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A NEW SPECIES OF *CLAUSOPHYES* (SIPHONOPHORAE, CLAUSOPHYIDAE), WITH A REDESCRIPTION OF *C. GALEATA* AND *C. MOSERAE*

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A new species of the genus *Clausophyes* (Siphonophora, Calycophora) is described from four anterior nectophores collected in the Southern Ocean. This species is distinguished from others in the genus by the presence of a large, undivided mouth plate on the anterior nectophore. However, in order to establish the distinctiveness of two other species in this genus, namely *C. moserae* and *C. galeata*, which a recent author has suggested should have only sub-specific ranking, the anterior and posterior nectophores of those species are redescribed.

INTRODUCTION

The Clausophyidae is a small, but highly distinctive, family of meso- and bathypelagic calycophoran siphonophores. Its species are characterized by the partially superimposed disposition of their anterior and posterior nectophores (swimming bells), each of which possesses a somatocyst, although the species of the genus *Heteropyramis* Moser, 1925 appears to be exceptional in that only the anterior nectophore is developed. Until recently the family was considered to be comprised of eight species within five genera. However, Margulis (1988) brought to light a major error in the taxonomy of this family and also made other sweeping changes. The error concerns the species *Clausophyes (Diphyes) ovata* (Keferstein & Ehlers, 1860). Margulis pointed out that the species, to which this name is usually applied, is not the same as that described by Keferstein & Ehlers (1860, 1861). This error arose when Moser (1925) gave a 'redescription' of this species, while actually describing a previously unknown species or, as Margulis (1988) maintains, subspecies. Margulis also pointed out that Patriti's (1969) description of a new species, *C. massiliana*, was practically the same as that for the original *C. ovata* given by Keferstein & Ehlers (1860, 1861) and, correctly, she reduced the former to a junior synonym of the latter.

Margulis (1988) considered that the specimens described by Moser (1925) did not warrant the status of a species, and consequently she ascribed them to the subspecies *moserae* within the species *Clausophyes galeata* Lens & van Riemsdijk, 1908, and reduced the latter species to the subspecies *C. galeata galeata*. She considered that the two subspecies differed only in the arrangement of the proximal (basal?) parts of the lateral

hydroecial flaps on the posterior nectophore. In addition her single posterior nectophore of *C. galeata galeata* possessed a tubercle on its mouth plate. Margulis (1988) also noted that the lateral teeth on this mouth plate were not as pronounced as had previously been described, by Lens & van Riemsdijk (1908) and Bigelow (1913). However, Totton's (1954) specimen only had an emarginated mouth plate, and so Margulis (1988) considered such variations as only of intra(sub)specific significance.

In the present paper a new species of *Clausophyes* will be described from material collected in the Southern Ocean. In addition a redescription of the nectophores of two other *Clausophyes* species will be given in order to establish our contention that *C. galeata* is distinct from the species that now must come to be called *C. moserae* Margulis, 1988. No mention will be made of *C. ovata* because the present authors believe that this species does not belong to the genus *Clausophyes*. Discussion of this, together with a consideration of the other changes that Margulis (1988) made to the family Clausophyidae, is deferred to a subsequent paper.

Clausophyes laetmata *sp. nov. (Figures 1 & 2)*

Material examined. Three anterior nectophores collected at Station 83, during Antarktis Cruise V/1 (RV 'Polarstern'), 22 May 1986, 62°23'S 58°25'W, depth range 1850-1480 m (bottom depth 1875 m). One of these has been designated the holotype and has been deposited in the Zoologisches Institut und Zoologisches Museum der Universität Hamburg (Germany), where it is entered as ZIM C 11574. The other two are designated the paratypes and have been deposited in the Natural History Museum, London, Registered no. 1993.5.26.1-2. In addition, one anterior nectophore was taken during 'Meteor' Cruise 11/4 at Station 29, 1 January 1990, 62°14'S 57°32'W, depth range 1500-

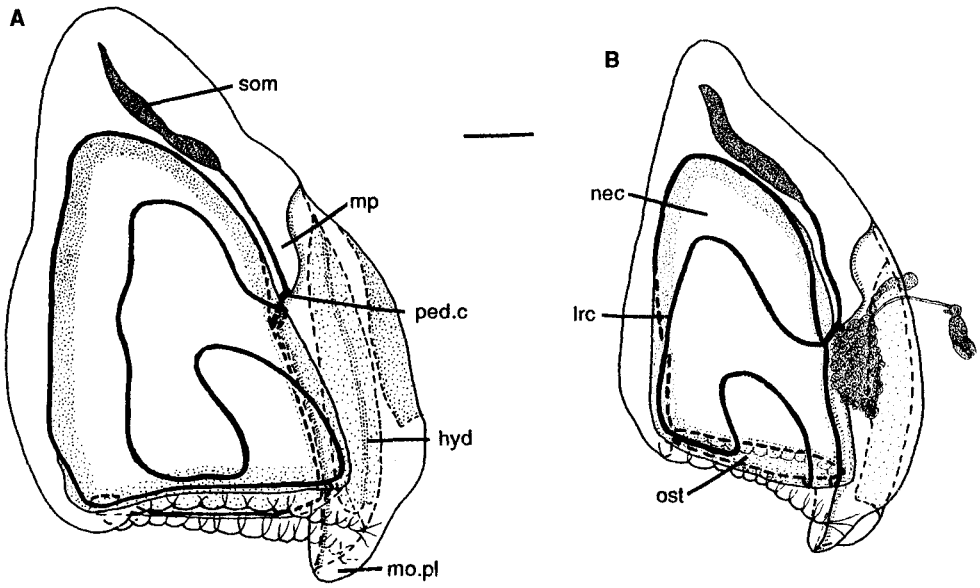

Figure 1. *Clausophyes laetmata* sp. nov. (A) and (B) lateral views of anterior nectophores from Antarktis V/1 Station 83. Scale bars: 1 mm. hyd, hydroecium; lrc, lateral radial canal; mp, mesogloeal protuberance; mo.pl, mouth plate; nec, nectosac; ost, ostium; ped.c, pedicular canal; som, somatocyst.

