

[短報]

## A New Occurrence of the Medusa of the “intermedia” Form of *Eutima japonica* (Hydrozoa, Leptomedusae, Eirenidae) at Okinawa Island, Japan

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### コノハクラゲ（ヒドロ虫綱、軟クラゲ目、マツバクラゲ科） 中間型のクラゲの沖縄島への新記録

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**Abstract** *Eutima japonica* Uchida was collected for the first time in the Nansei Islands and it belongs to the “intermedia” form of the species. One of the two mature female medusae collected in Tomari Port, Okinawa Island, was kept in the laboratory for about three weeks after collection, and no shift to any other form of *E. japonica* took place. Various body parts of this specimen were measured at three different stages of development, which are described together with photographs of the external morphology.

**Key words** New record, “intermedia” form of *Eutima japonica*, mature medusa, Okinawa

#### INTRODUCTION

Four forms of the bivalve-inhabiting Japanese hydrozoan *Eutima japonica* Uchida, 1925 have been recognized based on the morphology of the mature medusae; their geographic distributions are clearly different, exhibiting parapatry (Kubota, 1991, 1992a, 1999). Among the four forms, the mature medusa of the “intermedia” form is the most precocious, maturing at a stage equivalent to young developmental stages of the other forms; it has distinct characteristics such as a low value for every meristic feature, small umbrellar size, no peduncle on the manubrium, and cruciform oral lips

(Kubota, 1984, 1985, 1999). The “intermedia” form has been found at only two localities, Ago Bay in Mie Prefecture and Asou Bay of Tsushima Island, Nagasaki Prefecture (Kubota, 1992b, 1999).

Recently, as the first record of *Eutima japonica* in the Nansei Islands, I collected two mature female medusae of the “intermedia” form from Tomari Port, Okinawa Island, on March 12 and 17, 2002, by towing a plankton net (30 cm in mouth diameter, 55 cm in length, 0.34 mm in mesh size) horizontally on the sea surface and vertically and obliquely from the bottom (up to 8 m in depth) to the surface of the harbor. This finding was

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unexpected since no form of *E. japonica* had ever been collected during my research on bivalve-inhabiting hydrozoans in the Nansei Islands over more than 10 years, neither in oceanic waters on cruises (cf. Kubota *et al.*, 2000) nor in plankton collections taken in many harbors there. On the contrary, all the bivalve hosts in this region release medusae of *Eugymnanthea japonica* Kubota, 1979 (Kubota *et al.*, 2003). In the present paper, these very rare medusae of the "intermedia" form, and the morphological changes one underwent in the laboratory until its death, are described.

#### Materials and Methods

The morphology of the present two specimens was observed as soon as possible after collection (up to half a day), and various body parts were measured; meristic characters were counted under the microscope, and the specimens were photographed. The first specimen was preserved in 5% formalin seawater after observation, while the second specimen was brought back to the laboratory, transported to the Seto Marine Biological Laboratory in Shirahama, Wakayama Prefecture, on March 17, 2002, within half a day after collection, and reared for about 3 weeks until it began to degenerate. This specimen was kept in a 60 ml plastic vessel filled with filtered natural seawater from Shirahama at a constant temperature of 22°C; it was fed daily with *Artemia* nauplii. The sea water changed every day. The light was not controlled, but was set as close as possible to natural conditions by placing the vessel near a window and illuminating with artificial light in the daytime. For measuring, the specimens were anesthetized by MgCl<sub>2</sub>.

## Results and Discussion

### Description of the Mature Medusa

(of the "intermedia" form of *Eutima japonica* from Okinawa Island)

Various body parts of the two mature female medusae were measured soon after collection, and successive developmental changes were examined in one of them in order to confirm the form, while particularly checking to see whether it would shift to another of the recognized forms of the species (Table 1, Figs. 1-4). Throughout the life span 4 tentacles were found and no short peduncle was ever produced. As the medusa became old the number of statoliths per statocyst increased (from 3 when collected to up to 7), but the umbrellar diameter did not increase much (up to 4.2 mm). Lateral cirri were found on both sides of the perradial tentacular bulbs and the interradian marginal warts, but some of the other marginal warts bore no cirri. In the first specimen up to 6 cirri were found per marginal swelling, and in the second specimen up to 2. The tentacular bulbs and interradian marginal warts have black pigment. The oral lips are cruciform and not crenulated. The gonads are not oval, but oblong. The present individuals possess the typical features of the "intermedia" form and no shift to any other form took place. In the first specimen, two radial canals were jointed in the proximal part of the canal near the manubrium (Fig. 1), as an aberrant condition.

### Remarks

The morphology of the present specimens precisely coincides with previous descriptions of the "intermedia" form based on laboratory-reared specimens from both earlier known localities, Ago

