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Taxonomic revision of *Meniscium* Schreber (Thelypteridaceae: Polypodiopsida)

ROZIJANE S. FERNANDES^{1,*} & ALEXANDRE SALINO²

¹Centro de Ciências Agrárias e Ambientais–CCAA, Universidade Federal do Maranhão–UFMA, MA-222,
KM 04, S/N, Boa Vista, 65500-000, Chapadinha, Maranhão, Brazil;

✉ rozijaneff@hotmail.com;  <https://orcid.org/0000-0001-6556-8092>

²Universidade Federal de Minas Gerais, Instituto de Ciências Biológicas, Departamento de Botânica,
Caixa Postal 486, 30123-970, Belo Horizonte, Minas Gerais, Brazil

✉ salinobh@gmail.com;  <https://orcid.org/0000-0003-0104-7524>

*author for correspondence



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ABSTRACT

Meniscium Schreber (Thelypteridaceae) is a tropical American fern genus containing 25 species, distributed from Florida, the Antilles and southern Mexico to northern Argentina and Paraguay. This genus is characterized by 1–pinnate lamina (rarely simple) with entire, undulate, crenulate or serrate pinnae, conform or subconform apical pinnae, veins regularly anastomosing, indument, when present, with simple or glandular hairs, and indusia absent. We present a taxonomic revision of the genus including a key to species, descriptions, a list of specimens examined, geographical distribution, as well as comments and illustrations. Five names are relegated to synonymy (i.e. *Meniscium ensiforme* (C. Chr.) Pichi Sermolli, *Meniscium affine* Presl ex Ettingshausen, *Meniscium salzmannii* Fée, *Dryopteris standleyi* Maxon & Morton, *Dryopteris chrysodioides* (Fée) Maxon & Morton var. *goyazensis* Maxon & Morton), one neotype is designated for *M. chrysodioides* Fée, one epitype for *Polypodium reticulatum* Linnaeus and 17 lectotypes are designated.

Key words: Neotropics, ferns, *Thelypteris*, typification, new synonyms, nomenclature

RESUMO

Meniscium Schreber (Thelypteridaceae) é um gênero neotropical de samambaias com 25 espécies, distribuído da Flórida, sul do México, incluindo as Antilhas, até o norte da Argentina e Paraguai. O gênero é caracterizado pela lâmina 1-pinada (raramente lâmina simples), com pina apical conforme ou subconforme, margem inteira a serreada, nervuras regularmente anastomosadas, indumento, se presente, de tricomas simples ou glandulares e indúcio ausente. É apresentada uma revisão taxonômica contendo chave de identificação para as espécies, descrições, lista de material examinado, distribuição geográfica, mapas, comentários e ilustrações. Cinco nomes são indicados como novos sinônimos, *Meniscium ensiforme* (C. Chr.) Pichi Sermolli, *Meniscium affine* Presl ex Ettingshausen, *Meniscium salzmannii* Fée, *Dryopteris standleyi* Maxon & Morton, *Dryopteris chrysodioides* (Fée) Maxon & Morton var. *goyazensis* Maxon & Morton, um neótipo para *Meniscium chrysodioides* Fée, um epítipo para *Polypodium reticulatum* Linnaeus e ainda 17 lectótipos são designados.

Palavras-chave: Neotropical, Samambaias, *Thelypteris*, tipificação, novos sinônimos, nomenclatura

Introduction

Thelypteridaceae Pichi Sermolli (1970: 709) is one of the largest families of ferns, with about 1034 species distributed in 30 genera (PPG I 2016). Thelypteridaceae is monophyletic, in the clade “eupolypods II”, and in a subclade along with Woodsiaceae, Blechnaceae, Onocleaceae, and Athyriaceae. It is cosmopolitan, but with most of the species occurring in tropical and subtropical regions (Smith 1992). Phylogenies for Thelypteridaceae (Smith & Cranfill 2002, He & Zhang 2012, Almeida *et al.* 2016) have recovered two major monophyletic groups in the family, the ptegopteroid and thelypteroid clades. The latter includes *Thelypteris palustris* Schott (1834: 10), type of the genus *Thelypteris* Schmidel (1763: 45), which is sister to a clade comprising two well-supported subgroups, the Amauropteroid and Cyclosoroid clades (Smith & Cranfill 2002, Schuettpelz & Pryer 2007, He & Zhang 2012, Almeida *et al.* 2016). The Cyclosoroid clade includes representatives from both the Old and the New World (Smith & Cranfill 2002), but the composition of some of these genera and their interrelationships, especially in the Paleotropics, are not yet well established (Almeida

et al. 2016). In the Neotropics, there is one genus in the Amauropeltoid clade (*Amauropelta* Kunze 1843: 109) and five genera in the Cyclosoroid clade: *Christella* Lévillé (1915: 472), *Cyclosorus* Link (1833:128), *Goniopteris* C. Presl (1836: 181), *Meniscium* Schreber (1791: 757), and *Steiropteris* (Christensen 1911: 81; Pichi Sermolli 1973: 449).

Meniscium is neotropical, with 27 species according to PPG I (2016) distributed from Florida, southern Mexico and the Antilles to northern Argentina and Paraguay. *Meniscium* is characterized by the following combination of morphological characters: 1-pinnate lamina (rarely simple) with apical pinnae conform or subconform, pinna margins entire to serrate, veins regularly anastomosing with included free veinlets in the areoles, acicular or glandular hairs present, and indusia absent. In the Neotropics, the combination of regularly anastomosing venation and 1-pinnate laminae with a conform apex occurs in some species of *Goniopteris* but members of this genus usually have furcate or stellate hairs along the frond axes.

The most recent phylogeny of Thelypteridaceae based on molecular data included nine terminal taxa of *Meniscium*, which were recovered as a monophyletic group (Almeida *et al.* 2016). *Meniscium* has been treated as a subgenus of *Thelypteris* (Mickel & Smith 2004, Ponce 1987, Smith 1983, 1992, 1993, 1995a, b, Tryon & Tryon 1982) or as section of subg. *Cyclosorus* (Morton 1963) under *Thelypteris*. Christensen (1913) and Maxon & Morton (1938) have provided the only previous monographs for the genus. Christensen (1913, 1920) included most thelypteroid ferns in *Dryopteris* Adanson (1763: 551) and treated *Meniscium* as a subgenus comprising 13 species. Maxon & Morton (1938) expanded this number of species of *Meniscium* to 23 species, describing six new taxa and not considering *M. macrophyllum* Kunze as a species of *Meniscium*.

Despite the absence of a recent taxonomic review for *Meniscium*, there are floristic treatments for Mexico (Smith 1981a, 1988, Mickel & Smith 2004), the Lesser Antilles, Jamaica and Puerto Rico (Proctor 1977, 1985, 1989), Central America 1995), Guatemala (Smith 1981b), Venezuela (Vareschi 1969, Smith 1995b), Ecuador (Smith 1983), Peru (Smith 1992), Bolivia (Smith & Kessler 2017), Guianas (Smith 1993), Argentina (Ponce 1987), Uruguay (Legrand 1952), Santa Catarina-Brazil (Sehnm 1979), and São Paulo, Brazil (Salino & Semir 2004). In many of these treatments, types have not been examined and many names have been applied in ways with which we disagree.

The objective of this monograph is to present a taxonomic revision of the genus based on the study of morphological characters of the species and nomenclature studies of all binomials assigned to *Meniscium*.

Taxonomic history of the genus

Meniscium was described by Johann Christian Daniel von Schreber in 1791, and distinguished by “capsule congeftae in lunulas, venulis, frondis interietas”. The name *Meniscium* from the Greek, μηνίσκος (meniskos, meniscos) meaning crescent, and μενε (mene) meaning moon, refers to the sorol form similar to a crescent moon (Stewart *et al.*, 1983). When described, *Meniscium* was differentiated from *Polypodium* L. as “Felix latifolia, non ramosa nigris tuberculis pulverulenta”, with the type species *Polypodium reticulatum* L., a plant probably from Martinique described by Linnaeus in 1759 based on a Plumier drawing t. 9. *Polypodium reticulatum* L. was combined in *Meniscium* by Swartz (1801).

About 40 names were published in *Meniscium* between 1797 and 1883, including species of both the Old and New World. The Old World species, almost half of the above total, were later combined in several other genera of Thelypteridaceae such as *Pronophrium* (C. Presl) Fée (1852: 242), *Cyclosorus*, *Menisorus* Alston (1956: 20), and *Abacopteris* Fée (1852: 309), or even other families, e.g., Dryopteridaceae, including *Bolbitis* Schott (1834: 14) and *Dryopteris*, or Athyriaceae, e.g., *Diplazium* Swartz (1801: 61). The species of the New World, about 20 names, were recognized as *Meniscium* sensu stricto, based on 1-pinnate blades with conform apex, anastomosed “meniscioid” veins, forming rows of areolas between the costae and the margin with free venules included (Cavanilles 1802, Willdenow 1810, Desvaux 1827).

More recently, regional studies focusing on neotropical Thelypteridaceae (Proctor 1953, Morton 1960) treated the species of *Meniscium* under *Thelypteris*. Morton (1963) proposed an infrageneric classification in which the species of *Meniscium* were treated in a section of *Thelypteris* subg. *Cyclosorus*, but only in 1967 were most combinations made in *Thelypteris* (Morton 1967, Tryon 1967). Smith (1990) elevated *Meniscium* as a subgenus of *Cyclosorus*. In that same period, Iwatsuki (1964) treated *Meniscium* as a genus in a broad concept and included in its classification species of both the Old and the New World. Shortly afterwards, Reed (1968) recognized *Meniscium* as a subgenus of *Thelypteris* and this concept has been followed since then by several authors (Proctor 1977, Smith 1983, 1992, 1993, 1995a, b, Tryon & Tryon 1982). Since *Meniscium* became widely accepted as the subgenus of *Thelypteris*, three new

species have been described (Smith & Lellinger 1985, Smith 1992). More recently, Fernandes *et al.* (2014) recognized *Meniscium* at the generic level, described three new species and combined the other species that were still under *Thelypteris* (Fernandes *et al.* 2014; Fernandes & Salino 2018).

Material and Methods

Herbarium specimens (about 25,000), including types, were examined during visits and/or on loan from the following 40 herbaria: ASE, B, BHCB, BM, C, COL, EAC, F, FURB, GH, HB, HUA, IAN, INPA, K, LINN, MA, MBM, MG, MO, MPU, NY, P, R, RB, Q, QCA, QCNE, QPLS, RB, S, SPF, STR, UC, UFP, UPCB, US, USZ, EUA, and W (herbarium abbreviations follow *Index Herbariorum* (<http://sweetgum.nybg.org/ih/> Thiers 2018). Images of the specimens from additional herbaria—BR, CR, GEOT, MA, MPU, PR, PRC, OXF, SI, and USM—were accessed through JSTOR Plant Science (<http://plants.jstor.org/>), or sent by curators or accessed through herbarium websites. We also had access to collections made by us and by colleagues. Field trips were carried out in several parts of Brazil (Atlantic Forest, Cerrado, Caatinga, and Amazonian Forest), Colombia, Panama, and Mexico, mainly to collect specimens and data on morphological characters and habitats. The terminology used to describe species was based on Smith (1992) and Lellinger (2002) for sporophytes, with adaptations to *Meniscium*. The terminology used to describe spores was based on Tryon & Lugardon (1990). Spores and hairs were examined for almost all taxa at the Centro de Microscopia, Universidade Federal de Minas Gerais, using scanning electron microscopy (SEM). Spores were removed from herbarium specimens, transferred to aluminum stubs and sputter-coated with gold, and finally imaged using a FEI Quanta 200F SEM with an accelerating voltage of 30 kV. For species descriptions, representative specimens reflecting morphological variation were selected randomly from throughout the geographical distribution. Specimens are cited in alphabetical order by country and locality. Geographical distribution and habitat of the species were based on data from herbarium labels, field work, and from statements in the literature. Distribution maps are based on coordinates obtained from the labels of herbarium specimens seen. When this information was not available, coordinates were assigned according to the locality. We provide an illustration for each species. For those species that are scarcely or never illustrated, diagnostic features are also provided.

Results

Geographical distribution

Species of *Meniscium* occur in southern Mexico, Florida, Central America, the Caribbean, and much of tropical and subtropical South America (Fig. 1).

Within the genus, we recognize 25 species. Based on the regional centers of endemism proposed by Tryon (1972), the most important center of diversification for *Meniscium* is the Andes, from Colombia to Bolivia (Tab. 1). There are 18 species in the Andean region, of which three are endemic (Fig. 1). The low endemism of *Meniscium* in this region is because the members of the genus grow mostly in low or middle elevations, which has contributed to the richness of species in Amazonia, but not in the Atlantic Forest, where richness and diversity are high for many other fern genera (Tryon 1972, Moran 1987). In the Andean region, Ecuador and Peru have the highest diversity of *Meniscium*, both with 17 species, followed by Colombia with 16 species, of which two are endemic (Tab. 1).

In Brazil, there are 12 species (Fig. 1), of which one is endemic (*Meniscium delicatum*); 11 of these also occur in the Andean region, and four (*M. angustifolium*, *M. arborescens*, *M. longifolium*, *M. serratum*) reach Central America and Mexico (Tab. 1).

The Guiana Highlands, where there are eight species, have one species endemic to the Potaro-Siparuni region, which ranges to 1400 m (Tab. 1). In addition to having widely distributed species, this region is floristically similar to the Andes and Brazil. For example, *M. macrophyllum* and *M. nesioticum* occur in all three regions.

In Central America, there are 10 species, of which *M. cocleanum* is endemic (Tab. 1); nearly all occur in Panama. The Greater Antilles have only five species of *Meniscium*, notably *M. angustifolium* and *M. reticulatum*, and these are widely distributed on all the major islands (Tab. 1). In the Lesser Antilles there are four species, of which *M. reticulatum* occurs on all major islands and the other three occur only on Trinidad and Tobago (Tab. 1).

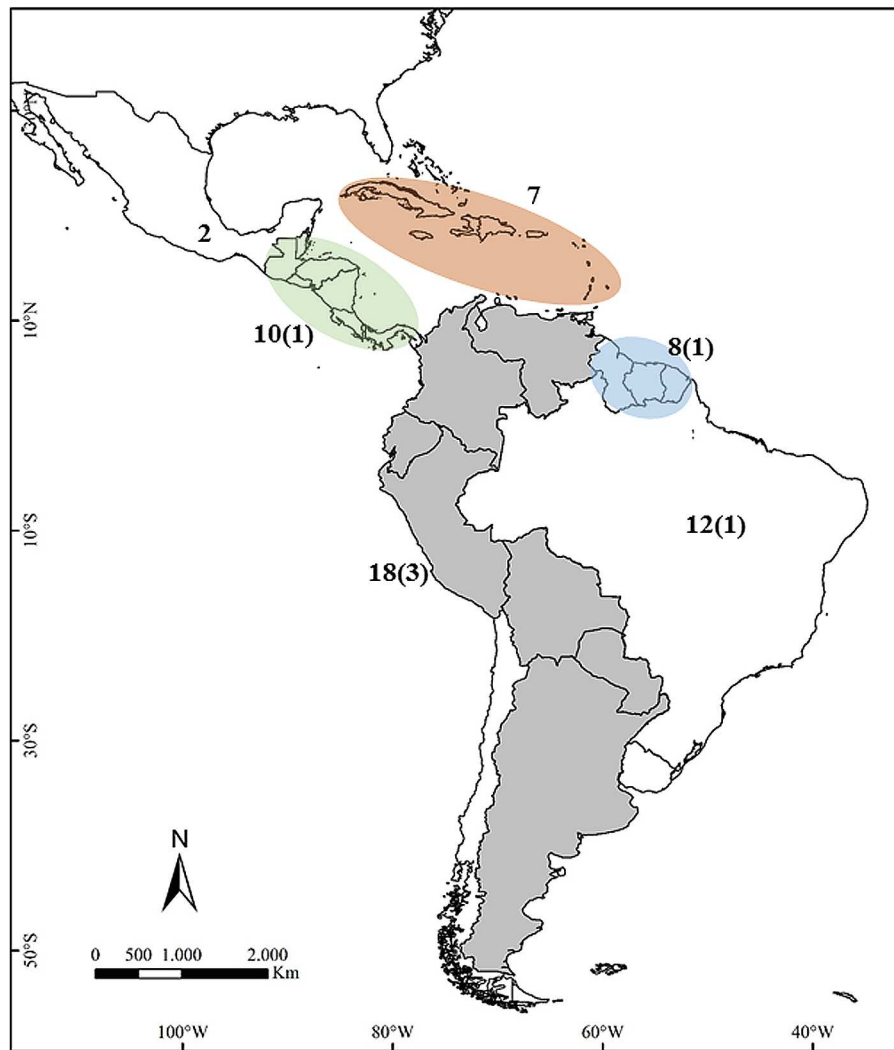


FIGURE 1. Richness of *Meniscium* species in the centers of diversity and endemism for Tropical America defined by Tryon (1972), with adaptations. (2) Mexican, (10) Central America, (7) Lesser and Greater Antilles, (18) Andes, (8) Guiana Highlands, and (12) Brazil. The number in parentheses on the map corresponds to the number of endemic species for a region.

TABLE 1. Distribution of *Meniscium* species by country, organized by geographical regions of America. Endemic species are in bold.

Countries	Species
U.S.A. FLORIDA	<i>M. reticulatum</i> , <i>M. serratum</i>
MEXICO	<i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. falcatum</i> , <i>M. reticulatum</i> <i>M. serratum</i>
BELIZE	<i>M. falcatum</i> , <i>M. serratum</i>
EL SALVADOR	<i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. serratum</i>
GUATEMALA	<i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. falcatum</i> , <i>M. serratum</i>
HONDURAS	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. falcatum</i> , <i>M. hostmannii</i> , <i>M. longifolium</i> , <i>M. serratum</i>
NICARAGUA	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. cocleanum</i> , <i>M. falcatum</i> , <i>M. lingulatum</i> , <i>M. serratum</i> , <i>M. turrialbae</i>
COSTA RICA	<i>M. andreanum</i> , <i>M. arborescens</i> , <i>M. cocleanum</i> , <i>M. falcatum</i> , <i>M. giganteum</i> , <i>M. lingulatum</i> , <i>M. serratum</i> , <i>M. turrialbae</i>
PANAMA	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. cocleanum</i> , <i>M. falcatum</i> , <i>M. giganteum</i> , <i>M. lingulatum</i> , <i>M. longifolium</i> , <i>M. serratum</i>
CUBA	<i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. falcatum</i> , <i>M. reticulatum</i> , <i>M. serratum</i>

...Continued on the next page

TABLE 1. (Continued)

Countries	Species
DOMINICAN REPUBLIC	<i>M. angustifolium</i> , <i>M. reticulatum</i>
JAMAICA	<i>M. angustifolium</i> , <i>M. reticulatum</i> , <i>M. serratum</i>
HAITI	<i>M. angustifolium</i> , <i>M. reticulatum</i> , <i>M. turrialbae</i>
PUERTO RICO	<i>M. angustifolium</i> , <i>M. reticulatum</i> , <i>M. serratum</i>
GUADELOUPE	<i>M. reticulatum</i> , <i>M. serratum</i>
GRENADA	<i>M. reticulatum</i>
SAINT VINCENT AND THE GRENADINES	<i>M. reticulatum</i>
SANTA LUCIA	<i>M. reticulatum</i>
SABA	<i>M. reticulatum</i>
DOMINICA	<i>M. reticulatum</i> , <i>M. serratum</i>
SAINT KITTS	<i>M. reticulatum</i>
MARTINIQUE	<i>M. reticulatum</i> , <i>M. serratum</i>
MONTSERRAT	<i>M. reticulatum</i>
DOMINICAN REPUBLIC	<i>M. reticulatum</i>
TRINIDAD AND TOBAGO	<i>M. macrophyllum</i> , <i>M. nesioticum</i> , <i>M. serratum</i>
FRENCH GUIANA	<i>M. hostmannii</i> , <i>M. macrophyllum</i> , <i>M. serratum</i>
SURINAME	<i>M. arborescens</i> , <i>M. chrysodioides</i> , <i>M. hostmannii</i> , <i>M. macrophyllum</i> , <i>M. serratum</i>
GUYANA	<i>M. arborescens</i> , <i>M. chrysodioides</i> , <i>M. divergens</i> , <i>M. hostmannii</i> , <i>M. longifolium</i> , <i>M. macrophyllum</i> , <i>M. nesioticum</i> , <i>M. serratum</i>
VENEZUELA	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. chrysodioides</i> , <i>M. falcatum</i> , <i>M. giganteum</i> , <i>M. hostmannii</i> , <i>M. longifolium</i> , <i>M. macrophyllum</i> , <i>M. nesioticum</i> , <i>M. reticulatum</i> , <i>M. serratum</i>
COLOMBIA	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. arcanum</i> , <i>M. falcatum</i> , <i>M. giganteum</i> , <i>M. hostmannii</i> , <i>M. lingulatum</i> , <i>M. longifolium</i> , <i>M. maxonianum</i> , <i>M. minusculum</i> , <i>M. nesioticum</i> , <i>M. pachysorum</i> , <i>M. serratum</i> , <i>M. triangularis</i> , <i>M. turrialbae</i>
ECUADOR	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. arcanum</i> , <i>M. chrysodioides</i> , <i>M. consobrinum</i> , <i>M. falcatum</i> , <i>M. giganteum</i> , <i>M. lanceum</i> , <i>M. lingulatum</i> , <i>M. longifolium</i> , <i>M. macrophyllum</i> , <i>M. membranaceum</i> , <i>M. nesioticum</i> , <i>M. pachysorum</i> , <i>M. serratum</i> , <i>M. turrialbae</i>
PERU	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. arcanum</i> , <i>M. chrysodioides</i> , <i>M. consobrinum</i> , <i>M. falcatum</i> , <i>M. giganteum</i> , <i>M. lanceum</i> , <i>M. lingulatum</i> , <i>M. longifolium</i> , <i>M. macrophyllum</i> , <i>M. maxonianum</i> , <i>M. membranaceum</i> , <i>M. nesioticum</i> , <i>M. pachysorum</i> , <i>M. serratum</i>
BOLIVIA	<i>M. andreanum</i> , <i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. arcanum</i> , <i>M. chrysodioides</i> , <i>M. consobrinum</i> , <i>M. falcatum</i> , <i>M. hostmannii</i> , <i>M. lanceum</i> , <i>M. longifolium</i> , <i>M. maxonianum</i> , <i>M. membranaceum</i> , <i>M. pachysorum</i> , <i>M. serratum</i>
BRAZIL	<i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. arcanum</i> , <i>M. chrysodioides</i> , <i>M. delicatum</i> , <i>M. hostmannii</i> , <i>M. longifolium</i> , <i>M. macrophyllum</i> , <i>M. maxonianum</i> , <i>M. membranaceum</i> , <i>M. nesioticum</i> , <i>M. serratum</i>
PARAGUAY	<i>M. angustifolium</i> , <i>M. arborescens</i> , <i>M. chrysodioides</i> , <i>M. lanceum</i> , <i>M. longifolium</i> , <i>M. serratum</i>
ARGENTINA	<i>M. serratum</i>

Morphology

Rhizomes:—The rhizome of *Meniscium* species is short-creeping or less frequently ascending (*M. membranaceum*, *M. giganteum*) (Fig. 2), never erect, and varies from (0.1–)0.5–3.0 cm diameter. It is glabrous or with sparse to moderate scales mainly at the apex. Generally, the rhizome is robust to subwoody (*M. arborescens*, *M. falcatum*), or rarely herbaceous or thin (*M. angustifolium*, *M. delicatum*) (Fig. 2 A–C).

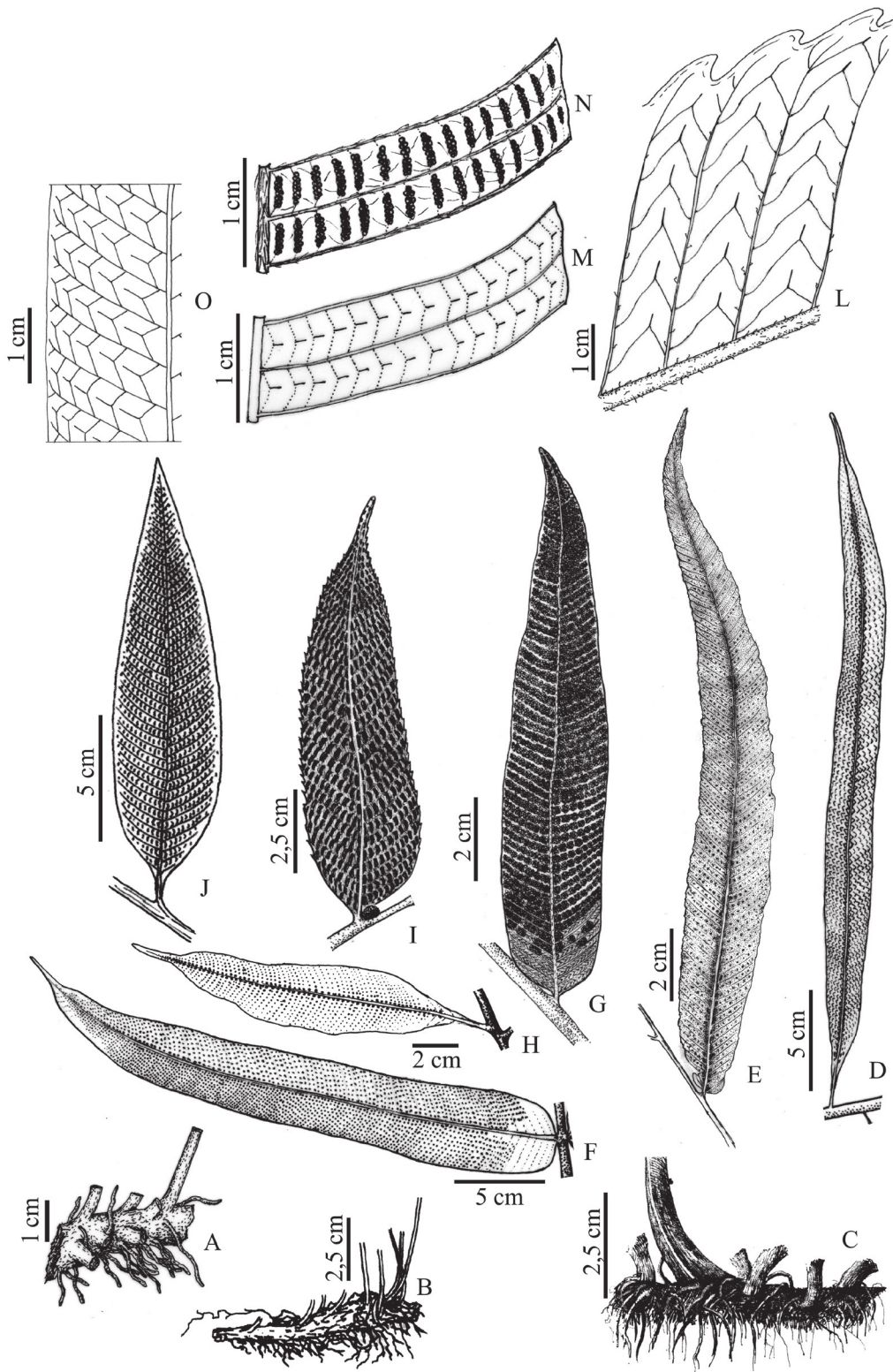


FIGURE 2. Some morphological characters of *Meniscium*: rhizome, pinnae and veins. **A–C.** rhizome short-creeping. **D–J.** proximal pinnae. **D.** oblong-lanceolate, rounded base; **E.** linear-lanceolate, long-cuneate; **F.** sessile, elliptic, acute base; **G.** elliptic, acute base; **H.** short-petiolulate, oblong-lanceolate to cuneate base; **I.** long-petiolulate, linear-lanceolate, long-cuneate base; **J.** sessile, linear-lanceolate, truncate base. **L–O.** veins. **L.** sterile, sigmoid; **M.** sterile, arcuate; **N.** fertile, straight; **O.** fertile, sigmoid (**A.** *M. divergens*, Clarke et al. 9677, NY; **B.** *M. angustifolium*, Salino 1967, BHCB; **C.** *M. arborescens*, Irwin et al. 30828, NY; **D.** *M. falcatum*, Grayum et al. 4632, UC; **E.** *M. delicatum*, Fernandes 779, BHCB; **F.** *M. andreanum*, Croat & Grayum 60176, UC; **G.** *M. arborescens*, Irwin et al. 30828, NY; **H.** *M. arcanum*, Tuomisto 3066, UC; **I.** *M. consobrinum*, Mexia 8315, UC; **J.** *M. chrysodioides*, Barreto 2806, BHCB; **L.** *M. serratum*, Figueiredo & Lima 512, BHCB; **M–N.** *M. membranaceum*, Alem et al. 121, UC; **O.** *M. divergens*, Henkel et al. 4368, NY).

FronDS:—Most *Meniscium* species have 1-pinnate fronds with a conform terminal pinna. Of the 25 species, only *M. giganteum* and *M. minusculum* have simple, entire laminae. The proportion and outline of the laminae vary from oblong, ovate, and deltate to more lanceolate shapes (*M. serratum*). Nearly all of the species of the genus have dimorphic or subdimorphic fronds. Dimorphic species have fertile and sterile fronds that differ not only in size, but also in shape and consistency of the lamina. The fertile fronds are erect with longer petioles and smaller and narrower laminae or pinnae. They have relatively smaller laminar surfaces that are covered with confluent sori or acrostichoid sporangia at maturity. Subdimorphic species have fertile fronds that are usually pendent (or sometimes erect in *M. serratum* and *M. arborescens*), with slightly longer petioles and reduced laminar surface with sporangia on only the secondary veins or sometimes the sori confluent with adjacent sori. Some species with subdimorphic fronds also have monomorphic fronds. Most of the species are subdimorphic or only subtly subdimorphic, i.e., little difference in size of fronds or shape of pinnae only four species can be considered to be dimorphic (*M. macrophyllum*, *M. divergens*, *M. nesioticum*, *M. lanceum*) and two of these, *M. nesioticum* and *M. lanceum*, can also be subdimorphic with sori only on the secondary veins.

This character, in association with the distribution of the sporangia, is very useful in separating similar species, such as *M. angustifolium*, *M. lanceum*, and *M. nesioticum*, and *M. macrophyllum* from *M. chrysodioides*.

Pinnae:—The pinnae have entire, serrate, crenate, or sinuate margins. The shape varies from lanceolate, linear-lanceolate, or oblong-lanceolate to elliptic (Fig. 2 D–J). Most of the species have proximal and distal pinna bases that differ. The proximal pinna bases are usually symmetric, truncate, rounded, cuneate, or acute, and short-to long-petiolulate, except in *M. andreanum* and *M. delicatum*, which have usually sessile pinnae (Fig. 2 F, E). The bases of median and distal pinnae are asymmetric with the basiscopic side rounded to adnate and acroscopic side subcuneate, slightly excavate, truncate and parallel to the rachis, except in *M. arcanum* (Fig. 2 H). In some species, such as *M. andreanum* and *M. pachysorum*, the base of the petiolule is swollen and darkened, making the pinna appear subarticulate to the rachis.

Buds and plantlets:—In *Meniscium*, nearly half the species have buds that generally produce plantlets on the rachises. These plantlets can reach up to 20 cm long. Unlike other genera of Thelypteridaceae, the buds or plantlets in most species of *Meniscium* are present on the proximal pinnae. Only two species have buds in the axils of distal pinnae (*M. cocleanum* and *M. triangularis*) and buds are rarely seen at the bases of all pinnae (only in *M. arborescens*). The buds are on the adaxial surfaces, at the bases of pinnae or where the rachis meets the costae, on the petiolules, or rarely at the bases of the laminae in *M. giganteum*.

The presence of buds or plantlets (and their position) is a very useful character to separate species (e.g., *M. membranaceum* has buds on the proximal pinnae and *M. triangularis* has buds on the distal pinnae) and is a diagnostic character in *M. cocleanum*. However, buds are not constantly present in some species, such as *M. arborescens*, *M. lanceum*, *M. reticulatum*, *M. serratum*, and *M. giganteum*.

Veins:—Veins in *Meniscium* are regularly anastomosing and help defining the genus (Fig. 2 L–O). This pattern consists of primary lateral and parallel veins that run from the costae to the pinna margins with transverse or secondary veins between these that form a series of similarly sized areoles. Between the parallel veins and in each areole, there is a single (rarely 2 or 3) excurrent veinlet(s) that arises from the transverse vein. This character is considered diagnostic for *Meniscium*, even though some species of *Goniopteris* also have veins with a similar anastomosing pattern.

Two characters related to this vein pattern have been shown to be informative: the number of areoles formed by the union of the secondary veins that varies from 4–32 between the costa and margin of the lamina or pinna; and the form of the secondary veins that, when compared to the same reproductive or vegetative stage, can be straight, arcuate, sigmoid, or subsigmoid (Fig. 2 L–O), and can form acute (as in *M. arborescens* and *M. serratum*), obtuse (as in *M. arcanum*), or right angles (as in *M. falcatum* and *M. pachysorum*), or even a rectangle (as in *M. giganteum* and *M. macrophyllum*). In coriaceous or subcoriaceous laminae (*M. andreanum*, *M. arcanum*, *M. minusculum*), the secondary veins on the abaxial surfaces can be seen with transmitted light.

Hairs:—Until now, hair and other indument characters, such as scales, in *Meniscium* were poorly understood or never studied in relation to their shape and disposition; only their presence or absence on a plant part was known. There are three types of simple hairs: acicular, ciliform, and glandular.

Acicular hairs are short to long, with a thick base and pointed apex, and vary from straight (Fig. 5D) to tortuous (Figs. 5C; 8C). In relation to the position of the hairs on laminar surfaces, the hairs can be erect (Figs. 5D; 6C, E; 7B,

C), curved (Figs. 5B; 7F) and appressed (Figs. 7F, 8B). Some acicular and simple tortuous hairs have a reddish-brown pigment throughout the body that makes them look multicellular.

Ciliform hairs have a uniform body from the base to the apex and are delicate, thin and adpressed, giving the rachis, costa, veins and between the veins a whitish appearance, as in *M. membranaceum*, *M. triangularis* and *M. giganteum* (Figs. 6D; 7E; 8D).

Glandular hairs or glands can be spherical or semispherical and sessile or stalked. Of the 25 species of *Meniscium* we recognize, ten have glandular hairs, often on the laminar surfaces and sporangia, rarely on the petioles, on scales at the base of the petiole and on the rachis (Figs. 6A, C; 7B, D).



FIGURE 3. Scales of *Meniscium*. **A.** filiform branched scales, articulated with long acicular hairs; **B–C.** irregular, oval, lanceolate scales with hairs on margins; **D.** lanceolate scale with entire margin (**A–C.** *M. triangularis*, Rodriguez et al. 4115, NY; **D.** *M. giganteum*, Herrera 2062, UC).

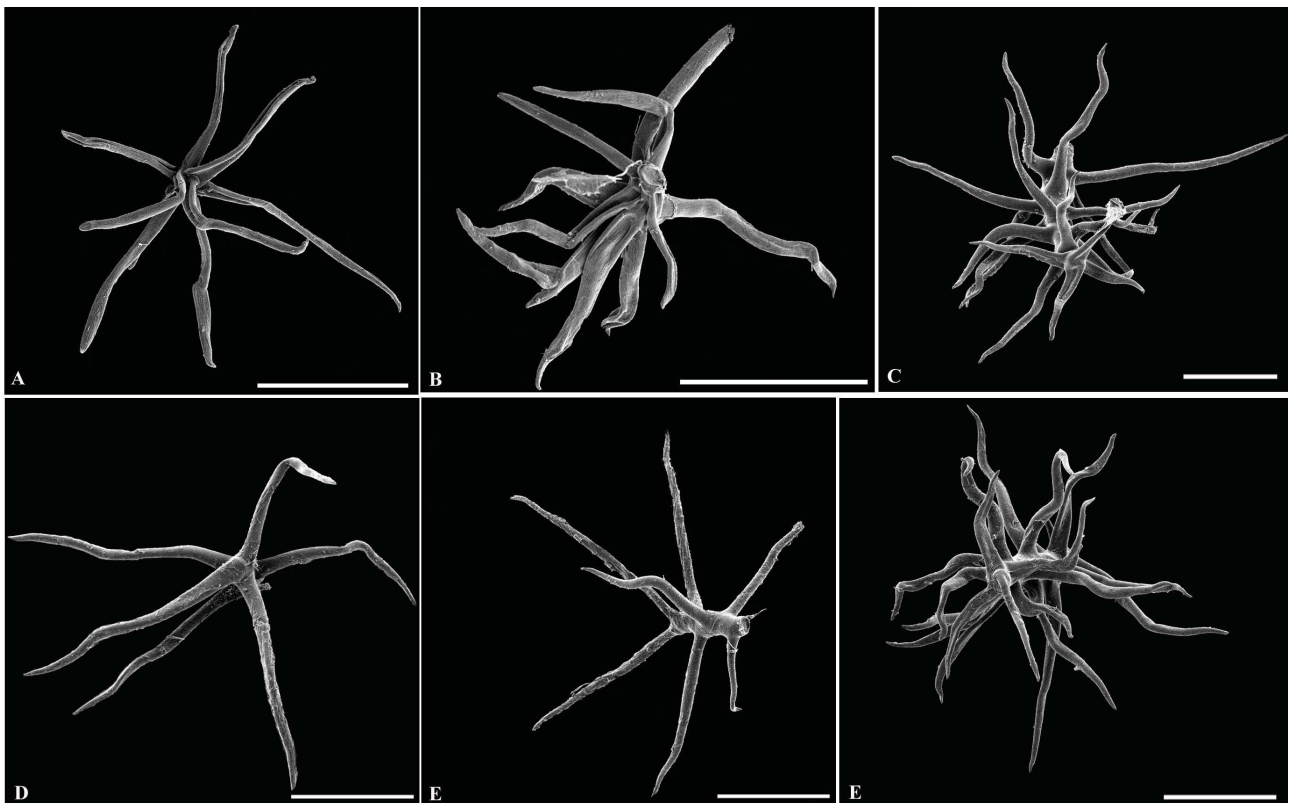


FIGURE 4. Scales of *Meniscium*. **A–F.** arachnoid scales (**A–B.** *M. falcatum*, Davidse & Herrera 26302, UC; **C–F.** *M. turrialbae*, Mickel 3514, NY). Scales bars: = 100 μ m.

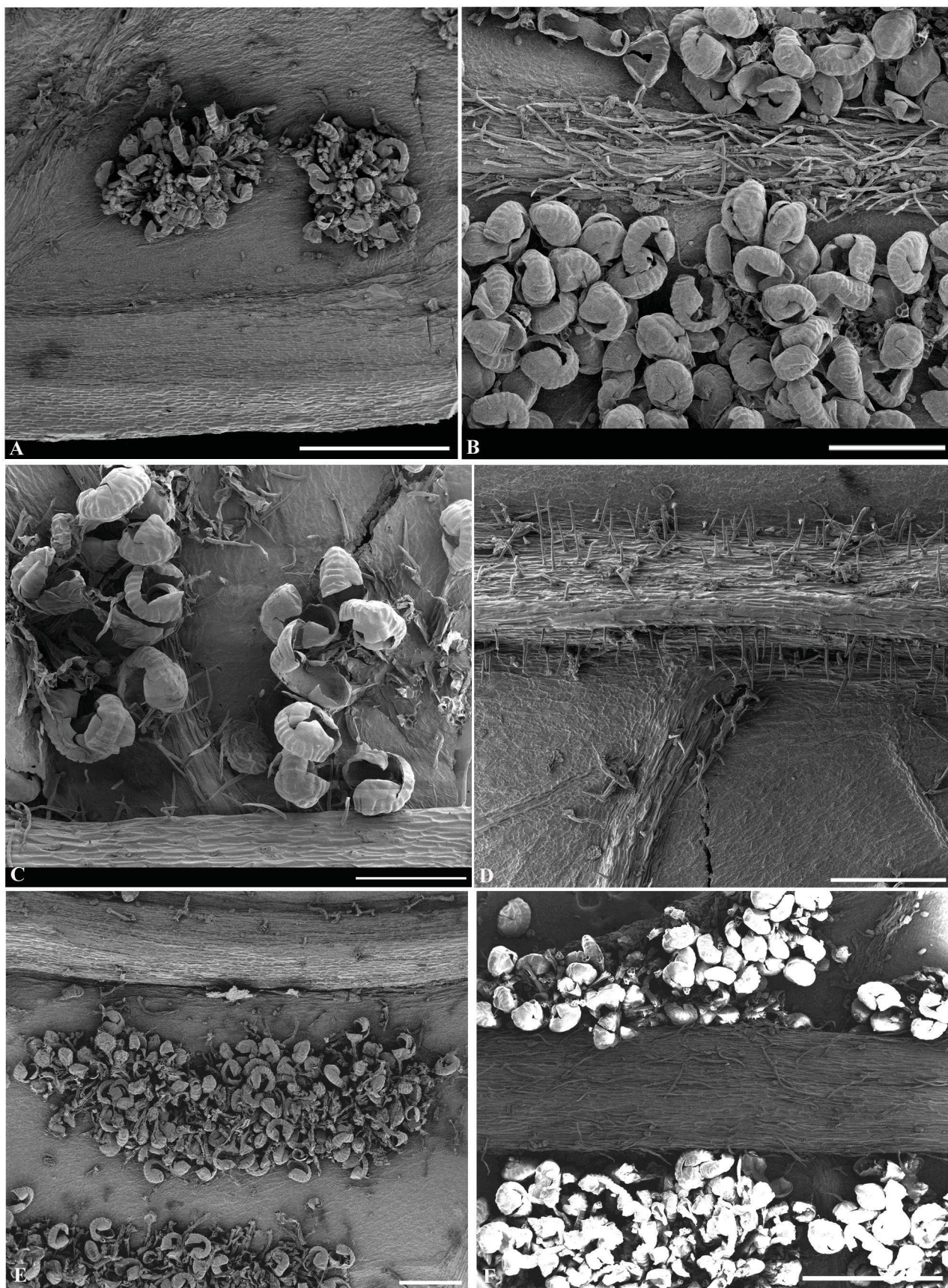


FIGURE 5. Abaxial laminar surface of pinnae near the costae showing sori and hairs. **A.** *Meniscium andreanum*; **B.** *M. angustifolium*; **C.** *M. arborescens*; **D.** *M. chrysodioides*; **E.** *M. cocleanum*; **F.** *M. consobrinum* (**A.** Salino 15362, BHCB; **B.** Forzza *et al.* 859, BHCB; **C.** Standley 28025, US; **D.** Almeida *et al.* 2273, BHCB; **E.** Salino *et al.* 15361, BHCB; **F.** Mexia 8315, UC). Scales bars: = 500 μ m.

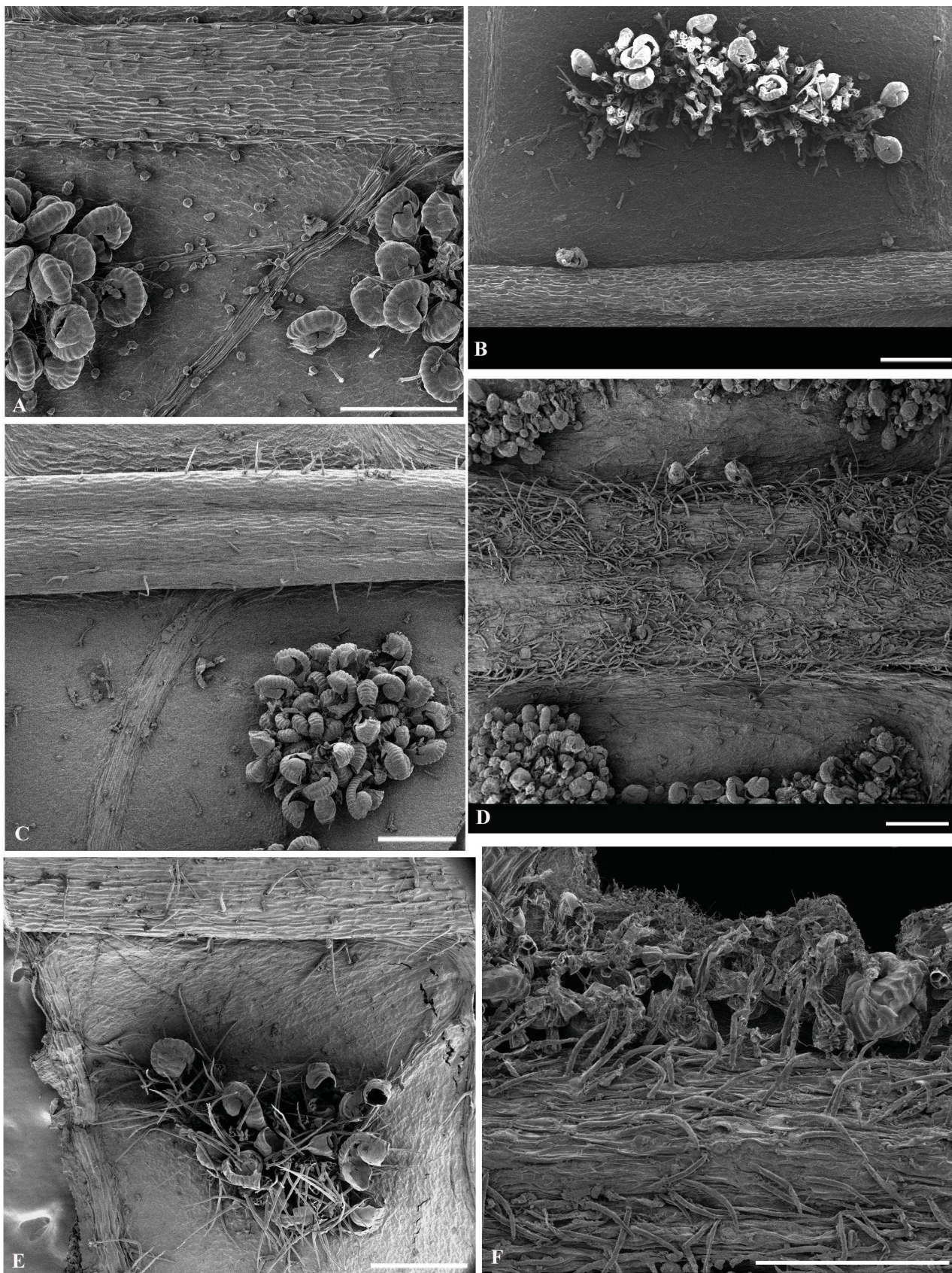


FIGURE 6. Abaxial laminar surface of pinnae near the costae showing sori and hairs. **A.** *Meniscium delicatum*; **B.** *M. divergens*; **C.** *M. falcatum*; **D.** *M. giganteum*; **E.** *M. hostmannii*; **F.** *M. lanceum* (**A.** *Fernandes 970*, BHCB; **B.** *Henkel et al. 4368*, NY; **C.** *Monteagudo & Francis 5318*, MO; **D.** *Stork 4257*, UC; **E.** *Austin et al. 7213*, US; **F.** *Beck et al 16602*, UC). Scales bars: = 500 μ m.

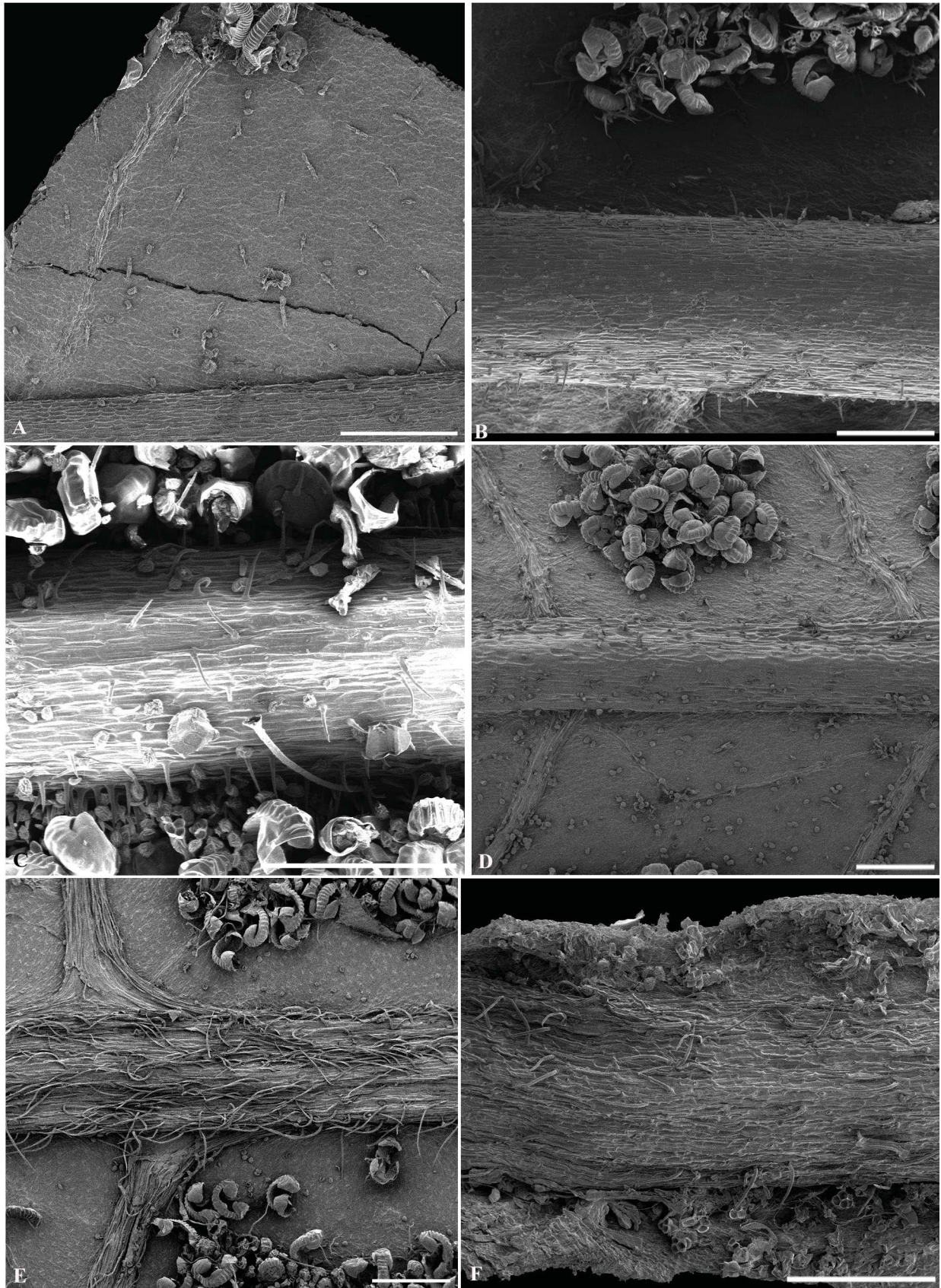


FIGURE 7. Abaxial laminar surface of pinnae near the costae showing sori and hairs. **A.** *Meniscium lingulatum*; **B.** *M. longifolium*; **C.** *M. macrophyllum*; **D.** *M. maxonianum*; **E.** *M. membranaceum*; **F.** *M. nesioticum* (**A.** Stevens *et al.* 24828, UC; **B.** Korte & Kniess 4935, FURB; **C.** Costa 210, MG; **D.** Arruda *et al.* 963, BHCB; **E.** Alem *et al.* 121, UC; **F.** Aymard 5331, UC). Scales bars: = 500 μm .

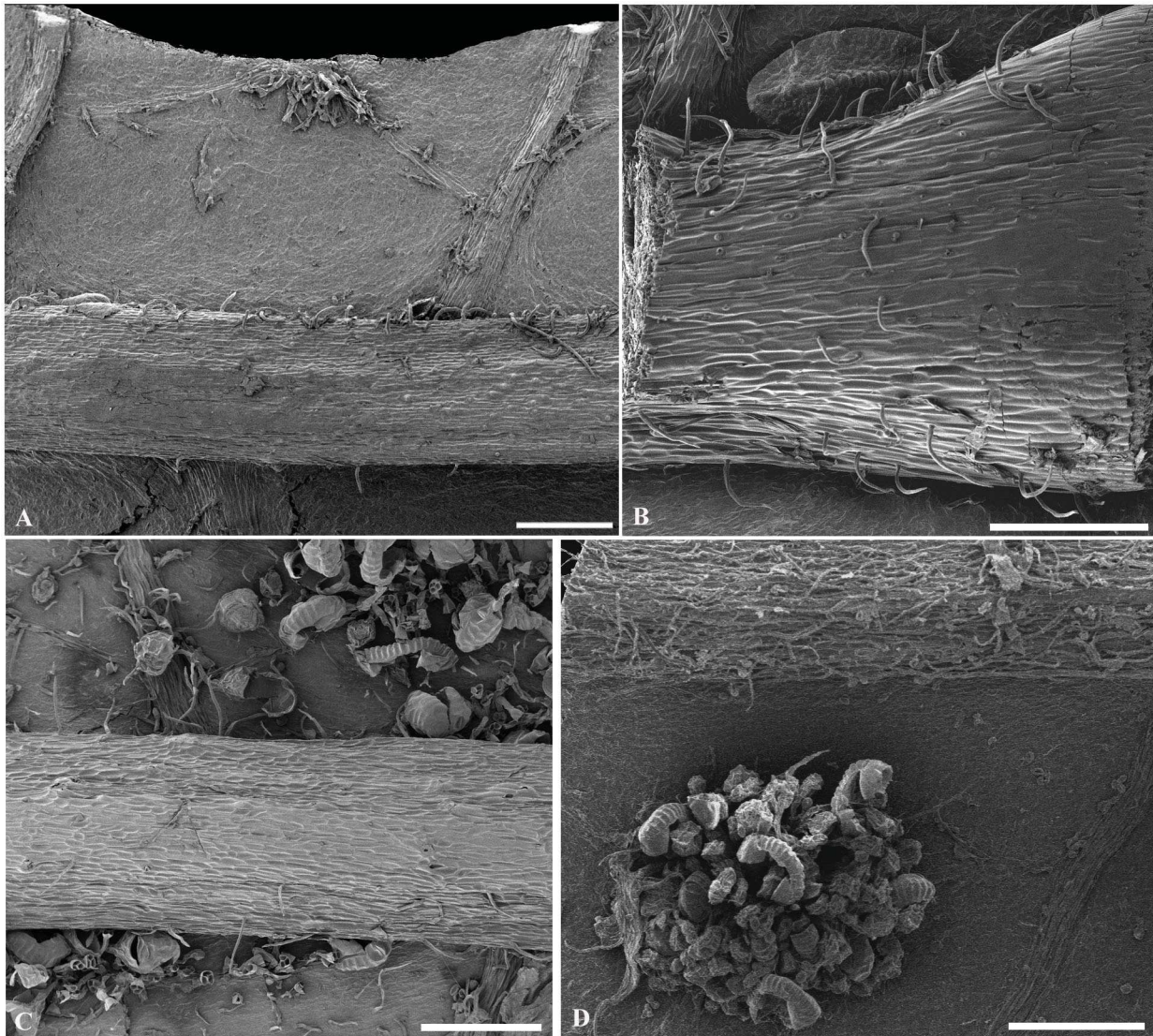


FIGURE 8. Abaxial laminal surface of pinnae near the costae showing sori and hairs. **A.** *Meniscium pachysorum*; **B.** *M. reticulatum*; **C.** *M. serratum*; **D.** *M. triangularis* (**A.** Sanín *et al.* 5073, NY; **B.** Boom & Marshall, 7082, NY; **C.** Pietrobom *et al.* 5101, BHCB; **D.** Rodriguez *et al.* 4115, NY). Scales bars: = 500 μm .

Although there are no detailed studies on the ontogeny of the glandular hairs in *Meniscium*, on the young leaves and immature sporangia these glands are more conspicuous and appear resinous. In some species, this is also the case for more mature leaves, as found in *M. maxonianum*; however, in other species the glandular hairs are caducous and dull when the leaves are mature, as in *M. falcatum*. According to Oliveira (2014), who studied species of *Amauropelta*, these hairs are functional as soon as they form, and secretory activity remains active throughout the unfurling of the leaf and stops when the leaf has expanded.

The presence of acicular or glandular hairs on the laminae and/or sporangia, when constant, can be used as a diagnostic character, as for *M. arcanum*, *M. longifolium*, and *M. chrysodioides*. However, if other characters do not vary and the presence of acicular and glandular hairs is not constant, as on the sporangia of *M. macrophyllum*, *M. maxonianum*, and *M. falcatum*, this is treated as a morphological continuum or population variation of the species.

Scales:—The presence of scales was poorly explored in *Meniscium* and ignored in descriptive works because the scales are usually caducous or inconspicuous. Maxon & Morton (1938) commented that *Meniscium* lacks scales along the costae. However, lanceolate to ovate, filiform or branched scales are conspicuous on the proximal portion of the petioles and on the costae and veins of *M. chrysodioides*, *M. hostmannii*, *M. membranaceum*, and *M. triangularis* (Fig. 3).

Scales on the laminae and petioles are caducous and usually inconspicuous, except on petioles of *M. giganteum* and young specimens, where they are more abundant. However, they are a good character for some species, such as *M. hostmannii* and sterile leaves of *M. chrysodioides* and *M. macrophyllum*. In general, the scales have no defined shape for each species and are irregular, reduced, opaque or translucent, lustrous or dull, and sublathrate. They can be differentiated into three types: 1) scales that have many wide cells, varying from lanceolate to ovate, with margins that are entire, ciliate or with globose cells, and are usually present on the basal portion or throughout the petiole, on the rachis, and rarely on the costa, as found in *M. triangularis* and *M. membranaceum* (Fig. 3B–D); 2) scales that are filiform or branched, articulate, with long, acicular hairs distributed among the simple hairs on the costae, veins, and receptacles, and are adpressed or patent (Fig. 3A); and 3) scales that are arachnoid, denominated as multiradiate hairs by Maxon & Morton (1938) for *Dryopteris desvauxii* f. *glandulosa* = *Meniscium maxonianum*. The arachnoid scales are similar to stellate or branched hairs. However, they have a multicellular central part (width) that is borne on a protuberance on the laminar surfaces, and they are sessile or stalked, with their axis in one plane or angular, with marginal hairs arising from one central axis in all directions. These scales are rarely observed fixed to the laminar surface because they are small and hyaline (Fig. 4). They are more easily observed after they have fallen because they usually form groups and are loose on the lamina and sporangia. Nearly all species of *Meniscium* have scales, including the species that lack acicular hairs. They are usually found along the costae near the pinna bases, but also on or near the veins, sori, or on the laminar surfaces. The scales are caducous, hyaline, and brown to reddish. However, there is no singular defined scale shape for each species. For example, in *M. falcatum* and *M. turrialbae* there are two distinct types, in a single plane and angular, and this kind of variation occurs in all other species of the genus.

Sori:—Sori in *Meniscium* are uniseriate or rarely biseriate between main lateral veins, on defined receptacles, and are on the secondary cross-veins; in a few species the sporangia are acrostichoid. Uniseriate sori can be confluent at maturity, giving them an acrostichoid appearance. A biseriate sorus is an infrequent character state observed only in *M. andreanum*, *M. arcanum*, and *M. lingulatum* (Figs. 5A; 26B). Maxon & Morton (1938) commented that biseriate sori are “primitive” in *Meniscium*, but this is a hypothesis yet to be tested. In addition to having biseriate sori, these species have other features in common, such as subcoriaceous laminae that lack indument. Further, *M. andreanum* and *M. arcanum* have tubular, glandular hairs on the petioles and sporangia and *M. arcanum* and *M. lingulatum* have long-petiolulate pinnae with a symmetrical, cuneate bases.

Acrostichoid sporangia are present only in *Meniscium macrophyllum* and *M. nesioticum*. Maxon & Morton (1938) did not include this character state in their concept of *Meniscium* and treated *M. macrophyllum* as part of the genus *Bolbitis*, species of which also have sporangia on the laminar surfaces between the veins. In the same work they described and accepted *Dryopteris nesioticum* (= *M. nesioticum*) as a true *Meniscium*, but it also has acrostichoid sporangia.

Sometimes there are sporangiasters on the receptacles, which is very similar to a sporangium stalk with paraphyses, when it has lost the capsule. However, sporangiasters are usually slender, non-septate, and do not have three cells at the base of the capsule.

Sporangia:—Fée (1852) was one of the first authors to discuss the sporangial hairs on the sporangia of *Meniscium* and divided the American species of *Meniscium* into two groups: one characterized by hirsute sori and another by glabrous sori. Maxon & Morton (1938) were more specific and commented that the presence of hairs on the sporangia can be an important diagnostic character among the species and even form natural groups within *Meniscium*.

More detailed study of the sporangia reveals that they are an important character separating some species: half the species have some type of ornamentation on the stalk or more rarely on the capsule. Sporangia can be glabrous (Figs. 9B, F, G; 10E–F) or have glandular (Figs. 9A, D; 10C) or simple hairs, with glandular or acicular paraphyses (Figs. 9C, E, H; 10D, G).

Paraphyses are small, unicellular or multicellular structures (similar to septate hairs), usually elongate or glandular, and on the receptacle of the sori or sporangial stalk. In *Meniscium*, paraphyses occur on the sporangial stalks. They are always uniseriate, multicellular, 3–4 septate, and branched, with glandular or acicular hairs on the septae and a globose hyaline cell at the apex, or rarely with simple, yellow or reddish brown hairs, which can be confused with glands but are not resinous; this type of paraphyses occurs in *M. arborescens*, *M. chrysodioides*, *M. hostmannii*, and *M. longifolium* (Figs. 9C, E, H; 10D, G).

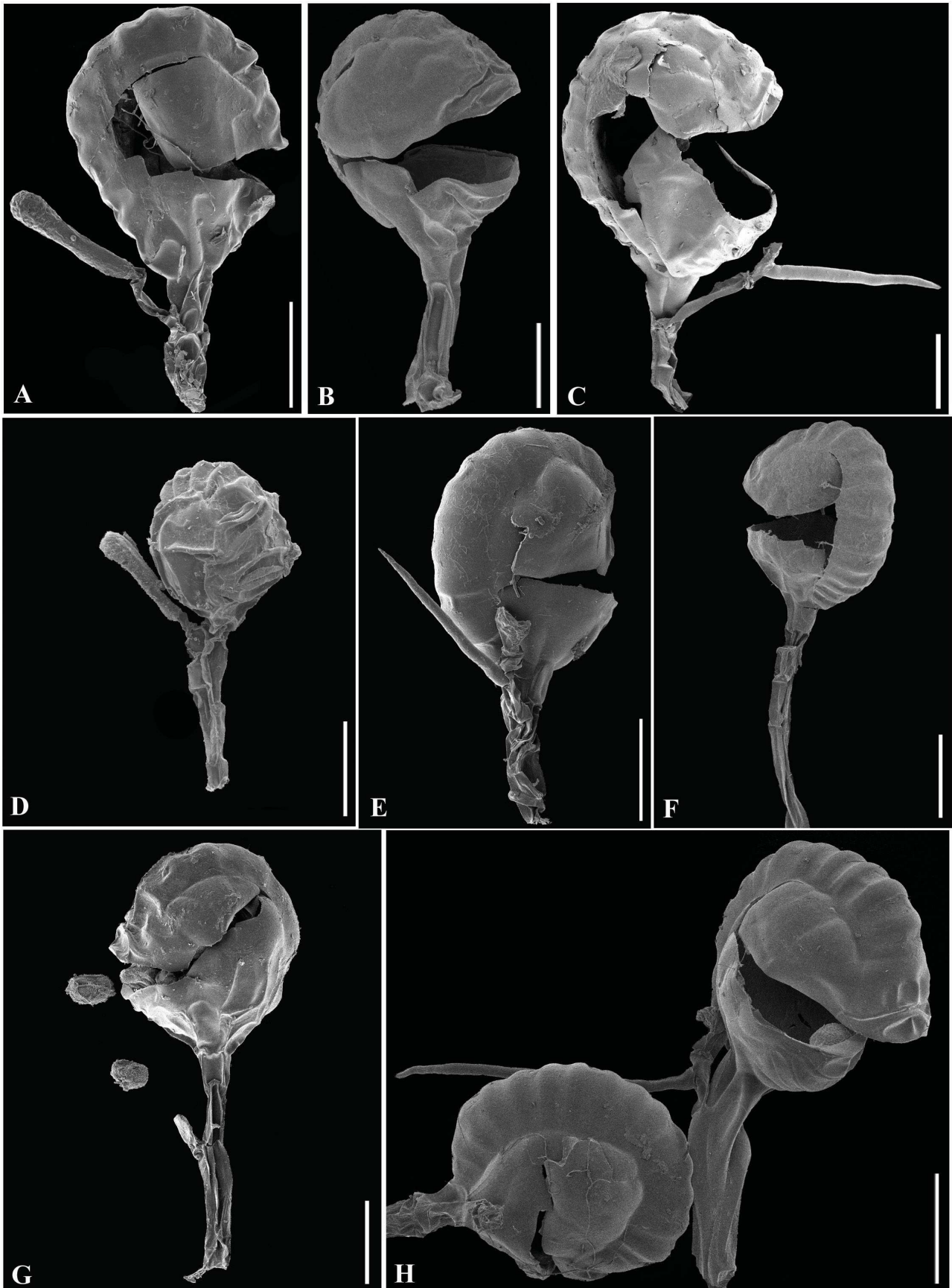


FIGURE 9. Some microscopic characters of the sporangia of *Meniscium*. **A.** *M. andreanum*; **B.** *M. angustifolium*; **C.** *M. arborescens*; **D.** *M. arcanum*; **E.** *M. chrysodioides*; **F.** *M. cocleanum*; **G.** *M. consobrinum*; **H.** *M. delicatum* (**A.** Salino 15362, BHCB; **B.** Forzza et al. 859, BHCB; **C.** Standley 28025, US; **D.** Salino 15026, BHCB; **E.** Almeida et al. 2273, BHCB; **F.** Salino et al. 15361, BHCB; **G.** Ellenberg 3818, GH; **H.** Fernandes 970, BHCB). Scales bars: = 50 μ m.

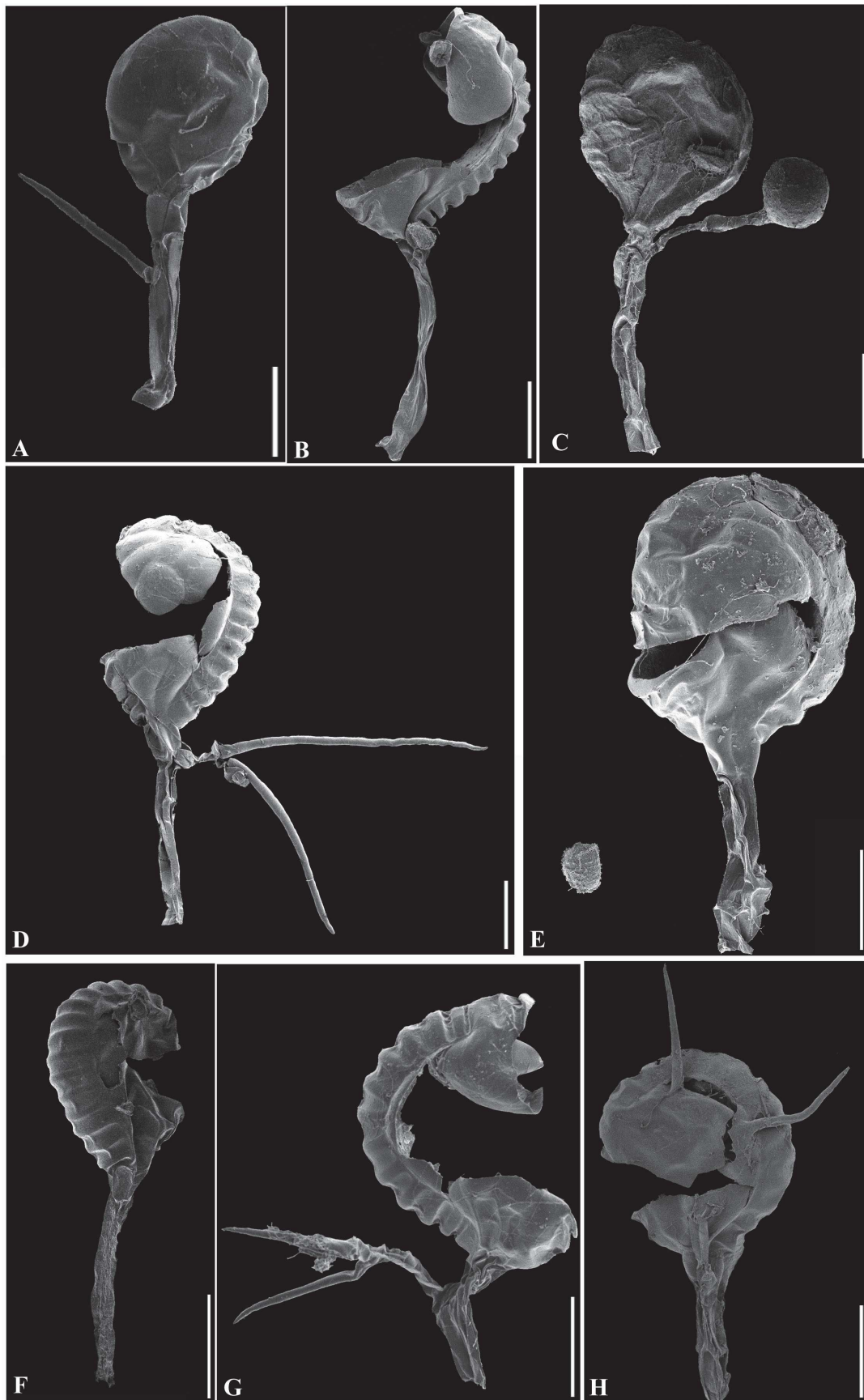


FIGURE 10. Sporangia of *Meniscium*. **A.** *M. divergens*; **B.** *M. falcatum*; **C.** *M. giganteum*; **D.** *M. hostmannii*; **E.** *M. lanceum*; **F.** *M. lingulatum*; **G.** *M. longifolium*; **H.** *M. macrophyllum* (**A.** Henkel et al. 4368, NY; **B.** Monteaugudo & Francis 5318, MO; **C.** Stork 4257, UC; **D.** Austin et al. 7213, US; **E.** Mexia 8474, MO; **F.** Stevens et al. 24828, UC; **G.** Korte & Kniess 4935, FURB; **H.** Almeida et al. 2445, BHCB). Scales bars: = 50 μ m.

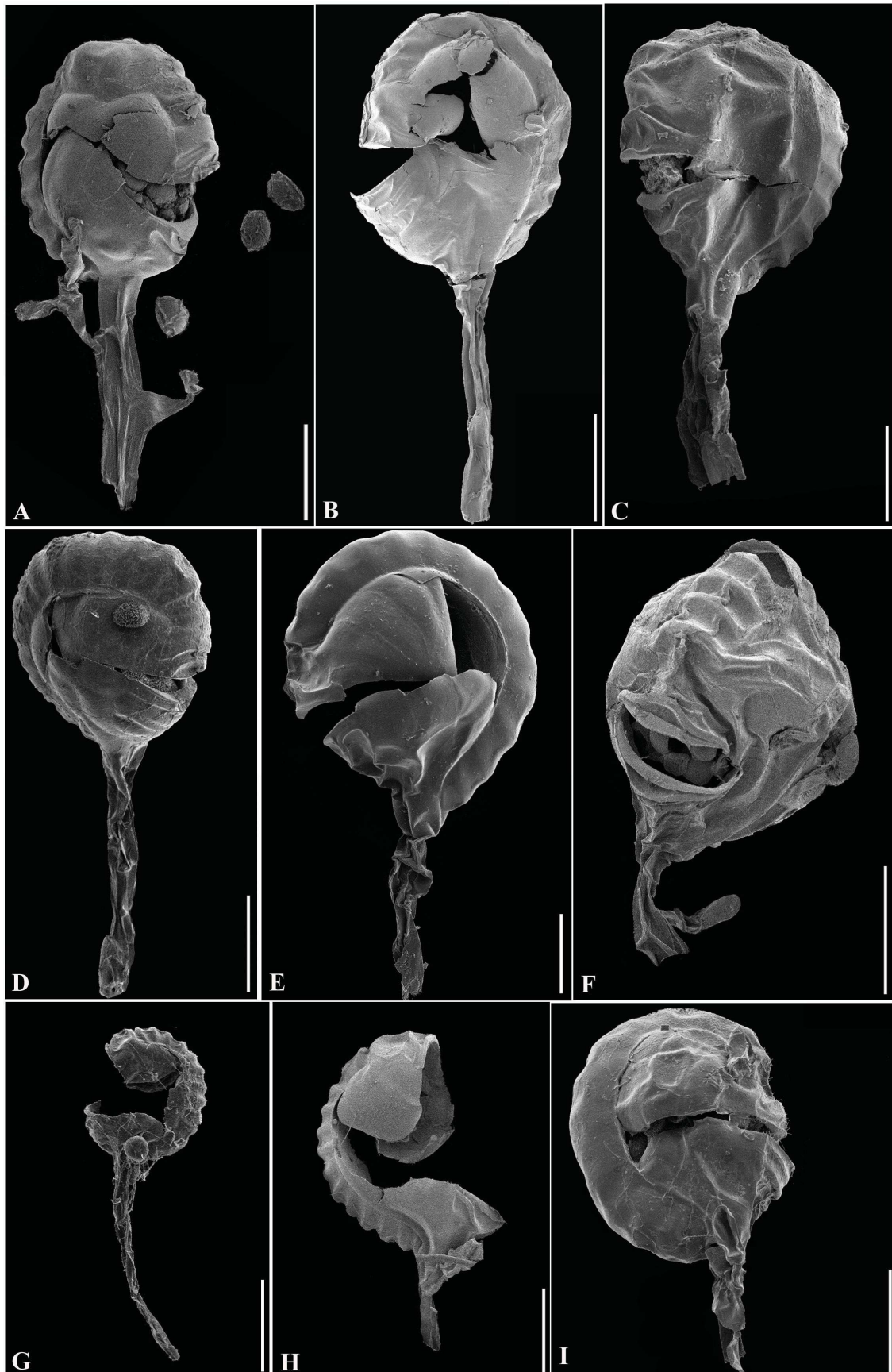


FIGURE 11. Sporangia of *Meniscium*. **A.** *M. maxonianum*; **B.** *M. minusculum*; **C.** *M. nesioticum*; **D.** *M. pachysorum*; **E.** *M. reticulatum*; **F.** *M. serratum*; **G.** *M. triangularis*; **H.** *M. membranaceum*; **I.** *M. turrialbae* (A. Arruda et al. 963, BHCB; B. Lehmann 4433, K; C. Salino 15584, BHCB; D. Sanín et al. 5073, NY; E. Boom & Marshall 7082, NY; F. Pietrobon et al. 5101, BHCB; G. Rodriguez et al. 4115, NY; H. Alem et al. 121, UC; I. Mickel 3514, NY). Scales bars: = 50 μ m.

Sporangia with glandular hairs are rare in the genus. Such hairs can be globose and reddish, as in *M. giganteum*, (Fig. 10C), globose and yellow, as in *M. falcatum*, *M. maxonianum*, and *M. trinangularis* (Figs. 10B; 11A, H), or tubular and yellow, as in *M. andreanum* and *M. arcanum* (Fig. 9A, D). The glandular, globose hairs are caducous, mainly in *M. falcatum* and *M. triangularis*, or persistent on the stalk or adhering to the capsule in *M. giganteum*.

Sporangia with acicular hairs are more common in the genus. The hairs can be on the capsule, sporangial stalk, or on paraphyses borne on the sporangial stalks (Figs. 9C, E; 10D, G, H). They may be simple on the capsule, as in *M. macrophyllum* (Fig. 10H), simple and inserted on the stalk, as in *M. divergens* (Fig. 10A) and rarely in *M. macrophyllum*, or arising from near the septae of the paraphyses, as in *M. arborescens*, *M. chrysodioides*, *M. hostmannii*, *M. longifolium*, and *M. delicatum* (Figs. 9C, E, H; 10D, G, H).

Spores:—Little has been written about the spores of *Meniscium*. Only five species have been previously sampled (by Wood, 1973; Tryon & Tryon, 1982; and Tryon & Lugardon, 1990).

Our analysis of 54 spore samples of the 25 species in the genus shows that the spore surfaces are highly variable and usually complex. Some species, e.g., *M. angustifolium*, *M. lanceum*, and *M. nesioticum*, are morphologically similar and have the same or very similar spore surface pattern (reticulate-cristate). *Meniscium reticulatum* and *M. turrialbae* have a reticulate-papillate and cristate-reticulate surfaces, respectively. The spore surfaces of the synonyms of *M. arborescens* (*M. salzmannii* and *M. standleyi*) are both papillate, highly cristate-undulate, and perforate (Fig. 16 A–D). However, *M. giganteum*, a morphologically distinct species with a simple lamina, has a smooth spore with rod-shaped or finger-like ornamentation, much different from spores of pinnate species (Fig. 28A–B).

Tryon & Tryon (1982) commented that the winged spores of *Meniscium* are similar to spores of *Goniopteris*. They examined material of two species, *M. salzmannii* (their voucher *Holm-Nielsen & Jeppesen 1050*, GH, is *M. nesioticum*, in our opinion) and *M. falcatum*, and that the surface of *Meniscium* spores generally has a thick, adpressed, tall or short, perforate-cristate reticulum, with crests that can be more or less obscured by dense papillae and echinate elements, as found in *M. falcatum*.

According to Tryon & Lugardon (1990), the surfaces of *Meniscium* spores are irregular, predominantly with perforations, echinate or cristate folds, or sometimes wings; however, their work examined only four species, including the sample of *M. nesioticum* cited above. It has a cristate-perforate surface, which is similar to that found by Fernandes *et al.* (2014). Another specimen they sampled, *Schultes & Cabrera 16444* (GH, US), was identified by them as *M. arborescens*, but in our opinion is *M. longifolium*; it was described as having an echinate surface. They also sampled *M. lingulatum*, with a winged-fimbriate surface, and *M. serratum*, with an echinate (short and dense) surface.

Our observations suggest that most *Meniscium* spores have a surface with a complex ornamentation, a combination of wings, crests, perforations, fimbria, spines, reticulations, and papillae (Figs. 13A–F; 16E–F; 19A–D; 24E–F; 28A–D; 30A–F; 34E–F; 37C–D; 40C–D). However, other spore surfaces are simpler, with only one principal ornamentation type: papillate, echinate, verrucose, or cristate (Figs. 16A–B; 24A–B; 34C–D; 37A–B, E–F; 40A–B, E–F).

Taxonomic Treatment

Meniscium Schreber (1791: 757)

Phegopteris subgen. *Meniscium* (Schreb.) Christ (1897: 269). *Dryopteris* subg. *Meniscium* (Schreb.) C. Christensen (1906: 250). *Thelypteris* sect. *Meniscium* (Schreb.) Morton (1963: 154). *Thelypteris* subg. *Meniscium* (Schreb.) C.F. Reed (1968: 254). **Type:**—*Polypodium reticulatum* Linnaeus (1759: 1325). *Meniscium reticulatum* (L.) Swartz (1803: 274).

Rhizomes short-creeping or ascending, (0.1–)0.5–3.0 cm diam., glabrous or with sparse to moderate scales at the apex, scales deciduous, irregular, linear, lanceolate to oval-lanceolate, subclathrate, thick, lustrous or dull, light to dark brown, margins entire, irregular or lacerate, glabrous or with glandular and acicular hairs. **Fronds** (50–)60–240(–300) cm long, monomorphic, subdimorphic, or rarely dimorphic, with subdimorphic or dimorphic fronds fertile fronds having longer petioles and more numerous pinnae, but with slightly smaller and narrower laminae or pinnae. **Petioles** (19–)30–127 cm long, 0.4–2 cm diam., adaxially grooved, with light brown to black basal portion and greenish to stramineous or orange-brown to reddish distal portion, dull or glossy, glabrous or moderately to densely pubescent, scales scattered on proximal portion or more rarely dense throughout, patent, persistent or deciduous, equal to those on the rhizomes, hairs

acicular, erect, arched, curved, tortuous, adpressed on both sides or denser on adaxially. **Laminae** (16–)30–80(–120) cm long, 1-pinnate or rarely simple, broadly elliptic, oval, oblong or lanceolate, apical pinna conform or subconform, membranaceous, chartaceous to coriaceous. **Rachises** grooved adaxially, glabrous, glabrescent or pubescent on both sides or only adaxially, groove with moderate to dense, 0.5–0.2 mm long, acicular, erect, curved, tortuous, patent hairs and sometimes glandular hairs, and sparse, irregular, lanceolate, filiform, adpressed, branched scales. **Buds** absent or present in the axils of proximal or distal pinnae, rarely on medial or all pinnae. **Pinnae** in (2–)4–25 pairs, medial pinnae (8–)11–31(–38) × 1.5–6.5 cm, distal pinnae not reduced or gradually to abruptly reduced, proximal pinnae opposite to subopposite and distal pinnae alternate, broadly elliptic, oblong, oval, falcate, lanceolate to linear-lanceolate, sessile or short or long-petiolate (0.1–5 cm long); **bases** uniform in all pinnae or unequal, proximal pinna bases truncate, rounded, short or broadly cuneate to narrow and long-cuneate, oblique, auriculate on both sides or only acroscopically, or without auricles, median pinna bases slightly short-cuneate, asymmetric, rounded to truncate, distal pinna bases asymmetric, oblique, obtuse, basiscopic side rounded, short-cuneate and adnate, acroscopic side excavate or truncate; **margins** usually membranous, entire, undulate, crenulate, serrate, or uncinately-serrate, glabrous or with hairs; **apices** gradually to abruptly reduced, acute, cuneate, long-acuminate to caudate. **Indument** of glandular and acicular, 0.05–0.4 mm long, erect, curved, tortuous hairs; ciliform, 0.4 mm long, adpressed hairs; and filiform, branched, irregular, arachnoid, hyaline to dark brown, usually deciduous scales; **adaxial surfaces of pinnae** glabrous or costae and veins with hairs and frequently filiform scales and glands, and laminar surfaces between the veins glabrous; **abaxial surfaces of pinnae** on the costae and veins glabrous or with glandular, acicular hairs and scales, the laminar surfaces between the veins glabrous or with glandular and acicular hairs. **Veins** regularly anastomosing in pairs, with cross-veins forming regular areoles in 4–25 rows between costae and pinna margins, usually each areole with a single, excurrent, generally free veinlet arising at the point of fusion of the cross-veins, from the costal veins (or primary) the secondary veins; **costal veins** on fertile fronds (narrow) closer and more numerous than on sterile fronds, 4–21 per 3 cm; **secondary veins** straight, arched, subsigmoid or sigmoid, usually joining at an obtuse or acute angle, with one or two, free, excurrent veinlets, or these veinlets completely dividing the areoles; **areoles** in 4–25 rows between the costa and pinna margin. **Sori** on the cross-veins, oblong or linear, straight or usually arcuate, infrequently in pairs between main lateral veins, sporangia rarely acrostichoid (also arising between the veins); **indusia** always absent; **receptacles** glabrous or with filiform, branched supposed sporangiasters with acicular hairs or glands present in a few species; **sporangia** glabrous, or stalks with simple acicular hairs or 2–3-septate paraphyses with glandular, globose, tubular or acicular hairs arising from septae, acicular hairs 0.2–0.4 mm long, capsule usually glabrous, rarely with 1–4 acicular hairs. **Spores** monolet, yellow to dark brown, perispore with prominent wing-like ridges, surface cristate (perforate or fenestrate), papillose, reticulate, echinate, or rugose, $x = 36$.

Key to species of *Meniscium*

1. Laminae simple, undivided2
- Laminae 1-pinnate3
2. Petioles scaly and pilose; areoles (18–) 24–35 between costae and laminar margins; sori linear or arcuate; sporangial stalks with spherical glands *M. giganteum*
- Petioles glabrous; areoles 10–12 between costae and laminar margins; sori oblong to rounded; sporangia glabrous *M. minusculum*
3. Rachises, costae, veins, and sometimes laminar tissue between veins glabrous abaxially or with rare and very short hairs (0.1 mm) with globose apex4
- Rachises, costae, veins, and sometimes laminar tissue between veins abaxially with scales and erect, tortuous, acicular hairs (0.2–0.3 mm) and / or glandular8
4. Fronds dimorphic; sterile pinnae with 5–6 rows of areoles between costae and pinna margins; sporangial stalks with acicular hairs *M. divergens*
- Fronds monomorphic to subdimorphic; sterile pinnae with 7–26 rows of areoles between costae and pinna margins; sporangial stalks glabrous or glandular5
5. Buds present in axil(s) of distal pinnae *M. cocleanum*
- Buds absent6
6. Proximal pinnae with base truncate, rounded or subcordate; medial and distal pinnae with asymmetric base *M. andreanum*
- Proximal pinnae with cuneate to acuminate base; medial and distal pinnae with symmetrical base, rarely the distal pinnae with basiscopic side adnate7
7. Fertile medial pinnae 14–25.5 × 2.6–4.4 cm; costal veins 10–13 for each 3 cm; receptacles and sporangia with orangish tubular glands *M. arcanum*
- Fertile medial pinnae 21–37.5 × 7.0–8.7 cm; costal veins 4–6 for each 3 cm; receptacles and sporangia glabrous *M. lingulatum*
8. Pinnae crenate-serrate, serrate, or uncinately-serrate, at least in the distal part9

–	Pinnae entire, undulate, or crenate	11
9.	Fronds dimorphic; costae abaxially with erect hairs	<i>M. lanceum</i>
–	Fronds monomorphic to subdimorphic; costae, veins, and laminar tissue abaxially with erect, curved or tortuous and glandular hairs	10
10.	Pinnae linear-oblong or oval to elliptical; all pinnae usually sessile; pinna apices long-acuminate to caudate; distal pinnae unreduced or slightly reduced; costae and veins abaxially glabrous or with sparse to dense, acicular, curved, and adpressed hairs, laminar tissue glabrous	<i>M. consobrinum</i>
–	Pinnae lanceolate to triangular-lanceolate; proximal pinnae usually stalked; pinna apices acute to acuminate; distal pinnae gradually or abruptly reduced; costae, veins, and laminar tissue (sterile laminae sometimes glabrous) abaxially with moderate to dense acicular, tortuous, patent and erect or slightly arcuate hairs	<i>M. serratum</i>
11.	Buds absent	12
–	Buds present	24
12.	Fronds dimorphic; sporangia acrostichoid (sporangia on the secondary veins and laminar tissue between the veins)	13
–	Fronds monomorphic to subdimorphic; sori discrete, only on secondary veins	14
13.	Fertile pinnae 3–6 (–8) pairs, elliptic to lanceolate; costae and veins abaxially with erect hairs; sporangia glabrous or with minute hairs 0.1 mm arising from the capsules	<i>M. macrophyllum</i>
–	Fertile pinnae 7–18 (–20) pairs, linear-lanceolate; costae and veins abaxially with curved hairs; sporangia glabrous	<i>M. nesioticum</i>
14.	Proximal fertile pinnae oblong to elliptic or elliptic-lanceolate	15
–	Proximal fertile pinnae linear to lanceolate	16
15.	Pinnae 6–13 pairs; pinna stalks 0.4–1.8 cm long; fertile pinnae abaxially with hairs everywhere	<i>M. chrysodioides</i>
–	Pinnae 20–28 (–40) pairs; pinna stalks (0.9) 2–5 cm long; fertile pinnae abaxially with hairs only on the costae and veins	<i>M. pachysorum</i>
16.	Sporangial stalks with acicular or glandular hairs; receptacles glabrous or with straight hair overlapping the sori	17
–	Sporangial stalks glabrous, with glands or rarely with simple hairs; receptacles glabrous or with tortuous hairs not overlapping the sori	21
17.	Laminar tissue between veins abaxially with conspicuous acicular and/or glandular hairs	18
–	Laminar tissue between veins abaxially glabrous or with inconspicuous deciduous glands	20
18.	Laminae membranaceous; pinna pairs 4–10; proximal pinnae truncate to rounded at bases, with two short auricles; areoles (4–)6–8 between costae and pinna margins	<i>M. delicatum</i>
–	Laminae chartaceous; pinna pairs (8–)12–20; proximal pinnae cuneate at bases, without auricles; areoles 7–15 between costae and pinna margins	19
19.	Costae, veins, and laminar tissue between veins abaxially and sporangia with acicular and glandular hairs	<i>M. longifolium</i>
–	Costae, veins, and laminar tissue between veins abaxially and sporangia only with glandular hairs	<i>M. maxonianum</i>
20.	Laminar tissue between veins abaxially glabrous; costae and veins with acicular, erect hairs, and branched filiform scales	<i>M. hostmannii</i>
–	Laminar tissue between veins abaxially with glandular hairs; costae and veins only with acicular, erect hairs	<i>M. falcatum</i>
21.	Fertile pinnae linear-lanceolate, 6–11 × 0.5–1.2 cm; bases of proximal pinnae long cuneate; areoles 4–8 (–10) between costae and pinna margins	<i>M. angustifolium</i>
–	Fertile pinnae oval-triangular to lanceate, oblong-lanceolate, oblong, elliptic-lanceolate, 11–29 (34) × 1.3–4 cm; bases of proximal pinnae short cuneate, acute, rounded or truncate; areoles 10–17 between costae and pinna margins	22
22.	Fertile pinnae lanceate to oval-triangular; bases of proximal pinnae broadly rounded to short-cuneate	<i>M. reticulatum</i>
–	Fertile pinnae linear, lanceolate, elliptic or falcate; bases of proximal pinnae cuneate to subequilateral or truncate to rounded	23
23.	Distal pinnae gradually to abruptly reduced; costae, veins, and laminar tissue between veins abaxially with patent, tortuous hairs; sterile pinnae with (7–) 9–13 (–17) rows of areoles between costae and pinna margins; sori confluent at maturity; receptacles with sporangiasters	<i>M. arborescens</i>
–	Distal pinnae unreduced or slightly reduced; costae, veins, and laminar tissue between veins abaxially glabrous or with curved hairs on costae; sterile pinnae with (9–) 13–26 rows of areoles between costae and pinna margins; sori non-confluent at maturity; receptacles glabrous	<i>M. turrialbae</i>
24.	Buds present in axils of distal pinnae	<i>M. triangularis</i>
–	Buds present in axils of proximal pinnae	25
25.	Fronds monomorphic; 2–4 pinna pairs; costae, veins, and laminar tissue between veins abaxially with ciliform hairs (0.2–0.5 mm), moderate to dense and adpressed	<i>M. membranaceum</i>
–	Fronds dimorphic or subdimorphic; (6–) 11–24 pinna pairs; costae, veins, and sometimes laminar tissue between veins abaxially with acicular hairs (0.1–0.3 mm), these sparse, moderate to dense, patent, tortuous, erect, curved or arched, or glandular	26
26.	Laminar tissue between veins abaxially with acicular hairs; sporangial stalks with acicular hairs	<i>M. arborescens</i>
–	Laminar tissue between veins abaxially glabrous; sporangial stalks glabrous	27
27.	Fertile pinnae 6–8 pairs; areoles 4–8 between costae and pinna margins	<i>M. angustifolium</i>
–	Fertile pinnae (7–) 8–13 (–15) pairs; areoles (9–) 11–26 between costae and pinna margins	28
28.	Fronds monomorphic or subdimorphic; sterile pinnae with 6–8 costal veins for each 3 cm	29
–	Fronds dimorphic or subdimorphic; sterile pinnae with 6–12 costal veins for each 3 cm	30
29.	Fertile pinnae triangular-lanceolate or narrowly ovate to lanceate	<i>M. reticulatum</i>
–	Fertile pinnae linear-lanceolate to oblong, falcate	<i>M. turrialbae</i>
30.	Costae abaxially with curved hairs; sterile pinnae with 6–9 costal veins for each 3 cm	<i>M. nesioticum</i>
–	Costae abaxially with erect hairs; sterile pinnae with 8–12 costal veins for each 3 cm	<i>M. lanceum</i>

1. *Meniscium andreanum* Sodiro (1883: 71). (Figs. 12A–D; 13 A–D)

Phegopteris andreana (Sodiro) Christ in Pittier (1901: 35). *Dryopteris andreana* (Sodiro) Christensen (1905: 252). *Thelypteris andreana* (Sodiro) Morton (1967: 50). *Cyclosorus andreanus* (Sodiro) Mazumdar & Mukhopadhyay (2014: 14). **Lectotype here designated:**—ECUADOR. Pichincha. “Crescit in silv. tropic. sec. fl. Pilaton”, December 1881, *A. Sodiro s.n.* Q (Q19170).

