

A new species of *Rosacea* (Siphonophora: Calyophorae: Prayidae) from the Gulf of Oman

P.R. Pugh

Southampton Oceanography Centre, Waterfront Campus, European Way, Southampton, SO14 3ZH.

E-mail: prp@soc.soton.ac.uk

A new species of the genus *Rosacea* (Siphonophora: Calyophorae: Prayidae) is described from the Gulf of Oman, where its eudoxid stage was found in abundance. It is distinguished from other *Rosacea* species by the course of the lateral radial canals on the nectosac of the nectophore, and the shape of the eudoxid bract and the arrangement of its bracteal canals.

Rosacea arabiana sp. nov.

Diagnosis

Small nectophores, with somatocyst having a short descending, but no ascending, branch. Lateral radial canals on nectosac arise separately from dorsal canal, and have a sigmoid course. Almost spherical eudoxid bracts, with dorsal bracteal canal arising from distal end of right longitudinal canal.

Material examined

Numerous specimens collected, using RMT8 multineets, during RRS 'Charles Darwin' cruise 104 to the Gulf of Oman. Two N₁ and two N₂ nectophores (one pair still attached together), three eudoxid bracts and two separate gonophores from station 54001#6 (23 February 1997, 24°13.2'N 58°36.3'E, depth range 201–152 m) have been designated the types and have been deposited in the Natural History Museum, London.

Description

Nectophores (Figure 1) small, roughly cylindrical measuring up to 6.4 mm in length. The hydroecium extended the entire length of the N₁ nectophore (Figure 1A), and was relatively deep, while it was limited to the central region in the N₂ one (Figure 1C), and was relatively shallow. The simple, tubular somatocyst had a short descending branch, basal to the origin of the pedicular canal, but no ascending one. The stem connecting the two nectophores was attached roughly in the middle of the somatocyst in the N₂ nectophore, but at its apical end in the N₁ one. The attachment lamella for the siphosome, however, lay along almost the entire length of the N₂ somatocyst, and often bore buds of gastrozooid and tentacles. The nectosac was small, and occupied only the basal one fifth (N₁) to less than one quarter (N₂) of the total length of the nectophores. Its ostial opening was either basal (N₁) or slightly dorso-basal (N₂). A relatively long pedicular canal connected the somatocyst to the nectosac. On reaching the latter, it gave rise only to the dorsal and ventral radial canals. The latter then ran straight to the ostial ring canal. The dorsal canal gave rise, separately, to the left and right radial canals. Either canal could arise first, and the distance between the two branches, and that from the pedicular canal to the first branch, were quite variable. The dorsal canal then ran straight to the ring canal. The lateral canals described an S-shaped curve as they passed basally and ventrally along the lateral margins of the nectosac, finally entering the ring canal quite close to the ventral canal.

The almost spherical eudoxid bract (Figure 2A–C) was relatively large, in comparison to the nectophore, and measured up

to 7 mm in diameter. In the axial plane, the incision on the right hand side allowing passage of the stem when still attached, was shallow, while that on the left was deeper. Six bracteal canals were present. The dorsal canal arose at the distal end of the right longitudinal canal. It extended up through the bract to end on the dorsal surface in the middle of a circular depression. The short longitudinal canals were thickened throughout their length. The proximal parts of the pair of hydroecial and the ventral canals, usually were also thickened. They thinned distally and all ended in a conspicuous swelling.

The eudoxid gonophore (Figure 2D) was elongate, with the subumbrella cavity usually occupying about half its length, although for some it was considerably less than this. There was a more or less pronounced apico-lateral lobe. The pedicular canal ended in a small depression at the apical end of the gonophore, and on reaching the subumbrella cavity gave off four straight lateral radial canals. Mantle canals were absent. The spadix of the mature male gonophore protruded well below the opening of the subumbrella cavity, while the female gonophore usually contained six eggs. Frequently two mature gonophores were found attached to a bract.

Remarks

The present specimens of *Rosacea arabiana* show the typical characters (Pugh & Harbison, 1987) of the genus *Rosacea*, having almost cylindrical nectophores, with a small nectosac, and a somatocyst with a descending branch, but without an ascending one. However, the sigmoid course of the lateral radial canals on the nectosac is not as convoluted as in most other *Rosacea* species. It is similar to that found in *Rosacea limbata* Pugh & Youngbluth, 1988, although ultimately the canals do not bend dorsally and run parallel with the ring canal. The major difference is that the lateral radial canals branch separately from the dorsal canal, instead of all four canals arising together from the pedicular canal, as in all other *Rosacea* species. Another feature of the nectophores of *R. arabiana* is their relatively small size, especially in comparison with their eudoxid bracts. In other *Rosacea* species the bracts are usually less than half the size of the nectophores, whereas in *R. arabiana* they are larger than the nectophores.

The almost spherical shape of the eudoxid bracts is very similar to those of *Rosacea cymbiformis* (delle Chiaje, 1822) and *Rosacea plicata sensu* Bigelow, 1911. The key difference between them is the point of origin of the dorsal bracteal canal. In *R. arabiana* it arises from the distal end of the right longitudinal canal, while in *R. plicata* it originates from the right hydroecial canal. In *R. cymbiformis* it also arises from the right longitudinal canal, but proximally, before the right hydroecial branches off.

Table 1. Total numbers of nectophores and eudoxids of *Rosacea arabiana* collected in the Gulf of Oman.

