Title	POLYP AND MEDUSA OF THE HYDROID SPHAEROCORYNE MULTITENTACULATA (WARREN) FROM JAPAN
Author(s)	Yamada, Mayumi; Konno, Kazuhiro
Citation	PUBLICATIONS OF THE SETO MARINE BIOLOGICAL LABORATORY (1973), 20: 103-109
Issue Date	1973-12-19
URL	http://hdl.handle.net/2433/175786
Right	
Type	Departmental Bulletin Paper
Textversion	publisher

POLYP AND MEDUSA OF THE HYDROID *SPHAEROCORYNE MULTITENTACULATA* (WARREN) FROM JAPAN

MAYUMI YAMADA

Zoological Institute, Hokkaido University

and

KAZUHIRO KONNO

Department of Biology, Hirosaki University

With 3 Text-figures

While surveying the marine fauna in the vicinity of the Fukaura Marine Biological Laboratory of Hirosaki University, Fukaura, Aomori Prefecture, northern Japan, the junior author (K. KONNO) found colonies of a corynid hydroid which lived on a sponge in shallow water. Closer examinations were made by us on the hydroid, and on the basis of the structure of the trophosome, it proved to be a species of the genus *Sphaerocoryne* which has never been reported from Japan. There are several records of the *Sphaerocoryne* species from different parts of the Indo-Pacific region but the knowledge on their gonosome still remains very poor. Fortunately we found hydroid colonies with medusa-buds, and after keeping the colonies for some time we succeeded in getting free liberated medusae from them. The following is the description of polyp and medusa of our species of *Sphaerocoryne*, with some references on its systematic considerations.

Polyp

The hydroid was obtained on demospongian species of *Halichondria* or *Haliclona*, which lived on bottom near low tide mark where the waves are generally rough. The hydroid polyp is always found with the sponge and seldom attaches to stones, rocks or algae directly. The hydrorhiza creeps irregularly through the inside of the sponge, but not on the surface, about 150–200 μ in diameter, covered with a thin perisarc. The hydrorhiza gives out branches forming an irregular network.

The hydrocaulus is standing from the hydrorhiza, not branched, about 10–15 mm in height and 130–140 μ in diameter. The hydrocaulus is covered with a thin perisarc which is nearly straight but irregularly sinuated, attaining just or somewhat below the hydranth. The hydrocaulus may have 1–3 annulations at the region where the hydro-

caulus appears above the sponge. The perisarc is mostly covered with diatom growth in August and September.

The hydranth grows on the top of each hydrocaulus. It is bottle-shaped, with a rather elongated distinct hypostome, on which a mouth opens, and an expanded basal half. The basal part is 0.7–1.0 mm in diameter. The top of the hypostome is white and other parts are light brown in color. Many tentacles 50–70 in number, grow from and are all packed in the basal part of the hydranth. They are all capitate,

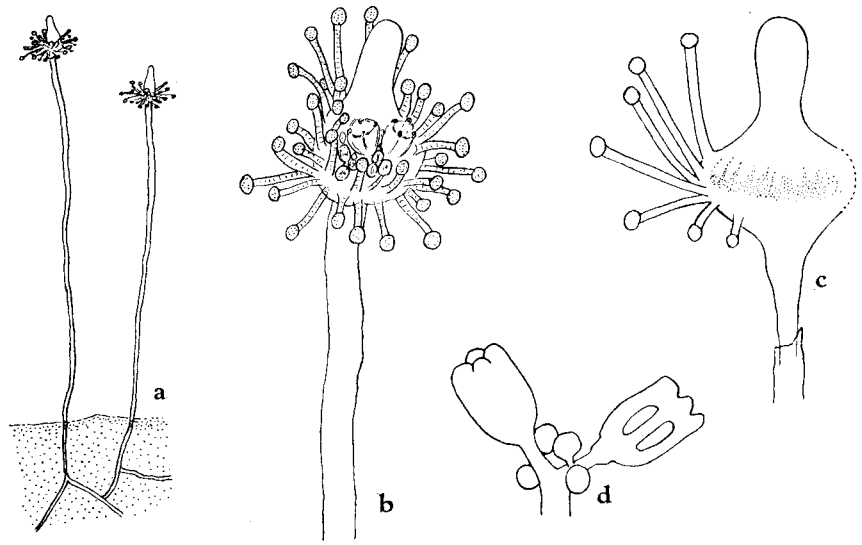

Fig. 1. *Sphaerocoryne multitentaculata* (WARREN). a. Two polyps standing from sponge. b. Hydranth and distal part of hydrocaulus. c. Hydranth, showing tentacles arranged in longitudinal rows. d. Medusa-buds in a cluster.

