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DESMOPHYES HAEMATOGASTER, A NEW SPECIES OF PRAYINE SIPHONOPHORE (CALYCOPHORAE, PRAYIDAE)

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ABSTRACT

A new species of prayine siphonophore, belonging to the genus *Desmophyes*, is described from a single specimen collected by the submersible DSRV JOHNSON-SEA-LINK II.

Desmophyes haematogaster new species
Figures 1–4

Material Examined.—One specimen collected in the Bahamas region by the submersible DSRV JOHNSON-SEA-LINK II during Dive 1682. A brief video sequence of the animal in situ is in the possession of the author.

Type Material.—A single specimen, consisting of two nectophores and fourteen eudoxids, collected during JSL II Dive 1682. Date: 8/9 October 1988. Position: 26°25.6'N, 77°52.7'W. Depth of collection: 871 m; temperature 8.0°C. Method of collection: "Slurp-gun" or "Critter-Gitter." Preserved in 5% formalin and presented to the U.S. National Museum of Natural History (Smithsonian Institution) and entered as Cat. No. 88823.

Diagnosis.—Prayine siphonophore with an apposed pair of cylindrical nectophores (N_1 and N_2), bearing no distinct ridges. The nectosac is extensive, reaching to about two-fifths the height of the nectophore, and bears four straight lateral radial canals. The somatocyst is short, around 3–3.25 mm in length, and has a short, approximately 0.6–1.0 mm, ascending branch, but no descending branch. The bracts are of the typical prayine form, with six bracteal canals. The dorsal canal arises from the distal end of the right longitudinal canal. The gonophore has two small, wing-like projections close to its apex, and has a large sub-umbrellar cavity, with four straight canals. It bears two, broad, symmetrically arranged mantle canals. No asexual nectophores are present. The gastrozooids have a bright, blood-red pigmentation in life.

Description.—NECTOPHORES (Figs. 1–3). The specimen consists of two apposed nectophores (N_1 and N_2) that are rounded, cylindrical, flimsy structures which bear no pronounced ridges or visible pigmentation. The flimsy nature of the nectophores indicates that their mesogloea is fairly diffuse. They have undergone considerable shrinkage during preservation, as will become evident from comparisons of the extant material with photographs of the fresh material taken, on board ship, shortly after capture, but after the nectophores had become dissociated. The material was photographed at ×1 magnification, and drawings have been made from the negatives at the same magnification as the preserved material. The two should, therefore, be comparable, and this is borne out by certain features, such as the length of the somatocyst.

The apical part of the larger, N_1, nectophore has become damaged during preservation, and the whole structure has become distorted (Fig. 2A). However, photographs of the fresh material (Figs. 1, 2B) indicate that the nectophore was rounded and cylindrical, and measured approximately 17 mm in height, and 14 mm in both width and depth (dorso-ventral direction). The preserved material is considerably smaller. Its large nectosac extends to about two-fifths the height of the nectophore and has a wide ostial opening directed baso-dorsally. The mesogloea in the dorsal region of the nectosac is very thin, and it is there that maximum distortion occurred during swimming activity. This is evident from a

