Cirripedia Thoracica (Crustacea) collected during the "Campagne de *La Calypso* (1961-1962)" from the Atlantic shelf of South America

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ABSTRACT
The cirripeds sampled by *La Calypso* on the Atlantic continental shelf of South America during 1961-1962 include 16 species. These are four scalpellomorphs, *Ornatoscalpellum gibberum* (Aurivillius), *Litoscalpellum henriquecostai* (Weber), *Diceroscalpellum boubalocerus* (Young) and *Weltnerium hydrozoaphilum* n. sp., one verrucomorph, *Verruca minuta* n. sp. and 11 balanomorphs, *Chelonibia patula* (Ranzani), *Coronula diadema* (Linnaeus), *Tetraclita stalactifera* (Lamarck), *Acasta cyathus* Darwin, *Megatrema madreporarum* (Bosc), *Balanus amphitrite* Darwin, *Balanus venustus* Darwin, *Balanus trigonus* Darwin, *Balanus spongicola* Brown, *Megabalanus coccopoma* (Darwin), *Austromegabalanus psittacus* (Molina). Among these are two previously undescribed species: *Weltnerium hydrozoaphilum* n. sp. has on the capitular cuticle a few scattered clusters of setae, the carina has subapical umbo, the inframedian latus is pentagonal, with a subapical umbo, the carino-latus has its umbo at lower third of the carinal margin. *Verruca minuta* n. sp. has its shell lacking depressions between the articular ridges of the carina and rostrum, the movable scutum has an adductor ridge and two articular ridges, and the cirri IV to VI have on their anterior margins four pairs of setae.

KEY WORDS
Cirripedia,
Thoracica,
new species,
South America,
Atlantic Ocean.

RÉSUMÉ

Cirripedia Thoracica (Crustacea) recueillis pendant la « Campagne de La Calypso *(1961-1962) » sur la plateforme continentale atlantique de l'Amérique du Sud.*

Les cirripèdes récoltés par *La Calypso* sur le plateau continental atlantique d'Amérique du Sud en 1961-1962 comprennent 16 espèces. Ce sont quatre scalpellomorphes, *Ornatoscalpellum gibberum* (Aurivillius), *Litoscalpellum henriquecostai* (Weber), *Diceroscalpellum boubalocerus* (Young) et *Weltnerium hydrozoaphilum* n. sp., un verrucomorphe, *Verruca minuta* n. sp. et 11 balanomorphes, *Chelonibia patula* (Ranzani), *Coronula diadema* (Linnaeus), *Tetraclita stalactifera* (Lamarck), *Acasta cyathus* Darwin, *Megatrema madreporarum* (Bosc), *Balanus amphitrite* Darwin, *Balanus venustus* Darwin, *Balanus trigonus* Darwin, *Balanus spongicola* Brown, *Megabalanus coccopoma* (Darwin), *Austromegabalanus psittacus* (Molina). Parmi eux, deux espèces n'avaient pas été décrites : *Weltnerium hydrozoaphilum* n. sp. présente sur la cuticule capitulaire quelques groupes épars de soies, la carène a un umbo subapical, la plaque latérale inframédiane est pentagonale, avec un umbo subapical, la plaque caréno-latérale a son umbo situé au tiers inférieur du bord de la carène. *Verruca minuta* n. sp. a un test dépourvu de dépressions entre les arêtes articulaires et le rostre, le scutum mobile a une arête du muscle adducteur et deux arêtes articulaires et les cirres IV à VI ont quatre paires de soies sur leurs bords antérieurs.

MOTS CLÉS
Cirripedia, Thoracica, nouvelles espèces, Amérique du Sud, océan Atlantique.

INTRODUCTION

The "Campagne de *La Calypso*" of 1961-1962, along the Atlantic coast of South America, collected samples mainly from the continental shelf, and also a few samples from the intertidal zone and the continental rise (Forest 1966). During the past 25 years there have been several studies on the shallow water cirriped fauna of southern South America (Newman & Ross 1971; Newman 1979; Young & Christoffersen 1984; Young 1988, 1989, 1990, 1991, 1992, 1993, 1994; Leta & Young 1995). The latitudinal distribution of the species that occur there have been analyzed by Young (1995).

The present study is the third to describe the cirripeds collected during one cruise of *La Calypso* (cf. Stubbings 1961, 1964). Where appropriate, I have included new information on the taxonomy and distribution of the species comprising this fauna. I have also included information on specimens collected recently by other research vessels from along the Atlantic continental shelf of South America.

All of the specimens are deposited in the Muséum national d'Histoire naturelle, Paris (MNHN), or Museu Nacional do Rio de Janeiro (MNRJ). Abbreviations used are as follows: cl, capitular length; tl, total length; rc, rostro-carinal diameter.

THE SPECIES FROM THE "CAMPAGNE DE *LA CALYPSO*"

Table 1 lists the stations, location and species collected. Table 2 lists all the species by station and the references to these for the Atlantic coast of South America. Where there is little or no new information relating to taxonomy or distribution of these species, they are not formally described, but are listed in Tables 1 and 2.

TABLE 1. — Stations, date, location, and cirriped species collected during the "Campagne de *La Calypso*" from South America.

