

***Sertularia echinocarpa* Allman, 1888, an unexpected new species of *Staurotheca* Allman, 1888 (Cnidaria; Hydrozoa; Sertulariidae)**

A.L. Peña Cantero & W. Vervoort

Peña Cantero, A.L. & W. Vervoort. *Sertularia echinocarpa* Allman, 1888, an unexpected new species of *Staurotheca* Allman, 1888 (Cnidaria; Hydrozoa; Sertulariidae).

Zool. Med. Leiden 77 (32), 30.xii.2003: 537-543, fig. 1.— ISSN 0024-0672.

A.L. Peña Cantero, Departamento de Zoología, Facultad de Ciencias Biológicas, Universidad de Valencia, Dr. Moliner 50, E-46100 Burjassot, Valencia, Spain (e-mail: Alvaro.L.Pena@uv.es).

W. Vervoort, National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands (e-mail: vervoort@naturalis.nnm.nl).

Key words: hydroid; leptolid; sub-Antarctic; distribution.

The holotype of *Sertularia echinocarpa* Allman has been examined, re-described and figured to determine its actual systematic position. The species actually belongs to the genus *Staurotheca*, raising the number of known species for this genus to 25.

Introduction

Allman (1888) described as *Sertularia echinocarpa* a new species of Sertulariidae, with alternate hydrothecae and peculiar features such as the even rim of the hydrothecal aperture and the curiously shaped gonothecae. Besides Millard's (1967) report, which constitutes the only additional record, Allman's species has never been reported again.

Our study on the species of *Staurotheca* Allman, 1888 (cf. Peña Cantero et al., 1997; 1999; Peña Cantero & Vervoort, 2003) focussed our attention on Allman's species because it has striking similarities with several species of *Staurotheca*, particularly *S. abyssalis* Peña Cantero & Vervoort, 2003 and *S. profunda* Peña Cantero & Vervoort, 2003. Thus we decided to examine the holotype of Allman's species in order to determine its actual systematic position.

Results and discussion

***Staurotheca* Allman, 1888**

Type species, by monotypy, *Staurotheca dichotoma* Allman, 1888.

List of species described in or now referred to *Staurotheca*:

Staurotheca abyssalis Peña Cantero & Vervoort, 2003

Staurotheca affinis (Jäderholm, 1904a) (= *Selaginopsis affinis* Jäderholm, 1904a)

Staurotheca amphorophora Naumov & Stepan'yants, 1962

Staurotheca antarctica Hartlaub, 1904

Staurotheca australis Peña Cantero, Svoboda & Vervoort, 1997

Staurotheca compressa Briggs, 1938

Staurotheca cornuta Peña Cantero, García Carrascosa & Vervoort, 1999

Staurotheca densa Peña Cantero & Vervoort, 2003

- Staurotheca dichotoma* Allman, 1888
Staurotheca echinocarpa (Allman, 1888)
Staurotheca frigida Peña Cantero, Svoboda & Vervoort, 1997
Staurotheca glomulosa Peña Cantero, Svoboda & Vervoort, 1997
Staurotheca jaderholmi Stechow, 1920 (= *Selaginopsis dichotoma* Jäderholm, 1904b)
Staurotheca juncea (Vanhöffen, 1910) (= *Selaginopsis juncea* Vanhöffen, 1910)
?Staurotheca megalotheca Vervoort & Watson, 2003
Staurotheca multifurcata Peña Cantero, García Carrascosa & Vervoort, 1999
Staurotheca nonscripta Peña Cantero, Svoboda & Vervoort, 1997
Staurotheca pachyclada (Jäderholm, 1904a) (= *Selaginopsis pachyclada* Jäderholm, 1904a)
Staurotheca plana Peña Cantero, Svoboda & Vervoort, 1997
Staurotheca polarsterni Peña Cantero, Svoboda & Vervoort, 1997
Staurotheca profunda Peña Cantero & Vervoort, 2003
Staurotheca stolonifera (Hartlaub, 1904) (= *Sertularia stolonifera* Hartlaub, 1904)
Staurotheca undosiparietina (Stepan'yants, 1979) (= *Thuiaria undosiparietina* Stepan'yants, 1979)
Staurotheca urceolifera (Kirchenpauer, 1884) (= *Selaginopsis urceolifera* Kirchenpauer, 1884) (?)
Staurotheca vanhoeffeni (Peña Cantero & García Carrascosa, 1994) (= *Selaginopsis vanhoeffeni* Peña Cantero & García Carrascosa, 1994)
Staurotheca vervoorti (El Beshbeeshy, 1991) (= *Thuiaria vervoorti* El Beshbeeshy, 1991)