=*Meniscium ensiforme* (C. Chr.) Pichi Sermolli (1968: 180). **Syn. nov.** *Dryopteris ensiformis* Christensen (1913: 269). *Thelypteris ensiformis* (C. Chr.) Tryon (1967: 6). *Cyclosorus ensiforme* (C. Chr.) Mazumdar & Mukhopadhyay (2014: 19). **Type:**—COSTA RICA. “Lisière des Paturâges à La Palma, 1459 m”, 4 September 1898, *A. Tonduz 12533* (lectotype P [P00643488], designated by Smith (1992); isoelectotypes BM, B [B200055223], CR [CR12533], NY [NY00149102], US [US826324]).

=*Dryopteris andreana* var. *glabra* Hieronymus (1907: 352). **Type:**—ECUADOR: Porto Mindo, s.d., *Stübel 767* (lectotype B [B200052353], here designated; isoelectotypes B [B200064538, B200064479, B200052354]).

Rhizomes short-creeping, 1–1.5 cm diam., glabrous. **Fronds** monomorphic or more often subdimorphic; sterile fronds 82–241 cm long, petioles 52–83 cm × 4–7 mm, laminae 55–158 cm long, pinnae 23–33 × 4.4–6.5 cm; fertile fronds 75–221 cm long, petioles 75–108 cm × 7–13 mm diam., **laminae** 30–20 cm long, pinnae 15–29 × 2.5–3 cm. **Petioles** with basal portion brown to black and distal portion paleaceous or reddish, glabrous or glabrescent, proximally with very sparse adpressed, lanceolate, oblong scales, hairs absent. **Laminae** 1-pinnate, elliptic to oblong, chartaceous to coriaceous. **Rachises** glabrous or abaxial side with scattered scales similar to the petioles. Buds absent. **Pinnae** (5–) 8–18 pairs, elliptic to oblong, sessile, the distal non-reduced; bases of the proximal pinnae truncate to rounded, subcordate, uni- to biauriculate, the median and distal pinna bases frequently asymmetric with basiscopic side adnate, rounded to short-cuneate, acroscopic side excavate or truncate, margins entire or undulate to slightly crenulate, glabrous, sometimes revolute, with a narrow membranous line; apices gradually reduced, long-acuminate to caudate, adaxially glabrous, abaxially glabrous or with hyaline arachnoid scales, imbricate, deciduous, mainly near the costae and veins; costal veins 7–10 for each 3 cm in the fertile and sterile pinnae; secondary veins (cross-veins) straight in the sterile and arcuate in the fertile pinnae, joining at an obtuse angle, with one or two free excurrent veinlets or dividing the areoles completely, thickened at the apex with hydathodes adaxially; areoles (11–)14–20 rows between the costae and the pinna margins, sterile areolae narrower than the fertile ones. **Sori** arcuate, infrequently biseriolate between the costal veins forming two sori per areole, these round or oblong on the secondary veins, rarely confluent at maturity; **receptacles** glabrous or with sporangiasters between sporangia and with yellow or orange tubular glands; sporangia glabrous or with yellow tubular glands on the pedicels. **Spores** crystallized-equine, irregular thick ridges, agglomerated, wavy with papillary elements.

Distribution and habitat:—Bolivia, Colombia, Costa Rica, Ecuador, Honduras, Nicaragua, Panama, Peru, and Venezuela (Fig. 41). Terrestrial in ravines and on slopes in humid and shaded forests, at 400–1800 m, rarely down to 80 m.

Notes:—Sodiro (1883) described *M. ensicum andreanum* and compared it with *M. reticulatum*; however these species are very different. Later, Maxon & Morton (1938) considered *M. andreanum* very similar to *M. lingulatum* and used the base of the pinnae to differentiate them.

Meniscium andreanum shares with *M. arcanum* the tubular glands in the sporangial pedicels (Smith 1983), and subcoriaceous laminae with secondary veins that are generally not very evident. *Meniscium lingulatum* differs in having sori in a single row. *Meniscium andreanum* differs from both in having fronds 82–240 cm long, with 8–18 pairs of sessile pinnae, and a dark brown lateral line on a swollen point on the abaxial surface of the petiole, pinnae base truncate, rounded, or subcordate, whereas *M. arcanum* has fronds with 47–130 cm long, 2–5 pairs of stalked pinnae, without lateral line, or if present, non-swollen, pinna bases cuneate, and *M. lingulatum* has fronds 93–170 cm long, 3–7 pairs of stalked pinnae, without lateral lines, and pinna bases cuneate to acuminate.

Neither Maxon & Morton (1938) nor Smith (1983) mentioned the relationship between *M. andreanum* and *M. ensiforme*, which we believe to be the same species. Christensen (1913), in the description of *M. ensiforme*, commented on the relationship with *M. andreanum* and mentioned that the most striking features of this species are: sessile pinnae with cartilaginous margins, excurrent veinlets dividing each areole, biseriolate sori, and sporangial pedicels glabrous. Except for the presence of yellowish tubular glands on the sporangial pedicels, these characters are all also found in *M. andreanum*. However, the type of *M. ensiforme* has almost no sporangia and the few existing ones are glabrous and without spores. Maxon and Morton (1938) compared *M. ensiforme* with *Dryopteris jurgensenii* (= *M. falcatum*), a species also glabrous between the veins; however, they do not mention the relation of this species with *M. andreanum*.

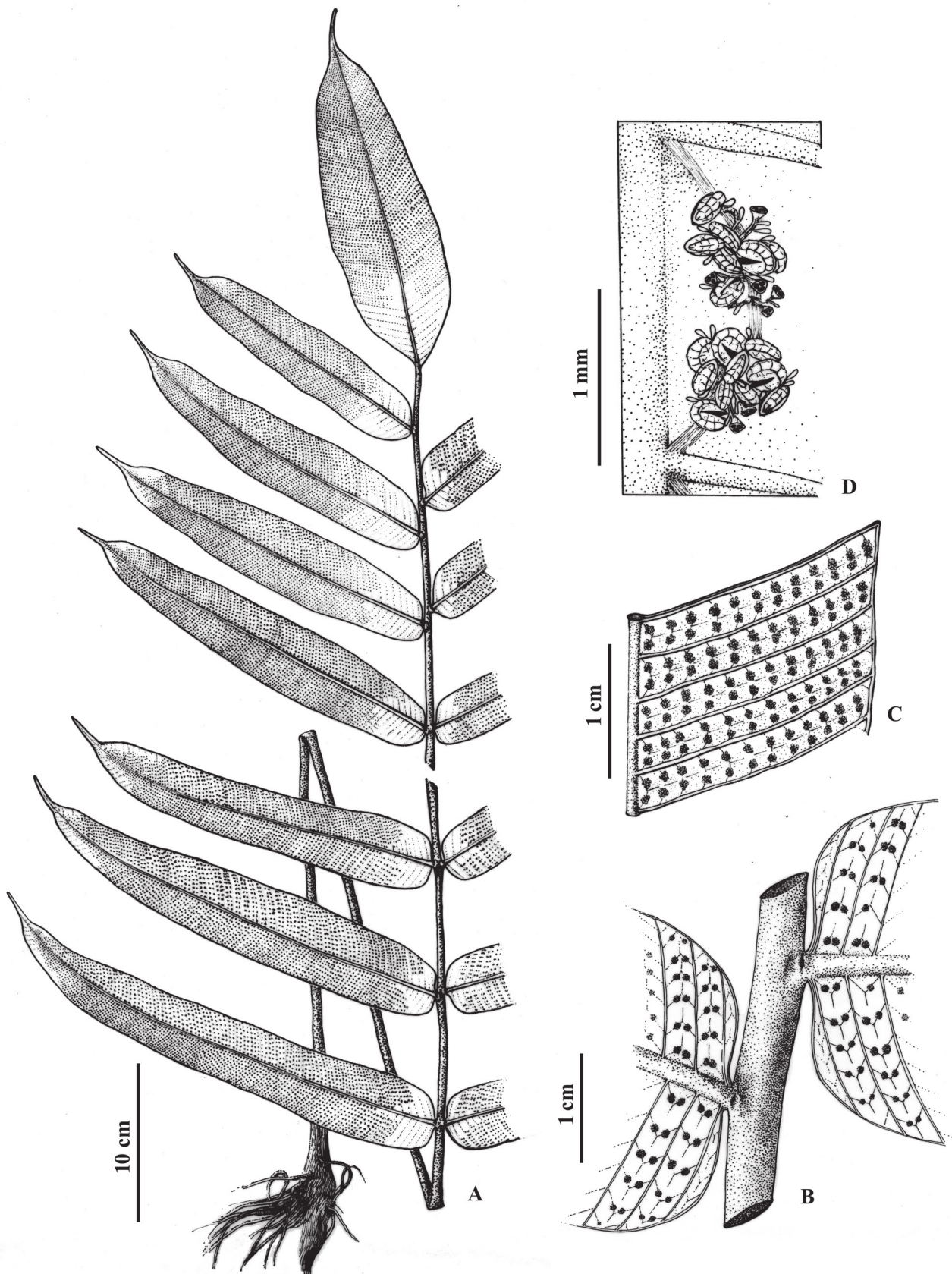


FIGURE 12. *Meniscium andreanum*. **A.** fertile frond; **B.** detail of the abaxial surface of pinnae base; **C.** detail of the abaxial surface of fertile pinna showing biseriate sori; **D.** detail of the biseriate sori (A–B. Croat & Grayum 60176, UC, MO; C–D. Smith 1743, UC, MO).

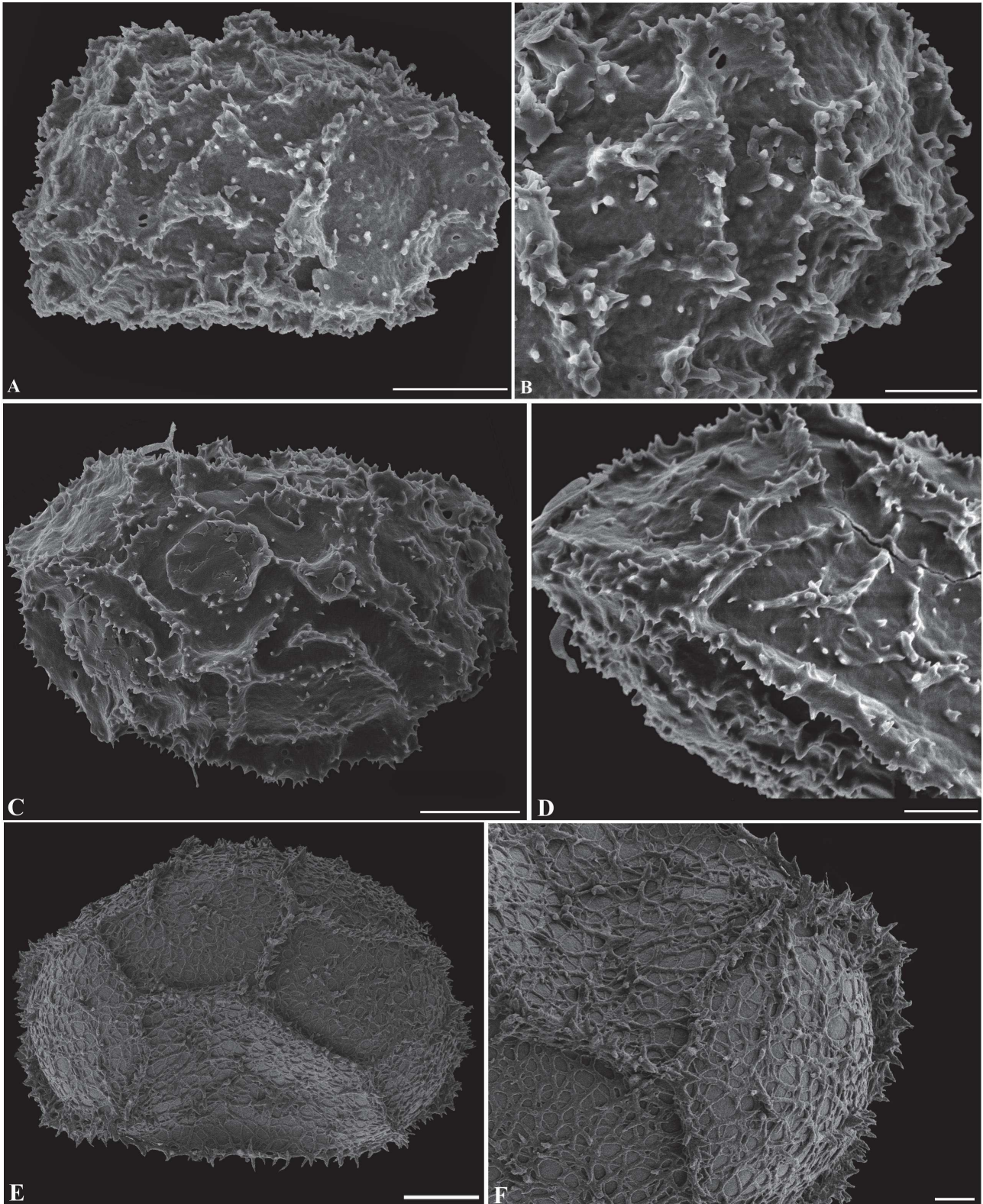


FIGURE 13. Spores of *Meniscium*. **A–D.** *M. andreanum*, cristate-echinate spore. **E–F.** *M. angustifolium*, reticulate-cristate spore (**A–B.** Salino 15362, BHCB; **C–D.** Van der Werff *et al.* 21657, UC; **E–F.** Forzza *et al.* 859, BHCB). Scales bars: A, C, E = 10 μm ; B, D, F = 5 μm .

The only character that might separate *M. ensiforme* from *M. andreanum* is the presence of yellow tubular glands on sporangial pedicels in the latter. However, this character is inconsistent, and in addition, among the specimens studied, tubular glands were present on some fronds and inconspicuous or absent on different fronds of the same

forest, 1°35' S, 77°53' W, 1200m, 1 September 1976, *Øllgaard & Balslev 9120* (F); *idem*, Mera, road approx. 4 km N of the banks and rain forest, 1°35' S, 77°53' W, 1200m, 1 September 1976, *Øllgaard & Balslev 9194* (F); *idem*, Mera Canton, 2 km north west of Mera, at campamento Vacacional, 78°75' S, 13°01' W, 1250m, 25 July 1992, *Fay et al. 3759* (NY); *idem*, 1 km al E de Topo por carretera entre Baños y Mera, 12°70' S, 78°09' W, 1300m, 18 March 1985, *Barker et al. 5785* (NY); 1862, *Fraser s.n.* (BM); *Sodiro s.n.* (US); *s.data*, *Verleysen s.n.* (P); Andes de Quito, *s.data*, *Sodiro 29/5* (P); Mera, 35°00' S, 77°53' W, 1200m, 1 September 1976, *Øllgaard & Balslev s.n.* (UC); *idem*, Mera, Isidro Ayora, 1000m, 18 January 1982, *Harling et al. 19689* (UC); *idem*, 13 August 1957, *Barclay 4810* (MO); **Pichincha**: 0°80' N, 78°34' W, 1400m, 2 February 1991, *Moran & Rohrbach 5195* (MO); *idem*, 0°80' N, 78°34' W, 1400m, 2 February 1991, *Moran & Rohrbach 5243* (MO); *idem*, Canton Quito, 0°14' N, 78°48' W, 1900m, 10 July 1991, *Fay & Fay 3341* (MO); *idem*, Mera, 1°35' S, 77°53' W, 1200m, 1 September 1976, *Øllgaard & Balslev s.n.* (UC); *idem*, Reserva Maquipucuna, 1300m, 23 August 2001, *Smith et al. 2835* (UC); *idem*, 1300m, 24 August 2001, *Smith & Webster 2850* (UC); *idem*, Quito–Santo Domingo via Ciriboga, 1060m, 17 May 1981, *Dodson & Clendenin 10959* (US); **Quininde**: 0°21' N, 79°44' W, 500m, 1 October 1994, *Kueppers 33* (MO); Quito, August 1874, *Sodiro 54/6* (K); *idem*, September 1874, *Sodiro 54/8* (K); *idem*, Andes do Ecuador, *Sodiro 9* (K); *idem*, Andes, Chimborazo, *Spruce 5739* (BM, P); **Zamora-Chinchi**, El Pangui, 33°44'10" S, 78°25'54" W, 1200m, 24 October 2006, *van der Werff et al. 21657* (UC, MO); *idem*, Zamora Cantón, 04°03'5" S, 78°57'50" W, 1000m, 18 July 1994, *Fay & Fay 4450* (MO, UC); *s.loc.*, *Sodiro 599* (NY).—**HONDURAS**. **Morazán**: near El Jicarito, along road toward El Pedregal, 900m, 13 September 1950, *Standley 26654* (GH).—**NICARAGUA**. **Matagalpa**: 13°14' S, 85°38' W, 1000m, 18 January 1982, *Stevens et al. 21071* (MO).—**PANAMA**. **Bocas del Toro**: 8°46' S, 82°14' W, 590m, 10 March 1985, *Croat & Grayum 60169* (MO, UC); *idem*, 8°46' S, 82°14' W, 590m, 10 March 1985, *Croat & Grayum 60176* (MO, UC); *idem*, Chiriqui Lagoon, 22 April 1941, *von Wedel 2315* (GH, MO, US); Bocas Del Toro, 24 April 1941, *Lagoon & von Wedel 2332* (MO); *idem*, 9°03'97" S, 82°43'93" W, 1525m, 8 March 2004, *Alfaro & Monro 5418* (MO); **Coclé**: 2600m, 25 April 1979, *Hammel 7150* (MO); *idem*, 880m, 22 July 1976, *Croat 37547* (MO); *idem*, 12 April 1971, *Croat 14287* (MO); *idem*, El Cope, 8°40'13.4" S, 80°35'25.5" W, 725m, 07 Jul 2012, *Salino et al. 15362* (BHCB); **Panama**: a 100 metros antes de Chilibre, 8 May 1977, *Méndez 12* (MO); **San Blas**: Nusagandi, Estrada El Llano–Carti road, 9°19' S, 78°55' W, 350m, 20 February 1985, *van der Werff 7003* (MO, UC); San Blas, 9°13' S, 78°15'00" W, 80m, 29 August 1994, *Herrera & Arosemena 1783* (MO).—**PERU**. **Loreto**: 22 August 1972, *Croat 19514A* (MO); **Junín**: Schunke Hacienda, above San Ramón, 1400m, 8 June 1929, *Killip & Smith 24651* (NY, US).—**VENEZUELA**. **Aragua**: Tovar, 1854, *Fendler 232* (B). *s.loc.*, August 1870, *Luerssen 3818* (P); 1839, *Gay s.n.* (P).

2. *Meniscium angustifolium* Willdenow (1810: 133). (Figs. 13E–F; 15 A–B)

Phegopteris angustifolia (Willd.) Mettenius (1859: 22). *Dryopteris angustifolia* (Willd.) Urban (1903: 21). *Thelypteris angustifolia* (Willd.) Proctor (1953: 57). *Cyclosorus angustifolius* (Willd.) Mazumdar & Mukhopadhyay (2013: 14). **Type**:—VENEZUELA. Caracas, s.d., *Bredemeyer s.n.*, (B–Herbarium Willdenow 19574, microfiche, UC).

Meniscium acrostichoides Desvieux (1827: 223). **Type**:—ILHAS VIRGENS. ex herb. Desvieux, de St. Thomas, s.d., *Lavallée A. 4* (lectotype P [P00644698], designated by Proctor (1985)).

=*Meniscium affine* C. Presl ex Ettingshausen (1864: 94). **Syn. nov.** *Dryopteris dispar* Maxon & Morton (1938: 364). *Thelypteris affinis* (C. Presl) Morton (1967: 50). **Type**:—BRAZIL. Rio de Janeiro. s.d., [Cerca de Rio de Janeiro, Brasilia, Pohl] *Pohl, J.P.E. s.n.* (lectotype W [W0045983] here designated). Annotation on the voucher specimen: “typified by L.Pignotti (W) 2013-06-21”.

Rhizomes short-creeping 0.6–1.3 cm diam., glabrous or with few scales on tip, deciduous scales, linear to oval-lanceolate, subclathrate, brown with entire margin, ciliate or with globular cells. **Fronds** monomorphic or slightly subdimorphic; **sterile fronds** 34–89 cm long, petiole 12–36 cm long and 2–5 mm diam., lamina 16–53 cm long., pinnae 7–17(–21) × 0.8–2.4 cm; **fertile fronds** 36–70 cm long, petiole 17–44 cm long. e 2–4 mm diam., lamina 18–33 cm long, pinnae 6–11 × 0.5–1.2 cm. **Petioles** with basal portion brown to black and distal portion greenish to paleaceous, glabrescent to moderately pubescent on adaxial side and sparsely pubescent on abaxial with acicular hairs, extremely arched, rare lanceolate scales, oblong at base and along petiole, in petiole grooves like rhizome. **Laminae** 1-pinnate, ovalate, chartaceous. **Rachises** usually pubescent on both side with acicular curved, falcate or crispate hairs, sparsely pubescent on the adaxial face with hairs 0.1–0.2 mm long. **Buds** usually absent or present in the axils of the proximal pinnae. **Pinnae** 6–18 pairs, linear lanceolate, sessile, the proximal and medial stalked (0.5–1.7 cm long), the distal sessile and not reduced; **bases** of the proximal pinnae long-cuneate, the median and distal pinnae base frequently asymmetric with adnate basisopic side, rounded to and acroscopic side excavate or truncate; **margins** entire to undulated (sterile) to crenulate (fertile), with acicular hairs; **apices** acuminate to long-acuminate; **adaxial**

sides of the costal and rarely on the veins with sparse to moderate (rarely dense in the fertile) straight or curved hairs, and laminar surface between veins glabrous; **abaxial sides** laminar surface between the veins glabrous, costal and rarely on veins with moderate to dense (sometimes glabrous in the sterile) hairs 0.15–0.25 mm long, acicular, curved and tortuous, glands and scales absent; **costal veins** for each 3 cm 8–17 in the sterile pinnae and 15–18 in the fertile; **secondary veins** (cross-veins) straight to slightly arcuate in the fertile pinnae and subsigmoid in the sterile pinnae, that join together at an obtuse to acute angle, with one free excurrent veinlets; **areoles** 4–8(–10) rows between the costae and the pinna margins, sterile areolae narrower and longer than fertile. **Sori** oblong, arcuate to linear, on the cross-veins, crowded and subconfluent at maturity; **receptacles** glabrous; **sporangia** glabrous. **Spore** reticulate-cristate, reticulum adpressed with low ridges or edges, fenestrate and fimbriate to echinate.

Distribution and habitat:—Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, and Venezuela (Fig. 41). This species is usually terrestrial in the interior of rain forests, along streams and occasionally as a reophyte, at 200–1200 m.

Notes:—The features that differentiate *Meniscium angustifolium* from its congeners are: pinnae linear-lanceolate, with long-cuneate base on basal pinnae, presence of acicular hairs extremely curved on the costal and abaxial veins, and laminar surface and sporangia glabrous (Fig. 15B). According to Smith (1992), *M. angustifolium* is probably most similar to *M. lanceum* (A.R. Sm.) R.S. Fernandes & Salino, but the latter often has dimorphic fronds with sterile pinnae oblong-lanceolate, base of proximal pinna short-cuneate to rounded and acicular, erect and tangled hairs on the costae of the abaxial side. Salino & Semir (2004) commented that some specimens of *M. angustifolium* resemble *T. salzmannii* (Fée) C.V. Morton (= *M. arborescens* Humb. et Bonpl. ex Willd.). This similarity is only evident in small, sterile specimens, which are sometimes glabrous, since *M. arborescens* typically has oblong-lanceolate, sessile pinnae base of the clamps, rounded or truncated and the abaxial surface and sometimes with sporangia acicular hairs and tortuous.

Meniscium nesioticum also has strongly curved acicular hairs on the costae of the abaxial side of the lamina, but it differs from *M. angustifolium* by having monomorphic to subdimorphic fronds and 4–8(–10) rows of areolas between the costae and the margin, whereas *M. nesioticum* has dimorphic, rarely subdimorphic, fronds usually with acrosticoid sori and 9–14 rows of areolas between the costae and the pinna margin on the sterile pinna and 6–16 rows on the fertile pinnae.

Meniscium affine is here treated as a synonym of *M. angustifolium*. Some uncertainties about the taxonomic identity of this species were pointed out by Maxon & Morton (1938) who, even without analyzing the type, considered the specimen *J.W.H. Traill 1402* at Kew (K000633661) as being *M. affine*. Despite this, Maxon & Morton (1938) commented that the description of this species contains no citations of other specimens and that the original description of *M. affine* C. Presl ex Ettingsh. (1864) does not exactly agree with *J.W.H. Traill 1402*, since it has auricles at the base of the pinnae and 4–6 rows of areolas between the costa and margin. This becomes clear after analyzing the type of this species at W, which Maxon & Morton (1938) did not see and is typical of *M. angustifolium*; beyond arched hairs on the costae, it has no auricles at the base of the pinnae and 5–6 areolas between the costa and margin (like the plate of Ettingshausen pl. 13, Fig. 3). Except for size, the type specimen of *M. affine* has no similarities with the Kew specimen (*J.W.H. Traill 1402*), which also has glands on the laminar surface and sporangium. This specimen was recently described as *M. delicatum* (Fernandes & Salino, 2016).

In addition to the proposed synonym, a lectotype was designated for *Meniscium affine* C. Presl ex Ettingsh. The choice was based on two collections at PRC and W. The specimen PRC [PRC455019], with the information “*In Brasilia ad Rio de Janeiro* (Mikan). *J.C.Mikan*,” has a note by the curator P. Márz from 11-02-2014 stating “This is probably not the original material for this name”. The description of the taxon by Constantin von Ettingshausen, botany professor at Vienna and Graz, was probably based on the collection by J.P.E. Pohl at W and not J.C. Mikan. Both J.C. Mikan and J.P.E. Pohl participated in the same Austrian expedition to Brazil (1817–1835). The label of the specimen at PRC was written by C. Presl, whereas the label with the locality that is at W was written by another person, but the name of the taxon, ‘*Meniscium affine* Presl,’ was written by C. Presl. Thus, based on the analysis of both specimens, the note above, and information in the protologue, the material at W was chosen as the lectotype.

Specimens examined:—**BOLIVIA. Beni:** Ballivian, Ravine, 138 km N of Caranavi, 15°20' S, 67°12' W, 700m, 20 June 1989, *Fay & Fay 2053* (MO, UC, US); *idem*, Ballivian, 15°20' S, 67°12' W, 700m, 20 June 1989, *Fay & Fay 2054* (MO, UC); *idem*, rio Chimane–Environs of Fatima, 320m, 3 June 1981, *Davis & Marshall 1146* (F, GH); **Cochabamba:** Chapare, 16°59' S, 65°25' W, 300m, 13 September 1996, *Kessler, M.; Kromer, T.; Acebey, A.; Hibbits, B.; Sonnentag 8444* (UC); **La Paz:** Franz Tamayo, Parque Madidi, orilla izquierda del Río Quendeque, 14°58'12" S, 0°67'49" W, 350m, 4 February 2002, *de la Quintana et al. 358* (MO, NY); *idem*, Franz Tamayo, Parque Nacional

Madidi, 14°58'47" S, 0°67'43" W, 380m, *Fuentes et al. 3614* (MO); **Santa Cruz**: Ichilo, Campamento Macuñucu, Parque Nacional Amboro, 17°43' S, 63°34' W, 16 September 1996, *Kessler et al. 8599* (UC); *s.loc.*, 5 February 1982, *Williams 1194* (GH, NY).—**BRAZIL**. **Acre**: Mâncio Lima, Bacia do rio Alto Juruá, Rio Moa, Parque Nacional, 7°30'52" S, 73°43'27" W, 8 May 1996, *Silveira et al. 1292* (NY); *idem*, Parque Nacional da Serra do Divisor, 7°26'51" S, 73°40'01" W, 220m, 13 December 2010, *Salino & Almeida 15010* (BHCB); *idem*, Serra de Moa, 7 May 1996, *Silveira et al. 8921* (NY); *idem*, Marechal Thaumaturgo, Basin of Rio Juruá, Rio Tejo, 8°55'57" S, 72°33'58" W, 27 November 200, *Daly et al. 10196* (MO, NY); *idem*, Sena Madureira, Basin of Rio Iaco (tributary of Rio Purus), 9°26'22" S, 86°36'45" W, 200m, 10 July 2008, *Daly et al. 13315* (RB); **Goiás**: 875m, 25 January 1970, *Ramos et al. 25402* (US); Catalão, ca. 24 km N.E. of Catalão, 25 January 1970, *Irwin et al. 25402* (C, NY); *idem*, Colinas do Sul, Estrada Colinas–Serra da Mesa, 41 km de Colinas, 13°53'50" S, 48°07'20" W, 650m, 24 June 1999, *Walter et al., 4354* (NY); *idem*, Serra Dourada, 14°00' S, 50°00' W, 650m, 21 January 1966, *Irwin et al. 11943a* (GH, IAN, MO, NY, RB, US); *idem*, 14°00' S, 50°00' W, 650m, 21 January 1966, *Santos et al. 11943* (US); *idem*, Ribeirão Cristalino, 48°50' S, 13°45' W, 18 May 1956, *Dawson 14930* (US); *idem*, Base da Serra Dourada, 21 January 1967, *Duarte 10203* (RB); Serra Dourada, ca 17 km S of Goiás Velho, ca. 6 km NE of Mossame, 750m, 9 May 1973, *Anderson et al. 9952* (NY); **Maranhão**: 50 km de Estreito, Cachoeira de Pedra Caída, 29 January 1976, *Carauta 1867* (BHCB, RB); **Mato Grosso do Sul**: Aquidauana, Aldeia Indígena Terena, Limão Verde, 20°19'30" S, 55°40'29" W, 200m, 16 August 2003, *Pott & Pott 6417* (BHCB); *idem* Estrada entre Piraputanga e Palmeiras, Fazenda Bat, 24 May 1998, *Forzza & Rezende 859* (BHCB, SPF); *idem*, Serra de Maracaju, 21 July 1969, *Hatschbach 22073* (MBM, UC, UPCB); Vale das Bruxas, 19 March 2005, *Silva et al. 26* (BHCB); *idem*, Cassilândia, Rodovia MS Inocência–Cassilândia, 19°07' S, 51°44' W, 500m, 11 November 1995, *Pietrobon & Lucca 2482* (MBM); *idem*, Rio Verde de Mato Grosso, Serra Pimenteira, cachoeira do cervo, 18°55' S, 54°53' W, 400m, 23 February 1994, *Silva et al. 1268* (MO, SPF); *idem*, Alto Araguaia, 22 September 1974, *Hatschbach & Kummrow 35078* (MBM, UC); *idem*, 19 December 1992, *Rodrigues Jr & Silva 351* (MO); *idem*, Barra do Garça, estrada de Alto do Garça para Baliza, 30 September 1989, *Prado & Windisch 291* (SPF); *idem*, Serra Ricardo Franco, 450m, 1 February 1978, *Windisch 1524* (BM); *idem*, Vila Bela da Santíssima Trindade, Serra Ricardo Franco, 15°00' S, 60°00' W, 29 July 1974, *Windisch 653* (MG, GH); **Minas Gerais**: Caldas Novas, 1744°00' S, 4837°00' W, 686m, 24 September 1994, *Hamilton et al. 387* (NY); *idem*, Patos de Minas, Baseata, 31 August 1950, *Bueste 30* (RB); *idem* Cascata, 700m, 31 August 1950, *Duarte 3041* (BHCB, NY); *idem*, São Sebastião do Paraíso, 17 April 1945, *Brade 117* (GH); São Sebastião do Paraíso, Fazenda Cachoeira, 27 April 1945, *Brade 17955* (RB); **Rondônia**: Alto Alegre dos Parecis, Fazenda Santa Rita, a 10 km da cidade, 19 December 2006, *Silva & Martins 5* (UPCB); **São Paulo**: Gália, Estação Ecológica de Caitetus, 14 July 1994, *Salino 1967* (BHCB); *idem*, 14 July 1994, *Salino 1969* (BHCB); Monte Aprazível, Sítio Santo Antônio, 20°43' S, 49°42' W, 10 November 1996, *Custódio & Zamaro 042* (HB); Sem município, Rio do Peixe, September 1906, *Sem coletor s.n.* (RB); Vista Alegre do Alto, Sítio Bahia, 20°43' S, 49°42' W, 9 October 1995, *Irovó 09* (HB); **Tocantins**: Lizarda, Fazenda Alto Bonito, 305m, 9°29'32,1" S, 46,54'21" W, 7 October 2006, *Santos 1381* (HB).—**COLOMBIA**. **Antioquia**: 06°13' S, 74°52'00" W, 760m, 23 February 1989, *MacDougal et al. 4174* (MO); *idem*, San Carlos, 06°14'0" S, 74°52'00" W, 650m, 5 November 1987, *Alan et al. 1676* (MO, UC); *idem*, 47.5 km E of San Carlos, Lake Punchina, 06°00' S, 74°52' W, 650m, 5 November 1987, *Brant et al. 1687* (NY); *idem*, Corregimiento Alto de Samaná Vereda Miraflores, 820m, 13 June 1989, *Fonnegra et al. 2984* (K, US); *idem*, San Luis, 10 km S. de Las partidas a San Luis, 5°55' S, 74°50' W, 420–460m, 24 June 1987, *Callejas et al. 4171* (NY); *idem*, Anorí, Vereda Madre Seca, quebrada Espirito Santo, 07°15'48,5" S, 75°03'05,9" W, 685m, 16 November 2003, *Rodríguez et al. 4353* (NY); *idem*, Vereda Madre Seca, quebrada Pilonas, 07°17'00,2" S, 75°03'00,0" W, 610m, 22 January 2004, *Rodríguez et al. 4529* (NY); *idem*, San Carlos, Corregimiento Alto Samaná, Vereda Miraflores, 06°05' S, 74°53' W, 880m, 25 October 1989, *Callejas et al. 8558* (NY); *idem*, San Luis, 10 km S. de las partidas a San Luis, 74°50' S, 5°55' W, 420m, 24 June 1987, *Callejas et al. 4171* (NY); *idem*, Magdalena, 1100m, 20 June 1992, *Arbelaez et al. 563* (UC); **Caquetá**: 320m, 11 January 1974, *Davidse et al. 5738* (MO); **Cauca**: Popayan, ca. 8km E de Popayán, 2°26' N, 76°31' W, 2000m, 12 January 1991, *Churchill & Rengifo 18315* (MO); **Chocó**: Along the banks of the río Suruco 6 km of Andagoya, 24 February 1971, *de la Sota & Lellinger 492* (US); *idem*, Along the Río Monomacho, 18 March 1971, *de la Sota & Lellinger 690, 720* (US); *idem*, Riosucio, 80m, 9 December 1976, *León 713* (MO), *idem*, Comisaría del Caquetá: Cordillera Oriental, vertice, 1000m, 3 April 1940, *Cuatrecasas 9032* (US); *idem*, 1100m, December 1860, *Lindig 324* (BM); **Cundinamarca**: Entre Nilo y Pueblo Nuevo, 530m, 19 July 1961, *Murillo & Jaramillo 266* (US); del Tolima: Ortega, Corregimiento Olaya Herrera, 4 July 1977, *Costa 1259* (B); *idem*, del Valle: Cordillera Occidental, 300m, 20 December 1942, *Cuatrecasas 13755* (US); *idem*, del Valle: Río Calima (región del Chocó): entre Pailón y El, 50m, 23 May 1946, *Cuatrecasas 21253* (US); *idem*, del Valle: Río Calima (região del Cochó), 5m, 3 March 1944, *Cuatrecasas 16674* (US); *idem*, alto Valle del río Paguey; arriba de Pueblo Nuevo, 700m, 7 October 1969, *Murillo. & Jaramillo 1117* (NY); *idem*, Pueblo Nuevo; cabaceras del río

Paguey, 900m, 4 October 1961, *Murillo et al.* 376 (NY); **El Valle**: Cuchilla, east of Zarzal, 1100m, 22 July 1922, *Pennell et al.* 8538 (NY); *idem*, Rio agua bonita to rio vieja, east of Zarzal, 1100–1300m, 23 July 1922, *Pennell et al.* 8583 (GH, NY, US); *idem*, El Valle del Cauca: Cuchilla, east of Zaral, 1100m, 22 July 1922, *Pennell et al.* 8538 (GH, US); *idem*, Sabaletas, km 29 of highway Buenaventura, 25m, 5 June 1944, *Killip, E.P.* Cuatrecasas 38854 (US); **Magdalena**: 11°05' N, 73°48' W, 700m, 13 July 1989, *Madriñán & Barbosa* 217 (MO); *idem*, 400m, July 1932, *Seifriz* 279 (US); *idem*, alto Río Buritaca. Alto de Mira, 73°48' W, 11°05' S, 700m, 13 July 1989, *Madriñán & Barbosa* 217 (GH); **Nariño**: Barbacoas, 1°30' N, 78°20' W, 350m, 19 January 1996, *Ramirez et al.* 9651 (UC); *idem*, Ricaurte, Corregimiento de Altaquer, 11°14' S, 78°09' W, 1054m, 20 May 1991, *Churchill et al.* 18315 (NY); **Putumayo**: Mocoa, 1°10' S, 76°42' W, 700m, 11 December 1986, *Hammel et al.* 15929 (MO, UC); **Risaralda**: 4°50' S, 75°53' W, 970m, 4 January 1995, *Silverstone-Sopkin & Paz* 7353 (MO, UC); **Santa Macarena**: Río Duita, 26 February 1942, *Gilliard s.n.* (NY); **Santa Marta**: 1898, *Smith* 2713 (NY); *idem*, 1936, *Bennet* 29? (US); *idem*, 2000m, July 1898, *Smith* 1053 (MO, NY, BM, K, P, GH, US); *idem*, 2000m, junho, *Smith s.n.* (UC); *idem*, El Recuerdo, 2500m, March 1935, *Bennet* 29 (US); *idem*, Mountains Falls, 2 August 1926, *Niemeyer* 36 (US); Pastaza River, Shell Mera, 13 August 1957, *Barclay* 4842 (NY); Sierra de La Macarena, Río Guapaya, 450m, 29 November 1949, *Philipsen* 1600 (BM); Sierra Nevada de Santa Marta, 1219m, 27 April 1898, *Brown s.n.* (GH); **Tolima**: Quebrada de La Picota, entre Mariquita y Honda, 7 February 1962, *Murillo et al.* 587 (NY); Isla Gorgona, 150m, 10 September 1987, *Alonso & Lozano et al.* 7461 (MO); *s.loc.*, *Mutis* 3284 (US); 820m, 13 June 1989, *Fonnegra et al.* 2984 (MO, UC). **COSTA RICA. Cartago**: Turrialba, near Interamerican Institute, 609 m, 18 March 1951, *Scamman* 5966 (GH, US); **Guanacaste**: 10°40'00" N, 85°04'50" W, 450m, 25 January 1985, *Grayum et al.* 4911 (MO); *idem*, 85°18' W, 10°32' S, 40m, 9 April 1973, *Burger & Gentry, J.* 9156 (F); *idem*, 10°40'00" N, 85°04'50" W, 450m, 25 January 1985, *Herrera et al.* 4911 (UC); **Heredia**: 300m, 15 August 1967, *Evans & Bowers* 3320 (MO); *idem*, 91m, 18 February 1955, *Scamman* 7460 (GH); *idem*, 91m, 18 February 1955, *Scamman* 7461 (GH); **Puntarenas**: 08°37'30" S, 83°40'50" W, 100m, 17 February 1991, *Cordero* 270 (MO); *idem*, 09°46'00" S, 84°34'40" W, 550m, 8 June 1995, *Rojas et al.* 1933 (MO); *idem*, Parque Nacional Corcovado, 8°38' N, 83°35' W, 400m, 22 January 1991, *Cordero* 137 (MO); San Jose: 09°41'05" N, 84°23'45" W, 290–350m, 25 April 1996, *Rojas & Morales* 2565 (MO); *idem*, 09°41'05" N, 84°23'45" W, 130m, 2 April 1993, *Grayum* 10427 (MO); *idem*, 84°20' W, 9°42' S, 400m, 7 November 1987, *Zamora et al.* 1480 (F); *idem*, 9°42' N, 84°20' O, 400m, 7 November 1987, *Zamora et al.* 1480 (MO); *idem*, Cantón de Puriscal, Z.P. La Cangreja, Cerros de Puriscal, 25 April 1996, *Rojas & Morales* 2565 (UC); San Juan, 20 March 1923, *Lankester* 605 (BM); *s.loc.*, Bosque estadual de Maricao, 18 August 1913, *Rosenstock* 44 (R); *idem*, 100m, 27 July 1979, *Grayum* 2115 (MO); *idem*, 475m, 27 February 1966, *Jiménez* 3693 (GH); *idem*, 600m, 1967, *Horish* 364 (MO).—**CUBA**. Along Río Buey, north slope of Sierra Maestra, 300m, 29 October 1941, *Morton & Acuna* 3799 (GH, UC, US); **Guantánamo**: Yateras Monte Verde, 575m, 29 April 1907, *Maxon* 4319 (NY, US); **Oriente**: Las Ninfas, 28 December 1917, *Hioram, B.* 1479 (NY); *idem*, Bayate, 9 July 1914, *Ekman* 1889 (NY); *s.loc.*, September 1859, *Wright s.n.* (UC); 1860, *Wright* 781 (US); September 1859, *Wright* 781 (BM, K, NY, F, MO, GH); *Clement* 5223 (US); March 1932, *Clement* 1785 (F); *Hioram* 1479 (NY, US).—**DOMINICAN REPUBLIC**. Central Plaine, Belladire, 25 February 1926, *Ekman s.n.* (UC); on road from Limbé to Marmelade, 1905, *Nash, G.V. Taylor, N.* 1221 (US); Port de Paix, 22 January 1929, *Leonard, E.C. Leonard, G.M.* 12296 (US); *idem*, Camp No. 3, on road from Limbé to Marmelade, 700m, 30 July 1905, *Nash, G.V.; Taylor, N.* 1221 (NY); *idem* Central Plaine, Belladère, edge of Riv. Jounan-de, 400m, 25 February 1926, *Ekman, E.L.* 5638 (NY, F, GH).—**EL SALVADOR. Morazán**: Arambala, Caripe del Guácharo, Río Sapó, área de la casada de las holominas, 13°56' S, 88°5' W, 758m, 18 April 2007, *Monterrosa & Bermúdez* 1381 (BM).—**ECUADOR. Esmeraldas**: 1°70' N, 78°37' W, 100m, 13 February 1988, *Hoover et al.* 4050 (MO); *idem*, Parroquia de Concepcion, 108m, 19 December 1936, *Mexia* 8474 (BM, GH, K, MO, NY, UC, US); *idem*, Quininde, 0°02'10" N, 0°79'44" W, 400m, 16 May 1995, *Clark & Watt* 891 (MO, UC); *idem*, 0°02'20" N, 79°45'00" W, 600m, 26 September 1994, *Abbott* 15318 (MO); *idem*, 50m, 8 April 1943, *Holdridge* 1664 (US); **Morona-Santiago**: 0°22' N, 78°08' W, 1000m, 7 September 1993, *Fay, A. & Fay, L.* 4028 (MO, NY); *idem*, Morona, near the city of Macas, 78°08' W, 2°20' S, 1000m, 7 June 1993, *Fay & Fay* 3999 (MO, NY); *idem*, Taisha, 2°23' S, 77°30' W, 400m, 17 June 1980, *Brandbyge & Asanza s.n.* (UC); *idem*, 457m, 9 February 1962, *Cazalet & Pennington* 7735 (NY, BM, K, B); *idem*, Río Guambime, 0°00' N, 77°30' W, 400m, 19 June 1980, *Brandbyge & Asanza* 32067 (NY); **Napo**: 0°10' N, 77°40' W, 440m, 5 June 1990, *Kohn* 1175 (MO); *idem*, 0°15' S, 76°20' W, 300m, 10 August 1980, *Brandbyge & Asanza s.n.* (UC); *idem*, Junction of río Juano with río Napo, 444m, 11 January 1981, *Proctor* 38707 (NY); *idem*, Reserva Biologica Jatun Sacha, 0°14' N, 77°36' W, 450m, 24 May 1987, *Carlos & Cerón* 1324 (UC); *idem*, Río Wai si syá, a northern tributary to Río Aguari, 76°20' W, 0°15' S, 300m, 10 August 1980, *Brandbyge & Asanza* 32720 (GH); **Pastaza**: 890m, 4 July 1990, *Flynn et al.* 4050 (MO); **Pichincha**: 400m, 11 September 2004, *Lehnert & Kessler* 1187 (UC); *idem*, Along N bank of river 3 km W of Alluriquin, 800m, 20 October 1981, *Werling & Leth-Nissen* 518 (NY, F); *idem*, Quito, *Jameson* 728 (K); *idem*, October 1883, *Sodiolo* 10

(K); *idem*, Rio Toachi, September 1874, *Sodiuro* 54 (BM, K); *idem* Rio de los Reyes, near Desecho, Parish of Colonche, 200m, 11 May 1938, *Bushne* 11 (BM); *idem*, Rio Palenque Sciencie Center, 150m, 2 February 1979, *Dodson* 7453 (US); *idem* Santo Domingo, Los Rios, Rio Palenque Biological Station, 15 July 1972, *Evoy* 30 (NY); **Sucumbios**: Gonzalo Pizarro Canton, 0°01'40" N, 77°13'00" W, 1050m, 30 March 1990, *Ceron et al.* 9402 (MO); *idem*, Gonzalo Pizzaro Canton, 0°01'40" N, 77°13'00" W, 1050m, 30 March 1990, *Cerón et al.* 9402 (UC); **Zamora-Chinchi**: Palanda, 0°44'51" S, 79°05'37" W, 800m, 10 March 2007, *Quizhpe & Wisum* 2624 (MO); 1500m, 9 February 1962, *Cazalet & Pennington* 7735 (UC, US); *s.loc.*, 13 August 1957, *Barclay* 4842 (MO).—**GUATEMALA**: **Retalhuleu**: Río Talculán, along road 5 km, west of Retalhuleu, 300m, 17 February 1941, *Standley* 87339 (F, US).—**HAITI**: **Ilha de São Domingos**: Hispaniola, 30 May 1946, *Ekman* 6187 (K); *s.loc.*, 22 January 1929, *Leonard & Leonard* 12296 (NY); *idem*, 600m, 27 August 1903, *Nash* 858 (NY); **Norte**: Vicinity of Dondon, 400m, 8 January 1926, *Leonard* 8730 (GH, NY, US).—**HONDURAS**. **Atlántida**: 16 July 1938, *Yuncker et al.* 8502 (BM, GH, F, K, MO, US); *idem*, Vicinity of San Alejo, 150m, 22 April 1947, *Standley* 7816 (F); *s.loc.*, 1200m, 23 August 1983, *Silva* 99 (MO, UC).—**JAMAICA**. **Portland**: Vicinity of Mill bank, 200m, 16 February 1920, *Maxon & Killip* 144 (NY, F, GH); *idem*, Upper Rio Grande Valley, near Bowden Pen, 18°10' S, 76°23' W, 450m, 20 February 2004, *Christenhusz & Tuomisto* 3172 (BM, UC); Saint Elizabeth: on moist shale boulders in stream, 25 April 1961, *Proctor* 22228 (GH); *idem*, Maggoty Falls, on dramp shaded rock by the Black, 12 May 1956, *Stearn* 1037 (BM); **Saint Mary**: Near Castleton, on the road to Annotto Bay, 6 June 1926, *Maxon* 799 (US); **Saint Thomas**: Along small stream above and west of Bowden Pen, 17°58'12" S, 76°25'59" W, 381m, 3 August 1963, *Crosby & Anderson* 1077 (F, GH, NY, UC); *idem*, Deep ravine in mountain forest above House Hill, 500m, 6 June 1926, *Maxon* 8851 (NY); *idem*, Bath, 1895, *Gilbert s.n.* (GH); *s.loc.*, 1852, *Moore s.n.* (GH), *idem*, 1874, *Jenman s.n.* (NY); *idem*, 1895, *Gilbert & Clayville* 122 (NY); *idem*, 2 May 1903, *Maxon* 1824 (US); *idem*, 3 April 1903, *Underwood* 1920 (NY); *idem*, 7 April 1903, *Underwood* 1994 (NY); *idem*, 2 May 1903, *Underwood* 2790 (NY); *idem*, 450m, 11 May 1903, *Underwood* 2941 (NY); *idem*, 28 February 1900, *Clute* 270 (US); *idem*, 4 May 1910, *Crawford* 805 (NY, US); *idem*, *Hart* 346 (US); *idem*, *Wilson?* 510 (BM, K); *idem*, 1190m, 12 April 1909, *Watt* 122 (BM, K, P); *idem*, 1500m, 28 February 1900, *Clute* 270 (MO); *idem*, 200m, 17 February 1922, *Maxon & Killip* 144 (US); *idem*, 457m, 28 February 1990, *Willard* 270 (K).—**MEXICO**. **Oaxaca**: Santa Maria Chimalapa, Arroyo Sangre, 16°54' S, 94°40'30" W, 200m, 28 December 1985, *Hernández* 1982 (NY, CAS).—**NICARAGUA**. **Rio San Juan**: El Castilllo, Comunidad km 20, 2 km al E 11°07'34" S, 84°22'21" W, 110m, 28 April 2005, *Guzmán* 3099 (MO); 11°14'22" S, 84°14' W, 350m, 7 April 2005, *Toval* 391 (MO); *idem*, El Castillo, 11°07'34" S, 0°84'22" W, 110m, 28 April 2005, *Guzmán* 3099 (UC); **Matagalpa**: 13°03' S, 85°44' W, 310–350m, 3 March 1981, *Stevens & Krukoff* 19186 (MO); *idem*, 13°03'00" S, 85°04'40" W, 310m, 3 March 1981, *Moreno s.n.* (UC); **Zelaya**: Región de Toumarin, Río Grande, 15m, 25 April 1949, *Molina* 2395 (US); *idem*, 25 April 1949, *Molina* 2397 (F, US); *idem*, 13°42' N, 84°50' W, 100m, 13 March 1979, *Pipoly* 4613 (MO).—**PANAMA**. **Chiriquí**: vicinity of El Valle de Anton, 600m, 17 September 1939, *Allen* 2002 (US); **Coclé**: 21 August 1960, *Ebinger* 969 (US); *idem*, 600m, 17 September 1939, *Allen* 2002 (MO); *idem*, El Valle a dos kms del río, 30 May 1975, *Mendoza s.n.* (F); *idem*, El Valle de Antón, 7 June 1939, *Alston* 8854 (BM, F); **Colón**: San Juan, *Herald* 228 (BM); río Providencia, 25m, 8 December 1973, *Gentry & Nee* 8664 (US); **Darien**: Parque Nacional del Darien, 8°01' N, 77°25' W, 200m, 13 October 1987, *Nevers et al.* 8289 (CAS, UC, MO.); Obispo, Canal Zone, 7 December 1924, *Standley* 31692 (US); *idem*, Rio Laranja, 9 December 1917, *Cornman* 559 (UC); Rio Tapia, 7 December 1924, *Standley* 28122 (US); *idem*, Rio Tuquesa, 25 August 1974, *Croat* 27162 (MO); **San José Island**: Gulf of PANAMA, 29 January 1946, *Johnston* 1280 (BM, GH, US); *idem*, 4 January 1946, *Johnston* 1029 (BM, GH); *idem*, area 11b, northern end of island, 30 June 1945, *Erlanson* 399 (F, GH, US); *idem*, Pearl Archipelago, 2 May 1945, *Erlanson* 31 (GH, US); *s.loc.*, 1917, *Killip* 2559 (US); *Leemam* 311 (K); *idem*, March 1850, *Fendler* 423 (K); *idem*, March 1850, *Fendler* 397 (GH); *idem*, 25m, 8 December 1973, *Nee & Gentry, A.* 8664 (MO).—**PARAGUAY**. **Amambay**: Parque Nacional Cerro Corá, 18 September 1980, *Foster* 80241 (UC); *idem*, 30 October 1983, *Foster* 83215 (UC).—**PERU**. **Amazonas**: Bagua, 04°55' S, 078°19' W, 350m, 22 June 1996, *Rodriguez et al.* 1209 (MO); *idem*, 1050m, 3 November 1978, *Barbour* 4399 (MO) *idem*, 04°55' S, 78°19' W, 450m, 21 October 1995, *Rodriguez* 605 (MO, UC); *idem*, Imaza: Comunidad Aguaruna de Putuim, 04°55' S, 078°19' W, 350m, 22 June 1996, *Rodriguez et al.* 1209 (UC); *idem*, Comunidad Nativa de Yamayakat, 50°32' S, 078°20' W, 350m, March 2002, *Bonino* 380 (UC, MO); **Cajamarca**: 05°22' S, 78°30' W, 900m, 15 May 1996, *Vasquez & Vasquez, A.* 20872 (MO); *idem*, San Ignacio, 05°44' S, 78°57' W, 790m, 12 February 2000, *Campos & Vasquez* 6364 (MO); Coronel Portillo: Calleria, Cuenca del Rio Utiquinia, 07°56,7' S, 73°53,61' W, 300m, 8 September 2003, *Graham* 2634 (UC); **Cusco**: La Convención, 12°43'23" S, 073°21'39" W, 964m, 17 August 2006, *Valenzuela et al.* 7424 (MO); *idem*, Camisea, 11°47'08" S, 72°41'57" W, 467m, 22 January 1997, *Acevedo-Rdgz et al.* 8990 (US); *idem*, Paucartambo, 580m, 29 May 1957, *Vargas* 11640 (GH); **Huánuco**: Huanuco, Tingo Maria 700m, 16 September 1956, *Tryon & Tryon* 5338 (GH, US); **Junín**: Rio Paucartambo Valley, near Perene Bridgi, 700m, 19 June 1929, *Killip &*

Smith 25260 (F, NY, US); **Loreto**: Above Pongo de Manseriche, 200m, 25 November 1931, *Mexia 6167* (BM, CAS, GH, MO, NY, S, UC, US); *idem*: Pucallpa–Lima, 200m, 20 July 1970, *McDaniel 13943* (GH, MO); **Madre De Dios**: Manu National Park, Colpa de Guacamayos, 17 October 1985, *Quinones 4* (UC); *idem*, 11°49' S, 71°28' W, 400m, 12 October 1998, *Tuomisto et al. 13208* (UC); *idem*, 11°54' S, 71°26' W, 400m, 11 October 1998, *Tuomisto et al. 13197* (UC). **Pasco**: Oxapampa, 10°45' S, 74°23' W, 1200m, 27 September 1983, *Smith 5311* (MO); *idem*, Gran Pajonal, 10°45' S, 74°23' W, 100m, 27 September 1983, *Smith, D.N. 5311* (UC, F); **Purús**: Ucayaly, Distrito Purús, Río Curanja, 10°04' S, 71°06' W, 250m, 2 July 2000, *Graham & Schunke Vigo 719* (NY, F); **San Martín**: Mariscal Cáceres, Toache Nuevo, 600m, 3 August 1984, *Schunke Vigo 14090* (K); *idem*, Tarapoto, June 1855, *Spruce 3978* (K); *idem*, Mariscal Cáceres: Caserío Dos de Mayo, 600m, 3 August 1984, *Schunke s.n.* (UC); *idem*, Tocache Nuevo, 3 August 1984, *Schunke 14090* (MO, NY); *idem*, 17 January 1971, *Schunke 4665* (F, GH, INPA, K, MG, MO, NY, US); *idem*, Ignacio, Huarango, 52°20' S, 78°30' W, 900m, 15 May 1996, *Vasquez & Vasquez, 20872* (UC); *idem*, Tarapoto, December 1929, *Williams 6136* (F).—**PUERTO RICO**. along La Mina Falls trail, Luquillo National Forest, 1 April 1963, *Howard et al. 15572* (GH); El Yunque and vicinity, 13 April 1924, *Dale 10* (US); Gorge of Río Tanamá of Observatorio de Arecibo, 160m, 16 December 1984, *Proctor 40954* (US); La Juanita, near las Marias, 7 February 1915, *Britton et al. 3935* (NY, US); Limestone cliff on Camuy river S. of Hatillo, 1931, *Thorp s.n.* (F); Luquillo Mountains, 21 July 1902, *Wilson 348* (NY, US); Luquillo Mountains, 9 July 1902, *Wilson 53* (NY, US); Martinson property, km 22.2 on Palmer to Forida, 1 April 1963, *Howard et al. 15578* (GH); Naguabo, Bo. Río Blanco, Caribbean National Forest, 480m, 29 February 1991, *Axelrod & Chavez 4115* (NY); Orocovis, Bosque Estadual del Toro Negro, 18°10'30" N, 66°29'33" W, 600m, 8 June 1996, *Thompson & Rawlins 12517* (US); Rt 533, Km 2, ravine up slope of Los Tres Picacg, 26 March 2000, *Axelrod & Stenzel 11148* (US); San Patricio: 14 June 1886, *Sintenis 4547* (BM, GH); San Sebastian: 100m, 1 August 1938, *Sargent 219* (MO); Sierra de Luquillo Mountains–El Yunque, 700m, 18 August 1994, *Sánchez & Liogier 82* (NY); Sierra de Luquillo, 400m, 10 October 1983, *Proctor 39602* (US); Sierra de Naguabo, along rio Cubuy to Meseta Falls, 465m, 30 July 1914, *Shafer 3541* (GH, NY); Sierra de Naguabo, along rio Cubuy to Meseta Falls, 60m, 16 July 1914, *Shafer 3144* (GH, F NY, US); Slopes of El Yunque, Caribbean National Forest, 914m, 4 April 1952, *Scamman 6536* (GH); Valleys near dona Juana Waterfall. Toro Negro, 3 March 1922, *Britton et al. 6392* (NY); 600m, 22 January 1938, *Sargent B177* (MO); *s.loc.*, 18 February 1926, *Britton, N.L. 8580* (NY, US); *idem*, 1852, *Blauner 301* (NY); *idem*, 19 March 1925, *Britton et al. 8429* (NY, US); *idem*, 2 January 1942, *Blomquist 12567* (UC); *idem*, 22 January 1938, *Sargent 13177* (US); *idem*, 22 June 1886, *Sintesis 4657* (NY, BM, F); *idem*, July 1885, *Kuhm 1761* (K); *idem*, May 1899, *Heller 1398* (F, NY, US).—**DOMINICAN REPUBLIC**. **El Seibo**: On road to Las Cabirmas, where río Jovero passes, 3 km S of Michesto–Nisibon highway, 18°56' S, 69°00' W, 30–50m, 6 August 1981, *Zanoni et al. 15928* (GH, NY, US); **Elias Piña**: Cordillera Central, 14 km S of Loma de Cabrera, 2050m, 4 March 1982, *Mickel et al. 8657* (NY); **Samaná**: Cordillera Oriental, 500m, 30 December 1964, *Jones & Norris 1231* (NY); **Santiago Rodriguez**: north side of Cordillera Central, Arroyo Caña, 1700m, 3 March 1982, *Mickel et al. 8595* (NY); San Francisco de Macoris: Pacificador, 400m, 5 April 1922, *Abbott 2017* (US); **Santiago**: San José, December 1929, *Valeur 319* (US); *idem*, San José de las Matas, Arroyo Guainita, Jiconié, 650m, 26 October 1929, *Valeur, E.J. 319* (MO); **Duarte**: Vicinity of San Francisco de Macoris, Pacificador, 400m, 5 April 1922, *Abbott, W.L. 2017* (GH); *s.loc.*, 14 March 1928, *Miller 1133* (US); *idem*, 25 March 1970, *Jiménez 5801* (NY); *idem*, 26 December 1929, *Valeur 319* (NY, BM, US, F); *idem*, 8 February 1923, *Abbott 2579* (US); *idem*, 100m, 8 February 1923, *Abbott 2579* (GH); *idem*, 25 June 1991, *Ingram & Rivero 1021* (UC).—**VENEZUELA**. **Aragua**: Umgebung von Maracai, *Peter & Vogl s.n.* (UC); **Caracas Herbarium Christensen, C.F.A. s.n.** (BM); **Carabobo**: Autonomo Mora, 10°17'28" S, 68°10'16" W, 200m, 22 June 1991, *Diaz & Jimenez s.n.* (UC); *idem*, 10°17'28" S, 68°10'16" W, 220m, 18 May 1991, *Diaz & Calderón s.n.* (UC); *idem*, Bejuma, 10°21' S, 68°22' W, 300m, 16 April 2000, *Meier & Flauger s.n.* (UC); *idem*, Hacienda La Calceta, 10°13,5' S, 68°14' W, 900–1030m, 9–11 May 1992, *Meier & Malther-Weisbeck 2196* (UC); *idem*, Valencia, Cordillera de la Costa, 10°18' S, 68°80' S, 600m, 10 June 2001, *Meier 8285* (UC); **Delta Amacuro**: San Victor, 65m, 2 November 1960, *Steyermark s.n.* (UC); **Lara**: Crespo, Qda. Tumaque Hda. El Danubio, 820m, 10°17' S, 69°08' W, 29 June 1985, *Rivero 969* (NY, UC); *idem*, Limite entre Lara e Portuguesa: 9°36' S, 69°25' W, 800m, 27 August 1983, *Ortega & Aymard s.n.* (UC); **Táchira**: along Quebrada La Colorada, 4–6 km south of Campam, 7°29'30" S, 72°05'30" W, 450–630m, 9 November 1979, *Steyermark et al. 119740* (MO, NY, UC); **Yaracuy**: San Felipe, 10°15' S, 68°31' W, 700m, 28 December 2009, *Meier et al. 16242* (UC); *idem*, 10°15'00" S, 68°31'30" W, 350m, 30 December 2009, *Meier, & Kostyk 16358* (UC); **Zulia**: 500m, 26 August 1967, *Steyermark & Fernández 99809* (MO); *idem*, Mara, cuencadel rio Guasare, alrededores del Destacament, 600m, 2 February 1983, *Bunting et al. 12786* (NY), *idem*, 10°52'10" S, 72°29'30" W, 600m, 2 February 1983, *George et al. 12786* (UC); 12 April 1909, *Hill 3910* (UC); *s.loc.*, 25 February 1926, *Ekman 5638* (US); *idem*, 26 September 1898, *Huber 1369* (MG); *idem*, March 1842, *Funcke 445* (K).

3. *Meniscium arborescens* Humboldt & Bonpland ex Willdenow (1810: 133). (Figs 14A–B; 16A–D)

Phegopteris arborescens (Humb. & Bonpl. ex Willd.) Mettenius (1859: 24). *Dryopteris reticulata* (L.) Urbam var. *arborescens* (Humb. & Bonpl. ex Willd.) Brause (1910: 2). *Thelypteris arborescens* (Humb. et Bonpl. ex Willd.) Morton (1967: 50). **Type:**—VENEZUELA. “Edo. Sucre Mission of Sta. Cruz, *Humboldt y Bonpland s.n.*” (holotype at B [Herbarium Willdenow 19576], microfiche, UC).

=*Meniscium salzmannii* Fée (1852: 223). **Syn. nov.** *Dryopteris salzmannii* (Fée) Maxon & Morton (1938: 357). *Thelypteris salzmannii* (Fée) Morton (1960: 7). *Cyclosorus salzmannii* (Fée) Mazumdar & Mukhopadhyay (2014: 29). **Type:**—BRAZIL. Bahia. “Habitat in Bahiã, locis humidis. (Salzmann in Herb. Mougeot.)” s.d., *Salzmann s.n.* [espécime cultivado], (lectotype P [P00644673], here designated; islectotype at P [P01546839, P01427932 in part], C [C10015999], K, NY, S, US [US1692743 fragment]).

=*Meniscium elongatum* Fée (1869: 83). **Type:**—BRAZIL. Rio de Janeiro. Copacabana, 16 March 1867, *Glaziou 1169*, (lectotype P [P00644677], here designated; islectotype at P [P00644676], US [US1692742 fragment]).

=*Meniscium sessilifolium* Pohl in Fée (1869: 84.). **Type:**—BRAZIL. Goiás. “San-Izidro, capitania de Goyaz, s.d., *Pohl*” (lectotype P [P00644674-basal portion], here designated; islectotype at STR [apical portion, examined on photographs]).

=*Dryopteris standleyi* Maxon & Morton (1938: 368). **Syn. nov.** *Thelypteris standleyi* (Maxon & C.V. Morton) Tryon (1967: 8). *Meniscium standleyi* (Maxon & C.V. Morton) Pichi Sermolli (1968: 181). *Cyclosorus standleyi* (Maxon & C.V. Morton) Mazumdar & Mukhopadhyay (2014: 30). **Type:**—GUATEMALA. Dept. Izabal, near Quiriguá, 75–225 m, 15–31 May 1922, *Standley 24126* (US [frond fertile–US1150894], [frond sterile–basal portion US1150895 + distal portion–US1150896]).

Rhizomes short-creeping, 0.8–1.7 cm diam., glabrous or with caducous, lanceolate, entire, light brown, dull scales at apex. **Fronds** (41–)96–189.5 cm long, monomorphic to subdimorphic; **sterile fronds** 123–188 cm long, petiole (30–)62–108 cm long, 7–8 mm diam., lamina (22–)61–80 cm long, pinnae 22–24 × 3.4–5.4 cm; **fertile fronds** 96–189.5(–221) cm long, petiole (19–)53–96(–127) cm long, 4–9 mm diam., lamina (17–)42–96 cm long, pinnae (6–)11–22.5 × (0.9–)1.3–3 cm. **Petioles** with black basal portion and stramineous distal portion, glabrous or with acicular, 0.2 mm long, moderate, erect hairs, rarely with caducous, lanceolate, dark brown, opaque, entire scales on the basal portion. **Laminae** (22–)43–96 cm long, 1-pinnate, linear, ovate to oblong-lanceolate, chartaceous to subcoriaceous. **Rachises** glabrescent to moderately pubescent on both surfaces, hairs acicular, 0.2–0.25 mm long, tortuous, patent, erect. **Buds** sometimes absent, usually present in axils of proximal pinnae, rarely in axils of all pinnae. **Pinnae** in (5–)9–20(–22) pairs, oblong-lanceolate, the proximal pinnae petiolulate (0.3–0.5 cm long), the distal pinnae sessile, gradually or abruptly reduced; **bases** of proximal and medial pinnae truncate to rounded, not auriculate or with basiscopic lobe or acroscopic auricle overlapping the rachis, base of distal pinnae obtuse to slightly asymmetric, basiscopic side round, acroscopic side truncate and parallel to rachis; **margins** generally undulate, sinuous or slightly crenate, thick, with hairs; **apices** acute to cuneate; **adaxial surfaces** glabrous on and between the veins, costa with moderate, acicular, 0.1–0.2 mm long, tortuous, patent hairs; **abaxial surfaces** on the costa, veins and between the veins (sometimes glabrous) with rare or moderate (rarely dense), acicular, tortuous, patent hairs and sparse, filiform, branched scales with acicular, 0.2–0.3 mm long hairs, and arachnoid, hyaline, caducous scales near the margin and on the sori, glands absent; **costal veins** 9–10 on sterile pinnae and 11–21 on fertile pinnae per 3 cm; **secondary veins** arcuate to subsigmoid on fertile pinnae, sigmoid on sterile pinnae, forming an obtuse angle, without or rarely with one, free, excurrent veinlet dividing areole; **areoles** in (7–)9–13(–17) rows between costa and margin, sterile areoles narrower and more elongate than fertile areoles. **Sori** oblong, uniseriate between costal veins, confluent at maturity; **receptacles** glabrous or with septate, filiform, branched sporangiasters with 1–2 acicular hairs, 0.3–0.4 mm long, tortuous, on the septa, with one globose cell at the apex; **sporangia** glabrous or with septate paraphyses on the stalk, with tortuous, acicular hairs on the septa. **Spores** cristate-papillate, papillae dense.

Distribution and habitat:—Bolivia, Brazil, Colombia, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Panama, Paraguay, Peru, Suriname, and Venezuela (Fig. 41). This species is terrestrial and occurs in gallery forests, open environments and on the margins of trails. It is always associated with water courses, along streams, is sometimes a rheophyte, and grows at 50–1470 m.

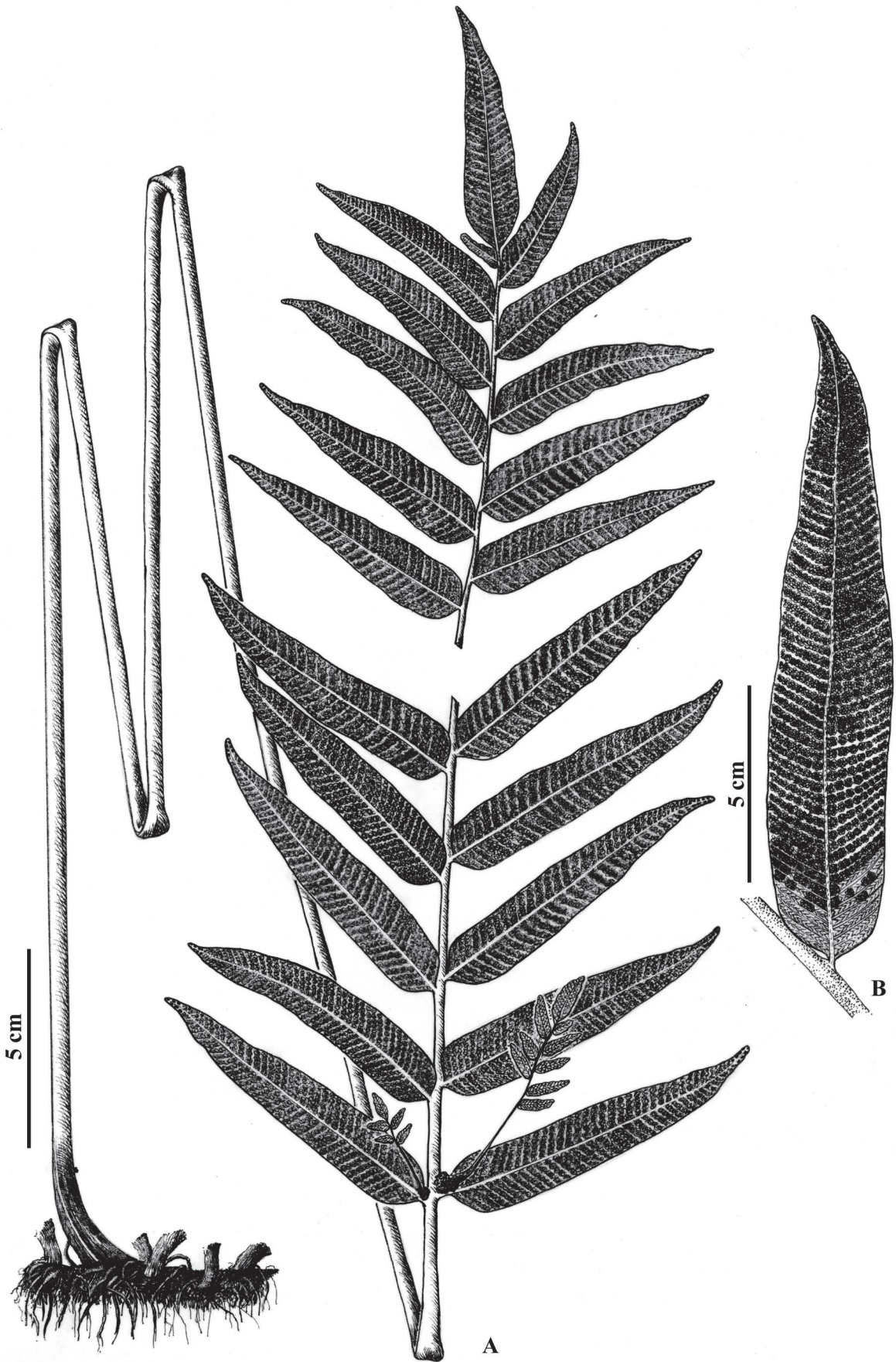


FIGURE 14. *Meniscium arborescens*. **A.** habit showing plantlets on proximal pinnae; **B.** abaxial surface of fertile pinna showing confluent sori (Irwin *et al.* 30828, NY).

Notes:—*Meniscium arborescens* has been treated as a complex of species comprising mainly smaller forms with dense hairs (*Thelypteris mollis* (Mett.) Tryon (1967: 7)) of *M. longifolium* Desvaux (1827: 223) (Smith 1992), as well as a synonym of *M. hostmannii* (Maxon & C.V. Morton 1938). Although there is some similarity, after studying the type material at P, B and K it became clear that these are not synonymous species as suspected by Smith (1992). This was due to incorrectly interpreting the type specimens that, historically, were only studied from photographs, making it impossible to analyze the hairs on the lamina and sporangia. The types of *M. arborescens* and *M. salzmannii* at B and P have the same morphological characters and, therefore, are the same taxon. Thus, we here propose synonymizing *M. salzmannii* under *M. arborescens*.

Specimens mainly from Amazonia, which were until now identified as *M. arborescens* are actually *M. hostmannii* or *M. longifolium*, and are characterized by the following traits: pinnae linear-lanceolate, uniform from the base, flexible and perpendicular, the proximal pinnae petiolulate, base cuneate, abaxial surface of all pinnae with dense, straight acicular hairs, glandular hairs and filiform, branched scales on the costae and veins, and paraphyses on the sporangia. However, *M. arborescens* has pinnae that are oblong-lanceolate, sessile, erect and ascendant, proximal pinnae with a truncate, rounded base (Fig. 14 A–B), and abaxial surfaces with tortuous, sparse to moderately dense hairs on the costa, veins, laminar surface (generally), and sporangial stalks (Fig. 5C).

Meniscium arborescens is similar to *M. serratum* by having pinnae that are generally ascendant, lanceolate and short (11–22 cm long), veins with a sigmoid to subsigmoid pattern, with narrow areoles, and abaxial surfaces with tortuous hairs. Some specimens of *M. arborescens* have a crenate margin that can be confused with *M. serratum*. However, *M. serratum* has serrate to uncinately serrate pinna margins and glabrous sporangia.

Another name synonymized under *M. arborescens* is *M. standleyi*, which was described based on the following characters: pinnae contiguous, sessile, distal pinnae gradually reduced or equal to lateral pinnae, chartaceous, margins membranaceous, hairs only on veins, absent on surfaces between veins. These characters are variable and are also found in *M. arborescens*. Maxon & Morton (1938) compared *M. standleyi* with specimens from Panama called “*forma pilosa*,” which is a typical form of *M. arborescens*, making this relationship clear. Numerous contradictions were found when analyzing this material and many other specimens. For example, *Smith 2458* (US) from Colombia is cited in the protologue as glabrous but there are two fronds that are densely pilose, with tortuous hairs on the costa and lamina surface, and another that is glabrous between the veins. Synonymizing *M. standleyi* is clearly justified since the authors described only one of the variations within our broad concept of *M. arborescens*.

The typification of the specimens described by Fée—*Meniscium salzmannii*, *M. elongatum*, and *M. sessilifolium*—is necessary because more than one specimen was found at P and duplicates were found at C, K, S, US, S, and STR.

