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Medusae in the Vicinity of Shimoda¹⁾

By

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(With 3 textfigures)

This report is mainly based on the medusan specimens deposited in the museum of the Mitsui Oceanographical Station at Shimoda. The collection contains 28 species of Hydro- and Scyphomedusae, including several abyssal forms. Though a few deep-sea medusae were known in Japan, they were not studied in so great numbers as in this collection. Most of these abyssal medusae have been recorded from Japan for the first time and three species of them seem to be new to science. It seems to be very interesting to note that two new species, *Hybocodon atentaculatus* n. sp. and *Proboscidactyla abyssicola* n. sp. are featured in the lack of tentacles. The degeneration of the marginal tentacles appears to be correlated with their abyssal life.

Before proceeding further, the writer should like to express his cordial thanks to Prof. I. Amemiya, director of the Oceanographical Station, and members of the station, who made several facilities for the writer to study the specimens.

In the following list those with asterisk are abyssal forms and those with the mark \oplus are medusae which can be found both in abyssal and shallow waters.

HYDROMEDUSAE

Anthomedusae

- * 1. *Hybocodon atentaculatus* n. sp.
- * 2. *Tiaranna sagamina* n. sp.
- * 3. *Proboscidactyla abyssicola* n. sp.

1) Contributions from the Akkeshi Marine Biological Station, No. 47.

Leptomedusae

- * 4. *Aequorea coerulescens* (Brandt)
- 5. *Aequorea macrodactyla* Bigelow

Trachomedusae

- ⊕ 6. *Rhopalonema velatum* Gegenbaur
- * 7. *Pantachogon haeckeli* Maas
- ⊕ 8. *Aglaura hemistoma* Péron et Lesueur
- ⊕ 9. *Aglantha digitale* (O. F. Müller)
- * 10. *Colobonema typicum* (Maas)
- * 11. *Crossota brunnea* Vanhöffen
- * 12. *Crossota rufobrunnea* Kramp
- * 13. *Crossota alba* Bigelow
- * 14. *Halicreas minimum* Fewkes
- ⊕ 15. *Liriope tetraphylla* (Chamisso et Eysenhardt)
- 16. *Geryonia proboscidalis* Eschscholtz

Narcomedusae

- ⊕ 17. *Solmissus incisa* Fewkes
- 18. *Aegina rosea* Eschscholtz

SCYPHOMEDUSAE**Cubomedusae**

- 19. *Charybdea rastoni* Haacke

Coronatae

- * 20. *Atolla wyvillei* Haeckel
- * 21. *Periphylla hiacinthina* Steenstrup

Semaeostomae

- 22. *Pelagia panopyra* Péron et Lesueur
- 23. *Dactylometra pacifica* Goette
- 24. *Phacellophora ambigua* Brandt
- 25. *Aurelia aurita* Lamarck

Rhizostomae

26. *Cepha cepha* (Forskål)
 27. *Mastigias papua* (L. Agassiz)
 28. *Thysanostoma thysanura* Haeckel

HYDROMEDUSAE

1. *Hybocodon atentaculatus* n. sp.

(Fig. 1)

Material. 1 specimen from 1100-0 meters in Sagami Bay (No. VII) on Nov. 13, 1937.

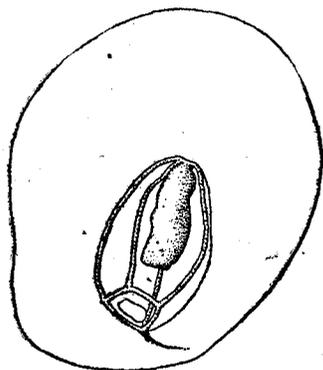


Fig. 1.
Hybocodon atentaculatus
 n. sp.

The medusa is formed by a thick fragile jelly mass containing a small subumbrellar cavity. Bell 23 mm in height and 25 mm in the widest part. Subumbrellar cavity 10 mm high and 8 mm in the widest part. Manubrium flask-shaped, without lips. Radial canals four in number, distinct and asymmetrical in length. A canal corresponding to the exumbrellar nematocyst band is the largest and the one arising opposite to the longest is the shortest. A ring canal forming a small circuit. Velum present. From the base of the longest radial canal extends the short nematocyst band (peronium) above the exumbrella to short extent, which terminates gradually upwards. No tentacles. Colour unknown.

