

Aulocystis okitsui, a New Silurian Tabulate Coral from the Suberidani Group, Tokushima Prefecture

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Abstract An early Ludlow (Late Silurian) species of auloporid tabulate coral, *Aulocystis okitsui* sp. nov., is described from the lowest Suberidani Group in the Katuura area, Tokushima Prefecture. Its diagnostic characters are small corallite diameters for *Aulocystis*, the rare spine-like projections on the tabulae, and the incomplete tabulae with somewhat irregular spacing. This species is conspecific with *Aulocystis* sp. indet. (Niko, 1998) from the G3 Member of the Gioniyama Formation, Miyazaki Prefecture.

Key words: Ludlow (Late Silurian), tabulate coral, Auloporida, *Aulocystis okitsui*, Suberidani Group, Tokushima.

Introduction

New material containing Silurian tabulate corals was collected by Mr. Noboru Okitsu from the lowest Suberidani Group, Kurosegawa Terrane in the Chouzuga-dani Valley of the Katuura area, Tokushima Prefecture, Southwest Japan (Fig. 1). As an addition to the previously known Suberidani coral fauna including *Favosites gotlandicus* (Fought) [?=*gotlandicus* Lamarck], *Schedohalysites kitakamiensis* (Sugiyama) and, *Coenites* sp. (Yamashita, 1946; Hirayama *et al.*, 1956; Hamada, 1958; and some doubtful taxa recorded by Hamada, 1965 and Shinohara, 1966), a new auloporid species *Aulocystis okitsui* is described herein on the basis of this material.

Based on Yamashita's (1946) preliminary report, the Suberidani Group was named by Hirayama *et al.* (1956) for a Silurian unit consisting of volcanoclastic rocks and fossiliferous limestone. Subsequently Hamada (1959, 1961) revealed that this group unconformably covers granitic rock, and is divided into the lowest stratum of limestone containing a small amount of "schalstein" (10–19 m thick) and the main stratum of tuffaceous sandstone with intercalations of rhyolite, rhyolitic tuff and conglomerate (more than 475 m thick). He considered these strata to be respectively coeval with the G3 and G4 Members of the Gioniyama Formation, Miyazaki Prefecture. The coral specimens dealt with in this paper all came from float blocks of brecciated reddish limestone belonging to bioclastic wackestone, whose specimens are housed

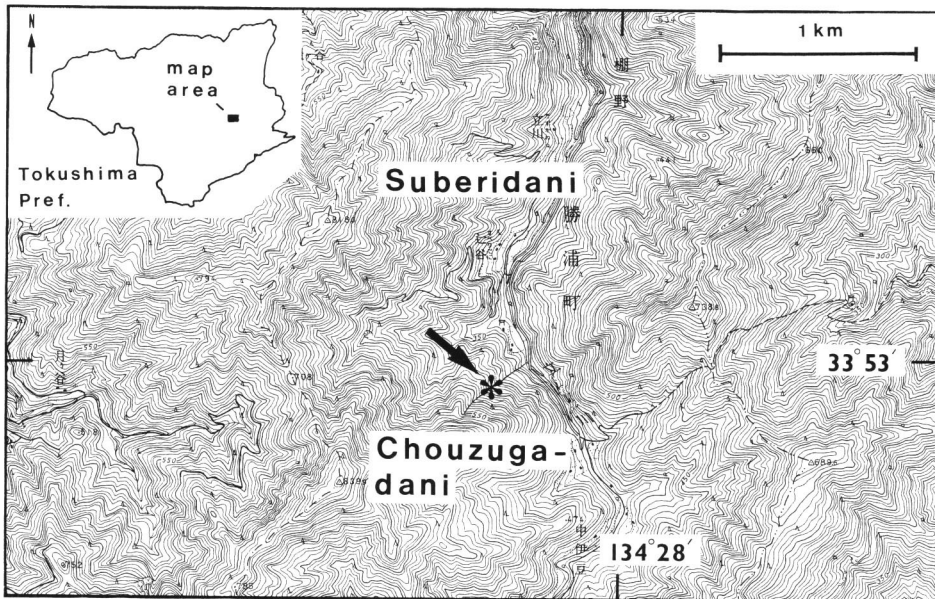


Fig. 1. Index map of the present coral locality (KT-9) in the Katura area, Tokushima Prefecture using 1 : 25,000 map of "Ai" published by the Geographical Survey Institution.

in the National Science Museum, Tokyo.

