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Novitiae florae cubensis No. 39

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Novelties in the fern genus *Polystichum (Dryopteridaceae)* I. Three new taxa for Cuba

Abstract

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A recent study of about 2500 specimens from 23 herbaria globally complemented a taxonomic study of Cuban species of the genus *Polystichum* that has been carried out since 2000. Three new taxa of Cuban *Polystichum* are described: *P. decoratum* subsp. *habanense, P. guajaibonense* and *P. sanchezii*. The differences to allied species are discussed for each taxon. *P. decoratum* subsp. *habanense,* endemic to western Cuba, can be distinguished from the nominal subspecies, endemic to eastern Cuba, by the leaf morphology, the presence of a basiscopic auricle on the basal pinnae, pinna margin and position of the sori. *P. guajaibonense* is endemic to western Cuba and, based on the proliferous flagelliform apex, can be confused with *P. machaerophyllum* and *P. ilicifolium,* two species from eastern Cuba, from which it can nevertheless easily be distinguished by the conduplicate petiole scales and the conspicuously serrate margin immediately above the auricles. *P. sanchezii* co-occurs in central Cuba with *P. trapezoides* and can be separated from it by the 1-pinnate frond, shorter leaf apices, crenate pinna margin, sharply triangular pinnae auricles and the irregular and bicolored indusium margin. Pictures of the type specimens of each taxon are also provided.

Additional key words: ferns, *Pteridophyta,* taxonomy, Greater Antilles

Introduction

Polystichum Roth is a cosmopolitan genus that molecular studies confirm as monophyletic within *Dryopteridaceae* (Little & Barrington 2003; Li & al. 2004; Smith & al. 2006; Schuettpelz & Pryer 2007). Despite this, it has been a taxonomically complex group because of the great morphological variability found in many of the species, together with the high occurrence of hybrids (Knobloch 1976; Tryon & Tryon 1982; Barrington 1985).

Many studies have formed the current knowledge that exists about the taxonomy of *Polystichum* in the West Indies (Maxon 1909, 1912, 1922; Christensen 1936; Morton 1967; Proctor 1977, 1985, 1989; Mickel 1997). Of note in the region are the presence of a great number of 1-pinnate species and the high frequency of vivipary as an alternative means of reproduction, which make the Caribbean species of *Polystichum* more similar to those from Asia, especially from western China, and the western Pacific, than to those of the New World. For Cuba, Maxon's works (1909, 1912, 1922) on *Polystichum* in the Greater Antilles constitute the first revisionary study of the genus; these were based on then new collections and the study and identification of specimens in Cuban herbaria. More recently, Morton (1967) and Mickel (1997) published studies of the genera that include identification keys, descriptions and analyses of the problematic taxonomy of the species.

In 2000, the first author began a new taxonomic study of Cuban *Polystichum,* which, to date, has included extensive field work with observation of the populational habitat conditions, macromorphological and micromor-

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phological analysis, and palynological, anatomical, and epidermal-cytology studies of the Cuban species (unpublished Bachler's and Master's theses 2004 and 2008, respectively, and ongoing research).

Here, we provide a first report based on recent study of about 2500 specimens (dry material) and online images from the herbaria of B, BM, BR, BSC, C, F, G, GH, HAC, HAJB,IJ, JE, K, L, MICH, MO, NY, P, PH, RB, S, U, UC, UPS, US, UW, YU (herbarium abbreviations following Thiers 2008+), including all the known species for the West Indies. The work reveals three entities new to science (2 species and 1 subspecies) based on study of frond morphology, lamina apex type, characteristics of the scales of the stem and petiole, presence or absence of auricles, pinna margin type, indusium morphology and indument, geographic distribution and habitat characteristics.

