width with carina, i.e. broadest diameter of shell.

The localities on the distribution map were found with the help of Geonames gazetteer (<http://gnswww.nga.mil/geonames/GNS/index.jsp>). The historical name "Neu Granada" refers to a large area with Colombia, Panama, and parts of Ecuador and Venezuela.

SYSTEMATIC PART

Subulinidae

Rhodea H. & A. Adams, 1855.

Type species: *Rhodea californica* (L. Pfeiffer, 1846).

Diagnosis.— Shells very slender, dextral or sinistral, with a cylindrical lower part, which gradually changes into a slowly tapering upper part. Last whorl with a keel, which is very distinct in some species and almost absent in others. Internal axis of the shell gyrate, i.e. ascending with an open spiral. Aperture with a strong columellar fold, usually triangular. Fully grown shells milky white, covered by a yellowish horny, more rarely light milky periostracum that is usually lost on the early whorls.

Measurements: H 20-65 mm, W2 2.3-14 mm.

Anatomy.— Unknown.

Biology.— According to Pilsbry (1906: 235) *Rhodea* is viviparous.

Habitat.— The specimens of *R. mariaalejandrae* spec. nov. were found alive among low vegetation around a rice plantation by Alan Pierre Infante. We have no data about the habitat of the other species.

Distribution.— Known from the Andean regions of northern Ecuador (N. of Quito), sporadically through the Cordillera Oriental, Cordillera Central and Cordillera Occidental, and in the valleys of the Rio Magdalena and the Rio Cauca up to Sierra Nevada de Santa Marta in northern Colombia and Ocana near the Venezuelan border (fig. 2).

Rhodea californica (L. Pfeiffer, 1846) (figs 3-6)

Achatina californica L. Pfeiffer, 1846: 89 ("Monterey Californiae"; BMNH 1985092/2 syntypes). Reeve, 1849: pl. 20 fig. 115.

Columna (Rhodea) californica; H. & A. Adams, 1855: 135. Binney, 1859: 190, fig. 330.

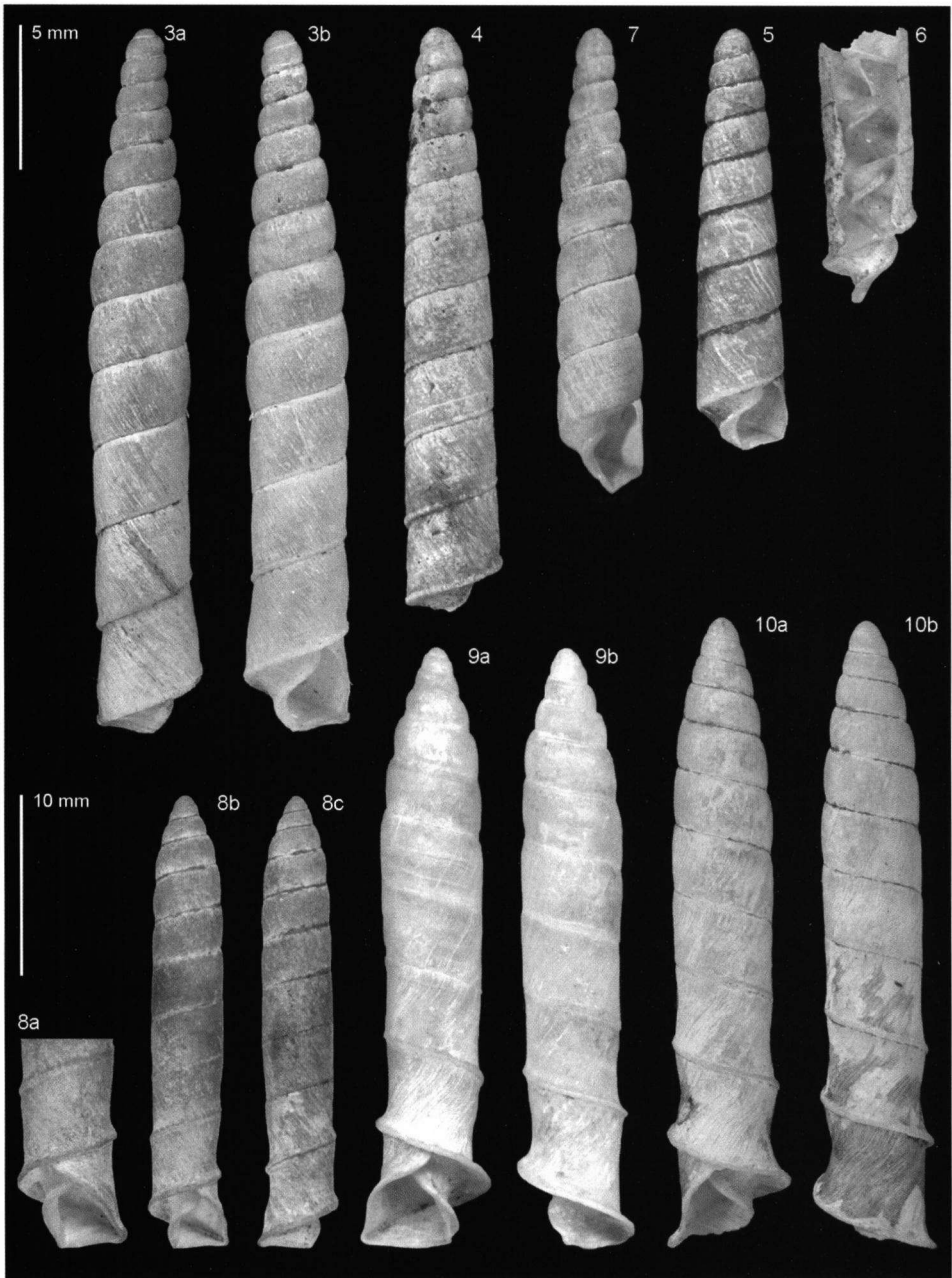
Rhodea californica; Dohrn, 1875: 308. Pilsbry, 1906: 235; 1907: pl. 38 figs 1-6, 10. Shileyko, 1999: 499-500, fig. 644. Zilch, 1959: fig. 1327 (SMF157250/1).

