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Deep-water Mangeliinae, Taraninae and Clathurellinae (Mollusca: Gastropoda: Conoidea: Turridae) from the Campos Basin, southeast Brazil

RAQUEL MEDEIROS ANDRADE FIGUEIRA and RICARDO SILVA ABSALÃO

Departamento de Zoologia, Instituto de Biologia, Centro de Ciências da Saúde, Universidade Federal do Rio de Janeiro, Ilha do Fundão, 21941-590 Rio de Janeiro, Rio de Janeiro, Brazil. E-mail: raquel@ffigueira.net

SUMMARY: During the program "Environmental Characterization of the Campos Basin, RJ, Brazil", from 2001 to 2003, samples were taken of soft bottoms from the continental slope of Campos Basin (off southeast Brazil) by the Research Vessel "Astro-Garoupa" with a 0.25 m^2 box corer or by dredging with a Charcot dredge; 117 stations with depths from 700 to 1950 m were sampled. There were molluscs in all samples, and among Gastropoda the Turridae showed the highest diversity. Here we present the results obtained for the subfamilies Mangeliinae, Taraninae and Clathurellinae. Two species were found within Mangeliinae: *Benthomangelia* cf. *macra* (Watson, 1881) and *Benthomangelia enceladus* n. sp. Within Taraninae only one undescribed species was found: *Taranis tanata* n. sp. Within Clathurellinae we found four species: *Corinnaeturris leucomata* (Dall, 1881), recorded for the first time in the South Atlantic; *Corinnaeturris rhysa* (Watson, 1881), extending its described depth range; *Corinnaeturris angularis* n. sp., *Typhlomangelia nivalis* (Lovén, 1846), expanding its known distribution farther south; and *Drilliola pulchella* (Verrill, 1880). The type material of *Drilliola loprestiana* (Calcara, 1841), previously considered lost, has been located and is illustrated here. *Drilliola crispata* (Cristofori and Jan, 1832) is considered to be a *nomen dubium*.

Keywords: deep-water, Conoidea, *Benthomangelia*, *Taranis*, *Corinnaeturris*, *Typhlomangelia*, *Drilliola,* southwestern Atlantic.

RESUMEN: Mangeliinae, Taraninae y Clathurellinae (Mollusca: Gastropoda: Conoidea: Turridae) de aguas profundas de la cuenca de Campos, sudeste de Brasil. – Se estudiaron muestras de sustratos sedimentarios procedentes de 117 estaciones del talud continental de cuenca de Campos (sudeste de Brasil), obtenidas entre los años 2001 y 2003 por el Buque de Investigación Astro-Garoupa, con un "box-corer" de 0.25 m^2 o con draga de Charcot a profundidades comprendidas entre 700 y 1950 m. Los moluscos estuvieron presentes en todas las estaciones y, entre los gasterópodos, la familia Turridae presentó la máxima diversidad. Se presentan aquí los resultados correspondientes a las subfamilias Mangeliinae, Taraninae and Clathurellinae. Se encontraron dos especies pertenecientes a la subfamilia Mangeliinae: *Benthomangelia* cf. *macra* (Watson, 1881) y *Benthomangelia enceladus* n. sp., que se describe como nueva para la ciencia. Otra de las especies encontradas pertenece a la subfamilia Taraninae: *Taranis tanata* n. sp., también nueva para la ciencia. Por último, se encontraron cinco especies pertenecientes a la subfamilia Clathurellinae: *Corinnaeturris leucomata* (Dall, 1881), que se cita por primera vez en el Atlántico sur, *Corinnaeturris rhysa* (Watson, 1881), en la cota batimétrica más profunda conocida hasta la fecha, *Corinnaeturris angularis* n. sp., también nueva para la ciencia, *Typhlomangelia nivalis* (Lovén, 1846), extendiendo su rango de distribución conocido hacia el sur, y *Drilliola pulchella* (Verrill, 1880). El material tipo de *Drilliola loprestiana* (Calcara, 1841), que se consideraba perdido, ha sido localizado y se ilustra aquí. El taxón *Drilliola crispata* (Cristofori and Jan, 1832) se considera *nomen dubium*.

Palabras clave: batial, Conoidea, *Benthomangelia*, *Taranis*, *Corinnaeturris*, *Typhlomangelia*, *Drilliola*, Atlántico suroeste.

INTRODUCTION

Turridae Swainson, 1840 (in its traditional sense) is one of the most diverse families of marine gastropods in terms of number of species, with about 10000 recent and fossil species and 700 nominal genera (Bouchet, 1990; Puillandre *et al*., 2008). Turridae is generally seen as one of the most taxonomically disconcerting families, and most of the proposed classifications for it are based entirely on the shell and radula characters (Powell, 1966; Bouchet and Warén, 1980). More recently, Taylor *et al.* (1993) suggested a new classification for the entire Conoidea, with a substantial rearrangement of the taxa, based on characters of the shell, operculum and foregut anatomy. Thus, these authors transferred most of the turrid genera to the family Conidae, and restricted Turridae to only a few genera. Bouchet and Rocroi (2005) followed this taxonomic suggestion. However, Rosenberg (1998) noted several misinterpretations in their analysis and recommended that the more traditional classification should not be abandoned just yet. Recently, Puillandre *et al.* (2008) provided a molecular phylogeny of the "turrids". We prefer to follow Rosenberg and the "traditional" taxonomic arrangement of Turridae until a more definitive taxonomic framework has been established. Figueira and Absalão (in press) presented a historical review of the publications on Brazilian deep water molluscs, but they noted that only Absalão *et al*. (2005) dealt with the Turridae.

The goal of the present study was to revise the Brazilian deep-water Mangeliinae, Taraninae and Clathurellinae from the Campos Basin off the state of Rio de Janeiro, the main oil production region in Brazil. The study is part of a large project on Brazilian deep-water molluscs.

MATERIALS AND METHODS

The molluscs were collected from off the southern coast of Brazil (700-1950 m depth). The sampling stations were in the Bacia de Campos (Campos Basin) and were visited as part of the program "Environmental Characterization of Campos Basin, RJ, Brazil". Samples were obtained by the Research Vessel "Astro-Garoupa" belonging to Petrobras S.A. (a public Brazilian oil company) with a 0.25 m^2 box corer or by dredging with a Charcot dredge. A total of 117 samples were taken in this region. Each sample was washed in running seawater through a mesh of

TABLE 1. – Geographical data for stations sampled with a box-corer. Number of specimens (N) refers to those belonging to the studied genera.