300 m (bottom depth 2000 m). This specimen is retained in the cnidarian collections of the Institut de Ciències del Mar (CSIC), Barcelona. At both stations a multiple opening/closing net system (0·25 m^2 mouth opening, 100-μm mesh) was used to collect the specimens.

Despite a thorough examination of the samples collected at the above stations, no trace of an appropriate posterior nectophore could be found.

Diagnosis. Clausophyid siphonophore known only from its anterior nectophore. This nectophore is smooth, ridgeless and rounded apically. The hydroecium extends to two-thirds the nectophore height and has extensive lateral flaps. A distinct, undivided mouth plate is present. The lateral radial canals on the extensive nectosac follow the typical *Clausophyes* course. The pedicular canal is short and runs down the basal part of a small mesogloeal protuberance. The somatocyst is expanded only in its apical half.

Description. (Figures 1 & 2.) Only four anterior nectophores have been found to date, of which one is very young (Figure 2B). The nectophores measure up to 9·25 mm in height and 5·25 mm in width and are laterally compressed. They are ridgeless, smooth-walled and have a rounded apex. The hydroecium extends to about two-thirds the height of the nectophore and shows several distinctive features. The median mesogloeal protuberance lies relatively high up, in the upper third of the hydroecium (Figure 1A,B). Toward the base of the protuberance the siphosomal stem is attached, as is also, presumably, a posterior nectophore, although such has yet to be identified. In the mature nectophores the lateral walls of the hydroecium form distinctive flaps that, in

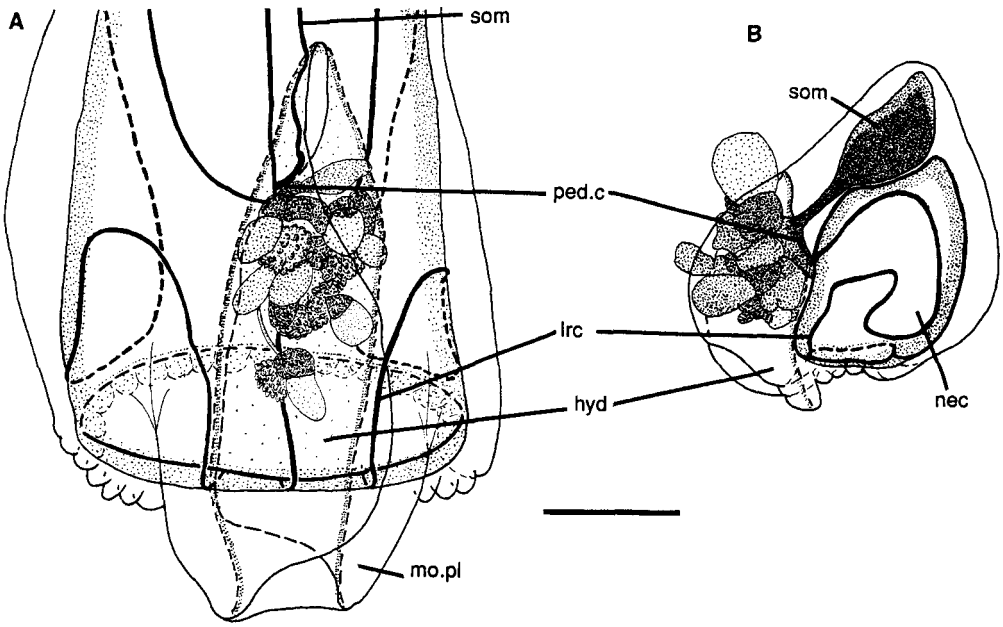

Figure 2. *Clausophyes laetmata* sp. nov. (A) Ventral view of basal part of anterior nectophore; and (B) lateral view of young anterior nectophore from Antarktis V/1 Station 83. Scale bar: 1 mm. hyd, hydroecium; lrc, lateral radial canal; mo.pl, mouth plate; nec, nectosac; ped.c, pedicular canal; som, somatocyst.

the absence of the posterior nectophore, overlap each other and close off the hydroecium except at its apex and base (Figure 2A). This is in marked contrast to the other *Clausophyes* species where the lateral flaps do not overlap each other (see below). In addition the lateral flaps extend basally, below the ostial level, and the hydroecium extends down on to a distinct and undivided mouth plate (Figure 2A).

The nectosac is extensive, occupying approximately the lower three-quarters of the nectophore. Apically its contours follow those of the nectophore itself, such that its apex lies toward the dorsal side. Its ventral wall, in its basal half, is closely apposed to the dorsal wall of the hydroecium. The ostium is wide and occupies most of the base of the nectophore. The opening is usually slightly inclined dorso-basally. The short pedicular canal extends down the basal part of the mesogloeal protuberance, where it joins with the somatocyst and the gastrovascular canal of the siphosome, to slightly below the mid height of the nectosac. It appears not to connect directly to the canal system on the nectosac, but gives off a short side branch to the nectosac while the main canal extends very slightly basally to this. The four radial canals on the nectosac arise together. The ventral canal runs straight down to the ring canal. The dorsal runs up to the apex of the nectosac and then straight down to the ostium. The lateral canals have an extensive looping course (Figures 1 & 2), characteristic of species of the genus *Clausophyes* but not previously illustrated correctly, except for Zhang & Zhang (1980) who illustrated it for *C. galeata*.

The somatocyst arises from the junction of the stem and pedicular canals. It runs obliquely up, following the contour of the nectosac, and in its basal half is a simple tube. However, in its apical half it is expanded, somewhat irregularly (Figure 1). As it ascends it continues to follow the contour of the nectosac, to the apex of the latter, before curving up and running toward the apex of the nectophore. In the youngest nectophore (Figure 2B) the apical part of the somatocyst is relatively enormously expanded to an extent that it affects the shape of the nectosac.