Results and Discussion

Polystichum decoratum subsp. ***habanense*** Morejón & C. Sánchez, **subsp. nov.**

Holotype: Cuba, La Habana, Jaruco, ladera norte de los mogotes de "La Chirigota", 23°2'30"N, 82°5'30"W, bosque semicaducifolio sobre carso, 100–150 m, 23.12. 2010, *C. Sánchez & R. Morejón HFC-86617* (HAJB) – Fig. 1.

Rupicolous. *Stem* erect or ascending, 2–3 mm in diameter (excluding the petiole bases), scaly; *scales* basifixed, deltate, 2–4 × 0.5–1 mm, dark brown, apex acuminate or acute, edge glandular in the apical third, anticlinal cell walls noticeably sclerotised. *Fronds* polymorphic, mostly rooting, 20.5–44 cm long; *petiole* grooved adaxially, 7–12 cm long (1/3 frond length), 1–2 mm in diameter, scaly principally at the base; *scales* brown, basifixed, deltate, ovate or narrowly lanceolate, 2–4 × 1.5–2 mm, straight or rather curved, apex acuminate, margin irregularly denticulate (upper petiole scales strongly spreading, linear-lanceolate, apex filiform, margin sparsely denticulate, to 3 mm long); *lamina* lanceolate or linear-lanceolate, 1-pinnate, 13.5–32 × 2.3–5 cm, chartaceous, gradually reduced towards the apex, apex flagelliform (occasionally pinnatifid), 3–9 cm long, with a propagule (vegetative bud) at the tip; *rachis* inconspicuously winged, adaxially slightly grooved, abaxially with filiform scales, these spreading, to 2 mm long, base broad and fimbriate; *pinnae* 9–12 pairs, the largest 1.3–3.5 × 1–2 cm, ovate or lanceolate, oblique, petiolulate (petiolules 1–2 mm long), alternate throughout, mostly auriculate only acroscopically (the basal pinnae evidently auriculate basiscopically and acroscopically and generally shorter and broader than the medial pinnae), apex apiculate, base inequilateral, decurrent and cuneate-decurrent, margin crenate (crenulations apiculate) or lobed (lobes acute or apiculate), adaxial surface naked, abaxial surface with stramineous filiform scales to 1 mm long on the veins; *venation* free, not prominent, pinnate, veins branched up to three times. *Sori* inframedial or nearly so, orbiculate, 4–8 pairs per pinna; *receptacle* concave; *indusium* absent.

Etymology — The subspecific name alludes to the fact that this species is found only on limestone formations in the eastern part of the formerly larger province of Habana in western Cuba, part of which was split in 2010 in the new separate province of Mayabeque.

Delimitation — Polystichum decoratum Maxon is the only 1-pinnate species, in Cuba, that lacks an indusium. *P. decoratum* subsp. *habanense* is distinguished from *P. decoratum* subsp. *decoratum* by the following characteristics: polymorphic fronds with flagelliform and proliferous (having a vegetative propagule) apices as well as pinnatifid and non-proliferous apices (versus monomorphic fronds with only flagelliform and proliferous apices); basal pinnae auriculate acroscopically and basiscopically (versus auriculate only acroscopically, with straight and entire margin basiscopically); pinna margins crenate or lobulate (versus serrate); sori inframedial (versus medial to supramedial); found only in western Cuba (versus eastern Cuba).

Polystichum rhizophorum (Jenman) Maxon is a Jamaican species, which is probably also present in Cuba and is very close to *P. decoratum* based the absence of indusia. Nevertheless, *P. decoratum* is either monomorphic or polymorphic, but *P. rhizophorum* is always dimorphic; also the morphology of the scales on the pinnae distinguish these two species, which in *P. decoratum* are filiform with the broad base conspicuously fimbriate (versus filiform with narrow base and entire margin).

Distribution and habitat — Polystichum decoratum subsp. *habanense* is endemic to the Habana-Matanzas 'limestone heights' in western Cuba (present-day Mayabeque and Matanzas provinces), where it grows in shady, humid, limestone rock cavities in mesophyllous evergreen forests on naked karst, at 100–200 m elevation.