Station	Date	Location	Species
22	21.XI.1961	8°15'S, 34°42'W, 33 m	*Acasta cyathus*
46	23.XI.1961	11°22'S, 37°09'W, 32 m	*Acasta cyathus*
57	24.XI.1961	12°56.4'S, 38°33.5'W, 18 m	*Weltnerium hydrozoaphilum* n. sp.
58	24.XI.1961	12°56.4'S, 38°34.3'W, 60-44 m	*Balanus spongicola*
63	26.XI.1961	12°56.0'S, 38°33.2'W, 27 m	*Balanus spongicola*
66	26.XI.1961	13°28'S, 38°50'W, 37 m	*Verruca minuta* n. sp.
69	27.XI.1961	15°37.5'S, 41°02'W, 39 m	*Acasta cyathus*
77	28.XI.1961	18°00'S, 38°18'W, 48 m	*Megatrema madreporarum*
79	28.XI.1961	18°09'S, 38°20'W, 33 m	*Balanus spongicola*
80	28.XI.1961	18°09'S, 38°30'W, 50 m	*Balanus spongicola*
84	28.XI.1961	Bahia, Abrolhos Bank, Redonda Island, intertidal	*Tetraclita stalactifera*
89	29.XI.1961	18°18'S, 38°53'W, 38 m	*Chelonibia patula*
92	30.XI.1961	Espírito Santo, Anchieta, Anchieta Beach, 5-0 m	*Tetraclita stalactifera*
100	01.XII.1961	22°12'S, 40°59'W, 39 m	*Coronula diadema, Balanus spongicola, Balanus trigonus*
104	02.XII.1961	23°08'S, 42°30'W, 103 m	*Balanus spongicola, Balanus venustus*
106	02.XII.1961	23°01'S, 43°05'W, 31 m	*Balanus trigonus, Balanus venustus*
110	08.XII.1961	Rio de Janeiro, Ilha Grande, Abraão Bay, 5-0 m	*Tetraclita stalactifera, Balanus spongicola, Balanus trigonus, Balanus venustus*
111	08.XII.1961	Off Abraão Bay, 16-19 m	*Balanus trigonus*
112	08.XII.1961	23°05'S, 44°08'W, 17 m	*Balanus venustus*
113	08.XII.1961	23°04'S, 44°11'W, 24 m	*Balanus venustus*
114	08.XII.1961	23°04'S, 44°14'W, 45 m	*Balanus spongicola, Balanus trigonus*
118	09.XII.1961	Rio de Janeiro, Ilha Grande, SW of Sitio Forte Bay, 5-0 m	*Balanus trigonus*
119	09.XII.1961	Rio de Janeiro, Ilha Grande, SE of Sitio Forte Bay, 5-0 m	*Balanus venustus*
120	09.XII.1961	23°07'S, 44°24'W, 25 m	*Balanus venustus*
122	09.XII.1961	23°26'S, 44°48'W, 36 m	*Balanus spongicola, Balanus trigonus, Balanus venustus*
125	10.XII.1961	Rio de Janeiro, Guanabara Bay, Middle of Flamengo Inlet, 6-8 m	*Balanus venustus*
128	10.XII.1961	23°32'S, 45°06'W, 18 m	*Balanus venustus*
129	10.XII.1961	23°40'S, 45°01'W, 37 m	*Balanus spongicola, Balanus trigonus, Balanus venustus*
130	10.XII.1961	23°43'S, 44°57'W, 46-47 m	*Balanus amphitrite, Balanus spongicola, Balanus venustus*
131	10.XII.1961	23°42'S, 45°14'W, 18-20 m	*Balanus venustus*
135	11.XII.1961	23°52'S, 45°30'W, 25 m	*Balanus venustus*
136	11.XII.1961	24°06'S, 45°29'W, 48 m	*Balanus spongicola, Balanus venustus*
137	11.XII.1961	24°18'S, 45°22'W, 66 m	*Litoscalpellum henriquecostai, Balanus spongicola, Balanus venustus*
138	11.XII.1961	24°43'S, 45°10'W, 97-100 m	*Balanus spongicola*
143	14.XII.1961	24°35'S, 46°31'W, 45 m	*Balanus spongicola, Balanus trigonus*
148	16.XII.1961	Santa Catarina, Zimbros Bay, W of the beach, 5-0 m	*Balanus spongicola, Balanus trigonus, Megabalanus coccopoma*
149	16.XII.1961	27°15'S, 48°29'W, 18 m	*Balanus venustus*
150	17.XII.1961	30°40'S, 49°35'W, 141-135 m	*Balanus venustus*
152	17.XII.1961	31°24'S, 50°36'W, 66 m	*Diceroscalpellum boubalocerus*
153	18.XII.1961	32°07'S, 51°43'W, 21 m	*Diceroscalpellum boubalocerus*
155	20.XII.1961	32°41'S, 51°39'W, 40 m	*Diceroscalpellum boubalocerus*
156	21.XII.1961	34°07'S, 53°12'W, 20-22 m	*Balanus venustus*
170	29.XII.1961	37°24'S, 54°56'W, 126-132 m	*Ornatoscalpellum gibberum*
172	29.XII.1961	37°35'S, 54°53.7'W, 220-270 m	*Ornatoscalpellum gibberum*
178	02.I.1962	37°55'S, 56°47'W, 48 m	*Balanus venustus*
181	03.I.1962	Chubut, Golfo Nuevo, Cracker Point, 18 m	*Austromegabalanus psittacus*
182	08.I.1962	34°31'S, 53°43'W, 25 m	*Balanus venustus*

TABLE 2. — List of the species, "Campagne de *La Calypso*" stations from South America, museum numbers and references for the South western Atlantic.

Species	Station	Museum Number	References
Ornatoscalpellum gibberum (Aurivillius, 1892)	170, 171	MNHN Ci2712-2713 ; MNRJ 12925	Newman & Ross 1971
Litoscalpellum henriquecostai (Weber, 1960)	137	MNHN Ci2714	Young 1992
Diceroscalpellum boubalocerus (Young, 1992)	152, 153, 155	MNHN Ci2715-2717	Young 1992, 1999
Weltnerium hydrozoaphilum n. sp.	57	MNHN Ci2718, MNRJ 12926	
Verruca minuta n. sp.	66	MNHN Ci2719, MNRJ 12929	
Chelonibia patula (Ranzani, 1818)	89	MNHN Ci2723	Young 1991
Coronula diadema (Linnaeus, 1767)	100	MNHN Ci2724	Young 1991
Tetraclita stalactifera (Lamarck, 1818)	84, 92, 110	MNHN Ci2720-2722	Young 1991
Acasta cyathus Darwin, 1854	22, 46, 69	MNHN Ci2725-2726, 2756	Young 1995
Megatrema madreporarum (Bosc, 1881)	77	MNHN Ci2727	Young 1988
Balanus amphitrite Darwin, 1854	130	MNHN Ci2728	Young 1994
Balanus venustus Darwin, 1854	104, 106, 110, 112, 113, 119, 120, 122, 125, 128, 129, 130, 131, 135, 136, 137, 149, 150, 156, 178, 182	MNHN Ci2729-2749	Young 1994
Balanus trigonus Darwin, 1854	100, 106, 110, 111, 114, 118, 122, 129, 143, 148	MNHN Ci2750-2755, 2757-2760	Young 1994
Balanus spongicola Brown, 1844	58, 63, 79, 80, 100, 104, 110, 114, 122, 129, 130, 136, 137, 138, 143, 148	MNHN Ci2761-2776	Young 1994
Megabalanus coccopoma (Darwin, 1854)	148	MNHN Ci2777	Young 1994
Austromegabalanus psittacus (Molina, 1782)	181	MNHN Ci2778, MNRJ 12930	Pilsbry 1916; Young 1995

Suborder SCALPELLOMORPHA Newman, 1987
Family SCALPELLIDAE Pilsbry, 1907
Genus *Ornatoscalpellum* Zevina, 1978

Ornatoscalpellum gibberum (Aurivillius, 1892) (Fig. 1A-G)

Scalpellum gibberum Aurivillius, 1892: 123; 1894: 50, pl. 4, fig. 3-4. – Newman & Ross 1971: 125, fig. 64, pls 12A, 13.
Ornatoscalpellum gibberum – Zevina 1978: 1004; 1981: 110, fig. 77.

MATERIAL. — See Table 2 for the list.

REMARKS

Newman & Ross (1998: 577) described the basic arrangement of the peduncular plates in the Scalpellomorpha and how it has been modified. During the ontogeny, the plates of each transverse whorl are formed sequentially, rather than simultaneously. The primitive pattern is an eight plated whorl divisible in two sets of plates: rl-cl and sr-l-sc. In some modern scalpellids a multiplication of the peduncular plates may develop, obscuring the original pattern. Newman & Ross (1998: 577) also observed, based on the descriptions of early stages of several species that the first plates to develop are the carino-latera, then the latera, and finally the rostrolatera. The basic whorl of eight plates is completed by the addition of a subrostrum and a subcarina.

