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Acrostichopteris hatae OHANA et KIMURA, sp. nov. from the Lower Cretaceous Tatsukawa Formation in the Outer Zone of Japan

By

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Abstract Pteridosperm- or fern-like, pinnate, sterile leaves were collected from the Lower Cretaceous Tatsukawa Formation in the Outer Zone of Japan. Their pinnae (or pinnules) are unique in form and have not been recorded so far from the Mesozoic. In this paper, they are described as *Acrostichopteris hatae*, sp. nov.

Introduction

In Tokushima Prefecture, Shikoku, the Lower Cretaceous sediments mostly of marine origin are extensively distributed in a narrow structural unit along the Katsuragawa Valley with an E–W trend. These sediments are stratigraphically divided into the Tatsukawa (brackish; Neocomian), Hanoura (marine; Aptian), Hoji (marine; lower Albian) and Fujikawa (marine; upper Albian) Formations in upward sequence (MATSUMOTO, 1953). The fossiliferous Tatsukawa Formation overlies unconformably the Palaeozoic sediments and several fossil plant taxa are known to occur (MATSUMOTO, 1953, p. 81; list only). Although the recorded plant taxa are small in number, the occurrence of these taxa (some are misidentified) shows that this florula is apparently of the Ryoseki-type (e.g., KIMURA, 1987 a, b; KIMURA *et al.*, 1992).

Recently Norikazu HATA, a science teacher of the Okawa-Higashi Senior High School, Kagawa Prefecture, collected several fossil plants from the Tatsukawa Formation. Among them we recognized a pteridosperm- or a fern-like plant in close association with the detached leaves of *Nilssonia* ex gr. *schaumburgensis* DUNKER, one of the characteristic taxa of the Ryoseki-type flora. Although its botanical affinity is uncertain, we have concluded that this pteridosperm- or fern-like plant is a new species of the form-genus *Acrostichopteris*.

We thank Mr. HATA who offered his specimens for our study. Our thanks are extended to Dr. Ikuwo OBATA who give us the facilities to publish this paper. Our thanks are also due to Dr. Shya CHITALEY of the Cleveland Museum of Natural History, Ohio for her linguistic check of the present manuscript.

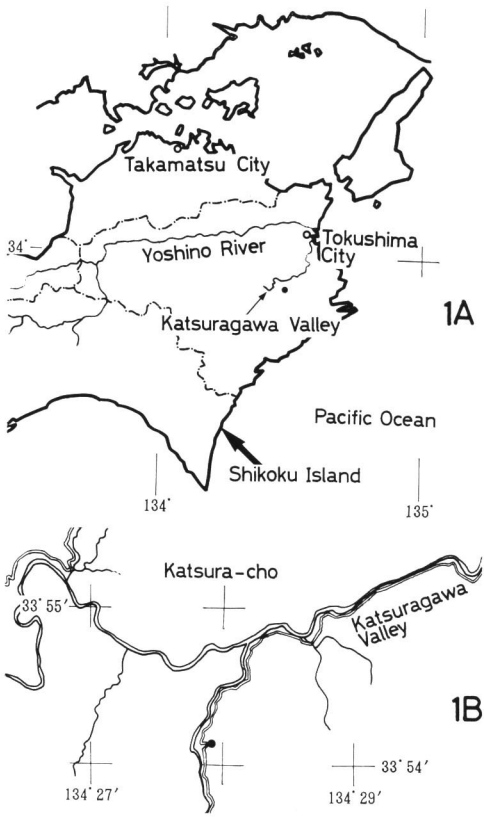


Fig. 1. Maps showing the collecting locality. 1A. Showing the eastern part of 'Shikoku Island'. Small solid circle indicates the position of the locality. 1B. Map (enlarged partly from Fig. 1A), showing the detailed position of the locality (solid circle).

