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Description of Some Oceanic Hydromedusae from Japan

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Abstract Three species of oceanic hydromedusae, *Sminthea eurygaster*, *Crossota alba*, and *Cytaeis tetrastyla*, are described and illustrated based on the specimens collected in the Pacific Ocean, off central Honshu, Japan. *Sminthea eurygaster* is the first record in Japan. One out of the three specimens of *Cytaeis tetrastyla* bears both the polypoid and the medusa buds. This is the second record of such an asexual reproduction of the species and the first record in the Pacific Ocean.

Key words: description, oceanic hydromedusae, Japan, *Sminthea eurygaster*, *Crossota alba*, *Cytaeis tetrastyla*, first record, polypoid bud

Introduction

Biological studies on the neritic hydromedusae along the coast of Japan have been well conducted. However, the oceanic medusae have so far been scarcely studied in Japanese waters. Recently we collected many medusan samples from various locations in Sagami Bay and the sea between Tokyo and the Ogasawara (Bonin) Islands. In these samples, *Sminthea eurygaster* Gegenbaur (Trachymedusa) was found as a new member of the Japanese hydrozoan fauna, and two rare species in Japan, *Crossota alba* Bigelow (Trachymedusa) and *Cytaeis tetrastyla* Eschscholtz (Anthomedusa) were also found. These three oceanic species are herein described and illustrated based on the specimens preserved in 5 or 10 % buffered formalin-seawater *in situ*.

Sminthea eurygaster Gegenbaur, 1856

(Fig. 1)

Sminthea eurygaster: Gegenbaur, 1856, pp. 245–246, pl. 9, figs. 14–16; Mayer, 1910, pp. 382–383, figs. 226–227; Groben, 1915, p. 5; Brown, 1916, pp. 171–172, 194–195; Broch, 1929, p. 499, fig. 11; Pell, 1938, p. 926; Vannucci, 1951, p. 117; Blackburn, 1955, pp. 415–416, 425–426; Kramp, 1957, pp. 55, 125, tab. 3; Kramp, 1959, pp. 54, 187, 242, 246, 248, 251, 253, 255–256, 259–260, 263, fig. 276; Kramp, 1961, pp. 263–264; Kramp, 1965, pp. 122–123; Kramp, 1968, pp. 116–117, 176, 178, 180, fig. 314.

Trachynema eurygaster: Haeckel, 1879, p. 260.

Marmanema mammaeforme: Haeckel, 1879, p. 262.

Material examined

One mature medusa collected by a vertical haul of a conical net (45-cm diameter, 0.8-mm mesh aperture) from 150-m depth to the surface in Sagami Bay (35°03.8'N, 139°40.8'E) on November 17, 1995.

