

# New Records of Azooxanthellate Scleractinia, *Labyrinthocyathus limatulus* (Squires) and *Dactylotrachus cervicornis* (Moseley) (Cnidaria: Anthozoa : Scleractinia : Caryophylliidae) from Japan

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**Abstract** Two species of the azooxanthellate Scleractinia of the family Caryophylliidae are recorded for the first time from Japanese waters. *Labyrinthocyathus limatulus* (Squires, 1964) occurred in south of Yakushima Island in the Osumi Islands, southwest of Yome-jima Island in the Ogasawara Islands, north of Hachijo Island and west of Izu-oshima Island in the Izu Islands and Omuro-dashi Bank and Kamegi-sho Bank in the Sagami Sea. This species has been reported from the South Pacific including New Zealand, seamounts off the eastern coast of Australia, and Vanuatu, and the present specimens greatly extend the geographic range of the species to the western North Pacific. Reexamination of the syntypes of *Ceratotrachus japonicus* Eguchi, 1968 has revealed that one of the two syntypes actually represents *L. limatulus*, and consequently, a lectotype is designated for *C. japonicus* in the interest of nomenclatural stability. *Dactylotrachus cervicornis* (Moseley, 1881), widely distributed in the tropical Indo-West Pacific, is recorded from Amami-oshima Island in the Amami Islands and north of Hachijo Island in the Izu Islands.

**Key words:** Cnidaria, Scleractinia, Caryophylliidae, *Labyrinthocyathus limatulus*, *Dactylotrachus cervicornis*, *Ceratotrachus japonicus*, new record, Japan.

The scleractinian coral genus *Labyrinthocyathus* was established by Cairns (1979) for solitary, attached azooxanthellate caryophylliid with no endotheca and pali, and having a columella composed of interconnected vertical lamellar plates. Although it is most similar to *Crispatotrachus* Tenison Woods, 1878, its characteristic labyrinthiform columella is considered to be diagnostic. Among the five species known in the genus (Cairns *et al.*, 1999), *L. limatulus* (Squires, 1964) is known to occur in the western South Pacific (Cairns, 1995; 1999; 2004) and *L. quaylei* (Durham, 1947) from eastern North Pacific (Cairns, 1994). However, this genus has not been recorded from western North Pacific including Japan. *Dactylotrachus cervicornis* (Moseley, 1881), a sole representative of the genus *Dactylotrachus* Wells, 1954, is a solitary azooxanthellate caryophylliid having unique finger-like thecal extensions (see Cairns, 1999). Although it is widely distributed in the tropical Indo-West Pacific including Vanuatu, Guam, New Caledonia, Philippines (Cairns, 1999) and the Red Sea (Scheer and Pillai, 1983), there has been no record of it from East Asian waters. In the course of taxonomic study of the azooxanthellate Scleractinia from Japan, specimens referred to *L. limatulus* and *D. cervicornis* were found among the

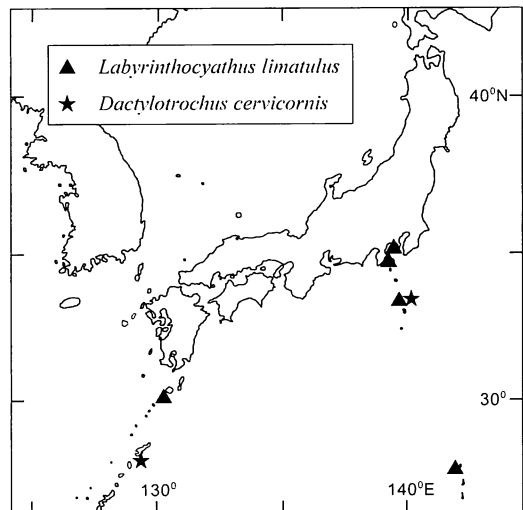


Fig. 1. Sampling localities of specimens used in this study. *Labyrinthocyathus limatulus* (Squires, 1964) (triangle) and *Dactylotrachus cervicornis* (Moseley, 1881) (star).

collections of the azooxanthellate Scleractinia accumulated by the author. In this paper, these two species are reported for the first time from Japanese waters.