Station	Coordinates	Depth	Date	N	Station	Coordinates	Depth	Date	N
OPI #44	22°10'43"S, 39°54'46"W	750 m	10/12/2002	10	OPII #45	22°10'53"S, 39°52'18"W	1039 m	01/07/2003	13
OPI #45	22°10'54"S, 39°52'19"W	1050 m	10/12/2002	9	OPII #47	22°11'04"S, 39°47'04"W	1654 m	22/06/2003	4
OPI #46	22°10'55"S, 39°49'00"W	1350 m	10/12/2002	5	OPII #48	22°11'16"S, 39°43'44"W	1068 m	22/06/2003	12
OPI #47	22°11'04"S, 39°47'04"W	1650 m	25/11/2002	3	OPII #49	22°04'32"S, 39°54'11"W	722 m	30/06/2003	7
OPI #48	22°11'16"S, 39°43'44"W	1950 m	25/11/2002	8	OPII #50	22°04'33"S, 39°52'05"W	1030 m	30/06/2003	4
OPI #49	22°04'34"S, 39°54'05"W	750 m	24/11/2002	2	OPII #50A	22°02'51"S, 39°52'22"W	1048 m	29/06/2003	6
OPI #50	22°04'33"S, 39°52'04"W	1050 m	24/11/2002	1	OPII #51	22°04'43"S, 39°49'09"W	1299 m	25/06/2003	2
OPI #50A	22°02'50"S, 39°52'24"W	1050 m	14/12/2002	3	OPII #52	22°04'45"S, 39°46'31"W	1643 m	27/06/2003	7
OPI #51	22°04'43"S, 39°49'08"W	1350 m	24/11/2002	1	OPII #53	22°04'45"S, 39°41'58"W	1910 m	27/06/2003	27
OPI #52	22°04'44"S, 39°46'31"W	1650 m	24/11/2002	8	OPII #54	21°57'11"S, 39°56'04"W	698 m	29/06/2003	4
OPI #53	22°04'46"S, 39°43'02"W	1950 m	24/11/2002	9	OPII #56	21°57'15"S, 39°49'37"W	1357 m	25/06/2003	3
OPI #54	21°57'17"S, 39°56'01"W	750 m	12/12/2002	1	OPII #57	21°57'15"S, 39°47'41"W	1587 m	28/06/2003	10
OPI #56	21°57'15"S, 39°49'37"W	1350 m	14/12/2002	1	OPII #58	21°57'26"S, 39°40'34"W	1942 m	27/06/2003	8
OPI #57	21°57'15"S, 39°47'43"W	1650 m	14/12/2002	2	OPII #59	21°52'59"S, 39°55'32"W	751 m	29/06/2003	12
OPI #58	21°57'26"S, 39°40'33"W	1950 m	11/12/2002	7	OPII #60	21°52'49"S, 39°51'40"W	1055 m	28/06/2003	1
OPI #59	21°52'59"S, 39°55'30"W	800 m	12/12/2002	13	OPII #61	21°52'51"S, 39°48'12"W	1372 m	26/06/2003	23
OPI #60	21°52'50"S, 39°51'42"W	1050 m	12/12/2002	4	OPII #62	21°52'41"S, 39°46'17"W	1688 m	26/06/2003	13
OPI #61	21°52'51"S, 39°48'11"W	1350 m	12/12/2002	14	OPII #63	21°52'43"S, 39°40'41"W	1941 m	26/06/2003	9
OPI #62	21°52'41"S, 39°46'17"W	1650 m	11/12/2002	3	OPII #65	22°40'57"S, 40°16'31"W	1050 m	11/06/2003	1
OPI #63	21°52'44"S, 39°40'45"W	1950 m	11/12/2002	20	OPII #67	22°46'58"S, 40°07'49"W	1596 m	12/06/2003	4
OPI #64	22°36'03"S, 40°21'45"W	750 m	22/11/2002	1	OPII #68	22°48'05"S, 40°06'38"W	1972 m	12/06/2003	14
OPI #68	22°48'05"S, 40°06'38"W	1950 m	15/11/2002	7	OPII #69	22°31'11"S, 40°15'12"W	743 m	18/06/2003	3
OPI #72	22°41'03"S, 40°02'29"W	1650 m	23/11/2002	2	OPII #72	22°41'10"S, 40°02'20"W	1623 m	13/06/2003	5
OPI #73	22°41'35"S, 40°00'45"W	1950 m	22/11/2002	4	OPII #73	22°41'31"S, 40°00'47"W	1906 m	12/06/2003	12
OPI #74	22°27'31"S, 40°09'23"W	750 m	21/11/2002	9	OPII #74	22°27'31"S, 40°09'23"W	749 m	18/06/2003	3
OPI #75	22°31'28"S, 40°03'50"W	1050 m	19/11/2002	7	OPII #75	22°31'28"S, 40°03'49"W	1043 m	18/06/2003	11
OPI #77	22°36'03"S, 39°57'54"W	1650 m	16/11/2002	1	OPII #77	22°36'12"S, 39°58'22"W	1670 m	13/06/2003	4
OPI #78	22°37'02"S, 39°56'20"W	1950 m	23/11/2002	1	OPII #78	22°37'02"S, 39°56'20"W	1945 m	13/06/2003	17
OPI #79	22°19'50"S, 40°00'35"W	775 m	20/11/2002	1	OPII #80	22°24'30"S, 39°57'28"W	1044 m	20/06/2003	1
OPI #80	22°24'31"S, 39°57'28"W	1050 m	20/11/2002	2	OPII #82	22°28'46"S, 39°53'27"W	1621 m	17/06/2003	2
OPI #82	22°28'49"S, 39°53'24"W	1650 m	17/11/2002	4	OPII #83	22°30'34"S, 39°51'44"W	1970 m	16/06/2003	4
OPI #83	22°30'35"S, 39°51'45"W	1950 m	23/11/2002	4	OPII #84	22°26'28"S, 39°58'53"W	1046 m	20/06/2003	2
OPI #84	22°26'27"S, 39°58'51"W	1050 m	20/11/2002	1	OPII #86	22°31'37"S, 39°55'14"W	1630 m	16/06/2003	5
OPI #85	22°29'33"S, 39°56'17"W	1350 m	19/11/2002	3	OPII #87	22°33'08"S, 39°54'21"W	1934 m	15/06/2003	7
OPI #86	22°31'36"S, 39°55'15"W	1650 m	16/11/2002	2	B #32	22°38'01"S, 40°17'26"W	900 m	18/05/2002	5
OPI #87	22°33'10"S, 39°54'22"W	1950 m	23/11/2002	4	B #36	22°37'54"S, 40°13'36"W	1000 m	19/05/2002	1
OPII #44	22°10'43"S, 39°54'45"W	750 m	01/07/2003	2	B #38	22°41'18"S, 40°14'05"W	1100 m	15/05/2002	1

TABLE 2. – Geographical data for stations sampled with a Charcot dredge. Nº specimens refers to those belonging to the studied genera.

Sample	Coordinates	depth	date	No. specimens
OPI #1	22°45'S, 40°10'W - 22°42'S, 40°07'W	1322 m - 1326 m	10/02/2003	1
OPI # 2	22°30'S, 40°00'W - 22°28'S, 39°58'W	1122 m - 1147 m	08/02/2003	3
OPI #5	22°27'S, 39°54'W - 22°24'S, 39°52'W	1320 m - 1299 m	08/02/2003	3
OPI # 8	22°48'S, 40°15'W - 22°47'S, 40°13'W	1324 m - 1321 m	11/02/2003	1
OPI #11	22°11'S, 39°49'W - 22°09'S, 39°48'W	1334 m - 1327 m	12/02/2003	1
OPI #13	21°53'S, 39°51'W - 21°50'S, 39°52'W	1120 m - 1060 m	14/02/2003	2
OPI #16	22°15'S, 39°53'W - 22°12'S, 39°52'W	1071 m - 1250 m	13/02/2003	3 (1 live)
OPI #18	22°16'S, 39°47'W - 22°13'S, 39°47'W	1628 m - 1622 m	12/02/2003	1
OPII #1	22°41'S, 40°07'W - 22°44'S, 40°10'W	1318 m - 1305 m	27/08/2003	1
OPII #3	22°32'S, 39°56'W - 22°35'S, 39°57'W	1605 m - 1605 m	27/08/2003	1
OPII #8	22°49'S, 40°16'W - 22°47'S, 40°13'W	1305 m - 1303 m	28/08/2003	1
OPII #9	22°39'S, 40°01'W - 22°41'S, 40°02'W	1605 m - 1602 m	27/08/2003	1
OPII #10	22°11'S, 39°51'W - 22°08'S, 39°51'W	1157 m - 1128 m	22/08/2003	2
OPII #11	22°11'S, 39°49'W - 22°08'S, 39°48'W	1332 m - 1325 m	22/08/2003	5 (1 live)
OPII #12-1	22°12'S, 39°47'W - 22°08'S, 39°46'W	1532 m - 1640 m	24/08/2003	1
OPII #13-1	21°53'S, 39°51'W - 21°47'S, 39°52'W	1064 m - 1114 m	20/08/2003	15 (1 live)
OPII #13-2	21°53'S, 39°51'W - 21°49'S, 39°52'W	1077 m - 1082 m	20/08/2003	7
OPII # 14	21°50'S, 39°48'W - 21°47'S, 39°50'W	1360 m - 1346 m	21/08/2003	3
OPII #15	21°50'S, 39°47'W - 21°46'S, 39°48'W	1664 m - 1577 m	21/08/2003	2
OPII #16	22°16'S, 39°53'W - 22°13'S, 39°52'W	1059 m - 1110 m	22/08/2003	31 (7 live)
OPII #17-1	22°15'S, 39°51'W - 22°12'S, 39°49'W	1332 m - 1300 m	23/08/2003	5
OPII # 17-2	22°16'S, 39°51'W - 22°12'S, 39°49'W	1332 m - 1264 m	24/08/2003	2
OPII #18-2	22°15'S, 39°47'W - 22°12'S, 39°47'W	1620 m - 1618 m	23/08/2003	1

300 μm, and the residue placed in 70% ethanol. In the laboratory, this residue was sorted under magnification and the turrid gastropods picked out. The analysis was based only on shell characters, since most of the material obtained consisted of empty shells. Types were not examined when the original illustration (and/or description) was enough to identify the taxon. The number of protoconch whorls was counted according to the method described by Bouchet and Kantor (2004). All material is deposited in the Molluscan Collection of the Departamento de Zoologia, Instituto de Biologia of the Universidade Federal do Rio de Janeiro (IBUFRJ). Additional paratypes of the new species described were sent to the following institutions: Museu de Zoologia da Universidade de São Paulo (MZSP) in São Paulo, Brazil, Museu Nacional (MNRJ) in Rio de Janeiro, Brazil, Muséum National d'Histoire Naturelle (MNHN) in Paris, France, and Museum of Comparative Zoology (MCZ) of the Harvard University, Massachusetts, United States.

Locations and data of the sampling stations are shown in Tables 1 and 2.

RESULTS

Family TURRIDAE Swainson, 1840
Subfamily MANGELIINAE Fischer, 1887
Genus *Benthomangelia* Thiele, 1925

Type species: *Surcula trophonoidea* Schepman, 1913, by original designation.

Benthomangelia* cf. *macra (Watson, 1881)
(Fig. 1A, B, C)

Pleurotoma (Mangelia) macra Watson, 1881: 437; Watson (1886: 345, pl. XXIII, Fig. 6 a-c).
Mangilia macra: Dautzenberg (1889: 27).
Pleurotoma macra: Dautzenberg and Fischer (1906: 12).
Pleurotoma (*Pleurotomella*) *macra*: Dautzenberg (1927: 57, pl. II, Fig. 5).
Benthomangelia macra: Bouchet and Warén (1980: 46, Fig. 104-105, 212-213); Rios (1994: 173, pl. 57, Fig. 792; 2009: 338, species 870).

Type material: BMNH 1887.2.9.1068, Challenger sta 78, off San Miguel, Azores (37º26'N, 25º13'W, 1828.8 m).