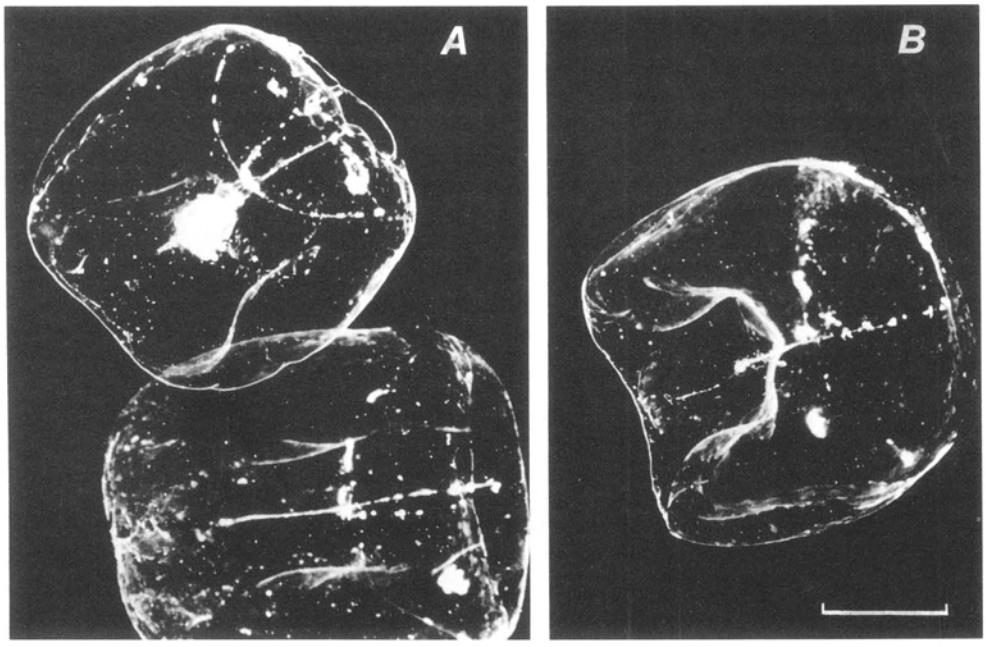

Figure 1. *Desmophyes haematogaster.* Photographs of fresh holotype specimen. A. Dorsal views of N_1 and N_2 nectophores. B. Apical view of N_1 nectophore. Scale = 5 mm. Photographs by G. R. Harbison.

brief video of the animal taken in situ. A characteristic feature of the nectosac, visible in both the photographs and the preserved material, is that the courses of its radial canals are straight (Figs. 1, 2). These canals arise, together, from the pedicular canal, which is inserted on the ventral side of the nectosac, below its apex.

The somatocyst is relatively short, about 3 mm in length, and does not extend basally beyond the junction with the pedicular canal, that is there is no descending branch. It lies, in the mid-line, in close contact with the dorsal wall of the hydroecium. At its apical end it gives rise to a short, approximately 1 mm long, ascending branch, which penetrates into the mesogloea in an apico-dorsal direction (Fig. 2).

The hydroecium extends from the base of the nectophore almost to its apex. It is a wide, deep gutter, with a deepest depth of about half that of the nectophore itself. An apical view of the nectophore (Fig. 1B) indicates that it had a deep opening onto the basal end of the nectophore but, because of shrinkage, this is not so apparent in the preserved material. There is a marked inflection in its dorsal wall in the region where the ascending branch arises from the main somatocyst (Fig. 2A). The ventral parts of the lateral walls to the hydroecium are thinner than the remainder, which results in the appearance of a distinct groove along the sides of the nectophore particularly apparent in the preserved material (Fig. 2A).

The smaller, N_2, nectophore (Figs. 1A, 3) was roughly cylindrical in shape in its original state, and measured approximately 12.5–14 mm in height and 8.5–11 mm in depth, depending on its aspect and condition (Figs. 1A, 3B, 3D). It has undergone considerable distortion during preservation, a feature most marked

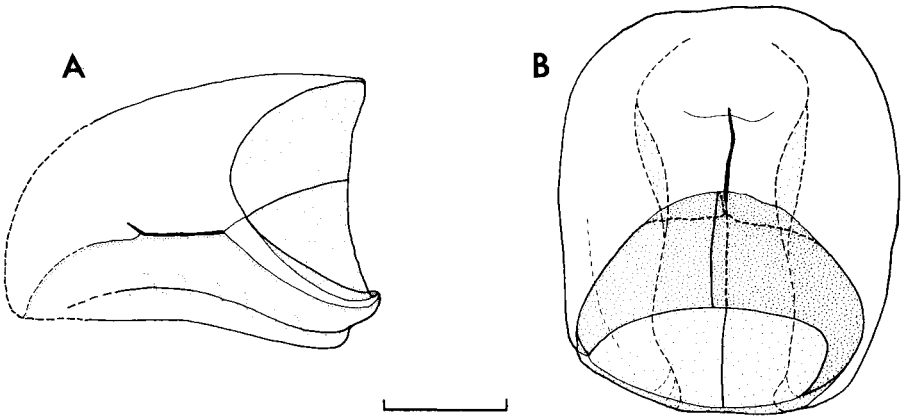

Figure 2. N_1 nectophore of *Desmophyes haematogaster*: A. Lateral view of preserved specimen. B. Dorsal view of fresh specimen, drawn from a photograph. Scale = 5 mm.

when the nectophore is viewed laterally (Fig. 3A, B). Nonetheless, it can be seen that the nectosac is extensive, stretching to about two-fifths the height of the nectophore. It has a wide ostial opening, which appears to be directed dorso-basally in the preserved specimen, but more basal in the fresh specimen (Fig. 3). The video sequence also indicates a dorso-basal opening, although this may be the result of the configuration of the two nectophores, when attached, and the fact that, as in the N_1 nectophore, the contractions of the nectosac during swimming resulted in the greatest deformation to its dorsal wall. The courses of the radial canals are straight (Fig. 3). These canals arise, on the apico-ventral side of the nectosac, from a short, narrow pedicular canal.

