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Arachnanthus sarsi Carlgren, 1912: a redescription of a ceriantid anemone new to the British Isles

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The cerianthid anemone *Arachnanthus sarsi* Carlgren, 1912 is redescribed from newly collected specimens from Western Scotland. Carlgren's type specimen was damaged and lacked the upper part of the body and tentacles, so this is the first description of a complete specimen. The anemones were observed alive and *in situ* by SCUBA diving, allowing a description of live coloration, habitat and feeding behaviour. The relationship of *A. sarsi* to the Mediterranean *A. oligopodus* and the Caribbean *A. nocturnus* is briefly discussed. The possiblity that *A. sarsi* is the adult form of the better known larval cerianthid *Arachnactis albida* M. Sars 1846 is considered and the changes in nomenclature which would result if this synonymy could be proven are noted.

KEY WORDS:—Anthozoa – Ceriantharia – Arachnanthus – Arachnactis – taxonomy.

CONTENTS

INTRODUCTION

Cerianthid anemones are common, often large, tube-dwelling anthozoans inhabiting sedimentary substrata in seas throughout the world. Until recently

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one species, *Cerianthus lloydii* Gosse, was known from British waters, although a larval form *Arachnactis albida* (not related to *C. lloydii*) had been sporadically reported from the plankton of western regions since 1841. In recent years several species new to Britain have been discovered, largely as a consequence of the use of SCUBA diving to survey sublittoral communities. *Pachycerianthus multiplicatus* Carlgren was first found in western Ireland (O'Connor *et al.*, 1977) and has since been recorded from several localities in western Scotland (Manuel, 1981). This was followed by the discovery of *Arachnanthus sarsi* in Scotland in 1981—the first record of this species since Carlgren's original description (1912)—and further localities were found in 1982. Another large cerianthid, tentatively identified as *Cerianthus membranaceus* (Spallanzani) from the Channel Islands, is at present being studied.

Arachnanthus sarsi was described by Carlgren (1912: 27) from a single damaged specimen lacking the uppermost part of the body. Some of the actinopharynx and all of the tentacles were missing, and the remains were 4.7 cm long in life. This type specimen was dredged in Trondheim Fjord, Norway, at a depth of 140 m, on 18 June 1901. Due to the necessarily incomplete nature of Carlgren's description a full description is given below.

MATERIAL

Site 1. Meall Eatharna, near Arinagour, Coll, W Scotland: 56° 37.4′ N, 6° 30.5′ W. 36 m below C.D. Coll. B.E. Picton 24 June 1981. Ulster Museum Cat. no. Md 322. A distal portion 4 cm long consisting of most of the actinopharynx and all of the tentacles. Specimen A.

Site 2. Channel E of Rubha Deireas, Lunga, W Scotland: 56° 13.0′ N, 5° 42.8′ W. 18 m below C.D. Photographs of two specimens. B.E.P., 13 July 1982.

Site 3. Channel E of Eilean Dubh Beag, W Scotland: 56° 14.15′ N, 5° 42.76′ W. 10–18 m below C.D. Coll. B.E.P., 16 July 1982. Two specimens, one complete—U.M. no. Md 391, specimen B; one missing the marginal tentacles U.M. no. Md 390, specimen C. One specimen was observed at this site by R.L.M. on 15 September 1983.

Site 4. Soay Sound, S Skye: 57° 10.1′ N, 6° 10.5′ W. 28 m below C.D. Photographs of one specimen G. Brown, 25 July 1982.

DESCRIPTION

The description is compiled from dissections of specimens A and C, and external observations of other specimens and photographs. For details of terminology see Manuel (1981).

Marginal tentacles

(A) 29, (B) 33. These are rather stout for a cerianthid, forming a single series (pseudocycle) at the periphery of the disc. They are about 3 cm long after fixation but in life they were much longer, about 10 cm. Their colour in life was greyish brown with a row of whitish spots along the centre line of the oral surface. Other specimens photographed and observed had similar tentacle numbers and it appears that 30–34 is the normal maximum number for this species. In comparison *A. nocturnus* den Hartog, 1977 has up to 54 tentacles but is about the same size as *A. sarsi*.

Labial tentacles

(A) 28, (B) 32, (C) 32. These are of typical cerianthid proportions—a little longer than the radius of the disc when expanded, shorter when preserved. Like the marginals they are arranged in a single series, and in life point inward and upward to form a cone, see Fig. 1; the directive labial tentacle is absent. There is no sign of the two labial tentacles, offset from the others and flanking the directive chamber, which were described in *A. nocturnus* by den Hartog. In life the labial tentacles are dark brown on the inner surface, matching the actinopharynx, whitish on the outer surface.

