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The fern family Gleicheniaceae (Polypodiopsida) in Brazil

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Abstract

We carried out a taxonomic study of the leptosporangiate fern family Gleicheniaceae (Polypodiopsida) in Brazil out and accepted 17 species distributed in three genera. Taxonomic descriptions to the whole family, genera and species are provided, as well as keys to the genera and species, synonymies, maps, illustrations, and notes. We also provide nomenclatural notes and propose 21 lectotypes.

Keywords: ferns, leptosporangiate, Gleicheniales, pteridophytes, taxonomy

Introduction

Gleicheniaceae is a fern family with the six genera *Diplopterygium*, *Dicranopteris*, *Gleichenella*, *Gleichenia*, *Stromatopteris*, and *Sticherus* (PPG I 2016). *Diplopterygium* has *ca.* 25 species, with only one native to tropical America; *Dicranopteris* has 12 species, four of them from the Neotropics; *Gleichenella* is a monotypic Neotropical genus; *Gleichenia* has about ten species confined to austral regions in the Old World; *Stromatopteris* is monotypic and restricted to New Caledonia; and *Sticherus*, a Pantropical genus with about 95 species, has 54 neotropical species (Gonzales & Kessler 2011, Kessler & Smith 2018). In Brazil the family is represented by the tree genera *Dicranopteris*, *Gleichenella*, and *Sticherus*.

Studies dealing with Gleicheniaceae in Brazil are restricted to local floras (e.g. Sturm 1859, Sehnen 1970, Windisch & Nonato 1994, Santiago 2015, Barros & Xavier 2009, Barros & Pietrobom 2005), leading to a consequent gap of knowledge of the family in the country. Furthermore, the taxonomy of *Sticherus* is intricate. Gonzales & Kessler (2011) recognize, at species level, several entities within complexes (*e.g. Sticherus tomentosus sensu lato*, with six species; *Sticherus bifidus sensu lato*, with seven species). Representatives of these complexes are present in Brazil, thus the number of Brazilian species of Gleicheniaceae may be overestimated. Therefore, studies aimed to better understand the circumscription of Brazilian species are needed. In this context, the aim of this paper is to provide a taxonomic treatment for Gleicheniaceae taxa that occur in Brazil.

Material & Methods

We examined herbarium specimens during visits and/or by loan, requested high-resolution pictures of type collections from the main European herbaria, and consulted the Jstor database. The specimens of the following 53 herbaria were consulted: ASE, ALCB, B, BHCB, BM, BR, CEN, CESJ, CEPEC, COL, E, EAC, ESA, FI, FLOR, FMB, FURB, HAL, HBRA, HUEFS, HSTM, INPA, JPB, K, LE, NY, NX, M, MBM, MG, MOSS, OUPR, P, PACA, PMA, PR, PRC, QCA, R, RB, RON, S, SP, SPF, UB, UEC, UFG, UFRPE, UFP, UPCB, US, VIC, and VIES (acronyms according to Thiers 2017, continuously updated). More then 4600 specimens were consulted. The selected material is presented by alphabetical order. At least five specimens by state were cited, when available, aiming to represent the geographic distribution of the taxa. To build the maps we used the coordinates of the exsiccate labels, except when this information was not available—in this case geographic coordinates were estimated. We performed all geographic information

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system (GIS) in ArcGIS ver. 10 (ESRI 2011), and the map of the Brazilian territory was obtained from the website of the Instituto Brasileiro de Geografia e Estatística (IBGE 2017). Some morphological features were illustrated with silhouettes for blade dissection, and line drawings for indument details. The terms used for description follow Lellinger (2002), and the frond terms of Gleicheniaceae follow Østergaard & Øllgaard (1996) with some modifications.

Taxonomic treatment

Gleicheniaceae (R. Br.) Presl (1825: 70).

Gleicheneae Brown (1810: 160).
Type:—*Gleichenia* Smith (1793: 419).

Dicranopteridaceae Ching (1954: 94).
Type:—*Dicranopteris* Bernhardi (1806: 38).

Stromatopteridaceae (Nakai 1950: 32) Bierhorst (1968: 263).
Type:—*Stromatopteris* Mettenius (1861: 84).

Plants terrestrial or epipetric, pendent or erect, perennials. **Rhizomes** slender, long-creeping, branched, protostelic or solenostelic, with scales or hairs. **Fronds** monomorphic, about 20 cm to 5 m long or longer. **Stipes** long, rigid, not articulate with the rhizomes, with a transversal section of solid xylem or vascular bundles in "C" shape. **Blades** of indeterminate growth, rarely determinate, one to several times pseudodichotomously forked, rarely simple, ultimate branches pinnate, pinnatisect, or bipinnate, ultimate segments linear, rarely deltoid. **Buds** dormant or latent on branch axils, with or without pseudostipules, covered by scales or hairs, rarely glabrous, sometimes with opposite branches. **Veins** free, 14-forked, prominent or immerse. **Sori** round, abaxial. **Indusia** absent. **Sporangia** globose or pyriform, with a transversal anulus not interrupted by pedicel, simultaneously maturating, with or without multicellular paraphyses. **Spores** >100(–800) per sporangium, monolete or trilete, achlorophyllous, surface smooth or granular. **Gametophytes** chlorophyllous, epigeal, obcordate to elongated, thickened at the center, the margins thin, with small hairs, archegonia on ventral surface of the thick portion, antheridia with about 6–12 cells on ventral surface.

Pantropical; 6 genera, about 157 species (PPG I 2016); 3 genera and 17 species in Brazil.

Key to the Brazilian genera of Gleicheniaceae

1. Rhizomes and buds covered by scales; veins 1-forked ..... *Sticherus*
- Rhizomes and buds covered by hairs; veins 2–4-forked 2
2. Fronds anisotomically branched, accessory branches absent; spores monolete ..... *Gleichenella*
- Fronds isotomically branched, accessory branches present; spores trilete ..... *Dicranopteris*

1. *Dicranopteris* Bernhardi (1806: 38).

nom. nov. for *Mertensia* Willd. (*non* Roth) with same type.

Mertensia Willdenow (1804: 165) *illegit.*, *non* Roth (1797: 34) (Boraginaceae), *non Gleichenia* subgen. *Mertensia* Hooker (1844: 4). Type:—*Mertensia dichotoma* (Thunb.) Willdenow. (1804: 167). *Polypodium dichotomum* Thunb. in Murray (1784: 980). *Dicranopteris dichotoma* (Thunb.) Bernhardi (1805: 38) = *Dicranopteris linearis* (Burm. f.) Underwood (1907: 250).

=*Hicriopteris* Presl (1851: 386). Type:—*Hicriopteris speciosa* Presl (1851: 386) = *Dicranopteris speciosa* (C. Presl) Holttum (1957: 273). Subgen. *Dicranopteris.*

=*Mesosorus* Hasskarl (1856: 2) *nom. nov.* for *Mertensia* Willd. with the same type.

=*Gleichenia* sect. *Heteropterygium* Diels (1900: 355). Type:—*Gleichenia linearis* (Burm. f.) Clarke (1880: 428) = *Dicranopteris linearis* (Burm. f.) Underw. (1907: 250). Subgen. *Dicranopteris.*

Plants terrestrial or epipetric. **Rhizomes** long-creeping, branched, protostelic, with multicellular brown to red-brown, rigid hairs. **Fronds** erect or pendant, pseudodichotomously branched, branches isotomic, abaxial surface glabrous or

pubescent with multicellular white or reddish hairs on the rachis and segments midrib, secondary veins with or without unicellular globose or bacilliform hairs, or with tector hairs, adaxial surface glabrous or with sparse multicellular white or reddish hairs restricted to the rachis, ultimate branches pectinate, segments linear. **Buds** with pseudostipule entire or trifid, covered by reddish-brown, multicellular, rigid hairs, with or without a pair of accessory branches, entire to pinnatisect. **Veins** free, 2–3(–4)-forked. **Sori** round, with 6–15 sporangia per sorus, paraphysiate or not. **Spores** trilete, whitish, scabrous, rugulose or perforate; x= 39.

Dicranopteris is a pantropical genus with about 12 species, four of which occur in Brazil.

Key to the Brazilian species of *Dicranopteris*

1. Abaxial blade surface glabrous, only with unicellular globose glandular hairs on the secondary veins ..... *D. flexuosa*
- Abaxial blade surface pubescent, with multicellular hairs or, when present, unicellular bacilliform glandular hairs on secondary veins.....2
2. Plants erect; fronds forked once (rarely twice); ultimate branches with caudate apex; accessory branches entire to slightly lobed at the base, dissimilar to the ultimate branches ..... *D. nervosa*
- Plants scrambling; fronds forked two to several times; ultimate branches with pinnatifid apex, accessory branches pinnatisect, similar to the ultimate branches.....3
3. Segments ascendant, occasionally patent, with multicellular hairs restrict to the segments midrib, and bacilliform glandular hairs on secondary veins (southeast and northeast Brazil)..... *D. rufinervis*
- Segments patent to retroflex, with multicellular hairs on the segments midrib and secondary veins, glandular hairs absent (north Brazil, Guiana Shield) ..... *D. seminuda*

1.1. *Dicranopteris flexuosa* (Schrad.) Underwood (1907: 254). Figs. 1A–D, 2B, 3A, 12A–B and G.

Mertensia flexuosa Schrader (1824: 863). *Gleichenia flexuosa* (Schrad.) Mettenius (1863: 50). Type:—BRAZIL. Espírito Santo: *Wied-Neuwied s.n.* (lectotype **designated here**, BR [BR0000006870515], photo!, isolectotypes BR [BR0000006869731]; [BR0000006869823]; [BR0000006869793]; [BR0000006869762] photos!).

Gleichenia nitida Presl (1825: 70). *Mertensia nitida* (C. Presl) Presl (1836: 51). *Dicranopteris nitida* (C. Presl) Nakai (1950: 68). Type:—MEXICO. *Haenke s.n.* (lectotype **designated here**, PRC [PRC45797] photo!, isolectotype PR [PR612503] photo!).

Mertensia rigida Kunze (1834: 16). *Dicranopteris rigida* (Kunze) Nakai (1950: 69). Type:—PERU. Chibangata: *Poeppig 1153* (lectotype **designated here**, L [L-3537345] photo!).

Mertensia rigida Smith (1843: 381), *nomen nudum.*

Mertensia scalpturata Fée (1869: 199). *Dicranopteris scalpturata* (Fée) Nakai (1950: 69). Type:—BRAZIL. Rio de Janeiro. *Glaziou 1695* (lectotype **designated here**, P [P00633237] photo!, isolectotypes P [P00633238], [P00633239] photos!). Remaining syntypes:—BRAZIL. *Claussen 102* (P [P00633240] photo!); *Glaziou 364* (P [P00633236] photo!).

Plants terrestrial or epipetric. **Rhizomes** 1.8–4.3 mm thick, with red-brown rigid hairs, glabrescent. **Fronds** scrambling, 1–4-forked, ultimate branches 7.4–30 × 2–7 cm, linear to lanceolate, apex pinnatifid, base attenuate, ultimate segments linear 3.5–15 × 1.8–2.3 cm, margins slightly revolute, abaxial surface green or pruinose, glabrescent, with globose glandular hairs on the secondary veins. **Buds** covered by multicellular red hairs, pseudostipules present, accessory branches entire to pinnatisect. **Veins** 3–4-forked. **Sori** medial, without paraphyses.

Distribution and habitat:—Brazil (Alagoas, Amazonas, Amapá, Bahia, Ceará, Distrito Federal, Espírito Santo, Goiás, Maranhão, Minas Gerais, Mato Grosso do Sul, Mato Grosso, Pará, Paraíba, Pernambuco, Paraná, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondônia, Roraima, Santa Catarina, Sergipe, São Paulo, and Tocantins), Bolivia, Central America, Colombia, Ecuador, Guiana, Mexico, Paraguay, Peru, Venezuela, and USA. It is a widespread species in Brazil that occurs between 100 m and 2000 m. It colonizes disturbed areas, where it may be dominant.

Notes:—This species has a broad distribution in Brazil, and the apparent absence of it in a few states (Acre and Piauí) may be due to lack of collection efforts in these areas. It occurs in all phytogeographic domains in Brazil, from sea level up to 2000 m Because of its broad distribution, this species presents great phenotypical plasticity, which results in a gradient of frond size, shape, and texture.

Epipetric specimens have significant blade reduction so that the fronds are deltoid and once-forked, usually with a long caudate apex. Because of the conspicuous differences in relation to terrestrial specimens, in herbarium determinations, the epipetric form of *Dicranopteris flexuosa* has repeatedly been misidentified for *D. linearis*. It does not have any taxonomic relevance, however, since this difference may be observed in the same individual with a portion terrestrial and other epipetric, the former with the traditional morphology, and the later with the reduced morphology described above.

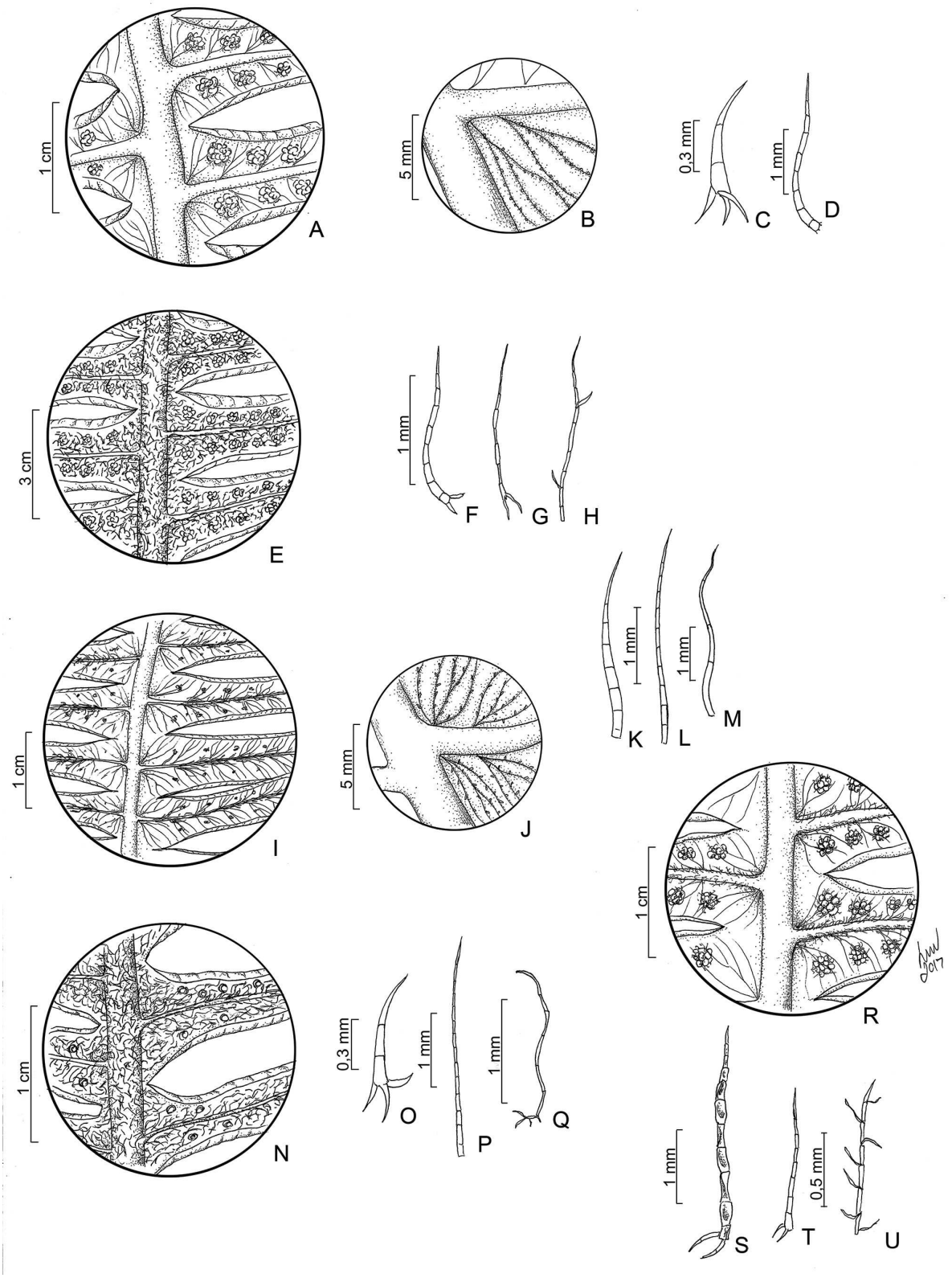

FIGURE 1. **A–D**. *Dicranopteris flexuosa* (*Dittrich 2012*, CESJ). **A**. Detail of the abaxial segment surface. **B**. Detail of the abaxial segment surface showing the globose glandular hairs on the secondary veins. **C**. Rhizome hairs. **D**. Bud hairs. **E–H**. *Dicranopteris nervosa* (*Salino 6470,* BHCB). **E**. Detail of the abaxial segment surface. **F**. Rhizome hairs. **G**. Bud hairs. **H**. Hairs of the abaxial segment surface. **I–M**. *Dicranopteris rufinervis* (*Viveros 26*, BHCB). **I**. Detail of the abaxial segment surface. **J**. Detail of the abaxial segment surface showing bacilliform glandular hairs on the secondary veins. **K**. Rhizome hairs. **L**. Bud hairs. **M**. Hairs of the abaxial midrib surface. **N–Q**. *Dicranopteris seminuda* (*Rodriguez 3406*, COL). **N**. Detail of the abaxial segment surface. **O**. Rhizome hairs. **P**. Bud hairs. **Q**. Hairs of the abaxial segment surface. **R–U**. *Gleichenella pectinata* (*Gonzatti 1913*, CESJ). **R**. Detail of the abaxial segment surface. **S**. Rhizome hairs. **T**. Bud hairs. **U**. Hairs of the abaxial segment surface.

