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Sphaeronectes pughi sp. nov., a new species of sphaeronectid calycophoran siphonophore from the subantarctic zone

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Abstract

A new species of sphaeronectid calycophoran siphonophore, *Sphaeronectes pughi* sp. nov. is described from material collected in the subantarctic zone, south of Australia. An identification key for sphaeronectid nectophores is provided, with illustrations of the eleven recognized species.

Keywords: *Sphaeronectes*; New species; Subantarctic; Siphonophore

Sphaeronectid siphonophores are small fragile calycophorans, the polygastric stage of which is composed of the single retained larval nectophore. The genus was established in the mid 1800s (Huxley, 1859), but the group has been subjected to much taxonomic confusion, partially abetted by the work of Claude Carré (1968a) and finally critically reviewed by Phil Pugh (2009). Both of these authors also described several new *Sphaeronectes* species (Carré, 1966, 1968b, c; Pugh, 2009). One further new species has subsequently been added to the literature (Lindsay et al., 2011). During the 2008 Collaborative East Antarctic Marine Census (CEAMARC) campaign in the Southern Ocean on the T/V *Umitaka Maru*, several NORPAC nets (NORth PACific standard plankton net, 45-cm diameter, 0.33-mm mesh aperture; Motoda, 1957) were deployed in the subantarctic zone south of Australia. In one of these nets a new species of *Sphaeronectes* was found, introduced here as *Sphaeronectes pughi* sp. nov.

Family Sphaeronectidae Huxley, 1859

Monotypic for the genus *Sphaeronectes* Huxley, 1859.

Nectosome with a single fragile, rounded nectophore, representing the retained larval nectophore. No definitive nectophores developed.

Bracts with a simple phyllocyst, resembling the somatocyst of the nectophore, and no bracteal canals.

Genus *Sphaeronectes* Huxley, 1859

With the characters of the family.

Type species: *Sphaeronectes koellikeri* Huxley, 1859.

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S. pughi/pū'i/sp. nov.

Diagnosis: Relatively small nectophore resembling a rounded cone. Nectosac extending to 80% the height of the nectophore. Curved radial canals, extending to 80% of nectosac height, not extending anterior of the hydroecium. Hydroecium on lower side only, with apex lying nearly on a level with the junction of the radial canals and the base of the somatocyst; hydroecial opening on lower side of nectophore, extending from 30 to 70% height of latter. Pedicular canal virtual, on lower side of nectophore, with somatocyst arising from it at 70% nectophore height; somatocyst 16% height of nectophore, an inverted pear-shape on a curved pedicle with apex just short of nectosac apex.

Material examined: A single specimen of *S. pughi* sp. nov. was collected during the T/V *Umitaka-Maru*'s CEAMARC cruise, in the NORPAC net from station S6 (25th January 2008; 42.8°S; 121.5°W; 0–150 m). The specimen was preserved in 5% formalin-seawater. The holotype has been deposited at the Showa Memorial Institute, National Museum of Nature and Science, Tokyo, under registration number NSMT-Co 1546. Additionally, specimens of *S. fragilis* Carré, 1968, *Sphaeronectes pagesi* Lindsay et al., 2011, and *S. koellikeri* were examined.

Description: Fig. 1 shows an illustration, in lateral view, of the type specimen of *S. pughi*. Fig. 2 shows illustrations of the same specimen, together with the ten other currently-recognized *Sphaeronectes* species.

The holotype specimen consisted of a single nectophore with a small anterior portion of siphosome. The nectophore had the appearance of a rounded cone and measured 2.85 mm in width and 3.36 mm in height. The nectosac, 2.60 mm in width, occupied nearly the whole width of the nectophore and was 2.8 mm in height. The radial canals arose together on the lower side of the nectosac at about 80% the height of the latter above the ostium. At this point the angle between the lateral and upper canals was close to 90°. Initially the lateral canals ran horizontally and distally away from their junction with the upper and lower canals, before, and after a short distance, gradually curving downwards and then passed vertically and directly to the ostial ring canal, connecting with it at c. 60% of the width of the nectosac from the insertion of the lower radial canal. The upper and lower canals have straight courses, the upper running along the apex of the nectosac. Hydroecium open from 30 to 70% height of the nectophore; its apex lying nearly on a level with the junction of the radial canals and the base of the somatocyst. The maximum depth of the hydroecium, at its apex, was about 30% of the width of the nectophore. Pedicular canal virtual. The somatocyst, on the lower side of the nectosac, formed a pyriform structure, with the globular side facing anteriorly and lying close to the nectosac, with a pedicle curving towards the lower side, from the point of junction with the pedicular canal. The globular part of the somatocyst measured 0.3 mm at its widest, and 0.47 mm in height, while the pedicle measured 0.08 mm in height.

