

***Paraphelliactis pabista*, a new species of
hormathiid sea anemone from abyssal northeastern
Pacific waters (Coelenterata: Actiniaria)**

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Accepted August 6, 1982

A new species of acontiate actinian, *Paraphelliactis pabista*, is described from waters west of Vancouver Island and between Vancouver Island and the Queen Charlotte Islands of British Columbia. The third known species in the genus, *P. pabista* inhabits muddy bottoms at depths around 2000 m.

KEY INDEX WORDS: *abyss*, *actinian*, *Pacific Ocean*, *Paraphelliactis*, *taxonomy*.

Syysis. 15:51-56 (1982)

Actinians from deep waters off the Pacific coast of North America are poorly known. Among the material collected in the course of faunistic surveys of the Canadian Pacific, and until recently kept at the Pacific Biological Station in Nanaimo, British Columbia, is a new species of acontiate sea anemone, *Paraphelliactis pabista*.

Materials and Methods

Animals were collected by trawling, fixed in formalin or picro-formol, and subsequently preserved in 75% ethanol. Data were gathered from 55 museum specimens. Histological sections 8 μ m thick were stained with hematoxylin and eosin. Cnidae were measured in smash preparations at 1000x magnification. Data on cnidae include the number of capsules measured (*n*) and the ratio of the number of animals in which a particular type of cnida was found to the total number examined for that tissue (*N*); measurements in parentheses are of single capsules that fell outside the usual range.

Description

Pedal disc

Somewhat to very much narrower than column in all except one specimen examined. Many elongate, being or showing evidence of having been wrapped around cylindrical objects such as worm tubes or echinoid spines (Fig. 1); others grasping a pebble or small bolus of mud.

Column

All individuals examined moderately to strongly contracted, with scapulus partly or completely in-

verted. Perhaps because of contraction, column of some asymmetrical, with scapulus on one side lapping over and hiding upper column of other side. Maximum column diameter 10-60 mm, widest at distal end; length generally equal to or slightly less than diameter. Scapus with longitudinal rows of 7-8 conical tubercles arrayed along endocoels; 12 rows in smaller individuals; 24, consisting of 12 rows of small ones alternating with 12 rows of large ones, in larger anemones. Most tubercles sharply pointed,

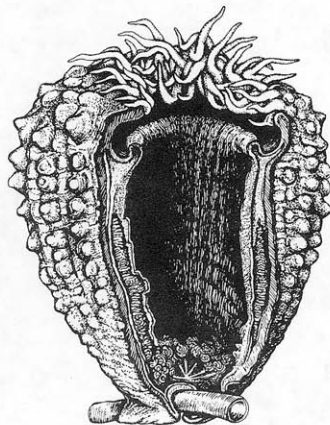


FIGURE 1. *Paraphelliactis pabista*.

