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PHYLLACTIS CORREAE N.SP. (CNIDARIA, ACTINIARIA, ACTINIIDAE)
FROM ATOL DAS ROCAS, BRAZIL, WITH NOTES ON *PHYLLACTIS*
FLOSCULIFERA (LESUEUR, 1817)

ERIKA SCHLENZ

Departamento de Zoologia, Instituto de
Biociências, Universidade de São Paulo

MARIA JULIA DA COSTA BELÉM

Departamento de Invertebrados, Museu
Nacional, Universidade Federal do Rio de
Janeiro; supported by Conselho de Ensino
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RESUMO: Neste trabalho, descrevemos *Phyllactis correae* sp. n. provavelmente endêmica do Atol das Rocas, e registramos observações morfológicas, taxonômicas e biológicas sobre *Phyllactis flosculifera* (Lesueur, 1817). *Phyllactis correae* sp. n. difere das demais espécies do gênero por: dimensões e colarinho menores e coloração mais clara, bem como pela ocorrência de um terceiro ciclo de mesentérios totalmente imperfeitos. Um exemplar utilizado para preparações histológicas era hermafrodita e continha plânulas; foi também observada localização anômala de gônadas em alguns exemplares. Sugerimos um adendo à diagnose do gênero *Phyllactis* Milne-Edwards & Haime, 1851 feita por CARLGREN (1949): todos os mesentérios perfeitos ou perfeitos e imperfeitos, hexâmera e regularmente dispostos. Na discussão, além dos problemas taxonômicos, incluímos os aspectos biológicos já observados em ambas as espécies, bem como os relativos à sua distribuição geográfica.

ABSTRACT: In this paper we describe *Phyllactis correae* n. sp., probably endemic to Atol das Rocas, and give morphological, taxonomic, and biological data about *Phyllactis flosculifera* (Lesueur, 1917). *Phyllactis correae* n. sp. differs from the other species of the genus in the

following: smaller dimensions and smaller collar more light-coloured, as well as for the occurrence of one third cycle of totally imperfect mesenteries. One specimen, used for histological preparations, was hermaphrodite and contained planulae; in several specimens we observed anomalous position of gonads. We suggest one addendum to the diagnosis of the genus *Phyllactis* Milne-Edwards & Haime, 1851, given by CARLGREN (1949): all mesenteries perfect or perfect and imperfect, hexamerous and regular. In the discussion, besides taxonomic problems, we include biological aspects already observed for both species, and their geographical distribution.

INTRODUCTION

The genus *Phyllactis* Milne-Edwards & Haime, 1851 occurred in Brazil only southwards of Salvador, Bahia (DANA, 1846; CORRÊA, 1964; BELÉM & PRESLECRRAVO, 1973; DUBE, 1974, 1976; BELÉM, 1976). In 1982 specimens of *Phyllactis* were collected on the Atol das Rocas, which proved to belong to a new species.

The present paper deals with the description of the new species and with the comparison between it and *P. flosculifera* (Lesueur, 1817). Morphological, taxonomic, and biological data about both species are also given.

MATERIAL AND METHODS

This description is the result of a study of 23 specimens collected by Clovis Barreira e Castro Southeast of Ilha do Farol, Atol das Rocas, Brazil, during a joint expedition with a team from the Departamento de Parques Nacionais e Reservas Equivalentes of the Instituto Brasileiro de Desenvolvimento Florestal, in March 1982.

The specimens were anaesthetized on the collection site with $MgCl_2$ solution and preserved in 10% formalin. Three of the specimens were re-preserved in the laboratory in Heidenhain's Susa for histological examination; sections were stained with Ehrlich's Haematoxylin/Eosin or with Mallory's Triple Stain.

The cnidom of *Phyllactis corraeae* n. sp. was studied examining nematocysts from the preserved specimens and comparing them with those of live *P. flosculifera* specimens. The nomenclature used for the nematocysts is that of SCHMIDT (1969, 1972, 1974).

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The holotype and paratypes, including the histological slides, were deposited in the Museu Nacional (Rio de Janeiro) Cnidaria Collection, under the following numbers: a) HOLOTYPE - Col CNID. MN n^o 00536 (whole specimen; height 22 mm; diameters - base 7 mm, column 8 mm, collar and oral disc 10 mm); b) PARATYPES: Col CNID. MN n^o 00469 (2 individuals), Col CNID MN n^o 00470 (7 individuals); Col CNID MN n^o 00471 (7 individuals); col CNID. MN n^o 00555 (slide, Mallory stained, with transverse sections of a female); Col CNID MN n^o 00556 (slide, HE stained, with transverse sections of a male); Col CNID. MN n^o 00557 (slide, Mallory stained, with longitudinal sections of a hermaphrodite)

The *P. flosculifera* specimens used for comparison with those of *P. correae* came from the Museu Nacional Cnidaria Collection, the Diva Diniz Corrêa Collection and the Collection of the Departamento de Sistemática e Ecologia of the Universidade Federal da Paraíba, apart from many live specimens collected at Arraial do Cabo, Rio de Janeiro State, and Ubatuba, São Paulo State.

The authors have chosen to name the new species after Dr Diva Diniz Corrêa, who pioneered the study of Brazilian Actiniaria and whose work has formed the basis for the projects they are developing today.

DESCRIPTION

Phyllactis correae n. sp.

Actiniidae, differing from other *Phyllactis* species in the following: smaller size and collar, and lighter colouring, in external morphology; internally, occurrence of a 3rd cycle of totally imperfect mesenteries. It is probably endemic to the Atol das Rocas.

External morphology (Fig. 1)

Column elongate, of variable shape in the various preserved specimens, wall thin and transparent. It is mostly smooth and a pale uniform flesh colour Greenish-white distally, below the collar (in preserved specimens), with 48 rows of exo- and endocoelic verrucae, with 6 verrucae in each row. Above these, there is a definite though fairly narrow collar (Fig. 2, c) formed of 48 series of marginal pseudospherules, each series corresponding to one of the rows of verrucae and, on close inspection, proving to consist of alternately one or two large pseudospherules,

capable of great distension, with smaller vesicles on top of them; each pseudospherule has several obvious swellings when fully distended (when contracted, their number and arrangement are hard to make out, and they seem more numerous and more compactly arranged) When fully distended, as in some specimens, they resemble large bubbles or, in the case of the more internal ones, rather short, thick, thin-walled tentacles. Maximum height 2.5 cm; maximum diameter 1.0 cm.

Oral disc small, separated from the collar by a shallow fosse, white with greenish tinge. Mouth small, slit-shaped. Tentacles short, conical, entacmaeic and whitish in the preserved specimens, the internal ones rather longer than the external. Most specimens have 24 tentacles in 3 cycles of 6-6-12. Each tentacle of the 3rd cycle alternates with an internal pseudospherule. Maximum diameter of the oral disc 1.3 cm; maximum length of tentacles 1.5 cm.

Pedal disc same colour as column and of larger or smaller diameter than the column in formalin, with lines of insertion of mesenteries visible. Diameter from 0.4 to 1.0 cm.

Internal morphology

Actinopharynx long, folded, whitish in formalin, with two deep siphonoglyphs extending beyond the pharynx (Fig. 3d) Twenty-four pairs of mesenteries running the length of the animal, extremely regularly arranged. At the top of the column, 12 pairs of mesenteries reach the actinopharynx, corresponding to the first two cycles (Fig. 3a) In those of the first cycle, the two pairs of directives are attached to the whole length of the pharynx and siphonoglyphs, but in the other pairs one of the mesenteries always separates from the pharynx before its partner (Fig. 3c) The 2nd cycle of mesenteries separate from the actinopharynx in the upper middle region and have no filaments in the lower middle (Fig. 3b, e) The 3rd cycle consists of 12 pairs of microcnemes, never with gonads or filaments and with retractor muscles relatively well developed only in the distal portion, which arise from the edge of the oral disc. All perfect mesenteries are joined proximally in a basal nodule.