Specimens examined:—**BOLIVIA. Cochabamba:** Capinota, 16°43'58" S, 0°65'30" W, 295m, 27 January 2007, *Peñaranda 408* (MO); **La Paz:** Bautista Saavedra, 15°02'40" S, 68°27'47" W, 920m, 30 May 2004, *Araujo-Murakami et al. 795* (UC); *idem*, 15°05'24" S, 68°29'30" W, 1470m, 13 May 2004, *Miranda et al. P.147* (UC); *idem*, Nor Yungas, 1000m, 4 April 1981, *Feverer et al. 5925a* (F); **Pando:** Manuripi, 11°46' S, 68°42' W, 220m, 30 July 2003, *Jimenez 1967* (UC); **Santa Cruz:** Ichilo, Norte de Buena Vista, caminho a Laguna Madrejón, 17°25' S, 63°40' W, 315m, 19 May 1991, *Arroyo 20* (MO, USZ); *idem*, ca 2 km W of Villa San Germán on highway from Buen, 17°21'00" S, 64°06'30" W, 275m, 22 February 1998, *Nee 48393* (MO, NY, USZ). *idem*, Andrés Ibañez, 17°47'57" S, 63°16'25" W, 430m, 16 February 1997, *Fuentes 1748* (USZ); *idem*, The road alongside the gaseoducto, to the west of, 17°48' S, 63°15' W, 430m, 26 June 1997, *Ritter et al. 4056* (USZ); *idem*, Buena Vista, 450m, March 1915, *Steinbach 1107* (GH); San Carlos, Mipiri, 850m, 23 January 1927, *Buchitien 228* (GH); *idem*, Serrania de Santiago, Bosque Semideciduo Chiquitano, 24 February 2003, *Lehnert 652* (UC); *idem*, 17°54'11" S, 0°63'28" W, 520m, 8 January 2008, *Molina 408* (MO); *idem*, Sara, 500m, 26 December 1920, *Steinbach 5235* (NY, F, GH); *idem*, Velasco, Parque Nacional Noel Kempf Machado, 13°39'20" S, 60°49'08" W, 250m, 6 October 1995, *Israel & Vargas 4068* (UC); *idem*, 14°31'16" S, 60°44'14" W, 700m, 6 July 1996, *Peña-Chocarro, M. 94* (NY); *idem*, Sara, Buenaventura, 3 January 1926, *Steinbach 1403* (B); *s.loc.*, 450m, 3 January 1926, *Steinbach 7403* (BM, F, GH, K, MO); *idem*, 27 February 1902, *Williams 1254* (NY); Florida, Refugio Los Volcanes 3 km al NE de Bermejo, 18°06' S, 63°36' W, 1050m, 2 October 1997, *Kessler et al. 12246* (UC).—**BRAZIL. Acre:** Cruzeiro do Sul, BR 317, Belo Monte, 16 November 2007, *Goldenberg et al. 1014* (NY, UPCB); **Amapá:** Rio Puchacá, afluente do Vila Nova, 16 November 1961, *Emmerich & Andrade 828* (R); **Amazonas:** Manaus, Reserva Florestal Ducke, Manaus–Itacoatiara, Km 26, 2°53' S, 59°58' W, 13 March 1995, *Prado, J. & Costa, M.A.S. 4/98* (IAN); **Bahia:** Angical, Alto do Siriema, 12°06'30" S, 44°38'34" W, 26 January 2012, *Yoshida-Arms et al. 103* (UFP); *idem*, Caitité, Região de Brejinho das Ametistas, 14°15'58" S, 42°31'17" W, 845m, August 2008, *Mendes et al. 663* (BHCB); *idem*, Jussiape, Cachoeira da Fraga, 17 February 1987, *Harley et al. 24362* (K, SPF); *idem*, Maraú, 4 km do fim do desvio para Itacaré, 39°11'80" W, 14°10'41" S, 28 February 2007, *Souza et al. 110* (NY); *idem*, Santo Amaro, 87 km de Salvador, ca. 8 km de Santo Amaro, em dir, 8 June 1975, *Windisch & Pe. Souza 846*

(BHCB); Serra da Água Rega, 1000m, 23 February 1971, *Irwin et al. 30828* (NY); *s.loc.*, 1842, *Glocker 184* (K); **Distrito Federal**: Área do Zoobotânico, 17 January 1967, *Duarte 10177* (HB); margem do riacho Tôrto, 16 November 1958, *Pereira & Pabst 4763* (HB); *idem*, RECOR, 10 August 1978, *Heringer et al. 588* (MG, US); Sobradinho, 10 July 1966, *Heringer 10843* (HB); *idem*, 1000m, 6 July 1966, *Irwin et al. 18029* (GH, IAN, K, MO, NY, RB, US); *idem*, 975m, 18 September 1965, *Irwin et al. R.8454* (US); *idem*, Brasília, 15 km ao sul de Luziania-GO, 9 February 1981, *Heringer 18146* (NY); *idem*, Cerrado a Nordeste da Fazenda Sucupira, 48°01' W, 15°55' S, 1080m, 21 January 1999, *Sampaio et al 319* (NY); *idem*, Reserva Ecológica do IBGE, 15°56'50" S, 47°52'06" W, 12 March 2008, *Silva & Inazawa 6512* (BHCB); *idem*, Jardim Zoológico, 1000m, 14 July 1966, *Irwin et al. 18208* (IAN, NY, F); *idem*, Rio Torto, imediatamente N, do DF, 975m, 18 September 1965, *Irwin et al. 8454* (IAN, F, NY, US); *idem*, Margem do riacho Tôrto, 16 November 1958, *Pereira & Pabst 4763* (RB); *idem*, RECOR, 10 August 1978, *Heringer & Paula 588* (NY); **Espírito Santo**: Castelo, Parque Estadual Forno Grande, 20°29'59" S, 41°04'54" W, 1130m, 25 June 2008, *Salino et al. 13525* (BHCB); *idem*, Divino de São Lourenço, Parque Nacional do Caparaó, 20°35'49" S, 41°46'53" W, 1000m, 12 September 2008, *Salino et al. 13850* (BHCB); **Goiás**: 8 November 1976, *Wilson, J. 5W* (K, MO); 14°30' S, 47°30' W, 20 April 1956, *Dawson 14493* (MO); 24 km NE of Catalão, 875m, 25 January 1970, *Irwin et al. 25375* (NY); Aporé, 19°57' S, 52°01' W, 600m, 15 February 1992, *Silva 45* (MO); *idem*, Rodovia GO-184 Aporé-Serranópolis, 19°57' S, 52°01' W, 620m, 10 June 1993, *Silva 876* (HB); Chapada dos Veadeiros, 1 km E of Alto Paraíso, 1300m, 5 March 1973, *Anderson 6300* (NY, UC); *idem*, Portal da Chapada, 14°09'53" S, 47°35'58" W, 1164m, 11 August 2006, *Rocha 48* (RB); *idem*, 14°09'53" S, 47°35'58" W, 1164m, 24 November 2006, *Rocha 96* (RB); *idem*, 14°30' S, 47°30' W, 20 April 1956, *Dawson 14493* (US); *idem*, Itarumã, ca. 50 km de Itarumã, 18°41' S, 51°24' W, 350m, 13 November 1994, *Silva 1393* (HB, MO); *idem*, Itiquira, 45 km do Distrito Federal, 1000m, 10 November 1968, *Onishi 817* (IAN); *idem*, Itumbiara, BR 153, 30 km N de Itumbiara, 20 January 1978, *Krapovickas et al. M.M. 33120* (MBM); *idem*, Serra dos Pirineus, 15 km N of Corumbá de Goiás on, 1150m, 16 January 1968, *Irwin et al. 18653* (F, NY, RB, US); *idem*, Serra Geral do Panamá, 850m, 15 March 1971, *Irwin et al. 31855* (NY, F, US); *idem*, Serra Geral do Paraná, 850m, 14 March 1971, *Irwin et al. 31740* (NY, F); *idem*, Teresina de Goiás, 13 km by of Teresina, 1000m, 16 March 1973, *Anderson 7232* (HB, K, NY, UC, US); **Maranhão**: Balsas, Projeto de Balsas, final da chapada, 24 November 1997, *Oliveira 743* (BHCB); Caxias, 8 November 2005, *Fernandes 06* (MG); **Mato Grosso do Sul**: Aparecida do Taboado, próximo a rodovia BR-158 sentido Aparecida do Tabo, 20°05' S, 51°05' W, 17 February 1996, *Nonato, F.R. 210* (HB); *idem*, Aquidauana, Aldeia Indígena Córrego Seco, 20°21'21" S, 55°41'21" W, 280m, 18 August 2003, *Pott & Pott 6469* (BHCB); *idem*, Fazenda Nova Esperança, 27 November 2004, *Costa s.n.* (BHCB); *idem*, Fazenda Taboca, 27 November 2004, *Nogueira s.n.* (UPCB); *idem*, Corumbá, Serra do Amolar, córrego Zé Dias, 27°52'08" S, 57°31'27" W, 5 May 2001, *Assis et al. 124* (UPCB); **Mato Grosso**: Ca 78 km Nova Xavantina, uper rio Araguaia, 500m, 16 June 1966, *Irwin et al. 17286* (NY); Chapada dos Guimarães, 17 October 1973, *Prance et al. s.n.* (UC); *idem*, Parque Nacional da Chapada dos Guimarães, 15°24'21" S, 55°50'10" W, 586m, 28 February 2011, *Almeida et al. 2658* (BHCB); *idem*, Rod. MT-251, Rio do Casca, 19 October 1995, *Hatschbach et al, 63572* (MBM, UC); *idem*, Drainage of the upper Rio Araguaia, 400m, 12 June 1966, *Irwin et al. 17023* (NY, US); Gorge of Veu de Noiva, Chapada dos Guimarães, 17 October 1973, *Prance et al. 19120* (INPA, NY); *s.loc.*, *Lindaman 12677* (US); *idem*, *Smith 119* (R); *idem*, 500m, 16 June 1966, *Irwin et al. 17286* (US); **Minas Gerais**: Abre-Campo, Distrito de Granada, área de Usina Hidrelétrica, 10 April 1999, *Salino & Morais 4585* (BHCB); *idem*, Alvorada de Minas, 18°48'18" S, 43°26'13" W, 707m, 16 September 2007, *Almeida et al. 1263* (BHCB); Araguari, Distrito de Paracaiba, fazenda mata da água fria, 18°29'50" S, 48°24'16" W, 860m, 27 January 2007, *Salino et al. 11552* (BHCB); *idem*, Belo Horizonte, Acaba mundo, 8 March 1934, *Samp 7386* (HB); *idem*, Jardim Botânico, 18 August 2003, *Fernanda s.n.* (BHCB); *idem*, Represa da Pampulha, 1953, *Renno s.n.* (BHCB); *idem*, Serra do Taquaril, 21 February 1904, *Sampaio 12481D* (UPCB); *idem*, Serra do Taquaril, 21 February 1934, *Sampaio 7183* (BHCB, R); *idem*, Boa Esperança, Estrada Boa Esperança-Coqueiral, km 15, 21°06'68" S, 45°28'23" W, 29 July 2006, *Caxambu 1154* (MBM); *idem*, Serra da Boa Esperança, 21°00'50" S, 45°40'40" W, 1050m, 14 December 2007, *Salino et al. 13050* (BHCB); Buenópolis, Curimataí, 9 June 2004, *Hatschbach et al. 77656* (C, MBM, UC); *idem*, Serra do Cabral, 17°53' S, 44°15' W, 950m, 12 October 1988, *Harley et al. 24891* (K, SPF); *idem*, Ca. 12 km N. de Patrocínio, 1000m, 31 January 1970, *Irwin et al. 25768* (F, K, UC, RB, NY, US); *idem*, Caeté, Serra da Piedade, 19°48' S, 43°40' W, 15 June 1987, *Grandi et al. 2447* (BHCB); *idem*, Campo Belo, 27 July 1999, *Castro s.n.* (BHCB); *idem*, Carandaí, Pedra do Sino hotel fazenda, 1000m, 9 February 2006, *Mota & Souza 567* (BHCB); *idem*, Caratinga, Estação Biológica de Caratinga, 24 March 2000, *Salino et al. 5133* (BHCB); *idem*, Carrancas, cachoeira e corredeira do Tira Prosa, 21°28'18" S, 44°38'71" W, 950m, 18 June 2007, *Salino et al. 12253* (BHCB); *idem*, Catas Altas, Parque Natural do Caraça, 20°05'46" S, 43°28'54" W, 1350m, 10 July 2004, *Salino et al. 9617* (BHCB); *idem*, RPPN Santuário do Caraça, 20°05'44" S, 43°29'42" W, 1263m, 20 May 2010, *Almeida & Salino 2376* (BHCB); *idem*, Chalé, Rio José Pedro, 20°02'53" S, 41°44'41" W, 371m, 28 August 2009,

Almeida et al. 2055 (BHCB); *idem*, Chapada Gaúcha, Distrito de Serra das Aranhas. Parque Estadual, 15°27'37" S, 45°16'23" W, 575m, 9 February 2006, *Salino et al. 10815* (BHCB); *idem*, Conceição do Mato Dentro, Parque Natural Municipal do Ribeirão do Campo, 28 December 2002, *Mota 1788* (BHCB); *idem*, Congonhas do Norte, Alto da Serra do Talhado, 18°50'43" S, 43°44'48" W, 1300m, 7 August 2009, *Almeida & Souza 2039* (BHCB); *idem*, Estrada para a Serra Talhada, 18 June 2000, *Fiaschi & Costa 324* (SPF); *idem*, Vale do Rio Soberbo e Ermo, 19°01'34" S, 43°43'57" W, 95m, 16 April 2006, *Almeida & Souza 184* (BHCB); *idem*, Conselheiro Pena, Parque Estadual de Sete Salões, 19°15'09" S, 41°23'37" W, 430m, 7 May 2006, *Salino et al. 10908* (BHCB); *idem*, 19°15'09" S, 41°23'34" W, 430m, 7 May 2006, *Salino et al. 10907* (BHCB); Diamantina, 28 November 1985, *Smith 1986* (US); *idem*, arredores da cidade, 10 December 1992, *Salino 1586* (BHCB); *idem*, Entorno do Parque Nacional da Sempre Vivas, 17°58'58" S, 43°46'31" W, 108m, 2 May 2007, *Almeida et al. 999* (BHCB) *idem*, estrada para Biribiri, 8 December 1992, *Salino 1556* (BHCB, UC); *idem*, Parque Estadual do Biribiri, 18°09'38" S, 43°35'03" W, 103m, 2 October 2006, *Almeida et al 447* (BHCB); *idem*, 18°17'39" S, 43°44'09" W, 1300m, 17 March 2007, *Salino et al. 11930* (BHCB); *idem*, Cachoeira dos Cristais, 18°17'39" S, 43°44'09" W, 1300m, 17 March 2007, *Salino et al. 11931* (BHCB); *idem*, Parque Nacional das Sempre Vivas, 17°47'41" S, 43°37'15" W, 690m, 21 June 2008, *Almeida et al. 1430* (BHCB); *idem*, Salto Cristais, 28 November 1958, *Hatschbach & Silva 50282* (C, MBM, UC); *idem*, Dionísio, Lagoa Verde dos Crentes, 19°50'21" S, 42°34'55" W, 291m, 13 November 2008, *Pivari et al. 1164* (BHCB); *idem*, Entre Rios, Pedra Branca, 26 January 1977, *Krieger14551* (BHCB); Formoso, Parque Nacional do Grande Sertão Vereda, 15°10'53" S, 45°46'07" W, 745m, 7 February 2006, *Salino et al. 10795* (BHCB); Frutal, Região do Triângulo Mineiro, 20°02' S, 48°56' W, 650m, 22 January 1996, *Pietrobon 2515* (BHCB, MBM); Furnas, 5 July 1995, *Salino 2186* (BHCB); *idem*, Paraíso Perdido, Córrego Quebra Anzol, 20°37'28" S, 46°19'24" W, 821m, 29 September 2005, *Romero et al. 7237* (BHCB); *idem*, Trilha da cachoeira Feixo da Serra, Região da Represa, 15 February 2006, *Arantes et al. 1684* (BHCB); *idem*, Gouveia, Margem do rio Paraúna, 18°37'50" S, 43°56'47" W, 706m, 7 June 2007, *Almeida et al. 1072* (BHCB); *idem*, Próximo a estrada Gouveia, 18°33'52" S, 43°48'23" W, 960m, 17 March 2007, *Salino A et al. 11858* (BHCB); Grão Mogol, Córrego dos Mortos, 11 November 1938, *Guat et al. 3394* (RB); *idem*, Montanha a esquerda do Riacho do Ribeirão, 16°32'30" S, 42°55'00" W, 1000m, 23 November 1987, *Mello-Silva et al. s.n.* (BHCB, SPF); *idem*, Serra do Espinhaço, 18 km Oeste de Grão Mogol, 950m, 17 February 1969, *Irwin et al. 23441* (MBM); *idem*, Montanha à esquerda do riacho Ribeirão., 16°32'30" S, 42°55'00" W, 1000m, 3 November 1987, *Mello-Silva et al. 11437* (BHCB); *idem*, Itabirito, RPPN Capivari 2, 20°09'38" S, 43°40'45" W, 1076m, 8 June 2001, *Arruda & Gonçalves 351* (BHCB); *idem*, Itamarandiba, Parque Estadual da Serra Negra, 18°01'05" S, 42°56'56" W, 1020m, 5 July 2006, *Salino et al. 11323* (BHCB); *idem*, Itambé do Mato Dentro, 19°24'53" S, 43°25'46" W, 720m, 6 August 2006, *Almeida & Souza 346* (BHCB); *idem*, Cachoeira do Soronata, 19°22'00" S, 43°16'32" W, 630m, 21 April 2011, *Salino 15118* (BHCB); Januária, Área de Proteção Ambiental do Peruaçu, 12 October 2001, *Salino & Morais 7598* (BHCB); *idem*, Jequeri, área de inundação da Usina de Providência, 27 September 1997, *Salino 3461* (BHCB); *idem*, Joao Pinheiro, 28 July 1961, *Heringer 8545* (F, US); *idem*, Joaqui Felício, Corrêgo Cachoeirinha, 17°45'29" S, 44°10'44" W, 710m, 11 February 2006, *Salino et al. 10873* (BHCB); *idem*, Joaquim Felício, Rio das Onças, 14 April 1996, *Hatschbach et al 64932* (MBM, UC); *idem*, Serra do Curral, 17°41'52" S, 44°15'35" W, 1150m, 14 July 2006, *Lopes et al. 958* (SPF); Juiz de Fora, 29 August 1971, *Krieger & Urbano 10740* (BHCB); Lagoa Santa, Área urbana de Lagoa Santa, 19°37'13" S, 43°54'13" W, 1 September 2010, *Souza et al. 1136* (BHCB); *idem*, Condomínio Estância da Mata, 8 August 1998, *Morais & Salino 09* (BHCB); Leme do Prado, Estação Ecológica de Acauã, 17°09'43" S, 42°46'38" W, 780m, 2 July 2006, *Salino et al. 11214* (BHCB); Mariana, 27 July 1959, *Labouriau 1035* (US); *idem*, Mina de Conta História, 20°15'55" S, 43°31'40" W, 990m, June 2007, *Mendes et al. 106* (BHCB); *idem*, Motes Claros, Serra do Espinhaço, 1000m, 23 February 1969, *Irwin et al. 23730* (MBM, RB, HB); *idem*, Nova Lima, RPPN Capitão do Mato, 20°55' S, 43°55' W, 4 June 2004, *Figueiredo & Lima 511* (BHCB); *idem*, RPPN de Tumbá, 20°01'40" S, 43°56'34" W, 1018m, 28 May 2004, *Figueiredo & Silva 493* (BHCB); *idem*, RPPN Mata do Jambeiro, 19°58'42" S, 43°53'11" W, 13 June 2004, *Figueiredo 338* (BHCB); *idem*, Ouro Branco, 20°25'49" S, 43°46'58" W, 19 October 2009, *Souza 991* (BHCB); Ouro Preto, 1937, *Badini 106* (BHCB, RB); *idem*, 5 March 2013, *Souza et al. 2153* (BHCB); *idem*, Caminho de Itacolomi, *Damazio 1905* (RB); *idem*, Distrito de São Bartolomeu, Entorno da Floresta Estadual, 20°17'49" S, 43°33'37" W, 1094m, 9 April 2013, *Almeida et al.3275* (BHCB); *idem*, Ouro Preto, Morro de São Sebastião, 1904, *Damazio 737* (BHCB, F, RB); *idem*, Parque Estadual do Itacolomi, 13 May 1998, *Salino et al. 4233* (BHCB); *idem*, 9 April 2003, *Rolim s.n.* (BHCB); *idem*, 20°24'35" S, 43°25'00", 24 March 2004, *Mynssen et al. 574* (RB); *idem*, Trecho entre Ouro Preto e Ouro Branco, 25 May 2008, *Mota 3530* (BHCB); *idem*, Paracatu, Fazenda Agostinho, 17°15'15" S, 46°58'09" W, 630m, 2 February 2006, *Salino et al. 0711* (BHCB); *idem*, Reserva do Acangaú, 17°10'38" S, 47°04'03" W, 665m, 1 February 2006, *Salino et al. 10666* (BHCB); *idem*, 17°11'27" S, 47°05'42" W, 2 February 2006, *Salino et al. 10705* (BHCB); *idem*, 17°12'15" S, 47°06'55" W, 700m, 4 February 2006, *Salino et al. 10749* (BHCB); *idem*,

Prata, *Lagaurian 93* (RB); Presidente Kubitschek, Estrada para Costa Sena, 18°39'10" S, 43°40'20" W, 1000m, 1 March 1998, *Rapini et al. 512* (SPF); Presidente Olegário, Fazenda Vereda Grande, 1 May 1989, *Grandi s.n.* (BHCB); *idem*, Raul Soares, Usina Hidrelétrica de Granada, 28 March 1998, *Salino 4132* (BHCB); *idem*, Rio Acima, PPPN de Andaime, 20°09'28" S, 43°47'39" W, 850m, 18 May 2004, *Figueiredo & Rodrigues 461* (BHCB); Rio Pardo de Minas, Distrito de Serra Nova, Cadeia do Espinhaço, 15°39'38" S, 42°45'54" W, 1000m, 13 March 2007, *Salino et al. 11725* (BHCB); Rio Pardo de Minas, Parque Estadual da Serra Nova, 15°38'55" S, 42°44'24" W, 969m, 20 March 2012, *Costa et al. 933* (BHCB); *idem*, 15°38'56" S, 42°44'29" W, 829m, 23 March 2012, *Góes-Neto et al. 727* (BHCB); *idem*, 15°39'04" S, 42°44'20" W, 908m, 22 March 2012, *Souza 7* (BHCB); Rio Preto, Cambuí, 11 October 2005, *Souza et al. 107* (BHCB); Sabará, RPPN Cuiabá, base da Serra da Piedade, 19°51'11" S, 43°44'01" W, 776m, 18 July 2006, *Almeida & Souza 265* (BHCB); Santa Bárbara, 13 February 1934, *Sampaio 6980* (BHCB); Santa Rita de Jacutinga, 22°06'26" S, 44°10'05" W, 852m, 13 February 2009, *Almeida & Souza 1762* (BHCB); Santana de Pirapama, Distrito de Fechados, 18°47'10" S, 43°52'26" W, 1100m, 6 August 2009, *Almeida & Souza 2024* (BHCB); *idem*, Serra do Cipó, Capela de São José, 18°58'30" S, 43°46'42" W, 660m, 3 March 2012, *Zappi 2710* (RB); Santana do Garambéu, 21°36'29" S, 44°07'36" W, 1100m, 8 June 2001, *Salino & Mota 7049* (BHCB); Santana do Riacho, estrada de Lagoa Santa a Conceição do Mato Dentro, 19°20' S, 43°40' W, 1370m, 2 February 1987, *Prado 76* (SPF, HB); *idem*, Parque Nacional da Serra do Cipó, 19°20'26" S, 43°37'09" W, 165m, 17 January 2006, *Almeida & Souza 165* (BHCB); *idem*, Serra do Cipó, 19°13'13" S, 43°29'57" W, 1500m, 5 July 2001, *Souza et al. 25092* (BHCB); Santo Antônio do Itambé, 18°25'27" S, 43°18'56" W, 1089m, 4 October 2006, *Almeida et al. 500* (BHCB); São Gonçalo do Rio Abaixo, Estação de Pesquisa Ambiental de Peti, 19°53'33" S, 43°21'55" W, 23 April 2002, *Salino 7988* (BHCB); São Gonçalo do Rio Preto, Parque Estadual do Rio Preto, 10 June 1999, *Salino 4732* (BHCB); *idem*, 24 March 2006, *Costa & Lessa 1051* (BHCB); *idem*, 18°07'34" S, 43°21'24" W, 7 April 2000, *Salino 5190* (BHCB); *idem*, 18°12'02" S, 43°20'18" W, 1550m, 8 December 2003, *Salino et al. 9359* (BHCB); *idem*, São João Del Rey, Casa de Pedra, 19 February 1985, *Krisger et al. s.n.* (BHCB); *idem*, São Roque de Minas, Parque Nacional da Serra da Canastra, 20°10'17" S, 46°39'52" W, 14 July 1997, *Salino 3174* (BHCB); *idem*, 20°11'38" S, 46°36'10" W, 1205m, 1 February 2007, *Salino et al. 11654* (BHCB); *idem*, São Vicente de Minas, Litoral, 26 December 1955, *Hoehne 4107 ?* (BHCB); *idem*, Serra da Anta, 2 km N.W, of Paracatú, 700m, 7 February 1970, *Irwin et al. 26282* (F, HB, NY, MO, RB); *idem*, Serra da Anta, 700m, 7 February 1970, *Irwin et al. 26282* (US); *idem*, Serra da Moeda, 12 April 1996, *Salino 2711* (BHCB); *idem*, Serra do Cipó, próximo a estátua do Juquinha, 1 October 1999, *Salino 4969* (BHCB); *idem*, Serra do Cipó, região de Congonhas, 29 May 1996, *Salino 2738* (BHCB); *idem*, Serra do Espinhaço, 18 km west of Grão Mogol, 950m, 17 February 1909, *Irwin et al. 23441* (NY, RB); *idem*, 33 km west of Montes Claros, 1000m, 23 February 1969, *Irwin et al. 23730* (NY); *idem*, 950m, 17 February 1969, *Irwin et al. 2344* (US); Serra do Salitre, Rio Salitre, 14 August 1987, *Meyer Pedralli s.n.* (BHCB); Serranópolis de Minas, Sete Quedas, 17 April 2007, *Ribas & Silva 7706* (MBM); *idem*, Estrada Rio Pardo de Minas Serranópolis, 15°56'29" S, 42°48'13" W, 790m, 14 March 2000, *Salino et al. 11762* (BHCB); Tiradentes, Córrego da cachoeira, Serra de São José, 26 April 1995, *Barbosa 2313* (RB); *idem*, 19 February 1985, *Krieger et al. 20380* (R); *idem*, 21°06'61" S, 44°12'47" W, 1002m, 20 June 2007, *Almeida et al. 1126* (BHCB); Uberlândia, Estação Ecológica do Panga, 8 May 1992, *Ranal 585* (UC); Viçosa, 13 July 1930, *Mexia 4857* (UC); *idem*, 680m, 11 May 1930, *Mexia 4683* (GH, US, UC); *idem*, Botumirim, Beira de rio formado pela cachoeira, 46°39'38" S, 81°95'80" W, 1100m, 29 June 1975, *Wels et al. 328* (HB); *idem*, Santana do Riacho, Serra do Cipó, Rodovia Belo Horizonte-Conceição do Mato Dentro, 19°13'13" S, 43°29'57" W, 1500m, 5 July 2001, *Souza et al. 25092* (ESA); *s. loc.*, 20 July 1972, *Emygdio et al. 3497* (NY); *idem*, 1000m, 23 February 1969, *Irwin et al. 23730* (MO); *idem*, 870m, 28 February 1976, *Davidse & Ramamoorthy 10776* (MO, UC); *idem*, 950m, 17 February 1969, *Irwin et al. 23441* (MO); **Pará**: Altamira, Serrado Cachimbo, December 2005, *Sobral & Oliveira 10572* (BHCB); Canaã dos Carajás, Floresta Nacional de Carajás, Serra Sul, Corpo A, 14 February 2010, *Almeida et al. 2188* (BHCB); rio Araguaya ponta da fortaleza travessão de S. Be, 14 July 1899, *Buscalione 3998* (NY); **Paraná**: Pontal do Paraná, 28 February 2007, *Souza et al. 110* (UPCB); **Piauí**: Bom Jesus, Riacho Palmeirrinha, 21 April 2010, *Lopes 716* (BHCB); **Rio de Janeiro**: Valley of the Rio Campo Bello, vicinity Monte Itat, 44°38' W, 22°28' S, 800m, 3 January 1929, *Smith 1648* (GH); *idem*, 1844, *Kunth s.n.* (B); *idem*, 20 km N of Parati, 19 July 1977, *Wilson s.n.* (K); *idem*, Corcovado, October 1833, *Herald 167* (K); *idem*, Macacé, 1887, *Reed s.n.* (BM); *idem*, Magé, *Carauta & Andrade 3574* (HB); *idem*, Organ Mountains, 12 August 1915, *Rose & Russel 20803* (US, NY); Pirai, Reservatório de Vigário, 4 February 1986, *Carauta et al. 5245* (NY); *idem*, Ilha do Governador, Tubiacanga Est. Guanabara, 25 August 1963, *Pabst & Sick 7388* (HB); *idem*, Serra do Itatiaia, 970m, May 1926, *Sampaio 4691* (HB, R); *idem*, Serra Sul de Minas perto do Rio Vermelho, 9 September 1974, *Windisch & Gillány 208* (HB); *idem*, Serra dos Órgãos, August 1915, *Luetzelburg 6024* (US); *idem*, Valley of the Rio Campo Bello, mt Itatiaia, 22°28' S, 44°38' W, 800m, 3 January 1929, *Smith 1648* (US); **Roraima**: Estrada Boa Vista-Venezuela, 5 km S of Rio Sur, 2 December 1977, *Steward et al. 197* (INPA); *idem*, Serra dos

Surucucus, 2°42'47" S, 63°33'36" W, 1800m, 14 February 1969, *Prance et al. 9927* (NY); Serra dos Surucucus, 63°33'36" W, 2°42'47" S, 1800m, 14 February 1969, *Prance et al. 9928* (NY); Territory of Roraima, Serra dos Surucucus, 2°42'47" N, 63°33'36" W, 1800m, 14 February 1969, *Prance et al. 9927* (INPA); **São Paulo:** 8 February 1959, *Travassos 25* (RB); *idem*, Araraquara, Chácara flora, 19 October 1996, *Frigo 18* (HB); Assis, próximo a represa do Cervo, 7 April 1995, *Salino 2100* (BHCB, UC); *idem*, próximo a represa do Cervo, 7 April 1995, *Salino 2103* (BHCB); Bauru, 10 June 2008, *Mazziero & Marciano 99* (BHCB); *idem*, Borborema, ca. 5 km da cidade, rodovia SP 304 Borborema-Ibiti, 21°33' S, 49°04' W, 21 December 1996, *Pietrobon 3931* (HB); *idem*, Brotas, Faz. Santa Elisa, 470m, 6 December 1991, *Salino 1041* (BHCB); *idem*, Mata do viveiro municipal, 14 July 1991, *Salino 949* (BHCB); Caraguatatuba, Parque Estadual da Serra do Mar, 23°66' S, 45°66' W, 8 March 2008, *Prado et al. 2001* (NY); Casa Branca, Rodovia SP-215 BR 267 Casa Branca-Várzea Grande, 21°46' S, 47°04' W, 650m, 17 June 1995, *Pietrobon 2025* (HB, MO); *idem*, Guarujá, Forte dos Andradas, 4 May 2004, *Prado et al. 1565* (UC); Itirapina, 22°14'14" S, 47°48'10" W, 26 April 1994, *Barreto et al. 2338* (ESA, BHCB); *idem*, Estação Ecológica, 22°10' S, 47°56' W, 705m, 12 March 2002, *Dittrich et al. 1089* (BHCB); *idem*, Reserva do Instituto Florestal, January 1997, *Begovacz 51* (BHCB); *idem*, Rodovia Washington Luiz, 22°09'54" S, 47°47'16" W, 50m, 7 October 1993, *Barreto et al. 01398* (ESA); *idem*, Serra de Itaqueri, 900m, 10 January 1992, *Salino 1247* (BHCB); *idem*, José Bonifácio, Fazenda Jacaré, 21°03' S, 49°41' W, 600m, 18 October 1991, *Silva & Matos 05* (MO, SPF); *idem*, Marabá Paulista, Rodovia SP-563 Teodoro Sampaio–Presidente Vences, 22°11' S, 51°58' W, 26 July 1997, *Pietrobon 4110* (HB); *idem*, Mirante do Paranapanema, Rodovia SP-272, Região do Pontal do Paranapanema, 22°17' S, 51°53' W, 400m, 8 March 1996, *Pietrobon da Silva & Fernandes 3121* (MBM, HB); Moji-Guaçu, Campos das Sete Lagôas, 47°71'00" W, 22°11'18" S, 575m, 18 December 1959, *Eiten & Eiten 1645* (GH, NY, US); Monte Aprazível, Sítio Santo Antônio, 20°43' S, 49°42' W, 10 November 1996, *Custódio & Zamaro 043* (HB); Mooca, August 1912, *Brade 5286* (HB); Penápolis, Usina Campestre, 9 November 1996, *Cordeiro 07* (HB); Pirassununga, junto ao rio Roque, 7 September 1987, *Salino 116* (BHCB); Praia Grande, 55 km 288, estrada praia Grande-Cubatão, 24°00'34" S, 46°30'20" S, 3m, 25 October 2007, *Lobão et al. 1449* (RB); *idem*, Presidente Bernardes, Região do Pontal do Paranapanema, 22°01' S, 51°34' W, 430m, 8 March 1996, *Pietrobon da Silva & Fernandes 3072* (BHCB, MBM, HB); *idem*, SP-272, 22°01' S, 51°34' W, 430m, 8 March 1996, *Pietrobon da Silva & Fernandes 3076* (MBM, HB); *idem*, Rio Grande, *Emygdio et al. 2343* (R); *idem*, Sandovalina, Rodovia entroncamento com SP-425 / Sandovalina, 22°26' S, 51°42' W, 25 July 1997, *Pietrobon 4061* (HB); *idem*, Santa Adélia, 3 December 1994, *De Lucca 20* (HB); *idem*, August 1995, *Lucca Jr. 36* (HB); *idem*, Santa Rita do Passa Quatro, A.R.I.E. Cerrado Pé de Gigate, 21°36'44" S, 47°34'41" W, 8 November 1995, *Batalha 801* (SPF); *idem*, São Luiz do Paraitinga, 23°25'57" S, 45°12'36" W, 800m, 10 August 2001, *Salino et al. 7441* (BHCB); *idem*, Praia Grande, 24°00'34" S, 46°30'20" W, 3m, 25 October 2007, *Lobão et al. 1449* (MBM); São Simão, 29 February 1940, *Viegas s.n.* (MO, SP, RB); *idem*, São Vicente, 26 December 1954, *Hoehne 4107 ?* (K, SPF); Tarabaí, Rodovia SP-425 Tarabaí-Estrela do Norte, 22°00' S, 51°38' W, 25 July 1997, *Pietrobon 4011* (HB); Ubatuba, 6 February 1996, *Salino 2548* (BHCB); *idem*, 9 April 1986, *Mizoguchi 2595* (NY); *idem*, 23°21'34" S, 44°50'53" W, 6 August 2001, *Salino et al. 7262* (BHCB); *idem*, Bairro de Parqueaçu, 9 April 1986, *Mizoguchi 2595* (MO); *idem*, Próximo a base Norte, Instituto Oceanográfico, July 1960, *Válio III* (SPF); Urupês, Região S. J. Rio Preto, Rodovia SP Roberto Mário P, 7 September 1992, *Rodrigues Jr. 176* (HB); **Sergipe:** Areia Branca, PARNA, Serra de Itabaiana, Riacho Coqueiro, 10°766667 S, 37°339167W, 11 julho, 2014, *Santiago 1311* (ASE); **Tocantins:** Colinas do Tocantins, Parcela de Monitoramento C4, Linha de Transmissão, 75°54'80" S, 48°12'74" W, 11 March 2010, *Saddi et al. 296* (RB); *idem*, Palmas, Próximo ao Lago da Região Sul do CEULP/ULBRA, 26 May 2006, *Santos 959* (HB); Paraiso do Tocantins, Fazenda Samuka, Cabeceira do Rio coco, 3 July 2007, *Santos & Santos 1396* (HB); *s.loc.*, Campo das Sete Lagoas, *Eiten 1645* (US); 20 November 1929, *Lofgren, A. 461* (RB); *Glaziou 15744* (B); *Schwarz 169* (B); *Sellow s.n.* (B); September 1999, *Preuss 1637* (B).—**COLOMBIA.** **Antioquia:** Anorí, Vereda Seca, quebrada Espírito Santo, 7°15'13" S, 75°02'36" W, 700m, 20 January 2004, *Rodríguez et al. 4509* (NY); **Cauca** Terr. Fed. Amazonas, 2°58' S, 64°41' W, 340m, January 1990, *Fernandez 6878* (NY). 1000m, 26 July 1883, *Lehmanni 2937* (K); **Huila:** carretera Laberinto a Tesalia, 800m, 31 May 1975, *Acosta-Arteaga & Lozano 896* (MBM, RB); *idem*, carretera Palermo a Los Guásimos, 720m, 30 May 1975, *Acosta-Arteaga & Lozano 887* (RB); **Chocó:** 1853, *Marjodel? 16* (BM); *idem*, Río Calima, Estación Agroflorestal del bajo CALIMA, 20m, 9 September 1961, *Cuatrecasas & Willard 26017* (US); **Santa Marta:** 1898, *Smith 2458* (GH, K, NY, US); *s.loc.*, December 1859, *Lindig 1400* (BM).—**COSTA RICA.** **Puntarenas:** Golfito, 300m, 30 July 1977, *Lorence & Pierce 1737* (MO).—**CUBA.** province?: near Nueva Gerona, 7 July 1900, *Palmer & Riley 1026* (NY, US); **Pinar Del Rio:** 26 August 1914, *Leon, B. 4576* (NY); Palm-Barrens west of Guane, 1 December 1911, *Shafer 10651* (GH, K, NY, US); *s.loc.*, 10 May 1910, *Jennings 451* (NY).—**DOMINICAN REPUBLIC.** **Villa Riva:** Pacificador, 100m, 11 January 1919, *Abbot 610* (US).—**EL SALVADOR.** **Morazán:** Rio Sapo, area burnt 20 years prior, 13°55'47" S, 88°06'10" W, 678m, 25 March 2002, *Monro et al. 3828* (BM); Arambala, Caripe del Guácharo,

Rio Sapo, área de la casada de las holominas, 18 April 2007, *Monterrosa 1380* (BM).—**ECUADOR**. 1500m, 22 January 1984, *Moran 3571* (MO); Morona-Santiago: 3°37' S, 78°34' W, 900m, 26 April 1973, *Holm-Nielsen et al. 4493* (F, MO, NY, UC); **Napo**: 0°04'40" N, 0°77'48" W, 1700m, 30 April 1998, *Clark et al. 5394* (MO); *idem*, 14 January 1973, *Holguer 2765* (GH; MO). **Pastaza**: Near Santa Clara at km 35 road from Puyo to Tena, 685m, 11 January 1981, *Proctor, G.R. 38706* (NY); **Zamora-Chinchi**: 0°40'40" S, 78°57'00" W, 1000m, 13 June 1984, *Øllgaard et al. 74866* (MO); *idem*, S and SE of Zamora, 78°56' W, 4°04' S, 1000m, 13 June 1984, *Øllgaard et al. 74866* (NY).—**GUATEMALA**. Chiquimula: Montaña Castilla, 1200m, 6 November 1939, *Steyermark 31332* (F, US); Puerto Barrios, 25 February 1905, *Deam 477* (GH). **GUYANA**: **Potaro-Siparuni**: Kaeieteur, 59°20' W, 51°00' S, 400m, 14 November 1991, *Tiwari & Mengharini 836* (NY); **Rupununi**: N of Shea, Camp. 1, 25°70' N, 59°09' W, 190m, 18 January 1994, *Jansen-Jacobs et al. 3265* (K, NY, UC, US); **U. Takutu-U. Essequibo Region**: 3°40' S, 59°25' W, 250m, 27 June 1989, *Gillespie et al. 1916* (NY, US); *idem*, Wilson-Brown's Camp, Waratwa head Savanna, 1 February 1952, *s.coll. 6812* (K, NY); *idem*, 2°15' S, 59°10' W, 250m, 26 April 1994, *Henkel & James 3764* (US); *idem*, South Rupununi, 2°15' S, 59°10' W, 250m, 26 April 1994, *Henkel 3764* (NY); *s.loc.*, 1895, *Jenman s.n.* (K).—**HONDURAS**. **Comayagua**: vicinity of Siguatepeque, 1050m, 25 March 1947, *Standley, P. 6425* (F). Drainage of the Río Yeguaré, 19 August 1949, *Williams 15900* (US); **Francisco Morazán**: 1200m, 6 March 1947, *Williams, L.O. & Molina, A.R. 12146* (US); *idem*, Along Río Agua Amarilla, 31 March 1951, *Morton 7547* (US); *idem*, Parque Nacional Unidas (Piacho), N de Tegucigalpa, 1487m, *Young 28* (US); *idem*, 1200m, 6 March 1947, *Williams & Molina 12146* (US); *idem*, 900m, 31 March 1951, *Morton 7547* (US); *idem*, Along río Agua Amarilla, 900m, 2 March 1949, *Standley 17303* (F); *idem*, Draige of the Río Yeguaré, 1200m, 19 August 1949, *Williams 15900* (US); *idem*, 14°00' S, 87°00' W, 1300m, 29 August 1949, *Molina 2604* (US); *idem*, 14°00' S, 87°00' W, 27 July 1951, *Molina 4071* (F; US); *idem*, 14°00' S, 87°00' W, 1200m, 6 March 1947, *Williams & Molina 12146* (F); *idem*, 14°00' S, 87°00' W, 900m, 20 November 1948, *Molina 1654* (F, US); *idem*, 87°00' W, 14°00' S, 900m, 25 April 1948, *Williams & Molina 14086* (F); *idem*, El Pedregal, 900m, April, *Williams & Molina 14066* (US); *idem*, Mountain slopes along Río Agua amarilla, northwest, 1100m, 27 July 1949, *Standley 21790* (F); *idem*, Region of Agua Amarilla above El Zamorano, 1100m, 6 March 1947, *Standley et al. 5114* (US); *idem*, 780m, 22 November 1946, *Standley & Williams 429* (F); *idem*, 900m, 6 March 1947, *Standley et al. (F)*; *idem*, 800m, 18 July 1949, *Standley 21343* (F); *idem*, Región of Suyatilla, north of el Zamorano, pine-oak, 800m, 18 July 1949, *Standley 21355* (F); *idem*, road between El Jicarito and El Pedregal, 800m, 13 November 1948, *Standley 14518* (F); **La Paz**: Pine-oak forest La Chorrera 3 km from Marcala, 1200m, 24 March 1969, *Molina, A.R. & Molina, A.R. 24418* (F); **Ocotepeque**: 8 km SW of Santa Fé near Guatemala border, 16 January 1976, *Molina, A.R. et al. 31255* (F); **Olancho**: 1200m, 17 September 1983, *Láinez 18* (MO).—**MEXICO**. **Chiapas**: Cerro de Tonalá, 1 February 1896, *Seler 2013* (GH, B); **Oaxaca**: Santa María Chimalapa, río Milagro, ca 2 km al SE de Sta María, 94°40'30" W, 16°54'00" S, 200m, 30 August 1984, *Hernández 385* (NY, MO).—**PANAMA**. Provincia de Panamá: Barro Colorado, Canal Zone, 24 April 1968, *Croat 5060* (MO, UC, US); *idem*, 14 January 1934, *Faull s.n.* (MO). **Chiriqui**, 800m, 13 August 1939, *Allen 1937* (MO, GH, US); Taboga, 186m, 23 July 1938, *Woodson et al. 1441* (GH, NY, MO, US); *idem*, December 1923, *Standley 28025* (US); *idem*, 30 October 1917, *Killip 2642* (GH, US); *s.loc.*, 24 July 1938, *Woodson et al. 1441* (US); *idem*, 29 January 1917, *Killip 2642* (US).—**PARAGUAY**. **Amambay**: Parque Nacional Cerro Corá, 5 June 1996, *Soria, N. 7582* (MO); **Concepción**: Estância Lapuri, between Estância Arrecife and road, 22°21'35" S, 57°28'34" W, 300m, 15 January 2000, *Zardini & Quintana 53846* (B); 1 km E of Nueva Colombia on road to Atyrá, 57°13' W, 25°10' S, 25 May 1990, *Zardini & Velázquez 20450* (NY).—**PERU**. **Cajamarca**: San Ignacio, 1650m, 5 May 1998, *Campos & Campos 4850* (MO, NY); **Lima**: Pampayacu, 25 July 1923, *Macbride 5046* (US); *idem*, hacienda at mouth of chinchao río, 1066m, 19 July 1923, *Macbride 5046* (F, GH); **Loreto**: Quebrada de Nauta, along Río Marañón, 3 July 1972, *Croat 17530* (NY); **Pasco**: 10°50' S, 75°34' W, 830m, 5 February 1983, *Gentry et al.* (MO); *idem*, Oxapampa, Gran Pajonal, 10°45' S, 74°23' W, 1200m, 26 September 1983, *Smith 5282* (MO, UC); **San Martín**: Zepelacio, near Moyobamba, 1100m, October 1933, *Klug 3354* (NY, MO, F, K, US). **SURINAME**: 2 February 1936, *Rombouts 453* (BM); 2°80' N, 56°12' N, 24 February 1963, *Boer 769* (US); 2°80' N, 56°12' W, 24 February 1963, *Boer 1963* (US). **VENEZUELA**: **Barinas**: Pedraza, 8°31' N, 70°34' W, 320m, 16 April 1988, *Dorr et al. s.n.* (UC); **Bolívar**: Gran Sabana, 1100m, 21 February 1978, *Steyermark et al. s.n.* (UC). 4°30' N, 61°34' W, 690m, 26 July 1982, *Croat 54200* (UC); *idem*, 4°30' N, 61°35' W, 900m, 8 November 1985, *Liesner 19732* (UC); *idem*, 5 km from Hato de Nuria, E. of Miamo, 400m, 12 January 1961, *Steyermark 88352* (HB, K, NY, US); *idem*, Piar, 5°55' S, 62°15' W, 600m, 2 May 1986, *Liesner & Holst 20498* (MO, UC); *idem*, Roscio Distr., alrededores de Santa Elena de Uairén, hacia kukená, 900m, 12 July 1974, *Ruiz-Terán & Lúpez-Palacios 11161* (NY); *idem*, 4°45' N, 61°03' O, 950m, 1 December 1982, *Steyermark & Liesner s.n.* (UC); *idem*, 5°10' S, 60°50' W, 1600m, 25 March 1984, *Aymard & Luteyn s.n.* (UC); *idem*, Alredores de Santa Elena de Uairén, hacia kunenán, 900m, 12 June 1974, *Ruiz-Terán & Lopez-Palacios, 11161* (NY, US); *idem*, Sifontes, 4°40' S, 61°33' W, 850m, 23 October 1986, *Aymard s.n.* (UC); **Carabobo**: 600m, 13 January

1939, *Alston* 6298 (MO); **Guárico**: Calabozo, El Recreo cerca Estación Biología de los Llanos, 6 August 1966, *Aristeguieta, L.* 6225 (NY, US); **Monagas**: Caripe del Guácharo, *Fendler* 119? (BM); **Portuguesa**: Araure, 9°43' N, 69°16' O, 300m, 13 November 1984, *Ortega & Aymard s.n.* (UC); **Sucre**: Cumaná, Guaranache, Parque Nacional Mochima, 80m, 31 August 1989, *Pérez Caldera* 1 (BM); 28 July 1982, *Stergios et al.* 4305 (UC); March 1842, *Funcke* 635 (BM); *Pater & Vogl s.n.* (UC) *Pittier* 14003 (US); **Trujillo**: Flor de Patria, 9°19' N, 70°38' W, 850m, 2 February 1978, *Cotthem* 1505 (UC); **Yaracuy**: San Felipe, Serranta Santa Maria, 10°12'50" S, 68°33'50" W, 750m, 25 January 1992, *Meier s.n.* (UC); **Zulia**: Colón, 350m, 27 April 1979, *Bunting & Alfonzo* 7288 (UC); *s.loc.*, June 1845, *Funcke Rhlim* 212 (BM).

4. *Meniscium arcanum* (Maxon & C.V. Morton) Pichi Sermolli (1968: 180). (Figs 15C–F; 16E–F)

Dryopteris arcana Maxon & Morton (1938: 352). *Thelypteris arcana* (Maxon & C.V. Morton) Morton (1967: 42). *Cyclosorus arcanus* (Maxon & C.V. Morton) Mazumdar & Mukhopadhyay (2014: 14). **Type**:—ECUADOR. Napo. trail from Tena to Napo, Province of Napo-Pastaza, 400 m, 2–11 April 1935, *Mexia* 7174 (holotype US [US1691406]; isotypes F [F0075689], GH [00021019], NY [NY00149085], UC [UC743438], US [US1691407, US1691408]).

Rhizomes short-creeping, 0.5–0.8 cm diam, glabrous. **Fronds** monomorphic to slightly dimorphic; **sterile fronds** 47–86.5 cm long, petiole 25–47.5 cm long, 1.3–3.9 mm diam., lamina 22–42 cm long, pinnae 14–20.5 × 3.7–5.2 cm; **fertile fronds** 86–128.5 cm long, petiole 43–77 cm long, 3.5–5.3 mm diam., lamina 43–51.5 cm long, pinnae 14–25.5 × 2.6–4.4 cm. **Petioles** with dark brown basal portion, distal portion lustrous and orangish brown to stramineous, glabrous, scales only at base, irregular, ovate to lanceolate, adpressed, caducous, subclathrate, dark brown, hairs absent. **Laminae** 1-pinnate, ovate to elliptic, chartaceous to subcoriaceous. **Rachises** glabrous. **Buds** absent. **Pinnae** in (1–)2–4(–5) pairs, elliptic to lanceolate, petiolulate, petiolule (0.2–)0.4–1.3 cm long; **bases** uniform on all pinnae, decurrent on petiolule, cuneate, not auriculate; **margins** thickened with a narrow (0.1 mm long), membranaceous, marginal line, entire, undulate to sinuate, glabrous; **apices** long-acuminate; **adaxial** and **abaxial surfaces** glabrous; **costal veins** 10–13 on sterile and fertile pinnae per 3 cm; **secondary veins** subsigmoid on sterile pinnae and arcuate on fertile pinnae, united at an obtuse angle, giving rise to a free, excurrent veinlet that almost or totally divides the areole; **areoles** in 8–12 rows between costa and margin. **Sori** uniseriate, oblong to rounded, rarely biseriate, on secondary veins, not confluent at maturity; **receptacle** glabrous or with sterile sporangia with glands; **sporangia** with tubular, elongate, orangish to light yellowish glands on the stalk near the capsule. **Spores** cristate-areolate, crests narrow, tall, anastomosed, fimbriate with small spines and rare perforations.

Distribution and habitat:—Bolivia, Brazil, Colombia, Ecuador, and Peru (Fig. 41). This species is not very common and is terrestrial in the interior of ombrophilous forests, on humid banks or the margins of shaded streams, at 100–2000 m.

Notes:—In the description of *Meniscium arcanum*, Maxon & Morton (1938) comment that this species is closely related to other pinnate species. However, compared to *M. minusculum* that has a simple lamina, the characters of these species are completely different, except for the fact that both species lack hairs on the lamina and axes.

Meniscium arcanum is similar to *M. andreanum* because of the subcoriaceous, glabrous lamina and presence of tubular glands on the sporangia (Figs. 9D; 15F). However, the latter species has 8–18 pinna pairs, sterile pinnae that are larger (23–33 × 4–7 cm), sessile, with a truncate, cordate to rounded base and a lateral, dark brown, prominent line on the abaxial base of the pinnae, whereas *M. arcanum* has 2–4 pinna pairs and sterile pinnae that are smaller (14–21 × 3.7–5.2 cm) and petiolulate, with a cuneate base (Fig. 15 C).

Although rare, there are specimens with intermediate characters between *Meniscium arcanum* and *M. andreanum*, such as *Sodi* 54/8 (UC) and *Silverstone-Sopkin et al.* 9547 (UC) from Ecuador that have 5 pinna pairs that are sessile or with short petiolules (0.2 mm), and have a short-cuneate base.

Smith (1983) also commented that *M. arcanum* is more closely related to *M. andreanum* than *M. minusculum*, due to the presence of tubular glands on the receptacle and sporangia. The author also noted that Sodi (1883), Christensen (1905) and Maxon & Morton (1938) did not mention the presence of these glands, which he believed to be an important character for these species.

Meniscium arcanum is often identified as *M. lingulatum*, which is another similar species because it has few pinna pairs (3–7) that are elliptic with a cuneate to acuminate base and long petiolules, and frequently has biseriate sori. However, it differs from *M. arcanum* by the glabrous sporangia and longer, wider pinnae (21–37.5 × 7.0–8.7 cm).

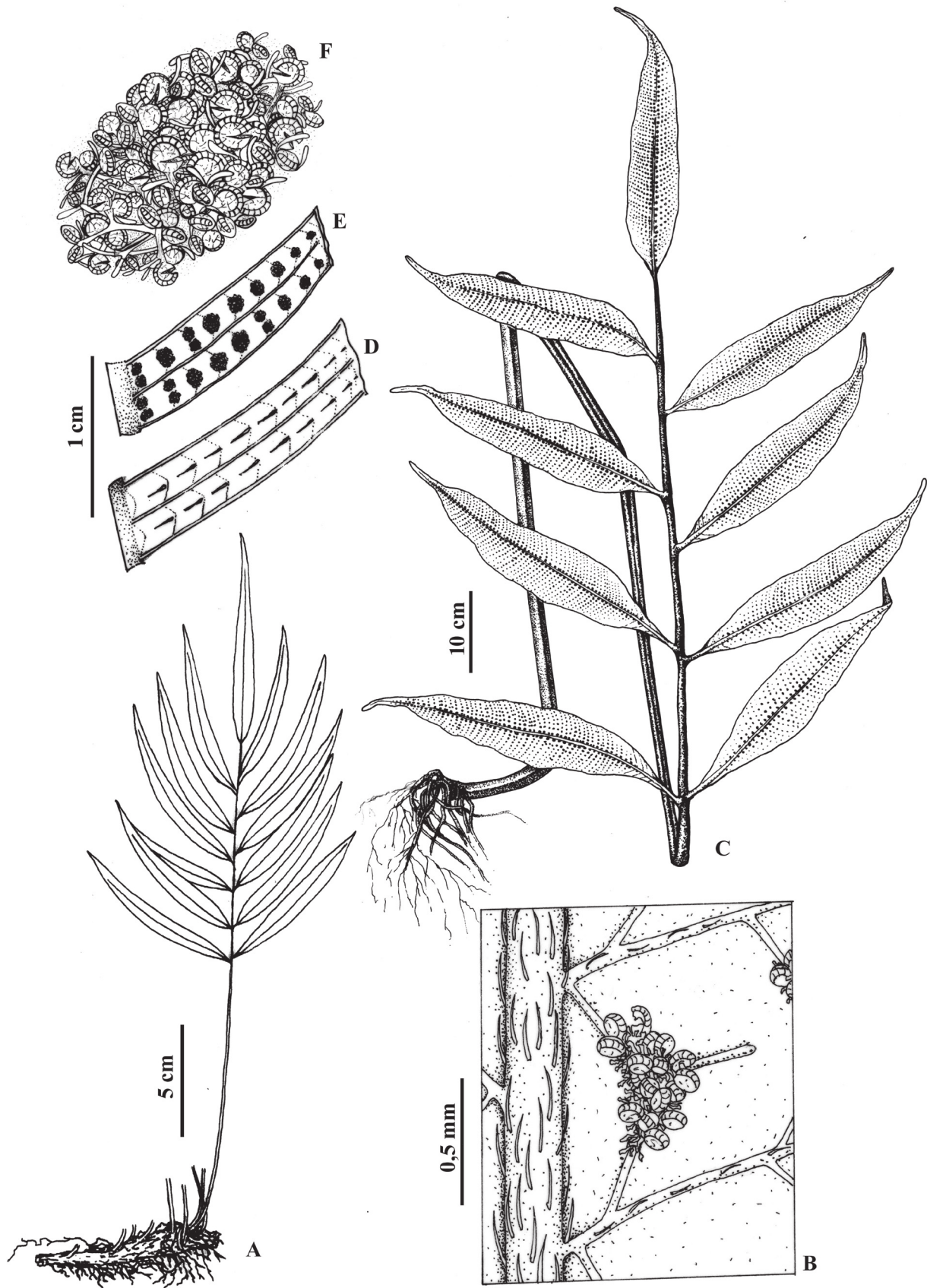


FIGURE 15. A–B. *Meniscium angustifolium*. A. habit; B. detail of the abaxial surface of fertile pinna showing curved hairs on costae and sori oblong on the secondary veins. C–F. *M. arcantum*; C. fertile frond; D. detail of abaxial surface of the fertile pinna showing glabrous costae and the veins; E. detail of abaxial surface of the fertile pinna showing sori; F. sori with tubular glands (A–B. Salino 1967, BHCB; C–F. Tuomisto et al. 3066, UC).

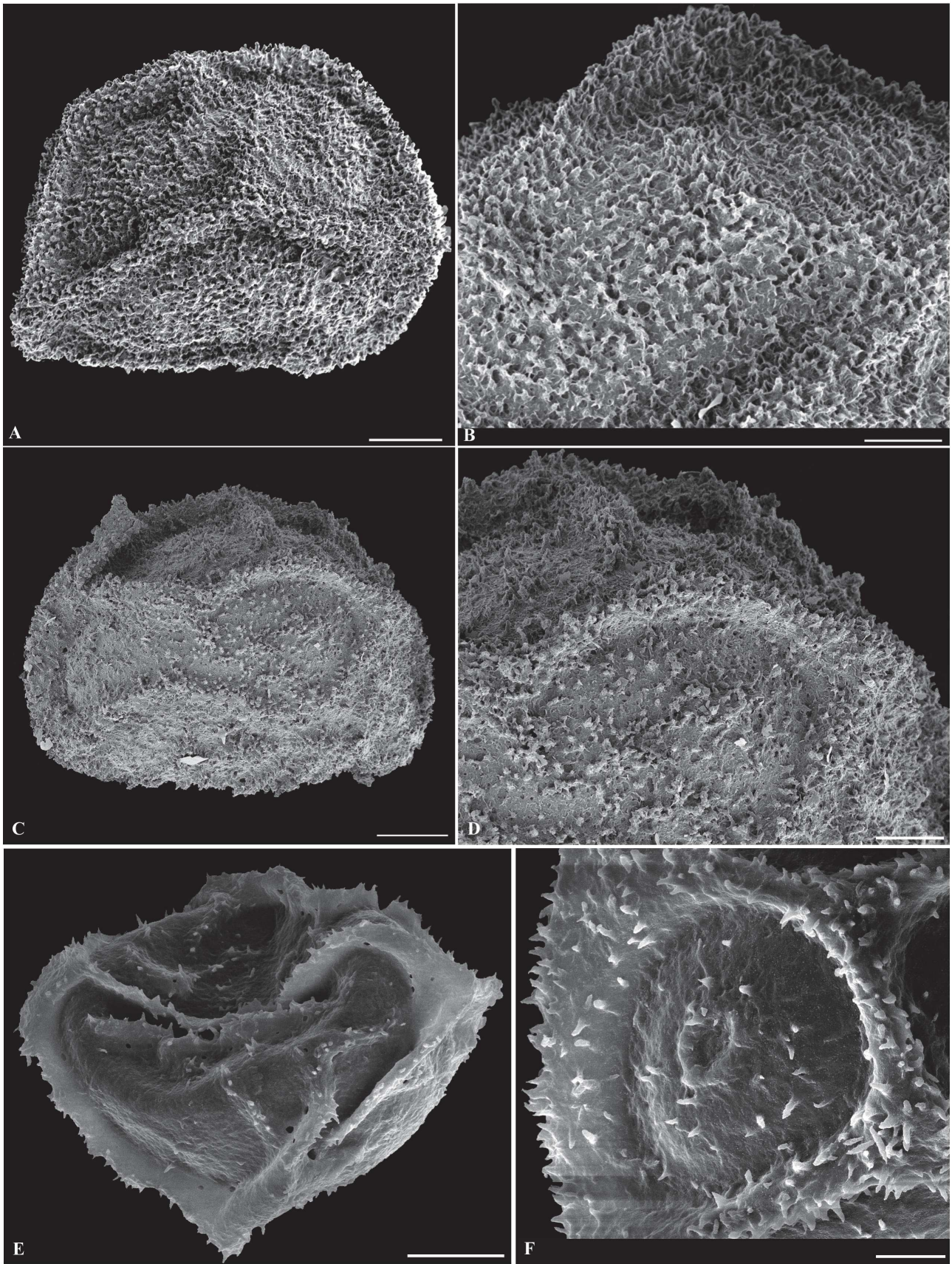


FIGURE 16. Spores of *Meniscium*. **A–D.** *Meniscium arborescens*, crustate-papillose spore. **E–F.** *M. arcanum*, crustate-areolate spore (**A–D.** Salino et al. 10772, BHCB; Standley 28025, US; **E–F.** Salino 15026, BHCB). Scales bars: A, C, E = 10 μ m; B, D, F = 5 μ m.

Specimens examined:—**BOLIVIA. La Paz:** Larecaja, Across river from the town of Mapiri, 15°15' S, 68°08' W, 840m, 19 December 1981, *Sperling & King 5518* (GH, MO, US).—**BRAZIL. Acre:** Mâncio Lima, Parque Nacional da Serra do Divisor, 7°24'31" S, 77°39'51" W, 275m, 13 December 2010, *Salino & Almeida 15026* (BHCB); *idem*, Rio Moa, 7°26'51" S, 73°40'01" W, 220m, 13 December 2010, *Salino & Almeida 15012* (BHCB); *idem*, Rio Moa, 7°30' S, 73°40' W, 0m, 5 October 1985, *Jangoux et al. 85/107* (INPA).—**COLOMBIA. s. loc.,** 3°47' S, 70°15' W, 100m, 12 April 1991, *Pipoly et al. 15164* (MO).—**ECUADOR. s. loc.,** 0°05'00" N, 0°78'08" W, 2010m, 24 January 2004, *Vargas et al. 4410* (MO); *idem*, 800m, 20 August 1989, *van der Werff & Gudino 11294* (MO); **Napo:** 1°04' S, 77°36' W, 450m, 18 May 1985, *Palácios et al. 00416* (MO); *idem*, Yasuni National Park, 0°38' N, 76°27' W, 200m, 25 March 1998, *Tuomisto & Ruokolainen 11935* (UC); **Napo-Pastaza:** Canton Napo, 400m, 5 April 1935, *Mexia 7174* (UC); *idem*, Tena, 400m, 5 April 1935, *Mexia, Y. 7174* (UC).—**PERU. Amazonas:** Bagua, Yamayakat Bosque de Rivera, 78°19' W, 4°55' S, 320m, 1 February 1996, *Jaramillo & Jaramillo 1044* (MO, UC); *s. loc.,* 9°31' S, 74°58' W, 350m, 13 April 1982, *Smith 1274* (MO); **Bagua?:** Imaza, Comunidad Aguaruna de Yamayakat, 4°55' S, 78°19' W, 450m, 2 June 1996, *Rodríguez & Rodríguez 803* (F, UC, MO); **Loreto:** Mariscal Ramon Castilla, 3°12' S, 72°09' W, 100m, 5 June 1997, *Tuomisto et al. 11396* (UC); *idem*, Mariscal Ramon Castilla, 3°16' S, 72°00' W, 100m, 15 May 1997, *Tuomisto et al. 10979* (UC); *idem*, Mariscal Ramon Castilla, 3°16' S, 72°00' W, 100m, 17 May 1997, *Tuomisto et al. 11017* (UC); *idem*, Mariscal Ramon Castilla, 3°16' S, 72°09' W, 100m, 18 May 1997, *Tuomisto et al. 11045* (UC); *idem*, 0°41' S, 73°30' W, 150m, 18 January 1991, *Vásquez 15868* (MO), *idem*, 22 August 1972, *Croat 19514* (MO, UC); *idem*, Loreto, 3°10' S, 72°52' W, 100m, 9 October 1992, *Tuomisto et al. 5820* (UC); *idem*, 3°37' S, 73°17' W, 100m, 21 November 1991, *Tuomisto et al. 3066* (UC); *idem*, 4°17' S, 73°34' W, 100m, 4 March 1996, *Tuomisto et al. 10037* (UC); *idem*, 4°40' S, 73°28' W, 100m, 8 January 1995, *Tuomisto et al. 7193* (UC); **Madre de Dios:** Manu, 11°54' S, 71°23' W, 400m, 7 October 1998, *Tuomisto et al. 13119* (UC); *idem*, 12°38' S, 70°22' W, 300m, 3 November 1998, *Tuomisto et al. 13615* (UC); Tambopata, 12°38' S, 69°54' W, 200m, 10 November 1998, *Tuomisto et al. 13675* (UC); **Pasco:** 10°29'16" S, 0°75'04" W, 770m, 28 February 2004, *Mellado et al. 1000* (MO); **San Martín:** Lamas, Alonso de Alvarado, 900m, 16 April 1973, *Schunke 5943* (CAS, NY).

5. *Meniscium chrysodioides* Fée (1852: 225). (Figs 17A–E; 19A–B)

Thelypteris chrysodioides (Fée) Morton (1967: 51). *Dryopteris chrysodioides* (Fée) Maxon & Morton (1938: 373). *Cyclosorus chrysodioides* (Fée) Mazumdar & Mukhopadhyay (2014: 16). **Neotype** (here designated):—GUIANA: Pomeroon River, 1895, *Jenman s.n.* (NY). [Type: "Habitat in Americâ australi. (Collect. Pamplin., in Herb. cl. Moug., 55.)", not found].

=*Dryopteris chrysodioides* (Fée) Maxon & Morton var. *goyazensis* Maxon & Morton (1938: 374), **syn. nov.** *Thelypteris chrysodioides* (Fée) Morton var. *goyazensis* (Maxon & Morton) Morton (1967: 51). **Type:**—BRAZIL: Goiás, In the valley of the Rio Corumba, 23 July 1894, *A. Glaziou 22631* (holotype: NY [NY00099428]; isotypes: US [US1692840], UC [UC180956], F, GH; P [P01427741, P01427742, P01427786, P01427787], B [B200064544, B200064545]).

=*Dryopteris handroi* Brade (1965: 29). *Meniscium handroi* (Brade) Brade (1972: 229). *Thelypteris handroi* (Brade) C.F. Reed (1968: 281). *Cyclosorus handroi* (Brade) Mazumdar & Mukhopadhyay (2014:21). **Type:**—BRAZIL. São Paulo: Moji-Guaçu, Reserva Florestal, 10 October 1956, *O. Handro 629* (holotype: SP; isotypes BHCB, SPF).

Rhizomes short-creeping, 0.5–2.0 cm diam., glabrous or with a few scales (at the apex), scales caducous, irregular, linear to ovate-lanceolate, subclathrate, brown, with globose cells at the margin. **Fronds** subdimorphic; **sterile fronds** 71–214 cm long, petiole 33–124 cm long, 5 mm diam., lamina 38.5–90 cm long, pinnae 22.5–35 × 5–5.5 cm; **fertile fronds** 140–218 cm long, petiole 78–121 cm long, 0.7–1.1 cm diam., laminae 54–107 cm long, pinnae 17–28 × 3–5.3 cm long. **Petioles** with brown basal portion and greenish to stramineous distal portion, glabrescent, hairs 0.1 mm long, acicular, dense, short, erect, rarely with caducous, irregular, adpressed, dark brown scales on basal portion. **Laminae** 1-pinnate, ovate-lanceolate, chartaceous. **Rachises** glabrous or with dense, short (0.1 mm long), acicular, erect hairs, rarely with lanceolate to irregular, adpressed scales. **Buds** absent. **Pinnae** in 6–12(–13) pairs, oblong to elliptic to elliptic-lanceolate, proximal pinnae sessile or petiolulate, petiolule 0.4–1.8 cm long, medial and distal pinnae sessile, not reduced; **bases** of proximal pinnae round, cuneate or widely cuneate, not auriculate, base of medial and distal pinnae oblique with basisopic side cuneate-adnate and acroscopic side excavate to truncate; **margins** undulate, sinuous, crenate, rarely entire with sparse acicular hairs; **apices** acuminate to slightly caudate; **adaxial surfaces** of sterile and fertile laminae glabrous or with 0.1–0.2 mm long, acicular, moderate to dense, curved, tortuous hairs on the costa; **abaxial surfaces** of fertile lamina pubescent on costa, veins and between veins (sometimes glabrous) with short (0.1–0.15 mm long), acicular, erect, moderate or dense hairs, filiform, branched, 0.4–0.8 mm long, sparse, irregular, adpressed scales and arachnoid, hyaline, caducous scales present near margin and costa or adpressed on

surface between the veins, glandular hairs absent; sterile lamina with moderate or sparse hairs and filiform scales on the veins, surface between veins glabrous; **costal veins** 5–6 on sterile pinnae and 8–13 on fertile pinnae per 3 cm; **secondary veins** straight or subsigmoid on sterile pinnae, arcuate or sometimes straight on fertile pinnae, united with adjacent vein to form an obtuse angle, with one, free, excurrent veinlet; **areoles** on fertile and sterile pinnae in 14–21 rows between costa and margin, rectangular, narrow, elongate. **Sori** straight, oblong to arcuate, on secondary veins, not or rarely confluent at maturity. **receptacles** with septate, branched sporangiaster, with 1–3, acicular, 0.1–0.15 mm long, straight hairs on the septa and one globose cell at the apex, and sterile, aborted sporangia; **sporangia** with paraphyses on the stalk, paraphyses 1–3 septate, with acicular hairs arising from each septum. **Spores** cristate-echinate, with large crests and sparse papillae.

Distribution and habitat:—Bolivia, Brazil, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, and Venezuela (Fig. 42). This species is usually terrestrial. It grows in the interior of humid forests or in gallery forests on rocks along streams or as a rheophyte, at 100–1800 m.

Notes:—When Maxon & Morton (1938) described *Dryopteris chrysodioides* var. *goyazensis*, the holotype of *Meniscium chrysodioides* Fée was not found and, due to this, the authors associated the description by Fée with specimens from Guyana (*Jenman s.n* [three specimens] at NY and *Jenman 2072* [one specimen] at K), which is a questionable decision when describing a new taxon. According to the authors, var. *goyazensis* differs from the typical variety of *M. chrysodioides* by having larger and more numerous sterile pinnae and smaller and strongly crenate fertile pinnae.

Smith (1993) considered *Dryopteris chrysodioides* var. *goyazensis* a synonym of *Meniscium chrysodioides* (Fée) Morton and also noted that the typical variety and var. *goyazensis* were cited for Guyana by Maxon & Morton (1938). After analyzing more specimens from Brazil, Bolivia, Peru, Ecuador and Guyana, including *Jenman s.n* and *2072* at NY and K that the variety is based on, we observed that the characters used in the description of the variety are not constant and that there is a continuum (e.g., specimens with nine pairs of pinnae may or may not have fertile pinnae with a crenate margin, and pinnae with a crenate margin can range from 18 to 20 cm long). Thus, we do not think there is enough variation to merit recognizing the variety.

Meniscium chrysodioides is most similar to *M. macrophyllum*. The main differences between these species are leaf dimorphism and the distribution of sporangia on the lamina. Thus, sterile specimens are difficult to determine. *Meniscium chrysodioides* has subdimorphic laminae with dense hairs on the abaxial surface of the fertile pinnae, between the veins and on the veins and costa, sori restricted to the secondary veins, and a sporangium stalk with 1–3 septa with acicular hairs. In contrast, *M. macrophyllum* has dimorphic laminae, abaxial surface of the fertile pinnae with dense hairs restricted only to the veins and costa, acrostichoid sori, and sporangia that are glabrous, or have hairs on the capsule (rarely with a simple seta on the stalk), and lack paraphyses.

The type material of the species described by Fée was mostly at Paris (P) where the Mougeot herbarium was also incorporated. However, no specimen with annotations was found that might represent the original collection used by Fée to describe *M. chrysodioides* in 1852. Although P has many types of names described by Fée (e.g., *Heteroneuron meniscioides* Fée, *Meniscium guyanense* Fée, *M. salzmännii* Fée, *M. sessilifolium* Fée and *M. elongatum* Fée.) and other herbaria, curators and scholars of the historical ‘Pamplim’ collection at AK, E, K, STR and OXF were consulted, nothing was found. It is very possible that this material was lost or destroyed.

In the protologue of *M. chrysodioides* Fée (1852), “América australi” is cited as the area of occurrence, and Maxon & Morton (1938) associated the citation “Chrysodii vulgare” in this protologue to some specimens from Guyana collected by Jenman between 1881 and 1895 and deposited at K and NY, which also agree with the description of the species. Although collected after this name was described, these are probably good historical collections, since they are well preserved, more complete and could represent the original circumscription of *M. chrysodioides*. For the neotype, we chose a historical collection. In addition to the collections by *Jenman*, there were few options, such as *Purdie 1850* (BM) from Trinidad, *Caugalli s.n.* 1854 (P) from Bolivia and *Riedel s.n.* 1821 (P), which are older and incomplete specimens. Thus, *Jenman s.n.* (NY) is designated as the neotype, which was carefully analyzed.

There is a specimen (*A. Glaziou 22631 B* [B 200024466]) with the same data as the type material of *Dryopteris chrysodioides* (Fée) Maxon & C.V. Morton var. *goyazensis* Maxon & C.V. Morton. This is a mixed collection, which includes a specimen of *M. arborescens*, and is therefore not part of the type collection.

Specimens examined:—**BOLIVIA. Beni:** Vaca Diez, 3km E of Riberalta on road to Guayaramerín, then 2km SE on side road. 11°00' S, 66°05' W, 230m, 19 May 1982, *Solomon 7699* (MO); *idem*, Ballivian, on Yocumo-Quiquibey road, 1–3 km from Yucumo, 15°09' S, 67°02' W, 244m, 20 November 1990, *Fay 2785* (UC, US); *idem*, Gral. Ballivian, Estacion Biológica del Beni, 14°30' S, 66°37' W, 200m, July 1996, *Eibing 220* (UC); **Cochabamba:** Carrasco, 17°05'74" S, 65°27'85" W, 600m, 13 December 1999, *Jimenez 124* (UC); *idem*, José Carrasco Torrico, Valle del Sajta,

17°07' S, 64°50' W, 220m, 4 October 1996, *Kessler et al. 8812* (UC); *idem*, Valle del Sajta, 17°07' S, 64°50' W, 220m, 8 October 1996, *Kessler et al. 8869* (UC); **La Paz**: locality, 13°57' S, 67°59' W, 266m, 18 July 2009, *Weigelt et al. 90436* (UC); *idem*, Abel Iturralde, Parque Nacional Madidi, 12°51' S, 68°48' W, 204m, 9 November 2004, *Gonzales et al. 4704* (UC); Mapiri Región, San Carlos, 1926, *Buchtien 298* (US); **Pando**: Manuripi, 11°46' S, 68°42' W, 220m, 1968, *Jimenez s.n.* (UC); **Santa Cruz**: Valle Grande, 18°47' S, 63°57' W, 1250m, 21 May 1996, *Kessler et al. 5968* (UC). Santo Domingo, trayecto entre el pueblo y campamento arroyo Tintaya, 14°47'22" S, 68°34'17" W, 1390m, 24 October 2006, *Fuentes 11202* (MO).—**BRAZIL**. **Acre**: along road from Cruzeiro do Sul to Barão do Rio Br, 7°37' N, 72°37' W, 150m, 25 August 1986, *Croat & Rosas Jr. 62670* (INPA, MO); Mâncio Lima, Parque Nacional da Serra do Divisor; Rio Mõa, 7°71'18" S, 73°41'38" W, 280m, 13 December 2010, *Salino & Almeida 15011* (BHCB); **Alagoas**: União dos Palmares, Serra das Bananeiras, 91277°50' S, 35524°80' W, 500m, 3 November 2002, *Thomas et al. 13238* (NY); **Amazonas**: Barcelos, 0–3 km N do km 211 da estrada Perimetral Norte, 1°32' S, 62°48' W, 3 February 1984, *Amaral 1459* (K, INPA, NY); Coarí, Província Petrolífera de Urucu, 4°53'39" S, 65°19'56" W, 68m, 16 February 2008, *Pietrobon 7685* (MG); Coarí, Província Petrolífera de Urucu, 900m, 6 March 2007, *Pietrobon 6974* (MG); Manaus: km 9 da BR 17, 8 July 1955, *Chagas 1363* (IAN, INPA, MG, US); Larges, on Amazon River 1 km, 10 September 1974, *Conant et al.* (GH, INPA); *idem*, Casa Augin, 17 October 1958, *Coelho s.n.* (INPA); *idem*, Igarapé do Buião, 30 August 1957, *Ferreira 67/67* (INPA); *idem*, 30 August 1957, *Ferreira s.n.* (HB); *idem*, 7 August 1957, *Rodrigues 479* (HB; INPA); *idem*, 900m, 30 August 1957, *Ferreira 5725* (HB); Manaus-Itacoatiara, km 26, 2°53' S, 59°58' W, 15 May 1996, *Prado & Silva 532* (INPA); Platô da Serra Aracá, 0°51' N, 63°22' W, 1150m, 17 February 1984, *Tavares et al. 79* (K, INPA, NY, US); **Distrito Federal**: 5 km w of Formosa, road to Brasília, 900m, 8 October 1965, *Irwin et al. 9071* ((IAN, NY, US); near Sobradinho D.F., 1000m, 10 July 1966, *Irwin et al. 18145* (NY, US); **Goiás**: Gurupi, 350m, 19 September 1963, *Eiten & Eiten 5583* (K, MO, US); Rio Corumbá, 23 July 1894, *Glaziou 92631* (UC); **Mato Grosso do Sul**: Dourados, Fazenda São Marcos, 27 August 1996, *Clemente 15* (BHCB); **Mato Grosso**: Alto Taquari, 850m, 11 November 1998, *Salino 605* (BHCB); *idem*, 859m, 10 November 1998, *Salino 591* (BHCB, UC); *idem*, Fazenda Bambuzal, 10 November 1988, *Salino 591* (UC); *idem*, Chapada dos Guimarães, 16 February 1988, *Salino 399* (UC); *idem*, Itiquira, 17°12' S, 54°07' W, 600m, 22 February 1994, *Silva & Rodrigues Jr 1255* (MO); Matto do Curupira, 17 February 1894, *Lindmam 3043* (K); Nova Xavantina, 10 km S. of Xavantina, 14°44' S, 52°20' W, 31 August 1967, *Richards et al. 540* (K, NY); Vila Bela da Santíssima Trindade, 13°00' S, 60°10' W, 11 January 1987, *Prado & Salino 27* (UC). *s. loc.*, 12°49' S, 51°46' W, 7 August 1967, *Richards 6622* (K, NY, MO); *s. loc.*, 12°49' S, 51°46' W, 7 August 1968, *Richards 6623* (K); **Minas Gerais**: Diamantina, 10 December 1992, *Salino 1586* (BHCB); São Roque de Minas, Parque Nacional da Serra da Canastra, 20°11'38" S, 46°36'10" W, 1205m, 1 February 2007, *Salino et al. 11655* (BHCB); **Pará**: Canaã dos Carajás, Estrada para Serra Sul, 6°08'50" S, 50°19'47" W, 512m, 28 August 2012, *Salino et al. 15496* (BHCB); *idem*, Floresta Nacional de Carajás, Serra Sul, Corpo D, 6°23'15" S, 50°20'17" W, 690m, 20 February 2010, *Almeida et al. 2273* (BHCB); *idem*, Serra Sul, corpo A, 6°18'30" S, 50°27'16" W, 582m, 29 June 2010, *Almeida et al. 2444* (BHCB); *idem*, 6°18'33" S, 50°27'19" W, 584m, 29 June 2010, *Almeida et al. 2445* (BHCB); *idem*, Corpo C, 6°22'52" S, 50°22'25" W, 594m, 16 February 2010, *Almeida et al. 2229* (BHCB); Parauapebas, Floresta Nacional de Carajás, Serra Norte, Corpo N, 6°02'14" S, 50°15'55" W, 520m, 14 February 2012, *Salino et al. 15191* (BHCB); **Pernambuco**: Bonito, Mata da Colônia, 8°30'14" S, 35°42'56" W, 800m, 26 April 2001, *Santiago & Silva Junior 424* (BHCB); São Vicente Ferrer, Complexo da Serra do Mascarenhas, Mata do Estado, 7°35' W, 35°29' W, 600m, 16 September 1998, *Pietrobon-Silva 4416* (HB, MBM); *idem*, 7°35' S, 35°29' W, 600m, 5 May 1999, *Pietrobon 4555* (UFP); **Roraima**: Serra dos Surucucus, 2°42'47" S, 63°33'36" W, 1800m, 14 February 1969, *Prance et al. 9928* (INPA); **São Paulo**: Casa Branca, Rodovia (SP-215) BR 267, Casa Branca/Nárzea Grande, 21°46' S, 47°04' W, 650m, 17 June 1995, *Pietrobon 2020* (BHCB, MBM, MO); Itirapina, Estação Ecológica do Instituto Florestal, 750m, 21 July 1991, *Salino 959* (BHCB, UC); *idem*, 750m, 21 July 1991, *Salino 959 b* (BHCB); Moji-Guaçu, Reserva Florestal, 16 April 1993, *Simabukuro 96* (BHCB); Piracicaba, 22°44'52" S, 47°52'38" W, 23 August 1994, *Barreto et al. 2987* (ESA); São Pedro, Alpes das Águas, 22°33'57" S, 47°57'31" W, 5 August 1994, *Barreto et al. 2806* (ESA, BHCB); Sem localidade, 25 km of Formoso, *Dawson 14931* (US); **Sergipe**: Areia Branca, PARNA, Serra de Itabaiana, Gruta, 10°749722 S, 37°340556 W, 11 July, 2014, *Santiago 31703* (ASE).—**ECUADOR**. **Morona-Santiago**: 0°22'00" N, 0°78'08" W, 1100m, 22 July 1993, *Fay & Fay 4104* (MO, NY, UC, US); *idem*, Gualaquiza Cantón, 3°24' S, 78°34' W, 1000m, 8 March 1993, *Fay & Fay 4240* (F, K, NY, MO, US); **Napo**: 0°53' N, 76°13' W, 200m, 10 March 1998, *Tuomisto, H.; Ruokolainen 11752* (UC).—**GUYANA**. **Cuyuni-Mazaruni**: Camp at Utshe, 5°45'00" S, 6°10'80" W, 975m, *McDowell & Anselmo s.n.* (NY). **U. Tukutu-U**: Essequibo, Kuyuwini R., trail to Kassikaityu R., 01°55' S, 59°06' W, 260m, 15 May 1997, *Clarke 4572* (NY); *s. loc.*, 0°00', 6108°00', 1882, *Jenman s.n.* (NY); *idem*, 1863, *Appun 844* (K); *idem*, March 1884, *Jenman 2072* (K); *idem*, 1895, *Jenman s.n.* (NY).—**PARAGUAY**. Amambay: 22°34' S, 55°37' W, September 1933, *Rojas 6314A* (MO).—**PERU**. **Cusco**: 13°13'27" S, 0°70'45" W, 628m, 22

January 2007, *Valezuela et al.* 8488 (MO); **Loreto**: 0°50'50" S, 73°50'00" W, 150m, 8 January 1990, *Vásquez 13361* (MO); *idem*, Mariscal Ramon Castilla, 3°18' S, 72°09' W, 100m, 23 May 1997, *Tuomisto et al.* 11265 (UC); *idem*, Mishuyacu, Near Iquitos, 100m, maio-July 1930, *Klug 1533* (F, NY, US); *idem*, 100m, October 1929, *Klug 200* (NY, F); **Madre de Dios**: Tambopata, 12°15' S, 70°48' W, 300m, 26 October 1998, *Tuomisto et al.* 13513 (UC); *idem*, 12°23' S, 69°22' W, 200m, 14 November 1998, *Tuomisto et al.* 13697 (UC); *idem*, 12°38' S, 69°54' W, 200m, 10 November 1998, *Tuomisto et al.* 13672 (UC); *idem*, 30 air km or 70–80 river km SSW Puerto Maldonado, 12°49' S, 69°17' W, 260m, 6 May 1980, *Barbour 5182* (NY, MO, UC); *idem*, Aguajal Huitoto, 12°62' S, 69°97' W, 230m, 14 October 2004, *Chocce et al.* 590 (NY); Manu National Park, 12°15' S, 70°48' W, 300m, 26 October 1998, *Tuomisto et al.* 13513 (UC).—**VENEZUELA. Amazonas**: 0°50' N, 66°09' W, 140m, 3 December 1984, *Croat 59591A* (MO). **Bolívar**: 4°27' S, 64°06' W, 26 April 1988, *Stergios 11884-a* (UC); 6°30' S, 66°30' W, 600m, 9 April 1988, *Ortega et al.* 3229 (UC); *idem*, Cadeño, Morichal El Caballo, 60°17' N, 67°15' W, 100m, 4 November 1985, *Holst & van der Werff 2577* (UC, MO); *idem*, Gran Sabane, ca 10 km SW of Karaurin Tepui at junction of rio Karaurin and Asadon, 5°19' S, 61°03' W, 900–1000m, 21 April 1988, *Liesner 23556* (UC); *idem*, Sifontes, 4°40' S, 61°33' W, 850m, 21 October 1986, *Gerardo Aymard 4625* (UC).

6. *Meniscium cocleanum* (A.R. Sm. & Lellinger) R.S. Fernandes & Salino (2014: 7) (Figs 17F–H; 19C–D).

Thelypteris cocleana Smith & Lellinger (1985: 918). *Cyclosorus cocleanus* (A.R.Sm. & Lellinger) Mazumdar & Mukhopadhyay (2014: 16). **Type**:—PANAMA. Coclé: “El Copé, along gravel road to right before sawmill, 2400 ft,” 731 m, 18 October 1979, *T. Antonio 2188* (holotype UC, isotype MO).

Rhizomes short-creeping, 0.7–1.0 cm diam., glabrous. **Fronds** subdimorphic; **sterile fronds** (47.5–)61–117.5 cm long, petiole (22–)32.5–62 cm long, 2.6–4.9 mm diam., lamina (25.5–)34–55.5 cm long, pinnae 14.5–19.5 × (1.9–)2.7–3.6 cm, oblong to lanceolate; **fertile fronds** (64–)90–165 cm long, petiole (37–)49.5–102 cm long, 2.9–6 mm diam., lamina (29–)40.5–63 cm long, pinnae 11.5–16(–24) × 1.5–2(–4.3) cm, oblong to lanceolate to slightly linear. **Petioles** with brown basal portion greenish to stramineous distal portion, glabrous or with hairs in the sulcus of the adaxial surface, hairs short (0.1 mm long), curved, inconspicuous. **Laminae** 1-pinnate, widely oblong, chartaceous. **Rachises** glabrous or with hairs in the sulcus adaxially, hairs moderate, 0.1–0.2 mm long, acicular, curved. **Buds** present in the axils of the distal pinnae. **Pinnae** in 5–12 pairs, linear-lanceolate, distal pinnae not reduced; **base** of proximal pinnae cuneate, petiolulate (1–1.5 cm long), distal pinnae sessile, subequilateral, basisopic side semiadnate and round, acroscopic side excavate; **margins** entire to undulate, glabrous; **apices** long-acuminate; **adaxial surfaces** glabrous or with 0.1–0.2 mm long, acicular, moderate, curved hairs on the costa; **abaxial surfaces** glabrous or rarely with small (0.05 mm long), branched, adpressed scales on the costa and veins; **costal veins** 6–10 on the sterile and fertile pinnae per 3 cm; **secondary veins** straight to arcuate on fertile pinnae and subsigmoid on sterile pinnae, united at an obtuse angle, giving rise to an excurrent, free veinlet, veinlet not dividing the areole; **areoles** in 7–10 rows on sterile pinnae and 6–7 rows on fertile pinnae between costa and margin. **Sori** linear, oblong to lunate, rarely subconfluent at maturity; **receptacles** glabrous; **sporangia** glabrous. **Spores** winged, fimbriate, wings narrow, tall, fimbriae irregular.

Distribution and habitat:—*Meniscium cocleanum* is distributed in Nicaragua, Costa Rica, and Panama (Fig. 42). It usually grows inside or along the edges of tropical evergreen forest formations, on hillsides, often along trails, at 350–1050 m.

Notes:—*Meniscium cocleanum* is easily recognized and because of its unique characters shares few similarities with other species of the genus. Smith & Lellinger (1985) noted that the affinities of *M. cocleanum* are uncertain and that in Maxon & Morton (1938) it keys out to *Dryopteris nesiotica* = *M. nesioticum*. Among other characters, *M. cocleanum* has buds in the axils of the distal pinnae, oblong sori on the veins that are rarely subconfluent at maturity and a glabrous abaxial surface, whereas in *M. nesioticum* the buds (when present) are in the axils of the proximal pinnae, the sori are acrostichoid or on the veins and confluent at maturity, and the costa and veins of the abaxial surface have curved hairs.

Meniscium triangularis, a recently described species, also has buds on the distal pinnae. However, *M. cocleanum* has glabrous lamina and sporangia, whereas *M. triangularis* has a dense indument of hairs and scales on the laminar surface and sporangia with glands (Fernandes *et al.*, 2014).

All of the individuals examined have buds on the distal pinnae; however, different parts of the plant are sometimes sent to different herbaria so not all fronds have buds. Smith & Lellinger (1985) note that *Croat 44555* at UC does not have buds on the distal pinnae, but a duplicate at MO has buds.

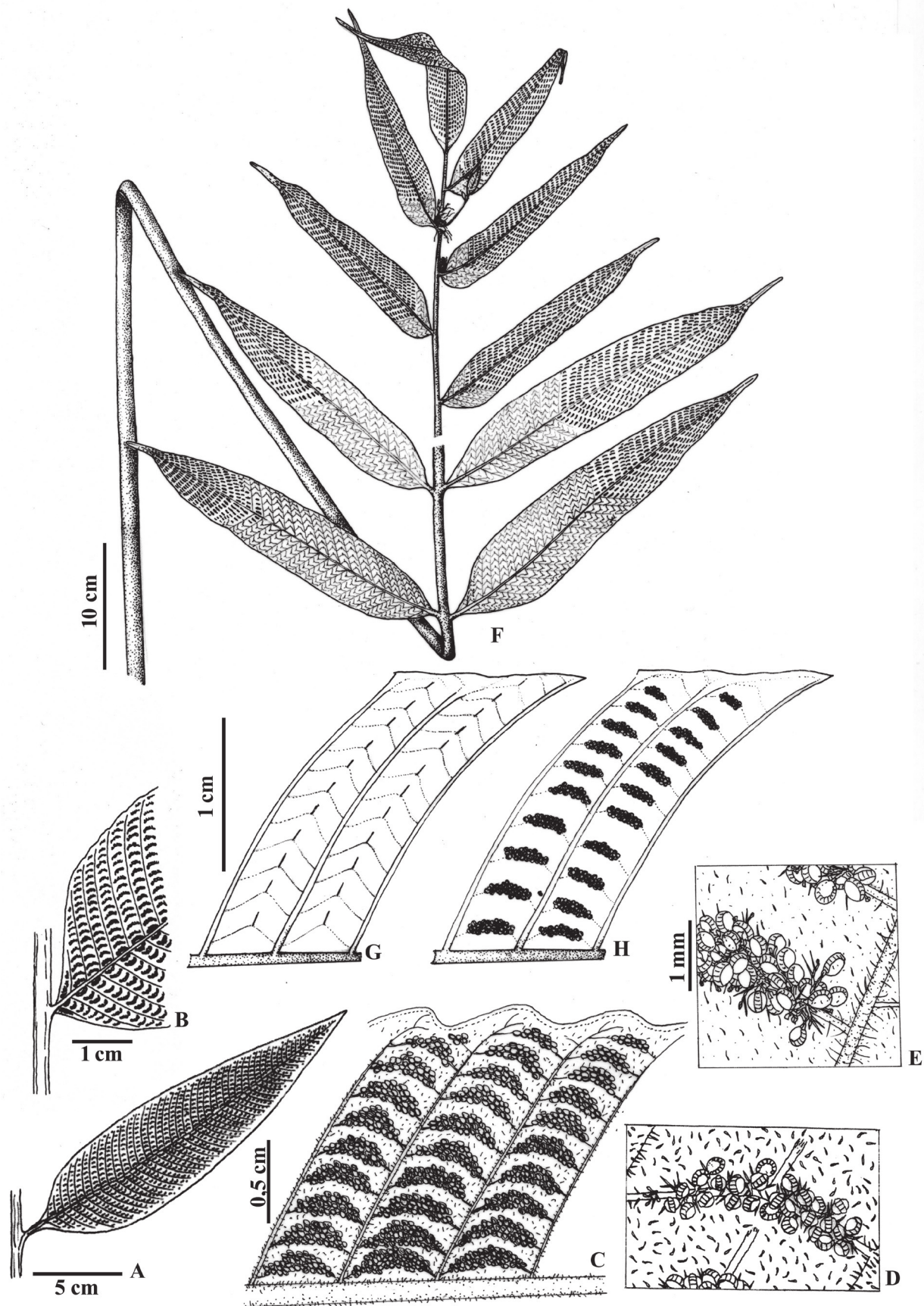


FIGURE 17. A–E. *Meniscium chrysodioides*. A. proximal fertile pinnae; B. base of median pinnae; C. detail of the fertile pinna showing oblong sori on the secondary veins; D. sori arcuate; E. detail of the veins with erect acicular hairs and sporangia with paraphyses. F–H. *M. cocleanum*. F. habit; G. detail of the sterile pinna showing the veins and glabrous costa; H. detail of the fertile pinna showing oblong sori (A–B. Barreto 2806, BHCB; C–E. Simabukuro 96, BHCB; F. Sytsma 1811, MO; G–H. Salino et al. 15361, BHCB).

Specimens examined:—**COSTA RICA.** **Alajuela:** 10°22'15" S, 84°42'10" W, 1000m, 8 October 1993, *Bello & Cruz 5387* (MO, US); *idem*, 10°56'55" S, 85°26'05" W, 900m, 18 April 2008, *Rojas 8572* (MO); *idem*, Alajuela-Upala, 700m, Falda sur Volcan Miravalles, 13 March 1982, *Chacón 038* (MO); **Guanacaste:** Cantón de La Cruz, Parque Nacional Guanacaste, 10°59'25" S, 85°25'40" W, 700m, 4 September 1996, *Rojas & Mata 2996* (UC); *idem*, 10°59'26" S, 85°25'40" W, 700m, 15 June 1991, *Ríos 373* (MO); *idem*, Cantón de Tilarán, 10°37'40" S, 84°59'45" W, 1050m, 26 July 1995, *Rojas & Rodríguez 2089* (MO, BM); *idem*, 10°57'55" S, 85°25'30" W, 650m, 12 April 2008, *Rojas & Grayum 8410* (MO); **Heredia:** Braulio Carilo National Park, 10°20' S, 84°10' W, 700m, 14 November 1986, *Haufler & Verduyn 6957* (MO).—**NICARAGUA.** **El Castillo:** *s. loc.*, 11°01' S, 84°12" W, 350m, 9 December 1998, *Rueda et al. 9689* (MO).—**PANAMA.** **Coclé:** El Cope, 8°40'13,4" S, 80°35'25,5" W, 725m, 07 July 2012, *Salino et al. 15361* (BHCB); *idem*, 900m, 19 January 1978, *Croat 44555* (UC, MO), *idem*, El Cope, 2400m, 18 October 1979, *Antonio 2188* (UC); *idem*, 8°38' N, 80°36' W, 1200m, 24 October 1980, *Sytsma 1811* (MO); *idem*, 5 April 1978, *Hammel 2430* (MO); *idem*, 3000m, *Hammel 2623* (MO); *idem*, 8°38' N, 80°34' W, 750m, 8 April 1988, *McPherson 12424* (MO); **Colón:** 08°49'18" S, 80°39'35" W, 255–292m, 28 November 2007, *van der Werff & McPherson 22165* (MO); **Veraguas:** 8°35' S, 81°05' W, 1100m, 15 July 1983, *Hamilton & Krager 3981* (UC); *idem*, 8°35' S, 8°05' W, 1000m, 20 February 1983, *Hamilton & Dressler 3069* (UC, MO); *idem*, 3200m, 3 April 1980, *Antonio 3958* (MO); *idem*, 450m, 31 August 1974, *Croat 27588* (MO); *idem*, 700m, 18 March 1973, *Croat 23188* (MO); *idem*, 700m, 24 July 1974, *Croat 25526* (MO).

7. *Meniscium consobrinum* (Maxon & C.V. Morton) Pichi Sermolli (1968: 180). (Figs 18; 19E–F)

Dryopteris consobrina Maxon & Morton (1938: 356). *Thelypteris consobrina* (Maxon & C.V. Morton) Tryon (1967: 5). *Cyclosorus consobrinus* (Maxon & C.V. Morton) Mazumdar & Mukhopadhyay (2014: 17). **Type:**—PERU. Junin, in a wooded valley near La Merced, ca. 700 m, 04 June 1929, *Killip & Smith 24087* (holotype US, [US1692123, US1464533, US1464534], isotype NY [two sheets]).

Rhizomes short-creeping, 1–1.8 cm diam., glabrous. **Fronds** monomorphic to subdimorphic; **sterile fronds** (99–)112–169 cm long, petiole 52–86 cm long, (3.3–)6.6–17.2 mm diam., lamina (34–)47–83 cm long, pinnae 22–35 × 4–5.5 cm; **fertile fronds** 112–174 cm long, petiole (49–)63.5–99 cm long, 0.8–1.5 cm diam., lamina 53.5–112 cm long, pinnae 13.3–20 × 2.7–4.6 cm. **Petioles** with brown basal portion and stramineous distal portion, glabrous or with hairs on the adaxial surface, hairs acicular, 0.2 mm long, sparse to moderate, curved, adpressed, tortuous, patent, scales absent. **Laminae** 1-pinnate, elliptic to oblong, chartaceous. **Rachises** pubescent on the adaxial surface, hairs rare to moderate, 0.1–0.2 mm long, acicular, tortuous, curved, adpressed, abaxial surface glabrous, scales absent. **Buds** present in the axil of the proximal pinnae. **Pinnae** in (7–)9–12 pairs, oblong, ovate or elliptic, sessile, the distal pinnae not reduced; **base** of the proximal pinnae narrowly rounded, short-cuneate, acute, median and distal pinnae generally subequilateral, basicopic side adnate, round, acroscopic side excavate, truncate; **margins** serrate throughout or at least near apex, with acicular, adpressed hairs; **apices** long-acuminate to caudate; **adaxial surfaces** glabrous or with moderate, 0.2 mm long, acicular, curved, adpressed hairs on the costa; **abaxial surfaces** glabrous between veins, the costa and veins sometimes glabrous or with sparse hairs on the sterile pinnae and moderate to dense hairs on the fertile pinnae, hairs 0.15–0.2 mm long, acicular, curved, adpressed, tortuous, glands absent, scales arachnoid, radiate, caducous, on all parts of the lamina and sporangia; **costal veins** in 6–10 pairs on sterile pinnae and 11–17 pairs on fertile pinnae per 3 cm; **secondary veins** straight or arcuate, untied to form an obtuse angle with one excurrent, free veinlet; **areoles** in 18–24 rows on the sterile pinnae and 12–22 rows on the fertile pinnae between the costa and margin. **Sori** lunulate, oblong to linear on the secondary veins, not (or rarely) confluent at maturity; **receptacle** glabrous, with sterile, aborted sporangia; **sporangia** glabrous. **Spores** echinulate-reticulate, with adpressed reticulum and dense echinate elements.

Distribution and habitat:—Bolivia, Ecuador, and Peru (Fig. 42). This species is uncommon and generally terrestrial in the interior of humid, semideciduous forests, on banks and along streams, at 200–1900 m.

Notes:—*Meniscium consobrinum* is one of three species of the genus that has serrate pinna margins. Among these, *M. lanceum* differs by the following: fronds usually dimorphic or subdimorphic, petiole densely pilose on both surfaces, rachis of fertile laminae with moderate or dense hairs on both surfaces, numerous pinnae in 12–24 pairs, fertile pinnae linear lanceolate, costa on abaxial surface with erect, tangled, moderate to dense hairs, and margins of fertile pinnae (sometimes) and sterile pinnae (almost always) entire, sinuous or crenate; whereas *M. consobrinum* has monomorphic fertile and sterile fronds, or the fertile fronds are slightly smaller and straighter than the sterile fronds, glabrous or glabrescent petiole, rachis of fertile fronds with moderate hairs only on the adaxial surface and glabrous on abaxial surface, fewer pinnae in 9–12 pairs, fertile pinnae oblong, elliptic or ovate, costa on abaxial surface of pinnae

glabrous or with curved, adpressed, sparse to moderate hairs, and margin of fertile and sterile pinnae always serrate from the base.

