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Asplenium nesii Christ (Aspleniaceae Pteridophyta)

Studies in *Asplenium* for "Flora Iranica" 2.

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&

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ABSTRACT

CHING, R. C., W.-T. CHIE & T. REICHSTEIN (1981). *Asplenium nesii* Christ (Aspleniaceae Pteridophyta). Studies in *Asplenium* for "Flora Iranica" 2. *Candollea* 36: 195-202. In English, German abstract.

An *Asplenium* collected in 1880 by J. E. T. Aitchison in Kurram valley, Afghanistan (today probably Pakistan, but within the area of "Flora Iranica") is identified as *A. nesii* Christ (1897). The species is widely distributed in N.- and N.W.-China, but so far has not been reported elsewhere. It is practically unknown to botanists in Europe and in the U.S.A. A new description with figures and a few records for N.-India are given.

ZUSAMMENFASSUNG

CHING, R. C., W.-T. CHIE & T. REICHSTEIN (1981). *Asplenium nesii* Christ (Aspleniaceae Pteridophyta). Untersuchungen an *Asplenium* für die "Flora Iranica" 2. *Candollea* 36: 195-202. Auf Englisch, deutsche Zusammenfassung.

Ein *Asplenium*, das 1880 von J. E. T. Aitchison in Kurram valley, Afghanistan (jetzt vermutlich Pakistan, aber im Bereich von "Flora Iranica") gesammelt war, wurde als *A. nesii* Christ (1897) erkannt. Die Art ist in N.- und N.W.-China weit verbreitet, aber bisher in anderen Ländern nicht bekannt. Sie ist den Botanikern in Europa und in den U.S.A. praktisch unbekannt. Eine neue Beschreibung mit Figuren wurde gegeben, ebenso einige Funde aus N.-Indien.

*First article in this series: see DEMIRIZ & al., *Candollea* 36: 181-193. 1981.

1. Introduction

When working for "Flora Iranica" one of us (TR) found in Paris (P) two sheets of an *Asplenium* unknown to him, collected by J. E. T. Aitchison ca. 100 years ago in Kurram valley, Afghanistan (today probably in Pakistan) (see details at 4.). The bigger sheet obtained from K, with one plant and six single fronds, was No. 256 and further sheets of the same collection were found in BM, FI and K (all sub *A. fontanum* or *A. varians*). A photographic silhouette of the Paris specimen was sent to R. C. Ching in Peking (in litt. 17.8.1978) who was able to identify it as *A. nesii* Christ (1897), which was described from a single collection from China, "Lun-san-huo, Oct. 1895, leg. Pater Nesi." This is in Shensi province. See also CHING & HSU (1974: 224). The species is widely distributed in the North and the whole of N.W.-China, including Hsinking (Chinese Turkestan) and Tibet, but has so far not been reported to occur outside China, DHIR (1980) does not mention it for the North-Western Himalayas. It is obviously unknown so far to botanists outside China. We therefore give a new description with figures and a list of some specimens of *A. nesii* we were able to find, more or less by chance in some herbaria in Europe, India and the U.S.A. (all indet. or under wrong names). Abbreviations for herbaria are according to Holmgren & Keuken: *Index Herbariorum*. I (ed. 6), Utrecht 1974. TR means herbarium T. Reichstein.

2. Description

Asplenium nesii Christ. Perennial herb, evergreen if not damaged by weather conditions. Rhizome short erect to ascending when young, branching and becoming caespitose later; its tip clad with blackish clathrate ovato-lanceolate, 2.5-3 mm long scales. Fronds gray-green, numerous tufted, ca. 2-12(-14) cm long and 1-2(-3) cm wide when ripe. Stipe 2-10 times shorter than blade, blackish (with a violet tint), at least in the lower half, green (like the rachis) higher up, ca. 0.5-1 mm thick; with a tuft of scales like those of the rhizome apex on its base, becoming less dense, scattered and solitary and light brown higher up including half way up the rachis. Blade herbaceous to subcoriaceous, lanceolate in outline, usually widest a little above the middle and tapering to the base, bipinnatifid or partly bipinnate in the lower part, with ca. 8-12 pairs of subopposite and alternate pinnae and ca. 0.5-1.5 cm long, \pm linear tip incised on both sides to produce 3-5 blunt teeth on each side directed upward. Pinnae with cuneiform bases, lower ones shortly stipitate with stalk of ca. 0.5-1 mm, upper ones becoming decurrent and sessile. Lowest pair of pinnae small, often irregular and ca. 1 cm apart from the next pair; slightly closer higher up and sometimes touching the next but not crowded; larger pinnae ca. (0.5-)0.8-1.2(-1.5) cm long and 0.3-0.5 cm wide, deeply incised to form 2-4 irregular lobes on both sides, the larger lobes often forked or cleft again thus forming ca. 1-4 mm long obtuse teeth directed towards the tip at an angle of ca. 30° to the costa. Sori nearer to the midrib

than to the margin, ca. 1-1.5 mm long; indusia whitish, entire, lifted when ripe. Spores large, bean-shaped, with the exospore (30-)36-42(-45) μm long and irregular, brown, perispore protruding up to ca. 7 μm in equatorial view.