Oral stoma large and conspicuous; marginal stoma small and inconspicuous.

Gonads on 1st cycle mesenteries, sometimes even on the directives. One of the specimens examined histologically was a male, another a female, and the third a hermaphrodite. In a series of transverse sections of the male, there were well-developed gonads on one directive and on the other

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mesenteries in the first cycle. In the female, few oocytes were found on some 1st cycle mesenteries (Fig. 4, o) and, extraordinarily, one oocyte was found developing in the mesogloea of one of the siphonoglyphs (Fig. 5, o). In addition, as in the hermaphrodite specimen, oocytes were found developing in the cnidoglandular tract of the filaments (Fig. 6, o). In the series of longitudinal sections of the hermaphrodite individual, oocytes and testicular follicles were found together in each perfect mesentery, the oocytes generally being fewer in number and situated more distally (Fig. 7a, o; te). In one of the dissected specimens numerous spermatozoa were found liberated and clustered together (Fig. 7b, sp). In the hermaphrodite specimen, three planulae were also found in different stages of development, two close to the pedal disc (Figs. 8 and 9. pl), and in the same gastric chamber; the larger already had an actinopharynx, developing primary septa and tentacular buds; both had abundant zooxanthellae in the gastroderm.

Microanatomy

Endodermic sphincter strong, circumscribed, situated in the fosse (Figs. 2 and 10, sph)

Retractors strong, restricted, well developed in all perfect mesenteries (Fig. 11, dr); those of directives located close up to the siphonoglyphs.

Parieto-basilaris well developed, with characteristic folds (Fig. 12, pb). Circular column muscles (Fig. 12, cmc) and basilaris (Fig. 8, bm) equally well developed.

Oral disc with well-developed ectodermic to mesoectodermic circular muscles (Fig. 13, cm) and endodermic radial muscles (Fig. 13, rm). Longitudinal muscles in tentacles ectodermic and well developed (Fig. 14 lm)

Tentacle epidermis, in section, is 3 to 5 times the thickness of the endoderm and totally folded with a great accumulation of spirocysts and b-rhabdoids, without, however, forming separate batteries (Fig. 14, n)

Pseudospherule walls very thin, with epidermis thinner than endoderm (Fig. 2, c)

Zooxanthellae throughout gastroderm, noticeably concentrated in distal parts of the animal, especially in the collar

Siphonoglyphs thick, with the three layers much thicker than in the rest of the actinopharynx (Figs. 5 and 11, sph)

Cnidom: spirocysts, b-rhabdoids and p-rhabdoids A. For distribution and dimensions of nematocysts, see Table 1 and Fig 15, a-1

Bio-ecological observations

Pedal disc preserved on rock fragments buried up to 7 cm deep in the calcareous sand typical of Atol das Rocas; colour light to dark cream with whitish tentacles, to the naked eye. Specimens were spaced about 10 cm from each other. Open during the day, even at very low tide, withdrawing tentacles with the rising tide - at the type locality there is always a covering layer of water even at the lowest tides (C. B. Castro, personal communication)

Distribution: ILHA DO FAROL, Atol das Rocas, off Rio Grande do Norte State, Brazil (type locality) (fig. 16)

Phyllactis flosculifera (Lesueur, 1817)

- *Actinia flosculifera* Lesueur, 1817: 174; *Asteractis flosculifera*: Verrill, 1899:45-46, 1907: 266-268, Fig. 117; Watzl, 1922:38-45, Fig. 2-5; *Phyllactis flosculifera* Stephenson, 1922:283; Carlgren, 1949:67; Steele & Goreau, 1977:421-437, Fig. 1-3.

- *Metridium praetexta* Dana, 1846: 150, pl 5, fig. 39, 39a, 39c. *Phyllactis praetexta* Milne-Edwards & Haime, 1857, pl C2, fig. 1a, 1b; Stephenson, 1922:283; Carlgren, 1949:67; Belém & Preslercravo, 1973:6-7 fig. 4; Dube, 1974:46-51, fig. 6, 1976:101-105; Belém, 1976:36-43, fig. 12-15, 26; Manjarrés, 1978:127-129, fig. 1

- *Oulactis conchilega* Duchassaing & Michelotti, 1860: 49, fig. 29; *Actinostella conchilega* McMurrich, 1905:4-6, fig. 1; *Asteractis conchilega* Pax, 1916: 194-197, pl 12, fig. 8, 1924:103-104, fig. 10, Pl 9, fig. 3; *Phyllactis conchilega* Stephenson, 1922:283; Carlgren, 1949: 67; Corrêa, 1964:85-90, fig. 29.

In addition to its larger size (up to 12 cm in height by 4.5 to 5.0 cm column diameter) and great variation in colour, even on the collar, *P. flosculifera* differs from *P. correae* in the following points:

- a) Each series of verrucae generally consists of 12 verrucae, possibly extending proximally to a greater or lesser extent in a line of smaller verrucae.

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- b) All pairs of mesenteries are perfect in the highest part of the column; the 12 pairs of the last cycle separate from the actinopharynx from the mid-level of the latter (and therefore there are no microcnemes)
- c) The collar is far more highly developed, formed from 48 series of numerous small marginal pseudospherules which individually do not dilate so much as in *P. correae*. When fully distended, the collar diameter is over twice that of the oral disc, although it is rare to see both distended together. Maximum dimensions: collar diameter up to 10 cm; oral disc diameter up to 4 cm.
- d) In addition to the sphincter (Fig. 17, sph), the directive retractors may be definitely circumscribed (Fig. 18, dr) The siphonoglyphs are thick, but less so than in *P. correae*. Other histological characters agree in the two species.
- e) Sexes separate in all specimens we have examined, with testes and oocytes developing in the normal gonad region of the 1st and 2nd cycle mesenteries, excepting the directives.
- f) Cnidom: see Table 1 and Fig. 15, m-z
- g) Larvae never encountered in the gastro-vascular cavity
- h) Geographical distribution (Fig. 16): Bermudas, Bahamas, Cuba, Jamaica, Haiti, Puerto Rico, St. Thomas, Guadeloupe, Barbados, Curaçao, Brazil, (CORREA, 1964), Venezuela (MANJARRÉS, 1978) Although typically a West Indian species, in Brazil it occurs only Southwards from Salvador, Bahia, with records at the following sites:

Bahia:	Salvador - beaches at Farol de Itapoã, Pituba, Ondina, Bugari and Ilha de Itaparica (DUBE, 1974, 1976) Camaçari - Guaratuba reef, Prado - reef between Ponta Imbaçuaba and Cumuruxatiba.
Espirito Santo:	Aracruz - Santa Cruz (BELÉM & PRESLECRRAVO, 1973; BELÉM, 1976) Guarapari - Três Ilhas; beaches at Castanheiras, Setiba and Três Praias. Anchieta - Ubu and Meaipe beaches.
Rio de Janeiro:	Cabo Frio - Búzios, Ferradura beach; Arraial do Cabo, Forno beach. Niterói - Boa Viagem

- beach. Ilha de Itacuruçá. Ilha da Marambaia. Angra dos Reis - Ilha do Cavaco. Ilha Grande - Abraão beach. Parati - Paratimirim
- São Paulo:** Ubatuba - Itaguá beach, enseada do Flamengo, Codó and Itaquaduva beaches, Saco da Ribeira. São Sebastião - Araçá and Segredo beaches, Ilha Bela. Ilha de Santo Amaro.
- Santa Catarina:** São Francisco do Sul - Itajuba beach. Barra Velha - Praia Grande. Penha - Ponta da Prainha.

