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On the sea anemone *Paracondylactis hertwigi* (Wassilieff, 1908)

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ABSTRACT

The type species of the genus *Paracondylactis* Carlgren, 1934 (Carlgren, 1934), *P. hertwigi* (Wassilieff, 1908), is redescribed based on specimens from the coast of São Paulo, Brazil.

A comparison is made with the first redescription of the species (Carlgren, 1934), as well as with the other two species of the genus, *P. sinensis* Carlgren, 1934 (Carlgren, 1934) and *P. dawydoffi* Carlgren, 1943 (Carlgren, 1943).

Until now the genus was known only from East Asiatic localities.

RESUMO

É redescrita a espécie tipo do gênero *Paracondylactis* Carlgren, 1934 (Carlgren, 1934), *P. hertwigi* (Wassilieff, 1908), com base em espécimes provenientes da costa de São Paulo, Brasil.

Uma comparação é feita com a primeira redescrição da espécie (Carlgren, 1934), assim como também com as outras duas espécies do gênero, *P. sinensis* Carlgren, 1934 (Carlgren, 1934) e *P. dawydoffi* Carlgren, 1943 (Carlgren, 1943).

O gênero era conhecido até agora apenas de localidades do Leste Asiático.

Genus *Paracondylactis* Carlgren, 1934 (Carlgren 1949, p. 55)

Actiniidae with very long body and narrow pedal disc. Column smooth, sometimes with nematocysts in groups. On the margin an annulus of perforated pseudospherules. *Deep fosse present.* Sphincter diffuse. Tentacles rather short, arranged hexamerously, up to 96. Longitudinal muscles of tentacles and radial muscles of oral disc ectodermal. Two well developed siphonoglyphs, far prolonged aborally. Mesenteries somewhat more numerous distally than proximally, or *equal number distally*

and proximally, arranged hexamerously, all or almost all perfect. Two pairs of directives. Retractors strong but diffuse. Parietobasilar muscles distinct. All mesenteries, with or without the directives, fertile. Cnidom: spirocysts, basitrichs, microbasic p-mastigophors and *macrobasic amastigophors.*

The genus *Paracondylactis* was introduced by Carlgren (1934), for one species of sea anemone described by Wassilieff (1908), in the genus *Condylactis* Duchassaing & Michelotti, 1866.

This procedure was based on a few remarks and the diagnosis of *Condylactis* given by Stephenson (1922, p. 268-270), which has no sphincter nor any kind of spherules.

Carlgren (1934) redescribed Wassilieff's species, *P. hertwigi* (Wassilieff, 1908), and described two further species of *Paracondylactis, P. sinensis* Carlgren, 1934 (Carlgren, 1934) and *P. dawydoffi* Carlgren, 1943 (Carlgren, 1943).

The diagnosis of *Paracondylactis,* presented here, received a few modifications.

The deep fosse, present in all three known species, was added, and an alternative introduced for the number of mesenteries distally and proximally. Carlgren (1934) mentions that the last cycle of mesenteries does not reach the border of the pedal disc, as occurs in the present specimens examined here.

In *P. hertwigi* from the coast of São Paulo there is one more type of nematocysts, the macrobasic amastigophors, which according to the new terminology of Schmidt (1969, 1972), corresponds to the p-Rhabdoid B2b type.

By study of the literature we deduced that the cnidom of *Paracondylactis* was established by Carlgren's examination of *P. dawydoffi* Carlgren, 1943. The nematocysts of *P. hertwigi* and *P. sinensis* were measured by Carlgren (1934) but, except for the spirocysts, they did not receive names, or received obsolete names as "spirulae" and "penicilli". However Carlgren (1943) does not mention spirocysts for *P. dawydoffi.*

Paracondylactis hertwigi (Wassilieff, 1908) (Figures 1-6)

Locality. Southern border of Ribeira Bay ("Saco da Ribeira"), situated about 15 km Southwest of Ubatuba, Northern Coast of São Paulo State, Brazil. It is a well protected small bay, inside the larger Flamengo Bay ("Enseada do Flamengo"), with shallow water and muddy bottom, flanked by rocky boulders and reefs.

The sea anemones live buried in sand, in the intertidal zone, leaving only the oral disc and tentacles exposed. Five specimens collected by Dr. Erika Schlenz. July, 1972.

