

Adiantopteris Ishidae KON'NO and NAITO, sp. nov., from
the Carnic Beds in Southwestern Japan

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Introduction

This paper gives the description of a new Carnian species of Filicophyta, *Adiantopteris Ishidae*, sp. nov. The material consists of abundant specimens obtained from the Momonoki Formation (Middle Carnic age) at a locality of about Lat. $34^{\circ}11'35''$ N. and Long. $131^{\circ}10'01''$ E. in Southwestern Japan. It was first discovered in 1966 by Hideo ISHIDA, to whom the new specific name is dedicated. Soon thereafter, the new material of the same species was added by OKAFUJI, GOAMI and NAITO. Preliminary, descriptive investigations of these specimens were collectively carried out by the junior author, and the taxonomic designation was made mainly by the senior author.

Before presenting the description, we first express our hearty thanks to Mr. H. ISHIDA. Thanks are also extended to Mr. G. OKAFUJI, Teacher of the Ominé Upper Secondary School, Mr. M. GOAMI, the Director of Taisei Chika-kogyo Co., Ltd. and all other collaborators, who all kindly helped us during the whole course of the present investigations. We are deeply indebted to Professor Kametoshi KANMERA, Faculty of Science, Kyushu University, Dr. Kazuo ASAMA, National Science Museum, Tokyo and Professor Tasuaki KIMURA, Department of Astronomy & Earth Sciences, Tokyo Gakugei University, for their kind help in preparation of this paper.

Description of Species

Family *Polypodiaceae* ?

Genus *Adiantopteris* VASILEVSKAYA, 1968

Adiantopteris Ishidae KON'NO and NAITO, sp. nov.

Plates. 1, 2, and Fig. 1 A-C.

Material:—Holotype, NSM-PP 7200; Paratypes, NSM-PP 7201, 7202, 7203, 7204, 7205, 7206.

Diagnosis:—Frond delicate in texture, probably herbaceous, simply pinnate for main and distal region of leaf, imparipinnate, lowest region unknown, probably with solitude lateral branchlets at some axils of pinnules. Rachis slender with a few, thick conducting bundles, usually two in number, surrounded by delicate and probably succulent material. Pinnules subopposite, given off obliquely and at a wide angle from rachis (see Plate 1, Fig. 3), with short and distinct petiole, not deciduous; lamina subobovate to obovate in form, deeply cut down near base by deep incision into two halves, lower one overwhelming upper one; each half subdivided by successive dichotomies into narrow, obcuneate segments ending in narrowly triangular and sharply pointed marginal teeth. Venation coarse and distinct; a single vein arising from rachis, forked near base of lamina into two major branch-veins, each one bifurcating in turn repeatedly, veinlets lying near deepest median incision of lamina always longer than those near side margins of pinnule. Fructification not known.

Remarks:—In view of the whole characteristic adduced just above, it seems highly possible to imagine that the present species would have grown in nature as a member of herbaceous plants in the Carnic flora. Existence of a few, thick, longitudinal conducting bundles surrounded by probably succulent and delicate material, small-sized pinnules occurring always as leaflets not deciduous but pinnately attached to the rachis, etc. reject decidedly the presence of any close relationship of this plant with any group under Ginkgoales, in which the leaflet-bearing axis is always solid and woody. Thus the present specimens would represent one of the members belonging to Filicophyta in the Carnic vegetation in Japan.

It deserves our special attention that the matured pinnules of this plant always show a dichotomous dividing pattern in both the lamina and venation, and this pattern reminds us at once that of “Dachübergipfelung asymmetrisch-anadromer Typ=*Adiantum*-Typ” of ZIMMERMANN (1949, 1957). Pinnae or pinnules showing the similar übergipfelung of *Adiantum* type are known not only in many recent species but also in some fossil ones of *Adiantum* and its allied forms from both Younger Mesozoic and Cenozoic beds. Though far remote in both the age and the features of the pinnule from any species of recent plants, it would be doubtless that this plant comes nearest to some species of *Adiantum* and its fossil allies.

