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## Ascidians Collected in the Vicinity of the Oga Peninsula, the Japan Sea

By

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西川輝昭\*: 男鹿半島周辺で採集されたホヤ類

Fortunately, taking part in the survey programm "Natural History Researches of the Backbone Range of Northeast Honshu and the Neighbouring Districts" of the National Science Museum, Tokyo, the author was given a chance to study taxonomically the ascidians collected in the vicinity of the Oga Peninsula, Akita Prefecture, on the Japan Sea coast of North Japan.

### Materials and Collecting Methods

(A) Specimens dredged by the research vessel Sensyu-maru of the Fisheries Experimental Station of Akita Prefecture on June 22 and 23, 1983 at the following stations off Oga Peninsula:

St. A3—39°50.39'N and 139°45.01'E to 39°50.78'N and 139°44.73'E, 90 to 89 m deep, June 23, 1983,

St. A9—39°48.55'N and 139°44.51'E to 39°48.19'N and 139°44.56'E, 104 to 102 m deep, June 23, 1983,

St. A10—39°49.89'N and 139°53.33'E to 39°49.58'N and 139°53.45'E, 31 to 33 m deep, June 22, 1983,

St. A11—39°49.30'N and 139°52.79'E to 39°49.17'N and 139°52.29'E, 39 to 42 m deep, June 22, 1983,

St. A12—39°48.94'N and 139°51.14'E to 39°49.13'N and 139°51.48'E, 52 to 48 m deep, June 22, 1983,

St. A13—39°48.56'N and 139°50.56'E to 39°48.31'N and 139°50.07'E, 57 to 62 m deep, June 22, 1983,

St. A18—39°48.88'N and 139°56.24'E to 39°48.88'N and 139°56.10'E, 21 to 21 m deep, June 22, 1983,

St. A19—39°47.85'N and 139°54.33'E to 39°47.64'N and 139°53.84'E, 39 to 42 m deep, June 22, 1983,

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St. B2—39°53.70'N and 139°43.78'E to 39°53.72'N and 139°43.44'E, 45 to 59 m deep, June 23, 1983,

St. C1—40°01.12'N and 139°49.74'E to 40°00.71'N and 139°50.00'E, 32 to 29 m deep, June 23, 1983,

St. C4—40°05.16'N and 139°46.45'E to 40°04.86'N and 139°46.57'E, 62 to 59 m deep, June 23, 1983.

- (B) Specimens collected by the author himself from the buoys of the net cages for fish rearing set off Toga on the northwestern coast of Oga Peninsula on June 21, 1983.
- (C) Specimens collected by the author himself by SCUBA diving from the rock surfaces down to 10 m deep off Toga on June 21, 1983.
- (D) Specimens collected by the author from the undersurface of stones in the intertidal zone of Daishima on the southern coast of Oga Peninsula on June 21, 1983.
- (E) Specimens collected mainly by the author by SCUBA diving down to 6 m deep, and partly by Dr. Y. SASAYAMA during his shore observation, off Unosaki on the southern end of Oga Peninsula on June 24, 1983.

Throughout the collections mentioned above, the following 34 species including 2 new species were identified. Four species with an asterisk are here recorded from the Japan Sea for the first time.

### List of Species Identified

#### Family Polyclinidae

- \*1. *Amaroucium sagamiense* TOKIOKA: Collection B.

#### Family Didemnidae

- 2. *Didemnum (Didemnum) moseleyi* (HERDMAN): Collections A (St. A9), B and E.
- 3. *Diplosoma mitsukurii* OKA: Collection B.

#### Family Polycitoridae

- 4. *Distaplia dubia* (OKA): Collection D.

#### Family Cionidae

- 5. *Ciona savignyi* HERDMAN (= *C. intestinalis* sensu HOSHINO & TOKIOKA, 1967; see HOSHINO & NISHIKAWA, accepted): Collections D and E.

#### Family Ascidiidae

- 6. *Ascidia sydneiensis samea* (OKA): Collection D.
- 7. *Ascidia zara* OKA: Collection D.
- \*8. *Ascidia alpha* TOKIOKA: Collection D.
- 9. *Ascidia ahodori* OKA: Collection C.

#### Family Corellidae

- 10. *Corella japonica* HERDMAN: Collection A (St. A3).
- 11. *Chelyosoma siboja* OKA: Collection A (St. A12)

#### Family Botryllidae

- 12. Botryllid sp. (Definite identification impossible owing to the complete lack of gonads): Collection D.

## Family Styelidae

13. *Symplegma japonica* TOKIOKA: Collection D.
14. *Polycarpa cryptocarpa* var. *kuroboja* (OKA): Collection C.
15. *Polycarpa maculata* HARTMEYER: Collection A (St. C4)
16. *Cnemidocarpa areolata* (HELLER): Collections A (Stns. A10 and A18) and C.
17. *Cnemidocarpa macrogastra* (OKA): Collection A (St. C4)
18. *Styela canopus* SAVIGNY: Collection B.
19. *Styela clava* HERDMAN: Collections A (St. A10), B and C.
20. *Styela clava* var. *symmetrica* TOKIOKA: Collection A (St. A18)
21. *Styela coriacea* (ALDER et HANCOCK): Collection A (Stns. A12 and C4).