External Description. The *base* (Figure 1) is narrow, circular, irregular when detached, wider, or with the same diameter, as the limb. It adheres firmly to a hard substrate, pebble or shell fragment. Colour dirty whitish gray. Diameter: 1.5 cm. The *column* is rather long, simple and smooth, but wrinkled in preserved animals. It bears a ring of 48 marginal pseudo-

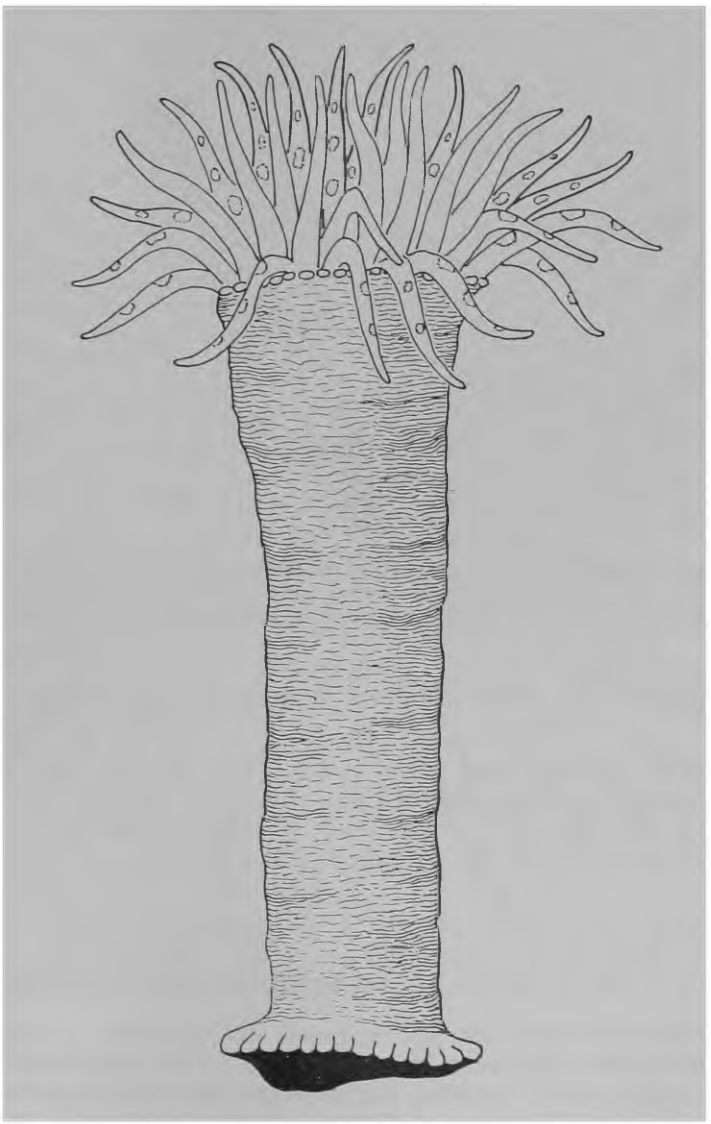

Fig. 1 — Total view of a preserved specimen.

spherules, situated on the outer rim of the deep fosse. Colour as the base. Height: up to 5.0 cm. Diameter at the limb: 1.0 cm. At the margin: 1.5 cm. The *tentacles* (Figures 1-2) are rather short, conical and pointed. They are 48 in number, hexamerously arranged in three cycles according the form 12-12-24. Their colour is also whitish gray, with opaque white oval zones and grayish blue irregular transverse stripes, both situated on the oral side of the tentacles. The length is about the same