Description of the species

Staurotheca echinocarpa (Allman, 1888)
 (fig. 1, table)

Sertularia echinocarpa Allman, 1888: LXIV, LXIX, 57, 60, pl. 28, fig. 1-1a; Driesch, 1889: 199; Pfeffer, 1890: 568; Murray, 1896: 415; von Campenhausen, 1896: 305; Nutting, 1904: 35 (text-fig. 132), 36.
Sertularella echinocarpa; Hartlaub, 1901: 16, 48, 53, 56, 67, 68 (text-fig. 40), 100; 1905: 621.
?Hincksella echinocarpa; Millard, 1967: 176, fig. 3A-C; 1975: 234, fig. 76F-G; 1978: 194 et seq.; Vervoort, 1993: 193.

Material.— Challenger Expedition, Stn 149D, Royal Sound, Kerguelen Island, 28-60 fms (53-113 m) (BMNH Coel. number 1888.11.13.45, here designated as the lectotype).

Description.— According to Allman (1888: 57) this species is “a large and strong form, attaining a height of upwards of six inches”. Presently, however, the lectotype is much fragmented, being composed of numerous fragments up to 60 mm long. Largest fragment c. 60 mm high, corresponding to basal part of colony. This fragment slightly polysiphonic, with up to three accessory tubes; Allman (1888: 57) indicated that “stem fascicled towards the root, becoming monosiphonic distally”. Though branching pattern of lectotype is indistinct in its present state, it is apparently in one plane and alternate; according to Allman (1888: 57) the stem is “pinnately branched, branches alternate”.

Hydrothecae visible throughout the colony, alternately arranged in one plane (fig. 1A). Hydrotheca almost cylindrical (fig. 1A-D, F-H), abcaudally directed and adnate for less than half its adcauline length (sometimes only for one third). Abcauline wall



Fig. 1. *Staurothecha echinocarpa* (Allman, 1888): A, hydrothecae showing alternate arrangement; B-D, hydrothecae; E, female gonotheca; F, hydrotheca with external male gonotheca; G, hydrotheca with internal male gonotheca; H, hydrotheca with both external and internal male gonothecae (All the drawings from the lectotype). Scale bar: 1 mm.

Table 1. Measurements of *Staurotheca echinocarpa* (Allman, 1888) (in µm).

	Lectotype	Millard's (1967) material
Hydrothecae		
Abcauline length	1300-1700	850-1050
Free adcauline wall	1050-1250	600-830
Adnate adcauline wall	620-700	360-570
Adcauline wall	1750-1950	-
Diameter at aperture	650-740	310-450
Female gonotheca		
Height	c. 2000	-
Maximum width	c. 1300	-
Diameter at aperture	c. 500	-
Male gonothecae		
Height	2000-2500	-
Maximum width	700-1150	-
Diameter at aperture	150-250	-
Nematocysts		
Larger group	17-18 x 4-4.5	-
Smaller group	9 x 2-2.5	-

straight or with a slight swelling at basal part. Adcauline wall slightly concave, with a distinct inflexion point where it becomes free. Adcauline wall longer than abcauline one. Hydrothecal aperture circular, directed upwards and outwards; rim even. Hydrothecae deprived of mushroom-shaped diaphragm. With distinct fenestrae just below diaphragm.

Male and female gonothecae present. Female gonotheca piriform (fig. 1E), arising directly from fenestrae below hydrothecae. Circular aperture slightly raised, placed in middle of adcauline side. External gonothecal wall ornamented with digitiform processes in the distal two-thirds. Male gonothecae either inserting at the same position as females ones (fig. 1F, H) or arising from interior of hydrothecae (fig. 1G, H). Gonotheca fusiform, with a distal, circular aperture. Usually one male gonotheca per hydrotheca, though two gonothecae per hydrotheca do also occur: one arising from a fenestra below hydrotheca and the other from interior of hydrotheca (fig. 1H). In the gonothecae arising from interior of hydrotheca it is only possible to see the distalmost part protruding from the hydrothecal aperture (fig. 1G, H).