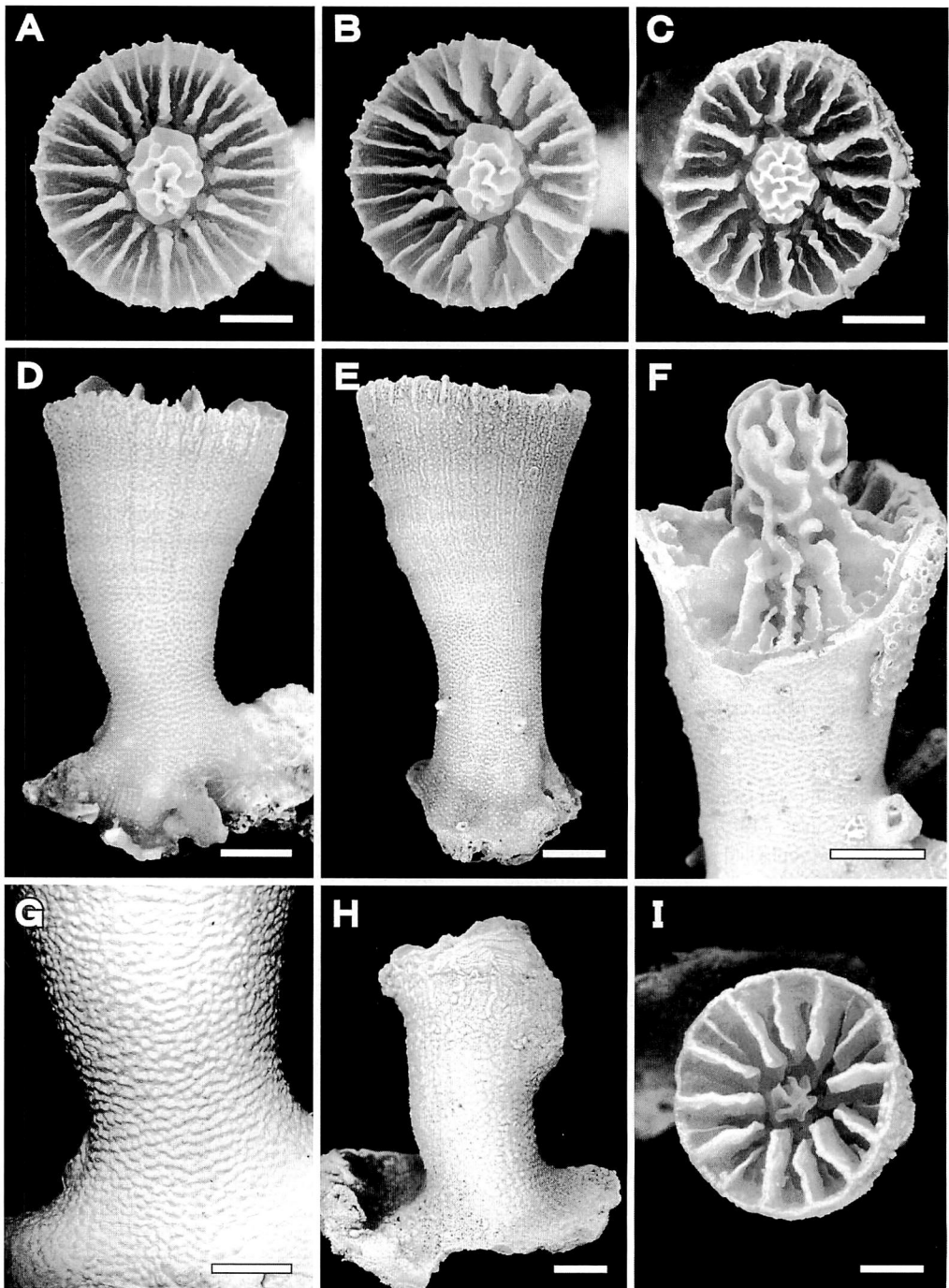


Fig. 2. *Labyrinthocyathus limatulus* (Squires, 1964). A, B, D, G, specimen from Kurose Bank, Izu Islands, 170-176m, CMNH-ZG 03498-1; F, specimen from same locality, CMNH-ZG 03498-2; C, specimen from Yakushima-shinsono, Ohsumi Islands, 186-189 m, CMNH-ZG 04663-1; E, specimen from same locality, 186-189 m, CMNH-ZG 04663-2; H, I, paralectotype of *Ceratrotrochus japonicus*, west of Kamegi-sho Bank, Sagami Bay, 150m, NSMT-Co R799. A-C, I, calicular views (A and B are stereo pair); D, E, H, side views of whole coralla; F, broken corallum showing labyrinthiform columella, oblique view; G, detail of thecal sculpturing. Scale bars: 2mm for A-F; 1mm for G-I.