Material examined: Type material and 18179 [4] OPI #45; 18177 [2] OPI #47; 18175 [6] OPI #48; 18188 [5] OPI #52; 18186 [3] OPI #53; 18184 [1] OPI #56; 18183 [2] OPI #57; 18181 [1] OPI #58; 18197 [5] OPI #61; 18195 [2] OPI #62; 18193 [13] OPI #63; 17593 [4] OPI #68; 18207 [1] OPI #72; 18205 [2] OPI #73; 18203 [6] OPI #75; 18201 [1] OPI #77; 18199 [1] OPI #78; 18215 [2] OPI #82; 18214 [3] OPI #83; 18212 [1] OPI #85; 18211 [1] OPI #86; 18209 [4] OPI #87; 18178 [2] OPII #45; 18176 [3] OPII #47; 18174 [9] OPII #48; 18190 [2] OPII #50; 18189 [3] OPII #50A; 18187 [5] OPII #52; 18185 [17] OPII #53; 18182 [7] OPII #57; 18180 [3] OPII #58; 18196 [9] OPII #61; 18194 [5] OPII #62; 18192 [4] OPII #63; 18191 [12] OPII #68; 18206 [4] OPII #72; 18204 [8] OPII #73; 18202 [11] OPII #75; 18200 [4] OPII #77; 18198 [9] OPII #78; 18216 [1] OPII #80; 18213 [4] OPII #83; 18210 [5] OPII #86; 18208 [6] OPII #87; 18219 [2] B #32; 18218 [1] B #36; 18217 [1] B #38.

Description. Shell high, slender, white, reaching 7 mm. Protoconch with 3.5 whorls, light yellow. Protoconch 1 sculptured with 8 zigzagging spiral lines. Protoconch 2 has about 24 curved axial riblets that do not touch the lower edge; there are tiny, straight axial riblets of intercalary lengths originating from the lower edge. Clear-cut proto-teleoconch boundary. Teleoconch with strongly angled whorls, sculptured by 14-18 sharp equidistant axial ribs (on the 3rd whorl) forming pointed nodules on the shoulder of the whorls; on the last whorl these ribs extend slightly over the base but do not reach the inner lip. There are about 25 spiral threads on the body whorl, from the whorl shoulder to the base, very faint on the whorl and becoming stronger toward the base. Shell surface covered by very

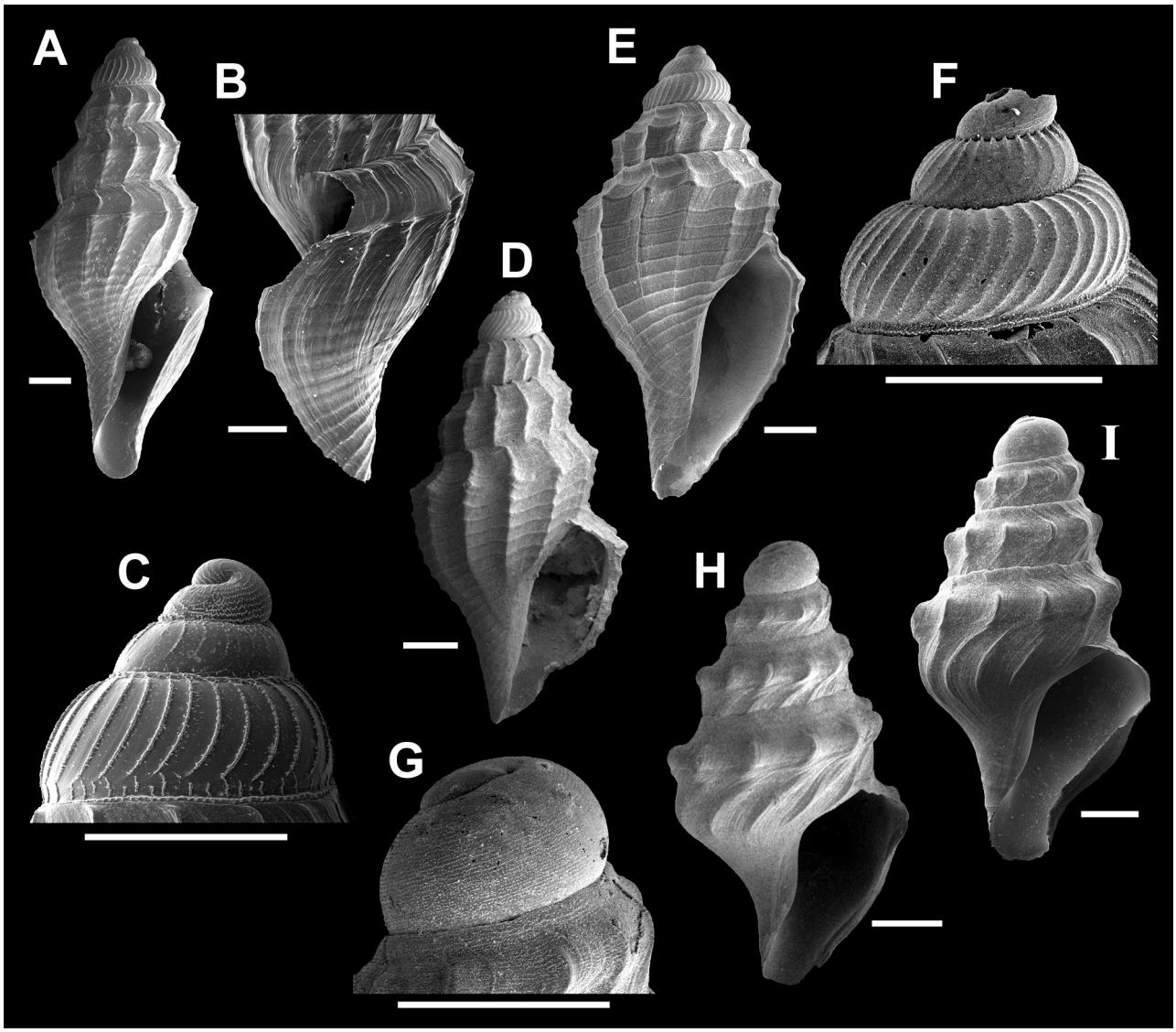

FIG. 1. – A-C, *Benthomangelia cf. macra* (Watson, 1881): A, IBUFRJ 18204, 5.36 mm, whole shell; B, IBUFRJ 18191, 5.84 mm, labial sinus; C, IBUFRJ 18174, 3.52 mm, protoconch. D-F, *B. enceladus* n.sp.: D, holotype, IBUFRJ 18233, 4.6 mm, whole shell; E, paratype, MCZ 362498, 4.26 mm, whole shell; F, paratype, IBUFRJ 18363, 2.26 mm, protoconch. G-I, *Taranis tanata* n.sp.: G, H, holotype, IBUFRJ 18341, 3.78 mm; G, protoconch; H, whole shell; I, paratype, MZSP 90709, 4.08 mm, whole shell. Scale bars = 500 μm.

fine growth scars. There is a strong subsutural spiral cord-like collar. Suture shallow. Labial sinus broad and shallow. Siphonal canal wide and long. Aperture narrowly ovate.

Geographical distribution. Southwest Atlantic: Rio Grande do Sul, south Brazil (Rios, 1994); Campos Basin, southeast Brazil (this paper). Northeast Atlantic: Azores (Watson, 1886); Morocco (Dautzenberg and Fischer, 1906); Azores and Morocco (Dautzenberg, 1927); Bay of Biscay, Portugal, Morocco, Azores, Côte d'Ivoire (Bouchet and Warén, 1980). From 72 m (Rios, 1994) to 2165 m (Dautzenberg and Fischer, 1906).

Remarks. The genus *Benthomangelia* was created by Thiele (1925) as a subgenus of *Mangelia* Risso, 1826. The type species *Benthomangelia trophonoidea* is characterized by the teleoconch with angled profile, numerous axial ribs, and weak spiral sculpturing, but *Mangelia* is defined by the more reticulated sculpturing, the spiral striation on the last portion of the protoconch and the possible presence of teeth on the aperture. *Benthomangelia* has the same general shape as *Kurtziella* Dall, 1918, *Granoturris* Fargo, 1953 and *Cryoturris* Woodring, 1928, and similar sculpturing on the teleoconch, but it is unique in having a smooth surface. *Kurtziella cerina* (Kurtz and Stimpson, 1851), *G. padolina* Fargo, 1953 and *C. engonia* Woodring, 1928 have grainy surfaces that give them a "frosted" appearance. This trait is particularly well developed in *Cryoturris*, which has rather prominent granules. The protoconch of *Kurtziella* also has axial ribs crossed by

3-4 spiral threads, and that of *Granoturris* has a few weak axial riblets on the last turn followed by a weak submedian peripheral keel preceding the sculpture of the shell; whereas both *Cryoturris* and *Benthomangelia* have a protoconch with many curved axial riblets and no keel.

Our material has shown some consistent deviations from typical *B. macra* that led us to use the name *Benthomangelia cf. macra.* In our specimens, the region between the suture and the shoulder has only a subsutural ribbon, whereas according to the original illustration of *B. macra* (Watson, 1886: pl. XXIII, Fig. 6), it should be ornamented with spiral threads. The axial ribs are low, oblique and sinuous in *B. macra* but raised and arched in *Benthomangelia cf. macra*. *Benthomangelia macra* (Bouchet and Warén, 1980: 95, Figs. 212-213) has long arched ribs on the protoconch, whereas *B. cf. macra* has curved ribs that do not reach the anterior suture and tiny straight axial riblets on the anterior portion of the whorls.