Ornatoscalpellum gibberum has several whorls in adults, each one containing more than 20 small plates. The first plates to appear are the large carino-latera (cl1) followed by the latera (l1). But the

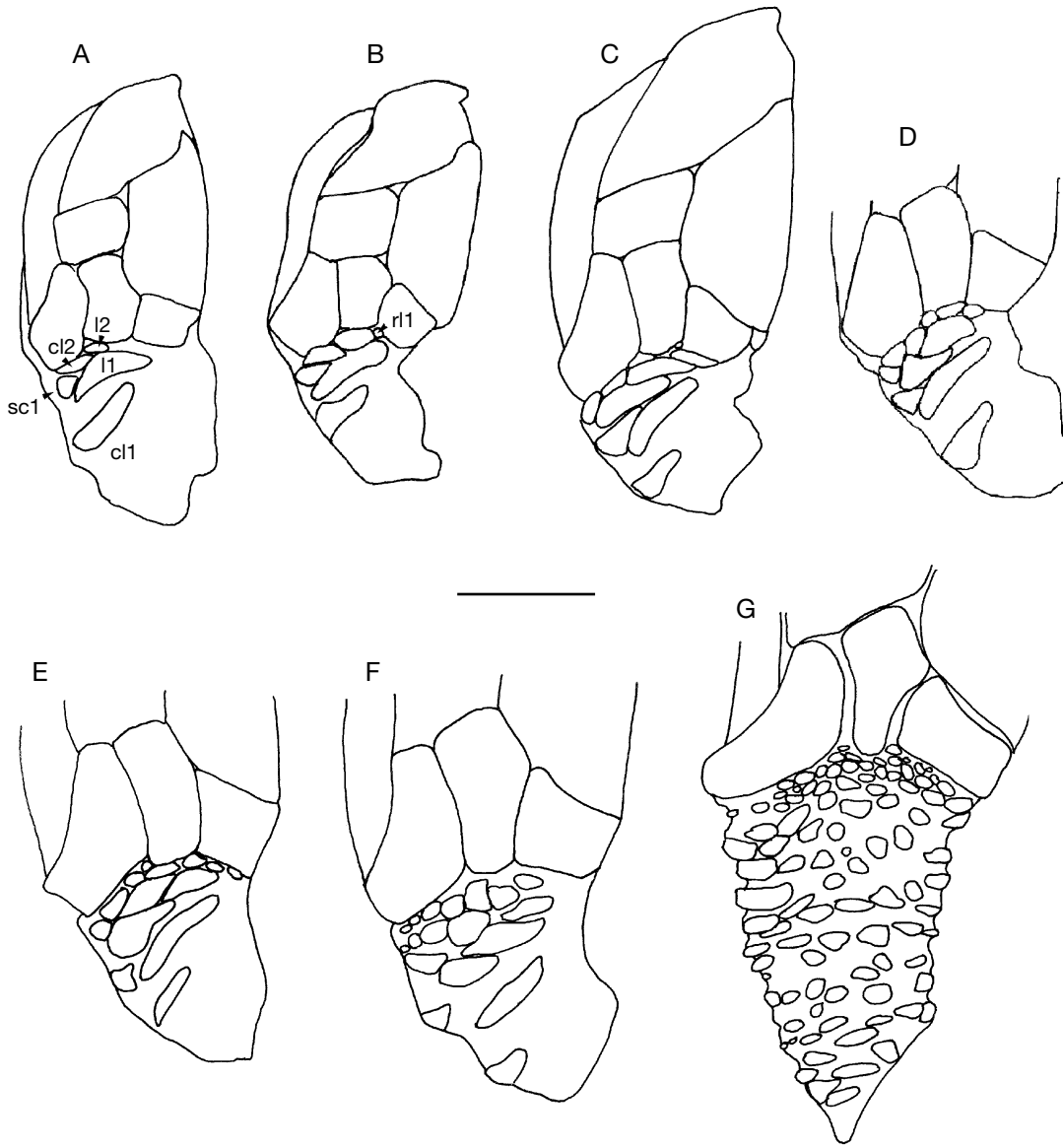

FIG. 1. — *Ornatoscalpellum gibberum* (Aurivillius, 1892); **A-G**, juvenile stages and the peduncular plates. Abbreviations: **cl**, carinal-latus peduncular plate; **l**, lateral peduncular plate; **rl**, rostral-latus peduncular plate; **sc**, subcarinal peduncular plate. Scale bar: A-F, 0.5 mm; G, 1 mm.

rostrolatera do not appear in sequence. Instead three small plates appear (subcarina, carino-latus and lateral; Fig. 1A). Next, small plates are added below the capitulum margin until small plates appear in the rostrolateral position (Fig. 1B-F). Therefore, the development of the plates progresses from the dorsal (carinal) to the ventral (rostral) side in each whorl, and subsequently by the replacement of the original large plates by two or more smaller ones (Fig. 1A-G).

This first stage in this sequence in this species was illustrated by Nilsson-Cantell (1930: 230).

Newman & Ross (1998) noted there are variations in the basic pattern, but until many more species are studied the significance of these variations, especially in this species, remains to be discovered. Jones (1998) also showed an elaboration of plates from the carinal region in another scalpellomorph. The significance of these variations, especially in this species, remains to be discovered.

Genus *Weltnerium* Zevina, 1978

Weltnerium hydrozoaphilum n. sp.
(Figs 2A-C; 3A-I)

TYPE MATERIAL. — Holotype: stn 57, 12°56,4'S, 38°33,5'W, 18 m, on hydrozoan stem, 24. XI.1961, tl 71 mm cl 47 mm (MNHN Ci2802). Paratypes: same locality, 3 specimens, tl 32 mm cl 22 mm, tl ? cl 34 mm, tl 65 mm cl 44 mm (MNHN Ci2718, MNRJ 12926).

ETYMOLOGY. — From the Greek *philo* (love, having an affinity for), preceded by *hydrozoa,* referring to the colony where the specimens were attached.

DIAGNOSIS. — Capitular cuticle with a few scattered clusters of setae. Carina with subapical umbo. Inframedian latus pentagonal, with subapical umbo. Carino-latus with umbo at lower third of carinal margin.

DESCRIPTION

Capitulum (Fig. 2A) flattened, length less than twice width, covered by thin cuticle, with occludent margin straight and carinal margin convex. Cuticle with few clusters of setae irregularly dispersed on capitulum. Plates with few conspicuous growth lines.

Tergum (Fig. 2A) triangular with its surface area greater than scutum, with lateral thickening near apex of carina. Basal margin convex. Carinal margin slightly convex. Occludent margin straight. Apex not recurved.

Scutum (Fig. 2A) convex, trapezoidal. Basal margin straight, curving to lateral margin which is slightly concave at apical portion. Tergal margin straight, only curving at apex. Occludent margin straight but upper portion convex. Apex recurved, superimposed on tergum.

Carina (Fig. 2A, B) regularly arched and thickened, umbo subapical. Tectum convex at upper portion and flat basally; basal margin triangular.

Upper-latus (Fig. 2A) pentagonal, symmetrical, with umbo usually slightly projecting above surface of capitulum; umbo displaced from apical to subapical position by thickened edge at scutal and tergal margins. All margins straight, except the concave scutal margin.

Carino-latus (Fig. 2A) high, one time and a half its width, umbo at lower third of carinal margin and below base of carina, not projecting outward. Carino-latera in contact with one another, but not interdigitating below carina (Fig. 2B).

Inframedian latus (Fig. 2A) large, pentagonal, with umbo subapical.

Rostro-latus (Fig. 2A) wider than high, with an apico-basal ridge. Lateral margin convex. Upper and basal margins straight and slightly diverging.

Rostrum (Fig. 2C) large, triangular with an alar projection on each side directed beneath carino-latera.