## Materials and Methods

Most of the specimens examined in this study were collected by research cruises of TRV *Shin'yo-maru* of the Tokyo University of Marine Science and Technology (formerly Tokyo University of Fisheries), TRV *Toyoshio-maru* of the Hiroshima University, and RV *Tansei-maru* of the Ocean Research Institute, University of Tokyo, and are deposited in Coastal Branch of Natural History Museum and Institute, Chiba (CMNH). Specimens cited in Eguchi (1968), deposited in the Showa Memorial Institute, National Museum of Nature and Science, Tsukuba (NSMT), were also examined. To enhance the contrast in conventional black and white photographs, specimens were stained with cyanine blue solution and coated with sublimed ammonium chloride prior to photography. SEM photography was made using a JEOL JSM-5310LV at CMNH in low vacuum mode. In morphological descriptions, the following abbreviations are used. GCD: greater calicular diameter; LCD: lesser calicular diameter; PD: pedicel diameter; Sx: septa of x-th order.

## Taxonomic Account

### Genus *Labyrinthocyathus* Cairns, 1979

#### *Labyrinthocyathus limatulus* (Squires, 1964)

(Figs. 1, 2A-I)

*Ceratotrochus* (*Ceratotrochus*) *limatulus* Squires, 1964: 3-5, pl.1, figs. 5-9. - Squires and Keyes, 1967: 24, pl. 2, figs. 9, 10.

*Labyrinthocyathus limatulus* - Cairns, 1979: 70; 1995: 58, pl. 13, figs. c-f, map 17; 1999: 77; 2004: 282.

*Ceratotrochus japonicus* Eguchi, 1968: C 38 (in part), pl. C11, figs. 1-3, pl. C20, figs. 1, 2. See "Remarks."

*Material examined.* Ohsumi Islands: TRV *Toyoshio-maru*, 2007 cruise, st. 4, Yakushima-shinsone, south of Yakushima Island, 29°48.9' N, 130°22.6' E to 29°48.7' N, 130°22.5' E, 189-186 m, 23.V.2007, 4 specimens, CMNH-ZG 04663. Ogasawara Islands: TRV *Shin'yo-maru*, 1997 cruise, st. 17, southwest of Yome-jima Island, 27°24.6' N, 142°10.2' E to 27°24.6' N, 142°10.1' E, 212-210 m, 16.X.1997, 1 specimen, CMNH-ZG 02792. Izu Islands: TRV *Shin'yo-maru*, 2003 cruise, st. 17, Kurose Bank, north of Hachijo Island, 33°26.0' N, 139°41.4' E to 33°26.1' N, 139°41.6' E, 160-190 m, 21.X.2003, 2 specimens, CMNH-ZG 03468; st. 18, similar locality, 33°26.3' N, 139°42.3' E to 33°26.5' N, 139°42.0' E, 157-172 m, 21.X.2003, 15 specimens, CMNH-ZG 03481; st. 19, similar locality, 33°26.8' N, 139°42.7' E to 33°27.0' N, 139°42.4' E, 170-176 m, 21.X.2003, 14 specimens, CMNH-ZG 03498; st. 20, similar locality, 33°27.3' N,

139°42.6' E to 33°27.7' N, 139°42.4' E, 200-211 m, 21.X.2003, 8 specimens, CMNH-ZG 03515; TRV *Shin'yo-maru*, 2002 cruise, st. 37, west of Izu-oshima Island, 34°43.9' N, 139°18.7' E to 34°44.0' N, 139°19.0' E, 304-284 m, 24.X.2002, 2 specimens, CMNH-ZG 03138. Sagami Sea: RV *Tansei-maru*, KT87-19 cruise, st. OM3, Omuro-dashi Bank, 223-234m, 10.XII.1987, 1 specimen, CMNH-ZG 01699. Sagami Bay: west of Kamegi-sho Bank, 150m, 28.VII.1960, 1 specimen, NSMT-Co R 799 (formerly registered in the Biological Laboratory, Imperial Household, Tokyo as No.796b).

*Description of Japanese specimens.* Corallum ceratoid, attached through relatively narrow but robust pedicel and a slightly spreading base: PD/GCD = 0.26-0.45. Largest specimen examined (CMNH-ZG 01699) 10.9 × 10.6 mm in calicular diameter and 28.0 mm in height, with a pedicel diameter of 2.8 mm. Calice circular to slightly elliptical: GCD/LCD = 1.0-1.1. Theca of basal 1/2 or 1/3 finely sculptured with faint transversal ridges or covered with transversally aligned blunt granules; theca of middle to distal part of corallum with low, wide, indistinct costae and covered with low, blunt granules. In small specimens, thecal granules are not arranged in apparent rows. Corallum either uniformly light brown, white, or light brown with white columella. Living tissue translucent light brown or pale orange.