DISCUSSION AND CONCLUSIONS

The collar and its pseudospherules, one of the main features of the genus *Phyllactis*, have been given various names in the literature, such as "frondescient tentacles", "compound tentacles", "branchiform organs", "actinobranchs", "ruffed collar", "foliose areas", "fronds" "Blattorgane", "bobble-like excretions" etc. (DANA, 1846; HUTTON, 1878; VERRILL, 1869, 1899; DUERDEN, 1902; STUCKEY, 1909; PAX, 1914; WATZL, 1922) Such diverse nomenclature resulted partly from the functions attributed to the collar; VERRILL (1899:45) states that "they are probably branchial in function". This and other problems were, however, the result of examining generally preserved specimens with the pseudospherules showing various degrees of contraction or dilation.

Many other omissions and divergences are to be found in most of the older descriptions, and there are no complete and satisfactory diagnoses. Divergences begin as to the number and arrangement of the mesenteries. CARLGREN (1934) states that "probably" all mesenteries in *Phyllactis digitata* (McMurrich, 1893) are perfect. DUERDEN (1898) reports 48 pairs of perfect mesenteries in the upper part of *P. expansa*, which CARLGREN (1949) considers synonymous with *P. conchilega*, a species in which MCMURRICH (1905) calculated 24 pairs.

There are also few references as to the location of the gonads. WASSILIEFF (1908:22) records gonads on 4th order septa in *P. striata*. DUERDEN (1898) found a male specimen of *P. expansa* without giving any details as to the position of the testes. WATZL (1922) found eggs in summer-collected *P. flosculifera* as viviparous, since he found a dozen young in the gastrovascular cavity of a Bermudas specimen and

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observed the same in the West Indies without, however, mentioning in how many specimens.

Studies on the types, distribution and measurements of the nematocysts are still very limited.

As a result of these limited and so often contradictory descriptions, generic and specific synonymies are complicated. CARLGRÉN (1949:66) placed five whole genera and part of a sixth in synonymy with *Phyllactis* Milne-Edwards & Haime, 1851, but there remained a problem of synonymy at the species level. Most Caribbean species continued to be separated by poorly defined points, such as colour, size of collar, number of verrucae in each row, and shape and size of sphincter. In WATZL's (1922) study of *P. flosculifera* specimens from Bahamas and Bermudas, he found great variation in the sphincter: in six specimens it was seen to be either diffuse or restricted or circumscribed, although in most cases there was a distinct common stalk and slightly branging lamellae.

CORREA (1964), working with specimens from Brazil and Curaçao discusses problems of synonymy and puts the five species then cited for the Tropical West Atlantic together in one, adding: "as far as can be deduced from these descriptions, all the material belongs to one and the same species", then designated as *Phyllactis conchilega* (Duchassaing & Michelotti, 1860). BELÉM & PRESLECRARO (1973) and BELÉM (1976) agree with CORREA's 1964 position but call the species *Phyllactis praetexta* (DANA, 1849) as a matter of priority; they also pointed out that, once synonymy with *P. flosculifera* is proved, this name will have priority (BELÉM, 1976:57-59). In later papers DUBE (1974, 1976) and MANJARRÉS (1978) use the name *P. praetexta* for specimens from Bahia, Brazil and Santa Marta, Colombia respectively, while STEELE & GOREAU (1977), working with specimens from Kingston Harbour, Jamaica, name them *P. flosculifera*. From simultaneous comparison of the literature and specimens from Brazil and Curaçao, there is no doubt of the synonymy between *P. praetexta* and *P. flosculifera*, as redescribed by WATZL (1922) and also in part described morphologically by STEELE & GOREAU (1977), as well as with the other names we have mentioned in the synonymy list; we thus reestablish the priority of the name *P. flosculifera*. As for the other species cited for the West Indies and *P. digitata* (McMurrich, 1893), described from Uruguay, their descriptions are inadequate and nothing can be concluded until a careful review of Caribbean species has been made, based on specimens collected in the type localities.

P. correae differs from all *Phyllactis* described in collar size and structure and in the existence of a totally

imperfect cycle of mesenteries. According to MCMURRICH (1905:6) and VERRILL (1899:47), *Phyllactis radiata* (Duchassaing & Michelotti, 1860) and *P. formosa* (Duchassaing, 1850) respectively, have smaller collars than *P. flosculifera*. In *P. correae* the collar is smaller and less complex than in the two species, according to illustrations in DUCHASSAING & MICHELOTTI (1860, Pl. 7, figs. 4 and 9). For neither of the two species is there any mention to the number or arrangement of the mesenteries. CORREA (1964:90) suggests joining all species from the West Indian Region into one "until material from the original localities is restudied". In view of the above, we consider *Phyllactis correae* to be a new species, different from all others already described for the genus.

There is no doubt that the new species found in Atol das Rocas is a *Phyllactis*. Although we have only been able to work with preserved specimens, the smaller collar is evident and well delimited between the verrucae of the column and the fosse and sphincter. All other morpho-anatomical, histological and cnidom features correspond to those included in CARLGREN'S (1949) diagnosis of the genus *Phyllactis*. This diagnosis, however, on account of the above-mentioned discrepancies, is not clear on mesentery arrangement; we therefore suggest that the following item be added to the diagnosis: all mesenteries perfect or perfect and imperfect, hexamerously and regularly disposed.

Surprisingly, *P. flosculifera* has not been found on the Northeast coast of Brazil, although we have searched for it personally and the Universidade Federal da Paraíba Collection is composed of cnidarians collected along the coast from Pará to the South of Bahia. We cannot yet offer any explanation for this hiatus in the distribution of the species, and the possibility of there being distinct geographical races between the Caribbean and the South Brazilian Provinces cannot be disregarded but depends on future genetic and biochemical studies.

The fauna of Atol das Rocas is characteristically and predominantly related to the West Indian fauna but also includes species exclusive to the islands. Among the 134 mollusc species identified for Atol das Rocas, LEAL (personal communication) found five species exclusive to the islands of the South Atlantic - Rocas, Fernando de Noronha, Trindade and Ascension.

Unfortunately, we were unable to examine *P. correae* live, either in its natural surroundings or in the laboratory, nor did we obtain samples of the substrate where it was collected for the necessary granulometric analysis. For the sediments in Atol das Rocas lagoon, OTTMAN (1963)

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reports: "Les sédiments sont tous de sables organe-détritiques, mais de granulométrie très variable. En effet, on passe de granules grossiers souvent de dimension supérieure à 1 cm, qui s'accumulent dans les chenaux parcourus par les courants de marée, à des sables ou même de boues blanches calcaires dans les zones les plus calmes" Grains of various sizes and calcareous mud came with the specimens, adhering to the verrucae and to smooth parts of the column, respectively. *P. correae* may well be endemic to Atol das Rocas, given the rarity of these sediments on equatorial oceanic islands in the Atlantic, but this can only be confirmed by extensive research on these islands in both the Eastern and Western Atlantic

STEELE & GOREAU (1977) showed that the collar of *P. flosculifera* is typically a zone of zooxanthella growth. Our observations of numerous specimens kept in aquaria have shown that during the day *P. flosculifera* keeps its oral disc and tentacles well contracted and the collar totally distended, thus providing its "kitchen garden" with as much light as possible. At night the opposite occurs: the oral disc reaches its greatest diameter, the tentacles distend completely, while the fully contracted collar resembles simply a dense strip of vesicles around the tentacles. *P. correae* may well behave similarly. As STEELE & GOREAU (1977) observed in *P. flosculifera*, we also found *P. correae* with extremely abundant entire zooxanthellae in its distal part, especially in the collar, and in various stages of degeneration in the filaments. The fact that the collar vesicles in several specimens were bubble-like or tentaculiform may be due to the anaesthesia having been carried out after the specimens had been removed from the substrate, and this might also explain the longstanding differences in nomenclature already mentioned.

