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

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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 amphibora 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 jaederholmi 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 polarsternii 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.

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. *Staurotheca 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.
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. Hydro-
thecae 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). Gono-
theca fusiform, with a distal, circular aperture. Usually one male gonotheca per hydro-
theca, 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

| 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 × 4-4.5              | -                           |
| Smaller group               | 9 × 2-2.5                  | -                           |

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 accommodate 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 alternes et biseriées. 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 *Hinckselfa*, has microbasic mastigophores. It is necessary to examine the cnidome of other species of *Hinckselfa* to determine if they have macrobasic mastigophores, bringing them close to *Synthecium* in the family Syntheciidae, or microbasic mastigophores, in which case *Hinckselfa* could better be considered congeneric with *Staurotheca*.

Ecology and distribution.— The lectotype was collected at 49°28'S 70°13'E (Royal Sound, Kerguélen) 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.

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References


194, figs 1-6.


