

Elaphoglossum of Japan, Ryukyu, and Formosa

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Elaphoglossum SCHOTT is a large genus, distributed in all warm countries, with far over 400 species of epiphytic and terrestrial ferns usually found in the shade, and with preponderance of species in tropical America, especially in the Andes; from tropical Asia we know only about 30 and from Polynesia about 15 species. The present paper is a taxonomic review of 8 species of *Elaphoglossum* known from Japan, the Ryûkyû Islands, and Formosa. They are all rare ferns.

The writer has examined all of the materials of *Elaphoglossum* available in the herbarium of the Kyôto University (abbreviated K in the specimen-citation), the private herbarium of the late M. OGATA (Og), and the herbarium of the Tôkyô University (T).

I. Species from Japan and the Ryûkyû Islands

Elaphoglossum is represented by 2 species in Japan, both of which are rare ferns and are known from several restricted localities in the warm districts, growing on mossy tree trunks or rocks in damp thick forests of mountainous regions at low elevation.

(1) *Elaphoglossum Yoshinagae* (YATABE) MAKINO, Phan. Pter. Jap. Ic. III. t. 51, 52. 1901; OGATA, Ic. Fil. Jap. I: pl. 27. 1928. — *Acrostichum Yoshinagae* YATABE, Bot. Mag. Tokyo 5: 109. t. 23. 1891, type from Japan. — *E. austro-sinicum* MATTHEW et CHRIST, Not. Syst. I: 57. 1909, type from Kwangtung; HU et CHING, Ic. Fil. Sin. I: pl. 49. 1930. — *E. parvum* COP. Phil. Journ. Sci. 11: 40. 1916, type from Fokien.

Known from Isl. Hatizyô, south and south-eastern part of the Kii Peninsula, Pref. Kôti, and from Isl. Yakusima; not yet found in the mainland of Kyûsyû. Specimens examined:

Honsyû. Pref. Tôkyô: Mt. Mihara-yama, Isl. Hatizyô, OGATA (Og). Pref. Mie: Onigazyô, Hohara-mura, Watarai-gun, HONDA (T); Tôgû, Ukura-mura, Watarai-gun, SIMADA (Og); Kata, Minamiwauti-mura, Minamimurô-gun, TUTIGA (K). Pref. Wakayama: Hirai, Sitigawa-mura, Higasimurô-gun, NAKAZIMA (T); Mt. Nati, NAKAZIMA (T).

Sikoku. Pref. Kôti: None, Aki-gun, YAMAWAKI (K); Mt. Sukawadake, Nâri, Aki-gun, KOIDZUMI (K); Mt. Hônokawa, YOSINAGA, type (T); YANO (T); UEMATU (K); Irô (T).

Kyûsyû. Pref. Kagosima : Isl. Yakusima : Kosugidani, TASIRO (K) ; prope Haruo, TAGAWA 777, 825 (K) ; without exact locality, MASAMUNE (T).

The range is from Japan to Formosa, South China (Fukien, Kwangtung, and Kwangsi, after HU et CHING, l. c. as *E. austro-sinicum*), and Laos (C. CHR. et TARDIEU-BLOT, Not. Syst. 8 : 209. 1939, as *E. austro-sinicum*).

E. austro-sinicum from South China is in no way different from Japanese *E. Yoshinagae* (TAGAWA, Acta Phytotax. Geobot. 8 : 28. 1939).

(2) ***Elaphoglossum tosaense*** (YATABE) MAKINO, Phan. Pter. Jap. Ic. III. t. 53, 54. 1901 ; OGATA, Ic. Fil. Jap. 1 : pl. 26. 1928. — *Acrostichum tosaense* YATABE, Bot. Mag. Tokyo 5 : 149. t. 24. 1891, type from Japan.

The range of distribution in Japan is like that of *E. Yoshinagae* ; also in the Ryûkyû Islands. Specimens examined :

Honsyû. Pref. Mie : Ooutiyama-mura, Watarai-gun, MAGOHUKU (T). Pref. Wakayama : Mt. Nati, NAKAZIMA (K, T) ; OGATA (Og) ; Sitigawamura, Higasimurô-gun, TATEWAKI (K) ; Hyôzei, Hutagawa-mura, Nisimurô-gun, Ui (K) ; NAKAZIMA (T).

Sikoku. Pref. Kôti : Mt. Hônokawa, YOSINAGA, type (T) ; YANO (T) ; Itô (T) ; Matubagawa, Takaoka-gun, YAMAMOTO (K). Pref. Tokushima : Mt. Todoroki-yama, Kaibu-gun, YAMAWAKI (K).