Description

Form-genus ***Acrostichopteris*** FONTAINE em. BERRY, 1911

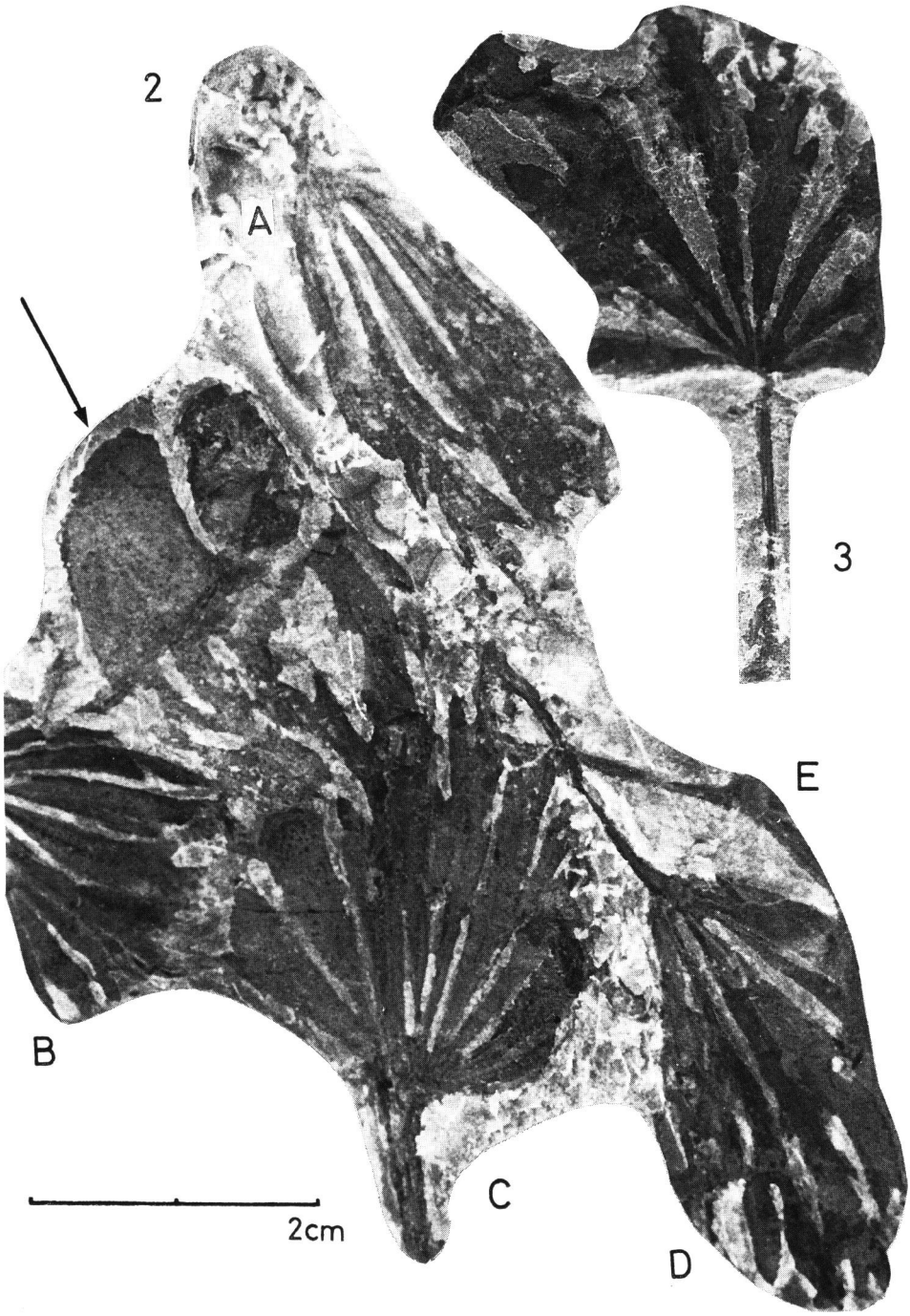
Acrostichopteris hatae OHANA et KIMURA, sp. nov.

Figs. 2(A–E)–5(A′–E′)

Material: Holotype, NSM PP-9015. Paratype, NSM PP-9016.
Locality and Horizon: Near Tanano (roughly 134°28′E, 33°56′N; Fig. 1A, B),

Fig. 2(A–E). *Acrostichopteris hatae* OHANA et KIMURA, sp. nov.: An aggregated population of detached pinnae (or pinnules) in association with a leaf fragment of *Nilssonia* ex gr. *schaumburgensis* DUNKER (indicated by an arrow). Reg. no. NSM PP-9015 (holotype).

Fig. 3. *Acrostichopteris hatae* OHANA et KIMURA, sp. nov.: A detached pinna (or pinnule). Reg. no. NSM PP-9016 (paratype).