unbranched, and somewhat different in length. They are neither scattered evenly all over the basal part of the hydranth nor forming any distinct circlet or circlets. On closer examination these tentacles seem to be arranged in some closely approximated longitudinal rows, usually 9–13, each composed of 3–5 tentacles.

The gonosomes develop from the hydranth surface, just distal to the tentacles. The medusa-buds do not grow solitarily but in 5–9 clusters, each cluster with 10 or more medusa-buds of different developmental stages. When only one or two rather developed medusa-buds are found in a cluster, the other buds still remain very small and undeveloped.

Medusa

The young medusa just liberated is nearly spherical, without any apical projection, and about 0.5–0.6 mm in diameter. It has 4 radial canals and a ring canal, a manu-

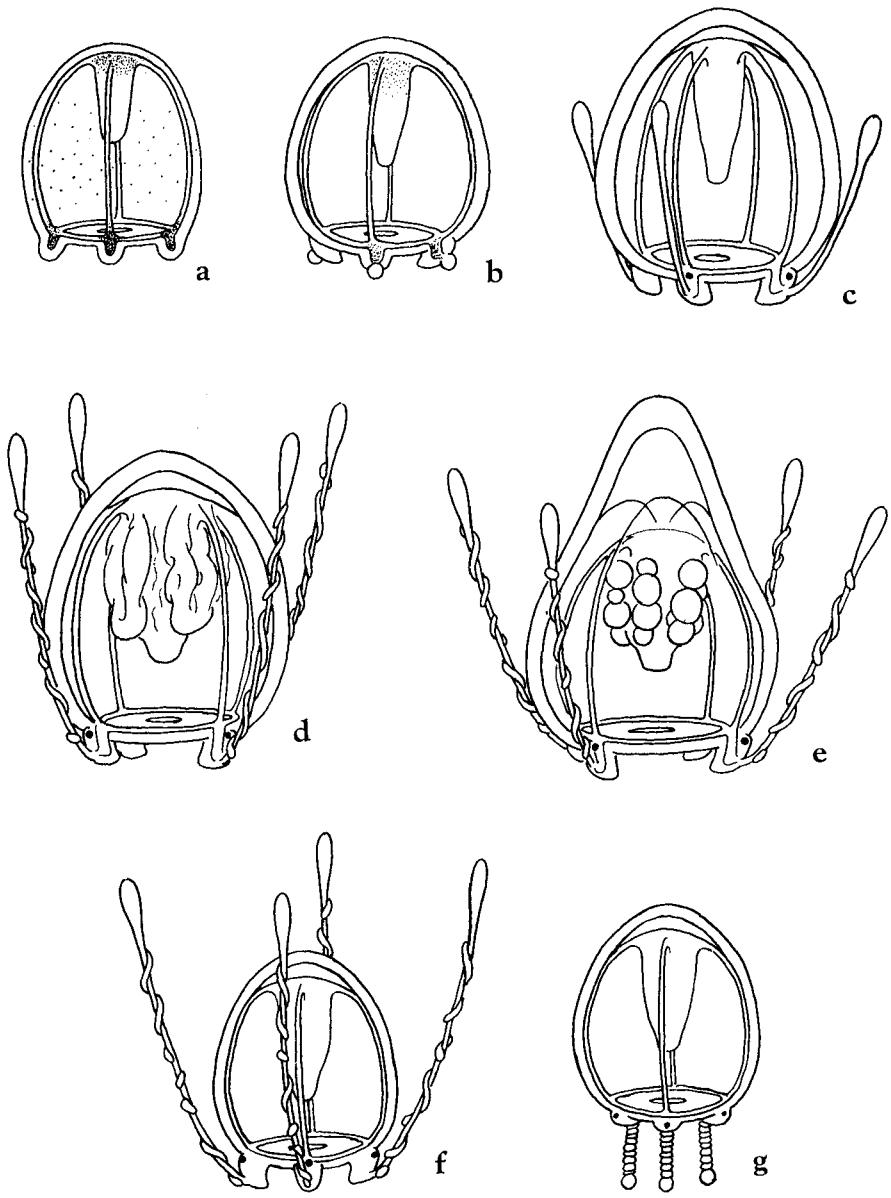

Fig. 2. *Sphaerocoryne multitentaculata* (WARREN). a. Medusa just liberated. b. Medusa, 5–6 days old. c. Medusa, 8–10 days old. d. Adult male medusa. e. Adult female medusa. f. Male medusa at pause. g. Male medusa in swimming.

brium, and 4 small tentacle-bulbs, but no ocelli are yet found. The radial canals are little broad and not strictly straight. The manubrium is simple, about a third to two-fifths of the bell height in length, and without any special oral structures. The nematocysts are scattered over the exumbrella. The top region of the stomach and four tentacle-bulbs are orange-yellow in color and the remainder of the medusa is nearly translucent.

These young medusae were kept in glass dishes in laboratory for some weeks and fed with *Artemia*-larvae.