Peduncle (Fig. 2A) short, one half length of capitulum, covered sparsely by lengthened scales arranged in basic pattern of eight verical tiers.

Labrum (Fig. 3A) bullate, with several denticles, most of them multifid. Palp (Fig. 3B) small, acuminate with a few thin setae on its margins.

Mandible (Fig. 3C) with three acute teeth; second and third with subsidiary cusps; lower angle denticulate. Maxilla I (Fig. 3D) with straight anterior border, lower portion not projecting, two large spines at apical angle and five moderate, one large and nine moderate to small spines directed downwards. Maxilla II (Fig. 3E), with anterior margin having median notch, posterior margin convex; covered by numerous large and simple setae, absent on anterior notch; papilla of maxillary gland short, not pronounced.

Cirrus I (Fig. 3F) anterior ramus shorter, with subequal rami; former with protuberant articles; both rami covered by numerous long, simple setae. Cirrus II to VI with equal rami. Median article of cirrus VI (Fig. 3G) four times and a half longer than wide, five pairs of setae on anterior margin and one to three setae on posterio-distal angle.

Caudal appendage (Fig. 3H) with three articles, length less than basal article of cirrus VI; articles with few setae on distal margins. Number of articles of cirri I-VI and caudal appendage is presented in Table 3. Penis long, covered with thin setae.

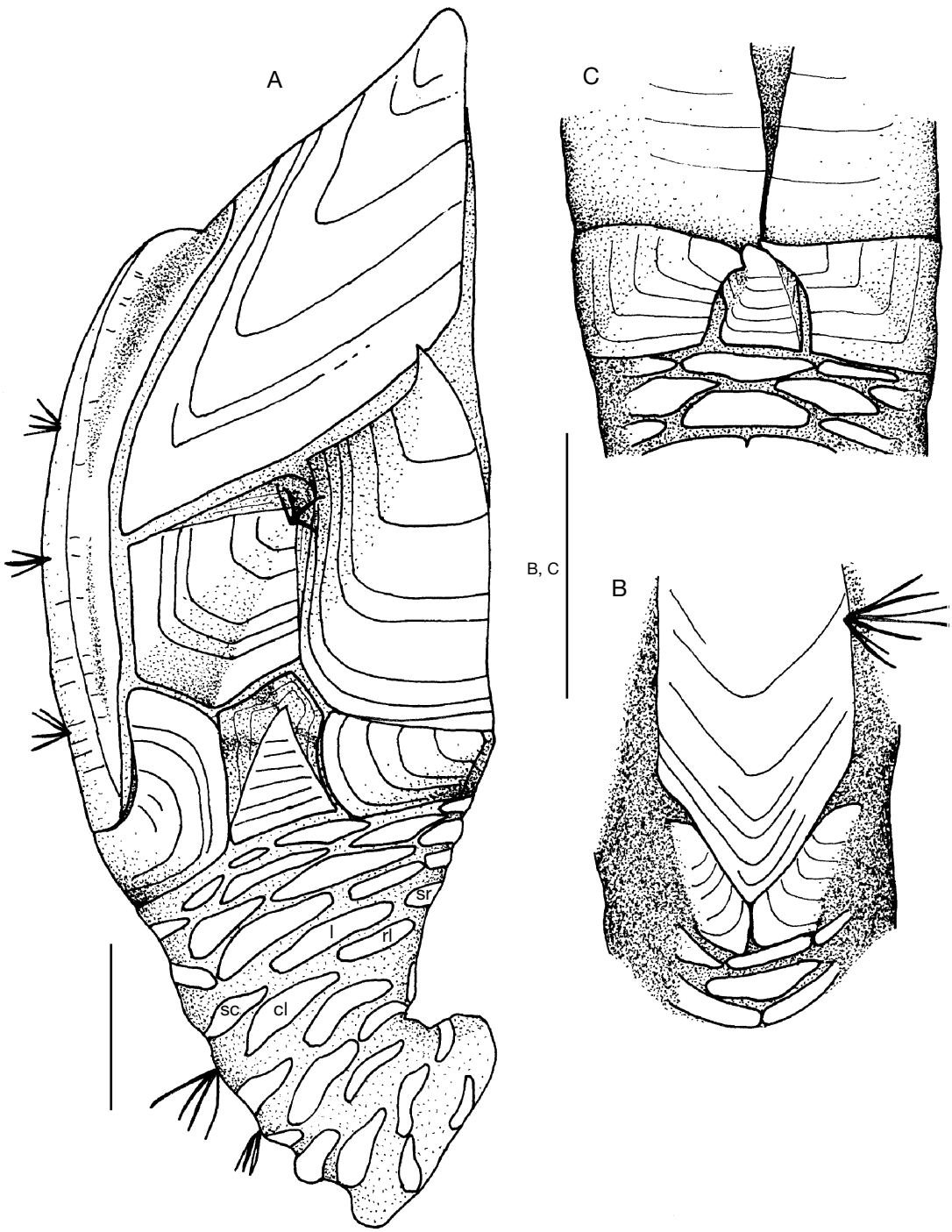

FIG. 2. — *Weltnerium hydrozoaphilum* n. sp. Holotype; **A**, lateral view of left side; **B**, carinal view, detail where the carino-latera are in contact; **C**, rostral view. Abbreviations: **cl**, carinal-latus peduncular plate; **l**, lateral peduncular plate; **rl**, rostral-latus peduncular plate; **sc**, subcarinal peduncular plate; **sr**, subrostral peduncular plate. Scale bars: 1 mm.