Additional specimens examined — Cuba: Prov. Mayabeque [formerly Prov. Habana]: Madruga, 2.4.1903, *J. A. Shafer 48* (HAJB, NY, UC); Loma de la Farola, 12.1.1913, *Fr. León* (L, P); Abra San Juan de Dios, Loma la Jaula, Tapaste, 12.1.1913, *Fr. León 3517* (S 11-24252); Lomas de Tapaste, cerca de Mendoza, 25.3.1913, *Hno. León LS-3629* (HAC, NY); Cuba occident., 1914, *E. L. Ekman* (S 11-24259); Tapaste, Lomas de la Jaula, Caliejon [Callejón] del Matador, ad rup. umbros., 11.6.1914, *E. L. Ekman 1328* (S 11-24257, 11-24258); Escaleras de Jaruco, sobre rocas calcáreas, 29.3.1928, *Hno. León LS-13321* [the acronym before collection number, for Cuban collectors, represent a serial numeration, see Regalado & al. 2008] (HAC); Sierra del Grillo, Madruga, en pare-

Fig. 1. *Polystichum decoratum* subsp. *habanense* – holotype specimen at HAJB.

dones, 5.7.1928, *J. T. Roig 4623 (= SV-20313)* (HAC); Sierra del Grillo, Madruga, 7.1939, *Hno. Clemente NSC-2451* (GH, HAC); Escaleras de Jaruco, La Vigía, 17.3.1946, *J. Acuña & J. T. Roig SV-23886* (2×) (HAC); Sierra del Grillo, Madruga, lomas calizas, 24.2.1956, *Hno. Alain 5283, 5288* (HAC); La Chirigota, Jaruco, bosque semicaducifolio degradado sobre carso, 23°02'30"N, 82°05'30"W, alt. aprox. 100–150 m, 20.12.2010, *C. Sánchez & R. Morejón HFC-86504, HFC-86505, HFC-86506, HFC-86513, HFC-86514* (HAJB); Ladera norte de los mogotes de "La Chirigota", Jaruco, bosque semicaducifolio sobre carso, 100–150 m, 23.12.2010, *C. Sánchez & R. Morejón HFC-86603, HFC-86629* (HAJB). — Prov. Matanzas: Ad rupes ad fl. St. Joachin prope Matanzas, rara [without date], *Rugel 19* (B 20 0157275b, NY); Ceiba Mocha, mogote, 8.1939, *F. Clemente LS-19057* (HAC).

Polystichum guajaibonense Morejón & C. Sánchez, **sp. nov.**

Holotype: Cuba, Pinar del Río, Bahía Honda, Pan de Guajaibón, subida por el camino de Los Mulos hasta la cima, bosque semideciduo mesófilo y pluvisilva, 200–720 m, 24.8.2010, *C. Sánchez, R. Morejón & V. Fuentes HFC-86443* (HAJB) – Fig. 2.