Kyûsyû. Pref. Kagosima : Isl. Yakusima : Kosugidani, TASIRO (K) ; TAGAWA 783, 798 (K) ; Mt. Miyanoura-dake, NAKAE (K) ; without exact locality, MURAMATU 14 (K) ; NAKANO (K) ; YOSH (T) ; MASAMUNE (T) ; Itô (T) ; MAKINO (T).

Ryûkyû. Isl. Okinawa : without exact locality, SÔMA (K), the first certain collection of the species from the Ryûkyû Islands.

Not known elsewhere. *E. Macclurei* CHING (Sinensia 1 : 55. 1930 ; Ic. Fil. Sin. 2 : pl. 82. 1934) from Hainan is, in all probability, referable to *E. tosaense*.

II. Species from Formosa

In Formosa *Elaphoglossum* is represented by 7 species of rare occurrence, of which *E. callifolium* MOORE is a Malaysian element new to Formosa, and *E. pendulifolium* TAGAWA is a new species.

1. Rhizome slender, wide-creeping, leaves distant (1) *E. angulatum*
1. Rhizome short-creeping, leaves approximate 2
2. Stipe short or the blade long-decurrent nearly to the base of stipe.
 - (2) *E. Yoshinagae*
2. Stipe long or the blade short-decurrent 3
3. Stipe densely clothed throughout with large scales ; sterile blade, at least when young, densely fringed with protruding scales, the apex obtuse or rounded (3) *E. lepidopodium*
3. Stipe sparsely clothed with small scales or nearly glabrous ; sterile

- blade not fringed even when young, the apex usually acute or acuminate 4
4. Scales on rhizome and at the base of stipe not over 5 mm. long ; sterile blade less than 3 cm. broad 5
4. Scales on rhizome and at the base of stipe to 1 cm. long ; sterile blade (3) - 4 - 8 cm. broad 6
5. Leaves erect, usually not over 30 cm. long, the sterile blade coriaceous, obtuse or acute at both ends (4) *E. conforme*
5. Leaves pendent, 30 - 40 cm. long, the sterile blade firm chartaceous, gradually attenuated towards both ends, acuminate at apex and base. (5) *E. pendulifolium*
6. Sterile blade narrowly lanceolate to oblong-lanceolate, 20 - 40 cm. long by 3 - 8 cm. broad (6) *E. callifolium*
6. Sterile blade elliptic, 10 - 20 cm. long by 3 - 3.5 cm. broad. (7) *E. subellipticum*

(1) *Elaphoglossum angulatum* (BL.) MOORE, Ind. 5. 1857 ; C. CHR. et HOLTUM, Gard. Bull. 7 : 290. 1934. — *Acrostichum angulatum* BL. Enum. 101. 1828, type from Java ; Fl. Jav. Fil. 25. t. 6. 1829. — *E. Ogatai* C. CHR. Dansk Bot. Ark. 9³ : 67. 1937, type from Formosa ; OGATA, Ic. Fil. Jap. 8 : pl. 381. 1940. — *E. laurifolium* MOORE sensu HAYATA, Ic. Pl. Form. 5 : 293. f. 117. 1915.

Central districts and southwards, rather rare, on mossy rocks or near the base of tree trunks in thick mountain forests, altitude 1500 - 2500 m., sometimes occurring in open and rather dry places. Specimens examined :

Prov. Taityû : between Hattûkwan and Tonpo, Niitaka-gun, TAGAWA 487 (K). Prov. Tainan : Arisan, OGATA, isotype of *E. Ogatai* (Og) ; Arisan in rupibus 2650 m. alt., FAURIE 621 (K) ; inter Tozan et Mingetsu in monte Arisan, ITÔ & HAYATA (T). Prov. Takao : between Takimi and Hinokiyama, Kizan-gun, TAGAWA 1872 (K) ; inter Takimi et Hinode, Kizan-gun, OKAMOTO (K) ; Miharasi, Kizan-gun, TAGAWA 3257 (K). Prov. Taitô : between Kôyô and Keitô, Kwanzan-gun, TAGAWA 2951 (K) ; between Asahi and Izumo, Kwanzan-gun, TAGAWA 3250 (K).

The range is from Java and Borneo (C. CHR. et HOLTUM, l. c.) to Luzon (v. A. v. R. Mal. Ferns Suppl. 423. 1917), Tonkin (C. CHR. et TARDIEU-BLOT, Not. Syst. 8 : 209. 1939), and Formosa.

As to *E. Ogatai*, CHRISTENSEN says : "....., but it is extremely like *E. angulatum* (BL.) MOORE. BLUME's figure (Fl. Javae pl. 6) could very well illustrate our species, which differs, however, in its remarkably thin texture and the distinctly but shortly decurrent lamina." The texture of *E. Ogatai* is not "herbacea," as stated in his original description, but thin-coriaceous, and *E. angulatum* has also "the distinctly but shortly decurrent lamina." I can not, therefor, draw a sharp line between these two species.