Two other species of *Benthomangelia* are known to occur in the western Atlantic (Rosenberg, 2009): *B. antonia* (Dall, 1881) and *B. bandella* (Dall, 1881). *Benthomangelia antonia* was described by Dall in 1881, and has only ever been illustrated by Dall (1889: pl. X, Fig. 4 and pl. XI, Fig. 11). Subsequently in 1890, Dall (pl. V, Fig 11) illustrated an ordinary specimen that he believed to be an adult *B. antonia*. Abbott (1974: 279, Fig. 3188) reproduced this supposed specimen of *B. antonia*. We do not agree with this identification because the spire angles in the two figures are quite different (40º in the type specimen illustrated in 1889 by Dall, and 25º in the ordinary specimen); furthermore, the specimen illustrated in 1890 has two strong spiral cords per whorl, creating a clathrate sculpture, but no spiral cords are shown in the illustration of the type specimen. In our opinion, the specimen illustrated by Dall (1890) is an unnamed species, and we will compare it with *Benthomangelia cf. macra* as well.

Benthomangelia cf. macra can be separated from *B. antonia* (Dall, 1881) (illustrated in Dall, 1889: pl. X, Fig. 4 and pl. XI, Fig. 11) by its more slender profile, much fainter spiral sculpture, and more prominent nodules on the middle keel. *Benthomangelia cf. macra* is distinguished from *Benthomangelia* sp. (named *B. antonia* by Dall, 1890: 363, pl. V, Fig. 11) by the absence of any clathrate sculpture. *Benthomangelia cf. macra* can be distinguished from *B. bandella* (Dall, 1881; illustrated by Dall, 1889: pl. X, Fig. 3) by its more slender shape, the much less pronounced middle keel and its widely separated spiral threads.

Gracia *et al*. (2004: 70, Fig. 62) illustrated a specimen identified as *Benthomangelia* sp., which we believe might belong to the same species as our material, though it seems to have stronger spiral ornamentation. Therefore, it would be necessary to observe the material itself before reaching a conclusion on this matter. Bouchet and Warén (1980: 47, Fig. 108) illustrated an adult of *B. decapitata* Bouchet and Warén, 1980 which is also similar to *B.* cf. *macra*, however in *B.* cf. *macra* the spiral threads on the body whorl are fainter, the shoulder is less pronounced and the region between the suture and the shoulder has only a subsutural ribbon, whereas *B. decapitata* has a subsutural nodulose spiral cord and 3-4 spiral threads.

Benthomangelia enceladus n. sp.
(Fig. 1D, E, F)

Type material. Holotype IBUFRJ 18223 [1] OPII # 50A (22°02’51”S, 39°52’22”W), 4.6 mm, 1048 m. Paratype IBUFRJ 18363 [1] OPII # 45 (22°10’53”S, 39°52’18”W), 2.26 mm, 1039 m. Paratype MCZ 362498 [1] OPII # 84 (22°26’28”S, 39°58’53”W), 4.26 mm, 1046 m. Paratype MZSP 90703 [1] OPI # 50 (22°04’33”S, 39°52’04”W), 4.9 mm, 1050 m. Paratype MNRJ 13551 [1] OPII # 50A (22°02’51”S, 39°52’22”W), 4.38 mm, 1048 m. Paratype MNHN [1] OPII # 84 (22°26’28”S, 39°58’53”W), 5.64 mm, 1046 m.

Type locality. 22°02’51” S, 39°52’22” W, Campos Basin, southeast Brazil, southwestern Atlantic, 1048 m.

Material examined. Type material and 18220 [3] OPI #45; 18222 [3] OPI #50A; 18224 [4] OPI #60; 18226 [4] OPI #61; 18229 [2] OPI #80; 18230 [1] OPI #84; 18232 [1] OPI #85; 16966 [5] OPII #45; 18221 [1] OPII #50A; 18225 [1] OPII #60; 18227 [3] OPII #61; 18228 [1] OPII #74; 18233 [1] B #32.

Description. Shell short, plump, white, reaching 5.64 mm. Protoconch with 3.5 whorls, light yellow. Protoconch 1 ornamented with irregular spiral cords. Protoconch 2 with curved axial riblets extending from the upper edge of the whorl to just above the lower edge; these riblets are at first thin and numerous, and then become broader, more spaced and less numerous on the last whorl. The anterior region of the second and third whorls has a granulation, more spread out on the last half whorl of the protoconch. Proto-teleoconch boundary clear-cut. Teleoconch with strongly angled whorls, sculptured by about 14 strong dominant orthocline axial ribs that extend on the body whorl over the base towards the inner lip. Spiral sculpture consists of several equidistant spiral threads of fairly equal strength that continue at the base. There are 3-4 faint threads above the whorl shoulder and 3-4 conspicuous threads below it. On the intersections with the axial ribs there are small rounded nodules, except for the nodules on the shoulder of the whorl, which are more prominent. Very light growth scars over the entire shell. Suture shallow. Base with about 15 evenly spaced spiral threads. Labial sinus shallow. Siphonal canal short. Aperture narrowly ovate.

Etymology. This name is in honour of the moon of Saturn of the same name.

Geographic distribution. Only known from Campos Basin, off Rio de Janeiro, 749 to 1350 m.

Remarks. *Benthomangelia enceladus* n. sp. differs from *B. cf. macra* because its shape and the aperture are wider, the spiral cords are stronger, the siphonal canal is shorter, it has fewer and coarser axial ribs on

the teleoconch and the axial riblets of the protoconch are more curved than those of *B. cf. macra*. In addition, *B. enceladus* n. sp. does not have the subsutural ribbon on the teleoconch or the suprasutural cord on the protoconch that are present in *B. cf. macra*. *Benthomangelia enceladus* n. sp. differs from *B. bandella* in that the axial riblets on the protoconch are much thinner and closer together, the axial ribs on the teleoconch reach the fasciolar region, the aperture is larger and the spiral cords are fewer and more spaced. *Benthomangelia enceladus* n. sp. can be distinguished from *B. antonia* by its fewer spiral cords on the teleoconch, which form nodules where they cross the axial ribs. In addition, *B. enceladus* n. sp. has 30-36 strongly arched axial ribs on the protoconch and the space between them is about twice the width of a rib, whereas the protoconch of *B. antonia* has about 20 less-arched axial ribs with interspaces of about three times the width of a rib. Furthermore, *B. antonia* has a very evident subsutural angulation that is not observed in our material, and its axial ribs are more sinuous below the keel. *Benthomangelia enceladus* n. sp. can be distinguished from *Benthomangelia* sp. (called *B. antonia* by Dall, 1890: 363, pl. V, Fig. 11) by its spiral threads, which are not strong enough to produce the clathrate sculpture typical of *Benthomangelia* sp.

Our material is quite similar to Figure 107, p. 47 in Bouchet and Warén (1980), identified as a young *B. decapitata* Bouchet and Warén, 1980 by the plump profile and short anterior canal. However, our specimens have fewer axial ribs, fewer spiral threads, more prominent nodules on the intersections of the axial ribs and spiral threads, no subsutural cord and, finally, the shoulder on *B. enceladus* n. sp. is not as close to the posterior suture (about 1/3 of the length of the whorl) as in *B. decapitata* (about ¼).

Subfamily Taraninae Casey, 1904
Genus *Taranis* Jeffreys, 1870

Type species. *Trophon moerchi* Malm, 1863 by monotypy

Taranis tanata n. sp.
(Fig. 1G, H, I)

Type material. Holotype IBUFRJ 18341 [1] OPII # 87 (22°33'08"S, 39°54'21"W), 3.78 mm, 1934m. Paratype MNRJ 13557 [2] OPI # 63 (21°52'44"S, 39°40'45"W), 3.18 mm and 4.02 mm, 1950m. Paratype MZSP 90709 [1] OPII # 53 (22°04'45"S, 39°41'58"W), 4.08 mm, 1910m. Paratype MCZ 362499 [2] OPII # 62 (21°52'41"S, 39°46'17"W), 3.38 mm and 3.4 mm, 1688m. Paratype MNHN [2] OPII # 78 (22°37'02"S, 39°56'20"W), 2.4 mm and 3.74 mm, 1945m.

Type locality. 22°33'08" S, 39°54'21" W, Campos Basin, southeast Brazil, southwestern Atlantic, 1934 m.

Material examined. Type material and 18317 [5] OPI #46; 18318 [1] OPI #51; 18319 [3] OPI #52; 18320 [4] OPI #53; 18321 [6] OPI #58; 18322 [3] OPI #61; 18323 [5] OPI #63; 15864 [3] OPI #68; 18324 [1] OPI #72; 18325 [2] OPI #73; 18326 [1] OPI #83; 18327 [1] OPI #85; 16707 [1] OPII #15; 18328 [3] OPII #48; 18329 [2] OPII #51; 18330 [7] OPII #53; 18331 [1] OPII #56; 18332 [3] OPII #57; 18333 [3] OPII #58; 18334 [3] OPII #61; 18335 [6] OPII #62; 18336 [5] OPII #63; 15914 [4] OPII #67; 18337 [1] OPII #72; 18338 [4] OPII #73; 18339 [5] OPII #78; 18340 [2] OPII #82.

Description. Shell short, plump, white, reaching 4.08 mm. Protoconch with 1.5 whorls, white, with tiny granules organized into spiral rows that continue onto the teleoconch. Clear-cut protoconch-teleoconch transition. Teleoconch whorls with a subsutural band forming a "collar", followed by a concave region leading to the whorl shoulder. Spiral sculpture on the teleoconch consists of a thick and prominent ribbon on the whorl shoulder ornamented with about 14 spoon-shaped elevations. Axial sculpture consists of 14 opisthocline ribs intercalated by many weaker opisthocline threads that cover the interspaces. Suture shallow. Base short, strongly concave and smooth. Labial sinus very shallow, forming a slight concavity on the shoulder. Inner lip thin, reflected. Outer lip thin. Siphonal canal broad and short. Aperture narrowly ovate.

