

# A New Species of the Coronatae, Scyphozoa, from the Japan Sea; *Atorella japonica* n. sp.

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In the late summer of 1974 some living ahermatypic corals attached to small pebbles were given to the senior author from the Oki Marine Laboratory of Shimane University. On these pebbles, there were several *Stephanoscyphus* polyps which were kept alive in the laboratory. After about ten days, one of them released some fifty ephyrae of about 1 mm in diameter. The ephyrae have 6 sense organs, 6 tentacles, 12 lappets and 4 gastric filaments. That is, they show characteristics of the genus *Atorella*. They differ distinctly from those of previous species. The following pages are a description of this species.

## CLASSIFICATION

Class	<i>Scyphozoa</i>	
Subclass	<i>Ephyridae</i>	
Order	<i>Coronatae</i>	
Family	<i>Atorellidae</i>	VanHoffen 1902
Genus	<i>Atorella</i>	VanHoffen 1902
Species	<i>Atorella japonica</i> n. sp.	

The polyp has a chitinous theca, horn-like in form, with a small attachment disk at the proximal end and with a crown of tentacles at the distal opening in an extended state (Fig.1 and Fig.2).

The theca is pigmented brown but translucent and is composed of a succession of many growth rings. It measures 18 mm in length 1.8 mm in diameter at the distal opening in the largest specimen. The growth rings vary in breadth, probably according to physiological and ecological conditions of the polyp.\* It bears fine longitudinal

\* Actually, in laboratory, a well fed polyp made a wider growth ring than a poor one.

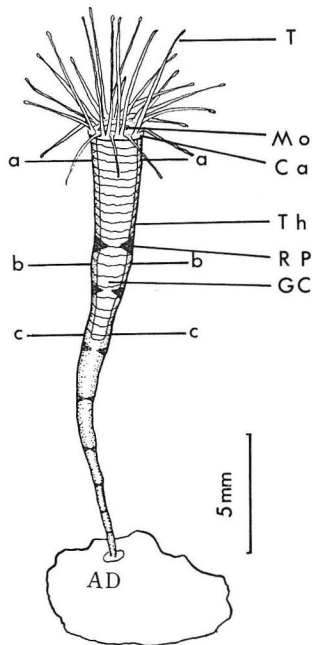


Fig.1. A coronate polyp of *Atorella japonica* n. sp. on a pebble. About 40–50 tentacles (T) are stretched from the crown (Ca). AD: attachment disk, RP: conical process, GC: gastric cavity, Mo: mouth, Th: theca. a–a, b–b and c–c indicate levels of cross section in Fig.6

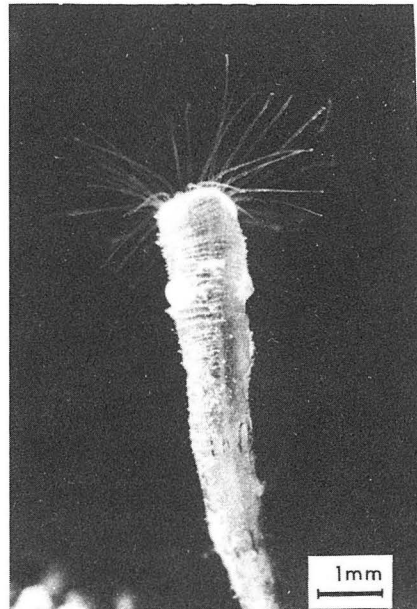


Fig.2. A side view photograph of a polyp showing expanded tentacles.

striae.

The theca has characteristic structures on conical processes in the inner wall (Fig. 3). The conical processes are found in a chain of sets, each of which is constituted of 4 large procosses and 4 small ones arranged alternately and almost on a plane, as shown in Fig.4. The numbers of these sets are 6–7 in samples of 7–8 mm in length and 8–9 in those of 11–12 mm in length. In the largest specimen of 18 mm 12 sets are found.

The attachment disk measures about 0.5 mm in diameter in a specimen of about 15 mm. It shows radial striations with a peripheral homogeneous ring (Fig.5). From the center of the attachment disk the proximal portion of the theca originates.

The tentacles are very thin and slender, counting about 40–50 in the larger specimens. They are quickly retracted into the theca when stimulated, showing an oral opening at the center of the oral disk. The wall of the polyps is intimately attached to the inner wall of the theca from the proximal end to the distal portion except for the latter regions. Sets of conical processes may serve to attach the polyps to the theca.