## Family Pyuridae

22. *Pyura vittata* (STIMPSON): Collection B.
23. *Pyura sacciformis* (DRASCHE): Collections A (Stns. A10 and A18) and C.
24. *Pyura lepidoderma* TOKIOKA: Collection A (Stns. A10 and A18)
- \*25. *Pyura lignosa* MICHAELSEN: Collections A (Stn. A10 and A18), C and E.
26. *Halocynthia hilgendorfi* (TRAUSTEDT) ("igaboja"-, "owstoni"- and "ritteri" forms): Collections A (Stns. A10, A12, A18 and C4), C and E.
27. *Halocynthia roretzi* (DRASCHE) ("type C" defined by NUMAKUNAI and HOSHINO, 1973): Collections A (Stn. A10, A12 and C4), C and E.
28. *Microcosmus multitentaculatus* TOKIOKA: Collections A (St. A12) and C.
29. *Boltenia echinata* f. *iburi* (OKA): Collection C.

## Family Molgulidae

30. *Eugyra glutinans* (MÖLLER): Collection A (Stns. A11, A13, A19 and C1).
31. *Eugyra extrorsa* n. sp.: Collection A (St. C1).
32. *Eugyra communis* n. sp.: Collection A (St. B2)
- \*33. *Pareugyrioides japonica* (OKA): Collection A (St. B2).
34. *Molgula oligostriata* TOKIOKA: Collection A (Stns. A19 and C1).

Of the species listed above, *Chelyosoma siboya* is a species of the temperate or boreal waters. As regards the two new species and a rare species *Pareugyrioides japonica*, no details of their distribution are known. All other species, namely the most part of the list, have been so far recorded, though not exclusively in some species, from the waters of more or less high temperature. Thus, it seems that the ascidian fauna of the studied vicinity of Oga Peninsula is affected dominantly by rather warm water under the influence of the Tsushima Current. On the other hand, the results of the underwater observations made in the present studied area, the warmer regions, such as Oki Islands, in the southern part of the Japan Sea (NISHIKAWA, unpublished), and the much warmer waters around Kii Peninsula on the Pacific coast of Middle Japan (NISHIKAWA, 1980) show that the ascidian fauna of the studied area is apparently distinguishable from those in other warmer waters by poor occurrence of *Polycarpa cryptocarpa* var. *kuroboja* and rich population of *Halocynthia roretzi*.

*Pareugyrioides japonica* and *Molgula oligostriata* were rediscovered after a lapse of 55 and 35 years, respectively. These two species are described again in the present paper together with the two new species. All the specimens examined are to be deposited in the National

Science Museum, Tokyo, excepting the holotypes that are kept at the Seto Marine Biological Laboratory of Kyoto University.

Before going into descriptions, the author would like to express his cordial thanks to Drs. Minoru IMAJIMA of the National Science Museum, Tokyo and Yuichi SASAYAMA of the Toyama University for their kind help in collecting the present material. Thanks are also due to Mr. Rin'ichi TOKITA and other members of the Fisheries Experimental Station of Akita Prefecture, especially to the officers and crew of the research vessel Sensyu-maru for every facility during the author's research works. The author is indebted to Dr. D. H. H. KÜHLMANN of the Zoologisches Museum an der Humboldt-Universität zu Berlin for the loan of the type specimen. Dr. Takasi TOKIOKA kindly read the manuscript critically, to whom the author's hearty gratitude is expressed here.

### Descriptions of New or Rare Species

#### ***Eugyra extrorsa* n. sp.**

(Fig. 1)

*Holotype.* A 19.5 mm long specimen in the collection A (St. C1); deposited at the Seto Marine Biological Laboratory, Kyoto University (SMBL Type No. 334).

*Description.* Body ellipsoid; the surface wholly and densely coated with sand grains and shell fragments. Both apertures nearly sessile. Test thin but tough, colourless and transparent; the surface furnished very densely with fine filaments gathering foreign matters. Mantle musculature consists on the siphonal area of a pair of siphonal musculatures, each containing ca. 20 radial bundles and a number of fine circular fibres around respective apertures, and on the lateral body wall, of 4 series of short pieces of bundles originally of the transverse ones, that are arranged one on each side along the dorsomedian line and endostyle (Fig. 1, A-B). Intersiphonal area is rather narrow and transversed by a thin fasciculus of fine transverse muscle fibres crossing above the middle of neural complex (Fig. 1, C). Branchial velum nearly indiscernible, while the atrial distinct though less developed. Tentacles about 20 excluding several minute papillae, the larger and smaller ones alternating almost regularly; branched in 3 orders. Ciliated groove C-shaped (Fig. 1, D). Seven inner longitudinal vessels and 8 longitudinal rows of infundibula on each side of branchial sac. Each longitudinal row, except the ventral-most one holding 12 infundibula, consists of 6 infundibula and is lying beneath a longitudinal vessel but the dorsal-most row which is free from any longitudinal vessel. Each infundibulum, usually very well developed, consists of double spiral stigmata, coiling up to ca. 10 times, uninterrupted but bridged with up to 15–18 thin parastigmatic vessels; the summit simple. Dorsal lamina tall and smoothly margined. First intestinal loop very deep and narrow, while the second deep but wide. Liver dark green, furnished on its free surface with ca. a dozen longitudinal folds. Rectum fastened to the dorsomedian line of the branchial sac. Anus bi-lobed. Gonad virtually immature. The right gonad lies horizontally with its distal part along the dorsal edge of oval renal sac, with elongated ovary fringed with testicular follicles along its dorsal margin; 12 ducts of vas