Rhodea pfeifferi Crosse, 1876: 14, pl. 1 fig. 1.

? *Rhodea gereti* Jousseau, 1900: 38, pl. 1 fig. 17 (Colombia; MNHN 4638/holotype; fig. 11). Pilsbry, 1906: 235; 1907: pl. 38 fig 7.

Material studied.— "Monterey California" BMNH 1985092/2 syntypes; ZMZ 217047). Colombia: without further geographic data (ANSP 4345, 78438; BMNH 2176 [ex Cuming]; FMNH 36158 [ex W.F. Webb]; MNHN 4638 / holotype *R. gereti*; SMF96258/2, 296789/1); "New Granada" (SMF296790/4, 296788/2; ZMB 35060 [ex Dohrn]; 103997 [leg. Paetel]; ZMZ 11856; ZSM [ex W. Blume 11530], "*R. pfeifferi*" [ex Friedrich 8314]); "Cauca valley" (SMF157250/1, 296791/3, 203230/1, 296787/3); department Cauca, Quilichao, El Congo (BMNH 1908.6.2.30); department Cauca, Marmato (ZMB 37602 [leg. Hettner]); department Cundinamarca, Lagune near Ubaque, 1700 m alt. (ZMB 37604 [leg. Hettner]); department Putumayo, Mocoa (ZMB 50851 "*R. gracilis*" [leg. Hopke & Deibrich]); "New Granada, Bolgiano", not located; "New Granada" ("*R. pfeifferi*" ZSM [ex Otting]).

locality data, H=16,1 mm, coll. MNHN 4368, photo MNHN, Delphine Brabant. 8, *Rhodea barcrofti* Pilsbry, 1958, holotype, Monteredondo, km 73 from Bogotá to Villavicencio, H=24,9 mm, coll ANSP 211335, photo ANSP, Paul Callomon; 9-10, *Rhodea wallisiana* Dohrn, 1875. 9, Mount of Amazon, Perdida, Santa Marta, Colombia, H=34 mm, coll. & photo Harry G. Lee; 10, "New Granada", H=35,3 mm, coll BMNH 1875122, photo BMNH, Phil Crabb.



Figs 3-10. *Rhodea* spec. 3-6, *Rhodea californica* (L. Pfeiffer, 1846); 3, "form A", syntype 1, "Monterey, California", H=24,0 mm, coll. BMNH 1985092, photo BMNH, Phil Crabb; 4, "form B", Colombia, H=20,0 mm, coll. BMNH acc. 2176, photo BMNH, Phil Crabb; 5, "form B", El Congo, Quilichao, Cauca, Colombia, H=19,3 mm, 19,7 mm and 14,5 mm resp., coll. BMNH 19086230, photo BMNH, Phil Crabb; 6, Colombia, coll. ANSP 78438 section, photo ANSP, Paul Callomon. 7, *Rhodea gereti* Jousseume, 1900, holotype, no

Description (after Pilsbry, 1906: 235).— “Shell subulate, thin, obliquely very closely rugose-striate, waxy-whitish; whorls 12 to 13, the upper ones convex, last 3 or 4 flat, last whorl a little more than one-sixth the total length, acutely carinate at the base, somewhat excavated below the carina; columella arcuate, reaching the base, thickened, subtruncate. Aperture subtetragonal, peristome simple, acute.”

Measurements: H 19.1-26.0 mm, W2 3.0-3.5 mm, AL 3.0-4.0 mm, AW 2.2-2.5 mm. With the number of whorls, the height/width ratio varies considerably.

Discussion.— Shells identified as *Rhodea californica* can be separated into two distinct forms.

1) The northern form (A) (figs 3, 11), to which the syntypes belong, is characterized by a relatively small protoconch, more acuminate apical whorls and a more slender general shape. This form is known from Bogotá and near Ubaque at 1700 m alt., both located in the department of Cundinamarca. This form may be identical with *R. gereti* Jousseume, 1900.

2) The southern form (B) (figs 5, 8, 10) has more cylindrical apical whorls, with a more blunt apex, whereas the shell is slightly broader. This form is known from Mocoa in the department of Putumayo, and from the department of Cauca: Marmato and El Congo, Quilichao.

Form B might represent a new species or subspecies, but without more exact locality and anatomical data a description as such would be premature. The variability in the number of whorls, shape, and height/width ratio, as well as the vast geographical separation of the localities that are known also suggests the presence of more species or subspecies than are recognized at present.

Because of the fact that the type locality was thought to be erroneous, i.e. “Monterey, Californiae”, Crosse (1876) corrected the misleading epithet and renamed the species as *R. pfeifferi*. It is possible however, that the type locality name refers to one of the 31 sites in Colombia with the name “California” in combination with the frequently used local name (for a farm, hacienda, or hill) “Monterei” in its near vicinity. Pilsbry (1907: pl. 38 figs 4-6) described the growth stages of the shell as forms resembling *Leptinaria* Beck, 1837, *Subulina* Beck, 1837, and *Obeliscus* Beck, 1837, finally forming the characteristic aperture of *Rhodea*.

Rhodea gereti Jousseume, 1900, is provisionally considered a junior synonym of *R. californica*. It is known from Colombia, without further locality data, after only a single specimen with an incomplete outer lip and no distinctive carina, and is very similar to juvenile shells of the form A (see above) of *R. californica*.

Rhodea gigantea Mousson, 1873 (figs 11-14, 20)

Rhodea gigantea Mousson, 1873: 15 (“Bogota”; ZMZ 11855/2 syntypes). Pfeiffer, 1875: 119-120, figs 10-11. Kobelt, 1875: 222, pl. 6 fig. 5 (SMF 227708/1). Crosse, 1876: 18, pl. 1 fig. 2. Pilsbry, 1906: 235; 1907: pl. 38 figs 17-19. Parkinson et al., 1987: 27, fig. 18.

