

On *Isarachnanthus* from Central Atlantic and Caribbean region with notes on *Isarachnactis lobiancoi* (Carlgren, 1912)

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Isarachnanthus specimens from different localities in the Central Atlantic and Caribbean regions were studied. All examined specimens belong to one widely distributed shallow water species, *Isarachnanthus maderensis* (Johnson, 1861). The synonymy of this species and possible reasons for such a wide distribution are discussed. *Isarachnactis lobiancoi* (Carlgren, 1912) may be a larval form of *I. maderensis*.

Introduction

The North and Central Atlantic are among the most well-investigated regions of the world ocean, however, information about cerianthids from these regions is still very incomplete. According to Carlgren (1912a: 356-391, 1912b: 356-391, 1931: 1-10), Danielssen (1890: 1-184) and Verrill (1873: 1-16, 1901: 51-62), there are approximately 10 species of cerianthids from the North Atlantic and adjacent regions of the Arctic Ocean. Valid data on their distribution are known only for the North Sea, Mediterranean Sea, and Norwegian Sea. Most species of cerianthids described from around the islands of the Central Atlantic were reported only once.

McMurrich (1910: 35) established the family Arachnactidae for several larval forms and for the genus *Pachycerianthus* Roule, 1904. The diagnosis of the group included larval forms with acontoids at the forth mesenteries, sterile second and third protomesenteries, and long fourth protomesenteries (the first metamesenteries by Carlgren). Later the genus *Pachycerianthus* was removed from the family Arachnactidae and placed in the family Cerianthidae (Carlgren, 1912a: 40). Two other benthic genera, *Arachnanthus* and *Isarachnanthus*, each of which contains only few species (Carlgren, 1912a: 27-30, 1912b: 357-367, 1924a: 187-195, 1924b: 388-398) were described in the family Arachnactidae but till now the family Arachnactidae remains an almost entirely "larval" family with very few benthic forms.

Den Hartog (1977: 221-233) described a new species from the Caribbean, *Arachnanthus nocturnus* den Hartog, 1977. This species is common in shallow waters of Puerto Rico, Jamaica, Curaçao, and Bonaire. Despite a very detailed description of the internal anatomy and a substantial discussion of the cnidom, some points have been missed in the description. For example, there was no information about the arrangement of the tentacles.

Another new species, *Isarachnanthus cruzi* Brito, 1986 (:173-181) was described from the Canary Islands. This species is striking for having a cnidom which is almost

identical to that of *Arachnanthus nocturnus*. To determine whether the two are separate species, I have studied material from Curaçao and the islands of the Central Atlantic, including specimens determined earlier as *Arachnanthus nocturnus* (Wirtz, 1995: 48-49). Based on my examinations, I have decided that such similarity of the two species from different genera cannot be explained only by fortuity or convergent affinity.

Material and methods

Most material used in the work was obtained from the collections of the Rijksmuseum van Natuurlijke Historie (RMNH), now National Natuurhistorisch Museum (National Museum of Natural History, NNM), Leiden, The Netherlands. The material from Madeira was collected and kindly provided by Dr Peter Wirtz; additional material from Granada was kindly provided by Dr L. Tochino. All material studied was preserved in 8-10% formalin in seawater, with preceding relaxation in menthol (see den Hartog, 1977: 214-215) or without preliminary relaxation. To study the arrangement and the structure of mesenteries, the preserved specimens were dissected longitudinally, laid open, and fastened with pins to a paraffin-wax plate.

Results

Suborder Penicilaria den Hartog, 1977

Family Arachnactidae McMurrich, 1910

Isarachnanthus Carlgren, 1924a

Isarachnanthus maderensis (Johnson, 1861) comb. nov.

Saccanthus maderensis Johnson, 1861: 305-306; Andres, 1884: 346.

? *Cerianthus natans* Verrill, 1901: 47; Pax, 1910: 167; Leloup, 1960: 11.

Cerianthus maderensis; Pax, 1908: 262-263.

pro parte Cerianthus membranaceus; Pax, 1908: 464-465, 497-498.

Arachnanthus nocturnus den Hartog, 1977: 221-230; Cairns et al., 1986; Wirtz, 1995: 48 (**syn. nov.**).

non *Arachnanthus nocturnus*; Ocana et al., 2000: 107.

Isarachnanthus cruzi Brito, 1986: 174-181 (**syn. nov.**).

? *Cerianthus spec.* Torelli, 1963: 714-175.