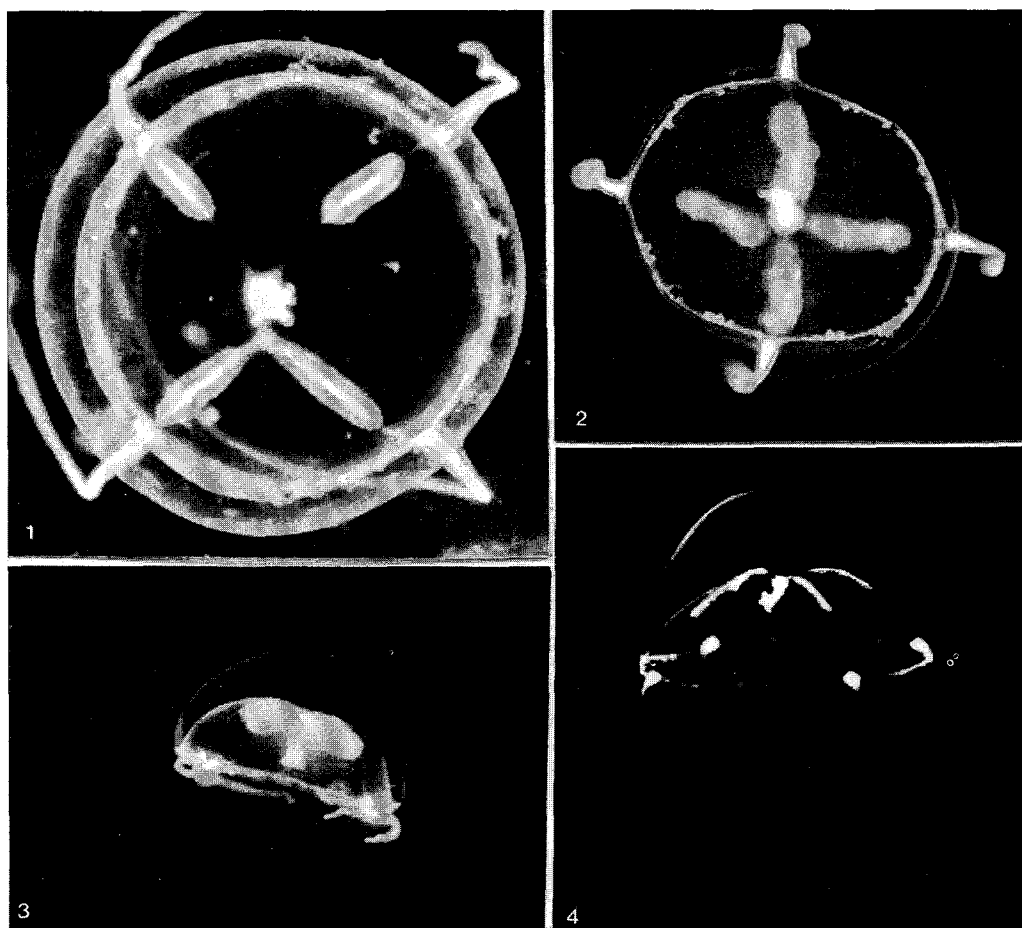


Fig. 1. Mature female medusa of the "intermedia" form of *Eutima japonica* soon after collection from Tomari Port, Okinawa Island, Japan. Oral view of the first specimen, showing the aberrant condition of the radial canals.

図1. 沖縄島泊港から採集されたコノハクラゲの中間型の雌成熟クラゲ. 採集直後の第1個体の口面図, 放射水管の異常な状態を示す.

Fig. 2. Mature female medusa of the "intermedia" form of *Eutima japonica* soon after collection from Tomari Port, Okinawa Island, Japan. Oral view of the second specimen.

図2. 沖縄島泊港から採集されたコノハクラゲの中間型の雌成熟クラゲ. 採集直後の第2個体の口面図.

Fig. 3. Side view of the second specimen of the "intermedia" form of *Eutima japonica* reared for 6 days in the laboratory following its collection.

図3. 採集後, 実験室で6日間飼育したコノハクラゲの中間型の第2個体, 側面図.

Fig. 4. Slightly oblique view of the second specimen of the "intermedia" form of *Eutima japonica* reared for 18 days following its collection.

図4. 採集後, 実験室で18日間飼育したコノハクラゲの中間型の第2個体, やや斜めから見た図.

Table 1. Measurements of two mature female medusae of the "intermedia" form of *Eutima japonica* from Tomari Port, Okinawa Island. Measurements were made soon after collection, and on three occasions during the culture of the second specimen.

表 1. 沖縄島泊港で採集したコノハクラゲの中間型の 2 個体の雌成熟クラゲの測定値。測定は採集直後と、1 個体を飼育し、3 回の異なる時期で実施した。

Days after coll.	Umbrella diameter (mm)	Umbrella height (mm)	Thickness of jelly at umbrellar apex (mm)	Length of manubrium (mm)	No. of tentacles (total)	No. of marginal warts (total)	No. of statocysts (total)	No. of statoliths (total)	No. of lateral cirri (total)
0	3.1	2.2	1.0	0.80	4	20	8	24	54
0	2.0	1.5	0.65	0.60	4	20	8	24	25
6	3.8	2.5	-	-	4	23	8	-	-
13	4.2	3.0	1.5	0.50	4	24	8	47	15
18	4.0	3.0	1.6	0.50	4	24	8	49	11

-: not measured.

Bay and Asou Bay (Kubota, 1984, 1985, 1992a). The known main host bivalves of this form are *Mytilus galloprovincialis* and *Barbatia virescens* (Kubota, 1992b). It is possible that in the new locality in Okinawa *Barbatia virescens* is the host of the hydroids; *M. galloprovincialis* does not occur, but *B. virescens* is common in the Nansei Islands (pers. observations). Tomari Port is the third place where the present species has been found sympatrically with another bivalve-inhabiting hydrozoan, *Eugymananthea japonica*; the medusa of the latter species was also collected in the same place (Kubota, unpublished data).

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### 要 約

2002年3月に沖縄島泊港で2個体の中間型のコノハクラゲを南西諸島では初めて採集した。採集後3週間、退化するまで実験室での飼育により、他の型への形態変化が見られないことを確認するとともに、3つの異なる時期での成熟クラゲの形態学的特徴を計測し、外形の写真撮影とあわせて記載した。

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