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Author(s)	Minato, M.; Minoura, N.
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## ADAMANOPHYLLUM FROM JAPAN

by

M. Minato and N. Minoura

(with 3 text-figures and 1 table)

(Contribution from the Department of Geology and Mineralogy,  
Faculty of Science, Hokkaido University, no. 1476)

### *Abstract*

A rugose coral, in the collection of fossils, from the Tateishi formation (Upper Viséan ?) of the Northeastern Abukuma mountains is systematically described as a new species, *Adamanophyllum abukumaense*.

### Introduction

The genus *Adamanophyllum* (Tetracoral) was established by N.P. Vassiljuk 1959, *Adamanophyllum incertus* Vassiljuk as the type species, which was found from the Namurian deposits of Donbass (the Donets basin). According to Vassiljuk, the name of *Adamanophyllum* was derived from the name of the Adaman-Chalgan ravine where the Lower Namurian deposits are reported to be well developed in the Donbass basin.

In 1966, T.A. Dobrolyubova (in T.A. Dobrolyubova, Kabakovitch, N.V. and Sayutina, T.A. 1966) described two corals from the Lower Carboniferous of the Kuznetsk basin under the same generic name, although these species are not likely congeneric with the type species of the genus *Adamanophyllum* for the present authors. Eventually except the three species above mentioned, no other occurrence of *Adamanophyllum* seems to have been recorded yet.

However, the senior author of the present paper unexpectedly found *Adamanophyllum* in the fossils collected from the Tateishi limestone formation typically developed at the Northeastern part of the Abukuma mountains, by himself, Dr. Y. Fujiwara and students in cooperation, when they made a geologic excursion there in October, 1975 (Fig. 1). This will be described below.

The Tateishi limestone formation has been currently correlated to the upper Viséan by the Japanese palaeontologists including the senior author (1955). As a matter of fact, T. Sato (1956) described a good many corals from the formation which shows, according to Sato, to be well correlatable with the

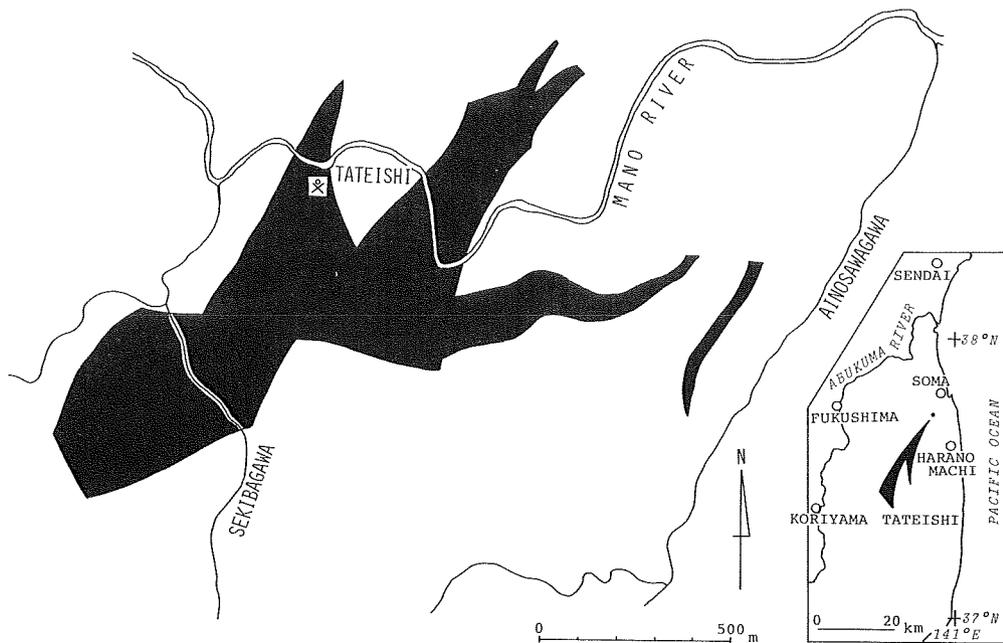


Fig. 1 Simplified geologic map showing the locality where the specimens were collected. The Tateishi formation is solidly blackened.

Upper Viséan, too.

To settle the geologic age of the Tateishi formation, however, might require more detailed palaeontologic and stratigraphic study in future. Especially it may be not conclusive yet how to correlate the upper level of this formation. As a matter of fact, T. Sato (1956) listed from this formation, though not yet systematically described, some foraminifera of apparently rather younger age than the Lower Carboniferous, *e.g.* *Ozawainella* sp.

The coral to be described below is a new species. Accordingly, it may be not useful horizon marker at present moment, although it looks like somewhat resembled the type species of the genus *Adamanophyllum*, which denotes the Namurian. Moreover, the material to be described was actually not collected *in situ* from this formation, but from the talus deposits at the foot of exposure of the limestone. Anyhow it would be desirable to reexamine the correlation of the Tateishi formation, at least its upper part is concerned.