The pedicular canal connects with the basal end of the somatocyst, which, thereby, does not have a basal descending branch. The somatocyst again is relatively short, being about 3.25 mm in length. Apically it gives rise to a short, 0.6 mm long, ascending branch which penetrates up into the mesogloea, in an apico-dorsal direction (Fig. 3A, B).

The hydroecium stretches almost the entire height of the nectophore and is open basally; a feature more apparent in the fresh material (Fig. 3B). It is deepest in the mid-region, where the somatocyst overlays it, and peters out shortly before reaching the apex of the nectophore. In the fresh material a distinct fold was found in each of the lateral walls; a more prominent feature than that seen on the N_1 nectophore. Because of shrinkage, these can be seen only vaguely in the preserved material.

SIPHOSOME. The brief video sequence of the in situ animal indicated that at least 16 stem groups originally were attached to the siphosomal stem. Fourteen of these have been preserved. A characteristic feature of the living animal was the blood-red color of the stomach regions of the gastrozooids. Comparisons of photographs of the recently collected specimen and the preserved material show that the stem elements have undergone much less distortion, due to preservation, than the nectophores, although some shrinkage has occurred. However, the basic morphological characters are retained in the preserved material and these are described below.

BRACTS (Fig. 4A, B). The bracts measure up to 5 mm in length and 2.2 mm in width, when detached and flattened out. When attached to the stem, they are almost hemispherical in shape and, as in several other prayine species, are divided