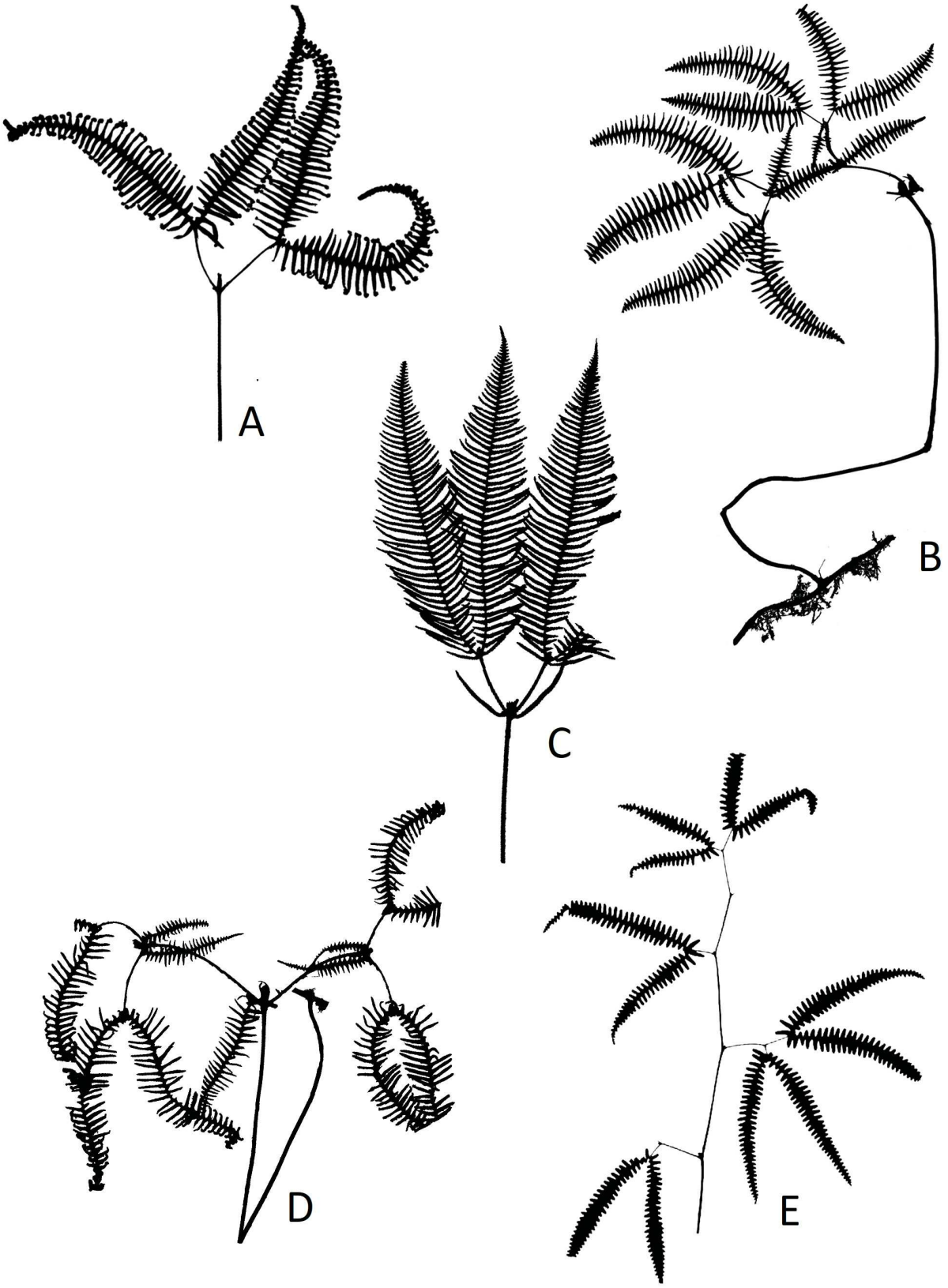

FIGURE 2. Habit. **A**. *Dicranopteris rufinervis*. **B**. *D. flexuosa*. **C**. *D. nervosa*. **D**. *D. seminuda*. **E**. *Gleichenella pectinata*.

Dicranopteris flexuosa is easily recognized by glabrous abaxial surface with only globose glandular hairs on the secondary veins, and presence of pseudostipules and accessory branches opposite to the main branches. It is morphologically related to *Dicranopteris rufinervis,* but this has whitish to red hairs on the midrib of ultimate segments on the abaxial surface, and coriaceous fronds. Glabrescent specimens of *D. rufinervis* may be mistaken for *D. flexuosa*, but have bacilliform glandular hairs on secondary veins rather than the having globose glandular hairs of *D. flexuosa*. In addition, *D. flexuosa* has the segment midribs strictly glabrous, whereas in *D. rufinervis* they bear multicellular hairs.

Several works that deal with the genus in Brazil assign *Dicranopteris linearis* (Burm. f.) Underw. (1907: 250) to the country (*e.g.* Barros & Xavier, 2009; Labiak & Prado 2003, Windisch, 1994). However, all the analyzed specimens previously identified as *D. linearis* are, in fact, *D. flexuosa*, *D. rufinervis*, or even *D. seminuda.* Furthermore, the distinctive characters used by those authors, like immerse veins and round ultimate segments apex, are not consistent due to the great phenotypical plasticity of the *D. flexuosa*. Mickel & Smith (2004) point out the resemblance between *D. flexuosa* and *D. linearis*, and they suggest that these names may be synonyms. In the preparation of the present work, a few specimens of *D. linearis* were examined and compared with Brazilian specimens of *D. flexuosa*. We concluded that it is impossible to distinguish unequivocally one from the other morphologically. Therefore, other studies must be performed to elucidate if there is a single species with Pantropical distribution or two separate species, one with Neotropical and the other with Paleotropical distribution. Phylogenetic studies using molecular data in the fern genus *Rumohra* Raddi (1819: 290) (Bauret *et al.* 2017) demonstrate that, despite of morphologic uniformity of *Rumohra adiantiformis* (Forster 1786: 82) Ching (1970: 34), it actually represents several cryptic species and different phylogenetic lineages. Similar studies should be performed in *Dicranopteris*, aiming to investigate such possibilities and to elucidate part of its evolutionary history.

In the original description**,** Schrader described *Mertensia flexuosa* based on a Brazilian collection of Wied, but unfortunately, he did not mention the herbarium where the type collection was stored. Proctor (1985) cited that the type of *M. flexuosa* is in BR. However, in that herbarium there are five specimens of that species among Wied's collection. Thus, we here proceed with a second step lectotype designation. Wied was in Brazil between 1815 and 1817 (Moraes 2009), but the labels of BR exsiccatae date 1820 and 1829. However, there is a precedent of misunderstandings of Wied's collections dates, and it seems that they actually represent the receiving date by Martius (Moraes 2009, 2011). Therefore, such collections are likely to be the original material of *M. flexuosa.* Among the five exsiccatae, two have Schrader's handwriting, one has Wied's label, and the others have transcript labels. We chose the most complete specimen among the exsiccate with Schrader's signature as lectotype.

Mertensia rigida was described by Kunze in 1834, as cited by the author, the type material was in the Poeppig-Kunze and Lehmann herbaria. Despite of a first locality indication by Kunze ("Peru ad Chibangata Jul.1829"), other material from Brazil is cited as "see and determinate" in the Lehmann collection, but there is no holotype indication. This herbarium was partially incorporated by L. We here choose the specimen cited by Kunze in the protologue as lectotype since the type material storage in LZ was destroyed in WWII. Lellinger (1989) suggests that a possible isotype of *G. rigida* was in L, and here we confirm this information and designate it as the lectotype. Tryon & Stolze (1989) indicate type material in P, but this specimen was not found.

Gleichenia nitida was described based on a Haenke collection from Mexico, without number or herbaria specified. Haenke's duplicates were distribuited to several herbaria, and we found two original specimens, one in PRC and another in PR. It is possible that other duplicates may be found in other herbaria. We chose as lectotype the PRC material, because it is the most complete specimen. Lellinger (1989), whithout seeing the type of *G. nitida*, considered this name as synonymous of *Gleichenella pectinata*, and were followed by Østergaard & Øllgaard (2001). However, we have examined the type material of *G. nitida* and it clearly corresponds to *Dicranopteris flexuosa.*

Mertensia scalpturata was described by Fée, and the original description lacks herbarium information. Besides that, three different collections are cited. We chose as lectotype the most complete specimen with Fée's original label and signature, which is in P.

Selected specimens examined:—BRAZIL**.** Alagoas: Ibateguara, 29 November 1966, *Pontual 305* (PEUFR); São José da Laje, Usina Serra Grande-Mata Maria Maior, 8°59'42.4"S, 36°07'28.9"W, 315 m, 08 February 2001, *Pietrobom 4796* (UFP). Amapá: Porto Grande, 0º35'N, 51º44'W, 20 March 2001, *Pereira 220* (BHCB). Amazonas: Manaus, estrada Manaus-Caracaraí, km 53, 27 September 1974, *Conant 1124* (INPA); Manicoré, Parque Nacional do Campos Amazônicos, estrada do Estanho, 08º30'37"S, 61º36'10"W, 132 m, 01 August 2013, *Almeida et al. 3310* (BHCB); Presidente Figueiredo, Barranco em beira da estrada de Balbina, próximo da chegada à Vila de Balbina, 01°00'S, 59°00'W, 25 September 2006, *Zuquim 194* (INPA). Bahia: Coarci, Serra do Corcovado, próximo a propriedade do Sr. Vitorino, 14º42'12"S, 39º35'27"W, 550 m, 10 December 2014, *Salino et al. 16026* (BHCB); Piatã, Serra da Tromba,

13°04’00.0”S, 41°54’00.0”W, 1339 m, 08 September 1996, *Harley 28390* (HUEFS), Pilão Arcado, Brejo da Serra, Cabeceira da vereda de Brejo da Serra, 10°00’12.0”S, 42°30’15.0”W, 08 November 2009, *Prata 2106* (ASE); Rio de Contas, Chapada Diamantina, Caminho para o Campo do Queiroz, 13°31’34.0”S, 41°54’18.0”W, 23 April 2011, *Guedes 18863* (ALCB); São Sebastião do Passé, Recôncavo, Fazenda Panema, 12°32’48.0”S, 38°22’38.0”W, 25 March 2001, *Loureiro 10* (ALCB). Ceará: Pacoti, perto de Guaramiranga, 4°13’30.0”S, 38°55’23.2”W, 720 m, 06 August 1944, *Cutler 8153* (NY); Baturité, Subida da Serra de Baturite, 04 October 1990, *Nunes s.n.* (EAC). Distrito Federal: Brasília, Jardim Botânico de Brasília, Reserva Olho D’água. Coletado perto da Lagoa dos Sapos, 05 July 1999, *Mascarenhas et al. s.n.* (UB); Riacho Fundo, Fazenda Sucupira Região entre Recanto das Emas e Riacho Fundo, 15°51’52.0”S, 47°52’10.0”W, 1150 m, 17 September 1999, *Rodrigues Júnior 1376* (HEPH). Espírito Santo: Cariacica, Reserva Biológica de Duas Bocas 20°18’13.9”S, 40°29’13.4”W, 425 m, 12 June 2010, *Salino et al. 14917* (BHCB); Santa Teresa, Reserva Biológica Augusto Ruschi, trilha da Cachoeira, 19°55’14.1”S, 40°33’37.3”W, ca. 800 m, 02 December 2008, *Salino et al. 14014* (BHCB); *idem*, 20°17’00.0”S, 40°28’12.0”W, 25 March 1990, *Akahori s.n.* (VIES); Viana, BR 262, 20°23’26.0”S, 40°28’58.0”W, 10 May 1988, *Behar et al. 69* (VIES); Vila Velha, Interlagos, 20°19’47.0”S, 40°17’32.0”W, 21 December 2007, *Souza et al. 78* (VIES). Goiás: Alto Paraíso de Goiás, Portal da Chapada, 14°09’52.8”S, 47°35’58.2”W, 1164 m, 06 October 2006, *Rocha 63* (UB); Caiapônia, Serra do Caiapó, 48 km S of Caiapônia, 25 October 1964, *Prance 59633* (UB); Catalão, Contraforte Central, ca. 26 km NE of Catalão Goiás, 875 m, 23 January 1970, *Irwin et al. 25215* (UB); Ipameri, rod. GO-213, 23 January 1996, *Pietrobom 2629* (MBM); Silvânia, 16°38’11.4”S, 48°38’50.5”W, 892 m, 06 December 2013, *Elias 70* (UFG). Maranhão: Balsas, final da Chapada, 300 m, 24 November 1997, *Oliveira et al. 737* (BHCB); Carolina, 7°07’48.0”S, 47°25’12.0”W, 14 April 1983, *Taylor 1263* (NY). Mato Grosso do Sul: Corumbá, área da Mineração Urucum S.A., 29 June 1999, *Assis et al. 27* (BHCB); Ponta Porã Fazenda Curupi, 02 March 2001, *Carneiro 37* (BHCB); São Gabriel do Oeste, Reserva legal da Fazenda Bonito, 18º57’35’S, 54º18’17.4”, 280 m, 15 June 2002, *Pott & Lima 5600* (BHCB). Mato Grosso: Barra do Garças, Distrito de Vale dos Sonhos, Serra de Vale dos Sonhos, 15°21’12.6”S, 52°13’32.9”W, 515 m, 22 February 2013, *Athayde Filho et al. 4749* (NX); Campo Novo do Parecís, 13°02’00.0”S 57°57’00.0”W, 06 October 1996, *Windisch 8469* (NX); Chapada dos Guimarães, Parque Nacional da Chapada dos Guimarães, Caminho para as cabeceiras do Rio Claro, 15º18’28”S, 55º51’28”W, 318 m, 01 March 2011, *Almeida et al. 2669* (BHCB); Nova Xavantina, Estrada paralela ao bairro Deus e Amor, a cerca de 5 Km da cidade, ao redor de uma nascente chamada Olho d’água, 17 May 2009, *Barbosa 9* (NX); Rondonópolis, Serra da Petrovina, A beira da rodovia, 400 m, 12 November 1989, *Salino 634* (UEC). Minas Gerais: Açucena, margens do rio Corrente Grande, 18°56’58.6”S, 42°31’13.4”W, 470 m, 24 September 2009, *Almeida 2105* (BHCB); Formoso, Parque Nacional do Grande Sertão Veredas, 15º11’30.8”S, 45º53’06.5”W, 760 m, 06 February 2006, *Salino et al. 10758* (CESJ); Lima Duarte, Parque Estadual do Ibitipoca, Prainha, lado direito, subindo, 08 August 1993, *Novelino & Yano 1170* (CESJ); Santa Rita do Jacutinga, Serra da Bandeira, 22°01’20.1”S, 43°59’39.8”W, 1620 m, 14 September 2014, *Dittrich et al. 1916* (CESJ); Santana de Pirapama, Distrito de Fechados, 18°47’10.0”S, 43°52’26.0”W, 1100 m, 06 July 2009, *Almeida 2025* (BHCB). Pará: Itaituba, Margens do rio Tapajós, a montante da sede do município de Itaituba, 4°22’54.0”S, 56°08’09.0”W, 25 m, 16 July 2016, *Almeida 4338* (HSTM); Oriximiñã, BR 163, estrada que dá acesso a perimetral Norte, a 14 Km de Cachoeira Porteira, 09 August 1986, *Ferreira 7633* (INPA); Parauapebas, Serra Norte, 06°00’S, 50°18’W, 700 m, 24 May 1969, *Cavalcante 2155* (MG); Rurópolis, Floresta Nacional do Tapajós, trilha que leva a Rio, 5 km após a comunidade de Piçarreiro (sentido Rurópolis), na altura do km 193 da BR-163 (Rodovia Cuiabá-Santarém), 3°56’17.0”S, 54°52’07.0”W, 116 m, 02 April 2016, *Almeida 4280* (HSTM). Paraná: Adrianópolis, Parque Estadual das Lauráceas, 24°40’48.0”S, 49°00’00.0”W, 840 m, 11 January 2000, *Dittrich 703* (NY); Curitiba, Parque Barigui, 26 March 1997, *Kozera 546* (UPCB); Jaguariaíva, Parque Estadual do Cerrado, 24°10’S, 49°39’W, 800 m, 12 April 1994, *Labiak 189* (UPCB); Ponta Grossa, rio Tibaji, 21 December 1971, *Krieger s.n.* (CESJ 11342); São José dos Pinhais, Usina Hidrelétrica de Guaricana, 11 July 1988, *Straube 83* (MBM). Paraíba: Areia, Saburá, Margem da estrada para Alagoa Grande, 25 December 1986, *Felix 478* (JPB); Mamanguape, Reserva Biológica Guaribas, Capim Azul. SEMA I, 6°44’30.7”S 35°08’31.4”W,181 m, 15 February 1989, *Santana 223* (JPB); Rio Tinto, Mata do Rio Vermelho, Fragmento Pb 113, 6°45’56.0”S 35°07’38.0”W, 94m, 29 March 2012, *Gadelha Neto 3241* (JPB). Pernambuco: Água Preta, Engenho Sacramento, 8°41’08.2”S, 35°24’51.6”W, 229 m, 27 January 2000, *Eugênio 453* (UFP). Rio de Janeiro: Itatiaia, 800 m, July 1933, *Brade 12618* (RB); Nova Friburgo, Morro Alto do Teleférico, 23 July 1996, *Pietrobom et al. 3372* (MBM); Petrópolis, subindo a Serra, próximo a rodoviária, 24 December 1992, *Oliveira s.n.* (CESJ); Rio de Janeiro, Parque Nacional da Tijuca, trilha para o Pico da Tijuca, 22º56’33”S, 43º17’11”W, 07 March 2013, *Mynssen 1385* (RB); Santa Maria Madalena, Mata da Derrubadinha, 24 December 1977, *Carauta 2763* (RB). Rio Grande do Norte: Nísia Floresta, Flona—IBAMA, 28 May 2003, *Sanjuan 15* (MOSS). Rondônia: Colorado do Oeste, Linha 1, Km 32, rio Escondido, 20 January 2005, *Neiva 81* (HBRA); Machadinho d’Oeste, Distrito de Tabajara, margens do