Material examined.— *Arachnanthus nocturnus* RMNH Coel. 11362, holotype, "Curaçao. Southcoast, Piscadera Bay, in front of Caribbean Marine Biological Institute, between the entrance of the 'inner' Bay and Hilton Hotel, on sandy bottom with gravel, shells and dead coral boulders, depth ca. 1-5 m, 21.ii.1973, coll. P. Creutzberg Jr. and J.C. den Hartog"; RMNH Coel. 11375, 1 specimen, "Curaçao, between Piscadera Bay and Blauw Bay, sandy bottom in shallow water, 9.xii.1972, coll. P. Creutzberg Jr."; ZIN RAS, coel., 5 specimens. "CANCAP II. Canary Islands Expedition St. H20, North coast of Gran Canaria, Las Palmas, 28°8'N 15°27'W, lagoon with sandy bottom and seagrass, 2-6 m, 14.ix.1977, coll. J.C. den Hartog"; P.P. Shirshov Institute of Oceanology RAS, 4 specimens. "Madeira, in front of Hotel Galomar Canico, 10 m, 31.x.2000, coll. P. Wirtz".

Additional material: *Pachycerianthus solitarius* (Rapp, 1829) P.P. Shirshov Institute of Oceanology RAS, 2 specimens, "Granada, S. Spain 14.xii.2001, coll. L. Tochino".

After a careful investigation of the type material of *Arachnanthus nocturnus* den Hartog, 1977 (RMNH 11362), material from the Canary Islands (CANCAP II. Canary Islands Expedition St. H20) and Madeira, I can confirm that all specimens belong to the same species. The species has to be regarded as a species of the genus *Isarachnanthus* Carlgren, 1924.

First it is necessary to explain the features separating *Arachnanthus* and *Isarachnanthus*. The key features of the genus *Isarachnanthus* include long and fertile protomesenteries 2 provided with acontiods (Carlgren, 1924b: 186-187). Unfortunately, sometimes this feature does not help distinguish species belonging to *Arachnanthus* and *Isarachnanthus*. In fact, animals from the same local populations belonging to the same species may both have and have not acontiods at protomesenteries 2 (Brito, 1986: 172). The taxonomic importance of this feature varies: Carlgren (1924b: 192) described a specimen of *Isarachnanthus panamensis* without any traces of acontiods. The length of protomesenteries 2 can also vary, and seems to depend on the degree of contraction of the animal. From the literature (Cerfontaine, 1891: 32-39, 1909: 653-707; Carlgren, 1912a: 27-30, 1912b: 357-369, 1924a: 193-195, 1937: 177-180; van Beneden, 1923: 97-98) it follows that in *Arachnanthus* species, the length of protomesenteries 2 does not exceed or only slightly exceeds the lower border of hyposulcus. However, at least in some specimens of *Arachnanthus sarsi* Carlgren, 1912a, the length of protomesenteries 2 can reach about 3/4 of gastral cavity (Picton & Manuel, 1985: 343-349).

The structure of the acontiods is also used to separate these two genera. Acontiods of *Arachnanthus* species consist of many mucous cells and very few nematocysts. In contrast, acontiods of *Isarachnanthus* species consist of many nematocysts and a few mucous cells (Carlgren, 1924a: 189). This feature is not good for routine determination, because it requires histological examination, and is useless in the case of specimens without any trace of acontiods.

Another distinguishing feature for *Arachnanthus* and *Isarachnanthus* is the presence or absence of an unpaired directive tentacle in the labial set of tentacles. This seems to be a reliable feature for identifying most well-known species of Ceriantharia (McMurrich, 1910: 17-19; Carlgren, 1912b: 368-369, 1924a: 169-195, 1931: 1-10; Uchida, 1979: 185-199). All species of the genus *Isarachnanthus* develop an unpaired directive labial tentacle (Carlgren, 1924a: 189-193; Brito, 1986:176); in contrast, species of the genus *Arachnanthus* have no trace of the directive labial tentacle (Carlgren, 1912b: 368, 1924a: 193-195, 1931: 9, 1937: 177-180; Picton & Manuel, 1985: 345). This feature seems to be useful for field identification of the Arachnactidae genera.