deferens, each opening just along the border between ovary and testis (Fig. 1, E). The left gonad is lying across the intestine at the bottom of the first intestinal loop, with the proximal end (=antiorifice) of ovary inside the loop. Ovary roughly oval in shape, fringed laterally and partly covered with testicular follicles; oviduct strongly bent dorsad; 5 ducts of vas deferens, opening roughly along the mesial line of the free surface of ovary (Fig. 1, F).

*Remarks.* This specimen is very similar to *Eugyra glutinans* (MÖLLER) in the present material, especially in the feature of the mantle musculature, branchial sac and the right

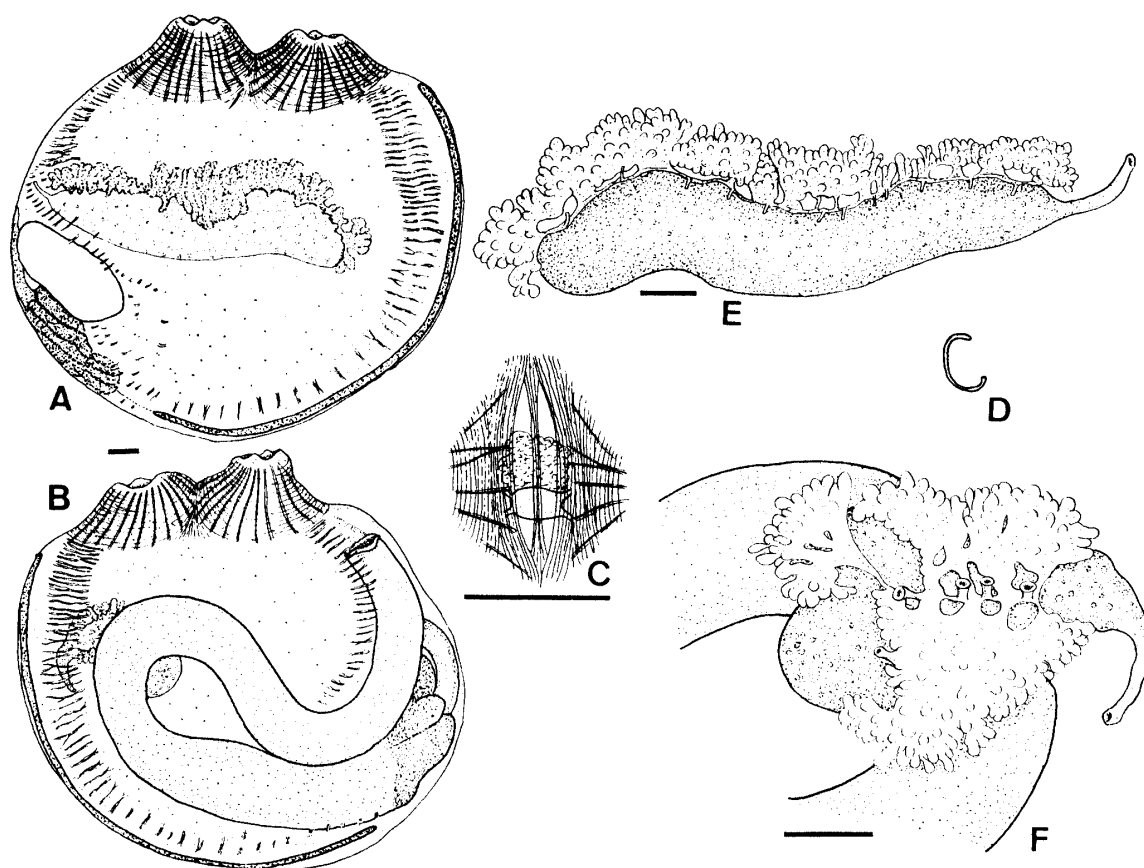


Fig. 1. *Eugyra extrorsa* n. sp. Holotype (SMBL Type No. 334). A: Right side of mantle body. B: Left side of mantle body. C: Intersiphonal area. D: Ciliated groove. E: Right gonad. F: Left gonad lying across the intestine at the bottom of the first loop. Scales for A–C and E–F indicate 1 mm.

gonad. The former can, however, be easily distinguished from the latter, as well as from all other hitherto known species of the genus *Eugyra* (sensu lato), by the unique position of its left gonad across the intestine at the bottom of the first intestinal loop and with the proximal end of ovary inside the loop. As this feature is so remarkable, the present specimen may well be treated as a new species, though the possibility that the present specimen might be an abnormal individual of *E. glutinans* is still retainable. The specific name *extrorsa* proposed for the new species came from the “extrorse” orientation of its left gonad.