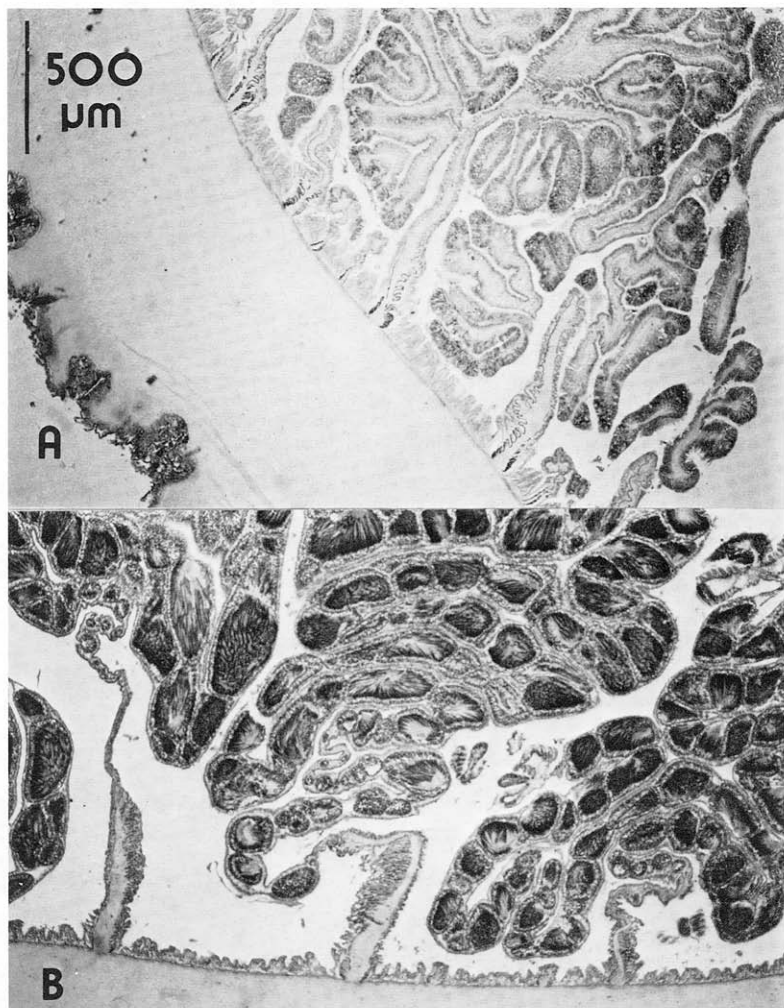


FIGURE 2. Cross-sections through column of *Paraphelliactis pabista*. A) Note thin cuticle, debris in grooves of body wall, fibers in mesoglea, and weak mesenterial musculature; holotype, NMCIC 1982-0039. B) Note greatly extended mesenteries with nearly ripe sperm; voucher, CAS 025997.

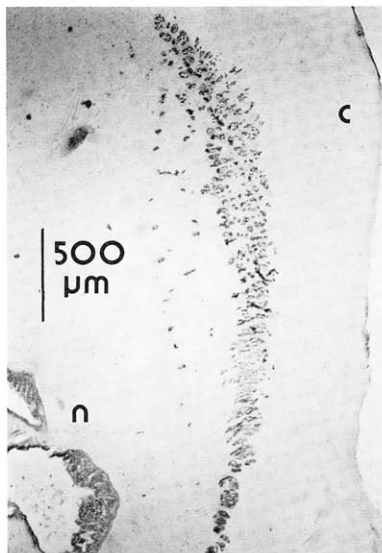


FIGURE 3. Longitudinal section through mesogleal sphincter of *Paraphelliactis pabista*. It is slightly stratified transversely at proximal end; *c* = ectodermal side, *n* = endodermal side. Voucher, CAS 025997.

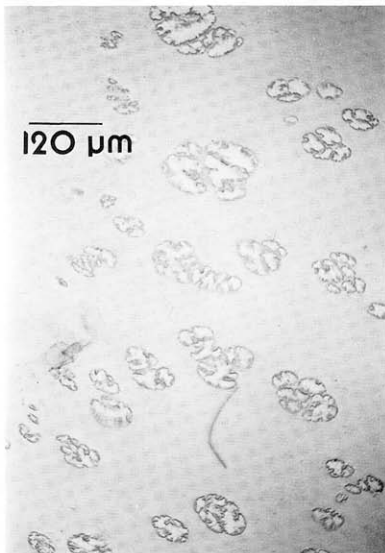


FIGURE 4. Section through muscle bundles in sphincter of *Paraphelliactis pabista*; holotype, NMCIC 1982-0040.

up to 2 mm long in larger specimens, 1 mm in small ones; about as wide basally as long; largest tubercle the most distal or penultimate one (Fig. 1). Longitudinal and circumferential grooves that trap debris (Fig. 2A) prominent between tubercles in larger animals; do not correspond to position of mesenteries. Tubercles of largest specimens eroded so that scapus reticulate; in some, distalmost tubercle the only prominent one, resembling coronal tubercle. Mesoglea very thick, rather fibrous (Fig. 2A); brownish ectoderm covered with thin cuticle (Fig. 2A) that may be preserved only in grooves.

No fosse. No cinclides. Scapulus short, smooth, not well demarcated from scapus in small individuals.

Weak sphincter mesogleal, short, slightly wider at or near distal end, with scattered muscular alveoli of various sizes (Figs. 3, 4) in marginal region. May be transversely stratified (Fig. 3); alveoli arrayed

either in narrow bands along endoderm and ectoderm, or a single band in centre of mesoglea (Fig. 3). Longitudinally oriented fibers in mesoglea may transgress sphincter.

Oral disc and tentacles

Oral disc mostly hidden in specimens examined. Radially furrowed along mesenterial insertions that are visible through disc; circumferentially-arrayed stripes of pigment between insertions. Radial musculature ectodermal, circular indistinguishable.

Tentacles at periphery of oral disc, arranged in distinct cycles. Inner ones up to 10 mm long, smooth, tapered to pointed tip (Fig. 1), mesoglea of basal end thickened on aboral side (Fig. 5); outermost tentacles 1–2 mm long, pointed, most lacking bulb but some arising from tentacle bulbs of large ones. Number variable and difficult to ascertain; maximum greater than 150. Musculature equally developed all around at distal end, but may be disrupted by bulb proximally; longitudinal muscles ectodermal, circular endodermal (Fig. 5).