Etymology. Tanata comes from the Greek Θάνατος, which means "death" and refers to the dead specimens.

Geographic distribution. Only known from Campos Basin, off Rio de Janeiro, 1068 to 1950 m.

Discussion. The genus *Taranis* was proposed by Jeffreys (1870) for shells with an apex similar to that of *Trophon* Montfort, 1810, very short canal, "peculiar sculpture" and lacking an anal sinus or operculum. Conchologically, *Taranis* is somewhat similar to the genera *Oenopota* Mörch, 1852 and *Micropleurotoma* Thiele, 1929, as these are characterized by small shells, with strongly middle-angled whorls, short anterior canal and shallow sinuses. However, *Taranis moerchi* can be distinguished by its rather typical protoconch of two whorls with spiral threads or rows of beads and teleoconch with lamellate axial sculpture and microscopic sculpture of minute granules (adapted from Kilburn, 1991 and Powell, 1966). Casey (1904) suggested the tribe Taranini to contain only the genus *Taranis*, mentioning that "the very broad shallow anal sinus situated on the periphery and not on or near the suture" was the most important feature separating this group from the other tribes. Kantor and Sysoev (1989) elevated Casey's tribe Taranini to subfamily status, based on the absence of the radula and the reduction of several features of foregut anatomy. This classification has been used, although reluctantly, by other authors (Kilburn, 1991; Taylor *et al.*, 1993) and we retain it in the present paper. Bouchet and Rocroi (2005) placed Taraninae as a synonym of Raphitominae Bellardi, 1875, in spite of several anatomical differences between these groups. As stated by Taylor *et al*. (1993), the very simplified morphology makes the evaluation of the status of the subfamily difficult, and we prefer to keep them provisionally separated.

Four species of *Taranis* are reported for the western Atlantic (Rosenberg, 2009): *T. moerchii* (Malm, 1861),

T. borealis Bouchet and Warén, 1980, *T. leptaleus* (Verrill, 1884) and *T. malmii* (Dall, 1889). Despite having the same general shape and protoconch, *Taranis tanata* n. sp. can be distinguished from *T. moerchii* and *T. borealis* by the absence of spiral threads and the presence of a thick ribbon on the whorl shoulder. *Taranis leptaleus* is similar to *T. tanata* n. sp. in shape and in the absence of spiral threads, but its axial sculpture is much more numerous and it does not have a thick ribbon on the shoulder. *Taranis malmii* is a very different species, both in the teleoconch, which is tall, with a strong subsutural cord and without a marked shoulder, and in the protoconch, which is diagonally cancelled. Kilburn (1991) suggested that *T. malmii* does not fit well into the genus *Taranis* and suggested the genus *Magnella* Dittmer, 1960 as a more appropriate position. We agree with Kilburn's opinion.

Taranis tanata n. sp. is quite similar to *Theta spicea* (Watson, 1881; figured in Watson, 1886: 281, pl. XX, Fig. 4), as both species have dome-shaped protoconchs, plump profiles and sinuous threads forming curved elevations over the whorl shoulder. However, *Taranis tanata* n. sp., besides having the typical *Taranis* micro-sculpture on the protoconch, has a slimmer profile, its aperture is narrower, the axial threads are less numerous and it has a thick ribbon on the whorl shoulder. The dome-shaped protoconch and somewhat plump profile are also present in *Micropleurotoma travailleuri* Bouchet and Warén, 1980 and *M. melvilli* (Sykes, 1906; illustrated in Bouchet and Warén, 1980: Fig. 65), but *T. tanata* can be distinguished by the presence of several sharp opisthocline ribs and the spoon-shaped elevations over the whorl shoulder; while both *M. travailleuri* and *M. melvilli* have rather faint axial ornamentation which forms blunt nodules on the whorl shoulder. *Taranis tanata* also has micro-sculpture on the protoconch, which is absent from the *Micropleurotoma* species, and it is unique in having a thick ribbon on the whorl shoulder.

Subfamily CLATHURELLINAE
H. Adams and A. Adams, 1858
Genus *Corinnaeturris* Bouchet and Warén, 1980

Type species. *Pleurotoma leucomata* Dall, 1881, by original designation.

Corinnaeturris leucomata (Dall, 1881)
(Fig. 2A, B, C)

Pleurotoma (Drillia?) leucomata Dall, 1881: 63.
Pleurotoma (*Mangilia*) *leucomata* Dall (1889: 120, pl. XI, Fig. 13).
Pleurotomella dalli Bush, 1893: 208, pl. II, Fig. 2 and 2a.
Pleurotoma joubini Dautzenberg and Fischer (1906: 11, pl. I, Fig. 5-7).
Pleurotomella leucomata: Abbott (1974: 288, Fig. 3422).
Corinnaeturris leucomata: Bouchet and Warén (1980: 77, Fig. 37, 159, 228).

Type material. USNM 87445, Gulf of Mexico, Blake sta 48, 975 m. (not examined)

Material examined. 18237 [2] OPI #53; 18240 [2] OPI #61; 18241 [3] OPI #74; 18242 [1] OPI #75; 18243 [1] OPI #82; 18244 [1] OPI #86; 16666 [1] OPII #8; 16685 [1] OPII #9; 16680 [2] OPII #10; 16597 [1] OPII #11; 16616 [10] OPII #13-1; 16395 [5] OPII #13-2; 16628 [8] OPII #16; 16581 [1] OPII #16; 16603 [3] OPII #17-1; 16302 [1] OPII #18-2; 18235 [1] OPII #50; 18236 [2] OPII #52; 18238 [2] OPII #56; 18239 [4] OPII #61.

Description. Shell high, slender, light yellow, reaching 23.1 mm. Protoconch with 3 whorls, dark yellow. Protoconch 1 slightly darker and granulose. Protoconch 2 with a spiral keel on its lower portion and a delicately nodulose suprasutural cord. The spiral keel itself is sculptured with tiny slanted riblets, giving it the appearance of a braid. Clear-cut protoconch-teleoconch transition. Teleoconch with about 8 middle-angled whorls. The middle shoulder bears large rounded axially elongated nodules, about 14 on the 7th whorl. The spiral sculpture consists of 6 very thin lines, the upper one right above the shoulder and the others spreading equidistally towards the lower suture. The entire shell surface is covered by axial growth scars and microscopic, spirally arranged granules. Suture shallow. Base convex, inflecting to form the siphonal canal, with about 17-20 spiral lines. Labial sinus deep, curved at the zone between the shoulder and the upper suture. Inner lip whitish and reflected. Outer lip thin. Siphonal canal long and narrow. Aperture elongated.

Geographical distribution. Northwest Atlantic: North Carolina, USA (Bush, 1893); Florida, USA, Gulf of Mexico (Dall, 1889); Gulf of Mexico (Dall, 1881). Southwest Atlantic: Campos Basin, southeast Brazil (this paper). Northeast Atlantic: Bay of Biscay, Morocco, Madeira, Canary Islands, western Sahara, Cape Verde (Bouchet and Warén, 1980); Cape Verde (Dautzenberg and Fischer, 1906). From 660 m (Dautzenberg and Fischer, 1906) to 3530 m (Bouchet and Warén 1980).

Remarks. According to Bouchet and Warén (1980), the genus *Corinnaeturris* differs from all the others in Turridae by the unique combination of a keeled protoconch and a granulose surface on the teleoconch. Both traits are also found in *Glyphostoma* Gabb, 1872 and *Ceritoturris* Dall, 1924, but the inner and outer lips in *C. leucomata* are smooth, unlike *Glyphostoma dentiferum* Gabb, 1872 which has teeth (Gabb, 1872: 270, pl. 11, Fig. 4). *Ceritoturris bittium* Dall, 1924 has a varicoid swelling preceding the outer lip border (Kilburn, 1988: 297, Fig. 275-278) that is absent in *C. leucomata.*

Corinnaeturris leucomata was originally described as a *Pleurotoma* by Dall (1881: 63; illustrated in Dall, 1889: 120, pl. 11, Fig. 13). Subsequently, Dall (1889: 120) transferred it to the genus *Mangelia* Risso, 1826, where it remained until Bouchet and Warén (1980) established the genus *Corinnaeturris* to accommodate *C. leucomata*, at the time the only species of this genus. Our material and that illustrated by Bouchet and Warén (1980: 76, Fig. 159) fit the description and illustration