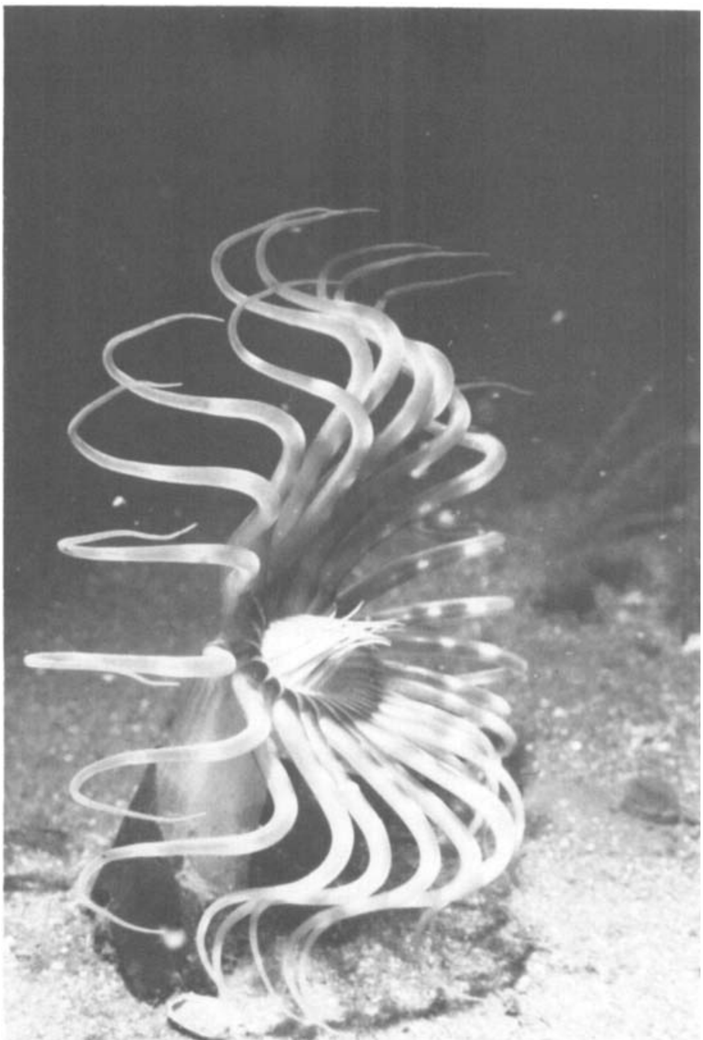

Figure 1. *Arachnanthus sarsi* A living specimen in its natural habitat (×1). Note characteristic feeding posture. Site 3 (Photograph B.E.P.).

Column

(B) 21 cm long and about 1.5 cm diameter, (C) 23 cm long. It is long and slender, even for a cerianthid, but capable of great contraction. There is an obvious aboral pore. In life the column was dirty whitish in colour, with brown longitudinal stripes in (B).

Actinopharynx

This is longer than in many other cerianthids, 7.5 cm in (C), probably about the same size in (A); dark chestnut brown in colour shading to cream on the lower third, the cream extending somewhat higher on the siphonoglyph. The internal surface of the actinopharynx is longitudinally ridged, each ridge being separated from its neighbour by a groove where, on the opposite side, a mesentery is attached. This arrangement contrasts with other Hexacorallia, in which the pharyngeal ridges themselves mark the insertion of the mesenteries. The labial tentacles are merely free continuations of the ridges.

New mesenteries, ridges, and tentacles arise in a segment diametrically opposite the siphonoglyph, the so called 'multiplication chamber', but as these parts do not arise simultaneously at all levels the situation in this region is variable and often obscure. The diagram (Fig. 2) shows the arrangement in this region of specimen C. Specimen A had a small marginal tentacle developing between two others but no equivalent labial tentacle or pharyngeal ridge.

The siphonoglyph is broad and clearly defined by its smoother texture. Laterally it extends over three ridges on either side of the directive mesenteries, but does not reach the distal edge of the actinopharynx (Fig. 2). There is a long (4 cm) hyposulcus, rounded at its lower end and translucent white in colour.

Mesenteries

These are arranged in duplets—alternately long and short. The long ('M') mesenteries bear the gonads and a double mesenteric filament; the shorter ('B') mesenteries are not fertile and bear a filament which, apart from the first few millimetres below the actinopharynx (where it is double) is single and very greatly convoluted. The double filament on the M mesenteries is only slightly wavy. The double portion of a filament is borne on a branched mesenterial lamella which forms a Y shape in cross-section. Both types of mesentery decrease in overall length towards the multiplication chamber. The longest six M mesenteries bear acontioids near their lower extremities. These are mere outgrowths of the filament (the double portions coalesce to become single around this point) and are only a few mm long. The directive mesenteries are a little shorter than the hyposulcus, the next couple (C2) is much longer, about $\frac{3}{4}$ of the body length, and both couples are sterile.