Terrestrial. *Stem* erect or ascending, 1.7–2.5 mm in diameter (excluding the petiole bases), scaly; *scales* lanceolate to deltate, 1.7–2.6 × 0.5–1.1 mm, golden yellow, slightly curved or straight, apex acute, base truncate, margin ciliate in the distal half and subentire in the proximal half. *Fronds* polymorphic, rooting or not, (22–)32–55(–70) cm long; *petiole* grooved adaxially, (3.5–)7–17(–21) cm long ($^1/_5$–$^1/_3$ frond length), 1–1.5 mm in diameter, scaly principally in the proximal third; *scales* concolorous, basifixed, of two kinds, (1) linear-lanceolate, 6–10 × 0.5–1 mm, golden brown, straight, the apex long acuminate, the margin irregularly ciliate in the distal third (cilia unicellular and simple) and subentire in the rest, and (2) conduplicate, the base encircling the entire petiole, broadly ovate, 6.5–10 × 4–8 mm, golden brown, straight, the apex apiculate and the margin ciliate only at the apex (cilia unicellular, short, simple and blunt) and subentire in the rest; *lamina* lanceolate to linear-lanceolate, 1-pinnate, (20–)24–44(–48) × 3–9 cm, coriaceous, gradually reduced towards the apex; apex flagelliform or pinnatifid (generally in young plants), the flagelliform apices (6–)13–19(–23) cm long, 0.5–1.5 mm wide, with a propagule (vegetative bud) at extreme tip, the pinnatifid apices acute; *rachis* grooved adaxially, not winged, scaly on both surfaces; *scales* basifixed, filiform, 2.5–8 × 0.1–0.5 mm, stramineous, irregularly sinuous, fimbriate (fimbriae multicellular, branched or not), margin irregularly denticulate in the distal half (the teeth widely spaced); *pinnae* 11–22 pairs, alternate or subopposite at the base, the largest lanceolate, 1.6–5.4 × 1–1.8 cm, spreading to ascendant, straight, petiolulate (petiolule up to 1–2 mm long), the apex acute, the base obtuse, asymmetric, auriculate acroscopically and basiscopically (the latter less developed and narrower), margin conspicuously serrate, both auricles acute, spinulose, scaly on both surfaces; *scales* similar to those of the rachis; *venation* free, pinnate, veins (in the largest pinnae) branched up to 9 times and prominent on the abaxial surface. *Sori* medial to inframedial, orbicular, producing a prominence on the adaxial surface, 3–7 pairs per pinna, occasionally 1–2 pairs are visible on the acroscopic auricle; *receptacle* concave; *indusium* suborbicular, brown, glabrous, margin lacerate and ciliate, 1.1–1.5 mm in diameter (hairs up to 0.5 mm long).

Etymology — The name allude to the geographical location of this taxon, currently known only from El Pan de Guajaibón, Pinar del Río.

Delimitation — Polystichum guajaibonense co-occurs with *P. wrightii* (Baker) C. Chr. ex Maxon, from which it can be easily distinguished by the following features: petiole $^1/_5$ to $^1/_3$ (versus $^2/_3$) of the blade length, pinnae 11–22 (versus 5–9) pairs, pinna margin conspicuously serrate (versus subentire), pinnae auriculate acroscopically and basiscopically (versus auriculate only acro-

Table 1. Differences between *Polystichum guajaibonense* and allied species. Medial pinna margin refers to the area immediately above the auricles. Scales are those of the stem apex and petioles.

Species	Medial pinnae margins	Scales
P. guajaibonense	conspicuously serrate	concolorous, broadly ovate or linear-lanceolate, conduplicate, surrounding the petiole diameter with its base
P. machaerophyllum	subentire, crenate, inconspicuously serrate or occasionally dentate	concolorous, ovate or lanceolate, joined to the petiole by only a small portion of its diameter
P. ilicifolium	subentire, regularly or irregularly spiny	bicolorous and lanceolate or ovate-lanceolate, or concolorous and linear-triangular, joined to the petiole by only a small portion of its diameter

Fig. 2. *Polystichum guajaibonense* – holotype specimen at HAJB.

scopically), and lamina apex generally flagelliform and rooting apically (versus pinnatifid and never rooting).

The fact that *Polystichum guajaibonense* can present polymorphic fronds, principally with flagelliform and proliferous apices and, less frequently, pinnatifid and non-proliferous apices, can cause it to be confused with *P. machaerophyllum* Slosson or *P. ilicifolium* Fée. Nonetheless, it can be differentiated from these two species by petiole scale and pinna margin characteristics (colouration and morphology, see Table 1), and its restricted geographical distribution in western Cuba (versus eastern Cuba).