Systematic Paleontology

Order Auloporida Sokolov, 1947

Superfamily Auloporicae Milne-Edwards and Haime, 1851

Family Aulocystidae Sokolov, 1950

Genus *Aulocystis* Schlüter, 1885

Type species: Aulocystis cornigera Schlüter, 1885.

Aulocystis okitsui sp. nov.

Figs. 2-1-4; 3-1-6

Aulocystis sp. indet., Niko, 1998, p. 48, figs. 5A-D.

Holotype: NSM PA14619, from which eleven thin sections were made.

Other specimens: Fifty-nine thin sections were studied from the eleven paratypes, NSM PA14620-14623, 14625, 14626, 14628-14631, 14633. In addition, the five poorly preserved specimens, NSM PA14617, 14618, 14624, 14627, 14632,

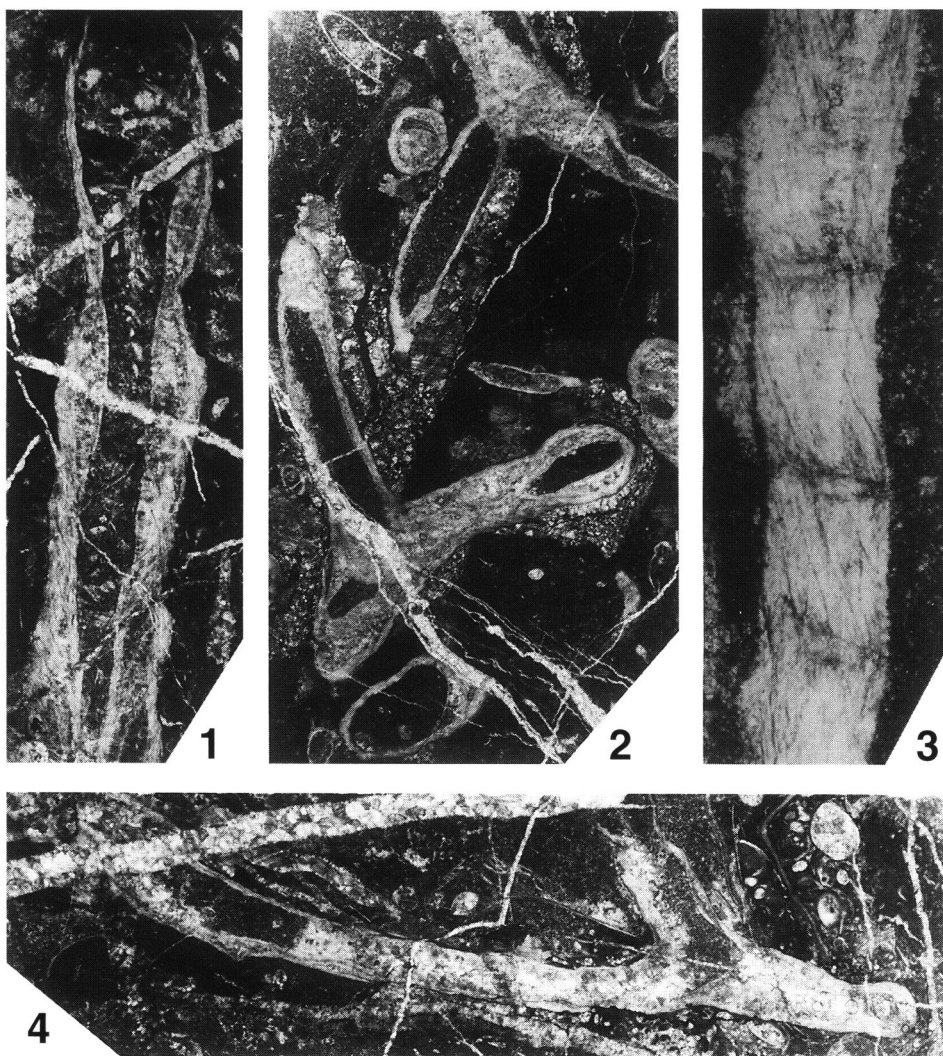


Fig. 2. *Aulocystis okitsui* sp. nov., thin sections. 1, holotype, NSM PA14619, transverse section, $\times 10$. 2, paratype, NSM PA14626, oblique and transverse sections, $\times 5$. 3, paratype, NSM PA14623, longitudinal section showing microstructure of corallite wall, $\times 50$. 4, paratype, NSM PA14631, longitudinal section, $\times 5$.

also examined.