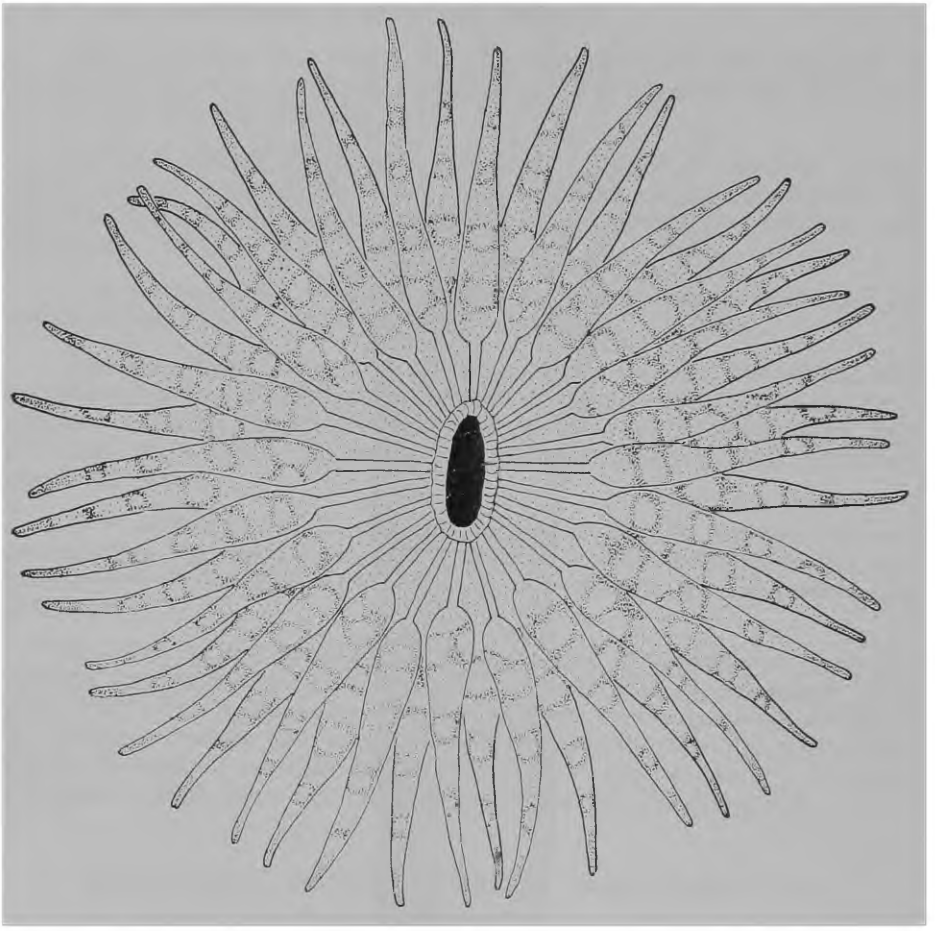

Fig. 2 — View of the oral disc and tentacles in a preserved specimen.

in all three cycles. Maximum length: 1.0 cm. The *oral disc* (Figure 2) is simple, light colored, showing radial stripes corresponding to the mesenteric insertions. Diameter: 1.5 cm.

Internal Description. The actinopharynx (Figure 3, *a*) is short but broad and contains several folds. There are two deep siphonoglyphs (*s*), very