Material studied.— No locality data (BMNH 1822/3 “*maxima*”; JGS). Colombia: without further geographic data (BMNH 1907.11.15.40; ANSP189393; CJH; SMF296784/1; NNHM; RMNH; ZMB Moll.103263 [ex Dunker]; FMNH 416; FMNH 36151; ANSP 189393; ZSM [ex W. Blume 8764]); “Neu Granada” (ZMZ 1185; BMNH 1875.1.2.1; BMNH 1824; ZMB 103258 [leg. Paetel]; ZMB 22632 [leg. Wessel]; SMF296785/1; ZSM [leg. Wallis; ex Otting 1902]); Bogotá - doubtful location (ZMZ 11855/2 syntypes [leg. G. Wallis]; BMNH 2178); Cordillera Occidental (NHMB); department Antioquia, Frontino NW. of Medellín

(SMF26529/1, 296786/2; ZMB 68923 [leg. Friedel]); department Antioquia, Sonsón SE. of Medellín, lower part of Rio Cauca basin, 1000 m alt. (SMF227708/1; ZSM); department Valle de Cauca, 3 km W. of Atuncela, 1500 m alt. (FLMNH UF36126 [leg. F.G. Thompson]); department Cauca, Popayán (ZSM [leg.1966; ex coll. Friedrich]). Brasil: uncertain locality (BMNH 1761).

Description.— Shell imperforate, lower 2-4 whorls cylindrical and following ones gradually tapering, obliquely and narrowly striated; surface dull, with an easily loosening, corneous gray cuticle. Spire slowly tapering; the apex rather obtuse, nucleus hyaline. Whorls 14, the initial ones glossy, moderately convex and separated by an indented suture; the following whorls more flattened and separated by a suture which may be accompanied by a thread-like ridge. Last whorl with conspicuously concave sides, encircled by a very prominent, erect, acute keel, and a second keel around the umbilical region. Aperture at 40° with the columellar axis, measuring one seventh of the shell height, triangular, with one angle at the periphery, the third angle at the subvertical, twisted, truncate columella. Peristome rather obtuse, narrowly expanded, somewhat reflexed; the oblique upper right margin straight, apart from a concave part near the carina; the basal margin straight and nearly horizontal, joining the columella at 50°; columellar margin narrowly reflexed.

Measurements: H 53.0–64.5 mm, W2 10.0–14.0 mm.

Discussion.— This is the best-known species of the genus. It is characterized by the largest shells, with a very distinctly keeled last whorl. The specimens collected during the 19th century are often vaguely labeled as from “New Granada” or Bogotá. Bogotá is quite distant from the other, reliable records, and separated by high mountain ridges and deep broad valleys. We therefore consider that record as most probably incorrect.

Rhodea wallisiana Dohrn, 1875 (figs 9-10, 15)

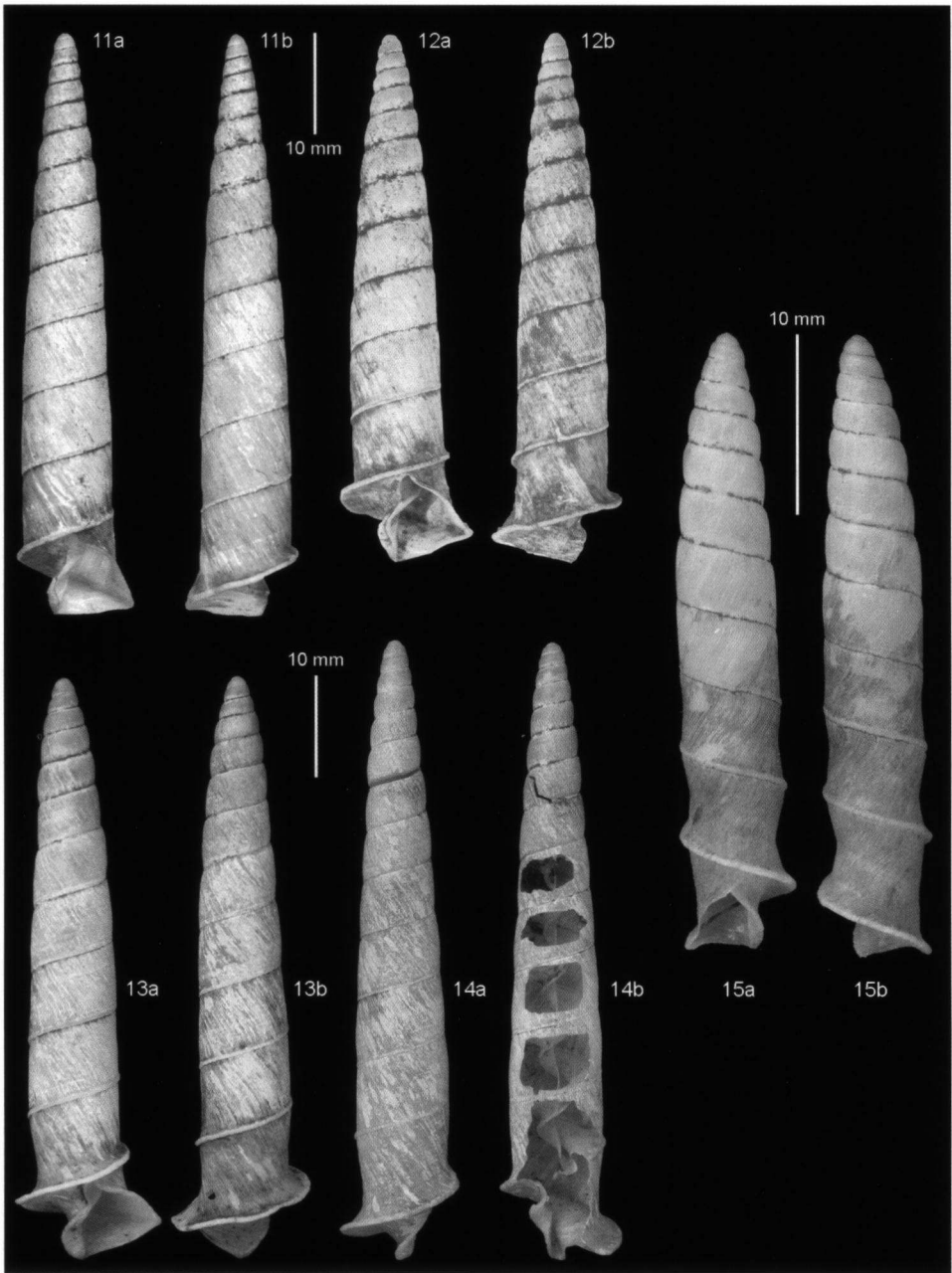
Rhodea wallisiana Dohrn, 1875a: 57, 58 (“Neugranada”, “in parte superiore vallis Magdalenae”; type series lost with the Dohrn collection). Dohrn, 1875b; 307, pl. 10 figs 7-8. Crosse, 1876; 21, pl. 1 fig. 3. Pilsbry, 1906: 236; 1907: pl. 38 figs 11-13, 15.