Rio Machado, 08°55’27.0”S, 62°07’28.0”W, 84m, 02 June 2015, *Labiak et al. 6133* (UPCB). Roraima: Amajari, estrada Boa Vista-Venezuela, Serra Pacaraima, 18 Km South of Santa Helena, 28 November 1977, *Steward 218* (INPA). Rio Grande do Sul: Balneário Pinhal, horto florestal, 10 m, 13 October 2012, *Gonzatti 618* (FURB); Pelotas, 08 June 1959, *Sacco 1324* (UFRPE); São Francisco de Paula, 4 km de S. Francisco vindo de Taquara, 800 m, 10 March 1993, *Windisch 8707* (NY); Torres, arredores do aeroporto, 15 April 2014, *Gonzatti 1150* (FURB). Santa Catarina: Blumenau, Serra do Itajaí, Morro do Sapo, 27°03’39.7”S, 49°05’40.3”W, 312m, 18 December 2012, *Funez 1144* (FURB); Indaial, Parque Estadual da Serra do Itajaí, estrada para sub-sede, 27°01’53.0”S, 49°09’55.2”W, 320 m, 22 April 2016, *Funez 4685* (FURB); Rodeio, morro da Abissínia, 26º86’24”S, 49º36’22”W, 538 m, 18 March 2015, *Funez 4219* (FURB). São Paulo: Bananal, Estação ecológica de Bananal, trilha até a sede, March 2001, *Salino 6372* (BHCB); Brotas, Fazenda Rochedo, 06 May 1992, *Lombardi s.n.* (BHCB 20830); Caraguatatuba, Parque Estadual da Serra do Mar, estrada intermediária km 30, 23º41’32”S, 45º37’06”W, 600 m, 03 May 2001, *Salino et al. 5299* (CESJ); São Paulo, March 1943, *Krieger s.n.* (CESJ 910B); Ubatuba, Parque Nacional da Serra do Mar, núcleo Pinciguaba, trilha do Picadão da Barra, 23º21’43.8”S, 44º50’02.3”W, 3 May 2001, *Salino et al. 6710* (CESJ). Sergipe: Areia Branca, Serra de Itabaiana, Riacho Coqueiro, 10°44’52.0”S, 37°20’25.0”W, ca. 206 m, 11 July 2014, *Santiago 1317* (ASE). Tocantins: Almas, região norte, Fazenda Minnehaha, arredores da antiga sede, ca. 70 km a nordeste da cidade de Almas, 11°08’18.0”S 47°07’20.0”W, 415 m, without date, *Walter 5309* (CEN).

1.2. *Dicranopteris nervosa* (Kaulf.) Maxon (1922: 49). Figs. 1I–H, 2C, 3B.

Mertensia nervosa Kaulfuss (1824: 37). *Gleichenia nervosa* (Kaulf.) Sprengel (1827: 25). *Dicranopteris nervosa* (Kaulf.) Ching (1940: 275). *nom. ileg.* Type:—BRAZIL. Santa Catarina: *Chamisso s.n*. (lectotype **designated here** LE [LE00000262] photo!).

Mertensia beyrichiana Sturm (1859: 238). Type:—BRAZIL. Rio de Janeiro. *Beyrich s.n.* (holotype B [B 20 0123225] photo!).

Mertensia latissima Fée (1869: 203). Type:—BRAZIL. Rio de Janeiro: Serra do Couto. *Glaziou 3174*. (lectotype **designated here** P [P00633253] photo!, isolectotype P [P00633252] photo!). Remaining syntypes:—BRAZIL. Rio de Janeiro: Serra do Couto. *Glaziou 3173* (P [P00633252] photo!, BR [BR0000006972196], [BR0000006971830] photos!). Serra dos Órgãos. *Glaziou 1751* (BR [BR0000006971809], [BR0000006972134], P [P00633247] photos!). *Glaziou 2825* (P [P00633248], [P00633249] photos!, BR [BR0000005794102], [BR0000005793488] photos!). *Glaziou 2826* (P [P00633251], [P00633250] photos!, BR [BR0000006971861] photo!).

Plants terrestrial. **Rhizomes** 1.1–4 mm thick, with reddish-brown rigid hairs, glabrescent. F**ronds** erect, 1–(2)-forked, ultimate branches 6.5–62 cm × 2.8–17 cm, ovate to elliptic, apex caudate, base asymmetric, inner side with reduced segments, external side with conform segments, segments linear 2–9.5 cm × 0.15–0.32 cm, margins revolute, abaxial surface green or pruinose, lanose, with reddish-brown to whitish multicellular hairs. **Buds** covered by multicellular reddish, pseudoestipule present, accessory branches usually absent, if present entire to lobate in the base. **Veins** 3–4-forked. **Sori** medial, without paraphyses.

Distribution and habitat:—Brazil (Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo), Bolivia, and Peru. In Brazil, this species occurs along roads and trails, and at forest edges in the Atlantic Forest Domain at 600–1850 m.

Notes:—*Dicranopteris nervosa* is recognized by multicellular hairs on the abaxial surface, and erect fronds usually 1-forked, with accessory branches simple to lobate or absent.

In the original description of *Mertensia nervosa*, Kaulfuss (1824) cited a collection of Chamisso without number and herbarium, and there is no information about the number of exsiccatae of this Chamisso’s collection. The Kaulfuss herbarium was incorporated by LZ, but unfortunately it was destroyed during WW-II. It seems that there was at least one type collection of *M. nervosa* in LZ, since the Kaulfuss herbarium was there, and the LE specimen seems to be a duplicate. Here we designate the material in LE as lectotype, since apparently it is the last preserved type material of *M. nervosa*.

In the original description of *Mertensia latissima*, Fée cites five collections of Glaziou as types, but did not indicate the herbaria. We chose among the type material in P the most complete specimen with original Fée label.

Selected specimens examined:—BRAZIL. Minas Gerais: Camanducaia, Patrimônio São Domingos, 29 March 2001, *Salino et al. 6399* (BHCB); Baependi, Parque Estadual da Serra do Papagaio, 23 November 2012, *Santiago 194* (CESJ); Delfim Moreira, Serra da Mantiqueira, Fazenda Boa Esperança, trilha dos Romeiros, 22°35’17.8”S, 45°18’51.5”W, 1558 m, 19 March 2011, *Fernandes 890* (BHCB); Passa Quatro, Sertões Matins, 1400 m, 10 May 1948, *Brade 19052* (RB). Paraná: Quatro Barras, Serra da Baitaca, Morro Anhangava, 13 March 1997, *Cordeiro & Cruz 1404* (BHCB); Passaúna, estrada a campo largo, divisa com Curitiba, 18 January 1951, *Tessemann 403* (RB); Ponta Grossa, 26 July 1981, *Krieger s.n.* (BHCB 4219). Rio de Janeiro: Itatiaia, Parque Nacional do Itatiaia, Trilha entre os abrigos

Macieira e Macena, c.a.1850 m, 10 November 1993, *Sylvestre et al. 924* (RB); Paraty, Pico do Cuscuzeiro, 1280 m, 21 December 1995, *Oliveira 6* (RB), Rio de Janeiro, Pico da Tijuca, 600 m, 17 July 1941, *Brade 16854* (RB). Rio Grande do Sul: Caxias do Sul, Criuva, 750 m, 18 September 1988, *Wasum 4429* (INPA); São Francisco de Paula, Lago São Bernardo, 830 m, 08 September 2000, *Wasum 653* (RON). Santa Catarina: Blumenau, Parque Nacional da Serra do Itajaí, 27°03'24.0"S, 49°05'16.0"W, 27 August 2007, *Gasper 622* (FURB); Botuverá, Reserva Biológica Canela Preta, 27º16'12"S, 49º08'24"W, 639 m, 30 March 210, *Stival-Santos et al. 2296* (BHCB); São Bento do Sul, Serra Alta, ponte do Rio Banhados, 26°16'32.0"S, 49°23'01.0"W, 31 December 2013, *Schwirkowski 199* (FURB); Urubici, Parque nacional de São Joaquim, 28°09'10.1"S, 48°37'54.8"W, 7 January 2012, *Matos 2001* (NYBG); Urupema, Fazenda Farofa, trilha do meio do campo drenado, em direção ao campo de altitude, 27º55'17,7"S, 49º52'5,3, 1535 m, 04 April 2007, *Salino et al. 11966* (BHCB). São Paulo: Bananal, Estação Ecológica do Bananal, nas trilhas da Estação, 1350 m, 09 March 2001, *Salino 6324* (BHCB); Campos do Jordão, *s.d.*, *Dittrich 1103* (BHCB); Caraguatatuba, *s.d.*, *Salino et al. 5405* (BHCB); Cunha, Rodovia SP 171, Pedra da Marcela, Torre de Transmissão de Furnas, 23°10'00.0"S, 44°51'00.0"W, 1700 m, 13 July 1997, *Nonato 385* (HUEFS); São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, 06 March 2001, *Salino et al. 6225* (BHCB).

1.3. *Dicranopteris rufinervis* (Mart.) Ching (1940: 275). Figs. 1I–M, 2C, 3B. 12C–D.

Mertensia rufinervis Martius (1834: 111). *Sticherus rufinervis* (Mart.) Nakai (1950: 28). Type:—BRAZIL. Minas Gerais. *Freireiss s.n.* (holotype BR [BR0000006972165] photo!).

Mertensia spissa Fée (1869: 200). Type:—BRAZIL. Rio de Janeiro. Nova Friburgo. Macaé de Cima. *Glaziou 2468* (lectotype **designated here**, P [P00633241] photo!, isolectotypes P [P00633243], [P00623242] photos!).

Gleichenia klotzschii Hook. (1844: 13). *Dicranopteris klotzschii* (Hook.) Ching (1940: 275). *Dicranopteris klotzschii* (Hook.) Nakai (1950:61). Type:—BRAZIL. *Sellow s.n.* (holotype K [K 000589350] !).

Plants terrestrial or epipetric. R**hizomes** 1.7–4.40 mm thick, with redish-brown rigid simple or branched hairs, glabrescent to tomentose. **Fronds** scrambling, 1–4–(6)-forked, ultimate branches 13.5–32.5 × 3–6.5 cm, ovate, apex pinnatifid, base asymmetric, inner side with reduced segments, external side with conform segments, ultimate segments linear 2.8–15 × 2–2.5 cm, margins revolute, abaxial surface green or pruinose, pubescent, rare glabrescent, with reddish, rare whitish, multicellular hairs, on the segments midrib, bacilliform glandular hairs on the midrib, secondary veins and laminar tissue. **Buds** covered by reddish multicellular hairs, pseudostipule present, accessory branches simple to pinnatisect. **Veins** 3–4-forked. **Sori** medial, with paraphyses.

Distribution and habitat:—Endemic of Brazil (Bahia, Minas Gerais, Rio de Janeiro, São Paulo). This species has a distribution mainly in the Cerrado domain, with few collections from the Atlantic Forest domain. It occurs mainly at forest edges at 800–1600 m.

Notes:—*Dicranopteris rufinervis* is recognized by the abaxial surface of the ultimate segments with multicellular reddish hairs, and bacilliform glandular hairs on the midrib, secondary veins, and laminar tissue. It has a preferential distribution in Cerrado areas, specially in Campos Rupestres formation.

In the original description of *Mertensia spissa*, Fée cited a collection of Glaziou as type. We found three correspondent specimens at P and chose the most complete one with original Fée label as lectotype.

Selected specimens examined:—Bahia: Lençois, 12°34'00.0"S, 41°23'00.0"W, 950 m, 03 April 1980, *Noblick 1766* (HUEFS); Mucugê-Igatu, Chapada da Diamantina, 12º53'47"S, 41º18'42"W, 764 m, 29 January 2017, *Salino & Moura 16256* (BHCB); Serra do Sincorá, Rio Cumbuca ca. 3 km S. of Mucugê, 850 m, 13º01'S, 41º21'W, 04 February 1974, *Harley et al. 15956* (K). Minas Gerais: Catas altas, RPPN Santuário do Caraça, Caminho para Bocaina, 20º 12' 48.2"S, 43º46'84.2"W, 1364 m 27 August 2008, *Viveros 26* (BHCB); Conceição do Mato Dentro, Parque Natural Municipal do Ribeirão do Campo, 19º06'12.3"S, 43º34'28.3"W, 13 September 2002, *Mota et al. 1780* (BHCB); Itamarandiba, Parque Estadual da Serra Negra, 18º00'55.5"S, 42º45'14.8"W, 1600 m 04 July 2006, *Salino et al. 11278*; Santana de Pirapama, margens do rio Paraúna, 18º38'17,5"S, 43º54'52.1"W, 882 m, 10 June 2007, *Almeida et al. 1089* (BHCB); Santo Antônio do Itambé, Parque Estadual do Pico do Itambé, 18º24'05.9"S 43º18'57.3"W, 07 October 2006, *Almeida et al. 596* (BHCB). Rio de Janeiro: Alto de Macaé, without date, *Glaziou 4456* (RB); Rio de Janeiro, Pico da Tijuca, 14 June 1933, *Brade 12555* (RB); Santa Maria Madalena, Serra da Forquilha, 4 February 1935, *Brade 14354* (RB). São Paulo: Ubatuba, Parque Estadual da Serra do Mar, Núcleo de Picinguaba, Trilha do Pico do Cuscuzeiro, próximo ao marco da divisa entre Rio de Janeiro e São Paulo, 23°21'33.7"S, 44°50'53.0"W, 07 August 2001, *Salino et al. 7317* (BHCB).

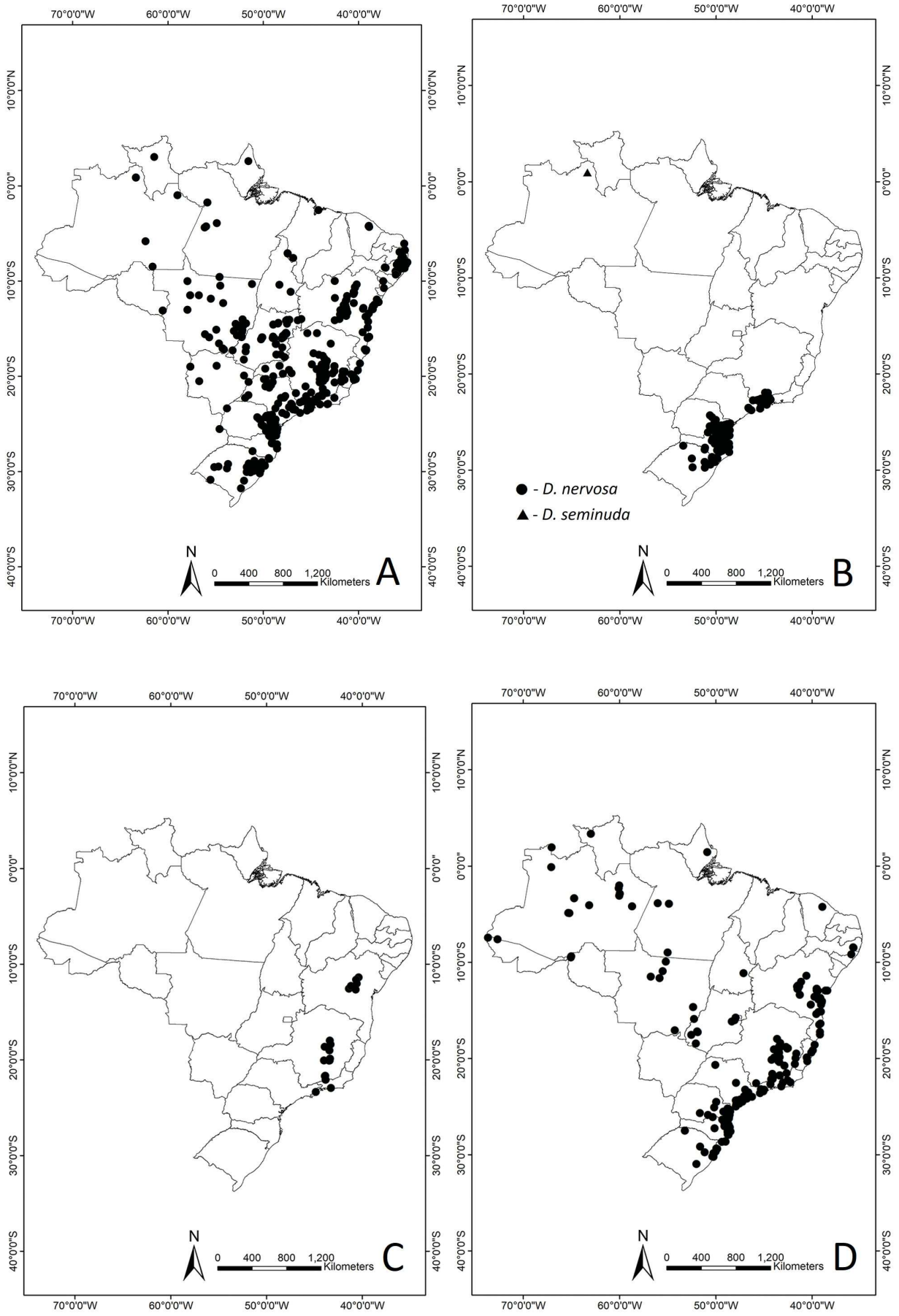

FIGURE 3. Distribution of five taxa of Gleicheniaceae in Brazil. **A.** *Dicranopteris flexuosa*. **B.** *D. nervosa* and *D. seminuda*. **C.** *D. rufinervis*. **D.** *Gleichenella pectinata*.