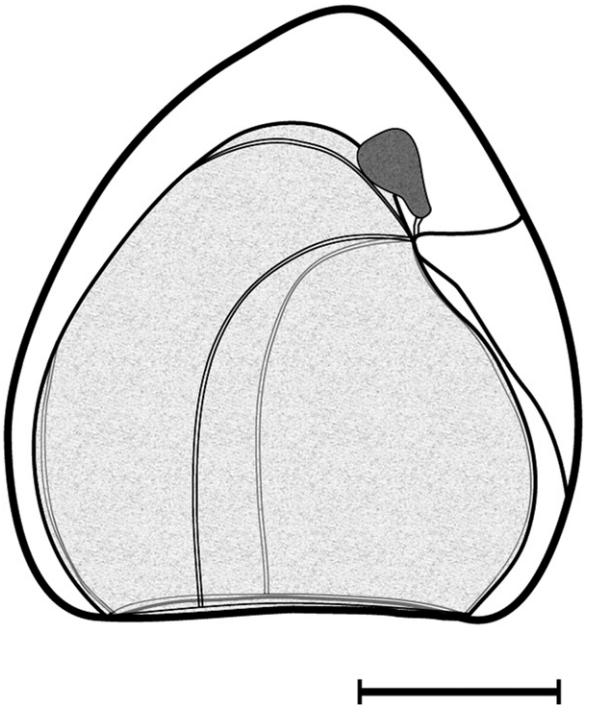

Fig. 1. *Sphaeronectes pughi* sp. nov., collected at station S6 in the NORPAC net. The view is not exactly lateral and therefore although the upper canal seems to pass over the right-hand side of the nectosac this is not actually the case. Scale bar = 1 mm.

The siphosomal stem arose in the upper distal part of the hydroecium, but in the holotype specimen, only its anterior part remained, and no useful information on the structure of the cormidia was obtainable.

Comments: In his review of the family Sphaeronectidae (Pugh, 2009), Pugh describes nine valid species of *Sphaeronectes*, and a further species, *S. pagesi* was recently described from Japan (Lindsay et al., 2011). In only two other species, *S. koellikeri* and *S. pagesi*, does any part of the hydroecium occupy or extend into the anterior half of the nectophore, and *S. pughi* can easily be differentiated from these by its size, and by both the extent of the hydroecium and the height of its opening. Additionally, the lateral radial canals of the nectophore of *S. pughi* do not extend anterior of the hydroecium at any point, a marked

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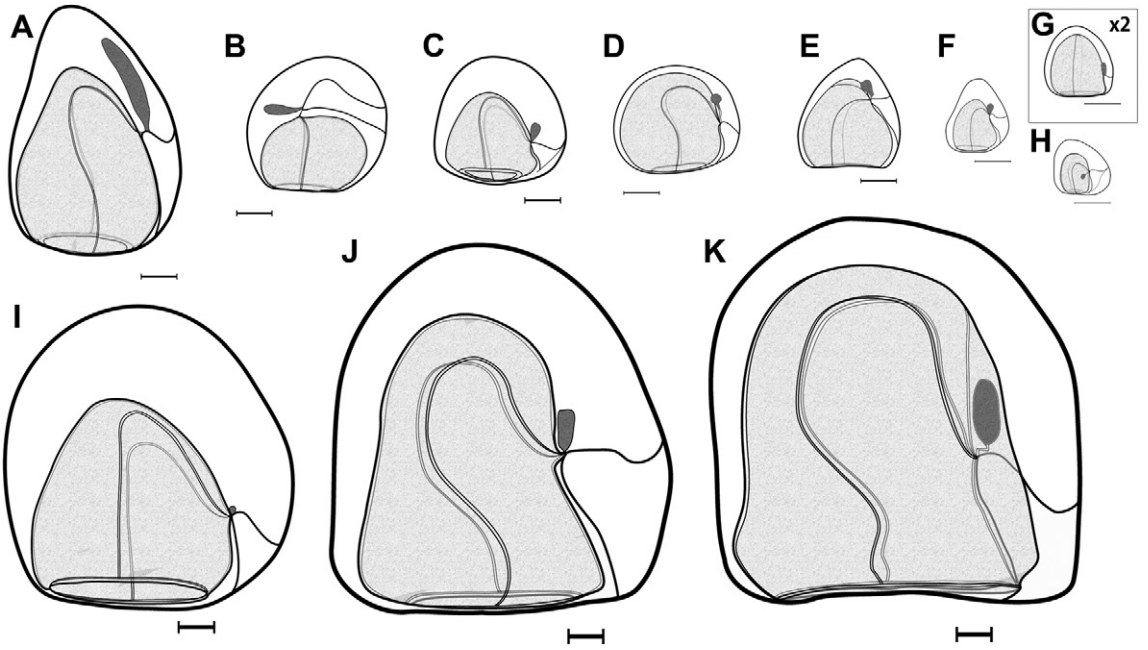

