

[短報]

New Association of *Eugymnanthea japonica* (Hydrozoa, Leptomedusae, Eirenidae) with an Oyster, *Dendrostrea sandvichensis* (Bivalvia, Ostreoida, Ostreidae), in Okinawa Island, Japan

Shin KUBOTA¹, Setsuko IWANAGA², Naomasa OSHIRO² and Kenji TORIGOE³

沖縄島産のノコギリガキ（二枚貝綱，カキ目，イタボガキ科）と
カイヤドリヒドラクラゲ（ヒドロ虫綱，軟クラゲ目，
マツバクラゲ科）の共生の初記録

久保田 信¹・岩永節子²・大城直雅²・鳥越兼治³

Abstract An association is reported for the first time between *Dendrostrea japonica* (Bivalvia, Ostreidae) and *Eugymnanthea japonica* (Hydrozoa, Leptomedusae), based on specimens collected in Okinawa in 2002. A brief description of the mature medusa of the latter species, obtained by laboratory-culture, is also given.

Key words New association, bivalve-associated hydroid, *Eugymnanthea japonica*, *Dendrostrea sandvichensis*, mature medusa, Okinawa

INTRODUCTION

In the Nansei Islands the bivalve-inhabiting hydroid *Eugymnanthea japonica* Kubota, 1979 has been reported in association with *Crassostrea vitrefacta* (Sowerby) from Yagaji, Nago City, Okinawa Island, and its medusa was obtained by laboratory-culture (Yamada and Kubota, 1979; Kubota, 1979). The medusa of this species was also collected in plankton samples taken in the harbor at Akajima Island, Kerama Islands (Kubota, 1998). One of us (SK) has been carrying out a faunal survey of

bivalve-inhabiting hydrozoans in the Nansei Islands and has found hydroids and medusae of *E. japonica* at some other localities in this region as well, associated with two bivalve species, *Barbatia virescens* (Reeve) and *Crassostrea gigas* (Thunberg), which were previously known as its hosts in Kyushu, Honshu, and Shikoku (Kubota unpublished data; Kubota, 1991, 1999).

Recently two of us (SI and NO) found hydroids within the mantle cavity of oysters. One of the bivalve species involved (identified by KT) proved to be

¹ Seto Marine Biological Laboratory, Kyoto University, Shirahama, Nishimuro, Wakayama 649-2211, Japan (e-mail: shin@seto.kyoto-u.ac.jp)

² Okinawa Prefectural Institute of Health and Environment, 2085 Ozato, Ozato-son, Okinawa 901-1202, Japan

³ Graduate School of Education, Hiroshima University, Kagamiyama 1-1-1, Higashi-Hiroshima 739-8524, Japan

a hitherto unreported host for hydroids, *Dendrostrea sandvichensis* (Sowerby, 1871). The host specimens were collected from Ginowan Port Marina in Okinawa Island on February 21, 2002, by SI.

In order to decide the taxonomic position of these associated hydrozoans, we cultured the materials as much as possible, and observed their mature medusae, the stage at which identification is possible (see Kubota, 1991). After the hydroids had been removed from the host in the laboratory (in Okinawa by SI and NO and in Shirahama, Wakayama Prefecture, by SK), they were cultured in filtered natural seawater taken from around the respective two laboratories at room temperature (about 20° - 24°C or more). In Okinawa, medusae were liberated on and after March 4, 2002, and in Shirahama release took place on and after March 6, 2002.

As a result, the diagnostic characters of *Eugymnanthea* species, including the presence or absence of the manubrium and the number of statoliths per statocyst in the mature medusa, could be observed under the microscope. The observed states of these two features (Table 1) allow the present hydrozoan to be assigned to *Eugymnanthea japonica* (see Kubota, 1979, 1987, 1991), which is one of the most advanced bivalve-inhabiting hydrozoans in the Eirenidae, differing from the congeneric species *E. inquilina* Palombi, which occurs in the Mediterranean Sea (Kubota, 2000).

In the present paper, the first finding of the association between *Dendrostrea sandvichensis* and *Eugymnanthea japonica* is reported, with a brief morphological description of the mature medusa of *E. japonica*.