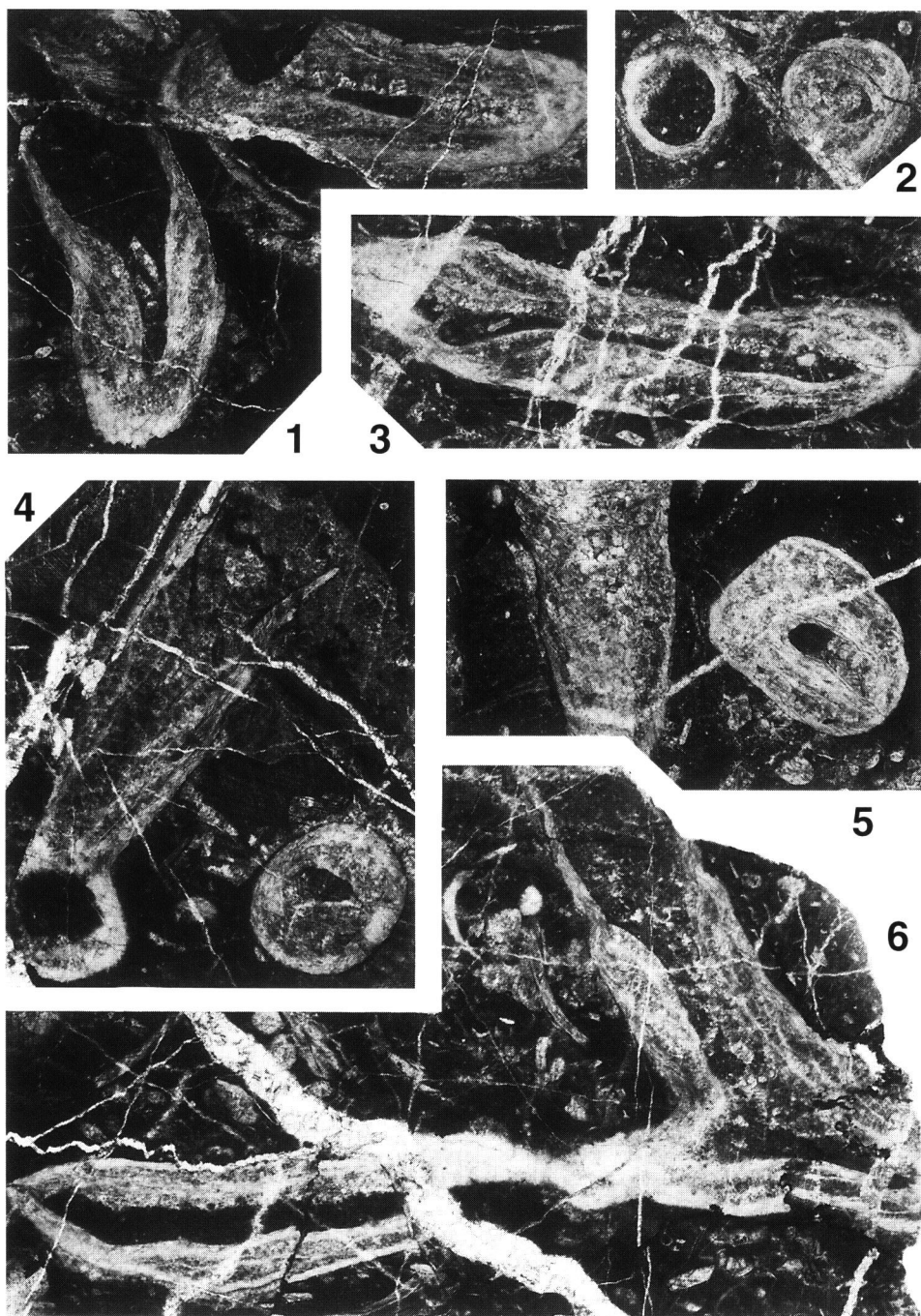
Diagnosis: Species of *Aulocystis* with small corallite diameter, usually 1.6–2.2 mm, for genus; corallite walls approximately 0.22 mm in thickness; spine-like projections on tabulae rare; tabulae incomplete with somewhat irregular spacing, thus partial corallites free from tabula.