***Eugyra communis* n. sp.**

(Fig. 2)

*Type-series.* The holotype, a 9.0 mm long specimen in the collection A (St. B2) deposited at the Seto Marine Biological Laboratory, Kyoto University (SMBL Type No. 335). Other forty-nine specimens, 3.8 to 9.0 mm long, dredged at the same station as the holotype, are designated as the paratypes and deposited in the National Science Museum, Tokyo (NS MT-Pc 103).

*Description.* Body roundish; the surface wholly and densely coated with sand grains and shell debris. Each aperture nearly sessile. Test very thin but rather tough, transparent

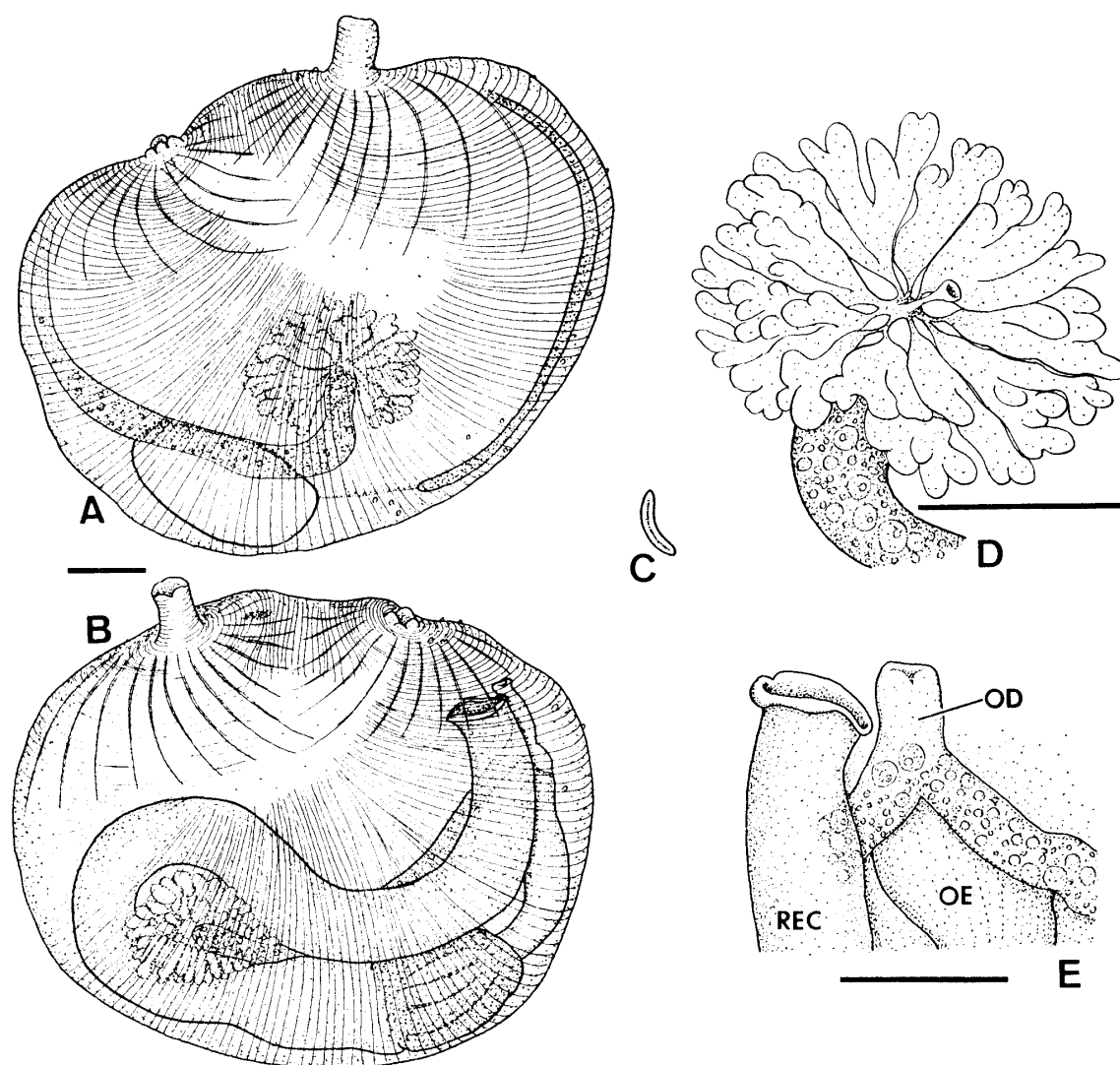


Fig. 2. *Eugyra communis* n. sp. A–D: Holotype (SMBL Type No. 335). E: 9 mm long paratype specimen (NSMT Pc-103). A: Right side of mantle body. B: Left side of mantle body. C: Ciliated groove. D: Testis and the proximal part of ovary. E: Common oviduct (OD), rectum (REC) and a part of oesophagus (OE), viewed from outside. Scales for A–B and D–E indicate 1 mm.