Material studied.— No locality data (BMNH Acc. 1822). Columbia: without further geographic data (BMNH 2176; ZMB 103979 [ex Dunker]); Bogotá (ZMB 27056 [ex Dämel]; ZMB 103146 [ex Paetel]); “New Granada” (BMNH 1875.1.2.2; ZMB 25131/maybe a syntype [ex Dohrn]; ZMB103146 [ex Paetel]; ZSM [ex F.von Heimburg]); department Antioquia, Frontino NW. of Medellín (ZMZ 217046); department Magdalena, Mount of Amazon, Perdida at N. side of Sierra Nevada de Santa Marta (HGL).

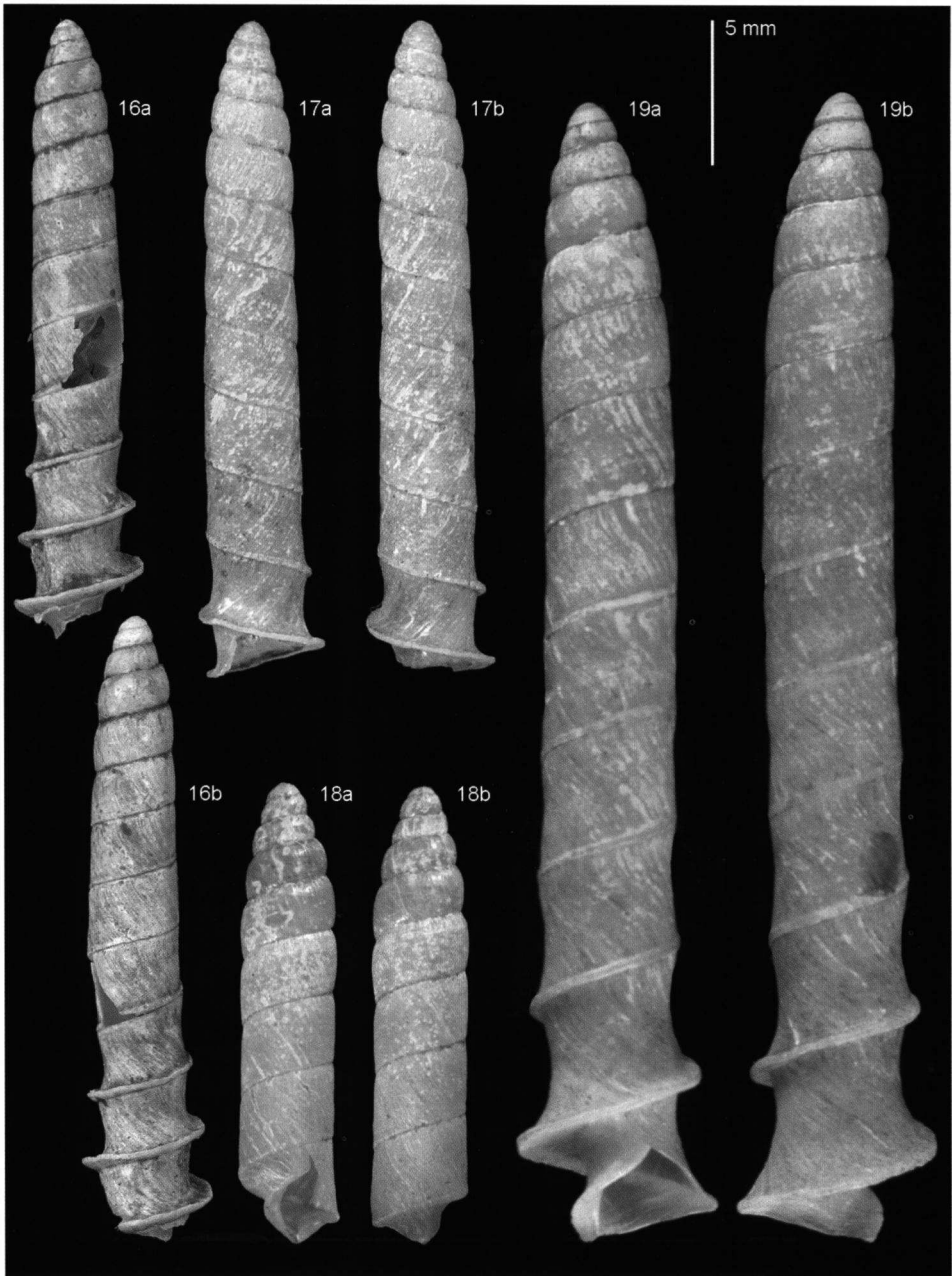
Description (after Pilsbry, 1906: 236-237).— “Shell sinistral, cylindric-turrite, thin, closely obliquely rugose-striate, chalky under a pale corneous deciduous cuticle without much gloss. Whorls 11 to 12, the upper a little convex, the middle ones flat, the last two concave in the middle, separated by an acute projecting carina; the base of the last whorl is excavated around the thread-like, nearly straight, much protracted and basally truncate columella; margin of the peristome arcuate; columella encircled with a wide lamina.”