Remarks. From the asymmetrical radial canals and the presence of the exumbrellar nematocyst band, the species seems to be eligible for *Hybocodon*. The manubrium is also similar in form to that of the Tubulariidae. The disappearance of the tentacles, the most distinct character of the new species, seems to be due to the abyssal life, and has no significance to generic value.

2. *Tiaranna sagamina* n. sp.

(Fig. 2)

Material. 1 specimen from 1000-0 meters at Ajiro, Sagami Bay on March 31, 1938.

The medusa has thick jelly, a small subumbrellar cavity and a small aperture of the cavity. Manubrium four-sided, with crenulated lips. Stomach cavity fairly spacious, four-sided. In each interradius the corner of the stomach extending over along the radial canals. Manubrium rather flat. Radial canals four in number, not especially broad but distinct. Ring canal could not be seen. Though the bell margin is more or less damaged, there can be seen no indication of the canal. The medusa seems to lack the ring canal completely. Tentacles 12 in number, one arising in each perradius from the base of the radial canals and two between the two neighbouring canals. These tentacles are all equal in length and in size. The tentacle bases are broad and conspicuous but the shaft is narrow and short. Gonads not yet developed.

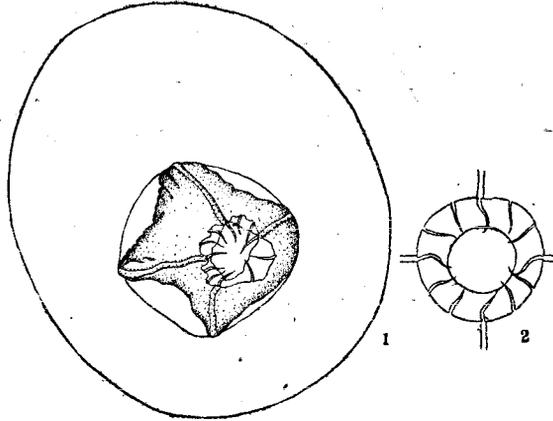


Fig. 2. *Tiaranna sagamina* n. sp.,
1. Medusa in oral view, 2. Marginal portion.

Remarks. The species is somewhat similar to *Tiaranna rotunda* in having thick jelly, but is distinctly different in the number of marginal tentacles. The absence of the ring canal, most distinguishable among the features from the other species, seems to be dependant on the abyssal life of the species.

3. *Proboscidactyla abyssicola* n. sp.

(Fig. 3)

Material. 1 specimen from 1000-0 meters in Sagami Bay. Date unknown.

Bell dome-like, 20 mm in diameter and 10 mm high. Stomach shallow and mouth polylobed. Radial canals 20 in number, some of them being bifurcated. Radial canals communicated with a ring canal on the margin. The marginal portion of the medusa seems to have regenerated after partial damage, so the canal system becomes partially irregular. One or two exumbrellar nematocyst strings are centripetally extended from the marginal portion between the canals. These nematocyst strings are variable in length and each ends in a small nematocyst cluster. The most distinct character of the medusa lies in the lack of marginal tentacles. Gonads developed on all the radial canals, extending about half the radius of the medusa. Manubrium and gonads reddish brown in preservative.

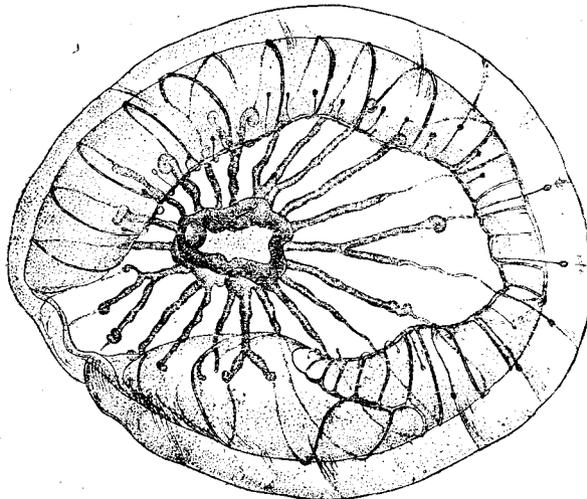


Fig. 3. *Proboscidactyla abyssicola* n. sp.