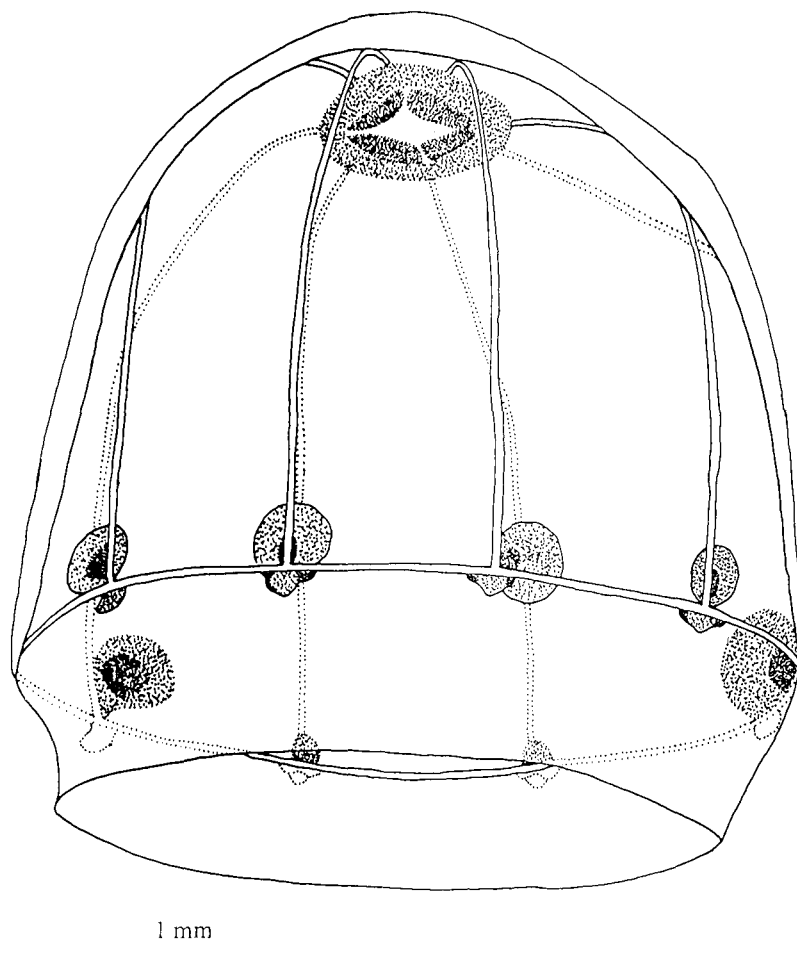


Fig. 1. Mature medusa of *Sminthea eurygaster* from Sagami Bay, Japan, oblique view.

Description

Umbrella 4.7 mm wide and 3.8 mm high, with deep bell cavity, thin jelly but slightly thickened at apex, eight radial canals, and eight gonads. Six gonads well-developed, globular to egg-shaped, 0.4–0.5 mm in major axis on distal end of radial canal, together with two damaged ones. Eight tentacles. Velum broad, 1.3 mm wide. Manubrium lost.

Remarks

The type specimen of Gegenbaur (1856) and the specimens of Haeckel (1879) as *Trachynema eurygaster* had four statocysts, however, specimens of Haeckel (1879) as *Marmanema mammaeforme* had eight statocysts. Specimens identified as *S. eurygaster* by Mayer (1910), Broch (1929), and Kramp (1961) had eight statocysts. The number of statocysts in our specimen was uncertain due to damage of the body parts during the collection.

Gegenbaur (1856) and Kramp (1961) noticed a small apical projection. There was

an apical thickening in the present specimen, but the apical portion did not seem to project as in the Australian specimens described by Blackburn (1955).

Gegenbaur (1856) described yellowish gonads, and Mayer (1910) described faintly yellowish gonads and faint red colored tentacle-bases, but the gonads and the tentacle-bases were white in the present specimen.

This species is the first record in Japan. It should be mentioned here that Pérès (1959) observed two small *Sminthea* (?) or *Halicreas* (?) medusae off the east of Honshu by the submersible, F. N. R. S. III. They are still difficult to identify, though Pérès (1959) illustrated them.

Distribution

Pacific Ocean: off the south-eastern Australia (Blackburn, 1955); near New Zealand and Tasman Sea (Kramp, 1965); outside of Gulf of Panama (Kramp, 1965); Sagami Bay, Japan (present record, Fig. 4).

Indian Ocean: Chagos Archipelago (Brown, 1916); Amirante Islands (Brown, 1916).

Atlantic Ocean: west of Cape of Good Hope (Kramp, 1957; 1959); off Namibia (Kramp, 1959); north of St. Helena (Kramp, 1959); off Gulf of Guinea (Kramp, 1957); near Canary Islands (Kramp, 1959); off Morocco (Kramp, 1959); near Cabo Frio, Brazil (Vannucci, 1951).

Mediterranean: Adriatic Sea (Grobben, 1915; Pell, 1938); near Sicily (Kramp, 1959).

