

A new species of *Ipciphyllum* from the Akasaka Limestone, Central Japan

By

Nobuo YAMAGIWA and Akiko YAMANO

Department of Earth Science, Faculty of Education,
Osaka Kyoiku University, Osaka

Abstract A new cerioid type rugose coral, *Ipciphyllum ishii* is described. It was collected from the Upper Formation (*Yabeina* zone) in the Akasaka Limestone, Central Japan. This paper is the first record of a cerioid type rugose coral from the Akasaka Limestone.

Introduction

A new cerioid type rugose coral described in this paper, *Ipciphyllum ishii* was collected by the second author (YAMANO) in 1988 from the Upper Formation (*Yabeina* zone) in the Akasaka Limestone, Ōgaki City, Gifu Prefecture, Central Japan. It was found in association with fusulinids, minor foraminiferas and tabulate corals. The fusulinids are *Yabeina globosa* (DEPRAT), *Y. katoi* (OZAWA) and *Neoschwagerina minoensis* (DEPRAT).

The geology of the Akasaka Limestone has been studied by many workers (OZAWA, 1927; ISOMI, 1955; AKASAKA RESEARCH GROUP, 1956; MORIKAWA, 1958; HONJO, 1959; MORIKAWA & SUZUKI, 1961; YAMAGIWA, IMAI & YAMAMURO, 1964; MORIKAWA, 1967; MURATA, ISHII & OKIMURA, 1978; MATSUDA, 1977; SAKAGAMI, 1980; ISHII, 1984), and its age has been subjected to discussion. According to ISHII (1984), the Akasaka Limestone consists of four formations; the Lower, Middle, Upper and Uppermost formations. The Lower Formation consists mainly of whitish gray limestone and belongs to the *Parafusulina* zone, and the Middle mainly of dark gray and black limestone and to the *Neoschwagerina* zone. The Upper Formation, consisting mainly of muddy black limestone, belongs to the *Yabeina* zone, and the Uppermost Formation is mostly composed of whitish dolomitic limestone and corresponds to the *Conofusiella-Palaeofusulina* zone.

The following rugose corals were previously found and described from the Akasaka Limestone.

- 1) Lower Formation (*Parafusulina* zone)
Yatsengia ibukiensis MINATO.....(see YAMAGIWA *et al.*, 1964)
- 2) Middle Formation (*Neoschwagerina* zone)
Praewentzelella honjoi MINATO & KATO.....(see MINATO & KATO, 1965)
Waagenophyllum (Waagenophyllum) polyseptata MINATO....(see MINATO,

1955; MINATO & KATO, 1965)

3) Upper Formation (*Yabeina* zone)

Waagenophyllum (*Waagenophyllum*) *akasakaense* (YABE) (see YABE, 1902; YABE & HAYASAKA, 1915; MINATO, 1955; MINATO & KATO, 1965)

W. (W.) polyseptata MINATO . . . (see MINATO, 1955; MINATO & KATO, 1965)

W. (W.) compactum MINATO & KATO (see MINATO & KATO, 1965)

W. (W.) pulchrum HAMADA (see MINATO & KATO, 1965)

The rugose corals mentioned above are fasciculate in type. Therefore, the present paper is the first record of a cerioid type rugose coral found from the Akasaka Limestone.

Acknowledgments

The authors express their hearty thanks to Professor Ken-ichi ISHII of Kobe University, Dr. Ikuwo OBATA of National Science Museum, Tokyo and Dr. Yoichi EZAKI of Osaka City University for their kind guidance and discussion.

Systematic description

Family Waagenophyllidae WANG, 1950

Genus *Ipciphyllum* HUDSON, 1958

Ipciphyllum ishii, n. sp.