Interesting question still open to investigation concerns reproduction. Anomalous location of gonads, hermaphroditism and larviparity may form part of the reproductive strategy of the isolated *P. correae* population, but our data are sparse and have no statistical validity. A study of the two species reproductive behaviour would be useful to provide grounds for an adequate evaluation of this question.

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LITERATURE CITED

- BELÉM, M.J.C. 1976. Estudo sistemático e histológico de quatro espécies de Endomyaria (Actiniaria) encontradas no município de Aracruz, Espírito Santo, Brasil (MSc dissertation) 50 pp., 28 figs., Rio de Janeiro.
- BELÉM, M.J.C. & J.C. PRESLECRAVO. 1973. Contribuições ao conhecimento da fauna de Cnidários do Espírito Santo, Brasil I Considerações sobre Actiniaria do Município de Aracruz, ES. *Bolm Mus. Biol Prof Mello-Leitão, S. Zool* 80:1-14, 9 figs.
- CARLGRÉN, O. 1934. Zur Revision der Actiniarien. *Ark Zool* 26A(18):1-36, 18 figs.
- CARLGRÉN, O. 1949. A survey of the Ptychodactiaria, Corallimorpharia and Actiniaria. *K. Svenska Vetensk.-Akad. Handl* 1(1):1-121, 4 pls.
- CORREA, D.D. 1964. Corallimorpharia e Actiniaria do Atlântico Oeste Tropical (Full-professorship thesis, USP) 139 pp., 16 figs, 4 mps. Universidade de São Paulo, São Paulo.
- DANA, J.D. 1848. Zoophytes in U.S. Exploring Expedition during the years 1838-42, 7:121-154, Philadelphia.
- DANA, J.D. 1849. Zoophytes in U.S. Exploring Expedition during the years 1838-42 (Atlas) 12 pp. 81 pls., Philadelphia
- DUBE, V.M.C. 1974. Anêmonas do mar (Ordem Actiniaria) do Estado da Bahia (MSc dissertation) 89 pp., 27 figs., São Paulo
- DUBE, V.M.C. 1976. Contribuição ao estudo das anêmonas-do-mar do Estado da Bahia. Parte II. *Phyllactis praetexta* (Dana, 1846) e *Calliactis tricolor* (Lesueur 1817). *Natura* 2(1/2):101-110.
- DUCHASSAING, P. & J. MICHELOTTI 1860. Mémoire sur les coralliaires des Antilles. *Mem. Reale Accad. Torino* 2(19):1-89, 10 pls. Torino.

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- DUERDEN, J.E. 1898. The Actiniaria around Jamaica. *Jl Inst. Jamaica* 2(5):449-465
- DUERDEN, J.E. 1902 Report on the Actiniaria of Porto Rico. *Bull U.S. Fish Comm* 20(2)(1900):321-374, 12 pls.
- HUTTON, F.W. 1878. The sea anemones of New Zealand. *Trans. N.Z. Inst.* 11:308-314
- LESUEUR, C.A. 1817 Observations on several species of the genus *Actinia*. *J. Acad. Nat. Sci. Philad.* 1:149-154, 169-189
- MANJARRÉS, G.A. 1978. Nuevos encuentros de *Actinias* (Hexacorallia) en la region de Santa Marta, Colombia. *An. Inst. Invest. mar. Punta Betin* 10:127-132, 4 figs.
- MCMURRICH, J.P. 1905. A revision of the Duchassaing & Michelotti actinian types in the Museum of Natural History, Turin. *Boll. Musei Zool. Anat. comp. R. Univ. Torino* 20(494):1-23, 8 figs.
- MILNE EDWARDS, H. 1857 *Histoire Naturelle de Corallieres ou Polypes proprement dits* (Atlas) 1, 326 pp., 31 pls, Librairie Encyclopédique de Roret, Paris.
- MILNE-EDWARDS, H. & J HAIME 1851 *Monographie des Polypiers fossiles, précédée d'un tableau général de la classification des Polypes*. *Arch. Mus* 5:1-504.
- OTTOMAN, F 1963. L'Atoll des Rocas dans l'Atlantique Sud Tropical. *Revue Géogr. Phys. Géol. dyn.* (2)5(2):101-107
- PAX, F 1914 *Die Actinien*. *Ergebn. Fortschr. Zool* 4:339-640. 182 figs.
- PAX, F. 1916. Studien an westindischen Actinien. *Zool Jb. Syst. Suppl* 11(2):157-330, pls. 11-19.
- PAX, F 1924. Actiniarien, Zoantharien und Ceriantharien von Curaçao. *Bijdr. Dierk. Fauna Curaçao* 23(7):93-122, pl 9, 22 figs.
- SCHMIDT, H. 1969. Die Nesselkapseln der Aktinien und ihre differential-diagnostische Bedeutung. *Helgolaender wiss. Meeresunters.* 19(2):284-313, 11 figs.
- SCHMIDT, H. 1972. Prodomus zu einer Monographie der mediterranen Aktinien. *Zoologica* 121:1-146, 36 figs.
- SCHMIDT, H. 1974. On the evolution of Anthozoa. *Proc. Second Intern. Coral Reef Symp.* 533-560, 16 figs.
- STEELE, R.D. & N.Y GOREAU 1977 The breakdown of symbiotic zooxanthellae in the sea anemone *Phyllactis* (= *Dulactis*) *flosculifera* (Actiniaria) *J. Zool* (London) 181(4):421-437
- STEPHENSON, T.A. 1922 On the classification of Actiniaria. Part III Definitions connected with the forms dealt with in Part II *Q. Jl microsc., Sci* 66:247-319
- STUCKEY, F.G.A. 1909. A review of the New Zealand Actiniaria known to science, together with a description of twelve new species. *Trans N.Z. Inst* 41(1908):374-398

- VERRILL, A.E. 1869 Notes on Radiata N.6 - Revision of the Corals and Polyyps of the West Coast of America. *Trans. Conn. Acad. Arts Sci* 1(2):377-545
- VERRILL, A.E. 1899. Descriptions of imperfectly known and new Actinians, with critical notes on other species II. *Am. J. Sci* 7(1898): 41-50, figs. 7-15
- VERRILL, A.E. 1907 The Bermuda Islands. Part V. An account of the Coral Reefs (Characteristic life of the Bermuda Coral Reefs) *Trans Conn. Acad. Arts Sci* 12:204-348
- WASSILIEFF, A. 1908. Japanische Actinien in Doflein: Beiträge zur Naturgeschichte Ostasiens. *K. Bayer Akad. Wiss.* 1, Suppl Bd. 2:1-52, 11 pls.
- WATZL, O. 1922. Di Actiniarien der Bahamainseln. *Ark Zool.* 14(24):1-89, 10 figs.