Fig. 2. Illustrations of the eleven described *Sphaeronectes* species. Scale bars = 1 mm, except for *S. bougisi* (G): scale = 0.5 mm. A: *S. brevitruncata* Chun, 1892 (redrawn from Chun, 1892); B: *S. koellikeri* Huxley, 1859 (from Lindsay et al., 2011); C: *S. irregularis* Claus, 1874 (redrawn from Pugh, 2009); D: *S. fragilis* Carré, 1968 (from Lindsay et al., 2011); E: *S. pughi* (original); F: *S. pagesi* Lindsay et al., 2011 (from Lindsay et al., 2011); G: *S. bougisi* Carré, C., 1968 (redrawn from Carré, 1968b); H: *S. gamulini* Carré, 1966 (redrawn from Carré, 1966); I: *S. tiburonae* Pugh, 2009; J: *S. christiansonae* Pugh, 2009; K: *S. haddocki* Pugh, 2009 (I, J, K redrawn from Pugh, 2009).

difference to the ten other *Sphaeronectes* species. *S. pughi* most closely resembles *S. irregularis* in size and shape, but in *Sphaeronectes irregularis* the somatocyst is characterized by the absence of a pedicle.

Distribution: The single specimen was found at a depth between 0 and 150 m in the subantarctic zone of the Eastern Southern Ocean: at station S6 (42°48′S, 121°5′E) in Subantarctic Surface Water, with a temperature range between 9.5 and 13 °C. The other cnidarians sampled in the same net were *Dimophyes arctica* (Chun, 1897), *Eudoxoides mitra* (Huxley, 1859), *Eudoxoides spiralis* (Bigelow, 1911), *Lensia meteori* (Leloup, 1934), *Maresearsia praeclara* Totton, 1954, *S. koellikeri* and a *Rhopalonema* species. With the exception of the calycophoran siphonophore *D. arctica*, all of these were only present at the subantarctic and not the Antarctic NORPAC stations. This distributional data has been deposited in the database of the Marine Biodiversity Information Network of the Scientific Committee on Antarctic Research (SCAR-MarBIN) (Grossmann and Lindsay, 2011) and is therefore also available through the Ocean Biogeographic Information System (OBIS).

Etymology: Named in honour of Phil Pugh of the National Oceanography Centre of Southampton, without whose review of the Sphaeronectidae (Pugh, 2009), and the order it brought to this confused family, this new species would probably not have been identified.

Key to the Sphaeronectidae

1 − Lateral radial canals straight……2
− Lateral radial canals curved or sigmoid……3
2− Hydroecium anterior of the nectosac, lateral radial canals arising from pedicular canal, nectophore more than 2 mm wide……*S. koellikeri*
− Hydroecium to the side of the nectosac, lateral radial canals arising from upper canal, nectophore less than 2 mm wide……*S. bougisi*[1]
3− Lateral radial canals not extending anterior of the somatocyst……4
− Lateral radial canals extending anterior of the somatocyst……6
4− Lateral radial canals extending anterior of the hydroecium……5

[1] The unique arrangement of the radial canals of *S. bougisi*, within the genus *Sphaeronectes*, resembles that found in the calyconula stage nectophores of *Lilyopsis*—the lateral radial canals originating independently, from the upper canal, rather than from the pedicular canal. It is, as of the latest review (Pugh, 2009), maintained within the genus.

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– Lateral radial canals not extending anterior of the hydroecium……*S. pughi*
5– Somatocyst more than twice as long as wide……*S. brevitruncata*
– Somatocyst less than twice as long as wide……*S. pagesi*
6– Somatocyst with a distinct pedicle……7
– Somatocyst without a distinct pedicle……9
7– Somatocyst less than twice as long as wide, pedicle longer than somatocyst……8
– Somatocyst more than twice as long as wide, pedicle shorter than somatocyst……*S. haddocki*
8– Pedicle horizontal (i.e. not lying in the anterior–posterior axis)……*S. gamulini*
– Pedicle vertical…… *S. fragilis*
9– Lateral radial canals with a single curve, nectophore less than 9 mm wide……10
– Lateral radial canals sigmoid, nectophore more than 9 mm wide……*S. christiansonae*
10– Somatocyst minute, nectophore more than 4 mm wide……*S. tiburonae*
– Somatocyst not minute, pyriform, nectophore less than 4 mm wide……*S. irregularis*

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