***Crossota alba* Bigelow, 1913**

(Fig. 2)

Crossota alba: Bigelow, 1913, pp. 49–50, pl. 3, figs. 9–12; Uchida, 1928, p. 80; Uchida, 1947, pp. 332, 339; Nicol, 1958, p. 715; Kramp, 1957, pp. 61–62, 99, 105, 126, tab. 4; Kramp, 1959, pp. 56, 191, 252, 256, 263, 273, fig. 288; Kramp, 1961, p. 256; Kramp, 1965, p. 126; Kramp, 1968, pp. 120, 178, 181, fig. 326; Naumov, 1969, pp. 602–604, fig. 450; Van der Spoel, 1996, p. 627, fig. 7.

Material examined

One mature specimen collected by an oblique haul (2000 m wire out) of the ORI net (160-cm diameter, 1-mm mesh aperture) in Sagami Bay (34°54.6'N, 139°14.9'E, 1232-m depth) on August 2, 1995.

Description

Umbrella 15.0 mm wide and 10.5 mm high, with transparent deep bell cavity. Jelly thickest at umbrellar apex, up to 1.5 mm in thickness. Exumbrella furrowed by many shallow meridional grooves. Manubrium, dark chocolate-brown in color, 7.0 mm long and up to 1.7 mm broad, with white wrinkled oral lips. With eight radial canals. Eight sausage-shaped gonads hang in bell cavity, each attached to radial canal at one end about one-third of meridional distance above umbrellar margin.

Remarks

The present specimen was much damaged: the marginal tentacles, statocysts and the velum were broken, furthermore the marginal part of the umbrella was separated, but attached by two radial canals which were also separated from the subumbrella and hung free in the bell cavity.

In Japan, only three specimens of *C. alba* were previously reported on three occasions (fig. 4): one specimen in the Pacific Ocean off northern part of Honshu, another in the East China Sea off the south-west of Kyushu (Bigelow, 1909, 1913) and a wrecked specimen