Two of the anterior nectophores have the proximal part of the siphosomal stem still attached. Although for the most part the stems are highly contracted and many of the attached individuals are very young, most of these appear to be gastrozooids with tentacles, and there are no clear signs of either bracts or gonophores.

Distribution. Known only from the Southern Ocean in a restricted area to the north of the Antarctic Peninsula.

Etymology. The name *laetmata* is derived from the Greek *laitma*, meaning the depth of the sea.

Remarks. The anterior nectophores of *Clausophyes laetmata* sp. nov. are distinguished easily from those of other *Clausophyes* species by the presence of a relatively large, undivided mouth plate; by the small size and relatively high position of the mesogloeal protuberance, where stem attachment takes place; and, consequently, by the relatively high insertion point of the pedicular canal onto the nectosac. In the preserved material the lateral hydroecial flaps of *C. laetmata* tend to overlap each other, which is not apparent in the isolated anterior nectophores of other *Clausophyes* species.

DISCUSSION

Margulis (1988) drew attention to the considerable confusion in the taxonomy of clausophyid siphonophores. This is particularly true for the species *Clausophyes ovata*, which was originally described by Keferstein & Ehlers (1860, 1861) under the name *Diphyes ovata*. However, the majority of more recent authors have used the re-description of *C. ovata* given by Moser (1925) to identify this species. Margulis (1988) pointed out that this was a misascription and that Moser's material was not the same as that described by Keferstein & Ehlers (1860). Further, she considered that the differences between Moser's '*C. ovata*' material and that described by Lens & van Riemsdijk (1908), under the name *C. galeata*, were insufficient to warrant specific status. Consequently, she included the former in the species *C. galeata* as the subspecies *moserae*, and relegated the latter to the subspecies *galeata*. Very few specimens of the latter have been collected and our knowledge of it is based largely on a brief re-description given by Bigelow (1913), and an illustration by Zhang & Zhang (1980). However, further specimens have been found recently in collections from the north-east Atlantic (Pugh, 1990) and from the Southern Ocean (Pagès *et al.*, in preparation). These have enabled us to establish, as discussed below, that there are clear differences between both the anterior and posterior nectophores of the *moserae* and *galeata* forms and consequently, herein, they are referred to as distinct species.

The anterior nectophores of *Clausophyes moserae* (Figure 3) usually are relatively small, about 7-8 mm in height, and laterally compressed. However, at bathypelagic depths they tend to be larger and specimens up to 14 mm in height have been found in the 'Discovery' collections. Moser (1925) reported one specimen with a height of 20 mm. This specimen would appear to belong to *C. moserae*, judging from her figure of it (Plate XXIV, figure 4), but none the less it is extraordinarily large for this species. The somatocyst is long, and extends up from the base of the usually prominent mesogloeal protuberance, where stem attachment occurs. Toward the apex of the nectosac, the somatocyst expands, to a very variable degree and extent. Above the nectosac, in the smaller specimens, it contracts back to form a relatively long, simple tube which runs up to very close to the apex of the nectophore. However, in some of the larger specimens that appear to belong to *C. moserae*, most of the apical part of the somatocyst may be swollen. This is probably related to the nutritive state of the animal, although it has not been noted for smaller specimens from shallower depths. When the somatocyst is expanded greatly, it can affect the shape of the apical region of the nectosac. The hydroecium, on the ventral side, usually extends to less than half the height of the nectophore (Figure 3A), although occasionally it extends higher (Figure 3C). The two simple, lateral, hydroecial flaps extend slightly below ostial level before their inner margins curve round and up toward the ventral margin of the ostium, just below which they are united by a small cross-process (Figures 3B,D). The rounded, basal margins of these flaps extend dorsally for a short distance before merging with the lateral margins of the ostium. The mesogloeal protuberance, within the hydroecium, is most prominent in the smaller specimens (Figure 3A), whereas in the larger ones, possibly as a result of preservation, it can be relatively smaller and appear shrivelled, particularly at its base. This results in the pedicular canal, which tends to run