3. Typification

The holotype of *A. nesii*, a single sheet, was in herb. Christ in P, where one of us (RCC) saw it in 1932. But Christ's herbarium had been rather neglected because of lack of adequate housing at that time and in spite of the recent efforts of M. Badré who has devoted much of his time to bringing it into good order, it has not been possible for him to find the type of *A. nesii* again. The holotype may well be lost. Fortunately we found two sheets of isotypes in FI (one with 6 plants, the other with one), both "Ott. 1895 raccolta il P. Pio Nesi". Unfortunately both are rather badly preserved, in their present state they hardly allow to recognize the typical shape of the fronds. We therefore deposit part of the following specimen in PE and another part (Fig. 1d) in G to serve as model for identifications. Other specimens mentioned sub 4. may be used for the same purpose.

Asplenium nesii Christ. China, Inner Mongolia. Collector: Agricultural school of Huhehot, sine n. In the valley of Ha-la-geng-gou of Tatsing-Shan, about 15 km N.E. of Huhehot, 9.VIII.1957. Part of a whole collection obtained from Professor Ma Yü-chuan, Dept. of Biology, University of Inner Mongolia, Huhehot is kept in China (PE), other part (TR-4975) deposited in (G).

4. Specimen examined

For China only such specimens deposited in PE, others which were used in this work for iconography and for raising living progeny and those we have seen in herbaria outside China (Europe, U.S.A. and India) will be mentioned here.

4.1. Material obtained to be kept in Basel

China. 1. Prov. Kansu No. 3405 ex Herb. PE. One frond sent to Basel (Fig. 1a).

2. Inner Mongolia obtained from the Dept. of Biology, University of Inner Mongolia, coll. 9.8.1957. Part deposited in P, second part was sent to Basel (in litt. 30.3.1979). now TR-4875 (Fig. 1d). Spores good, a sowing on 4.4.1979 gave ample prothallia and a few sporophytes. Will soon be deposited in G.

3. Inner Mongolia, on a mountain known as Ta-Tsing Shan, near the University of Inner Mongolia, in rock crevices facing N. at ca. 1600-1800 m alt., 5.7.1979, leg. Ma Yü-chuan. Five ripe fronds with spores sent to Basel (in

