

Hideaki OHBA\*: **A branched tree fern.**  
**Studies on the plants of Isl. Minami Iwojima (Japan) (1)\*\***

大場秀章\*: 南硫黄島の植物研究 (1)\*\* 分枝する木生シダ

(Pl. XVI)

In 1936 Tuyama and his associate botanists accomplished the first ascent of the virgin summit of Isl. Minami Iwojima (Tuyama 1981). As reported by him, one of the dominating elements of the vegetation at the summit is a branched tree fern. Tuyama (1938) regarded this fern as a variety of *Cyathea boninsimensis* (Christ ex Diels) Copel. and named as var. *ramosa*. He wrote: "The thick trunk is almost about 1.5 m in diameter, and its branches are more than twenty in number. Except the branching character, this plant is identical with the typical form of *Cyathea boninsimensis*". Iwatsuki (1963) and Nakaike (1975) regarded it as an abnormal or monstrous form of *C. spinulosa* Wall. ex Hook. (*C. boninsimensis* was reduced to its synonymy). I also treated it as *C. spinulosa* (Ohba 1971).

In 1982 I observed a dense forest consisting of the branched *Cyathea* which occupies the vast area around the summit. The forest which almost lacks any other tree species is characterized by the dense covering of the fully exposed crown with radiate leaves (Fig. 1A). In fact all individuals of this *Cyathea* bore variable number of branches in various portion of its trunks (Figs. 1B, C; 2).

It was also revealed that the *Cyathea* is different from *C. spinulosa* in several vegetative features and somewhat approaches to *C. callosa* Christ. *C. callosa*, known from Luzon (the Philippines), is distinguished from *C. spinulosa* by the shorter and less spiny stipes and by the gradually reduced lower pinnae

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\*\* In the middle of June 1982, I had a chance to examine the plants of the uninhabited island in the Volcano Group as a member of the 1st Comprehensive Scientific Survey of the Minami Iwojima Island Wilderness Area by the Environment Agency, Japan (Leader: Prof. Kiyoshi Okutomi, Tokyo University of Agriculture and Technology). The collection of herbarium specimens by Mikio Kaji (Laboratory of Forest Botany, Faculty of Agriculture, University of Tokyo) and by me is deposited in TI. In this series of papers, I will publish a number of new records and taxonomic clarifications and also a phytogeographical consideration on the flora.