About 8–10 days after liberation the medusa has more growth and in this stage an ocellus is found on abaxial surface on each tentacle-bulb and the four tentacles are now distinct. The tentacles are hollow, attaining about two-thirds the bell height, and the terminal end of each tentacle is a little enlarged, there nematocysts are contained.

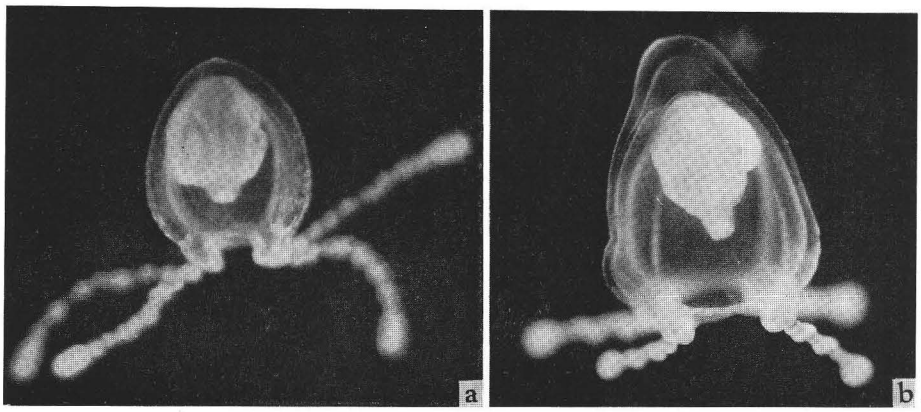

Fig. 3. *Sphaerocoryne multitentaculata* (WARREN). a. Adult male medusa. b. Adult female medusa.

About two weeks after liberation the medusae attain to maturity. The bell of male medusae is nearly ovoid in shape, 2.5–3.5 mm in height and 2.0–3.0 mm in diameter, while the bell of female ones is of somewhat a conical shape with the developed jelly at the top of the bell, 3.0–4.5 mm in height and 2.0–3.0 mm in diameter. These male and female mature medusae have 4 radial canals and a ring canal. The velum is well-developed. An ocellus is present on abaxial surface of each tentacle-bulb and dark brown in color. The tentacles have now distinct nematocyst clusters on them. These clusters are arranged nearly forming a spiral on the whole length of the tentacle. The number of twists in a spiral is 7–8 in male and 5–6 in female. The nematocyst cluster at the terminal end of each tentacle is large, forming an ellipsoid colored light yellow. The manubrium is simple, without any oral tentacles nor other oral structures. In female the manubrium is usually about two-thirds as long as the bell cavity, while in male it is longer than in female, being two-thirds to four-fifths the length of the bell cavity. The bell cavity of males is often almost occupied by the manubrium with matured gonads which develop usually on perradial surfaces of the manubrium.