and colourless; the surface provided wholly with numerous minute projections, and almost exclusively in the posterior part of body, with a few filaments up to 7 mm long, both gathering the foreign matters. On the mantle body, both apertures usually open on the top of more or less distinct siphons. Minute papillae scattered all over the surface. Mantle musculature consists of fine transverse muscle fibres densely distributed nearly all over the mantle body including the intersiphonal area, and about two dozens of thin muscle bundles radiating from each siphon but never reaching the level of the middle on each lateral side (Fig. 2, A-B). Both branchial and atrial vela less developed. Tentacles of various sizes and always simple; ranging from a dozen to about 20 in number. Ciliated groove as a longitudinal slit (Fig. 2, C). Five inner longitudinal vessels and 7 longitudinal rows of infundibula on each side. Each longitudinal row, except the 2 dorsal ones free from any vessel, consists of 6 infundibula beneath respective longitudinal vessels. Each infundibulum developed very well, consisting of double spiral stigmata coiling up to about 4 or more times (generally fewer times in the smaller specimens; only 2 times in the smallest one), never interrupted but bridged with usually 4 parastigmatic vessels. Dorsal lamina very tall and smoothly edged. First intestinal loop very deep and narrow, while the second deep but wide. Liver not remarkable. Rectum fastened to the middorsal line of branchial sac. Anus bi-lobed. A single gonad on each side; more or less matured even in the smallest specimen; ovarian eggs up to 150  $\mu$ m in diameter. The gonad consists of rather elongate and lobed testicular follicles, up to about a dozen and arranged radially at the proximal end (=antiorifice) of a long tubular ovary. A single vas deferens is issued from the centre of the testis (Fig. 2, D), while the ovaries on both sides are united at their distal ends to form a single short common oviduct on the dorsomedian line of the branchial sac, that opens just on the right side of the anus (Fig. 2, E). In the left gonad, the whole testis and the proximal part of ovary are kept inside the first intestinal loop, while the rest distal part of ovary is creeping on the intestinal wall passing the bottom of the second loop, sometimes partly across the loop space (Fig. 2, B). In the right gonad, the proximal part of ovary occupies nearly the middle of the right lateral side of the mantle body and proceeds posteriorly but soon turns rectangularly to run along the anterior margin of renal sac and then the middorsal line of the body (Fig. 2, A). Renal sac is oval and usually, though not always, filled with pale yellow matters. A notodelphid copepod was found in the peribranchial cavity in two larger paratype specimens.

*Remarks.* The arrangement of testicular follicles in the present specimens may be reminiscent of *Eugyra* (*Eugyrioides*) *hexarhiza* TOKIOKA recorded from Matoya Bay on the east coast of Kii Peninsula, Central Japan (TOKIOKA, 1949, p. 13). The present specimens are, however, clearly distinguishable from TOKIOKA's species by the appearance of body surface (only a few filaments in the posterior part of the body in the former, instead of 6 tufts of hairy processes around the body in the latter), the branchial structure (5 inner longitudinal vessels and 7 longitudinal rows of infundibular on each side, instead of 7 vessels and 8 rows), the feature of vas deferens (a single common duct situated at the centre of testis, instead of, according to TOKIOKA (1965, p. 128), a single opening on each follicle at the centre of testis), and that of oviduct (see below).

The present specimens resemble closely *Eugyra islandica* MILLAR recorded from the

east coast of Iceland at a depth of 10–15 m (MILLAR, 1974) especially in the mantle musculature, the branchial structure including simple tentacles, and the position and structure of gonads excluding the oviduct. The former are, however, obviously different from the latter in the structure of oviduct (a single common oviduct in the former, instead of a long oviduct on each gonad in the latter), as well as in the feature of body surface (furnished with projections and filaments in the former, instead of “devoid of processes or fibrils” (MILLAR, p. 149) in the latter). Further, so far as the author is aware, the feature of the oviduct seen in the present specimens from the Japan Sea is quite unique among the members of Molgulidae. Thus, it seems quite evident that the present specimens represent a new species, to which the specific name *communis* is proposed after the formation of a “common” oviduct leading to two ovaries on respective body sides. Then it seems necessary to check the general feature of gonad in the present new species on the revised diagnosis of the genus *Gamaster* given by TOKIOKA (1965, pp. 128–129), defining the genus as “the eugyrid in which the ovary and testes (=testicular follicles) are completely separated from each other, the testes are elongated bodies, gathered radially near the starting point of the ovary in a stellate arrangement, each opening at the centre of the disc-shaped male gonad and branched in the periphery”. Putting aside the feature of opening of the testicular follicles, the present new species might be assignable to TOKIOKA’s *Gamaster*. Its validity may, however, better be kept unsettled here until a consistent revision of the taxa concerned is given in future. Thus, the present new species is here attributed to the genus *Eugyra* (sensu lato).