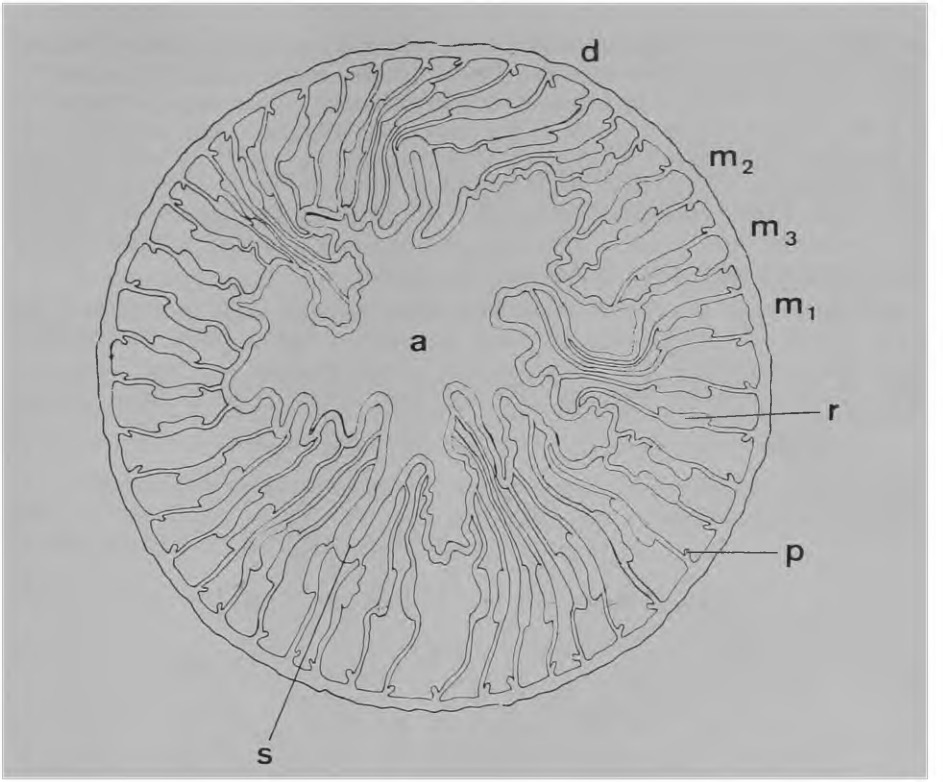

Fig. 3 — Section at the upper actinopharynx level. *a*, actinopharynx; *d*, directives; m_1, first cycle of mesenteries; m_2, second cycle of mesenteries; m_3, third cycle of mesenteries. *p*, parietobasilar muscles; *r*, retractor muscles; *s*, siphonoglyph.

much extended aborally, beyond the inner border of the actinopharynx (Figure 4, *s*).

For the study of the number, types and cycles of mesenteries, as well as the presence of gonads and filaments, several transverse sections were made in various levels of the column. The following description is based upon 4 sections, which represent all the characteristics of the mesenteries.

The number of mesenteries is 48 (24 pairs), both proximally and distally (Figures 3-6). They are distributed in 22 pairs of ordinary mesenteries and 2 pairs of directives (*d*).

Figure 3 represents the mesenteries at the upper actinopharynx level, immediately below the oral disc. All 48 mesenteries are perfect, but the retractor muscles (*r*) are weak at this level.

Figure 4 shows a section below the actinopharynx level, but, as the siphonoglyphs (*s*) are prolonged aborally, they are still present on this level. The 48 mesenteries are distributed in 3 cycles: the first cycle (m_1)

includes 6 pairs of large mesenteries, of which 4 pairs are ordinary mesenteries, containing gonads (*g*) and filaments (*f*), and 2 pairs are the directives (*d*) still attached to the siphonoglyph walls. Their retractor muscles (*r*) are a little stronger than in the preceding Figure. The second cycle is composed of 6 pairs of medium size mesenteries (m_2), all with gonads and filaments. The third cycle contains 12 pairs of short mesenteries (m_3), also with gonads and filaments. At this level all mesenteries, except the directives, are fertile. The retractor muscles (*r*) are a little thinner in the second and third cycles of mesenteries.

Figure 5 is a section below the siphonoglyph level and shows the three cycles of mesenteries disposed as follow: the 6 pairs of the first cycle (m_1), including the directives (*d*), have gonads (*g*) and filaments (*f*). Their retractor muscles (*r*) are very thick. The 6 pairs of the