Septa hexamerally arranged in 4 cycles (48 septa) according to the formula S1-2>S3>>S4. Smallest specimen 3.5 mm in GCD (NSMT-Co R799) having only 4 pairs of S4, resulting 32 septa in all. S1-2 equal, 0.3-1.0 mm exsert, having highly sinuous inner edges and join to columella deep in fossa. S3 0.2-0.7 mm exsert, about 2/3 width of an S1-2, having moderately sinuous inner edges. S4 only 0.2 mm exsert, up to 1/3 width of an S3, having slightly sinuous inner edges. Septal faces of S1-4 sparsely covered with small, bluntly conical granules. Columella large, elliptical and convex, composed of interconnected vertical lamellae, fused into a honeycomb-like structure.

*Distribution.* Previously known from northeast of the Alderman Islands and Lord Howe Seamount Chain, New Zealand (Squires, 1964; Cairns, 1995); Vanuatu (Cairns, 1999); at depths of 20-508 m. The new Japanese localities include Osumi Islands, Ogasawara Islands, Izu Islands, and Sagami Sea. 150-284 m.

*Remarks.* Although several undescribed species were reported from the western Pacific by Cairns (1995) and Cairns and Zibrowius (1997), *Labyrinthocyathus limatulus* is the only formally described species of the genus in this region. It is the only species of the genus characterized by the