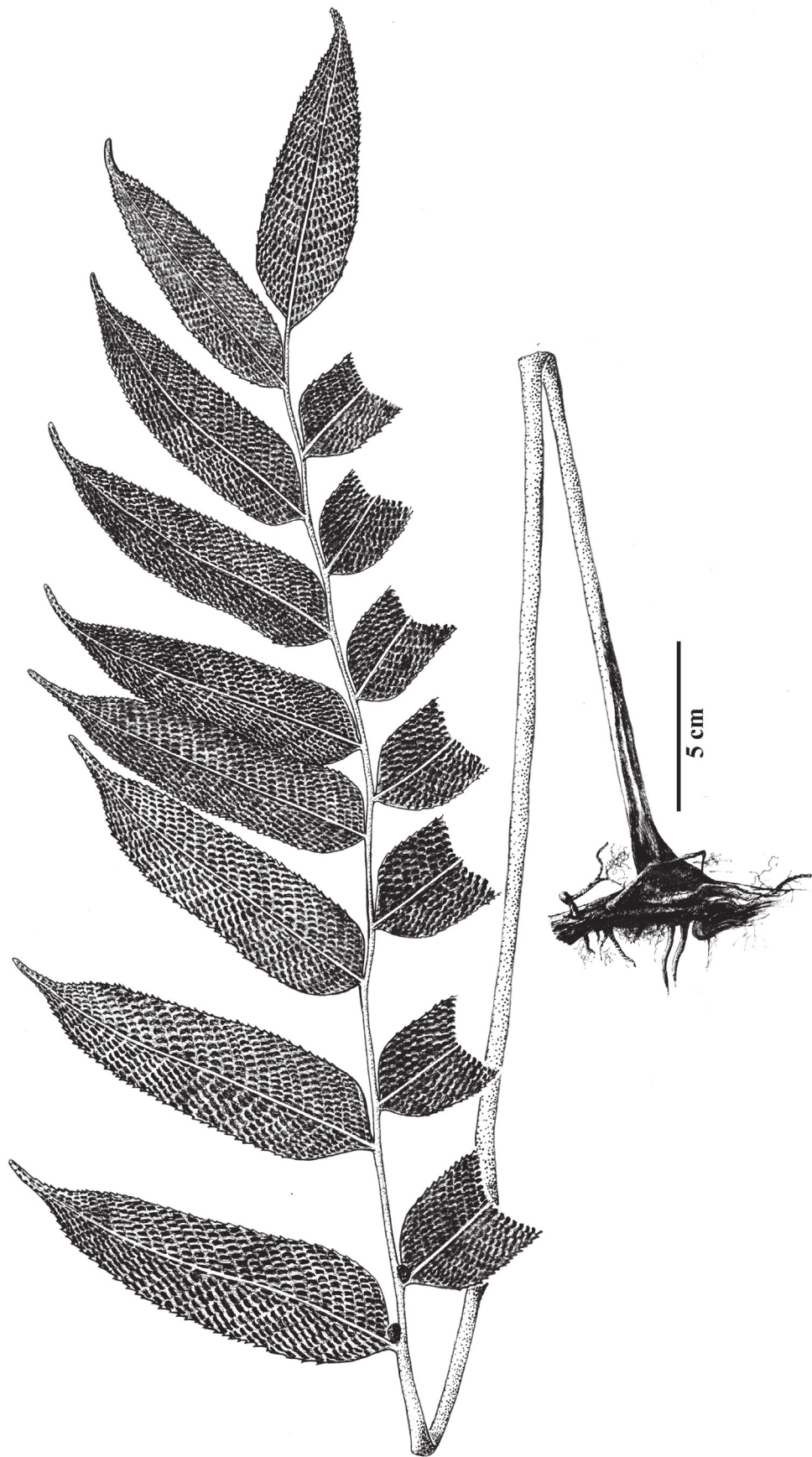


FIGURE 18. *Meniscium consobrinum*, habit showing pinnae with serrate margins and proximal pinnae with buds (*Mexia* 8315, UC).

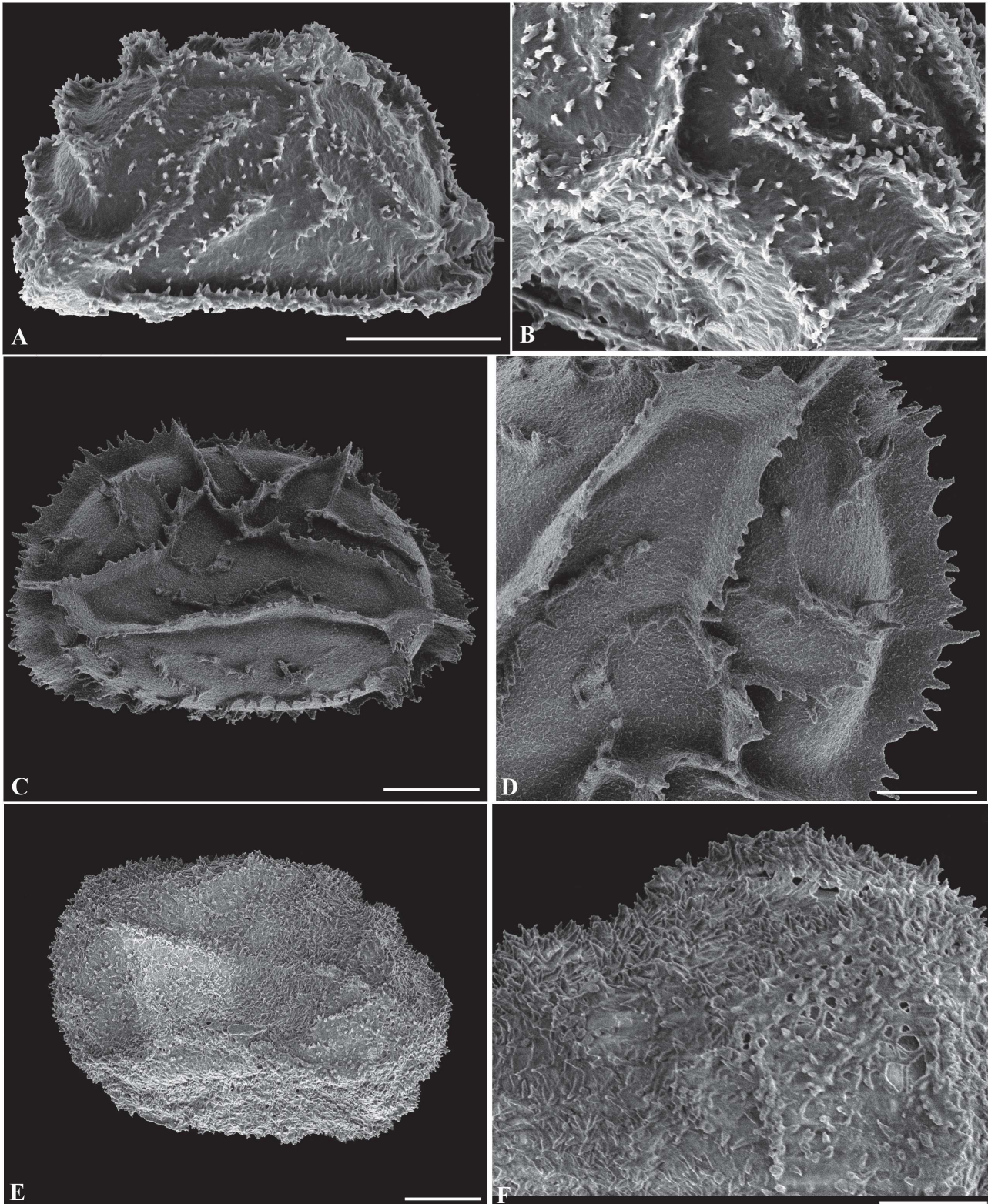


FIGURE 19. Spores of *Meniscium*. **A–B.** *Meniscium chrysodioides*, cristate-echinate spore. **C–D.** *M. cocleanum*, winged-fimbriate spore. **E–F.** *M. consobrinum*, echinulate-reticulate spore (**A–B.** Almeida et al. 2273, BHCB; **C–D.** Salino et al 15361, BHCB; **E–F.** Mexia 8315, UC). Scales bars: A, C, E = 10 μ m; B, D, F = 5 μ m.

Meniscium serratum is the other species mainly recognized by the serrate margin. It can be easily differentiated by the following: pinnae lanceolate to triangular-lanceolate, if short-oblong (9–12 cm long), then with cuspidate apex, distal pinnae gradually attenuate in the direction of the apex, proximal pinnae often petiolulate, abaxial surface of fertile pinnae pubescent on veins, costa and usually between the veins, with tortuous, patent, erect hairs, sori confluent

at maturity, and sporangia sometimes with acicular, tortuous hairs; whereas *M. consobrinum*, among other characters, has distal pinnae that are not reduced, sessile proximal pinnae, sori generally not confluent at maturity, and sporangia always glabrous (see additional comments under *M. lanceum*).

Specimens examined:—**BOLIVIA. Cochabamba:** Carrasco, Projecto Valle del Sacta, 241 km of Santa Cruz, 17°12' S, 64°43' W, 290m, 8 July 1989, *Fay & Fay 2293* (MO, US); **Santa Cruz:** Florida, 4 km NE of Bermejo, 19°01' S, 63°36' W, 1070m, 27 July 2003, *Sundue 736* (NY).—**ECUADOR. Morona-Santiago:** Macas, in vicinity of the town of Macas, 78°08' W, 2°19' S, 1100m, 3 July 1993, *Fay & Fay 3943* (NY); **Napo:** 0°54' N, 76°13' W, 200m, 24 February 1998, *Tuomisto & Ruokolainen 11486* (UC).—**PERU. Ayacucho:** Río Apumirac Valley, near kimpitiriki, 400m, 10 May 1929, *Killip & Smith 22945* (F, US); **Chanchamayo:** 25 July 1911, *Schunke 3* (BM); *idem*, La Merced, 700m, 1907, *Rosenstock 17* (GH); **Huánuco:** 22 March 1979, *Hodge s.n.* (UC, GH); *idem*, 792m, 19 October 1936, *Mexia 8315* (B, F, K, GH, MO, UC, US); Leoncio Prado?, Tingo Maria, Pucallpa, 1510m, 1971, *Ellenberg 3818* (GH); **Ica:** Huacachi, estación near muna, 0m, 20 May 1923, *Macbride 4170* (US); *idem*, Estacion near Muna, 1980m, 20 May 1923, *Macbride 4170* (F); **Junín:** La Merced, 700m, 20 May 1929, *Killip & Smith 23514* (US); **Madre de Dios:** Manu, 11°55' S, 71°19' W, 400m, 16 October 1998, *Tuomisto et al. 13296* (UC); **Pasco:** 10°04'02" S, 0°75'33" W, 1200m, 2 June 2004, *Rojas et al. 2555* (MO); *idem*, 10°11' S, 75°34' W, 1225m, 8 April 2003, *Monteagudo et al. 4893* (MO); *idem*, 10°11'00" S, 0°75'34" W, 1100m, 13 August 2003, *Rojas et al. 1276* (MO); *idem*, 10°11'00" S, 0°75'34" W, 1100m, 9 November 2004, *Mellado 2186* (MO); *idem*, 10°11'11" S, 0°75'34" W, 1130m, 13 November 2004, *Mellado 2245* (MO); *idem*, 10°28'40" S, 75°06'00" W, 670m, 25 February 2004, *Mellado 0781* (MO); *idem*, 10°38'00" S, 0°75'10" W, 1280m, 17 September 2003, *Perea et al. 0318* (MO); *idem*, 10°45' S, 74°23' W, 1200m, 26 September 1983, *Smith 5261* (K, MO, UC); **San Martín:** Arroyo Bravo about 40km from Tingo Maria on highw, 1250m, 1 November 1949, *Allard 22064* (US); *idem*, Chazuta, Rio Huallaga, 260m, March 1935, *Klug 3970* (BM, F, K, NY, US); *idem*, Huallaga, Saposoa, 6°44,09' S, 77°18,35' W, 950m, 20 August 2000, *Quipuscoa et al. 2238* (UC, F); *s.loc.*, Cerro de Campana, *Spruce, R. 4644?* (K); *idem*, *Soukup 1645* (F); *idem*, 1833, *Mettenius s.n.* (K).

8. *Meniscium delicatum* R.S. Fernandes & Salino (2016: 176). (Figs 20A–C; 40E–F).

Type:—BRAZIL. Piauí: Caracol, Parque Nacional da Serra das Confusões, gruta do riacho do boi, 9°13'26" S, 43°14'06" W, 561 m, 19 July 2012, *R.S. Fernandes 970, M.S. Lopes, L.C.J. França & G.M. Saraiva* (holotype BHCBI, isotype UC!).

Plants rupicolous or terrestrial. **Rhizomes** short-creeping, (0.1–)0.6–1.3 cm diam., glabrous. **Fronde** monomorphic, (10–)25–138 cm long. **Petioles** 20–57 cm long and (0.8–)1.2–4.5 mm in diameter at bases, with proximal portion castaneous and distally greenish, glabrous, glabrescent, with sparse glandular hairs, or scaly at bases with a few irregular to elliptic-lanceolate, light-brown to yellowish, adpressed to patent scales. **Laminae** (22–)37–84 cm long, 1-pinnate, broadly ovate to deltate, membranaceous. **Rachises** with yellowish, sessile, glandular hairs. **Buds** absent. **Pinnae** (1–)4–10 pairs, median pinnae (6–)8–24(–34) × 1.5–2.8 cm, linear-lanceolate, short-petiolulate (0.8–3.3 mm), proximal pinnae sessile, distal pinnae sessile and slightly shorter; pinnae bases not decurrent, proximal pinnae truncate to rounded with two small auricles, these most prominent on the acroscopic side, distal pinnae with obtuse to slightly asymmetrical bases, sometimes auriculate on both sides, basiscopic side acute to rounded, acroscopic side truncate and parallel to rachis; pinna margins undulate to crenulate, glabrous or with sparse acicular hairs; pinna apices long-acuminate; adaxial surfaces of costae, veins, and sometimes laminar surfaces between veins with sparse sessile to short-stalked glandular hairs, rarely with acicular hairs up to 0.15 mm; abaxial surfaces of costae, veins, and laminar surfaces between veins with sessile to short-stalked, yellowish glandular hairs, and with acicular hairs up to 0.15 mm; venation completely anastomosing, forming (4–)6–8 rows of areoles between costa and pinna margins, veins arising from costae 9–14 per 3 cm; cross-veins subsigmoid (sterile) or arcuate (fertile) uniting at an obtuse angle, giving rise to a free excurrent veinlet. **Sori** roundish to oblong, on the cross-veins, uniseriate between costal veins, not confluent with adjacent sori at maturity, **receptacles** with sporangiasters bearing acicular hairs, **sporangia** glabrous or bearing septate paraphyses from sporangial stalks. **Spores** ca. 40 × 30 µm, with papillate surfaces, papillae dense.

Distribution and habitat:—Northern, northeastern, and central Brazil, in the states of Amazonas, Mato Grosso do Sul, Goiás, Maranhão and Piauí (Fig. 43). *Meniscium delicatum* is usually an arching, pendent herb growing in shaded and humid sites on sandstone cliffs, at 260–560 m.

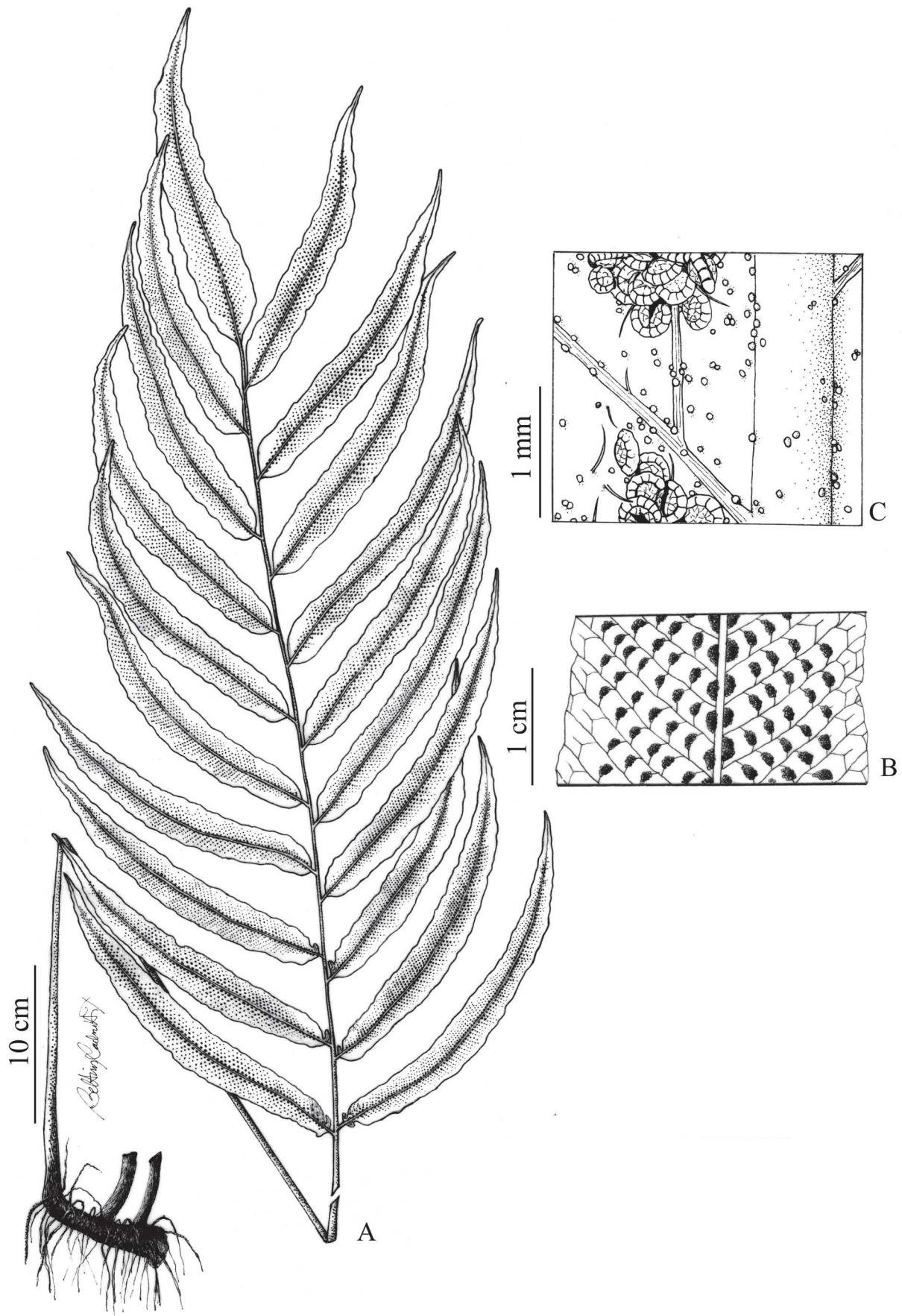


FIGURE 20. *Meniscium delicatum*. **A.** habit; **B.** detail of the abaxial surface of fertile pinna showing oblong sori on cross-veins; **C.** detail of the abaxial surface of fertile pinna showing acicular and glandular hairs (Fernandes 779, BHCB). Modified from: Fernandes & Salino 2016: 177, fig 1A–C.

Notes:—*Meniscium delicatum* is most similar to *M. longifolium* and *M. maxonianum* by having linear lanceolate pinnae and glandular hairs on the abaxial laminar surfaces. However, *M. delicatum* differs by having membranaceous laminae, bases of proximal pinnae (sometimes also middle and distal pinnae) truncate to rounded, sessile to short-stalked, and with two short auricles on both sides of the pinna bases, (4–)6–8 rows of areoles between costae and pinna margins, and main costal veins 9–14 per 3 cm, sporangia glabrous or bearing septate paraphyses (Fig 20A–C). *Meniscium longifolium* has chartaceous laminae, bases of proximal pinnae cuneate, petiolulate, and without auricles, 7–13 rows of areoles between costae and pinna margins, and main costal veins 8–19(–22) per 3 cm, besides the acicular hairs and dense glandular hairs on abaxial surfaces of the laminae and on sporangial pedicels. *Meniscium maxonianum* has chartaceous laminae, bases of the proximal pinnae cuneate and lacking auricles, and 9–13(–15) rows of areoles between costae and pinna margins (Fernandes & Salino, 2016). Maxon & Morton (1938) identified the material *J.W.H. Traill 1402* (K!, P!) as *Dryopteris dispar* Maxon & Morton (1938: 364). However, this name is synonymous with *Meniscium angustifolium* Willdenow (1810: 133) (Fernandes & Salino 2016).

Additional specimens examined:—**BRAZIL. Amazonas:** “Cliff on E bank of R. Mauhes near the rapids,” 20 April 1874, *Traill 1402* (K, P). **Goiás:** Caldas Novas, 500 m, 3 January 1980, *Mizoguchi 1371* (MO, NY); **Mato Grosso do Sul:** Aquidauana, Vale da Hidrelétrica, 20°28'15"S, 55°47'13"W, 18 June 2005, *Silva et al. 32* (BHCB); **Maranhão:** Carolina, PARNA Chapada das Mesas, Cachoeira São Romão, ca. 7°1'17,2"S, 47°2'27,8"W, 258 m, 13 March 2017, *Silva & Pietrobom 65* (CCAA/UFMA); **Piauí:** Caracol, Parque Nacional da Serra das Confusões, 09°13'07"S, 43°29'23"W, 561 m, 9 December 2011, *Siqueira-Filho 2638 et al.* (BHCB); *idem*, gruta do riacho do boi, 9°13'26"S, 43°14'06"W, 19 July 2012, *Fernandes 779 et al.* (BHCB, UC), *idem*, *Fernandes 976 et al.* (BHCB).

9. *Meniscium divergens* R.S. Fernandes & Salino (2014: 2). (Figs 21A–D; 24A–B)

Type:—GUYANA. Potaro-Siparuni Region: Pakaraima Mts, Mt. Wokomung top slope 0.5–2 km NW from northern escarpment, 05°04'N, 59°53'W, 1300–1400 m, 13 November 1993, *T.W. Henkel et al. 4368* (holotype NY, isotypes NY, US).

Plants rupicolous or terrestrial. **Rhizomes** short-creeping. **Fronds** dimorphic, the fertile with longer petioles and pinnae smaller and narrower than sterile ones; sterile fronds 45–97 cm long, petiole 21–42 cm long and 2.5–3.8 mm in diameter at base, laminae 24–53 cm long, pinnae 15.0–21.5 × 2.4–3.6 cm, oblong-lanceolate; fertile fronds 73–105 cm long, petioles 53–61 cm long and 2.3–3.6 mm in diameter, at base laminae 20–44 cm long, pinnae 10.5–17 × 1.0–1.8 cm, linear lanceolate. **Petiole** brown at base, stramineous to greenish further up, glabrous. **Laminae** 1-pinnate, membranaceous. **Rachis** glabrous. **Buds** absent. **Pinnae** 5–6 pairs, short-petiolulate (1.6–3.1 mm long) to sessile in the distal pinnae, base rounded to cuneate in the basal pinnae, and asymmetric (basiscopic side rounded and acroscopic side excavate and parallel to the rachis) in the distal pinnae, margin entire or undulate, apex acuminate to caudate; adaxial surface of costae glabrous or sparsely pubescent, with acicular to ciliform hairs mostly 0.2–0.3 mm long, veins and laminar surface between the veins glabrous, abaxial surface of costae, veins and laminar surface between the veins glabrous; venation regularly anastomosing, forming 5–6 areole rows in sterile pinnae and 3–4 areole rows in fertile pinnae between costae and pinnae margin, veins arising from costae of fertile pinnae ca. 10–12 and sterile 8–9 per 3 cm; cross-veins arcuate (fertile) or subsinuate (sterile), uniting at an obtuse (fertile) or acute (sterile) angle, giving rise to a free excurrent veinlet. **Sori** oblong, on the cross-veins, not confluent at maturity, **receptacle** setose with acicular hairs; **sporangial** stalks glabrous or with acicular hairs to 0.3 mm long. **Spores** monolete, ellipsoidal, with echinulate surface with low, dense echinulae.

Distribution and Habitat:—*Meniscium divergens* is endemic to the Guayana Shield, (Fig. 42) with collections only from the Potaro-Siparuni Region (Guyana), where it apparently grows inside or along the edges of cloud forests in soils with thick layers of organic matter on brown sand and with occasional sandstone outcrops at 700–1400 m.

Notes:—*Meniscium divergens* is most similar to *M. nesioticum* (Maxon & Morton) Pichi Sermolli (1968: 180), with which it shares dimorphic fronds, and *M. cocleanum* (Smith & Lellinger 1985: 918) R.S.Fernandes & Salino, with which it shares pinnae that are glabrous abaxially. It differs from these species mainly by the presence of 5–6 pinna pairs, 5–6 rows of areoles between the costa and pinna margin in sterile pinnae, and 3–4 areole rows in fertile pinnae, sori on the cross-veins, sori not confluent at maturity, and sporangial stalks with hairs (Fernandes *et al.*, 2014).

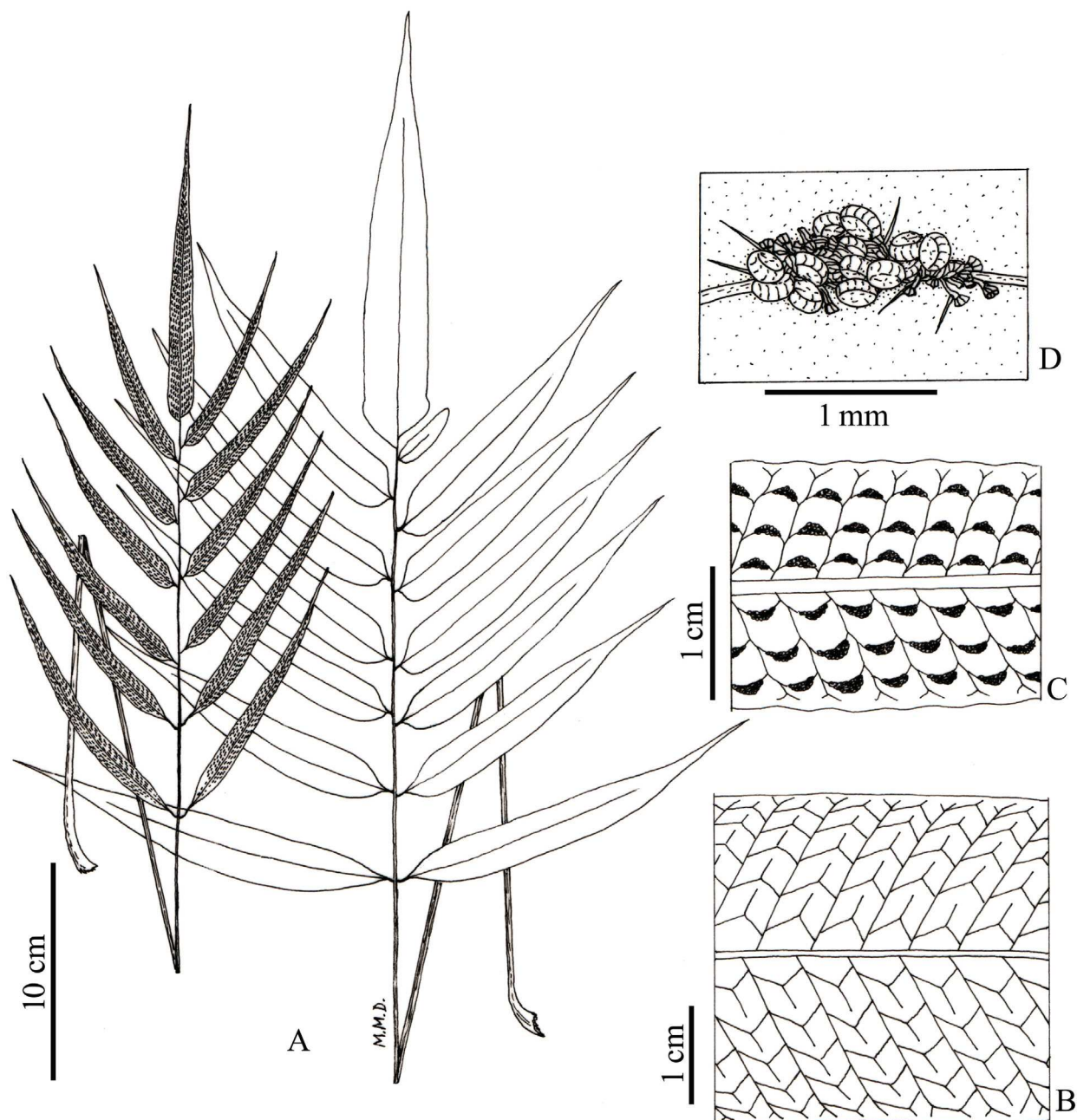


FIGURE 21. *Meniscium divergens*. **A.** habit; **B.** detail of the abaxial surface of sterile pinnae showing venation; **C.** detail of the abaxial surface of fertile pinnae showing sori oblong on the cross-veins; **D.** detail of a sorus showing acicular hairs (A. Clarke *et al.* 9677, NY; B–D. Henkel *et al.* 4368, NY). Modified from: Fernandes *et al.* 2014: 2, fig 1).

In the genus *Meniscium*, only three species have dimorphic fronds—*Meniscium macrophyllum* Kunze (1839: 44), *M. nesioticum*, and *M. divergens*—and they all occur in Guyana. *Meniscium macrophyllum* and *M. nesioticum* are distinct from the new species in having acrostichoid sori and pilose abaxial surfaces of costae and veins. In addition, *M. macrophyllum* has sterile pinnae 5.7–7.8 cm wide, fertile pinnae 2.7–3.2 cm wide, and oblong to elliptic pinnae. *Meniscium nesioticum* has 7–11 pinna pairs, fertile pinnae with 6–13 areole rows between costae and margin, fertile lamina with curved hairs on abaxial side of costae, sori usually appearing to cover the lamina (acrostichoid) and sporangia glabrous. In comparison, *M. divergens* has sterile pinnae 2.4–3.6 cm wide, fertile pinnae 1.0–1.8 cm wide, and linear–lanceolate to oblong pinnae, as well as 5–6 pinna pairs, fertile pinnae with 3–4 areole rows between costa and margin, fertile laminae glabrous abaxially, sori oblong, on the cross-veins, not confluent at maturity (Fig. 21A–D), and sporangia stalks with acicular hairs (Fernandes *et al.*, 2014). Although with a distinct geographical distribution

(Panama, Costa Rica and Nicaragua), *Meniscium cocleanum* is most similar to *M. divergens* in having both sides of laminar surface between the veins glabrous but differs by the presence of buds on the axils of the distal pinnae, 7–10 areole rows between costa and margin in fertile pinnae, and glabrous sporangia. The spores have not been used to distinguish species within *Meniscium* in the past. However, they provide good characters, not only at the generic level (Tryon & Tryon 1982) but also for separating closely related species. Spores are echinulate in *M. divergens* (24A–C), cristate-reticulate in *M. nesioticum* (Fig. 4E–F), and winged in *M. cocleanum* (Fig. 4A–B) (Fernandes *et al.*, 2014).

Specimens examined :—**GUYANA. Potaro-Siparuni Region**: Mt. Ayanganna, east face, base of first of three escarpments. 05°20'04"N, 59°55'30"W, 712 m, 4 June 2001, *Clarke et al.* 8961 (NY, US); same locality, 30 June 2001, *Clarke et al.* 9677 (NY, US).

10. *Meniscium falcatum* Liebmann (1849: 183). (Figs 22; 24C–D)

Dryopteris falcata (Liebm.) Christensen (1913: 270). *Phegopteris falcata* (Liebm.) Mettenius, (1859: 23). *Thelypteris falcata* (Liebm.) Tryon (1967: 6). *Cyclosorus falcatus* (Liebm.) Mazumdar & Mukhopadhyay (2014: 20). **Type**:—MEXICO. Oaxaca. Distr. Chinantla, Near Lacoba, Distr. Chinantla, Puebla, 600–750 m, *s.d.*, *Liebmann 680* (lectotype designated by Smith, Flora of Chiapas 1981: 234, C [C10014114]).

=*Meniscium jurgensenii* Fée (1852: 223). *Dryopteris jurgensenii* (Fée) Maxon & Morton (1938: 360). **Type**:—MEXICO. Sierra San Pedro Nolasco, Talea, etc., 1843–1844, *Jürgensen 917* (lectotype P [P00644675], here designated; isolectotype K [K000633674 in part]).

=*Dryopteris sorbifolia* (Jacq.) Hieronymus var. *confertivenosa* Hieronymus, Hedwigia (1907: 350). **Type**:—ECUADOR. Between Honda and Bogotá, *s.d.*, *Stübel 392* (holotype B; isotype US-fragment).

Rhizomes short-creeping, 0.7–1.3(–3.0) cm diam., glabrous or with caducous, lanceolate, dark brown, lustrous, subclathrate scales. **Fronds** (46–60–)82–252 cm long, monomorphic. **Petioles** (20–31.5–)57–132 cm long, (0.4–)1.4–2 mm diam., with brown basal portion and stramineous to reddish-brown distal portion, glabrous or rarely with scales on the basal portion equal to those on the rhizome. **Laminae** (young 26–34–)41–124(–144) cm long, 1-pinnate, ovate to lanceolate, membranaceous to chartaceous. **Rachises** with narrow, shallow sulcus, usually glabrous or rarely with 0.1–0.15 mm long, acicular, usually curved hairs in the adaxial sulcus, young leaves with glands in the sulcus. **Buds** absent. **Pinnae** (16–)20–41 × 1.2–2(–3.6–3.9) cm, in (5–)8–18 pairs, linear-lanceolate to slightly falcate, proximal pinnae petiolulate, petiolule (0.3–)0.8–3 cm long, medial and distal pinnae sessile, not reduced; **bases** decurrent on petiolule, basal pinnae cuneate to slightly acuminate, not auriculate, distal pinnae acute or slightly asymmetric with basicopic side round and acroscopic side excavate and parallel to the rachis; **margins** entire to undulate, or crenate at least towards the apex, glabrous; **apices** long-acuminate; **adaxial surfaces** glabrous or usually with sparse to moderate hairs on the costa, hairs equal to those on the rachis, glands caducous; **abaxial surfaces** on the costae and veins with sparse to moderate, acicular, 0.1–0.25 mm long, erect hairs and usually yellow, glandular hairs, laminar surface between veins glabrous or often with round, stalked or sessile, caducous, glandular hairs, rarely with arachnoid scales and small, adpressed, scale-like structures; **costal veins** 8–14(–15) per 3 cm; **secondary veins** straight or arcuate on fertile pinnae, arcuate to subsigmoid on sterile pinnae, united to form a straight or obtuse angle, with one, excurrent, free veinlet that often completely divides areole; **areoles** in 8–12(–15) rows between costa and margin, nearly as long as wide, forming a rectangle. **Sori** oblong to arcuate, uniseriate between the costal veins, not confluent at maturity; **receptacles** glabrous or with filiform, glandular sporangiaster; **sporangia** glabrous or frequently with septate paraphyses with glands on the septa. **Spores** extremely cristate-undulate, crests tall, thick and perforated with papillae or echinate elements (sometimes surface smooth and perforated).

Distribution and habitat:—Belize, Bolivia, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, and Venezuela (Fig. 44). This species is terrestrial and very common in the interior of forests. It grows pendent on humid banks and between rocks along the margins of streams or trails in secondary forest, at 10–2400 m.

Notes:—*Meniscium falcatum* is variable, mainly in size of the fronds as well as the presence of glands and hairs on the lamina and glands on the sporangia. However, long, linear-lanceolate to slightly falcate pinnae, long-petiolulate proximal pinnae and short, erect hairs on the costae of all pinnae are constant characters.

The glandular hairs on the abaxial lamina surface and glandular paraphyses on the sporangia had not been described for *M. falcatum*, maybe because these structures are caducous and sometimes inconspicuous. In more recently collected specimens and those not overheated during the drying process, the glands of the sporangia are yellow and conspicuous. In other specimens the glands are dark brown to black and can be confused with spores. In the Flora of Peru, Smith (1992) described the sporangia as glabrous. However, the specimens cited (*Killip & Smith 25570* [NY, US], *Killip*

& Smith 23890 [F, NY, US]) are *M. pachysorum* (Hieron.) R.S. Fernandes & Salino, which indeed has glabrous sporangia. *Meniscium falcatum* is not a common species in Peru; the only material examined (*Monteagudo & Francis 5318* [MO, NY, UC]) has sporangia with glandular paraphyses and acicular hairs on the receptacle.

Meniscium pachysorum and *M. maxonianum* are similar to *M. falcatum* because of the lanceolate, long-petiolate pinnae, glandular hairs on the abaxial surface of the lamina and paraphyses that are sometimes on the sporangia. *Meniscium maxonianum* differs by the abaxial surface of the pinnae with persistent and conspicuous glandular hairs, whereas in *M. falcatum* the glandular hairs, when present, are inconspicuous and caducous, and there are acicular hairs on the costae of the abaxial surface and sometimes on the receptacle.

Meniscium pachysorum is a larger plant with the following characters: pinnae in 15–28(–40) pairs, lamina chartaceous to subcoriaceous, rachis with one deep sulcus, pinnae articulate to prominent rachis, pinna base abruptly acute, not decurrent on petiolule, proximal and medial pinnae long-petiolate, receptacle rarely with filiform sporangiaster and glabrous sporangia. Although it also has large fronds, *M. falcatum* only has up to 18 pinna pairs, a membranaceous to chartaceous lamina, rachis with narrow, shallow sulcus, petiolulate pinnae that are not articulated to the rachis, base of proximal pinnae cuneate to slightly acuminate and decurrent on the petiolule, receptacle glabrous or with filiform and glandular sporangiaster, and sporangia with glandular paraphyses with caducous glands.

The plants from Mexico have longer, straighter and more falcate pinnae, with crenate margins; however, the remaining characters, such as hairs on the costa and long petiole, are constant.

It was necessary to clarify the type material of *Meniscium jurgensenii* Fée because Smith (1992) commented that he did not see or did not find the type at P. However, two fragments of *Jurgensen 917* were found, one at P and another at K. Thus, the material at P was selected as the lectotype.

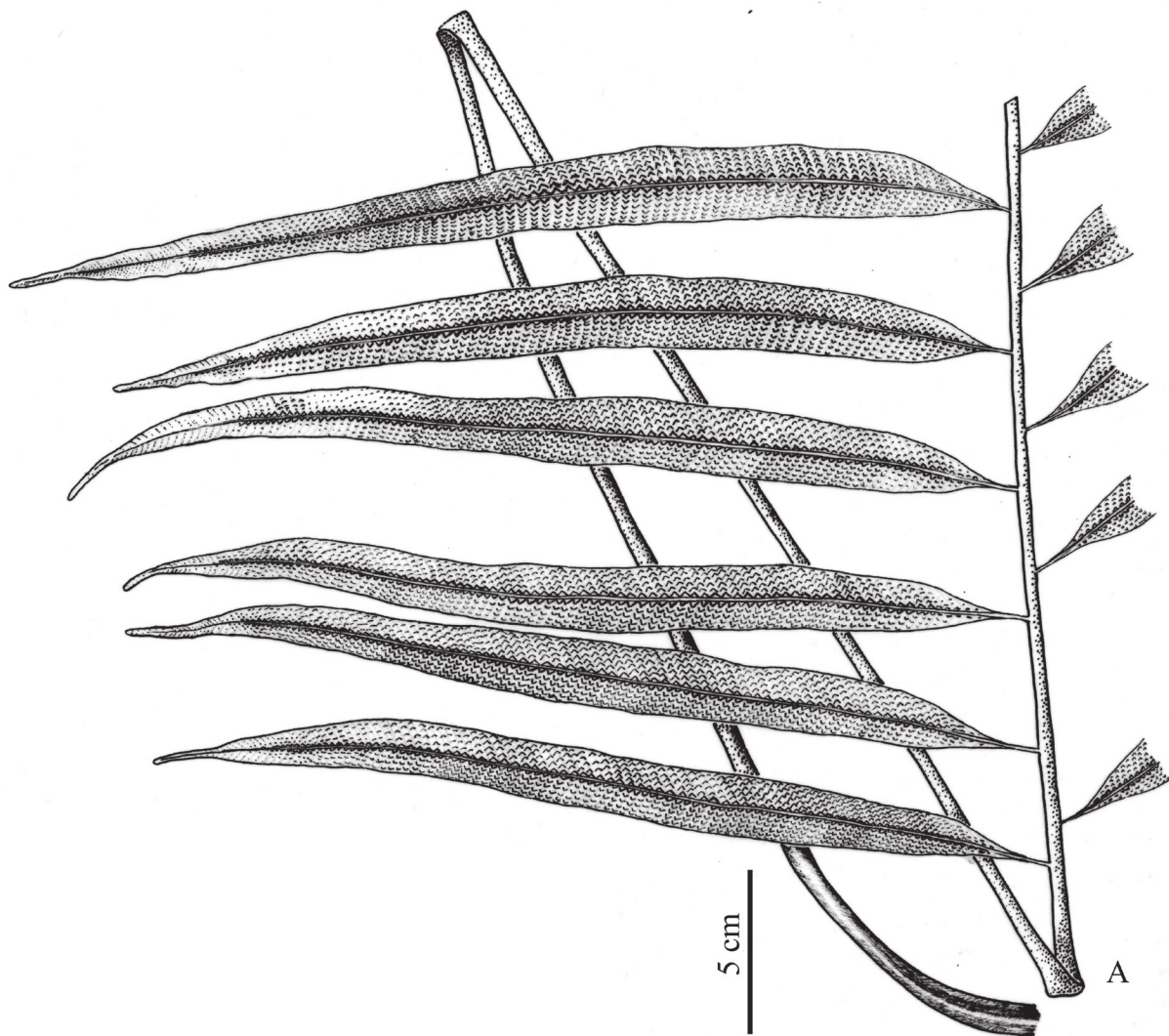


FIGURE 22. *Meniscium falcatum*, fertile frond (*Grayum et al. 4632, UC*).

Specimens examined:—**BELIZE.** **Cayo:** Maya Mountains: Smokey Branch, 800m, 19 March 1994, *Monro. & Helgason 255* (BM); *idem*, 26 June 1973, *Dwyer 11421* (NY, UC); *idem*, Maya Mountains, Smokey Branch, 16°33'45" S, 89°14'00" W, 800m, 19 March 1994, *Monro & Helgason 253* (BM); Stann Creek: Cockscomb Basin. Jaguar Preserv, 10 km W of Maya Center, off southern highway, 16°45' S, 88°35' W, 400m, 23 May 1900, *Balick et al. 2693* (NY, US); *s.loc.*, 17°03' S, 88°28' W, 246m, 9 May 1994, *Bruce & Miller 2620* (UC); **Toledo:** Crique Sardo, 25 August 1966, *Hedger 243* (BM).—**BOLIVIA.** **La Paz:** Abel Iturralde, 13°38' S, 68°26' W, 300m, 15 August 1997, *Kessler et al. 11197* (UC); *idem*, Franz Tamayo, 14°36' S, 68°55' W, 1660m, 12 November 2001, *Jimenez & Gallegos 1047* (UC); *idem*, J. Bautista Saavedra M., 15°02' S, 68°29' W, 1450m, 5 June 1997, *Kessler et al. 9703* (UC); *idem*, Larecaja, Copacabana, 850m, 15 November 1939, *without collector, s.n.* (UC); *idem*, Nor Yungas, 16°11' S, 67°53' W, 1550m, 23 August 2000, *Eberhardt et al. 236* (UC); *idem*, Nor-Yungas, Puerto Linares, 1410m, 10 March 1979, *Beck 442* (UC).—**COLOMBIA.** **Antioquia:** 1030m, 8 November 1986, *Callejas et al. 2320* (UC); *idem*, 7°13' S, 75°03' W, 400m, 3 December 1974, *Denslow 2523* (US); *idem*, Anorí, Vereda o la Concha abajo, quebradas El Salto y El, 7°17'01" S, 75°05'17" W, 720m, 16 January 2004, *Rodríguez et al. 4450* (NY); *idem*, Gomez Plata-Yolombó, Sector La Cancana, margem izquierda del Río Porce, 1030m, 8 November 1986, *Callejas et al. 2320* (NY); *idem*, San Carlos, Corregimiento El Jordán, Vereda Santa Barbara, 890m, 12 March 1988, *Escobar & Velásquez 8347* (NY); *idem*, San Luis, 16 km. S.O. de las partidas a San Luis, sobre la, 74°50' W, 6°00' S, 800m, 23 June 1987, *Callejas et al. 4232* (NY); Bay of Chore, November 1847, *Lehmann s.n.* (K); Bay of Utría, January 1848, *Lehmann s.n.* (K); Boyacá: Carretera Chiquinquirá a Pauna, 1900m, 13 October 1967, *Mejía et al. 3534* (NY); *idem*, Carretera Pauna a Otro Mundo, 1350m, 16 October 1967, *Mejía et al. 3654* (NY); **Cauca:** Guapi, Parque Nacional Isla Gorgona camino a la placa, 2°59' S, 78°11' W, 15 June 1987, *Estrada et al. 320* (NY); Island Gorgona, 11 January 1837, *Barclay 899* (BM, F, US); **Chocó:** Área of Baudó, 11 February 1967, *Fuchs & Zanella 21997* (US); *idem*, 1.5–2.5 km W of Istmina along the road to Pie de P, 75m, 23 February 1971, *Lellinger & de la Sota 436* (US); *idem*, Andagoya, 70m, 20 April 1939, *Killip 35056* (US); *idem*, Mojarras de Tadó, 8 km E. of Istmina., 150m, 20 February 1971, *Lellinger & de la Sota 407* (BM, US); *idem*, near Punta San Francisco Solano, 27 January 1971, *de la Sota & Lellinger 91* (BM, US); *idem*, Río El Salto, 9km W of Andagoya, 75m, 23 February 1971, *Lellinger & de la Sota 451* (US); *idem*, Río Munguidó, alrededores de Altagracia, 40m, 3 May 1975, *Forero et al. 1488* (NY); *idem*, rio Serrano, 4–6 kms arriba de Guayabal, 50m, 28 April 1975, *Forero et al. 1308* (GH); Colorado north shore of Buenaventura Bay, 3 June 1944, *Killip & Cuatrecasas 38723* (US). **Nariño:** East side of Gorgona Island, 11 February 1939, *Killip & Garcia 33213* (BM, S, US); *idem*, Ricaurte, 2°01' S, 78°13'00" W, 715m, 6 January 1996, *Ramírez & González 9443* (UC); *idem*, Tumaco, 1°18' S, 78°30' W, 245m, 18 May 1996, *Ramírez et al. 9858* (UC); Puerto Berrio, between Carare and Magdalena, 100m, 20 June 1935, *Haught 1842* (US, NY); Sur de Santander: Vicinity of Puerto Berrio, between Carare and Magdalena, 100m, 20 July 1935, *Haught 1842* (BM, K); **Valle del Calca:** Costa del Pacífico, Buenaventura, 20m, 15 May 1946, *Cuatrecasas 21031* (F, US); *idem*, Córdoba, 50m, 17 February 1939, *Killip & Garcia 33377* (BM, US); *s.loc.*, *Lehmann 5034* (K); *idem*, 1020m, 11 March 1980, *Forero et al. 7171* (MO); *idem*, 1932, *Mutis 3299* (US).—**COSTA RICA.** **Alajuela:** forests along Río San Rafael, near springs, 500m, 18 February 1966, *Molina 17421* (US); **Puntarenas:** Buenos Aires, February 1892, *Pittier & Durand Th. 4839* (BM, P); Cartago, Valley of Río Reventazon, 9km, 650m, 30 June 1949, *Holm & Iltis 202* (US); *idem*, 9°04'30" S, 83°05'00" W, 1100m, 29 March 1984, *Davidse & Herrera 26302* (UC); **Heredia:** 10°28' S, 84°04' W, 80m, 21 January 1986, *Smith et al. 1816* (UC); *idem*, 100m, 10 December 1980, *Hammel 10731* (US); *idem*, Finca El Bejuco, 10°27' S, 84°04' W, 100m, 14 December 1984, *Grayum et al. 4632* (UC); *idem*, 1.4 km NW of Puerto Viejo, 75m, 15 June 1966, *Anderson & Mori 34* (F); *idem*, Finca La Selva, 100m, 6 April 1980, *Grayum 2757* (NY, CAS, F); *idem*, W of the southwest sector of new properte, La Selv, 24 May 1982, *Hammel 12469* (F); *idem*, Buenos Aires: February 1892, *Pittier 245* (US); *idem*, Cantón de Golfito, 8°39' S, 83°09' W, 300m, 1 February 1993, *Grayum et al. 10102* (UC); *idem*, Refugio de Vida Silvestre Boracayán, 9°13' S, 83°45' W, 500m, 30 May 2003, *Clark et al. 422* (NY); San Carlos, 200m, April 1910, *Brade 485* (B, NY); **Limón:** 9°30'05" N, 82°58'05" W, 80m, 11 April 1996, *Gallardo et al. 350* (UC); *idem*, Talamanca, Alto Lari, trail down to the river, 9°25'10" S, 83°03'05" W, 200m, 4 March 1992, *Bittner 1418* (B); *idem*, Braulio Carrillo National Park, March 1985, *Barcock, J. 487* (K); San José: El General Valley, vicinity of San Isidro El Gener, 300m, 26 February 1966, *Molina et al. 17981* (BM, F); **San José:** El General, 950m, December 1935, *Skutch 2181* (US); *idem*, Vicinity of El General, 700m, February 1939, *Skutch 4123* (BM); *idem*, 36 km south of San Isidro El General, 500m, 27 February 1966, *Molina et al. 18000* (F); *idem*, Finca El Quizarrá, lower slopes Cordillera de Talamanca, along Río He, 28 January 1965, *Williams et al. 28453* (F); *idem*, vicinity of El General, 950m, December 1935, *Skutch 2181* (GH); *s.loc.*, 23 April 1932, *Lankester 819* (BM, US); *idem*, February 1892, *Pittier 4859* (B); *idem*, 1.4km of Puerto Viejo., 75m, 15 June 1966, *Anderson & Mori 348* (US).—**CUBA.** Along Río Buey, north slope of Sierra Maestra, 300m, 29 October 1941, *Morton & Acuna 3827* (GH, US); *idem*, *Morton & Acuna 4304* (US); Santander: vicinity of Puerto Berrio, 100m, 20 July 1935, *Haught*

1842 (GH).—**ECUADOR. Esmeraldas:** Further down Rio Palavi km's camp, 1°70' S, 78°37' W, 150m, 13 February 1988, *Hoover et al. 4152* (MO); *idem*, San José de Cayapas, 0°52' N, 78°56' W, 80m, 2 September 1980, *Holm-Nielsen et al. 25657* (UC); *idem*, 2–4 km SE of San Lorenzo, along railroad track, 1°15' S, 78°50' W, 10m, 17 July 1983, *Boom 2567* (NY); **Quininde:** 50m, 8 April 1943, Holdridge, L.R. 1633 (US); Sucumbíos, 0°01'20" N, 77°31'54" W, 1300m, 14 August 2001, *Aguinda et al. 1318* (UC).—**GUATEMALA.** Along the Trans-Ishtmian highway (route 185), 50m, 5 August 1958, *King 1110* (US); **Alta Verapaz:** Cubilquitz, 330m, September 1901, *Tuerckheim 8039* (K, US); **Cubilquitz:** Alta Verapaz, 350m, September 1901, *von Tuerckheim s.n.* (GH); Between Los Amates and Izabal, Sierra del Mico, 2000m, 26 February 1908, *Kellerman 7212* (F); *idem*, Cerro San Gil, 400m, 24 October 1996, *López s.n.* (UC); *idem*, El Estor La Cumbre, 15°33'00" N, 0°89'24" W, 450m, 17 July 1988, *Tenorio et al. 14531* (UC); *idem*, Puerto Barrios, 2 June 1922, *Standley 25003* (US); *idem*, Puerto Barrios, 2 June 1922, *Standley 25017* (US); *idem*, Sierra del Mico, between Los Amantes and Izabal, 2000m, 26 February 1908, *Kellerman 7212* (US); *idem*, South shore of Lake Izabal west of village os Izab, 15°15' S, 89°25' W, 600m, 23 April 1966, *Jones et al. 3052* (F, NY); *idem*, vicinity of Puerto Berrios, 2 June 1922, *Standley 25003* (GH); **Izabal:** Livingston, 18 February 1905, *Deam 453* (NY); near the Finca Supecuite, alta Vera Paz, 20 April 1902, *Cook & Griffs 667* (US); *idem*, El Estor La Cumbre, al NE del Estor, camino a la Finca Moca, 15°33' S, 89°24' W, 450m, 17 July 1988, *Tenorio et al. 14531* (GH); **Quiché:** 396m, 30 November 1934, *Skutch 1801* (GH); *s.loc.*, 18 February 1905, *Deam 453* (GH); *idem*, 1862, *Godman & Salvin 83* (BM); *idem*, *Salvin s.n.* (GH).—**HONDURAS. Atlántida:** San Alejo, Base of hills south San Alejo, near Río San Alejo, 150m, 22 April 1947, *Standley 7874* (F, US). **Cortes:** 650m, 14 April 1951, *Williams & Molina 17918* (US); Edge of thicket, lower slopes of Mt. Cangrejal, 12 July 1938, *Yuncker et al. 8384* (K, NY, GH, US); **El Cayo:** In cohune ridge, 25 April 1955, *Gentle 8693* (F, NY, UC, US); **Olancho:** Las Minas, 20 km NE de Culmi, 700m, 25 March 1986, *Méndez 212* (F); *s.loc.*, 11 March 1929, *Schipp 97* (BM, F, GH, K, US); *idem*, 12 July 1938, *Yuncker et al. s.n.* (UC); *idem*, 21 October 1904, *Campbell 18* (K); *idem*, 304m, 24 May 1935, *Schipp S-933* (GH).—**MEXICO. Oaxaca:** *Comaltepec s.n.* (NY); *idem*, Comaltepec, Entre Puerto Eligio y Comaltepec, km 149 carretera, 710m, 26 November 1965, *Calderón 544* (NY, CAS); *idem*, Vista Hermosa. km 134 Tuxtepec-Oaxaca, Sierra Juárez, 1600m, 18 May 1966, *Calderón 814* (CAS); *idem*, Ixtlán, 15 km S of bridge at Valle Nacional, 1500m, 17 September 1972, *Mickel & Pardue 6509* (NY, UC); *idem*, Villa Alta, Along trail between La Selva and Arroyo Macho, 450m, 4 December 1971, *Hallberg 1614* (NY, UC); Veracruz: Mirador, *Liebman s.n.* (B).—**NICARAGUA. San Juan del Norte** (Greytown): February 1896, *Smith 2030* (NY, GH, US); Zelaya: 12 April 1961, *Bunting & Licht 1265* (US); *idem*, 14°18'00" S, 0°84'26" W, 200m, 22 January 1996, *Rueda et al. 4005* (MO); *idem*, along highway between El Recreo and El Pijibaye, 40m, 11 May 1949, *Standley 19895* (F); *idem*, vicinity of Bluefields, 12 April 1961, *Bunting & Licht 1265* (GH, NY).—**PANAMA.** 10 km above Pan-Am Highway on road from El Llana t, 150m, 23 March 1973, *Kennedy & Dressler 2937* (F, MO); 240m, 10 September 1973, *Nee 6886* (US); 6 km above Pan-Am Highway on road from El Llano to, 200m, 18 October 1972, *Kennedy 1787* (F, MO, NY); 600m, 6 November 1986, *Aranda & Valdespino 226* (US); Along road past Cerro Jefe toward La Eneida, 6 January 1971, *Croat 13093* (MO); Area along Pipeline road, 9km NW of Gamboa, 150m, 29 October 1973, *Nee 7677* (US); Bocas del Toro, 200m, 23 February 1980, *Correa et al. 3648* (F, MO, UC); Bocas del Toro, 30m, 4 August 1976, *Croat 38189* (MO); *idem*, in Laguna de Chiriqui and its neighborhood, December 1885, *Hart 16* (US); **Canal Zone:** N of Gamboa, along Pipeline road, 8 October 1982, *Schmalzel & Moreno 1116* (MO, UC); *idem*, 13 October 1965, *Austin 1694* (MO); *idem*, 6 December 1970, *Croat 12756* (F, MO); *idem*, 2000m, 3 November 1965, *Tyson 2119* (GH, MO); *idem*, 240m, 10 September 1973, *Nee 6886* (MO); *idem*, 50m, 19 February 1911, *Maxon 4895* (BM, GH, NY); *idem*, Pipeline road from Gamboa, 26 July 1970, *Armond 565* (CAS); Cerro Azul, deep shady canyon, 3 November 1965, *Austin 2120* (MO); Cerro campana, 10 September 1970, *Croat 12096* (MO); *idem*, Cloud forest., 10 December 1967, *Lewis et al. 3078* (MO, UC); *idem*, moist forest on steep slope near FI, 10 September 1970, *Croat, T.B. 12112* (MO); **Coclé:** 1200m, 3 February 1980, *Antonio 3689* (MO); **Colón:** 28 June 1978, *Hammel 3670* (MO); *idem*, 9°19' S, 79°47' W, 200m, 1 August 1983, *Miller & Miller 905* (MO, UC); *idem*, Along the Río Culebra, above Santa Isabel, 10 August 1911, *Pittier 4153* (US); *idem*, Río Rita, 10 June 1973, *Troetsch 16* (F); *idem*, Parque Nacional Soberania, 9°09'34" N, 79°45'01" W, 60m, 5 July 2012, *Salino et al. 15337* (BHCB); *idem*, Comarca de San Blas, 78°15' W, 9°19', 350m, 10 August 1984, *Nevers & González 3647* (MO); *idem*, Nusagandi, 400m, 26 July 1986, *McDonagh et al. 400* (BM); *idem*, El Elano-Carti Road, 9°15' S, 79°00' W, 300m, 12 July 1988, *Croat 69233* (MO); *idem*, Santa Rita Ridge, 6 April 1969, *Lewis et al. 5234* (K, MO, UC); **Darien:** Río Cocalito, 19 February 1982, *Whitefoord & Eddy 243* (BM); *idem*, 600m, 6 February 1991, *Herrera 849* (MO, UC); *idem*, 23 January 1981, *Garwood 1196* (MO); *idem*, 7°55' S, 77°40' W, 500m, 22 September 1982, *Hamilton & Stockwell 1446* (MO, UC); *idem*, Río Cocalito, 19 February 1982, *Whitefoord & Eddy 243* (UC, US); El Elano-Carti Road, 330m, 28 March 1976, *Croat 33798* (MO); El Elano-Carti Road, 330m, 28 March 1976, *Croat 33804* (MO); hilly forest 2 to 3 miles east of Las Cascadas, 50m, 19 February 1911, *Maxon 4895* (US); Montijo: Isla Coibsa, 30 August 1995, *Araúz*

et al. 188 (US); Panamá, 600m, 6 November 1986, *Valdespino & Aranda 226* (UC); *idem*, 9°19' S, 79°15' W, 670m, 19 November 1985, *McPherson 7516* (MO); *idem*, Cerro Azul, 16 July 1984, *Ceballos 4* (MO, UC); *idem*, Pipeline Road., 9°15' S, 79°45' W, 50m, 10 March 1983, *Hamilton et al. 3246* (MO, UC); *idem*, Cidade do Panamá, Canal Zone, 29 October 1973, *Nee 7677* (MO, RB); *idem*, road from Gatun Locks to Piña, 11 July 1970, *Armond 429* (F); *idem*, road from Gatun locks to Piña; scrubby woods, 11 July 1970, *Armond 420* (CAS, MO); Panamá: Cerro Jefe, Parque Nacional Soberania, 9°13'12" N, 79°21'51" W, 790m, 4 July 2012, *Salino et al. 15318* (BHCB); *idem*, Chepo, Carretera El Llano-Carti, 9°16'44" N, 78°57'34" W, 406m, 14 July 2012, *Salino et al. 158784* (BHCB); San Blas, 350m, 27 August 1987, *Herrera & Irvine 340* (MO, UC, US); San Blas: Forest southeast of Puerto Obaldia, 18 August 1971, *Croat 16782* (MO, NY); San Felix, Eastern Chiriquí, 120m, December 1911, *Pittier 5209* (US); Santa Rita hills, 4 January 1958, *Smith & Smith 3446* (F, US); *idem*, gold mine at Cana, 500m, 26 July 1976, *Croat 37616* (MO); **Veraguas**: area of Santa Fe, 8°31' S, 81°08' W, 700m, 26 August 1984, *Churchill et al 5977* (MO); *s.loc.*, 20 December 1960, *Rodriguez 16* (MO); *idem*, 31 January 1971, *Croat 13176* (MO); *idem*, 4 December 1967, *Oliver et al. 2681* (MO); *idem*, 5 March 1908, *Williams 507* (NY); *idem*, March 1850, *Fendler 404* (GH, K, MO, US).—**PERU**. **Pasco**: Oxapampa, 10°19' S, 75°15' W, 450m, 16 May 2003, *Monteagudo & Francis 5318* (NY, UC).—**VENEZUELA**. **Aragua**: Tovar, 690m, 1986, *Lellinger 8433* (US); *idem*, orillas de la carretera entre Zea y Santa Bárbara, 800m, 7 April 1973, *Ruiz-Terán & Andrade 8430* (NY). *s.loc.*, 500m, 15 April 1989, *Aymard et al. 7518* (MO).

11. *Meniscium giganteum* Mettenius (1856: 19). (Figs 23A–C; 24E–F)

Phegopteris gigantea (Mett.) Mettenius (1859: 22). *Nephrodium giganteum* (Mett.) Diels (1899: 177). *Dryopteris gigantea* (Mett.) Christensen (1905: 267). *nom. illeg. Dryopteris simplicifrons* C. Chr. (1905: 486). *Thelypteris gigantea* (Mett.) R.M. Tryon (1967: 6). *Cyclosorus giganteus* (Mett.) Mazumdar & Mukhopadhyay (2014: 20). **Type**:—PERU. St. Gavan. “Pl. peruan. 2292. St. Gavan.”, in shady wet forests, July 1854, *Lechler 2292* (lectotype B [B200056984], here designated; isolectotypes B[B200056985] BR[BR000000583786], GOE T[GOET008721], K[K000633681], MPU[MPU015330], P[P00644691, P00644692], S[S05-10928]), L[L0052307], LE[LE00008274, LE00008273]).

Rhizomes short-creeping, ascending or suberect, 0.8–1.0 cm diam., glabrous. **Fronds** subdimorphic; **sterile fronds** (39–)49–84.5 cm long, petiole (10–)15–32.5 × 0.2–0.4 cm, lamina (29–)34–52 × 5–13 cm; **fertile fronds** 72–138 cm long, petiole 46.5–82 × 0.3–0.5 cm, lamina (24–)26–56 × 5–8(–10) cm. **Petioles** with dark brown to black basal and distal portions, with dense, subclathrate, patent, persistent, brown, lanceolate, entire scales and ciliform, 0.3–0.4 mm long, dense, curved, adpressed hairs throughout. **Laminae** simple, ovate to elliptic; **bases** usually rounded on sterile lamina and cuneate on fertile lamina; **margins** entire to crenate; **apices** acute to acuminate, chartaceous. **Buds** usually absent, sometimes present at lamina base. **Costae** with dense hairs equal to those on the petiole; **adaxial surfaces** glabrous; **abaxial surfaces** glabrous between the veins, the costa and veins with dense, ciliform, 0.3–0.4 mm long, thin, adpressed hairs and arachnoid, caducous scales with a wide center on the sterile lamina; **costal veins** 3–5 on sterile lamina and 4–7(–8) rows on fertile lamina per 3 cm (8–10 mm between each vein); **secondary veins** straight on fertile lamina and straight to arcuate on sterile lamina, uniting to form a rectangle, with 1–3 excurrent, free veinlets per areole that partially or almost completely divide the areole; **areoles** (18–)24–35 between the costa and margin, narrow-elongate, rhomboid. **Sori** linear to arcuate for most of the length of the secondary veins; **receptacles** with sporangiaster between the sporangia, with spherical glands at the apex; **sporangia** with paraphyses on the stalk, with spherical, red to orange glands at the apex or adpressed glands at the base of the capsule. **Spores** smooth with rod-shaped, finger-like, stellate and adpressed ornamentations.

Distribution and habitat:—Costa Rica, Colombia, Ecuador, Panama, Peru and Venezuela (Fig. 44). This species grows inside forests, occasionally along trails in the forest on clay and humous soil or on wet rocks along the stream bank at 100–1500 m.

Notes:—In the genus, only *M. giganteum* and *M. minusculum* have simple laminae. *Meniscium giganteum* is the only species that has round, reddish glands on the sporangia stalk (Fig. 10C). Although *M. giganteum* and *M. minusculum* have simple leaves, *M. giganteum* is probably more similar to 1-pinnate species, such as *M. membranaceum* that have the same type of indument on the abaxial lamina surface, which is formed by dense, ciliform, long (0.3–0.4 mm long), fine, adpressed hairs on the costa and veins. However, *M. membranaceum* differs by having ciliform hairs between the veins and on the receptacle on the abaxial lamina surface and glabrous sporangia.

The round, reddish glands on the sporangia appear resinous. On some specimens (*Meier 9389* UC) they fall and adhere to parts of the lamina or capsule, resulting in sporangia stalks that lack glands.

The type material (*Lechler 2292*) of *M. giganteum* used by Mettenius is questionable, since two specimens were found at B (B200056984, B200056985) where it is deposited. Smith (1992) cites that the type is at B, but it is not clear which specimen is the lectotype, and there are duplicates at other herbaria. Thus, B200056984 is here designated as the lectotype.

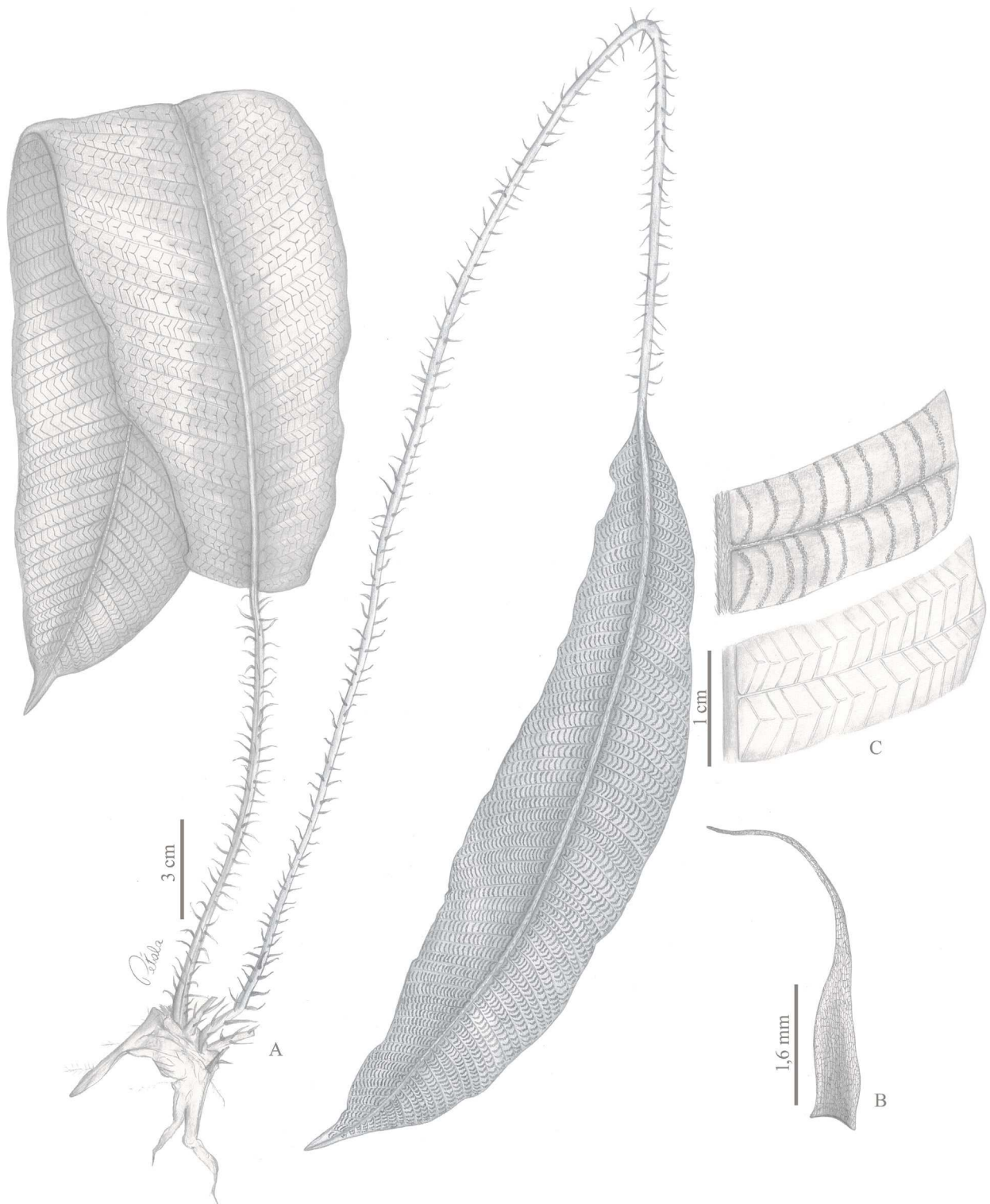


FIGURE 23. *Meniscium giganteum*. **A.** habit showing sterile and fertile laminae; **B.** petiole scales; **C.** details of the adaxial side of sterile lamina showing venation, and abaxial side of fertile lamina showing sori (*Herrera 2062*, UC).

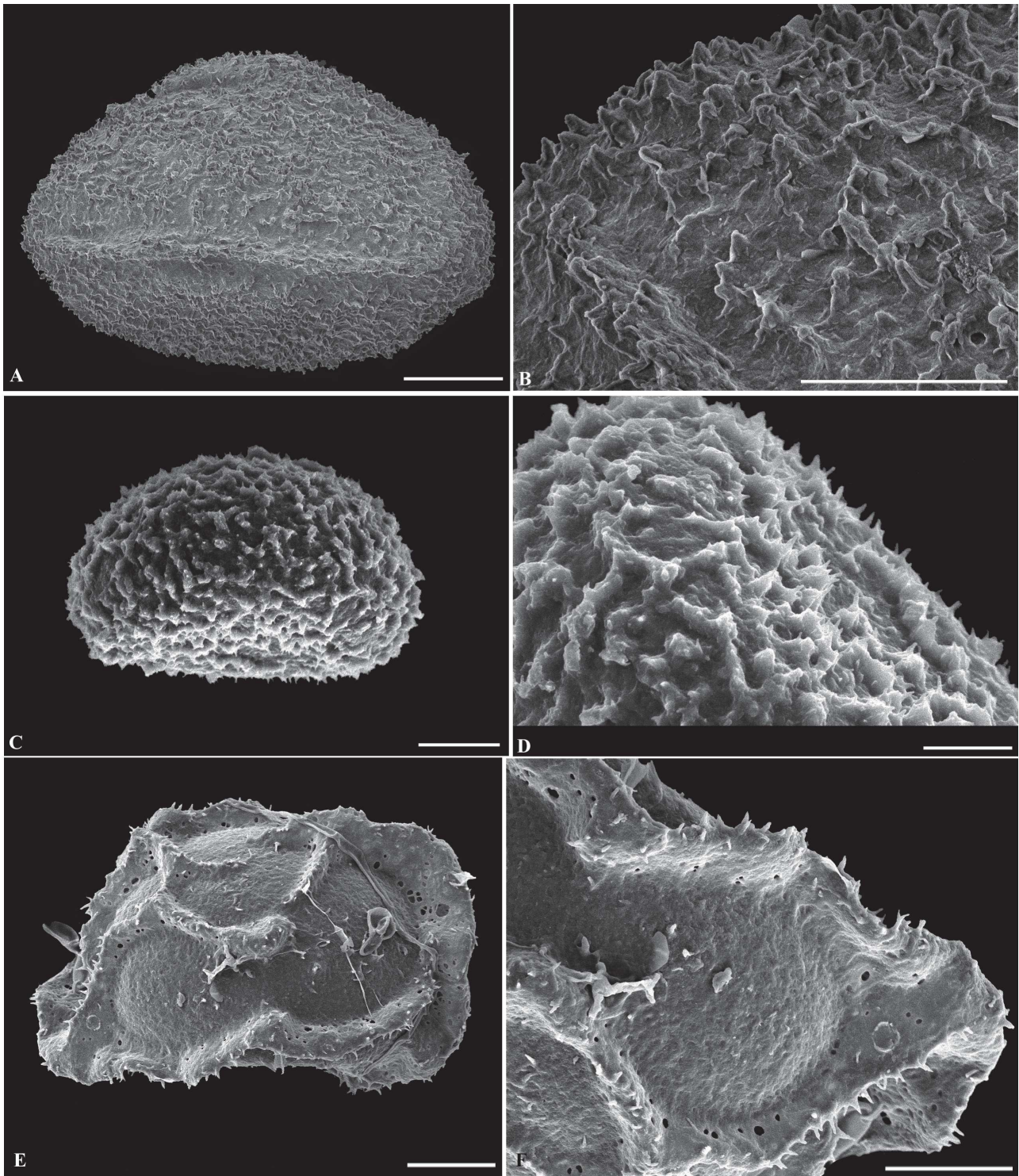


FIGURE 24. Spores of *Meniscium*. **A–B.** *Meniscium delicatum*, papillose spore. **C–D.** *Meniscium divergens*, papillose spore. **E–F.** *M. falcatum*, cristate-undulate spore (**A–B.** *Fernandes 970*, BHCB; **C–D.** *Henkel et al. 4368*, NY; **E–F.** *Davidse & Herrera 26302*, UC). Scales bars: A, C, E = 10 μ m; B, D, F = 5 μ m.

Specimens examined:—**COLOMBIA.** **Antioquia:** Amalfí, 8–27 kms NE de Amalfí en la via Vetilla-Fraguas, 6°56' S, 75°04' W, 1450m, 7 December 1989, *Callejas et al. 9131* (NY); *idem*, Anorí, Vereda Madre Seca, quebrada Espírito Santo, 7°15'13" S, 75°02'36" W, 700m, 20 January 2004, *Rodríguez et al. 4504* (NY); *idem*, Vereda San Antonio, 7°15'59" S, 75°04'27" W, 790m, 12 November 2003, *Rodríguez et al. 4307* (NY); **Cauca:** Rio Timbiquí, 100–500m, February 1899, *Lehmann 8946* (B); Timbiquí, October 1903, *Lehmann. s.n* (K, NY); **Chocó:** 0.3 km E

of the ciudad Coclé-Quibdo, 3 April 1971, *Lellinger & de la Sota 882* (US); **El Valle**: Agua Clara, along highway from Buenaventura to Cali, 100m, 8 June 1941, *Killip & Cuatrecasas 38912* (US); **Nariño**, Barbaçoas, 8 May 1939, *Alston 8521* (BM).—**COSTA RICA**. **Alajuela**: Rio Sarapiquí at bridge on road to Colonia Virgem, 10°16' S, 84°11' W, 830m, 1 October 1987, *Croat 68327* (MO, UC); *idem*, 10°43'30" S, 85°00'30" W, 600m, 12 July 1988, *Herrera 2062* (MO, UC); *idem*, Along the road from Cariblanco to Laguna Hule, 750m, 16 December 1974, *Luteyn & Wilbur 4305* (US); **Cartago**: Peralta, 1905, *Lankester s.n.* (F); *idem*, *Lankester 1925* (NY); Peralta *Stork 4257* (UC); *idem*, 1925, *Lankester s.n.* (GH); *idem*, Near Rio Toro Amarillo, 2 km W. of Guapiles, 500m, 17 July 1964, *Woodruff s.n.* (C); **Guanacaste**: 10°22' S, 84°52' W, 1400m, 30 July 1986, *Haber & Bello 5844* (MO); *idem*, Carrillo, 400m, 18 June 1909, *Brade 308* (NY); **Guanacaste-Alajuela**: Acima da Bijagua, 1500m, November 1982, *Gómez 19198* (MBM); **Heredia**: 10°28' S, 84°04' W, 80m, 21 January 1986, *Smith et al. 1768* (UC); *idem*, between Quebrada Tigre and east fork of Río Sardin, 2 February 1985, *Grayum et al. 5027* (MO); *idem*, Upstream from Puerto Viejo ca. 4 km at Finca La Se, 16 August 1967, *Mickel 3489* (NY); **Limón**: above the flood plain of the Río Toro Amarillo, 460m, 22 June 1975, *Lellinger et al. 1867* (US); *idem*, Cantón de Limón, 9°47'40" S, 83°06'30" W, 750m, 13 April 1989, *Robles & Chacón 2762* (UC); *idem*, Near Río Toro Amarillo, 17 June 1964, *Woodruff s.n.* (US); *idem*, SW of Siquirres, on road to Turrialba, 700m, 4 August 1970, *Lellinger & White 1441* (US); *idem*, 10°01' S, 83°25' W, 100m, 20 October 1988, *Herrera & Martínez 2227* (MO); *idem*, 9°47'40" S, 83°06'30" W, 750m, 13 April 1989, *Robles & Chacón 2762* (MO); **Puntarenas**: Monteverde reserve on the Atlantic slope, 10°19' S, 84°43' W, 730m, 12 June 1986, *Hammel et al.* (MO); *s. loc.* Carillo, 300m, 1907, *Herbarium Christensen 2060* (BM); *s. loc.*, 1925, *Lankester s.n.* (US); *idem*, September 1930, *Lankester s.n.* (K); *idem*, April 1895, *Conduz 9448* (US); *idem*, 600m, 17 March 1968, *Horich 507* (MO).—**ECUADOR**. **Carchi**: 0°10'10" N, 78°16'00" W, 900m, 21 May 1992, *Quelal et al. 562* (MO); Awá Indigenous territory, community of Gualpi Alto, 1°01' N, 78°18' W, 825m, 19 November 1995, *Ortiz et al. 779* (NY); *idem*, El Pailon, 800m, 28 November 1979, *Madison & Besse 7100* (GH); *idem*, 100m, 6 February 1991, *Moran & Rohrbach 5281* (UC). **Esmeraldas**: 0°10'80" N, 78°33'00" W, 200m, 21 September 1992, *Aulestia et al. 574* (MO); *idem*, 0°11' N, 78°31' W, 300m, 19 October 1992, *Tipaz et al. 2125* (MO); *idem*, 0°21' N, 79°44' W, 400m, 29 September 1994, *Pitman et al. 750* (MO); *idem*, 0°21' N, 79°44' W, 400m, 30 October 1994, *Clark & Neill 226* (MO); *idem*, 0°21' N, 79°44' W, 400m, 9 May 1995, *Clark & Watt 828* (MO); *idem*, Community of Mataje, 1°15' N, 78°40' W, 200m, 17 February 1993, *Beck et al. 1756* (US); *idem*, Quininde, 0°21' N, 79°44' W, 400m, 29 September 1994, *Pitman et al. 750* (UC); *idem*, Quininde Cantón, Bilsa Biological Station, Mare Mountains, 0°21' N, 79°44' W, 400m, 11 October 1994, *Clark 188* (MO, NY, UC); *idem*, San Lorenzo, 0°10'90" N, 78°31'00" W, 100m, 15 April 1991, *Rubio & Quelal 1349* (MO, UC); *idem*, 0°10'80" N, 78°33'00" W, 200m, 21 September 1992, *Aulestia et al. 588* (MO); *idem*, 0°11'30" N, 78°44'00" W, 70m, 4 July 1990, *Palacios 5233* (MO); *idem*, 0°21' N, 79°44' W, 400m, 27 October 1994, *Pitman & Bass 890A* (MO); *idem*, 0°21' N, 79°44' W, 400m, 29 September 1994, *Bass et al. 106* (MO); *idem*, 100m, 6 February 1991, *Moran & Rohrbach 5281* (MO); *idem*, Awá Reserve. Community of Mataje, 1°15' N, 78°40' W, 200m, 17 January 1993, *Beck et al. 1756* (NY); *idem*, Parroquia de Concepcion; El Sajado, Rio Santiago, 70m, 15 December 1936, *Mexia 8448* (BM, B, F, GH, K, MO, NY, UC, US.); *idem*, Quininde Cantón, Bilsa Biological Station, Mare Mts., 79°44' W, 0°21' N, 400m, 11 October 1994, *Clark 188* (NY); *idem*, Reserva Ecologica Mache-Chindul. Comunidad Caña, 0°25' N, 79°45' W, 250m, 16 March 1998, *Clark 4740* (NY, UC); **Imbabura**: Lita, 540m, 28 May 1949, *Solil 12531* (F). **Los Rios**: Rio Palenque Biological Station, 20 August 1976, *Dodson 6213* (US); **Morona-Santiago**: 0°23'20" N, 0°77'55" W, 1050m, 21 January 2002, *Palacios et al. 15761* (MO); Cordillera de Cutucu, 800m, 4 February 1989, *van der Werff & Palacios 10387* (MO, UC); *idem*, 0°15'90" N, 77°49'00" W, 850m, August 1993, *Palacios 10990* (MO); *idem*, 0°20'66" N, 0°77'49" W, 889m, 28 November 2008, *Croat 100701* (MO); *idem*, 0°25'70" N, 77°50'00" W, 600m, 15 October 2003, *Toasa & Grupo Shuar de Conservacion, 9352* (MO); **Napo**: 00°35' S, 77°25' W, 1200m, 25 January 1991, *Moran & Rohrbach 5128* (MO); **Pastaza**: 1°27' S, 77°51' W, 970m, 4 May 1984, *Croat 59040* (MO); **Pichincha**: 0°01' N, 79°03' W, 600m, 7 April 1989 *Grayum et al. 9340* (MO); 20km W of Santo Domingo de Los Colorados, 1000m, 30 October 1961, *Cazalet & Pennington 5202* (B, BM, K, NY, US); Santo Domingo de los Colorados, 200m, 28 October 1960, *Pennington 42* (NY); **Zamora-Chinchipec**: 0°42'00" S, 0°78'42" W, 1060m, 23 October 1991, *Ceron et al. 17019* (MO); *idem*, 900m, 16 February 1994, *van der Werff et al. 13150* (MO); 10 December 1887, *Sodiro 54* (K); *idem*, Andes de Quito, October 1896, *Sodiro 54/1* (B, K); *idem*, L. Florencio rio Toachi, 18 September 1974, *Sodiro s.n.* (BM); Nangaritza Canton, 0°42' S, 78°40' W, 100m, 8 December 1990, *Palacios 6637* (MO UC); *s. loc.*, 150m, 20 August 1976, *Dodson 6213* (MO); *idem*, 850m, 8 October 1979, *Dodson, C.H.; Gentry, A.; Shupp, G. 9041* (MO).—**PANAMA**. **Bocas del Toro**: 8°44' S, 82°15' W, 700m, 10 March 1985, *Croat & Grayum 60253* (MO, UC, GH); **Chiriqui**: 1200m, 6 February 1985, *van der Werff & van Hardeveld 6566* (MO, UC).—**PERU**. **Carabaya**: San Gaban August 1954, *Lechler 2493* (B); **Huanuco**: Huanuco, Tingo María, 16 August 1940, *Asplund 12260* (US); *idem*, Huanuco, Tingo María, 700m, 6 September 1956, *Tryon & Tryon 5282* (F, BM, GH, US); **Junín**: Pichis Trail, San

Nicolas, 1100m, 4 July 1929, *Killip & Smith 26018* (GH, NY, US); **San Martín**: Tingo María, 625m, 30 October 1949, *Allard 21561* (US); Mariscal Cáceres, Distrito Campanilla. Carretera Marginal de la Selva, 76°40' W, 7°43' S, 900m, 21 December 1981, *Plowman & Schunke 11595* (F); *idem*, Tingo María, 625m, 30 October 1949, *Allard 21575* (GH, US); *idem*, on ridge east of Tingo María, 625m, 30 October 1949, *Allard 22291* (US, GH); *idem*, 625m, 30 October 1949, *Allard 22363* (US); *idem*, On ridge east of Tingo María, 30 October 1949, *Allard 22364* (US); *s.loc.*, 26 August 1969, *Lochwood 569* (GH); *idem*, 10°45' S, 74°23' W, 1300m, 7 April 1984, *Smith 6816* (MO).—**VENEZUELA**. **Yaracuy**: 10°14'00" S, 68°37'30" W, 1000m, 26 July 2003, *Meier et al. 9383* (UC); *idem*, 10°14'00" S, 68°37'30" W, 1000m, 26 July 2003, *Meier et al. 9389* (UC).

12. *Meniscium hostmannii* (Klotzsch) R.S. Fernandes & Salino (2014: 8). (Figs 25; 28A–B)

Polypodium hostmannii Klotzsch (1847: 397). *Dryopteris hostmannii* (Klotzsch) Maxon & Morton (1938: 369. t. 14). *Thelypteris hostmannii* (Klotzsch) C.V. Morton (1967: 59). **Type**:—SURINAME: “In sylvis humidis”, *s.loc.*, *s.d.*, *Hostmann 828* (lectotype B[B.200064474], designated by Fernandes *et al.* (2014); isolectotypes B, K, P, US).

Rhizomes short-creeping, 1.1–1.7 cm diam., glabrous. **Fronds** (67–)85–193(–232) cm long, monomorphic. **Petioles** (32–37–)58–94(–141) × (0.3–)0.5–1 cm, with black basal portion and stramineous to light brown distal portion, glabrous, glabrescent or pubescent, with acicular, 0.2–0.3 mm long, erect hairs and caducous, lanceolate, brown, opaque scales with margins entire, glabrous or with acicular hairs. **Laminae** (27–)36–90(–106) cm long, 1-pinnate, elliptic, chartaceous. **Rachises** abaxial surface with sparse hairs and adaxial surface with dense, acicular, 0.2–0.3 mm long, patent hairs. **Buds** absent. **Pinnae** in (8–)13–22 pairs, median pinnae (11–)16–30(–43) × 1.3–2.7(–3.9) cm, linear-lanceolate or oblong-lanceolate, proximal pinnae short-petiolulate, petiolule 0.1–0.8 cm long, distal pinnae sessile, not reduced; **bases** of proximal and median pinnae truncate to short acuminate, not auriculate or auriculate on the acroscopic side or on both sides, rarely with appendix, distal pinnae obtuse to slightly asymmetric, basis copic side round, acroscopic side truncate, parallel to rachis; **margins** usually undulate or crenate, glabrous; **apices** cuneate to acuminate; **adaxial surfaces** glabrous or costa and veins with moderate to dense, acicular, 0.1–0.2 mm long, tortuous, patent or curved hairs and filiform, caducous scales with long cilia on the margins, the latter rarely between the veins; **abaxial surfaces** between veins glabrous or with acicular hairs near the sori (rarely with glandular hairs), costa with acicular, 0.1–0.25 mm long, erect hairs and filiform (2–5 septa or 0.2–0.3 mm long) scales, veins with moderate to dense, filiform, branched scales with long (0.15–0.3 mm long), acicular hairs, arachnoid scales present on all parts; **costal veins** (8–)11–18 on sterile and fertile pinnae per 3 cm; secondary veins arcuate to subsigmoid on fertile pinnae and subsigmoid on sterile pinnae, united to form an obtuse angle with one, free, excurrent veinlet; **areoles** in (8–)9–13 rows between costa and margin. **Sori** oblong, uniseriate between veins and costa, not confluent to subconfluent at maturity; **receptacles** with 1–3 septate, filiform, branched sporangiaster with 2–4, 0.2–0.4 mm long, acicular, erect hairs on the septa with globose cell at the apex; **sporangia** with paraphyses on the stalk, with acicular hairs equal to those on the sporangiaster. **Spores** highly cristate-papillate, perforated with echinate elements.

Distribution and habitat:—*Meniscium hostmannii* is distributed in Bolivia, Brazil, Colombia, French Guiana, Guyana, Suriname, and Venezuela, (Fig. 44). It is associated with forest formations, where it usually grows on hillsides, along streams or trails exposed to the sun, at 200–1200 m.

Notes:—*Meniscium hostmannii* has variable fronds, pinnae and hairs; however, there is a uniformity in the distribution and type of hairs on the lamina. One of the most common variations has linear-lanceolate, narrower, smaller pinnae and dense, filiform (0.2–0.3 mm long) scales with acicular, tangled (0.1–0.25 mm long) hairs on the veins and sporangia. Another variation has oblong-lanceolate, wider, longer pinnae and an abaxial surface with sparse, filiform, septate scales on the veins and acicular, short (0.1–0.15 mm long) and long hairs on the sporangia that make the lamina appear nearly glabrous (*R.S. Fernandes 99*, MG). Both variations are common in the Amazonian region of Brazil and Colombia. Glands are usually absent or, when present, are inconspicuous and hyaline. Specimens of *M. hostmannii* that have glands can be confused with *M. longifolium*. However, the latter species has sessile proximal and medial pinnae and a glabrous abaxial laminar surface between the veins.



FIGURE 25. *Meniscium hostmannii*, fertile frond (Gleason 609, US).

Meniscium hostmannii has been treated as a synonym of *Meniscium arborescens* Humboldt et Bonpland ex Willdenow (1810: 133) by some authors (Maxon & Morton 1938; Smith 1993; Smith 1995a, b). However, based on studies of the types at P, B and K, we concluded that *M. arborescens* and *M. salzmanni* Fée (1852: 223) represent a single species, and that *Meniscium hostmannii* is more similar to *M. longifolium* Desvaux (1827: 223). Both have linear-lanceolate pinnae, petiolulate basal pinnae that usually have cuneate bases, and dense indument on the abaxial surface of the pinnae and sporangia. *Meniscium hostmannii* has an abaxial laminar surface with an indument comprising a mixture of scales and acicular hairs scattered on the costae and veins, but it is glabrous between the veins, while *M. longifolium* has acicular hairs, dense to moderate and numerous short-stipitate glands on the costae, veins, and laminar surfaces, and rarely has filiform scales on the costae and veins (Fernandes *et al.*, 2014).