The Charles Wright collections of this and other Antillean *Polystichum* species present a particular challenge. The plants collected by Charles Wright under his number 828, deposited in B, NY (3×) and US, that I have identified as *P. guajaibonense* are mixed with *P. decoratum* subsp. *decoratum,* a taxon endemic to eastern Cuba. All collections more recent than C. Wright's of *P. decoratum* subsp. *decoratum* and *P. guajaibonense* correspond to the geographical distributions provided in this work for both species, which supports the idea that C. Wright's mixed collections are the result of confusion during their sorting (see Howard 1988). As Howard reports in 1988, collections from different localities and different dates were intermixed by Asa Gray as if they were exact duplicates, creating much confusion and uncertainty with respect to the exact collection locality and date for each specimen. In addition to the mixed collections and labels, it is clear that some of the labels actually have incongruent and contradictory information. This idea is reinforced by the analysis of the collections made by C. Wright of both species. The specimens identified as *P. decoratum* subsp. *decoratum* in B, BR, G (3×), GH, L, MO, NY, UC, US and YU (2×) have two kinds of original label (the numbering is the same used by Howard (1988) to classify the labels of C. Wright's collections): label 2 "C. Wright, prope villam *Monte Verde* dictam, Cuba Orientali, Jan–Jul 1859" or label 5 "C. Wright, 1856–57 in Cuba Orientali", except for one specimen in YU with both the original label 6 "C. Wright, 1865" and the annotation "Monte Verde" (in an unknown hand). The specimens identified as *P. guajaibonense* (mixed with *P. decoratum* subsp. *decoratum* or not) have two kinds of original labels: label 4 "C. Wright, in Cuba Orientali, 1859, 1860" and label 6 (as above), one of the latter (at YU) with the annotation "Loma pelada."

Distribution and habitat — Polystichum guajaibonense is endemic to the Pan de Guajaibón in western Cuba (Artemisa province), where it occurs in montane rainforest, growing on karst soils with abundant leaf litter and filtered light, at an altitude of 620–720 m.

Additional specimens examined — Cuba: Prov. Artemisa [formerly Prov. Pinar del Río]: Falda norte del Pan de Guajaibón, 16.5.1953, *Hno. Alain & J. Acuña 2958* (HAC, MO); Pan de Guajaibón, La Mulata, 16.5.1953, *J. Acuña & Alain SV-18511* (HAJB); La Palma, falda norte del Pan de Guajaibón, 300–400 m, 12.1967, *J. Bisse & L. Rojas HFC-4782* (5×) (HAJB); La Palma, cima del Pan de Guajaibón, 720 m, 28.12.1969, *J. Bisse HFC 15599* (HAJB, JE); Bahía Honda, camino de Los Mulos, ladera norte Pan de Guajaibón, 200–620 m, 27.4.1990, *C. Sánchez HFC-69143* (HAJB); Bahía Honda, Pan de Guajaibón, ladera norte, cerca de la cima, 680–700 m, 30.3.2004, *E. Bécquer HFC-81699* (HAJB); subida y cima del Pan de Guajaibón, ladera norte por el camino de Los Mulos, Bahía Honda, 400–700 m, 21.12.2006, *R. Morejón & al. HFC-84230* (HAJB); subida por el camino de Los Mulos hasta la cima, Pan de Guajaibón, Bahía Honda, bosque semideciduo mesófilo y pluvisilva, 200–720 m, 24.8.2010, *C. Sánchez & al. HFC-86442*, *HFC-86444, HFC-86445* (HAJB). — Precise locality unknown [due to label mix-up, i.e. these label localities are presumed to be erroneous, see above, as this taxon is only known from the Pan de Guajaibón region]: 1865, *C. Wright 828* (B 20 0157271, NY (2×), US 50133) [mixed with *P. decoratum*]; in Cuba Orientali, 1859, 1860, *C. Wright 828* (NY, S 11-22443); loma Pelada, 1865, *C. Wright 828* (YU).