Phyllactis correae n.sp. (Cnidaria, Actiniaria, Actiniidae)

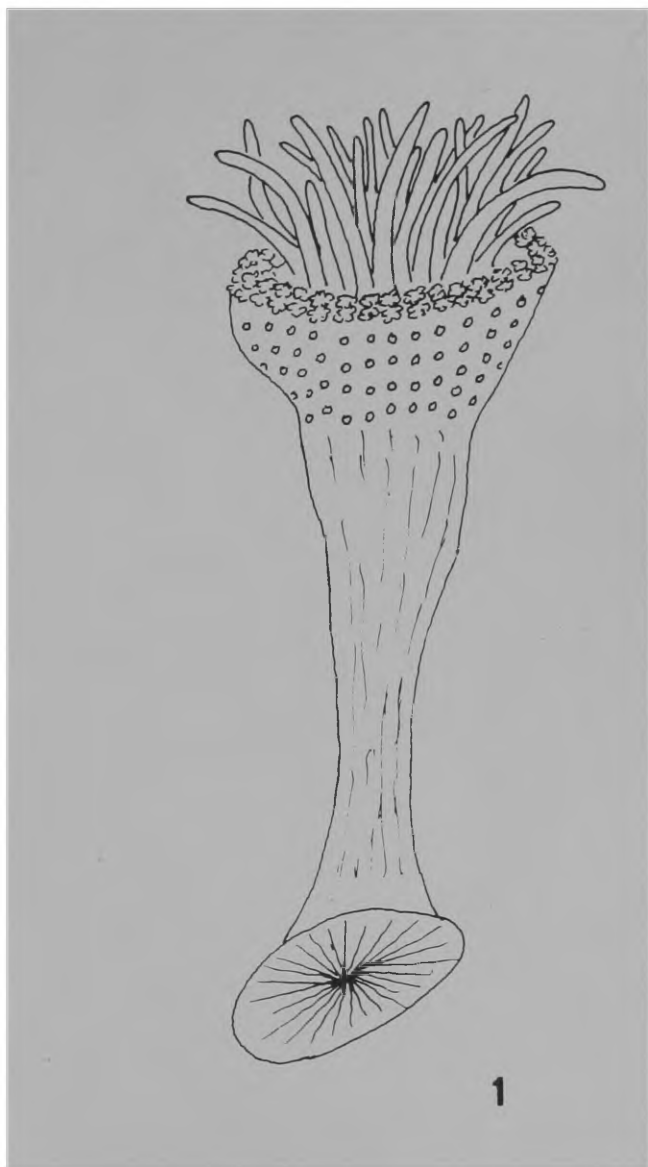
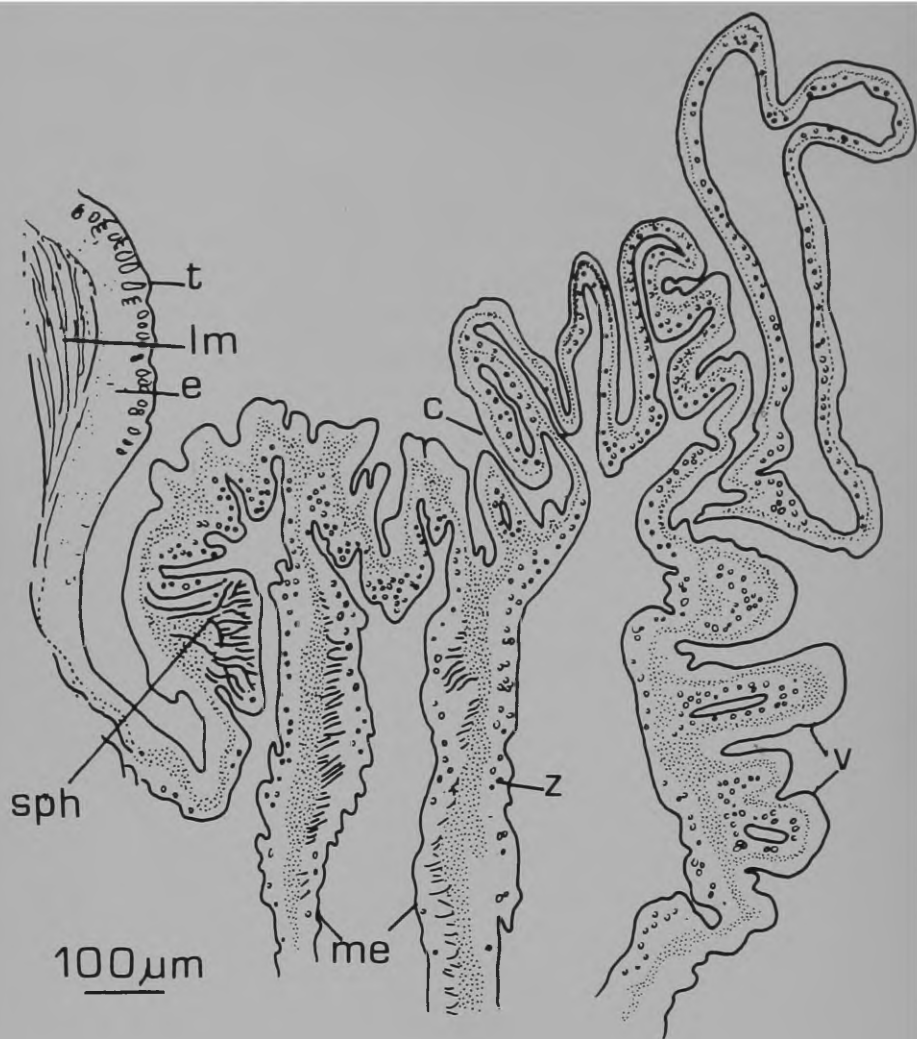


Fig. 1 *P. correae*, preserved specimen.



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Fig. 2. *P. correae*, distal part of column.

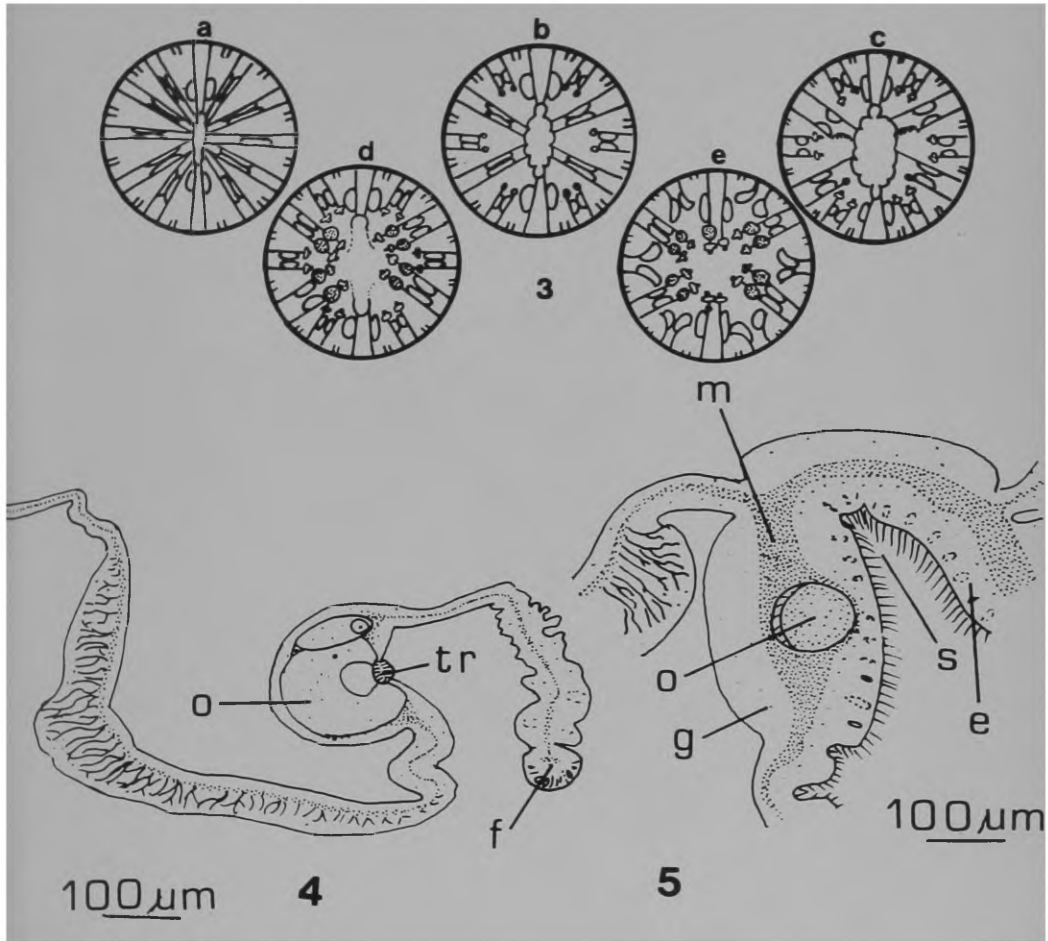
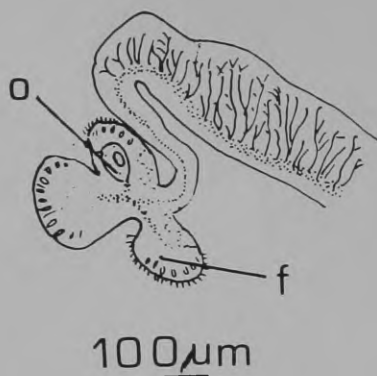
Phyllactis correae n.sp. (Cnidaria, Actiniaria, Actiniidae)