Specimens examined:—**BOLIVIA. Cochabamba:** Chapare, 16°58'31" S, 63°34'20" W, 800m, 23 August 2009, *Teran et al.* 3800 (MO); **Santa Cruz:** Velasco, Parque Nacional Noel Kempff Mercado, 14°31'16" S, 60°44'14" W, 700m, 6 July 1996, *Peña-Chocarro* 94 (USZ); *s.loc.*, (Antohnacana?) 750m, June 1909, *Buchtien* 2210 (UC, US).—**BRAZIL. Acre:** Cruzeiro do Sul, BR 317, Belo Monte, 16 November 2007, *Goldenberg et al.* 1014 (UPCB); *idem*, Comunidade de Santa Luzia, 7°53'45" S, 72°24'30" W, 275m, 10 December 2010, *Salino & Almeida* 15007 (BHCB); *idem*, Trilha do Córrego FESD, 7°35'36" S, 72°45'00" W, 190m, 9 December 2010, *Salino & Almeida* 15001 (BHCB); **Amapá:** Igarapé do Paia, Território do Amapá, Região Costa, 20 July 1962, *Murça Pires & Cavalcante* 52243 (IAN, MG, UC, NY, US); Oeste do Acampamento da Sop, km 105 este de Porto, 19 October 1979, *Austin et al.* 7127 (INPA, MG, NY); Campo Verde-Norte da estrada de Zona, 25 October 1979, *Austin et al.* 7213 (NY, MG, US); **Amazonas:** Cachoeira das Furnas, Rio Negro, August 1903, *Kock* 35 (B); Manaus, 16 August 1928, *Tate* 11 (NY); *idem*, Campus da Universidade, 16 March 1996, *Arévalo* 918 (INPA); *idem*, Manaus-Itacoatiara, km 26, 19 September 1974, *Bautista* 94 (INPA, MG); *idem*, km 26, 6 December 1974, *Araújo* 52 (INPA); *idem*, km 26, 2°53' S, 59°58' W, *Costa & Silva* 443 (INPA, K); *idem*, Reserva Ducke, 20 August 1975, *Araújo & Mota* 265 (INPA); *idem*, Km 26, *Conant et al.* 894 (HB, INPA, NY, GH); Novo Japurá, Confluencia dos rios Traira e Apapóris, próximo a, 18 November 1982, *Cid & Lima* 3708 (RB, INPA, MG, NY, US); Rio Xié, próximo a cachoeira de Cumati, 9 May 1973, *Silva, M.F.; Machado, P.; Pires, O.* 1401 (INPA); *s.loc.*, upper Rio Negro, 1907, *Weiss & Schmidt s.n.* (NY); **Distrito Federal:** Acampamento do D.V.O., 23 December 1964, *Belém & Mendes* 68 (NY); Planaltina, near Brasília, 24 June 1967, *Ralter & Gifford* 72439 (NY); **Goiás:** 7 May 1896, *Glaziou* 22633 (B, K); **Maranhão:** Mirador, Parque Estadual do Mirador, Base da Geraldina, 6°37' S, 45°53' W, *idem*, 20 April 2007, *Fernandes* 82 (MG); *idem*, 12 November 2007, *Fernandes* 99 (MG); *idem*, 13 November 2007, *Fernandes* 102 (MG); *idem*, 13 November 2007, *Fernandes* 108 (MG); **Mato Grosso:** Serra Ricardo Franco, 500m, 18 July 1977, *Windisch* 1358 (GH); Vila Bela da Santíssima Trindade, Parque Estadual Serra de Ricardo Franco, 14°55'53" S, 60°01'29" W, 265m, 6 March 2011, *Almeida et al.* 2740 (BHCB); **Pará:** Marabá, Serra do Carajás, mina de ferro N-1, 28 April 1985, *Rosa & Silva* 4704 (MG); Lower Amazonas. Gurupatuba. W. of Mont Alegre, 8 November 1873, *Traill* 1403 (K); **Pernambuco:** Bonito, Brejo de Altitude, Mata da Colônia, 8°30'14" S, 35°42'56" W, 800m, 7 May 2001, *Santiago & Pietrobon* 432 (BHCB); **Roraima:** Estrada Boa Vista-Venezuela, 5 km South of rio Sur, 2 December 1977, *Steward et al.* 197 (NY); Plateau of Serra Tepequem, 1200m, 18 February 1967, *Prance et al.* 4503 (INPA, K, NY, US).—**COLOMBIA. Amazonas:** Araracuara, 275m, 12 August 1983, *Pabón* 1083 (NY, MO); Comisaria del Amazonas: Leticia, edge of jungle in the Brazil side, near E, 200m, 7 September 1963, *Soejarto* 576 (GH; US); **Antioquia:** Magdalena, vereda la Tagua, sitio Alto Mira, 1100m, 20 July 1992, *Arbelaez et al.* 581 (NY, MO); **Vaupés:** Mitú, orillas Río Vaupés, 200m, 13 November 1939, *Arbeláez & Cuatrecasas* 6775 (US). **GUYANA:** *s.loc.*, 15 August 1921, *Gleason* 609 (NY, US); *idem*, 1864, *Appun* 1469 (K); *idem*, 1939, *Majarurú & Fanthawe* 244 (BM); *idem*, April 1887, *Jenman* 3845 (K); Demerara, 1897, *Jenman s.n.* (NY); Cuyuni-Mazaruni: Camp at Utshe, 0.3 km N of Utshe R., 54°50' S, 61°08' W, 975m, 23 May 1990, *McDowell* 2768 (BM, NY, US).—**HONDURAS. Morazán:** Vicinity of El Zamorano, 800m, 22 September 1948, *Standley* 12564 (F, NY, US); swampy meadow, 24 March 1969, *Molina & Molina* 24418 (NY).—**SURINAME. s.loc.**, 1844, *Kappler s.n.* (B); *idem*, 390m, 11 August 1944, *Maguire* 24304 (NY, US).—**VENEZUELA. Apure:** Páez, Selva de Cutufí between Cutufí on the Río Sanare, 71°56'58" W, 9°11'00" S, 300m, 8 November 1982, *Davidse & González* 21739 (MO); **Aragua??:** Tovar, entre Santa Bárbara y La Carbonera, abajo Zea, 690m, 7 April 1973, *Ruiz-Terán & Andrade* 8433 (NY, MO); **Bolívar:** Gran Sabana, ca 10 km SW of Karaurin Tepui at junction of rio o, 5°19' S, 61°03' W, 900m, 21 April 1988, *Liesner* 23556 (NY, UC); *idem*, Conuco de Odremán, Sta. Elena, February 1946, *Tamayo* 2999 (US); **Mérida:** Rio Ikabaru, cerca del campo Dimantífero de Uaipa, 400m, 16 April 1957, *Bernardi* 6577 (NY); Tovar, 8°27' N, 72°44' W, 700m, 25 July 1983, *van der Werff & Ortiz* 5682 (UC, MO); **Sucre,** 15 km al norte de La Azulita, 1500m, 17 August 1987, *Ortega & Smith* 3137 (BM); **Tachira:** Uribante, along road from La Siberia to entrance to LAs Cuev, 9 July 1983, *van der Werff & Gonzáles* 5191 (MO); **Trujillo:** en las cercanías de Vitú, Cerro El Zamorro, Qda. E, 9°27' N, 70°23' W, 1800m, 23 November 1984, *Ortega & van der Werff* 2298 (NY, UC).

13. *Meniscium lanceum* (A.R. Sm.) R.S. Fernandes & Salino (2014: 8) (Figs 26A–D; 28C–D)

Thelypteris lancea Smith (1992: 74). *Cyclosorus lanceus* (A.R.Sm.) Mazumdar & Mukhopadhyay (2014: 23). **Type**:—PERU. Pasco: Prov. Oxapampa, Palcazú Rio Alto Iscozacín, Ozuz to Rio Lobo, 400–500 m, 10 May 1985, R. Foster & d'Achille 10061 (holotype F [F1958343]; isotype USM [USM163323 ou 000999]).

Rhizomes short-creeping (rarely long-creeping, fronds 3.6 cm apart), 0.9–1.7 cm diam., glabrous or with a few scales at the apex, scales ovate-lanceolate, subclathrate, brown, margins entire or with globose cells. **Fronds** dimorphic to subdimorphic; **sterile fronds** (64–)73–163.5 cm long, petiole (25.5–)34.5–90 cm long, 3.5–8 mm diam., lamina 39–73.5 cm long, pinnae (13–)18–38.8 × (1.7–)2.0–3.7 cm long, oblong-lanceolate; **fertile fronds** (49.5–)56.5–190 cm long, petiole (19.5–)25.5–97 cm long, 4.7–9.4 mm diam., lamina 30–100 cm long, pinnae (8–)10–20 × (0.8–)1.6–2.7 cm long, linear-lanceolate. **Petioles** with brown basal portion and greenish to stramineous distal portion, glabrescent to moderately pubescent on the adaxial surface, with 0.15–0.2 mm long, curved hairs and sparse scales on the basal portion, scales adpressed or patent, caducous, brown to black, subclathrate, opaque, irregular, ovate and lanceolate, base cordate, margin entire to lacerate. **Laminae** 1-pinnate, ovate to lanceolate, chartaceous. **Rachises** of fertile frond with dense, 0.1–0.2 mm long, acicular, patent, erect hairs on both sides, hairs on sterile frond usually only on the adaxial surface, moderate, acicular, erect, curved. **Buds** usually present (sometimes small) in axil of proximal pinnae on the petiolule, rarely on median pinnae or absent. **Pinnae** in 12–24 pairs, distal pinnae not reduced, sessile or petiolulate (0.1–0.4[–0.6] cm long); **base** of proximal pinnae cuneate, short-cuneate to acute, rounded, not auriculate, median and distal pinnate asymmetric, basicopic side round to semicuneate, adnate, acroscopic side truncate, parallel to rachis; **margins** entire, undulate (usually sterile pinnae), crenate to crenate-serrate (usually fertile pinnae) at least towards the apex, with acicular, tortuous hairs; **apices** acuminate to long-acuminate; **adaxial surfaces** between the veins glabrous, costa with sparse to moderate (rarely dense), acicular, curved to arcuate hairs, these rarely on the veins; **abaxial surfaces** between the veins glabrous, costa and veins on the fertile pinnae with moderate to dense, 0.15–0.2 mm long, acicular, tangled, erect, tortuous, patent hairs, sterile pinnae glabrous or with sparse to moderate hairs, arachnoid scales near the costa and glands absent; **costal veins** 8–12 on sterile pinnae and (9–)12–20 on fertile pinnae per 3 cm; **secondary veins** straight to arcuate on fertile pinnae and subsigmoid on sterile pinnae, united to form an obtuse angle, with one excurrent, free veinlet; **areoles** in (7–)10–15 rows on sterile pinnae and (6–)8–12(–16) rows on fertile pinnae between the costa and margin. **Sori** arcuate, oblong, on secondary veins, not subconfluent at maturity; **receptacles** glabrous or with sterile sporangia; **sporangia** glabrous. **Spores** reticulate-cristate, reticulum adpressed and crests short, fenestrate and fimbriate with echinate elements.

Distribution and habitat:—Bolivia, Brazil, Ecuador, Paraguay, and Peru (Fig. 44). This species is usually terrestrial in the interior of humid forests and in gallery forests, on slopes and along streams, sometimes as a rheophyte, at 100–1320 m.

Notes:—Both *Meniscium consobrinum* and *M. lanceum* have pinnae with a serrate margin. However, *M. consobrinum* has monomorphic fertile and sterile fronds, or fertile fronds only slightly smaller and narrower, petiole and rachis glabrous or with rare to moderate, curved to adpressed hairs on the adaxial surface and glabrous abaxial surface, 9–12 pinna pairs, fertile pinnae oblong, longer and wider, and (when present) sparse to moderate, curved, adpressed hairs on the costa on the abaxial surface. However, *M. lanceum* has dimorphic or subdimorphic fronds, glabrescent to pubescent petiole and rachis on both sides, 12–24 pinna pairs, and larger and narrower, linear-lanceolate pinnae with dense hairs on the costa on the abaxial surface.

A specimen of *M. lanceum*, *Davis & Marshall 1117* (GH), is confusing because it has serrate, sterile and fertile pinnae margins; however, the fronds are dimorphic with 22 pairs of pinnae and costa of the abaxial pinna surface with erect, dense hairs.

Meniscium lanceum also resembles *M. angustifolium*, mainly because of specimens with small fronds and pinnae that are short and narrow (9.5 × 0.9 cm) with an entire margin and similar hairs on the costa on the abaxial surface. Due to this, the absence of one of the fronds, fertile or sterile, makes it difficult to identify these species. *M. angustifolium* has monomorphic to slightly dimorphic fronds and costa on the abaxial pinnae surface with curved hairs. Although they have small fronds, specimens such as *G. Klug 4035* (BM, K-Peru) are *M. lanceum* because they have patent, erect, dense hairs on the costa and the proximal pinnae are usually petiolulate. Sterile specimens of *M. lanceum* are more difficult to identify because the costa on the abaxial surface is usually glabrous or with few hairs and can also be confused with *M. nesioticum*.

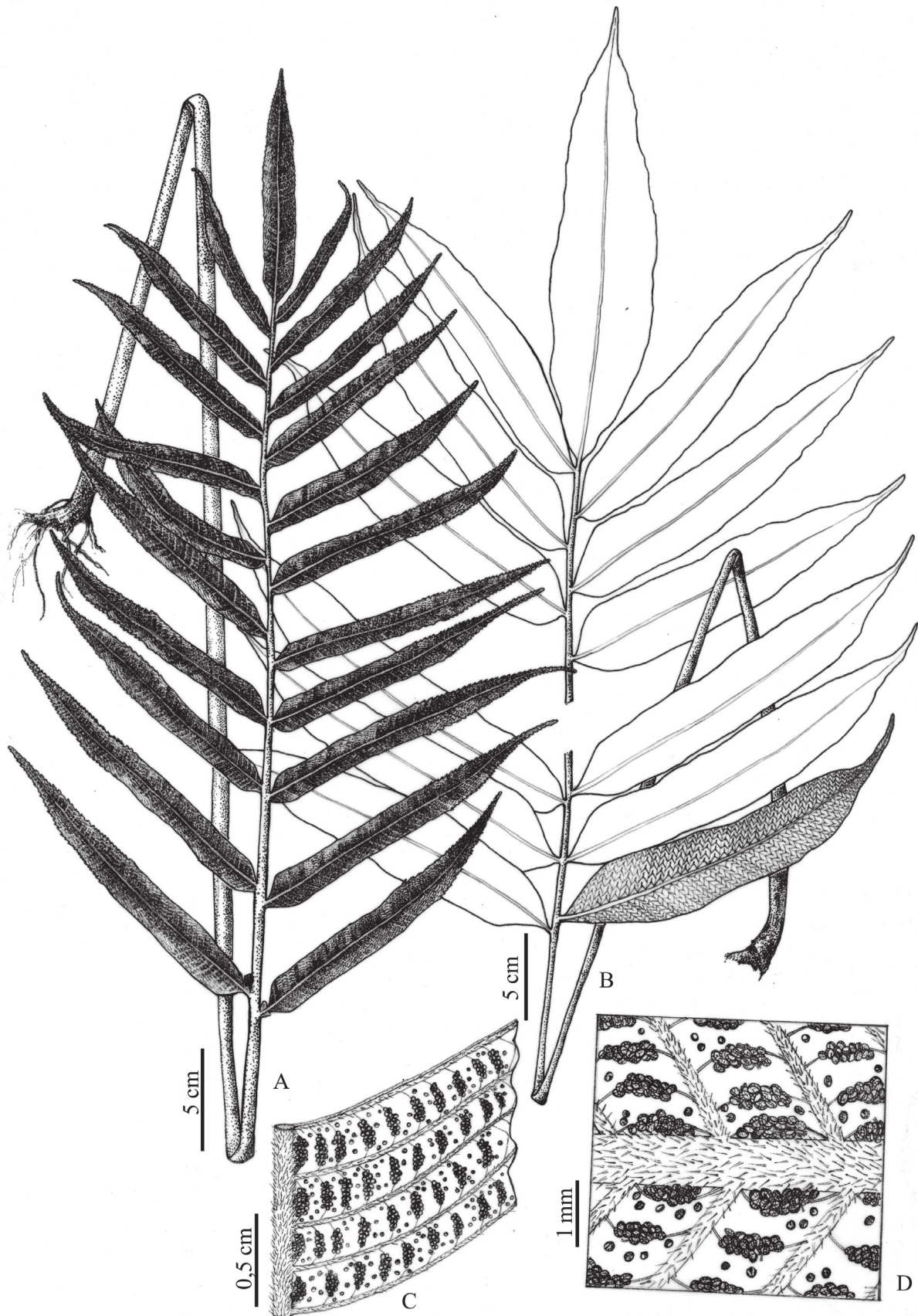


FIGURE 26. *Meniscium lanceum*. **A.** fertile frond; **B.** sterile frond; **C.** detail of the abaxial surface of fertile pinna showing oblong sori on the secondary veins and the crenate margin; **D.** detail of the abaxial surface of the fertile pinna showing erect and patent hairs on the costae and veins (Sundue 736, NY).

Specimens examined:—**BOLIVIA. Beni:** 15°11' S, 66°41' W, 257m, 28 June 2009, *Weigelt et al. 90271* (UC); *idem* Ballivián, 240m, 28 May 1988, *Beck et al. 16602* (UC); *idem*, Gral. Ballivián, 15°04' S, 67°06' W, 450m, 21 June 1997, *Kessler et al. 10669* (UC); *idem*, Ballivián, 270m, 12 March 1982, *Beck 8298* (UC, F); *idem*, 15°04' S, 67°06' W, 450m, 26 July 1997, *Kessler et al. 10847* (UC); *idem*, lower slopes of Serrania Pilon Lajas, 67°03' W, 15°19' S, 700m, 10 June 1985, *Solomon 13905* (MO, NY); *idem*, rio Chimane-Environs of Fatima, 320m, 2 June 1981, *Davis 1117* (F, GH); Rurrenabaque, 12 January 1921, 300m, *Cardenas 1899* (GH); Rurrenabaque, 549m, 12 January 1921, *White 1899* (GH, NY); **Chuquisaca:** Hernando Siles, 63°48' W, 19°48' S, 1320m, 8 July 2000, *Huyalla & Wandelberg 10* (MO); **Cochabamba:** José Carrasco Torrico, 17°07' S, 65°34' W, 1000m, 31 August 1996, *Kessler et al. 7987* (UC); *idem*, Chapare, 17°05'35" S, 65°29'35" W, 900m, 2 September 2003, *Alem et al. 32* (UC); *idem*, Chapare, 17°05'10" S, 65°29'15" W, 500m, *Altamirano 68* (UC); *idem*, Chapare, 16°57' S, 65°25' W, 413m, 7 June 2009, *Weigelt et al. 90219* (UC); *idem*, Ayopaya, 16°30' S, 66°40' W, 580m, 23 September 2004, *Huaylla 1365* (UC); *idem*, Tiraque, km 18 al Palmer, 65°29'36" W, 17°05'35" S, 900m, 2 September 2003, *Zabala, M.A. 32* (NY); *idem*, Carrasco, Parque Nacional Carrasco Arepuchó, 17°22'09" S 65°14'11" W, 1070m, 23 October 2000, *Zárate & Muriel 833* (NY); *idem*, Chapare, San Rafaél, 500m, 14 November 1966, *Steinbach 490* (UC, NY, F, MO, NY, GH); **La Paz:** Sud Yungas, Alto Beni, Sapecho, a 1 km del pueblo, 15°32' S, 67°20' W, 450m, 30 January 1997, *Acebey & Jimenez 140* (UC); *idem*: Abel Iturralde, 14°20'57" S, 67°58'15" W, 367m, 6 October 2002, *Fuentes & Torrico 5395* (UC); *idem*, Abel Iturralde, Parque Nacional Madidi, 14°10' S, 67°55' W, 740m, 4 July 2004, *Jimenez & Huaylla 2570* (UC); *idem*, 14°80' S, 67°47' W, 270m, 16 July 2009, *Weigelt et al. 90394* (UC); *idem*, Nor Yungas, 15°40'00" S, 67°27'20" W, 1140m, 27 July 1990, *Fay & Fay 2820* (UC, MO); *idem*, Abel Iturralde, Parque Nacional-ANMI Madidi, 14°21'43" S, 67°57'41" W, 154m, 26 September 2002, *Araujo et al. 324* (UC, MO); *idem*, Abel Iturralde, Parque Nacional Madidi, 14°20'57" S, 67°58'15" W, 367m, 26 September 2002, *Fuentes et al. 5293* (UC); *idem*, Abel Iturralde, Parque Nacional Madidi, campamento de guardaparque, 14°10' S, 67°55' W, 740m, 4 July 2004, *Jimenez & Huaylla 2570* (NY); *idem*, Guanai, May 1886, *Rusby 412* (B, BM, K, GH, NY); *idem*, Iturralde, Rio Tuichi 1 km upstream from mouth on L bank, 14°30' S, 67°30' W, 240m, 14 April 1990, *Williams et al. 1137* (NY, MO, US); *idem*, Franz Tamayo, Sumpulo, 14°34'51" S, 68°46'18" W, 900m, 14 July 2008, *Jiménez 5249* (MO); *idem*, Sud Yungas, Chulumani 107 kms hacia NNE, 900m, 7 August 1983, *Beck 8535* (MO); *idem*, Nor Yungas, On La Paz-Caranavi, 15°40'00" S, 67°27'20" W, 1140m, 27 June 1990, *Fay & Fay 2820* (US); *idem*, Pilon Lajas: Parque Madidi, rio Beni, 67°39'71" W, 14°52'73" S, 260m, *Boer & Maldonado 1254* (NY); **Santa Cruz:** Ichilo, Parque Nacional Amboro, 17°39' S, 63°43' W, 400m, 18 January 1988, *Nee & Saldias 35982* (UC, MO); *idem*, Parque Nacional Amboro, 17°39' S, 63°43' W, 400m, 18 January 1988, *Nee & Saldias 35981* (UC); *idem*, 17°29' S, 63°38' W, 360m, 18 July 1994, *Moran 5892* (UC); *idem*, 600m, 29 July 1999, *Wood 14980* (UC); *idem*, Parque Nacional Amboro, 17°34' S, 63°52' W, 430m, 13 August 2003, *Sundue 890* (UC, USZ); *idem*, Florida, 18°12' S, 41°30' W, 1250m, 2 November 1999, *Nee, M. 50412* (UC); *Mendoza s.n.* (UC); *idem*, 4 km NE of Bermejo, 19°01' S, 63°36' W, 1070m, 27 July 2003, *Sundue 736* (NY, UC); *idem*, 18°14'19" S, 63°41'71" W, 1300m, 25 November 2008, *Calzadilla & Muñoz 357* (UC); *idem* on road to Bella Vista 4.5 km S of turn off Cuevas, 18°12'00" S, 63°41'30" W, 1250m, 2 November 1999, *Nee 50412* (USZ); *idem*, Ichilo, 500m, 4 October 1997, *Wood & Menacho 12647* (UC); *idem*, Sara, Rio Japacari, 400m, 9 March 1926, *Steinbach 7500* (BM, F, GH, K, MO, UC); *idem*, Parque Nacional Noel Kempff Mercado, 14°24'18" S, 61°08'40" W, 700m, 1 July 1996, *Peña-Chocarro & Sims 56* (USZ, MO); *idem*, Ichilo, 4 km SE of Buena Vista, 17°29' S, 63°38' W, 360m, 18 July 1994, *Moran 5892* (USZ); *idem*, Ichilo: Parque Nacional Amboro, Campamento Mataracu, 17°34' S, 63°52' W, 430m, 13 August 2003, *Sundue & Mendoza 890* (USZ); *idem*, Andrés Ibañez: Monumento Natural Espejillos, 17°54'11" S, 63°28'14" W, 520m, 1 October 2008, *Molina et al. 414* (USZ); *idem*, Yapacani, 127 km N from Santa Cruz on north road to Cochabam, 17°25' S, 63°50' W, 8 August 1982, *Daly & Balick 2110* (NY); *idem*, Yapacani, 600m, March 1926, *Tate 413* (NY); *idem*, Buena Vista, Yapacani, February 1915, *Steinbach 20767* (GH); *idem*, Ichilo, 4 km SE of Buena Vista, 17°29' S, 63°38' W, 360m, 18 July 1994, *Moran 5892* (NY); *idem*, Ichilo, Parque Nacional Amboro, 17°39' S, 63°43' W, 400m, 18 January 1998, *Nee & Saldias 35981* (NY); *idem*, Florida, side of rio Moile, SW from Campamento Moile of Par, 64°81'50" W, 17°24'00" S, 275m, 22 April 2002, *Sundue et al. 699* (NY); *idem*, 4.5 km S of turnoff at Cuevas of Bermejo-Samaipata, 18°12'00" S, 63°41'30" W, 1250m, 2 November 1999, *Nee 50412* (NY, UC, USZ, MO); *idem*, SW from Campamento Moile of Parque Nacional Amboro, 17°24'00" S, 64°81'50" W, 275m, 22 April 2002, *Sundue et al. 699* (US); **s.loc.**, rio Chimane-Environs of Fatima, 328m, 29 May 1981, *Davis & Marshall 1075* (GH).—

ECUADOR. Esmeraldas: Esmeraldas, Parroquia de Concepcion, 108m, 19 December 1936, *Maxia 8474* (BM, GH, K, MO, NY, UC, US); *idem*, Quinde, 35 km W of Quinnind, 0°21' N, 79°44' W, 400m, 3 October 1994, *Pitman et al. 808* (MO); **Morona-Santiago:** Macas, in vicinity of the town of Macas, 2°19' S, 78°08' W, 1100m, 3 July 1993, *Fay & Fay 3943* (NY); *idem*, Morona Cantón, near the city of Macas, 2°20' S, 78°08' W, 1000m, 7 September 1993, *Fay & Fay 4028* (NY); **Napo and Pastaza:** Bimbino, Pacuno, W of confluence with Rio Napo at Bimbino, 0°40' N, 77°20'

W, 300m, 21 October 1960, *Whitmore 777* (BM); *idem*, north of city of Puyo, 1°29'00" S, 77°59'50" W, 950m, 14 June 1992, *Fay & Fay 3626* (US). **Napo: s.loc.**, *Stübel 965* (B); **Pichincha:** Los Rios, Quevedo, rio Palenque Science Center, 150m, 2 February 1979, *Dodson 7453* (MO).—**PERU. Cusco:** Paucartambo, Kosñipata / Pilcopata, 740m, 19 July 1963, *Vargas 14749* (GH); *idem*, La Convencion, 12°30' S, 73°40' W, 710m, 31 July 1968, *Dudley 11507* (GH); *idem*, 700m, 26 July 1957, *Vargas 11788* (GH); January 1942, *Sandeman 3993* (K); **Madre de Dios:** Manu, Atalaya vicinity of Hacienda Amazonia, 71°12' W, 12°55' S, 500m, 12 December 1983, *Foster & Wachter 7424* (MO); **Padre Abad**, quebrada Chesman, cerca al Boqueron de Padre Abad, margen izquierda del rio Yurac, 0°90'30" S, 0°75'40" W, 350m, 7 March 2004, *Vigo & Graham 15834* (UC); **Pasco:** Oxapampa, Palcazu valley, on the Rio Palcazu, 10°10' S, 75°13' W, 300m, 24 April 1983, *Smith 3924* (NY, MO, GH); **San Martín:** Boquerón Pass, 92 km from Tingo María on highway to Pucallpa, 400m, 16 December 1949, *Allard 22085* (US); *idem*, Chazuta, Rio Huallaga, 260m, March 1935, *Klug 4035* (BM, K, UC, CAS, F, MO, GH); *idem*, Lamas, km 47.9 of Tarapoto-Yurimaguas road, 6°24' S, 76°18' W, 380m, 1 October 1986, *Knapp & Mallet 8473* (NY, F, MO); **s. loc.**, San Gaban, *Lechler 2318* (B); July 1854, *Lecher 2332* (B); *idem*, Tarapoto, June 1955, *Spruce 978* (BM).—**PARAGUAY. Amambay:** in Altaplanitie et declivibus Serra de Amambay, 23 September 1910, *Hassler 10508* (BM, K).

14. *Meniscium lingulatum* (C. Chr.) Pichi Sermolli (1968: 180). (Figs 27A–D; 28E–F)

Dryopteris lingulata Christensen (1913: 271). *Thelypteris lingulata* (C. Chr.) Morton (1967: 43). *Cyclosorus lingulatus* (C. Chr.) Mazumdar & Mukhopadhyay (2014: 24). **Type:**—COSTA RICA. “Forêts de la vallée du Rio Hondo près Madre de Dios”, Florestas do vale do Rio Hondo perto Madre de Dios, 200 m, November 1906, *Pittier 10349* (C = Herbarium H. Christ) [Christ herbarium is in Paris, not Copenhagen?] (lectotype P [P00643480], designated by: Smith (1992; isolectotypes B[B200058753-fragment], BM [BM000937791-fragment], US[US826323]).

Rhizomes short-creeping, 0.7–1.3 cm diam., glabrous. **Fronds** (68–)93–170 cm long, monomorphic. **Petioles** 40–102 cm long, 0.3–0.8 cm diam., with brown basal portion and greenish to stramineous distal portion, glabrous or rarely with scales on the basal portion, scales caducous, irregular, adpressed, subclathrate, dark brown, entire, glabrous. **Laminae** (young 28–)51–67(–101) cm long, 1-pinnate, ovate to elliptic, chartaceous. **Rachises** glabrous or rarely with small (to 0.1 mm long), acicular, erect hairs in the sulcus. **Buds** absent. **Pinnae** 21–38 × 7–9 cm (median pinnae), in (1–)3–7 pairs, elliptic, proximal pinnae petiolulate, petiolule 0.8–2.3 cm long, median and distal pinnae sessile, semi-adnate to the basiscopic side, conform; **bases** decurrent on petiolule, cuneate to acuminate, auricles absent; **margins** entire to undulate, glabrous; **apices** abruptly acuminate; **adaxial surfaces** glabrous or costa and rarely veins with hairs equal to those on the rachis; **abaxial surfaces** glabrous or with sparse, small (less than 0.1 mm long), adpressed, caducous hairs and arachnoid, caducous scales between the veins; **costal veins** 4–6 per 3 cm; **secondary veins** subsigmoid on sterile pinnae and arcuate on fertile pinnae, united to form an obtuse angle, with one excurrent, free veinlet, or veinlet elongate and almost completely dividing the areole; **areoles** in 15–26 rows between costa and margin, wider than long. **Sori** arcuate or often biseriate between the costal veins, forming two sori per areole, oblong, on secondary veins, not confluent at maturity; **receptacle** glabrous; **sporangia** glabrous. **Spores** winged-fimbriate, wings thick and tall with echinate micro-ornamentations.

Distribution and habitat:—Colombia, Costa Rica, Ecuador, Nicaragua, Panama, and Peru (Fig. 45). This species is terrestrial in the interior of forests and occasionally along forest trails and grows in clay or humus-rich soils, or on wet rocks along the margins of streams, at 10–1800 m.

Notes:—*Meniscium lingulatum* is characterized by its elliptic, long-petiolulate pinnae, with cuneate base decurrent on the petiolule and glabrous abaxial laminar surface, as well as biseriate sori and glabrous sporangia. It is often confused with *M. chysodioides* because of the shape of the pinnae, but the latter has paraphyses on the sporangia stalk and dense hairs on the abaxial laminar surface.

Maxon & Morton (1938) noted that the secondary veins are often sterile in the middle, so that a pair of sori form per areole, and that this sometimes occurs in other species (e.g., *M. andreanum*) and therefore cannot be considered an exclusive character, but that perhaps it could be used to indicate that *D. lingulata* = *M. lingulatum* is one of the “most primitive species in this lineage.” The pair of sori is always elongate and there is never a single receptacle, as found in *Goniopteris* and some species in the Old World that have been called *Meniscium* (Maxon & Morton 1938).

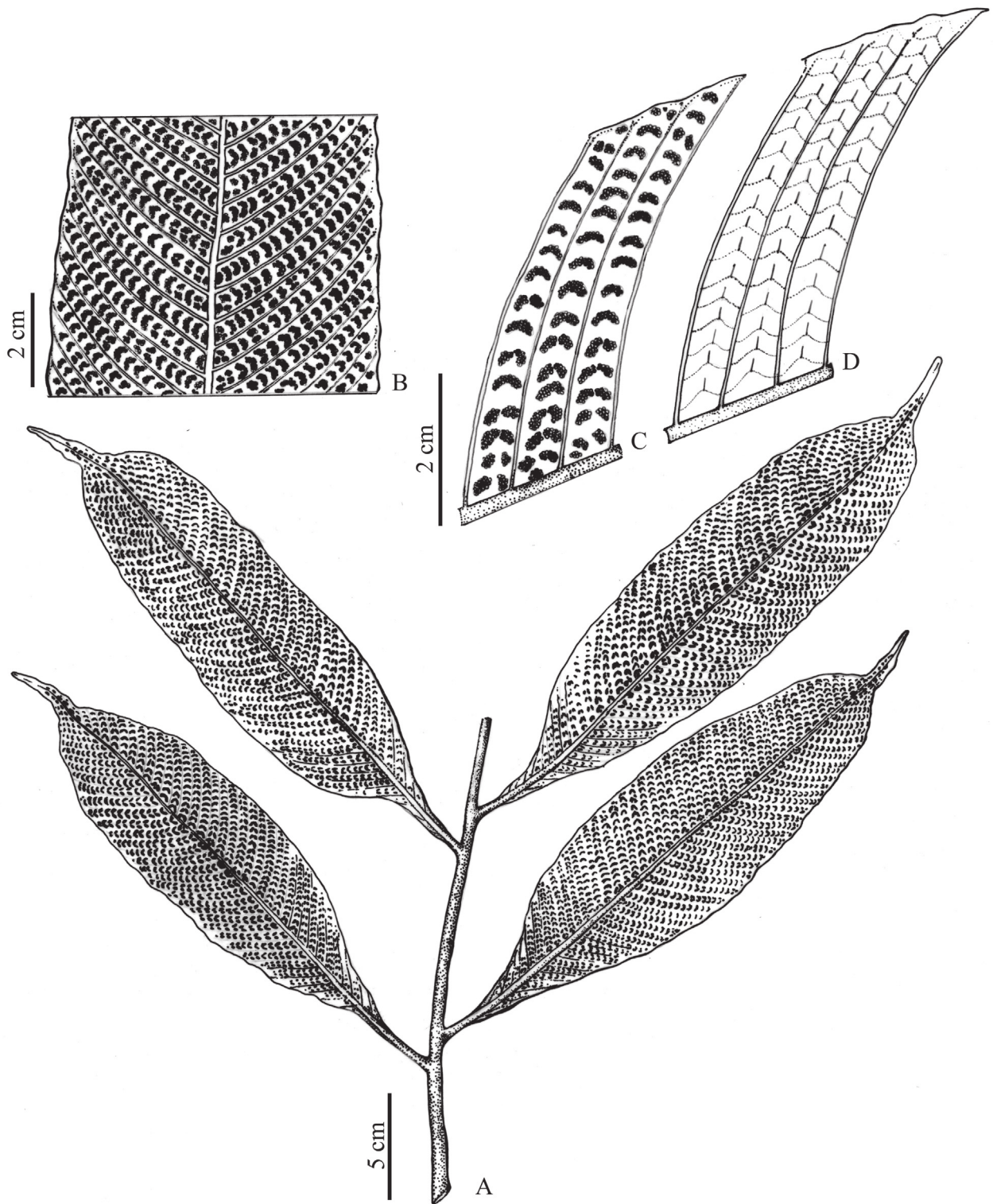


FIGURE 27. *Meniscium lingulatum*. **A.** fragment of the lamina with proximal pinnae; **B.** detail of the abaxial surface of the fertile pinna; **C.** detail of the abaxial surface of the fertile pinna showing some biserial sori; **D.** detail of the adaxial surface of the sterile pinna showing arcuate veins (Rosenstock 306, UC).

Christensen (1913) cited in the protologue that the type collection of *M. lingulatum*, *Pittier 10349*, is at the herbarium C = H. Christ. However, this was subsequently sold or possibly donated to P and BM. Maxon & Morton (1938) mention that the type collection might be deposited at US and Smith (1992) cited the material at P as the type collection. *Pittier 10349* was deposited at P and US and there are fragments at BM and B. Thus, the material at P designated as the lectotype by Smith (1992) is correct.

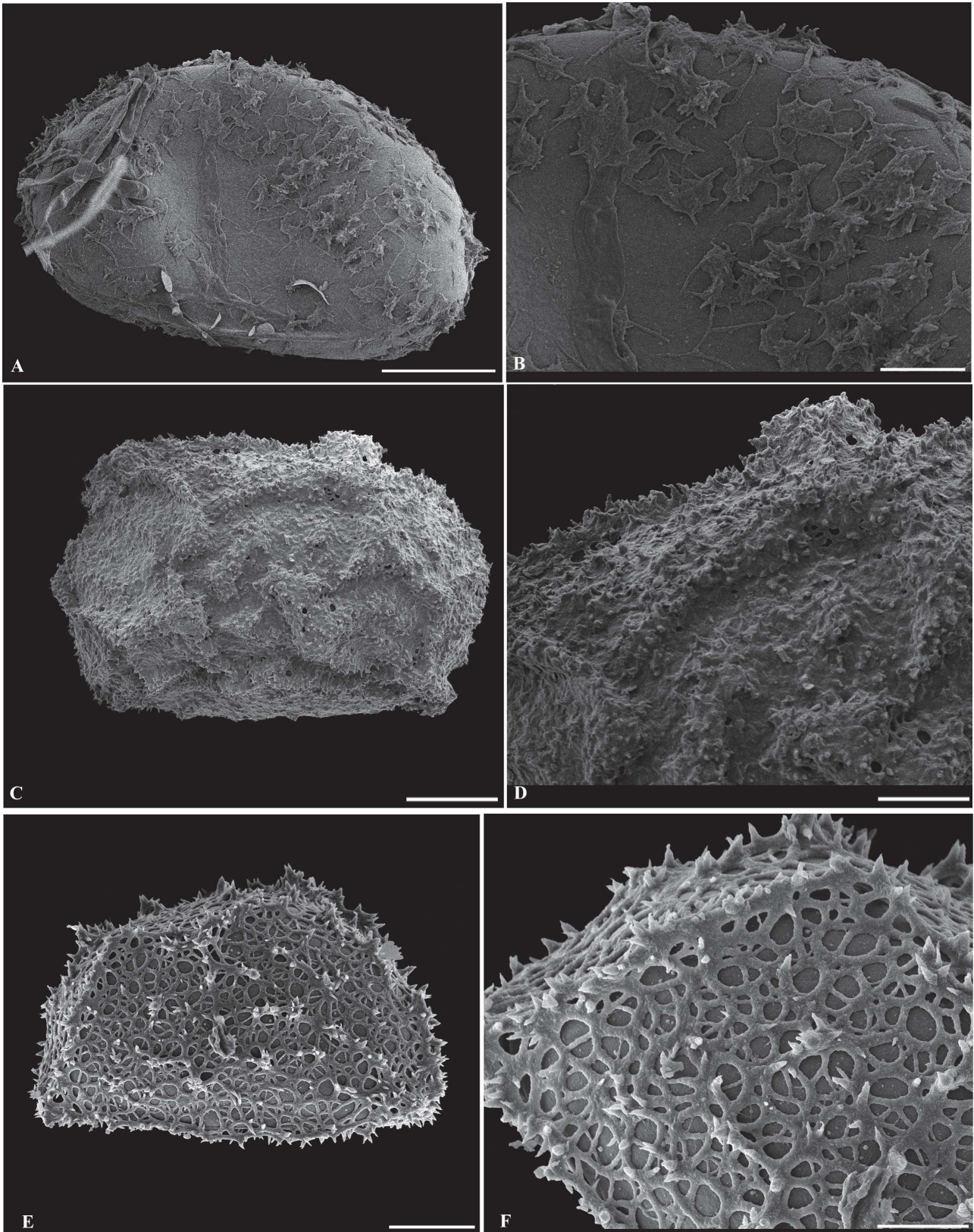


FIGURE 28. Spores of *Meniscium*. **A–B.** *M. giganteum*, spore smooth with bacilliform or digitiform ornamentations. **C–D.** *Meniscium hostmannii*, cristate-papillose spore. **E–F.** *M. lanceum*, reticulate-cristate spore (**A–B.** *Stork 4257*, UC; **C–D.** *Arbelaez et al. 581*, MO; **E–F.** *Mexia 8474*, MO). Scales bars: A, C, E = 10 μm ; B, D, F = 5 μm .

Specimens examined:—**COLOMBIA. Antioquia:** 19 April 1949, *Barkley & Soto 618* (US); *idem* 20 March 1948, *Johnson & Barkley s.n.* (US); *idem*, Cáceres, 7 km Nordeste de Cáceres sobre Troncal, 110m, 5 November 1987,

Arbeláez et al. 199 (NY); *idem*, Chocó, Hoya del Río San Juan, 4°10' S, 77°09' W, 2 April 1979, *Forero & Jamillo 4496* (US); *idem*, Dos Bocas, on Río Nechi, near Pato, drainage of Ri, 23 June 1944, *Ewan 15818* (BM, US); *idem*, Mutatá, 150m, 28 April 1987, *Fonnegra et al. 1920* (MO); *idem*, Mutatá, 200m, 18 May 1976, *Atehortúa & Hojos 196* (MO); *idem*, Remedios, Vereda Santa Lucía 9–18 km SO de Remedios, 7°01' S, 74°45' W, 530m, 4 July 1989, *Callejas et al. 8088* (UC, NY); *idem*, Remedios, Vereda Santa Lucía, 7°01' N, 74°45' W, 530m, *Callejas et al. 8088* (US); **Caldas**: Santa Cecilia, 800m, 14 November 1945, *Sneidern 5188* (F, US); **Chocó**: 3m, 20 May 1967, *Duke 11291* (NY); *idem*, 5°43' N, 76°41' W, 50m, 13 March 1984, *Croat 57404* (UC, MO); *idem*, 6°15' N, 77°25' W, 100m, 6 March 1983, *Gentry & Juncosa 41035* (UC); *idem*, 6°16' N, 77°20' W, 1m, 1 January 1984, *Juncosa 1614* (MO, UC); *idem*, 76°13'45" W, 5°20'30" N, 240m, 23 February 1990, *Croat 70936* (MO); *idem*, 76°56' W, 5°35' N, 21 April 1979, *Forero et al. 5462* (MO); *idem*, 77°25' W, 6°15' N, 100m, 6 March 1983, *Gentry & Juncosa 41035* (MO); *idem*, Andagoya, 70m, 20 April 1939, *Killip 35052* (US); *idem*, Hoy del Río San Ruan, 77°09' W, 4°10' N, 5m, 2 April 1979, *Forero & Jaramillo 4496* (MO, US); *idem*, on the left side of Río Baudo, 11 February 1967, *Fuchs & Zanella 22282* (US); *idem*, Pichimá, 4°25' S, 77°17' W, 100m, 16 November 1976, *Forero 703* (MO); *idem*, Quebrada in low hills ca. 2km NE of El Valle, 25m, 13 February 1971, *Lellinger & de la Sota 371* (US); *idem*, Quibdó, carretera Quibdo-Guayabal, 80m, 12 September 1976, *Forero & Jaramillo 2782* (MO); *idem*, carretera Quibdo-Yuto, Río Cabí, 7 April 1984, *Cossio 073* (MO); *idem*, Riosucio, 100m, 11 January 1988, *Cárdenas 960* (MO); *idem*, 100m, 12 October 1987, *Cárdenas 243* (MO); *idem*, 300m, 10 February 1988, *Cárdenas 1184* (MO); *idem*, 50m, 17 November 1987, *Cárdenas 825* (MO); *idem*, Serranía de Baudo, 5°29' S, 76°47' W, 150m, 18 April 1983, *Croat 56076* (MO); *idem*, Slopes and ridge of Loma del Cuchillo, 150m, 9 March 1971, *Lellinger & de la Sota 633* (US); *idem*, Tutunendo, 20 km north of Quibdó, 80m, 19 May 1931, *Archer 2130* (US); *idem*, Andagoya, 70m, 20 April 1939, *Killip 35052* (BM, US); *idem*, Trial to Miniquíá E of Mutis (Bahía Solano), 20m, 26 January 1971, *Lellinger & de la Sota 30* (BM, US); **El Valle**: Behind Boaventura, 24 May 1939, *Alston 8615* (BM, MO); *idem*, Costa del Pacífico, Río Cajambre: San Isidoro, 5m, 2 May 1944, *Cuatrecasas 17300* (F, US); *idem*, Sabaletas, 29 of highway from Buenaventura to Cali, 25m, 4 May 1944, *Killip & Cuatrecasas 38795* (F, US); **Cali**: 40m, 4 August 1979, *Calrera 5157* (MO).—**COSTA RICA**. *s.loc.*, *Rosenstock 306* (UC); **Alajuela**: 1100m, 17 July 1983, *Moran 3211* (UC, MO); *idem*, Llanura de San Carlos, 200m, 20 February 1966, *Molina et al. 17573* (F); **Heredia**: Cerros Sardinal, 10°28' N, 84°04' W, 80m, 21 January 1986, *Smith et al. 1777* (UC); *idem*, 100m, 22 March 1983, *Chacon 528* (MO); *idem*, 1800m, 20 July 1979, *Sperry 955* (MO); *idem*, 20m, 27 May 1976, *Croat* (MO); *idem*, 300m, 15 August 1967, *Evans & Bowers 3322* (MO); *idem*, Finca La Selva, on the Río Puerto Viejo, 91m, 28 March 1956, *Scamman & Holdridge 8000* (GH); *idem*, Finca La Selva, Sarapiquí region, 150m, 31 August 1961, *Weber 6128* (GH); *idem*, Finca la selva. Puerto Viejo de Sarapiquí, 1800m, 20 July 1979, *Sperry 955* (F); *idem*, near rio Puerto Viejo, about 2 km, 84°00' W, 10°26' S, 100m, 14 June 1968, *Burger & Stolze 5878* (F, GH); *idem*, on Río Puerto Viejo, 91m, 18 February 1955, *Scamman 7478* (GH); *idem*, Sarapiquí, 84°01'35" W, 10°43'24" S, 10m, 21 January 2008, *Rothfels 08-180* (MO); *idem*, Upstream from Puerto Viejo ca. 4 km at Finca La Se, 125m, 16 August 1967, *Mickel 3489* (NY); Limón: 100m, 4 May 1983, *Gómez et al. 20334* (MO, UC); *idem*, Cerro Coronel, 10°41' N, 83°38' W, 20m, 16 January 1986, *Stevens 23859* (UC); *idem*, Cerro Coronel, 10°41' N, 83°38' W, 80m, 14 March 1987, *Stevens et al. 24828* (UC); *idem*, 82°39' W, 9°35' S, 25m, 19 November 1984, *Grayum 4479* (MO); *idem*, Cantón de Pococi, 40m, 17 May 1995, *Rojas et al. 1820* (BM, MO); *idem*, Cerro Coronel, 10°41' S, 83°38' W, 20m, 16 January 1986, *Stevens 23859* (MO); *idem*, Cerro Coronel, E, of Laguna Danto, 10°41' N, 83°38' W, 80m, 14 March 1987, *Stevens et al. 24828* (MO); *idem*, Dulce Nombre Arriba San Carlos, 650m, 23 June 1966, *Jiménez 4049* (F, GH); *idem*, in the hills between BriBri on the Río Sixaola and, 9°36' S, 82°49' W, 50m, 28 November 1975, *Baker & Burger 112* (F); *idem*, Pococi, 83°51' W, 10°34' S, 40m, 17 May 1995, *Rojas et al. 1820* (MO); *idem*, Talamanca, 9°32'30" N, 82°54'00" W, 150m, 25 June 1989, *Herrera 2981* (MO).—**ECUADOR**. **Esmeraldas**: San Lorenzo, 1°08' N, 78°33' W, 200m, 21 September 1992, *Aulestia et al. 585* (MO); *idem*, Reserva Etnica Awá. Centro, 0°10' N, 78°31' W, 300m, 19 October 1992, *Tipaz & Llanos 2135* (MO); *idem*, San Lourenzo, 1°10' N, 78°31' W, 300m, 19 October 1992, *Tipaz et al. 2039* (MO); *idem*, 1°70' N, 78°37' W, 200m, 12 February 1988, *Hoover et al. 4032* (UC, MO); *idem*, San José de Cayapas, 0°52' N, 78°56' W, 80m, 2 September 1980, *Holm-Nielsen et al. 25663* (NY, UC); **Napo**: Parque Nacional Yasuní, 0°38' N, 76°28' W, 14 April 1996, *Moran et al. 6198* (NY, QCN); **Orellana**: Carrillo, *Reyes 697* (MO).—**NICARAGUA**. **Atlántico Norte**: Bonanza, reserva de Bosawas, 14°06'59" S, 84°43'49" W, 50m, 20 September 2003, *Coronado & Gurdian 290* (MO); **El Castillo**: 11°14'22" S, 0°84'14" W, 350m, 7 April 2005, *Toval 300* (UC, MO). Río San Juan: 200m, 18 April 1978, *Neill & Vincelli 3586* (MO); *idem*, 10°51' S, 84°10' W, 150m, 28 November 1998, *Rueda et al. 9174* (MO); *idem*, 10°51' S, 84°10' W, 150m, 28 November 1998, *Rueda et al. 9190* (MO); *idem*, 10°51' S, 84°10' W, 150m, 29 November 1998, *Rueda et al. 9268* (MO); *idem*, 10°51' S, 84°10' W, 150m, 30 November 1998, *Rueda et al. 9276* (MO); *idem*, 11°01' S, 84°12' W, 350m, 9 December 1998, *Rueda et al. 9631* (MO); *idem*, 11°01' S, 84°14' W, 120m, 3 January 1997, *Rueda et al. 5267* (MO).—**PANAMA**. **Coclé**: Logging

camp 12 mi from Liano Grande, 8°47' S, 80°28' W, 700m, 11 December 1983, *Churchill et al.* 4057 (MO); **Colón:** 8°58'29" S, 80°45'28" W, 10m, 9 December 2007, *van der Werff* 22296 (MO); **Darién:** 21 December 1980, *Hartman* 12107 (UC); *idem*, Parque Nacional del Darién, 8°03'50" N, 77°17'00" W, 600–850m, 15 October 1987, *Hammel et al.* 16219 (UC, MO); *idem*, 0.5 to 1.5 me E of Manene, along or near stream, 21 December 1980, *Hartman* 12107 (MO); *s.loc.*, 10 km above Pan-Am Highway on road from, 350m, 21 February 1973, *Kennedy* 2538 (MO).—**PERU.** **Imaza:** Amazonas: Condorcanti, 5°03'24" S, 78°20'17" W, 350m, March 2002, *Bonino* 414 (MO); **Loreto:** Mariscal Ramon Castilla, 3°13' S, 72°80' W, 100m, 3 June 1997, *Tuomisto et al.* 11371 (UC); *idem*, 3°15' S, 72°40' W, 100m, 28 May 1997, *Tuomisto et al.* 11324 (UC); *idem*, 3°16' S, 72°00' W, 100m, 16 May 1997, *Tuomisto et al.* 11008 (UC); *idem*, San Antonio, on rio Itaya, 110m, 18 September 1929, *Killip & Smith* 29378 (NY); *idem*, San Antonio, Rio Itaya, 110m, 18 September 1929, *Killip & Smith* 29378 (US); *s.loc.*, 1938, *Elias s.n.* (US).

15. *Meniscium longifolium* Desvaux (1827: 223). (Figs 29A–C; 30A–B)

Dryopteris desvauxii Maxon & Morton (1938: 369). *Dryopteris reticulata* var. *longifolia* (Desv.) Rosenstock (1910: 44). *Thelypteris longifolia* (Desv.) Tryon (1967: 7). *Cyclosorus longifolius* (Desv.) Mazumdar & Mukhopadhyay (2014: 24). **Type:**—BRAZIL. “Habitat in Brasilia”, *s.loc.*, *s.d.*, *Desvaux A.N.* 60 (lectotype P [P00644690], here designated).

=*Meniscium longifolium* Fée (1869: 84, t. 25, f. 2). *nom. illeg.* *Nephrodium longifolium* (Fée) Hieronymus (1904: 449). *Dryopteris longifolia* (Fée) Hieronymus (1907: 351). **Type** (Syntypes):—BRAZIL. Rio de Janeiro. “Jacuacanga”, Jacuecanga, 18 June 1868, *Glaziou A.*, 2375 K, P, S, *s.d.*, *Glaziou*, 1747 K, P, S, US, (fragment B) (lectotype P [P01630820]), here designated; isolectotypes K [000945827], P [00644682, 00644683, 00644684, 00644685, 01514646, 01514647] and S [without barcode].

=*Phegopteris mollis* Mettenius (1864: 242). *Dryopteris sorbifolia* var. *mollis* (Mett.) Hieronymus (1907: 351). *Dryopteris permollis* Maxon & Morton (1938: 372). *Thelypteris mollis* (Mett.) Tryon (1967: 7). **Type:**—COLOMBIA. “Llano de San Martin, Paraiso, altit. 300 metr. (Triana)”, January 1856, *J.J. Triana* 615 (herbarium number) (lectotype COL [COL00756], here designated; isolectotypes BM [BM000937793], US [US1593679-fragment]).

=*Nephrodium sorbifolium* var. *molle* f. *angustipinnata* (Mett.) Hieronymus (1904: 449). **Type:**—COLOMBIA. “Columbia: locis humidis in monte Alto de las Cruces prope urbem Cali in provincia Cauca, alt. s. m. 1000–1300 m (L. 2937, 26. m. Jul 1883)”, 26 July de 1883, *Lehmann* 2927 (lectotype B [B200064539], here designated; isolectotypes: B [B200064538], US [US826358], K [K000633672]).

Rhizomes creeping, 1.1–2.0 cm diam., glabrous. **Fronds** (49.5–)63–195(–303) cm long, monomorphic. **Petioles** (19–)30–108 cm long, 0.4–1.2 cm diam., with brown basal portion and greenish to stramineous distal portion, glabrous or glabrescent, hairs on the basal portion acicular, 0.1–0.2 mm long, erect, scales further up adpressed, patent, caducous, filiform, ovate and lanceolate, with acicular hairs on the margin. **Laminae** 30.5–108 cm long, 1-pinnate, widely oblong, triangular-lanceolate, chartaceous. **Rachises** glabrous or sulcus on adaxial side with 0.1–0.2 mm long, acicular, curved hairs and sometimes glands. **Buds** absent. **Pinnae** in (8–)12–20 pairs, median pinnae (8.5–)11–31(–38) × (1.5–)2.2–2.7(–3.5) cm, lanceolate to linear-lanceolate, proximal pinnae sessile to petiolulate, petiolule 0.1–1.6 cm long, distal pinnae sessile, abruptly or not abruptly reduced; **bases** of proximal pinnae short- or long-cuneate, truncate, rarely (on individuals with numerous hairs) with short auricle on the acroscopic side, base of median and distal pinnae round, truncate or asymmetric with basisopic side round and adnate and acroscopic side truncate and parallel to the rachis; **margins** entire or undulate, sinuous to slightly crenate, with hairs equal to those on the rachis; **apices** narrowly acute to long-cuneate; **adaxial surfaces** glabrous or rarely with filiform scales on veins and between veins, costa with moderate to dense, acicular, 0.1–0.2 mm long, curved, tortuous, patent hairs; **abaxial surfaces** on costae, veins, and between the veins with moderate to dense, glandular, acicular, 0.15–0.3 mm long, erect hairs and sparse, filiform, 0.2–0.5 mm long, adpressed, branched scales with long (0.2–0.3 mm), acicular hairs, rarely with arachnoid, hyaline, caducous scales near margin; **costal veins** 8–19(–22) on sterile and fertile pinnae per 3 cm; **secondary veins** arcuate on fertile pinnae and subsigmoid on sterile pinnae, united to form an obtuse angle with one excurrent, free veinlet or veinlet completely dividing the areole; **areoles** in 7–13 rows between costa and margin, wider than long. **Sori** oblong to lunulate, uniseriate between the costal veins, not subconfluent, subconfluent or rarely confluent at maturity; **receptacles** glabrous or with scale-like, branched sporangiaster; **sporangia** with paraphyses on the stalk, 2–3 septate, with acicular, 0.2–0.4 mm long hairs on the septa and globose apical cell, this sometimes inconspicuous, brown to reddish. **Spores** highly cristate-echinate, crests short, wide, with echinate elements.

Distribution and habitat:—Bolivia, Brazil, Colombia, Ecuador, Guyana, Honduras, Panama, Paraguay, Peru, and Venezuela (Fig. 45). This species is terrestrial in forests or in swampy environments in gallery forests, on the margins of streams, at 10–1650 m.

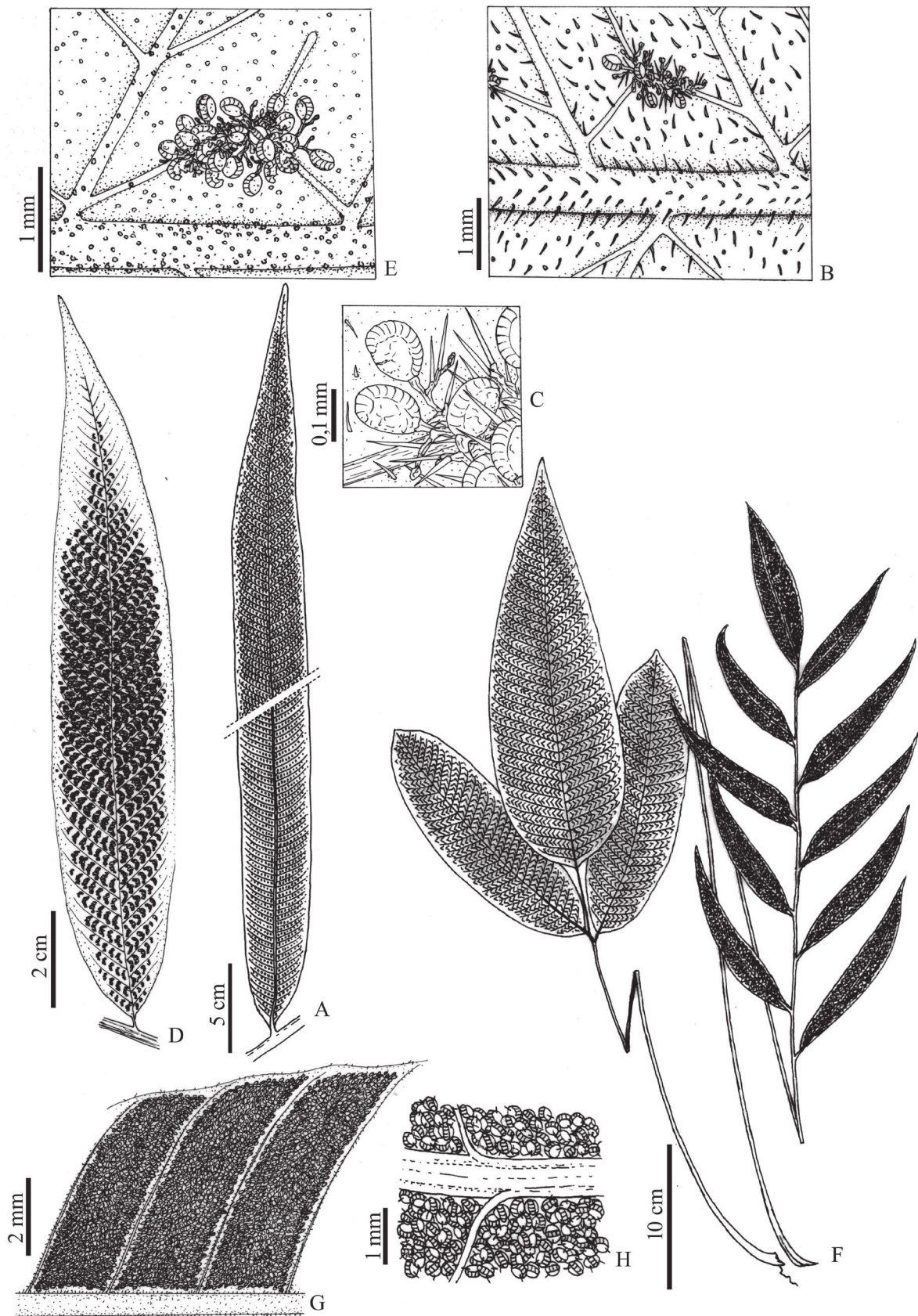


FIGURE 29. A–C. *Meniscium longifolium*. A. fertile pinna; B. detail of the abaxial surface of the fertile pinna showing acicular and glandular hairs; C. sporangia with paraphyses. D–E. *M. maxonianum*. D. fertile pinna; E. detail of the abaxial surface of the fertile pinna showing glandular hairs. F–H. *M. macrophyllum*. F. sterile and fertile fronds; G. detail of the abaxial surface of the fertile pinna showing acrostichoid sporangia; H. sporangia with acicular hairs on capsule (A–C. Salino 2202, BHCB; D–E. Pietrobom & Santiago 4894, BHCB; F–H. Arruda et al. 819, 963, BHCB).

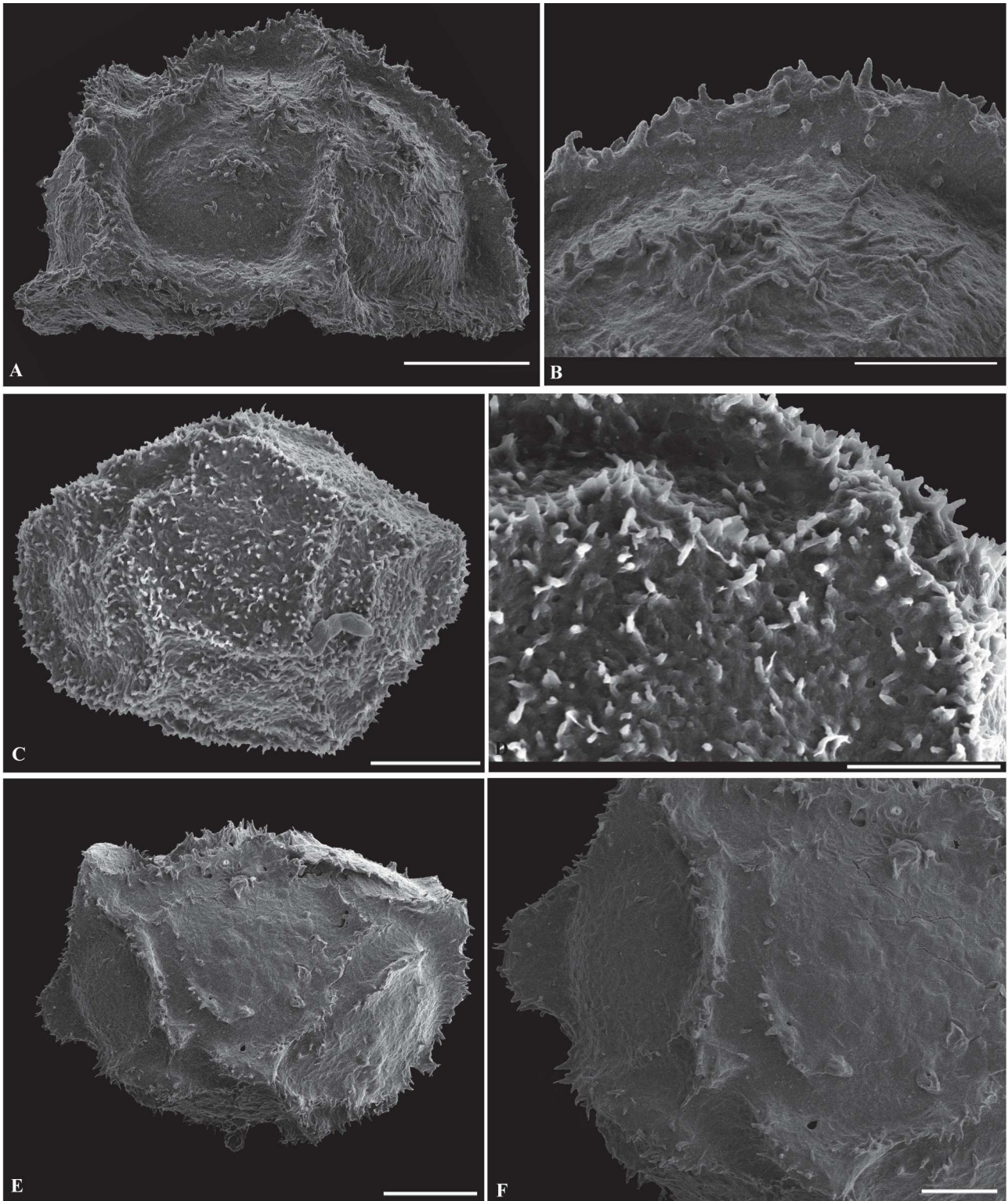


FIGURE 30. Spores of *Meniscium*. **A–B.** *M. lingulatum*, alate-fimbriate spore. **C–D.** *M. longifolium*, cristate-echinate spore. **E–F.** *Meniscium macrophyllum*, winged-fimbriate spore (**A–B.** Stevens *et al.* 24828, UC; **C–D.** Korte & Kniess 4935, FURB; **E–F.** Costa 210, MG). Scales bars: A, C, E = 10 μ m; B, D, F = 5 μ m.

Notes:—*Meniscium longifolium* has pinnae that are linear to lanceolate, sessile, or with the proximal pinnae petiolulate, with acicular, erect hairs and glandular hairs on the abaxial surface that are moderate to dense (rarely sparse).

The concept we recognize for *M. longifolium* includes two general patterns that corroborate what was proposed by Smith (1983): the “*mollis*” pattern, which includes specimens that have smaller fronds and pinnae (8–19 \times 1.2–2 cm),

proximal pinnae sessile, base truncate and abaxial surface with dense acicular hairs, with a velvety appearance, and rarely with glands; and the *longifolium* pattern, which includes specimens with larger fronds and pinnae (16–29 × 2.3 cm), proximal pinnae sessile or petiolulate, base cuneate and abaxial surface with moderate to dense hairs and glands. However, when these patterns are observed together, there is a continuum within the species, which can be confirmed in specimens with an intermediate morphology, such as those with large fronds, long pinnae (41 × 3.3 cm) and abaxial surface of the pinnae with dense glandular hairs and few acicular hairs or long pinnae (41 × 3.3 cm) with dense hairs (velvety) and glands (Cardenas 2991 [F]–Bolivia). Although they consider *Dryopteris permollis* a different species from *M. longifolium*, Maxon & Morton (1938) commented about the large variation observed in *M. longifolium* = *D. desvauxii*.

A study of *M. longifolium* at the population level might be necessary to better understand the distribution of morphological characters associated to the environments where this species occurs.

Meniscium longifolium is most similar to *M. hostmannii* and *M. maxonianum*. *Meniscium hostmannii* differs by the costa and vines on the abaxial pinna surface with filiform, branched scales (rarely with acicular hairs on the costa) and glabrous surface between the veins. *Meniscium maxonianum* differs from *M. longifolium* by all parts of the abaxial pinna surface and sporangia with only dense glandular hairs, while *M. longifolium* has an abaxial pinna surface with glandular and acicular hairs on all parts and acicular hairs on the sporangia.

In addition to *M. longifolium*, the other species of the genus that has dense acicular hairs on the abaxial pinna surface and sporangia is *M. chrysodioides*. However, it differs from *M. longifolium* by having an abaxial pinna surface with short, acicular hairs (0.15–0.1 mm long), no glandular hairs, elliptic-lanceolate, wide (2.4–5.1 cm wide) pinnae, fertile pinnae with a margin that is usually crenate, and straight to arcuate sori on the secondary veins that are not confluent at maturity.

Meniscium longifolium is also similar to larger specimens of *M. arborescens* that have long, wide pinnae. However, *M. arborescens* has sigmoid veins and tortuous hairs on the costa and veins of the abaxial surface, sporangia that are usually glabrous or with paraphyses, with only one hair, as well as erect pinnae, abruptly reduced distal pinnae and a chartaceous lamina.

Specimens examined:—**BOLIVIA.** Cordillera Real, Ticunhuaya, 1524m, 20 April 1926, *Tate 1062* (NY); **Pando:** Manuripi, camino, Cobija-Chivé, comunidad Holanda vertiente, 11°46' S, 68°42' W, 220m, 30 July 2003, *Jimene 1967* (NY); Roboré, 416m, October 1934, *Cárdenas 2991* (F, US); **Santa Cruz:** San José de Chiquitos, 508m, 2 February 1902, *Williams 1245* (NY, GH); *idem*, San Carlos, Mapiri, 850m, 13 January 1927, *Buchtien 241* (NY); *idem*, Velasco, 60°49' W, 13°39' S, 250m, 4 June 1994, *Wellens & Rocha 786* (MO); *idem*, Parque Nacional Noel Kempff, 13°39'20" S, 60°49'08" W, 220m, 5 June 1994, *Arroyo & Rocha 786* (NY, UC); *idem*, Parque Nacional Noel Kempff Mercado, 13°39'20" S, 60°49'08" W, 250m, 6 October 1995, *Vargas et al. 4068* (USZ).—**BRAZIL.** **Acre:** Cruzeiro do Sul, 7°35'36" S, 72°24'50" W, 190m, 9 December 2010, *Salino & Almeida 15002* (BHCB); *idem*, Arredores do Aeroporto, Projeto Radam BRAZIL, 9 February 1976, *Monteiro & Damião 204* (MG, INPA); **Amapá:** Oeste do Acampamento da Sop, km 105 este de Porto, 19 October 1979, *Austin et al. 7127* (INPA, MG); Airão, Rio Negro, 1000m, 27 May 1948, *Black 48-2899* (IAN); *s.loc.*, 19 October 1979, *Austin et al. 7127* (US); **Amazonas:** Coarí, Província Petrolífera de Urucu, 6 March 2007, *Pietrobon 6971; 6973* (MG); *idem*, 4°52'56" S, 65°19'23" W, 56m, 11 March 2007, *Pietrobon 7096* (MG); *idem*, 4°53'03" S, 65°08'18" W, 65m, 14 February 2008, *Pietrobon 7630* (MG); *idem*, 4°53'37" S, 65°10'52" W, 14 March 2007, *Pietrobon 7140* (MG); *idem*, 4°53'39" S, 65°19'56" W, 68m, 16 February 2008, *Pietrobon et al. 7688* (MG); *idem*, 4°53'39" S, 65°19'56" W, 68m, 16 February 2008, *Pietrobon et al. 7693* (MG); *idem*, 31 May 1991, *Freitas & Mota 465* (INPA); Humaitá: Igarapé Mangabal, 1 km ao sul da BR 230, Km 4, 7°31' S, 63°10' W, 7m, 24 July 1981, *Janssen 564* (INPA); Manaus: 16 August 1928, *Tate 11* (NY); *idem*, 3 August 1998, *Coelho 15* (INPA); *idem*, 90 km N de Manaus, Distrito Agropecuário de SUFRAM, 19° S, 60°05' W, 250m, 18 August 1995, *Nee 4622* (NY); *idem*, BR 17km, 11 June 1958, *Ferreira s.n.* (HB); *idem*, Campus da Universidade, 31 August 1995, *Arévalo 767* (INPA); *idem*, Campus da Universidad 31 August 1995, *Arévalo 775* (INPA); *idem*, 31 August 1995, *Arévalo, M.F. 777* (INPA); *idem*, Casa Augin, 17 October 1958, *Coelho 31* (HB); *idem*, cerca de 90 km N de Manaus, 2°19' S, 60°05' W, 50m, 18 August 1995, *Nee 46222* (INPA, MBM); *idem*, Distrito agropecuário da SUFRAMA, 24 February 1992, *Nee 42573* (INPA); *idem*, estrada Manaus-Caracarái, km 15, *de la Sota 7850* (GH); *idem*, garapé do Baião, 7 August 1957, *William 478* (HB); *idem*, Igarapé do Bindá, 7 August 1957, *Rodrigues s.n.* (INPA); *idem*, Igarapé do Buião, 7 August 1957, *Rodrigues 478* (MG); *idem*, INPA, *Conant et al. 1035* (INPA, GH); *idem*, km 30 da BR 17, 11 June 1958, *Ernani s.n.* (INPA); *idem*, Km 9 da BR 17, 8 July 1955, *Chagas 1363* (IAN, MG, INPA, US); *idem*, Manaus-Itacoatiara, km 26, 13 March 1995, *Prado & Costa 566* (INPA, IAN, NY); *idem*, Manaus-Itacoatiara, km 26, 2°53' S, 59°58' W, 20 March 1995, *Prado et al. 626* (INPA); *idem*, Manaus-Itacoatiara, Km 26, 2°53' S, 59°58' W, 22 March 1995, *Prado et al. 681* (INPA, MG); *idem*, Manaus-Caracarái road,

Km 2, 29 March 1971, *Prance et al. 11654* (INPA, MG, NY); *idem*, Manaus-Caracarai, km 15, *de la Sota s.n.* (INPA); *idem*, Ponte da Bolívia, 26 September 1968, *Rodrigues & Monteiro, O. 8566* (INPA, IAN); *idem*, Reserva Ducke, Km 26, Manaus-Itacoatiara road, 1975, *Conant et al. 895* (BM, F, HB, INPA, K, NY, UC, US); *idem*, Caracarai: Estrada Manaus-Caracarai, Km 15, *de la Sota 7850* (HB); Rio Javari, 11 October 1967, *Prance et al. 23813* (INPA, NY); Rio Urubu, Serra da Lua, 6 June 1968, *Prance et al. 5008* (INPA, UC, NY); São Gabriel da Cachoeira, March 1852, *Spruce 2141* (K, BM); *idem*, Margem do rio Negro, 12 November 1997, *Freitas et al. 587* (INPA); *idem*, São Gabriel da Cachoeira, Margem do rio Negro, 13 November 1997, *Freitas et al. 592* (INPA); *idem*, Nogueira, 10 January 1982, *Krieger s.n.* (BHCB); *idem*, Tefé, Nogueira, 25 February 1973, *Marilene 12564* (INPA); *s.loc.*, upper Rio Negro, 1907, *Weiss & Schmidt s.n.* (NY); Barra do Rio Negro, January 1857, *Spruce 1243* (K); *idem*, *Philcox 5055* (INPA); **Bahia**: Rui Barbosa, Encosta da Serra do Orobó, Bom Jardim, 12°19'39" S, 40°28'33" W, 478m, 3 September 2004, *Queiroz et al. 9472* (UFP); **Ceará**: *s.loc.*, 1840, *Gardner 1904* (BM, K); Crato, Fontes do Rio Granjeiro, 16 June 1934, *Philipp von Luetzelburg 26312* (EAC); Ceará: 'Crato', Fontes do Rio Granjeiro, 21 February 1933, *Philipp von Luetzelburg 25817* (EAC); **Distrito Federal**: *s.loc.*, 1100m, 5 October 1965, *Irwin & Reis dos Santos 8973* (US); *idem*, 35 km E. of Brasília, 700m, 21 August 1964, *Irwin & Soderstrom 5404* (NY, US); QI 19 córrego mata gado, 15°52' S, 47°51' W, 102m, 9 August 1999, *Rodrigues & Jesus Jr. 1349* (UFP); Cabeceira do Guariba a 3 km sudeste do Acampamento, 1000m, 8 October 1968, *Onishi 1245A* (IAN); Chapada da Contagem, ca. 15 km NE of Brasília, DF, 1000m, 4 May 1966, *Irwin et al. 15624* (IAN, NY); Fazenda Água Limpa/UNB, 15°57' S, 47°55' W, 1060m, 2 December 1994, *Walter 2297* (NY); Fazenda Santa Prisca, 29 January 1990, *Alvarenga & Lopes 640* (K, NY); Acampamento do D.V.O., 550m, 23 December 1964, *Belém & Mendes 68* (IAN); Parque do Gama, 600m, 23 January 1966, *Pabst 8760* (HB); Planalto Central, 1100m, 5 October 1965, *Irwin 8973* (IAN, NY); Planalto Central, 950m, 15 May 1966, *Irwin et al. 15880* (IAN); Fazenda Água Limpa Olho d'Água da Onça, 14 April 1997, *Novelino & Moreira 1304* (BHCB); Fazenda Sucupira, 1080m, 6 March 1996, *Walter 3241* (NY); near Vargem Bonita, 18 km SSW of Brasília TV tower, 15 October 1976, *Ratter et al. 3793* (K, NY); near Vargem Bonita, 18 km SSW of Brasília TV tower, 21 September 1976, *Ratter et al. 3631* (K, NY); Parque Municipal do Gama, 25 km de Brasília, 1150m, 10 November 1965, *Irwin et al. 10140* (NY); Perto de DF-20, ca 12km W de Gama., 16°01' S, 48°12' W, 960m, 10 February 1982, *Kirkbride 4641* (US); Planaltina, 24 June 1967, *Ratter & Gifford 72439* (K, NY); Planaltina, near Brasília, 26 June 1967, *Rotter 5* (US); *s.loc.*, 5 May 1957, *Helmuth s.n.* (B); *idem*, 11 July 1976, *Ratter 3261* (K); *idem*, near Brasília, *Irwin 15880* (US); **Espírito Santo**: Cariacica, Reserva Biológica de Duas Bocas, 20°18'14" S, 40°29'13" W, 425m, 12 June 2010, *Salino et al. 14894* (BHCB); Cariacica, Reserva Biológica Duas Bocas, 20°18'90" S, 40°28'55" W, 500m, 16 February 2008, *Labiak et al. 4655* (UPCB); Conceição da Barra, Reserva Biológica de Córrego Grande, 18°16'56" S, 39°48'10" W, 44m, 12 June 2009, *Salino et al. 14366* (BHCB); Linhares, Reserva Floresta de Linhares, 12 January 1998, *Folli 3094* (BHCB); *idem*, 19°09'18" S, 40°02'33" W, 30m, 8 February 2007, *Almeida et al. 666* (BHCB); Linhares, Reserva Natural da Vale, 19°09'43" S, 40°04'00" W, 10m, 17 April 2011, *Salino et al. 15069* (BHCB); Sooretama, Reserva Florestal de Linhares-Floresta Rio Doce, 20 March 1999, *Salino & Morais 4517* (BHCB); Vila Velha, Barra do Jucu, *Pr. Vedens s.n.* (BR); Sooretama, Reserva Florestal de Linhares-Floresta Rio Doce, 19 March 1999, *Salino & Morais 4504* (BHCB); **Goiás**: 5 May 1957, *Sick s.n.* (HB); Itarumã, Estrada municipal entrocamento com GO 184-Itarumã, 18°42' S, 51°25' W, 650m, 28 August 1993, *Silva 999* (HB); Parque Nacional do Tocantins, 2 October 1967, *Hass Has 508* (HB); Pirenópolis, Serra dos Pireneus, 1200m, 15 February 2000, *Hatschbach et al. 70263* (C, MBM, UC); Serra dos Cristais, 1200m, 4 April 1973, *Anderson et al. 8149* (B, F, K, NY, UC); **Mato Grosso do Sul**: Corumbá, Reserva Acurizal. Campina do Fundão, 17°52'54" S, 57°33'02" W, 8 May 2003, *Pott et al. 6271* (BHCB); *idem*, Serra do Amolar, 17°54'20" S, 57°34'07" W, 605m, 12 May 2003, *Pott & Lima 6328* (BHCB); Rio Verde de Mato Grosso: Serra Pimenteira, Cachoeira Babaçu, Fazenda Quarte, 18°55' S, 54°53' W, 300m, 23 February 1994, *Rodrigues Jr. & Silva 745* (BHCB); **Mato Grosso**: 5 km N of Barra do Garça, south face of mountain, 500m, 7 May 1973, *Anderson et al. 9898* (NY, UC, US); Alto Araguaia, 17°18' S, 53°13' W, 500m, 5 September 1993, *Silva & Nobile 1093* (MO); Alto Taquari, Fazenda Bambuzal, 850m, 10 November 1988, *Salino 592* (BHCB); *idem*, Fazenda Bambuzal, 850m, 10 November 1988, *Salino 593* (BHCB); Canarana: 13°35' S, 52°00' W, 400m, 14 October 1990, *Windisch 5856* (UC); Chapada dos Guimarães, Chapada dos Guimarães-Cachoeira do Pulo, 17 February 1988, *Salino 407* (BHCB); *idem*, 15°24'59" S, 55°50'31" W, 591m, 2 March 2011, *Almeida et al. 2675* (BHCB); *idem*, 15°24'21" S, 55°50'10" W, 586m, 28 February 2011, *Almeida et al. 2658* (BHCB); *idem*, Caminho, 15°19'20" S, 55°52'22" W, 301m, 1 March 2011, *Almeida et al. 2663* (BHCB); Cuiabá: Salgadeira, Chapada ds Guimarães, 2 March 1983, *Cunha et al. 783* (MG); Itiquira, Ribeirão Ponte Preta, 8 November 1991, *Windisch 6607* (UC); Nova Xavantina, 6 km S of Xavantina, 14°38' S, 52°14' W, 15 September 1967, *Argent et al. 6403* (K, NY, US); *idem*, cabeceira do riacho Guariba, 8 October 1968, *Onishi & Fonseca 466/1245* (K); *idem*, Serra do Roncador, 550m, 13 May 1966, *Irwin et al. 16304* (F, IAN, K, MO, US); Cachimbo road, 600m, 31 May 1966, *Hunt & Ramos 5676* (K, US); Rio

Verde, Serra da Pimenteira, 28 August 1973, *Hatschbach 32451* (MBM, NY); **Minas Gerais**: Ouro Preto, In Serra de Antonio Pereira, prope Frazão, February 1907, *Neves 474* (R); Catas Altas, RPPN Santuário do Caraça. Mata do Engenho, 20°02'57" S, 43°30'32" W, 793m, 20 May 2010, *Almeida S & Salino 2383* (BHCB); *idem*, Mata do Engenho, 20°05'00" S, 43°51'64" W, 847m, 25 August 2008, *Viveiros et al. 02* (BHCB); Conceição do Mato Dentro, 19°05'31" S, 43°34'11" W, 1 July 2003, *Mota 2053* (BHCB); *idem*, 600m, 12 September 1974, *Wels & Windisch 222* (HB); *idem*, Distrito de São Sebastião do Bonsucesso, Serra do, 18°55'50" S, 43°25'94" W, 888m, 10 September 2007, *Almeida et al. 1261* (BHCB); Conceição do Mato Dentro, Estrada para Morro do Pilar, 19°06'11" S, 43°24'34" W, 25 September 2005, *Almeida et al.* (BHCB); *idem*, Fazenda Jardim, 18°55' S, 43°24' W, 832m, 20 February 2007, *Viana & Silva 2837* (BHCB); *idem*, No entorno do Parque Natural Municipal do Ribeirão, 19°03'14" S, 43°37'04" W, 1200m, 8 August 2003, *Salino & Mota 8881* (BHCB); *idem*, Pito Aceso, 700m, 19 May 1989, *Hatschbach et al. 52933* (UC, MBM, HB, UPCB); Diamantina, Parque Estadual do Biribiri. Fazenda São José, 18°08'19" S, 43°30'47" W, 703m, 3 October 2006, *Almeida et al. 464* (BHCB); Formoso, Parque Nacional do Grande Sertão Veredas, 15°23'27" S, 45°53'04" W, 775m, 7 February 2006, *Salino et al. 10799* (BHCB); Furnas, 2 July 1995, *Salino 2202* (BHCB); Furnas, Região da Represa de Furnas, Morro próximo a Pousa, 30 September 2005, *Arantes et al. 1504* (BHCB); *idem*, Paraíso Perdido, 16 February 2006, *Hattori et al. 464* (BHCB); Grão Mogol, Estreito do Riacho Ribeirão, 16°32' S, 42°54' W, 950m, 16 June 1990, *Zappi et al.* (BHCB); *idem*, 16°32' S, 42°54' W, 950m, 16 June 1990, *Zappi et al. 13121* (BHCB, SPF); Itambé do Mato Dentro, Cachoeira do Lúcio, 19°41'40" S, 43°33'05" W, 670m, 21 April 2011, *Salino 15105* (BHCB); Itambé do Mato Dentro, Cachoeira do Soronata, 19°22'00" S, 43°16'32" W, 630m, 21 April 2011, *Salino 15119* (BHCB); Itambé do Mato Dentro, Cachoeira do Soronata, 19°22'00" S, 43°16'32" W, 630m, 21 April 2011, *Salino 15120* (BHCB); Leme de Prado, Estação Ecológica de Acauã, 17°09'43" S, 42°46'38" W, 780m, 2 July 2006, *Salino et al. 11215* (BHCB); Mariana, Parque Estadual do Itacolomi. Cibrão, 20°28'43" S, 43°25'50" W, 680m, 13 February 2006, *Rolim & Silva 256* (BHCB); Marliéria, Parque Estadual do Rio Doce, 13 September 1997, *Salino & Melo 3416* (BHCB); Mendanha, 18°00'37" S, 43°30'14" W, 930m, 14 January 1998, *Forzza et al. 645* (SPF); Perdizes, Estação Ambiental Galheiro, 7 April 2003, *Nakajima et al. 3170* (MBM); Santa Rita do Itueto, Parque Estadual de Sete Salões, trilha para Gruta, 19°16'42" S, 41°22'27" W, 770m, 9 May 2006, *Salino et al. 11010* (BHCB); *idem*, 19°17'07" S, 41°22'30" W, 590m, 9 May 2006, *Salino et al. 11012* (BHCB); São Gonçalo do Rio Abaixo, Estação de Pesquisa e Desenvolvimento Ambiental, 31 July 2003, *Salino et al. 8846* (BHCB); *idem*, 19°53'00" S, 43°22'10" W, 26 September 2002, *Salino 8060* (BHCB); São Gonçalo do Rio Preto, Parque Estadual do Rio Preto, 10 June 1999, *Salino 4749* (BHCB); *idem*, 12 June 1999, *Salino 4836* (BHCB); *idem*, 19 November 1999, *Melo 06* (BHCB); *idem*, 18°07'26" S, 43°20'48" W, 714m, 24 March 2006, *Costa & Lessa 1051* (BHCB); *idem*, Córrego das Éguas, 18°08'43" S, 43°22'10" W, 8 April 2000, *Salino 5203* (BHCB); *idem*, Rio das Éguas, 18 November 1999, *Melo 12* (BHCB); São Sebastião do Paraíso, Fazenda Cachoeira, 17 April 1945, *Brade & Barbosa 17955* (BHCB, RB); Serranópolis de Minas, Estrada Rio Pardo de Minas à Serranópolis de Minas, 15°54'16" S, 42°46'29" W, 790m, 14 March 2007, *Salino et al. 11775* (BHCB); Turmalina, Estação Ecológica de Acauã, 17°11'35" S, 42°47'48" W, 720m, 3 July 2006, *Salino et al. 11233* (BHCB); Virgem da Lapa, Cia Suzano Celulose-Gleba J, 11 January 2006, *Tameirão 4554* (BHCB); Santana do Riacho, Serra do Cipó, Base da cachoeira da Farofa, 19°22'49" S, 43°34'37" W, 1010m, 6 July 2001, *Souza et al. 25248* (ESA); *s.loc.*, Serra da Babilônia, May 1883, *Glaziou 14459* (B, K); **Pará**: Santarém, 40m, 22 July 1954, *Ashton 88* (BM); **Paraná**: Alexandra, 21 August 1910, *Dusén 10159* (B, BM, K, NY); Antonia, Reserva Natural Rio Cachoeira (SPVS). Trilha do Be, 48°41' W, 25°18' S, 30m, 1 May 2006, *Matos & Weiss 1138* (UPCB); *idem*, Manduira, 50m, 10 September 1993, *Hatschbach & Campos 59451* (C, ESA, MBM, UC); *idem*, Reserva Ecológica de Sapitanduva, 15 October 2003, *Cervi et al. 8437* (UPCB); *idem*, Reserva Ecológica de Sapitanduva, June 1992, *Moro 264* (UPCB); *idem*, Reserva Natural rio Cachoeira, 25°15' S, 48°41' W, 30m, 15 January 2005, *Matos 189* (UPCB); *idem*, Reserva Natural Rio Cachoeira. Trilha do Corvo, 25°18' S, 48°41' W, 30m, 6 October 2005, *Matos & Schwarsburd 825* (MBM; UPCB); *idem*, Reserva Natural Rio Cochoeira, 25°18' S, 48°41' W, 30m, 11 July 2006, *et al. 1220* (UPCB); *idem*, Rio Faisqueira, 20m, 12 May 1990, *Hatschbach & Ribas 54108* (C, MBM, UC); Curitiba, 15 July 1951, *Frenzel, A. 634* (MBM); Guaraqueçaba, Poruquara, 5 February 1992, *Motta 2432* (MBM); *idem*, Trilha do vale do rio Real, 25°20' S, 48°12' W, 17 April 1993, *Prado et al. 519* (MBM, UPCB); Guaratuba, Morretes, July 1951, *Frenzel 1951* (MBM); *idem*, Morretes, 100m, 15 February 1964, *Sehnm 964* (MBM); *idem*, Morro do Morrete, 100m, 15 February 1964, *Hatschbach 10978* (F, MBM); *idem*, Rio São João, Porto Miranda, 20m, 24 June 1968, *Hatschbach 19420* (MBM, UPCB, UC); Jacaré, 23 September 1908, *Dusén 6580* (BM, F, MO); Matinhos, recanto Coqueiro, Rodovia Alexandra-Matinhos Km 12, 25°40'15" S, 48°34'25" W, 5m, 29 May 2007, *Ceccantini & Balboni 3122* (SPF); Morretes, 3 August 1977, *Dombrowski & Scherer Neto 7518* (MBM); *idem*, Bairro Porto de Cima, 25°28'50" S, 48°49'14" W, 91m, 11 April 2010, *Salino & Almeida 14809* (BHCB); Paranaguá, Estação Ecológica do Guaraguaçu, 20 June 2000, *Kozera & Isernhagem 1432* (UPCB); *idem*, Ilha do Mel, 11 October 1992, *Salino et al. 1518* (BHCB); *idem*, Ilha do