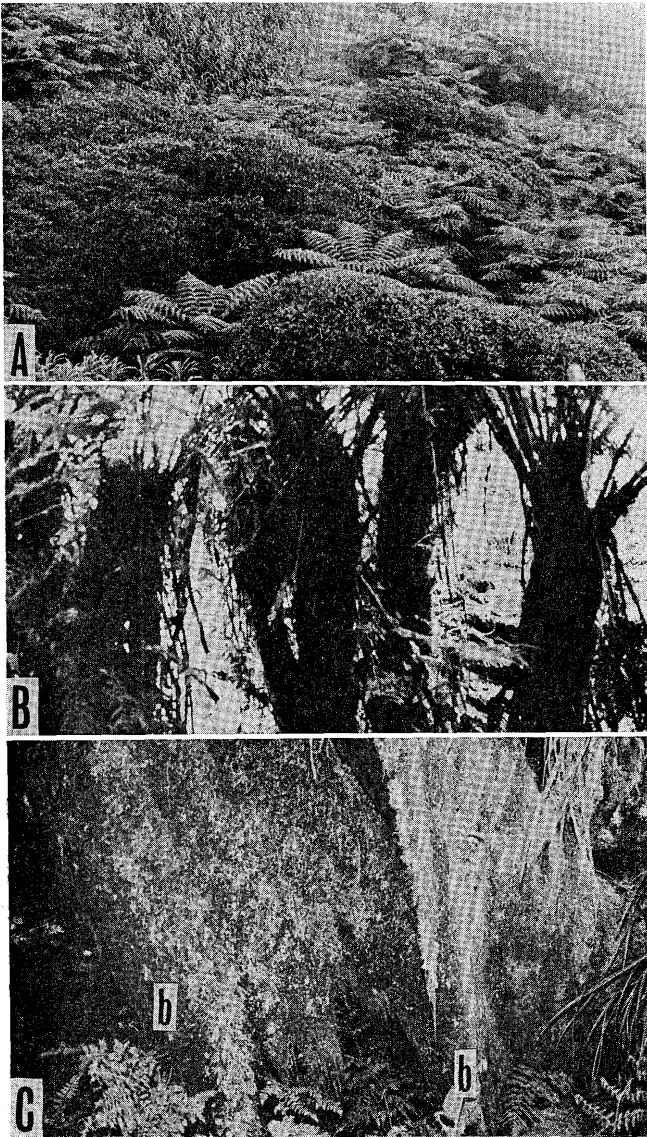


Fig. 1. *Cyathea Tuyamae*. A. Forest showing the dense covering of the crowns. B. Trunks showing a bifurcation (middle). C. Basal part of a trunk showing the buttress root-like branches (b).

Tab. 1. Comparison of the branched *Cyathea* (*C. Tuyamae*) and its related species.

	<i>C. spinulosa</i>	<i>C. Tuyamae</i>	<i>C. callosa</i> *
Colour of leaves	dark green; lustrous	light green; lustreless	—
Length of stipe	30-40 cm	12-18(-30) cm	max. 15 cm
Length of spines of the stipe	(2-)3-4 mm	0.9-1.1 mm	ca 2 mm
Length of the lowest pinna	15-20 cm	8-11(-14) cm	commonly less than 10 cm
Length of the largest pinna	40-60 cm	30-40 cm	40 cm or more
Size of the largest pinnule	commonly 8-10 cm long; 16-22 mm wide	8-9 cm long; 16-18 mm wide	10 cm long; 24 mm wide
Interval between costules	3-4 mm	3.5-4 mm	4-4.5 mm
Scales on costae	moderate to sparse, flat; those near base brown; distal ones pale, entire	moderate, flat to convex, brown or pale, entire	sparse, dull brown, sometimes with a dark seta near apex
Scales on costulae	moderate to few, pale, entire, flat to convex	conspicuous, brown or pale, entire, flat to convex	few, flat, pale, not bullate but sometimes convex
Scales on veins	sparse, hairy	moderate, hairy	conspicuous, hairy
Habitat	in shady forest; the crown not exposed	in open place; the crown fully exposed	—

\* Taken from Holttum (1963).

(Holttum 1963). The differences among the *Cyathea* and these two species are summarized in Tab. 1. In the genus *Cyathea*, the differences in these characters are regarded as stable and significant specifically. Thus I treat the branched *Cyathea* as a distinct endemic species without regard to branching, and named as *Cyathea Tuyamae*. As discussed later, the branching features are hardly recognized as specific.

***Cyathea Tuyamae*** H. Ohba, sp. nov. (Figs. 1-3, Pl. XVI)

*C. boninsimensis* (Christ ex Diels) Copel. var. *ramosa* Tuyama in Bot. Mag. Tokyo 52: 567 (1938).

*C. spinulosa* Wall. ex Hook. monstr. *ramosa* (Tuyama) Nakaike, Enum.



Fig. 2. *Cyathea Tuyamae*, showing a trunk with a lateral branch.

Pterid. Jap. 121 (1975).

*C. spinulosa* Wall. ex Hook. sens. Iwatsuki in Act. Phytotax. Geobot. 19: 133 (1963); H. Ohba in Sci. Rep. Tohoku Univ., Ser. 4, 36: 106 (1971).

Inter *Cyathea callosa* Christ (Luzonensi) et *C. spinulosa* Wall. ex Hook. forsan locanda, ab illa spinis stipitis (longitudine 0.9-1.1 mm) brevioribus pinnis maximis angustioribus costulis 3.5-4 mm inter se distantibus, ab hac stipite brevioris spinis brevissimis pinna infimae conspicue reducta differt.