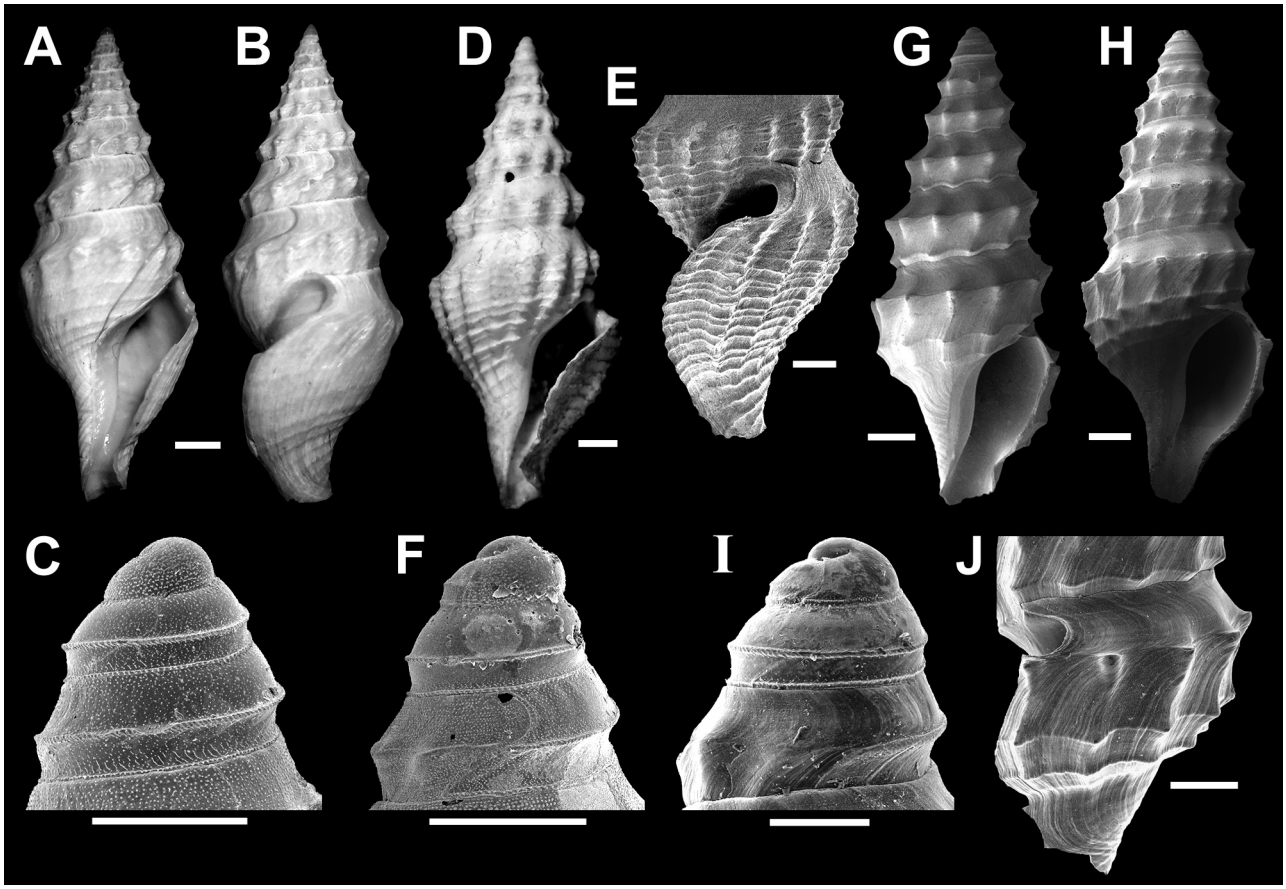

FIG. 2. – A-C, *Corinnaeturris leucomata* (Dall, 1881): A, B, IBUFRJ 16616, 20.9 mm, whole shell; C, IBUFRJ 18236, 2.82 mm, protoconch; D-F, *Corinnaeturris rhysa* (Watson, 1881): D, IBUFRJ 17052, 12.2 mm, whole shell; E, F, IBUFRJ 18234, 14.2 mm; E, labial sinus; F, protoconch; G-J, *Corinnaeturris angularis* n.sp.: G, I, J, Holotype, IBUFRJ 17053, 5.74 mm; G, whole shell; I, protoconch; J, labial sinus; H, paratype, MCZ 362500, 6 mm, whole shell. Scale bars: A, B = 2 mm; D, E = 1 mm; C, F, G, H, I, J = 500 μm.

by Dall well, but Bouchet and Warén's shell is a bit more inflated than ours. We consider this difference too slight to distinguish two species.

Corinnaeturris rhysa (Watson, 1881)
(Fig. 2D, E, F)

Pleurotoma (Raphitoma) rhysa Watson, 1881: 400; Watson (1886: 310-311, pl. XXI, Fig. 2).
Mangelia rhysa: Lange de Morretes (1949: 108).
Kurtziella rhysa: Rios (1994: 174, pl.58, Fig. 802; 2009: 341, species 880).

Type material. BMNH 1887.2.9.1000-1, off Pernambuco, Challenger sta. 122, 09°05'S, 34°50'W, 640 m.

Material examined. The type material and 18234 [1] OPI #44; 17052 [1] OPI #59.

Description. Shell high, slender, white, reaching 14.09 mm. Protoconch with 3 whorls, light yellow, Protoconch 1 granulose. Protoconch 2 with a spiral keel on its lower portion and a delicately nodulose suprasutural cord. The spiral keel itself is sculptured with tiny slanted riblets, giving it the appearance of a braid. Clear-cut protoconch-teleoconch transition. Teleoconch with 7 middle-angled whorls. Sculpture consisting of 18 axial ribs (on the 7th whorl), beginning on the shoulder and extending below it. Spiral sculpture consisting of 5 thin equidistant cordlets that spread from the shoulder to the lower suture. Area between the shoulder and the upper suture smooth. The entire shell surface is covered by growth scars and a rather thick, spirally arranged granulation, thinner at the protoconch and the first whorl of the teleoconch. Suture shallow. Base lightly convex, with slight inflection to form the siphonal canal, with about 17 evenly spaced spiral cords. Labial sinus deep, curved at the zone between the shoulder and upper suture. Inner lip almost straight, reflected over the parietal wall. Outer lip crenulated by spiral ornamentation. Siphonal canal long and narrow. Aperture elongated.

Geographic distribution. Southwest Atlantic: Pernambuco, northeast Brazil (Watson, 1886); – Bahia, Brazil (Absalão *et al*., 2005); West Indies and Brazil, Amapá to Rio de Janeiro (Rios, 2009); Campos Basin, southeast Brazil (this paper). From 27 m (Rios, 1994) to 750 m (this paper).

Remarks. Absalão *et al*. (2005: 30) proposed to transfer *Granoturris rhysa* (according to Rosenberg, 2009) or *Kurtziella rhysa* (according to Rios, 2009) to the genus *Corinnaeturris*, arguing that the protoconch with axial riblets and 3-4 spiral threads typical of *Kurtziella* is not observed in this species, which has a macroscopically smooth protoconch with a spiral keel present from the second whorl. However, *Granoturris* is characterized by a protoconch that may have "a few weak axial riblets on the last turn, followed by a weak submedian peripheral keel" and "the anal sinus shallow or absent" (Fargo, 1953: 394); whereas *C. rhysa* has a deep anal sinus. Moreover, *Granoturris padolina* Fargo, 1953 (Fargo: pl. 23, Figs. 5, 5a), the type species of *Granoturris*, has a spire that is taller than the body whorl and a subcylindrical profile, whereas *C. rhysa* has a spire that is shorter than the body whorl and a biconic profile. Therefore, *Granoturris* proves to be a dubious taxonomic placement for *rhysa*. However, *C. rhysa* fits the characters of *Corinnaeturris* well, and is confirmed in this genus.

Corinnaeturris angularis n. sp.
(Fig. 2G, H, I, J)

Corinnaeturris sp.: Absalão *et al*., 2005: 30, Figs 67, 110.

Type material. Holotype IBUFRJ 17053 OPI # 59 (21°52'59"S, 39°55'30"W), 5.74 mm, 750 m. Paratype MCZ 36500 [1] OPI # 54 (21°57'17"S, 39°56'01"W), 6 mm, 800m. Paratype MZSP 95878 [1] OPII # 49 (22°04'32"S, 39°54'11"W), 6.68 mm, 722 m. Paratype MNRJ 17882 [1] OPII # 54 (21°57'11"S, 39°56'04"W), 5.72 mm, 698 m. Paratype MNHN [2] OPII # 59 (21°52'59"S, 39°55'32"W), 6.28 mm and 6.52 mm, 751 m.

Type locality. 21°57'17"S, 39°56'01"W, Campos Basin, southeast Brazil, southwestern Atlantic, 750 m.

Material examined. The type material and 17172 [7] OPI #44; 15039 [1] OPI #49; 17056 [9] OPI #59; 16092 [1] OPI #64; 15349 [6] OPI #74; 18357 [2] OPII #44; 18358 [4] OPII #45; 18359 [5] OPII #49; 15572 [2] OPII #54; 18360 [10] OPII #59; 15544 [2] OPII #69; 17306 [2] OPII #74; 18362 [1] B #32.

Description. Shell high, slender, white, reaching 6.68 mm. Protoconch with 3 whorls, yellow. Protoconch 1 smooth. Protoconch 2 with a spiral keel on its lower portion and a delicately nodulose suprasutural cord. The spiral keel itself is sculptured with tiny slanted riblets, giving it the appearance of a braid. Very fine granules, sparsely distributed, spread over the area below the spiral keel. Clear-cut protoconch-teleoconch transition. Teleoconch with about 7 middle-angled whorls, sculptured by 16 strong retractive axial ribs (on the 7th whorl), hardly visible between the shoulder and the upper suture. A thin spiral cord appears above the suture from the 3-4th whorl onwards, and pointed nodules are formed where the axial ribs cross both the shoulder and the thin spiral cord. The entire teleoconch surface is covered by microscopic granules, usually spirally arranged. Suture shallow, forming a collar-like structure below it. Base concave, inflecting to form the siphonal canal, with two nodulose spiral cords on the upper part and smooth below, the upper spiral cord stronger. Labial sinus deep, curved at the zone between the shoulder and upper suture. Inner lip delicate. Siphonal canal wide and of medium length. Aperture elongated.