Measurements.— H 34.0–37.2 mm, W2 5.8–6.4 mm; AL 5.0–5.5 mm, AW 4.0–5.0 mm.

Discussion.— The type locality is located in the upper part of the Magdalena region. One of the specimens (ZMZ 217046) is from Frontino, which is the name of both a remote city in the Magdalena valley and a river in the department Caldas in the upper Magdalena valley. Specimens that were recently found in Perdida (fig. 19), in the northern part of the Sierra Nevada de Santa Marta, more than 900 km from the type locality, are almost iden-



Figs 11-15. *Rhodea* spec. 11-14, *Rhodea gigantea* Mousson, 1873; 11, Colombia, H=62 mm, coll. ANSP189393, photo ANSP, Paul Callomon; 12, syntype 2, "Bogota", Colombia, H=53 mm, coll. ZMZ 11855, photo ZMZ, Juerg Stauffer; 13, "New Granada", H=60,0 mm, coll. BMNH. 1875121, photo BMNH, Phil Crabb; 14, "Colombia", coll. BMNH 1907111540, photo BMNH, Phil Crabb. 15, *Rhodea wallisiana* Dohrn, 1875, "Columbia, H=35,3 mm, coll. BMNH acc. 2176, photo BMNH, Phil Crabb.



Figs 16-19. *Rhodea* spec. 16-18, *Rhodea aequatoria* Da Costa, 1899; 16, lectotype, Paramba, Ecuador, H=21,8 mm, BMNH 19071121144/1, photo BMNH, Phil Crabb; 17, paralectotype, locality as 16, H=2,5 mm, BMNH 19071121144/2, photo BMNH, Phil Crabb; 18, holotype of *Rhodea equatorensis* Jousseume, 1900, Ecuador, H=15,5 mm, MNHN 4637, photo MNHN, Delphine Brabant. 19, *Rhodea cousini* Jousseume, 1900, holotype, Guallabamba, Ecuador, H=40,4 mm, MNHN 4636, photo MNHN, Delphine Brabant.

tical to *R. wallisiana*, differing slightly in only the shape of the outer lip and the apex.

Most type specimens were probably lost in Szczecin, together with the Dohrn collection during WW II, but a shell in ZMB (25131, ex Dohrn collection) could be a syntype.

Rhodea aequatoria Da Costa, 1899 (figs 16-17)

Rhodea aequatoria Da Costa, 1899: 304, figs 3-4 (NW. Ecuador, Imbabura province, Paramba; BMNH 1907.11.21.144/1-2/lectotype, here designated [fig. 24] and paralectotype [fig. 25] of *R. aequatoria*). Pilsbry, 1906: 239; 1907: pl. 38 fig. 13.

? *Rhodea equatorensis* Jousseaume, 1900:37 pl.1 fig.17, (NW. Ecuador, Pichincha province, Los Puentos near Quito; MNHN 4637/holotype [fig. 26]). Pilsbry, 1906: 239; 1907: pl.38 fig.8.

Rhodea aequatorica Sykes, 1901: 20.

Description (after Pilsbry, 1906: 239).— “Shell elongate, cylindric, dextral”, “dirty whitish, more or less covered with a buff cuticle. Spire cylindric, gradually tapering above, rather obtuse at the summit. Whorls 13, the upper 5 a little convex, the following 6 flat, the last two concave, carinate at the periphery, radially striate below the angle, flat.” “Columella arcuate, spirally revolving, forming a hollow umbilicus.”

Measurements.— Lectotype: H 21.8 mm, W1 3.1 mm, W2 4.4 mm; paralectotype: H 22.5 mm, W1 3.3 mm, W2 4.2 mm.

Discussion.— This species was described after only two syntypes (one dextral and one sinistral) with juvenile or broken apertures. These shells might not even be conspecific. Therefore, we decided to designate a lectotype here. The lectotype is the dextral shell (fig. 24; BMNH 1907.11.21.144/1), which was also figured in the original description. It has a more prominent carina than the paralectotype. The lectotype has a subtetragonal hole in the 9th whorl. The sinistral paralectotype (fig.25; BMNH 1907.11.21.144/2) has a less conspicuous keel on the last three whorls and a finely striated surface. It could represent a different species.

The holotype of *R. equatorensis* Jousseaume, 1900, is a relatively small (H 15.5 mm, W2 4.2 mm) juvenile shell, resembling a not fully grown specimen of *R. aequatoria*. It has a weak keel and a subtetragonal aperture. For the moment being, since also the type localities are not far apart, *R. equatorensis* is considered a junior synonym of *R. aequatoria*.

Rhodea crosseana Da Costa, 1899 (fig. 22)

Rhodea crosseana Da Costa, 1899: 305, fig. 5 (see material studied; BMNH 1896.2.1.4/holotype); Pilsbry, 1906: 237; 1907: pl. 38 fig. 9.

Material studied.— Colombia: department Valle de Cauca, Río Dagua valley, western side of the Cordillera Occidental, NW of Cali (BMNH 1896.2.1.4. [leg.W.F.H. Rosenberg] holotype).

Description (after Pilsbry, 1906: 237).— “Shell cylindric, slowly narrowing towards the apex, subpellucid, corneous. Whorls 13, the upper 3 or 4 smooth, convex, the following 2 or 3 convex, the rest nearly flat, obliquely delicately and closely striate, separated by an oblique suture which is carinate in the last few whorls; last whorl acutely carinated, deeply excavated below the carina. Aperture irregularly quadrate, bicanalicate; columella spirally twisted, ascending within, forming an umbilicus penetrating nearly to the apex; lip thin, angular in the middle, channelled, concave below.”

Measurements.— Holotype: H 30.0 mm, W2 5.0 mm.

Discussion.— A poorly known species, its shell without a prominent carina around the last whorl. The only known specimen is subadult and its aperture is broken.