1.4. *Dicranopteris seminuda* (Klotzsch) Maxon (1933: 140). Figs. 1N–Q, 2D, 3B.

Mertensia seminuda Klotzsch (1844: 538). Type:—VENEZUELA. Caracas. *Moritz 91 pro parte* (lectotype **designated here**, B [B 20 013 9889] photo!).

Mertensia schomburgkiana Sturm (1859: 233). *Dicranopteris schomburgkiana* (J.W.Sturm) Morton (1951: 16). Type:—GUYANA. *Schomburgk 1671* (lectotype **designated here**, B [B 20 013 9896], photo!, isolectotype B [B 20 013 9897] photo!).

Plants terrestrial. **Rhizomes** 2.45–3.85 mm thick, with redish-brown rigid simple or branched hairs, glabrescent. **Fronds** scrambling, 2–4-forked, ultimate branches 14.5–33.5 × 3.8–7.5 cm, lanceolate, occasionally eliptic, apex pinnatifid, base asymmetric, inner side with reduced segments, external side with conform segments, ultimate segments linear 2.7–4 × 0.23–0.4 cm, margins slightly to strongly revolute, abaxial surface green or pruinose, lanose, with multicellular reddish hairs on midrib and secondary veins, without glandular hairs. **Buds** covered by multicellular reddish hairs, pseudoestipule present, accessory branches pinnatisect. **Veins** 3–4-forked. **Sori** medial, with hyaline paraphyses.

Distribution and habitat:—Brazil (Amazonas), Colombia, and Venezuela. In Brazil it occurs only in the high areas (1150–1250 m) of the Serra do Aracá near the border with Venezuela.

Notes:—*Dicranopteris seminuda* is morphologically related to *Dicranopteris rufinervis* but differs form it by the absence of bacilliform glandular hairs on segments secondary veins, slightly patent to retroflex segments, and multicellular hairs on segment midribs, secondary veins, and laminar tissue and blade chartaceous.

In the original description of *Mertensia schomburgkiana*, Sturm cited *Schomburgk 1671* as type material in B, but there are two exsiccatae of this collection. On them, there are recent labels indicating "A" and "B". However, although both seems to be part of a single specimen, the original labels are not clear about this and thus must be considered as duplicates. For that reason, we chose the most complete specimen as lectotype.

Selected specimens examined:—BRAZIL. Amazonas: Barcelos, Parque Estadual da Serra do Aracá, contrafortes do Pico da Aparecida, 00º56'20"N 63º20'53"W, 30 October 2011, *Martinelli et al. 17233* (RB); Platô da Serra do Aracá, parte SE da Serra Norte, 1150–1250 m, 00º51'N 63º22'W, 15 February 1984, *Tavares & Silva 52* (K).—COLOMBIA. Antioquia: Belmiria, Vereda Montanita, 6º37'18.7"N 75º40'00.3"W, 2885 m, 17 June 2002, Rodriguez 3406 (COL); Medellin, córrego, Santa Helena, Vda Mazo, caminho que conduce a la estacion biodiversidade, 06º15'45.5"N 75º30'49.5"W, 2450 m, 19 January 2001, *Rodriguez 3245* (COL).

2. *Gleichenella* Ching (1940: 276).

Gleichenia Sm. Sect. *Acropterygium* Diels (1900: 353).

Dicranopteris Bernh. Sect. *Acropterygium* (Diels) Underwood (1907: 251).

Dicranopteris Bernh. Subg. *Acropterygium* (Diels) Holttum (1957: 261).

Type:—*Gleichenella pectinata* (Willd.) Ching. (= *Mertensia pectinata* Wild.)

Plants terrestrial. **Rhizomes** long-creeping, branched, solenostelic, with brown multicellular hairs, pubescent. **Fronds** erect or scrambling, pseudodichotomically branched, with anisotomic branches, abaxial surface with reddish branched, usually stellate hairs, secondary veins without glandular hairs, adaxial surface glabrous, ultimate segments linear. **Buds** covered with hairs, with pseudostipule, accessory branches absent. **Veins** 2–3(–4)-forked. **Sori** round, about (6–)8–15(–25) sporangia per sori, without paraphyses. **Spores** ellipsoid, monolete, rugose surface; x= 43.

A monotypic genus with neotropical distribution.

2.1. *Gleichenella pectinata* (Willd.) Ching (1940: 276). Figs. 1R–U, 2E, 3D. 12E.

Mertensia pectinata Willdenow (1804: 168). *Gleichenia pectinata* (Willd.) Presl (1825: 71). *Dicranopteris pectinata* (Willd.) Underwood (1907: 260). *Acropterigyum pectinatum* (Willd.) Nakai (1950: 6). Type:—VENEZUELA. Distrito Federal. Caracas, *Bredemeyer s.n.* (holotype B [B-W 19465] photo!).

Mertensia glaucescens Humb. & Bonpl. ex Willdenow (1810: 72). *Gleichenia glaucescens* (Humb. & Bonpl. ex Willd.) Kunth (1815: 29). Type:—VENEZUELA. Santa Cruz, *Humboldt & Bonpland s.n.* (lectotype **designated here**, B [B-W 19464] photo!, isolectotype HAL [HAL0137760] photo!).

Mertensia glaucescens var. *mexicana* Fée (1866: 121). Type:—MEXICO. Veracruz, "Sabannes de Mirador," 1840, *Galeotti 6402 pro parte* (lectotype **designated here**, P [P00633258] photo!, isolectype BR [BR0000006869854] photos!).

Mertensia canescens Kaulfuss (1824: 38). Type:—BRAZIL. (holotype E [E00385974] photo!).

Mertensia elata Desvaux (1827: 201). Type:—JAMAICA. (holotype P [P00633259] photo!).

Mertensia brasiliana Desvaux (1811: 329). Type:—BRAZIL. (holotype P [P00633246] !).

Plants terrestrial. **Rhizomes** 3.5–4.3 mm thick, with reddish-brown hairs, glabrescent. **Fronds** scrambling, 1–4-forked, ultimate branches 10.2–22.5 × 1.8–2.8 cm, linear-lanceolate, apex pinnatifid, base attenuate, ultimate segments linear 1–1.5 × 0.35–0.45 cm, margins planate to slightly revolute, abaxial surface green or pruinose, with reddish stellate. **Buds** covered with reddish hairs, pseudoestipule present, at least on the first branches, accessory branches absent. **Veins** 1–2-forked. **Sori** inframedial, without paraphyses.

Distribution and habitat:—Brazil (Acre, Alagoas, Amazonas, Amapá, Bahia, Ceará, Distrito Federal, Espírito Santo, Goiás, Minas Gerais, Mato Grosso, Pará, Pernambuco, Paraná, Rio de Janeiro, Rondônia, Roraima, Rio Grande do Sul, Santa Catarina, São Paulo and Tocantins), Antilles, Bolivia, Colombia, Costa Rica, El Salvador, Ecuador, Guatemala, Guayana, Honduras, Mexico, Nicaragua, Panama, Peru, Suriname, Trinidad y Tobago and Venezuela. In Brazil this species occurs along roads and trails, and forest edges in all phytogeographic domains at 100–1800 m.

Notes:—*Gleichenella pectinata* is a very distinct species among the Gleicheniaceae. It is readily recognized by the anisotomic branches, absence of accessory branches, and the branched hairs on the abaxial surfaces of the segments.

In the original description of *Mertensia glaucescens*, Willdenow cited as type material a collection of Humboldt & Bonpland without number, and despite of Willdenow's initial at the end of type citation, it seems that this may not be a reference to his herbarium, because his initial is at the end of every paragraph. We found two specimens labelled as *M. glaucescens* at B and HAL with original Willdenow labels, both corresponding to *G. pectinate*. The label of the B specimen has the collection number of Humboldt and Bonpland "470", but this may be a mistake, because in Willdenow's herbarium there is another Humboldt and Bonpland exsiccate assigned to this number which corresponds to *Sticherus bifidus*. The specimen at HAL does not have a collection number, which fits with the protologue. Thus, we chose the HAL specimen as lectotype, due to the uncertain numeration of the B specimen. Furthermore, the HAL specimen is in better condition.

In the original description of *Mertensia glaucescens* var. *mexicana,* Fée cited a collection of Galeotti number 6402 from Mexico. We found three specimens under this number, two in P and one in BR. A specimen of P is chosen as lectotype, because the label information matches the protologue and it is the most complete specimen of Galeotti's original material. The other specimen at P is not a type of this species, since it is *D. flexuosa*. In addition, the label of that sheet is different from the others. There is a note "bis" in front of the number of collection, and the date is 1842, while in the others, the date is 1840. It may be a mixed collection or a mistaken attribution to the original material of Galeotti.

Selected specimens examined:—BRAZIL. Acre: Cruzeiro do Sul, Serra da Moa, 19 April 1971, *Prance 12119* (INPA). Alagoas: Murici, Estação Ecológica de Murici, 9°11'05.0"S, 35°55'12.0"W, 350 m, 06 May 2009, *Pereira, A.F.N. 1081* (UFP). Amapá: Tartarugalzinho, Cachoeira duas bocas, 01°25'37.9"N, 50°52'49.6"W, 17 November 2005, *Pietrobom 6237* (HBRA). Amazonas: Cucuí, Alto Rio Negro, margem esquerda do rio, 04 May 1975, *Cavalcante 3119* (INPA); Manaus, Reserva Florestal Adolfo Ducke, Estrada de acesso entre alojamento e estação meteorológica, 02°53'S, 59°58'W, 14 May 1996, *Costa 516* (INPA); Presidente Figueiredo, Estrada de Balbina, margem da estrada de acesso a Balbina, 26 January 1998, *Freitas 610* (INPA); São Gabriel da Cachoeira, Rio Negro, São Gabriel da Cachoeira, margem do Rio Negro, Serra, 12 November 1997, *Freitas de 588* (INPA); Tefé, 27 July 1972, *Krieger s.n.* (CESJ 12345). Bahia: Ibicoara, Chapada Diamantina, Fazenda Ribeirão da Serra, margem do Rio Sincor, ca. de 2 Km a nordeste da sede, 13°24'S, 41°17'W, 900 m, 09 March 1999, *Passos Júnior et al. 234* (ALCB); Picadão, área da Aracruz Celulose, 23 August 1993, *Guedes 2966* (ALCB); Prado, próximo à mata da Angélica, estrada Prado-Cumuruxatiba, 17°16'S, 39°11'W, 19 October 1997, *Fonseca 936* (ALCB); Santa Cruz Cabrália, 16°23'S 39°08'W, 16 May 1994, *Guedes 3106* (ALCB); Santa Terezinha, Serra da Jibóia, próximo a torre da Telebahia, 21 October 1995, *Melo 1339* (HUEFS). Ceará: Guaramiranga, Sítio Mucunã, 07 February 1991, *Paula-Zárate 14* (EAC). Distrito Federal: Brasília, Parque Municipal do Gama, 16°01'48"S, 48°03'00"W, 1150 m, 10 November 1965, *Irwin 10135* (NY). Espírito Santo: Cariacica, Reserva Biológica de Duas Bocas, Floresta Ombrófila Densa, 20°18'13.9"S, 40°29'13.4"W, 425 m, 12 June 2010, *Salino 14902* (BHCB); Castelo, Parque Estadual Forno Grande, 1130 m, 25 June 2008, *Salino 13543* (BHCB); Divino de São Lourenço, Parque Nacional do Caparaó, RPPN Águas do Caparaó-Cachoeira Alta, ao longo do córrego do Veadinho, 20°35'49.2"S, 41°46'52.5"W, 1000 m, *Salino 13833* (BHCB); Linhares, 19°09'07.2"S,

39°55’47.9”W, 60 m, 09 February 2007, *Almeida 674* (BHCB), Santa Teresa, Reserva Biológica Augusto Ruschi, Trilha da Cachoeira, 19°55’14.1”S 40°33’37.3”W, 800 m, 02 December 2008, *Salino 14013* (BHCB). Mato Grosso: Itiquira, Limite com Pedra Preta, estrada do Mineirinho, a ca. de 16 Km de Itiquira, Ribeirão Ponte de Pedra, junto a cachoeira, 17°04’48.0”S, 54°15’00.0”W, 600 m, 17 June 1991, *Windisch, 6269* (NY); Nova Xavantina, Rio das Mortes próximo a ilha 23, 07 September 2005, *Machado 14* (HBRA); Novo Mundo, Parque Estadual do Cristalino, beira do rio Cristalino, 224 m, 01 June 2007, *Henicka 65* (INPA). Minas Gerais: Açucena, Margens do rio Corrente Grande, 18°58’52.9”S, 42°33’48.8”W, 529 m, 24 November 2009, *Almeida 2107* (BHCB); Alvorada de Minas, 18°47’02.4”S, 43°25’12.5”W, 17 November 2007, *Almeida 1274* (BHCB); Catas Altas, Parque Natural do Caraça. Gruta da Bocaína, 20°07’35.7”S, 43°27’48.0”W, 28 October 2009, *Salino 8080* (BHCB); Juiz de Fora, Campus UFJF, Instituto de Ciências Biológicas, 21°46’31.8”S, 43°22’16.4”W, 875 m, 05 September 2014, *Lima 62* (CESJ); Passa-Vinte, 22°09’54.0”S, 44°14’22.3”W, 806 m, 14 February 2009, *Almeida. 1799* (BHCB); Pará: Marabá, Floresta Nacional de Carajás, estrada para a Serra, 21 February 2010, *Almeida 2276* (BHCB); Rurópolis, Floresta Nacional do Tapajós, trilha que leva a Ri, na altura do km 193 da BR-163 (Rodovia Cuiabá-Santarém), 03°56’17.0”S 54°52’06.9”W, 116 m, 02 April 2016, *Almeida 4278* (HSTM). Paraná: Antonina, Rio Catatu, 09 December 1998, *Cervi 6581* (UPCB); Caiobá, Serra da Prata, 20 June 1961, *Braga, R. 1638* (UPCB); Guaratuba, 07 December 1971, *Krieger s.n.* (BHCB 123053); Paranaguá, Ilha do Mel, Estação Ecológica, Morro da Baleia, c.a. 120 m, 25 September 2004, *Schwartsburd 342* (UPCB); Ponta Grossa, s.d., 21 December 1971, *Krieger s.n.* (CESJ 113412A). Pernambuco: Bonito, Mata da Colônia, 19 June 1998, *Barros 8* (PEUFR); Lagoa do Gatos, RPPN Pedra D’Antas, 13 July 2012, *Farias 88* (UFP). Rio de Janeiro: Guapimirim, Estação Ecológica Estadual de Paraíso, estrada entre o CPRJ e a represa, 20 November 1991, *Sylvestre. 647* (RB); Cachoeira de Macacu, 22º27’52”S, 42º45’48”W, 38 m, *Baber 398* (RB), Silva Jardim, Reserva Biológica de Poço das Antas. Trilha Rodolfo Norte, primeira trilha à esquerda após a porteira, 05 March 1998, *Sylvestre 1338* (RB); Rio de Janeiro, Parque Nacional da Tijuca; Estrada da Vista Chinesa. Parque Nacional da Tijuca, 22º58’23”S, 43º15’04”W, 4 m, 25 April 2013, *Bicalho 16* (RB); Mangaratiba, RPPN Rio das Pedras. Trilha do Mirante, 26 August 1998, *Santos 1066* (RB). Rio Grande do Sul: Cristal, Museu Bento Gonçalves, 30°59’18.0”S, 52°00’45.0”W, 39 m, 23 May 2014, *Gonzatti 1239* (FURB); Palmares do Sul**,** Horto Municipal, 30°11’33.0”S, 50°20’54.0”W, 10 m, 27 May 2012, *Gonzatti 505* (FURB). Rondônia: Porto Velho, Parque Nacional Mapinguari, aprox. 40 km à margem esquerda do Rio Madeira, 09°24’05.5”S, 65°01’08.8”W, 134 m, 29 July 2014, *Giacomin 2178* (INPA). Roraima: Amajari, Ilha de Maracá, 3°20’00.0”N, 62°58’00.0”W, 24 May 1987, *Milliken 277* (INPA). Santa Catarina: Blumenau, Campus FURB, 26°54’19.8”S, 49°04’44.9”W, 02 December 2006, *Luz da s.n.* (FURB 5710); Florianópolis, Cachoeira do Sertão, Trindade, Ilha de Santa Catarina, 60 m, 09 September 1983, *Falkenberg & Souza. 744* (FURB); Jaraguá do Sul, Garibaldi, 26°33’08.0”S, 49°10’33.4”W, 180 m, 26 January 2010, *Dreveck & Carneiro 1606* (FURB); Paulo Lopes, Sertão do Campo/Parque Estadual da Serra do Tabuleiro, 27°53’36”S, 48°45’21”W, 295 m, 10 June 2010, *Verdi et al. 4933* (FURB); Santo Amaro da Imperatriz, Cova da Onça, 27°37’44”S, 48°46’51”W, 236 m, 31 May 2010, *Stival-Santos 2894* (FURB). São Paulo: Caraguatatuba, *s.d.*, *Salino 5295* (BHCB); Iguape, Estação Ecológica Juréia-Itatins, Serra da Juréia, trilha para o campo do alto do morro próx. ao alojamento, 16 July 1990, *Prado et al. 356* (UPCB); Jundiaí, Serra do Japi, na estrada para a torre da TV Cultura, 23°09’00”S, 46°34’12”W, 1120 m, 16 October 2009, *Hirai et al. 659* (UEC); São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virginia, 950 m, 04 March 2001, *Salino 6141* (BHCB); Sete Barras, Parque Estadual Carlos Botello, Núcleo de Sete Barras, Estrada Sete Barras- São Miguel Arcanjo, 28 November 2002, *Dittrich 1244* (BHCB). Tocantins: Almas, Fazenda Minnehaha-Arredores da Antiga Sede. ca. 70 km a nordeste da cidade de Almas, 11°08’18.0”S 47°07’20.0”W, 415m, 12 August 2004, *Walter 5309* (UFP).