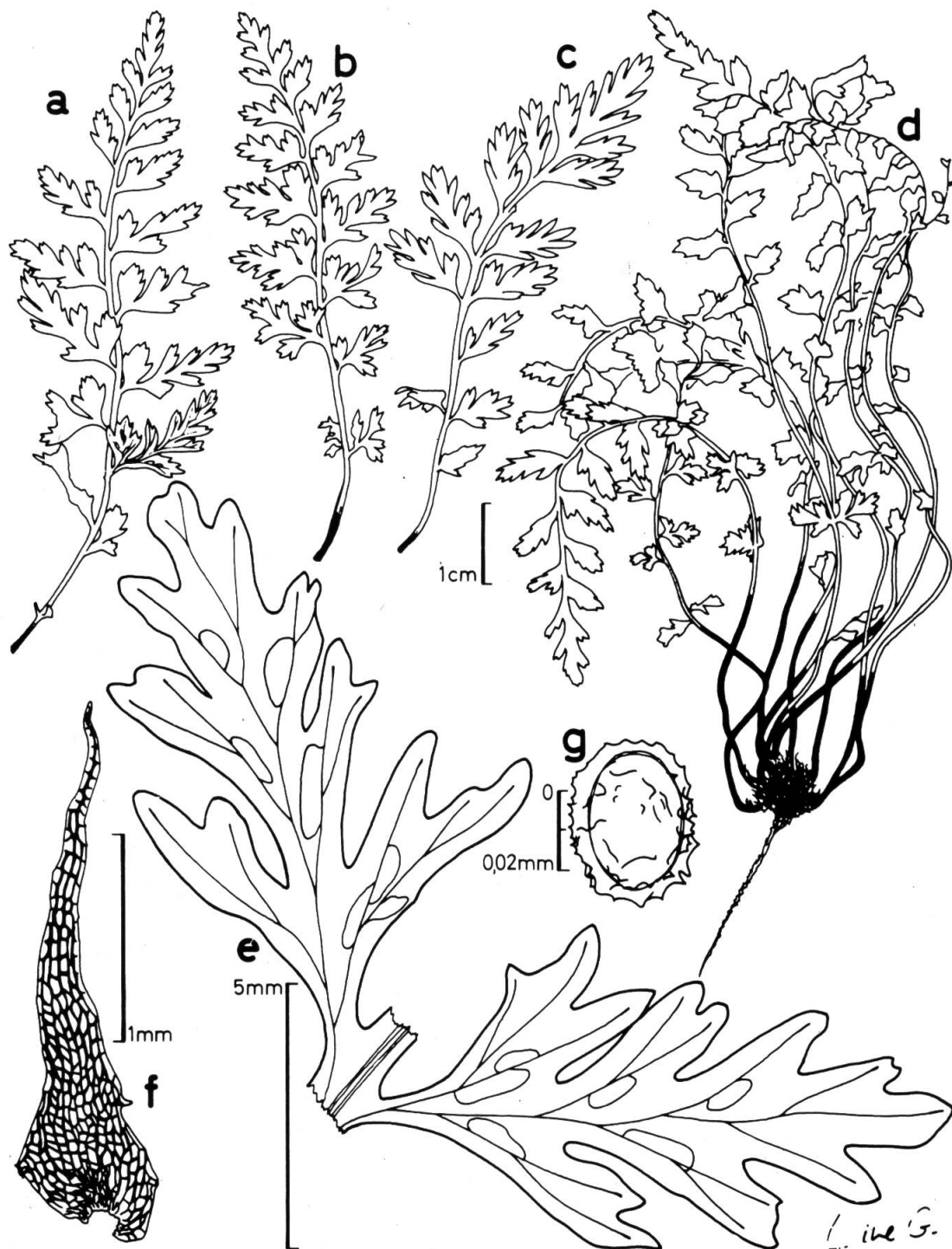


Fig. 1. — *Asplenium nesii* Christ

a, b, c, single fronds; **a**, from China, Prov. Kansu (PE-3405); **b, c**, from Jurram valley (original coll. Aitch.-256); **d**, part of whole plant from Inner Mongolia (TR-4975); **e**, pair of pinnae showing venation and sori (Aitch.-256); **f**, rhizome scale (TR-4975); **g**, spore $\times 500$ (TR-4975), a small spore with exospore $34\ \mu\text{m}$ long is given, main range is $36\text{--}42\ \mu\text{m}$. Design Line Guibentif.

litt. 11.7.1979), now TR-5069. Spores good, sowing on 23.7.1979 gave ample prothallia.

4. Inner Mongolia, locality as above, 5.7.1979, leg. Ma Yü-chuan, two small whole plants with ripe spores sent to Basel (in litt. 23.3.1980), now TR-5179. Spores good.

4.2. Material deposited in Peking (PE) (apart of that mentions sub 3)

Shensi: Licent 2334, 23.7.1929; Y.P. Hsu 1025.

Tibet: K. S. Fu 450; P. C. Tsoong 3205.

Kansu: Y. C. Ho 5427.

Hsingkiang (Chinese Turkestan): Tien Shan, R. C. Ching, s.n. 1956, on limestone; Y. C. Yong 710080, 700028, 730173.

Ninghsia: Ho-lan Shan, without collectors name.

Shansi: S. Y. Pao 2290.

Hopei: C. W. Wang 60586, 61789; W. Y. Hsia 1485, 2859.

4.3. Material seen in Herbaria outside China

"Afghanistan" (today probably in the district of Kurram, Pakistan).

1. With a printed label: "Plants collected by J. E. T. Aitchison, Surgeon Major, ... 1880" and additions written with pencil in Aitchison's hand: "256 June 30 Filices rocks blue limestone *Asplenium fontanum* Bernh." With a second label: "409 Herb. Mus. Paris. *Asplenium varians* Hook. & Grev. Afghanistan. Vallée de Kurram. Donné par la Direction du Jardin Royal de Kew. Reçu le 6.9.1881." One plant and six single fronds (P) (Fig. 1b, c, e). Further sheets of the same collection were seen in BM, FI and K.

2. The duplicate of above in BM had the following label: "Filices Malam Gorge 7000 ft. lime stone, June 30, 1880. J. E. T. Aitchison 256" (details again with pencil in Aitchison's hand on printed label) with additions in other hand writing "*Asplenium varians* Wall. ex Hook. & Grev." Three plants (two of them small) and three loose fronds (BM).

3. "*Asplenium* Afghanistan. 1. J. E. T. Aitchison 1880.", in ink (not written by Aitchison) and a second label "*Asplenium varians* Hook. Grev." (written by another person in ink). Two fragments of small plant and three fronds (P).