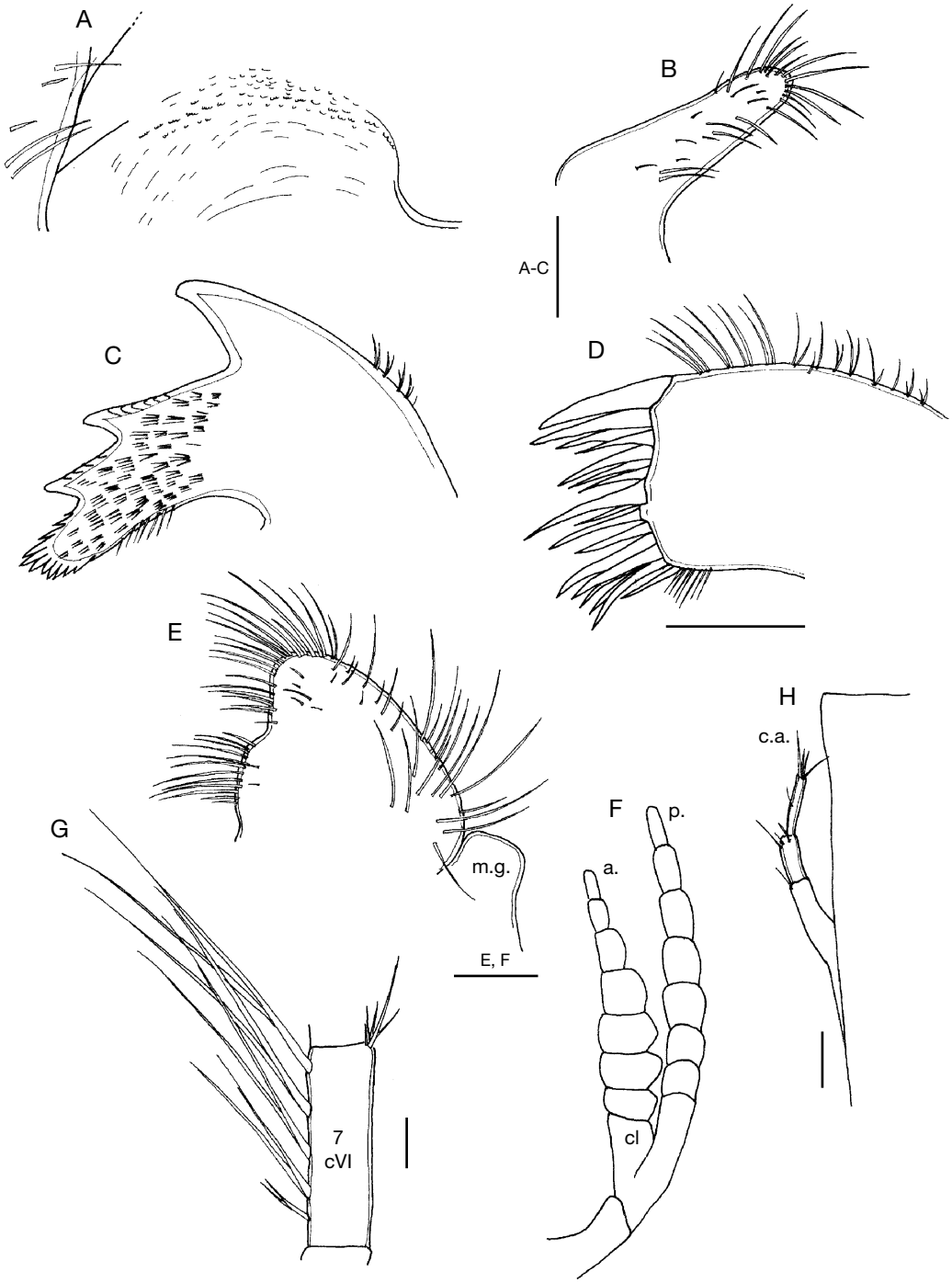

FIG. 3. — *Weltnerium hydrozoaphilum* n. sp. Holotype; **A**, portion of labrum; **B**, palp; **C**, mandible; **D**, maxilla I; **E**, maxillae II; **F**, outline of cirrus I; **G**, intermediate article (7) of cirrus VI; **H**, caudal appendage and coxopodite of cirrus VI. Abbreviations: **a,** anterior ramus; **c.a.**, caudal appendage; **cI**, cirrus I; **cVI**, cirrus VI; **m.g.**, papilla of maxillary gland; **p.**, posterior ramus. Scale bars: A-E, G, H, 1.1 mm; F, 0.3 mm.

TABLE 3. — Number of articles for anterior and posterior rami of cirri I-VI, and the caudal appendages of *Weltnerium hydrozoaphilum* n. sp. Holotype. *La Calypso,* stn 57; **I-VI**, cirri I to VI; **CA**, caudal appendage; **RC**, right cirri; **LC**, left cirri; **+**, broken ramus.

	I	II	III	IV	V	VI	CA
RC	8/8	12/12	12/11	14/13	13/13	12+/14	3
LC	8/8	12/11	12/12	12/12	12/13	13/14	3

REMARKS

Zevina (1978) described the genus *Weltnerium* to include those species with large inframedian latera (four to six angles) and the carino-latera not projecting beyond the carinal margin outline. She included 13 species in *Weltnerium* (Zevina 1981). Among these, only four have a carina with a subapical umbo, *W. aduncum* (Aurivillius, 1892), *W. bouvieri* (Gruvel, 1906), *W. convexum* (Nilsson-Cantell, 1921) and *W. campestrum* (Zevina, 1975). However, *W. convexum* was previously recognized as a species of *Litoscalpellum* by Newman & Ross (1971); the fully developed plates only being noted in the juvenile stages, and it should remain there.

W. aduncum was described from collections with no locality data, living on the pygnogonid *Phoxichilidium fluminense*, which occurs in Brazil. It can be distinguished from *Weltnerium hydrozoaphilum* n. sp., in having an inframedian latus with its umbo on the rostro-lateral margin; the rostro-latus being as high as wide, and the height of the inframedian latus being larger than the height of the upper-latus (Aurivillius 1894; Zevina 1981).

W. bouvieri was described from the Antarctic and Subantarctic region, from 70-920 m depth, and it has the following distinct characters: height of inframedian latus more than two times its width, with umbo near the rostrolateral angle; rostro-latus with strongly oblique upper margin; caudal appendage uniarticulate (Newman & Ross 1971; Zevina 1981). It is therefore quite distinct from the present species.

W. campestrum was described from the Scotia Sea, Subantarctic region (Zevina 1975, 1993) and subsequently recorded from off La Plata and north of the Tristan da Cunha Islands (Zevina 1990); all the records are from 4620-5470 m depth. This deep-sea species is distinguished by the scutum having an apicolateral arm, the carino-latera interdigitating below the carina, and the caudal appendage of five articles that are longer than the protopodite (Zevina 1981).

Weltnerium hydrozoaphilum n. sp. is among the species of *Weltnerium* which lives on the shallowest habitat. Only *W. nymphocola* (Hoek, 1883), *W. bouvieri* (Gruvel, 1906), and *W. richardi* (Gruvel, 1920) have records shallower than 100 m: 28-1360, 70-920 and 85 m, respectively.

Order SESSILIA Lamarck, 1818
Suborder VERRUCOMORPHA Pilsbry, 1916
Family VERRUCIDAE Darwin, 1854
Genus *Verruca* Schumacher, 1817

Verruca minuta n. sp.
(Figs 4-6)

TYPE MATERIAL. — Holotype: Revizee Project, stn 24C, 20°21'03"S, 36°38'14"W, 62 m, 1 specimen rc 2.2 mm (MNRJ 12928). Paratypes: Revizee Project, same locality, 2 specimens 1.9 mm (MNRJ 12929). — Stn 66, 13°28'S, 38°50'W, 37 m, 26. XI.1961, 2 specimens 1.8 mm (MNHN Ci2719, MNRJ 12930).

ETYMOLOGY. — From the Latin *minuta* (small), referring to the small size of the species.

DIAGNOSIS. — Shell with shallow depressions between articular ridges of carina and rostrum; movable scutum with adductor ridge and two articular ridges; cirri IV to VI with anterior margins with four pairs of setae.

DESCRIPTION

Shell (Fig. 4A, E) white or translucent; cuticle not persistent; flattened; ornamented only with irregular thin growth lines; ridges at suture between rostrum and carina conspicuous but flat, not projecting. Plane of opercular plates

TABLE 4. — Number of articles for anterior and posterior rami of cirri I-VI, and the caudal appendages of *Verruca minuta* n. sp. Holotype. Stn 24C (Revizee). **I-VI**, cirri I to VI; **CA**, caudal appendage; **RC**, right cirri; **LC**, left cirri; **+**, broken ramus.