In a 7.0 mm long specimen, dredged at the station where the specimens of type-series were obtained, and quite consistent in the structure with the present new species except only that the left gonad is completely missing, the oviduct of the right gonad is found running along the right side of the distal part of the rectum. This specimen may be similar in the absence of left gonad and the structure of the testis and its duct to *Eugyra woermannii* MICHAELSEN from SW Africa (MICHAELSEN, 1914, p. 423; 1915, pp. 343–355) and *Gamaster dakarensis* PIZON from the French coast (GLEMAREC & MONNIOT, 1966, pp. 357–361; MONNIOT, 1969, pp. 187–190), but easily distinguishable from these two species mainly by the branchial structure (5 inner longitudinal vessels in the former, instead of usually 6 in the latter). Further, the absence of left gonad in the present specimen from the Japan Sea is shared with the specimens of *Gamaster dakarnesis* PIZON collected from Gambia, NW Africa (MILLAR, 1965, p. 254). The specimen in question is similar to those of MILLAR also in the branchial structure (5 longitudinal vessels and 7 (probably longitudinal, in the latter) rows of infundibula on each side) and the arrangement of testicular follicles, but distinct from the latter in the structure of the vas deferens (a single common duct in the whole testis in the former, instead of respective testicular follicles opening independently in the latter). So far as the position of the gonad is taken as a significant generic criterion, the present specimen should be assigned to the genus *Gamaster*, or subgenus *Gamaster* of the genus *Eugyra*, defined prevalingly (for example, see MONNIOT & MONNIOT, 1973, p. 361). On the contrary, it has been insisted by several authors that in the eugyrid ascidians “the presence of gonad on one or both sides of the body cannot be a generic or subgeneric characteristic” (TOKIOKA, 1965, p. 129). Here may the present specimen better be treated as an aberrant



individual of *Eugyra communis*.

***Pareugyrioides japonica* (OKA, 1929), n. comb.**

(Fig. 3)

*Eugyrioides japonicum*: OKA, 1929, pp. 170–172, figs. A–B; TOKIOKA, 1963, p. 142 (only listed).  
Nec *Pareugyrioides japonica*: HARTMEYER, 1914, pp. 23–25, fig. 9; 1923, p. 43; REDIKORZEV, 1916, pp. 47–52, pl. 1, fig. 5, pl. 4, fig. 4, text-fig. 8; 1941, pp. 168–169; ÄRNBÄCK-CHRISTIE-LINDE, 1928, p. 64.

**Description.** A 9 mm long specimen in the collection A (St. B2). Body ellipsoid in outline; the surface coated wholly and densely with sand grains and shell fragments. Test very thin but rather tough, transparent and colourless; the surface provided wholly with short protuberances and limitedly in the posterior part with fine filaments, up to 10 mm long; both protuberances and filaments carrying foreign matters. Both apertures sessile. Minute papillae scattered all over the mantle surface. Mantle musculature consists on the siphonal area of about a dozen short radial muscle bundles and fine circular fibres just around each aperture and many fine transverse fibres covering the whole intersiphonal area, and on the other larger part of the body, of 4 series of short pieces of transverse muscle bundles, that are arranged a series on each side of the dorsomedian line and the endostyle, and many muscle fragments scattered over the whole lateral sides (Fig. 3, A–B); all these become obscured in the posterior region of the body. Branchial and atrial vela less developed. Tentacles 10 in number, the larger and smaller ones alternating almost regularly; branched in 2 orders; in addition several minute papillae. Ciliated groove as a transverse slit (Fig. 3, C). Seven inner longitudinal vessels and 8 longitudinal rows of infundibula on each side. Each longitudinal row consists of 8 infundibula, excepting the dorsal- and ventral-most rows holding 6(?) and 12 infundibula respectively; each row, except the dorsal-most one free from the vessel, lying beneath a longitudinal vessel. Each infundibulum, usually well developed but sometimes nearly flat, consists of double spiral stigmata coiling up to 4 times, rarely interrupted and bridged with ca. 6 parastigmatic vessels. No secondary infundibula. Dorsal

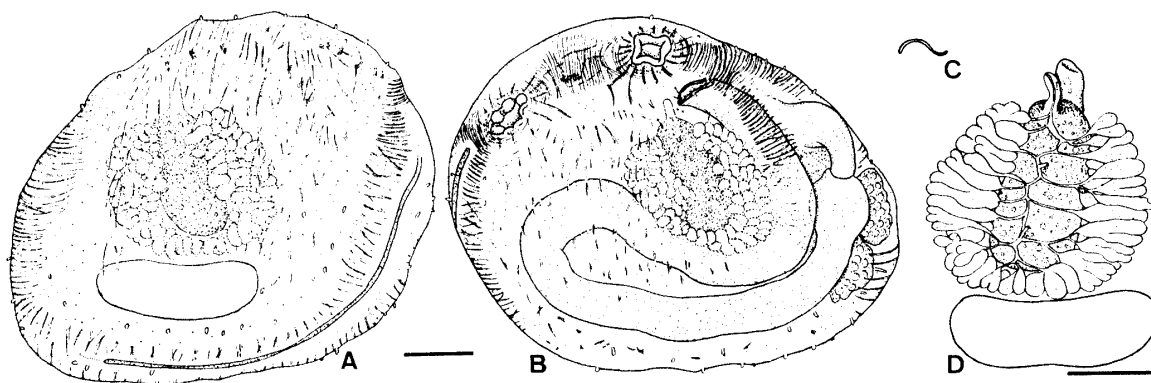


Fig. 3. *Pareugyrioides japonica* (OKA). 9.0 mm long specimen. A: Right side of mantle body. B: Left side of mantle body. C: Ciliated groove. D: Right gonad and renal sac. Scales for A–B and D indicate 1 mm.