3. *Sticherus* Presl (1836: 51)

Lectotype (designated by Christensen 1906: 54): *Sticherus laevigatus* (Willd.) Presl (1836: 52) [≡ *Mertensia laevigata* Willdenow (1810: 75)] = *Sticherus truncatus* (Willd.) Nakai (1950: 20).

=*Gleichenia* subgen. *Mertensia* Hooker (1844: 4) *not Mertensia* Willdenow (1804: 165), *nor* Roth (1797: 34). Type:—*Gleichenia truncata* (Willd.) Spreng (1827:25). (≡ *Mertensia truncata* Willd. (1804:169).

=*Gleichenia* subgen. *Mertensia* sect. *Holopterygium* Diels (1900: 353). *Dicranopteris* sect. *Holopterygium* (Diels) Underwood (1907: 251). Type:—*Gleichenia pubescens* (Willd.) Kunth (1815: 29) [≡ *Mertensia pubescens* Willd. (1810: 73)].

Plants terrestrial or epipetric. **Rhizomes** long-creeping, branched, protostelic, with brown, reddish-brown or golden, peltate or basifix, rigid scales. **Fronds** erect or scrambling, pseudodichotomically branched, rare entire, with isotomic branches, abaxial surface glabrous, glabrescent or pubescent, with whitish, reddish or nigrescent scales on rachis, segments midrib, secondary veins, or laminar tissue, adaxial surface glabrous, or with scales restrict to the rachis or

segments midrib, ultimate branches pectinate, with deltoid, lanceolate or linear segments. **Buds** covered by whitish, reddish or nigrescent scales, concolorous or bicolorous, in that case with apical, central or basal cells with darkening, with or without pseudoestipule, acessory branches absent. **Veins** 1-forked. **Sori** round, about 3–6 sporangia per sori, with or without hyaline paraphyses. **Spores** ellipsoid, monolete, slightly rugose, and minimally perforated; x= 34.

Sticherus is a pantropical genus with about 95 species, 12 of which occur in Brazil.

Key to Brazilian species of *Sticherus*

1. Segments glabrous....2
- Segments with scales at least on the midribs....4
2. Rachises reddish-brown; ultimate branches with segments reduced to auricles at the base; segments strongly ascending (northeast Brazil)....*S. salinoi*
- Rachises brown to stramineous; ultimate branch bases conform or nearly so; segments patent to slightly ascending (southeast Brazil)....3
3. Fronds 1–3-forked; rachises glabrous or sparsely scaly; segments linear....*S. gracilis*
- Fronds 2–5-forked; rachises densely to moderately scaly; segments deltoid, occasionally triangular....*S. pruinosus*
4. Bud scales completely nigrescent....*S. nigropaleaceus*
- Bud scales with strictly apical, central, or basal darkening, but never fully dark, or without darkening....5
5. Segments deltoid to narrowly triangular....*S. pruinosus*
- Segments linear....6
6. Segment midribs or rachises with stellate scales with ciliate margins; segments remote, separated by at least once or twice their width....*S. remotus*
- Segment midribs or rachises with triangular scales with ciliate, dentate, fimbriate, or hastate margins; segments contiguous....7
7. Rachises and segment midribs with hastate, anchor-shaped scales with setose margins....*S. longipinnatus*
- Rachises and segment midribs with triangular scales with ciliate or fimbriate margins....8
8. Secondary veins strongly prominent; segments present only on the ultimate branches....*S. brevitomentosus*
- Secondary veins at the same level of the laminar surface; segments present on all branches....9
9. Abaxial segment surfaces glabrescent with only tiny, sparse scales on the rachises, segment midribs, and secondary veins....*S. holttumii*
- Abaxial segment surfaces pubescent, densely to moderately covered by scales....10
10. Rachises usually sulcate with abaxial surfaces sparsely to moderately covered by reddish scales....*S. paulistanus*
- Rachises always terete, with abaxial surfaces densely covered by stramineous or hyaline scales....11
11. Rhizomes densely covered by dentate scales; petioles with scales; bud scales short-ciliate....*S. squamosus*
- Rhizomes sparsely covered by ciliate scales at least on the apex; petioles without scales; bud scales fimbriate....12
12. Rhizome scales only ciliate in the apical portion; bud scales without any type of darkening; adaxial surfaces of rachises and segments densely to moderately covered by hyaline scales; segments strongly revolute and convolute....*S. lanuginosus*
- Rhizome scales completely ciliate; bud scales usually with basal or apical darkening; adaxial surfaces of rachises and segments glabrous or slightly covered by stramineous scales; segments slightly revolute, never convolute....*S. bifidus*

3.1. *Sticherus bifidus* (Willd.) Ching (1940: 282). Figs. 4A–E, 5A, 6A.

Mertensia bifida Willdenow (1804: 168). *Gleichenia bifida* (Willd.) Sprengel (1827: 27). *Dicranopteris bifida* (Willd.) Maxon (1909: 60). Type:—VENEZUELA. Distrito Federal: Caracas, *Bredemeyer s.n.* (lectotype B [B-W-19468-01 0] photo!, designated by Proctor 1985, isolectotype S [S-R-3496] photo!).

Mertensia pubescens Humb. & Bonpl. in Willdenow (1810: 73). *Gleichenia pubescens* (Humb. & Bonpl. ex Willd.) Kunth (1815: 29). *Dicranopteris pubescens* (Humb. & Bonpl. ex Willd.) Conzatti (1939:129). *Sticherus pubescens* (Humb. & Bonpl. ex Willd.) Nakai (1950: 25). Type:—VENEZUELA. Sucre: Cumaná, Santa Cruz, *Humboldt & Bonpland s.n.* (holotype B [B-W-19467-01 0] !).

Mertensia decurrens Raddi (1825:73). *Sticherus decurrens* (Raddi) Gonzales in Gonzales & Kessler (2011: 23). Type:—BRAZIL. Rio de Janeiro: *G. Raddi s.n.* (lectotype PI, designated by Pic-Semolli 2005: 328, isolectotypes P [P00625735; P00625726] photos!).

Gleichenia mathewsii Hooker (1844: 9). *Mertensia mathewsii* (Hook.) Fée (1866: 122). *Sticherus mathewsii* (Hook.) Nakai (1950: 22). Type:—PERU. Chachapoyas: Chachapoyas, 1844, *Mathews 1092 pro parte* (holotype K [K000589324]!).

Mertensia trifurcans Fée (1869: 201). *Gleichenia trifurcans* (Fée) Christ in Schwacke (1900: 35). *Sticherus trifurcans* (Fée) Nakai (1950: 29). Type:—BRAZIL. Rio de Janeiro: Tijuca, 8 April 1967, *Glaziou 1697* (lectotype **designated here**, P [P00625775] photo!, isolectotype P [P00625774, P00625773] photos!, BR [BR0000006971748, BR0000006964191] photos!, S [S05-3159] photo!).

Plants terrestrial. **Rhizomes** 2.4–3.9 mm thick, with dark-brown, with scales narrow triangular, rigid, with apex acuminate, margins short to long ciliate. **Fronds** erect when young, becoming scrambling with age, 2–3(4)-forked, petiole 1.75–5.1 mm thick, ultimate branches 19–36.8 × 3.2–4.8 cm, lanceolate, apex pinnatifid, base truncate, rare slightly reduced, abaxial surface face dense to moderately scaly, rachis with scales light-brown, triangular, apexacuminate, base slightly cordate, margins short to long-ciliate, adaxial surface sparse to densely covered by hyaline filiform scales,

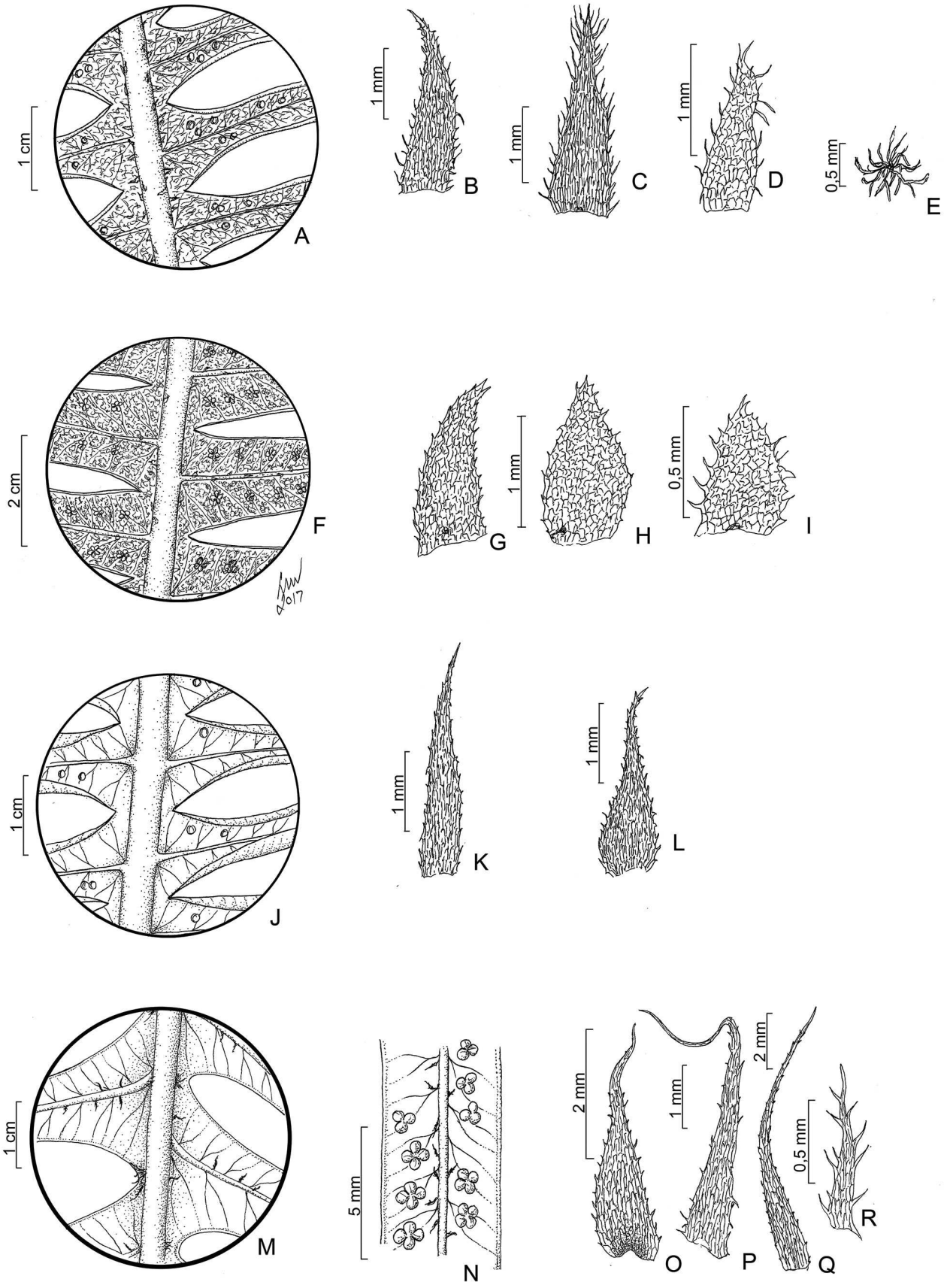

FIGURE 4. **A–E**. *Sticherus bifidus* (*Krieger s.n.*, CESJ 10201). **A**. Detail of the abaxial segment surface. **B**. Rhizome scale. **C**. Bud scale. **D**. Rachis scale. **E**. Arachnoid scale of the abaxial side of the laminae. **F–I**. *S. brevitomentosus* (*Forzza et al. 7225*, BHCB). **F**. Detail of the abaxial segment surface. **G**. Rhizome scale. **H**. Bud scale. **I**. Rachis scale. **J–L**. *S. gracilis* (*Salino 3611*, BHCB). **J**. Detail of the abaxial segment surface. **K**. Rhizome scale. **L**. Bud scale. **M–R**. *S. holttumii* (*Almeida et al. 4174*, BHCB). **M**. Detail of the abaxial segment surface. **N**. Detail of the abaxial segment surface. **O**. Bud scale. **P–Q**. Rhizome scales. **R**. Rachis scale.

segments linear 1.45–2.7 × 0.25–0.35 cm, margins plane to slightly revolute, abaxial surface dense to moderately covered by arachnoid scales on laminar tissue and secondary veins, midrib with arachnoid and smaller scales similar to the rachis. **Buds** with light-brown scales, with occasional apical or basal darkening, apex acuminate, base truncate, margins short to long-fimbriate, pseudoestipule present or not. **Veins** 1-forked. **Sori** medial, without paraphyses.

Distribution and habitat:—Brazil (Bahia, Ceará, Distrito Federal, Espírito Santo, Minas Gerais, Mato Grosso, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo) Bolivia, Colombia, Costa Rica, Cuba, Ecuador, Guianas, Panama, Peru, Trinidad and Tobago, and Venezuela. In Brazil, this species occurs along roads and trails, and forest edge in the Atlantic forest domain at 150–1500 m.

Notes:—*Sticherus bifidus* is characterized by arachnoid scales present on the abaxial surfaces of the laminar tissue, secondary veins, segment midribs, and rachises; fimbriate bud scales; and mainly by the ciliate margins of the rhizome scales. Certainly, this is one of the most missapplied names in Gleicheniaceae, due to its large phenotypical plasticity and its close relationship to other species. Relative to the Brazilian species of the genus, *S. bifidus* is morphologically related to *S. lanuginosus*, *S. paulistanus*, and *S. squamosus*. It differs from *S. lanuginosus* by having branches pendent, larger segments (4 times longer than wide), fronds lesser forked, and by lacking of scales on the petioles. It differs from *S. paulistanus* and *S. squamosus* mainly by having bud scales fimbriate, arachnoid scales on the laminar tissue, rachises always terete, and rhizome scales ciliate.

Gonzales & Kessler (2011) recognized *Sticherus decurrens* as a different species from *S. bifidus* based in the apical bud scales darkening pattern, presence of pseudostipules, and fibrillose or arachnoid scales on abaxial surface of segments. In the present work, we chose to adopt a broad circumscription of *S. bifidus* because the differences listed by Gonzales (2003) and Gonzales & Kessler (2011) are quite variable between individuals from different populations, within the same population, or even in the same individual. Furthermore, Gonzales & Kessler (2011) recognized *S. ferrugineus* as a separate species from the *S. bifidus* complex, but, in that case, the Brazilian specimens identified as *S. ferrugineus* in several herbaria are in fact *S. paulistanus* (see notes on *S. paulistanus*). These problems suggest that morphological studies do not satisfactorily resolve the circumscription problems in *S. bifidus* complex, and that future studies with different tools should be performed to test the monophylly of these proposed species and to provide precise species circumscriptions.

In the original description, Fée cited a collection of Glaziou (#1697) from Tijuca, Rio de Janeiro, Brazil. We found six exsiccatae of this Glaziou collection, three at P, two at BR, and one at S. Among the P specimens, we chose the one with original Fée label and in best conservation state. The BR specimens have transcript labels, but all information matches the protologe of the original description, as well the S material.