Mel, baía de Paranaguá, 27 February 1953, *Tessmann s.n.* (MBM); *s.loc.*, Serra do Mar. Porto de Cima, 200m, 17 March 1916, *Dusén 14679* (F); *idem*, 23 September 1908, *Dusén 6580* (B); *idem*, 24 May 1804, *Lehman 166* (NY); **Pernambuco**: Bonito, Mata da Colônia, 8°30'14" S, 35°42'56" W, 800m, 7 May 2001, *Santiago. & Pietrobon 432* (BHCB); **Rio de Janeiro**: Cachoeira de Macacu, 22°27'52" S, 42°45'48" W, 38m, 16 November 2009, *Baber & Wesenberg 402* (RB); *idem*, 22°28'64" S, 42°45'10" W, 47m, 21 May 2009, *Baber & Wesenberg 119* (RB); *idem*, 22°29'00" S, 42°45'41" W, 28m, 8 November 2009, *Baber & Wesenberg 351* (RB); Duque de Caxias, Parque Natural Municipal de Taquara, 600m, 27 May 2006, *Jascone & Lima 632* (HB); Linhares, Reserva do Rio Doce, 19°09'45" S, 40°04'25" W, 2 December 2003, *Mynssen et al. 507* (RB); Majé, ca 3 km ESE Santo Aleixo, 22°35' S, 43°02' W, 50m, 15 August 1979, *Guedes & Gonzaga 16* (RB); *idem*, 22°35' S, 43°02' W, 50m, 26 October 1980, *Guedes Gonzaga 85* (RB); *idem*, 22°35' S, 43°02' W, 50m, 28 May 1983, *Guedes & Gonzaga 256* (RB); Parque Nacional da Restinga de Jurubatiba, 30 May 1999, *Guerra Santos et al. 1166* (BHCB); Restinga de Carapebus, Mata do Córrego Fundo, 19 October 1995, *Guerra Santos 556* (BHCB); Serra do Itatiaia, 2 July 1930, *Brade 10350* (R); Duque de Caxias, Xerém, 7 March 1964, *Andrade s.n.* (R); *s.loc.*, 1814, *Humboldt 1836* (B); *idem*, *Glaziou 2375* (B); *idem*, *Miers s.n.* (B, K); *idem*, 8 October 1939, *Brade 16138* (RB); **Roraima**: Estrada Boa Vista-Venezuela, 5 km South of rio Sur, 2 December 1977, *Steward et al. 197* (NY); **Santa Catarina**: Ascurra, Ilze Grande, 27°00'00" S, 49°19'14" W, 154m, 1 June 2012, *Korte & Kniess 2425* (FURB); Blumenau, Parque Nacional da Serra do Itajaí, 29 September 2007, *Gasper s.n.* (BHCB); *idem*, Parque Natural Municipal São Francisco de Assis, 11 July 2007, *Verdi & Santo 72* (FURB); *idem*, Rua Alpinópolis, 23 June 2006, *Souza 5431* (FURB); Botuverá, Salto Águas Negras, 27°10'47" S, 49°02'57" W, 219m, 31 October 2009, *Stival-Santos et al. 1126* (FURB); Garuva, Palmita, 26°01'49" S, 48°48'07" W, 18m, 1 February 2011, *Korte & Rigon-Junior 5852* (FURB); *idem*, Sol nascente, 26°03'18" S, 48°43'38" W, 13m, 30 September 2009, *Gasper et al. 2429* (FURB); Itapóá, Reserva Volta Velha, 4 March 1993, *Negrelle & Londero 831* (UPCB); *idem*, Saí Mirim, 26°06'00" S, 48°44'12" W, 18m, 18 November 2012, *Korte 5011* (FURB); Joinville, 24 May 1904, *Schmalz 166* (F, MO); São Francisco do Sul, 21 February 1952, *Smith & Pe Reitz 5705* (US); *idem*, Porto das Canoas, 21 February 1952, *Pe Reitz 4382* (BM); *idem*, 2m, 21 February 1952, *Smith & Pe Reitz 5705* (R, RB); *idem*, Vila da Glória, 4 February 2003, *Ferraz s.n.* (MBM); *idem*, Vila da Glória, CEPA, 27 August 2007, *Ziffer Berger 866* (MBM); *idem*, Vila da Glória, CEPA, 4 February 2003, *Ferraz 42* (MBM); *s.loc.*, May 1883, *Ule 44* (B); **São Paulo**: Brotas, Divisa com Itirapina, Fazenda Rochedo, 17 October 1991, *Salino 1117* (BHCB); Brotas, Mata Ciliar do Viveiro Municipal, August 1991, *Salino 1014* (BHCB); Brotas, Mata do Viveiro Municipal, 14 July 1991, *Salino 939* (BHCB); Cananéia, Parque Estadual do Jacupiranga, 25°00'09" S, 48°03'52" W, 50m, 29 March 2005, *Salino et al. 10300* (BHCB); Eldorado, Parque Estadual do Jacupiranga, 24°38'44" S, 48°23'36" W, 400m, 23 March 2005, *Salino et al. 10166* (BHCB); In circuito urbis Conceição de Itanhaém, July 1901, *Schiffner s.n.* (K); Itanhaém, 24°13'13" S, 46°55'51" W, 25m, 18 April 2001, *Salino 6630* (ESA); Itanhaém, Floresta Ombrófila Densa da Planície Litorânea, em, 24°13'13" S, 46°55'51" W, 25m, 18 April 2001, *Salino 6630* (BHCB); Itirapina, Estação Ecológica do Instituto Florestal, 750m, 21 July 1991, *Salino 963* (BHCB); Moji-Guaçu, Campos das Sete Lagoas, 22°11'18" S, 47°71'00" W, 575m, 15 June 1960, *Eiten & Eiten 2126* (US); Natividade da Serra, Parque Estadual da Serra do Mar, 23°24'45" S, 45°10'12" W, 900m, 30 October 2001, *Salino et al. 7732* (BHCB); Paranapiacaba, 600m, November 1925, *Brade 21440* (HB); Piracicaba, Dois Córregos, 22°36'15" S, 47°36'17" W, 23 June 1993, *Barreto 766* (BHCB); São José dos Campos, 1–2 km ao SW ao longo da Rodovia Pres. Dutra, 560m, 28 March 1962, *Mimura 341* (K, US); São Luiz do Paraitinga, Parque Estadual da Serra do Mar, Núcleo de Santa V, 23°25'57" S, 45°12'36" W, 800m, 10 August 2001, *Salino et al. 7444* (BHCB); São Paulo, Parque Estadual da Serra do Mar, Núcleo de Curucut, 23°59'38" S, 46°46'31" W, 800m, 13 April 2001, *Salino 6549* (BHCB); Ubatuba, Morro Corcovado, 7 September 1998, *Ribas & Dittrich 2690* (UC); Ubatuba, Parque estadual da Serra do Mar, 13 November 1993, *Salino 1904* (UC); Ubatuba, Parque Estadual da Serra do Mar, 12 November 1993, *Salino 1905* (BHCB); Ubatuba, região sul do município, 115m, 7 September 1998, *Dittrich 468* (BHCB); Ubatuba, Sertão da Quina, 7 September 1998, *Ribas & Dittrich 2690* (MBM); Cananéia, along east shore of island from center of city, 25°00' S, 47°55' W, 1m, 17 February 1965, *Eiten & Clayton 6175* (US); Campinas, 1905, *Rosenstock 215* (B); *s.loc.*, 1866, *Blanchet 3984* (K); *idem*, *Burchell 2635* (K); *idem*, *Glaziou 15743* (B); *idem*, *Glaziou, A. 15745* (B); *idem*, *Reidel s.n.* (B); *idem*, *Sellow s.n.* (B).—**COLOMBIA**. **Amazonas**: río Miritiparaná, 700m, 8 May 1952, *Schultes, R.E. & Cabrera, I. 16444* (GH, US); **Antioquia**: 29 November 1880, Kalbreyer, Mr. 1376 (K); *idem*, 75°04' W, 7°18' S, 400m, 2 March 1977, *Alverson et al. 139* (NY); *idem*, Anori, Vereda Santa Gertrudis, finca La Estrella, 7°07'59" S, 75°09'35" W, 1420m, 4 October 2003, *Rodríguez et al. 4142* (NY); *idem*, Segovia, 609m, December 1947, *Laudeman, L. 5566* (K); *idem*, Urrao, 4°35'57" S, 77°04'51" W, 1400m, 3 May 1995, *Fonnegra et al. 5556* (MO); **Chocó**: 22 January 1949, *Molina & Barkley s.n.* (US); *idem*, Quibdó, Quebrada La Platina, 60m, 26 March 1958, *Idrobo & Cuatrecasas 2690* (US); *idem*, Quibdó, Río Atrato, 60m, April 1931, *Archer 1808* (US); *idem*, Quibdo-Medellin road near Quibdó, 80m, 18 August 1976, *Gentry Fallen 17885* (US); **El Valle**:

Boaventura, 24 May 1939, *Alston 8626* (BM); *idem*, Buenaventura, 10m, 5 October 1922, *Killip 11683* (US); *idem*, Costa do Pacífico; Bahía de Buenaventura, 22 February 1946, *Cuatrecasas 19936* (US); *idem*, Buenaventura, pacific coast, 5 May 1922, *Pennel & Killip 5295* (NY, UC, GH); **Magdalena**: Sabanas de San Juan de Arama, 500m, 20 December 1950, *Idrobo & Schultes 687* (US); **Meta**: two km E of Río Zanza above junction with Río, 500m, 22 August 1950, *Smith & Idrobo 1541* (IAN, UC, US); *idem*, La Serranía entre los ríos Ariari y Meta, 260m, 22 November 1939, *Cuatrecasas 7825* (US); *idem*, Villarencio, 500m, January 1930, *Oubelaez 10* (US); Puerto López, Intendencia del Meta, 240m, 1 August 1944, *Little & Little 8376* (US); **Norte de Santander**: región del Sarare, 320m, 15 November 1941, *Cuatrecasas 13229* (F, US); **Putumayo**: 15 km NW of Puerto Asís, 304m, 30 July 1965, *King & Guevara 6117* (NY, US, GH); **San Martín**: *Stübel 648* (B). **Santander**: Guadalupe, 1650m, 12 December 1949, *Uribe 2018* (US); *idem*, Mesa de los Santos, 1500m, 11 December 1926, *Killip & Smith 15248* (NY, US, GH); **Vaupés**: Vicinity of Mitu, ca 2 km along dirt road, 1°14' N, 70°14' W, 200m, 24 May 1983, *Croat 56818* (UC, MO); **Vichada**: 140m, 28 December 1973, *Davidse 5289* (MO); *s.loc.*, 2km E of Río Zanza above junction with Río Guej, *Smith 1541* (US).—**COSTA RICA**. Buenos Aires: January 1892, *Pitter 539* (US).—**ECUADOR**. 600m, 11 April 1933, *Heinrichs 335* (B); **Morana-Santiago**: La Mision Salesiano, 5 km al S del rio Bomboiza y cerca la carretera Ze, 800m, 10 May 1985, *Baker 6135* (NY). **Pastaza**: Mera, North northwest of Shell, 1°29'50" S, 78°04'00" W, 1100m, 22 July 1992, *Fay & Fay 3681* (NY); road from Lago Agria-Coca. Profecto Payamina, July 1980, *Sobel & Strudwick 2378* (K, NY, US); **Zamora-Chinipe**: Zamora, Within 3 km of the town of Zamora, 4°03'50" S, 78°57'50" W, 1000m, 7 July 1994, *Fay & Fay 4345* (NY, MO); *idem*, Zemora, within 3 km of the town of Zemora, 78°57'50" W, 4°03'50" S, 1000m, 7 September 1994, *Fay & Fay 4378* (NY).—**GUYANA**. Rupununi Northern Savanna, 350m, 1963, *Goodland s.n.* (US); Potaro-Siparuni: Pakaraima Mts, Upper Ireng R, 4°49' S, 60°01' W, 570m, 16 January 1993, *Henkel et al. 832* (NY); *idem*, R, 4°48' S, 60°02' W, 600m, 13 January 1993, *Henkel et al. 734* (NY, US); *idem*, Paramakatoi and vicinity, 4°42' S, 59°48' W, 650m, 13 March 1989, *Hahn et al. 5668* (NY, US); *idem*, 4°40' S, 59°50' W, 650m, 25 March 1989, *Gillespie & Persaud 881* (NY, US); *idem*, Pakaraima Mtns., 5°06' S, 59°58' W, 625m, 18 October 1994, *Mutchnick et al. R. 63* (NY); *s.loc.*, 1863, *Appun 1058* (K).—**HONDURAS**. **Morazán**: Encostas do Nordeste do Cerro de Uyuca, 900m, 31 March 1951, *Morton 7544* (UC, US); *idem*, 28 August 1946, *Williams & Molina 10464* (US); *idem*, 1000m, 29 April 1964, *Molina 13779* (NY, US, GH); *idem*, Agua amarilla, 1160m, 28 August 1946, *Williams & Molina 10464* (GH); *idem*, Mountain slopes along Río Agua Amarilla, 1100m, 31 July 1950, *Standley 26206* (GH); *idem*, Near El Jicarito, along road toward El Pedregal, 900m, 13 September 1950, *Standley 26654* (GH); *idem*, Region of el Jicarito, 900m, 14 August 1950, *Standley 26404* (GH).—**PANAMA**. **Veraguas**: La Yeguada, 23 February 1974, *Mendieta 33* (US); *idem*, Between Cananzas and the foot of the Cordillera, 300m, 8 February 1937, *Allen 164* (US).—**PARAGUAY**. Sierra de Amambay, In Altaplanitie et declivibus, April 1907, *Hassler 10443* (B, BM, MPU); *s.loc.*, 1854, *Regnell 1444* (B).—**PERU**. **Maynas**: cerca a la quebrada de Shushuna, 130m, 16 April 1984, *Rimachi 7441* (MO, US); *idem*, Iquitos. Carretera Quisto Cocha-Nauta, Km 10, 160m, 10 January 1984, *McDaniel et al. 27604* (US); Pampayacu: 23 January 1927, *Kanehira 129* (GH); **Pasco**: Oxapampa, Palcazu, alrededores de la Estacion Biologica Pauj, 10°19' S, 75°15' W, 450m, 16 May 2003, *Monteagudo & Francis 5295* (NY); **Puno**: Sandia, between Rio Azata-Colorado downstream, 12°50' S, 0°00' W, 1100m, 27 June 1986, *Núñez & Munoz 5347* (NY); Rio Negro, Stubelianae 1075 (B); San Martín, rio Negro, 848m, 20 January 1965, *Soukup 5219* (GH); *idem*, Moyobamba, Rio Huallaga, *Stubelianae 1094* (B); *idem*, N.W. of San Martín, Rioja: rio Negro, 848m, 20 January 1965, *Soukup 5221* (GH).—**VENEZUELA**. **Apure**: Pedro Camejo, 6°39' S, 67°17' W, 70m, 21 February 1979, *Davidse & González 15560* (MO, UC); *idem*, 6°13' S, 68°48' W, 70m, 16 February 1978, *Davidse & González 14231* (MO); **Barinas**: Pedraza, road then trail from El Algarrobo to Mesa de Canag, 8°31' S, 70°34' W, 320m, 16 April 1988, *Dorr et al. 4742* (NY); **Bolívar**: Gran Sabana, Conuco de Odremán, Sta. Elena, February 1946, *Tamayo 2999* (US); *idem*, Raúl Leoni, Aza-karon, Pista Nueva, 6°21'04" S, 63°25'09" W, 270m, 30 May 1992, *Diaz 895* (NY); *idem*, Raúl Leoni, 6°34' S, 66°23' W, 800m, June 1989, *Fernandez 5637* (MO); *idem*, Roscio, selva ribereña, a lo largo del río Uairén, 4°45' S, 61°03' W, 900m, 1 December 1982, *Steyermark & Liesner 127477* (NY); **Carabobo**: Puerto Cabello, On road to Valencia, 3000 feet, September 1843, *Funck 786* (US); **Mérida**: Sucre, 1500m, 15 August 1987, *Ortega & Smith s.n.* (UC); **Portuguesa**: Araure, Araure a orillas del rio Auro (La Lucia), 69°16' W, 9°43' N, 300m, 13 September 1984, *Ortega & Aymard 2215* (NY); **Territorio Federal Amazonas**: Atabapo, 2°58' S, 64°41' W, 340m, January 1990, *Fernandez 6878* (NY). Sierra Parima, 3°49' S, 64°36' W, 795m, 18 April 1973, *Steyermark 107116* (NY, MO); Zulia: Perijá, alrededores de la Estación Hidrológica Aricuaisá-P, 9°35'30" S, 72°53'55" W, 100m, 25 February 1982, *Bunting et al. 11079* (NY).

16. *Meniscium macrophyllum* Kunze (1839: 44). (Figs 29F–H; 30C–D)

Phegopteris macrophylla (Kunze) Mettenius (1859: 22). *Meniscium reticulatum* var. *macrophyllum* (Kunze) Sodiro (1883: 71). *Dryopteris macrophylla* (Kunze) Christensen (1913: 35). *Bolbitis macrophylla* (Kunze) Maxon & Morton (1938: 375). *Thelypteris macrophylla* (Kunze) Morton (1971: 17). *Cyclosorus macrophyllus* (Kunze) Mazumdar & Mukhopadhyay (2014: 24). **Type:**—BRAZIL. Bahia. Serra do Mar, near Ilhéos, *s.d.*, *C.F.P. Martius 363* (lectotype B [B200059178], here designated; isolectotypes BM, K [K000633667, K000633666], NY [0099427], P [P01428966], S).

=*Meniscium guyanense* Fée (1852: 224). *Thelypteris guyanensis* (Fée) Morton (1971: 19). **Type:**—FRENCH GUIANA. “Habitat in sylvis paludosis, ad amnes Conana et Gaberet, (Guyana Gallicâ, Leprieur, 1835, in Schedulâ *M. sorbifolium*”, May 1835, *Leprieur s.n.* (holotype P [P00644680]).

=*Heteroneuron meniscioides* Fée (1845: 93). *Poecilopteris meniscioides* (Fée) C. Presl (1851: 535). **Type:**—BRAZIL. Bahia, without further locality, *Bory, 2240* (holotype P [P00644681]).

=*Acrostichum fendleri* Baker (1887: 100). *Leptochilus fendleri* (Baker) Christensen (1905: 385). *Dryopteris anceps* Maxon (1922: 62). **Type:**—TRINIDAD. Without locality, 9 December 1880, *Fendler 88* (lectotype K [K000633655, K000633656], designated by Smith (1992); isolectotypes NY [NY00099427], UC [UC952989, UC553205], US [US00066725, US826341], GH, P [P01427684]).

Rhizomes short-creeping, 1.3–1.7 cm diam., glabrous. **Fronds** dimorphic; **sterile fronds** (103–)126.5–167 cm long, petiole 50–96 cm long, 5.2–5.9 mm diam., lamina (34–)37–91 cm long, pinnae (23–)26–40 × 4–8 cm; **fertile fronds** (102–)132–173 cm long, petiole 61–114 cm long, 5–8 mm diam., lamina 38–59 cm long, pinnae 11–14.4 × 1.5–3.2 cm. **Petioles** with brown basal portion and greenish to stramineous distal portion, glabrescent to moderately pubescent, hairs acicular, 0.05–0.1 mm long, erect, scales absent or caducous, irregular, pilose. **Laminae** 1-pinnate, elliptic to oblong, chartaceous. **Rachises** glabrous or with sparse hairs on abaxial surface, pubescent on adaxial surface, hairs acicular, short (0.05–0.1 mm long), curved, erect, scales irregular, filiform, adpressed, branched, with long (0.2–0.3 mm long), acicular, tortuous hairs. **Buds** absent. **Pinnae** in (1–)3–8(–9) pairs, elliptic to oblong-lanceolate, or lanceolate, proximal pinnae sessile or petiolulate, petiolule 0.4–1.3 cm long, distal pinnae sessile, not reduced. **bases** of proximal pinnae round to cuneate, base of median and distal pinnae oblique with basiscopic side adnate and acroscopic side semi-cuneate, slightly truncate; **margins** entire, undulate to crenate, with sparse, acicular hairs; **apices** acute, acuminate to slightly attenuate; **adaxial surfaces** glabrous on sterile pinnae, fertile pinnae with moderate to dense, acicular, 0.2 mm long, curved hairs only on the costa and veins; **abaxial surfaces** of sterile pinnae glabrous on costa and veins, glabrous or rarely with inconspicuous hairs between the veins, hairs acicular, 0.05 mm long, with globose terminal cell, fertile pinnae, on costa, veins and between veins with moderate to dense, 0.05–0.1 mm long, acicular, erect hairs and filiform, 0.3–1.0 cm long (3–6 cells), septate scales with hairs that depart irregularly from each septum, glandular hairs absent; **costal veins** 4–8 on sterile pinnae and 11–12 on fertile pinnae per 3 cm; **secondary veins** straight to slightly arcuate on fertile pinnae, arcuate to subsigmoid on sterile pinnae; **areoles** in 12 rows on fertile pinnae and 16–19 rows on sterile pinnae between costa and margin, forming an obtuse angle with one, free, excurrent veinlet. **Sori** acrostichoid, rarely subacrostichoid, on secondary veins and between veins, covering entire abaxial lamina surface or sometimes everything but costal veins; **receptacles** glabrous or with 1–2 septate sporangiaster, with 0.2–0.3 mm long, erect, ciliform hairs between sporangia; **sporangia** glabrous or with 1–4, 0.1 mm long, simple hairs on the capsule, rarely with one, acicular, simple hair (same as on capsule) on the stalk, paraphyses absent. **Spores** winged-fimbriate, wings narrow and tall, with echinate elements between wings.

Distribution and habitat:—Brazil, Ecuador, Guyana, French Guiana, Peru, Suriname, Trinidad and Tobago, and Venezuela (Fig. 45). This species is usually terrestrial in the interior of intact forests in wet environments or among rocks, at 20–1000 m.

Notes:—The circumscription of *Meniscium macrophyllum* includes two morphological patterns. One pattern corresponds to the morphology of the type specimen of *M. guyanense* and includes specimens with pinnae that are in 6–8 pairs and elliptic to oblong-lanceolate or lanceolate, sporangia with short hairs (0.1 mm) and a glabrous receptacle, and has a disjunct distribution in Trinidad, Guyana, French Guiana, and northern and southeastern Brazil (Pará, Minas Gerais and Rio de Janeiro). The second pattern corresponds to the morphology of the type specimens of *M. macrophyllum* and includes specimens with pinnae that are in 3–6 pairs and elliptic, glabrous sporangia and a receptacle with filamentous structures between the sporangia, and also has a disjunct distribution in Venezuela, Ecuador, Peru, and northeastern Brazil (Pernambuco, Alagoas and Bahia). Although the species exhibits these two morphological patterns, some characters are weak and overlap, such as the number and shape of the pinnae. In addition, on specimens of *M. macrophyllum* that lack acicular hairs on the capsules, hairs can be present on the stalk of some sporangia, even if they are simple and inconspicuous, and there are filamentous, tortuous, branched structures on the receptacle. This

differs from the sporangia of *M. chrysodioides* and *M. longifolium* that have a stalk with 1–3 septate paraphyses with acicular hairs. Thus, we do not recognize these patterns as different taxa (including varieties).

Meniscium macrophyllum is most similar to *M. chrysodioides* Fée, which differs by having sori only on the secondary veins, fertile pinnae usually with a crenate margin, non-rectangular fertile areoles and an abaxial surface with hairs distributed uniformly on all parts, and sporangia with paraphyses on the pedicel that have acicular hairs, whereas *M. macrophyllum* has acrostichoid sori, fertile pinnae usually with an entire margin, rectangular areoles, abaxial surface with hairs only on the costa and veins and sporangia that are glabrous or usually only with simple hairs on the capsule and rarely on the stalk.

Specimens with intermediate characters were observed among populations of *M. chrysodioides* and *M. macrophyllum*. These were not included in the description because they are isolated cases and it is suspected they are of hybrid origin since the two species have overlapping geographical distributions and the same collection exhibits different character states. This is the case for *Pietrobon & Santiago 4720* (BHCB, MBM, NY) from Alagoas that has 5 pairs of lanceolate pinnae, sori only on the secondary veins and glabrous sporangia, whereas a duplicate at UFP has acrostichoid sori with rare acicular hairs on the capsule. Another case is *Pietrobon 4416* (MBM) from Pernambuco that has 6 pinna pairs, sori only on the secondary veins and many sterile, glabrous sporangia (rarely with simple hairs on the stalk), while a duplicate at HB that also has sori only on the veins has long hairs on the sporangia stalk. Although the lamina format and pinnae are more similar to *M. chrysodioides*, the duplicate at HB does not fit *M. chrysodioides*, because it has long hairs on the capsule, or *M. macrophyllum*, because it lacks acrostichoid sori. Thus, these specimens can be treated as distinct individuals or a mixed collection. A more detailed study should be conducted by collecting individuals of these populations and analyzing more specimens.

In an analysis of the spores, three specimens were sampled: one with hairs on the capsule of the sporangia, one without hairs on the capsule, and one with subacrostichoid sori and hairs on the capsule. In all three specimens the spores are winged-fimbriate (Fig. 29C–D), although the last had slightly different ornamentations with wider and shorter wings, which is similar to *M. chrysodioides*. The spores of the other specimens, with and without hairs on the capsule, have narrow and tall wings and sparse fimbria, and the surface between the wings is smooth or with sparse spines

Specimens examined:—**BRAZIL. Alagoas:** Iateguara, 9°00'19" S, 35°51'51" W, 390m, 10 February 2001, *Pietrobon 4894* (BHCB); *idem*, Engenho Coimbra, Grota do Varjão, 9°00'12" S, 35°51'56" W, 400m, 19 December 2000, *Pietrobon & Santiago 4720* (BHCB, MBM, MG, NY, UFP); *idem*, Usina Serra Grande, 9°00'30" S, 35°51'14" W, 390m, 9 February 2001, *Pietrobon & Santiago 4842* (BHCB, MBM, NY, UFP); *idem*, Usina Serra Grande, Engenho Coimbra, 9°00'19" S, 35°51'51" W, 390m, 10 February 2001, *Pietrobon & Santiago 4894* (BHCB, UFP); São José da Laje, Usina Serra Grande, Mata Maria Maior, 8°59'27" S, 36°07'24" W, 380m, 28 April 2001, *Pietrobon et al. 5133* (BHCB, UFP); *s.loc.*, 1842, Glocker (US); *idem*, 6 March 1921, *Britton et al. 2142* (US); *idem*, *Reidel s.n.* (B); *idem*, *Reidel s.n.* (GH); **Bahia:** Arataca, RPPN Caminho das Pedras, 15°10'25" S, 39°20'30" W, 1000m, 15 June 2006, *Amorim et al. 6087* (UPCB); *idem*, Serra do Peito de Moça, 39°20'30" W, 15°10'25" S, 1000m, 14 February 2006, *Matos et al. 965* (UPCB); Cairu, Ilha de Boipeba, 38°55'11" W, 13°35'19" S, 4 February 2007, *Borges et al. 736* (UPCB); Camacan, Fazenda Serra Bonita, 9.7 km W de Camacan, 15°23'28" S, 39°33'27" W, 650m, 30 July 2008, *Matos & Santos 1561* (UPCB, UC); Ilheus, Camacã, km 1 a 2 da estrada L de Camacã, 18 January 1971, *Santos 1336* (NY); Itacaré, 15 km E of Aurelio Leal on BA 654, 100m, 20 February 1987, *Edwards 2405* (K); Porto Seguro, Parque Nacional Monte Pascoal, 16°52'02" S, 37°24'54" W, 50m, 5 February 1999, *Thomas et al 11971* (NY); Uruçuca, 7.3 km N of SerranGrande on road to Itacaré, 39°01' W, 14°25' S, 7 May 1992, *Thomas et al 9207* (NY); *s.loc.*, *Luschnath 82* (B); *idem*, October 1835, *Blanchet 1023* (NY); Brasília, 1821, *Ricdel 59* (US); **Espírito Santo:** Águia Branca, Águas Claras, 18°54'10" S, 40°40'09" W, 300m, 2 February 2006, *Magnago et al. 645* (BHCB); Conceição da Barra, Floresta Nacional do Rio Preto, 18°22'23" S, 39°51'02" W, 27m, 10 June 2009, *Salino et al. 14328* (BHCB); *idem*, Reserva Biológica de Córrego Grande, 18°14'05" S, 39°49'36" W, 41m, 12 June 2009, *Salino & Megale 14364* (BHCB); Linhares, Reserva Florestal de Linhares (CVRD), 19°05'58" S, 4°02'55" W, 30m, 9 February 2007, *Almeida et al. 680* (BHCB); *idem*, Reserva Florestal de Linhares, 19 March 1999, *Folli 3382* (BHCB); Sooretama, Reserva Biológica de Sooretama, 19°01'21" S, 39°58'28" W, 20m, 12 May 2008, *Salino et al. 13322* (BHCB); Sooretama, Reserva Florestal de Linhares-Florestas Rio Doce, 20 March 1999, *Salino & Morais 4528* (BHCB); **Goiás:** Goiânia, December 1936, *Brade 15363* (RB); **Minas Gerais:** Almenara, Fazenda Limoeiro, 16°02' S, 40°51' W, 250m, 22 February 2003, *Salino, A.; Carvalho, F.A.; Lombardi, J.A.; Mota, R.C. 8307* (BHCB); *idem*, Fazenda Limoeiro, 16°03'26" S, 40°51'19" W, 741m, 28 February 2004, *Salino et al. 9367* (BHCB); *idem*, Fazenda Limoeiro, Mata da Mamoneira, 16°02' S, 40°51' W, 250m, 22 February 2003, *Salino et al. 8307* (BHCB); Bandeira, Área cerca de 14 km da sede de Bandeira, na divisa, 15°49'30" S, 40°31'16" W, 500m, 6 October 2003, *Salino et al. 9098* (BHCB);

Jequitinhonha, Reserva Biológica da Mata Escura, 16°20'57" S, 40°57'20" W, 860m, 27 March 2008, *Salino et al. 13218* (BHCB). **Pará**: Alenquer/Monte Alegre, Floresta Estadual de Trombetas, 22 April 2008, *Maciel 685* (BHCB); Almerin, Reserva Biológica Maicuru, 47°40' S, 53°55'23" W, 188m, 23 October 2008, *Souza & Maciel 113* (BHCB); *idem*, Reserva Biológica Maicuru, 250m, 25 October 2008, *Maciel 1231* (BHCB); *idem*, Reserva Biológica Maicuru, 0°49'52" S, 53°57'20" W, 190m, 27 October 2008, *Maciel 1317* (BHCB, MG); Belém, Ilha de Mosqueiro, Fazenda Mari-Mari, 1°08'32" S, 48°22'32" W, 11 July 2005, *Costa 210* (MBM, RB); Óbidos, Estação Ecológica do Grão Pará, 0°38'34" S, 55°41'48" W, 21 January 2009, *Souza & Teixeira 437* (BHCB); *idem*, São Domingos do Capim, Igarapé do Prata, 2 September 2007, *Fonseca et al. 41* (MG); São Miguel do Guamá, Perto do Igarapé Murureteua, 9 November 1956, *Black 56-18889* (IAN); **Pernambuco**: Bonito, Brejo de Altitude, Mata da Colônia, 8°30'14" S, 35°42'56" W, 800m, 22 February 2000, *Santiago et al. 404* (BHCB); Cabo, 30 September 1991, *Fonseca et al 17* (MO); Cabo, Mata do Gujaú, 30 September 1991, *Fonseca & Porto s.n.* (UFP); Igarassu, Usina São José, 7°50'20" S, 35°00'10" W, 25m, 1 January 2005, *Rocha & Freire 126* (UFP); Jaqueira, Mata do Ageró, 8°42'37" S, 35°50'01" W, 600m, 26 March 2003, *Guerreiros 118* (UFP); *idem*, Usina Colônia Mata do Ageró, 8°44'27" S, 35°50'38" W, 415m, 18 October 2001, *Lopes & Pietrobon 433* (RB, UFP); *idem*, Usina Colônia, 545m, 19 October 2001, *Lopes & Pietrobon 447* (UFP); *idem*, Usina Colônia, 8°43'02" S, 35°50'20" W, 652m, 31 May 2001, *Lopes Pietrobon 573* (UFP); *idem*, 8°43'02" S, 35°50'20" W, 652m, 31 May 2001, *Lopes & Pietrobon 275* (MBM, RB, UFP); *idem*, Mata do Jasmim, 8°04'15" S, 35°50'13" W, 650m, 17 October 2001, *Lopes & Pietrobon 329* (MBM, UFP); São Vicente Férrer, Mata do Estado, 14 June 1999, *Pierrot s.n.* (UFP); *idem*, Mata do Estado, May 1995, *Barros s.n.* (UFP); *idem*, Serra do Mascarenhas, 7°35' S, 35°29' W, 600m, 14 June 1999, *Pietrobon 4555* (UFP); *idem*, 7°35' S, 35°29' W, 600m, 17 August 1998, *Pietrobon 4405* (UFP; HB); *idem*, 7°35' S, 35°29' W, 640m, 20 April 1998, *Pietrobon 4247* (MBM, HB); *idem*, 7°35' S, 35°29' W, 650m, 12 September 1999, *Pietrobon & Pessoa 4614* (UFP); Timbaúba, Complexo da Serra do Mascarenhas, Usina Cruangi, E, 7°37'07" S, 35°23'43" W, 304m, 14 December 2001, *Pietrobon 5433* (BHCB, HB, UFP); **Rio de Janeiro**: Silva Jardim, Reserva Biológica de Poço das Antas, 6 January 1993, *Sylvestre, L. et al. 811* (RB); *idem*, Reserva Biológica de Poço das Antas, 22°30' S, 42°15' W, 1000m, 13 January 1994, *Guedes et al. 2342* (BHCB, RB); *idem*, 5 March 1998, *Sylvestre, L. 1333* (RB); *s.loc.*, 1854, *Gay* (Herb.) *s.n.* (K); **Rondônia**: Espigão do Oeste, 61°00' W, 11°31' S, 260m, 10 December 2006, *Costa, M.S. 36* (UPCB); **São Paulo**: Ilheus, Ilha do Mar, 1908, *Wacket 211* (NY); Santos, April 1854, *Gay, J. (Herb.) 545* (K); Serra do Mar, *Wacket 21775* (GH, SPF).—**ECUADOR**. **Napo**: 40° S, 76°23' W, 216m, 27 November 1994, *Svenning 103* (MO); *idem*, Parque Nacional Yasuni, 45° S, 76°28' W, 200m, 10 April 1996, *Moran et al. 6040* (NY); *idem*, 0°44' S, 77°05' W, 250m, 23 October 1988, *Palacios 3206* (MO); *idem*, 1°04' S, 77°36' W, 450m, 24 April 1987, *Cerón 1349* (MO). **Pastaza**: Lorocachi. a 3 km del rio Curaray, 1°38' S, 75°58' W, 200m, 24 May 1980, *Jaramillo et al. 30972* (K); 1°38' S, 75°58' W, 200m, 24 May 1980, *Jaramillo 30972* (MO). **Orellana** Terr. Fed. Amazonas, 2°58' S, 64°41' W, 340m, January 1990, *Fernandez 6878* (NY); 29°47' S, 77°07'50" W, 84m, 7 October 2007, *Croat 99432* (MO); *s.loc.*, *Blanchet 2228* (K).—**FRENCH GUIANA**. Commune Roura, 4°36' S, 52°16' W, 200m, 20 February 2003, *Christenhusz & Bollendorff 2425* (UC); Crique Belvedere, 3°35' S, 53°12' W, 200m, 1 January 1986, *Granville et al. 9046* (US); Eau Claires: near Saul, 200m, 11 August 1993, *van der Werff et al. 12956* (NY, MO); Eaux-Claires, 3°37' S, 53°12' W, 200m, 12 September 2000, *Mustiala 193* (NY); Mont Atachi Bacca, 3°33' S, 53°55' W, 720m, 23 January 1989, *Cremers et al. 10341* (US); Rivière Grande Ouaqui: 8 km en amont de son confluent avec la Petite Oua, 13 July 1973, *Granville 4958* (NY); Rivière, Petite Ouaqui Saut Verdu Rive gauche, 24 July 1973, *Granville 1913* (NY); Surroundings of Saul in central part of the countr, 3°38' S, 53°12' W, 300m, 9 January 1988, *Zimmer 346* (B); *s.loc.*, 10 February 1969, *Granville 61* (US); *idem*, 1899, Herb. Sagot 1396 (B, BM, K); *idem*, 4°28' S, 52°20' W, 28 July 1997, *Hequet 439* (UC).—**GUYANA**. *s.loc.*, 030°80' S, 058°32' W, 220m, 12 September 1999, *Jansen-Jacobs et al. 5859* (UC); *idem*, 1865, *Appun 732* (K); *idem*, 1866, *Felski s.n.* (B); *idem*, *Canlon ? 176* (B); *idem*, *Leprieur 465* (B); *idem*, *Leprieur s.n.* (B); Barima River, 1907, *s.col.*, *s.n.* (NY); *idem*, Essequibo river, June 1923, *Persaud 352* (F); Portaro-Siparuni, 5°12' S, 59°07' W, 304m, 10 October 1990, *McDowell Gopaul 3469* (NY); Sheenabowa, Potaro river, September 1881, *Jenman 1449* (K); 4°43'00" S, 53°94'30" W, 80m, 29 April 1991, *Granville et al. 11611* (US); Cayenne, 16 December 1979, *Granville 718* (US); Potaro-Siparuni Region: Ridge of Eagle Mountain, 5°12' S, 59°07' W, 304m, 10 October 1990, *McDowell 3469* (US); Upper Essequibo Region, Rewa River, 3°08' S, 58°32' W, 220m, 12 September 1999, *Jansen-Jacobs et al. 5859* (US).—**PERU**. **Amazonas**: Condorcanqui, El Cenepa, Cominidad de Mamayaque, rio Cenepa, 4°31'40" S, 78°11'40" W, 300m, 26 January 1997, *Vásquez et al. 22327* (NY, UC, MO); **Loreto**: 16 September 1972, *Croat 20309* (UC, F, MO, GH); *idem*, 30 August 1972, *Croat 19735* (UC, MO, GH); *idem*, 4°28' S, 73°34' W, 100m, 2 August 1992, *Tuomisto et al. 4151* (UC); *idem*, above pongo de Manseriche, 400m, 2 December 1931, *Mexia 6206* (GH); *idem*, Maynas, 100m, 8 January 1995, *Tuomisto et al. 7182* (UC); *idem*, 3°38' S, 72°56' W, 100m, 28 August 1992, *Tuomisto et al. 4769* (UC); *idem*, 5°01' S, 73°70'00" W, 100m, 3 February 1996, *Tuomisto & Oré 8744* (UC); *idem*, Pongo de Manseriche, 400m, 2 December 1931, *Mexia 6202* (BM, CAS, F, GH, K, NY, UC, MO, US); **Pasco**: Oxapampa, 400m,

25 January 1984, *Foster, R.B. 9496* (MO); *s.loc.*, *Blanchet 2477* (K); *s.loc.*, *Spruce 3030* (K).—**SURINAME.** *s.loc.*, 13 October 1954, *Lindeman 4945* (US); *idem*, 15 February 1915, *Stahel 971* (US); *idem*, *Florschütz 3054* (K); *idem*, *Hostmann 188* (K); Joden savanne-Mapanecreek area, 10 December 1961, *Hekking 1212* (GH); Sipaliwini: Ulemari River, 2°46'05" N, 54°51'15" W, 175m, 26 April 1998, *Hammel 21699* (MO, UC, US).—**TRINIDAD & TOBAGO.** Aripo Road, towards Heights of Aripo, 3 October 1924, *Broadway s.n.* (K, US); Aripo road via Arima end of forest part, 13 November 1925, *Broadway 6006* (BM, K, UC); Aripo road via Arima, 21 August 1925, *Broadway 5755* (BM, F, GH); Aripo Savanna, 3 November 1974, *Jermy 11118* (BM); Cumuto, 13 May 1927, *Homersley 415* (BM); Cumuto, 7 August 1925, *Homersley 83* (K, BM); L' Orange road, 21 November 1924, *Homersley 226* (BM); Manzanilla Ward, near Sangre Grand Oropuche, in Mel, 20 October 1974, *Jermy 10930* (BM); Quare Vage, 26 March 1926, *Homersley 414* (BM); *s.loc.*, 11 May 1928, *Broadway s.n.* (BM); *idem*, 26 March 1926, *Broadway 6239* (K); *idem*, 6 March 1921, *Britton et al. 2143* (NY); *idem*, 6 March 1921, *Britton et al. 2142* (GH); *idem*, August 1927, *Homersley 413* (BM); *idem*, *Prestoe s.n.* (BM); *idem*, 1927, *Homersley 226* (US); *idem*, 26 July 1914, *Broadway 4904* (US).—**VENEZUELA.** **Amazonas:** Cerro Neblina, 0°50' S, 66°09' W, 140m, 3 December 1984, *Croat 59593* (NY, UC, MO); *idem*, Río Yatuá, 1°10'30" S, 66°32'58" W, 105m, 4 January 2005, *Redden et al. 3543* (US); *idem*, Río Negro: 0°50' S, 66°09' W, 140m, 30 November 1984, *Liesner 17387* (UC, MO); *idem*, Río Negro, Neblina Base Camp on rio Barío, 0°49'50" S, 66°09'40" W, 140m, 23 February 1985, *Beitel & Rossman 85256* (NY, UC), **Aragua:** Tovar, 1854, *Fendler 232* (K).

17. *Meniscium maxonianum* (A.R. Sm.) R.S. Fernandes & Salino (2014: 9). (Figs 29D–E; 30E–F)

Thelypteris maxoniana Smith (1992: 71). *Cyclosorus maxonianus* (A.R. Sm.) Mazumdar & Mukhopadhyay (2014: 25). **Type:**—PERU. Maynas. Quistococha, vicinity of Iquitos, 18 November 1977, *A. Gentry 20751* (holotype MO [MO2940902]; isotype UC [UC1502829]). =*Dryopteris desvauxii* f. *glandulosa* Maxon & Morton (1938 372). *Thelypteris longifolia* (Desv.) Tryon f. *glandulosa* (Maxon & C.V. Morton) Morton (1967: 52). **Type:**—BRAZIL. São Paulo. Morro das Pedras, *A.C. Brade 5753* (holotype NY [00099429]).

Rhizomes short-creeping to ascending, 1.1–1.7 cm diam., glabrous or with caducous scales at the apex, scales lanceolate to ovate, light brown, lustrous, margin irregular, lacerate. **Fronds** (79–) 142.5–174.5 cm long, monomorphic. **Petioles** (young 35.5–41–)67.5–81(–118) cm long, 5–6 mm diam., with black basal portion and stramineous to light brown distal portion, glabrous or rarely with scales on the basal portion equal to those on the rhizome. **Rachises** usually glabrous or with sparse glandular hairs and rarely adpressed, filiform, branched, caducous microscales. **Buds** absent. **Pinnae** in 11–23 pairs, median pinnae (15.5–)22–35.5(–45.5) × (1.9–)2.4–3.1(–3.4) cm, linear-lanceolate, proximal pinnae petiolulate, petiolule 0.3–1.5 cm long, distal pinnae sessile, not reduced; **bases** of proximal pinnae cuneate, not auriculate, base of distal pinnae obtuse to slightly asymmetric, basisopic side round, acrosopic side truncate, parallel to rachis; **margins** usually undulate or crenate, glabrous; **apices** acute to cuneate; **adaxial surfaces** usually glabrous or with sparse to moderate, glandular hairs on the costa; **abaxial surfaces** on costa, veins and between the veins with dense, glandular, 0.1 mm long, stalked, yellow, persistent hairs, veins with branched, filiform, septate, glandular, adpressed structures and arachnoid, hyaline, caducous scales near the sori, acicular hairs absent; **costal veins** 9–13 per 3 cm; **secondary veins** arcuate to subsigmoid on fertile pinnae and subsigmoid on sterile pinnae, united to form an obtuse angle, with one excurrent, free veinlet or rarely with veinlet dividing the areole; **areoles** in 9–13(–15) rows between costa and margin, wider than long. **Sori** oblong to arcuate, uniseriate between costal veins, not confluent at maturity; **receptacles** glabrous or with multicellular, filiform, glandular sporangiaster; **sporangia** glabrous or stalk with septate paraphyses with glands on the septa. **Spores** winged-fimbriate, wings wide and tall with sparse fimbria, surface between wings smooth or with sparse spines.

Distribution and habitat:—Bolivia, Brazil, Colombia, and Peru (Fig. 45). This species is terrestrial in forests or in swampy environments in gallery forests, on the margins of streams, at 50–1000 m.

Notes:—The most notable character of *M. maxonianum* is the dense cover of sessile to stalked glands on the abaxial surface of the laminae, and having the sporangial stalks glabrous or with inconspicuous filamentous, septate structures. In these characters, it differs from *M. longifolium*, which shares the same shape of lamina and pinnae, but is characterized by having glands and hairs (sometimes only hairs) on the abaxial surface of the lamina and sporangial stalks with long, acicular hairs. Another species that also has glandular hairs on the abaxial surface of the lamina is *M. falcatum* Liebmann (1849: 183). However, it differs from *M. maxonianum* by having longer pinna stalks and acicular and erect hairs on the costae (Fernandes *et al.*, 2014).

Meniscium maxonianum is similar to *M. longifolium*. The specimens of *M. maxonianum* with few glandular hairs on the abaxial surface differ from *M. longifolium* by the absence of acicular hairs on the laminar surface and sporangia stalk. *Meniscium maxonianum* has a sporangial stalk with septate paraphyses with glands on the septa. *Meniscium falcatum* can also have glandular hairs on the abaxial laminar surface and sporangia stalks with glandular paraphyses; however, it has acicular hairs on the costa and long-petiolulate, proximal (and sometimes median) pinnae. However, *M. maxonianum* only has glandular hairs on the lamina and sporangia.

Meniscium delicatum also has glandular hairs on the abaxial surface, but it differs from *M. maxonianum* by the lamina with a membranaceous consistency, base of the proximal pinnae sessile or short-petiolulate, truncate to rounded, with short auricle on acroscopic side or on both sides, areoles in (4–)6–8 rows between costa and pinnae margin, sporangia with branched stalk with hairs and globose apical cell, and receptacle with acicular hairs equal to those on the stalk. *Meniscium maxonianum*, in addition to the characters discussed above, has a lamina with a chartaceous consistency, base of proximal pinnae short-petiolulate (0.3–1.5 cm long), cuneate and not auriculate, and 9–13(–15) rows of areoles between the costa and pinnae margin.

There is some variation in specimens of *M. maxonianum*, such as laminae that are more glabrous or with sparse, glandular hairs in specimens from the South Region of Brazil (Paraná and Santa Catarina). There are also some nearly glabrous specimens of *M. longifolium*, with only rare acicular hairs and glands on the lamina and sporangia, from the central-west, south and southeast regions of Brazil (Distrito Federal, Minas Gerais, and São Paulo).

Specimens examined:—**BOLIVIA. La Paz:** Mapiiri, 22, September 1901, *Williams 1281* (NY, US). Cochabamba: José Carrasco Torrico, Valle del Sajta, 17°07' S, 64°50' W, 220m, 8 October 1996, *Kessler et al. 8869* (UC); Velasco: Santa Cruz, Parque Nacional Noel Kempff Mercado, 13°34'15" S, 61°01'29" W, 250m, 7 June 1994, *Arroyo & Wellens 797* (USZ).—**BRAZIL. Amazonas:** Margem esquerda do Rio Negro em frente ao Rio Uaup, 1000m, 8 October 1962, *Oliveira 2163* (IAN); Coarí, Província Petrolífera de Urucu, 4°52'56" S, 65°19'23" W, 56m, 11 March 2007, *Pietrobon 7097* (MG); *idem*, prox. do poço RUC, 4°49'51" S, 65°14'51" W, 85m, 12 February 2008, *Pietrobon et al. 7550* (MG); **Bahia:** Inhaúmas, 14°15' S, 44°40' W, 600m, 28 April 1980, *Harley et al. 21879* (K); **Distrito Federal:** ca. 35 km S.W. of Distrito Federal on road to Anápolis, 700m, 6 September 1964, *Irwin & Soderstrom 6042* (RB, NY, MO); Parque Municipal do Gama, ca. 20 km S of Distrito, 700m, 3 September 1964, *Irwin & Soderstrom 5880* (F, K, NY, MO, RB, US); On road to Anápolis, 700m, 6 September 1964, *Irwin & Soderstrom 6042* (US); **Goiás:** 7 May 1896, *Glaziou 22632* (NY, F, B); **Maranhão:** Balsas, Faz. do Senhor Amâncio, margem esquerda do rio Man, 46°39'38" S, 81°95'80" W, 20 September 2004, *Santos 984* (HB); **Mato Grosso:** Alto Araguaia, Rodovia Buriti-Pedro Gomes, Serra Preta, 17°18' S, 53°13' W, 500m, 5 September 1993, *Silva & Rodrigues Jr. 1085* (SPF, HB); Canarana, 13°30' S, 52°20' W, 400m, 14 October 1990, *Windisch 5864* (UC); Agua Boa, 13°45' S, 52°45' W, 350m, 15 October 1990, *Windisch 5871* (UC); Chapada dos Guimarães, Cachoeira da Independência, 17 February 1986, *Salino 414* (UC); *idem*, Cachoeira do Pulo, 17 February 1988, *Salino 407* (UC); Chapada dos Guimarães, Parque Nacional da Chapada dos Guimarães, 15°24'59" S, 55°50'31" W, 591m, 2 March 2011, *Almeida et al. 2675* (BHCB); Chapada dos Guimarães, Parque Nacional da Chapada dos Guimarães, 15°18'28" S, 55°51'28" W, 318m, 1 March 2011, *Almeida et al. 2670* (BHCB); Chapada dos Guimarães, 17 February 1988, *Salino 407* (BHCB); *idem*, Parque Nacional da Chapada dos Guimarães, 15°24'21" S, 55°50'10" W, 586m, 28 February 2011, *Almeida et al. 2658* (BHCB); Chapada dos Guimarães, Parque Nacional da Chapada dos Guimarães, 15°18'28" S, 55°51'28" W, 318m, 1 March 2011, *Almeida et al. 2670* (BHCB); Serra do Roncador, 12°51' S, 51°45' W, 450m, 8 September 1968, *Eiten & Eiten 8617* (US); **Mato Grosso do Sul:** Rio Verde do Mato Grosso, Rodovia Sete Quedas-Rio Negro, 18°55' S, 54°53' W, 400m, 7 September 1993, *Silva & Nobile 1149* (HB); Rio Verde de Mato Grosso, ca. de 30 km da cidade, Rodovia Sete Quedas-Rio Negro, 18°55' S, 54°53' W, 370m, 7 September 1993, *Silva 1166* (SPF); Rio Verde de Mato Grosso, Rodovia Sete Quedas-Rio Negro, Cachoeira do Cervo, 54°53' W, 18°55' S, 370m, 7 September 1993, *Silva & Rodrigues Jr. 1164* (MO); **Minas Gerais:** Conceição do Mato Dentro, Conceição do Mato Dentro, 19°05'31" S, 43°34'11" W, 1 July 2003, *Mota 2053* (BHCB); Mariana, 29 January 2001, *Mota & Viana 668* (BHCB); Mariana, Mina da Samitri., 29 January 2001, *Mota Viana 668* (BHCB); Catuji, BR 116, Teófilo Otoni em direção a Catuji, margem, 17°24'22" S, 41°30'56" W, 7 January 2011, *De Paula et al. 38* (BHCB); **Pará:** Parauapebas, N4-WS, 6°07'00" S, 50°11'70" W, 720m, 20 April 2012, *Arruda et al. 963* (BHCB); Canaã dos Carajás, Estrada para Serra Sul, 6°08'50" S, 50°19'47" W, 512m, 28 August 2012, *Salino et al. 15497* (BHCB); Parauapebas, N8, Campo gramíneo sobre canga, 718m, *Arruda et al. 819* (BHCB); **Paraná:** Guaratuba, July 1951, *Frenzel & Soderstrom 634* (RB); Alexandra, 5 July 1914, *Dusén 15258* (NY, F, US); Paranaguá, Ilha do Mel, Estação Ecológica, 11 October 1992, *Salino et al. 1518* (UPCB); Paranaguá, Ilha do Mel, Estação Ecológica, 25°30'44" S, 48°19'08" W, 3m, 15 February 2004, *Labiak et al. 3133* (UPCB); Antonia, Reserva Natural Rio Cachoeira (SPVS), 25°15' S, 48°41' W, 50m, 12 September 2008, *Matos et al. 1593* (UPCB); Serra do Mar, 200m, 7 January 1914, *Dusén 14360* (MO); São Paulo: April 1894, *Linby? 595* (B); **Santa Catarina:**

Joinville, Jardim Botânico de Joinville, 19 March 2009, *Tromm, A. 13* (MBM); Itapoá, Reserva Volta Velha, 20 January 1993, *Negrelle & Fava 615* (UPCB); Blumenau, RPPN Bugarkopf, 27°00'13" S, 49°04'10" W, 200m, 23 July 2008, *Gasper 1860* (BHCB); Blumenau, Parque Nacional da Serra do Itajaí, 29 September 2007, *Gasper s.n.* (BHCB); Itapoá, reserva Volta Velha, 20 January 1993, *Negrelle & Fava A-615* (UPCB); Santa Catarina: Itapoá, Reserva Volta Velha, November 1993, *Negrelle s.n.* (UPCB); **São Paulo**: Pariqueira-açu, Pariqueira-Mirim, November 1910, *Brade 5053* (HB); Iguape, 600m, November 1928, *Brade 8630* (HB); São Vicente, June 1912, *Luederwaldt s.n.* (SPF); Estação Rio Grande, *Wacket 82* (SPF); São Paulo: Eldorado, Parque Estadual do Jacupiranga, 24°38'44" S, 48°23'36" W, 400m, 23 March 2005, *Salino et al. 10166* (BHCB); São Paulo, Estação Rio Grande, *Wacket 82* (BHCB, SPF); Iporanga, Parque Estadual Intervales, 24°18'24" S, 48°24'45" W, 530m, 18 May 2003, *Salino et al. 8595* (BHCB); **Tocantins**: Recursolândia, Estrada para Riachinho, 47°06'30" S, 84°53'90" W, 20 July 2005, *Santos 1148* (HB). São Paulo: Cananéli, about 1 km NE along east shore of Cananea Island, 25°00' S, 47°55' W, 17 February 1965, *Eiten & Clayton 6175-A* (K, MO).—**COLOMBIA**. **Caquetá**: Florencia, Quebrada de las Perdices, 400m, 29 March 1940, *Cuatrecasas 8855* (US).—**PERU**. **Loreto**: Maynas, 0°34'45" S, 73°14'31" W, 122m, 13 March 1997, *Vásquez & Rojas 22698* (UC, MO); *idem*, 160m, 14 September 1982, *Rimachi 6348* (UC); *idem*, 1 September 1976, *Revilla 1249* (UC, MO); *idem*, 130m, 18 November 1977, *Gentry 20751* (UC); *idem*, Iquitos km 8 Carretera Quisto Cocha-Varillal, 130m, 24 July 1984, *McDaniel & Rimachi 27821* (NY); *idem*, Iquitos. Carretera de Picuruyacu, lower Río Nanay, 140m, 9 March 1980, *McDaniel & Rimachi 23405* (NY); *idem*, Iquitos, Carretera Quisto Cocha-Nauta, km 10, 160m, 10 January 1984, *McDaniel idem, 27604* (NY); *idem*, Mishuyacu, near Iquitos, 100m, April 1930, *Klug, G. 1255* (NY, F); *idem*, Mishuyacu, near Iquitos, 100m, October 1929, *Klug 509* (NY, F); *idem*, Maynas, Iquitos, 140m, 30 July 1982, *Rimachi 6283* (MO); *idem*, 150m, 10 March 1982, *McDaniel & Rimachi 25740* (MO); *idem*, 140m, 9 March 1980, *McDaniel & Rimachi 23405* (MO); *idem*, 130m, 24 July 1984, *McDaniel & Rimachi 27821* (MO); *idem*, Río Nanay, 12 August 1978, *Hickok 613* (GH); *idem*, San Juan, 12 April 1972, *Muler 2517* (GH); *idem*, Maynas, Iquito: San Juan, 120m, 24 August 1965, *Sagastegui & Aldare 5794* (GH); *idem*, Mishuyacu, near Iquitos, 100m, November 1929, *Klug 509* (US); *idem*, 3km S of Iquitos, 5 August 1959, *Tryon & Tryon 5164* (US); *s.loc.*, 5 km above Iquitos, 6 August 1972, *Croat 18813* (MO); 24 July 1972, *Croat 18435* (UC); *idem*, 23 July 1972, *Croat 18333* (UC); *idem*, 7 km of rio Nanay, 23 July 1972, *Croat 18312* (MO); *idem*, 27 August 1972, *Croat 19759* (MO); Iquitos, Road to Quistococha, 24 February 1971, *Santiago s.n.* (US).

18. *Meniscium membranaceum* (Mett.) Pichi Sermolli (1968: 180). (Figs 31A–C; 34A–B)

Phegopteris membranacea Mettenius (1859: 22). *Dryopteris membranacea* (Mett.) Christensen (1913: 35). *Thelypteris membranacea* (Mett.) R.M. Tryon (1967: 7). *Cyclosorus membranaceus* (Mett.) Mazumdar & Mukhopadhyay (2014: 25). *Nephrodium lechleri* Hieronymus (1904: 448). *Dryopteris lechleri* (Hieron.) Christensen (1905: 274). **Type**:—PERU. “*Meniscium reticulatum* Mett. f. Lechl. 19. Azangaro; St. Gavan.” In *rupibus umbrosis*, June 1854, *Lechler 1785* (lectotype here designated: B [B200058651]; isolectotype GH, K [K000633679], P [P01427689, P01428940 in part].

Rhizomes short-creeping to ascending, 0.9–1.5 cm diam., glabrous. **Fronds** monomorphic to slightly subdimorphic; **sterile fronds** 31–97.5 cm long, petiole 31–65.5 cm long, 0.3–0.5 cm diam.; lamina 29.5–45 cm long; pinnae 28–23 × 4.9–6.3 cm long; **fertile fronds** 84–154 cm long, petiole 76–100.5 cm long, 0.4–0.7 mm diam., lamina 36–53.5 cm long, pinnae 15.4–18.5 × 3.3–4.2 cm. **Petioles** with brown basal portion and green to stramineous distal portion, glabrous or rarely with scales on the basal portion, scales caducous, adpressed, irregular, sublathrate, dark brown. **Laminae** 1-pinnate, elliptic to oblong, chartaceous. **Rachises** pubescent on both surfaces, hairs long (0.5–0.8 mm), ciliform, adpressed, dense, fine. **Buds** present in axil of proximal pinnae. **Pinnae** in 2–4 pairs, elliptic to oblong, sessile, adnate; **bases** of proximal pinnae narrowly round to acute, base of median and distal pinnae oblique, asymmetric with basiscopic side round, adnate, and acroscopic side excavate or truncate, parallel to rachis; **margins** entire to undulate, with sparse acicular hairs; **apices** acuminate to slightly attenuate; **adaxial surfaces** of fertile and sterile pinnae glabrous or with moderate, 0.2–0.3 mm long, ciliform, adpressed or slightly patent hairs restricted to the edge of the sulcus on the costa; **abaxial surfaces** of fertile and sterile pinnae with moderate to dense, 0.2–0.5 mm long, ciliform, fine, adpressed hairs on the costa, veins and between the veins, giving the veins a whitish aspect, costa and veins with filiform, lanceolate, adpressed scales, these sometimes loose on the hairs, glands absent, arachnoid scales not seen; **costal veins** 7–10 per 3 cm; **secondary veins** straight to slightly arcuate, united with the adjacent veins and forming an obtuse angle, with one excurrent, free veinlet up to the middle of the areole; **areoles** in 17–20 rows between the costa and pinnae margin. **Sori** straight to arcuate on the secondary veins, not confluent at maturity; **receptacles** with ciliform hairs equal to those on the lamina; **sporangia** glabrous. **Spores** echinate, with agglomerated, perforated spines.

Distribution and habitat:—Bolivia, Brazil, Ecuador, and Peru (Fig. 46). This species is usually terrestrial and occurs on wet rocks, in the interior of undisturbed forests, on the edges of trails, along water courses, on slopes or in shady places, at 200–1100 m.



FIGURE 31. *Meniscium membranaceum*. **A.** fertile frond; **B.** details of the abaxial surface of the fertile and sterile pinnae showing venation and sori; **C.** detail of the costa on abaxial surface with ciliform, adpressed hairs, and sori with hairs (Alem *et al.* 121, UC).

Notes:—*Meniscium membranaceum* can be distinguished by its relatively membranaceous lamina, long (0.2–0.5 mm), fine, adpressed hairs on the adaxial pinnae surface, buds in the axils of the proximal pinnae, straight secondary veins that unite to form narrow areoles, and straight to arcuate sori covering the entire secondary vein. The shape of the

pinnae and straight to arcuate sori are similar to *M. chrysodioides*, which differs by having an abaxial pinnae surface with short (0.1–0.2 mm), straight, rigid and thicker hairs.

In relation to the indument, the most similar species to *M. membranaceum* are *M. giganteum* and *M. triangularis*. *Meniscium giganteum* mainly differs by having a simple lamina and *M. triangularis* differs by having buds on the distal pinnae and no adpressed, ciliform hairs between the veins on the laminar surface.

Of the two Mettenius syntypes (*Lechler 1785* and *Lechler 2321*), *Lechler 1785* was chosen by Maxon & Morton (1938) as the lectotype of *M. membranaceum*, and specimens of this collection are at B, GH, K, and P. However, the two specimens of this collection at K (K000633678 and K000633679) are mixed and Maxon & Morton (1938) erroneously chose *Lechler 1785* at K (K000633678) (photo page 66) as the lectotype, which is *M. chrysodioides*, creating a conflict between the original description and type material selected. These authors also commented that the *Lechler 1785* specimens are young with mostly undeveloped sporangia.

Lechler 1785 at P is also a mixed collection. Of the three specimens labeled *Lechler 1785*, only two (P01427689; P01428940) are *M. membranaceum*; the latter has a fragment of an *M. chrysodioides* pinna and the third specimen [P01553331] is *M. reticulatum*.

Although mixed in some herbaria, *Lechler 1785* at B better represents *M. membranaceum*. In addition to being complete, it is more in accordance with the protologue; the label is in Mettenius' handwriting and there are duplicates at GH, K, and P. Therefore, *Lechler 1785* B00058651 is designated as the lectotype of *M. membranaceum*.

Lechler 2321 (B200058653 and B200058650) is not a mixed collection and could have been chosen as the lectotype. However, one part of the specimen is sterile and the other is a fragment of the lamina, and the pinnae shape of both parts is very similar to *M. chrysodioides*, which might cause confusion. Further, there are no duplicates in other herbaria.

Specimens examined:—**BOLIVA. Cochabamba:** Carrasco, Parque Nacional Carrasco, Arepucho, 17°22'09" S, 65°14'11" W, 1070m, 23 October 2000, *Zárate 834* (NY); Chapare, Cavernas del Repechón, PN Carrasco, 17°02' S, 65°26' W, 550m, 8 September 1996, *Kessler et al. 8293* (UC); *idem*, 17°03'41" S, 65°28'16" W, 510m, 12 September 2003, *Alem et al. 121* (UC); *idem*, Carrasco, 17°05'74" S, 65°27'85" W, 600m, 11 December 1999, *Jimenez 55* (UC); *idem*, Parque Nacional Carrasco, 17°23' S, 64°23' W, 560m, 23 September 1997, *Acebey, A. 769* (UC).—**BRAZIL. Acre:** Mâncio Lima, Parque Nacional da Serra do Divisor, 7°26'51" S, 73°40'01" W, 220m, 13 December 2010, *Salino & Almeida 15013* (BHCB); *idem*, 7°26'51" S, 73°40'01" W, 220m, 13 December 2010, *Salino & Almeida 15015* (BHCB);—**ECUADOR. Morona-Santiago:** 650m, 17 August 1989, *van der Werff & Gudino 11168* (UC, MO) **Napo:** 0°53' S, 76°13' W, 200m, 10 March 1998, *Tuomisto & Ruokolainen 11754* (UC); **Pastaza:** 0°13' N, 77°59' W, 950m, 14 July 1992, *Fay & Fay 3599* (UC, NY, MO); *idem*, Cordillera de Cutucu, 800m, 2 February 1989, *van der Werff & Palacios 10316* (UC, MO); *idem*, Hacienda San Antonio del Barón von Humboldt, 1°27' S, 78°59' W, 1050m, 1 March 1985, *Baker et al. 5432* (NY); *idem*, 3°37' S, 78°34' W, 900m, 26 April 1973, *Holm-Nielsen et al. s.n.* (UC); Cordillera de Cutucu, 800m, 4 February 1989, *van der Werff & Palacios 10389* (NY, MO); Chinchipe, Pachicutza, Sendero hacia el Hito, 17 October 1991, *Jaramillo 13921* (NY); **Zamora-Chinchipe:** 3°31'41" S, 78°25'33" W, 950m, 2 November 2004, *Werff et al. 19212* (UC, MO); *idem*, 3°31'10" S, 78°25'53" W, 900m, 3 November 2004, *van der Werff et al. 19247* (UC, MO); *idem*, 3°04'40" S, 78°38'28" W, 1066m, 26 May 2003, *Croat & Menke 89463* (UC, MO); *s.loc.*, *Stübel 1002* (B).—**PERU. Amazonas:** Bagua, 660m, 6 December 1999, *Díaz et al. 10612* (MO); **Cuzco:** Quispicanchis, 510m, 3 September 1965, *Vargas 16501* (GH); **Pasco:** Oxapampa, 75°26'07" W, 10°26'24" S, 480m, 8 June 2004, *Rojas, P. et al. 2784* (MO); *idem*, 75°15'49" W, 10°19'24" S, 380m, 26 February 2005, *Mellado 2878* (MO); **Puno:** Carabaya, 70°02' W, 13°15' S, 550m, 24 October 1996, *Cornejo & Balarezo 2653* (MO). **Ucayali:** Padre Abad: Padre Abad, 300m, 30 September 2004, *Vigo & Graham 16148* (UC); in monte Campana, prope Tarapoto, August 1856, *Spruce 4645* (BM, K; US).

19. *Meniscium minusculum* (Maxon) Pichi Sermolli (1968: 180). (Figs 32A–C; 34C–D)

Dryopteris minuscula Maxon (1932: 135). *Thelypteris minuscula* (Maxon) C.V. Morton (1967: 43). *Cyclosorus minusculus* (Maxon) Mazumdar & Mukhopadhyay (2014: 26). **Type:**—COLOMBIA. [Valle del Cauca: Buenaventura]. “Ao longo do Rio D’agua, região costeira de Buena Ventura, 0–300 m, [3°53'11,8" S, 77°04'12,8 W], *s.d.*, *Lehmann 4433*” (holotype K [K000633680]).

Rhizomes short-creeping, 0.5 cm diam., with a few scales at the apex, scales ovate, lanceolate, subclathrate, dark brown. **Fronds** 23–28.5 cm long, monomorphic. **Petioles** 13–16 × 0.1 cm diam., with brown basal portion and greenish to stramineous distal portion, glabrous. **Laminae** 10–12.3 × 2.5–4 cm, simple, elliptic-oblong, subcoriaceous; **bases** cuneate, not decurrent; **margins** revolute, entire, glabrous; **apices** long-acuminate to attenuate and abruptly caudate.

Buds absent. **Costa** glabrous; **adaxial surfaces** and **abaxial surfaces** glabrous; **costal veins** 10 per 3 cm; **secondary veins** subsigmoid to arcuate, united to form an acute angle, with one, excurrent, free veinlet with a thick apex, adaxial surface with hydathodes; **areoles** in 10–12 rows between the costa and margin. **Sori** oblong to rounded, on secondary veins, not confluent at maturity; **receptacles** and **sporangia** glabrous. **Spores** cristate, crests thick, irregular, smooth.

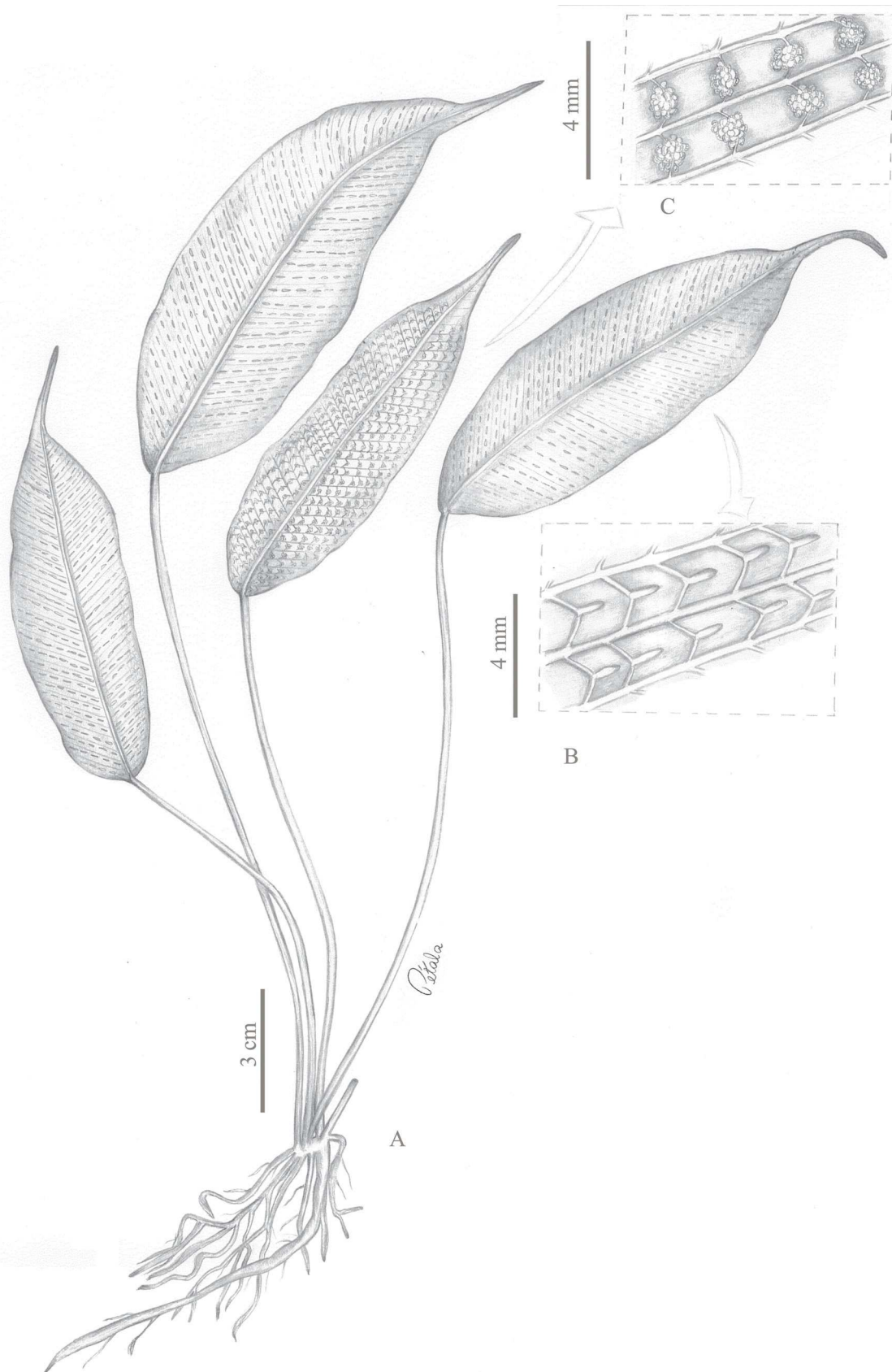


FIGURE 32. *Meniscium minusculum*. **A.** habit; **B.** details of the abaxial surface of sterile lamina showing venation; **C.** details of the abaxial surface of the fertile lamina showing the round sori on the secondary veins (*Lehmann 4433, K*).

Distribution and habitat:—Endemic from Colombia (Fig. 46). *Meniscium minusculum* is considered rare, known only from the type collection, collected in a humid environment and stone walls along the D'Agua river, at 0–300 m.

Notes:—Based on Maxon (1932), it is possible that *M. minusculum* can be a little larger than indicated by the specimens analyzed. Maxon & Morton (1938) compared *M. minusculum* to *M. giganteum*, which is the other species of the genus with a simple lamina, and has dense hairs and scales on the lamina and glands on the sporangia, and to *M. arcanum* that, although it has glabrous subcoriaceous laminae, also has glands on the sporangia. However, the elliptic-oblong lamina of *M. minusculum* is more similar to the pinna of *M. andreanum*. Further, both species have subcoriaceous laminae, glabrous petioles and laminae on both surfaces, obscure secondary veins abaxially, hydathodes on adaxial surfaces, and glabrous sporangia.

20. *Meniscium nesioticum* (Maxon & C.V. Morton) Pichi Sermolli (1968: 180). (Figs 33A–D; 34E–F)

Meniscium nesioticum (Maxon & C.V. Morton) Jermy & Walker (1985: 276). *Thelypteris nesiotica* (Maxon & C.V. Morton) C.V. Morton (1967: 43). *Dryopteris nesiotica* Maxon & Morton (1938: 362). *Cyclosorus nesioticus* (Maxon & Morton) Mazumdar & Mukhopadhyay (2014: 26). **Type:**—TRINIDAD. *s.d.*, *Jenman s.n.* (holótipo NY [NY00149130]; isotype US [US1692745-fragment]).

Rhizomes short-creeping, 1.0–1.7 mm diam., glabrous. **Fronds** dimorphic or subdimorphic; **sterile fronds** 60–116 cm long, petiole 23–61 cm long, 4–7 mm diam., lamina 36–61 cm long, pinnae 18–24.5 × 2.3–3.5 cm, oblong-lanceolate; **fertile fronds** 56.5–175 cm long, petiole 30–95.5 cm long, (2.4–)4–9 mm diam., lamina 26–80 cm long, pinnae 10–19 × 1.0–1.9 cm, linear-lanceolate. **Petioles** with brown basal portion and greenish to stramineous distal portion, glabrous to glabrescent, basal portion rarely with caducous, irregular, black scales. **Laminae** 1-pinnate, widely oblong, membranaceous to chartaceous. **Rachises** of fertile lamina with dense, 0.1–0.2 mm long, acicular, curved, adpressed or tortuous hairs adaxially or on both sides, rachises of sterile laminae glabrous or with moderate, acicular, curved hairs on adaxial surfaces. **Buds** present on petiolule near the base of the proximal pinnae or absent. **Pinnae** in 7–18(–20) pairs, proximal pinnae sessile or petiolulate, petiolule 2–7 mm long, median and distal pinnae sessile, not reduced; **bases** of proximal pinnae obtuse, cuneate, base of distal pinnae subequilateral with basispic side semiadnate to round-cuneate, acroscopic side truncate or parallel to rachis; **margins** entire to undulate on sterile pinnae, undulate to slightly crenate on fertile pinnae, with sparse, acicular hairs; **apices** long-acuminate; **adaxial surfaces** glabrous between the veins, the costa with dense, 0.1–0.2 mm long, acicular, curved hairs; **abaxial surfaces** of fertile lamina glabrous between the veins, the costa and veins with moderate to dense, 0.1–0.15(–0.2) mm long, acicular, curved hairs and sparse, filiform, 0.2–0.3 mm long, branched, adpressed, caducous scales with a globose apex, sterile pinnae glabrous or with sparse, adpressed, small (0.1 mm long) hairs between the veins; **costal nerves** 6–9 on sterile pinnae and 9–16 on fertile pinnae per 3 cm; **secondary veins** arcuate on fertile pinnae and subsigmoid on sterile pinnae, united to form an obtuse angle, with one, excurrent, free veinlet; **areoles** in 9–14 rows on sterile pinnae and 6–16 rows on fertile pinnae between the coast and pinna margin. **Sori** arcuate only on the secondary veins and confluent at maturity or acrostichoid to subacrostichoid with sporangia on the secondary veins and between the veins; **receptacles** glabrous; **sporangia** glabrous. **Spores** reticulate-cristate, reticula adpressed with narrow and wide areoles, crests fimbriate, short, fenestrate, perforated.

Distribution and habitat:—Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Trinidad and Tobago, and Venezuela (Fig. 46). This species is usually terrestrial in the interior of humid forests, on banks and along streams, sometimes as a rheophyte, at 65–1100 m.

Notes:—*Meniscium nesioticum* is similar to *M. angustifolium* because of the curved hairs on the costa, but can be distinguished by the following characters: sterile pinnae wide (2.3–3.5 cm) and, except for the basal pinnae, not petiolulate, not cuneate, with 6–9 costal veins per 3 cm (Maxon & Morton 1938), whereas in *M. angustifolium* the sterile pinnae are narrower (0.8–2.4 cm) and usually all have a cuneate base, or the distal pinnae have a slightly asymmetric base and the proximal and median pinnae are petiolulate, with 8–17 costal veins per 3 cm.

Meniscium nesioticum and *M. macrophyllum* are the only species of the genus that have acrostichoid sori (sporangia between the veins). These two species differ because *M. nesioticum* has curved hairs only on the costa and laminar surfaces that are glabrous between the veins. *Meniscium nesioticum* is also similar to *M. lanceum* that also has dimorphic fronds. However, *M. lanceum* has erect, tangled, dense hairs on the costa abaxially.

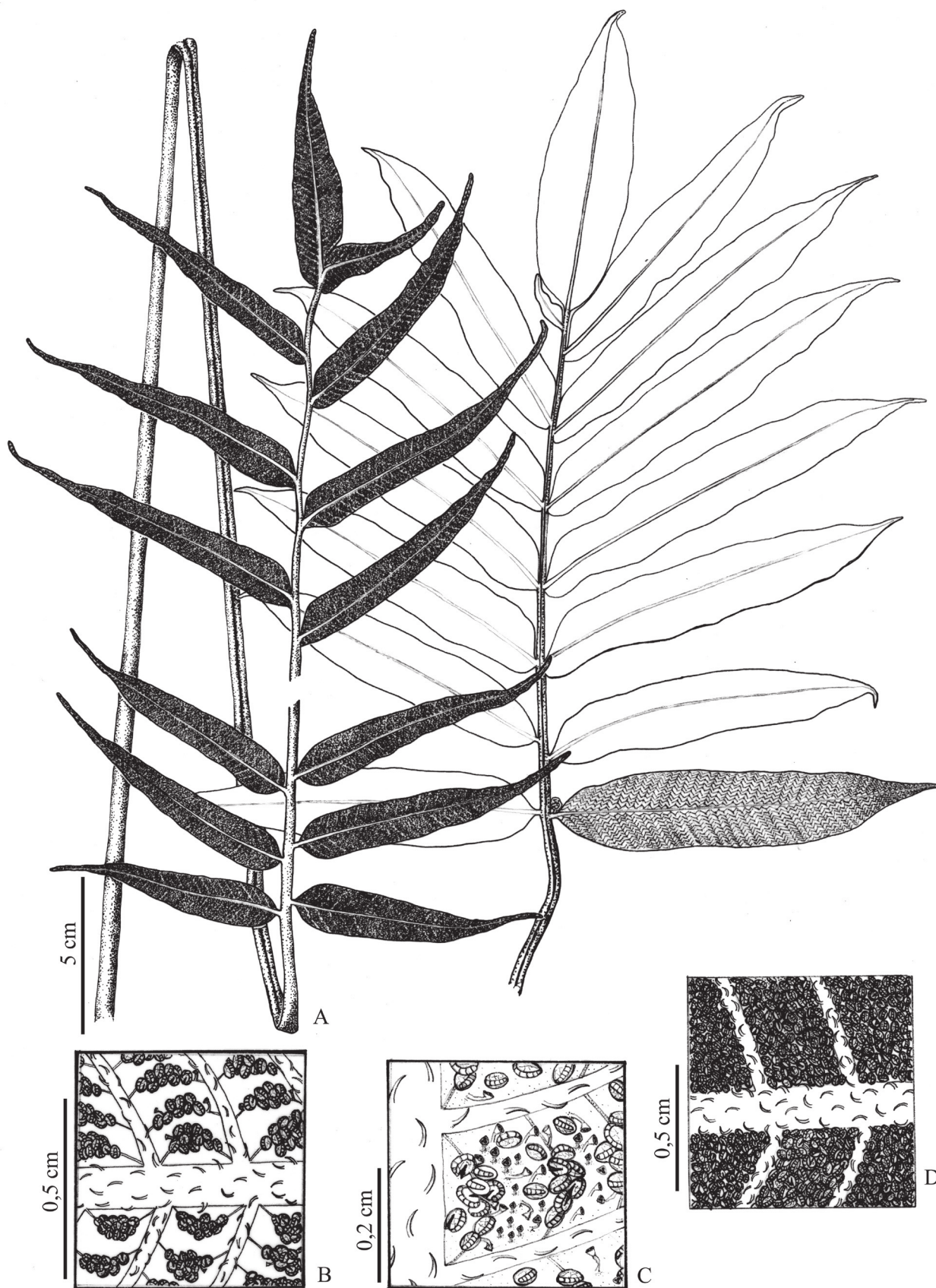


FIGURE 33. *Meniscium nesioticum*. **A.** fertile (left) and sterile (right) fronds; **B.** details of the abaxial surface of the fertile pinna with curved hairs on the costae and veins, and sori on the veins; **C.** details of the abaxial surface of the fertile pinna with curved hairs on the costae and veins, and acrostichoid sori; **D.** details of the abaxial surface of the fertile pinna showing the confluent and acrostichoid sori (**A.** Salino 15584, BHCB; **B–D.** Fay & Fay 3708, NY).

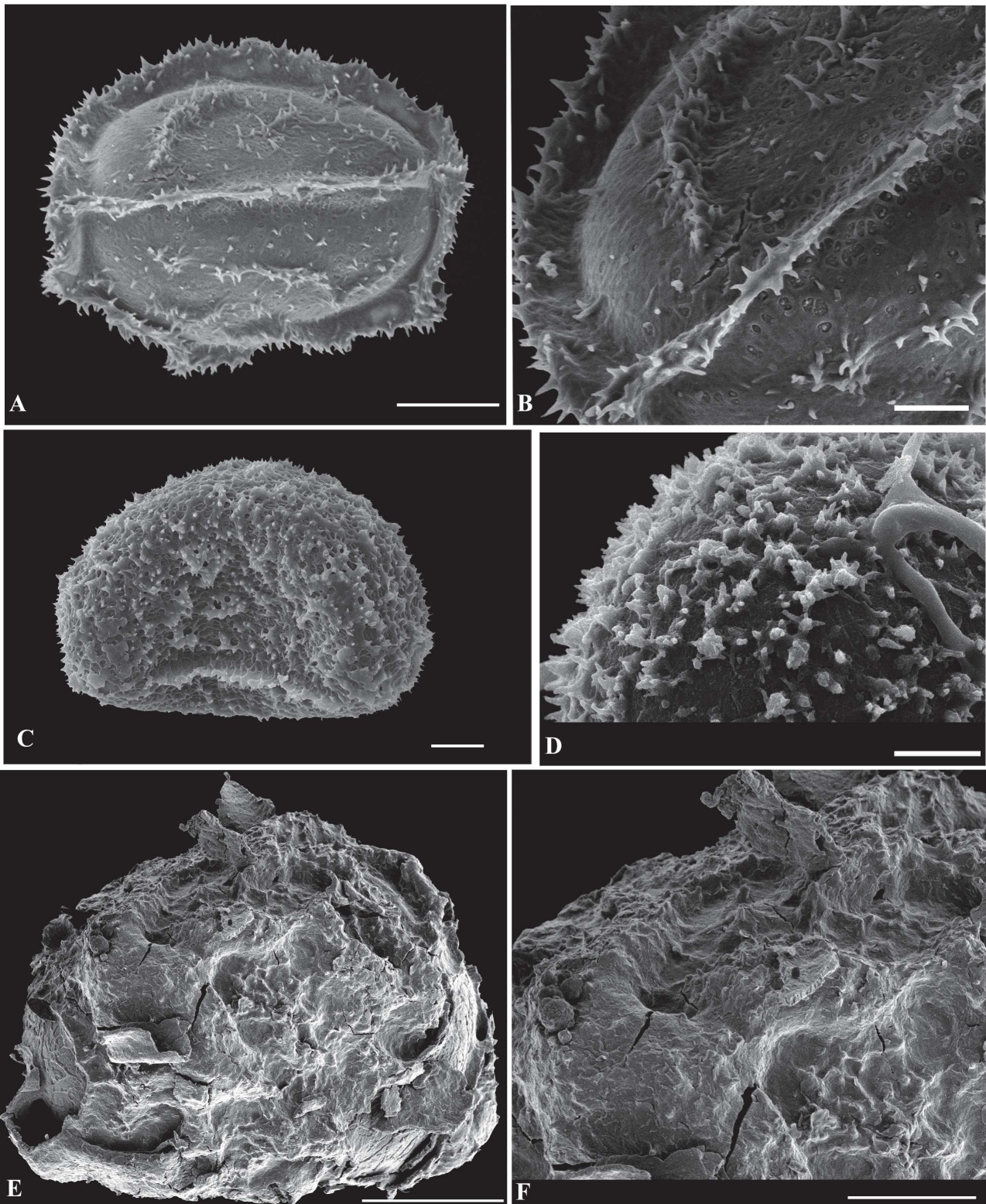


FIGURE 34. Spores of *Meniscium*. **A–B.** *M. maxonianum*, winged-fimbriate spore. **C–D.** *M. membranaceum*, echinate spore. **E–F.** *M. minusculum*, deformed spore (**A–B.** Arruda et al. 963, BHCB; **C–D.** Salino & Almeida 15015, BHCB; **E–F.** Lehmann 4433, K). Scales bars: A, C, E = 10 μm ; B, D, F = 5 μm .

Another morphologically similar species is *M. turrialbae* because it has buds on the proximal pinnae, a long-acuminate, caudate pinna apex, and curved hairs on the costa abaxially. However, *M. nesioticum* has dimorphic fronds and sori that are usually acrostichoid, while *M. turrialbae* has monomorphic to slightly dimorphic fronds and sori only on the secondary veins.

Specimens examined:—**BOLIVIA. Cochabamba:** Antahuacana, 750m, June 1909, *Buchtien 2219* (US). **Santa Cruz:** Velasco, Parque Nacional Noel Kempff Mercado, 14°37' S, 61°42' W, 150m, 26 June 1993, *Arroyo 251* (USZ).—**BRAZIL. Mato Grosso:** Alta Floresta, 10°00' S, 56°00' W, 6 May 1986, *Windisch 4774* (UC, US); **Pará:** Canãa dos Carajás, Distrito de Racha Placa. Floresta Nacional de Carajás, 6°25'14" S, 50°16'57" W, 325m, 29 April 2010, *Almeida et al. 2355* (BHCB); Serra Sul, 6°20'36" S, 50°24'30" W, 575m, 24 May 2012, *Salino et al. 15290* (BHCB); *idem Salino et al. 15584* (BHCB); **Rondônia:** Costa Marques, Chapada dos Parecís, Distrito de Alta Floresta, 11°12' S 62°63' W, 10 June 1984, *Cid 4582* (NY).—**COLOMBIA. Putumayo:** Rio Oretopungo near confluence with Rio Putumayo, 400m, 13 January 1945, *Ewan 16761* (GH, US).—**ECUADOR. Napo:** 0°54' N, 77°48' W, 600m, 27 June 1968, *Holm-Nielsen & Jeppesen 1050* (GH); *idem*, Cotococha, 1 km west of Venecia and 25 km east of Tena, 1°27'50" S, 77°42'70" W, 450m, 16 June 2003, *Landrum 10685* (NY); **Pastaza:** Pastaza Canton, 0°12'90" S, 77°59'50" W, 950m, 14 July 1992, *Fay & Fay 3626* (MO, NY, UC,); *idem*, 0°13'05" S, 77°58'00" W, 950m, 19 July 1992, *Fay & Fay 3708* (MO, NY, UC); *idem* Montalvo, on the Río Bobonaza, 2°5' S, 76°58' W, 300m, 28 July 1980, *Øllgaard et al. 35430* (NY, GH, UC).—**GUYANA.** northwestern slopes of Kanuku Mountains, 150m, 31 May 1938, *Smith 3554* (B, F, GH, IAN, K, MO, NY, S, US).—**PERU. Amazonas:** Bagua, 0°45'50" S, 78°19'00" W, 320m, 29 January 1996, *Jaramillo & Jaramillo 1000* (MO); *idem*, Valley of Río Marañón, 450m, 3–4 September 1962, *Wurdack, J.J. 1829* (US).—**TRINIDAD & TOBAGO.** Arima Blanch. Rd. 18,5 mi post., 300m, 18 April 1970, *Fay, A. 459* (BM, MO); 17 January 1925, *Homersley 217* (BM); Tacarigua Ward, 9 May 1945, *Johnston 211* (BM); Spring Bauk, 22 January 1932, *Homersley 482* (BM); Tacarigua Ward, 3 April 1966, *Walker 10479* (BM); Aripo Savana, 3 November 1974, *Jermy 1974* (BM); Tacarigua Ward, 3 April 1966, *Walker 10480* (BM); Arima Ward, Guanapo Road, along the valley of river, 19 August 1963, *Jermy 2893* (BM), 2901 (BM, MO), 2902 (BM); *idem*, 19 August 1963, *Walker 7014* (BM); Spring bank Estate, *Humbert "83"* (K); *s.loc.*, 6 January 1925, *Homersley 227* (BM); *idem*, 22 February 1932, *Homersley 467* (BM); *idem*, *Prestore s.n.* (BM); *Lorhhart (ilegível) s.n.* (K).—**VENEZUELA. Bolívar:** 8°25' N, 62°00' W, 350m, 11 March 1987, *Aymard 5331* (UC). **Monagas:** Sierra Imataca, Delta Amacuro, 65m, 2 November 1960, *Steyermark 87258* (K, NY).

21. *Meniscium pachysorum* (Hieron.) R.S. Fernandes & Salino (2016: 179). (Figs 36A–B; 37A–B)

Dryopteris pachysora Hieronymus (1907: 19). Type:—ECUADOR. Tungurahua: Abitagua inter Banõs et Jivaría de Pintuc, without date, *A. Stübel 897* (lectotype B20 0062230, designated by Fernandes & Salino (2016), isolectotype BM000937790!).

=*Dryopteris sorbifolia* Jacquin (1788: 106) Hieronymus (1907: 350) var. *punctivenulosa* Hieronymus (1907: 350). **Type:**—COLOMBIA. Cundinamarca: Muzo, without date, *A. Stübel 544* (lectotype B20 0064468 designated by Fernandes & Salino (2016), isolectotype US1692747).

Rhizomes short-creeping, 1.4–2.0 cm diam., glabrous or with subclathrate, caducous, lanceolate, dark brown, glabrous, lustrous scales. **Fronds** 214–300(–400) cm long, monomorphic. **Petioles** 77–111 cm long, 4–8 mm diam., with brown to black basal portion and stramineous to reddish-brown distal portion, glabrous or glabrescent, with rare scales on the basal portion equal to those on the rhizome. **Laminae** 129.5–149 cm long, 1-pinnate, lanceolate, chartaceous. **Rachises** deeply sulcate, glabrescent with rare, 0.1–0.15 mm long, acicular, curved hairs usually in the adaxial sulcus. **Buds** absent. **Pinnae** in 15–28(–40) pairs, 23–35 × 2.7–5 cm, oblong-elliptic, usually subarticulate to rachis, proximal and median pinnae petiolulate, petiolule (0.9)2–5 cm long, distal pinnae sessile; **bases** not decurrent on petiolule, base of proximal pinnae short-cuneate to acute, not auriculate, base of distal pinnae with basiscopic side round and acroscopic side excavate or truncate and parallel to rachis; **margins** entire to undulate or crenate at least towards the apex, glabrous or with hairs; **apices** long-acuminate; **adaxial surfaces** glabrous or costa usually with acicular, 0.1–0.15 mm long, curved, tortuous, sparse to moderate hairs. **abaxial surfaces** glabrous or costa and veins (rarely on the laminar surfaces near sori) with acicular, 0.1–0.15 mm long, sparse, moderate to dense, curved to erect hairs, and filiform, branched, septate, flattened, 0.2–0.5 mm long (1–2 cell rows wide), reddish brown, caducous or adpressed scales (reaching the laminar tissue) and arachnoid, hyaline or reddish, caducous scales, glandular hairs absent; **costal veins** on fertile and sterile pinnae 8–14 per 3 cm; **secondary veins** straight to arcuate on fertile pinnae and arcuate to subsigmoid on sterile pinnae, united to form an obtuse angel, with one, excurrent, free veinlet or veinlet often completely dividing areole; **areoles** in 13–17 rows between costa and margin, nearly as long as wide, forming a rectangle. **Sori** round to slightly oblong, uniseriate between costal veins, not confluent at maturity; **receptacles** glabrous or rarely with filiform, branched sporangiaster with an acicular hair; **sporangia** glabrous or rarely with septate paraphyses on the stalk, septa with acicular hairs. **Spores** echinate, spines tall, dense, uniform.