(2) *Elaphoglossum Yoshinagae* (YATABE) MAKINO ; YAMAM. Suppl. Ic. Pl. Form. 5 : 4. 1932.

Certainly throughout the Island, rare, on mossy tree trunks or rocks in damp thick mountain forests, ascending to about 2000 m. alt. Specimens examined :

Prov. Taihoku : Mt. Taihei-zan, INUMARU (K) ; Mt. Rara-san, MATUDA (T). Prov. Sintiku : Kagiran, Taikei-gun, YAMAMOTO & SASAKI (T). Prov. Taityû : Keitô to Numanohira, Niitaka-gun, OGATA (Og). Prov. Tainan : Arisan, OGATA (Og). Prov. Takao : Tona, Kizan-gun, TAGAWA 2038 (K) ; Tabogan-goe, Ariko savage region, MATUDA (T) ; Raisya, OGATA (Og). Japan to South China, Formosa, and Laos.

(3) *Elaphoglossum lepidopodum* C. CHR. Dansk Bot. Ark. 9³ : 66. 1937 ; OGATA, Ic. Fil. Jap. 8 : *pl.* 380. 1940.

Restricted to southern districts, rare, on densely mossy tree trunks in damp thick mountain forests, altitude 500 - 1500 m. Specimens examined :

Prov. Takao : between Daizyurin and Sinsuiei, TAGAWA 2216, 2218, 2247 (K). Prov. Taitô : Tyatyagatoan, Taitô-gun, TAGAWA 2585 (K) ; Sinsuiei, OGATA, isotype (Og) ; TAGAWA 2375 (K).

Not known elsewhere. Stipe to 20 cm. long ; sterile blade elongate-oblong, oblong-lanceolate, or sometimes oblanceolate, 10 - 30 cm. long by 2.5 - 4 cm. broad, rounded or sometimes obtuse at apex, gradually attenuated below and short-decurrent at base (not "basi apiceque rotundata," as stated by CHRISTENSEN, l. c.).

Though CHRISTENSEN compared this fern with *E. austro-sinicum* MATTHEW et CHRIST, a synonym of *E. Yoshinagae* MAKINO, its true affinity is to *E. Cumingii* (FÉE) MOORE from the Philippines.

(4) *Elaphoglossum conforme* (Sw.) SCHOTT, sens. lat. ; HAYATA, Ic. Pl. Form. 4 : 257. 1914 ; C. CHR. Contr. U. S. Nat. Herb. 26 : 327. 1931 ; OGATA, Ic. Fil. Jap. 8 : *pl.* 379. 1940. — *Acrostichum marginatum* WALL. List no. 17. 1828, nom. nud. ; FÉE, Mém. Foug. 2 : 31. 1845, type from Himalayas. — *E. fuscopunctatum* CHRIST, Bull. Herb. Boiss. 6 : 867. 1899, type from Yunnan.

Probably throughout the Island, rather rare, on mossy rocks or tree trunks in thick mountain forests, altitude 1000 - 2500 m., sometimes occurring in open and rather dry places. Specimens examined :

Prov. Taityû : Keitô to Arisan, Itô (T). Prov. Tainan : Bunkiko in arboribus, FAURIE 489 (K) ; Arisan in arboribus, FAURIE 622 (K) ; HAYATA & SASAKI (T) ; OGATA (Og) ; INADA (T) ; SATÔ 215 (T) ; Kodamayama in Arisan, HONDA & Itô (T) ; Kodamayama to Sekisan, Arisan, TATEWAKI (K) ; between Tâtaka and Numanohira, Arisan, TAGAWA 377 (K). Prov. Takao : between Masuhoaru and Nakanoseki, Kizan-gun, TAGAWA 1412 (K) ; between Hudieda and Keinanzan, Kizan-gun, TAGAWA 2034 (K) ; between Keinanzan and Isiyama, Kizan-gun, TAGAWA

2042 (K) ; Miharasi, Kizan-gun, TAGAWA 3256 (K).

Taken in the wide sence this species is widely distributed in the tropics of both hemispheres and it is an aggregate of several probably distinct species. Plants from Formosa are certainly included among the Sino-Himalayan form of an aggregate species, *E. conforme*, some referable to Chinese *E. fuscopunctatum*, others to Himalayan *E. marginatum*, others standing intermediate ; but I am by no means sure in what respects the Himalayan and South Chinese form can be specifically distinguished from the true South African *E. conforme*.

(5) *Elaphoglossum pendulifolium* TAGAWA, sp. nov.