In male testicular folds are on the manubrium, and in female rather large eggs are found on it. We could not find any longitudinal nematocyst rows on exumbrella in any developmental stage of the medusae. The medusae are, on pause, holding the tentacles extended upwards, but in swimming the tentacles are usually contracted.

We have never found the medusae among the plankton materials collected near the Fukaura Marine Biological Laboratory.

Nematocysts

The nematocysts of polyp, young medusa and adult medusa are summarized as below.

Polyp:

Stenoteles (on hypostome) 11.0–13.0×9.0–10.5 μ
Stenoteles (on tentacle) 23.0–25.5×16.0–17.5 μ
Stenoteles (on tentacle) 12.0–14.0×8.0–10.0 μ
Desmonemes (on tentacle) 10.0–12.0×4.5–6.0 μ

Young medusae just liberated:

Stenoteles (on exumbrella) 9.0–13.0×7.5–9.0 μ
Stenoteles (on tentacle) 12.5–15.0×10.0–11.5 μ
Stenoteles (on tentacle) 10.0–12.0×8.0–9.0 μ
Stenoteles (on tentacle) 7.5–8.5×6.0–7.5 μ
Basitrichous haplonemes (on exumbrella) 8.0–11.0×7.0–9.5 μ
Desmonemes (on tentacle) 7.5–9.0×4.0–5.0 μ

Adult medusae:

Stenoteles (on exumbrella) 10.0–12.0×8.0–10.0 μ
Stenoteles (on manubrium) 16.0–20.0×13.0–15.0 μ
Stenoteles (on tentacle bulb) 18.0–20.0×13.0–15.0 μ
Stenoteles (on tentacle bulb) 15.0–17.0×11.0–12.0 μ
Stenoteles (on tentacle) 18.0–21.0×14.0–16.0 μ
Basitrichous haplonemes (on exumbrella) 15.0–17.0×13.0–15.0 μ
Desmonemes (on tentacle bulb) 9.0–11.0×5.0–6.0 μ

Discussion

The hydroid species which are referable to the genus *Sphaerocoryne* have been reported several times since its original description by PICTET (1893). PICTET created a new genus *Sphaerocoryne* for the new species, *Sphaerocoryne bedoti*, on the material from Amboine Island, Indonesia. WARREN (1908) described *Clavatella multitentaculata* as a new species on the material from the South African coast, but from his description and figures it is clear that WARREN's species is included in the PICTET's genus *Sphaerocoryne*. Main character of the genus is its hydranth with closely ar-

ranged capitate tentacles. PICTET and WARREN reported the gonosome as medusoid, but the medusa-buds of their material were still in unadvanced stage of development. GRAVELY (1927) reported *Syncoryne* sp. from South India, but GRAVELY's species should be a member of *Sphaerocoryne,* as is clear from his description and figures. He wrote only some words for its gonosome which is medusoid. PENNYCUIK (1959) recorded *Coryne* (?) *multitentaculata* among the Queensland hydroids, and MAMMEN (1963) reported *Sphaerocoryne bedoti* from South India. These reports are without any notes on gonosomes. Recently GRAVIER (1970) reported *Sphaerocoryne multitentaculata* from Madagascar, but no details on gonosomes have yet been described.

In Japan, some colonies which are probably identical with our present material were collected in Sagami Bay by His Majesty the Emperor of Japan about 40 years ago. Recently His Majesty has kindly given us a bit of these colonies. This material has some gonophores, but they are too small and immature for clearing further development. But the trophosome is very similar to our present material in general.

As is clear from the above description, two distinct species have been ever described in *Sphaerocoryne,* namely *S. bedoti* PICTET and *S. multitentaculata* (WARREN). MAMMEN (1963) gave considerations on the difference between these two species and synonymized WARREN's *S. multitentaculata* with *S. bedoti* PICTET. Our present material shows similar characters to those of MAMMEN and other authors, the differences are rather little. We, however, hesitate to accept the MAMMEN's treatment at this time, as we have now little information on the living condition of the materials other than Japanese one. Provisionally we treat here our material as *S. multitentaculata.*

In 1957 REES attempted to revise the system of the hydroids with capitate tentacles. He recognized to many 16 families and they were grouped into 2 super-families, Tubularoidea and Corynoidea. These families are mainly distinguished by the arrangement-pattern and structure of tentacles. It seems that in respect of the arrangement-pattern of capitate tentacles *Sphaerocoryne* may be included in the Corynidae of the system of REES and is sttuated somewhat close to *Linvillea* of MAYER (1910).