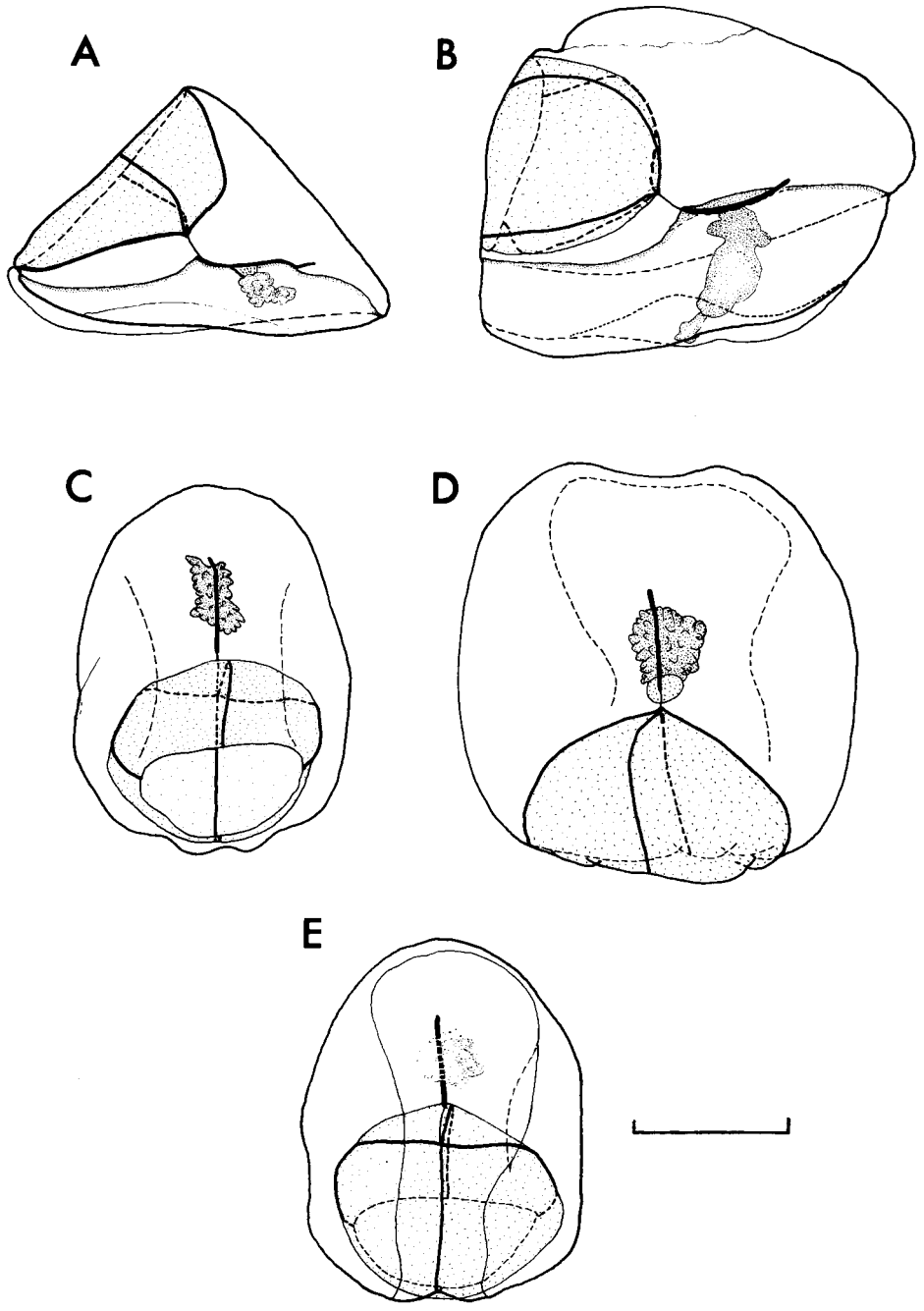

Figure 3. N_2 nectophore of *Desmophyes haematogaster*. A. Lateral, C. Dorsal and E. Ventral views of preserved specimen. B. Lateral and D. Dorsal views of fresh specimen, drawn from photographs. Scale = 5 mm.