2
A
3
E
B
C
D
2cm

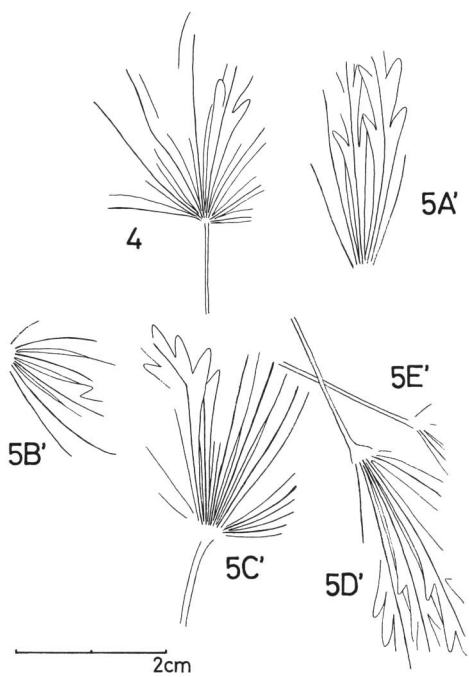
Katsura-cho, Katsura-gun, Tokushima Prefecture (Shikoku Island); Tatsukawa Formation (Neocomian in age).

Etymology: After N. HATA, a collector.

Occurrence (Frequency): Probably rare.

Description of specimens: Whole leaf is unknown, but it is highly probable that it is pinnate in habit and with a slender axis. A pinna (or pinnule) consists of definite lamina and petiolule. Petiolule is long and very slender, typically 20 mm long and 0.5 mm wide, and is rigid in appearance. Lamina is obtriangular or fan-shaped, 35 mm in radius with a basal angle of 70 degrees and is divided into 6 or 7 segments by deep incisions reaching at the tip of petiolule. Margins of segment are remarkably toothed by two opposite pairs of teeth at the apical half of a segment; each tooth is directed forward. A marked single vein persists to the tip of wach segment, but its laterals are invisible. Further details are unrecognized. Reproductive organs are not known.

Discussion and comparison: The present pinnae (or pinnules) are all detached and scattered closely on the same bedding plane (Figs. 2, 5). Judging from their external form, the present leaves appear to belong to some pteridosperm or fern. At any rate, at present it is appropriate to keep these present leaves in the form-genus *Acrostichopteris*.



Figs. 4–5 (A′–E′). *Acrostichopteris hatae* OHANA et KIMURA, sp. nov.: 4. Drawn from Fig. 3. 5 (A′–E′). Drawn from Fig. 2(A–E) respectively.

The present pinnae (or pinnules) might remind us of those of *Baieropsis* originally described by FONTAINE (1889) from the Lower Cretaceous Potomac Group. In *Baieropsis*, however, some segments are deeply incised and others are shallowly incised without toothed margins, and each segment possesses veins which are three or more in number.

The present pinnae (or pinnules) are characterized by (1) having long and very slender petiolule, (2) lamina deeply incised reaching almost the tip of petiolule, (3) margins of a segment at its distal half being remarkably toothed, and (4) a marked single vein persisting to the tip of a segment. Incidentally, it is possible that these poorly preserved pinnae (or pinnules) might be confused with ginkgoalean leaves.

From the Lower Cretaceous plant-beds in Eurasia, especially in East Eurasia many *Acrostichopteris* species have been described by the previous authors. But most do not have segmented lamina, and if segmented, the mode of segmentation is quite different from the present pinnae (or pinnules).

The pinnae of *Acrostichopteris nervosa* (HEER) described by TEIXEIRA (1948) from the Lower Cretaceous of Portugal resemble those of the present ones, but the mode of segmentation in the former is also different from that of the latter.

Under the circumstances, we propose *Acrostichopteris hatae*, sp. nov. for the present leaves.

The specimens examined here are kept in the National Science Museum, Tokyo.

Diagnosis: Leaf (or ultimate pinna) pinnate. Pinnae (or pinnules) consisting of long and very narrow petiolule and obtriangular or fan-shaped lamina divided into 6 or 7 segments by deep incisions reaching at the tip of petiolule. Margins of each segment remarkably toothed by 2–3 subopposite pairs of teeth at the distal half of segment. A marked vein persisting to the tip of each segment. (Lateral veins invisible; whole leaf and reproductive organs not known.)

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