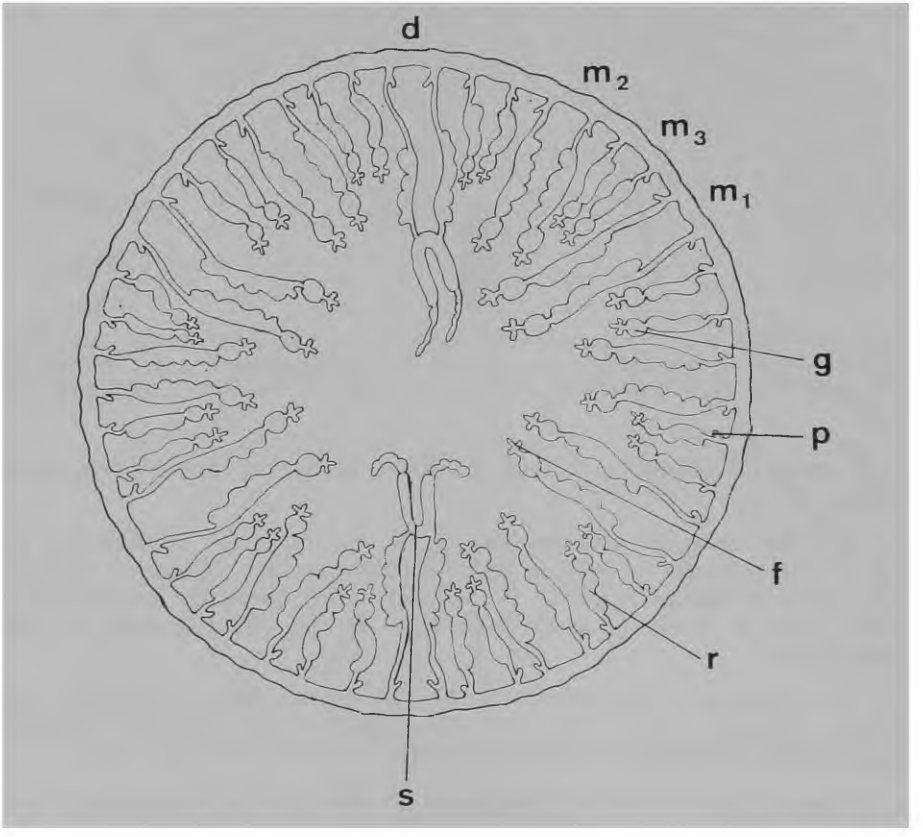

Fig. 4 — Section at the lower siphonoglyph level. *d*, directives; *f*, filament; *g*, gonad; m_1, first cycle of mesenteries; m_2, second cycle of mesenteries; m_3, third cycle of mesenteries; *p*, parietobasilar muscles; *r*, retractor muscles; *s*, siphonoglyph.

second cycle (m_2) have also strong retractor muscles, but no gonads or filaments. The retractor muscles of the 12 pairs of the third cycle (m_3) are thin and gonads or filaments are also absent.

Figure 6 shows that the three cycles of mesenteries (m_1, m_2, m_3) have no gonads or filaments at a level immediately above the pedal disc. The retractor muscles (r) are thin and all mesenteries reach the lower border of the base.

In conclusion, all mesenteries are perfect at the upper actinopharynx level, all are fertile, including the directives, and their number is equal distally and proximally.

The sphincter belongs to the diffuse endodermal type. It is long and broadly attached to the column. The retractor muscles of the mesenteries are also of the diffuse type, not being strongly concentrated.

The parietobasilar muscles (p) are delicate, extending up to the distal part of the body. There are one oral and one marginal stoma situated on the upper part of the mesenteries.

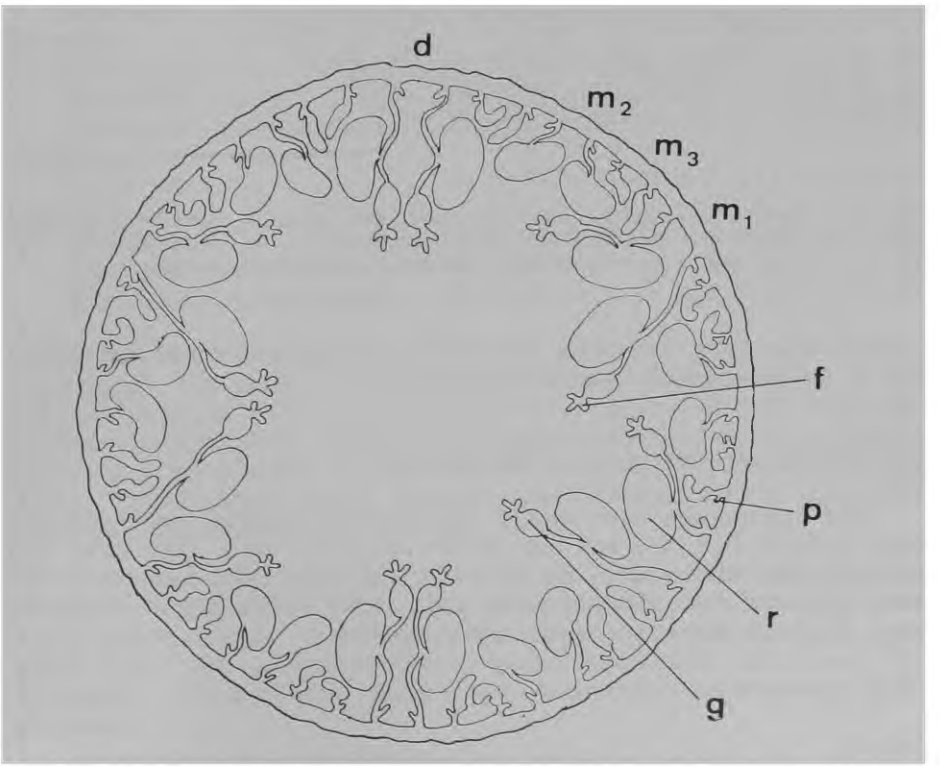

Fig. 5 — Section below the actinopharynx level. *d*, directives; *f*, filament; *g*, gonad; m_1, first cycle of mesenteries; m_2, second cycle of mesenteries; m_3, third cycle of mesenteries; *p*, parietobasilar muscles; *r*, retractor muscles.