(Pl. 1, figs. 1–3; Pl. 2, figs. 1–4)

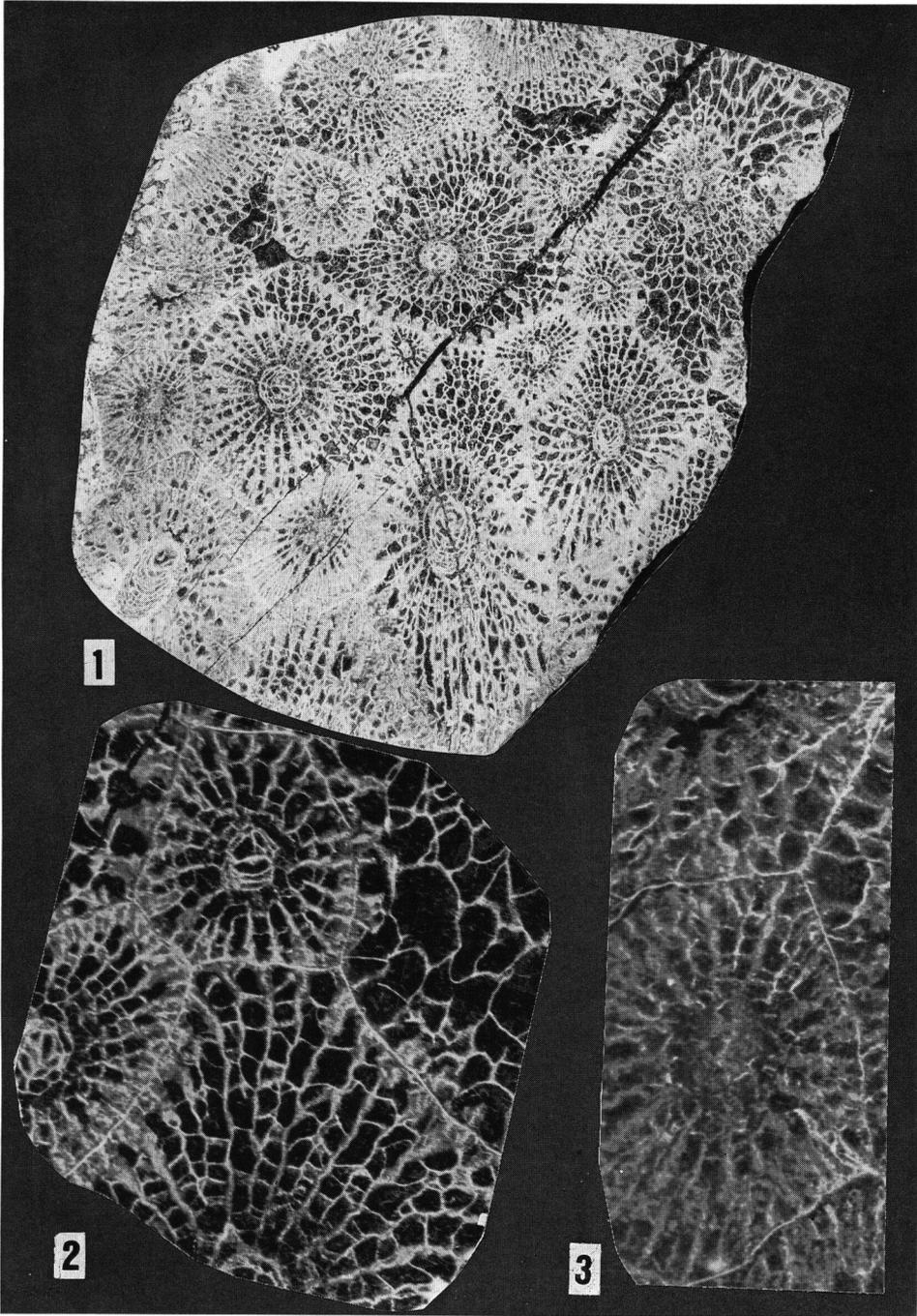
Derivation of the specific name: After Professor Ken-ichi ISHII, who greatly contributed to the research of fusulinids in Japan and Asia.

Diagnosis: *Ipciphyllum* having wide dissepimentarium with numerous series of dissepiments, long minor septa, occasionally developed lonsdaleoid dissepiments and rarely developed naos-like septa. Wall is thick in immature stage, but becomes rather thin in mature stage.

Description: Corallum compound, massive and cerioid.