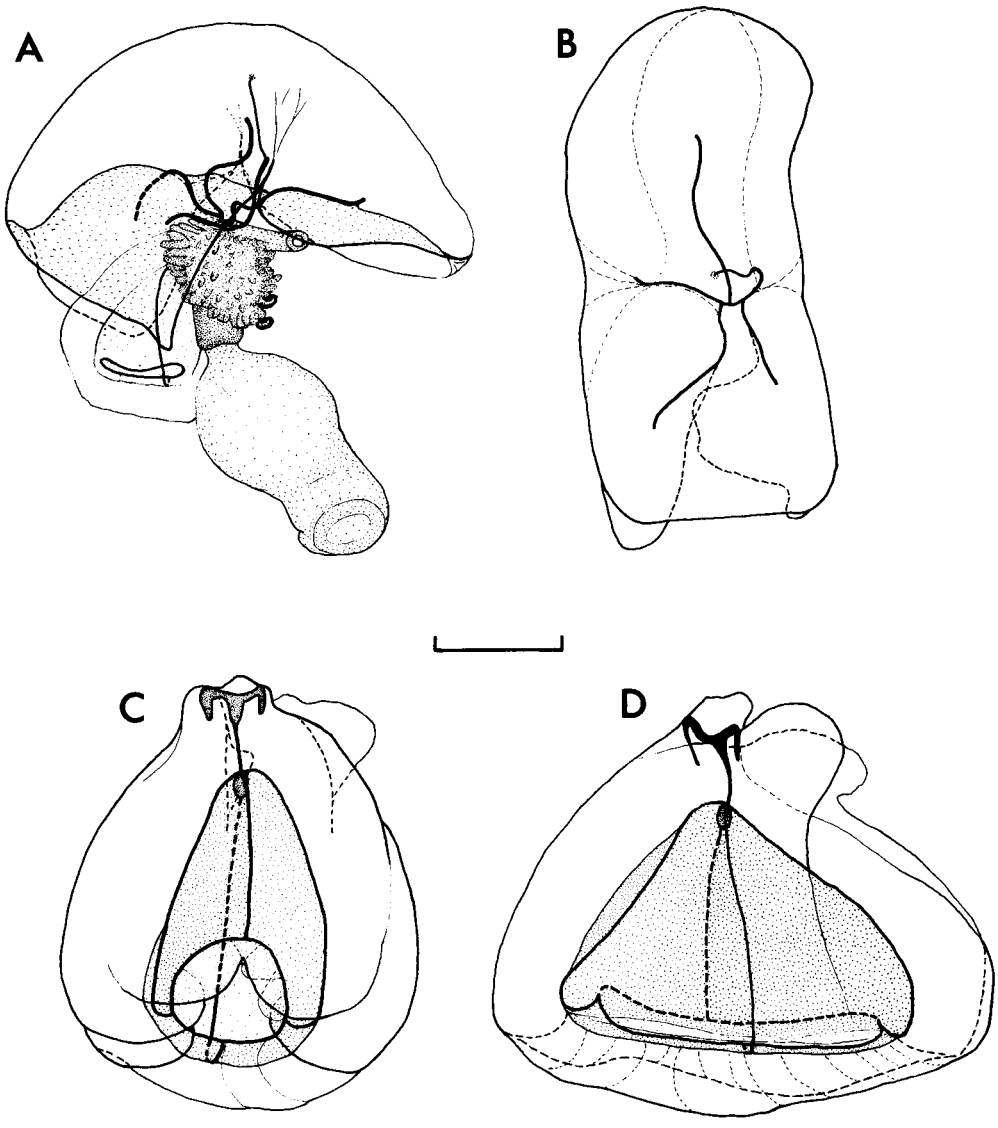

Figure 4. *Desmophyes haematogaster*. A. Lateral view of complete stem group. B. Dorsal view of bract. C. and D. lateral views of gonophores. Scale = 1 mm, for A. and B.; and = 0.5 mm, for C. and D.

into two parts by the incision in the plane of, and through which passes, the siphosomal stem (Fig. 4A). This incision is deeper on the proximal (left) side. The hydroecium is present throughout the length of the bract, and in one half there are extensive hydroecial lobes which surround the proximal parts of the gastrozooid and gonophore.

There are six bracteal canals, and the dorsal canal arises from the distal end of the right longitudinal canal (Fig. 4A, B). It is much narrower than the others and travels up through the mesogloea to end in a slight depression on the dorsal surface of the bract. The terminology used here is the same as in previous publications,

for instance Pugh and Harbison (1987). The right longitudinal canal is slightly shorter than the left one, which is in accord with the differences in the depth of the incision on either side of the bract. The right hydroecial canal also is shorter than the left hydroecial, and often there is a considerable disparity in their relative lengths. The distal end of the ventral canal is inflected into the mesogloea, away from the dorsal wall of the hydroecium.

GONOPHORE (Fig. 4C, D). Only one large gonophore, measuring up to 2 mm in both height and width, is present in each stem group, although small buds of replacement gonophores sometimes can be seen. The sub-umbrella cavity is extensive and bears four straight radial canals in its lining. None of the gonophores were sexually mature, bearing only small manubrial processes. The short pedicular canal gives rise, at its apex, to two expanded mantle canals, which are arranged symmetrically.

Two small, wing-like flaps are present on one side of the gonophore, close to its apex. Because the photographs of the fresh material are of the entire, highly contracted, siphosome, it is difficult to discern these flaps on them. However, that is not to say that they are absent, and it is unlikely that they are a preservation artifact, particularly as such flaps are present on the gonophores of living and preserved specimens of some other prayine species.

GASTROZOOID AND TENTACLE. The gastrozooids measure up to 3.3 mm in length in their preserved state, and show little coloration except for the light-brown basigaster region. However, in life the gastrozooids are a bright blood-red, while the tentacles are orange. These were the only pigmented parts of the specimen. The tentilla on the tentacles have the usual kidney-shaped cnidoband and coiled terminal filament, and are very similar to those of related prayine species. The arrangement of their nematocysts has not been examined in detail.

Distribution.—Known only from the region of the Bahamas at a depth of 871 m.

Etymology.—The name *haematogaster* refers to the blood-red color of the gastrozooids.

DISCUSSION

Pugh and Harbison (1987) discussed the taxonomy of the sub-family Prayinae, and tabulated the important characters by which the existing species could be identified. They noted that each of the nine recognized prayine genera could be characterized on the basis of the general shape of the nectophore, and the presence or absence of a distinct descending or ascending branch to the somatocyst. In addition, the course of the lateral radial canals on the nectosac was a useful diagnostic feature. Pugh and Youngbluth (1988) added a further two species to the genus *Rosacea,* on the basis of the above characters, although in one, *R. repanda,* as in some specimens of *R. plicata,* a short apical process to the somatocyst was present. However, this does not significantly alter the distinctiveness of the genus *Rosacea,* for the presence of sinuous lateral radial canals on the nectosac clearly distinguishes it from the genus *Praya* which also possesses cylindrical nectophores and a descending branch to the somatocyst.