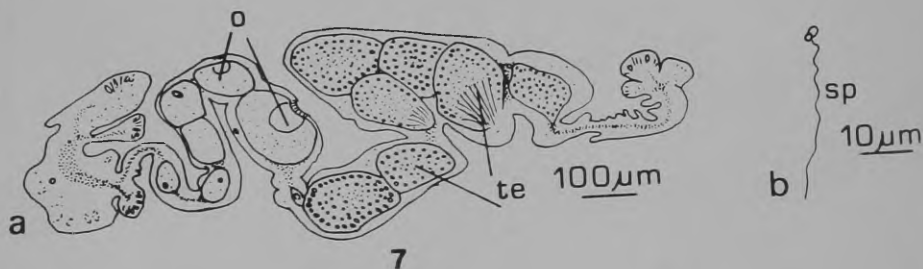
Fig. 3. Schematic diagrams of transverse sections at different levels in *P. correae*; a = upper region of pharynx, b = middle region of pharynx, c = lower region of pharynx, d = just below pharynx, with siphonoglyphs still present, e = below pharynx.

Fig. 4. *P. correae*, detail of oocyte in normal gonad region of paratype Col CNID. MN 00555

Fig. 5. *P. correae*, detail of siphonoglyph with oocyte in mesogloea, paratype Col CNID. MN 00555.



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Fig. 6. *P. correae*, detail of oocytes in filament of paratype Col CNID MN 00555

Fig. 7. *P. correae*, a. detail of mesentery in monoecious individual, paratype Col CNID. MN 0057; b. spermatozoon

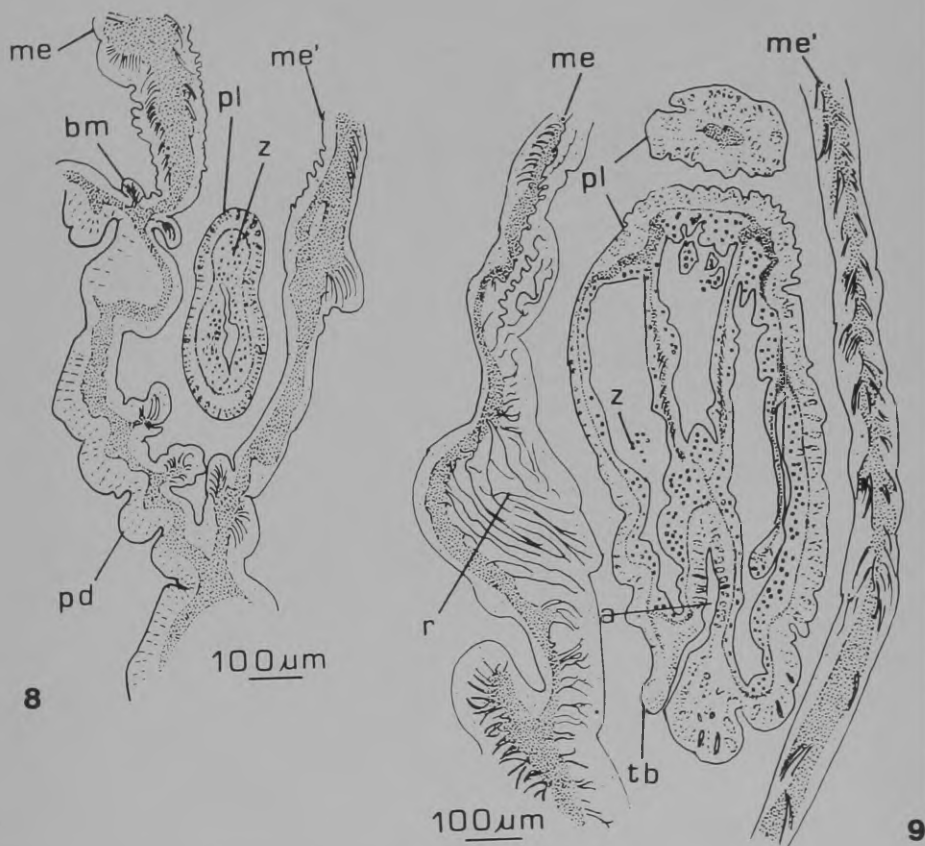
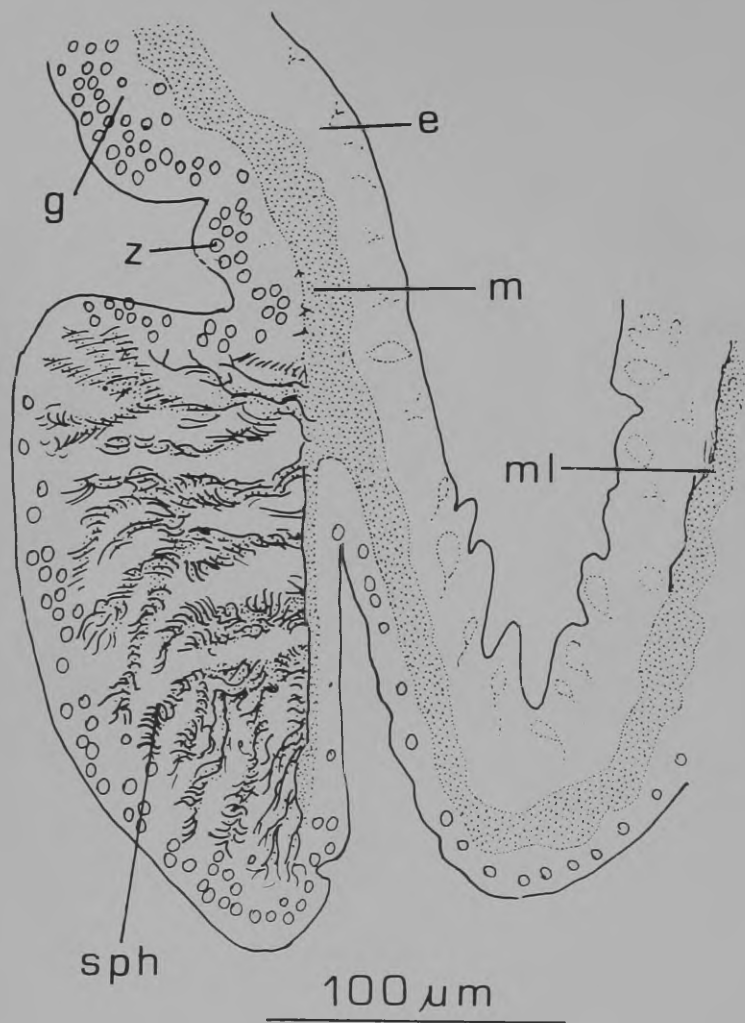
Phyllactis correae n.sp. (Cnidaria, Actiniaria, Actiniidae)

Fig. 8. *P. correae*, longitudinal section of a planula in one of the gastric chambers of paratype Col. CNID. MN 00557

Fig. 9. *P. correae*, longitudinal section of two planulae at different stages of growth in one of the gastric chambers of paratype Col. CNID. MN 00557



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Fig. 10. *P. correae*, detail of sphincter.