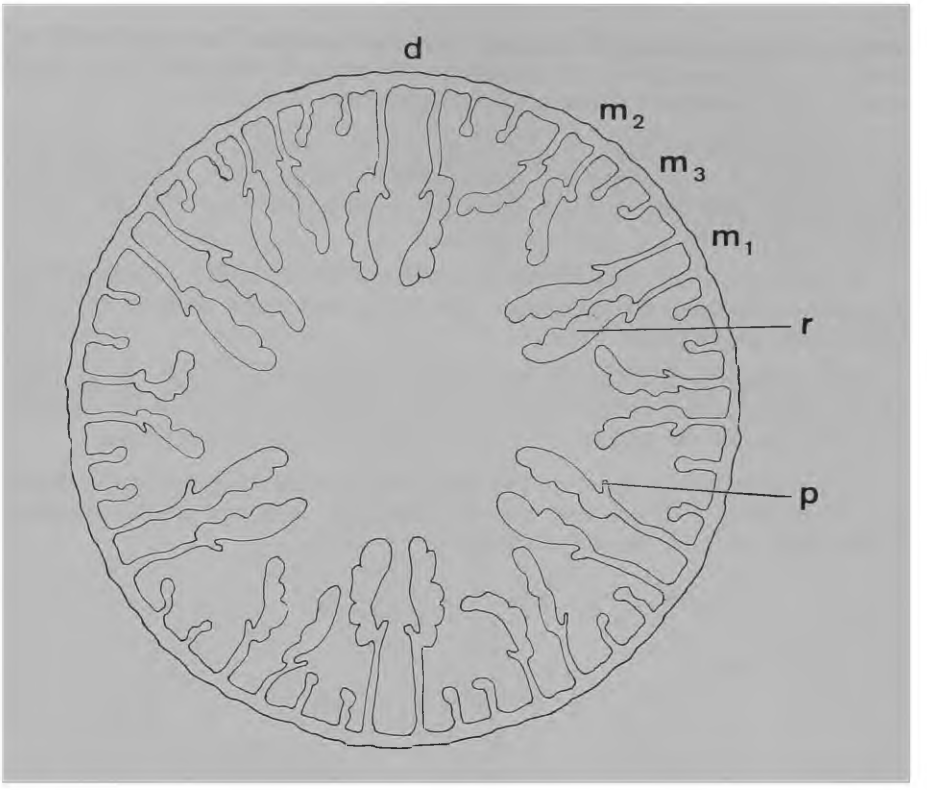

Fig. 6 — Section immediately above the pedal disc level. *d*, directives; m_1, first cycle of mesenteries; m_2, second cycle of mesenteries; m_3, third cycle of mesenteries; *p*, parietobasilar muscles; *r*, retractor muscles.

Cnidom. Spirocysts, basitrichs, microbasic p-mastigophors and macrobasic amastigophors (p-Rhabdoid B2b).

Distribution and Dimension of Nematocysts

The nematocysts were studied and measured in two specimens, one large (height: 5.0 cm) and one smaller one (4.0 cm). The types and measurements differ slightly in these two specimens. For instance, in the small specimen, macrobasic amastigophors occur in the column but in the large specimen they occur in the actinopharynx.

Large specimen

Column	
Basitrichs	14.3 (13.2-15.0) × 1.5 (1.2-1.8) μm
Pseudospherules	
Basitrichs	13.0 (9.6-13.8) × 1 7 (1.2-1.8) μm

Tentacles	
Spirocysts	15.9 (12.0-18.0) × 2.0 (1.2-2.4) μm
Basitrichs	15.4 (10.2-19.8) × 1 7 (1.2-1.8) μm
Macrobasic amastigophors	23.3 (21.6-25.8) × 5.8 (4.2-6.0) μm
Actinopharynx	
Basitrichs	21.8 (16.8-25.2) × 2.0 (1.2-2.4) μm
Macrobasic amastigophors (very rare)	24.6 (21 6-28.2) × 6.8 (6.0-7.8) μm
Filaments	
Basitrichs	32.2 (19.2-36.6) × 3.5 (1.8-4.2) μm
Microbasic p-mastigophors	17.9 (16.8-19.2) × 3.8 (3.0-4.8) μm
Macrobasic amastigophors	26.0 (22.8-27.6) × 7.6 (7.2-7.8) μm