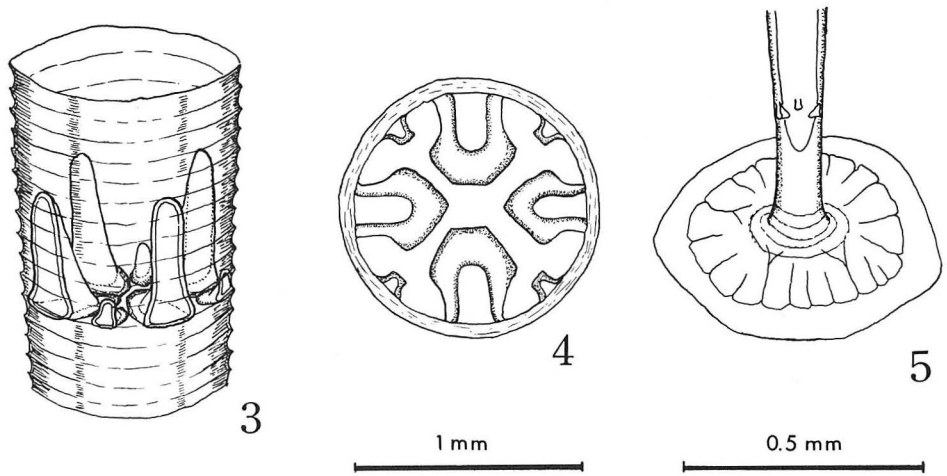


Fig.3. A side view of one set of conical processes. The processes resemble the foot of waterfowl in shape.  
 Fig.4. A top view of the third set of conical processes. The set is constituted by four larger processes and alternate smaller ones.  
 Fig.5. An attachment disk of the proximal end of a polyp. Note the radial pattern except in the peripheral homogeneous region.

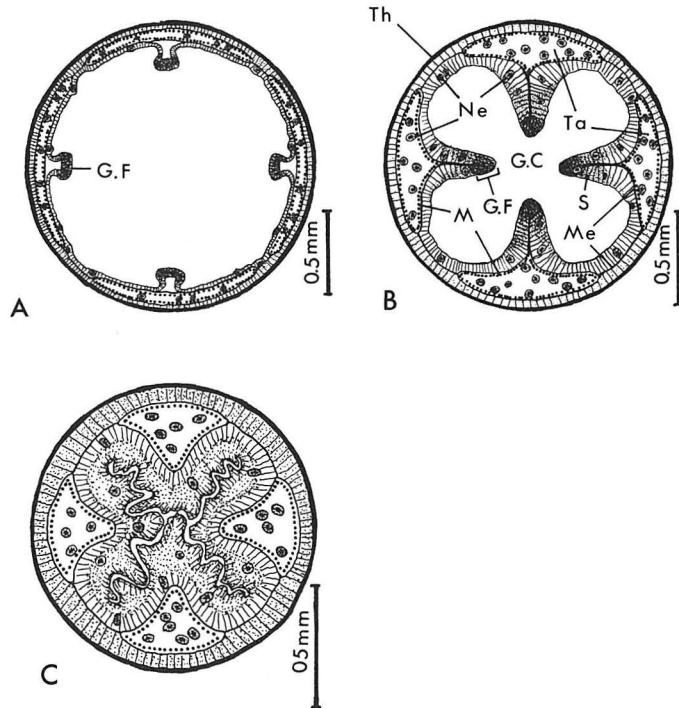


Fig.6. A,B and C are cross sections of the polyp at a-a, b-b and c-c in Fig.1 respectively. G.C: gastric cavity, G.F: gastric filament, M: muscle, Me: mesoglea, Ne: nematocyst, Ta: taeniole, Th: theca, S: septum.

No other special structure is observed in the soft parts.

There are 4 gastric filaments and corresponding taenioles, in accordance with the general structure of coronate polyps. Four septa are also found on the inner surface of the gastric cavity, and run straight from the mouth to the stalk. They appear as small ridges below the oral disk, and become enlarged toward the bottom where they finally fill the whole space of the gastric cavity (Fig.6). Gastric filaments are situated at the top regions of the septa, and taper off gradually toward the lower portion of the cavity.

Taenioles run longitudinally down to the stalk in the mesoglea at the basal areas of the septa. Taenioles are like depressed horns in shape as a whole, and in cross sections, they appear flat in the upper areas, but become triangular at the lower regions of the stalk (Fig.6).

### EPHYRA

The ephyra strobilation proceeds over a period of several days in a contracted polyp in the theca. About a hundred ephyrae are released within a few hours or more. An ephyra measures about 1 mm in diameter and is provided with 12 lappets, 6 tentacles, 6 sense organs and 4 gastric filaments around a mouth (Figs. 7 and 8 ). It is almost flat in form when relaxed and colorless except for a few glittering spots which are composed of a group of several nematocytes. It has a thin circular muscle bearing cross striations near the base of tentacles.

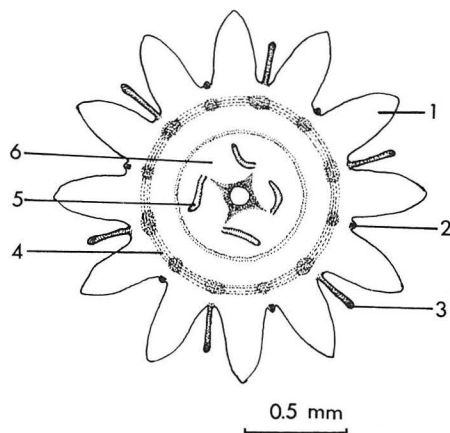


Fig.7 An ephyra of *Atorella japonica* n.sp. 1. lappet, 2. sense organ, 3. tentacle, 4. circular muscle, 5. gastric filament, 6. gastric cavity.

