

NOTES ON GUIANA FERNS

by

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(Supplement to "The Ferns of Surinam").

This paper deals with the ferns collected by G. Stahel during his expedition to the Wilhelmina-range in the interior of Surinam. The material was partly collected in the hills at low altitudes, on the Gran Rio during the voyage and near the camp at the starting point for the mountains, mostly, however, on or near Summit 910, at about 800 m alt. (May 14, 1926), on or near Summit 1200, about 920 m h. (June 9, 1926), near Camp 40½ (June 12, 1926) at the same altitude, and on or near Summit 1280, about 1200 m above sea-level. Some plants again were collected at lower altitudes on the Coppename creek (June 11, 1926) and in the south-western part of Surinam on the Koetari river (October 16, 1926). The exact altitude at which the specimens were collected is mostly not indicated on the labels. For particulars on the localities mentioned cf. Bull. Nos. 82—87 of the Maatschappij ter bevordering van het Natuurkundig Onderzoek der Nederlandsche Koloniën; maps in Bull. No. 4, pp 119 and 120 and in Bull. No. 5, p. 203.

The material is in the Herbarium of the University of Utrecht; most of it was already determined by Dr. P. J. Eyma. Moreover I could study specimens of Surinam ferns in the Leyden herbarium, and had the opportunity to see the Richards collection of British Guiana ferns in the Kew herbarium, meanwhile published

by Alston (in Kew Bulletin, 1932, pp 305—317). A discussion of this is added to the present paper, which can thus be considered as a supplement to my book on the Ferns of Surinam and of French and British Guiana.

In the following enumeration the arrangement is after C. Christensen's Index Filicum; in a few cases newer nomenclature had to be used, in these cases the literature is quoted too.

Trichomanes cristatum Kaulfuss.

Summit 1200, on rocks, No. 459 (B.W. 7056) 9-VI-1926; summit 1280, common, No. 514 (B.W. 7093) 20-VI-1926.

Trichomanes diversifrons (Bory) Mettenius.

KM 40½, on loamy soil and wet rocks, No. 486 (B.W. 7288) 12-VI-1926.

Trichomanes elegans Richard.

Summit 1200, on rocks, No. 451 (B.W. 7124) 9-VI-1926.

Trichomanes pedicellatum Desvaux.

Summit 1200, climbing on trees, between mosses, No. 425 (B.W. 7066) 9-VI-1926.

Trichomanes pinnatum Hedwig.

KM 40½, on loamy soil, on wet rocks, No. 485 (B.W. 7186) 12-VI-1926.

Trichomanes rigidum Swartz.

Summit 1280, on loamy soil, 1100 m, No. 504 (B.W. 7152) 20-VI-1926 (this label is possibly not quite correct).

Hymenophyllum antillense Jenman.

Summit 1280, in mossy covering on trees, No. 506 (B.W. 7154).

This material is identical with the plants, gathered on the Roraima by Im Thurn (203, 375) and by Connell-Quelch (562), which I saw in the British Museum, and which have been mentioned in literature as *H. lineare* Swartz. The latter species, however, differs from *H. antillense* Jenman in being larger and less densely clothed with soft hairs; it seems to be restricted to the W. Indian Islands.

Hymenophyllum ciliatum Swartz.

Summit 1200, on rocks, No. 458 (B.W. 7055) 9-VI-1926; summit 1280, in mossy covering on trees, No. 507, (B.W. 7155) 20-VI-1926.

Hymenophyllum polyanthos Swartz.

Summit 1200, on rocks, No. 427 (B.W. 7075) 9-VI-1926. Of this specimen most of the tops of the segments are blunt; this character is probably caused by the fronds not yet being quite developed, the tops of the segments not yet being fully grown out. The specimen Leprieur 223, mentioned in "the Ferns" as *H. Kohautianum* Pr., which I could see again in the Paris herbarium, shows the same features; in my opinion it is the same plant. Whether the true *H. Kohautianum* Presl, the occurrence of which in the Guianas thus is not made certain at all, is really different, can here be left out of discussion.

Cyathea petiolulata Karsten.

Summit 1280, tree-fern, No. 518 (B.W. 7161) 20-VI-1926.

Alsophila marginalis Klotzsch.

Summit 1200, No. 444 (B.W. 7083), No. 455 (B.W. 7090) 9-VI-1926.

Alsophila phalerata Martius, var. *infesta* Kunze.

Gran Rio, Pina-swamp behind camp, No. 253, 8-III-1926.

Dryopteris effusa (Swartz) Urban.

Summit 1280, about 1000 m, No. 501 (B.W. 7158) 20-VI-1926.

The material is not sufficient for a reliable determination.

Dryopteris serrata (Cavan.) C. Christensen.

Gran Rio, near the camp, No. 226, 6-III-1926.