Rhizomate breviter repente, ca. 5 mm. crasso, paleis rigide membranaceis fusco-brunneis lanceolatis ad 5 mm. longis parce ciliatis dense oblecto. Folio pendulo, stipite approximati, gracili, ad phyllopodia fusco-brunnea 1.5 cm. alta paleis iis rhizomatis similibus oblecta articulato. Folii sterilis stipite 10-18 cm. longo, pallide rubro-brunneo, paleis parvis adpressis membranaceis lanceolatis acuminatis sparse ciliato-fimbriatis laxe vestito, sursum mox nudo ; lamina anguste lanceolata, medio latissima, utrinque attenuata, apice basique acuminata, 15-30 cm. longa, 2-3 cm. lata, statu sicco rigide chartacea, margine membranacea albida pellucida, supra glabra, laete viridi, subtus pallide viridi, paleis minutis radiatim lacertatis sparse punctata ; costa tenui, supra tenuiter sulcata, subtus sursum plana, deorsum leviter elevata paleis paucis iis stipitis similibus apice onusta ; venis sub angulo 45° e costa egredientibus, plerisque furcatis, leviter clavatim incrassatis saepe furcatis. Folii fertilis stipite 20 cm. longo crassiore, lamina 10-20 cm. longa, 2 cm. lata, utrinque acuta.

Epiphyte with pendulous leaves on densely mossy tree trunks in moist thick mountain forests, altitude ca. 1600 m.

Prov. Takao : Keinanzan, Kizan-gun, TAGAWA 2041, type (K).

I have never seen any specimens except the type collection. This new species is a relative of the Asiatic form of "*E. conforme*," from wich it is distinguished by the longer and pendulous leaves with less scaly stipe and narrowly lanceolate blade of much thinner texture, the blade being gradually attenuated towards both ends. The scales on rhizome and stipe are also distinctive.

(6) *Elaphoglossum callifolium* (BL.) MOORE, Ind. 7. 1857 ; 353. 1862. — *Acrostichum callifolium* BL. Enum. 100. 1828, type from Java ; Fl. Jav. Fil. 22. t. 4. 1829.

Restricted to southern districts, rare, on densely mossy tree trunks in damp thick mountain forests, altitude 1000-1500 m. Specimens examined :

Prov. Takao : Okuyama in the basin of the River Sangô-kei, Kizan-gun, TAGAWA 1790 (K) ; between Kuwarusu and Mt. Daibu, TAGAWA 2263 (K). Prov. Taitô : near Baribugai, Taitô-gun, TAGAWA 2931 (K) ; between Syussuiha and Sinsuiei, TAGAWA 2377 (K).

New to Formosa. The range is from Java and Borneo (C. CHR. et HOLTUM, Gard. Bull. 7 : 289. 1934) to Philippines, Annam, Cochinchina (C. CHR. et TARDIEU-BLOT, Not. Syst. 8 : 209. 1939), and Formosa.

The shape of sterile blade is subject to great variation. Materials from Formosa are roughly divisible into the following three forms in virtue of the shape and size of their sterile blade.

1. Typical form ; blade elliptic- or oblong-lanceolate, 40-45 cm. long by 7-8 cm. wide, acute at both ends, on stipe 10 - 25 cm. long. TAGAWA 1790 and 2377.

2. Blade elliptic-lanceolate, 20 - 30 cm. long by 4 - 6 cm. wide, acute or acuminate at apex and gradually attenuated towards the base, otherwise hardly different from the typical form. TAGAWA 2931.

3. Blade narrowly lanceolate, 25 - 30 cm. long by 3 - 4 cm. wide, acute at apex and short-attenuate towards the base, and hence having an appearance of an *E. Yoshinagae* with long stipe, but scales on rhizome and at the base of stipe identical with those of the typical form. TAGAWA 2263.

E. latifolium (Sw.) J. SM. was reported by HENRY from South Cape (List Pl. Form. 116. 1896) ; the species is generally regarded as exclusively tropical American, and his determination was probably not quite accurate. There is every probability that HENRY's plant is *E. callifolium*.

(7) *Elaphoglossum subellipticum* Ros. Hedwigia 56 : 348. 1915.
Prov. Tainan : Bunkiko 1500 m., FAURIE 488, isotype (K, T).

Not known elsewhere. I have never collected this fern, nor seen any except the isotype. No one has critically identified this species. There seems to be no doubt that *E. subellipticum* is related to *E. callifolium* MOORE ; the leading feature by which it is distinguished is the fact that the scales on rhizome and at the base of stipe are light reddish brown, membranous, and somewhat crisped, and that the sterile blade is smaller, elliptic, 10 - 20 cm. long by 3 - 3.5 cm. wide.