Selected specimens examined:—BRAZIL. Bahia: Arataca, Serra do Peito de Moça, estrada que liga Arataca à Uma, ramal ca. 22.4 km de Arataca com entrada no assentamento Santo Antônio. RPPN Caminho das Pedras, 15°10’25.0”S, 39°20’30.0”W, 1000 m, 15 February 2006, *Matos et al. 968* (UPCB); Camacan, Fazenda Serra Bonita, 9.7 Km W de Camacã na estrada de Camacã para Jacarecí, daí 6 Km SW na estrada para a Reserva e Torre da Embratel, 15°23’30.0”S, 39°33’55.0”W, 835 m, 10 July 2005, *Matos et al. 651* (UPCB). Ceará: Maranguape, Serra de Maranguape, Estrada Pirapora a Castelo, 27 June 1981, *Martins s.n.* (EAC10518). Espírito Santo: Cariacica, Reserva Biológica de Duas Bocas, 20°18’13.9”S, 40°29’13.4”W, 425 m, 12 June 2010, *Salino et al. 14890* (BHCB); Castelo, Parque Estadual Forno Grande, 1130 m, 25 June 2008, *Salino et al. 13538* (BHCB); Divino de São Lourenço, Parque Nacional do Caparaó, RPPN Águas do Caparaó, 20º35’49.2”S, 41º46’52.2”W, 1000 m, 12 September 2008, *Salino et al. 13847* (BHCB); Santa Tereza, Mata da Penha, 10 April 1984, *Boone 42* (BHCB). Minas Gerais: Caeté, Serra da Piedade, 1600 m, 14 June 1997, *Salino et al.* 3142 (BHCB); Juiz de Fora, Campus Universidade Federal de Juiz de Fora, Faculdade de Direito, 21º46’22”S, 43º22’16”W, 885 m, 12 December 2014, *Lima 90* (BHCB); Ouro Branco, Miguel Bournier, 20º25’49”S, 43º46’58”W 19 October 2009, *Souza 978* (BHCB); Santa Rita do Itueto, Parque Estadual de Sete Salões, trilha da Gruta de Sete Salões e Pico do Garrafão a partir da fazenda dos Correa, 19º17’07”S, 41º22’29,6”W, 590 m, 09 May 2006, *Salino et al. 11020* (BHCB); Simonésia RPPN Mata do Sossego, 20º04’02”S, 42º04’40,4”W, 1250 m, 20 May 2006, *Salino et al. 11072* (BHCB). Paraná: Antonina, Reserva Natural Rio Cachoeira, Fazendo Rincão, 25º15’S, 48º41’W, 30 m, 1 March 2005, *Matos 459* (UPCB); Guaratuva, estrada Alto da Serra- Ouro Fino, 29 June 1063, *Hatschbach s.n.* (PACA); Matinhos, Estrada Velha Alexandra, 11 August 1999, *Dunaiki 1262* (UPCB); Paranaguá, Ilha das Cobras, 25°31’12.0”S, 48°30’33.1”W, 04 May 1986, *Souza s.n.* (UEC 67703); Tijucas do Sul, Vossoroca, 14 February 1974, *Kummrow 344* (PACA). Rio de Janeiro: Cachoeiras de Macacu Street between Funchal and Guapiaçu, near REGUA, 22º28’73”S, 42°45’33”W, 37 m, 17 November 2009, *Baber 447* (RB); Nova Friburgo, Distrito der Macaé de Cima, estrada para o Sítio Sophronitis, 25 October 1990, *Sylvestre 339* (RB); Petrópolis, Mato do Judeo, 700 m, 07 December 1968, *Sucre 4266* (RB); Rio de Janeiro, Parque Nacional da Tijuca, trilha para o Pico da Tijuca, 22º56’33.3”S, 43º17’11.1”W, 812 m, 7 March 2013, *Mynssen 1387* (RB); Teresópolis Parque Nacional da Serra dos Órgãos, trilha Mozart Catão, 03 November 2004, *Engelmann 042* (RB). Rio Grande do Sul: Osório, APA

Morro da Borusia, 09, April 2008, *Santos 68* (PACA); Pixirica, Morrinhos do Sul, 29°21'29.5"S, 49°56'48.0"W, 141 m, 10 September 2013, *Gonzatti 866* (HUCS); Santo Antonio da Patrulha, 19 August 1993, *Bueno et al.* 3475 (PACA); São Francisco de Paula, Tainha, Serra do Pinto, 950 m, 5 May 2002, *Lehn 345* (PACA); São Leopoldo, zona campestre, 20 May 2001, Oliveira, C.M. 121 (PACA). Santa Catarina: Blumenau, Parque Natural Municipal São Francisco de Assis, 26°55'17.4"S, 49°04'18.6"W, 25 April 1998, *Hiendlmayer s.n.* (FURB); Imaruí, Forquilha da Aratingaúba, Parque Estadual da Serra, 28°10'10.0"S 48°52'13.0"W, 604 m, 17 March 2010, *Verdi et al.* 4046 (FURB); Santo Amaro da Imperatriz, Cova da Onça, 27°37'44.0"S, 48°46'51.0"W, 236 m, 17 March 2010*, Stival-Santos et al. 2111* (FURB); São Bento do Sul, Serra Alta, trilhos, rabo do macaco, 26°20'16.0"S, 49°23'01.0"W, 22 December 2013, *Schwirkowski 149* (FURB); São Bonifácio, Rio Sete, 28°04'50.0"S, 48°57'39.0"W, 332 m, 12 April 2010, *Verdi et al. 4370* (FURB). São Paulo: Eldorado, 6–10 km da Caverna do Diabo, 150 m, 09 September 1976, *Davis 60658* (UEC); Itirapina, Próximo ao cerrado do Alvaro, 750 m, 06 July 1991, *Salino 808* (UEC); Salesópolis, Estrada de Boraceia, represa do Rio Claro, *s.d., Travassos 308* (RB); São Luiz do Paraitinga, Parque Estadual da Serra do Mar, trilha do Poço Pito, 23º18'42"S, 45º07'11.4"W, 900 m, 05 March 2001, *Salino et al. 6203* (BHCB); São Miguel Arcanjo, Parque Estadual Carlos Botelho, 20 April 2002, *Farias et al. 635* (UEC).

3.2. *Sticherus brevitomentosus* Østergaard & Øllgaard (2001: 132). Figs. 4F–I, 5B, 6B.

Type:—ECUADOR, Prov. Zamora-Chinchipe, Yangana-Valladolid, km 29, 2580 m, *Østergaard Andersen 10728* (holotype QCA [QCA113182] photo!; isotypes AAU, QCNE).

Plants terrestrial. **Rhizomes** 2–5 mm thick, with orange-brown, with scales triangular, soft, with apex attenuate, margins dentate. **Fronds** erect when young, becoming scrambling with age, 2–3-forked, petiole 2.33–3.0 mm thick, ultimate branches 21.4–29.3 × 1.5–4.2 cm, lanceolate, apex pinnatifid or caudate, base truncate, abaxial surface moderately scaly on the rachis, scales light-brown, triangular, apex attenuate, base slightly truncate, margins ciliate, adaxial surface glabrous, segments linear 2.0–3.0 × 0.34–0.38 cm, margins plane, abaxial surface tomentose, with arachnoid scales on laminar tissue and secondary veins, midrib with arachnoid scales and triangular ciliate scales. **Buds** with light-brown, triangular scales, with occasional central or basal darkening, with apex attenuate, base truncate, margins short-ciliate, pseudoestipule absent. **Veins** 1-forked. **Sori** inframedial, without paraphyses.

Distribution and habitat:—Brazil (Amazonas), Bolivia, Colombia, Ecuador, Venezuela. In Brazil, this species is only known from the state of Amazonas, where it occurs along edge of the wet montane forest at 2000–2200 m.

Notes:—*Sticherus brevitomentosus* is morphologically related to *S. bifidus* and differs by having only the ultimate branches with segments (vs. segments present in all branches), prominent secondary veins (vs. veins at the same level of the laminar tissue), and segments abaxial surface with indument much less dense and usually restrict to the sorus area (vs. arachnoid scales spread through all abaxial surfaces of the segments).

Specimen examined:—Amazonas: Santa Isabel do Rio Negro, Parque Nacional do Pico da Neblina, Igarapé Cuiabixi, 0º47'18.0"N, 66º01'15.0W, 2060 m, 20 September 2012, *Forzza et al. 7225* (BHCB).

3.3. *Sticherus gracilis* (Mart.) Copeland (1947: 27). Figs. 4J–L, 5C, 6C.

Mertensia gracilis Martius (1834: 107). *Gleichenia gracilis* (Mart.) Moore (1862: 378). Type:—BRAZIL. Minas Gerais, *Martius s.n.* (lectotype **designated here** [M-0243581] photo M!, isolectotype photo M! [M-0243582]).

Plants terrestrial. **Rhizomes** 3.15–5.20 mm thick, with scales dark-brown, rigid, narrow-triangular, with apex attenuate, margins short-ciliate to dentate. **Fronds** erect or scrambling, 1–3-forked, petiole 1.98–3.78 mm thick, ultimate branches 11.5–18.5 × 1.3–2.5 cm, linear to lanceolate, apex pinnatifid or caudate, base truncate, abaxial surface glabrous or with sparse scales on the rachis, scales light-brown, narrow-triangular, apex attenuate, base truncate, margins ciliate, segments linear 1.5–3.5 × 1.8–2.5 cm, margins slightly revolute, abaxial surface glabrous. **Buds** with scales similar to the rachis, pseudoestipule absent. **Veins** 1-forked. **Sori** medial, with hyaline paraphyses.

Distribution and habitat:—Endemic to Brazil (Distrito Federal, Goiás, Minas Gerais, Mato Grosso, Rio de Janeiro, São Paulo). This species occurs along roads, trails and forest edge at 500–1500 m. It is mainly distributed in the Cerrado domain, but also has populations in semi deciduous seasonal forest of the Atlantic Forrest domain.

Notes:—*Sticherus gracilis* differs from the other species of *Sticherus* by having the abaxial segment surfaces glabrescent, with only a few sparse scales on the rachises or rarely on the segment midribs. It is morphologically related to *S. salinoi* and differs by having segments smaller and patent to slightly ascending, and orange bud scales. Furthermore, *S. gracilis* is also morphologically related to *Sticherus hypoleucus* (Sodiro 1883: 8) Copeland (1947: 28), a species with Andean distribution, from which it differs mainly by the bud scales, which in *S. gracilis* have ciliate margins, whereas in *S. hypoleucus* they have entire margins, and the segment distribution through the branches, which in *S. gracilis* are found on all axes, whereas in *S. hypoleucus* only the ultimate axes bear segments.

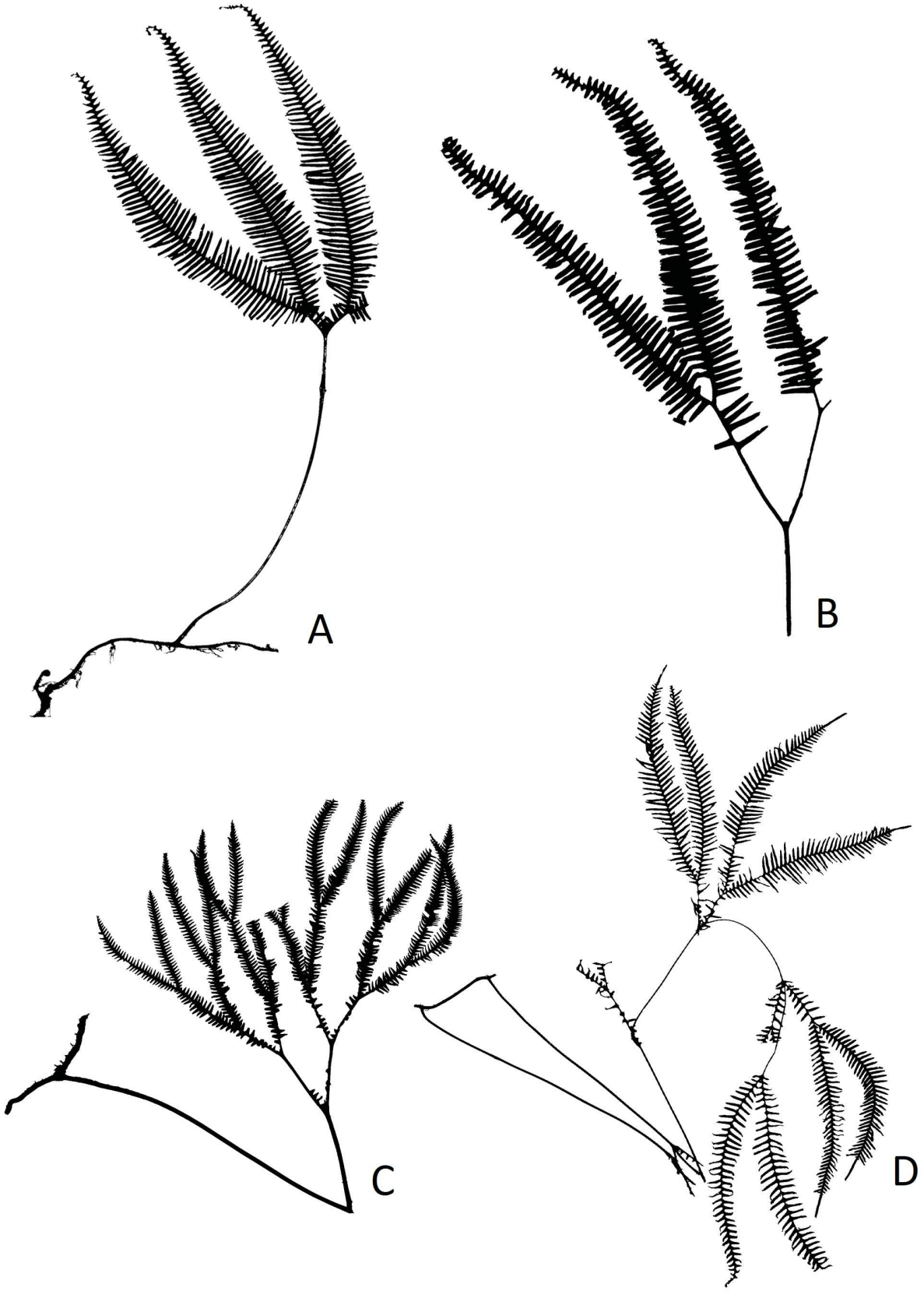

FIGURE 5. Habit. **A**. *Sticherus bifidus*. **B**. *S. brevitomentosus*. **C**. *S. gracilis*. **D**. *S. holttumii*.

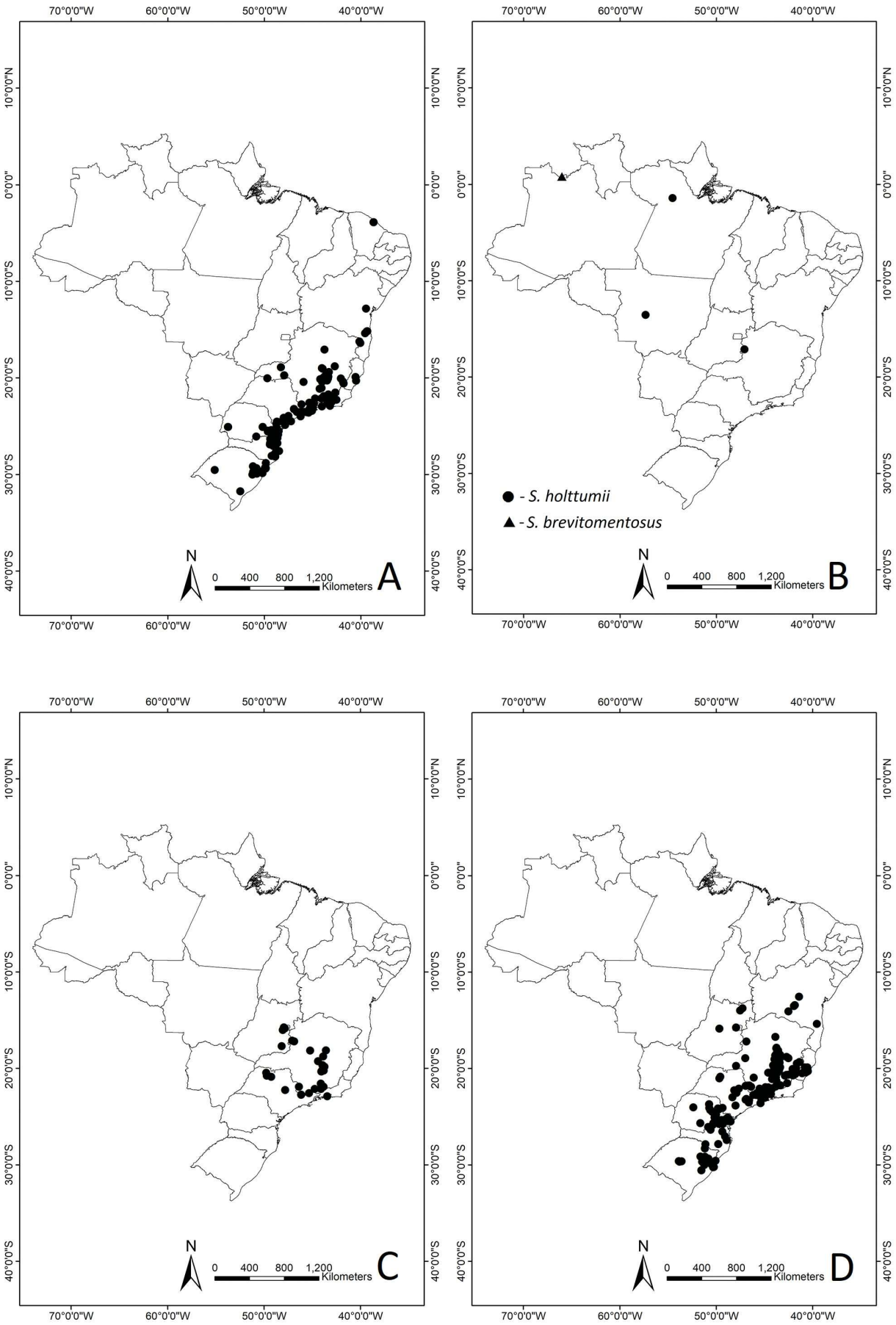

FIGURE 6. Distribution of five taxa of *Sticherus* in Brazil. **A**. *Sticherus bifidus*. **B**. *S. brevitomentosus* and *S. holttumii*. **C**. *S. gracilis*. **D**. *S. lanuginosus*.

In the original description, Martius (1834) only provides the type locality as "Prov. Minarum parte australi". We found two specimens among Martius's collections in M, and here we chose the most complete specimen as lectotype. Both exsiccate at M have labels with information that matches the original description protologue.

Selected specimens examined:—BRAZIL**.** Distrito Federal: Brasília, Jardim Botânico de Brasília, APA Cabeça de Veado, 15º52'0"S, 47º51'0"W, 1100 m, 23 June 1999, *Rodrigues 1330* (UB). Goiás: Ipameri, rodovia GO-213, 17º43'S, 48º08'W, 23 January 1996, *Pietrobom 2330* (MBM); Pirenópolis, Serra dos Pirineus, córrego da barriguda, 06 November 2004, *Delprete 9047* (RB). Minas Gerais: Santo Antônio do Itambé, Parque Estadual do Pico do Itambé, 18º24'05.9"S, 043º18'57,3"W, 1357 m, 07 October 2006, *Almeida et al. 594* (BHCB); Boa Esperança, Parque Estadual da Serra da Boa Esperança, 21º00'00.5"S, 45º40'40.3W, 1050 m, 14 December 2007, *Salino et al. 13023* (BHCB); Aiuruoca, Vale do Matutu, nas proximidades do riacho da Cachoeira das Fadas, 22º08'12,9"S, 44º64'49,9"W, 1300 m, 13 October 2004, *Salino et al. 9836* (BHCB); Catas Altas, Parque Natural do Caraça, a caminho da Capelinha, 20º05'45,5"S, 43º28'54,1"W, 1350 m, 10 July 2004, *Salino et al. 9622* (BHCB). Mato Grosso: Itiquira, rodovia MT299, encontro com a BR364, a 25 km de Itiquira, 17º12'S, 54º07'W, 600 m, 22 February 1994, *Silva 1252* (SPF). Rio de Janeiro: Rio de Janeiro, Instituto Zoobotânico de Morro Azul, Córrego do IZMA, próximo ao criadouro, 08 July 1998, *Santos 1030* (RB). São Paulo: Itirapina, ca. Engenheiro João Baptista Cabral Renno km 97, 22°15'60"S, 47°48'00"W, 500 m, 23 May 1993, *Silva 966* (MO).