Cnidom

Measurements of the cnidae from the various tissues, compiled from specimens A and C (preserved in formalin) are given in Table 1. Carlgren (1912) gave little information on the cnidom of the type specimen but later (1940) he provided more detailed measurements.

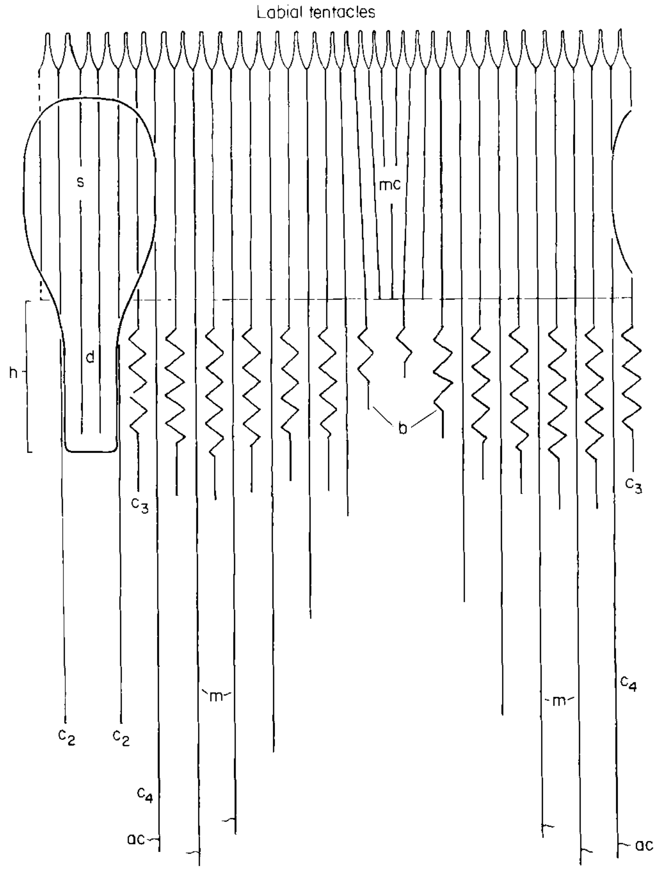

Figure 2. Diagram of the mesenteric arrangement in *A. sarsi* (specimen C). The ratio circumference: length as been increased for clarity. ac, Acontioid; act, actinopharynx; b, convoluted mesentery; c, couple of mesenteries, numbered from directives outward; d, directive mesenteries; h, hyposulcus; m, mesentery with double filament; mc, multiplication chamber; s, siphonoglyph.

HABITAT

The first specimen was one of three seen on a steep slope at 36 m (Site 1). The animals were living in tubes buried in pockets of muddy gravel amongst boulders. Site 2 was in a semi-sheltered channel at 18 m where four animals were seen. The substratum consisted of mud and gravel with some pebbles and a few larger stones mixed into it. Site 3 consisted of a mud slope alongside a rock ridge running from 10 to 25 m. Two specimens were collected using an airlift to dig in the muddy sediment, and several others were seen at this site. Excavation of the animals showed that they lived in a tube which ran vertically into the substratum to a depth of about 25 cm and then sideways for at least 40 cm. The animal could retreat down the tube very quickly and apparently moved by a series of contractions; inverse peristalsis. The only effective method of collecting a specimen was to dig a trench 30 cm deep around an expanded anemone, thereby cutting through the lateral part of the tube before the animal was disturbed.

Table 1. *Arachnanthus sarsi*—range of sizes (and means) of combined cnidoms of specimens A and C