Etymology. The name *angularis* is derived from "angled" and refers to the angle formed by the projection of the pointed nodules.

Geographic distribution. Southwest Atlantic: Espírito Santo, southeast Brazil (Absalão *et al.*, 2005); Campos Basin, southeast Brazil (this paper). From 500 m (Absalão *et al.*, 2005) to 1039 m (this paper).

Remarks. *Corinnaeturris angularis* n. sp. can be distinguished from *C. leucomata* and *C. rhysa* by its bi-angled whorls, absence of spiral ornamentation on the spire, and the base ornamented with only two spiral cords. In addition, *C. angularis* n. sp. is unique in having pointed nodules where the axial ribs cross both the shoulder and the thin spiral cord below it.

Genus *Typhlomangelia* G. O. Sars, 1878

Type species. *Pleurotoma nivale* Lovén, 1846 by monotypy

Typhlomangelia nivalis (Lovén, 1846)
(Fig. 3A, B, C, D)

Pleurotoma nivale Lovén, 1846: 146.
Typhlomangelia nivalis: Sars (1878: 241, pl. 17, Fig. 6); Bouchet and Warén (1980: 27, Fig. 74-76, 200); Absalão *et al.* (2005: 25, Fig. 25).
Pleurotoma (*Typhlomangilia*) *nivalis*: Dautzenberg (1927: 37).
Suavodrillia (*Typhlomangelia*) *nivalis*: Abbott (1974: 274).

Type material. Bergen, Norway, in Swedish Museum of Natural History (not examined).

Material examined. 16727 [1] OPI #1; 16393 [3] OPI #2; 16730 [3] OPI #5; 16478 [1] OPI #8; 16734 [1] OPI #11; 16403 [2] OPI #13; 16692 [2, 1 live] OPI #16; 16471 [1] OPI #18; 16391 [1] OPII #1; 16621 [1] OPII #3; 16568 [3, 1 live] OPII #11; 16614 [1] OPII #12-1; 16567 [4, 1 live] OPII #13-1; 16629 [2] OPII #13-2; 16400 [3] OPII #14; 16672 [1] OPII #15; 16550 [15, 7 live] OPII #16; 16570 [2] OPII #17-1; 16674 [2] OPII #17-2.

Description. Shell high, turrited, slender, whitish, reaching 33.2 mm. Protoconch with 1.5 dark-yellow whorls covered with a corrugated surface. Clear-cut protoconch-teleoconch transition. Teleoconch whorls weakly shouldered in the middle, with a slightly concave region between the suture and the shoulder. Whorls sculptured with 16 low sinoidal ribs, forming large blunt axially elongated nodes as they cross the shoulder. The ribs spread over the base, vanishing towards the inner lip. There are additional, numerous, very fine sinuous axial lines and 18 nearly equidistant spiral threads. The spiral threads overlie the fine axial lines. Suture moderately shallow. Base entirely covered by spiral threads. Inner lip reflected. Outer lip thin. Labial sinus broad and shallow. Siphonal canal wide and short. Aperture ovate.

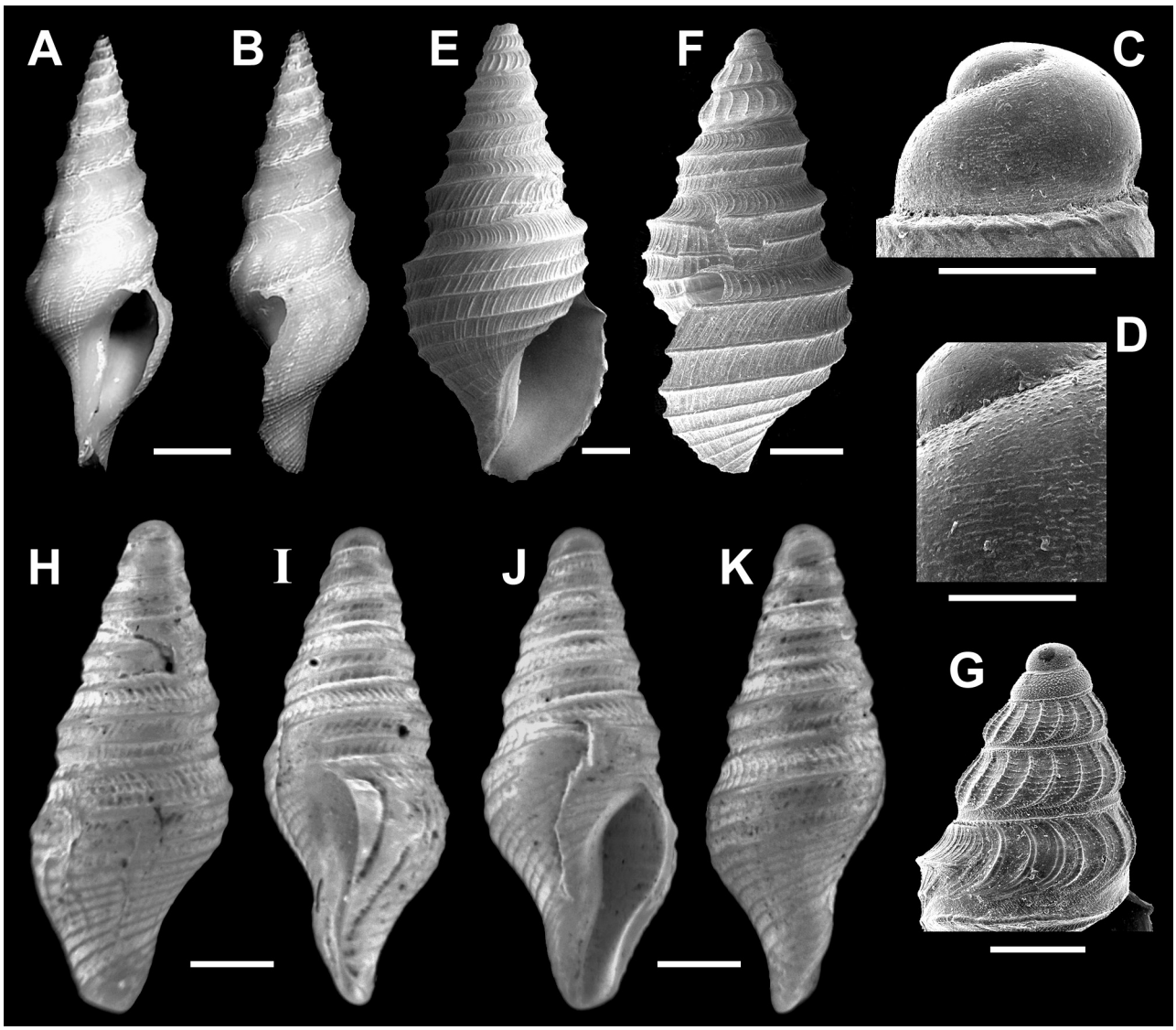

FIG. 3. – A-D, *Typhlomangelia nivalis* (Lovén, 1846): A, B, IBUFRJ 18299, 19.72 mm, whole shell; C, D, IBUFRJ 16629, 19.04 mm, protoconch. E-G, *Drilliola pulchella* (Verrill, 1880); E, IBUFRJ 18355, 5.36 mm, whole shell; F, IBUFRJ 18355, 3.54 mm, whole shell; G, IBUFRJ 18400, 2.28 mm, protoconch. H-K, holotype *Drilliola loprestiana* (Calcara, 1841), MAL-1930, photo courtesy of Museo di Zoologia 'P. Doderlein', Palermo University. Scale bars: A, B = 2 mm; C, E, F, G = 500 μm; D = 200 μm; H, I, J, K = 100 μm.

Geographical distribution. Southwest Atlantic: Espírito Santo, southeast Brazil (Absalão *et al.*, 2005), Campos Basin, Southeast Brazil (this paper). Northeast Atlantic: Norway (Lovén, 1846; Sars, 1878); Iceland, Scandinavia, Shetland, Bay of Biscay, Portugal, Azores, Madeira, Cape Verde (Bouchet and Warén, 1980); Spain (Dautzenberg, 1927). From 100 m to 3056 m (Bouchet and Warén, 1980).

Discussion. Sars (1878) described the genus *Typhlomangelia* based on the absence of eyes, the radula and on the "peculiar" sculpture. According to him, *Typhlomangelia* shells are elongate conical, with a nodulose middle angulation, a short anterior canal and a distinct labial sinus. Powell (1966) added to this description a smooth protoconch with obscure axials over the last half whorl, a teleoconch sculpture of flexuous axials and dense spiral lirae, and a deep anal sinus on the shoulder slope. The shells of the species of this genus could be misidentified as *Leucosyrinx* Dall, 1889. The type species *L. verrillii* (Dall, 1881) and *T. nivalis* are similar in size, and both have angled whorls, a smooth protoconch, a faint spiral sculpture and strong axial threads; however, in *Typhlomangelia* the siphonal canal is shorter and the spiral sculpture is stronger. Our specimens of *T. nivalis* fit quite well within the range of intraspecific variation shown by Bouchet and Warén (1980: 28, Fig. 74-76). However, the protoconch in our shells has a corrugated surface, whereas it should be smooth according to the figure in Bouchet and Warén (1980: 93, Fig. 200). We believe that this difference is due to the magnification used in the SEM photograph.

Genus *Drilliola* (Monterosato ms.) Locard, 1897

Type species. *Taranis emendata* Monterosato, 1872 by subsequent designation, Cossmann, 1896.