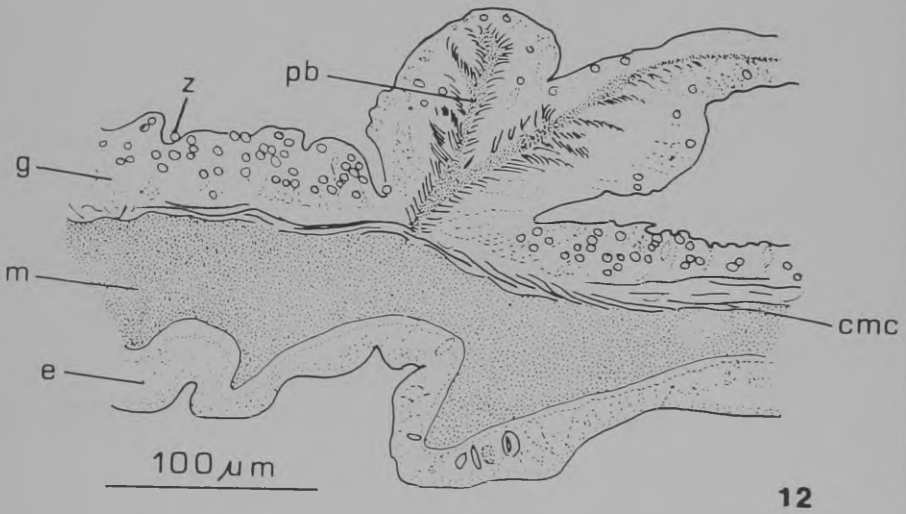
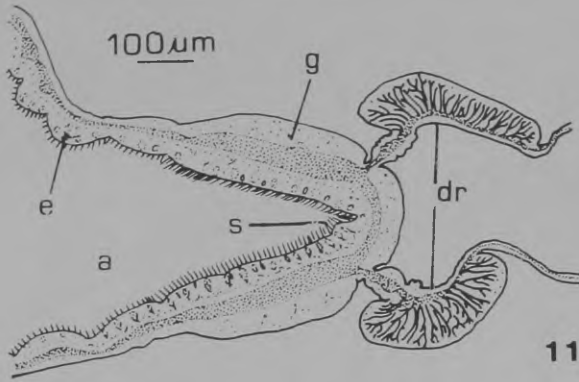
Phyllactis correae n.sp. (Cnidaria, Actiniaria, Actiniidae)

Fig. 11 *P. correae*, directives and siphonoglyph.

Fig. 12. *P. correae*, detail of column, longitudinal section.

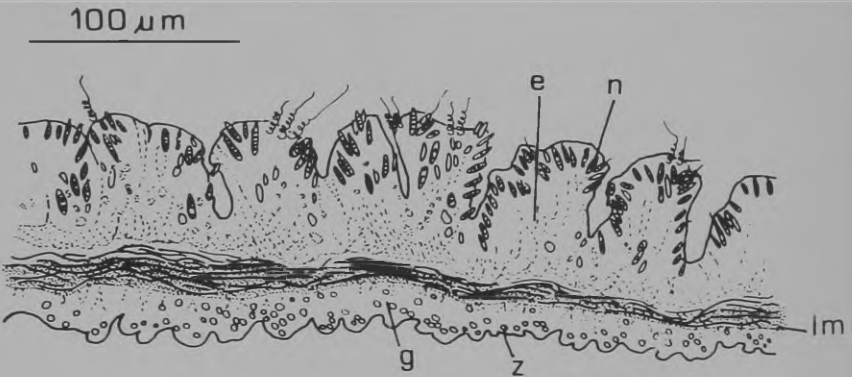
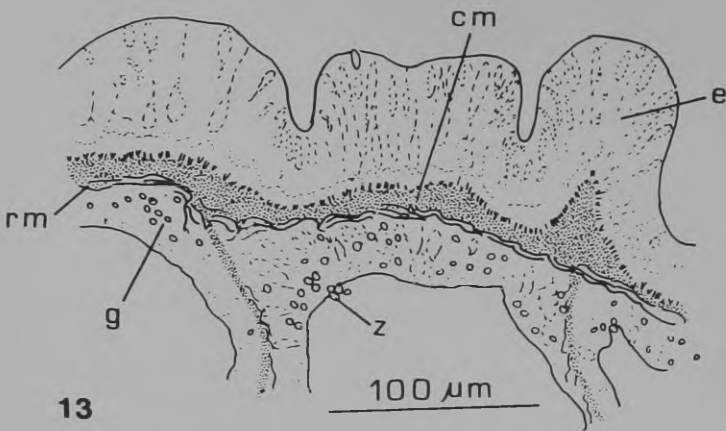
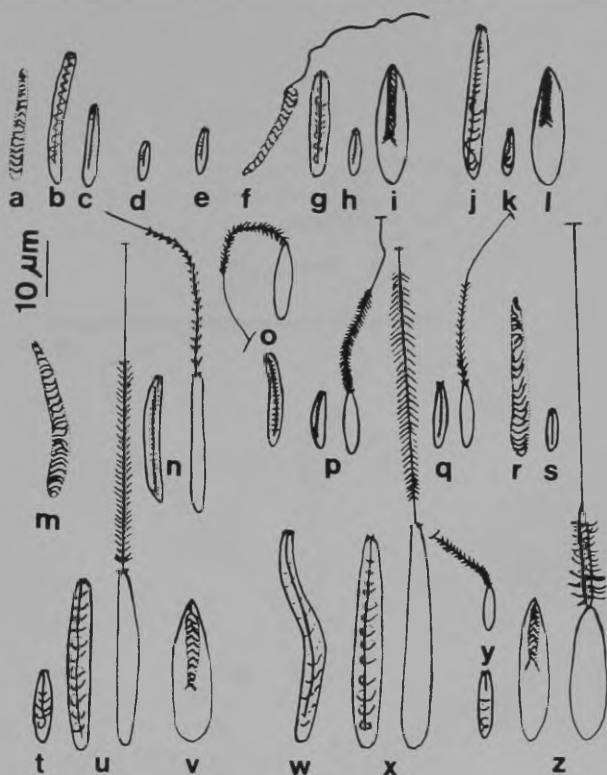


Fig. 13. *P. correae*, detail of oral disc

Fig. 14. *P. correae*, detail of tentacle. longitudinal section.

Phyllactis correae n.sp. (Cnidaria, Actiniaria, Actiniidae)

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Fig. 15. Cnidom. a-l: *P. correae*. Tentacles: a = spirocyst, b-c = b-rhabdoids. Collar: d = b-rhabdoid. Column: e = b-rhabdoid. Pharynx: f = spirocyst, g-h = b-rhabdoids, i = p-rhabdoid A. Filaments: j-k = b-rhabdoids, l = p-rhabdoid A. m-z = *P. flosculifera*. Tentacles: m = spirocyst, n-o = b-rhabdoids. Collar: p = b-rhabdoid, Column: q = b-rhabdoid. Pharynx: r = spirocyst, s-t-u = b-rhabdoids, v = p-rhabdoid A. Filaments: w-x-y = b-rhabdoids, z = p-rhabdoid A.