The genus *Linvillea* is said to be synonymous with *Corynitis* (MCCRADY, 1857). A small number of the species are known from the Atlantic coast of North and South Americas, and *Linvillea agassizi* is commonly found from the Atlantic coast of North America. With the kindness of Dr. D.R. CALDER of Virginia, we have had an opportunity to examine the polyp and medusa of this species which were collected from the coast of Virginia. This hydroid polyp is very similar to our Japanese material of *Sphaerocoryne,* except for some minor differences. On the other hand, however, the young medusae which are liberated from *Linvillea agassizi* show some difference from our material. The young medusae of *Linvillea* have 2 opposite tentacles, while our medusae 4. And the manubrium of adult medusae of *Linvillea* is cruciform in cross-section, but our medusae do not show this character so distinctly. *Linvillea* medusa has 8 irregular, longitudinal rows of nematocysts on exumbrella, but our medusa does not bear this feature. These nematocyst-rows on exumbrella are often

regarded as an important character to distinguish the genera or sometimes even families of hydromedusae, and according to REES this character may be of primitive.

Although considerable differences are found between *Sphaerocoryne* and *Linvillea*, it seems to us that *Sphaerocoryne* stands more close to *Linvillea* than to such corynid genera as *Sarsia, Dipurena, Hydrocoryne*, etc.

Acknowledgements

We wish to express our hearty thanks to His Majesty the Emperor of Japan for His Majesty's generosity in giving us the material collected in Sagami Bay and allowing us to make reference to His Majesty's unpublished data in this paper. Thanks are due to Dr. N.A.H. MILLARD, South African Museum, Cape Town, South Africa, for her kind information on *Sphaerocoryne* and Dr. D.R. CALDER of Virginia Institution of Marine Science, Gloucester, U.S.A., for his kindness in sending us the material of *Linvillea agassizi* from the Atlantic coast of North America.

REFERENCES

CALDER, D.R. 1971. Hydroids and hydromedusae of Southern Chesapeake Bay. Virginia Inst. of Mar. Sci., Special Paper in Mar. Sci. No. 1. 125pp.

GRAVELY, F.H. 1927. Coelenterata. Class Hydrozoa. Orders Gymnoblastea and Calyptoblastea. Bull. Madras Govt. Mus. (Nat. Hist.) 1: 7–20, pl. 1–2.

GRAVIER, N. 1970. Etude des hydraires épiphytes des phanérogames marines de la région de Tulear (Sud-ouest de Madagascar). Rec. Trav. Stat. mar. Endoume, Fasc. hors série suppl. 10: 111–161.

KRAMP, P.L. 1961. Synopsis of the medusae of the world. J. mar. biol. Ass. U.K. 40: 1–469.

MAMMEN, T.A. 1963. On a collection of hydroids from South India. I. Suborder Athecata. J. mar. biol. Ass. India 5: 27–61.

MAYER, A.G. 1910. Medusae of the world. I. The hydromedusae. CARNEGIE Inst. Washington Publ. 109: 1–230, pl. 1–29.

PENNYCUIK, P.R. 1959. Faunistic records from Queensland. Part V. Marine and brackish water hydroids. Univ. of Queensland Papers (Dept. of Zoology) 1: 141–210.

PICTET, C. 1893. Etudes sur les Hydraires de la baie d'Amboine. Rev. Suisse Zool. 1: 1–64, pl. 1–3.

REES, W.J. 1957. Evolutionary trends in the classification of capitate hydroids and medusae. Bull. Brit. Mus. (Nat. Hist.) Zool. 4: 453–534, pl. 12–13.

WARREN, E. 1908. On a collection of hydroids, mostly from the Natal coast. Ann. Natal Govt. Mus. 1: 269–355, pl. 45–48.