India. 1. U. P. Kumaun. Rocks in Dhauri valley 10.000', 6.8.1886. Coll. J. F. Duthie-6247(a) *Asplenium* (and in another hand: "exiguum, Bedd. pinnae unusually long") (DD). Big specimen, spores good, big, with exospore (33-)36-39(-42) μ m long.

2. U. P. Deoban, above Chakrata, about 25 miles W.N.W. of Mussoorie, alt. 9000', 1.10.1951, coll. R. L. Fleming No. 1096 (sub *A. varians*) (MICH), fourteen excellent single fronds. A duplicate (sub. *Polystichum thomsonii* (Hook.) Bedd.) (DD), two plants together with a third one of an *Asplenium* of the *A. varians* group.

China. 1. Prov. Shansi contr. Lu Yah-shan, parte media in rupibus 5.6.1925, leg. Lao Ch'in. Harry Smith No. 8133 (sub *A. varians*) (BM). Six single fronds.

2. Herb. H. F. Hance No. 13335. Alt. 6500 ft. (BM). One plant and four fronds, on the same sheet with many *Asplenium* of the *A. varians* group.

3. S.E. Tibet. Takpo Province. Above Nye Tsangpo valley, growing over rocks, 11.000 ft., F. Ludlow, G. Sherriff & G. Taylor No. 4234 (sub *A. moupinense* Franch.) (BM). Four plants and eight fronds.

4. S.E. Tibet. Takpo Province. Damp rocks above Nang, 11.000 ft., F. Ludlow, G. Sherriff & G. Taylor No. 4241 (sub *A. moupinense* Franch.) (BM). Two big plants.

5. S.E. Tibet, Kongbo Province, Yüsum, Tsangpo valley 10.500 ft. 2.7.1938. Growing on old walls, sandy soil. F. Ludlow, G. Sherriff & G. Taylor No. 5714 (sub *A. varians*) (BM). Ten plants and six fronds.

6. Tibet, Syanke (?), 13.000 ft. Rock crevice 28.9.1924. F. Ludlow (BM). Three big plants.

7. Tibet, Stretta de Tranggo. Substrato granitico — nelle fessure delle rocce — m. 4200 circa, 13.7.1937, leg. Fosco Maraini (No. 5); Herb. R. Pichi-Sermolli (No. 10869) (sub *A. moupinense* Franch.) (BM, FI). One plant and two fronds.

5. General distribution (so far as is known)

Kurram valley (formerly Afghanistan, today probably in the Distr. of Kurram, Pakistan), N.-India and China, centered in N.W.-China. *A. nesii* is therefore mainly a Sino-Himalayan element.

6. Possible relationship

Specimens of *A. nesii* in European, Indian and American herbaria are usually deposited sub *A. varians* Wall. ex Hooker & Grev. In our opinion *A. nesii* is not closely related to the *A. varians* complex, but much more to the group which one could call the *A. exiguum* Bedd. — *A. yunnanense* Franchet complex (including *A. moupinense* Franchet and other taxa). With members of this group it shares some common features, such as the shape of frond

(predominantly only bipinnatifid and tapering to the base) and the blackish colour at least on the lower part of the stipe (in *A. exiguum* and *A. yunnanense* the whole stipe is usually blackish and often the lower part of the rachis too). Apart from other distinct differences in the shape of pinnae etc., *A. nesii* never produces proliferous buds at the pinnae tips or rachis prolongations, which are pronounced in *A. exiguum* and often present in *A. yunnanense*.

Examination of cytology and hybridization experiments to check possible relationships will be started as soon as good living plants can be established in cultivation. Spores of *A. nesii* keep their viability for a long time; the spores of the specimen TR-4975, which was 22 years old, were sown in Basel and gave ample prothallia, but very few sporophytes. The fresh sample (TR-5059) collected by Professor Ma Yü-chuan, 1979, behaved in a similar way. It may be that this species is highly self-sterile.

7. Ecology

A. nesii is reported as growing on rocks from ca. 1000 to 4000 m alt. The type of rock is rarely indicated. Aitchison noted that it was limestone. Professor Ma kindly collected a fragment of rock from Inner Mongolia (near the University) on which he had collected the specimen and sent it to Basel. Professor W. Wimmenauer at the Institut of Mineralogy, University of Freiburg i. Br. (Germany), had it examined after a thin section had been prepared. The fragment turned out to be granit of the relatively rare one-feldspar type. *A. nesii* therefore seems to grow both on calcareous and acidic rocks and the small plants in cultivation also grew equally well on limestone containing and limefree, slightly acidic soil.

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