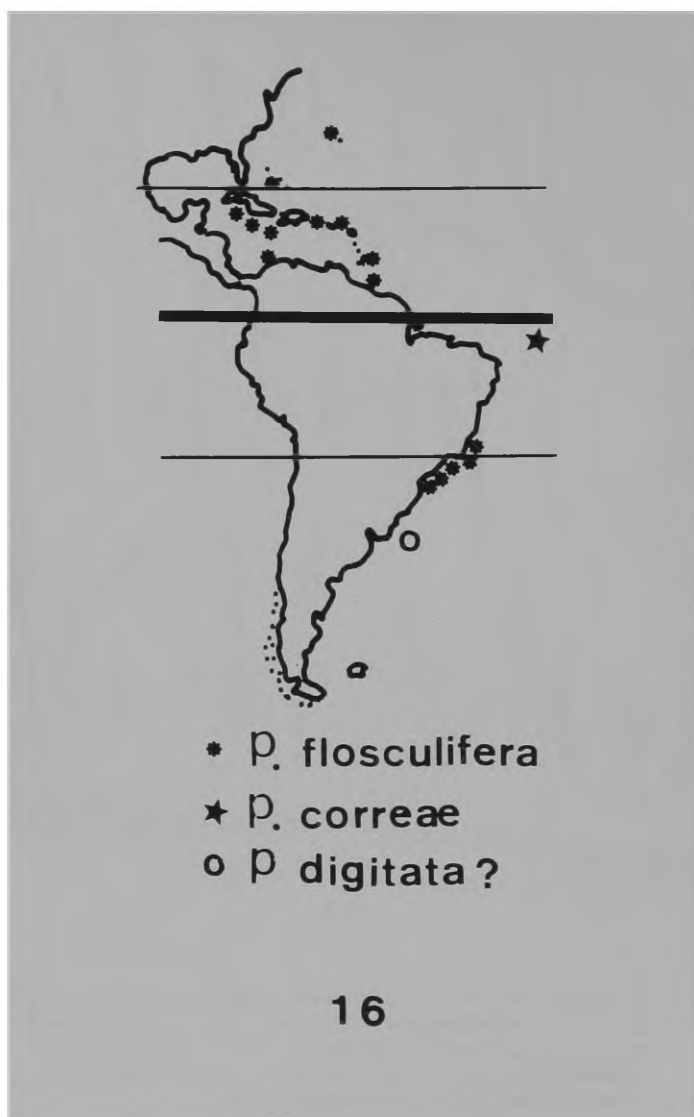


Fig. 16. Distribution of species of *Phyllactis* in the Western Atlantic

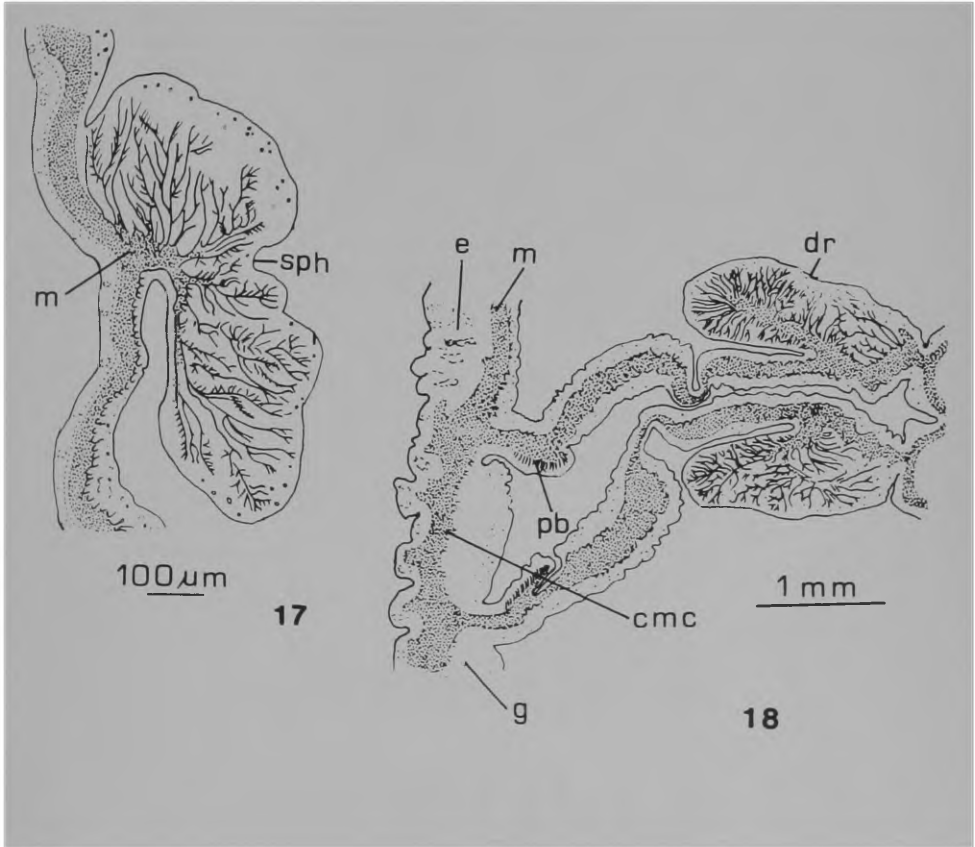


Fig. 17 *P. flosculifera*, sphincter

Fig. 18. *P. flosculifera*, directives.

Table 1. Comparison between the cuticle of the Brazilian species of *Phyllactis* (measures in μm)

STRUCTURE	TYPE OF NEMATOCYST	<i>P. correae</i>	<i>P. flosculifera</i>
TENTACLES	spirocysts	17.3 (11.3-22.7)	1.9 (1.2-2.5)
	b-rhabdoids	22.6 (18.9-24.5) x 1.9 (1.2-2.5)	20.0 (10.7-25.8) x 1.6 (1.3-2.5)
	b-rhabdoids	14.9 (13.2-17.0)	24.4 (20.2-27.7) x 2.0 (1.9-2.5) 14.6 (10.1-17.0) x 1.5 (1.3-1.9)
COLLAR	b-rhabdoids	9.0 (7.5-10.1) x 1.2	10.0 (8.2-11.3) x 1.3
	b-rhabdoids	8.3 (5.0-11.3)	11.7 (10.1-13.2) x 1.3
ACTINOPHARYNX	spirocysts	16.9 (9.4-22.7) x 2.0 (1.9-3.1)	20.9 (12.6-27.7) x 1.9 (1.3-2.5)
	b-rhabdoids	20.8 (18.9-22.7) x 2.6 (1.9-3.1)	27.2 (25.2-28.3) x 2.5 (1.9-3.1)
	b-rhabdoids	-----	16.2 (13.2-22.0)
	b-rhabdoids	8.2 (6.3-11.3) x 1.4 (1.2-1.9)	10.1 (8.8-11.3)
	p-rhabdoids A	20.0 (15.7-23.3) x 4.1 (3.1-5.0)	20.5 (16.4-22.7)
FILAMENTS	b-rhabdoids	28.8 (26.4-30.2)	37.1 (34.6-39.7)
	b-rhabdoids	-----	39.1 (33.4-42.2) x 2.0 (1.9-2.5)
	b-rhabdoids	9.8 (6.9-11.9) x 1.5 (1.2-1.9)	11.5 (8.8-13.9) x 1.3
	p-rhabdoids A	20.6 (18.9-22.7)	23.3 (20.8-25.2)

Phyllactis correae n.sp. (Cnidaria, Actiniaria, Actiniidae)

Abbreviations used in figures

a	=	actinopharynx
bm	=	basilar muscle
c	=	collar
cm	=	circular muscles of oral disc
cmc	=	circular muscles of column
dr	=	directive retractor muscles
e	=	epidermis
f	=	filament
g	=	gastroderm
lm	=	longitudinal muscles
m	=	mesogloea
me	=	mesenteries
n	=	nematocysts
o	=	oocytes
pb	=	parieto-basilar muscle
pd	=	pedal disc
pl	=	planulae
r	=	retractor
rm	=	radial muscles of oral disc
s	=	siphonoglyph
sp	=	spermatozoon
sph	=	sphincter
t	=	tentacles
tb	=	tentacular bud
te	=	testes
tr	=	trophonema
v	=	verrucae
z	=	zooxanthellae