	I	II	III	IV	V	VI	CA
RC	5/9	4/12	6/15	19/17+	25/21	25/25	10
LC	5/8	5/14	6/16	22/19+	22/22	20+/25	4+

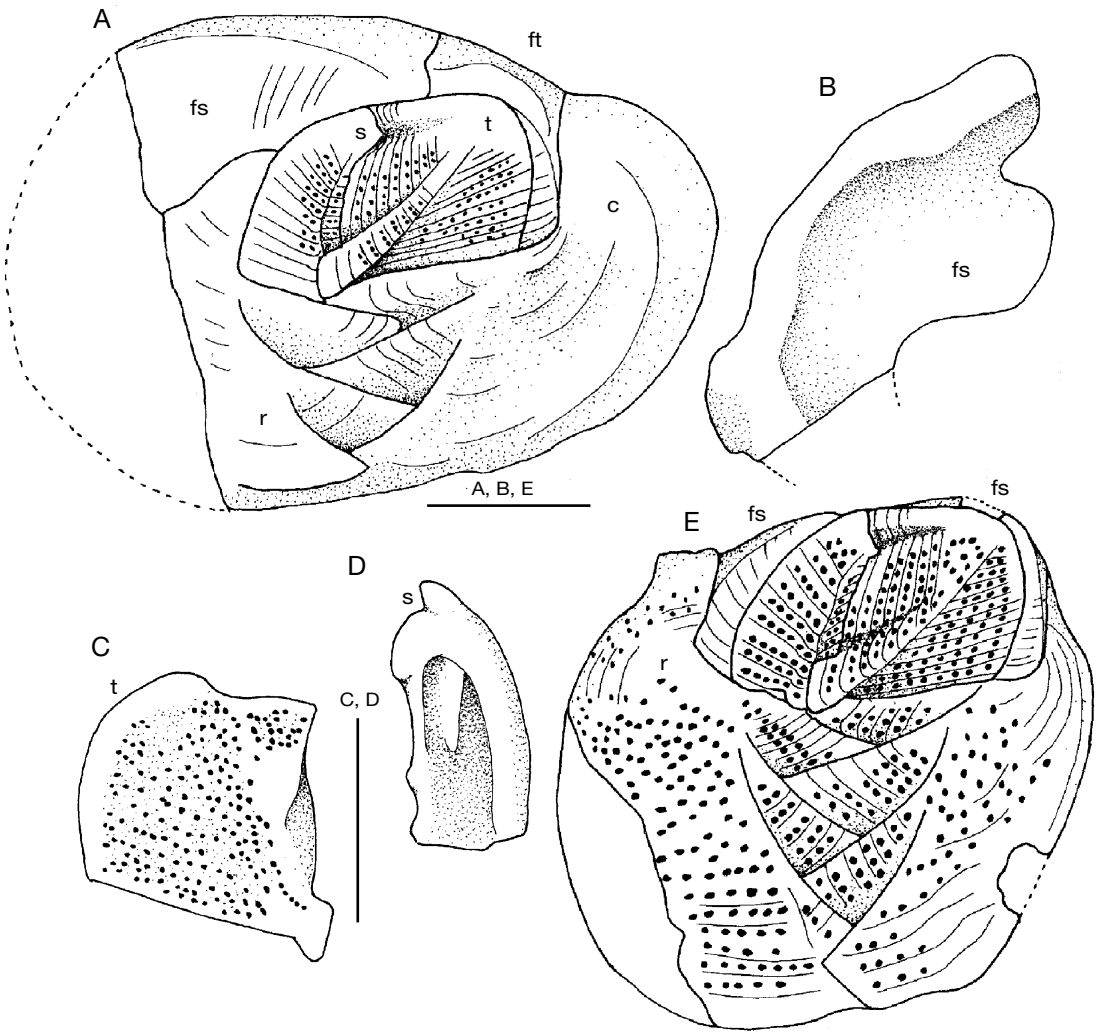

FIG. 4. — *Verruca minuta* n. sp. Holotype; **A**, apical view; **B**, fixed scutum, internal view; **C, D**, tergum and scutum, internal view. Paratype; **E**, apical view (*La Calypso* stn 66). Abbreviations: **c.**, carina; **fs**, fixed scutum; **ft**, fixed tergum; **r**, rostrum; **s**, scutum; **t**, tergum. Scale bars: 0.5 mm.

(Fig. 4A, E) parallel to basis, size reduced, one half rostro-carinal diameter. Surface of opercular plates and shell permeated by several rows of uncalcified tubes paralleling to growth lines in small specimens, calcified closed in larger ones. Basal margin of wall not inflected.

Fixed tergum (Fig. 4A, E) smaller than fixed-scutum, marginal apex thickened; alar projections absent, sutures essentially straight.

Fixed scutum (Fig. 4A, B, E) nearly rectangular, upper surface turned toward rostral margin of scutum; sutural areas simple and nearly straight. Internally, with well-developed myophore parallel to basis.

Carina (Fig. 4A, E) smaller than rostrum, well-developed ridge area at suture with rostrum but forming only shallow depressions between ridges, three to four interlocking teeth, ridges decreasing slightly in size from apex to basis; suture with fixed tergum straight.