Before going to description, the authors wish to express their gratitude to Dr. E.W. Bamber of Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada, Calgary, who kindly placed the translation of the Vassiljuk's paper in English at the present author's disposal.

The authors are also grateful for Drs. Y. Fujiwara and J. Tazawa and students for their kind cooperation with the senior author in collection of fossils.

### Description of Species

Order Rugosa Milne-Edwards and Haime 1850

Family Adamanophyllidae Vassiljuk, 1959

Genus *Adamanophyllum* Vassiljuk, 1959

1959 *Adamanophyllum*, Vassiljuk, p.85

1960 *Adamanophyllum*, Vassiljuk, p.53

1962 *Adamanophyllum*, Dobrolyubova, p.317

? 1966 *Adamanophyllum*, Dobrolyubova, p.92

1973 *Adamanophyllum*, Cotton, p.13

*Type species: Adamanophyllum incertus* Vassiljuk, 1959, Lower Namurian Donbass, p.85, pl.3, figs.1a, b.

*Included species: Adamanophyllum vassiljukae* Dobrolyubova, 1966 in Dobrolyubova, Kabakovitch and Sayutina, 1966, p.92, pl.14, figs.1-3, text-fig.3, Upper Tournaisian-Lower Viséan, Kuznetsk and *Adamanophyllum buskuskanense* Dobrolyubova 1966 in Dobrolyubova, Kabakovitch and Sayutina 1966, p.95, pl.14, figs.4a-3, Upper Tournaisian, Kuznetsk, may be tentatively regarded to be congeneric with the type species of the genus *Adamanophyllum*.

*Generic diagnosis:* Solitary corals with stronger five major septa compared with the rest of major septa, e.g. the cardinal, two counter laterals and two alar septa and possessing a peripheral area with more or less well developed vesicular tissue. Minor septa alternating with majors, and fairly short and thin. Tabulae, complete to incomplete, almost horizontal or slightly concave in the earlier stage, and strongly concave in the mature stage. Especially the type species of the genus has definite clinotabulae.

*Remarks:* The present genus is similar to the genera *Plerophyllum* Hinde 1890 and *Oligophyllum* Pocta 1902 (in Schindewolf, 1942) in having five stronger septa, but different from them in the development of lonsdaleoid dissepiments in the peripheral area. It is also similar to the genus *Prosmilia* Koker 1924 (in Schindewolf, 1942) in having lonsdaleoid dissepiments but the latter has four stronger septa, eg. the cardinal, counter and two alar septa. The genus *Tachyphyllum* Dobrolyubova 1962, also resembles very much the present genus, but in *Tachyphyllum* cardinal septum is very short although two counter lateral septa and two alar septa are similarly longer than the rest of the major septa.

*Adamanophyllum abukumaense* Minato and Minoura, sp. nov.

Fig.2, figs.A, B and C

*Material:* Holotype, Department of Geology and Mineralogy, Faculty of Science, Hokkaido University. UHR 30170-a, 30170-b.

Paratype, UHR 30167

*Specific diagnosis:* *Adamanophyllum* of small corallite and less numerous septa. Outer wall is relatively thick. Concentric dissepiments are sporadically developed, and lonsdaleoid dissepiments are poorly developed. Clinotabulae are remarkable.

*Description:* Corallum simple. Outer form of corallite is unobservable, since it is firmly embedded in the limestone slab, but may be cylindrical, at least more than 30 mm long, and its maximum calicular diameter may attain 15 mm. Two cross sections, more or less obliquely cut, and single longitudinal section were made from two specimens (UHR 30170a, 30167, UHR 30170b). Corallite is badly recrystallized, and the original fine structure of skeletons is hardly observable, although the septa may represent the trabecular type, instead of fibro-normal one. Outer wall is fairly thick. Septa are of two orders; major septa counted 22 in all, which are unequal in length: namely five of them are very long as to be stated below, while the rest of them are usually 1/3 the length of the calicular diameter. The minor septa are only 1/4 to 2/3 the length of the majors and considerably thin. Although the counter septum is almost similar, in length, to the most of other major septa, it is remarkably shorter than the counter lateral septa, two alar septa and cardinal septum. These five proto-septa are extraordinarily thick and long, almost reaching the center of corallite at their distal ends. All the major septa of different length begin to grow directly from the outer wall, whereas the minor septa locally start to grow, in the mature stage, from the lonsdaleoid dissepiments developed between major septa, instead of the outer wall. In the earlier growth stage, the minor septa, however grow from the outer wall without exception, and even in the mature stage, some of them still grow from the outer wall.