Polystichum sanchezii Morejón, **sp. nov.**

Holotype: Cuba, Cienfuegos, Cumanayagua, entre Vega de Mataguá y Carso de Buenos Aires, complejo de vegetación de mogotes, 26.5.2004, *C. Sánchez & L. Regalado HFC-82350* (HAJB; isotype: HAJB) – Fig. 3.

Rupicolous, sometimes pendent when on steep slopes or cliffs. *Stem* erect or ascending, 4.8–5 mm in diameter (without including the petiole bases), scaly; *scales* basifixed, unguinate to linear-lanceolate, 5.5–9.5 × 0.4–1.1 mm, yellowish brown, straight, apex narrowly acute, margin irregularly denticulate or ciliate in the distal third (otherwise subentire). *Fronds* monomorphic, fasciculate, 18.5–71.8 cm long; *petiole* grooved adaxially, 4–28.6 cm long ($^1/_5$–$^1/_3$ frond length), 1.3–1.4 mm in diameter, scaly in its entire length; *scales* bicolorous and concolorous; *bicolorous scales* basifixed, restricted to the petiole base, lanceolate, 9–10.5 × 4–5 mm, scale centre dark castaneous to blackish (excluding base) and margin yellowish brown, slightly curved, apex acute, margin inconspicuously and irregularly ciliate, cilia multicellular, irregularly branched with branches uneven in length or unbranched; *concolorous scales* basifixed, lanceolate, 7–7.5 × (1.5)2.5–4.3 mm, yellowish brown, straight, apex acuminate, margin conspicuously ciliate principally toward the apex, cilia multicellular, irregularly sinuous, irregularly branched or unbranched; *lamina* lanceolate to narrowly oblong, 1-pinnate, 12–43.2 × 3.5–6 cm, coriaceous, gradually reduced towards the apex; apex pinnatifid, acuminate; *rachis* grooved adaxially, not winged, scaly; *scales* basifixed, filiform, 2–8 × 0.1–0.5 mm, stramineous, irregularly sinuous, apex filiform, base

Fig. 3. *Polystichum sanchezii* – holotype specimen at HAJB.

expanded, the attachment point curved or truncate, irregularly fimbriate (fimbriae multicellular, branched or not), margin irregularly denticulate in the distal half (the teeth widely spaced); *pinnae* 17–40 pairs, scaly principally on the abaxial surface; *scales* similar to those of the rachis, medial pinnae lanceolate-ovate to oblong, 2–3.2 × 1.2–1.4 cm, oblique or subspreading, straight or slightly falcate, petiolulate to c. 1 mm, mostly alternate (occasionally the basal pinnae subopposite), apex acuminate, base asymmetric, cuneate, auriculate acroscopically and basiscopically, the auricles deltate, acute, spinulose (basiscopic auricles less developed, narrower), margin immediately above the auricles crenate, the crenations very close and apiculate; *venation* free, pinnate, veins (on largest pinnae) branched up to 6 times, prominent on the abaxial surface. *Sori* supramedial to submarginal, orbicular, conspicuously prominent on the adaxial surface, more than 5 pairs per pinna; *receptacle* concave; *indusium* usually oval, generally bicolorous (margins reddish brown, centre yellowish brown) or concolorous (and then dark brown), glabrous, margin irregularly cleft, 1.2–1.7 × 0.9–1.4 mm in diameter.

Eponomy — This species is dedicated to Dr Carlos Sánchez, Cuban fern and lycophyte specialist, professor of botany of the University of La Habana, and researcher at the National Botanic Garden of Cuba.

Delimitation. — The specimens classified as *Polystichum sanchezii* were included in *P. echinatum* (J. F. Gmel.) C. Chr., probably the most controversial species of Antillean *Polystichum*. The study of herbarium material from throughout the Antilles shows that *P. echinatum* is found primarily in Jamaica, while only two specimens have been collected in Cuba: *Maxon 4267* (NY, S) and *Linden 1866* (BR), both from eastern Cuba. Morphologically, *P. sanchezii* can easily be separated from *P. echinatum* by the narrower, lanceolate to linear-lanceolate (versus broadly ovate) pinnae and the predominantly linear (versus predominantly ovate) petiole scales.