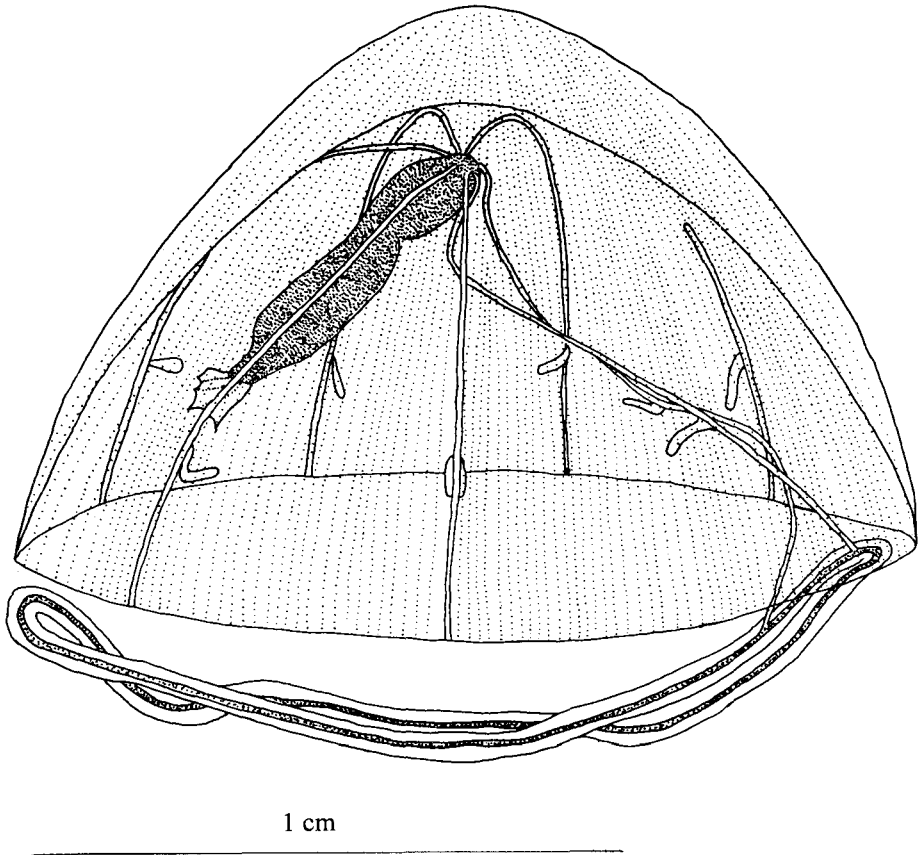


Fig. 2. Mature medusa of *Crossota alba* from Sagami Bay, Japan, oblique view.

from Suruga Bay in the Pacific Ocean (Uchida, 1947). Therefore, this is the fourth record in Japanese waters.

Three species of *Crossota* are known in Japan, together with this species (Bigelow, 1909, 1913; Uchida, 1947; Pérès, 1959).

Distribution

Van der Spoel (1996) reported the world distribution of this species, but in his map a record by Naumov (1969) from south of Kuriles was not included.

Pacific Ocean: Japan (Bigelow, 1913; Uchida, 1947; present record, Fig. 4); south of Kuriles (Naumov, 1969); near New Caledonia (Kramp, 1965); Kermadec Trench, north of New Zealand (Kramp, 1965); Banda Sea (Kramp, 1965).

Atlantic Ocean: Bay of Biscay (Nicol, 1958; Kramp, 1959); off Namibia (Kramp, 1959); north of St. Helena (Kramp, 1959); east of Ascension (Kramp, 1957; 1959); off Guinea and Liberia (Kramp, 1957; 1959); off Morocco (Kramp, 1959).

***Cytaeis tetrastyla* Eschscholtz, 1829**

(Fig. 3)

Cytaeis tetrastyla: Mayer, 1910, pp. 132–133; Brown, 1916, pp. 170–171, 177–178; Bigelow, 1918, pp.