lamina low and plainly edged. First intestinal loop very deep and narrow, while the second deep but wide. Liver dark green, consisting of roundish prominences arranged rather irregularly. Rectum fastened to the dorsomedian line of branchial sac. Anus bi-lobed. Gonad matured; ovarian eggs up to 100  $\mu\text{m}$  in diameter. The left gonad occupies almost the whole second intestinal loop, while the right situated dorsal to the renal sac (Fig. 3, A-B). Each gonad comprises an oval ovary fringed with a number of testicular follicles along its whole margin excepting the distal region protruding a short oviduct (Fig. 3, D). Ducts of vas deferens 2 on the left gonad, while 3 on the right; opening on the mesial surface of ovary; the anterior-most one situated near, though never attached to, oviduct.

*Remarks.* The present specimen conforms well with the original description of *Eugyrioides japonicum* OKA, 1929 basing on a single specimen collected from Hakodate facing the Tsugaru Straits, though some differences are recognized as follows. In the original specimen, the siphonal musculature consists of circular and longitudinal muscles, the latter of which are extending downward "in ziemlichen Abständen" (OKA, p. 170), and the dorsal and ventral margins of the mantle body are furnished with transverse muscles, while each lateral side is free from any muscles. In the present specimen, however, the radiating muscles on siphons are very short and many muscle fragments are scattered all over the lateral side of the body. The branchial sac is provided on each side with 7 longitudinal vessels and 7 longitudinal rows of infundibula in the original specimen, while an additional row bearing no vessel is found on each side of the dorsal lamina in the present specimen. In order to estimate these differences, closer reexaminations of the type specimen was tried, but in vain, for the specimen was much deteriorated, though still kept in OKA collection of the University of Tsukuba (No. 161 (M550)). These differences might be of some taxonomic significance, therefore the present identification of the specimen from the Japan Sea with *E. japonicum* may be rather tentative. Crucial studies are highly desirable in future on the basis of more specimens. The assignment of the present eugyrid to the genus *Pareugyrioides* (sensu KOTT, 1969, p. 160) may undoubtedly be justified by the position of gonads in the specimen.

The holotype of *Pareugyrioides japonica* HARTMEYER, 1914, collected from Kobe and kept at the Zoologisches Museum an der Humboldt-Universität zu Berlin was reexamined by the present author. This type specimen is quite similar to *Eugyra glutinans* (MÖLLER) in the present material, especially in features of mantle musculature, branchial sac and gonads. In the type specimen, the anterior one-third or more of the left gonad is covering the intestine surface of the proximal branch of the second intestinal loop, but never going out into the loop space, while the rest of the gonad occupies the whole first intestinal loop, as already described in the original description (p. 24). Therefore, *P. japonica* HARTMEYER should, as pointed out by KOTT (loc. cit.), be transferred to the genus *Eugyra* (sensu lato), and further be regarded as a junior synonym of *E. glutinans*. On the other hand, the specimens collected from the Peter the Great Bay and the Okhotsk Sea and referred to *Pareugyrioides japonica* HARTMEYER by REDIKORZEV (1916, 1941) clearly belong to the genus *Pareugyrioides*, though they are evidently distinct from *P. japonica* (OKA) especially in the structure of gonads and seemingly closely allied to *P. dalli* (RITTER) (for example see VAN NAME, 1945, pp. 431–433).

***Molgula oligostriata* TOKIOKA, 1949**

(Fig. 4)

*Molgula oligostriata*: TOKIOKA, 1949, p. 15, pl. 7, figs. 4-7.