Distribution and habitat:—Bolivia, Colombia, Ecuador, and Peru (Fig. 46). This species generally grows on steep banks in the interior of humid forests, in montane areas, at 700–1600 m.

Notes:—*Meniscium pachysorum* has been treated as a synonym of *M. falcatum* (Maxon & Morton 1938, Smith 1983). However, these species can be distinguished using a set of characters. The most notable characters for *M. pachysorum* are the following: deeply sulcate rachis, pinnae up to 5 cm wide, oblong-elliptic, base acute to short-cuneate and abruptly reduced, proximal and median pinnae petiolulate. In addition, the veins are prominent, the sori are usually round and the sporangia are glabrous, or the stalk has septate paraphyses with acicular, non-glandular hairs (see discussion under *M. falcatum*).

Meniscium pachysorum is probably the largest species of the genus and has the highest number of pinna pairs. For this reason, it is rarely possible to analyze a complete specimen, which makes it difficult to compare it to *M. falcatum*. The only complete specimen analyzed, *Killip 34881* (COL, US), has 28 pinna pairs. For the other specimens, the information was obtained from the labels (*Sanín et al. 5073* [NY], *Killip & Smith 25570* [NY]), which cite that the leaf has a scandent appearance, is ca. 4.5 m long and has 40 pinna pairs.

Specimens examined:—**BOLIVIA. Chuquisaca:** 19°48' S, 63°48' W, 1320m, 8 July 2000, *Huaylla, H.; Wendelberger, K. 10* (MO). **La Paz:** Larecaja, Copacabana, 850m, 8 November 1939, *Krukoffs, B.A. 11128* (NY, F, K, MO, GH); Sobre el camino a Tipuani, 1400m, February 1920, *Buchtien, O. 5158* (NY, US); Sem localidae, 150m, 17 April 1902, *Williams, R.S. 1280* (NY).—**COLOMBIA. Antioquia:** Anorí, Vereda Santa Gertrudis, finca La Estrella, 4 October 2003, *Rodríguez, W.; Colorado, J.; Arango, A.; Ospina, J.; Agudelo, L.; Urán, V. 4146* (NY); *idem*, Frontino, Parque Nacional Natural Las Orquideas, sector de V, 6°32'23" S, 76°17'59" W, 1000m, 27 July 2011, *Sanín, D. et al. 5073* (NY); *idem*, Yolombó, Vereda El Bote, 8,1 km SO de Yolombó, 6°32' S, 75°01' W, 1550m, 1 July 1989, *Callejas, R.; Betancur, J.; Escobar, O. 7955* (NY, UC). **Caldas:** La Selva, Cordillera Occidental, 1600m, (1 March 1946), *Sneidern, K. 5533* (F, US). **El Valle:** Río Digua Valley, la Margarita, 760m, 4 April 1939, *Killip, E.P. 34881* (US). **Putamayo:** Mocoa, Corregimiento de San Antonio, 1°12' S, 76°38' W, 1400m, 20 April 1994, *Betancur, J.B.; Galviz, P.; Marin, Z. 5083* (US); *idem*, Monte la Tortuga, 24 May 1935, *H. B. Guamaz?, 4600* (US). **Santander:** 6°70' S, 73°42' W, 1200m, 2 May 1983, *Croat, T.B. 56380* (UC, MO).—**ECUADOR. Tungurahua:** *Stübel 897* (BM).—**PERU. Junín:** East of Quimiri Bridge, near La Merced, 800m, 1 June 1929, *Killip, E.P.; Smith A.C. 23890* (F, NY, US); *idem*, February 1939, *Soukup 1085* (F); *idem*, Pichis Trail, Yapas, 1350m, 28 June 1929, *Killip, E.P.; Smith A.C. 25570* (NY, US).

22. *Meniscium reticulatum* (L.) Swartz (1803: 274). (Figs 35A–C; 37C–D)

Polypodium reticulatum Linnaeus (1759: 325). *Phegopteris reticulata* (L.) Mettenius (1859: 24). *Nephrodium reticulatum* (L.) Keyserling (1873: 49). *Dryopteris reticulata* (L.) Urban (1903: 22). *Thelypteris reticulata* (L.) Proctor (1953: 63). **Type:**—Probably Martinica, “Felix latifolia, non ramosa nigris tuberculis pulverulenta” in Plumier Descr. Pl. Amér., 6, t. 9, 1693, based on Plumier’s illustration. (lectotype designated by: Underwood (1906). Epitype here designated: Martinique, Mont Rouge, October 1870, *Hahn, L. 29* (P).

Rhizomes short-creeping, 0.8–2.8 cm diam., glabrous or with few scales at the apex, scales caducous, irregular, linear to ovate-lanceolate, subclathrate, brown, and glabrous or with glands on the margin. **Fronds** monomorphic or subdimorphic; **sterile fronds** 78–149 cm long, petiole 37–73 cm long, 4–8 mm diam., lamina 49–76 cm long, pinnae (15–)18–26 × (2.2–)3.7–4.8 cm; **fertile fronds** 99.5–224 cm long, petiole 55–116 cm long, 5–12 mm diam., lamina 43–116 cm long, pinnae 13.5–22 × 2.4–3.8 cm. **Petioles** with brown basal portion and greenish to stramineous distal portion, glabrescent, with rare scales on the basal portion and hairs throughout, scales caducous, irregular, adpressed, dark brown, hairs 0.1–0.2 mm long, moderate, acicular, curved, patent, adpressed. **Laminae** 1-pinnate, lanceolate to ovate-oblong, chartaceous. **Rachises** glabrous abaxially, adaxial surfaces usually with dense hairs equal to those on the petiole or glabrous. **Buds** present in axils of proximal pinnae. **Pinnae** in (6–)8–13(–15) pairs, sterile pinnae oblong, fertile pinnae triangular-lanceolate or narrowly ovate to lanceate, proximal pinnae short-petiolulate, petiolule 2–5 mm long, distal pinnae sessile; **bases** of proximal pinnae acute to widely rounded, sometimes asymmetric with basiscopic side truncate, base of distal pinnae oblique with basiscopic side rounded to decurrent on the rachis and acroscopic side excavate; **margins** undulate to slightly crenate near the apex, rarely entire on sterile pinnae, with sparse, acicular hairs; **apices** acute to long-acuminate; **adaxial surfaces** glabrous between and on veins, costa with moderate to dense, 0.1–0.2 mm long, acicular, curved, adpressed hairs; **abaxial surfaces** glabrous between the veins (rarely with hairs), costa and veins with short (0.15–0.25 mm), sparse to moderate, acicular, curved or patent and tortuous hairs, and filiform, irregular, adpressed, arachnoid, caducous, hyaline scales near the costa and on the sori, glandular hairs absent; **costal veins** 7–11 on fertile and sterile pinnae per 3 cm; **secondary veins** subsigmoid on sterile pinnae, arcuate on fertile

pinnae, united with adjacent vein to form an obtuse angle with one excurrent, free veinlet; **areoles** in (9–)11–14(–17) rows between costa and margin. **Sori** oblong to arcuate on secondary veins, not subconfluent at maturity; **receptacles** glabrous; **sporangia** glabrous. **Spores** cristate-reticulate, fimbriate with echinate elements.

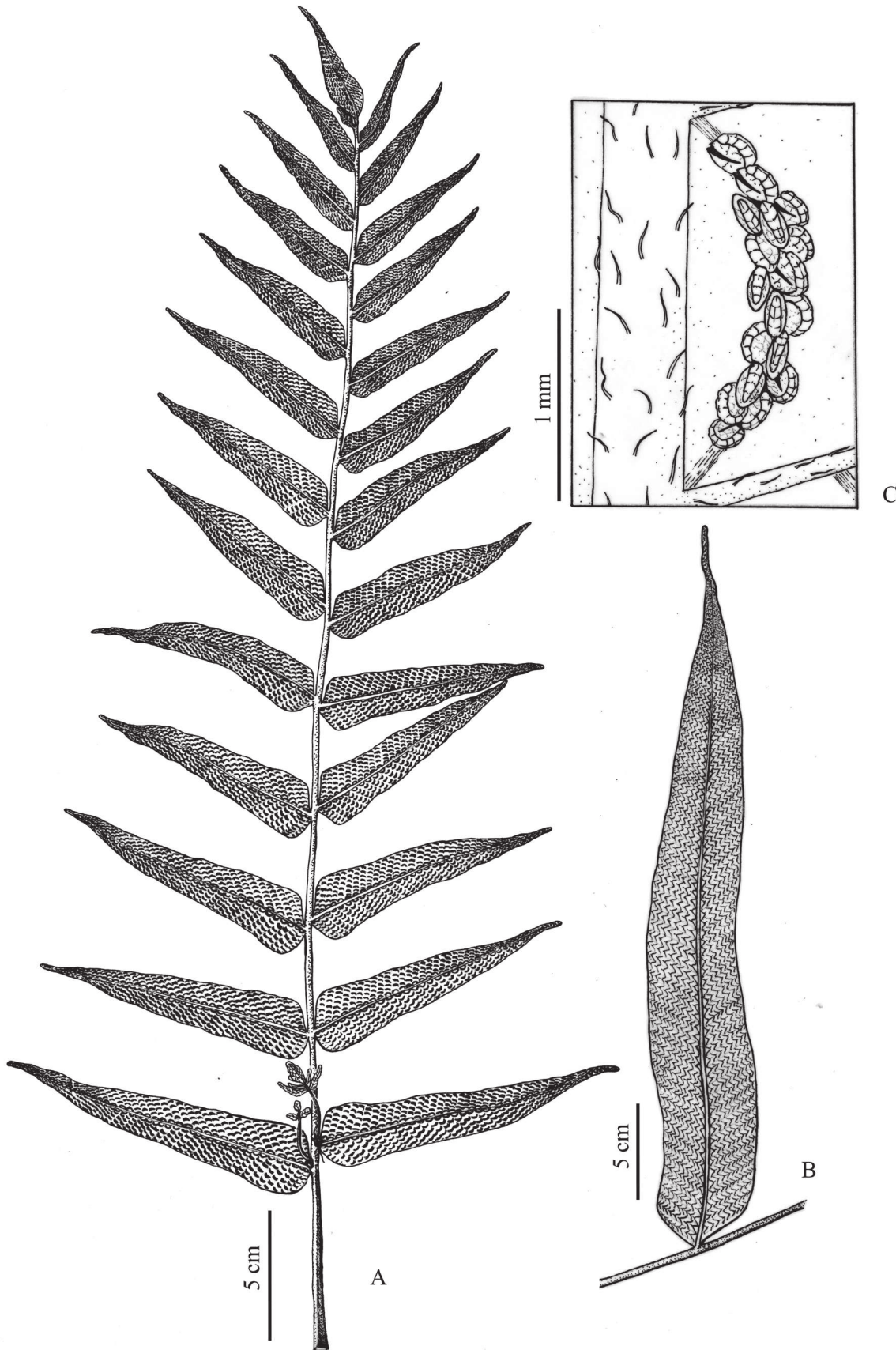


FIGURE 35. *Meniscium reticulatum*. **A.** fertile lamina; **B.** median sterile pinna; **C.** detail of the abaxial costa with tortuous and patent hairs and arcuate sori on secondary veins (**A,C.** Morton 5220, US; **B.** Eaton 779, US).

Distribution and habitat:—Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Mexico, Montserrat, Puerto Rico, Saint Kitts, Saint Lucia, Saint Vincent and the Grenadines, U.S.A. (Florida), and Venezuela (Fig. 47). *Meniscium reticulatum* is terrestrial, very common in the Caribbean islands, and usually occurs in secondary forest clearings, swampy areas with humid, clayey soils, along rivers, in sunny places or along trail margins on steep slopes, at 10–900 m.

Notes:—The most notable characteristic of *Meniscium reticulatum* is the fertile pinnae, which are ovate-triangular to lanceolate, wider at the base and narrower toward the apex. Although not as prominent, *M. serratum* also has wider pinnae bases but it differs by the serrate to uncinete-serrate pinnae margin and usually has hairs on the sporangium stalk. Smith (1995) commented that *M. reticulatum* is very similar to *M. turrialbae*, that this might be due to variation in *M. reticulatum*, and that these taxa are separated only by pinna shape. However, in addition to having oblong pinnae that are uniform from the base, *M. turrialbae* has curved, adpressed hairs on the costa abaxially.

Proctor (1977) described *M. reticulatum* as having hairs on the sporangia. This might be based on material from Brazil that is *M. arborescens*, since *M. reticulatum* does not occur in Brazil and lacks hairs on the sporangia and receptacles.

The lectotype of *Polypodium reticulatum* L. was designated by Underwood (1906) based on the illustration of Plumier and, subsequently, Proctor (1977) erroneously designated the material 1251.25 (LINN) as the type. The Plumier illustration is of part of a leaf, does not show diagnostic characters for the species and could be another species of *Meniscium*. Therefore, the taxonomic identity of the lectotype is ambiguous and an epitype is here designated to maintain the correct application of the name (according to Art. 9.8 do ICN). The material 1251.25 (LINN) could be chosen as the epitype, and not the lectotype as done by Proctor (1977). However, it was probably not collected in the geographical regions where Plumier was active (mainly Haiti and Martinique). Further, the specimen is sterile and does not morphologically represent the species. Thus, a specimen at P that is probably from Martinique is here designated as the lectotype, which has more duplicates than any other collection at other herbaria.

Specimens examined:—**CUBA. Cienfuegos:** Mina Carlota, prope villam Monte Verde dictam, Cuba Orientali, July 1859, *Wright 782* (BM, B, GH, K, NY, US); *idem*, SE of Cumanayagua, Sierra de San Juan, 3m, July 1941, *Howard 5698* (GH); **Guantánamo:** Baracoa: Base of el Yunque MT, March 1903, *Underwood 832* (NY). *idem*, base of El Yunque Mt, March 1908, *Underwood & Earle 561* (NY); *idem*, lower valley of Río Navas, 20 March 1910, *Shafer 4366* (US); *idem*, Oriente, Lower Valley of Río Navas, 20 March 1910, *Shafer 4366* (GH; NY); **Habana:** Isle of Pines, 6 February 1956, *Morton 9969* (US); *idem*, 31 March 1903, *Shafer 19* (NY); *idem*, in Cuba orientali, 1859, *Wright 1084* (NY, BM, GH, K, US); **Holguín:** La Perla: 6 August 1913, *Luis, B.; Gustavo 3836* (NY); *idem*, 600m, 6 February 1911, *Shafer, J.A. 8568* (GH, K, NY, US). *idem*, Sierra del Cristal, 26 August 1959, *Lopez 167* (US); **Isla de la Juventud:** (Isle of Pines) 31 March 1954, *Killip 43789* (US); *idem*, near Nueva Gerona, 30 July 1900, *Palmer & Riley 917* (US); *idem*, near Nueva Gerona, 8 July 1900, *Palmer & Riley 1048* (US); *idem*, **Las Tunas:** 22 February 1916, *Britton, N.L.; Britton, E.G.; Wilson, P. 14742* (NY). *idem*, Isle of Pines, 22 February 1916, *Britton, N.L.; Britton, E.G.; Wilson, P. 14742* (US); *idem*, San Francisco de las Piedras, Isle of Pines, 23 March 1954, *Killip 43744* (US); *idem*, Santa Bárbara, Isle of Pines, 4 February 1953, *Killip 42596* (US); *idem*, Santa Fé, Isle of Pines, 8 March 1953, *Killip 43051* (US); **Pinar de Rio:** Source of Río: Taco-Taco, Sierra de Los Organos, 400m, 18 November 1941, *Morton 4384* (NY, GH); *idem*, Pinar de Santa Ana, 800m, April 1889, *s. coll. 5019* (NY); *idem*, Arroyo del Sumidero, 7 August 1912, *Shafer & Leon 13689* (NY, GH, US); *idem*, La Palma, 16 July 1996, *Ranker & Lemieux 1665* (UC); *idem*, 26 February 1900, *Palmer & Riley 82* (NY, US); *idem*, Palm-Barrens west of Guane, 1 December 1911, *Shafer 10688* (GH, NY, US); *idem*, vicinity of Viñales, 17 September 1910, *Britton & Britton 7537* (NY; US); *idem*, Source of Río: Taco-Taco, Sierra de los Organos, 400m, 18 November 1941, *Morton 4384* (US); **Santiago de Cuba:** Loma del Gato, Sierra Maestra, August 1923, *Hiora & Clement 6457* (US); *idem*, Monte Libano, Caverns of Thermopylae and vicinity, 600m, 27 April 1907, *Maxon 4254* (US); *idem*, Northern spur of Sierra Maestra, west of Río Yao, 300m, 24 October 1941, *Morton & Acuna 3327* (K, US); *idem*, Oriente: 15 km SW of the mill Compania de Moa, July 1941, *Howard 5830* (HY, GH); *idem*, Caverns of Thermophylae and vicinity, Monte Libano, 600m, 27 April 1907, *Maxon 4254* (NY, GH); *idem*, Oriente: Firmeza to Gran Piedra, 4 March 1911, *Shafer 8955* (NY, GH, K, US); *idem*, Oriente: Sierra de Nipe in manacales ad Río Piloto, 21 July 1914, *Ekman 2106* (NY); *idem*, Petrero de Santa Fe, 7 December 1917, *Hioram, B. 1396* (NY, US); *idem*, Oriente, Santa Ana, about 6 miles north of Jaguey, Yateras, 600m, 25 April 1907, *Maxon 4208* (BM, NY, US); *idem*, Baracoa, 4 January 1902, *Pollard et al. 48* (NY, US); *idem*, Santo Yago de Cuba, April 1844, *Linden 2116* (B, BM, US); **Villa Clara:** Santa Clara, Trinidad Mountains, Los cocos to Río Negro, 430m, 6 March 1910, *Britton & Wilson 5142* (NY, US); *idem*, Santa Clara: Trinidad Mountains, San Blas-Buenos Aires, August 1941, *Howard 6435* (NY, GH); *idem*, Santa Clara: Trinidad mts near San José, June 1941, *Howard 5168* (NY, GH); **s.loc.**, 20 October 1898, *Harris 7420* (K, BM); *idem*, 31 March 1954, *Killip 43789* (UC); *idem*, 300m, 24 October 1941, *Morton & Acuna 3327* (UC); *idem*, Amaro: 11 August 1192, *Leou & Laustalot 9432* (NY).—**DOMINICA.** 14

July 1964, *Wilbur et al.* 7438 (US); 1888, *Ramage s.n.* (BM); April 1922, *Bailey* 763 (US); *Campbell s.n.* (K); 15°21' S, 61°21' W, 22 August 1992, *Lee* 38 (US); 19°20' S, 16°30' W, 500m, 1 June 1996, *Hill* 28048 (UC); Baiac, inland from Roseau, 15 August 1982, *Sydes* 313 (BM); Baiac, inland from Roseau, 16 August 1982, *Sydes* 321 (BM); Baiac, inland from Roseau, 18 August 1982, *Sydes* 344 (BM); between Pointe Michel and Sufrière, 13 May 1964, *Ernst* 1311 (US); Fresh Water Lake, near Laudat, 450m, 26 March 1956, *Smith* 10220 (US); Melville Hall: Marigot, Bank of the Mantipo River, 21 July 1938, *Hodge* 106 (US); Morne Brule: Portsmouth, North of River watershed, 22 August 1938, *Hodge* 108 (US); near the Syndicate. Road to Trou Cochon, 650m, 9 October 1983, *Whitefoord* 3962 (BM); North-west slopes of Morne Diablotin. Syndicate Es, 25 March 1988, *Whitefoord* 5862 (BM); Pagua river, 5 January 1966, *Chambers* 2503 (US); Saint Paul Parish: Lesser Antilles, 61°22'20" W, 15°20'30" S, 1500m, 29 May 1994, *Hill* 25657 (MO, US); South Chiltern Estate between Pointe Michel and So, 457m, 14 May 1964, *Ernst* 1311 (BM); St. Paul: road ca. 0,5 mi. W of Pont Cassé, 457m, 23 November 1965, *Lellinger* 622 (BM, US); *idem*, Archbold Tropical Research Center Springfield Esta, 15°20'30" S, 61°22'20" W, 26 May 1994, *Hill* 25657 (NY).—**DOMINICAN REPUBLIC.** **El Siebo:** 18°57' S, 69°28' W, 200m, 14 June 1988, *Croat* 68499 (UC); **Corona Estate:** 61°21' W, 15°21' S, 496m, 22 August 1922, *Lee* 38 (NY, GH); **Laudat:** 1903, *Lloyd* 326 (NY); Lisdara, 457m, 27 August 1937, *Hodge* 105 (GH). **La Vega:** Cotuy, 300m, 28 January 1921, *Abbott* 746 (US); *idem*, Propr Jarabacoa, 550m, June 1912, *Fuertes* 1682 (NY, GH, BM); *idem*, Moist forest bordering Pegoua river, *Hodge* 2993 (GH); moist forests in valley of Hampstead River, 100m, 10 May 1940, *Hodge & Hodge* 3646 (GH); Monte Plata, Valle del Cibao-Los Haitises Límite, 69°47' W, 18°42' S, 11 May 1988, *Zanoni et al.* 40859 (NY); on the western slopes of Morne Brule, Portsmouth, 29 August 1938, *Hodge, W.H.* 108 (GH); Santiago: San José de Las Matas, 650m, 3 January 1930, *Valeur* 336 (BM); **Pacificador:** Vicinity of San Francisco of Macoris, 400m, 2 April 1992, *Abbott* 2166 ? (HB, GH); 1903, *Lloyd* 20 (GH, K, NY); *idem*, San Francisco, 400m, 5 April 1922, *Abbott* 2166 (US); *idem*, Villa Riva, 100m, 11 January 1919, *Abbott* 610 (US); **Puerto Plata:** base-Cordillera 1.8 km al suroeste de Cabarete en, 19°45' S, 70°40' W, 10m, 9 May 1984, *Zanoni et al.* 29937 (NY); Río San Juan, 17 March 1928, *Miller* 1162 (US); **Saint Paul:** 457m, 23 November 1965, *Lellinger* 622 (GH); **Samaná:** Sánchez, 300m, 29 December 1920, *Abbott* 37 (US); *idem*, Sánchez, 300m, 29 December 1920, *Abbott* 74 (US); *idem*, 300m, 29 December 1920, *Abbott* 77 (US); San Cristobal: 30 April 1966, *Lavastre* 2126 (NY); **San Cristobal:** Río Comate where it crosses road town of Sierra de, 18°50' S, 69°34' W, 180m, 21 August 1980, *Mejía & Zanoni* 8038 (NY); *idem*, vicinity of Sánchez, 29 November 1920, *Abbott* 37 (GH); **Santiago:** Arroyo Mata Puerto Rico, 650m, 3 January 1930, *Valeur* 336 (NY, US); **Santo Domingo:** Station 9066-Villa Riva, 22 April 1978, *Liogier* 90664 (NY); scrubby coastal woodlands along trail between Atki, 3 May 1940, *Hodge* 3390 (GH); Woodlands on the Noth River watershed, 29 August 1938, *Hodge* 108 (NY); **s.loc.**, 19 July 1938, *Hodge* 107 (GH); *idem*, 500m, 9 February 1940, *Hodge & Hodge* 1354 (GH); *idem*, 665m, 8 March 1940, *Hodge & Hodge* 1786 (GH); 21 July 1938, *Hodge* 106 (GH); 457m, 31 August 1933, *Proctor* 100 (NY); 6m, 7 October 1931, *Valeur* 827 (GH, K, US); 701m, 14 July 1964, *Wilbur et al.* 7380 (GH); *idem*, 550m, 1 June 1887, *Eggers* 2315 (B); Cordillera Central, 1 February 1929, *Ekman* 11092 (NY); Río Básima, 21 March 1964, *Augo, B.* 1403 (NY); Catarey, 23 February 1963, *Augo* 714 (NY).—**GRENADA.** 10 September 1945, *Beard* 1195 (K, US).—**GUADELOUPE.** Basse Terre: route D23 de Petit Bourg à Pointe Noi, 14 October 1984, *Billiet & Jadin* 989 (NY); La Soufrière, 1853, *Duchassaing s.n.* (BM); 1862, *Herminier* 103 (B, K); 16°11' S, 61°42' W, 248m, 17 March 2005, *Christenhusz & Katzer* 4112 (UC). *s.loc.*, 19 April 1939, *Questel* 1981 (GH); 19 February 1936, *Stehlé* 511 (GH); 4 March 1939, *Questel* 963 (GH); April 1894, *Duss* 4233 (NY).—**HAITI.** **Nord:** vicinity of Plaisance, 400m, 26 January 1926, *Leonard* 9188 (GH, NY, US); *idem*, Port-de-Paix, 17 April 1925, *Ekman* 3823 (K). Road from Camp No. 1 La Barrière Couchant, 762m, 17 July 1905, *Nash & Taylor* 1053 (NY, US).—**JAMAICA.** **Portland:** Alajuela, Upper Rio Grande Valley, near Bowden Pen, 18°10' S, 76°23' W, 450m, 20 January 2004, *Christenhusz & Tuomisto* 3171 (BM; UC); *idem*, 450m, 30 March 1958, *Yuncker* 18546 (BM, NY); *idem*, Seamen's Valley, 150m, 14 February 1920, *Maxon & Killip* 24 (B, BM, NY, US); *idem*, spur of John Crow Mountains opposite Mill Bank, Po, 450m, 18 June 1926, *Maxon* 9358 (NY, GH, US); E. slope of John Crow Mtns, March 1951, *Robertson* 4267 (NY); *idem*, vicinity of Port Antonio, 25 September 1906, *Underwood* 3477 (NY); **Saint Thomas:** 381m, 4 August 1963, *Crosby & Anderson* 1039 (GH); *idem*, Mountain trail between House Hill and Cuna Cuna Ga, 550m, 7 June 1926, *Maxon* 8948 (NY); *idem*, Trail W over Blue, 609m, 11 August 1954, *Wilson & Murray* 562 (BM); *idem*, thicket by trail toward Cuna-Cuna Pass, 16 June 1940, *Chrysler* 4664 (NY); **Trelawny-Saint Elizabeth:** Cockpit Country, Cook's Bo, 450m, 1 February 2004, *Christenhusz & Tuomisto* 3359 (BM); **Saint Ann:** upper slopes of Mount Diabolo, 500m, 25 February 1920, *Maxon, & Killip* 502 (GH, US); *idem*, upper slopes of Mount Diabolo, 500m, 25 February 1920, *Maxon & Killip* 503 (NY); *idem*, vicinity of Hollymount, Mount Diabolo, 750m, 25 May 1904, *Maxon* 2282 (US); **s.loc.**, 1853, *Barkly & Barkly s.n.* (BM); 21 April 1901, *Ehday s.n.* (NY); 24 July 1897, *Fredholm* 3209 (NY); *idem*, 26 January 1903, *Underwood* 46 (NY); *Jenman s.n.* (NY); 1000m, 29 March 1909, *Watt* 162 (GH); *idem*, 18°14' S, 77°47' W, 450m, 1 February 2004, *Christenhusz & Tuomisto* 3359 (UC); *idem*, 609m, 16 February 1903, *Underwood* 1564 (NY); *idem*, above Cedar Valley, 600m, 20 July 1926, *Maxon* 10323 (US);

idem, along foot trail W from Ecclesdown into E slope of ???, 304m, 16 January 1967, *Evans 2535* (BM); *idem*, along the trail from bath to cuna cuna pass, 1000m, 1 May 1903, *Maxon 1710* (US); *idem*, Cedar Valley, 13 February 1900, *Clute, N.W. 149* (NY, US); *idem*, Corn Puss Gap, 2000m, 11 August 1954, *Wilson & Murray 562* (US); *idem*, Cuna Cuna, bellow Millbank, Blue Mountains, 20 July 1932, *G.F.P. s.n.* (US); *idem*, Harford and adjoining properties, near Priestman's R, 75m, 9 June 1904, *Maxon 2552* (NY); *idem*, Mansfield and adjoining properties, near Bath, 300m, 2 June 1904, *Maxon 2371* (NY); *idem*, Mountain trail between House Hill and Cuna Cuna, 550m, 7 July 1926, *Maxon 8948* (US); *idem*, near Bath, s.d., *Ehday s.n.* (NY); *idem*, near Bath, 300m, 7 July 1926, *Maxon 2371* (US); *idem*, near Mocho, above Catadupa, 750m, 3 April 1920, *Maxon & Killip 1542* (GH, NY, US); *idem*, near Port Antonio, 12 May 1903, *Underwood 2986* (US); *idem*, near Priestmans River, 75m, 7 July 1926, *Maxon 2552* (US); *idem*, near Troy, 457m, 7 May 1903, *Underwood 2969* (NY); *idem*, near tweedside, 3 April 1903, *Maxon 1004* (US).—**MARTINIQUE**. 1868, *Husnot 348* (BM); 1804, *Duss 1611* (NY); 1893, *Gilbert, B.D. s.n.* (GH); s.d., *Lieben 238* (B); November 1867, *Hahn 29* (B, K); *Stubeliana 1194* (B); 10m, *Herbarium Christensen, C.F.A. 1611* (BM); 14°44' S, 61°50' W, 350m, 21 March 2003, *Christenhusz & Bollendorff, S.M. 2698* (UC); 14°45' S, 62°01' W, 530m, 23 March 2003, *Christenhusz & Bollendorff 2715* (UC); Morne Calebasse: north of Morne Rouge, 650m, 7 December 1960, *Proctor 21689* (GH); near Alma, 14 November 1938, *Bailey & Bailey 269* (GH).—**MEXICO**. **Chiapas**: Ococingo, 250m, 22 January 1985, *Martinez 10079* (UC); *idem*, Ococingo, 180m, 21 September 1984, *Martinez 7675* (MO). **Oaxaca**: Choapam, Yaveo; Arroyo San Pedro, 440m, 23 March 1938, *Mexia 9202* (B, F, GH, K, MO, NY, UC, US).—**MONTSERRAT**. 365m, 23 February 1907, *Shafer 790* (NY); 457m, 23 January 1907, *Shafer 202* (NY); 548m, 13 February 1907, *Shafer 736* (NY); 609m, 12 February 1907, *Shafer 738* (NY); 829m, 14 June 1950, *Hodge 11890* (GH); Chances Peak, Chances Mt., 829m, 14 June 1950, *Haward 11890* (BM); Runaway Gut, near Woodlands, 152m, 13 February 1959, *Proctor 19172* (GH).—**PUERTO RICO**. *s.loc.*, 1 July 1901, *Underwood & Griggs 530* (NY, US); 12 April 1899, *Heller 1034* (NY); 15 March 1925, *Britton et al. 8398* (NY); 18 September 1941, *Blomquist 11822* (UC); 1874, *Kuntze 357* (NY); 1899, *Vanderbilt 1034* (US); 22 November 1899, *Goll et al. 682* (NY, US); 24 June 1901, *Underwood & Griggs 267* (NY, US); 25 March 1887, *Sem coletor 6584* (NY, US); 28 September 1884, *Kuhn s.n.* (GH); 9 March 1887, *Kuhn 6378* (NY); July 1881, *Eggerr 452* (B); *Luersen s.n.* (K); November 1925, *Britton et al. 8398* (US); *Sintenis s.n.* (K); 200m, 23 January 1979, *Alain 28165* (NY); 200m, 23 January 1979, *Alain et al. 28161* (US); 365m, 7 August 1903, *Nash 183* (NY); along Igartua trail, 12 January 1999, *Acevedo-Rdgz 10613* (US); Arecibo: Arecibo, Rio Abajo Insular Forest, 31 July 1966, *Stimson 3718* (UC, NY, GH); Caribbean Nacional Forest. Along hwy. 988 between, 65°45' W, 18°20' S, 191m, 12 January 1987, *Boom & Marshall 7082* (NY); Coamo Springs, 17 March 1913, *Britton 2258* (NY, US); El Yunque and vicinity, 1924, *Dale 4* (GH); Humacao, 1852, *Shuttleworth 138* (BM); Humacao, *Blauner 138* (BM); In forest, río Abajo, Utuado, 300m, 7 August 1980, *Alain et al. 30875* (NY); Playa de Humacas, July 1881, *Eggers 724* (B, K); Pueblo Viejo, January 1911, *Hioram 89* (US); Punta Santiago: Humacao, 26 April 1995, *Liogier & Oquendo s.n.* (NY); Rd. 155, km 5 Sw of Vega Baja, 19 July 1959, *Woodburg s.n.* (NY); San Juan, 1912, *Hioram s.n.* (US); San Juan, 140m, 23 December 1983, *Proctor & Pinto 39965* (US); San Juan: 23 April 1921, *Letchworth 423* (GH); San Juan: Rio Viedras prás, 14 August 1912, *Hioram s.n.* (GH); San Juan: rio Viedras, *Hiorani s.n.* (K); Serra de Luquillo, June 1885, *Kuhn 1774* (BM); Sierra de Naguado S.W. side of loma francesa to fa, 300m, 17 July 1914, *Shafer 3232* (NY, US); Slopes of El Yunque, Caribbean National Forest, 914m, 4 April 1952, *Scamman 6537* (GH); Utuado, 2 January 1988, *Acevedo-Rdgz 2261* (US); Yauco: 1880, *Garber 138* (GH).—**SABA**. Along Sandy Cruz Trail, 17°38'13" S, 63°14'12" W, 525m, 12 August 2006, *Mori et al. 26206* (NY); Mt. Scenery: on trail to peak between first shelter and the pea, 17°38' S, 63°14' W, 877m, 10 August 2006, *Mori et al. 26062* (NY).—**SAINT KITTS & NEVIS**. along track between Gingerland and Iron Gate, 1000m, 10 March 1959, *Proctor 19486* (GH); 8 September 1901, *Britton 181* (NY); Phillips level, 426m, 17 March 1959, *Proctor 19554* (GH); 19 April 1962, *Cooley 8809* (GH); Phillips, 426m, 24 July 1982, *Box 263* (BM).—**SAINT LUCIA & GRENADINES**. 12 June 1945, *Beard 1094* (GH, US); 274m, November 1967, *Sturrock 324* (GH); Barre de 'Isle, 22 April 1950, *Howard 11386* (BM, GH, US); Barre d'Isle, near the Agricultural Station, 16 April 1962, *Cooley 8696* (GH); Barre d'Isle: 800m, 4 April 1958, *Proctor 17582* (GH, US); Distrito Sonpriere: San Remy, 335m, May 1935, *Box 452* (BM, US); Headwaters Troumasse River, 365m, 29 May 1986, *Slane 912* (GH); Milette Bridge, 150m, 30 March 1936, *Box 491* (BM).—**SAINT VINCENT**. 4 May 1891, *Sherring 35* (BM); March 1890, *Smith, & Smith 191* (BM); Charlotte, Montreal, in ditch at base of st, 1400m, 3 February 1962, *Cooley 8300* (GH); 300m, 20 May 1947, *Morton 6014* (US); along Chateaubelair, 300m, 16 April 1947, *Morton 5220* (US); 400m, *Morton 5502* (US).—**U.S.A. Florida**: 18 January 1919, *Hammock 5738* (GH); 28 May 1904, *Eaton 999* (GH); Allapattah, 28 December 1903, *Eaton 799* (GH); NE of Avon Park Highlands County, 31 October 1954, *Brass, L.J. 25259* (GH); near Maiami, 28 December 1903, *Eaton, A.A. 779* (MO, GH). **VENEZUELA**. **Margarita**: 450m, 22 July 1903, *Johnston 166* (F, GH, NY, NY, US); 450m, 22 July 1903, *Johnston 166* (US); 16 August 1901, *Miller & Johnston 156* (NY, BM, K, MO, GH, US); Piton du Carbet trail above Alma, 29 May 1945, *Ewan 17083* (US); **Without province**: May 1890, *Sherring 35* (US).

23. *Meniscium serratum* Cavanilles (1802: 548). (Figs 36C–E; 37E–F)

Dryopteris reticulata var. *serrata* (Cav.) Farwell (1931: 292). *Dryopteris serrata* (Cav.) Christensen (1905: 291). *Nephrodium serratum* (Cav.) Keyserling (1873: 49). *Phegopteris serrata* (Cav.) Mettenius (1864: 243). *Thelypteris serrata* (Cav.) Alston (1932: 309).

Type:—CUBA. Havana, s.d., *Guio* s.n. (holotype MA [MA228615], isotype [MA475975]).

=*Meniscium dentatum* C. Presl (1822: 162). **Type:**—BRAZIL. Rio de Janeiro. “Hab. In Brasilia. 4”, 1818, s.d., (lectotype PR [PR615995], here designated; probable isoelectotype [PRC 455014]).

=*Meniscium palustre* Raddi (1819: 284). *Phegopteris palustis* (Raddi) Mettenius (1859: 24). *Polypodium palustre* (Raddi) Lowe (1858: 2). **Type:**—BRAZIL. “In sylvis inundatis prope paroeciam Nossa Senhora de Piedade Inhumirim sitam ad fluenta fluminis Hujus nominis”, *G. Raddi* s.n. (lectotype designated by: Pichi Sermolli, Webbia 60(1).69: 2005. FI [FI005073]; isoelectotype PI (five herbarium specimens without barcode).

=*Meniscium rostratum* Fée (1852: 224). **Type:**—BRAZIL. Ceará, s.d., *G. Gardner* 1905 (lectotype P [P00644672, fragment+ P01427941, basal portion], here designated; isoelectotype GH without barcode, K [K000956872 K000956879], B [B200065826, fragment]).

Rhizomes short-creeping, 0.6–1.9 cm diam., glabrous. **Fronds** monomorphic to subdimorphic; **sterile fronds** 63–148 cm long, petiole 22–75 cm long, 2–6 mm diam., lamina 29.5–73.5 cm long, **pinnae** (4–)9–24 × 1.4–4.3 cm; **fertile fronds** (60–)77–190(–229) cm long, petiole (24–)42–123 cm long, 3–9 mm diam., lamina 34–105 cm long, pinnae (5.2–)7–23 × (1–)1.9–3.3 cm. **Petioles** with brown basal portion and greenish to stramineous distal portion, glabrescent or pilose on both surfaces, hairs moderate, acicular, patent, erect, scales sparse on the basal portion, these caducous, irregular, adpressed, dark brown. **Laminae** 1-pinnate, lanceolate to oblong, chartaceous. **Rachises** usually with dense hairs adaxially, glabrous abaxially or glabrescent with sparse hairs equal to those on petioles. **Buds** usually present in axil of proximal pinnae, rarely in axil of all pinnae or absent. **Pinnae** in (9–)11–22 pairs, lanceolate to triangular-lanceolate, distal pinnae gradually or abruptly reduced, sessile, proximal pinnae petiolulate, petiolule 0.2–0.5 cm long; **bases** of proximal pinnae short-cuneate, acute to widely rounded (sometimes asymmetric, basisopic side truncate), base of distal pinnae oblique, basisopic side adnate, rounded, acroscopic side excavate or truncate; **margins** serrate to uncinately-serrate, with sparse, acicular hairs; **apices** long-acute, acute or cuspidate; **adaxial surfaces** of fertile and sterile pinnae glabrous between and on the veins, costa with moderate to dense, 0.15–0.2 mm long, acicular, erect, tortuous hairs; **abaxial surfaces** with moderate, 0.15–0.35 mm long, acicular, tortuous, patent, erect or slightly arcuate hairs between the veins (sterile lamina sometimes glabrous) and on the costa and veins, rarely with filiform, irregular, arachnoid, caducous, hyaline scales near the costa and veins, glandular hairs absent; **costal veins** 8–11 on sterile pinnae and 8–17 on fertile pinnae per 3 cm; **secondary veins** sigmoid on sterile pinnae and arcuate on fertile pinnae, united with adjacent vein to form an obtuse angle on fertile pinnae and acute angle on sterile pinnae, giving rise to an excurrent, free veinlet that reaches the middle of the areole; **areoles** in (6–)9–19 rows on sterile and fertile pinnae between the costa and margin. **Sori** oblong to arcuate on secondary veins or confluent at maturity; **receptacles** glabrous; **sporangia** usually glabrous, rarely with inconspicuous paraphyses with one acicular hair. **Spores** echinulate, with short, dense spines and wide, undulating formations.

Distribution and habitat:—Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominica, El Salvador, Ecuador, Florida, Guadeloupe, Guatemala, Guyana, French Guiana, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad, and Venezuela (Fig. 47). This species is terrestrial and very common in open and swampy areas of secondary forest and or alongside trails and streams within riparian forests, at 5–1800 m.

Notes:—*Meniscium serratum* is most similar to *M. consobrinum* (see comparison in comments there). *Meniscium serratum* is also very similar to *M. arborescens* because it has oblong-lanceolate, ascendant pinnae, distal pinnae gradually or abruptly reduced, secondary veins of sterile pinnae sigmoid to subsigmoid, tortuous hairs on the costa, veins and usually between the veins, and confluent to subconfluent sori at maturity; however, *M. arborescens* lacks serrate pinnae margins.

Meniscium serratum is highly variable in relation to the distribution of hairs and pinnae size, which could be attributed to its wide geographical distribution and occurrence in highly variable environments. Regardless, the characters discussed above are stable. The most characteristic lamina format has larger proximal pinnae that become gradually smaller below the apex, resulting in a deltate-lanceolate lamina.

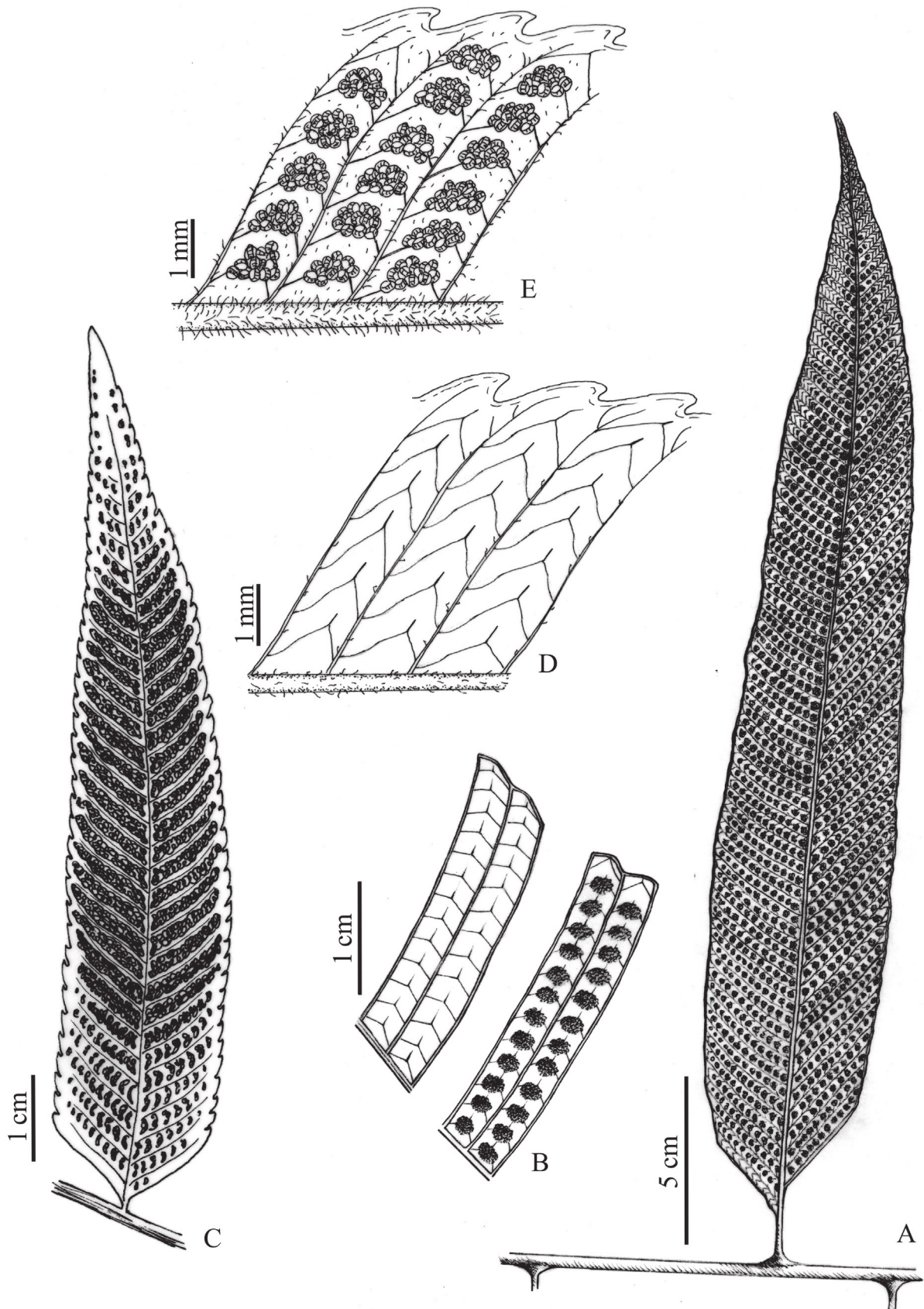


FIGURE 36. A–B. *Meniscium pachysorum*. A. proximal pinnae; B. details of the abaxial surface of the fertile and sterile pinnae showing the veins and round sori. C–E. *M. serratum*. C. proximal pinna; D. details of the abaxial surface of the sterile pinna showing secondary, sigmoid veins; E. details of the abaxial surface of the fertile pinna showing serrate margins, oblong sori on secondary veins and patent hairs on costae, veins and between the veins (A–B. Alston 7915, MO; C–E. Figueiredo & Lima 512, BHCB).

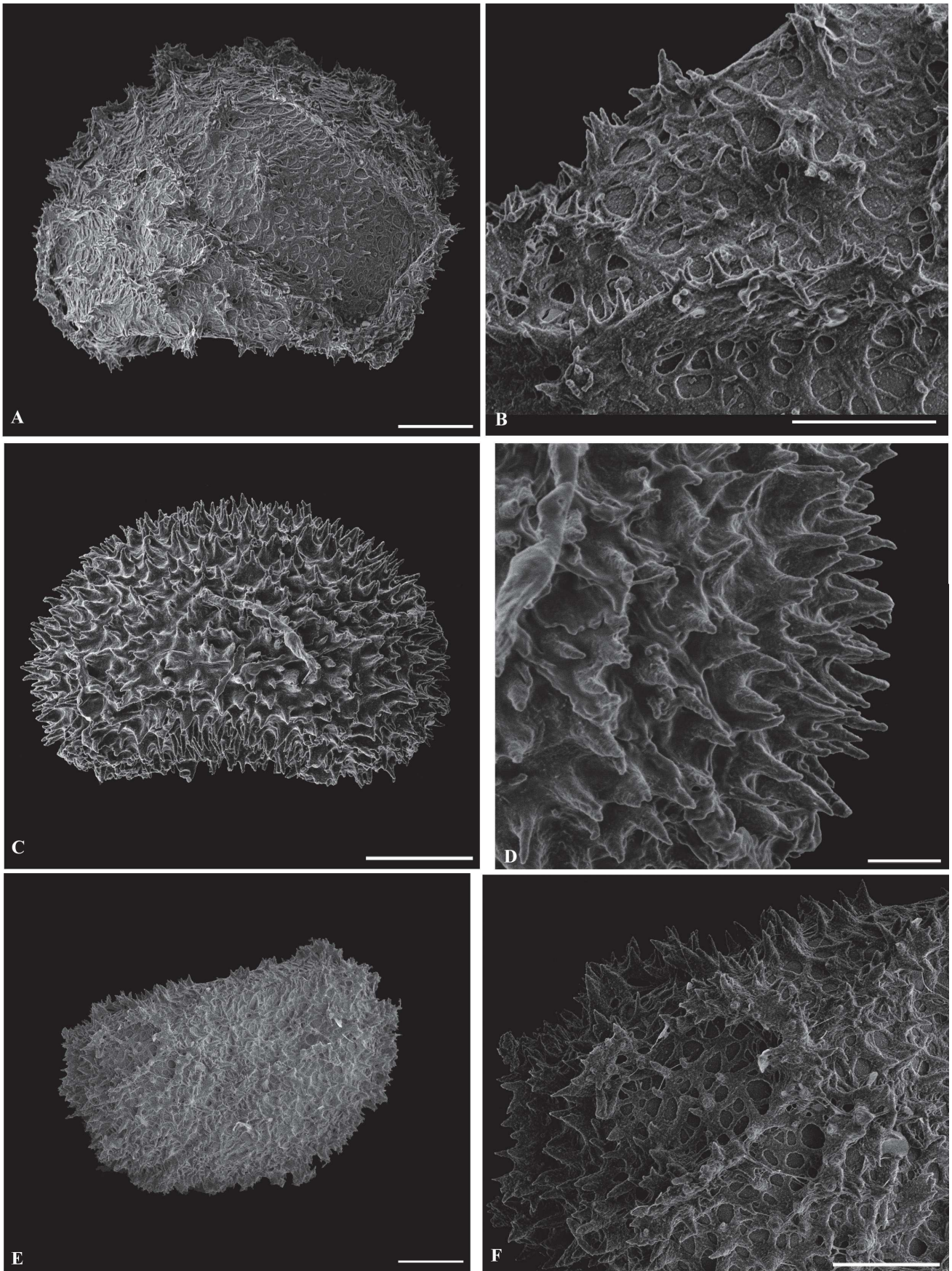


FIGURE 37. Spores of *Meniscium*. **A–B.** *M. nesioticum*, reticulate-cristate spore. **C–D.** *M. pachysorum*, echinate spore. **E–F.** *M. reticulatum*, cristate-reticulate spore (**A–B.** *Aymard 5331*, UC; **C–D.** *Sanin et al. 5073*, NY; **E–F.** *Ranker & Lamieux 1665*, UC). Scales bars: A, C, E = 10 μ m; B, D, F = 5 μ m.

The plants in Paraguay (*Hassler 10164*, B) have a linear, subcoriaceous lamina and pinnae that are more narrow-oblong with a cuspidate apex, narrow areoles and strongly sigmoid, prominent secondary veins. Bud position is another character that is not constant in *M. serratum*. Buds are common at the base of the proximal pinnae; however, some specimens have them in the axil of all pinnae.

Specimens examined:—**ARGENTINA.** **Mburucuyá:** Corrientes, Estancia Santa Teresa, 12 June 1979, *Pedersen 12468* (UC, MO); **Misiones:** San Juan, 22 December 1965, *Pedersen 7630* (C); *idem*, Parque Nacional Iguazu, 18 June 1982, *Sharpe 401* (NY); *s.loc.*, March 1922, *Nuñez 234* (BM); **Santo Tomé:** 56°40' W, 28°05' S, 100m, 27 April 1995, *Arbo et al. 6624* (MO); **Salta:** El Cedral, Orau, 19 October 1913, *Rodrigues 1035* (GH).—**BELIZE.** Stann Creek, near district of Cayo, 300m, 14 June 1973, *Croat 24544* (MO).—**BOLIVIA.** **Beni:** Ballivian, on Yucumo-Quiquibey road, from Yucumo, 15°09' S, 67°02' W, 244m, 20 July 1990, *Fay & Fay 2786* (US); *idem*, on Yucumo-Quiquibey road, 1–3 km from Yucumo, 15°09' S, 67°02' W, 244m, 20 July 1990, *Fay & Fay 2786* (US); near Ríos Marmoré y Securé, ca 30 km south of Trin, 15°10' S, 65°00' W, 280m, 19 August 1990, *Fay & Fay 3045* (US). *idem*, Moxos, Chimanes Forest, 15°10' S, 66°37' W, 260m, 25 July 1990, *Fay & Fay 2813* (US); *idem*, 15°00' S, 67°09' W, 235m, 21 June 1989, *Fay & Fay 2074* (UC, F, MO); *idem*, Moxos, 15°10' S, 66°37' W, 260m, 25 July 1990, *Fay & Fay 2813* (UC, MO); *idem*, 15°09' S, 67°02' W, 244m, 20 July 1990, *Fay & Fay 2786* (UC, MO); Gral. Ballivian, Estacion Biológica del Beni, 14°30' S, 66°37' W, 200m, July 1996, *Eibing 312* (UC); *idem*, Yucumo, 15°08' S, 67°02' W, 300m, 25 September 2000, *Lehnert 91* (UC); Ballivian, Rio Chimane-Evrons of Fatima, 320m, 2 June 1981, *Davis & Marshall 1124* (F, GH); Ballivian, 67°09' W, 15°00' S, 235m, 23 June 1989, *Fay & Fay 2109* (MO); 65°00' W, 15°10' S, 280m, 19 August 1990, *Fay & Fay. L. 3045* (MO); *idem*, Loreto: Lower rio Huallaga, 155m, October 1929, *Williams 4236* (F); **Cochabamba:** José Carrasco Torrico, Parque Nacional Carrasco, 17°23' S, 64°30' W, 560m, 14 September 1997, *Acebey 544* (UC); *idem*, Chapare, 16°14' S, 66°25' W, 1300m, 14 September 2003, *Kessler et al. 13462* (UC); *idem*, Chapare, Villa Tunari, 420m, 30 December 1982, *Fernández 7910* (NY); *idem*, Chapare, 65°26'30" W, 17°01'00" S, 300m, 3 November 1994, *Ritter 1401* (MO). **La Paz:** Abel Iturralde, 14°15' S, 68°04' W, 620m, 18 April 1997, *Beck & Foster 24060* (UC); *idem*, Franz Tamayo 14°19'47" S, 68°33'35" W, 700m, 17 June 2005, *Araujo et al. 1986* (USZ, MO); Yungas, 1890, *Lectea 554* (NY, F, BM, MO); *idem*, Nor Yungas, im Tal unterhalb Coroico, unmittelbar am Flub, 1100m, 4 April 1981, *Feuerer 5826a* (F); *idem*, 1890, Yungas *s. coll.* 554 (K, US); **Pando:** Manuripi, 11°46' S, 68°42' W, 220m, 1969, *Jimenez s.n.* (UC); *idem*, Nicolas Suarez, ca. 30 km SW of Cobija, 250m, 14 August 1982, *Sperling & King 6623* (BM, NY, INPA, MG); *idem*, Manuripi, camino Cobija-Chivé, comunidad Holanda, 68°42' W, 11°46' S, 220m, 30 July 2003, *Jimenez 1969* (NY); *idem*, Nicolas Suarez, 11°11' S, 68°09' W, 250m, 14 August 1982, *Sperling & King 6623* (NY); *idem*, Nicolás Suárez, 290m, 13 January 1983, *Casas & Susanna 8236* (NY); *idem*, Nicolas Suarez, ca 30 km southwest of Cobija on the road to Naraue, 68°09' W, 11°11' S, 250m, 14 August 1982, *Sperling & King 6623* (NY); **Santa Cruz:** Andrés Ibáñez, 5km by dirt road NW of bridge over Río Pirai, 17°30'80" S, 63°15'40" W, 350m, 21 April 2002, *Nee & Sundue, M. 693* (US); *idem*, Ichilo, New road, Santa Cruz to Cochabamba, 17°14' S, 64°00' W, 355m, 7 July 1989, *Fay & Fay 2266* (US); *idem*, Ichilo, near Río Itilí on road to Mataracú camp of P.N.A., 17°28' S, 63°52' W, 300m, 5 January 1998, *Nee 47804* (MBM, UC, NY, MO); *idem*, Ichilo, 250m, 18 March 1981, *Beck 6602* (UC); *idem*, Ichilo, 17°14' S, 64°00' W, 355m, 7 July 1989, *Fay & Fay 2266* (UC, F, MO); *idem*, Ichilo, 17°43' S, 63°34' W, 16 September 1996, *et al. 8599* (UC); *idem*, Santiesteban, 17°11'00" S, 63°13'15" W, 260m, 20 February 1994, *Nee 45099* (NY, MO); Ichilo: old meander loop of Río Ichilo, 1–1.5 km SW of hig, 17°18' S, 64°12' W, 245m, 17 July 1994, *Nee & Moran 45228* (NY, MO); *idem*, Ichilo, 2.5 km W of San Carlos, 17°23' S, 63°45' W, 300m, 30 January 1988, *Nee & Coimbra 36106* (UC, NY, MO); Ichilo, Santa Cruz, 13.5 km NW of main Colonia San Juan, 17 December 1994, *Nee 45970* (NY); Andrés Ibáñez, 5 km by dirt road NW of bridge over Río Pirai at L, 17°30'80" S, 63°15'40" W, 350m, 21 April 2002, *Sundue & Nee 693* (NY); Santa Cruz, 17°03' S, 64°31' W, 250m, 26 October 1993, *Billiet & Jadin 5998* (MO); Villa Tunari, 407m, *Boer 1184* (K).—**BRAZIL.** **Acre:** Mâncio Lima, Parque Nacional da Serra do Divisor, 7°26'51" S, 73°40'01" W, 220m, 13 December 2010, *Salino & Almeida 15009* (BHCB); Rio Branco, BR 317, 10°30' S, 67°45' W, 6 June 1991, *Daly et al. 6882* (NY); *idem*, Highway Abunã to Rio Branco, 19 July 1968, *Forero et al. 19* (INPA); *idem*, km 242–246 vicinity of Campinas, 19 July 1968, *Forero et al. 6377* (NY); *idem*, Senador Guimard, Fazenda Experimental Catuaba, BR 364, km 35, 10°03' S, 67°37', 18 April 2010, *Medeiros et al. 416* (RB); *idem*, 5 km from Brasília-Assis, 2 November 1980, *Lowrie & Nelson 695* (INPA, MG, F, US); **Alagoas:** Iateguara, 8°59'58" S, 35°52'15" W, 390m, 11 February 2001, *Pietrobon & Santiago 4956* (BHCB); *idem*, 9°00'19" S, 35°51'51" W, 390m, 10 February 2001, *Pietrobon & Santiago 4909* (BHCB, UFP); São José da Lage, Usina Serra Grade. Mata Maria Maior, 8°58'19" S, 36°06'36" W, 380m, 25 November 2001, *Pietrobon 5396* (BHCB, UFP); *idem*, Usina Serra Grande, 8°59'42" S, 36°07'29" W, 380m, 8 February 2001, *Pietrobon 4805* (UFP); *idem*, Usina Serra Grande, Mata Maria Maior, 8°59'11" S, 36°08'03" W, 380m, 24 November 2001, *Pietrobon 5346* (BHCB); *idem*, 8°59'27" S, 36°07'24" W, 380m, 12 February 2001, *Pietrobon & Santiago 5011* (BHCB); *idem*, Usina

Serra Grande, Mata Maria Maior, 25 November 2001, *Pietrobon 5346* (UFP); *idem*, Usina Serra Grande, Mata Maria maior, 8°59'21" S, 36°06'57" W, 380m, 27 April 2001, *Pietrobon et al. 5101* (HB, MBM, MG, UFP); União dos Palmares, 5 June 1975, *Windisch 827* (BHCB); **Amapá**: Macapá, Campo Verde, fazenda do Sr. Wolf, 24 October 1979, *Austin et al. 7209* (MG, NY, F); *idem*, Margem do Rio Matapi, 13 February 1980, *Rabelo 385* (MG); Parque Nacional do Tumucumaque, 32°93'00" S, 52°25'32" W, 31 August 2005, *Lobão et al. 799a* (RB); Pedra B. do Amapari, Ramal do Arrependido, 15 September 2001, *Pereira 642* (BHCB, SPF); **Amazonas**: Vila do Quatipuru, igarapé do Canavial, 9 April 1963, *Rodrigues, W. 5157* (HB); Benjamim Constant, Alto Solimões, 8 September 1962, *Duarte 6937* (RB); Coarí, Província Petrolífera de Urucu, 4°51'04" S, 65°05'15" W, 72m, 15 February 2008, *Pietrobon et al. 7660* (MG); *idem*, 4°52'58" S, 65°19'04" W, 34m, 11 March 2007, *Pietrobon 7113* (MG); *idem*, 45°30'26" S, 65°13'51" W, 9 March 2007, *Pietrobon 7060* (MG); Lábrea ?, Rio Purus, south of Lago Preto 2 km N of Lábrea, 25 June 1971, *Prance et al. 13677* (MG); Lago do Castanho, 29 March 1974, *Junk 11* (INPA); Lago Miriti, 27 January 1975, *Junk 297* (INPA); Manaus, 59°54' W, 2°25' S, 24 February 1992, *Nee, M. 42573* (NY); Manaus, Manaus-Itacoatiara, Km 35, 25 July 1974, *Junk, W. 51* (INPA); Manaus, SUFRAMA, Rodovia BR 174, 2°25' S, 59°54' W, 24 February 1992, *Nee 42573* (US); Maués, Rio Parauari, afluente do rio Maués-Açu, 4°48' S, 57°56' W, 15 July 1983, *Hill et al. 13092* (MG); Presidente Figueiredo, Estrada do Pau Rosa, ca 5 km da margem da estrada, 1 October 1998, *Freitas 631* (INPA); rio Parauari, 15 July 1983, *Hill et al. 13092* (INPA, NY, SPF); Rio Purus, Soth of Lago Prêto 2 km north of Lábrea, 25 June 1971, *Prance et al. 13677* (INPA, NY, UC); Rio Solimões, margem esquerda, lago encantado, 3°15' S, 60°25' W, 30 June 1999, *Lohmann 279* (SPF); Upper Amazon, *Truill 1406* (K); *s.loc.*, no date, *Martius s.n.* (B); **Bahia**: Camacã, Fazenda Serra Bonita, 15°23'30" S, 39°33'55" W, 835m, 9 July 2005, *Matos et al. 612* (BHCB, MBM, UPCB); Cocos, ca. 10 km S of Cocos, 17 March 1972, *Anderson et al. 37014* (BM, F, NY, US); Ipiáú, Mirabela Mineração, 14°10'50" S, 39°41'33" W, 6 November 2007, *Souza 338* (BHCB); Itabuna, Fazenda Pirataquise, 16 December 1966, *Emygdio et al. 2442* (R); Salvador, Cabula 19° Batalhão de caçadores, 7 October 2007, *Macedo 9* (BHCB); *s.loc.*, *Schomburgh 459* (K); Blanchet 2450 (MG); **Ceará**: Maranguape, Sítio São José, 3 October 1979, *Martins & Castro s.n.* (EAC); Aratuba, Serra Baturité, 22 August 1992, *Paula et al. 78* (UFP); Baturité, Sítio B. Inácio de Azevedo, 1937, *José Eugênio 21* (RB); Guaramiranga, 16 May 1980, *Nunes & Martins s.n.* (EAC); Guaramiranga, 28 September 1992, *Paula s.n.* (EAC); Guaramiranga, 6 May 1992, *Paula s.n.* (EAC); Guaramiranga, Mata, 16 May 1980, *Nunes & Martins 8659* (UFP); Guaramiranga, Serra de Baturité, Sítio Brejo, *Paula s.n.* (UFP); Guaramiranga, Serra de Baturité, Sítio Mucunã, 840m, 6 May 1992, *Paula s.n.* (UFP); Pacatuba, Serra da Aratanha, 3 October 1979, *Martins & Castro s.n.* (UFP); Serra do Araripe, 8 August 1948, *Duarte, A. 1347* (NY); Serra do Araripe, 8 August 1948, *Duarte & Ivone 1343* (RB); Ubajara, 30 April 1997, *Paula s.n.* (EAC); Ubajara, Parque Nacional de Ubajara, Planalto da Ibiapaba, 14 December 1998, *Fernandes et al. s.n.* (EAC); *s.l.*, 1840, *Gardner 1905* (BM); **Distrito Federal**: Área do Zoobotânico, 17 January 1967, *Duarte 10177* (RB); Recreio dos Bandeirantes, 19 January 1939, *Bertaies 1234* (BM); **Espírito Santo**: Alegre, Parque Estadual da Cachoeira da Fumaça, 20°37'53" S, 41°36'80" W, 510m, 14 September 2008, *Salino et al. 13929* (BHCB); Cariacica, Reserva Biológica de Duas Bocas, Represa Velha, 20°15'31" S, 40°29'51" W, 170m, 11 June 2010, *Salino et al. 14877* (BHCB); Castelo, Parque Estadual da Mata das Flores, 20°37'05" S, 41°09'45" W, 120m, 24 June 2008, *Salino et al. 13495* (BHCB); Conceição da Barra, Floresta Nacional do Rio Preto, 18°22'23" S, 39°51'02" W, 27m, 10 June 2009, *Salino et al. 14327* (BHCB); Linhares, 19°09'40" S, 40°04'16" W, 3m, 12 February 2007, *Almeida et al. 707* (BHCB); Linhares, Reserva Florestal de Linhares, 10 March 1993, *Folli 1835* (BHCB); Linhares, Reserva Florestal de Linhares, 12 May 1999, *Folli 3423* (BHCB); *idem*, 16 December 1996, *Folli 2870* (BHCB); Reserva Natural da Vale, 19°09'07" S, 40°02'49" W, 60m, 21 April 2011, *Salino et al. 15104* (BHCB); Pinheiros, Reserva Biológica do Veado, 18°22'13" S, 40°92'59" W, 50m, 9 June 2009, *Salino et al. 14300* (BHCB); Sooretama, Reserva Biológica de Sooretama, 19°02'54" S, 39°58'04" W, 25m, 11 May 2008, *Salino et al. 13298* (BHCB); *idem*, Reserva Florestal de Linhares-Floresta Rio Doce, 20 March 1999, *Salino & Morais 4516* (BHCB). **Goiás**: Aporé, Aporé-serranópolis km 22, 500m, 3 April 1992, *Windisch s.n.* (SPF); Aporé, Rodovia Aporé-Serranópolis, ca. de 23 km de Aporé, 19°57' S, 52°01' W, 580m, 1 August 1995, *Pietrobon da Silva et al. 2290* (MBM); Itajá, Povoado Lagoa Santa, 20°29' S, 49°47' W, 600m, 21 December 1992, *Silva & Rodrigues Jr. 671* (HB); Itajá, Povoado Lagoa Santa, 21 December 1992, *Silva & Rodrigues Jr. 652* (HB, SPF); Mineiros, Serra do Rio Verde, pilões, 26 January 1969, *Carauta 731* (RB); Nova Roma, 13°42'56" S, 46°52'13" W, 30 July 2000, *Souza et al. 24653* (BHCB); Nova Roma, Estrada entre Nova Roma e Montes Belos, 13°42'56" S, 46°52'13" W, 30 July 2000, *Souza et al. 24653* (ESA); Serra dos Pirineus, 75 km of Corumbá de Goiás, 700m, 24 January 1968, *Irwin, H.S. et al. 19149* (NY); **Maranhão**: Buriti Bravo, Capoeira, 9 November 1979, *Martins & Nunes 7197* (EAC, UFP); Caxias, Brejinho, margem da BR 316, 2 November 2007, *Fernandes 37* (MG); Mirador, Parque Estadual do Mirador, Sul Base da Geraldina, 20 April 2007, *Fernandes 83* (MG); Santa Luzia, fazenda Cacique, entrance, 83 km W of Santa Inês, 46°04' W, 3°50' S, 26 March 1983, *Taylor et al. 1096* (MG, NY); São Luis, Estrada do Sacavem, February 1939, *Froes, R.; Krukoff 11524*

(NY, F, MO, GH); **Mato Grosso do Sul:** Bela Vista, Rod. BR-060, 7 km N de Bela Vista, 2 February 1998, *Ribas & Pereira 2449* (BHCB, MBM, UC); Campo Grande, Córrego Piraputanga, Embrapa Gado de corte, 20°21'30" S, 54°43'26" W, 14 April 2002, *Pott & Pott 5299* (BHCB); Cassilândia, Margem da Rodovia MS-306 sentido Cassilândia-Chapa, 19°07' S, 51°37' W, 18 February 1996, *Nonato 231* (HB); Corumbá, Região da Band'alta, próximo ao mirante do pantane, 15 September 1999, *Assis 60* (BHCB); Paranaíba, Rodovia Paranaíba-Cassilândia, ca. 30 km da cidade, 19°37' S, 51°32' W, 300m, 17 February 1996, *Nonato 220* (HB); Paranaíba, Rodovia Selvíria-Inocência, 19°37' S, 51°32' W, 11 November 1995, *Pietrobon & Lucca 2457* (HB, MBM); Selvíria, Estrada Selvíria-São Pedro, 20°23' S, 51°25' W, 300m, 11 November 1995, *Lucca 75* (HB); **Mato Grosso:** Alto Araguaia, Estrada para Itiquira, ca 2 km da BR 364, 17°14' S, 53°25' W, 12 October 1995, *Windisch & Oliveira 7937* (BHCB); Caceres, 16°07' S, 58°05' W, 160m, 30 October 1987, *Salino 162* (UC); Caceres, Junto ao Rio Piraputanga, 16°05' S, 57°40' W, 150m, 2 November 1987, *Salino 187* (UC); Caceres, Rio Piraputanga, 180m, 30 May 1988, *Salino 454* (BHCB); Dourados, Fazenda de Caranba, 650m, 11 March 1978, *Mizoguchi 524* (MO, NY, UC); Salto do Céu, estrada Nova Fernandópolis a Salto do Céu, ca 20 k, 15°10' S, 58°16' W, 28 December 1994, *Windisch 7794* (HB); Vila Bela da Santíssima Trindade, Fazenda Cachoeira, 19 April 2012, *Ribas et al. 8710* (MBM); *idem*, Fazenda Rio do Meio, Corredor Cupuaçu, 18 April 2012, *Silva et al. 8353* (MBM); *idem*, Parque Estadual Serra de Ricardo Franco, 14°56'20" S, 60°01'33" W, 301m, 6 March 2011, *Almeida et al. 2747* (BHCB); *s.loc.*, 1899, *Pilger 753* (B); **Minas Gerais:** Bom Jesus do Galho, Lagoa Areia Branca, 19°39'53" S, 42°28'36" W, 249m, 3 February 2009, *Pivari et al. 1187* (BHCB); Campina Verde, Fazenda Campo Belo, 23 November 1997, *Moura 12* (HB); Caratinga, Estação Biológica de Caratinga, 24 March 2000, *Salino et al. 5138* (BHCB); Chapada Gaúcha, Parque Estadual da Serra das Araras., 15°28'19" S, 45°24'24" W, 575m, 9 February 2006, *Salino et al. 10820* (BHCB); Conceição das Alagoas, Usina Hidrelétrica de Volta Grande, Estação CEMIG, 15 December 1998, *Salino 4424* (BHCB); Coração de Jesus, Fazenda da Felicidade, August 1979, *Krieger s.n.* (BHCB); Dolores de Guanhanes, Rio Guanhanes, 19°00'13" S, 42°56'44" W, 500m, 14 August 2005, *Almeida et al. 59* (BHCB); Itaituba, 28 May 1949, *Macedo 1876* (BM, SPF); Itapagipe, 140 km de Rio Preto, Fazenda São Vicente, 20°13' S, 49°55' W, 27 July 1997, *Athayde 180* (HB, SPF); Itapagipe, 20°13' S, 49°55' W, 27 July 1997, *Athayde 174* (HB, SPF); Ituiutaba, Fazenda Santa Terezinha, 7 August 1948, *Macedo 1158* (RB); Januária, Vale do Rio Peruaçu, 15°07'85" S, 44°15'17" W, 23 May 1997, *Salino 3025* (BHCB); Januária, Vale do Rio Peruaçu, 20 July 1997, *Salino 3245* (BHCB); Januária, Vale do Rio Peruaçu, 25 May 1997, *Salino 3106* (BHCB); Januária, Refúgio Estadual de vida Silvestre do Rio Pandeiro, 15°39'55" S, 44°37'59" W, 470m, 11 June 2008, *Pivari et al. 1058* (BHCB); Jequitinhonha, Reserva Biológica da Maa Escura, 16°21'13" S, 40°57'38" W, 850m, 27 March 2008, *Salino et al. 13228* (BHCB); Juiz de Fora, Represa São Pedro, August 1980, *Krieger s.n.* (BHCB); Juiz de Fora, Represa, 28 August 1980, *without collector 2626* (BHCB); Marliéria, Parque Estadual do Rio Doce, 15 June 1995, *Salino 2146* (BHCB, UC); Marliéria, Parque Estadual do Rio Doce, 17 July 1996, *Salino 2794* (BHCB); Marliéria, Parque Estadual do Rio Doce, 30 March 1996, *Salino 2683* (BHCB); Nova Lima, RPPN Capitão do Mato, 20°55' S, 43°55' W, 4 June 2004, *Figueiredo & Lima 512* (BHCB); Nova Lima, RPPN de Tumbá, 10 February 2004, *Figueiredo & Queiroz 239* (BHCB); Nova Lima, RPPN Mata do Jambeiro, 19°58'42" S, 43°53'11" W, 23 March 2004, *Figueiredo & Alves 296* (BHCB); Ouro Preto, 1934, *Badini 267* (RB); Paracatu, Reserva do Acangaú, 17°11'27" S, 47°05'42" W, 675m, 2 February 2006, *Salino et al. 10706* (BHCB); Rio Acima, RPPN de Andaime, 20°09'28" S, 43°47'39" W, 850m, 19 May 2004, *Figueiredo & Rodrigues 465* (BHCB); Rio Pardo de Minas, Parque Estadual de Serra Nova, 15°35'02" S, 42°45'07" W, 1017m, 25 March 2013, *Costa et al. 1110* (BHCB); Santa Maria do Salto, Distrito de Talismã. Fazenda Duas Barras, 16°23'54" S, 40°03'39" W, 730m, 10 March 2004, *Salino et al. 9544* (BHCB); Santa Rita do Itueto, Região da Cachoeira do Pontão, 19°24'52" S, 41°22'45" W, 185m, 27 May 2009, *Almeida et al. 1961* (BHCB); Serranópolis de Minas, 17 April 2007, *Ribas & Silva 7706* (MBM); Uberlândia, Reserva Ecológica do Panga, 8 May 1987, *Ranl, M. 431* (UC); **Pará:** Acará, Jacarequara, Tapera, 23 February 1966, *Silva 571* (MG); Altamira, Juruá, Travessão do CNEC, 29 November 1986, *Souza et al. 617* (MG); Barcarena, Ilha de Trambioca, jacarequara, 23 September 2009, *Teixeira et al. 143* (RB; MG); Belém, 9 June 1969, *Austin 4168* (MO); Belém, Parque Ambiental de Belém, 16 August 2003, *Costa & Nunes 38* (MG); Utinga, waterworks 10 km, December 1937, *Moss 12* (BM); Canã dos Carajás, Distrito de Racha Placa. Floresta Nacional de Carajás 6°25'18" S, 50°16'58" W, 320m, 29 April 2010, *Almeida et al. 2356* (BHCB); Canã dos Carajás, Distrito de Racha Placa, Floresta Nacional de Carajás 6°26'30" S, 50°19'36" W, 316m, 1 May 2010, *Almeida et al. 2359* (BHCB); Goianésia, ZPVS Base 4, 4°09'53" S, 49°32'36" W, 75m, 24 September 2008, *Fernandes & Maciel 257* (MG, RB); Goianésia, ZPVS Base 4, 4°15'19" S, 49°31'04" W, 60m, 13 March 2009, *Fernandes & Costa 372* (MG, RB); Itaituba, Km 70 da estrada Itaituba-Jacareacanga, Parque Na, 15 November 1978, *Silva & Rosario 3744* (MG); Itaituba, Km 70 da estrada Jacareacanga, Parque Nacional do, 15 November 1978, *Silva & Roasario 3718* (MG); Moju, Campo Experimental da Embrapa Amazônia Oriental, 2°09'37" S, 48°46'55" W, 6 December 2006, *Maciel & Pietrobon 258* (MG); *idem*, 2°10'11" S, 48°42'41" W, 27 August 2006, *Maciel et al. 307* (MG); Oriximiná-

Óbidos, Igarapé da Onça, 29 August 1968, *Silva 1781* (MG); Ourilândia do Norte, Colônia Nossos Campos, 26 March 2003, *Rosário & Almeida 2279* (MG); Quatipurú, Igarapé do Canavial, 9 April 1963, *Rodrigues 5157* (MG); Quatipurú, Igarapé dos cavalos, 11 July 1966, *Silva 627* (MG); Vila de Quatipurú, Igarapé do Canavial, 9 April 1963, *Rodrigues 5157* (INPA); Redenção, Fazenda Bica D'água, 45°30'26" S, 65°13'51" W, 24 January 2003, *Pietrobon 5576* (MG); Santarém, 15 September 1969, *Silva & Souza s.n.* (UC); Santarém, km 70 da estrada do Palhão, 15 September 1969, *Silva & Souza 2596* (HB, MG, NY, US); Tucuruí, Zona de Preservação da Visa Silvestre, base 4, 4°09'53" S, 49°32'36" W, 75m, 24 September 2008, *Fernandes & Maciel 257* (BHCB); *s.loc. Spruce 36* (K); **Paraíba**: Areia, Escola de Agronomia do Nordeste, 25 October 1944, *Vasconcelos 264* (RB); Areia, Mata do Pau Ferro, 15 July 1998, *Fernandes 1357* (JPB); Areia, Mata do Pau Ferro, 1987, *Felix & Dornelas 964* (JPB); João Pessoa, Campus universitário da UFPB, 4 February 1980, *Sousa 739* (JPB); *idem*, Mata do Buraquinho, 23 May 1985, *Santana 72* (JPB); *idem*, Mata do Buraquinho, 3 July 1995, *Almeida 19* (JPB); *idem*, Mata do Buraquinho, Campus da UFPB, 23 May 1985, *Santana 72* (UFP); Rio Tinto, APA de Mamanguape, 27 March 2000, *Fernandes 1460* (JPB); Rio Tinto, APA de Mamanguape, 6°48'00" S, 35°04'44" W, 45m, 19 October 2000, *Fernandes & Oliveira 1533* (JPB); Rio Tinto, Sema III, Pedrinhas, 31 January 1989, *Santana & Felix 203* (JPB); **Paraná**: Alexandra, 6 March 1911, *Dusén 11469* (B, BM); Antonina, Recerva Natural Rio Cachoeira, 25°15' S, 48°41' W, 50m, 2 March 2005, *Matos & Ferreira 478* (UPCB); Antonina, Recerva Natural Rio Cachoeira, 25°16' S, 48°41' W, 30m, 30 April 2005, *Matos & Silva 540* (MBM, UPCB); Antonina, Rio Manduira, 11 February 1981, *Hatschbach 44020* (MBM, UC); Campo Mourão, Capela do Calvário, 31 May 2006, *Geraldino 367* (MBM); Campo Mourão, Estrada para barreiro da fruta, 1 July 2007, *Ostapechem s.n.* (HB); Diemante do Norte, Estação Ecológica do Caiuá, 23 February 2006, *Zeiden 06* (RB); Foz do Iguaçu, 25°36'06" S, 54°21'40" W, 170m, 3 October 2006, *Labiak et al. 3821* (UPCB); Guaraqueçaba, Reserva Natural Salto Morato, 1 October 1999, *Gatti 527* (UPCB); Guaratuba, Ponte do Quinze, Rio Sai-Guaçu, 16 January 2002, *Silva & Barbosa 3508* (UC); Guaratuba, Rio São João SANEPAR, 17 December 1998, *Borgo & Silva 314* (UPCB); Iporã, Fazenda Doralice, 14 February 1996, *Silva s.n.* (MBM, UPCB); Jaguaraiava, Rio Jaguaraiave, 9 July 2005, *Schwartzburd et al. 863* (MBM, UPCB); Jundiá do Sul, Fazenda Monte Verde, 7 April 2000, *Carneiro 930* (MBM, UC); Morretes, 10m, 25 March 1904, *Dusén 14733* (MO, GH); Palotina, Linha São Vicente, 3 December 1992, *Pivetta 1553* (HB); Paranaguá, Ilha do Mel, baía de Paranaguá, 5 March 1953, *Tessmann* (MBM); Paraty, Várzea of rio Paraná near Porto Ryington, 20 June 1966, *Lindeman & Hass 1965* (RB); Pinhão, Rio da Reserva, 14 February 1996, *Silva s.n.* (BHCB); Pontal do Paraná, Pontal do Sul, 11 April 1998, *Dunaiski Jr. 558* (UPCB); Porto Byington, 20 June 1996, *Lindeman & Haas 1665* (MBM); Telêmaco Borda, PCH Getúlio Vargas, 10 April 2012, *Michelon 1361* (BHCB); Vila Velha, 27 April 1914, *Dusén 14773* (F); *s.loc.*, 3 km W of Gamboa along the RR, 30m, 5 October 1973, *Nee 7233* (RB, MO); *idem*, 25 April 1904, *Dusén 4478* (BM); **Pernambuco**: Amaragi, Engenho Animoso, March 2008, *Souza & Marques 08* (UFP); Amaragi, Engenho Palmares, March 2008, *Souza & Marques 15* (UFP); Amaragi, March 2008, *Souza & Marques 24* (UFP); Bezerros, Serra Negra, Sítio Vertentes, 30 December 1998, *Xavier 05* (UFP); Bezerros, Serra Negra, 30 December 1998, *Xavier & Barros s.n.* (UFP); Bonito, Mata da Chuva, 8°32'21" S, 35°43'22" W, 750m, 8 May 2001, *Santiago & Pietrobon-Silva 457* (BHCB); Cabo de Santo Agostinho, 4 April 1991, *Fonseca & Silva s.n.* (UFP); Cabo de Santo Agostinho, Mata de Gurjaú, Reserva Florestal da COMPESA, 9 November 1988, *Silva s.n.* (UFP); Cabo de Santo Agostinho, Mata do Gurjaú, 17 October 1991, *Fonsêca & Edivan s.n.* (UFP); Cabo, Mata de Gurjaú, 14 March 1991, *Barros s.n.* (UFP); Cabo, Mata de Gurjaú, Reserva Florestal da COMPESA, 9 November 1980, *Silva s.n.* (UFP); Cabo, Mata do Gurjaú, 12 December 1990, *Fonsêca & Silva s.n.* (UFP); Cabo, Mata do Gurjaú, 4 April 1991, *Fonsêca & Silva s.n.* (UFP); Cabo, mata do Gurjaú, 4 April 1991, *Fonsêca et al. s.n.* (UFP); Caruaru, Agreste, Pedra do Guariba, 16 December 2007, *Sobral-Leite et al. 591* (UFP); Caruarú, Brejo dos Cavalos, 16 June 1988, *Barros s.n.* (UFP); Caruaru, Brejo dos Cavalos, 16 June 1988, *Barros & Silva s.n.* (UFP); Caruaru, Brejo dos Cavalos, 7 December 1984, *Santana s.n.* (JPB); Caruarú, Brejo dos Cavalos, 7 December 1984, *Windisch s.n.* (UFP); Iateguara, Usina Serra Grande, 8°59'58" S, 35°52'15" W, 390m, 11 February 2001, *Pietrobon & Santiago 4956* (UFP); Jaboatão dos Guararapes, *Ambrosio & Barros s.n.* (UFP); Jaqueira, Mata do Ageró, 8°42'37" S, 35°50'01" W, 600m, 26 March 2003, *Guerreiros 145* (UFP); Jaqueira, Usina Colônia, 8°43'21" S, 35°50'22" W, 545m, 20 May 2002, *Lopes & Pietrobon 585* (UFP, RB); Jaqueira, Usina Colônia, Córrego da Guariba, 8°43'02" S, 35°50'20" W, 652m, 19 October 2001, *Lopes & Pietrobon 481* (MBM); Jaqueira, Usina Colônia, mata da Turbina, 8°43'21" S, 35°50'22" W, 545m, 20 May 2002, *Lopes & Pietrobon 585* (UFP); Jaqueira, Usina Colônia, Mata do Ageró, 8°44'09" S, 35°50'17" W, 415m, 18 October 2001, *Lopes & Pietrobon 392* (UFP); Jaqueira, Usina Colônia, mata do Ageró, 8°44'27" S, 35°50'38" W, 415m, 18 October 2001, *Lopes & Pietrobon 392* (MBM; UFP; RB); Jaboatão, Reserva Ecológica de Jangadinha, 25 May 1993, *Ambrósio & Barros s.n.* (UFP); Jaboatão, Reserva Ecológica de Jangadinha, 4 October 1993, *Ambrósio, S.T. s.n.* (UFP); Marial, Engenho Curtume, 8°48' S, 35°50' W, 28 April 1998, *Pietrobon 4278* (BHCB); Marial, Engenho Curtume, 8°48'20" S, 35°50'22" W, 246m, 25 February 2007, *Sobral-Leite 317* (UFP); Moreno, Reserva do

Gurjaú, December 1994, *Fonsêca s.n.* (UFP); Paulista, Reserva Ecológica de Caetés, 8 June 1991, *Fonseca et al. s.n.* (UFP); Quipapá, Mata do Soldado, 8°45'42" S, 35°53'05" W, 358m, 23 November 2001, *Gueiros et al. 01* (UFP); Recife, Dois Irmãos, 11 November 1982, *Calvacanti 29* (UFP); Recife, Dois Irmãos, 21 March 1986, *Silva s.n.* (UFP); Recife, Dois Irmãos, 22 May 1982, *Calvacanti 24* (UFP); Recife, Dois Irmãos, 4 February 1999, *Antunes s.n.* (UFP); Recife, Dois Irmãos, 4 February 1999, *Melo s.n.* (UFP); Recife, Dois Irmãos, Mata de Dois Irmãos, 26 August 2000, *Pietrobon s.n.* (UFP); Recife, Dois Irmãos. Mata de Dois Irmãos, 22 April 1999, *Santiago s.n.* (UFP); Recife, Mata de Dois Irmãos, 11 June 1990, *Lira s.n.* (UFP); Recife, Mata de Dois Irmãos, 27 June 1986, *Silva s.n.* (UFP); Recife, Mata de Dois Unidos, 26 September 2000, *Pietrobon 5532* (UFP); Recife, Mata Dois Irmãos, 27 June 1986, *Silva s.n.* (UFP); Recife, Mata São João, 11 May 2001, *Almeida 01* (UFP); Recife, Parque Estadual dois Irmãos, açude do Prata, 8°00'28" S, 34°56'55" W, 18m, 25 January 2007, *Sobral-Leite 281* (RB, UFP); Rio Formoso, Mata Xanguá, 14 October 2011, *Costa & Farias 31* (UFP); Rio Formoso, Reserva-Florestal de Saltinho, 15 September 1983, *Barros, I.C.L. s.n.* (UFP); Rio Formoso, Reserva Florestal de Saltinho, 10 December 1984, *Grupo Mestrado s.n.* (UFP); Saltinho, reserva do IBDF, 3 June 1975, *Windisch 820* (BHCB); Saltinho, Rio Formoso, 30 July 1985, *Barros s.n.* (UFP); São Lourenço da Mata, Mata São João (Tiúma), *Barros et al. s.n.* (UFP); São Vicente Ferrer, Complexo da Serra do Mascarenhas, "Mata do Estado", 7°35' S, 35°29' W, 20 April 1998, *Pietrobon 4235* (HB); São Vicente Ferrer, Complexo da Serra do Mascarenhas, "Mata do Estado", 7°35' S, 35°29' W, 600m, 16 November 1998, *Pietrobon 4483* (HB); São Vicente Ferrer, Complexo do Maciço Serra do Mascarenhas, 'Mata do, 7°35' S, 35°29' W, 640m, 20 April 1998, *Pietrobon 4260* (HB, MBM); São Vicente Férrer, Mata do Estado, 14 June 1999, *Barros s.n.* (UFP); São Vicente Férrer, Serra do Mascarenhas, 7°35' S, 35°29' W, 640m, 20 April 1998, *Pietrobon-Silva 4260* (UFP); Timbaúba, Complexo Serra do Mascarenhas, Usina Cruangi, 7°37'07" S, 35°23'43" W, 304m, 15 December 2001, *Pietrobon 5446* (BHCB); Timbaúba, Serra do Mascarenhas, 7°37'06" S, 35°23'29" W, 304m, 31 March 2001, *Pietrobon & Santiago 5063* (UFP); Timbaúba, Serra do Mascarenhas, Usina Cruangi, 7°37'07" S, 35°23'43" W, 304m, 15 December 2001, *Pietrobon 5446* (UFP); Timbaúba, Usina Cruangi, Engenho Água azul, 7°37'06" S, 35°23'29" W, 304m, 31 March 2001, *Pietrobon & Santiago 5063* (BHCB); Vicência, Engenho Judiá Cana Brava, 7°35'36" S, 35°19'02" W, 25 May 2002, *Carvalho & Pietrobon 33* (UFP); Vicência, Engenho Jundiá, Cana Brava, 7°35'36" S, 35°19'16" W, 25 May 2002, *Carvalho et al. 33* (UFP); *s.loc.*, 24 November 1931, *Bento Pickel 2251* (US); **Rio de Janeiro**: Angra dos Reis, 10 July 1973, *Sucre 10044* (RB); Angra dos Reis, 21°04' S, 49°34' W, 600m, 2 March 1965, *Castellanos & Lanna-Sobrinho 872 25600* (HB); Jacarepaguá, 5 September 1972, *Sucre & Silva 9575* (RB); Mangaratiba, Reserva Rio das Pedras, Lagoa Seca, 13 August 1999, *Mynssen 289* (RB); Paraíba do Norte, 25 October 1944, *Vasconcelos s.n.* (NY); Paraty, Área de Proteção ambiental de Cairuçu, às margens, 9 May 1991, *Sylvestre et al. 492* (RB); Paraty, Loteamento Frade de Paraty, 10 November 1991, *Marquete et al. 489* (RB); Santo Antonio e Pádua, BR 393 estrada para Pirapetinga, 25 November 1982, *Pirani et al. 270* (SPF); Silva Jardim, Reserva Biológica de Poço das Antas, Juturnaiba, 22°30' S, 42°15' W, 10m, 24 January 1995, *Braga et al. 1821* (RB); *s.loc.*, *Glaziou 5302* (B); **Rondônia**: Porto Velho?, 19 July 1968, *Forero et al. 6377* (MG); Porto Velho?, Madeira-Mamoré, próximo a Mutumparaná, 6 July 1986, *Prance et al. 5681* (MG, INPA, NY); Basing of Rio Madeira., 16 July 1968, *Prance et al. s.n.* (UC); Cerejeiras, 3 June 1991, *Pivetta 1484* (HB); Colorado do Oeste, Linha 01, norte, 28 May 1992, *Pivetta 1516* (HB); *idem*, 20 August 1972, *Maas & Maas 413* (NY, INPA, MO); **Santa Catarina**: 23 March 1948, *Rohr 1016* (US); Blumenau, 1 December 1905, Haerchen, F. 72 (B); Blumenau, 1881, *Muller s.n.* (B); Blumenau, 1906, *Haerchen s.n.* (NY); Blumenau, A. D. Hering, 26°54'11" S, 9°07'09" W, 135m, 21 April 2012, *Backhauser, T.A. 127* (FURB); Blumenau, Bairro Ristow, 26°56'21" S, 49°09'17" W, 130m, 22 May 2010, *Korte 3510* (FURB); Blumenau, Haerchen, L.F. 72 (US); Blumenau, *Spannagel 335* (US); Brisque, 27°06' S, 8°54' W, 35m, 4 March 1952, *Smith 6025* (US); Florianópolis, Trindade, Ilha de S. Cat., 11 August 1946, *Rohr 364* (HB); Imaruí, Fazenda São Paulo, 28°15'36" S, 8°46'48" W, 7m, 12 May 2001, *Korte 6842* (FURB); Itajai, Escalvado, 20m, 12 April 1946, *Reitz 1606* (RB); Joinville, 19 July 1901, *Schmalz 57* (F); Lagoa Peri, 2m, 2 January 1960, *Sehnm 7609* (US); Luiz Alves, 12 January 1941, *Reitz 91* (RB); Prope Lagoa Peri, 9 January 1960, *Sehnm 7609* (B, NY); Tijuquinhas, Biguaçu, 25 March 1948, *Rohr 1016* (B, HB, NY); Trindade, Ilha de Santa Catarina, 11 August 1946, *Rohr s.n.* (US). **São Paulo**: Adolfo, estrada de terra Adolfo-Sales, 6 km de Adolfo, 21 February 1993, *Silva 756* (SPF); Américo de Campos, Rodovia Américo de Campos até entroncamento com a, 20°17' S, 49°44' W, 300m, 4 April 1995, *Silva 1703* (HB, SPF); Analândia, Serra do Cuscuzeiro, June 1993, *Salino 1993* (BHCB, UC); Aparado da Serra, 6 January 1907, *Usteri 21840* (BM); Aparecida D'Oeste, 20°27' S, 50°52' W, 300m, 4 April 1995, *Silva 1734* (HB, SPF); Araraquara, 48°07' W, 21°52' S, 22 August 1987, *Coradin et al. 8165* (NY); Bady Bassit, Rio Borá, 8 km da cidade, 15 November 1996, *Kharfan 47* (HB); Campinas, 19 July 1968, *Forero et al. 6377* (US); Campinas, Barão Geraldo, Mata de Santa Genebra, 5 May 1992, *Salino 1349* (BHCB); Cosmorama, Estrada vicinal Angelo Gabade, Fazenda Borges, 20°35' S, 49°53' W, 26 August 1997, *Athayde & Almeida 248* (HB, SPF); Cosmorama, Rodovia SP 461, 20°29' S, 49°47' W, 600m, 4 April 1995, *Silva 1714* (HB);