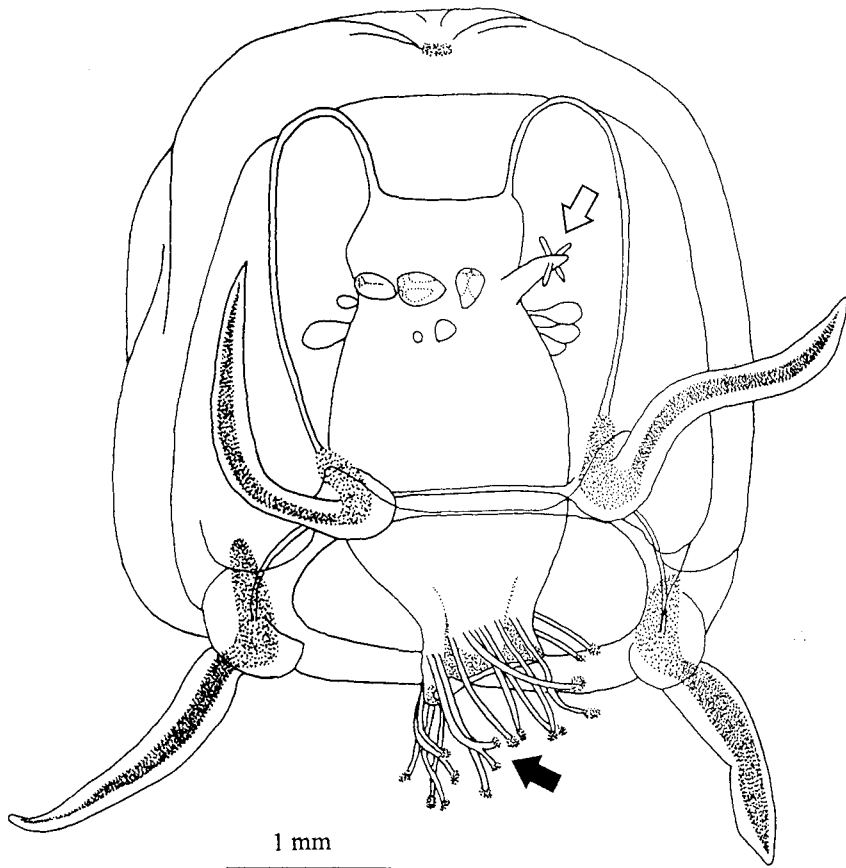


Fig. 3. Immature medusa of *Cytaeis tetrastyla* with a polypoid bud (white arrow) from close to Ogasawara Islands, Japan, oblique view. Note one branched oral tentacle (black arrow).

367, 430; Ranson, 1932, pp. 994, 997–998, figs. 1–2; Pell, 1938, p. 923; Vannucci, 1957, pp. 37, 51–52, 89–90, 99, 101–102, figs. 14–15; Kramp, 1957, pp. 7, 125, tab. 3; Kramp, 1959, pp. 7–8, 99, 242, 249, 251, text-fig. 62, pl. I, figs. 3–6; Kramp, 1961, pp. 63–64; Rees, 1962, pp. 381–383; Uchida, 1964, pp. 133, 138; Kramp, 1965, pp. 9–12; Kramp, 1968, pp. 26, 143–147, 155, 163, 176–177, fig. 64.

Material examined

Three immature specimens collected by surface tows of a larva-net (130-cm diameter; 2-mm mesh aperture in the front part and 0.33-mm in the rear part) at three locations close to the Ogasawara (Bonin) Islands (26°45.6'N, 142°14.1'E; 26°52.9'N, 142°17.8'E; 26°57.0'N, 142°16.3'E) on June 18 and 19, 1995.

Description

Umbrella wider than high, 3.8, 4.0, and 2.0 mm wide and 3.3, 3.1, and 1.7 mm high, respectively. Jelly thick and solid, with short peduncle on manubrium. Each specimen has one distinct apical depression. Many medusa buds, 26 and 12 in number in first two specimens, of up to 0.7 mm high and 0.5 mm wide, on upper part of