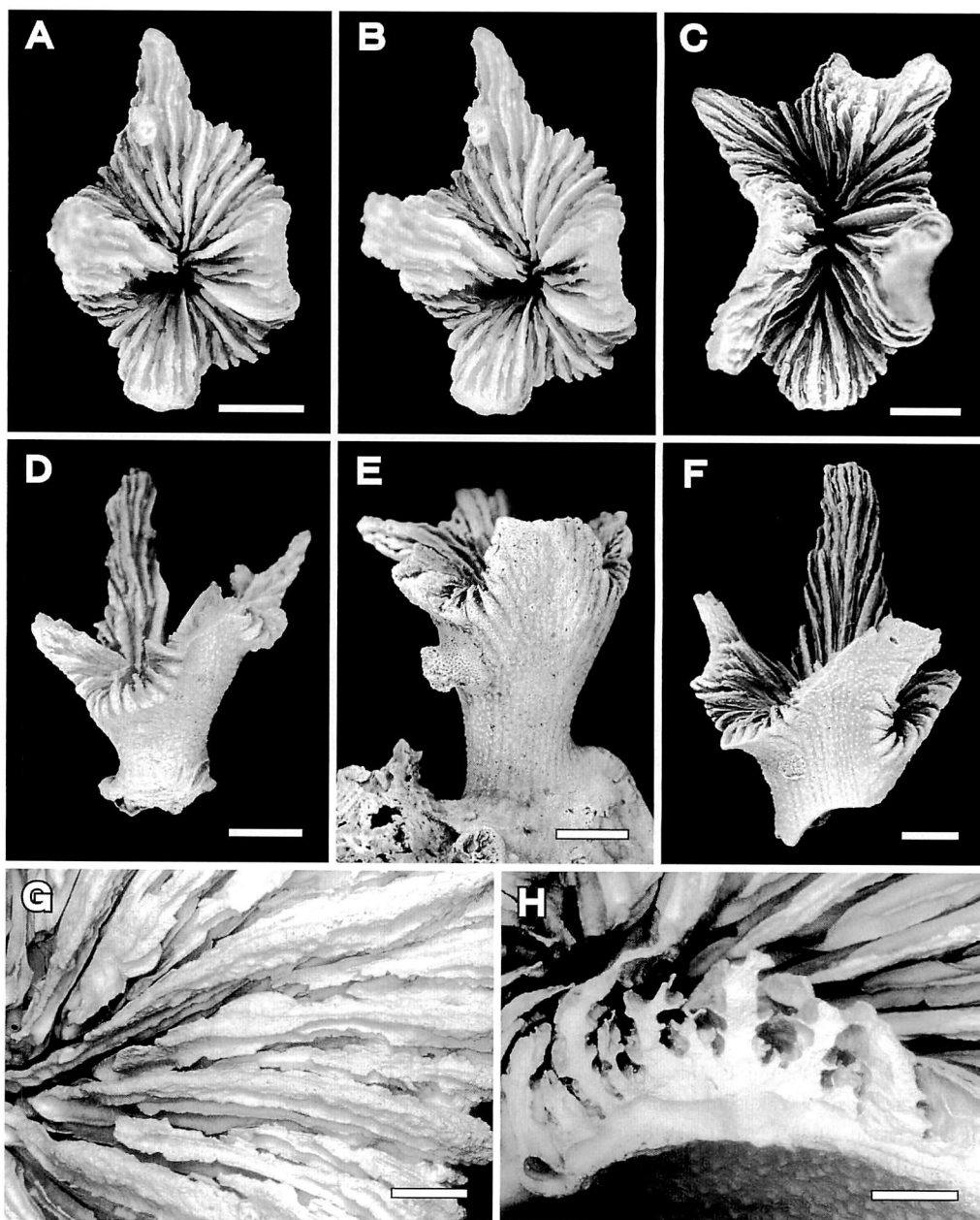


Fig. 3. *Dactylotrachus cervicomis* (Moseley, 1881). A, B, D, G, specimen from south of Amami-oshima Island, Amami Islands, 133 m, CMNH-ZG 02597; C, F, H, specimen from Kurose Bank, Izu Islands, 340-446 m, CMNH-ZG 03538-1; E, specimen from same locality, 340-446 m, CMNH-ZG 03538-2. A-C, calicular views (A and B are stereo pair); D-F, side views of whole coralla; G, detail of septal menianes; H, broken calicular edge showing opposite menianes of adjacent septa. Scale bars: 2 mm for A-F; 1 mm for G-H.

transversely ridged lower theca. The specimens reported herein agree well with those reported from New Zealand and Vanuatu (Cairns, 1995; 1999), including septal formula, septal edge sinuosity and sculpture of the theca, although the transversal sculpturing are quite faint in most of the coralla in the present

specimens. The Japanese specimens also differ from the specimens from the South Pacific in the corallum coloration: some of the specimens from Kurose Bank have white coralla as those reported from New Zealand (Cairns, 1995), whereas most of the other specimens have coralla of uniformly light brown. As the

specimens of both colors are morphologically indistinguishable and collected together, it is regarded as intraspecific variation.

Eguchi (1968) described a new species *Ceratotrachus japonicus* Eguchi, 1968 based on two specimens from Sagami Bay (specimens 782 and 796b of the Biological Laboratory, Imperial Household). He did not designate the holotype for his new taxon, and consequently the two specimens are syntypes. He illustrated both specimens, but only the specimen 782 was apparently used for description. Judging from the figures in Eguchi (1968), these two specimens look quite different, and Cairns (1994) presumed that the specimen 796b to be a juvenile specimen of *Conotrachus* although he could not examine these specimens. Reexamination of the two syntypes, now deposited in the Showa Memorial Institute, National Museum of Nature and Science, Tsukuba, has shown that they represent two separate species. One of which (specimen 796b, now NSMT-Co R799) is identical with the present specimens referred to *Labyrinthocyathus limatulus*, particularly in its sinuous septal edges, light brown corallum and labyrinthiform columella. Therefore, the specimen 782 (NSMT-Co R782) is herein selected as a lectotype of *Ceratotrachus japonicus* in the interest of nomenclatural stability.

#### Genus *Dactylotrachus* Wells, 1954

##### *Dactylotrachus cervicornis* (Moseley, 1881)

(Figs. 1, 3A-H)

*Tridacophyllia cervicornis* Moseley, 1881: 183-184, pl. 10, figs. 2a-d, 3a. - Bassett-Smith, 1890: 368.

*Tridacophyllia primordialis* Gardiner, 1899: 168, pl. 19, fig. 7a-e.

*Dactylotrachus cervicornis* - Wells, 1954: 470-471, pl. 178, figs. 1-3. - Scheer and Pillai, 1983: 158-159, fig. 3, pl. 40, fig. 4. - Cairns and Zibrowius, 1997: 131. - Cairns, 1999: 106, figs. B, 16a-f.

*Material examined.* Amami Islands: RV *Tansei-maru*, KT02-3 cruise, st. B-1, south of Amami-oshima Island, 28° 06.36' N, 129° 24.55' E, 133 m, 16.IV.2002, 1 specimen, CMNH-ZG 02597. Izu Islands: TRV *Shin'yo-maru*, 2003 cruise, st. 21, Kurose Bank, north of Hachijo Island, 33° 28.0' N, 139° 42.6' E to 33° 28.5' N, 139° 42.4' E, 340-446 m, 21.X.2003, 2 specimens, CMNH-ZG 03538.

