

Notes on the North American species of *Phanerophlebia**

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In determining recently two species of *Phanerophlebia* collected by the writer in the mountains of Chiriqui, in western Panama, it became necessary to go somewhat critically over most of the material of this genus in the U. S. National Herbarium. Specimens have been received from various sources during the past twelve years, so that it is now possible to separate the species somewhat more exactly than at the time of Dr. Underwood's revision of the genus,† and partly by the use of characters not previously emphasized. The following key and notes are offered merely as supplementing that treatment. One species, *P. guatemalensis*, appears not to have been well founded.

Key to the North American species of *Phanerophlebia*

Venation copiously areolate.

Plants of lax spreading habit; pinnae few (5-11), normally 3.5-5 cm. broad; veins distant (mostly 3-3.5 mm. apart), spreading at a very wide angle; sori distinctly infra-medial upon the veinlets, the first row distant usually about 2 mm. from the midvein, the other sori similarly situated or often nearly basal upon the branches. 1. *P. juglandifolia*.

Plants apparently of more upright habit; pinnae numerous (16-20), mostly 2-3 cm. broad; veins closer, usually 2-2.5 (rarely 3) mm. apart, much more oblique; sori medial or supramedial (rarely subterminal), the first row usually 3-5 mm. distant from the midvein. 3. *P. remotispora*.

Venation wholly free, or the veins casually anastomosing near the margin.

Pinnae 3-5, cordate or at least subcordate at the base. 2. *P. pumila*.

Pinnae 10-30, variously cuneate, or unequally rounded or auriculate at the base, never cordate.

Sori borne in a definite zone much nearer the margin than the midvein. 5. *P. umbonata*.

Sori occupying a medial zone or generally distributed over the pinna.

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† Bull. Torrey Club 26: 205-216. 15 My 1899.

Lamina 15-30 cm. long; pinnae auriculate at the upper base, the auricles usually overlapping the rachis, the margins elsewhere serrate or often deeply incised.

6. *P. auriculata*.

Lamina 40-90 cm. long; pinnae not auriculate.

Pinnae 12-15 cm. long, mostly falcate; veins 1.5-3 mm. apart at the base, the veinlets very close; sori small; margins slightly cartilaginous, nearly all the outer veinlets prolonged into slender awnlike antrorse teeth.

4. *P. nobilis*.

Pinnae 18-25 cm. long, usually very much broader (3-4 cm.); veins 4-6 mm. apart at the base, branched at a much wider angle; sori very large; margins heavily cartilaginous, the marginal teeth stout and short, one to each group of veinlets.

7. *P. macrosora*.

1. PHANEROPHLEBIA JUGLANDIFOLIA (H. & B.) J. Sm.

In addition to Dr. Underwood's description it may be noted that the rhizome is woody, relatively slender (about 1 cm. in diameter), 10 cm. long, or less, decumbent and without exception strongly curved. The small crown is densely clothed within with thin dark brown deltoid-oblong laxly ciliate scales, mostly with lighter brown margins. A few similar scales are borne at intervals along the strongly sulcate greenish or stramineous stipe. Both this and the next species are remarkable for the length of the stipe, which is usually much greater than that of the lamina. The characters of venation and position of sori mentioned above in the key appear to be constant, in the case of normally well-developed plants.

As observed by the writer in Alta Verapaz, Guatemala (*Maxon & Hay* 3289), and in the mountains of Chiriqui (*Maxon* 4935, 5192, 5544), at from 900 to 1,500 meters elevation, *P. juglandifolia* grows in deep shade, on very humid heavily forested slopes. Additional specimens, not cited by Dr. Underwood, are as follows:

COSTA RICA: Alajuelita, altitude 900 meters, *John Donnell Smith* 8074; collected by A. Alfaro, original number 103.

GUATEMALA: San Miguel Uspantan, altitude 6,000 ft., *John Donnell Smith* 3259;* collected by Heyde and Lux. Coban, Alta Verapaz, altitude 1,350 meters, *H. von Türckheim* II. 1856.

* The balance of this number in the National Herbarium (3 sheets) is *P. remotispora*.

The Coban plants, which are only partially fertile and are aberrant in the position of the sori, were listed* incorrectly by the writer as *P. remotispora*.

2. PHANEROPHLEBIA PUMILA (Mart. & Gal.) Fée.

Of this species only the following material has been seen by the writer:

MEXICO: Top of the Sierra Madre, near Chilpancingo, Guerrero, *E. W. Nelson 2222* (2 sheets).

3. PHANEROPHLEBIA REMOTISPORÆ Fourn.

There are in the National Herbarium three sheets of specimens of this species from the vicinity of Cordoba, Vera Cruz, collected by Hugo Fink, 1889-1891, no. 60, and not listed by Dr. Underwood. Two of these represent fertile fronds which appear quite typical; the third is of a plant with four fronds (30 to 50 cm. high), three of which are sterile, the fourth partially fertile and showing the true characters of the species in the position of its sori. The rhizome, which is not very complete, appears to have been short and nearly erect; it is clothed with thin delicate pale brown laxly ciliate-fibrillose scales of oblong-ovate form. A few scales of similar character occur sparingly upon the lower part of the stipe, and mixed with them are others that are nearly capillary and of a rusty color. These last extend along the stipe and rachis throughout, but are readily abraded. The pinnae of this young and nearly sterile plant are narrowly ovate or oblong-ovate, 10 to 12 cm. long, 2.5 to 3 cm. broad (3.5 in one pinna), strongly falcate, long-acuminate and caudate. The margins are conspicuously long-spinulose nearly or quite to the base of the pinna (the spines very oblique or appressed), in this respect differing widely from *P. juglandifolia*.