Aspidium martinicense Sprengel.

Coppename creek, rather common along its borders, No. 469, (B.W. 7215) 10-VI-1926.

Cyclodium meniscioides (Willdenow) Presl.¹⁾

¹⁾ Possibly the specimen No. 463 (B.W. 7218) from camp 52, 9-VI-1926, belongs to this or an allied species.

Near camp KM 40½, No. 496 (B.W. 7202) 12-VI-1926.
Bolbitis nicotianifolia (Sw.) Alston, Kew Bulletin, 1932,
 p. 310. *Leptochilus nicotianifolium* (Swartz) C. Christensen.

A specimen collected in Surinam by Kappler (no. 6, 1862) in the Leyden herbarium, labelled *L. pandurifolius* (Hk.) C. Christensen, quite agrees with the above named species, except for the smaller size and fewer pinnulae. As most species of this group are variable in size and development of the leaves, it may safely be assumed that this specimen belongs to *Bolbitis nicotianifolius* (Sw.) Alston.
Lindsaya dubia Sprengel.

Near KM 40½, on loamy soil, No. 484 (B.W. 7187) 12-VI-1926.

Lindsaya falcata Dryander.

Summit 1200, No. 449 (B.W. 7088) 9-VI-1926.

Lindsaya sagittata (Aublet) Dryander.

Summit 1200, on wet loamy soil, No. 462 (B.W. 7087) 9-VI-1926.

Asplenium praemorsum Swartz.

Collected in Surinam without indication of locality by Weigelt; the specimen is in the Leyden herbarium.

Asplenium sulcatum Lamarck.

Summit 910, common on bare, moist rocks, about 800 m above sea-level, No. 390 (B.W. 7219) 14-V-1926.

Blechnum occidentale Linnaeus.

Without indication of date or locality: B.W. 7224.

Stenochlaena japurensis (Martius) Grisebach; Underwood in Bulletin Torrey Bot. Club, vol. 23, p. 598, 1906.

Stenochlaena marginata (Schrader) C. Christensen.

Upper Gran Rio, pina swamp behind the camp, No. 247, 8-III-1926.

Gymnopteris rufa (Linn.) Bernhardt.

Upper Koetari river, along the borders, near the last cataract, No. 614 (B.W. 7005) 16-X-1926.

Doryopteris sagittifolia (Raddi) J. Smith.

Summit 910, on wet rocks, about 800 m, No. 396 (B.W. 7221) 14-V-1926; KM 49, in primary forest, common on wet rocks, No. 420 (B.W. 6795) 5-VI-1926.

***Adiantopsis radiata* (Linnaeus) Fée.**

Summit 1200, No. 450 (B.W. 7081) 2-VI-1926.

This specimen has winged petioles; this character was used by Prantl to describe a species *A. alata* based on the specimen Schomburgk 1132, from the Canuku Mts. A study of more ample material learns that transitional stages can be found from narrow lateral lists on the adaxial side of the petioles, to well developed wings, a few mm broad, which easily break down in dried specimens. Except in the above mentioned material from British Guiana, such wings were also observed in Hulk 272, Gran Rio, Surinam, a specimen collected by Leprieur in Cayenne (Br. Mus.), and another one, collected by Glaziou in Brazil. Even if this form is considered to be a separate species, it has a wide distribution and has therefore to be removed from the list on p. 182 of "The Ferns", in which it is mentioned as an endemic species of British Guiana.

***Adiantum latifolium* Lamarck.**

Near the camp, Gran-Rio, in dark primary forest, No. 280, 21-III-1926.

***Adiantum obliquum* Willdenow.**

Gran Rio, near "de Haan" cataract, rather common, along the loamy river-banks, near the high-water level, No. 262, 17-III-1926.

***Adiantum serrato-dentatum* Willdenow.**

Gran Rio, near the Maupé-barrage, No. 172, 20-II-1926.

***Adiantum terminatum* Kunze.**

Gran Rio, Pina-swamp behind the camp, in marshy places, No. 251, 8-III-1926.

***Cochlidium furcatum* (Hooker et Grev.) C. Christensen** in Dansk Bot. Arkiv, vol. 6, p. 18, 1929; *Eschatogramme furcata* (Linn.) C. Christensen.

Summit 1200, between mosses on tree-branches and on rocks, No. 426 (B.W. 7064) 9-VI-1926.

Cochlidium linariaefolium (Desvaux) Maxon; C. Christensen in Dansk Bot. Arkiv, vol. 6, p. 18, 1929; *Monogramme linariaefolia* Desvaux.

Summit 1280, on branches between moss, No. 512 (B.W. 7167), 20-VI-1926.

Polypodium adnatum Kunze.