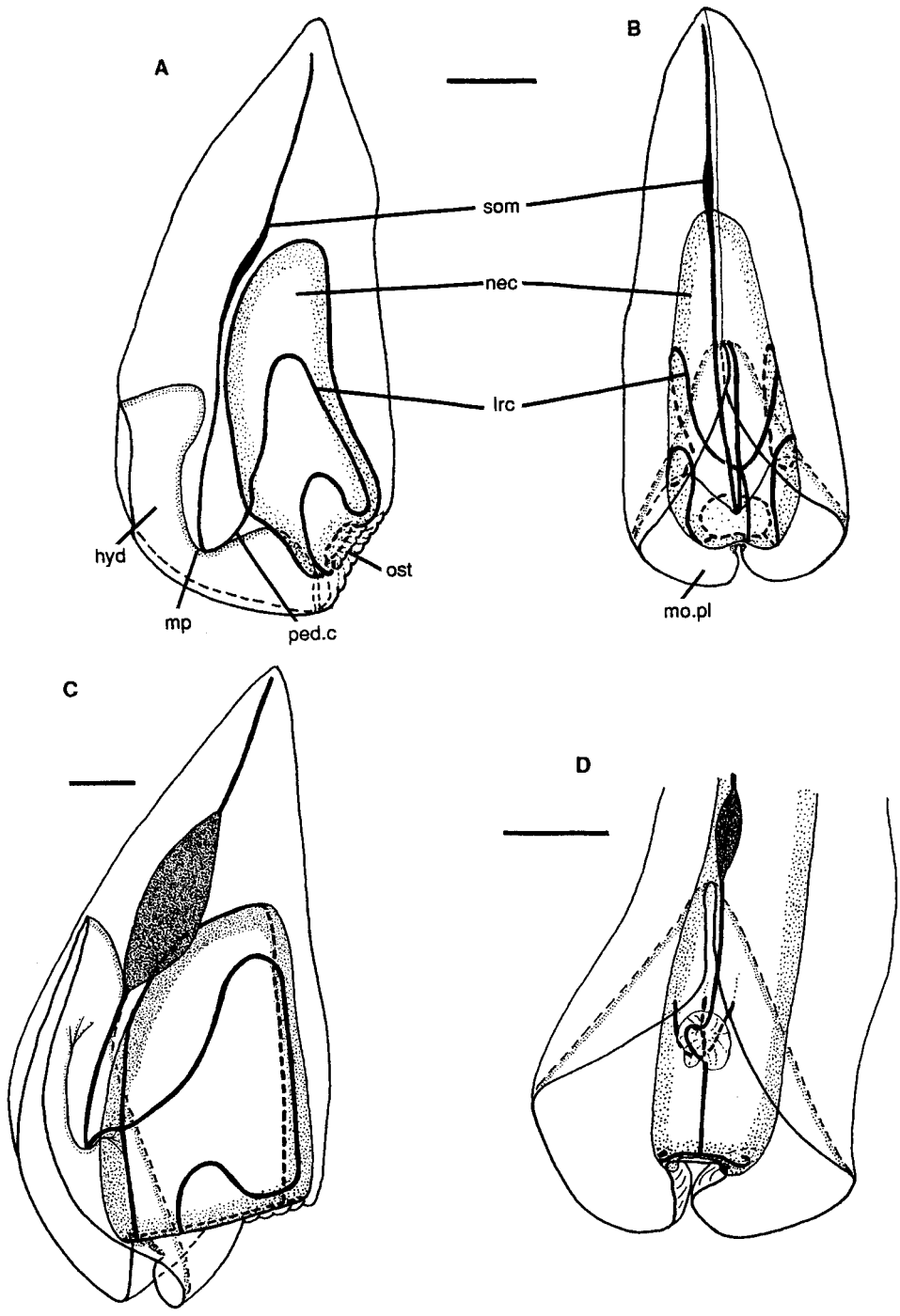

Figure 3. Anterior nectophores of *Clausophyes moserae*. (A) and (C) lateral, and (B) and (D) ventral views. (A) and (B) of specimen collected during 'Johnson-Sea-Link II' Dive 992. (C) and (D) of specimens from 'Discovery' Stations 9960#3 and 11121#23 respectively. Scale bars: 1 mm. hyd, hydroecium; lrc, lateral radial canal; mp, mesogloeal protuberance; mo.pl, mouth plate; nec, nectosac; ost, ostium; ped.c, pedicular canal; som, somatocyst.

up toward the nectosac in the smaller specimens (Figure 3A), running straight, or slightly down, to the nectosac. The pedicular canal joins the nectosac in the lower third of the latter, often at about one-fifth its height. Because the lining of the nectosac is usually detached in preserved specimens, the courses of the radial canals on the nectosac often cannot be discerned. In these cases the nectophore takes on the brownish sheen described by Moser (1925). However, in better preserved material the canal system can be seen, and the course of the lateral radial canals (Figure 3) shows the same looping arrangement as