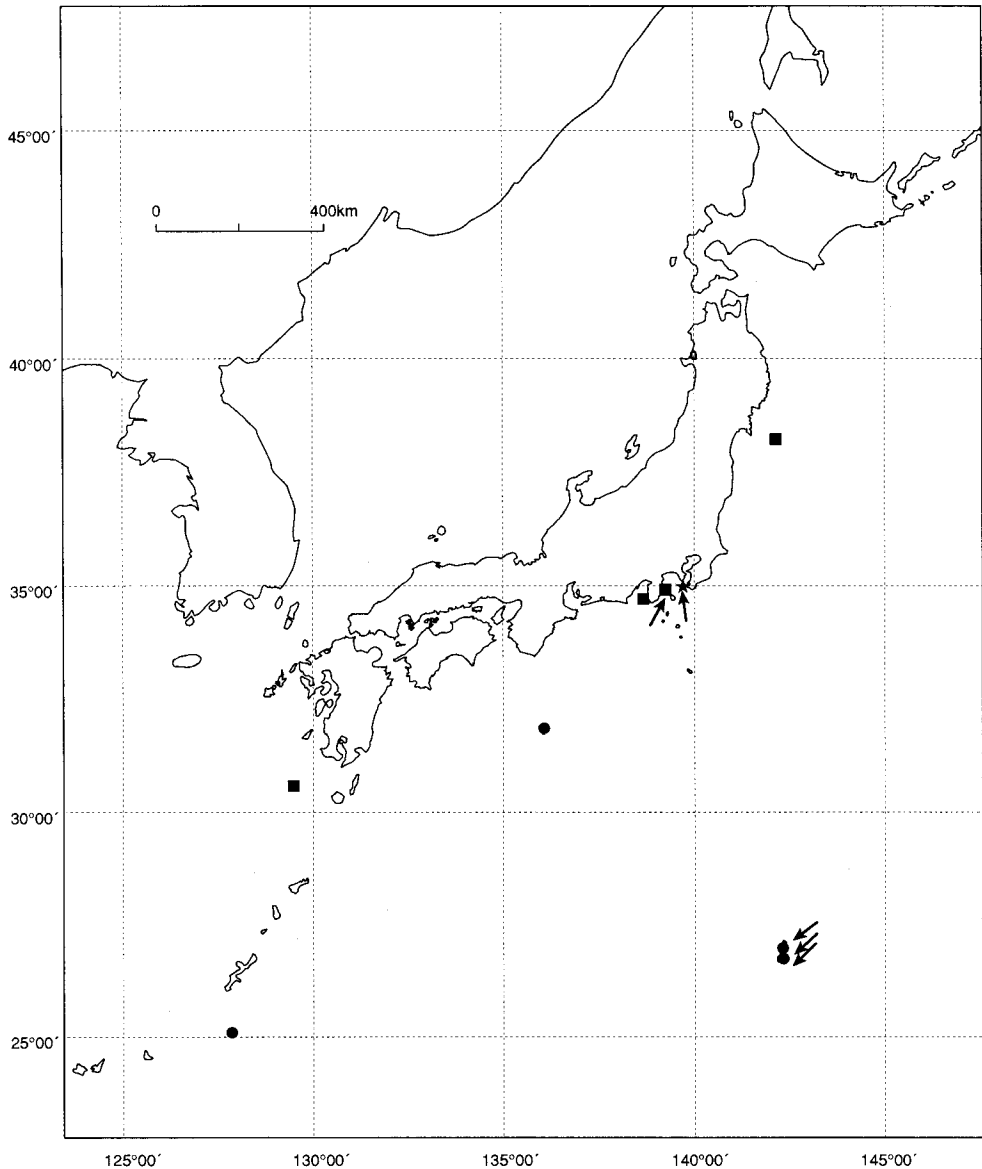


Fig. 4. A map of geographical distributions of *Sminthea eurygaster* (★), *Crossota alba* (■), and *Cytaeis tetrastyla* (●) around Japan. Present records are shown by arrows.

manubrium. Together with medusa buds, first specimen had one polypoid bud, 0.5 mm long and 0.2 mm wide with four filiform tentacles (Fig. 3). Mouth round, surrounded by many unbranched oral tentacles, 31, 25, and 15 in number, each with one terminal cluster of nematocysts. Only one oral tentacle branched once extraordinarily in first specimen (Fig. 3), the other oral tentacles unbranched. With four marginal tentacles, each on large globular bulb.

Remarks

The present specimens had an apical depression which had not so far been reported in any other specimens of *C. tetrastyla*. Such a depression is treated as one of the specific characters of *C. uchidae* (Uchida, 1964), but *C. tetrastyla* differs from *C. uchidae* in having more numerous oral tentacles and in the ability of asexual reproduction of medusa buds. The present specimens had a short peduncle as described by Brown (1916) and Vannucci (1957), but Kramp (1959, 1968) did not mention this character. Brown (1916) described that the marginal tentacles were pigmented dark reddish internally along their whole length and were covered with very thick ectoderm. Our specimens agreed with his description.

One of the present specimens had a polypoid bud, together with many medusa buds. Such a mode of asexual reproduction is the second finding in *C. tetrastyla* and the first record in the Pacific Ocean. The only one previous report on this asexual reproduction was based on three specimens collected off the Cape Verde, the Atlantic Ocean (Kramp, 1959). Other than *C. tetrastyla*, the asexual reproduction of polypoid structures has been reported in only four species in the hydromedusae, i.e. *Bougainvillia platygaster* (Anthomedusa), *Phialidium mccradyi* (Leptomedusa), *Eucheilota paradoxica* (Leptomedusa), and *Proboscoidactyla ornata* (Limnomedusa) (Kramp, 1959; Carré and Carré, 1990).