In transverse section, corallites are polygonal, 5 to 7 sided. They are 4.5 to 6.0 mm in diameter in mature stage. The outermost part of the corallite wall consists of a very thin dark line and a thin layer of bright coloured fibres inwardly perpendicular to the dark line. Even inside dark coloured septal wall is present. Septal wall is thick in immature stage, but becomes rather thin in mature stage. Dissepimentarium is wide. Dissepiments are usually arranged concentrically or anguloconcentrically, but sometimes irregular in pattern. In mature stage, regularly or irregularly formed lonsdaleoid dissepiments occasionally present. They interrupt the continuation of

Plate 1. *Ipciphyllum ishii*, n. sp. 1. Transverse section . . . × 5.0 (NSM PA12856a) 2. Transverse section . . . × 15.0 (NSM PA12856a) 3. Transverse section . . . × 15.0 (NSM PA12856a)



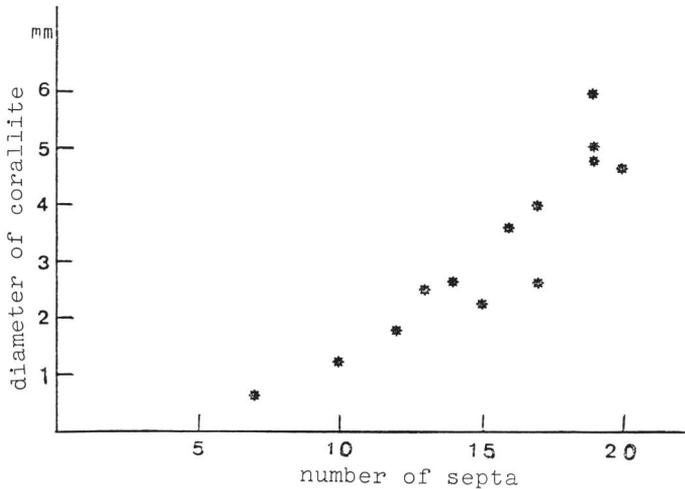
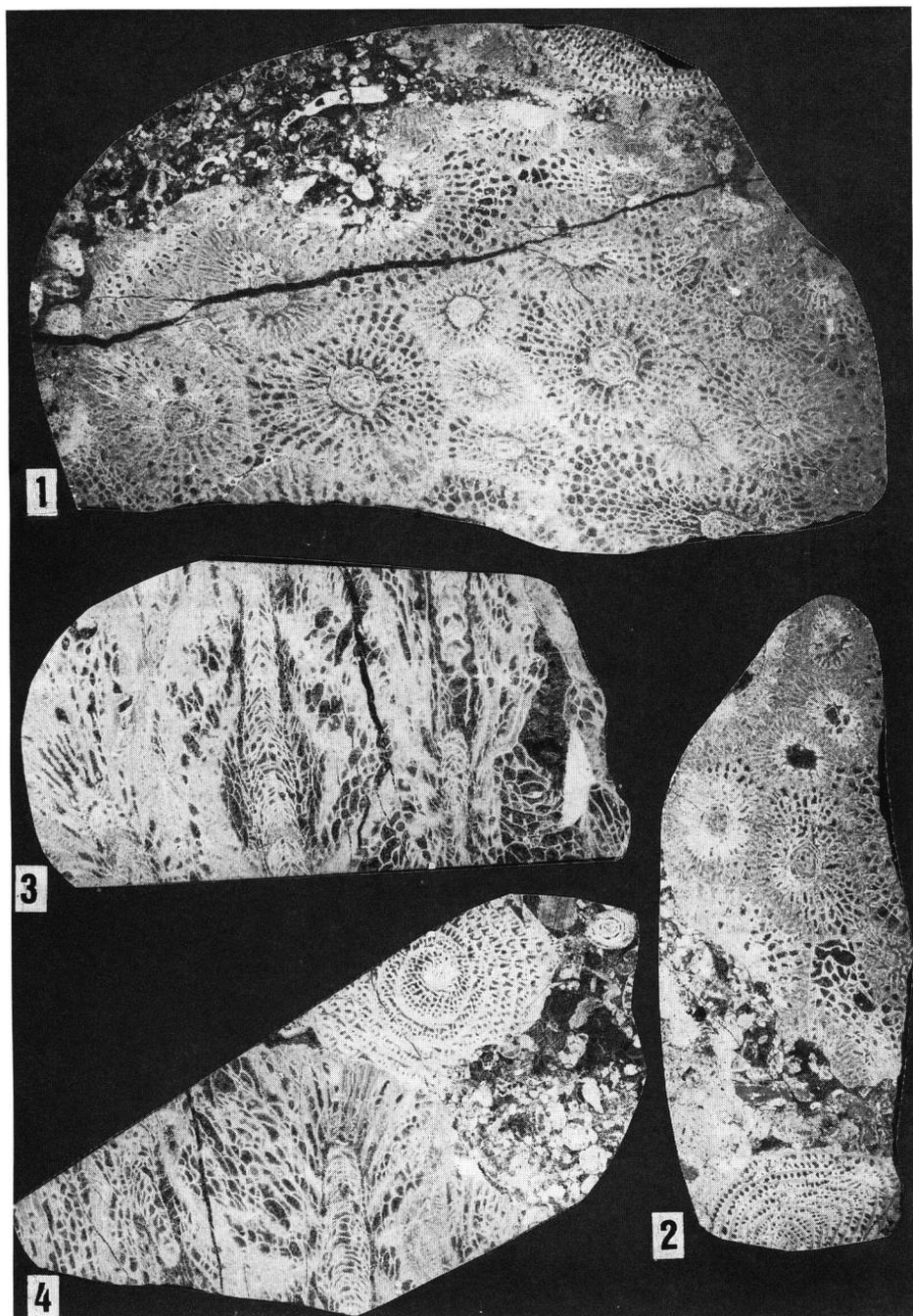