Remarks. Inferring from the presence of exumbrellar nematocyst strings and gonads developed along the many radial canals, this medusa is, in all probabilities, referable to the genus *Proboscidactyla* (*sensu* Uchida & Okuda, 1941), including the genus *Willsia*. The

lack of marginal tentacles is the unique feature in the genus.

4. *Aequorea coerulescens* (Brandt)

Material. 1 specimen from 1000-0 meters in Suruga Bay on July 25, 1937.

Bell low-dome-like, 18 mm in diameter and 5 mm high. Ex-umbrella flat. Mouth 11 mm in diameter. Tentacles 54 in number, 27 larger and 27 smaller, alternative in position, all arising from tentacle bulbs.

5. *Aequorea macrodactyla* Bigelow

Material. 3 specimens collected by a surface tow at Arashidomari on Dec. 21, 1939.

This medusa is common in winter. The largest specimen examined by the writer is 60 mm in diameter and has 14 large tentacles.

6. *Rhopalonema velatum* Gegenbaur

Material. 2 specimens from 1200-0 meters in Sagami Bay on Nov. 15, 1937; 1 specimen from 1000-0 meters at Ajiro on Oct. 26, 1938; 2 specimens from 1000-0 meters in Sagami Bay in Sept., 1938.

The medusa is common in surface tows on the middle and Southern coasts of Japan.

7. *Pantachogon haeckeli* Maas

Material. 1 specimen (17 mm high) from 1210-0 meters in Sagami Bay on Nov. 13, 1937; 1 specimen (young) from 1400-0 meters in Suruga Bay on Nov. 17, 1938; 2 wrecked specimens from 1200-0 meters in Sagami Bay on Nov. 15, 1937.

Bell globular in form. Jelly universally thin, with the apical thickened portion, with exumbral furrows. Radial canals eight in number. Tentacles short, equally formed, alternative with sensory organs in position. Subumbrellar muscle well developed. Velum wide and well-developed. Gonads developed almost on the whole length of the radial canals, showing several (6-7) irregular thickened foldings in the middle portion.

Remarks. The species is widely distributed at fair depths of most of the seas. It is, however, the first record of the species from the Japanese waters.

8. *Aglaura hemistoma* Pérom et Lesueur

Material. 1 specimen from 1000-0 meters in Sagami Bay on Sept. 3, 1938.

This species is very common in surface tows on the coasts from middle Japan southwards.

9. *Aglantha digitale* (O. F. Müller)

Material. 1 specimen from 1000-0 meters off Toi on Dec. 25, 1937.

The medusa is commonly found in surface tows of the northern half of Japan.

10. *Colobonema typicum* (Maas)

Material. 1 specimen from 1000-0 meters at Ajiro on Oct. 26, 1936; 2 specimens from 1000-0 meters in Suruga Bay on March 3, 1937; 4 specimens from the depth of 1486 m between the localities 35°04'N. 138°44'E-34°56'N. 138°39'E on Oct. 22, 1940.

Exumbrella bell-like. Jelly, rigid and thin, becoming thin towards the bell-margin. Radial canals eight in number, straight, wider in the apical part. Tentacles 32 in number, short and solid, having the endodermal core inserting the jelly mass near the margin. Statocysts could not be found. Manubrium short and four-sided. Gonads developed along nearly the whole length of radial canals except the proximal part adjacent to the margin. In the subumbrella the ring muscle is well-developed. On account of the presence of the ring canal, the subumbrella is not transparent but shows beautiful iridescent colours. The heights of four specimens so far examined are 29 mm, 37 mm, 45 mm and 48 mm. The medusa is known as a cosmopolitan species which is widely distributed in the abyssal seas in the temperate and tropical belts.

Remarks. The adoption of the generic name for this medusa is after Broch (1929), Ranson (1936) and Bigelow (1939). The genus

seems to be separated from *Homoeonema* in the absence or in the possession of insufficient series of statocysts in the specimens so far examined.

11. *Crossota brunnea* Vanhoeffen

Material. 7 specimens from 1000-0 meters at Ajiro on Oct. 26, 1938; 19 damaged specimens from 1000-0 meters in Sagami Bay on Nov. 12-15, 1937; 1 complete specimen from 1000-0 meters off Toda on April 30, 1938; 5 specimens from Sagami Bay on June 18, 1939; 1 specimen from 1000-0 meters off Toda on July 25, 1937; 1 specimen from 1000-0 meters off Ajiro on March 31, 1938.