Unfortunately, however, the collection at hand is incomplete, containing no specimens to know the fructification of this plant. Therefore we can only except here to refer this plant to some form-genus resembling *Adiantum* and its allies. Recently a new form-genus, *Adiantopteris*, was proposed by VASILEVSKAYA in 1968. This genus is defined, according to BOUREAU (1975, p. 658), as follows: “Fougères à frondes pennées ressemblant à celles des *Adiantum*. Pinnules alternes ou opposées, flabelliformes, aux contours cordiformes arrondis, ou avec un court pétiole, à marge dentelée ou encore dentelée-lobée. Nervation en éventail, nervures fines deux fois dichotomes. Appareil reproducteur inconnu.” It has been recorded from beds of various countries in North Hemisphere ranging in age from Jurasso-Cretaceous, Lower to Upper Cretaceous, Eocene to Miocene. In Japan and her neighbours, too, some three species

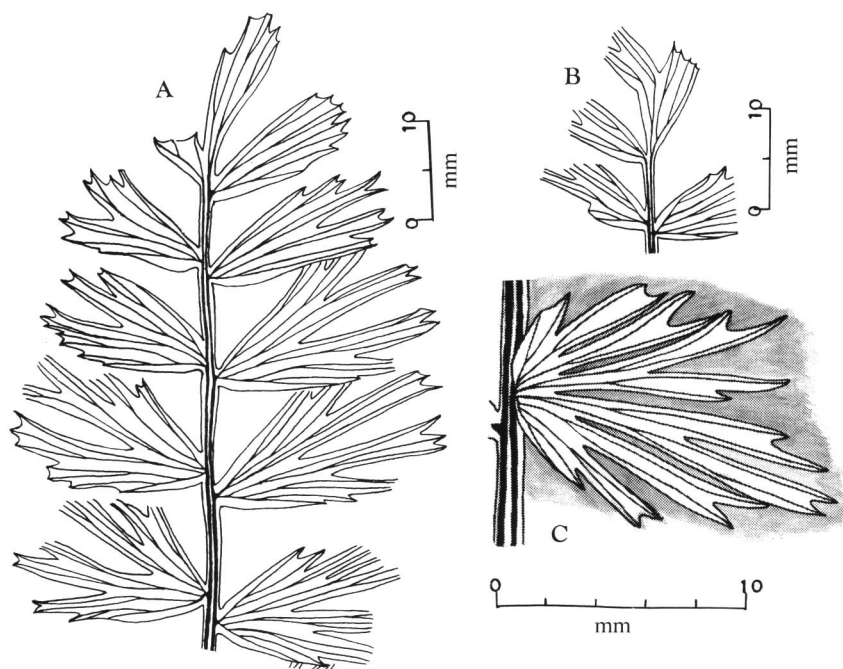


Fig. 1. *Adiantopteris Ishidae* KON'NO et NAITO.

A: Distal part of frond.

B: Imparipinnate apical part of frond.

C: Matured pinnule.

were reported from the Jurasso-Cretaceous beds as the Ryoseki, Kiyosue and Tetori (all in Japan), Naktong in South Korea, Nikan in Ussuriland, etc. (see YOKOYAMA, 1894; YABE, 1905; OISHI, 1931, 1940, 1950; KRYSHTOFOVICH, 1910).

Though differing rather remarkably from any known above-cited examples in various respects, for example, the far remote age (Carnic), the characteristic features of the pinnules, etc., the inclusion of this Carnian plant into *Adiantopteris* seems for us more reasonable than its separation from that genus. The authors consider here that it is more appropriate to widen the former diagnosis of the genus *Adiantopteris* to such an extent so as to make inclusive of this Carnic plant into more comprehensive one, *Adiantopteris* (s. l.).