An additional specimen is:

MEXICO: Orizaba, altitude 4,000 ft., Aug. 26, 1891, *Henry E. Seaton 49*; distributed as *Hemitelia* sp.

4. PHANEROPHLEBIA NOBILIS (Schlecht.) Fée.

A species readily distinguished by the characters noted in the key. The margins are, naturally, more freely spinulose in the

* Contr. U. S. Nat. Herb. 13: 20. 1909.

sterile fronds, the numerous teeth being almost wholly correlated with those outer veinlets that extend to the margin.

A single new specimen:

MEXICO: Ixtaccihuatl, *C. A. Purpus* in 1905, 1595.

5. PHANEROPHLEBIA UMBONATA Underw.

A unique species, not to be confused readily with any other of the genus. A single additional specimen has been received:

MEXICO: Sierra Madre, above Monterey, Nuevo Leon, altitude 3,000 ft., March 12, 1906, *Pringle* 13739.

6. PHANEROPHLEBIA AURICULATA Underw.

This species is noteworthy not only for its auriculate and often incised pinnae, but for its thin, almost membranous texture.

The following additional specimens have been received:

NEW MEXICO: Van Patten's Camp, Organ Mountains, Doña Ana County, altitude about 6,300 ft., *Wooton*, May 14, 1899, and March 5, 1902. Filmore Cañon, Organ Mountains, Doña Ana County, *Wooton*, Feb. 28, 1904.

7. PHANEROPHLEBIA MACROSORA (Baker) Underw. Bull. Torrey Club 26: 213. 1899

Aspidium juglandifolium var. *macrosorum* Baker, Journ. Bot. 25: 25. 1887.

Phanerophlebia guatemalensis Underw. Bull. Torrey Club 26: 214. 1899.

Complete material now at hand indicates very clearly that *P. guatemalensis*, founded upon John Donnell Smith's no. 3241, collected by Heyde and Lux at San Miguel Uspantan, Department of Quiché, Guatemala, altitude 7,000 ft., is identical with *P. macrosora*, which was described first as a variety by Baker based upon imperfect Costa Rican specimens collected by J. J. Cooper. Specimens of both type collections are in the National Herbarium, and in addition further very complete specimens from Guatemala, Costa Rica, and western Panama. These prove beyond all question the distinctness of the species as emended and indicate for it a probable continuous distribution along the higher mountains

of Central America. From this material the following description is drawn:

Rhizome very stout, decumbent, chaffy at the summit, bearing a semierect crown of 4 to 6 fronds, these 85 to 135 cm. long; stipes stout, 35 to 45 cm. long, 5 to 9 mm. thick at the base, at first very densely clothed on all sides with spreading light brown to dirty yellowish brown oblong to oblong-ovate scales, these 1 to 2 cm. long, of thin texture, or those toward the base thicker, glossy, and with darker brown centers, all delicately erose or lightly fimbriate-lacerate; lamina oblong to very broadly oblong in outline, 40 to 90 cm. long, 25 to 45 cm. broad, comprising 6 to 17 pairs of equal pinnae below the conform terminal segment of the same size; rachis very stout, strongly angled, copiously but deciduously chaffy, the scales narrow to nearly capillary, forming a loosely crispate covering; pinnae spreading or somewhat ascending, 4.5 to 7 cm. apart on each side, straight or nearly so (rarely falcate), 18 to 25 cm. long, 3 to 4 cm. broad,* sharply long-acuminate, narrowly oblong to oblong-lanceolate from a strongly inequilateral base, the upper side broadly cuneate and parallel to the rachis, the lower widely and abruptly excavate, all petiolate (the basal ones 5 to 10 mm.); leaf tissue coriaceous, the under surface bearing numerous minute setiform reddish scales, especially along the veins; veins 4 to 6 mm. apart at the base, evident, or below conspicuously elevated, 3- to 5-forked, the lowest proximal branch usually extending nearly to the margin; margins strongly cartilaginous, the marginal teeth stout and short, almost invariably only one to each group of veinlets; sori (except with age) very large, 2 to 3 mm. in diameter, hemispheric, distinctly inframedial as to the veinlets, 1 to 4 to each group, forming 1 to 4 lines (the outer ones often incomplete) upon each side of the midvein, the first row usually about 1 to 2 mm. distant, the others close or apart, never extending to the vicinity of the margin; indusia ample, but delicate and usually early withering.

Specimens examined in the National Herbarium:

COSTA RICA: Without definite locality, *J. J. Cooper* (type collection). Forêts du Tittoral, southeastern slope of Volcano Irazu, altitude 2,400 meters, *Pittier* 848. Forêts du Copey, altitude 1,800 meters, *Tonduz* 11930.

GUATEMALA: San Miguel Uspantan, Depart. Quiché, altitude 7,000 ft., *J. D. Smith* (Heyde & Lux) 3241 (type collection of *P.*

* In one exceedingly fertile frond only 2 cm. broad.

guatemalensis). Volcano Atitlan, Depart. Sololá, *W. A. Kellerman* 5774.

PANAMA: Vicinity of Camp Aguacatal, eastern slope of Chiriqui Volcano, altitude 2,100 to 2,300 meters, March 10-13, 1911, *Maxon* 5273, 5290.

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