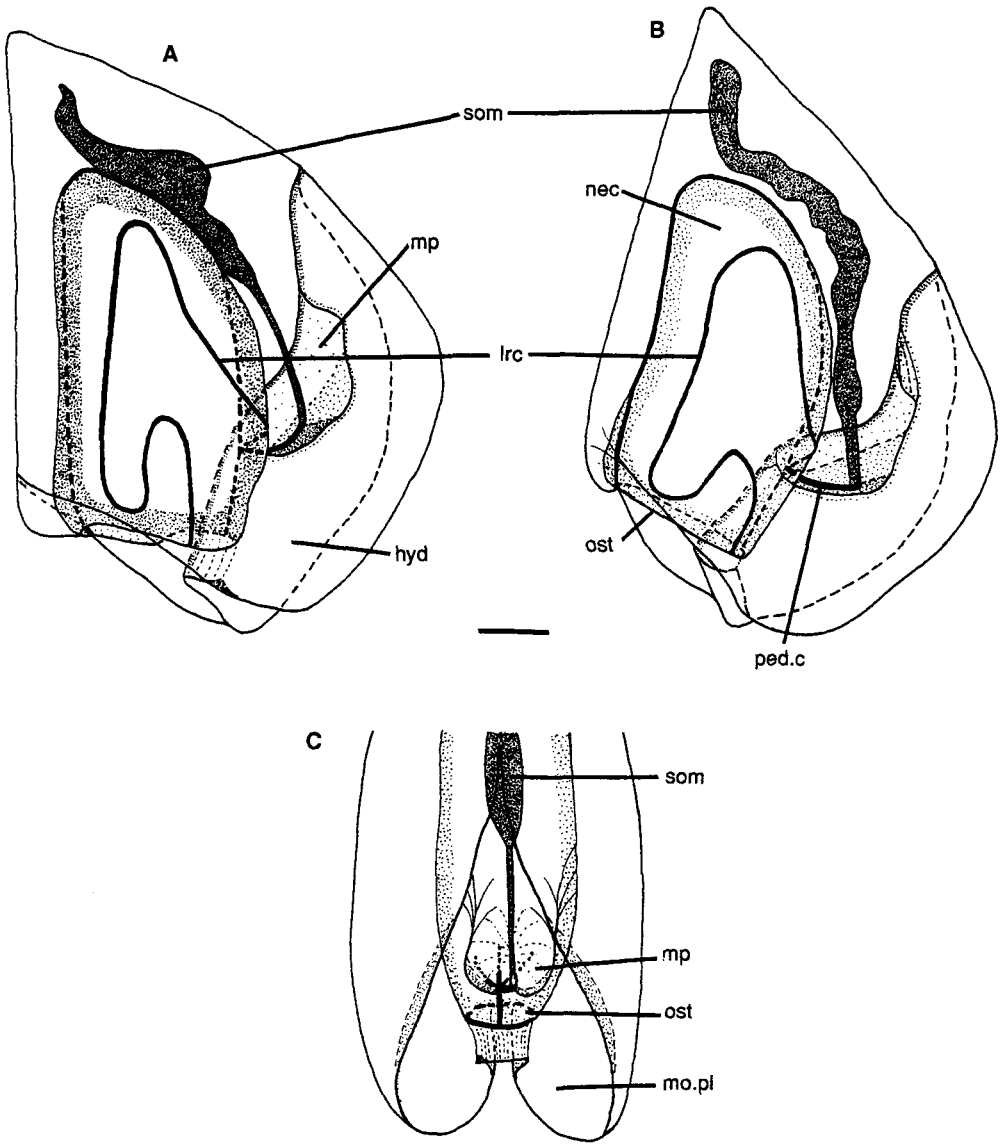

Figure 4. Anterior nectophores of *Clausophyes galeata*. (A) and (B) lateral, and (C) ventral views of specimens from 'Discovery' Stations 9964#3 (A and C) and 9968#2 (B). Scale bars: 2 mm. hyd, hydroecium; lrc, lateral radial canal; mp, mesogloeal protuberance; mo.pl, mouth plate; nec, nectosac; ost, ostium; ped.c, pedicular canal; som, somatocyst.

seen in *Clausophyes laetmata*. The nectosac height is variable, but usually it stretches up to about 60-75% the height of the nectophore.

The anterior nectophores of *Clausophyes galeata* (Figure 4) are usually much larger than those of *C. moserae*. Most specimens measured, including those reported in the literature, lie in the size range of 11-21 mm, averaging about 16 mm, in height. They are always more robust, having more mesogloea, and are less laterally compressed. They are also relatively wider than those of *C. moserae* because the lateral hydroecial flaps are more extensive. These flaps are thickened with mesogloea and basally they extend well below the level of the ostium, before curving round towards the latter. The inner margins of the flaps, as in *C. moserae*, are united by a cross-process, but in *C. galeata* the latter is situated well below the ventral ostial margin of the nectosac (Figure 4C) and, if stretched out, is much more extensive. The rounded, basal margins of the hydroecial flaps are more extensive than in *C. moserae* and extend dorsally and appear to peter out on the lateral surfaces of the nectophore, without uniting with the ostium. The deep, and relatively high, hydroecium invariably extends to greater than half, and usually to about two-thirds, the height of the nectophore. On its dorsal wall, approximately in the middle third of its height, lies the large mesogloeal protuberance. The somatocyst runs down into this protuberance and joins with the pedicular canal. The broad, basal margin of the protuberance has a distinct central furrow. Such a furrow was not seen on specimens of *C. moserae*. Below its surface runs the pedicular canal (Figure 4C), which joins the nectosac at between one-quarter and one-third the height of the latter. It gives rise to the four radial canals, whose courses are the same as in other *Clausophyes* species described herein (Figure 4A,B). The nectosac, because of the depth of the hydroecium, lies mainly in the dorsal half of the nectophore and extends to about three-quarters the height of the latter. The somatocyst usually has a tubular, but thickened, proximal region, but even this region may be considerably expanded. In its apical half it is always greatly, but irregularly, expanded, although it may taper slightly towards its apex.

Most specimens of the anterior nectophores of *Clausophyes moserae* can easily be distinguished from those of *C. galeata* by the considerable difference in their size, the former usually being only about half the height of the latter, and have a less robust appearance. In these cases there are also clear differences in the structure of the somatocyst. However, in bathypelagic collections, where it is possible to find larger specimens of *C. moserae*, these differences may not be quite so apparent. None the less, the structure of the somatocyst usually remains as a distinguishing feature. This, in combination with other general characters, such as the shape of the nectophore, the size and structure of the hydroecium, its mesogloeal process, and the arrangement of its lateral flaps, should serve to distinguish the species.

The posterior nectophores of the two species, however, do show distinctive features that easily separate them. The height of the posterior nectophores of *Clausophyes moserae* (Figure 5) usually lies in the range 10-16 mm, but occasionally ones up to 20 mm in height have been found in the 'Discovery' Collections. Moser (1925) found one of 30 mm in height that again, judging by her illustration (Plate XXV, figure 4), would appear to belong to this species. Margulis (1988) quotes a maximum size of 35 mm for *C. galeata moserae*. This number appears to be derived from Stepanjants's (1967) description of 'C.