Cnidome consisting of microbasic mastigophores in two size classes (17-18 × 4-4.5 µm and 9 × 2-2.5 µm).

Remarks.— Prior to Millard's (1967) report, recording unfertile colonies up to 90 mm high, this species had only been found once. The material recorded by Millard is close to Allman's species in the form of the colony but, as noted Millard (1967), the size of the hydrothecae is smaller than that of the type material (cf. Table). She also reports that they share "the absence of regular segmentation, the shape of the hydrotheca and the presence of oval areas below hydrothecae". However, Millard (1967) also indicated that "gonothecae are necessary for final confirmation of the identification". We have here considered Millard's material doubtfully conspecific with Allman's species because of the distinctly smaller dimensions of the hydrothecae

and the absence of gonothecae.

Prior to the study by Peña Cantero & Vervoort (2003), there were no described species of *Staurotheca* with alternate pattern arrangement of the hydrothecae. Hydrothecae arranged in two longitudinal series were already included in the genus (cf. *S. amphorophora* and *S. vervoorti*). Nevertheless, Peña Cantero & Vervoort (2003) found two species of *Staurotheca* (*S. abyssalis* and *S. profunda*) with hydrothecae alternately arranged in one plane and forming two longitudinal rows. As these authors indicated, the shape of the female gonothecae in *S. abyssalis* undoubtedly indicated its relationship with a group of Antarctic species of the genus (*S. antarctica*, *S. compressa*, *S. cornuta* and *S. frigida*), having female gonothecae with the external surface ornamented by a series of digitiform processes. Accordingly the diagnosis of the genus was changed to accomodate species with alternate hydrothecae arranged in one plane (cf. Peña Cantero & Vervoort, 2003). The female gonothecae in Allman's *Sertularia echinocarpa* differ from those in these species because it lacks the bifid, digitiform process on which the gonotheca rests. As in *S. abyssalis* the gonotheca is provided with a simple short peduncle, though in *S. echinocarpa* it is much shorter.

Allman (1888) already indicated that the "perfectly circular" aperture of the hydrotheca in *Sertularia echinocarpa* was a character "exceptional among the Sertulariae with alternate hydrothecae". He also considered that the gonangia were a "striking character in this species".

After the study of the lectotype of *Sertularia echinocarpa* and considering the new diagnosis of the genus *Staurotheca* it is obvious that Allman's species belongs to the genus *Staurotheca*. The main characters of Allman's species agree with those of that genus. The smooth hydrothecal rim, the shape of the hydrotheca, the presence of fenestrae below the base of the hydrothecae and, as indicated above, the shape of the female gonothecae. Moreover, the cnidome of Allman's species, as in the remaining species of *Staurotheca*, consists of microbasic mastigophores in two size classes.

The presence of male and female gonothecae in the lectotype examined can be due to the fact that originally two or more colonies may have been present; Allman (1888) did not specify how many colonies were present in the material. *Staurotheca* is characterized by dioecious colonies, though there are occasional aberrant situations in which gonothecae of both sexes are found in the same colony (cf. *Staurotheca multifurcata* in Peña Cantero & Vervoort, 2003).

On the other hand, the presence of male gonothecae arising both from the fenestrae situated below hydrothecae and from the interior of the hydrothecae has previously been observed in species of *Staurotheca* (cf. *S. vervoorti* in Peña Cantero & Vervoort, 2003).

Millard (1967) brought this species to the genus *Hincksella* Billard, 1918, without giving any reason. This genus is traditionally included into the family Syntheciidae Marktanner-Turneretscher, 1890, and according to Bouillon (1985: 176) *Hincksella* has "hydrothèques alternées et bisériées. Gonothèques naissant à l'intérieur des hydrothèques ou immédiatement en dessous de celle-ci". As we have shown above, these features are also present in species of *Staurotheca*, so that it is not clear which are the differences between *Staurotheca* and *Hincksella*. Peña Cantero et al. (1997: 338) showed that *Staurotheca* is a genus belonging to the family Sertulariidae Hincks, 1868. In the species of *Staurotheca* the predominant type of nematocyst is the microbasic masti-

gophore, whereas in the species of *Synthecium* Allman, 1872, the predominant type is the macrobasic mastigophores (cf. Peña Cantero et al., 1997: 338). *Staurotheca echinocarpa*, considered by Millard (1967) a species of *Hincksella*, has microbasic mastigophores. It is necessary to examine the cnidome of other species of *Hincksella* to determine if they have macrobasic mastigophores, bringing them close to *Synthecium* in the family Synthechiidae, or microbasic mastigophores, in which case *Hincksella* could better be considered congeneric with *Staurotheca*.