*Description of Japanese specimens.* Corallum solitary, attached through a robust pedicel and a thin, expansive base. Basally broken corallum showing polycyclic base. Calicular diameter including thecal extensions 9.3 × 7.2 mm and height 13.3 mm in most well preserved specimen. Basal part of corallum conical, circular to elliptical in cross section. Thecal edge divided

into four vertically to obliquely oriented thecal extensions; two extensions in the plane of GCD and two in LCD. Length of intact thecal extension up to 8 mm. Thecal edge between the vertical extensions slightly flared or extending horizontally up to 2 mm. Theca covered with low, small granules. Costae very low and faint or absent. Well-preserved corallum white.

Septa not arranged in apparent symmetry. Five to eight large septa reaching deep in fossa and several smaller size classes of septa inserted between them. Number of septa ca. 70-106 (see "Remarks"). All septa closely spaced, having smooth faces and edges, and bearing several elongate ridges (menianes) parallel to the septal margin. Menianes of adjacent septa oriented opposite or, less frequently, alternate in position, producing closely packed appearance of septa. Fossa deep, columella absent.

*Distribution.* Widely distributed in the Indo-West Pacific: South China Sea (Bassett-Smith, 1890); Loyalty Islands (Gardiner, 1899); Bikini Atoll, Marshall Islands; Philippines (Wells, 1954); New Caledonia (Cairns and Zibrowius, 1997); Vanuatu; Wallis and Futuna Islands; Guam (Cairns, 1999); Red Sea (Scheer and Pillai, 1983); 73-400 m. The present specimens from Amami Islands and Izu Islands, at depths of 133-340 m, represent the first record of this species from East Asian waters.

*Remarks.* Cairns (1999) showed a diagrammatic representation of the calicular extensions of *Dactylotrachus cervicornis*. According to his description, a well-developed corallum of this species have up to eight extensions: four vertical and four lateral ones. All the specimens examined in this study are relatively small in size and only the vertical extensions are developed, as those shown in Gardiner (1899) and Wells (1954). As all of the present specimens are damaged when collected and some of the thecal extensions are missing, the number of septa counted in these specimens is only minimum assumption. Cairns (1999) noted that septal number in larger specimens of the species attain 240.

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Kurozumi, Natural History Museum and Institute, Chiba and the late Eiji Tsuchida, Ocean Research Institute, University of Tokyo. I also thank Hiroshi Namikawa, Showa Memorial Institute, National Museum of Nature and Science, Tsukuba, for loan of the specimens, and Stephen D. Cairns, National Museum of Natural History, Smithsonian Institution for reviewing the manuscript. Thanks are also due to anonymous reviewers for their comments on the manuscript.

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## 日本初記録のメイロチョウジガイ (新称)

*Labyrinthocyathus limatulus* (Squires)

およびツノマタサンゴ (新称)

*Dactylotrachus cervicornis* (Moseley)

(刺胞動物門：花虫綱：イシサンゴ目：  
チョウジガイ科)

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南日本近海からドレッジを用いて採集された標本に基づき、共生藻を持たないチョウジガイ科のイシサンゴ類 2 種を新たに記録した。大隅諸島海域の屋久島新曾根、小笠原諸島海域の嫁島南西方、伊豆諸島海域の黒瀬および伊豆大島西方、相模灘の大室出しおよび亀城礁付近の水深 150~284 m から採集されたメイロチョウジガイ属 (新称) *Labyrinthocyathus* のメイロチョウジガイ (新称) *Labyrinthocyathus limatulus* (Squires, 1964) は、これまでニュージーランド、オーストラリア東方沖の海山群、バヌアツから知られていた種で、本記録により分布域が南太平洋から西部北太平洋へと拡大した。Eguchi (1968) により相模湾から記載されたコマサンゴ *Ceratotrachus japonicus* のシタイプ 2 個体のうちの 1 個体は本種であることが判明したため、レクトタイプの指定を行い、本種と同定される標本をパラレクトタイプとした。ツノマタサンゴ属 (新称) *Dactylotrachus* のツノマタサンゴ (新称) *Dactylotrachus cervicornis* (Moseley, 1881) はインド西太平洋の熱帯域に広く分布する種で、今回奄美諸島海域の奄美大島南方および伊豆諸島海域の黒瀬の水深 133~340 m から記録された。