Johnson (1861: 305-306) described *Saccanthus maderensis* from Funchal (Madeira). The type specimen of this species was never deposited in any museum and its inner anatomy has never been described. Two other species of cerianthids are reported from Madeira, *Pachycerianthus* spec. and *Isarachnanthus nocturnus* (Wirtz, 1995: 48-49, personal communication). *Pachycerianthus* spec. is a rather large animal, with up to 150 long, marginal tentacles and about the same number of labial ones. Based on external appearance, the specimen described by Johnson is very similar to *I. nocturnus*, which is very common in rock crevices in Madeira. *Saccanthus maderensis* has a small number of tentacles (24 marginal and 25 labial), and a thin, slender body, about 11 cm long in relaxed specimens. The colour of the animal described by Johnson (1861) is very similar to that described by den Hartog (1977: 224) for a young specimen of *I. nocturnus*.

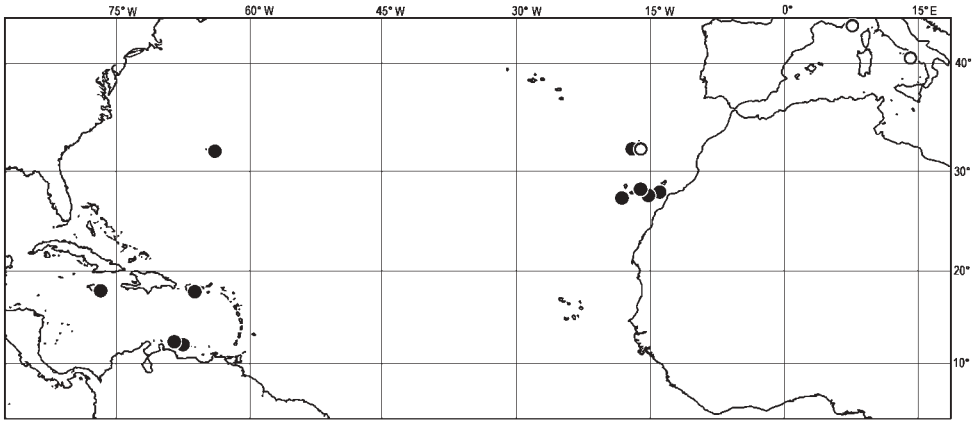


Fig. 1. Distribution of *Isarachnanthus maderensis* (filled circles) and *Isarachnactis lobiancoi* (outlined circles) in Atlantic and the Mediterranean Sea.

from Curaçao, and to adult specimens from the Canary Islands (Brito, 1986: 176). From this I conclude that *S. maderensis* is the senior synonym of *I. nocturnus*.

Verrill (1901: 47) described a cerianthid from Bermuda. The type material of this species was lost. Based on the brief description of *Cerianthus natans* Verrill, 1901, this species could belong to the family Arachnactidae. Like most arachnactids, *Cerianthus natans* has a small number of tentacles, but the number of marginal tentacles exceeds that of the labial ones (38 and 24 respectively). The form and the colour of the polyp also seem to be typical of Arachnactidae species. *Cerianthus natans* was collected from shallow waters, in the habitat typical of *Isarachnanthus maderensis*. The synonymy seems more evident when considering that the only other species reported from Bermuda is *Arachnanthus nocturnus* (= *I. maderensis* syn. nov.) (Cairns et al., 1986: 192).

Isarachnanthus maderensis is widely distributed in the Central Atlantic and Caribbean. Additionally, there is a record of *A. nocturnus* from the Mediterranean coast of Spain, province of Granada (Ocaña et al., 2000: 107); unfortunately the specimen in the accompanying photo (p. 118) looks more like *Pachycerianthus solitarius* (Rapp, 1829). In fact, the material from Granada coast, provided by Dr. Tochino, belongs to *P. solitarius*. Thus, there are no reliable records of this species from the Mediterranean Sea.

The wide distribution of *Isarachnanthus maderensis* in the Atlantic and Caribbean (Fig. 1) can easily be explained by planktonic larvae. Many cerianthid larvae live in the plankton for several months (Leloup, 1932: 10-17; Carlgren, 1924b: 342-349); in some planktonic larvae, gonad formation has been described (Vanhoffen, 1895: 1-10; Bourne, 1919; Leloup, 1964: 256-257). Unfortunately, most cerianthid larvae are known only from preserved material, and it is impossible to trace their development to adult animals. There are only few shallow-water cerianthids in which larval development has been investigated in detail: *Cerianthus membranaceus* Spallanzani (Haime, 1854: 381-384; van Beneden, 1897: 54-56; 1923: 178-186), *Cerianthus lloydii* Gosse (e.g., van Beneden, 1897: 52; 1923: 170-176; Riemann-Zürneck, 1968: 37-45) and *Cerianthus misakiensis* Nakamoto (Song, 1989: 82). Unfortunately, we have no information about the larval development of *Isarachnanthus maderensis*.