3.4. *Sticherus holttumii* Lima & Salino (2018: 182). Figs. 4M–R, 5D, 6B.

Type:—BRAZIL. Pará: Monte Alegre, trilha para cachoeira de prata no Iguarapé do Ambrósio, Mata da Alegria, 01º26'11.5"S, 54º32'40"W, 302 m, 09 December 2015, *Almeida, T.E. et al. 4174* (holotype BHCB!, isotypes CESJ!, HSTM!).

Plants terrestrial. **Rhizomes** 2.15–3 mm thick, with scales brown, rigid, linar-lanceolate, with apex attenuate to filiform, base truncate, margins dentate. **Fronds** scrambling, 2–3-forked, petiole 1.98–2.04 mm thick, ultimate branches 20–22.5 × 2.5–4.5 cm, eliptic, apex caudate, base slightly reduced, abaxial surface moderately scaly on the rachis, with light-brown, triangular, scales, with occasional apical darkening, apex attenuate, base truncate, margins setose, adaxial surface sparsely covered by hyaline filiform scales, segments linear 1.35–2.6 × 0.15–0.25 cm, margins slightly revolute, abaxial surface pubescent, with hyaline, linear scales, margins setose on the segments midrib and hyaline filiform scales on secondary veins, laminar tissue glabrous. **Buds** with brown, narrow-triangular scales, apex acuminate, base truncate, margins setose, pseudoestipule present only at the first branch. **Veins** 1-forked. **Sori** medial, with hyaline paraphyses.

Distribution:—Endemic of Brazil (Minas Gerais, Mato Grosso and Pará). This species occurs in gallery forest, between 300 m and 500 m.

Notes:—*Sticherus holttumii* is morphologically related to *Sticherus gracilis* and differs from it by having sparse scales distributed on the abaxial segment surfaces, scales of the buds and rachises with setose margins and occasional apical darkening. *Sticherus holttumii* has a disjunct distribution, with populations in Minas Gerais, Mato Grosso, and Pará state. This distribution pattern is also known for others species of leptosporangiate ferns, like *Blechnum heringeri* Brade (1966: 87). The type of that species is from Paracatu, Minas Gerais state, as is the paratype of *S. holttumii*. Dittrich *et al.* (2015) pointed out the record of *Blechnum heringeri* from Pará state, as a disjunct population.

Selected specimens examined:—BRAZIL. Mato Grosso: Campos Novos do Pareci, 13º34'S 57º21'W, 06 October 1996, *Windisch 8421* (ICN); Chapada dos Guimarães, Parque nacional da Chapada dos Guimarães, cachoeira do Pulo 15º24'59"S 55º50'31W, 591 m, 2 March 2011, *Almeida et al.* 2674 (BHCB). Minas Gerais**:** Grão Mogol, entre a BR251 e a cidade de Grão Mogol, Cachoeira Véus das Noivas, Serra de Grão Mogol, 16º35'43.6"S 42º57'17.3W, 875 m 15 March 2007, *Salino et al. 11798* (BHCB); Paracatu, Reserva do Acangaú, 17º08'59"S 47º04'43.3W, 665 m, 03 March 2006, *Salino et al. 10716* (BHCB).

3.5. *Sticherus lanuginosus* (Moric. ex Fée) Nakai (1950: 20). Figs. 6D, 7J–N, 8A.

Gleichenia lanuginosa Moric. ex Fée (1869: 202). *Gleichenia pennigera* (Mart.) T. Moore *var. lanuginosa* (Moric. ex Fée) Moore (1862: 381*) nomen nudum.* Type:—BRAZIL. Bahia: *without date, Blanchet* 3706 (lectotype **designated here**, P [P00625760] photo!, isolectotypes [P00625761], [P00625762] photos!, BR [BR0000006971571; BR0000006972226] photos!, B [B 20 0139890], [B 20 0139891] photos!, K! [K000589319], NY! [NY00144751] photo!). Remaining syntype: BRAZIL. Minas Gerais: Ponte Alta, *St.-Hilaire B'273* (P [P01346675] photos!).

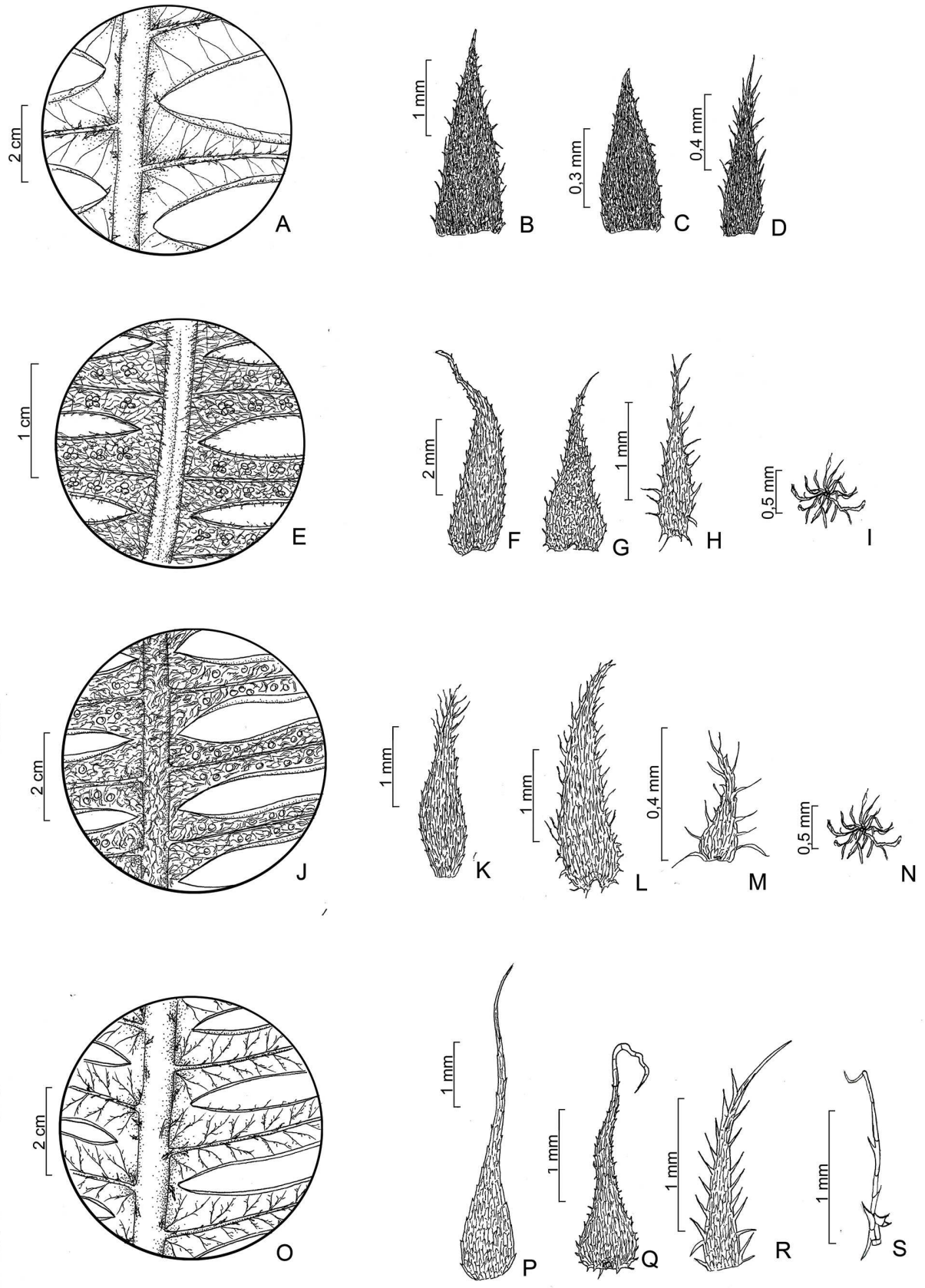

FIGURE 7. **A–E.** *Sticherus nigropaleaceus* (*Lima 20*, CESJ). **A.** Detail of the abaxial segment surface. **B.** Rhizome scale. **C**. Bud scale. **D**. Rachis scale. **E–I**. *S. paulistanus* **E**. Detail of the abaxial segment surface. **F**. Rhizome scale. **G**. Bud scale. **H**. Rachis scale. **I**. Arachnoid scale of the abaxial side of the laminae. **J–N**. *S. lanuginosus* (*Novelino s.n.*, CESJ 29978). **J**. Detail of the abaxial segment surface. **K**. Rhizome scale. **L**. Bud scale. **M**. Rachis scale. **N**. Arachnoid scale of the abaxial side of the laminae. **O–R**. *S. longipinnatus* (*Maciel 780*, BHCB). **O**. Detail of the abaxial segment surface. **P**. Rhizome scale. **Q**. Bud scale. **R**. Rachis scale. **S**. Anchor-shaped scale of the abaxial rachis surface.

Plants terrestrial. **Rhizomes** 3.15–5.2 mm thick, with brown, rigid, narrow-triangular scales, apex attenuate, base truncate, margins dentate with short to long-ciliate apex. **Fronds** erect, 3–5 times forked, petiole 2.5–6 mm thick, ultimate branches 4.5–18.5 × 0.6–3 cm, linear-lanceolate, apex pinnatifid, base truncate, abaxial surface densely scaly on the rachis, scales stramineous, triangular, apex filiform, base truncate, margins long-ciliate, adaxial surface sparse to densely covered by arachnoid scales, segments linear 0.5–2 × 0.15–0.35 cm, margins strongly revolute, abaxial surface with arachnoid scales on midrib, secondary veins and laminar tissue. **Buds** with light-brown, triangular scales, apex filiform, base truncate, margins long-fimbriate, pseudoestipule present. **Veins** 1-forked. **Sori** medial, without paraphyses.

Distribution and habitat:—Brazil (Bahia, Distrito Federal, Espírito Santo, Goiás, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo)**,** Bolivia, Colombia, Costa Rica, Ecuador, Hispaniola, Paraguay, Peru, and Venezuela. In Brazil, this species occurs along roads, trails and forest edges in the Cerrado and Atlantic Forest domains at 500–1850 m.

Notes:—*Sticherus lanuginosus* differs from the other Brazilian species of *Sticherus* by having erect fronds with strongly ascendant branches, rhizome scales with margins dentate and a few apical cilia, and bud scales long-fimbriate. It forms large populations in the south and southeast of the country and smaller and disjunct populations in the northeast and midwest.

In the original description of *Gleichenia lanuginosa*, Fée cited three different collections, *Blanchet 3706*, *Claussen 88* and *St.-Hilaire B' 273*. We found nine specimens of Blanchet's collection, none of Claussen's, and one of St.-Hilaire's. The Blanchet collections were located in P (three), BR (two), B (two), and one each in K and NY. The K specimen has an original label of Blanchet, but without his signature. The NYspecimen doesn't have the original label of Blanchet, but only a transcript label with a Morics signature. The BR material of Blanchet's collection both have transcript labels and are from Herbarium Martii. The B specimens have original labels but it lacks Blanchet's signature. At P, we found one complete specimen with original label with Blanchet's signature and here we choose it as lectotype since the other two specimens at P both have an original label but lack Blanchet's signature. Regarding the St.-Hilaire collection, we found one specimen at P under the name *Gleichenia ramosissima* with a handwritten description, as cited in the original protologue of *Mertensia lanuginosa*. In this case, *G. ramosissima* it is not a valid name, since it has not been published.

Selected specimens examined:—BRAZIL. Bahia: Andaraí, Igatu, 25 August 2009, *Pedro et al. 2911* (NY); Caetité, Serra geral a 15 km de Caetité, 14°05'19"S, 42°30'19"W, *Guedes 10330* (CEPEC); Camacan, Fazenda Serra Bonita, 9,7 km de Camacan na estrada de Camacan para Jacarecí, 6 km na estrada para a Reserva e Torre da Embratel, 15°23'30"S, 39°33'55"W, 885 m, 10 July 2005, *Matos et al. 54* (UPCB); Lençóis, Trilha Lençóis/Capão, próximo à Cachoeira Estrela do Céu, 12°34'11"S, 41°25'03"W, 800 m, *Passos s. n.* (CEPEC 74853); Rio de Contas, Pico das Almas 25 km do centro da cidade em direção ao Campo do Queiroz, 13°33'S, 41°57'W, 1850 m, 26 February 2006, *Matos et al. 1041* (UPCB). Distrito Federal: Brasília, APA-Gama e Cabeça de Veado. R.A. do Núcleo Bandeirante, Área vizinha à Associação dos Empregados da Embrapa, 15º54'52"S, 47º57'45"W, 29 April 2003, *Fonseca 4649* (RB). Espírito Santo: Cachoeiro de Itapemirim, Vargem Alta, 23 August 1948, *Brade 19352* (RB); Cariacica, Floresta na beira da estrada para a localidade de Alegre, 20º18'9"S, 40º28'55"W, 500 m, 16 February 2008, *Labiak et al. 4662* (RB); Castelo, Parque Estadual Forno Grande, 1130 m, 25 June 2008, *Salino et al. 13537* (BHCB); Marechal Floriano, Sítio Almir Bressan, 20°24'47.0"S, 40°40'59.0"W, 700 m, 12 July 1988, *Pereira 1617* (VIES); Nova Venécia, Reserva Biológica de Duas Bocas, entorno da reserva, na estrada de acesso a São Paulo Viana, 20°03'18"S, 40°32'04"W, 575 m, 05 May 2008, *Amorim et al. 7364* (RB). Goiás: Alto Paraíso de Goiás, Chapada dos Veadeiros, Portal da Chapada, 14º6'53"S, 47º35'58"W, 1164m, 06 October 2006, *Rocha 64* (RB); Teresina de Goiás, 31 July 2000, *Souza et al. 24769* (ESA). Minas Gerais: Chalé, Rio José Pedro, 20°02'48.1"S, 41°44'51.3"W, 371 m, 30 August 2009, *Almeida 2063* (BHCB); Congonhas do Norte, Alto da Serra do Talhado, 18°50'43.0"S, 43°44'48.0"W, 1300 m, 07 August 2009, *Almeida 2038* (BHCB); Lima Duarte, Parque Estadual de Ibitipoca, à beira da estrada para a ponte de pedra, 28 August 1992, *Novelino 883* (CESJ); Ouro Preto, Lavras Novas, 21 January 1996, *Salino 2422* (BHCB); Sapucaí-Mirim, 22°46'31.6"S, 45°49'59.6"W, 1549 m, 29 October 2008, *Almeida 1528* (BHCB). Paraná: Curitiba, Parque Barigui, 25 August 1957, *Lange 1032* (UPCB); Lapa, Fazenda do Uruguai, 23 May 1984, *Rubia 98* (MBM); Piraquara, Mananciais da Serra, próximo ao Reservatório do Carvalho, 25°29'00.0"S, 48°59'00.0"W, 910 m, 05 June 2005, *Matos et al. 604* (UPCB); Telêmaco Borba, Parque Ecológico da Klabin, Trilha Ecológica, 28 June 2004, *Sakagami 64* (UPCB); Tibagi, Parque Estadual do Guartelá, 08 May 2010, *Michelon et al. 809* (UPCB). Rio de Janeiro: Cachoeiras de Macacu, trilha entre Funchal e Guapiaçu, próximo Régua, 22º27'59"S, 42º45'18"W, 39 m, 21 October 2009, *Baber 293* (RB); Paulo de Frontin, Morro Azul, Instituto Zoobotânico de Morro Azul (IZMA), estrada de acesso ao Sítio do Sérgio, 13 January 1999, *Santos 1105* (RB); Petrópolis, Mata do Judeu, 800 m, 25 January 1969, *Sucre 4495* (RB); Rio de Janeiro, Campo

Grande, Serra do Medanha, 06 July 1977, *Lins 99* (RB); Santa Maria Madalena, 24 November 1977, *Carauta 2754* (RB). Rio Grande do Sul: Monte Belo do Sul, linha Santa Barbara Saúde, 29°09'46.1"S, 51°37'54.1"W, 600 m, 07 August 2011, *Valduga 87* (HUCS); Muitos Capões, estrada para Lagoa Vermelha, 18 October 2014, *Gonzatti 1317* (HUCS); Palmares do Sul, Estrada para Parque Eólico, Horto Florestal, 30°15'39.0"S 50°19'11.0"W, 10 m, 24 September 2012, *Gonzatti 598* (FURB); Pinhal da Serra, São Cristóvão, 27°53'17.0"S, 51°06'43.9"W, 834 m, 03 February 2015, *Gonzatti 1668* (HUCS); Santo Antônio da Patrulha, 29°55'52.2"S, 50°30'29.9"W, 72 m, 27 April 2014, *Gonzatti 1167* (HUCS). Santa Catarina: Blumenau, Parque Nacional da Serra do Itajaí, 27°03'24.0"S, 49°05'16.0"W, 30 June 2007, *Gasper 626* (FURB); Canoinhas, Rio dos Pardos, Serra da Morte, 26°22'53.0"S, 50°34'49.0"W, 112 m, 08 November 2007, *Gasper 925* (FURB); Garuva, Alto Quiriri, 1200 m, 05 May 2005, *Funez 4363* (FURB); Rio dos Cedros, estrada Palmeiras-Rio Bonito, próximo à Cascata Formosa, 26°33'34.5"S, 49°22'20.8"W, 789 m, 22 April 2016, *Funez 4712* (FURB); Rio Rufino, rodovia que liga Urubici a Rio Rufino, 20 May 2009, *Gasper 2116* (FURB). São Paulo: Cunha, Parque estadual da Serra do Mar, Núcleo Cunha, 19 July 1996, *Salino 3006* (UEC); Itirapina, Estação Ecológica do Instituto Florestal, Cerrado do Pedregulho, 06 July 1991, *Salino et al. 913* (UEC); Jundiaí, Serra do Japi, Na trilha à esquerda antes de chegar na base da Reserva, indo para a Cachoeira Paraíso, 23°14'S, 46°56'W, 996 m, 13 November 2009, *Prado et al. 2067* (UEC); São Miguel Arcanjo, Parque Estadual Carlos Botelho, Núcleo São Miguel Arcanjo, 24°04'02.0"S, 42°58'08.0"W, 20 April 2002, *Farias 627* (UEC); Vargem Grande Do Sul, Brejo ao lado da estrada, cerca de 5 km depois da cidade em direção a São Sebastião da Grama, 21°49'30.0"S, 46°57'15.0"W, *Amaral s.n.* (UEC 183839).