Fig. 1. Relationship between number of septa and diameter of corallite in *Ipciphyllum ishii*, n. sp.

the peripheral parts of septa. The boundary between tabularium and dissepimentarium is not clear in immature stage. However, the tabularium is partly differentiated from the dissepimentarium by an incomplete inner wall in mature stage. Septa of two orders, major and minor in alternation; they straight or more or less sinuous. Septa is thick at periphery, but gradually taper towards the axial structure. Naos-like septa rarely present. Major ones are 19 to 20 in number in mature stage. They are long and reach near the axial structure except the counter septum. The counter one unites with the axial structure. Minor ones are slightly shorter and thinner than the major. Septal fine structure is diffuso-trabecular. Fossula indistinct. Axial structure is sub-round to elliptical in outline and 1.0 to 1.4 mm in shortest diameter in mature stage. It consists of a median plate, several axial tabellae and septal lamellae in mature stage. Sometimes median plate and septal lamellae are indistinct.

In longitudinal section, wall is generally thick and wavy. Dissepimentarium is wide with numerous (4 to 10) series of dissepiments in mature stage. The greater series consists of small globose dissepiments. But elongate ones also present. Differentiation between the dissepimentarium and tabularium is not sharp. Tabularium is relatively narrow. It is occupied by generally steeply inclined clinotabulae and short horizontal tabulae. 4 to 5 short horizontal ones are counted in a vertical distance of 1 mm. Axial structure is well differentiated from the tabularium. It consists of a median plate, axial tabellae and septal lamellae. Axial tabellae show dome-like structure.

Plate 2. *Ipciphyllum ishii*, n. sp. 1. Transverse section . . . $\times 5.0$ (NSM PA12856b) 2. Transverse section . . . $\times 5.0$ (NSM PA12856c) 3. Longitudinal section . . . $\times 5.0$ (NSM PA12856d) 4. Longitudinal section . . . $\times 5.0$ (NSM PA12856e)