Truncus 3-5 m vel ultra altus, interdum parte basali irregulariter bifurcatus, undique irregulariterque ramosus; ramis ex parte superiore erectis vel adscendentibus, apice

frondes paene verticillatas ferentibus, verticillo quoque frondibus numero 6 vel 10 constituto; ex parte infima (ut videtur anterides) declinatis vel nutantibus undique aphyllis nescio an truncos fulcrantibus. Frondes 100 cm vel ultra longae. Stipes brevior vulgo 12-18 raro 30 cm longus lucentior atrobrunneus totam spinis obtusis multis 0.9-1.1 mm longis armatus, basi paleis brunneis dense vestitus; paleae lineares vel raro subulatae 2-3 cm longae basi 1-2 (raro 3) mm mediano 0.6-1.3 mm latae basi carnosulae omnes margines fragiles non setiferae. Laminae ellipticae supra laete viridissimae sed non lucidae, tripinnatifidae pinnulis segmentisque totalibus modo catadromois dispositae; rhachidi infra sparsim verruculosa non nitida, glabrescenti vel paleis paucis minutis irregularibus vestita. Pinnae inferiores (2- vel 3-jugatae) sensim reductae, infimae 8-11 vel raro 14 cm longae, maximae 30-40 cm longae 14-17 cm latae. Pinnulae maximae 8-9 cm longae 16-18 mm latae sessiles acuminatae basi fere aequales, profunde pinnatifidae (ala costale 1.5-2 mm lata); segmentis 18-20-jugatis anguste oblongis obtusis 8-9 mm longis 2.5-3 mm latis crenulatissimis, costulis 3.5-4 mm inter se distantibus; venulis 9-12-jugatis plerumque bifurcatis. Sori globosi prope costulas siti; indusiis pallidis fragilibus hemiteliiformis, primum semicircularibus prope 3/4 sori tegentibus, ore parvo irregulare aperientibus, demum versus costulam reflexis rumpentioribus sed persistentibus; paraphysibus

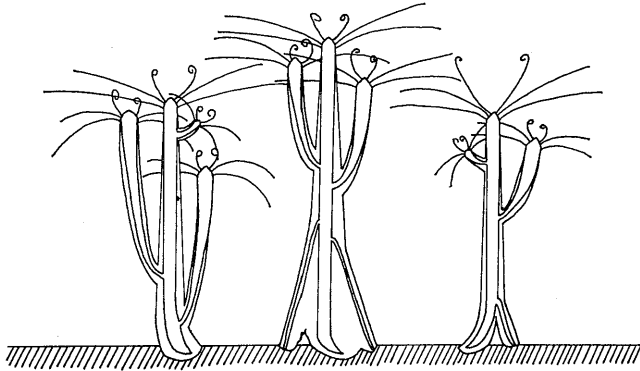


Fig. 3. *Cyathea Tuyamae*. Schematic diagram of the branching.

pallidis sporangiis 2-plo brevioribus. Rhaches pinnarum infra pallidae glabrescentes paleis subulatis brunneis ad 1 cm longis sparsissime praeditae. Costae infra omnino paleis minoribus planis pallidis ovatis vel triangularibus integris sparsim praeditae (paleis brunneis subulatis ad 3 mm longis versus basin mixtae); supra pilis brunneis elongatis persistentibus dense ornatae. Costulae infra paleis pallidis ovatis vel circularibus planis vel convexis integris, squamulisque minutis obtectae. Venulae infra pilis minutissimis sparsim praeditae.

Hab. Japan. Volcano Islands. Minami Iwojima (San Augustino) Isl., around the summit, alt. ca 910 m (Hideaki Ohba 826051, TI—type); loc. cit. (Takasi Tuyama, 31 Mar. 1936, TI—type of *C. boninsimensis* var. *ramosa* Tuyama).