Most of the specimens are damaged more or less. The following description is based on a complete specimen. Body 22 mm high, globular, higher than wide. Jelly thicker towards the apical portion. Radial canals eight in number, narrow and straight. Tentacles numerous, thickly set, arranged in a single row. Gonads on the radial canals, greyish brown, sac-like, pendant. Velum well-developed. Subumbrella and tentacles chocolate coloured. The medusa has been recorded for the first time in Japan.

Distribution. The species is cosmopolitan and is widely distributed in the deep sea of the Atlantic and the Pacific, but never been found from the Mediterranean and the North Polar regions.

12. *Crossota rufobrunnea* Kramp

Material. 1 specimen from Sagami Bay in Sept., 1938; 2 specimens from Sagami Bay on June 18, 1939; 2 specimens from 1000-0 meters off Toda on April 30, 1938; 4 specimens from 1000-0 meters off Toi on July 25, 1937; 5 specimens from Sagami Bay on June 20, 1939.

These specimens are well preserved and provided with gonads and from 28 mm to 32 mm in diameter. Bell slightly lower than a hemisphere. Jelly thin and rather soft. Radial canals wide and 8 in number. Tentacles short and numerous, larger and smaller ones alternative in position, with the endodermal core inserting to the mesogloea near the bell margin. Manubrium short and four-sided, about $\frac{1}{3}$ the whole height. Statocysts could not be found. The gonads, eight, attached to the upper portion of the radial canals and

manubrium forming protruded mass in the bell cavity. Gonads yellowish in preserved condition.

Remarks. These specimens seem to coincide in general with the description of *C. rufobrunnea* but the gonads of this species are slightly different in form from those of the latter. In *C. rufobrunnea*, gonads are only attached to the radial canals and sausage-shaped, while in our specimens they are attached to both the radial canals and manubrium, and not so slender. Inferring from the size-difference of these specimens, the medusae from Sagami Bay seem to be more advanced in stage than the European specimens.

Distribution. This medusa has hitherto been known from the Polar region. It is the first record of this species from the Pacific and the temperate region.

13. *Crossota alba* Bigelow?

Material. 1 specimen from 1400-0 meters in Suruga Bay on Nov. 17, 1938.

A wrecked specimen, 19 mm high, with iridescent subumbrella and many tentacles. Gonads narrow in form, pendant in the lower part of radial canals.

Remarks. Two medusae collected from the eastern coasts of Honshu were described as forming a species by Bigelow (1913). The specimen here dealt with, though damaged, seems to agree with his description.

14. *Halicreas minimum* Fewkes

Material. 1 specimen from 1200-0 meters in Sagami Bay on Nov. 14, 1937; 1 ill-preserved specimen from 1000-0 meters off Ajiro on Oct. 2, 1938; 1 specimen from 1000-0 meters off Toi on July 24, 1937; 2 damaged specimens from 1000-0 meters in Sagami Bay on Nov. 12, 1937.

These specimens were measured as follows, 20 mm wide and 14 mm high, 22 mm wide and 15 mm high, 38 mm wide and 16 mm high. In the first specimen (20 mm wide and 14 mm high) 20 intermediate tentacles are present in each octant. In the largest specimen, the gonads are well-developed, containing large ova.

Remarks. This species is characterized by the presence of ex-umbrellar papillae. It is one of the cosmopolitan medusae. The

medusa has long been reported as *H. papillosum* Vanhoeffen which is more in vogue than the name here adopted. Bigelow (1938) newly examined the two specimens used by Fewkes (1882) concerning the description of *H. minimum*, the type species of the genus, and pointed out that *H. minimum* has the typical exumbral papillae, each with several conical projections, though previously overlooked by Fewkes and agrees with the specimens of *H. papillosum*. By the priority of *H. minimum* to *H. papillosum*, hence the identification.

15. *Liriope tetraphylla* (Chamisso et Eysenhardt)

Material. 2 specimens from 1000-0 meters off Toi on July 25, 1937; 10 specimens from 1010-0 meters in Sagami Bay on Nov. 12, 1937.

The medusa is very common in surface tow along the Japanese coasts.

16. *Geryonia proboscidalis* Eschscholtz

Material. 8 specimens collected by a surface haul at Arashidomé on Dec. 21, 1939.