Polystichum sanchezii co-occurs with *P. trapezoides* (Sw.) C. Presl, a morphologically highly variable species that can also be found in eastern Cuba and the rest of the Greater Antilles. The degree of lamina division in *P. trapezoides* can vary from 1-pinnate to 2-pinnate. Therefore, plants with 1-pinnate blades can be confused with *P. sanchezii,* but, nevertheless, can be differentiated because in *P. sanchezii* the blade apex is evidently shorter, 1.5–2.5 cm long (versus more than 4 cm), the pinnae are straight (versus falcate), the abaxial pinna surface is abundantly (versus sparsely) scaly, the pinna margin is crenate with crenulations very close and apiculate (versus entire, subentire, slightly crenate or conspicuously serrate), the pinnae auricles are triangular and pointed (versus obtuse or rounded and apiculate) and the indusia are oval with irregularly cleft margin, generally bicolorous with reddish brown margin and yellowish brown centre or, when concolorous, dark brown (versus rounded with entire margin to subentire and generally concolorous, light brown).

The specimens *Rolla & Alice Tryon 5572* (GH)*, L. B. Smith & al. 3362* (GH), *J. G. Jack 6919* (GH, NY, S 11-23957, US 1555338), from Cuba, are tentatively identified as *Polystichum sanchezii* but must be kept in a doubtful status because of their intermediate morphology between this species and *P. trapezoides*. Recent collections from an area where both species co-occur (*C. Sánchez & L. Regalado HFC-82336* (2×), *R. Morejón & M. Cabarroi HFC-84732* (3×), *C. Sánchez & R. Morejón HFC-87446* (HAJB)) corroborate this pattern, which, in conjunction with the presence of abortive spores on these specimens, suggest that these are hybrids of two species.

Distribution and habitat — *Polystichum sanchezii* is endemic to the Guamuhaya mountain range in central Cuba (Cienfuegos and Sancti-Spíritus provinces), where it grows in montane rainforest and submontane karstic forest ('mogote' vegetation complexes) on shady, moist rocky slopes on limestone, at an altitude of 800–900 m.

Additional specimens examined — Cuba: Prov. Cienfuegos: Buenos Aires, near Glen Ames, about 2500 to 2800 ft. alt., 11.3.1929, *J. G. Jack 7237* (AJBC (2×), GH, HAC, NY, S 11-23954); Trinidad Mountains, limestone hills "El Naranjo", covered by low dense forest, alt c. 900 m, shaded cliff associated with *Pinguicula*, 18.7.1933, *G. L. Webster & al. 210* (GH); creek, across from Gaviñas, Trinidad mountains, San Blas-Buenos Aires, Aug 1941, *R. A. Howard 6455* (GH, MO 1866520, NY (2×)); on rocks in coffee planting at Gaviñas, Trinidad mountains, San Blas-Buenos Aires, 6.1.1942, *A. Gonzales 452* (U); alrededores Pico San Juan, en rocas húmedas, asociado a plantones de *Pleurothalis gelida,* 900 m, 1.2.1990, *René Calá & R. Oviedo MGC-2849* (3×) (BSC). — Prov. Sancti-Spíritus: Pico Potrerillo, Trinidad, sobre caliza húmeda, raro, complejo de vegetación de Mogotes, 800 m, 10.6.1984, *M. G. Caluff & L. Díaz MGC-858* (2×) (BSC); Sierra del Escambray, Topes de Collantes, Mogote Mi Retiro, 22°22'N, 79°50'W, en ladera rocosa, área sombreada, 800 m, 2.7.1993, *P. Acevedo-Rodriguez & al. 5598 (= SV-40466)* (HAC, US 3262764).

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