For these reasons the authors dared to designate this Carnic plant under the name of *Adiantopteris Ishidae* KON'NO et NAITO, sp. nov.

Occurrence.—The specimens including the holotype were obtained from the Middle Carnian Momonoki Formation at the Ominé colliery (a now abandoned mine) in 1.6 km north-northwest of the Ominé station of the Ominé Railway Line.

Repository.—All specimens figured in Plates 1 and 2 are deposited in National Science Museum, Tokyo.

References

- BOUREAU, Ed. & DOUBINGER, J., 1975. *Traité de Paléobotanique*, Tome IV, Fasc. 2, Pteridophylla (Première partie). 1-768 pp. Paris, Masson et C^{ie}.
- KRYSHTOFOVICH, A., 1910. Jurassic Plants from Ussuriland. *Mém. Com. Géol. St.-Petersbourg*, N.S., **56**: 1-23, pls. 1-3 (in Russian.).
- OISHI, S., 1931. The Mesozoic Plants, in Iwanami's Geological and Paleontological Series. 1-91 pp., Tokyo, Iwanami (in Japanese.).
- , 1940. The Mesozoic Floras of Japan. *Jour. Fac. Sci., Hokkaido Imp. Univ., Ser. IV*, **5**: 123-480, pls. 1-48.
- , 1950. Illustr. Catal. East-Asiatic Fossil Plants. Chigaku-shuppan-shiseisha, Kyoto, Japan. (In Japanese.).
- OKAFUJI, G., 1971. Fossil Monograph of Akiyoshi and its neighbourhood, Yamaguchi Prefecture, Japan. Edited by Educational Foundation, Yamaguchi Prefecture, pp. 1-147, including 62 pls., 4 locality maps. (In Japanese.).
- VASILEVSKAYA, N. D., 1968. A new Late Mesozoic fern from Yakutsk. In 'New genera of ancient plants and invertebrates in USSR.' *Geol. Inst. All Unions' Sci. Res. (VSEGEI), Min. Geol. USSR, Nedra, Moscow*, **2**(1): 49-51, pl. 16 (in Russian.).
- YABE, H., 1905. Mesozoic Plants from Korea. *Jour. Coll. Sci. Tokyo*, **20** (8): 1-59.
- YOKOYAMA, M., 1894. Mesozoic Plants from Kozuke, Kii, Awa and Tosa. *Jour. Coll. Sci., Imp. Univ. Tokyo*, **7** (3), 201-231, pls. 20-28.
- ZIMMERMANN, W., 1930-1959. *Die Phylogenie der Pflanzen*, Jena, Stuttgart.

Explanation of Plates

Plate 1

- Fig. 1, 1a. Holotype, showing main and distal parts of frond, $\times 1$; 1a shows small lateral branch preserved at lower right-hand part of the holotype, $\times 2$, NSM-PP 7200.
- Fig. 2. Showing imparipinnate distal part of frond with zigzag-coursed rachis, $\times 1.5$, NSM-PP 7205.
- Fig. 3. Distal part of frond, $\times 1.5$, NSM-PP 7206.

Plate 2

- Fig. 1. Upper part of frond, showing imparipinnate apex, $\times 1.5$, NSM-PP 7201.
- Figs. 2, 3. Main part of frond, showing subopposite insertion of pinnules to rachis. Originally obliquely inserted pinnule-lamina appressed on bedding plane by subsequent pressure. Fig. 2, $\times 1.5$, NSM-PP 7202; Fig. 3, $\times 1$, NSM-PP 7203. 3a: Showing rachis with thick longitudinal conducting bundles and its pinnule with sharply pointed triangular marginal teeth, $\times 3$, NSM-PP 7203.
- Fig. 4. Showing imparipinnate distal part of frond with zigzag-coursed rachis, $\times 2$, NSM-PP 7204.