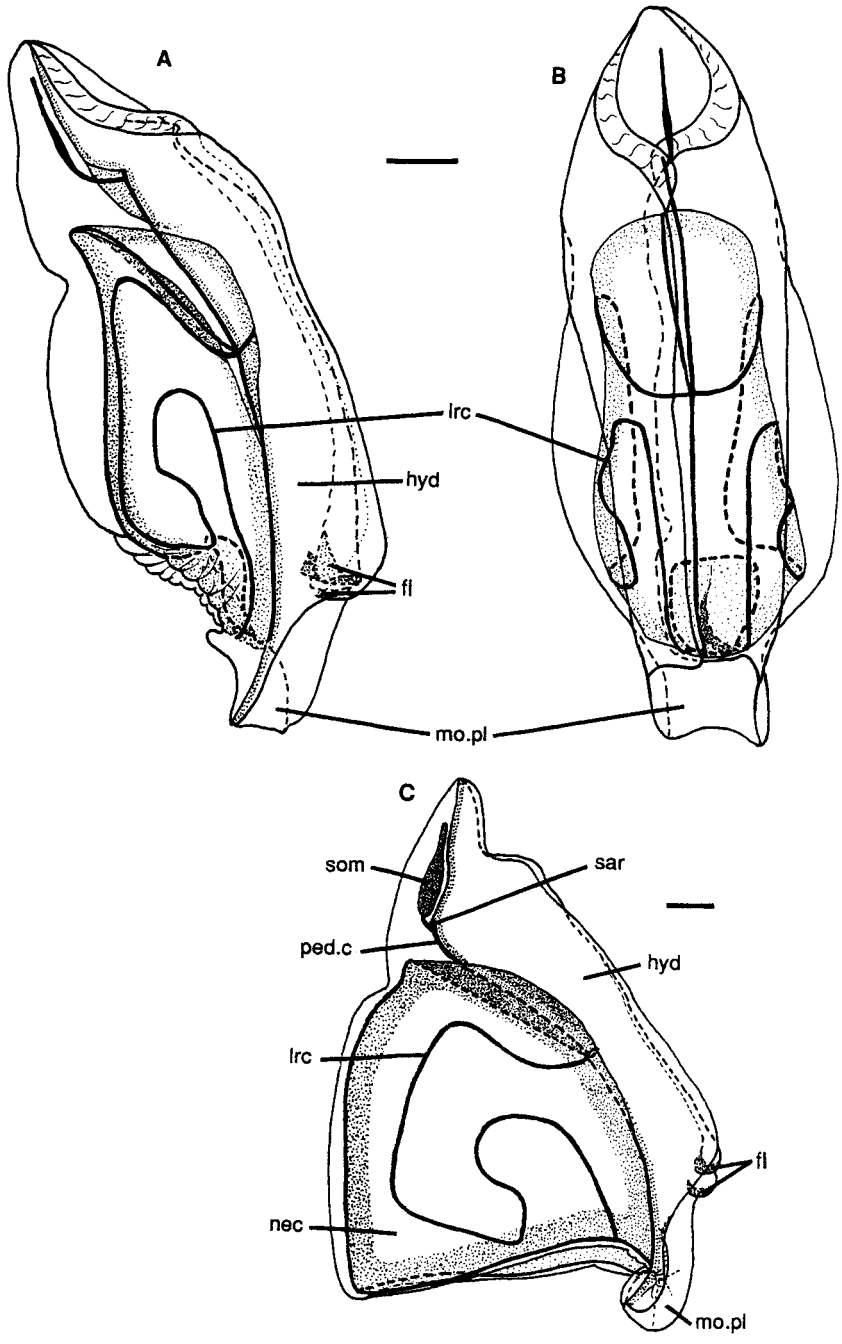

Figure 5. Posterior nectophores of *Clausophyes moserae*. (A) Lateral and (B) ventral views of specimen from 'Johnson-Sea-Link II' Dive 992; (C) lateral view of specimen from 'Discovery' Station 9992#1. Scale bars: 1 mm. fl, flaps; hyd, hydroecium; lrc, lateral radial canal; mo.pl, mouth plate; nec, nectosac; ped.c, pedicular canal; sar, stem attachment region; som, somatocyst.

galeata?'. Margulis (1988) pointed out that some of the characters of the posterior nectophore described by Stepanjants (1967) were more characteristic of *C. moserae*, but it is difficult to tell from the illustration to which species it belongs. In most specimens the musculature of the nectosac is lost, and the nectophores take on the characteristic brownish sheen described by Moser (1925). Well-preserved posterior nectophores of *C. galeata* (Figure 6) are much more robust than those of *C. moserae*, because they have a greater thickening of mesogloea. Also they do not have such a strong brownish sheen, despite the fact that the musculature of the nectosac is generally lost. Most specimens are between 20 and 40 mm in height, averaging about 30 mm. Thus in general, as was the case for the anterior nectophores, the posterior nectophores of *C. galeata* are about twice the height of those of *C. moserae*.

There are several features, apart from the usual difference in size, by which the posterior nectophores of *Clausophyes moserae* and *C. galeata* can be distinguished. These mainly concern the structure of the somatocyst; the region of stem attachment; the basal parts of the lateral wings of the hydroecium; and the mouth plate. The course of the lateral radial canals on the nectosac is also more complicated in *C. galeata*. However, in most preserved specimens of *C. moserae* these canals cannot be traced, as the musculature of the nectosac has been lost. No single specimen of *C. galeata* from the 'Discovery' Collections shows the complete canal system, but by studying the remnants of the system in all the available nectophores it has been possible to reconstruct it. This shows that it conforms exactly with that illustrated by Zhang & Zhang (1980). The arrangement is more complicated than that described by Totton (1954), which we were unable to confirm as the canal system on his specimen can no longer be discerned.

In the posterior nectophores of *Clausophyes moserae* the region of attachment to the anterior one lies on a small median prominence toward the apex of the hydroecium (Figure 5A). From this a canal runs basally for a short distance before it branches to form the pedicular canal and the somatocyst. The latter, at first, is a narrow canal that runs dorsally and then curves round apically. It then expands, to a varying degree (Figure 5A,C), into a smooth-walled sac, which shows no irregularities. This continues up alongside the median dorsal wall of the hydroecium and usually tapers apically. In *C. galeata* the somatocyst is always a much more complicated structure (Figure 6), having irregular protuberances from its walls. It arises at the base of a small prominence, which represents the connection with the anterior nectophore, and immediately becomes expanded. Usually it runs dorso-basally before curving up to run apico-ventrally, forming a U-shaped structure in lateral view. However, it also has several lateral bends such that in dorsal view its distal part appears sigmoid.