In *Cyathea* some species produce branches (Schoute 1906, 1914, Nakai 1927, Dobbie 1929, Holttum 1963, Hallé 1966, Berthet 1972). The majority of them reported the branching is abnormal and often due to injury, though Dobbie explained a forest of forked tree fern in New Zealand. Schoute (1914) studied branching by bifurcation and suggested that there is no sharp distinction between bifurcation and lateral branching in which the branch occurs on one side of a leaf-base. As regards the lateral branching, Hallé (1966) distinguished two types based on two African *Cyathea* species. One of these observed in *C. camerooniana* Hook. is characterized by the lateral branch showing negative geotropism and a strong tendency to come into leaves. In the adult condition the trunk has lateral crowns of leaves upon it. The other given by *C. Manniana* Hook. is defined as the lateral branch showing positive geotropism. The branch elongates downwards and bears numerous adventitious roots. When its apex

is buried in the ground, the branch becomes a subterranean stolon. Then it turns up and finally changes itself into a trunk.

The case of *C. Tuyamae* appears to differ from both types proposed by Hallé and is shown schematically in Fig. 3. In this species its trunk always produces branches, both near the base of the trunk and the upper. In the former there is a small cluster of trunks (Fig. 1B); in the latter the main trunk has lateral crowns of somewhat smaller leaves (Fig. 2). Moreover, it also produces branches showing geotropism; in this case the branches with dense adventitious roots give themselves the look of a buttress root (Fig. 1C). Externally the ascending branches arising near the base are better to be regarded as the result of bifurcation of the trunks. But others are thought to be derived from hypophyllous buds taken place on one side of a leaf-base.

#### Literature cited

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#### Explanation of plate XVI

*Cyathea Tuyamae*. a. Scales on the lower surface of costa,  $\times$ ca 50. b. Scales of the lower surface of the costulae,  $\times$ ca 50. c. The lower surface of segment, showing hairs,  $\times$ ca 170. d. The hair shown in c,  $\times$ ca 800. e. Hairs on the upper surface of costa,  $\times$ ca 80. f. A sorus showing the semiglobose indusium,  $\times$ ca 80.

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エダウチムニンヘゴ (津山 1938) は南硫黄島山頂の優占種のひとつで、独特の林を形成する。幹は枝を出す。木生シダが時に枝をつくる例はこれまでに知られている。その枝には 2 とおりある。即ち、上方に伸びて頂に葉を叢生する(A)、下方に伸び、地中