	Range (μm)	Mean (μm)	Status
Ectoderm of upper column			
P-mastigophores	57–63 × 7.0– 8.0	59.1 × 7.7	Fairly common
P-mastigophores	29–33 × 7.5– 9.0	30.9 × 8.1	Uncommon
P-mastigophores	12–15 × 4.0– 5.0	13.3 × 4.5	Rare
Atrichs	39–70 × 8.0– 12	56.2 × 10.6	Abundant
Marginal tentacles			
P-mastigophores	59–71 × 7.5–90	65.9 × 8.05	Common
P-mastigophores	11–17 × 4.0– 5.0	14.05 × 4.4	Common
B-mastigophores	43–52 × 6.0– 6.5	48.6 × 6.18	Rare
B-mastigophores	23–29 × 2.5– 3.0	26.2 × 2.9	Abundant
Atrichs	42–75 × 8.0–14	60.5 × 11.7	Common
Labial tentacles			
P-mastigophores	68–78 × 10 –12	—	Rare (4 only)
B-mastigophores	41–51 × 5.5– 6.5	46.3 × 5.95	Common
Atrichs	47–60 × 10 –11	52.7 × 10.0	Common
Actinopharynx			
P-mastigophores	52–71 × 10 –12.5	63–7 × 11.31	Common
P-mastigophores	13–14 × 5.0– 6.0	13.6 × 5.4	Uncommon
B-mastigophores	32–57 × 4.5– 7.0	42.4 × 6.0	Abundant
Atrichs	34–69 × 7.0–13	57.0 × 10.21	Common
B mesenteries (simple, convoluted filament)			
P-mastigophores	22–37 × 6.0– 8.0	33.6 × 7.21	Common
P-mastigophores	15–17 × 6.0– 7.0	16.5 × 6.5	Scarce
M mesenteries (double filament)			
P-mastigophores	65–82 × 14 –17	74.7 × 15.4	Common
B-mastigophores	42–54 × 6.0– 6.5	47.7 × 6.1	Common
Atrichs	50–72 × 10 –11	63.3 × 10.3	Less common
Acontioid			
P-mastigophores	65–78 × 11 –13	69.9 × 12.05	Common
B-mastigophores	35–43 × 5.5– 6.0	38.3 × 5.7	Abundant
Atrichs	28–90 × 7.0–20	53.8 × 11.5	Rare

Spirocysts were abundant in the marginal and labial tentacles, actinopharynx, and on the mesenteric filaments, but were not measured. It seems likely that several categories of cnidae were overlooked as den Hartog (1977: 225–226) found a greater range of types in *A. nocturnus*. This might be explained by the fact that some types of cnidae discharge readily on fixation, the *A. sarsi* specimens being fixed, whereas den Hartog's material of *A. nocturnus* was fresh. Den Hartog's penicilli and spirulae = P and B-mastigophores respectively.

The anemones were often found with the column extending well clear of the bottom and with the crown of tentacles bent over sideways in the current. The tentacles when fully expanded formed a graceful sinuous curve. Feeding was observed, with small particles being caught by a single outer tentacle, which then bent inwards and transferred the particle to the labial tentacle, before returning to its expanded position.

DISCUSSION

There is no doubt that the present specimens belong to Carlgren's *A. sarsi* in spite of some minor differences. The directive and C2 mesenteries are rather shorter in the type than in our specimens. This can be attributed to the smaller size and presumed immaturity of the former. Similarly the lower number of mesenteries (21) in the type is an indication of its incomplete development. Carlgren stated that the hyposulcus in his specimen exceeded the length of the 'stomatodaeum' (actinopharynx) but as a portion of the latter was missing this statement is not necessarily correct.

It is unfortunate that Carlgren (1912: 41) designated *Arachnanthus oligopodus* (Cerfontaine, 1891) a Mediterranean species, as the type-species of the genus *Arachnanthus*. The specimens described by Cerfontaine (1891, and more fully in 1909) were clearly immature and probably represented a recent, localized settlement of larvae. No adult specimen of *A. oligopodus* has yet been described (indeed, there is no way of positively identifying it!) so a comparison of *A. sarsi* with the type-species is impossible. The only record of an adult *Arachnanthus* from the Mediterranean that we know of is a photograph kindly supplied by Mr Mark Caney of Paphos, Cyprus, taken locally in shallow water at night. Whatever species this represents—perhaps *A. oligopodus*?—it is different from *A. sarsi* as its marginal tentacles are arranged in two distinct pseudocycles.

The discovery of *A. sarsi* in western Scotland inevitably raises the question of the possible (or probable?) relationship between the adult form *A. sarsi* and the well known larval cerianthid *Arachnactis albida* Sars, 1846 (for a description see Manuel, 1981). Carlgren (1912: 29) was obviously inclined to the view that *A. albida* was the larval stage of *A. sarsi:* was it coincidence that he named the latter after the discoverer of the former? Now that the adult form has been found in a region where *A. albida* has frequently been recorded the correlation seems more than likely. Anatomically it is easy to derive the adult form from the larva and there are no obvious dissimilarities. An agreement between the cnidae of large specimens of *A. albida* and *A. sarsi* would presumably constitute acceptable proof of conspecificity. The ultimate confirmation of culturing living *A. albida* to maturity presents obvious practical difficulties.

If *Arachnanthus sarsi* Carlgren, 1912 were proved to be conspecific with *Arachnactis albida* Sars, 1846 then the latter, senior name would have priority. The genus *Arachnanthus* Carlgren, 1912 would become a junior synonym of *Arachnactis Sars*, 1846, (the type-species being *A. albida* by monotypy) and the valid name of the species would be *Arachnactis albida* Sars, 1846.

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