Station	Position	Water depth (m)	Total nectophores	Mean depth of collection (m)	Total eudoxids	Mean depth of collection (m)
54001	~24°13'N 58°40'E	~2250	155	188	9633	183
54002	~24°30'N 57°10'E	~680	18	253	4717	121
54004	~24°46'N 57°07'E	~500	14	251.5	3687	183
54005	~25°15'N 57°00'E	~280	0		3229	140

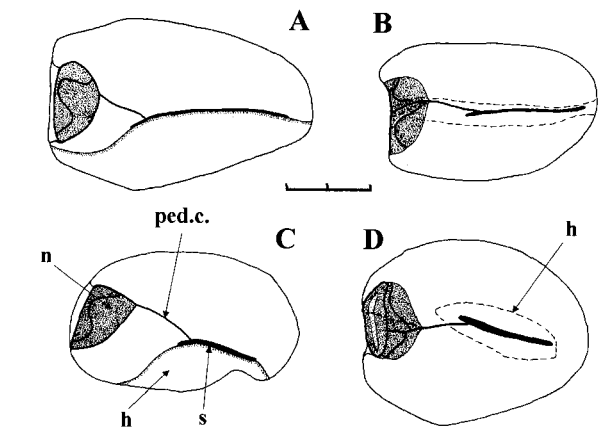


Figure 1. (A) Lateral and (B) dorsal views of N_1 nectophore; (C) lateral and (D) dorsal views of N_2 nectophore. h, hydroecium; n, nectosac; ped.c., pedicular canal; s, somatocyst. Scale bars: A–D, 2 mm.

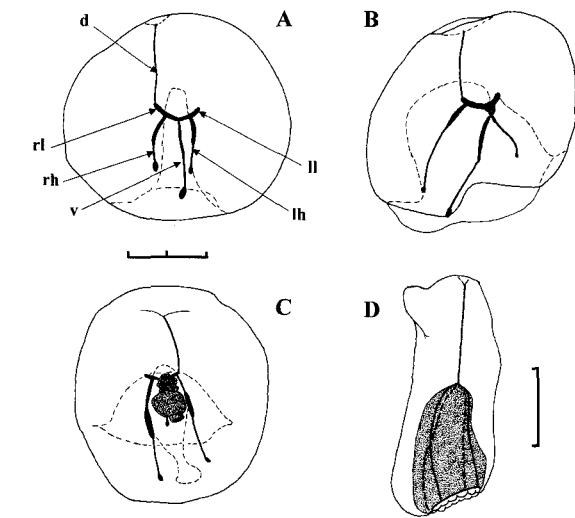


Figure 2. (A–C) Various views of eudoxid bracts; (D) gonophore, after loss of sexual products. d, dorsal; lh, left hydroecial; ll, left longitudinal; rh, right hydroecial; rl, right longitudinal; and v, ventral bracteal canals. Scale bars: A–C, 1 mm; D, 2 mm.

However, in all other *Rosacea* species the dorsal radial canal arises in a similar position. Nevertheless, the bracts of these three species are quite distinct from *R. arabiana* as they are not almost spherical in shape. The bract of *Rosacea flaccida* Biggs, Pugh & Carré, 1978 is very distinctive and cannot be confused with that of any other siphonophore. For *Rosacea repanda* Pugh & Youngbluth, 1988 and *R. limbata* the bract is more flattened and both the ventral and left hydroecial canals have a curved, ?-shaped, course, without any proximal thickenings.

The elongate gonophore of *R. arabiana* is quite distinctive, particularly in the absence of any mantle canals, at the proximal end of

the pedicular canal. Apart from *R. flaccida*, all other *Rosacea* species have two mantle canals, of varying extent. *Rosacea flaccida* also does not have any mantle canals, but the gonophore is easily distinguished from that of *R. arabiana* by its bell like appearance, almost completely filled by the subumbrella cavity.

Rosacea arabiana was found at four stations, sampled during RRS ‘Charles Darwin’ cruise 104 in 1997 (Table 1). Of the 187 nectophores that were identified, 140 (24 per 10^4 m³ of water filtered) were found in the single sample from which the type material was extracted. The eudoxid bracts were much more abundant, and a total of 21,266 specimens was enumerated, with an astonishingly high maximum density, again in the 100–150 m depth range at station 54001#6, of 2381 per 10^4 m³. It is possible that, because of the relatively small size of the nectophores, some were lost through the 4.5 mm meshes of the RMT8 nets. However, examination of the RMT1 (mesh size 0.33 mm) catch from station 54001#6 revealed no increased density of nectophores.

The mean depths of collection for *R. arabiana* at each station are given in Table 1. The disparity in the mean depth of the nectophores and eudoxids at station 54002 was due to the fact that 16 of the 18 nectophores were found in the 200–250 m depth range, with the other two in the 450–650 m range, while the eudoxids, although present at these depths, were commonest at shallower ones. Similarly, at station 54004 all the nectophores were found in the 200–300 m depth range and, although eudoxids were commonest in this range, large numbers also occurred at shallower depths. Depth and spatial distribution of *R. arabiana*, together with all the other siphonophore species collected during the cruise, will be dealt with in more detail in a subsequent publication. However, it was not collected at the two shallow water (water depth ~50 m) stations in the southern Arabian Gulf sampled during the same cruise. It is also interesting to note that during an earlier sampling programme (RRS ‘Discovery’ cruise 209) off Oman, but in the Arabian Sea (19N 59W) south of Ras al Hadd, no specimens of *R. arabiana* were collected. Indeed, only a few nectophores of an unidentifiable, but much larger, *Rosacea* species were found. Thus, presently, the distribution of *R. arabiana* appears to be rather restricted, to the Omani side of the Gulf of Oman.

Etymology

Named for the general area whence the specimens came.

REFERENCE

Pugh, P.R. & Harbison, G.R., 1987. Three new species of prayine siphonophore (Calycophorae, Prayidae) collected by a submersible, with notes on related species. *Bulletin of Marine Science*, **41**, 68–91.

Submitted 9 March 2001. Accepted 30 November 2001.