Remarks: *Ipciphyllum* much resembles *Aridophyllum*. According to ZHAO (1976), *Aridophyllum* differs from *Ipciphyllum* in having thick wall. HILL (1981) synonymized the former with the latter with query, but YÜ *et al.* (1983) published the former as an independent genus. Later, KATO & EZAKI (1986) considered that the validity of the former was questionable. The wall of the present new species is thick in immature stage, but becomes rather thin in mature stage. Therefore, the present one may be an intermediate type between *Ipciphyllum* and *Aridophyllum*. Judging from the data mentioned above, *Aridophyllum* may be synonymious with *Ipciphyllum*. The present new species resembles the type species of *Aridophyllum*, *A. anshunense* ZHAO (1976, p. 220, pl. 1, figs. 15a-b) from the lower part of the Wuchiaping Formation in Guizhou, China and *Ipciphyllum timoricum* var. *regulare* WU (1963, p. 498, 503, pl. 2 figs. 5-6) showing *Aridophyllum* type from the Maokou Formation in Kueichow, China in many respects, but differs from the latter two by having more numerous series of dissepiments in longitudinal section in mature stage and occasionally developed lonsdaleoid dissepiments in mature stage. It is also similar to *Wentzelella timorica* showing *Aridophyllum* type described by HERITSCH (1937, p. 2, pl. 1, figs. 6a-d, 7) from the Upper Productus Limestone, Salt Range in its form of wall, size of corallite, number of septa and others. However, the former is distinguished from the latter in having longer minor septa and occasionally developed lonsdaleoid dissepiments in mature stage.

Atopophyllum is related to *Ipciphyllum*, but differs from the latter in having naos-like septa (see ZHAO & WANG in WANG, 1978). HILL (1981) thought that the former was synonymous with the latter, but YU *et al.* (1983) considered the former as an independent genus. The septa of the present new species rarely show naos-like structure. Therefore, the present one may show an intermediate form between *Ipciphyllum* and *Atopophyllum*. From the above mentioned data, *Atopophyllum* may be included in *Ipciphyllum*. Two species belonging to *Atopophyllum* such as *A. shiqianense* and *A. irregulare* were described by ZHAO & WANG in WANG (1978, p. 180, pl. 58, figs. 1, 5-8) from the Wuchiaping Formation in Guizhou, China up to the present. The latter was formerly described as *Ipciphyllum irregulare* by WU (1963, p. 497, 502, pl. 2, figs. 7-10) from the Maokou Formation in Kueichow, China. The present new species differs from the above mentioned two in having smaller corallites and occasionally developed lonsdaleoid dissepiments in mature stage.

Occurrence: The present new species was collected from the Upper Formation (*Yabeina* zone) in the Akasaka Limestone, Ōgaki City, Gifu Prefecture, Central Japan. A single corallum.

Collector: Akiko YAMANO

Repository: Reg. no. NSM PA 12856 (holotype) (National Science Museum, Tokyo).