**Description.** Eight specimens in the collection A (St. A19) and 149 specimens in the same collection (St. C1). Body ellipsoid or roundish, 3.2 to 16.2 mm long; the surface coated wholly and densely with sand grains and shell debris. Both apertures sessile. Test very thin but rather tough, transparent and colourless; the surface furnished with numerous fine filaments, long or short, gathering foreign matters. Minute papillae scattered on the ventral surface of mantle body. Mantle musculature consists almost of many widely interrupted muscle bundles or fibres over the whole surface (Fig. 4, A-B); intersiphonal area including the neural complex is wholly covered with fine fibres. Branchial aperture 6-lobed, while the atrial 4-lobed. Branchial and atrial vela less developed. Ciliated groove as a longitudinal slit, usually slightly inclined to the right (Fig. 4, C). Tentacles 14 to 16, exclusive of several minute papillae; the larger and smaller tentacles usually alternating regularly; branched in 2 orders. Seven branchial folds on either side; they are represented each by 2 inner longitudinal vessels, excepting the dorsal- and/or ventral-most ones that are represented each by only a single vessel, usually in the former but very rarely in the latter. No longitudinal vessels in the interspaces. Six infundibula under each fold, except the ventral-most one holding 10 to 12 (usually 11) infundibula beneath it. Additionally a rudimentary longitudinal row of 3(?) inconspicuous infundibula was found between the dorsal lamina and the dorsal-most fold on only the left side in a 14.5 mm long specimen from St. C1. Each infundibulum well developed or nearly flat, consisting of double spiral stigmata, coiling up to 6 times and bridged with ca. 6 parastigmatic vessels; summit simple. Dorsal lamina tall and smoothly margined. Gonads matured except in some smaller specimens; ovarian eggs up to 100  $\mu$ m in diameter. The left gonad is situated in the second loop with its antiorifice along the dorsal edge of the proximal branch of the loop, while the right dorsal to the elongated renal sac. The left gonad was found completely missing in a 12.8 mm long specimen from St. A19. Each gonad consists of an elongated ovary fringed with many testicular follicles along its whole margin. Oviduct is issued from the distal end of ovary. Ducts of

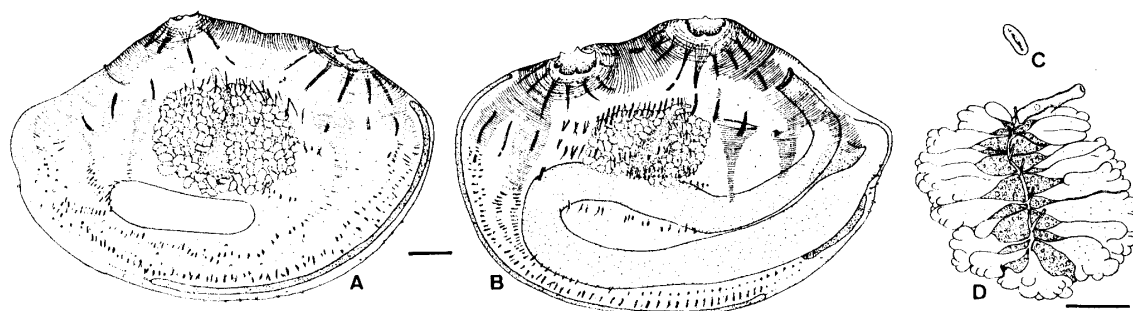


Fig. 4. *Molgula oligostriata* TOKIOKA. A-B: 15.2 mm long specimen. C-D: 14.5 mm long specimen. A: Right side of mantle body. B: Left side of mantle body. C: Ciliated groove. D: Right gonad. Scales for A-B and D indicate 1 mm.

vas deferens ranging from 1 to 6 (usually 3 to 5) in number and opening on the mesial surface of ovary (Fig. 4, D).

*Remarks.* The specimens examined in the present study conform very well with the original description of *Molgula oligostriata* basing on three specimens obtained by dredging in Matoya Bay on the east coast of Kii Peninsula and in Nanao Bay on the protected coast of Noto Peninsula, excepting that the transverse muscle fibres are not so widely interrupted in the latter (judging from the figures 5 and 6 of plate 7) as in the former, and that the ducts of vas deferens are more numerous in the latter (up to 12) than in the former (up to 6). Although the reexamination of the type specimens as to these differences was impossible, as those specimens were found unfortunately wholly missed, the differences may seemingly be of little taxonomic significance.

In features of the branchial sac and gonads, *Molgula oligostriata* may resemble *M. brieni* MONNIOT et MONNIOT recorded from Mozambique (MONNIOT & MONNIOT, 1976, pp. 389–390) and *M. calvata* SLUITER from Indonesia (SLUITER, 1904, pp. 116–117), Australia (KOTT, 1964, p. 140) and the Philippines (MILLAR, 1975, pp. 322–323). Closer comparisons among these species are highly desirable in future.

## 摘 要

1983年6月に男鹿半島周辺で、ドレッジ（約100 m以浅）、スクーバ潜水あるいは磯採集などにより採集されたホヤ類は、10科34種（属の同定ができないボトリルス科の1種を含む）に分類された。このうち *Eugyra extrorsa* と *Eugyra communis* は新種であり、前者はカンテンボヤ *E. glutinans* とよく似るが左の生殖腺の位置が異なる。他方 *E. communis* は、左右の輸卵管が合一して開口する点でユニークである。また *Amaroucium sagamiense*, *Ascidia alpha*, *Pyura lignosa*, *Pareugyrioides japonica*（新結合）の4種は日本海新記録であった。2新種のほか、それぞれ55年および35年ぶりに再発見された *P. japonica* と *Molgula-olig ostriata* をここに記載した。

本調査における記録種の大部分はこれまで温暖な水域で見い出されている。したがって本調査海域は、ホヤ相をみるかぎり、対馬暖流に強く影響されていると推察された。

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