Cubatão, 1906, *Wacket 96* (NY); Cuiabá Paulista, Rodovia Viscinal Planalto do Sul-Cuiabá Paulista, 22°20' S, 52°07' W, 26 July 1997, *Pietrobon 4101* (HB); Distrito de Eng. Schmidt, ca. de 7 km do distrit, 17 November 1996, *Athayde 53* (HB); Euclides da Cunha Paulista, Rodovia SP-613 Teodoro Sampaio-Rosana, 22°33' S, 52°35' W, 26 July 1997, *Pietrobon 4077* (HB); Gavião Peixoto, Distrito de Nova Paulicéia, 29 October 1996, *Tomasetto 17* (HB); Guapiaçu, cerca de 20 km de Rio Preto, 20 October 1996, *Athayde 26* (HB); Icém, BR 153, ca. de 50 km de Rio Preto., 2 November 1996, *Athayde 50* (HB); Iguape, Morra das Pedras, July 1917, *Brade 7700* (HB); Iguape, Morro das Pedras, rio Peroupava, July 1927, *Brade 21317* (HB); Ipiruá, 3 October 1996, *Athayde 09* (HB); Ipiruá, Córrego Barra funda, 20°39' S, 49°23' W, 16 November 1995, *Nonato 203* (HB); Irapuã, Córrego Figueira, 21°13' S, 49°22' W, 3 April 1993, *Silva 783* (HB); Itajobi, Monte Aprazível, 13 April 1992, *Rodrigues Jr. & Silva 95* (HB); Itajobi, próximo ao bairro Monjolinho, Chácara Estância Oas, 19 October 1996, *Peres-Freschi 01* (HB); Itanhaém, Parque Estadual da Serra do Mar, Núcleo de Curucut, 24°03'22" S, 46°49'40" W, 100m, 16 April 2001, *Salino 6572* (ESA, BHCB); Itapirema, Arredores do município, 27 August 1988, *Sossae 47* (UC); Itirapina, April 1997, *Begovacz 55* (BHCB); Jaci, Região S. J. Rio Preto, 12 September 1992, *Silva 376* (HB, SPF); Jales, 17 January 1950, *Hoehne 3297* (BHCB; SPF); Jales, 20°16' S, 50°33' W, 300m, 4 April 1995, *Silva 1725* (HB, SPF); Macaubal, Fragmento P-02, 20°44' S, 49°55' W, 11 December 2007, *Prado et al. 1753* (BHCB); Marabá Paulista, Rodovia SP-563 Teodoro Sampaio-Presidente Vences, 22°11' S, 51°58' W, 26 July 1997, *Pietrobon 4108* (HB); Mendonça, Fazenda Santa Maria, 21°12' S, 49°35' W, 21 December 1996, *Pietrobon 3858* (HB); Mirassol, Instituto Penal Agrícola (APA), Reserva Biológica, 20°48' S, 49°31' W, 550m, 25 April 1996, *Pietrobon 3228* (HB); *idem*, 20°48' S, 49°31' W, 550m, 25 April 1996, *Pietrobon 3246* (HB); Mongaguá, Estrada que atravessa todo o morro, 24°06' S, 46°37' W, 10 February 1997, *Athayde 97* (HB); Mongaguá, Vila Jardim Alice, 24°06' S, 46°37' W, 600m, 10 February 1997, *Athayde 75* (HB); Monte Alto, Serra Anhumas ca. 5 km da cidade, 20°22' S, 48°28' W, 3 June 1995, *Pietrobon da Silva & Nonato 1807* (MBM, HB, MO); Monte Aprazível, Sítio Santo Antonio ca. 12 km da rodovia SP 320 Eu, 27 October 1996, *Custódio & Zamaro 3* (HB); Morro das Pedras, 1921, *Brade s.n.* (NY); Neves Paulista, 20°52' S, 49°37' W, 2 October 1996, *Almeida Neto 27* (HB); Nhandeara, Fazenda, 3 km da cidade, 20°43' S, 50°03' W, 18 June 1994, *Nonato & Pietrobon 45* (HB); Nova Aliança, Distrito Nova Itapirema, 21°04' S, 49°34' W, 600m, 11 June 1992, *Silva & Rodrigues Jr. 158* (HB); Onda Verde, Fazenda Grupo Fischer, 20°35' S, 49°17' W, 450m, 11 April 1996, *Pietrobon 3207* (HB); Onda Verde, Fazenda Grupo Fischer, 20°35' S, 49°17' W, 450m, 11 April 1996, *Pietrobon 3208* (HB); Palestina, Fazenda Corredeira, próximo ao rio Turvo, 20°25' S, 49°27' W, 21 April 1997, *Athayde et al. 162* (HB); Palestina, Fazenda Nossa Senhora da Conceição, próximo ao rio, 20°25' S, 49°27' W, 21 April 1997, *Athayde et al. 156* (HB); Penápolis, Chácara Santa Terezinha, 14 September 1996, *Cordeiro 10* (HB); Planalto, Fragmento G-03, 21°00' S, 49°59' W, 440m, 29 November 2007, *Prado et al. 1745* (BHCB); Presidente Epitácio, Margem do rio Paranapanema em área da Reserva Flor, 9 November 1985, *Windisch 4253* (HB); Presidente Epitácio, Região do Pontal do Paranapanema, 22°05' S, 52°07' W, 250m, 23 September 1996, *Pietrobon 3481* (HB); Road between Sao Vicente and Itaipu, 24°00' S, 46°24' W, 20m, 25 February 1929, *Smith 2008* (US); Sales, 21 February 1993, *Silva 733* (SPF, MO); Santos, Empresa MRS, 23°57'57" S, 46°19'39" W, 10 April 2007, *Souza & Almeida 136* (BHCB); São Carlos, Rodovia de acesso ao Broa, 26 September 1997, *Pietrobon 4195* (HB); São José do Rio Preto, APA-Instituto Penal Agrícola, 10 March 1995, *Pietrobon 2221* (HB, MBM); São Sebastião, Parque Estadual da Serra do Mar, 23°42'29" S, 45°42'29" W, 130m, 21 April 2000, *Salino et al. 5381* (BHCB); *ide*, Sítio Urucurana, 23°42'43" S, 45°04'29" W, 130m, 21 April 2000, *Salino et al. 5365* (ESA); Sete Barras, Fazenda Intervalles, Base de Saibadela, 21 July 1994, *Salino 2053* (BHCB); Sud Menucci, Sítio Sta. Helena, 10 October 1992, *Silva & Rodrigues Jr. 486* (HB); Tananbi, 24 March 1991, *Mizoguchi 103948* (MO); Turmalina, Fragmento P-04, 20°00' S, 50°25' W, 400m, 27 November 2007, *Prado et al. 1719* (BHCB); Ubatuba, 23°21'01" S, 44°51'11" W, 30 January 1996, *Salino 2444* (BHCB); *idem*, Estrada do Farol, 23°26' S, 45°04' W, 29 December 1997, *Athayde 328* (HB); *idem*, Parque Estadual da Ilha Anchieta, 8 May 1993, *Salino 1734* (BHCB, UC); *idem*, Parque Estadual da Serra do Mar, Núcleo de Picingu, 23°21'44" S, 44°50'23" W, 3 May 2001, *Salino et al. 6717* (BHCB); *idem*, Praia de Itamanbuca, na planície, 5 February 1996, *Salino 2540* (BHCB); Uchoa, Região S. J. Rio Preto, estrada de terra, municipa, 7 September 1992, *Rodrigues Jr. 203* (HB); Vicentinópolis, Fazenda Canadá, 20°56' S, 50°20' W, 380m, 28 November 2007, *Prado et al. 1735* (BHCB); Vila Atlântida, Praia Grande, 26 May 1950, *Jolly s.n.* (BHCB, SPF); Zacarias, Cerca de 2 km da cidade, Fazenda Nádia, 21°04' S, 50°03' W, 300m, 13 August 1994, *Nonato & Pietrobon 48* (HB); Zacarias, Fazenda Santa Irene, 21°04' S, 50°03' W, 300m, 13 August 1994, *Nonato & Pietrobon 65* (HB); **Sergipe**: Capela, Mata do Junco, 16 June 2007, *Nascimento Junior et al. 06* (ASE); Capela, RVS do Junco, 37°03'16" W, 10°32'12" S, 29 March 2011, *Gomes et al. 98* (ASE); *idem*, 37°03'17" W, 10°32'05" S, 29 March 2011, *Gomes et al. 102* (ASE). *s.loc.*, 8°10' S, 60°00' W, 23 March 1923, *de la Cruz s.n.* (UC); 15 August 1921, *Gleason 786* (US); Amakura river, northwest district, 10°00' N, 60°00' W, 23 March 1923, *de la Cruz 3449* (US); 27 June 1921, *Gleason 471* (US).—**COLOMBIA**. *s.loc.*, 8 January 1945, *Ewan 16707* (UC); **Antioquia**: Caucasia, 0°80'20" N, 75°10'00"

W, 50m, 11 November 1987, *Brant & Escobar 1276* (UC, MO); *idem*, Anorí, Vereda San Antonio, 75°03'52" W, 7°16'01" S, 700m, 11 November 2003, *Rodríguez et al. 4266* (NY); *idem*, Puerto Berrio, 14 June 1917, *Pennel & Rusby 51* (NY); *idem* El prado, San Isidro, 12 July 1962, *Brown 100* (F); **Caldas**: San José, 1160m, 4 November 1984, *Gómez et al. 23073* (UC, MO); Osa Peninsula, Topical Science Center field station SW of Rincón, 50m, 16 July 1967, *Mickel 2836* (NY); San José, vicinity of El General, 640m, March 1939, *Skutch 4248* (NY, K, BM, MO, GH); **Cauca**: 1891, *Triana s.n.* (BM); *idem*, del Norte: Catatumbo. Campo rio de Ouro, 150m, 14 May 1959, *Bischler 2423* (BM); *idem*, Puerto Wilches, 100m, 28 November 1926, *Killip & Smith 14924* (NY); *s.loc.* 240m, 30 July 1944, *López et al. 8344* (NY); **Chocó**: Quibdó, 25 October 1984, *Córdoba & García 463* (MO); **Magdalena**: Santa Marta, 76m, September 1898, *Smith, H.H. 1055* (B, BM, K, NY, F, MO, US); Magdalena?, *Stübel 370* (B); **Meta**: Carretera Medina, 500m, 20 June 1986, *Murillo & Harker 2219* (NY, MO); *s.loc.*, between Puerto Asis and San Pedro, 24 July 1957, *Barclay 4706* (MO); Macarena, *Ohba et al. JC-1992-1218* (MO); **Putamayo**: Rio Mocoa drainage, on trail to San Antonio, 8 January 1945, *Ewan 16707* (US); *idem*, Puerto Ospina, 230m, 25 November 1940, *Cuatrecasas 10788* (US); *idem*, Puerto López, Intendencia del Meta, 240m, 30 August 1944, *Little & Little 8344* (US); *idem*, Barranca Bermeja, Magdalena valley, between Sogamoso and Colorado, 100m, *Haught 1596* (US); *idem*, Puerto Wilches, 100m, 21 December 1926, *Killip & Smith 14924* (US); *idem*, del Norte, Catatumbo, Campo Tibú, 200m, 15 May 1959, *Bischler 2443* (BM); **Santander**: 100m, 10 March 1935, *Haught, O. 1596* (UC); **Valle del Cauca**, El Valle: Cordillera Occidental. Hoya del río Anchiacaya, 30m, 28 September 1946, *Cuatrecasas 22044* (US); *idem*, Cordillera Occidental, vertiente occidental, 30m, 28 September 1946, *Cuatrecasas 22044* (F); *idem*, Hacienda El Trejo, north of Palmira, 1050m, 28 December 1938, *García 6428* (US). **COSTA RICA**: **Cocos Island**: 23 January 1967, *Wiggins & Proctor 180* (MO); *idem*, Chatham Bay, Isla del Coco, 13 April 1965, *Jiménez 3201* (F, GH); *idem*, along one stream leading into Chatham Bay, Cocos I, 8 March 1964, *Fournier 323* (NY); **Guanacaste**: 13 July 1965, *Croat 747* (MO); **Heredia**: 10°27' N, 84°04' W, 60m, 21 January 1986, *Smith & Béliz 1838* (UC); *idem*, Finca La Selva, 100m, 6 May 1982, *Hammel 12056* (NY, F, MO); Caribo: 500m, 18 June 1909, *Brade 305* (NY); Playa Blanca, Golfo Dulce, 25 February 1933, *Valerio 339* (F); **Limón**: Atlantikküste: Strand zwischen Punta Uva und Punta, 150m, 9 September 1989, *Dobbeler 297* (BM); *idem*, Talamanca, P.N. La Amistad, 9°36'54" S, 83°15'43" W, 800m, 21 July 2007, *Rodríguez 11193* (NY); *idem*, Talamanca, P.N. La Amistad, 83°16'04" W, 9°37'12" S, 927m, 22 July 2007, *Solano et al. 4380* (NY); *idem*, 12 September 1961, *Scamman 6214* (GH); *idem*, Siquirres, Siquirres, ca. 62 m, 10 September 1961, *Weber 6194* (GH); *idem*, Los Diamantes, 304m, 29 April 1951, *Scamman 5967* (GH); *idem*, al Sur del aeropuerto de Limón, 11 February 1965, *Jiménez 2831* (F); *idem*, La Lola, a cacao finca, near Río Madre de Dios, 18 March 1953, *Scamman 7118* (GH); **Puntarenas**: 16 November 1973, *McAlpin 2353* (UC); *idem*, 20 July 1967, *Mickel 2836* (UC); *idem*, Osa Peninsula, Tropical Science Center field station SW of Rincón, 150m, 16 July 1967, *Mickel 2769* (NY); *idem*, 5°32'55" S, 87°02'40" W, 26 June 1997, *Rojas 3686* (MO); *idem*, Golfito, 83°13'02" W, 8°41'31" S, 450m, 5 October 1996, *Fletes & Rojas 358* (MO); *idem*, Osa, 8°26'10" S, 83°23'00" W, 17 October 2008, *Rojas & Vásquez 8799* (MO); in brackish marsh behind beach south of Puerto Limón, 11 February 1965, *Lent 341* (GH); *s.loc.*, Santa Clara, Rio Verde, Llanuras, May 1896, *Smith 6934* (NY, GH, K); *idem*, Turrialba, 650m, 5 August 1909, *Brade 304* (NY).—**CUBA**. 29 November 1911, *Shafer 10606* (UC, GH); edge of water, at crossing of Rio Cuyaguaje, 17 August 1912, *Shafer 13759* (GH); Near Catalonia de Guines, 19 April 1911, *Leoz 2404* (US).—**DOMINICA**. north west slopes of Morne Diablotins. Syndicate esta, 650m, 11 September 1983, *Whiteford 3569* (BM).—**ECUADOR**. **Guayas**: 40m, 17 September 1998, *Dodson 11308* (MO); Capeira, km 21 Guayaquil to Daule, 20m, setembro, *Dodson & Dodson 11308* (US); **Los Ríos**: Between Mocachi, 8 May 1981, *Cledenin & Dodson 10609* (US); *idem*, 300m, *Sodiolo 54/5* (K); *idem*, *Sodiolo s.n.* (K); *idem*, in silv. equat. los Colorados, *Sodiolo s.n.* (K)**Morona-Santiago**: Taisha, 2°23' S, 77°30' W, 400m, 24 June 1980, *Brandbyge & Asanza s.n.* (UC); *idem*, Morona, near city of Macas, 78°08' W, 2°20' S, 1100m, 22 July 1993, *Fay & Fay 4089* (MO, NY); **Pastaza**: Pastaza Canton, 0°13' S, 77°59' W, 950m, 14 July 1992, *Fay & Fay 3595* (UC, NY, MO); *idem*, Tsurakú, 77°48' W, 1°51' S, 800m, 1 August 1988, *Lewis et al. 14143* (MO); **Napo**: Canton Tena, 1°04' S, 77°36' W, 400m, 9 December 1990, *Fay, A.; Fay, L., 2724* (UC); Putumayo, Rio Aguarico town of Dureno, 457m, 1 August 1974, *Plowman, T. et al 4042* (GH); *idem*, Putumayo, Rio Aguarico, 1 August 1974, *Plowman et al. 4042* (US); **Zamora-Chinchipe**: Zamora, 4°03'50" S, 78°57'50" W, 1000m, 7 December 1994, *Fay & Fay 4412* (UC, NY, MO); *idem*, 4°04'50" S, 78°57'50" W, 1000m, 7 December 1994, *Fay & Alice 4412* (US); *s.loc.*, 70m, 8 May 1981, *Dodson & Clendenin 10609* (MO); 1892, *Eggers 14396* (B).—**EL SALVADOR**. **Cabanãs**: A. P. Cinquera, la San Benito, 467m, 16 May 2007, *Monterrosa et al. 1395* (BM, MO).—**GADELOUPE**. Grand Etang, 400m, 27 November 1959, *Proctor 20184* (US); Basse Terre: Vicinity of Grand Etang, 400m, 27 November 1959, *Proctor 20184* (GH).—**GUATEMALA**. **Escuintla**: March 1890, *Smith 2421?* (GH, K); Izabal: Quirigua, 8 February 1945, *Weatherwax 224* (UC, MO); *idem*, on road between Escuintla and Santa Lucía Cotz, 540m, 24 January 1939, *Standley 63507* (F); **Izabal**: Serra del Mico, between Los Amates and Izabal, 2000m, 26 February 1908, *Kellerman 7360* (NY, F); *idem*,

Jocoló, 25 January 1921, *Johnson 1164* (NY); *idem*, along rid between Puert Barrios and Santo Tomás, 5m, 2 January 1942, *Steyermark 42037* (F); *idem*, swamps of Salomón Creek, south of Bananera, 50m, 6 April 1940, *Steyermark 38976* (F); *idem*, near Puerto Barrios, 25 April 1939, *Standley 72827* (F); Puerto Barrios, 24 February 1905, *Deam 476* (GH); **Santa Rosa**: Rio de la Cruz, east of Taxisco, 225m, 2 December 1940, *Standley 78983* (F); near El Molino, 600m, 26 November 1940, *Standley 78348* (F); **Retalhuleu**: Along río Ocosito, west of Retalhuleu, 300m, 24 February 1941, *Standley 88264* (F). *s.loc.*, vicinity of Puerto Barrios, near sea-level, 28 December 1904, *Maxon & Hay 3056* (NY).—**GUYANA**. **Cuyuni-Mazaruni**: Aurora, 59°44' W, 6°47' S, 60m, 9 October 1989, *Gillespie & Tiwari 2215* (NY); **Demerara-Mahaica**: 58°13' W, 6°32' S, 10m, 23 January 1992, *Hoffman & Capellaro 801* (NY); Region Demerara-Mahaica, 6°32' N, 58°13' W, 23 January 1992, *Hoffman & Capellaro 801* (US); **Essequibo IIs-Demerara**: 58°25' W, 6°50' S, 31 March 1988, *Pipoly 11294* (NY, MO); *idem*, Naamryck canal, 6°50' N, 58°25' W, 31 March 1988, *Pipoly 11294* (US); Portaro Landing, 1899, *Jenman s.n.* (NY); *idem*, Landing, 27 July 1921, *Gleason, H.A. 471* (NY). **Region U. Takutu-U. Essequibo**: Rewa River, 9°25' S, 58°35' W, 150m, 21 February 1997, *Clarke, D. 3817* (BM); *idem*, South Rupununi, 59°18' W, 2°27' S, 250m, 26 July 1994, *Henkel & James 3895* (NY); *idem*, Rewa river, 58°35' W, 2°59' S, 150m, 21 February 1997, *Clarke 3817* (NY); *idem*, South Rupununi, 2°27' N, 59°18' W, 26 July 1994, *Henkel & James 3895* (US); *idem*, Sewa River, 2°59' N, 58°35' N, 150m, 21 February 1997, *Clarke 3817* (US); *s.loc.*, 23 March 1923, *de la Cruz 3449* (NY, F, MO); 15 July 1921, *Gleason 786* (NY); 7 December 1880, *Jenman 386* (B); 1863, *Appun 76* (B); 1862, *Appun 11* (B); October 1844, *Leprieru 1090* (B); *Appun 1277* (B); Kartabo, 30 July 1930, *Graham 379* (US); *Schomburgh 1674* (K); 9 September 1930, *Richard 840* (BM, K); 1837, *Schomburgh 1159* (BM).—**FRENCH GUIANA**. *s.loc.*, 3°35' S, 53°12' W, 200m, 2 February 1986, *de Granville et al. 9060* (UC); 4°14', 52°57', 60m, 12 January 1992, *Hoff 7374* (UC); 1857, *Sagoto 720* (B, BM, K); Saul, Ancienne Savane Grainger, 53°12' W, 3°35' S, 200m, 2 February 1986, *Granville et al. 9060* (NY); 8 May 1985, *Granville 7268* (B, NY); 26 August 1962, *Halle 695* (US); 3°55' S, 51°48' W, 5m, 12 April 1988, *Cremers 9870* (US); 3°35' S, 53°12' W, 200m, 2 February 1986, *Granville et al. 9060* (US).—**HONDURAS**. **Atlantida**: Triunfo, near Tela, 28 December 1927, *Standley 53784* (F); **Colón**: Trujillo, 20 February 1981, *Saunders 1049* (NY, F); vicinity of lancetilla, 19 August 1934, *Yuncker 5049* (NY, F, MO); 24m, 18 July 1934, *Yuncker 4646* (NY, F, MO); Vicinity of Tella, 14 December 1927, *Standley 53701* (F); **Comayagua**: 640m, 16 March 1945, *Rodriguez, J.V. 2464* (F, GH); Tela river above Lancetilla, 1 August 1951, *Steeves & Ray 400* (GH); **Cortes**: 640m, 28 March 1974, *Horwath 26* (F); Vicinity of La Ceiba, 10 July 1938, *Yunckere et al. 8348* (BM, NY, F, MO, GH, K); **Olancho**: vicinity of Catacamas. Scarce, 450m, 18 March 1949, *Standley 18795* (F).—**JAMAICA**. **Saint Elizabeth**: along the eastern edge of the Black River Morass, 12 August 1954, *Webster & Proctor 5336* (GH); 1858, *Wilson s.n.* (B).—**MARTINIQUE**. 1838, *Husnot 349* (BM).—**MEXICO**. **Chiapas**: Pichucalco, 14 September 1944, *Gilly, C.L.; Hernandez 163* (GH); Cacahuatan, 1820m, 9 August 1935, *Fisher 35387* (NY, MO); **Guerrero**: Xochistlahuaca, 400m, 4 June 1985, *Fonseca 1076* (UC); Oaxaca: Putla, 16 December 1985, *Torres 8033* (UC); **Oaxaca**: Juchitán, 400m, 26 September 1972, *Mickel & Pardue 6816* (UC); *idem*, Tehuantepec, near Guigovelaga; Atlantic drainage, 1400m, 26 July 1972, *Halberg 1762* (NY); *idem*, Juchitán, 400m, 26 September 1972, *Mickel 8616* (NY); **Tabasco**: Cardenas, 4 November 1978, *Miranda & Cowan 1676* (NY); *idem*, Tenosique, 15 October 1980, *Cowan 3301* (NY, MO); **Vera Cruz**: Buenaventura, 100m, October 1906, *Ross, H. 1064* (BM); *idem*, Tehuantepec, 14 January 1895, *Smith 2111* (NY, MO, GH); *idem*, November 1921, *Purpus 8602* (NY, MO, GH); Cozamaloapan, 24 January 1968, *Martínez 1616* (MO).—**NICARAGUA**. **Bluefields**: vicinity rio Escondido, 83°45' W, 12°05' S, 150m, 9 April 1966, *Proctor 27413* (NY).—**PANAMA**. **Panamá**: Barro Colorado Island, Canal Zone, 1 May 1968, *Croat 5253* (F, MO); *idem*, 6 February 1972, *Croat 13236* (MO); 4 July 1931, *Bailey & Bailey 476* (GH); *idem*, 24 July 1927, *Kenoyer 23* (US); *idem*, 5 October 1931, *Shattuck 67* (MO); *idem*, July 1931, *Starry 252* (MO); *idem*, 15 October 1965, *Blum 1376* (MO); Canal Zone, West of the Chagres River, opposite Bohio, 20m, 12 February 1911, *Maxon 4782* (NY); Canal Zone, 24 August 1940, *Barlett & Lasser 16884* (MO, GH); *idem*, 14 July 1966, *Tyson et al. 4601* (MO); *idem*, 20 August 1982, *Schmalzel 864* (MO); *idem*, 25m, 7 April 1974, *Nee & Smith 11110* (MO; US); *idem*, 9 August 1925, *Dodge 3453* (GH); *idem*, opposite Bohio, 20m, 12 February 1911, *Maxon 4782* (US); Cerro Azul, 1 June 1975, *Torres & Vergara 7* (F, MO); **Bocas del Toro**: 5m, 24 February 1989, *Peterson & Annable 7099* (MO); *idem*, 8 August 1938, *Woodson et al. 1868* (MO, GH) *idem*, Nievécita, 8 August 1938, *Woodson et al. 1868* (US); Chenui du Guayabal, 500m, July 1921, *Hieram 4698* (GH); **Chiriquí**: 15 May 1975, *Mendoza 3* (MO); Near Tapia River, Juan Díaz region, 1 June 1923, *Maxon & Harvey 6723* (GH); Juan Mina, Río Aguardiente Chico, 17 July 1940, *Bartlett & Lasser 16498* (US); Near Tapla river, Juan Diaz region, 1 June 1923, *Maxon & Harvey 6723* (US); *s.loc.*, vicinity of Juan Mina, rio Aguardiente Chico, 17 July 1940, *Barlett & Lasser 16498* (GH); 20 May 1968, *Croat 5715* (UC, MO); vicinity of Arenoso, lower rio Trinidad, 26m, 7 August 1935, *Seibert 641* (NY, MO, GH, K, US). 27 July 1927, *Bailey 401* (US); 27 July 1927, *Bailey 476* (US); 27 January 1918, *Killip 2819* (US); 7 August 1923, *Stork 105* (US); **Veraguas**: Montijo, Isla Coiba, 1 May 1995, *Araúz et al. 160* (US).—**PARAGUAY**. **Alto**

Paraná: Estancia Rio Bonito, 25°38' S, 54°49' W, 28 February 1996, *Zardini et al. 44787* (UC, NY). **Amambay:** Parque Nacional Cerro Corá, 22°39' S, 56°03' W, 300m, 20 February 1982, *Solomon et al. 7089* (UC); *idem*, Parque Nacional Cerro Corá, 18 September 1980, *Foster 80230* (UC); *idem*, 22°40'19" S, 56°01'31" W, 14 June 1996, *Zardini & Cardozo 45179* (UC); *idem*, Cerca del Parque Nacional Cerro Corá, Cerro Tuyá, *Fernández & Molero 6109* (NY); Serra de Amambaí, 23 September 1910, *Hassler, E. 10164* (B, BM, K); **Canindeyú:** Ballinoti-cué, Reserva Natural del Bosque Mbaracayú, 5 October 1997, *Peña-Chocarro 286* (BM); Mbaracayú Natural Reserve, 24°11'16" S, 0°55'16" W, 14 January 1998, *Zardini & Vera 47795* (RB; UC); *idem*, Jejui-mi, Rumbo Norte, 18 April 1996, *Jiménez & Marín 177* (BM); **Cordillera:** Desvio del la Ruta 2 para el Ramal Piribebuy-Parag, 21 July 1995, *Pietrobon et al. 2121* (SPF); Cordillera de Altos, 25 March 1903, *Fiebrig 999* (F); *idem*, Cerro Zanja Jhú, *Zardini 5159* (K); Cordillera de Altos, 25 March 1903, *Fiebrig 999* (B); *idem*, August 1902, *Fiebrig 17* (B); **Itapua:** 27°29'20" S, 0°56'45" W, 5 December 2002, *Zardini & Gamarra 59258* (UC); *idem*, 25°10' S, 57°13' W, 26 May 1990, *Zardini & Velázquez 20511* (UC); Isla Yaciretá, 21 February 2004, *Peña-Chocarro et al. 1841* (BM); **San Pedro:** Santa Rosa-Santa Bárbara, 23°50'26" S, 56°23'47" W, 26 May 1997, *Zardini & Guerrero 46624* (UC, F); 23°02'39" S, 57°00'41" W, 210m, 1 July 1994, *Zardini & Guerrero 39939* (UC); *idem*, Primavera, Alto Paraguay, 120m, 26 December 1958, *Woolston 1048* (K, NY, UC, US); **Paraguarí:** Lago Ypoá, 25°55' S, 57°25' W, 4 January 1994, *Zardini & Tilleria 37802* (UC); *idem*, Parque Nacional Ybycu'í, *Zardini 8757* (K); *s.loc.*, 21 November 1950, *Vervoorsr 356* (BM); *Jorgensen 7607* (NY); 1900, *Hassler 5476* (BM, K, NY); 1905, *Hassler 1539* (NY); Parque Nacional Ybycui, 4 June 1989, *Zardini 12668* (NY); San Juan: Misiones, 22 December 1965, *Pedersen 7630* (MO); Central: Estero del Ypoa, 57°30' W, 25°40' S, 31 March 1994, *Zardini & Vera 39055* (MO); March 1881, *Balansa 2830* (B, BM, K); in regione calcarea cursus superioris fluminis Apa, 7 August 1913, *Hassler 11628* (B); 1885, *Hassler 1539* (BM, K); Serra de Maracayú, 1898, *Hassler 4835* (BM, K, NY).—**PERU:** **Amazonas:** Bagua, 600m, 31 October 1978, *Barbour, P. 4336* (MO); **Cusco:** La Convención, 1100m, 7 March 1990, *Núñez et al. 11882* (MO); *idem*, Quispicanchis, 70°45' W, 13°13' S, 643m, 24 July 1991, *Núñez 13845* (MO); *idem*, Echarate, Belenpata, 12°49'00" S, 0°72'34" W, 1750m, 21 August 2003, *Suelli & Farfán 1239* (UC, MO); **Junín:** 6 May 1982, *Léon 200* (MO); **Pasco:** Oxapampa, 10°11' S, 75°13' W, 350m, 11 July 1986, *Knapp 7835* (MO); 10°50' S, 75°34' W, 830m, 5 February 1983, *Gentry et al. 40089* (UC); **Loreto:** Maynas, 3°54' S, 73°33' W, 100m, 27 December 1991, *Tuomisto et al. 3543* (UC); *idem*, vicinity of Iquitos, 120m, 1977, *Revilla 3515* (NY); *idem*, Maynas: Iquitos, Carreera Iquitos-Nauta, Km 21, 150m, 18 October 1995, *Rimachi 11379* (NY, MO); *idem*, Iquitos: *Tessmann 3681* (NY); *idem*, 3 August 1929, *Killip & Smith 27036* (NY, F); *idem*, Iquitos, Mishutacu, October 1929, *Klug 431* (NY, F); *idem*, 10 July 1972, *Croat 17942* (MO); *idem*, 21 September 1972, *Croat 20603* (MO); *idem*, Maynas, 16 December 1982, *Encarnación & Mejia 25128* (MO); *idem*, Alto Amazonas, 2°48' S, 76°28' W, 210m, 16 August 1980, *Al Gentry et al. 29824* (MO); *idem*, Rio Parapapura above Yurimaguas, 10 July 1972, *Croat 17942* (US); *idem*, Iquitos, 100m, 11 August 1929, *Killip & Smith 27036* (US); *idem*, Mishuyacu, 100m, November 1929, *Klug 431* (US); *idem*, Lower Rio Huallaga, November 1929, *Williams 4236* (US); **Madre de Dios:** Tambopata Reserve, 250m, 16 March 1981, *Young 117* (UC, MO, NY); *idem*, Manu, 550m, 11 October 1971, *Alfaro 827* (MO); *s.loc.*, 1924, *Tessmann 3687* (B); *idem*, 1924, *Tessmann 368* (B); *idem*, 400m, 16 June 1984, *Schunke 14063* (MO).—**PUERTO RICO.** 9 March 1887, *Sintensis 6378* (B, US); Cuba: La Prenda, 22 November 1921, *Hioram 4698* (US).—**SURINAME.** 19 October 1944, *Maguire & Stahel 24991* (NY, F, K, US); 28 January 1961, *Kramer & Hekking 2763* (NY, MO); 24 March 1954, *Lindeman 5681* (MO); 1846, *Hostmann 1772* (MO); 1845, *Kappler 1772* (B); 19 October 1944, *Stahel 24991* (US); 24 March 1954, *Kramer 5681* (US); near Wilhelminagebergte, 6 March 1926, *D.D. 226* (US); Jodensavanne-Mapanekreek area, *Schulz 9946* (K).—**TRINIDAD.** December 1919, *Broadway 5720* (US); West Indies, 8 January 1908, *Broadway 2778* (US); Malejo Nature Reserve, around 4 mile post on east, 8 March 1996, *Jermy 10930* (BM); Brickfield, 9 July 1963, *Walker 6160* (BM); Cocal Ward, Biche, 11 May 1945, *Johnston 213* (BM); Tacarigua Ward, American road, near St. Augine, 1 January 1945, *Johnston 45* (BM); Carapo Rd. 1/4 m east of Mausica Rd., 30m, 27 September 1970, *Fay 496* (BM); Opuna river crossing Churchill Roosevelt, 15m, 15 July 1963, *Walker 6272* (BM); Blue Basin, 1931, *Sherring s.n.* (BM); 31 January 1977, *Fendler 57* (B, BM, K, NY, GH, US); Brickfields Teak Plantation, three miles south of, 60m, 9 July 1963, *Jermy 2134* (BM); dry water course running under Churchill-Roosevelt, 60m, 15 July 1963, *Jermy 2362* (BM, MO, NY, US, F, MA); Cedros La Brea Wards, 19 April 1940, *McCallum 38* (BM); St. Augine: 23 March 1920, *Britton et al. 948* (K, NY, GH, US). **U.S.A.:** **Florida:** 17 November 1967, *Smith 281* (UC); Highlands, 24 November 1966, *Mickel et la. 1810* (UC); *idem*, Sarasota, 10m, *Holst et al. 6147* (K).—**VENEZUELA.** **Amazonas:** Atabapo: 0°30'30" N, 67°29'00" W, 270m, January 1990, *Fernandez s.n.* (UC); **Apure:** Campamento de Corpo Andes, along rio Arauca at Col, 30 June 1983, *Werff & González 4656* (NY, UC, MO); **Aragua:** Chaparral, December 1858, *Triana 366* (BM); **Barinas:** La Pedraza, 16 September 1985, *Stergios & Taphorn 8738* (NY); **Bolívar:** alrededores de Tumeremo, camino Tumeremo—Bochinc, 18 May 1982, *Stergios et al. 3653* (MO); **Delta Amacuro:** Antonio Diaz, 0°84'00" S, 61°00' W, February 1987, *Fernandez s.n.* (UC); *idem*,

0°83'50" S, 60°22'00" W, February 1987, *Fernandez s.n.* (UC); 25 October 1975, *Trujillo 13427* (UC); *idem*, 9°51'00" S, 61°61'20" W, 50m, 17 October 1977, *Steyermark et al. s.n.* (UC) *idem*, Sierra Leone Road, 14 January 1932, *Homersley 463* (BM); *idem*, Caño Tucupita, 21 September 1995, *Colonnello 1991* (MO); *idem*, Laquna Terraplen, 4 June 1994, *Colonnello 1798* (MO); *idem*, Antonio Diaz, 8°25' S, 61°05' W, February 1987, *Fernandez 3794* (MO); *idem*, Antonio Diaz, 9°50'00" S, 62°01' W, 50m, 17 October 1977, *Steyermark et al. 114835* (MO); *idem*, May 1997, *Wilbert et al. 176* (NY); *idem*, Antonio Diaz, riverine forest along Cano Araguao, 9°50' S, 61°12' W, 50m, 17 October 1977, *Steyermark et al. 114801* (NY, MO); *idem*, Antonia Diaz, 61°00' W, 8°36' S, February 1987, *Fernandez 3963* (NY); *idem*, 8°35' S, 60°22' W, February 1987, *Fernandez 3872* (NY); **Mérida**: 400m, 12 August 1987, *Marcano 773* (MO); **Portuguesa**: Paéz, 27 July 1980, *Stergios et al. 2073* (UC); *idem*, Guanare, 8°50' N, 69°28' W, 200m, 2 November 1982, *Smith & Lemieux 847* (UC, MO); **Táchira**: Libertador, 200m, 22 June 1981, *Steyermark & Manara s.n.* (UC); Anzoategui: 29 September 1980, *Raydan 10* (UC); **Trujillo**: vicinity La Ceiba, 1 December 1927, *Pittier 10879* (NY); La ceiba, trujillo, 2 December 1922, *Pittier 10879* (US); **Zulia**: 10 July 1983, *Hayward 231* (UC); *idem*, 72°30' W, 7°31' S, 300m, 31 July 1979, *Steyermark & Liesner 119312* (MO); **s.loc.**, 23 September 1927, *Homberlsey 66* (BM, K); 1868, *Stevens s.n.* (NY); August 1954, *Gines 5055* (US); December 1952, *Gines 4945* (US); December 1952, *Gines 4960* (US); **s.loc.**, Orinoco, 1896, *Rusby & Squires 378* (NY); *idem*, Lower Orinoco, 1896, *Rusby & Squires 378* (NY).

24. *Meniscium triangularis* R.S. Fernandes & Salino (2014: 4). (Figs 38A–D; 40A–B)

Type:—COLOMBIA. Antioquia: Anorí, Vereda Santa Gertrudis, finca La Estrella, entre las quebradas Santa Gertrudis y Rivas. 07°07'46.3"N, 75°09'31.4"W, 1315 m, 2 October 2003, *W.D. Rodríguez et al. 4115* (holotype HUA142183 [basal portion] + HUA 142184 [distal portion], isotypes COL, NY).

Plants terrestrial. **Rhizomes** unknown. **Fronds** probably monomorphic (sterile specimen not seen). **Fertile fronds** 124–158 cm long; petioles 63–88 cm long, 4.7 mm in diameter at base, brown at the base and stramineous to greenish further up, pubescent with slightly appressed, tortuous hairs, 0.2 mm long; **laminae** 61–70 cm long, 1-pinnate, elliptic to oblong, chartaceous. **Rachises** sinuate, pubescent, abaxially glabrous or spreading hairs, adaxially with acicular, curved hairs 0.2–0.3 mm long and spreading scales mostly 0.4–1.4 × 0.05–0.10 mm with two or more lateral cell ranks, irregular, filiform to lanceolate, basifix and appressed, caducous. **Buds** present in axils of distal pinnae. **Aerophores** present at pinna bases. **Pinnae** 10–11 pairs, 14–15 × 2.0–2.3 cm, lateral pinnae lanceolate to narrow-triangular, usually sessile or stalked to 5 mm in proximal pair; **bases** asymmetric with acroscopic sides excavate to truncate and parallel to rachis and basiscopic sides rounded to short-lobed, proximal pinnae with cuneate base, **margins** entire to undulate, slightly crenate near the apex, with appressed hairs; **apices** acute to acuminate; **adaxial surfaces** pubescent only at costae with scattered acicular, curved to appressed hairs (0.1 mm long), **abaxial surfaces** of costae and veins tomentose with a white appearance, hairs dense, acicular, ciliform, appressed 0.3–0.5 mm long, scales appressed, caducous, 0.4–1.4 × 0.05–0.1 mm, filiform to lanceolate, or with irregular forms, sometimes with long ciliate margins; laminar surfaces between the veins glabrous or with sparse, small, appressed, capitate hairs (0.08–0.10 mm long with two cells); **venation** regularly anastomosing, forming 6–9 of areoles between costa and pinna margin, ca. 7–10 veins arising from costae of fertile pinnae per 3 cm; **cross-veins** straight to slightly arcuate, uniting at an obtuse angle (145°), giving rise to a free excurrent veinlet, these veinlets occasionally bisecting the areole. **Sori** round, on the cross-veins, not confluent at maturity, hairs present on receptacles between sporangia; **sporangia** with globose caducous glands on the capsule. **Spores** monolete, ellipsoidal, perispore echinulate with sparse stelae.

Distribution and habitat:—*Meniscium triangularis* is known only from the type locality in Colombia where it grows in secondary forest at 1315 m (Fig. 47).

Notes:—*Meniscium triangularis* is similar to *M. cocleanum*, *M. reticulatum* and *M. membranaceum* by the presence of buds in axils of pinnae and having triangular-lanceolate pinnae. It differs from these species mainly by the presence of the dense indument of scales and hairs on the abaxial surfaces of the laminae, appressed hairs on the main veins and costae, asymmetric pinna bases, round sori, and glands on the sporangia (Fernandes *et al.*, 2014).

Meniscium triangularis is well characterized by features that have not been commonly mentioned in the past, such as the presence of scales on the abaxial surfaces of the laminae and the presence of the buds on axils of distal pinnae, a character that is also found in *M. cocleanum*. However, *M. cocleanum* has glabrous abaxial laminar surfaces, oblong sori, and glabrous sporangia, while *M. triangularis* has scales and appressed hairs on the main veins and costae, round sori, and glandular sporangia. *Meniscium triangularis* and *M. reticulatum* have the same triangular-lanceolate pinna outline. *Meniscium triangularis* can be distinguished by having buds in the axils of distal pinnae, abaxially on costae

and veins tomentose with hairs and scales, hairs 0.3–0.5 mm long, acicular, ciliform, dense, appressed, which gives a white aspect to the costae; conspicuous scales 0.4–1.4 × 0.05–0.10 mm, appressed, caducous, with irregular forms, with long-ciliate margin, sori rounded (Fig. 2A–D), and sporangia capsule with globose, caducous glands. Conversely, *M. reticulatum* lacks buds on the axils of basal pinnae or buds, has costae and veins abaxially with curved, acicular hairs, 0.1–0.2 mm long, slightly to moderately dense, scales usually lacking or rare, filiforme or shapeless and margin not ciliate, sori oblong, and sporangia glabrous (Fernandes *et al.*, 2014).

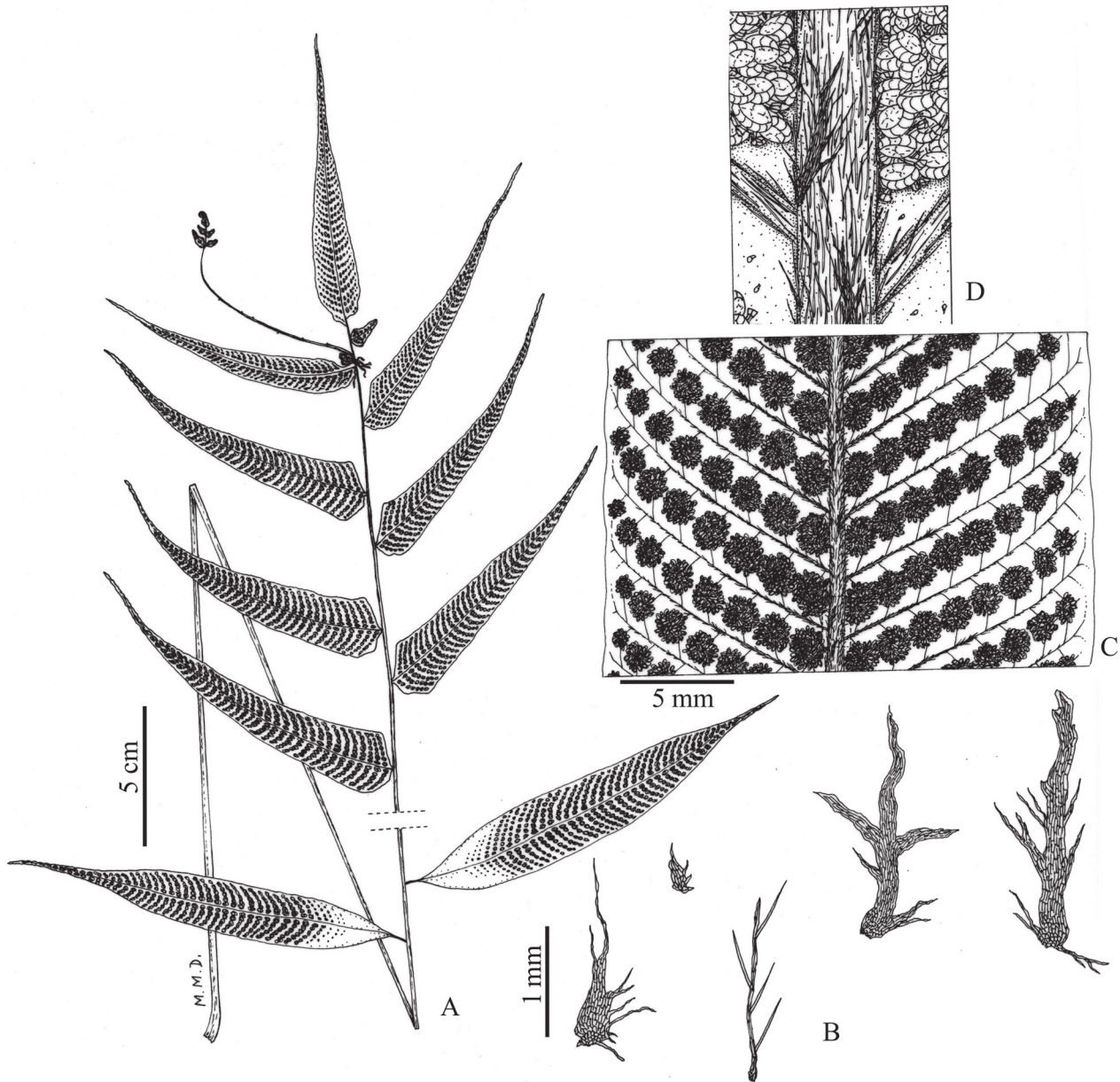


FIGURE 38. *Meniscium triangularis*. **A.** fertile frond showing plantlets on the distal pinna; **B.** scales of the abaxial surface of costae and veins; **C.** detail of the abaxial surface of fertile pinna showing round sori on the cross-veins; **D.** detail of the abaxial surface of costa showing hairs and scales (Rodríguez *et al.* 4115, NY). Modified from: Fernandes *et al.* 2014: 4, fig 2).

Meniscium membranaceum has an indument of hairs and scales on costae and veins similar to that of *M. triangularis*, from which it differs by having only 2–4 pinna pairs, with 19–20 areole rows between costa and pinna margin, buds in the axils of basal pinnae and straight secondary veins forming a 180° angle (Fernandes *et al.*, 2014).

Meniscium membranaceum and *M. triangularis* have echinulate spores, but *M. triangularis* has sparse stelae forming clumps (Fig. 5C–D) whereas *M. membranaceum* has stelae with perforations (Fig. 5A–B). *Meniscium reticulatum* has cristate–reticulate spores, confirming the statements of Wood (1973) and Tryon & Tryon (1982).

25. *Meniscium turrialbae* (Rosenst.) Pichi Sermolli (1968: 181). (Figs 39A–C; 40A–B)

Dryopteris turrialbae Rosenstock (1925: 10). *Thelypteris turrialbae* (Rosenst.) Morton (1967: 44). *Cyclosorus turrialbae* (Rosenst.) Mazumdar & Mukhopadhyay (2014: 33). **Type**:—COSTA RICA. Turrialba, 650 meters, 05 August 1909, *A. C. Brade 357* (lectotype UC [UC405913], here designated; isolectotype HB [HB9535], S [S1783]).

Rhizomes short-creeping, 1.0–1.6 cm diam., glabrous. **Fronds** monomorphic to subdimorphic; **sterile fronds** 133–188 cm long, petiole (60–)66–91 cm long, 5–8.8 mm diam., lamina 67–97 cm long, pinnae 24–32.5 × 3.3–4.1 cm; **fertile fronds** (75–)112–203 cm long, petiole (32–)68–107.5 cm long, 5–11 mm diam., lamina (43–)61–97 cm long, pinnae 15.5–29(–34) × 1.7–4 cm. **Petioles** with brown basal portion and stramineous distal portion, glabrous or with 0.15 mm long, acicular, curved, adpressed hairs, scales not seen. **Laminae** 1-pinnate, ovate to oblong, chartaceous. **Rachises** with moderate to dense hairs adaxially, these equal to those on the petiole, scales absent. **Buds** present in axil of proximal pinnae, on petiolule. **Pinnae** in (6–)9–13 pairs, lanceolate to oblong-lanceolate, proximal pinnae short-petiolulate, petiolule 0.1–0.8 mm long, distal pinnae sessile, conform or slightly smaller; **bases** of proximal pinnae cuneate, base of distal pinnae asymmetric with basisopic side round to adnate and acroscopic side excavate to truncate; **margins** entire, undulate or rarely serrate at least at the distal part of the proximal pinnae to the apex (only fertile pinnae), with acicular, adpressed hairs; **apices** long-acuminate to caudate; **adaxial surfaces** glabrous between the veins and on the veins, costa with sparse to moderate, 0.1–0.2 mm long, acicular, curved, patent hairs; **abaxial surfaces** glabrous or with filiform, irregular, adpressed scales between the veins, costa and veins glabrous or with sparse to moderate, 0.15–0.2 mm long, acicular, curved, adpressed hairs and arachnoid, caducous, hyaline to reddish-brown scales near the costa, adpressed on surfaces between veins and on sori, glands absent; **costal veins** 6–8 on sterile pinnae and 8–14 on fertile pinnae per 3 cm; **secondary veins** arcuate to slightly subsigmoid on sterile pinnae and straight or arcuate on fertile pinnae, united with adjacent vein to form an obtuse angle, with one excurrent, free veinlet; **areoles** in 13–26 rows on sterile pinnae and 8–18 rows on fertile pinnae between the costa and pinna margin. **Sori** oblong on the secondary veins, not confluent at maturity; **receptacles** glabrous; **sporangia** glabrous. **Spores** reticulate-papillate with straight, sparse, fimbriate crests.

Distribution and habitat:—Colombia, Costa Rica, Ecuador, Nicaragua, and Panama (Fig. 47). This species is terrestrial inside forests, and between rocks along stream banks or in disturbed trail-side environments at 25–1500 m. **Notes**:—According to Maxon & Morton (1938), *M. turrialbae* (= *D. turrialbae*) might only be a geographical variety of *M. reticulatum* (= *D. reticulata*) from the West Indies, which differs only by the pinna shape. The wide base of the fertile pinnae is a diagnostic character for *M. reticulatum* and, in addition to this, *M. turrialbae* differs not only by the oblong-lanceolate pinnae, with a non-wide base, but also because it has elongate fertile pinnae (15.5–29[–34] cm long) with surfaces abaxially that are generally glabrous or with few curved, adpressed hairs only on costae. However, *M. reticulatum* has ovate-triangular to lanceolate fertile pinnae that are shorter (13.5–22 cm long) with abaxial surfaces that have sparse or moderate, short (0.15–0.25 mm long), acicular, curved or patent, tortuous hairs on the costae and veins.

Meniscium turrialbae is also similar to *M. nesioticum* because of, for example, the acicular, curved hairs on the costa, buds sometimes on the proximal pinnae, and glabrous sporangia. However, *M. nesioticum* has dimorphic leaves, linear-lanceolate fertile pinnae with a crenate to serrate margin, and sori usually acrostichoid or confluent at maturity (vs. leaves monomorphic to subdimorphic, oblong to lanceolate pinnae with entire to undulate or serrate margin, and sori not confluent at maturity).

The main collection of Rosenstock Herbarium is deposited in Herbarium S. However, specimens of this species deposited in S are incomplete and in disagreement with the original description. Therefore, a specimen of the UC Herbarium was chosen as lectotype because this is more in accordance with the protologue.

Specimens examined:—**COLOMBIA**: **Boyacá**: Carretera entre Pauna y Borbur, 530m, 15 October 1967, *Mejía et al. 3618* (NY); *idem*, Carretera entre Pauna y Borbur, 530m, 15 October 1967, *Mejía et al. 3622* (NY); **Chocó**: Nuqui, Corregimiento Termales, Quebrada Piedra, 25m, 5 September 1994, *Acevedo-Rdgz et al. 6798* (MO, NY, US); *idem*, Chirambia, *Darien 972* (BM); Bay of Chocó, 1848, *Seemann s.n.* (BM); *s.loc.*, 1760–1808, *Mutis 3298* (US).—**COSTA RICA**: **Alajuela**: Cantón de Upala, 10°49' S, 84°53' W, 80m, 17 November 1988, *Grayum 9049* (MO); *idem*, forest along Río San Rafael, near hot springs, 500m, 18 February 1966, *Molina et al. 17421* (F); *idem*, Monteverde Cloud Forest, 10°18'00" S, 84°44'30" W, 850m, 29 February 1992, *Grayum 10207* (MO); *idem*, Vertiente Norte de la Cordillera Central, 750m, 27 September 1991, *Dobbeler et al. 604* (BM); **Cartago**: Cantón de Turrialba, 83°27'02" W, 9°58'24" S, 500m, 13 September 1999, *Castro 458* (NY); *idem*, Tuis, 650m, December 1897, *Tonduz 11321 herb.* (CR, K, US); Turrialba, 650m, 5 July 1909, *Brade 357* (HB, UC); **Heredia**: Upstream from Puerto Viejo ca. 4 km at Finca

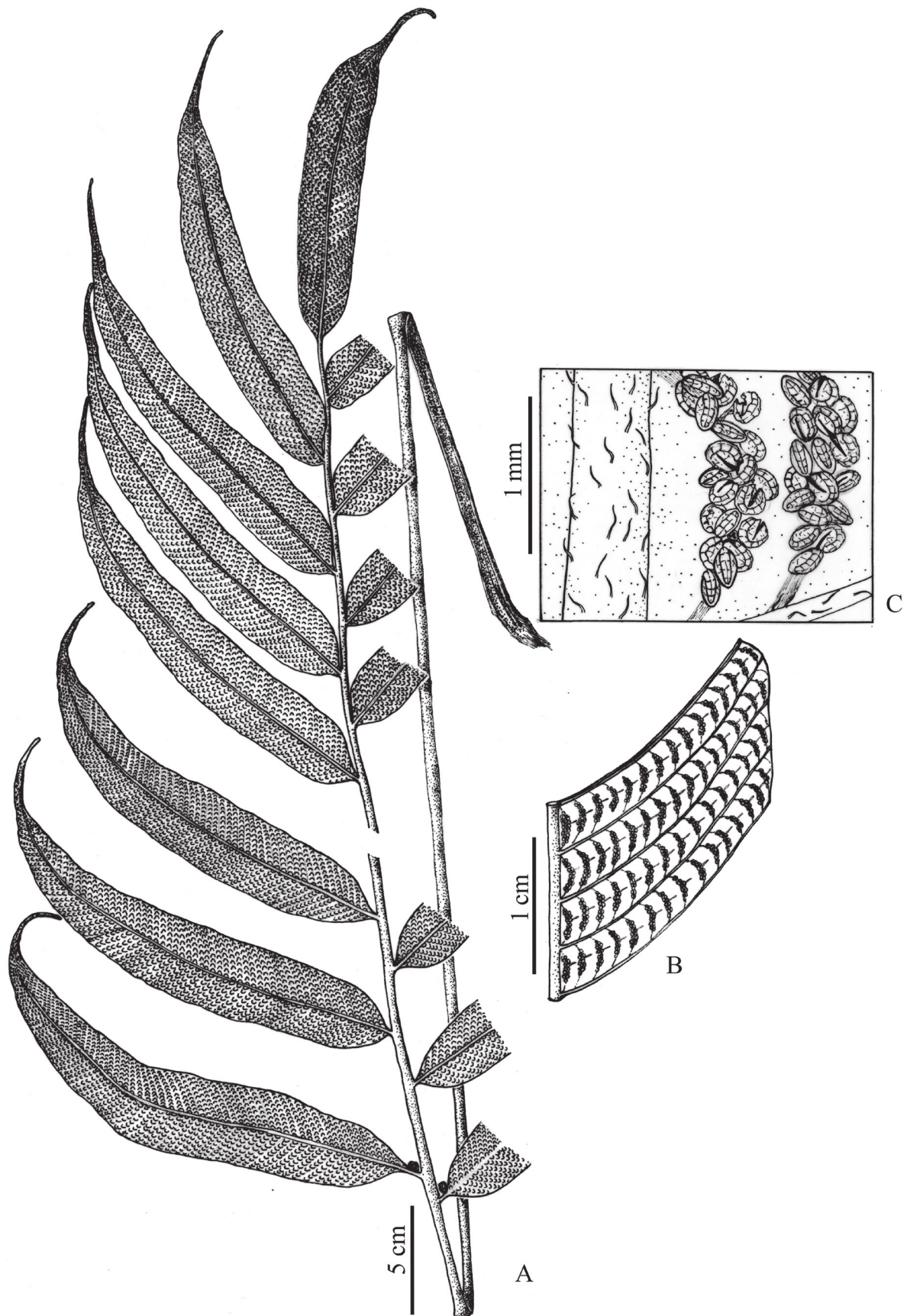


FIGURE 39. *Meniscium turrialbae*. **A.** fertile frond; **B.** detail of the abaxial surface of fertile pinna showing oblong sori on secondary veins; **C.** detail of the abaxial costae with tortuous patent hairs and oblong sori on secondary veins (*Chacón & Herrera 1626*, MO, US).

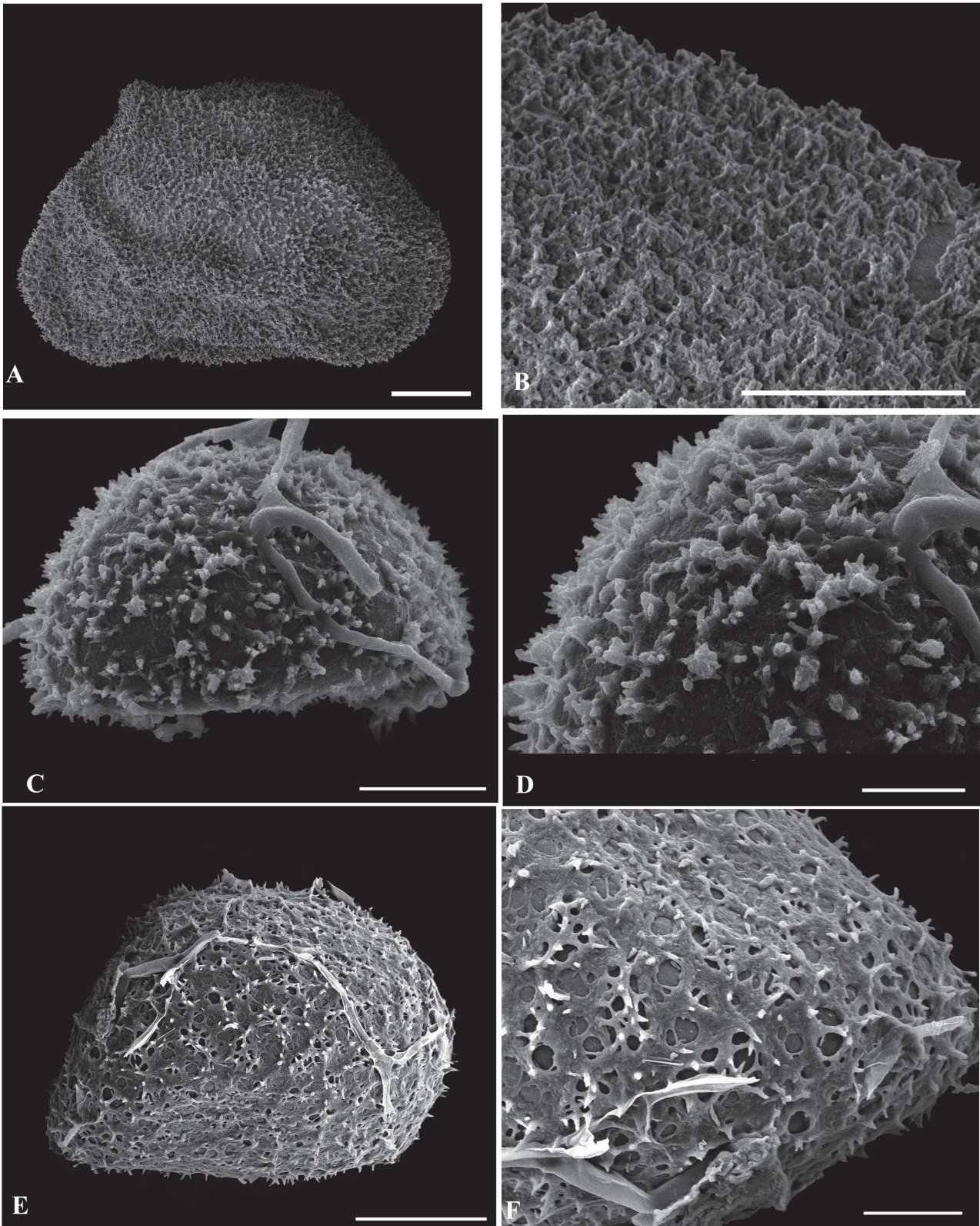


FIGURE 40. Spores of *Meniscium*. **A–B.** *M. serratum*, echinulate spore with short, dense spines. **C–D.** *M. triangularis*, echinulate spore. **E–F.** *M. turrialbae*, reticulate-papillate spore (**A–B.** *Pietrobon et al.* 5101, BHCB; **C–D.** *Rodriguez et al.* 4115, NY; **E–F.** *Mickel* 3514, NY). Scales bars: A, C, E = 10 μ m; B, D, F = 5 μ m.

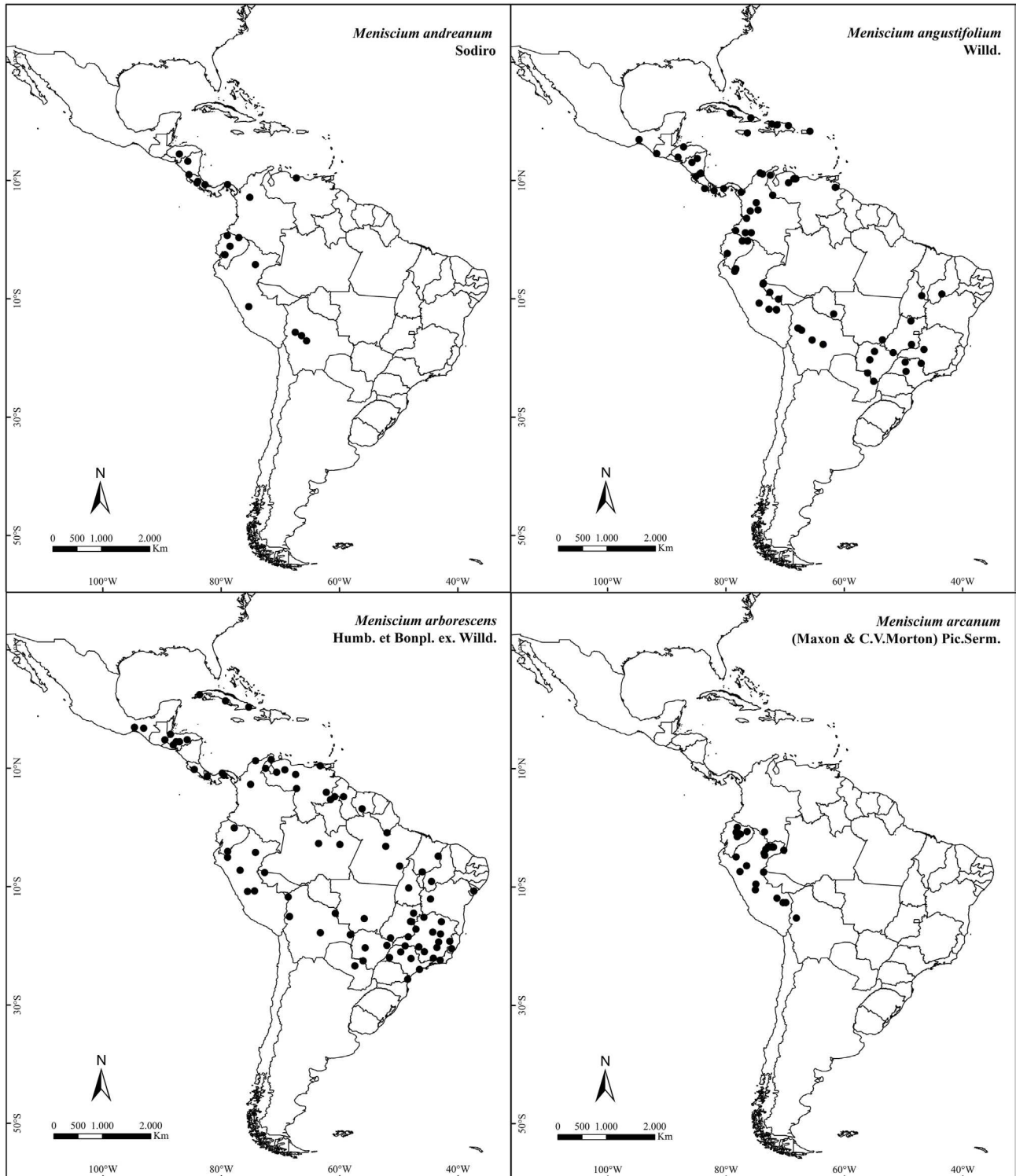


FIGURE 41. Distribution of *Meniscium andreaeanum*, *M. angustifolium*, *M. arborescens*, and *M. arcanum*.

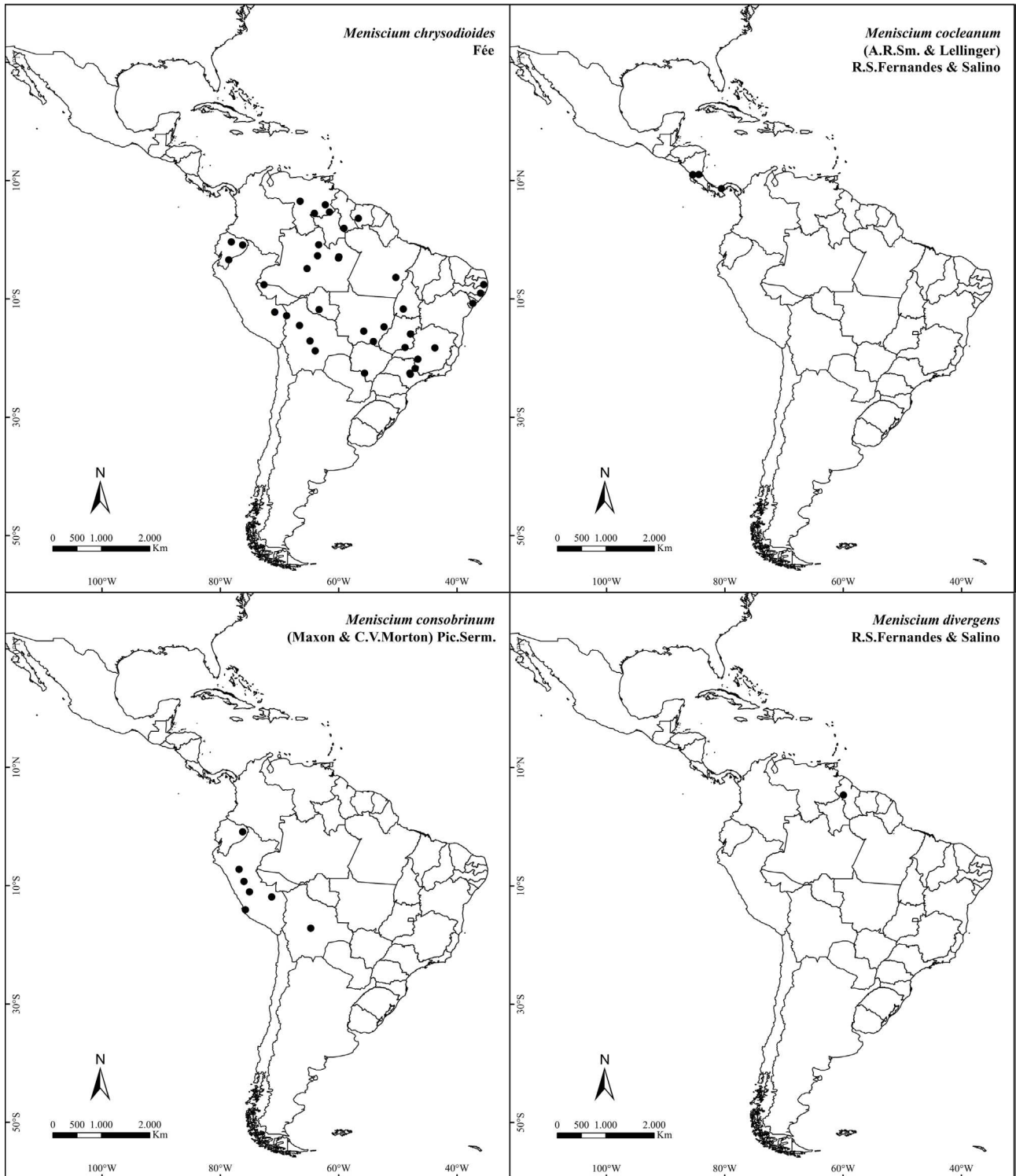


FIGURE 42. Distribution of *Meniscium chrysodioides*, *M. cocleanum*, *M. consobrinum*, and *M. divergens*.



FIGURE 43. Distribution of *Meniscium delicatum*.

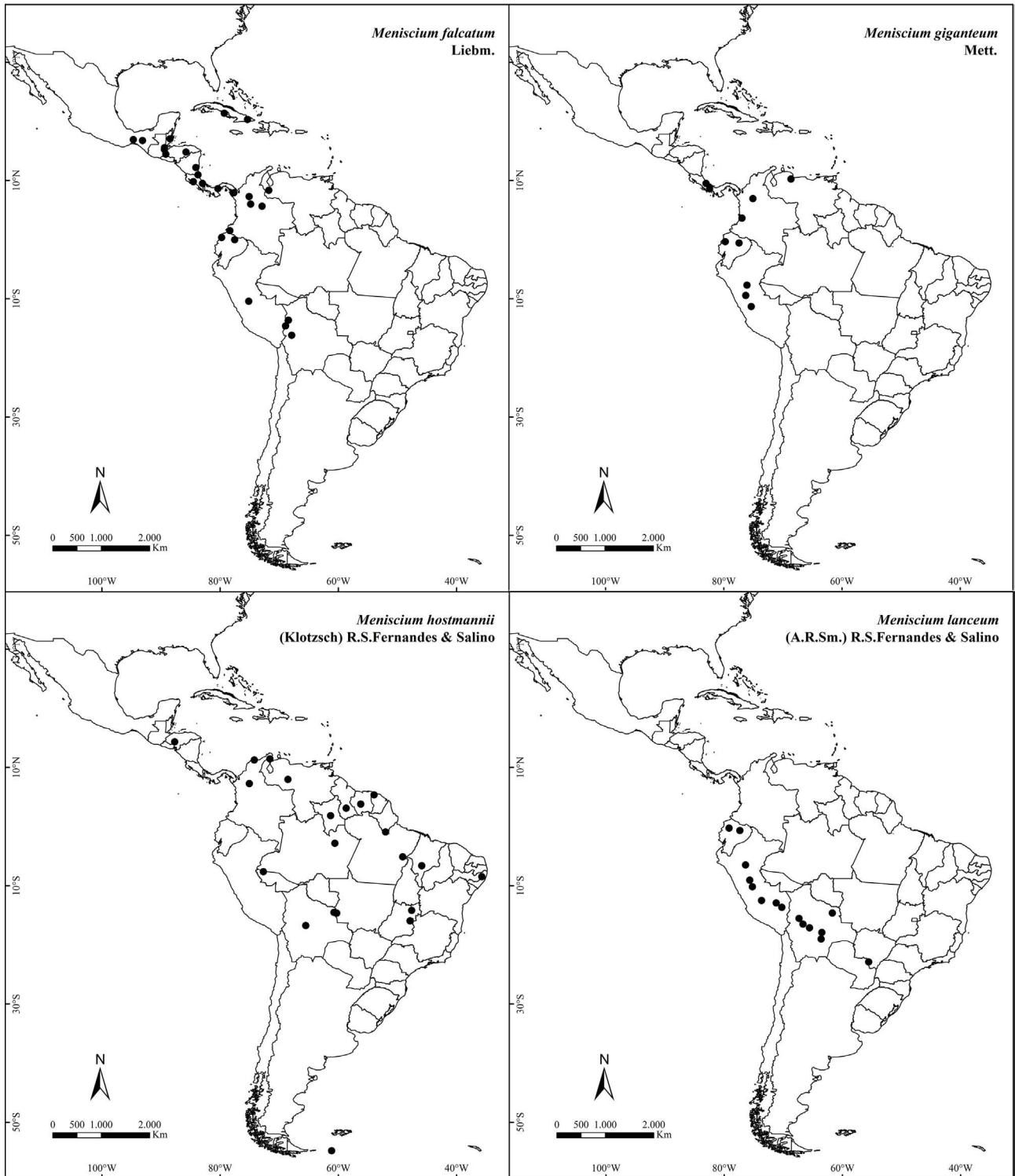


FIGURE 44. Distribution of *Meniscium falcatum*, *M. giganteum*, *M. hostmannii*, and *M. lanceum*.

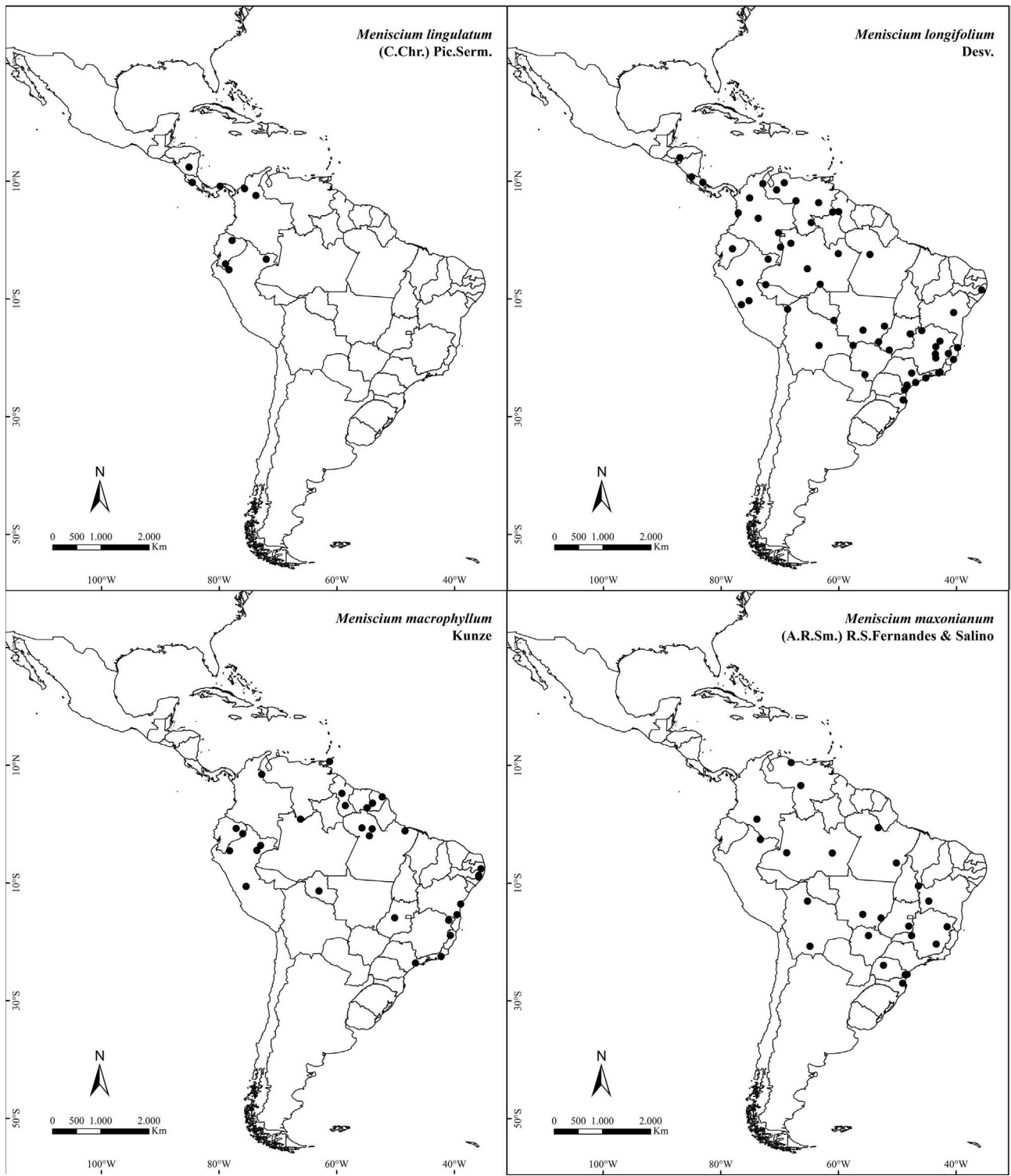


FIGURE 45. Distribution of *Meniscium lingulatum*, *M. longifolium*, *M. macrophyllum*, and *M. maxonianum*.

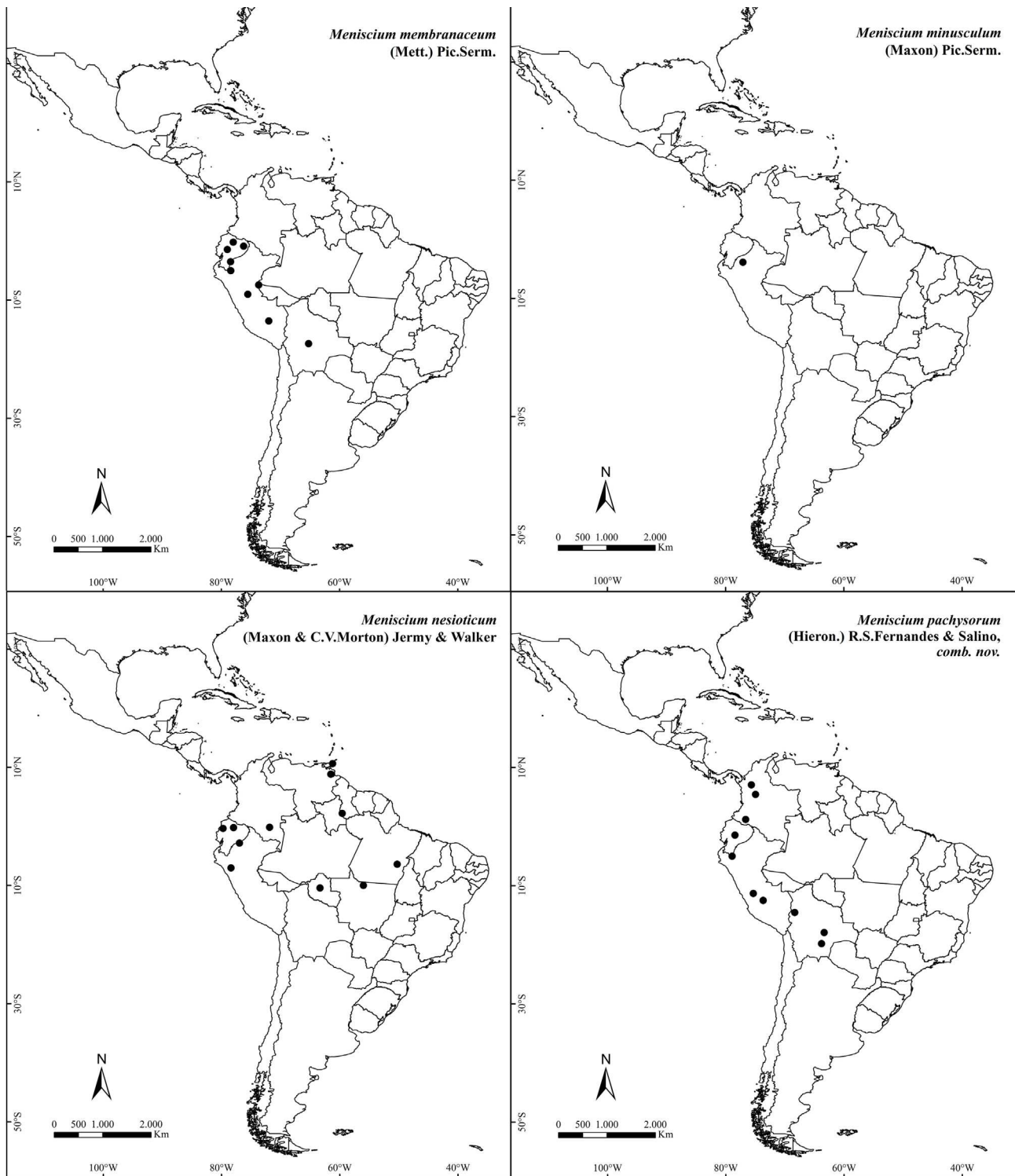


FIGURE 46. Distribution of *Meniscium membranaceum*, *M. minusculum*, *M. nesioticum*, and *M. pachysorum*.

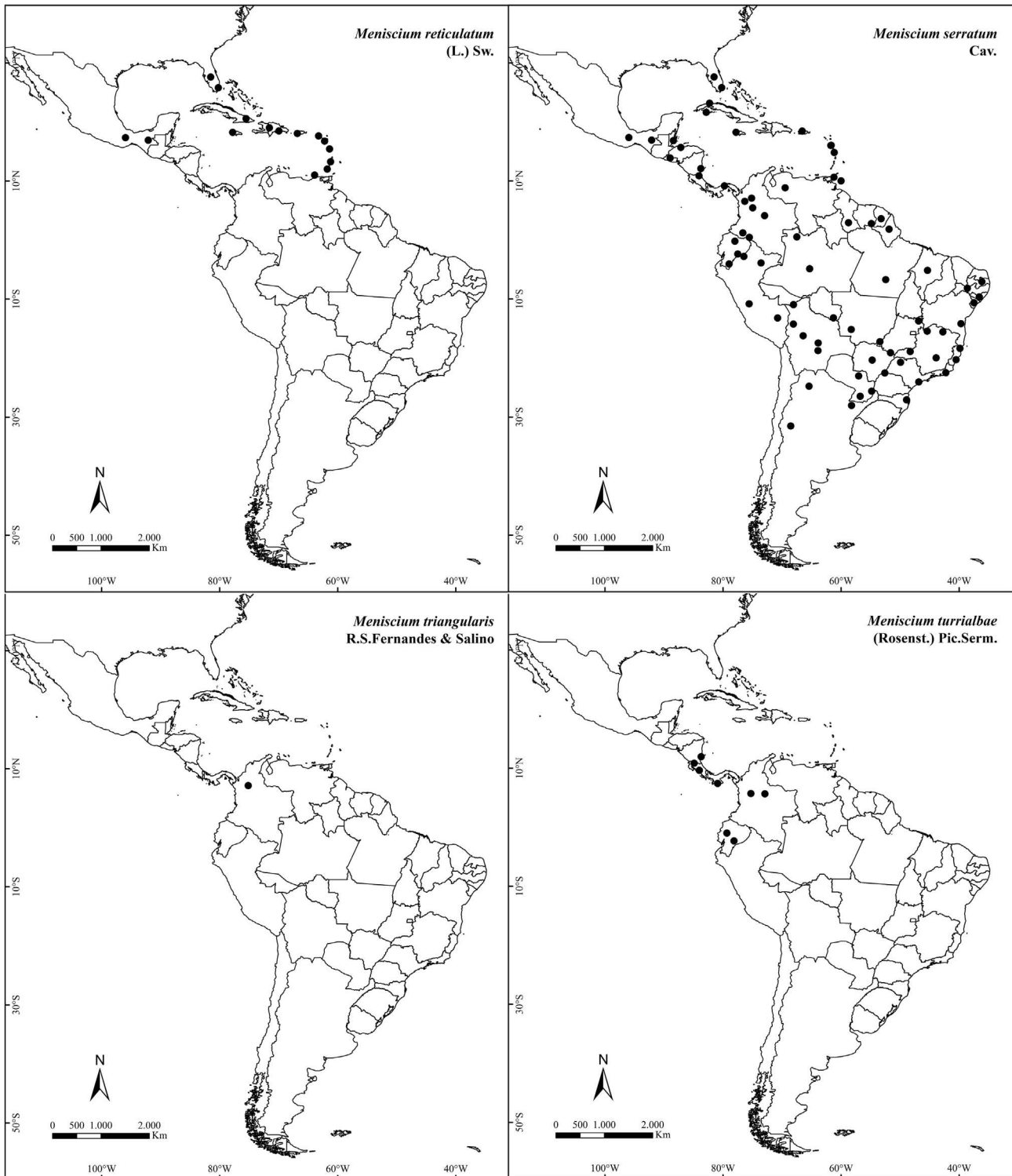


FIGURE 47. Distribution of *Meniscium reticulatum*, *M. serratum*, *M. triangularis*, and *M. turrialbae*.

La Se, 125m, 16 August 1967, *Mickel 3497* (NY); *idem*, upstream from Puerto Viejo ca. 4 km at Finca La Se, 125m, 16 August 1967, *Mickel 3514* (NY, US); **Limón**: Flood plain of the Río Toro Amarillo, 420m, 22 June 1975, *Lellinger 1836* (US); **Puntarenas**: 20m, 6 March 1973, *Croat 22623* (MO); **San José**: 450m, 12 November 1983, Chacón, *Herrera 1626* (UC, US, MO); **s.loc.**, 30m, December 1947, *Skutch 5342* (US).—**ECUADOR**: **Carchí**: Tulcan, 01°06' N, 78°14' W, 1500m, 16 November 1990, *Rubio et al. 929* (MO). **Esmeraldas**: Quininde, Bilsa Biological Station. Montañas de Mache, 0°21' N, 79°44' W, 400m, 16 May 1995, *Clark & Watt 898* (NY); *idem*, San Lorenzo, 01°02' N, 78°26' W, 250m, 16 March 1991, *Rubio et al. 1180* (MO); *idem*, Awa encampment, 01°70' S, 78°37' W, 100m, 13 February 1988, *Hoover et al. 4067* (MO); **Morona-Santiago**: Morona, 02°20' N, 78°08' W, 1000m, 7 August 1993, *Fay & Fay 4010* (MO); **Pichincha**: NE of Vicente Maldonado, Reserva de ENDESA, 01°01' N, 79°20' W, 600m, 2 June 1984, *Laegaard 52236* (NY).—**NICARAGUA**: **Río San Juan**: 200m, 7 March 1978, *Neil, D. 3340* (MO).—**PANAMA**: **Chiriqui**: Burica Peninsula, 20 February 1973, *Croat 22058* (MO).

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