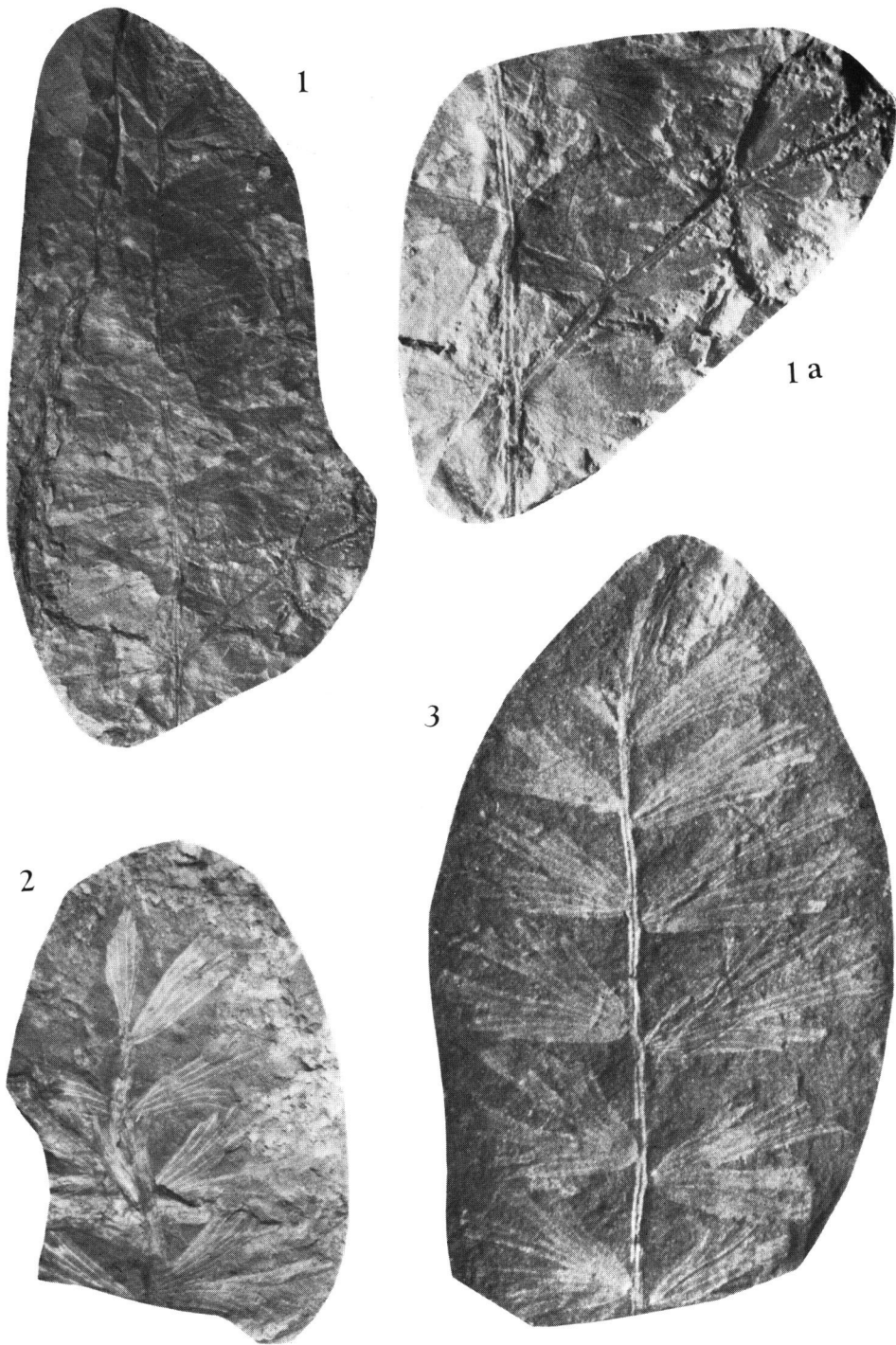


Plate 2 KON'NO & NAITO: *Adiantopteris Ishidae* sp. nov. from the Carnic in Japan