Ecology and distribution.— The lectotype was collected at 49°28'S 70°13'E (Royal Sound, Kerguelen) in January, at depths between 50 and 108 m on a bottom of volcanic mud. Millard's (1967) material comes from depths of 1610 to 2200 m off the east coast of South Africa.

Acknowledgments

The authors wish to express their gratitude to Ms Sheila Halsey, the Natural History Museum, London, for the loan of material.

This study was supported by a research contract funded by the Ministerio de Ciencia y Tecnología and the Universidad de Valencia, Spain (Ramón y Cajal Program).

References

- Allman, G.J., 1872. A monograph of the gymnoblastic or tubularian hydroids. Conclusion of part I, and part II, containing descriptions of the genera and species of the Gymnoblaster: xiii-xxiv, 155-450, pls 1323.— London, Ray Society.
- Allman, G.J., 1888. Report on the Hydroida dredged by H.M.S. Challenger during the years 1873-76. Part II. The Tubularinae, Corymorphinae, Campanularinae, Sertularinae and Thalamophora.— Rep. scient. Results Voy. Challenger, Zool. 23(70): i-lxix, 1-90, pls 1-39, 1 map.
- Billard, A., 1918. Notes sur quelques espèces d'hydroïdes de l'expédition du Siboga.— Archs Zool. exp. gén., 57, notes et revue 2: 21-27, figs 1-5.
- Bouillon, J., 1985. Essai de classification des Hydropolypes - Hydroméduses (Hydrozoa-Cnidaria).— Indo-Malayan Zool., 2(1): 29-243, tabs 1-32.
- Briggs, E.A., 1938. Hydroida.— Scient. Rep. Australas. antarct. Exped., (C)9(4): 1-46, figs 1-3, pls 15-16.
- Driesch, H., 1889. Tektonische Studien an Hydroidpolypen.— Jena. Z. Naturw., 24(1): 189-226, figs.
- El Beshbeeshy, M., 1991. Systematische, Morphologische und Zoogeographische Untersuchungen an den Thekaten Hydroiden des Patagonischen Schelfs: 1-390, figs 1-102, tabs 1-80.— Dissertation, Universität Hamburg.
- Hartlaub, C., 1901. Revision der Sertularella-Arten.— Abh. Geb. Naturw. Hamburg, 16(2)(1): 1-143, figs 1-56, pls 1-6.
- Hartlaub, C., 1904. Hydroiden. In: Expédition antarctique Belge. Résultats du voyage du S.Y. Belgica en 1897-1899.— Rapports scientifiques, Zoologie: 1-19, pls 1-4.
- Hartlaub, C., 1905. Die Hydroiden der Magalhaensischen Region und chilenischen Küste. In: Fauna chilensis.— Zool. Jb., suppl. 6(3)(3): 497-714, 142 figs, map 1.
- Jäderholm, E., 1904a. Mitteilungen ueber einige von der Schwedischen Antarctic-Expedition 1901-1903 eingesammelte Hydroiden.— Archs Zool. exp. gén., (4)3, notes et revue, 1: i-xiv.
- Jäderholm, E., 1904b. Hydroiden aus den Küsten von Chile.— Ark. Zool., 2(3): 1-7, pls 1-2.
- Kirchenpauer, G.H., 1884. Nordische Gattungen und Arten von Sertulariden.— Abh. Geb. Naturw. Hamburg, 8(3): 93-144, pls 11-16.
- Marktanner-Turneretscher, G., 1890. Die Hydroiden des k.k. naturhistorischen Hofmuseums.— Annln naturhist. Hofmus., 5: 195-286, pls 3-7.
- Millard, N.A.H., 1967. Hydroids from the south-west Indian Ocean.— Ann. S. Afr. Mus., 50(9): 168-

194, figs 1-6.