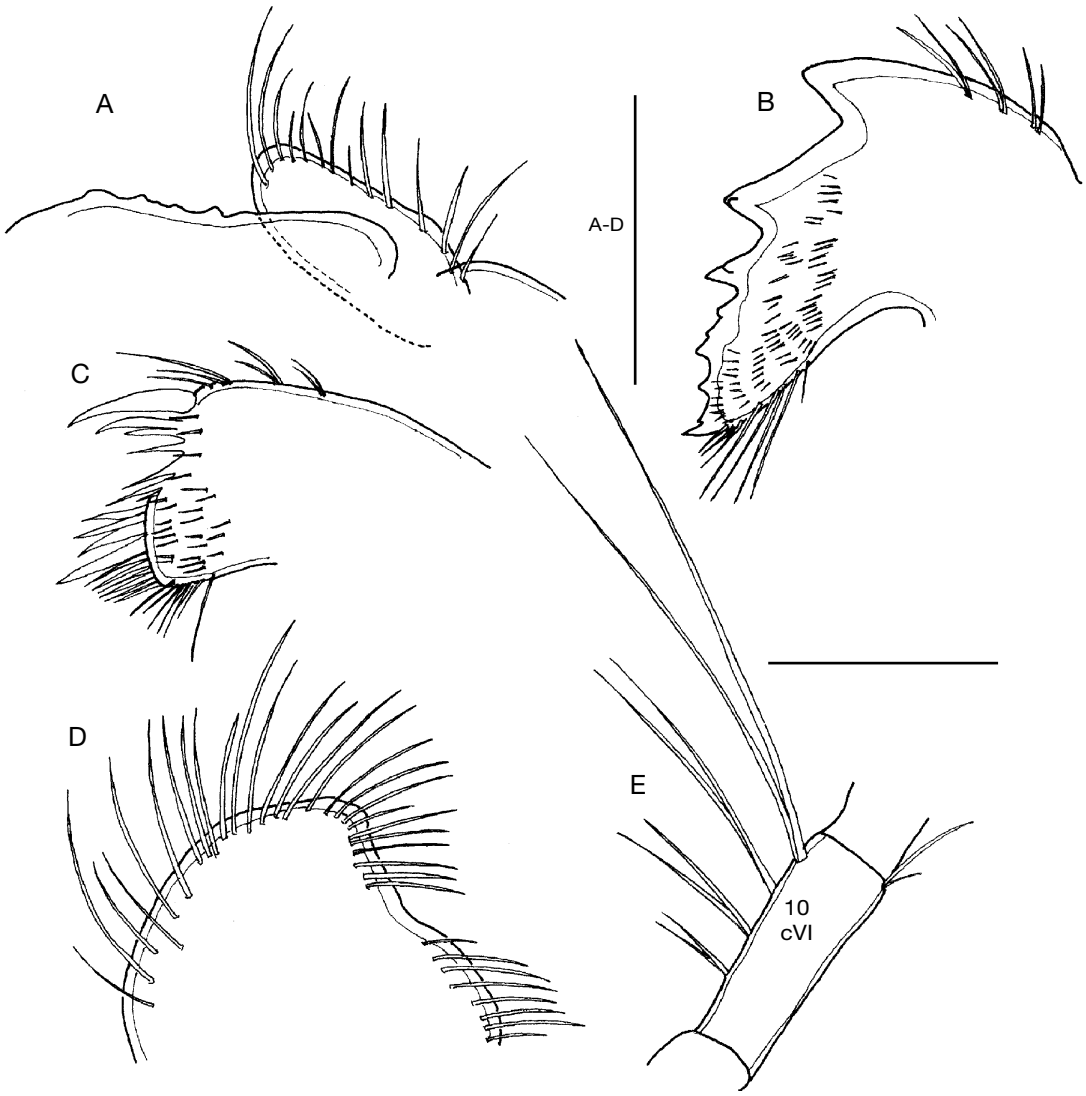

FIG. 5. — *Verruca minuta* n. sp. Holotype; **A**, palp and part of the labrum; **B**, mandible; **C**, maxilla I; **D**, maxillae II (Paratype, *La Calypso* stn 66); **E**, intermediate article (10) of cirrus VI. Abbreviation: **cVI**, cirrus VI. Scale bars: 0.1 mm.

Rostrum (Fig. 4A, E) with well-developed ridged area at suture with carina, but forming only shallow depressions between ridges, three to four interlocking teeth, ridges decreasing slightly in size from apex to basis; suture with fixed scutum nearly smooth.

Opercular plates with growth lines conspicuous, but not projecting. Tergum (Fig. 4A, C, E) larger than scutum, nearly quadrangular, with three articular ridges; axial (apico-basal) ridge elevated, conspicuous at both sides, thinner than second, second ridge low and wide, third small, very narrow; with one groove between second and third ridges; without ridges at carinal area. Internally, surface flat, some sealed tubes visible; scutal margin slightly sinuous.

Scutum (Fig. 4A, D, E) with two low articular ridges, axial ridge very low, thin, sloping continuously to rostral area; second ridge very narrow, no ridges at rostral area; greater width of plate less

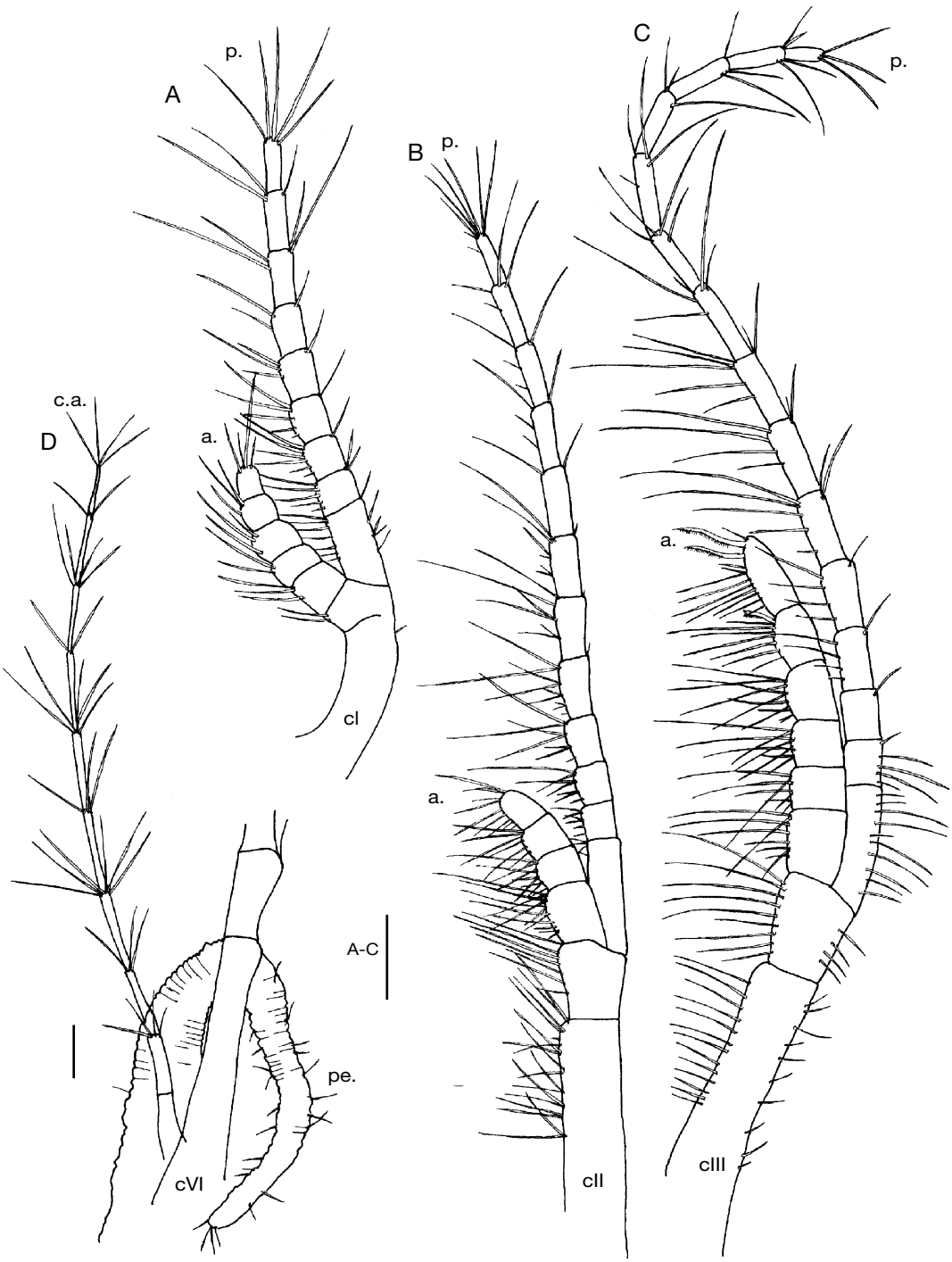

FIG. 6. — *Verruca minuta* n. sp. Holotype; **A**, cirrus I; **B**, cirrus II; **C**, cirrus III; **D**, caudal appendage, penis and protopodite of cirrus VI. Abbreviations: **a.**, anterior ramus; **c.a.**, caudal appendage; **pe.**, penis; **p.**, posterior ramus. Scale bars: 0.1 mm.

than one half scutum height. Internally, surface with some sealed tubes visible, adductor ridge conspicuous; tergal margin sinuous; occludent margin thickened.

Labrum (Fig. 5A) with row of obtuse teeth. Palp (Fig. 5A) paddle-like, simple setae at inner margin. Mandible (Fig. 5B) with three distinct teeth, second and third serrated on apical margin, low obtuse denticles on inferior angle. Maxilla I (Fig. 5C) with lower portion of anterior margin protruding; upper portion of anterior margin with two large spines, followed by 12-16 intermediate to small spines. Maxilla II (Fig. 5D) bilobed, with numerous simple setae along its margins.