Rhodea cousini Jousseau, 1900 (fig. 19)

Rhodea cousini Jousseau, 1900: 36, pl. 1 fig.15 (NW. Ecuador, Pichincha province, Río Guailabamba; MNHN 4636/holotype); Pilsbry, 1906: 238; 1907: pl. 38 fig.16.

Material studied.— NW Ecuador: Pichincha prov., Río Guailabamba, (MNHN MOLL 4636 holotype [leg. Cousin]).

Description (after Pilsbry, 1906: 238).— “Shell narrowly and very deeply umbilicate, worm shaped, collared anteriorly with an acute spiral keel, rather thin, corneous buff, obliquely wavy striate, the apex smooth, obtusely conoid. Whorls 14, the first a little convex, the following ones flat, the rest excavated, parted by a straight carina at the suture, this carina median on the last whorl, which is excavated below it. Aperture suboblique, triangular, margin simple, columella thickened, arcuate, reaching to the base, forming a channel with the base margin.”

Measurements.— Holotype: H 40.4 mm, W1 5.0 mm, W2 7.0 mm, AL 5.0 mm, AW 4.0 mm.

Discussion.— The shell has a distinct keel. It is similar in general shell shape to the geographically close *R. aequatoria* Da Costa, 1899, but much larger, and its keel is more prominent.

Rhodea barcrofti Pilsbry, 1958 (fig. 8)

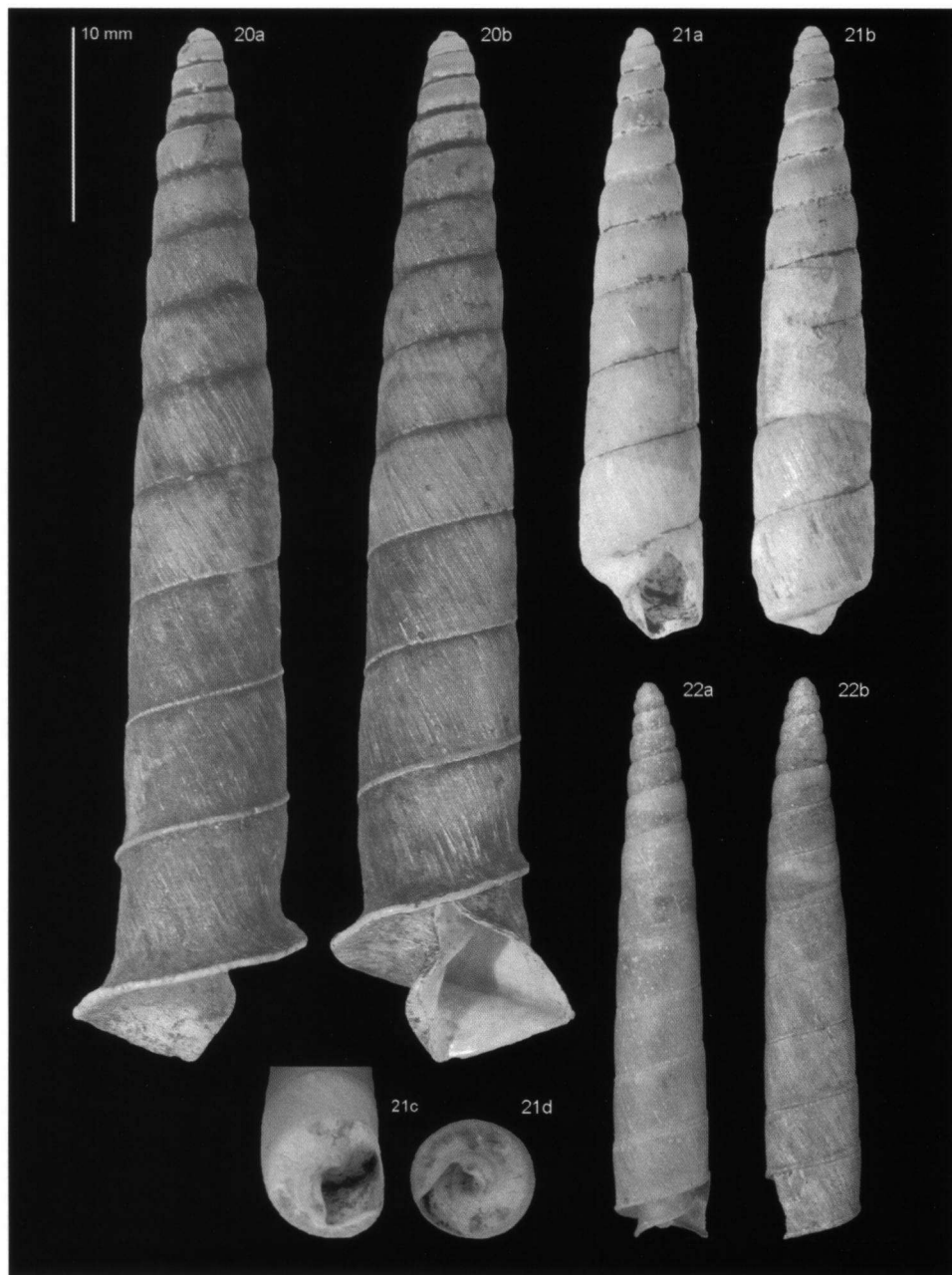
Rhodea barcrofti Pilsbry, 1958: 83, pl. 9 figs 3-4 (see material studied; ANSP 211335/holotype)

Material studied.— Colombia: department Cudimamarca, Monteredondo, 73 km from Bogotá to Villavicencio, 1700 m alt. (ANSP 211335/holotype and paratype [leg. Medem]); SMF 16414/2, 181287/2; FMNH 216063).