In *Clausophyes moserae* the dorsal wall of the hydroecium is almost vertical in the apical region above the nectosac (Figure 5A,C), and the siphosomal stem appears to be attached at the junction point of the anterior and posterior nectophores. However, in *C. galeata* there is much more structure to the hydroecium in this region (Figures 6 & 7D). From the apex of the posterior nectophore, its dorsal wall curves baso-ventrally to the junction point with the anterior nectophore. Below this it forms a deep dorsal hollow, before continuing down the ventral side of the nectosac. The siphosomal stem appears to be attached to the pedicular canal in the upper part of this hollow. One other feature in this

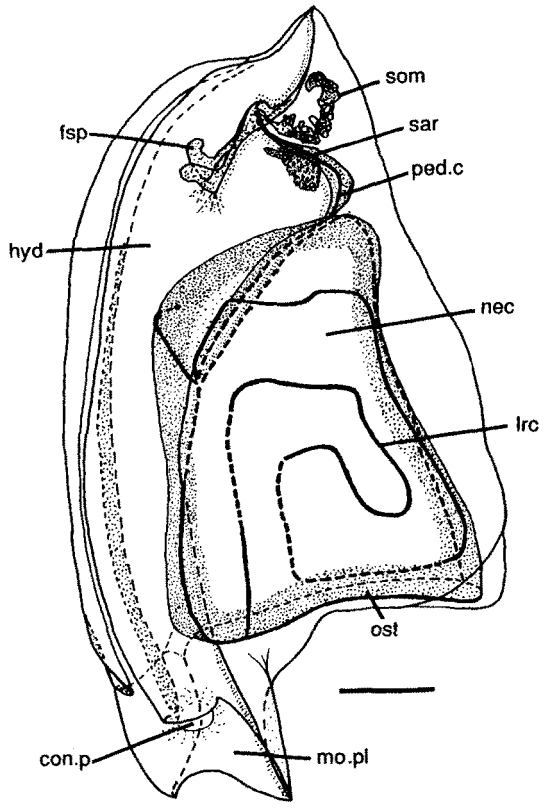

Figure 6. Posterior nectophore of *Clausophyes galeata* from 'Discovery' Station 9967#2. The course of the lateral radial canal is shown as a solid line where present on the specimen, and as a dotted line where it has been reconstructed from other specimens. Scale bar: 5 mm. con.p, conical process; fsp, finger-shaped process; hyd, hydroecium; lrc, lateral radial canal; mo.pl, mouth plate; nec, nectosac; ost, ostium; ped.c, pedicular canal; sar, stem attachment region; som, somatocyst.

region of the hydroecium also serves clearly to distinguish the posterior nectophores of *C. galeata* from those of *C. moserae*. This is the presence, in the former, of the 'finger-shaped' projections (Figures 6 & 7D) that Totton (1954) described but did not illustrate. Such structures are absent from the posterior nectophores of *C. moserae*.

In the present material of *Clausophyes galeata* these 'finger-shaped' projections are variable both in size and shape. They project freely into the hydroecium, and form the basal ends of small flaps from the lateral walls of the hydroecium. These flaps extend up to surround the junction with the anterior nectophore. Although these structures always are present on the posterior nectophores of *C. galeata*, they can be difficult to discern without careful study or staining. This may explain why Zhang & Zhang (1980) did not illustrate them, although the other characteristics of the posterior nectophore of *C. galeata* are clearly shown. Similarly, the single posterior nectophore that Margulis (1988) illustrated under the name *C. galeata galeata*, would appear to belong to *C. galeata*, but no 'finger-shaped' projections were noted.

In both species the right lateral wing of the hydroecium is relatively simple. However, its ventral margin is slightly thickened as it appears that the original ventral margin has