There is a well-known cerianthid larvae, *Isarachnactis lobiancoi* (Carlgren, 1912b) described from the Mediterranean Sea (Carlgren, 1912b: 357-367, 1924b: 375; Leloup, 1960: 3-10; Torelli, 1963: 169-177; Vive, 1966: 64). There are two species of the genus *Arachnactis* described under the species name *lobiancoi* from the Mediterranean Sea: *A. lobiancoi* Carlgren, 1912 and *A. lobiancoi* van Beneden, 1923. Torelli (1963: 170-173) showed that these are two separate species. *Arachnactis lobiancoi* van Beneden, 1923, is similar to the well-known species *Arachnactis albida* M. Sars, 1946.

Early larval stages of *Arachnactis albida* from the Mediterranean Sea differ from those of *Arachnactis albida* collected in the North Atlantic. The early planktonic stages from the North Atlantic have longer marginal tentacles than the Mediterranean forms. Furthermore, in the Mediterranean species, the unpaired directive tentacle in the marginal set of tentacles forms earlier than in the larvae from the North Atlantic (compare van Beneden, 1923: 161-165; Leloup, 1960: 3-10). Apparently, all Mediterranean *A. albida* belong to the van Beneden's species *A. lobiancoi* (Torelli 1963: 176).

Torelli (1963: 170-173) considered *Isarachnactis lobiancoi* (Carlgren, 1912) the larva of *Arachnanthus oligopodus* (Cerfontaine, 1890). However, *A. oligopodus* has no unpaired directive tentacle in the labial set of tentacles; *I. lobiancoi* (Carlgren, 1912b) has a well-developed directive labial tentacle at the stage with 16 marginal tentacles.

Although *Isarachnactis lobiancoi* (Carlgren) was previously recorded only from the Mediterranean Sea, in the NNM, there is a specimen with 17 marginal tentacles collected off Funchal Harbour (Madeira) (RMNM Coel. 24099) that belongs to *I. lobiancoi* (Carlgren). From this, I infer that this species cannot be occasional for the Atlantic, and has wider distribution than was previously thought.

Most morphological features of *I. lobiancoi* (Carlgren) are very similar to those of *I. maderensis*. Both species have an unpaired directive labial tentacle and rather long second pair of protomesenteries. *Isarachnactis lobiancoi* (Carlgren) has no acontoids at protomesenteries 2; some specimens of *Isarachnanthus maderensis* from the Canary Islands also have no acontoids at protomesenteries 2 (Brito, 1986). Unfortunately, only few specimens of *I. lobiancoi* (Carlgren) have been captured and investigated (i.e., Carlgren, 1912b: 357-367; Leloup, 1960:10-12, Torelli, 1963: 169-177), and there is no information about early planktonic stages of this larval form.