Drilliola pulchella (Verrill, 1880) (Fig. 3E, F, G)

Taranis pulchella Verrill, 1880: 368; Verrill (1882: 487, pl. 57, Fig. 17); Verrill (1884: 267, pl. 29, Fig. 8).
Pleurotoma (*Mangilia*) *comatotropis* Dall, 1881: 58; Dall (1889: 116, pl. 11, Fig. 12); Dall (1903: 102, pl. 11, Fig. 12, pl. 61, Fig. 77).
Pleurotoma tiara Watson, 1881: 440; Watson (1886: 347, pl. 21, Fig. 7).
Pleurotoma comatotropis: Verrill (1882: 452).
Pleurotoma (*Teretia*?) *comatotropis*: Dautzenberg (1927: 35).
Microdrillia comatotropis: Abbott (1974: 268, Fig. 2983).
Microdrillia pulchella: Abbott (1974: 268, Fig. 2984).
Drilliola comatotropis: Rios (1994: 161, pl. 53, Fig. 719).
Drilliola loprestiana auct non Calcara, 1841: Rios (2009: 311, species 788).

Type material. USNM 37841, sta 892 (39°53'00"N, 71°05'00"W), 890 m (not examined).

Material examined. 17174 [2] OPI #44; 18342 [2] OPI #45; 18343 [1] OPI #47; 18344 [2] OPI #48; 15048 [1] OPI #49; 17054 [2] OPI #59; 18345 [1] OPI #62; 16873 [1] OPI #79; 18346 [1] OPI #82; 18347 [1] OPII #45; 18348 [1] OPII #47; 18349 [1] OPII #49; 18350 [1] OPII #50; 18351 [2] OPII #53; 15577 [1] OPII #54; 18355 [2] OPII #58; 18352 [4] OPII #61; 18400[1] OPII # 63; 17638 [1] OPII #65; 18353 [2] OPII #68; 15997 [1] OPII #69; 18354 [1] OPII #78; 18356 [1] B#32.

Geographical distribution. Northwest Atlantic: Massachusetts, USA (Verrill, 1880; 1882); Maine to Florida, USA, Gulf of Mexico, West Indies (Dall, 1889; 1903); Florida, USA (Abbott, 1974); Gulf of Mexico (Dall, 1881); West Indies (Watson, 1886). Southwest Atlantic: Campos Basin, southeast Brazil (this paper); Santa Catarina, South Brazil (Rios, 1994). Northeast Atlantic: Azores and Canary Islands (Dautzenberg, 1927). From 36 m (Abbott, 1974) to 1972 m (this paper).

Description. Shell high, slender, white, reaching 6.48 mm. Protoconch with 4.5 whorls. Protoconch 1 brown and granulose. Protoconch 2 light yellow, with about 20 axial ribs on each whorl crossed by 7 faint equidistant spiral lines. The axial ribs are slightly curved and reach the upper edge of the whorls, but bend sharply just before reaching the lower edge. Clear-cut protoconch-teleoconch transition. Teleoconch with up to 4 angled whorls. Spiral sculpture consists of a faint subsutural cord and two strong spiral cords crossing the upper and lower parts of the whorls, with a third cord gradually appearing between these two. The entire surface of the conch is covered by numerous axial riblets which are uneven in their distribution and width. These riblets are curved between the subsutural and the upper spiral cord, and below this cord they are fairly straight and opisthocline. Suture very shallow. Base crossed 9 thin and evenly spaced spiral cords. Labial sinus broad and shallow. Inner lip thin and reflected. Outer lip thin. Siphonal canal wide and very short. Aperture ovate.

Remarks. Bouchet and Warén (1980) synonymized the genus *Drilliola* with *Microdrillia* (Casey, 1903). Kilburn (1986) disagreed with this synonymy, basically because of the differences in the protoconch. The protoconch in *Microdrillia* has about 4.5 whorls, protoconch 1 is granulose and protoconch 2 is sculptured with curved axial ribs and spiral lines; whereas the protoconch in *Drilliola* has about 1.5 smooth whorls with median angulation. Bouchet and Warén (1980) and Kilburn (1986) seemed to agree that the teleoconchs of these genera are very similar. Illustrations of the type species, *Taranis emendata* (illustrated in Powell, 1966: pl. 14, Fig. 13) and *Pleurotoma cossmanni* (Meyer, 1887: 9, pl. 1, Fig. 5; also illustrated in Powell, 1966: pl. 12, Fig. 13), are of insufficient quality to allow us to make a reasonable judgment on this issue. Kilburn (1986) also mentioned a possible difference in the radular apparatus, comparing the type species of *Drilliola* (Bouchet and Warén, 1980: Fig. 29) with the type of *Acrobela* Thiele, 1925 (illustrated in Thiele, 1929: Fig. 446), which is considered a synonym of *Microdrillia*. Although the radular tooth in *Drilliola* seems longer and has a narrower base than that in *Acrobela*, we are not convinced that this information is enough to retain *Microdrillia* as a valid genus. If indeed there are no differences in the teleoconchs to support the separation of the genera, then we believe that Bouchet and Warén's option is the best at the moment.

According to Rosenberg (2009), there are 4 species of *Drilliola* (and *Microdrillia*, since he did not agree with the synonymy) described from the western Atlantic: *D. loprestiana* (Calcara, 1841), *D. crispata* (Cristofori and Jan, 1832), *D. trina* (Mansfield, 1925) and *D. pruina* (Watson, 1881). Bouchet and Warén (1980) synonymized *D. pulchella* to *D. loprestiana* but they did not discuss their decision, nor did they illustrate the types of either species. They believe *D. pulchella*, *D. tiara* and *D. comatotropis* are synonyms of *D. loprestiana* and a consequence of simultaneous publication rather than polymorphism.

Bouchet and Warén were unable to locate the type material of *D. loprestiana* and relied on what was "traditionally" considered as *D. loprestiana* when they defined the synonymy (Warén, pers. com.). The Calcara collection, which included the type of *D. loprestiana*, was (partially) obtained by Giuseppe Brugnone. When Brugnone died, Monterosato purchased his collection, including Calcara's specimens. Unfortunately Brugnone replaced the original labels by hand, making it difficult to distinguish his own specimens from those of Calcara. In our investigation, we located only one specimen identified as *Pleurotoma loprestiana* in the old Monterosato collection. There is not much information on this specimen, but it is identified as having been collected by Calcara (found in the Museo di Zoologia 'P. Doderlein'- Palermo University, registered as

MAL-1930). Therefore, we conclude that this material is the holotype of *D. loprestiana* (Fig. 3H, I, J, K). The specimen has a dome shaped lecithotrophic protoconch, narrower aperture, stronger subsutural cord and longer siphonal canal than *D. pulchella*. Therefore, we cannot accept the synonymy proposed by Bouchet and Warén.

Drilliola comatotropis is the most common name for this species, and *D. pulchella* has already been considered as its synonym (Dautzenberg, 1927). However, this was an error probably caused by the fact that *D. pulchella* was only illustrated in Verrill's 1882 paper. But the species had already been described in 1880, so it is in fact the oldest name for it, and therefore the valid one for this taxon (Art.23, ICZN). We believe that *D. comatotropis* and *D. tiara* should be considered synonyms of *D. pulchella*, but *D. loprestiana* is a different species. Our material fits well with the original description (Verrill, 1880: 368) and the original illustration (Verrill, 1882: pl. 57, Fig. 17) of *D. pulchella*.

D. crispata was described as a Tertiary fossil from northern Italy. It was at first reported for the western Atlantic by Watson (1886) and this record has been followed by other authors (Rios, 1994; Rosenberg, 2009), although without a thorough analysis of the taxon. We were able to observe Watson's material and it was in fact a young specimen of *D. pulchella.* Considering that the type material of *D. crispata* is lost (as pointed out by Bouchet and Warén, 1980) and the original description is too short and unspecific (Cristofori and Jan, 1832: 9), we propose that *D. crispata* is a *nomen dubium* (Art. 75.5, ICZN). *Drilliola trina* (Mansfield, 1925: 28, pl. 4, Fig. 5) is much more slender than *D. pulchella*, and all of its spiral cords are stronger than those observed in *D. pulchella*. *Drilliola pruina* is quite different from *D. pulchella* or any other species of the genus, as it has a plump profile, strongly shouldered whorls and a protoconch ornamented with axial ribs and diagonal spiral threads resembling the diagonally cancelled protoconch of the Raphitominae. *Drilliola emendata* (Monterosato, 1872), the type species of the genus *Drilliola*, has a very different protoconch of about 1.5 whorls with a middle angulation, the teleoconch has a longer siphonal canal, stronger and fewer axial threads, weaker spiral cords and narrower aperture than *D. pulchella*.

Bouchet and Warén (1980: 32, Fig. 82) illustrated a specimen identified as *D. loprestiana*. The authors assumed *D. loprestiana* was similar to *D. pulchella*, but their material seems to be different from both species. The figured shell has a multispiral axially and spirally ornamented protoconch, shorter siphonal canal, wider aperture and stronger spiral ornamentation on the teleoconch than *D. loprestiana*. However, though the shell is very similar to *D. pulchella*, its body whorl is convex without the concave inflexion on the fasciolar region observed in our material, this area is also ornamented with thick spiral cords, instead of the thin spiral cords observed in *D. pulchella*, and the subsutural cord is much more prominent in Bouchet and Warén's specimen than in ours. We are unsure of the correct identification for this material, it would be necessary to observe the shell itself before reaching a conclusion.

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