Fig. 2 *Adamanophyllum abukumaense* sp. nov.

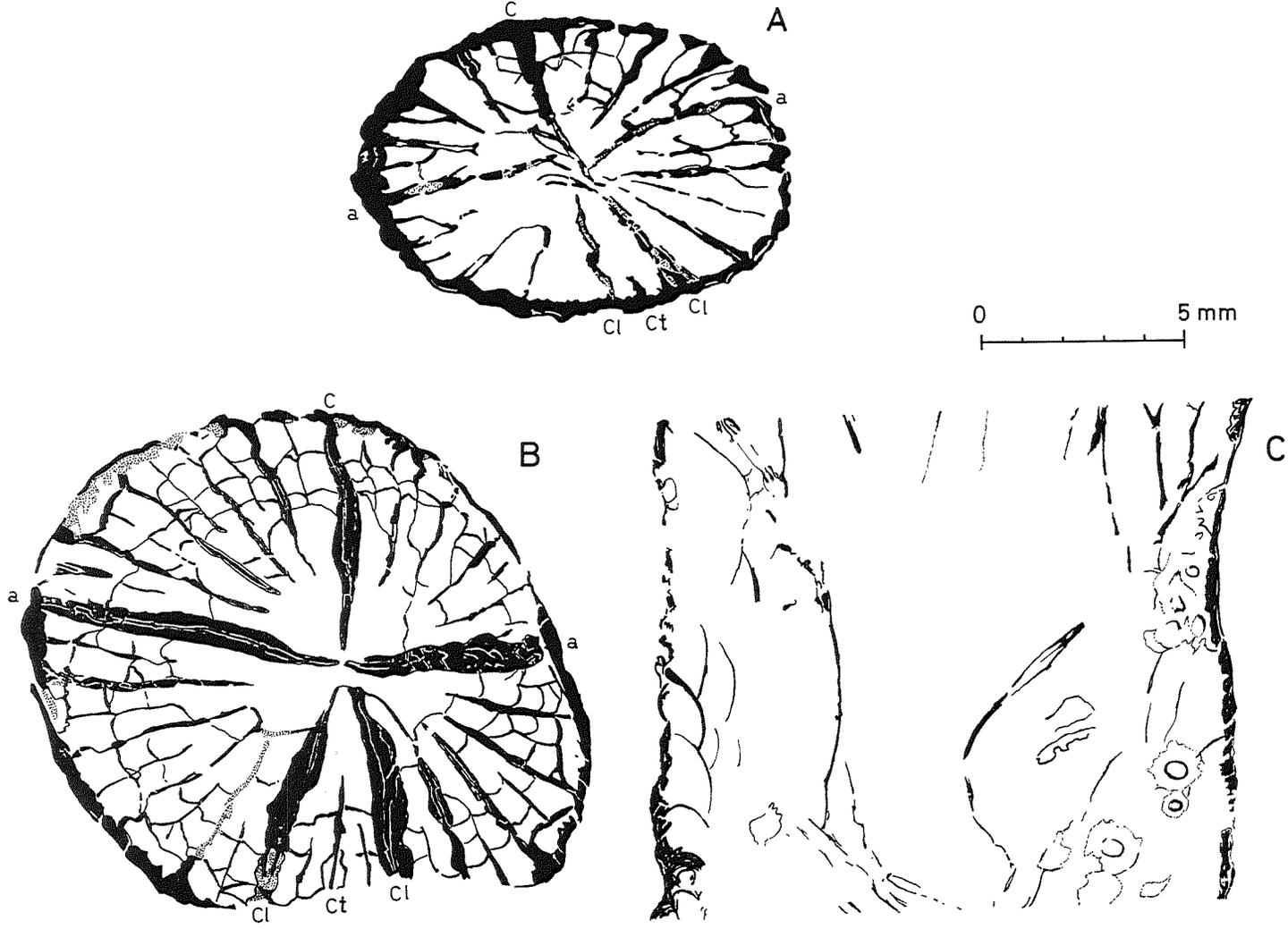
All drawings were made directly on the photograph using water-proof ink and photographically reduced, since the specimens are severely recrystallized and details of skeletons are indistinct on the photograph of the thin section.

A: Cross cut section of the paratype specimen: UHR 30167

B: Cross cut section of the holotype specimen: UHR 30170-a.

C: Longitudinal section of the holotype specimen: UHR 30170-b.

All figures are same magnification and the scale is indicated at right-hand side.



There are two kinds of vesicles in the peripheral area: lonsdaleoid dissepiments, more elongate in form, positioned in the outer part of the area, and concentric dissepiments between major and minor septa, which develop in the inner part of the peripheral area and are arranged in two or three rows.