## LOCALITY AND COLLECTION

The materials were collected by a dredge at a depth of 40–60 meters about 2 km off the shore of Tsuma-mura near the Oki Marine Laboratory of Shimane University at Okinoshima in the Japan

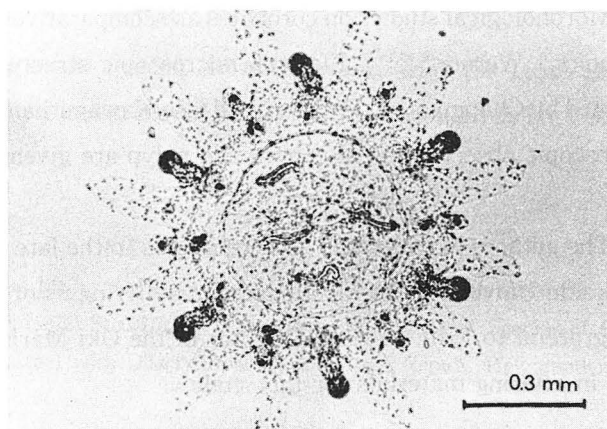


Fig.8. An oral view photograph of an ephyra.

Sea. They were found attached to pebbles or dead shells. Since 1974 they have been collected almost every year in warmer seasons. (In winter, it is very difficult to collect them owing to very rough waters.) Some of them were reared in laboratory throughout the whole year. But in laboratory conditions, ephyrae have been released only in autumn. Ephyrae survived for a month or two. However, in the laboratory they did not show any further development to coronate medusae except a slight modification in tentacles. No medusae have been found in the sea as yet.

## REMARKS

Two species have been reported in Genus *Atorella*, namely, *A. subglobosa* van-Hoffen 1902<sup>8,11</sup> and *A. vanhoffeni* Bigelow 1909. <sup>1</sup> *A. japonica* here reported is the third species and differs distinctly from the previous two species, although its whole life cycle is still not clear. This is the first record of the occurrence of *Atorella* in Japanese waters.

The polyps of *Atorella japonica* show closely related characteristics to those of *Stephanoscyphus corniformis* which was reported by Komai<sup>6)</sup> from the Japan Sea and Sagami Bay of the Pacific. However, the polyps of *A. japonica* are distinguishable from that of *S. corniformis* by the nature of its conical processes and its basal attachment.

For a comparison of *A. japonica* with *S. corniformis*, some data are summarized in Table 1 with data of *A. vanhoffeni* and *Nausithoe punctata* reported by Werner<sup>12</sup>.

To our great regret, we could not refer directly to an actual type specimen of *S. corniformis*. Further surveys are expected for elucidation of the relations between these two species.

Morphological studies on coronates are comparatively few (Komai,<sup>4,5,6</sup> Komai and Tokuoka,<sup>7</sup> Werner<sup>12,13,14</sup>). Electron microscopic structures of *Stephanoscyphus* were reported by Chapman and Werner<sup>2</sup> and also Kawaguti and Yoshimoto<sup>3</sup>. Some electron microscopic observations of ephyra and polyp are given elsewhere (Matsuno<sup>9,10</sup>).

The authors express their sincere thanks to the late Dr. T. Uchida, Prof. emer. of Hokkaido University, for his kindness in notifying us of Werner's papers.<sup>12</sup> They are also grateful to Prof. M. Ouji, Director of the Oki Marine Laboratory for his generosity in offering materials for this study.

Table 1 Classificatory Characters of *Atorella japonica*

	<i>Atorella japonica</i>	<i>Stephanoscyphus corniformis</i>	<i>Atorella vanhoeffeni</i>	<i>Nausithoe punctata</i>
I. POLYP				
Form	horn-like	horn-like	horn-like	columnar
Length (mm)	3–18	6–17.5	8–15	1.5–3.0
Diameter (mm)	0.2–2.0	0.6–1.5	1.4–2.1	1.1–1.8
Length/Diameter	0.13	0.10	0.16	0.07
Form of attachment disk	radial pattern	network pattern		
Numbers of conical process	8 (4 + 4)	4–6	8 (4 + 4)	8 (4 + 4)
Numbers of set of process	6–12	7–10	2–4	3–5
Numbers of tentacle	40–50		50–100	40–70
Phase of strobilation (day)	3–12		11–23	7–14
Numbers of ephyra	100–150		500–2000	100–300
II EPHYRA				
Diameter (mm)	1.0–1.5		0.6–0.8	1.2–1.8
Numbers of lap-pet	12		12	16
Numbers of sense organ	6		6	8
Numbers of tentacle	6		2	0
Numbers of gastric filament	4		undeveloped	slightly developed

## SUMMARY

The polyp and ephyra of a new species, *Atorella japonica* from the Japan Sea are described. The polyp is closely related to that of *Stephanoscyphus corniformis* but distinctly different.

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