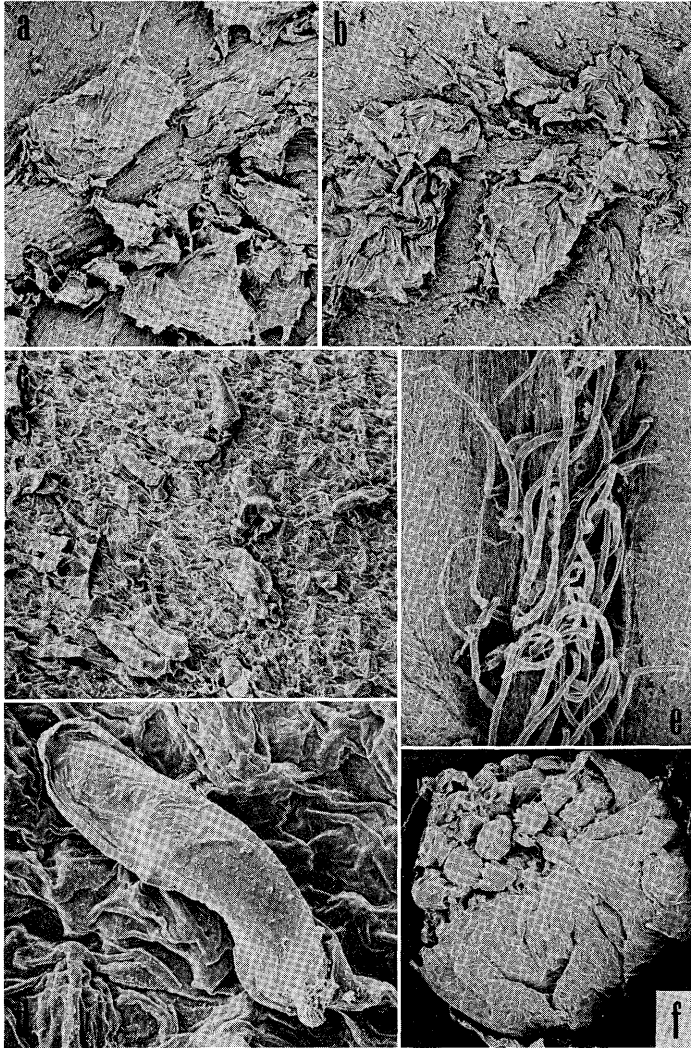
を横走し、再び上方に伸び、新しい幹となる (B) ものである。エダウチムニンヘゴでは (A) の枝と地向性を示し、あたかも幹が板根を具えるかのように不定根を密生する枝をだす。このような例はこれまで知られていない。さらに幹が二叉分枝をするように思われるが、外形上は上方に伸びる枝との区別がむずかしい。

エダウチムニンヘゴは、樹冠が露出する、葉面が光沢のない明るい緑色になる、最下羽片が縮まる、葉柄が短い、葉柄のとげが短い等の点でヘゴとは異なる。ルソン島の *Cyathea callosa* Christ. に近い形質もみられる。南硫黄島固有の独立種と結論し、*Cyathea Tuyamae* の学名を与えた。

□大阪大学附属図書館中之島分館：自然科学系外国雑誌センター館現行受入雑誌目録 278 pp. 1982. 昭和52年度から理工、医、農学の3領域で当時欠落していた資料を、外国雑誌センターを指定して収集と整備と情報の提供とをはじめた。それは東北大医学分館、東京大学農学部、東京工業大学、大阪大学中之島分館、九州大学医学分館、鹿児島大学の6ヶ所の図書館であった。昭和55年9月に自然科学系拠点図書館外国雑誌目録を出したが、その改訂、補遺版でもある。はじめに記録の様式を述べ、それからABC順に雑誌名と所蔵機関を掲げているが、大体上記の6館の内の1館に限られ、細かい活字とびっしりつまった形態で、何しろ各頁に35項は乗っているので大体で一萬に近い雑誌名がならんでいる。しかも古いもの、名の知れたものはほとんど載っていないからここ数年の新雑誌の数はおどろくべきものといえよう。生物学関係は主に鹿児島大学に集中しているように見うけた。(前川文夫)

□井波一雄：広島県植物図選Ⅱ (Inami, K.: Illustrations of selected plants from Hiroshima Prefecture II) 100 pls., +11 pp. 1982. 博新館, 広島, ¥4,000. 前巻にひきつづいて、広島県産の特産種或は稀産種に重点をおき、井波氏が実物を相手に麗筆をふるったもので、前巻で多少目についた陰影をへらし、細部にはその機微を現わすのに骨を折ったものである。アキテンナンショウ、セトウチホトトギス、キミズモドキ、キピナワシロイチゴ、ビッチェウフウロ、クロタキカズラ、ナツアサドリ、ヤナギイボタ、テリハアザミ等は特産に近いものであるし、オゼコウホネ、クロヅル、デワノタツナミソウなどはおやと思われる種類で面白い。頁下に地形図索引番号や金井索引番号を附し、大井、寺崎、保育社等の頁数、それに短かいが重点をついた短文を載せていて参考になる。ただ31図のサンヨウアオイはやはりミヤコアオイであろうと考えられる。

(前川文夫)



H. OHBA: A branched tree fern