Pugh and Harbison (1987) defined the characteristics of the genus *Desmophyes* as the possession of cylindrical nectophores, with nectosacs occupying less than half the height, and with an ascending, but no descending, branch to the somatocyst. In addition, the species of the genus *Desmophyes* are the only prayine siphonophores to have straight lateral radial canals on the nectosac of both nec-

tophores. All these characters are to be found on the nectophores of *Desmophyes haemotogaster.*

Pugh and Harbison (1987) included two species in the genus *Desmophyes,* namely *D. annectens* Haeckel, 1888 and *D. villafrancae* (Carré, 1969), which they removed from the genus *Rosacea.* The inclusion of the latter species was based on the assumption that its N_2 nectophore, which had a relatively enormous nectosac, was young and had not attained its full size and proportions. To these a new species, *D. haematogaster* now is added. *D. annectens* easily is distinguishable from the other two species as it has a large swelling at the distal end of the ascending branch of the somatocyst of the nectophore, and a similar swelling at the proximal end of the dorsal bracteal canal, which arises in a central position. The basic arrangement of the nectophores of the other two species is very similar, if one ignores the difference in size, which probably is not of taxonomic importance particularly as only individual specimens of each species are known to exist. Both species have short somatocysts, but the ascending branch in *D. villafrancae* is about twice the length of that in *D. haematogaster.* In addition, the depth of the hydroecium, particularly basally where it underlies the nectosac, appears from the photographs to be considerably deeper in the latter species.

The most significant difference between all three species of *Desmophyes* lies in the arrangement of the bracteal canals, and in particular the origin of the dorsal canal. In *D. annectens,* as stated above, the dorsal canal arises centrally from the inflated "central organ." In *D. villafrancae* this canal arises from the right hydroecial canal, while in *D. haematogaster* it arises from the distal end of the right longitudinal canal. The arrangement of the bracteal canals usually is a good diagnostic feature for separating the species within a given genus. However, species in other prayine genera may also have the same arrangement. For instance, the dorsal canal arises from the right hydroecial in the bract of *Rosacea plicata,* and several other species have it originating from the distal end of the right longitudinal bracteal canal. Thus only with a combination of morphological characters can all the prayine species be distinguished from each other.

The gonophores of both *Desmophyes annectens* and *D. haematogaster* have two, symmetrically arranged, mantle canals, while Carré (1969) described the presence of only one in *D. villafrancae.* The gonophores of the first two species, however, can be distinguished respectively by the virtual absence or presence of small lateral flaps towards their apices. Although some shrinkage and distortion of such flaps would be expected during preservation, their relative disposition would not be expected to alter substantially, and their presence cannot be considered as a preservation artifact. The number, and arrangement, of the mantle canals is usually, but not always, a consistent feature of the various prayine genera. However, Pugh and Harbison (1987) concluded that the arrangement in *D. villafrancae* was exceptional. None the less, the presence of other basic characteristics warranted its inclusion within the genus *Desmophyes.*

Thus *Desmophyes haematogaster* can be distinguished from all other known prayine siphonophores through a combination of the characteristics of the nectophores and stem elements. The nectophores are typical of the genus *Desmophyes,* in that their nectosacs have four straight lateral radial canals, and that the somatocyst has an ascending, but no descending, branch. These characters clearly are discernible in the preserved material despite the general distortion of the flimsy nectophores. However, the preserved nectophores of *D. haematogaster* and those of *D. villafrancae,* which also have undergone considerable shrinkage and distortion, might be difficult to distinguish as the main difference between them

is associated with the relative length of the ascending branch to the somatocyst. With only one specimen of each species available for study, it is difficult to comment on the possible variability in this character. However, their stem groups, which have undergone much less distortion with preservation, easily can be separated on the basis of the point of origin of the dorsal canal in the bract, and the arrangement of the mantle canals on the gonophore. Neither of these characters would be affected by preservation.

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