Cirrus I (Fig. 6A) with unequal rami; anterior ramus with protuberant articles, two fifth of the length of posterior ramus, covered by numerous simple setae; posterior ramus with slightly protuberant articles. Cirrus II (Fig. 6B) with unequal rami, anterior ramus about one fourth of the length of posterior, both rami covered by numerous simple setae. Cirrus III (Fig. 6C) also with unequal rami, anterior ramus about one third of the length of posterior, both rami covered by numerous simple setae, distal articles of anterior ramus with few bipectinate setae. Cirri IV to VI with equal rami; intermediate articles (Fig. 5E) with four pairs of setae on anterior margin, one or two setae on posterior angle, length about three times width; large setae six times width of article. Caudal appendages (Fig. 6D) of 9-10 articles, three times length of coxopodite of cirrus VI; articles covered by numerous simple setae at distal margins. Number of articles of cirri I-VI and caudal appendage is presented in Table 4. Penis (Fig. 6D) short, clothed with thin setulae.

REMARKS

Young (1998) revised the genera of Verrucidae. Only four species were assigned to *Verruca* s.s.: *V. stroemia* (Müller, 1776) (type species); *V. spengleri* Darwin, 1854; *V. laevigata* (Sowerby, 1827), and *V. cookei* Pilsbry, 1927. Buckeridge (1997) described *V. jago* which is here assigned to this group. Thus *Verruca minuta* n. sp. is the sixth species included in *Verruca* s.s. All of the species have a low or depressed wall and the proportionately small opercular plates are parallel to the basis, the umbones of the carina and rostrum are marginal, without secondary ridges, and the myophore is well-developed and projects parallel to the basis.

V. minuta n. sp. differs from *V. stroemia*, *V. laevigata* and *V. jago* in having an adductor ridge on the movable scutum. *V. spengleri* and *V. cookei* are very similar to *V. minuta* n. sp. in the movable scutum having a characteristic adductor ridge.

V. cookei was described briefly by Pilsbry (1927) based on specimens from Hawaii, but the movable scutum of this species has three articular ridges, its adductor ridge is longer and the anterior margins of the posterior articles of cirrus VI have five pairs of setae.

V. spengleri was originally described from Madeira Island by Darwin (1854) and subsequently recorded from the Azores (Young 1998). The movable scutum has three articular ridges, the occludent margin protrudes in the middle with a relative shorter basal margin, and the carina and rostrum have a suture forming deep depressions between ridges.

All of the species are usually small and are found in shallow waters, mostly on the continental shelf. *Verruca minuta* n. sp. occurs between 37 and 62 m, from 13 to 20°S. This species was probably overlooked previously, due to its small size. The specimens were not attached to the substrate. Both Revizee specimens were found when sorting samples taken from washes of calcareous algae nodules. *V. minuta* n. sp. probably attaches on this calcareous substrate, which is common on the tropical Brazilian continental shelf.

Suborder BALANOMORPHA Pilsbry, 1916
Family CORONULIDAE Leach, 1817
Genus *Coronula* Lamarck, 1802

Coronula diadema (Linnaeus, 1767)

Lepas diadema Linnaeus, 1767: 1108.

Coronula diadema – Lamarck 1818: 387. – Pilsbry 1916: 273, pl. 65, figs 3, 4 (with synonymy).

MATERIAL. — See Table 2 for the list.

REMARKS

Plates of *Coronula* have been collected commonly along the Brazilian coast between the latitudes 18°S and 23°S, from 300-3400 metres depth (Young 1999).

Family ARCHAEOBALANIDAE
Newman & Ross, 1976
Genus *Acasta* Leach, 1817

Acasta cyathus Darwin, 1854

Acasta cyathus Darwin, 1854: 312, pl. 9, fig. 3A-C. – Pilsbry 1916: 244, figs 79, 80, pl. 57, figs 1-3.

MATERIAL EXAMINED. — *La Calypso*, stn 22, 33 m, 1 specimen rc 10mm (MNHN Ci2725). — Stn 46, 32 m, 17 specimens rc 3-9mm (MNHN Ci2726). — Stn 69, 39 m, 1 specimen rc 6 mm (MNHN Ci2756).

OTHER MATERIAL EXAMINED. — **Pernambuco, Porto de Galinhas.** Rasinho do Coiceiro, 2 specimens rc 7-8 mm (MNRJ 5471). — Taçaíba, > 100 specimens rc 4-8 mm (MNRJ 5462).
Bahia. Itacaré, Cachimbo, > 50 specimens rc 2-10 mm (MNRJ 4230). — Itacaré, Ribeira Beach, > 50 specimens rc 4-7 mm, (MNRJ 4007, 4224). — Abrolhos, Paredes reef, 13 specimens rc 6-12 mm (MNRJ 4226).

REMARKS
Acasta cyathus is a common species found associated with several species of sponges along all the tropical oceans. Young (1995) recorded this species as ranging to 18°S from Brazil. The new samples show a wide tropical South Atlantic distribution of this species from 8°S to 18°S. It is presently the only species of *Acasta* found along the Brazilian coast.

Family BALANIDAE Leach, 1817
Genus *Balanus* Da Costa, 1778

Balanus spongicola Brown, 1844

Balanus spongicola Brown, 1844: 121, pl. 53, figs 14-16. – Stubbings 1963: 22, figs 7-9 (synonymy).

MATERIAL. — See Table 2 for the list.

REMARKS
Young (1995) considered *Balanus spongicola* to have a subtropical distribution, occurring from 18° to 35°S. However, these new samples extend its northern distribution up to 13°S, inside the South Atlantic tropical region. Its depth range is also increased to 103 m.

Genus *Austromegabalanus* Newman, 1979

Austromegabalanus psittacus (Molina, 1782)

Lepas psittacus Molina, 1782: 223 (apud Darwin, 1854: 206).
Balanus psittacus – Pilsbry 1916: 75, pl. 17, figs 1-4, pl. 18, figs 1-3 (synonymy).
Austromegabalanus psittacus – Newman 1979: 290, fig. 4.

MATERIAL. — See Table 2 for the list.

REMARKS
Austromegabalanus psittacus is found along the coast of Peru and Chile in the Pacific Ocean and on the coast of Patagonia in the Atlantic Ocean (Darwin 1854; Lahille 1910; Pilsbry 1916). The northern limit of this species is 39°S in the Atlantic, and therefore its distribution is probably limited to the influence of Falklands Current (Young 1995).

GENERAL REMARKS

Most of the data presented herein are records from the continental shelf of South America and corroborate the general distribution pattern for the southern Atlantic described by Young (1995). Only *Balanus spongicola* and *Acasta cyathus* show latitudinal range extensions. In addition, the record of a shallow-water verrucid on the continental shelf in the shallow tropical waters of Brazil, is new for this group. The cirriped fauna of the tropical and subtropical continental shelf of Brazil is largely comprised of the balanids *Balanus venustus*, *B. trigonus*, and *B. spongicola.* Occasionally, *Diceroscalpellum boubalocerus* and *Litoscalpellum henriquecostai* are found on the subtropical portion of the Brazilian continental shelf.

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