References

- AKASAKA RESEARCH GROUP, 1956. Geological studies of the Akasaka Limestone. *Earth Science.*, (26-27): 10-18. (In Japanese with English abstract.)
- HERITSCH, F., 1937. Rugose Korallen aus dem Salt Range, aus Timor und Djoulfa mit Bemerkungen über die Stratigraphie des Perms. *Sitzungsberichte d. Mathem.-naturw. Kl., Abt. 1*, **146**: 1-16, pls. 1-2.
- HILL, D., 1981. Rugosa. In: TEICHERT, C., (ed.), *Treatise on Invertebrate Paleontology*, Part F. Coelenterata. Geol. Soc. America and Univ. Kansas Press: 1-429, figs. 1-283.
- HONJO, S., 1959. Neoschwagerinids from the Akasaka Limestone (Palaeontological study of the Akasaka Limestone, 1st Report). *Jour. Fac. Sci., Hokkaido Univ., ser. 4*, **10**(1): 111-161, pls. 1-11.
- HUDSON, G. R. S., 1958. Permian corals from Northern Iraq. *Paleontology*, **1**(3): 174-192, pls. 32-35.
- ISHII, K., 1984. Geology of the Akasaka Limestone. In: Kinshozan (Its culture and nature). Fossil Association of Kinshozan: 98-105. (In Japanese.)
- ISOMI, H., 1955. Geological sheet map with Explanatory Text, Ōgaki, **1**: 50000. Geol. Surv. Japan: 1-24, 1-6. (In Japanese with English abstract.)
- KATO, M. & Y. EZAKI, 1986. Permian corals from Pahang and Trengganu, Malaysia. *Jour. Fac. Sci., Hokkaido Univ., ser. 4*, **21**(4): 645-668, pls. 1-7.
- MATSUDA, T., 1980. Discovery of Permian-Triassic mixed conodont assemblage from the Akasaka Limestone, Gifu Prefecture. *Jour. Geol. Soc. Japan*, **86**(1): 41-44. (In Japanese.)
- MINATO, M., 1955. Japanese Carboniferous and Permian corals. *Jour. Fac. Sci., Hokkaido Univ., ser. 4*, **9**(2): 1-202, pls. 1-43.
- MINATO, M. & M. KATO, 1965. Waagenophyllidae. *Jour. Fac. Sci., Hokkaido Univ., ser. 4*, **12**(3-4): 1-241, pls. 1-20.
- MORIKAWA, R., 1958. Fusulinids from the Akasaka Limestone (Part 1). *Sci. Rep. Saitama Univ., ser. B*, **3**(1): 93-130, pls. 12-26.
- MORIKAWA, R., 1967. Akasaka Limestone. Guide-book for geologic excursion (Nagoya). Geol. Soc. Japan: 1-24. (In Japanese.)
- MORIKAWA, R. & Y. SUZUKI, 1961. Fusulinids from the Akasaka Limestone (Part 2). *Sci. Rep. Saitama Univ., ser. B*, **4**(1): 43-74, pls. 4-22.
- MURATA, M., K. ISHII & Y. OKIMURA, 1978. Late Permian microfauna above the *Yabeina globosa* zone in the Akasaka Limestone. Abst. Program, 1979 Annual Meet. Geol. Soc. Japan: 240. (In Japanese.)
- OZAWA, Y., 1927. Stratigraphical studies of the Fusulina Limestone of Akasaka, Province of Mino. *Jour. Fac. Sci., Imp. Univ. Tokyo, sect. 2*, **2**(3): 121-164, pls. 34-45.
- SAKAGAMI, S., 1980. Preliminary note on the upper part of the Akasaka Limestone Group, Japan. *Proc. Japan Acad., ser. B*, **56**(1): 25-29.
- WANG, H. D., 1978. Tetracoralla. In: *Paleontological Atlas of the Southwestern Regions*, Guizhou, Fascicle 2, Carboniferous-Permian. Geological Press (Peking): 106-188, pls. 29-61. (In Chinese.)
- WU, W. S., 1963. On the *Wentzelella*. *Acta Palaeont. Sinica*, **11**(4): 495-504, pls. 1-2. (In Chinese with English summary.)
- YABE, H., 1902. Materials for Acknowledge of the Anthracolithic fauna of Japan. *Jour. Geol. Soc. Tokyo*, **9**: 1-5.
- YABE, H. & I. HAYASAKA, 1915-1916. Paleozoic corals from Japan, Korea and China. *Jour. Geol. Soc. Tokyo*, **22**: 55-70, 79-92, 93-109, 127-142; **23**: 57-75.
- YAMAGIWA, N., K. IMAMURA, & A. YAMAMURO, 1964. *Yatsengia ibukiensis* MINATO from the Akasaka Limestone, Gifu Prefecture. *Mem. Osaka Univ. Lib. Art. & Educ., B*, (13): 215-221, pl. 1. (In Japanese and English.)
- YÜ, C. C., Y. D. LIN, S. YEN, Z. X. HUANG & X. G. YU, 1983. Carboniferous and Permian corals. Jilin people's Publishing House (China): 1-357, pls. 1-17. (In Chinese.)
- ZHAO, J., 1976. Late Permian rugose corals from Anshun, Luzhi and Qinglong, Guizhou Province. *Acta Palaeont. Sinica*, **15**(2): 213-222, pl. 1. (In Chinese with English abstract.)