The medusa is common in winter along the coasts of Japan from Misaki southwards. The largest specimen is 35 mm high and 63 mm in diameter.

17. *Solmissus incisa* Fewkes

Material. 3 specimens collected in Sagami Bay during Nov. 12-15, 1937; 1 specimen from 1210-0 meters in Sagami Bay on Nov. 13, 1937; 1 specimen from 1000-0 meters at Ajiro on April 1, 1937.

The relation between the diameter and the number of antimeres in these medusae is as follows.

Diameter	38 mm	45 mm	45 mm	90 mm
Antimeres	17	23	19	33

The medusa is also found in surface tow in the middle and southern Japan.

18. *Aegina rosea* Eschscholtz

Material. 7 specimens collected by a surface tow at Arashidomé on Dec. 21, 1939; 7 specimens caught by a surface tow at Arashidomé on April 10, 1939.

These specimens are all well-preserved, pinkish in colour and pentamerous.

SCYPHOMEDUSAE

19. *Charybdea rastoni* Haacke

Material. Several specimens collected in September, 1938.

This medusa is common from the end of August to the end of September.

20. *Atolla wyvillei* Haeckel

Material. 1 small specimen from 1000-0 meters off Toi on Dec. 25, 1937; 1 specimen from 1486 meters at the locality (35°04'N. 138°44'E.-34°56'N. 138°31'E.) on Oct. 22, 1940; 12 specimens from 1500 meters off Osé on Nov. 20, 1938; 1 young specimen from 1000-0 meters off Ajiro on April 2, 1938; 3 specimens from Sagami Bay during 12-15, November, 1937; 1 specimen from 1000-0 meters off Ajiro on Oct. 26, 1938; 9 specimens from 1100 meters at the locality (35°0'N. 138°42'E.) on Sept. 16, 1940.

The species is known as a common bathypelagic medusa and is widely distributed in the Pacific and the Atlantic, excluding the Mediterranean. Bigelow (1938) pointing out that the medusa had not been collected in the winter months, suspected that the medusa might have the fixed stage in the winter. From this collection it revealed that this medusa also obtained in the winter (from October to December).

21. *Periphylla hiacinthina* Steenstrup

Material. 1 small specimen from 1000-0 meters off Toi on July 25, 1937; 1 specimen from 1000-0 meters in Sagami Bay on Nov. 15, 1937; 1 well-preserved specimen from 1100-0 meters in Sagami Bay on Nov. 13, 1937; 1 specimen from 1486 meters between the localities (35°4'N. 133°44'E.-34°56'N. 138°39'E.) on Oct. 22, 1940;

1 specimen from 1600 meters in Suruga Bay on Oct. 22, 1940; 3 specimens from 1500 meters off Osé in Suruga Bay on Nov. 25, 1938; 4 specimens collected from Sagami Bay during 12-15, Nov., 1937.

These specimens comprise various stages of this species. Most of them are well-preserved. The medusa is known as a typical abyssal cosmopolitan form.

22. *Pelagia panopyra* Péron et Lesueur

Material. 1 specimen collected at Arashidomé on Dec. 21, 1939; 2 specimens collected at Arashidomé on Dec. 21, 1939.

The medusa is common along the middle and southern coasts of Japan in winter and spring.

23. *Dactylometra pacifica* Goette

Several specimens were collected in March 1939.

This medusa is common in Japanese waters but rare in Hokkaido.

24. *Phacellophora ambigua* Brandt

Many specimens were preserved in the museum of the Marine Biological Station attached to the Bunrika University. This species is often abundant in February.

25. *Aurelia aurita* Lamarck

Several specimens were found to be preserved in the Shimoda Oceanographical Station. They were collected in February, 1938. The scyphomedusa is very common from winter to spring along the coasts of Honshu.

26. *Cepha cepha* (Forskål)

Two fine specimens were found in preserved condition in the Mitsui Oceanographical Station. The date of collecting is not noted. This species is common along the southern coasts of Japan but is not found in large number.

27. *Mastigias papua* (L. Agassiz)

Several specimens were found in the collection. They were collected in July, 1935. This medusa is common on the Japanese coasts from Mito city southwards.

28. *Thysanostoma thysanura* Haeckel

Three fine specimens were found in the Shimoda Marine Biological Station of the Bunrika University. A few specimens of this medusa are often found drifting on the southern coasts of Japan.

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