- Millard, N.A.H., 1975. Monograph on the Hydroida of southern Africa.— Ann. S. Afr. Mus., 68: 1-513, colourplate, figs 1-143.
- Millard, N.A.H., 1978. The geographical distribution of southern African hydroids.— Ann. S. Afr. Mus., 74(6): 159-200, figs 1-9, tabs 1-2, appendices 1 & 2.
- Murray, J., 1896. On the deep and shallow water marine fauna of the Kerguelen region of the Great Southern Ocean.— Trans. R. Soc. Edinb., 38(2)(10): 343-500, figs, tabs, 1 map.
- Naumov, D.V. & S.D. Stepan'yants. 1962. Hydroida Thecaphora collected in the Antarctic and Subantarctic by the Soviet Antarctic Expedition with the R.V. 'Ob'. In: Biological results of the Soviet Antarctic Expedition, 1955-1958, 1.-Issled. Fauna Morei. 1(9): 68-106, figs 1-22, tabs 1-8, map.
- Nutting, C.C., 1904. American hydroids. P. II. The Sertulariidae.— Spec. Bull. U.S. natn. Mus., 4(2): 1-325, pls 1-41.
- Peña Cantero, A.L. & A.M. García-Carrascosa, 1994. Hidrozoos de la campaña "Antártida 8611". In: J. Castellví, ed., Actas del cuarto simposio español de estudios antárticos. Puerto de la Cruz, 20-25 de octubre de 1991: 117-140, figs 1-10.
- Peña Cantero, A.L., A.M. García Carrascosa & W. Vervoort, 1999. Two new species of *Staurothea* Allman, 1888 (Cnidaria, Hydrozoa, Sertulariidae) from the Scotia Sea (Antarctica).— Polar Biol., 21: 155-165, figs 1-5.
- Peña Cantero, A.L., A. Svoboda & W. Vervoort, 1997. Species of *Staurothea* Allman, 1888 (Cnidaria: Hydrozoa) from recent antarctic expeditions with R.V. *Polarstern*, with the description of six new species.— J. Nat. Hist., 31(3): 329-381, figs 1-13, tabs 1-13.
- Peña Cantero, A.L. & W. Vervoort, 2003. Species of *Staurothea* Allman, 1888 (Cnidaria: Hydrozoa: Sertulariidae) from US Antarctic expeditions, with the description of three new species.— J. Nat. Hist., 37(22): 2653-2722.
- Pfeffer, G., 1890. Die niedere Thierwelt des antarktischen Ufergebietes. In: Die internationale Polarforschung 1882-1883. Die deutschen Expeditionen und ihre Ergebnisse, herausgegeben von G. Neumayer, 2: 455-572.
- Stechow, E., 1920. Neue Ergebnisse auf dem Gebiete der Hydroidenforschung.— Sb. Ges. Morph. Phys., München, 31: 9-45, figs 1-10.
- Stepan'yants, S.D., 1979. Hydroids of the antarctic and subantarctic waters, in Biological results of the Soviet Antarctic Expeditions, 6.— Issled. Fauny Morei, 22(30): 1-99, figs 1-9, pls 1-25 (in Russian).
- Vanhöffen, E., 1910. Die Hydroiden der Deutschen Südpolar-Expedition 1901-1903.— Dt. Südpol.-Exped., 11 (= Zool., 3): 269-340, figs.
- Vervoort, W., 1993. Cnidaria, Hydrozoa, Hydroida: Hydroids from the Western Pacific (Philippines, Indonesia and New Caledonia) I: Sertulariidae (Part 1). In: Résultats des Campagnes MUSORSTOM, 11.— Mém. Mus. natn. Hist. nat. Paris, 158, Zool.: 89-298, figs 1-67, tabs 1-58.
- Vervoort, W. & J.E. Watson, 2003. The Marine Fauna of New Zealand: Leptothecata (Cnidaria: Hydrozoa) (Thecate Hydroids).— NIWA Biodiversity Memoir 119: 1-538, figs 1-108.
- Von Campenhausen, B., 1896. Hydroiden von Ternate. In: W. Küenthal, Ergebnisse einer zoologischen Forschungsreise in den Molluken und Borneo, Theil 2.— Abh. senckenb. naturf. Ges., 23(2): 297-320, pl. 15.

Received: 30.vii.2003

Accepted: 5.x.2003

Edited: L.P. van Ofwegen