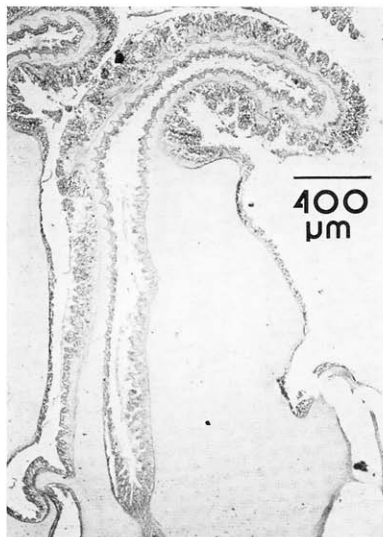


FIGURE 5. Longitudinal section through tentacle of *Paraphelliactis pabista*; note greatly thickened mesoglea basally on aboral side; voucher, CAS 025997.

Mesenteries and internal anatomy

Mesenteries regularly arrayed; equal number throughout length of animal, fewer than tentacles; no stomata. In most specimens examined four orders of mesenteries present, all or all except highest order with filaments; only six primary pairs complete; short, straight acontia extend from basal end of at least the larger mesenteries. Retractor muscles diffuse, weak, narrow and short (Fig. 2). Parietobasilar musculature hardly developed.

Sexes separate. Primary mesenteries sterile; the six secondary and 12 tertiary pairs gametogenic, occasionally fourth cycle as well. Ova develop in bundles, swelling centre of mesentery laterally; eggs in various stages of maturity in one mesentery; maximum diameter of ovum in section 160 μm . Spermatogenic area of mesenteries much wider, convoluted, so that sperm packets arrayed more linearly than are ova (Fig. 2B).

Actinopharynx very long (three-quarters or more column length) (Fig. 1) with shallow sulci, elongate

in directive plane with deep siphonoglyph at each end; siphonoglyphs not or hardly longer than rest of gullet. Pair of very narrow directive mesenteries attached to each siphonoglyph.

Cnidom

Spirocysts, basitrichs, microbasic *p*-mastigophores.

Size and distribution of cnidae

The letter following each cnida type refers to illustration of it in Figure 6.

Tentacles

- spirocysts (A) 22.1–59.9 \times 3.1–5.7(8.2) μm
 $n = 55$ $N = 7/7$
 basitrichs (B) 24.6–41.8 \times 2.5–3.5 μm
 $n = 55$ $N = 7/7$

Actinopharynx

- basitrichs (C) 32.8–43.5 \times 3.1–3.9 μm
 $n = 44$ $N = 7/7$

Acontia

- basitrichs (D) (41.0)44.3–54.9 \times 2.7–3.7 μm
 $n = 67$ $N = 7/7$

Mesenterial filaments

- basitrichs (E) 14.8–19.7 \times 1.8–2.5 μm
 $n = 22$ $N = 4/8$
 microbasic *p*-mastigophores
 (F) 23.0–33.6 \times 3.1–4.3(4.9) μm
 $n = 59$ $N = 8/8$

Column (scapus)

- basitrichs (G) 16.4–25.4 \times 2.9–3.7 μm
 $n = 40$ $N = 6/6$

Cnidae of the tentacle bulbs are identical to those of the distal portion, although basitrichs tend to be shorter proximally. The distribution of basitrichs in the mesenterial filaments is probably patchy, accounting for the perceived absence of that type of nematocyst in some smears. Spirocysts are generally separable into two types (Fig. 6a) but those of intermediate size may also be intermediate in morphology; thus measurements on all are combined.

Natural History Notes

Paraphelliactis pabista is known only from 55 specimens collected between Vancouver Island and the Queen Charlotte Islands, and one from west of Vancouver Island, all taken at depths around 2000 m. The substratum, from trawling data and traces adherent to the actinians, is mud; the animals attach

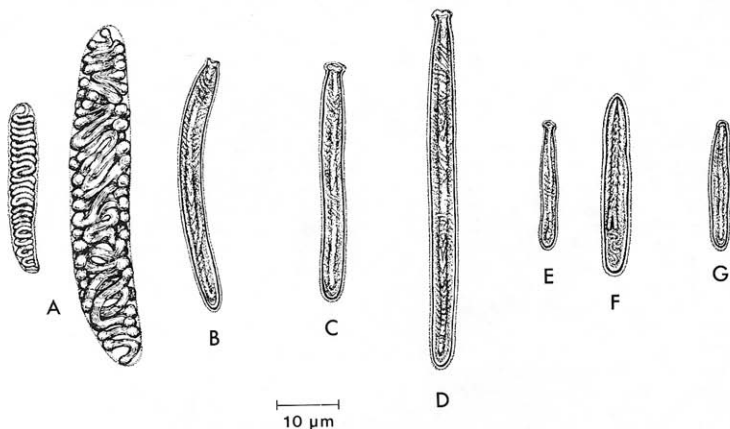


FIGURE 6. Cnidae of *Paraphelliactis pabista*. See text for explanation.

to solid objects such as stones, worm tubes and echinoid spines, or grasp a bolus of mud with the pedal disc. The coelenterons of several specimens contain bulbous nematocysts of a sort unknown in anthozoans, suggesting that these animals feed on medusae.