In Japan, a total of only four specimens of *C. tetrastyla* were previously reported from near Okinawa Islands and south of Honshu (Kramp, 1965). Including the present species, four species of the genus *Cytaeis* are known in Japan (Rees, 1962; Uchida, 1964; Kramp, 1965; Hirohito, H. M. the Showa Emperor, 1988).

Distribution

Pacific Ocean: off San Francisco (Kramp, 1965); outside of Gulf of Panama (Kramp, 1965); Polynesian Islands (Kramp, 1965); Kermadec Islands and Kermadec Trench (Kramp, 1965); near the Solomon Islands (Kramp, 1965); Great Barrier Reef (Vannucci, 1957); Gulf of Siam and the Java Sea (Kramp, 1965); west of Luzon (Kramp, 1965); Japan (Kramp, 1965; present record, Fig. 4).

Indian Ocean: west of Sumatra (Kramp, 1965); southern part of the Bay of Bengal (Kramp, 1965); near Ceylon (Kramp, 1965); between Ceylon and Seychelles (Kramp, 1965); near Saya de Malha Bank (Brown, 1916); north of Madagascar (Kramp, 1965); near Mombasa in east Africa (Kramp, 1965); off the African coast from Mombasa to Delagoa Bay (Kramp, 1965); south of Somalia (Kramp, 1965); St. Paul Island (Ranson, 1932); Chagos Archipelago (Brown, 1916).

Atlantic Ocean: north-east of Ascension Island (Kramp, 1959); Gulf of Guinea (Kramp, 1957); off north-western Africa (Kramp, 1959); near Cape Verde Islands (Kramp, 1957); south-west of Canary Islands (Kramp, 1959); north-west of Azores (Kramp, 1959); between the Azores and West-Indian Islands (Kramp, 1959); West-Indian waters (Kramp, 1959); Bermudas and Strait of Florida and Bahama Bank (Bigelow, 1918); near Cape Hatteras on the east coast of North America (Kramp, 1959); off southern part of Brazil (Kramp, 1957); between Ilha Grande and Paranagua, Brazil (Vannucci, 1957); north-east of Cape San Roque, Brazil (Kramp, 1957); near St. Paul's Rocks (Kramp, 1957).

Mediterranean: Adriatic Sea (Pell, 1938).