Small specimen

Column	
Basitrichs	15.9 (14.4-17.8) × 1.8 μm
Macrobasic amastigophors (very rare)	23.8 (22.8-24.6) × 6.2 (5.4-7.2) μm
Pseudospherules	
Basitrichs	13.6 (12.6-14.4) × 1.6 (1.2-1.8) μm
Tentacles	
Spirocysts	14.6 (11.4-17.4) × 1.9 (1.8-2.4) μm
Basitrichs	16.3 (12.0-18.0) × 1 7 (1.2-1.8) μm
Macrobasic amastigophors	23.6 (21.0-25.8) × 5.7 (4.8-6.6) μm
Actinopharynx	
Basitrichs	17.8 (13.8-21.0) × 2.1 (1.2-3.0) μm
Filaments	
Basitrichs	37.9 (18.0-42.0) × 4.4 (1.8-4.8) μm
Microbasic p-mastigophors	18.7 (16.8-20.4) × 3.5 (3.0-4.2) μm
Macrobasic amastigophors	30.0 (27.0-31.8) × 6.8 (6.0-7.2) μm

Discussion. The genus *Paracondylactis* Carlgren, 1934, known up to now only from East Asia (China Sea and Coasts of Japan), includes 3 species: *P. hertwigi* (Wassilieff, 1908), from Yang-tze-Kiang, Swatow, Amakusa, Suruga Bay and Enoura Bay; *P. sinensis* Carlgren, 1934, from Yang-tze-Kiang, Tschou-schan Island, Swatow and Schönau; and *P. dawydoffi* Carlgren, 1943, from Poulo Condore.

The specimens from the coast of São Paulo were identified as *P. hertwigi* (Wassilieff, 1908). They differ from the ones from East Asia, but in minor details. 1) height of the column (respectively 4.0-5.0 cm and 5.5-16.0 cm); 2) disposition of tentacles (12-12-24 and 6-6-12-24); 3) number of mesenteries distally and proximally (equal and smaller proximally).

The cnidom and measurements of nematocysts of the specimens from East Asia (Carlgren, 1934) were not considered, because their study is incomplete. The comparison of the colours of the specimens from East

Asia and São Paulo does not offer much distinction as they are quite similar.

P. hertwigi differs from the other two species of the genus by the following characteres: 1) number of tentacles (*P. hertwigi* — 48, *P. sinensis* — 96, *P. dawydoffi* — about 90); 2) number of mesenteries (*P. hertwigi* — 48, *P. sinensis* — 96, *P. dawydoffi* — ?); 3) gonads (*P. hertwigi* — in all mesenteries, including directives, *P. sinensis* — in all mesenteries, except directives, *P. dawydoffi* — in all mesenteries, except one directive).

The height of the column was not considered for comparison (*P. hertwigi* — 5.5-16.0 cm, *P. sinensis* — 9.0-18.5 cm, *P. dawydoffi* — 7.5 cm).

From the original description of *P. sinensis* the cnidom is poorly known (Carlgren, 1934). The cnidom of *P. dawydoffi* was indicated, as well as the measurements of nematocysts (Carlgren, 1943). They differ somewhat from those of *P. hertwigi* presented here. The column, tentacles, actinopharynx and filaments of *P. hertwigi* have macrobasic amastigophors and the tentacles have spirocysts, both types not mentioned for *P. dawydoffi*. In turn the last species has microbasic p-mastigophors in the actinopharynx, not observed for *P. hertwigi*.

The papers of Corrêa (1964, 1973a, 1973b) and Belém & Preslercravo (1973) reveal that the 19 species of sea anemones known for Brazil occur mostly in the Western (Northern and Southern) Atlantic Ocean, except for one from Madeira Island and the Mediterranean.

P. hertwigi (Wassilieff, 1908) is the first species of sea anemones found to occur in Brazilian waters, which was originally described from the Western Pacific Ocean.

Carlgren (1949) mentions a few cases of wide distribution among sea anemone species, e. g., *Haliplanella luciae* (Verrill, 1889), *Actinia equina* Linné, 1758, *Bolocera tuediae* (Johnston, 1832) and *Halcampoides abyssorum* Danielsen, 1890.

As the Brazilian anemonofauna is still very little known it is possible that more species with such a wide distribution will be found.

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