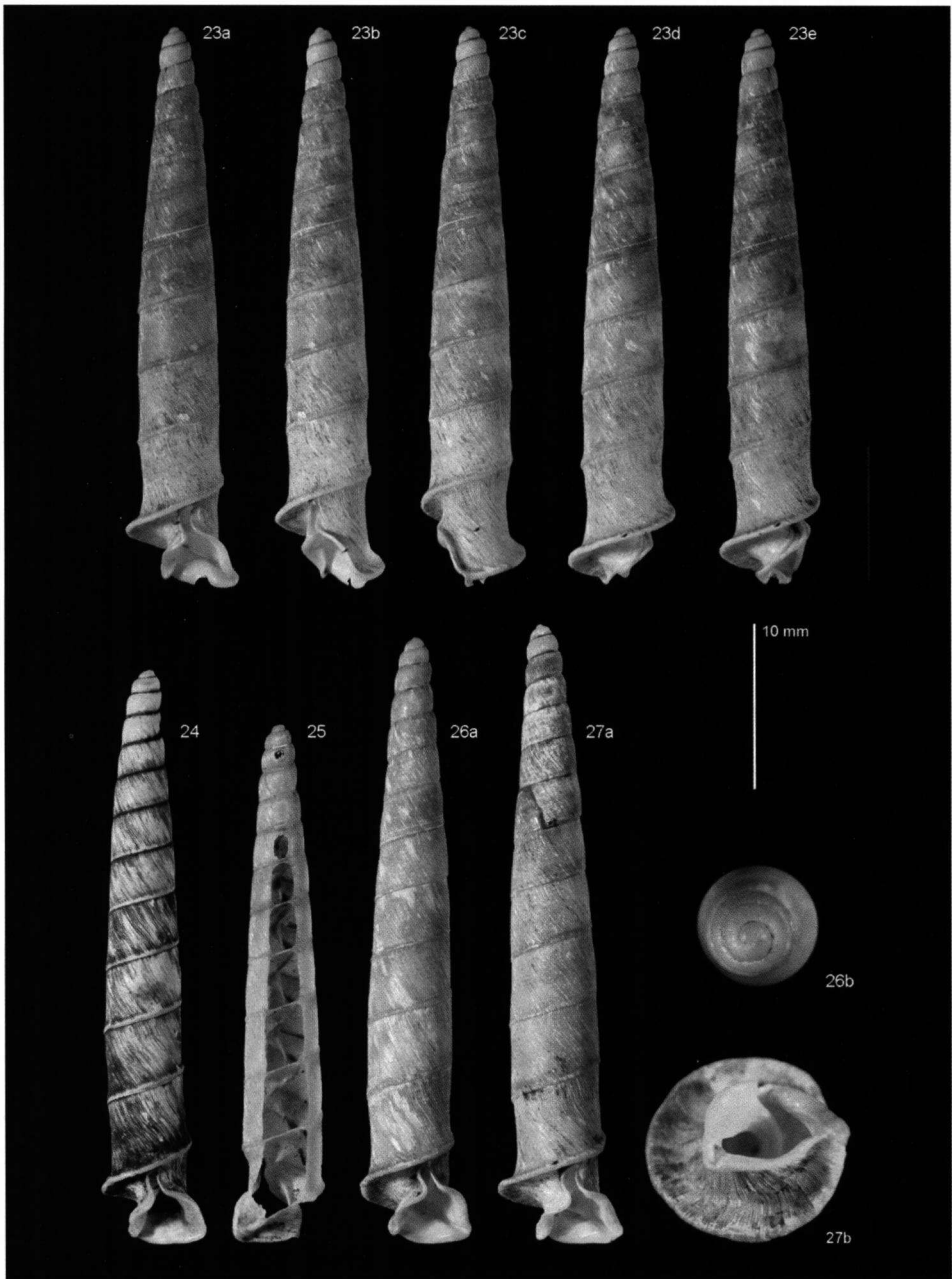
Description (after Pilsbry, 1958: 83-84).— “The shell is dextral, cylindrical, the apical fourth tapering to a rather obtuse summit. The tapering whorls are moderately convex; the last five whorls are flat, the last whorl with a projecting peripheral keel, concave above it and deeply concave at the base. Sculpture of close, strongly oblique, straight, fine striae, remaining distinct on the last few whorls only. The aperture is strongly oblique, subtriangular, the basal margin straight, outer margin curved slightly forward, inner margin formed of a strong spiral callous ridge, truncate at the columellar base and spirally ascending the axis within, coiling around a small but distinct central cavity which viewed from the base forms a sort of false umbilicus.”

Measurements.— H 22.0-28.0 mm, W2 3.6-4.1 mm. Holotype, H 25.0 mm, W2 4.0 mm; paratype, H 22.0 mm and W2 3.7 mm.

Discussions.— The species is most similar to *R. wallisiana*, differing mainly by being dextral, smaller and less prominently keeled.



Figs 20-22. *Rhodea* spec. 20, *Rhodea gigantea* Mousson, 1873, syntype 1, "Bogota, Colombia", H=56mm, coll. ZMZ 11855, photo ZMZ, Juerg Stauffer. 21, *Rhodea moussoni* spec. nov., holotype, Ocana, Colombia, H=33,5 mm, coll. ZMZ, photo ZMZ, Juerg Stauffer. 22, *Rhodea crosseana* Da Costa, 1899, holotype, Rio Dagua valley, Colombia, H=30,0 mm, BMNH 1896214, photo BMNH, Phil Crabb.



Figs 23-27. *Rhodea mariaealejandrae* spec. nov., Colombia, department Huila, Timaná, 1°58'56"N / 75°56'54"E, 1011 m alt., photo Dušan Slivka and Jozef Grego. 23, holotype, H=34,2 mm, coll BMNH 20050248; 24, paratype 8, H=35,7 mm, coll. NNHM 102246; 25, paratype 5, H=31,6 mm, section, coll. JGB L1285/3; 26, paratype 4, H=35,8 mm, coll. JGB L1285/2 (35c-d, enlarged); 27, paratype 3, H=36,9 mm, coll. JGB L1285/1 (36c-d enlarged).

Rhodea mariaalejandrae spec. nov. (figs 23-27)

Material (holotype and paratypes, all from the type locality).— Colombia, department Huila, Timaná, 1° 58' 56" N 75° 56' 54" E, 1000 m alt. (ANSP 413201, BMNH 20050248/holotype, 20050248, FLMNH-UF 378848, FMNH 308164, HNHM 95830, MNHN 5526, NMSA, NNHM 102.246, SMOPAJ 12 251, ZMZ 574510, ZSM Mol 20070672-3).