Description: Coralla mat- to overlapped shrub-like in growth form with maximum observed diameter approximately 74 mm in paratype (NSM PA14620). Corallites cylindrical, lack attachment scar; their diameters small for genus, ranging from 1.2 to 2.5 mm, usually 1.6–2.2 mm; each corallite consists of proximal prostrate portion, 4.2–15.5+ mm in length, and distal free portion, 5.0–9.8 mm in length, forming relatively deep and funnel-shaped calice occupied distal corallite length of 2.2–4.1 mm; calical opening upward with 47° to 56° in angle to proximal corallites; apparent calical modification of external corallite shape is not detected; increase of corallites unilateral; daughter corallite of offset arises near basal part of preceding free portion. Corallite walls moderately thick, range from 0.10 to 0.38 mm, usually 0.17–0.27 mm with 0.22 mm mean, consisting of thin epitheca and microlamellar thickening of stereoplasm. Septal spines sporadic, ranging from 0.19 to 0.27 mm in length, but almost enclosed in stereoplasm; short, approximately 0.13 mm, spine-like projections rarely recognized on tabulae. Tabulae incomplete and infundibuliform, with somewhat irregular spacing, usually abundant and 3–6 in 2.5 mm of corallite length; crowded tabulae form continuous axial syrinx with nearly central position, but partial corallites free from tabula, where corallite walls somewhat thickened; diameters of axial syrinx are 0.45–0.75 mm; diaphragms of axial tabellae complete, rare.

Discussion: Its cylindrical corallites lacking the chain-like conjunction and connecting tubule, and the presence of the infundibuliform tabulae justify the assignation of this new species to *Aulocystis*. An Early Silurian genus *Adaverina* (Klaamann, 1969; type species *Syringocystis adaverensis* Klaamann, 1966, figs. 29a, b, pl. 20, fig. 9) has many features in common with *Aulocystis*, but bears a thick peripheral stereozone in the corallite walls and probably lacks the prostrate portion of the proximal corallites.

This new species clearly differs from most other described *Aulocystis* species in having the smaller corallite diameters (usually 1.6–2.2 mm); e.g., the type species, *A. cornigera* Schlüter (1885, p. 148–150; 1889, pl. 16, figs. 8–10) from the Middle Devonian of Germany, indicates approximately 4–6 mm in corallite diameter. Only the two Chinese species, *Aulocystis xinjiangensis* Lin and Wang in Wang (1983, pl. 67, figs. 7a, b) from the Lower Devonian of Xinjiang and “*A.*” *spinosus* Chen (1959, pl. 3, figs. 2a–c) from the Upper Devonian of Guizhou, and a Russian species, “*A.*” *tikhyi* Sokolov (1952, pl. 40, figs. 4–6), from the Upper Devonian of the Russian Platform, also indicate similar corallite diameters with *A. okitsui*. However, *Aulocystis xinjiangensis* has the both complete and incomplete tabulae. The corallites of “*Aulocystis*” *spinosus* and “*A.*” *tikhyi* seem to form the contiguous chain, which is the diagnostic

→Fig. 3. *Aulocystis okitsui* sp. nov., thin sections. 1, 3, 4, 6, holotype, NSM PA14619. 1, oblique sections, 3, oblique section, 4, oblique (left) and transverse (right) sections, 6, longitudinal section. 2, paratype, NSM PA14620, transverse sections. 5, paratype, NSM PA14621, oblique (left) and transverse (right) sections. All figures are $\times 10$.



feature of *Aulostegites* (Lejeune and Pel, 1973). Additionally, *Aulocystis okitsu* exhibits the fewer spine-like projections on the tabulae for the genus.