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References

- Andres, A., 1884. Le Attinie.— Fauna und Flora des Golfes von Neapel 9: 1-459.
- Beneden, E van., 1897. Les Athozaires de la "Plankton-expedition.— Ergeb. Plankton-Exped. Humboldt-Stiftung 2 k(e): 1-222.
- Beneden, E van, 1923. Travaux Postumes d'Edouard Van Beneden sur les Cérianthaires — Archives de Biologie, vol. hors Série: 1-242.
- Bourne, G.C., 1919. Observations on *Arachnactis albida* M. Sars.— Q. J. Microsc. Sci. N.S., 64 (253): 27-65.
- Brito, A., 1986. Descripción de *Isarachmanthus cruzi*, una nueva especie de cerianthario (Cnidaria: Anthozoa: Ceriantharia) de las Islas Canarias.— Vieraea, 16 (1-2): 173-181.
- Carlgren, O., 1912a. Ceriantharia.— The Danish Ingolf-Expedition, 1 (3): 1-78.
- Carlgren, O., 1912b. Über Cerianthairen des Mittelmeers.— Mitteilungen aus der Zoologischen Station zu Neapel. 20 (3): 356-394.
- Carlgren, O., 1924a. Ceriantharia. Paper from Dr. Th. Mortensen's Pacific Expedition.— Vidensk. Medd. dansk. naturh. Foren. Kbh., 75: 169-195.
- Carlgren, O., 1924b. Die Larven der Ceriantharien, Zoantharien und Actiniarien der Deutschen Tiefsee-Expedition.— Deutsche Tiefsee-Expedition 1898-1899 19 (8): 341-476.
- Carlgren, O., 1931. On some Ceriantharia.— Ark. F. Zool., 23A (2): 1-10.
- Carlgren, O., 1937. Ceriantharia and Zoantharia.— Sci. Rep. Gr. Barrier Reef Exped. 5(5): 177-207.
- Cairns, S., den Hartog, J.C., Arneson, C., 1986. Class Anthozoa (Corals, anemones). In: Marine Fauna and Flora of Bermuda. A Systematic Guide to the Identification of Marine Organisms (ed. W. Sterrer): 1-742.— New York.
- Cerfontaine, P., 1891. Notes préliminaires sur l'organisation et le développement de différentes formes d'Anthozaires. IV. Sur un nouveau Cerianthe du golfe de Naples, *Cerianthus oligopodus* (n.sp.).— Bull. Acad. Belg. Cl. Sci., (3) 21 (4): 32-39.
- Cerfontaine, P., 1909. Contribution à l'études des "Cerianthides".— Arch. Biol., Paris, 24: 653-707.
- Danielssen, D.C., 1890. Actinida.— Den Norske Nordhavs-expedition 1876-1878, Zoologi, 19: 1-184.
- Haime, J., 1854. Memoire sur le cérianthe (*Cerianthus membranaceus*).— Ann. Sci. Nat (4) 1: 341-389.
- Hartog, J.C. den, 1977. Description of two new Ceriantharia from the Caribbean region, *Pachycerianthus curacaoensis* n. sp. and *Arachnanthus nocturnus* n. sp. with discussion of the cnidom and of the classification of the Ceriantharia.— Zoologische Meded. 51 (14): 211-242.
- Johnson, J.Y., 1861. Notes on the Sea -Anemones of Madeira.— Proceed. Zool. Soc. London: 298-305.
- Leloup, E., 1932. Cérianthaires de l'Océan Atlantique.— Bull. Mus. Roy. d'Hist. Nat. Belg. 8 (4): 1-19.
- Leloup, E., 1960. Larves de Cérianthaires de Monaco et de Villefranche-sur-Mer.— Bull. l'Inst. Océan. 57 (1185): 1-19.
- Leloup, E., 1964. Larves de Cérianthaires.— Discovery reports 33: 251-307.
- McMurrich, J.P., 1910. The Actinaria of the Siboga Expedition. I. Ceriantharia.— Siboga-Expeditie, 15a: 1-48.
- Ocaña, M.A., Tocino, L.S., López González, S., Viciano Martín, J.F., 2000 Guía submarina de invertebrados no artrópodos. 2ª Edición: 1-417. — Albolote, Granada.
- Pax, F., 1908. Anthozoa. Die Aktinienfauna Westafrikas.— Denkschr. Med. Naturw. Gesellschaft 13: 261-302.
- Pax, F., 1910. Studien an westindischen Actinien.— Zool. Jahrb. Suppl. 11 (2): 157-330.
- Picton, B.E., Manuel, R.L., 1985. *Arachnanthus sarsi* Carlgren 1912: a redescription of a cerianthid anemone new to the British Isles.— Zoological Journal of Linnean Society 83 (4): 343-349.
- Riemann-Zürneck, K., 1968. Cerianthus-Larven aus dem Weserästuar.— Veröff. Inst. Meeresforsch. Bremerhaven 11: 37-45.
- Torelli, B., 1963. Due larve di Ceriantharia del Golfo di Napoli (Anthozoa).— Publ. Staz. Zool. Napoli 33: 169-177.
- Uchida, H., 1979. Cerianthids (Anthozoa, Coelenterata) from Kii-region, middle Japan.— Memoirs natn. Sci. Mus., Tokio 12: 185-199.

- Vanhöffen, E., 1895. Untersuchungen über Anatomie und Entwicklungsgeschichte von *Arachnactis albida*.— Bibl. Zoologica, 20: 1-14.
- Verrill, A.E., 1873. Brief Contributions to Zoology, from the Museum of Yale College. No. XXIII.— Results of Recent Dredging Expeditions on the Coast of New England.— Am. J. Sci. (3) 5 (25): 1-16.
- Verrill, A.E., 1901. Additions to the fauna of the Bermudas from the Yale Expedition of 1901, with notes on other species.— Trans. Conn. Acad. Arts Sci. 11 (1): 15-62.
- Vive, F., 1966. Zooplancton nerítico de las aguas de Castellón (Mediterráneo occidental).— Inv. Pesq. 30: 49-66.
- Wirtz, P., 1995. Unterwasserführer Madeira Kanarien/Azoren. Niedere Tiere: 1-247.— Stuttgart.