Results and Discussion

(1) New host and attachment of the hydroids

Three out of 25 bivalve specimens harbored the present hydroids. The hydroids were usually attached to the mantle of the host (Fig. 1), and some zooids produced medusa buds. Among the specimens of the new host *Dendrostrea sandvichensis* (Sowerby, 1871), the largest individual was 28 mm in shell length and 43 mm in shell height, and all were attached to a rope reaching to 2.5 m depth. The water temperature at the collecting site was around 20°C.

This host species has been recorded from the Boso Peninsula of Honshu to southern Japan and is not a rare species (Torigoe, 1981). Since *E. japonica* is common along the coasts washed by the warm Kuroshio Current (Kubota, 1999), the present association will, very likely, be found in other regions in the future.

(2) Morphology of the medusa of *Eugymnanthea japonica*

Mature medusae of about 1 mm in diameter possess a vestigial manubrium, 8



Fig. 1. Hydroids attached to the mantle of the new host, *Dendrostrea sandvichensis*, from Ginowan, Okinawa Island, Japan.

図1. 沖縄島宜野湾産のノコギリガキ(新宿主)の外套に付着するヒドロポリプ。

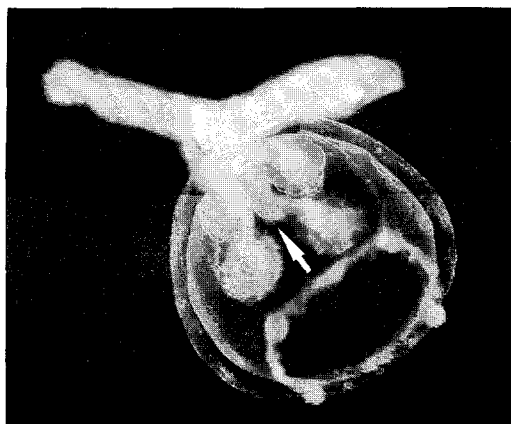


Fig. 2. One-day-old mature female medusa of *Eugymnanathea japonica* from Ginowan, Okinawa Island, Japan (still attached to the hydroid by its apex), oblique view, arrow indicating the vestigial manubrium.

図2. 沖縄島宜野湾産のカイヤドリヒドラクラゲ(1日齢)の雌成熟クラゲ(傘頂にポリプがまだ付着した状態), 斜面図, 矢印は痕跡的な口柄を示す。

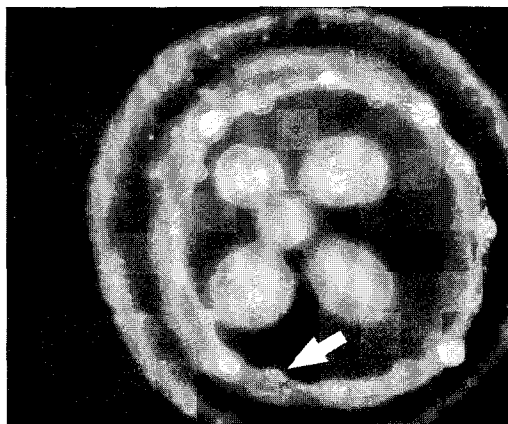


Fig. 3. Oral view of another mature medusa of *Eugymnanathea japonica*, showing inclusion of a small number of statoliths per statocyst, usually 1 (arrow).

図3. カイヤドリヒドラクラゲの成熟クラゲの別個体(口面図), 1個の平衡胞あたり少数の平衡石(通常1個: 矢印)を含むのを示す。

Table 1. Measurements of mature medusae of *Eugymnanathea japonica* associated with a new host bivalve, *Dendostrea sandvichensis*, from Ginowan Port Marina, Okinawa Island, Japan.