Gran Rio, Pina swamp, behind the camp, climbing on trees, No. 254, 8-III-1926.

Polypodium aureum Linn.

Summit 910, covering the moist bare rocks, at 800 m above sea level, No. 391 (B.W. 7222) 14-V-1926.

Polypodium fraxinifolium Jacquin.

A sterile but characteristic specimen, collected, "in the interior" of Surinam by I. G. Westphal, No. 7, without further indication of the locality, is in the Leyden herbarium.

Polypodium hygrometricum Splitgerber.

Camp 49, on moist rocks, No. 417 (B.W. 6972) 5-VI-1926.

Polypodium jubaeforme Kaulfuss.

KM 40½, on tree-trunks, between mosses, No. 483 (B.W. 7195) 12-VI-1926.

Polypodium Stahelianum Posthumus.

Summit 1200, on rocks, No. 460 (B.W. 7085) 9-VI-1926. The material consists of a few scanty specimens only.

Polypodium pressum Brause.

Summit 1280, epiphytic, on branches, No. 511 (B.W. 7165) 20-VI-1926.

Polypodium trichomanoides Swartz.

Summit 1200, on trees, between mosses, No. 428 (B.W. 7062) 9-VI-1926; summit 1280, on branches between mosses, No. 513 (B.W. 7166) 20-VI-1926.

Polypodium trifurcatum Linnaeus.

Summit 1200, No. 424 (B.W. 7067) 9-VI-1926; summit

1280, on trees at 1000 m altitude, No. 505 (B.W. 7153) 20-VI-1926.

Schizaea elegans (Vahl) Swartz.

KM 40 $\frac{1}{2}$, between moist rocks, No. 490 (B.W. 7183).

Ophioglossum macrorrhizum Kunze.

This species, also known from French Guiana and Brazil, is mentioned from Surinam by Miquel (Ann. Lugd. Bot., vol. IV, p. 93, 1868). This statement was overlooked in "the Ferns".

Of the 42 plants, mentioned above, 7 are new for Surinam. One of them, *Bolbitis nicotianifolius* was known already from both British and French Guiana. The same is the case with *Adiantopsis alata* Prantl, if considered a distinct species. *Ophioglossum macrorrhizum* Kunze is known from French Guiana and Brazil. This demonstrates once more the homogeneity of the fernflora of the lower altitudes throughout the 3 Guianas.

As stated in "the Ferns" on pp 178—184 the larger number of species in British Guiana is due to the fact that collecting work has been done there also at higher altitudes, up to about 2800 m. Though, of course, ferns of the summit region cannot be expected in Surinam and French Guiana, species of the lower slopes, above about 900 to 1000 m altitude, might be expected to be found in the interior as soon as it was possible to penetrate into the mountaneous part. A short list of 6 species of this group was already given; now 6 more species can be added, which, though in absolute sense not a high number, is already a rather high percentage of this collection. These species are: *Alsophila marginata* Klotzsch, *Asplenium praemorsum* Sw., *Cyathea petiolulata* Karsten, *Hymenophyllum antillense* Jenman, *Polypodium pressum* Brause, and *P. trifurcatum* Linn., all of which were known, formerly, in the Guianas, from the Roraima only. Further exploration

no doubt will increase this group of species. The ferns of the Richards collection were gathered at low altitude only; some new finds also show the homogeneity of the flora of the Guiana lowlands.

The species new for British Guiana in the Richards collection are the following: *Lindsaya surinamensis* Posth., formerly known from Surinam only; *Polypodium nanum* Fée, formerly known from French Guiana only; *Danaea Leprieurii* (no. 702, 751)¹⁾ which was already known from French Guiana and from Surinam. New for the Guianas are the following species: *Trichomanes cordifolium* (Fée) Alston, *T. hymenophylloides* v. d. B., *T. eximium* Kze and *Polypodium consimile* Mettenius. Furthermore *Lindsaya crenata* Kl. is considered to be a good species, endemic in British Guiana. These species are all from the lowlands. From the Roraima mountains, from the lower forest, about 1600 m above sea level, I saw a specimen of *Asplenium dissectum* Sw., collected by Ule (no. 8524, Febr. 1910), in the Leyden herbarium.

If these additions to our knowledge are taken into account, and *Adiantopsis alata* and *Hymenophyllum Kohautianum* are omitted, the composition of the fern flora of the Guianas is, as indicated in the following list:

Found in the 3 Guianas	135	Species
In British and French Guiana	16	„
In Surinam and French Guiana	15	„
In Surinam and British Guiana	30	„
In Surinam only	19	„
In French Guiana only	18	„
In British Guiana only	125 ²⁾	„
	358	Species

¹⁾ These specimens are not mentioned in Alston's publication.

²⁾ Of which number 96 species are known from the Roraima and neighbouring mountains only.