Type Locality and Specimens

Holotype: A sterile specimen 40 mm long and 33 mm at its widest (National Museums of Canada, National Museum of Natural Sciences NMCIC 1982-0038), along with two slides cut longitudinally at its margin through the sphincter (NMCIC 1982-0040 a,b) and two slides of cross-sections low in the column (NMCIC 1982-0039 a,b); collected 5 August 1965.

Type locality: 51°43'N, 131°13.5'W, off the southern tip of the Queen Charlotte Islands, 1000 fm [1828 m].

Paratypes: National Museum of Natural Sciences NMCIC 1982-0041, one specimen from 50°54.5'N, 130°06'W, 1200 fm [2194 m], collected 11 September 1964; British Columbia Provincial Museum BCPM 982-1-1, two specimens from 50°54.5'N, 130°06'W, 1200 fm, collected 11 September 1964; United States National Museum of Natural History USNMNH 60379, two specimens from 50°54.5'N, 130°06'W, 1200 fm, collected 11 September 1964; California Academy of

Sciences CAS 026000, two specimens, one with histological sections, taken with the holotype; CAS 025999, two specimens, both with histological sections, from 51°27'N, 131°47.5'W, 2430 m, collected 8 August 1965; CAS 028040, one specimen with histological sections, from 53°33'N, 133°38'W, 1050 fm [1919 m], collected August 1965; CAS 028043, one specimen from 49°53.2'N, 127°22.7'W, 1830 m, collected 10 September 1964.

Additional material examined: Voucher specimens at the California Academy of Sciences: CAS 025998, three specimens from 51°27'N, 131°47.5'W, 2430 m, collected 8 August 1965; CAS 025997, 38 specimens, three with histological sections, from 50°54.5'N, 130°06'W, 1200 fm, collected 11 September 1964; CAS 028041, two specimens from 53°33'N, 133°38'W, 1050 fm, collected August 1965.

Etymology

The specific name "pabista" is an acronym for the Pacific Biological Station, the source of these specimens. Its gender is feminine.

Discussion

Two other species of *Paraphelliactis* are known, *P. spinosa* Carlgren 1928, the type species, from 1416 m in the Denmark Straits, and *P. michaelsarsi*

Carlgrén 1934, from 2603 m off the Canary Islands. The three known species of the genus resemble one another in many respects, clearly indicating their generic affinity.

Tubercles of the previously known species are irregularly arrayed, unlike those of *P. pabista*. *Paraphelliactis michaelsarsi* is a large anemone, attaining a length of over 100 mm and a like width; *P. spinosa* is similar to *P. pabista* in size.

Carlgrén (1928) originally described the sphincter of *Paraphelliactis* as strong. No adjective modified "sphincter mesogloea" in his 1949 (p. 94) catalog entry for *Paraphelliactis*, presumably because the sphincter of *P. michaelsarsi* is weak (Carlgrén 1934). The sphincters of all three species are composed of similar muscle alveoli, the greater density of these muscle bundles in *P. spinosa* undoubtedly accounting for the superior strength of its sphincter.

Although acontia nematocysts of all three species are virtually identical, as are those of the actinopharynx of *P. pabista* and *P. michaelsarsi*, size of other cnidae clearly distinguish the three species. In addition, *P. spinosa* has microbasic *p*-mastigophores in its actinopharynx, unlike the other two species.

The three species of *Paraphelliactis* live at similar depths. Published reports are based on two specimens of *P. michaelsarsi* and four of *P. spinosa*. Nothing is known of the natural history of these actinians except that *P. michaelsarsi* and *P. pabista* inhabit muddy bottoms, and *P. pabista* probably feeds on medusae.

I am especially grateful to Mary Needler Arai and Frank Bernard of the Pacific Biological Station, Nanaimo, for making these anemones and others from the same area available to me for study. Steve Sechovec executed drawings of cnidae and sphincter with great skill; Susan Middleton of the California Academy of Sciences printed the photomicrographs.

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