Diagnosis.— Shell with a prominent keel at the last whorl, a broad pseudombilicus, a basally reflexed apertural lip, and a prominent columellar fold forming a denticle in front.

Description.— Shell dextral, turrid-cylindrical (more turrid in the apical half and more cylindrical in the apertural half), with 13 tapering teleoconch whorls. The protoconch whorls and the initial teleoconch whorls are convex, while the central whorls are flat and the last two ones concave; with a distinctly projecting peripheral keel, which is deeply concave at the base. Sculptured with close, fine, evenly obliquely spaced, undulate striae over the entire surface. Aperture oblique subtriangular; its columellar margin sinuous, with a distinct callous fold, forming a very distinct tooth-like denticle in front. Outer lip distinctly curved upward, forming a very conspicuous sinulus with the columellar margin (similar to the sinulus in Clausiliidae); sinulus curved to the right. Basal margin callous, reflexed downward, with a weak callous bump near the basal, carinal canal. Columella spirally ascending within the aperture, coiling around a relatively large central cavity (when viewed from the base), thus forming a kind of pseudombilicus, while the true umbilicus of the shell is closed.

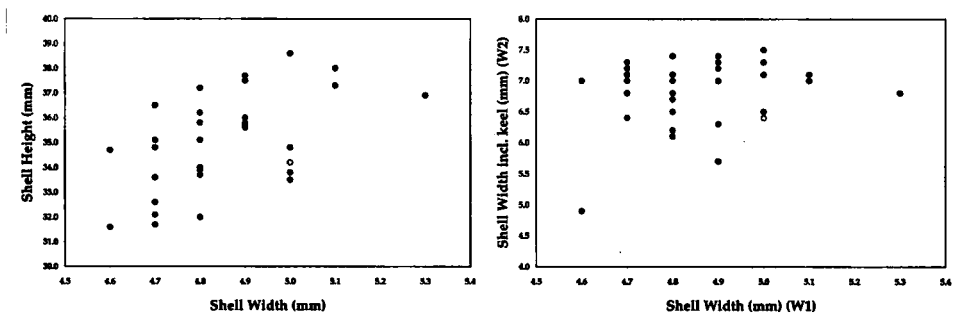
Shell ivory white, covered by a yellowish-brown, horny, seldom light milky periostracum that is usually lost on the early whorls when the specimens become fully grown.

Measurements (in mm) of holotype (= Ht) and paratypes: H, 31.6-37.7 mm; W1, 4.6-5.3 mm; W2, 4.9-7.4 mm; AL 4.5-5.6 mm; AW 4.7-5.3 mm.

Habitat.— The specimens of *R. mariaalejandrae* spec. nov. were found alive in a low vegetation around a rice plantation.

Distribution.— Only known from the type locality.

Discussion.— *Rhodea mariaalejandrae* spec. nov. resembles *R. gigantea* Mousson, 1873, in shell shape, but differs significantly by being smaller and by having a markedly different aperture. In *R. mariaalejandrae* spec. nov. the columellar side of the aperture differs, especially its part forming the conspicuous sinulus and distinct, tooth-like denticle. The



Figs 28-29. type series measurements (mm). Open dot holotype, closed dots paratypes. 28, shell height (H) vs. shell width (W1); 29, shell width (W1) vs. shell width including carina.

broader, marginal lamella of the pseudoubilicus with its different connection to the columellar peristome, and the much more reflexed basal lip of the aperture, are also diagnostic. The new species also reminds of the juvenile shell of *R. crosseana* Da Costa, 1899, from the Río Dagua valley, but the two species can be separated by the different protoconch, the shape of the upper whorls, and the striae which are coarser and more undulating in *R. mariaalejandrae* spec. nov. Furthermore, a vast geographical distance with the high mountain ridges of the Cordillera Central, the Cordillera Occidental and the deep valley of the Río Cauca separate the localities of both species. The other members of the genus are more different and can thus be easily distinguished from *R. mariaalejandrae* spec. nov.

Etymology.— The new species is named after María Alejandra Infante from Bogotá, Colombia, daughter of the junior author, who discovered the first specimens and supplied the type material.

Rhodea moussoni spec. nov. (fig. 21)

Material.— Colombia, department Norte de Santander, Ocaña (ZMZ 210839/holotype).

Diagnosis.— Shell with less corrugated striae and very narrow pseudoubilicus.

Description.— Shell dextral, milky white, with a yellowish periostracum, which is present at only a few places; measuring 33.7 mm in height and 6.3 mm in width, with 11 tapering teleoconch whorls. The protoconch whorls and the initial 7 teleoconch whorls are rather convex, whereas the final four 4 are more flat. The entire surface is sculptured with close, very fine, evenly spaced striae. Aperture subtetragonal; the columellar margin sinuous, angled, with a distinctly curved, and callous fold; the fragile outer lip is slightly curved downward. The basal apertural margin is fragile; it is almost vertically connected to the outer lip. Columella spirally ascending, coiling around a very small central cavity and forming a kind of small pseudoubilicus. The apertural callosity and the peripheral keel are not fully developed in the holotype, which might be subadult or slightly damaged.

Measurements: H 33.7 mm, W1 6.3 mm, W2 6.3 mm, AL 4.8mm, AW 4.3 mm.

Distribution.— The species is only known from the type locality .

Discussion.— The shell reminds of subadult specimens of *R. gigantea* Mousson, 1873, but the general shape differs. It is more slender, with a more finely striate surface, and a much narrower pseudoubilicus (the narrowest in the genus). The subadult condition of the single known specimen could be the reason why Mousson has not described this novelty.

The type locality of *R. moussoni*, Ocaña, N. Colombia, is far outside the hitherto known range of *Rhodea*.

Etymology.— The new species is named in honour of Albert Mousson (1805-1890), a Swiss malacologist, who contributed significantly to the knowledge of the genus *Rhodea*.

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