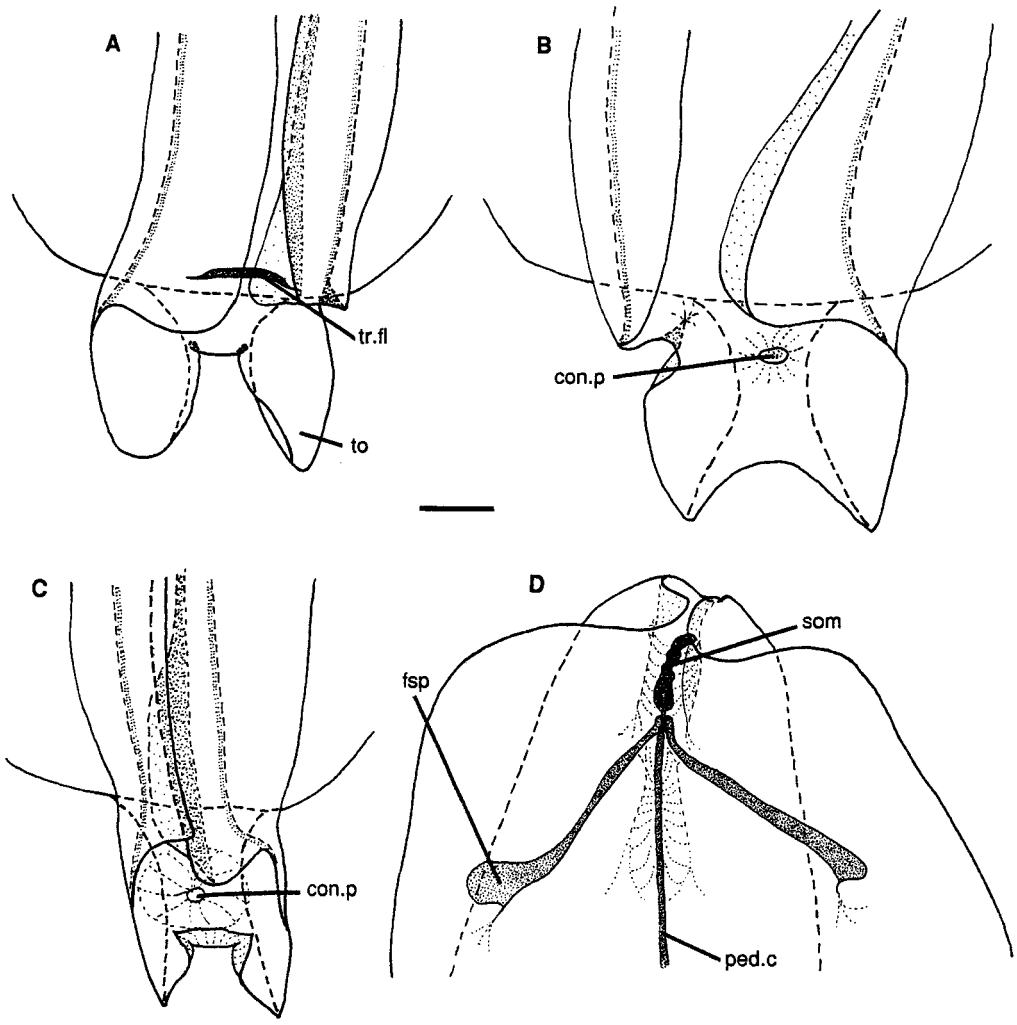

Figure 7. Posterior nectophores of *Clausophyes galeata*. (A), (B) and (C) ventral views of basal part of nectophore to illustrate variation in form of mouth plate. From 'Discovery' Stations 11261#23, 1639 and 9968#3 respectively. (D) Ventral view of apical part of nectophore from 'Discovery' Station 11121#20. Scale bars: 2 mm. con.p, conical process; fsp, finger-shaped process; ped.c, pedicular canal; som, somatocyst; to, tooth; tr.fl, transverse flap.

folded in and fused back on itself leaving no free margin. This has also occurred on the left lateral wing, but the folding in is more extensive and the fusion incomplete so that a small free margin remains within the hydroecium. At the base of this wing the free margin is more pronounced and forms a flap (Figure 6). In *Clausophyes moserae* an additional flap is also present at the base of the left lateral wing, usually either below or dorsal to the other one (Figure 5). This second flap is variable in size and occasionally may be absent. It is not present on the posterior nectophores of *C. galeata*. In *C. moserae* the lateral flaps of the hydroecium end, basally, above the level of the ostium, whereas in *C. galeata* they end below that level.

The mouth plate of the posterior nectophore of *Clausophyes moserae* is relatively thin and simple (Figure 5B). It can be slightly emarginated basally and the left side can be slightly more extensive than the right. The ridges that extend down from the ostial margins are relatively weak. The dorsal surface is convex and the ventral concave, and there is no median projection on the latter surface. The mouth plate of the posterior nectophore of *C. galeata* is variable in design, although most nectophores examined show either of two different patterns. One pattern is shown by all the posterior nectophores collected by 'Discovery' in the north-east Atlantic (Figure 7A), and is that described by Lens & van Riemsdijk (1908) and Bigelow (1913). In this case the mouth plate is formed by two large, roughly triangular teeth, whose inner ventral margins are joined by a cross-process at about half, or more, of their length. The ridges which extend down onto each tooth, from the ostial margin, are relatively weak and either peter out on the dorsal side of the tooth or unite with the inner ventral ridge. No median conical projection is present on the ventral side of the mouth plate in the specimens of this type examined. However, on the 'Discovery' material, a transverse flap is present on the dorsal wall of the hydroecium, approximately on a level with the ostial opening (Figure 7A).

The second mouth plate pattern is found on most of the 'Discovery' specimens of *Clausophyes galeata* collected in the Southern Ocean (Figure 7B), and is the same as Totton (1954) and Margulis (1988) found. In this case the mouth plate does not have distinct teeth, but its base is deeply emarginated. The ridges which extend down on each side from the ostial margin are very distinct and they join with those that extend from the hydroecial flaps at the baso-lateral points of the mouth plate. On the ventral side of the mouth plate a median conical projection, of variable size, is present, but there is no transverse flap across the dorsal wall of the hydroecium.

Although these two forms of the mouth plate would appear to be strikingly different, we consider that they represent only intra- rather than inter-specific variability. The constancy of the other characters of the posterior, and the associated anterior, nectophores attests to this. Indeed, some of the less well-preserved 'Discovery' specimens from the Southern Ocean show an intermediate state (Figure 7C). In these, distinct teeth are present, but only in the basal third of the mouth plate. The upper two-thirds forms a cushion-like structure, on the ventral wall of which is a slightly raised, but extensive, median conical projection. This arrangement seems to be similar to that illustrated by Zhang & Zhang (1980). Since their specimen appears to be in good condition, the variability in the mouth plate would seem not to be a preservation artefact, although distortions are always possible; nor is it related to the age/size of the nectophore. Although the data are few, it appears that the variability may be related to geographical distribution. The specimens without distinct teeth on the mouth plate are mainly associated with the Southern Ocean, although Margulis' (1988) specimen appears to have come from the North Pacific. Only with more specimens can this feature be investigated further.

On the basis of the features discussed above, the posterior nectophores of *Clausophyes moserae* and *C. galeata* are easily distinguishable, even if the second form of the latter species, with only an emarginated mouth plate, is present. Although the differences between the anterior nectophores of the two species might be less obvious, under most

circumstances they should be distinguishable, not least by the usually considerable difference in size. It is interesting to note that a similar situation pertains in the closely related genus, *Chuniphyes*, which contains two very similar species. Again the original species, *Chuniphyes multidentata*, was described by Lens & van Riemsdijk (1908), and again Moser (1925) confused another species with it. Totton (1954) finally established the second species as *Chuniphyes moserae*. For these two species the anterior nectophores are very similar in design, but there are clear differences between them. However, as Margulis (1988) noted, the differences between the posterior nectophores are much less marked. None the less Margulis did not consider that their specific status should be reduced. Thus we conclude that Margulis' (1988) reduction of the status of the two similar species of the genus *Clausophyes* to subspecies of *C. galeata* is unwarranted, and that they should be recognized as separate and distinct species. This requires the name *Clausophyes moserae* Margulis, 1988 to be established, although it is rather unfortunate as it could lead to confusion with *Chuniphyes moserae*.

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