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References

- Bigelow, H. B. 1909. Rep. Sci. Res. Exped. Eastern Tropical Pacific U. S. Fish. Comm. 'St. Albatross' 1904-1905. XVI. Medusae. Mem. Mus. comp. Zool. Harv., 37: 1-243, pls. 1-48.
- Bigelow, H. B. 1913. Medusae and Siphonophorae collected by the U.S. fisheries steamer 'Albatross' in the north-western Pacific, 1906. Proc. U. S. nat. Mus., 44: 31-119, pls. 1-6.
- Bigelow, H. B. 1918. Some Medusae and Siphonophorae from the western Atlantic. Bull. Mus. comp. Zool. Harv., 62 (8): 365-442, pls. 1-8.
- Blackburn, M. 1955. Trachymedusae and Narcomedusae of South-East Australian waters. Austr. J. mar. freshw. Res., 6 (3): 410-428.
- Broch, H. 1929. Craspedote Medusen. Teil II, Trachylinen. Nord. Plankt., XII, B: 481-539, text-figs. 1-40.
- Brown, E. T. 1916. Medusae from the Indian Ocean. Trans. Linn. Soc. Lond. (Zool.), 17: 169-210, pl. 39.
- Carré, D. & Carré, C. 1990. Complex reproductive cycle in *Eucheilota paradoxa* (Hydrozoa: Leptomedusae): medusae, polyps and frustules produced from medusa stage. Mar. Biol., 104: 303-310.
- Gegenbaur, C. 1856. Versuch eines Systemes der Medusen, mit Beschreibung neuer oder wenig gekannter Formen; zugleich ein Beitrag zur Kenntniss der Fauna des Mittelmeeres. Z. wiss. Zool., 8: 202-273.
- Groben, K. 1915. Adriatic medusae collected by S. M. S. 'Najade'. Anz. Akad. Wiss. Wien, 52: 2-5.
- Haeckel, E. 1879. Das System der Medusen. Erster Theil einer Monographie der Medusen. Jena: 1-360, pls. 1-20.
- Hirohito, H. M. the Showa Emperor. 1988. The hydroids of Sagami Bay. Biol. Lab. Imp. Household, Tokyo, 179 pp. + 110 pp. (text in Japanese), 2 maps.
- Kramp, P. L. 1957. Hydromedusae of the Discovery collections. 'Discovery' Rep., 29: 1-128, text-figs. 1-19, Pl. I-VII.
- Kramp, P. L. 1959. The hydromedusae of the Atlantic Ocean and adjacent waters. Dana-Rep., 46: 1-283. pls. 1-2.
- Kramp, P. L. 1961. Synopsis of the medusae of the world. J. mar. biol. Assoc. U. K., 40: 1-469.
- Kramp, P. L. 1965. The hydromedusae of the Pacific and Indian Oceans. Dana-Rep., 63: 1-162.
- Kramp, P. L. 1968. The hydromedusae of the Pacific and Indian Oceans. Sections II and III. Dana-Rep., 72: 1-200.
- Mayer, A. G. 1910. Medusae of the world. Hydromedusae, I, II: 1-498.
- Naumov, D. V. 1969. Hydroids and Hydromedusae of the USSR. Israel Program for Scientific Translations. Jerusalem: 1-690.
- Nicol, J. A. C. 1958. Observations on luminiscence in pelagic animals. J. mar. biol. Ass. U. K., 37: 705-752, pl. 1, text-figs. 1-19.
- Pell, M. 1938. The Hydromedusae of the Adriatic, collected by the 'Najade'. Math. term. Kozlem, 57 (2): 919-930.
- Pérès, J. M. 1959. Deux plongées au large du Japon avec le bathyscaphe français F. N. R. S. III. Bull. Inst. océanogr. Monaco, 1134: 1-28.
- Ranson, G. 1932. Revision de la collection des méduses du Muséum National d'Historie Naturelle (précédée de quelques conseils aux naturalistes sur la conservation de ces animaux). Bull. Mus. Hist. nat., Paris, Ser. 2, 4: 988-1000, text-figs. 1-2.
- Rees, W. J. 1962. Hydroids of the family Cytaeidae L. Agassiz. Bull. Brit. Mus. Zool., 8:

- 381-400, pls. 10-11.
- Uchida, T. 1928. Studies on Japanese hydromedusae 2. Trachymedusae and Narcomedusae. Jap. J. Zool., 2: 73-97.
- Uchida, T. 1947. Medusae in the vicinity of Simoda. J. Fac. Sci. Hokkaido Univ., Ser. 6, Zool., 9: 331-343.
- Uchida, T. 1964. A new hydroid species of *Cylaeis*, with some remarks on the interrelationships in the Filifera. Publ. Seto Mar. Biol. Lab., 12 (2):133-144.
- Van der Spoel, S. 1996. A hypothesis on mesozoic vicariance in hydromedusae. J. Plankton Res., 18 (4): 615-634.
- Vannucci, M. 1951. Distribuição dos Hidrozoa até agora conhecidos nas costas do Brasil. Bol. Inst. Paul. Oceanogr., 2: 105-124.
- Vannucci, M. 1957. On Brazilian hydromedusae and their distribution in relation to different water masses. Bol. Inst. oceanogr. São. Paulo, 8: 23-109.
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