表1. 沖縄島宜野湾マリーナ産の新宿主のノコギリガキと共生したカイヤドリヒドラクラゲの成熟クラゲの測定値

Age (in days)	Sex	Manubrium	Diameter (mm)	No. of statocysts (no. of statoliths in a statocyst x n)	No. of marginal swellings (perradial + interradial)
1	female	present	0.92	8 (2x1+1x7)	not examined
1	female	present	0.90	8 (1x8)	not examined
2	spent	present	1.18	8 (1x8)	4+4
2	spent	present	1.10	8 (2x1+1x7)	4+4
2	spent	present	1.08	8 (2x1+1x7)	4+4
1	female	present	1.08	8 (2x1+1x7)	4+4
1	female	present	1.00	8 (1x8)	4+4
1	female	present	1.03	8 (1x8)	4+4

statocysts, and 8-9 statoliths (a statocyst contains 1, sometimes 2 statoliths) (Figs. 2, 3; Table 1). The morphology of the present mature medusae associated with the present new host accords well with that of medusae associated with other known hosts such as *Mytilus galloprovincialis*, *Crassostrea gigas*, *Chlamys farreri*, *Septifer virgatus*, and *Barbatia virescens* (Kubota, 1979, 1987, 1991, 1993, 1998, 2000). No distinct differentiation is detected among the hydrozoans symbiotic with any host.

Acknowledgements

The authors extend their heartfelt thanks to Dr. Mark Grygier for his critical reading of the manuscript.

References

- Kubota, S., 1979. Occurrence of a commensal hydroid *Eugymnanthea inquilina* Palombi from Japan. J. Fac. Sci. Hokkaido Univ. Ser. VI, Zool., 21: 396-406.
- Kubota, S., 1987. Occurrence of a bivalve-inhabiting hydroid *Eugymnanthea inquilina japonica* Kubota from Okinawa Island, southwest of Japan, with notes on parthenogenesis. Galaxea, 6: 31-34.
- Kubota, S., 1991. The stability of diagnostic characters of the medusa of a bivalve-inhabiting hydrozoan *Eugymnanthea japonica* Kubota. Proc. Japan. Soc. Syst. Zool., (44): 1-7.
- Kubota, S., 1993. A new host of *Eugymnanthea japonica* (Leptomedusae, Eirenidae) in Japan. Publ. Seto Mar. Biol. Lab., 36: 93-94.
- Kubota, S., 1998. First record of the mature medusa of *Eugymnanthea japonica* (Cnidaria, Hydrozoa, Leptomedusae) from Akajima Island, the Kerama Islands. Midoriishi, (9): 9-11. (In Japanese with English summary)
- Kubota, S., 1999. Biogeographical study on bivalve-inhabiting hydroids (Cnidaria, Hydrozoa) in Japan. In "Updated Progress in Aquatic Invertebrate Zoology", eds by Okutani, T., Ohta, S., and Ueshima, R., pp. 35-39, Tokai Univ. Press, Tokyo. (In Japanese with English summary)
- Kubota, S., 2000. Parallel, paedomorphic evolutionary processes of the bivalve-inhabiting hydrozoans (Leptomedusae, Eirenidae) deduced from the morphology, life cycle and biogeography, with special reference to taxonomic treatment of *Eugymnanthea*. Scientia Mar., 64 (Suppl. 1): 241-247.
- Sowerby, G. B. Jr., 1870-71. Monograph of the genus *Ostrea*. In Reeve's Conchologia Ionica (1843-78, 20 vols.), 18, 33 pls. L. Reeve & Co., London.
- Torigoe, K., 1981. Oysters in Japan. J. Sci. Hiroshima Univ., Ser. B., Div. 1 (Zool.), 29: 291-419.
- Yamada, M. and S. Kubota, 1979. Preliminary report on the marine hydroid fauna in Okinawa Islands. Galaxea, 6: 35-42.

要 約

2002年2月に沖縄島宜野湾産のノコギリガキ(水深2.5m以浅のロープ付着)3個体に共生するカイヤドリヒドラクラゲを世界で初めて記録した。飼育により得たカイヤドリヒドラクラゲの成熟クラゲの形態学的特徴(口柄を有し、各平衡胞が通常1個の平衡石を含有)を観察し、近縁種のチチュウカイカイヤドリヒドラクラゲの標徴(口柄を欠如し、各平衡胞に通常2-3個の平衡を含有)とは明瞭に異なることを確認した。

(2003年4月12日受理)