Niko (1998) referred the two poorly preserved coralla (NSM PA14289 and 14290), collected from the lower Ludlow (Upper Silurian) G3 Member, to *Aulocystis* sp. indet. This pending species can easily be allocated to *Aulocystis okitsu*. The stratigraphic range of *Aulocystis okitsu* is limited to the G3 Member and its equivalent indicates that this new species appears to be an index for early Ludlow.

Etymology: The specific name honors Mr. Noboru Okitsu, who discovered this coral.

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References

- Chen, M. T., 1959. Some Silurian and Devonian stromatoporida and coral fossils from Vonsyan, Kueichow. *Acta Palaeont. Sinica*, **7**: 285–317, pls. 1–7. (In Chinese with Russian abstract.)
- Hamada, J., 1965. An investigation of Silurian limestone in the central and eastern parts of Shikoku, Japan. *Chigakukenkkyu*, **16**: 171–196. (In Japanese.)
- Hamada, T., 1958. Japanese Halysitidae. *Jour. Fac. Sci., Univ. Tokyo*, Sect. 2, **11**: 91–114, pls. 6–10.
- Hamada, T., 1959. Gotlandian stratigraphy of the Outer Zone of Southwest Japan. *Jour. Geol. Soc. Japan*, **65**: 688–700. (In Japanese with English abstract.)
- Hamada, T., 1961. The Middle Palaeozoic group of Japan and its bearing on her geological history. *Jour. Fac. Sci., Univ. Tokyo*, Sect. 2, **13**: 1–79.
- Hirayama, K., N. Yamashita, K. Suyari & C. Nakagawa, 1956. Geological map of Kenzan, Tokushima Prefecture, with an explanatory text. 52 pp. Prefectural Office of Tokushima, Tokushima. (In Japanese.)
- Klaamann, E. R., 1966. The incommunicate Tabulata of Estonia. 96 pp., 22 pls. Eesti NSV Tead. Akad. Geol. Inst., Tallin. (In Russian with Estonian and English abstract.)
- Klaamann, E. R., 1969. New name for *Syringocystis* Klaamann, 1966. *Eesti NSV Tead. Akad. Toim.*, **18**: 88. (In Russian.)
- Lejeune, M. & J. Pel, 1973. Un autre Tabulé nouveau du Givétien de l'Ardenne belge; *Aulostegites hillae* gen. et sp. nov. *Ann. Soc. Géol. Belg.*, **95**: 451–462, pl. 1.
- Niko, S., 1998. Silurian tabulate corals *Eofletcheria* and *Aulocystis* from the Gioniyama Formation, Miyazaki Prefecture. *Bull. Natn. Sci. Mus., Tokyo*, Ser. C, **24**(1, 2): 41–49.
- Schlüter, C., 1885. Ueber einige neue Anthozoen aus dem Devon. *Naturhist. Ver. Preuss. Rheinl. Westfal., Jahrg. 42, Niederrhein. Ges. Nat. Heilkd., Bonn, Sitzungsber.*, 144–151.
- Schlüter, C., 1889. Anthozoen des rheinischen Mittel-Devon. *Abh., Geol. Specialkarte Preuss. Thüring. Staaten*, **8**: 261–465, pls. 1–16.
- Shinohara, I., 1966. Cultural properties in Awa (7). Natural monuments on geology. *Tokushimaken Kyōiku Getupou (Tokushima Pref. Edu. Bull.)*, S. 41, **8**: 39–42. (In Japanese.)
- Sokolov, B. S., 1952. Paleozoic Tabulata of the European parts of the USSR, Part 4: Devonian of the

- Russian Platform and the western Urals. *Vses. Neft. Nauchno-issled. Geol.-Razved. Inst. (VNIGRI), Tr., N.S.*, **62**: 1–292, pls. 1–40. (In Russian.)
- Wang, B. Y., 1983. Tabulata. In, Palaeontological Atlas of Northwestern Regions, Fascicle Xinjiang Uygur Autonomous Region, Part 2, Late Paleozoic, pp. 217–249, pls. 66–80. Beijing, Geological Press. (In Chinese.)
- Yamashita, N., 1946. Discovery of the Gotlandian deposits in Tokushima Prefecture. *Jour. Geol. Soc. Japan*, **52**: 17. (In Japanese.)