In longitudinal section, which unfortunately cut septa for its major part, and details of tabularium is accordingly unobservable. Outer wall is also observed as being fairly thick. Large, somewhat elongate lonsdaleoid dissepiments and relatively small, spherical, concentric vesicles occupy the peripheral area. Tabularium seems to be well spaced, and only a few large clinotabulae develop there. No axial structure.

*Comparison:* The present form is characteristic in having relatively smaller corallite and less numerous septa as is shown in table 1, and Fig. 3.

**Table 1.** Calicular diameter and number of major septa of *Adamanophyllum* species

	$\phi$ of corallite mm	septal number	age
<i>Adamanophyllum abukumaense</i>	13–15	22	Up. Viséan (?)
<i>Adamanophyllum incertus</i>	22–23	28–30	Namurian
<i>Adamanophyllum vassiljukae</i>	19–24	42	Up. Tournaisian L. Viséan
<i>Adamanophyllum buskuskanense</i>	35	55	Up. Tournaisian

Among the hitherto described three species, the Tournaisian and Viséan species have alar septa which are somewhat rhopaloid in their distal ends. Of them *Adamanophyllum buskuskanense* Dobrolyubova possesses rather wide dissepimentarium composed of concentric interseptal dissepiments arranged in several rows, besides relatively narrow area with smaller lonsdaleoid dissepiments. In contrast, *Adamanophyllum vassiljukae* possesses concentric interseptal dissepiments sporadically developed, and lonsdaleoid dissepiments arranged only in one row. In this regard, the present species now in investigation is akin to *vassiljukae* than *buskuskanense*. However, both *Adamanophyllum buskuskanense* and *vassiljukae* show to have rather complete and somewhat arched to horizontal tabulae, against the typespecies and the present form, which have actually clinotabulae and/or concave tabulae.

Thus, the Japanese form is now concluded to be most nearly related with the typespecies of the Namurian age in many points. Similarity between the typespecies and the Japanese form is mentioned below: thick outer wall, relatively small sized corallite, less numerous septa, rather poorly developed lonsdaleoid dissepiments which are large in size and presence of clinotabulae.

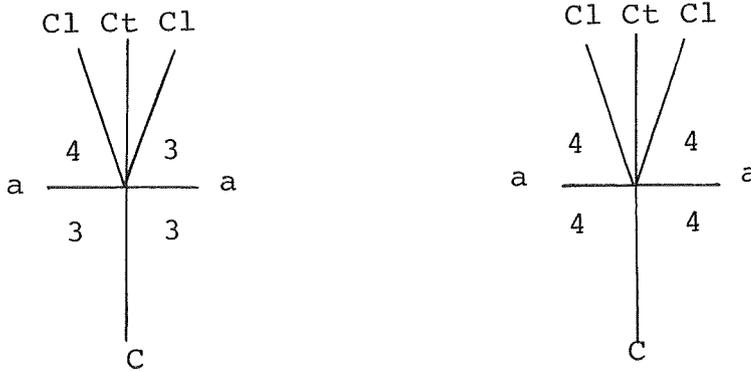


Fig. 3 Diagram of septal increasing of *Adamanophyllum abukumaense* sp. nov.  
 Left: the earlier stage, UHR no.30167 Fig.2, A  
 Right: the mature stage, UHR no.30170-a Fig.2, B

However, the present form specifically differs from the Donbass species in the following points. Namely (1) most of major septa other than the strong five proto-septa in the typespecies are longer than those of the Japanese, and (2) the five proto-septa of the typespecies are still far thinner than those of the Japanese. (3) Concentric dissepiments are more numerous in rows in the Donbass form. (4) Nearly all the minor septa of the Donbass species do not grow from the outerwall, whereas only a few minor septa start to grow from lonsdaleoid dissepiments in the Japanese form. (5) So far as observable part is concerned, clinotabulae are well developed but horizontal tabulae are lacking in the Japanese form, whereas the typespecies possesses both clinotabulae and incomplete concave to horizontal tabulae. And (6) the typespecies possesses corallite being ceratoid in form in contrast to the probable cylindrical Japanese form. Specific independence of the Japanese form from the typespecies should be accordingly doubtless.

*Remarks:* Although two species established and placed into the genus *Adamanophyllum* by Dobrolyubova are tentatively regarded here to be congeneric with the typespecies, nature of tabulae of Dobrolyubova's species are considerably different from that of the typespecies, as stated in the foregoing lines. In this connection, the Japanese species newly proposed is concluded to be fully akin to the typespecies, but definitely differs from the Dobrolyubova's two species. According to the senior author's view, the Dobrolyubova's two species would be better generically distinguished from both the typespecies of the genus *Adamanophyllum* and the present species, because of the different nature of tabulae. In short, two species proposed by Dobrolyubova need to have their own taxonomic position, *viz.* either an independent genus from the genus *Adamanophyllum* or subgenus of the latter.

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