3.6. *Sticherus longipinnatus* (Hooker) Ching (1940: 238). Figs. 7O–S, 8B, 9A.

Gleichenia longipinnata Hooker (1844: 9). *Mertensia longipinnata* (Hook.) Klotzsch (1844: 537). *Dicranopteris longipinnata* (Hook.) Maxon (1922: 48). Type:—SURINAM. *Hostmann 238* (lectotype **designated here**, K [K000589334]!, isolectotypes B! [B 20 0139886], BM [BM000585933; BM000585934] K [K000589335]!).

Plants terrestrial. **Rhizomes** 1.8–4.28 mm thick, with scales dark-brown, rigid, triangular, with apex acuminate, base truncate, margins setose. **Fronds** scrambling, 1–2-forked, petiole 2.71–2.82 mm thick, ultimate branches 27–98 × 3.4–6.2 cm, elliptic, apex pinnatifid, base slightly reduced, abaxial surface dense to moderately scaly on the rachis, scales dark-brown to reddish, linear, apex acuminate, base truncate, margins setose, adaxial surface densely covered by dark-brown to reddish filiform scales on the rachis, segments linear 2.7–3.2 × 0.24–0.30 cm, margins plane to slightly revolute, abaxial surface with filiform scales on the secondary veins, midrib with dark-brown to reddish, hastate, filiform and triangular scales. **Buds** with reddish, linear scales, with apex filiform, base truncate, margins setose, pseudoestipule present. **Veins** 1-forked. **Sori** medial to supramedial, without paraphyses.

Distribution and habitat:—Brazil (Acre and Pará), Ecuador, Peru, and Suriname. In Brazil, this species occurs along forest edge in the Amazonian domain, at 500–600 m.

Notes:—*Sticherus longipinnatus* is easily recognized by the anchor-shaped scales on the abaxial rachis surfaces and segment midribs, and very long ultimate branches with segments very close to each other. It appears to be a rare species due to the few herbarium records. In Brazil, there are only two records with a collection gap of 37 years. Despite the paucity of collection efforts in the occurrence area of the species, it should be considered that this species might be threatened.

In the original description, Hooker cited the collection *Hostmann 238* from Suriname as type material. We found five exsiccatae of this collection, two in K, one in BM, one in FI, and one in B. Tryon & Stolze (1989) made a nonintentional lectotypification by indicating the K material as holotype. However, there are two original specimens at K, and here we proceed with a second step lectotypification. We chose as lectotype the most complete specimen with the label of Hostmann, as the other specimen has a handwritten label of the collection data. The FI specimen has a transcript label with only the original numeration, the B specimen also has a transcript label, and the BM specimens both have transcript labels.

Selected specimens examined:—BRAZIL. Acre: Cruzeiro do Sul, Serra da Moa, entre os rios Jurua e Moa, 30 April 1971, *Prance 12681* (K, NY). Pará: Oriximiná, Estação ecológica do Grã Pará, Trilha T2 entre a parcela 1 e o acampamento, 01º96'32.1"N 58º41'29.2"W, 600 m, 27 August 2008*, Maciel 780* (BHCB).

3.7. *Sticherus nigropaleaceus* (J.W. Sturm) Prado & Lellinger (1996: 98). Figs. 7A–D, 8C, 9B.

Mertensia nigropaleacea Sturm (1840: 222). *Gleichenia bífida* (Willd.) Spreng. var. *nigropaleacea* (J.W. Sturm) Rosenstock (1906: 60). *Sticherus longipinnatus* (Hook.) Ching var. *nigropaleaceus* (J.W. Sturm) Nakai (1950: 22). Type:—BRAZIL. Rio de Janeiro: without date, *Gaudichaud 142* (lectotype B [B 20 0096735] photo!, isolectotypes P [P00625794], [P00625795], [P00625796], [P00625797] photos!).

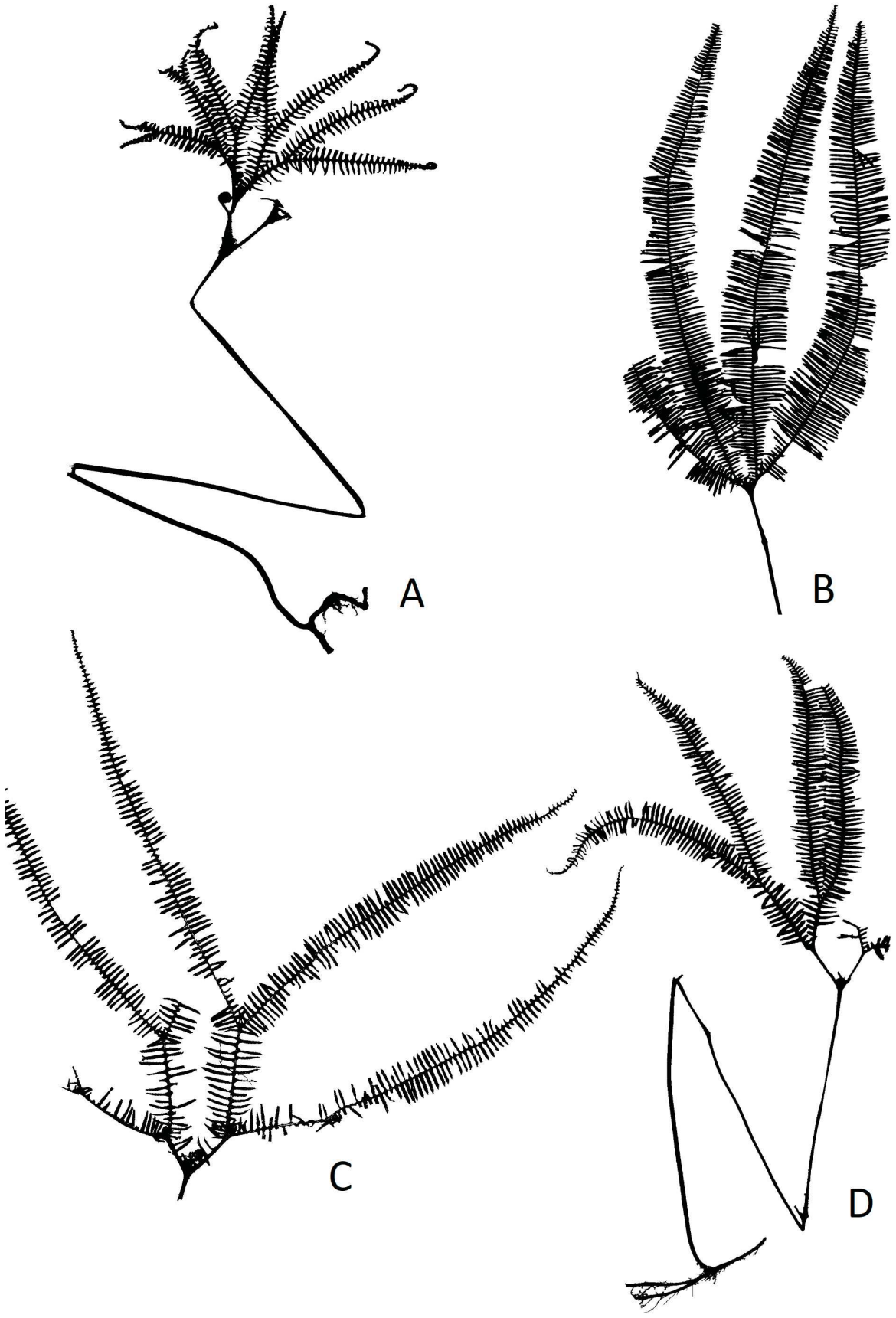

FIGURE 8. Habit. **A.** *Sticherus lanuginosus*. **B.** *S. longipinnatus*. **C.** *S. nigropaleaceus*. **D.** *S. paulistanus*.

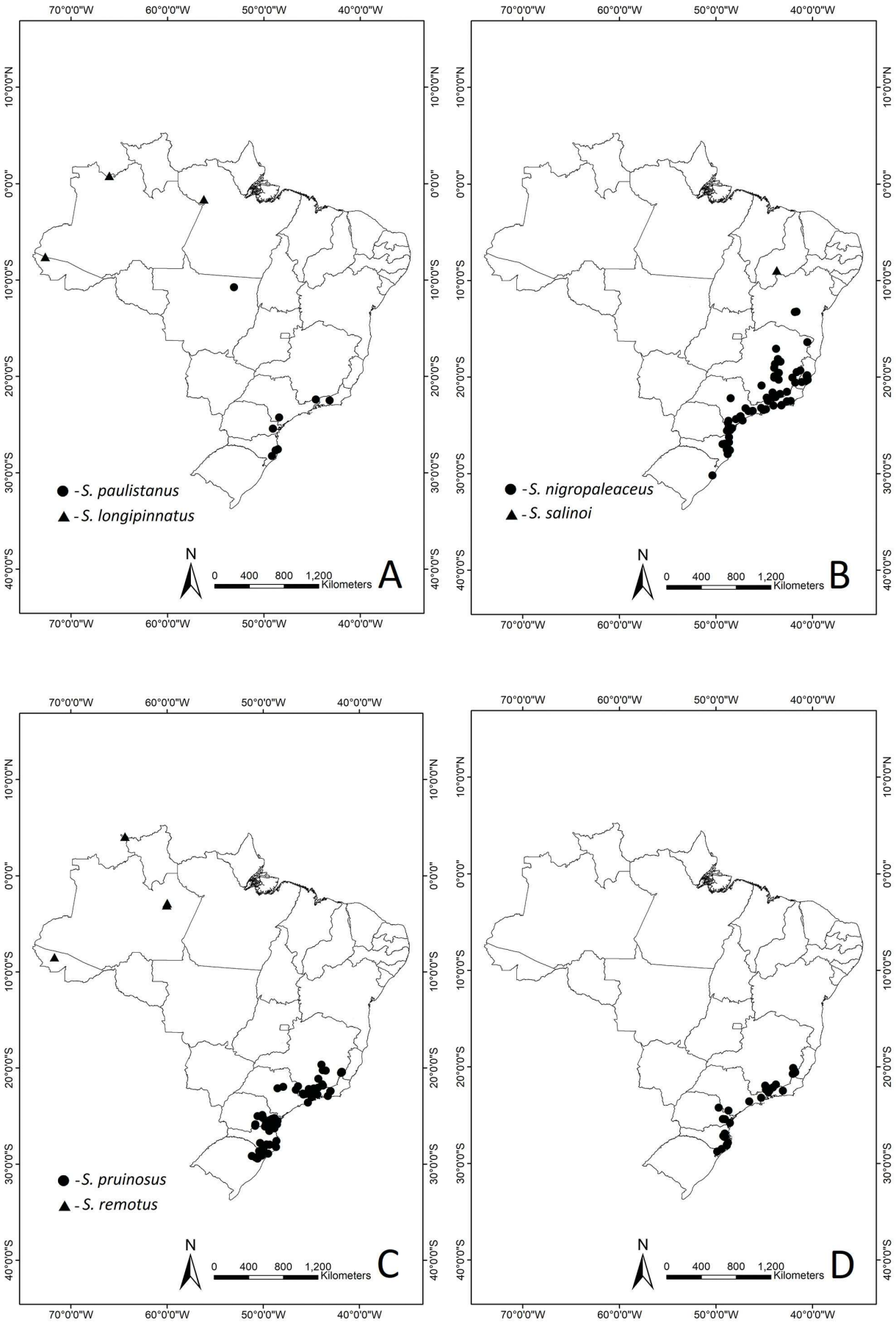

FIGURE 9. Distribution of five taxa of *Sticherus* in Brazil. A. *Sticherus longipinnatus*, S. *paulistanus*. B. *S. nigropaleaceus* and *S. salinoi*. C. *S. pruinosus* and *S. remotus*. D. *S. squamosus*.

Plants terrestrial. **Rhizomes** 2.62–4.15 mm thick, with scales dark-brown, rigid, linear-lanceolate, with apex acuminate, base truncate, margins setose. **Fronds** scrambling, 1–3-forked, petiole 2.45–5.20 mm thick, ultimate branches 11–60 × 2.2–7.7 cm, linear to lanceolate, apex pinnatifid, base truncate, abaxial surface moderately scaly on the rachis, scales nigrescent, lanceolate, apex acuminate, base truncate, margins setose, adaxial surface sparsely covered by hyaline filiform scales, segments linear 1.34–3.5 × 0.20–0.40 cm, margins plane to rarely revolute, abaxial surface with filiform scales on laminar tissue and secondary veins, midrib with hyaline, deltoid scales, apex acuminate, base truncate, margins long-ciliate. **Buds** with nigrescent, narrow-triangular scales, with apex acuminate, base truncate, margins dantate to setose, pseudoestipule present. **Veins** 1-forked; **Sori** medial, with hyaline paraphyses.

Distribution and habitat:—Endemic to Brazil (Bahia, Espírito Santo, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo). This species occurs along roads, trails, and forest edge in the Atlantic Forest domain at 38–1800 m.

Notes:—*Sticherus nigropaleaceus* differs from the other Brazilian species of *Sticherus* by having nigrescent bud scales, rachises with at least apically nigrescent scales, and large trifid pseudostipules. Gonzales & Kessler (2011) proposed a relationship of *S. nigropaleaceus* with *S. interjectus* (Jermy & T.G.Walker) Gonzales (2011: 28), and they differentiated them by the pattern of darkening on the buds and rachis scales. According to these authors, in *S. interjectus* the darkening pattern is from the base to the apex of the scale, and in *S. nigropaleaceus* is from the apex to the base. Jermy & Walker (1985) described *S. interjectus* as a tetraploid species with intermediate morphology between *S. ferrugineus* and *S. remotus*. However, by the analysis of the type of *S. intejectus* we conclude that the morphological character used by Gonzales & Kessler (2011) to differentiate it from *S. nirgropaleaceus* are not consistent due to the variability of this character. Besides that, the intermediary morphology and the chromosome number used by Jermy & Walker (1985), by themselves are not conclusive to affirm that *S. interjectus* is really a hybrid between *S. ferrugineus* and *S. remotus*. Therefore, *S. intejectus* may be a synonym of *S. nigropaleaceus*, in this case we should consider it to be a single species with a large distribution. Future studies must be performed aiming to elucidate the possible hybrid origin of *S. interjectus*.

Selected specimens examined:—BRAZIL. Bahia: Abaíra, trilha para o Pico do Barbado, Catolés de Cima, 13°17’28”S, 41°54’14”W, 1715 m, 03 April 2010, *Dittrich 1648* (CESJ); Catolés, Chapada Diamantina, Subida para a Serra do Barbado, 13°17’S, 41°50’W, 30 April 2006, *Guedes 12309* (ALCB). Espírito Santo: Castelo, Parque Estadual do Forno Grande, 20º32’06”S, 41º05’54”W, 1100 m, 28 June 2008, *Salino 13683* (BHCB); Divino de São Lorenço, Parque Nacional do Caparaó, RPPN Águas do Caparaó, Cachoeira Alta, 20º35’49.2”S, 41º46’52.5”W, 1050 m, 12 September 2008, *Salino 13883* (BHCB); Itarana, Alto Jatiboca, propriedade de, Frederico Saedler, 20º00’51”S 40º54’42.6”W, 816 m, 27 August 2009, *Salino 14517* (BHCB); Marechal Floriano, Sítio de Almir Bressa, 20°24’47”S 40°40’59”W, 700 m, 12 July 1988, *Pereira 1616* (VIES); Santa Teresa, Reserva Biológica Augusto Ruschi, trilha da cachoeira, 19º55’14”S 40º33’37”W, 800 m, 02 December 2008, *Salino 14036* (BHCB). Minas Gerais: Catas Altas, Parque Natural do Caraça, caminho da capelinha, 20º05’45.5”S, 43º28’54”W, 1350 m, 10 July 2004, *Salino 9621* (BHCB); Diamantina, entorno do Parque Nacional das Sempre Vivas, vila de Macacos, 17º5’14.5”S, 43º46’11.8”W, 1084 m, 02 May 2007, *Almeida. 996* (BHCB); Juiz de Fora, Parque da Lajinha, Trilha da água, parte da frente do parque, 29 October 2013, *Lima 20* (CESJ); Nova Lima, RPPN Mata do Jambeiro, 19º58’41.9”S, 43º53’10.6W, *Figueiredo 295* (BHCB); Santa Maria do Salto, distrito de Talismã, fazenda Duas Barras, próximo à divisa com estado da Bahia, 16º24’16.5”S, 40º03’27.4W 800 m, 10 October 2003, *Salino 9295* (BHCB). Paraná: Antonina, Reserva Natural Rio Cachoeira, Fazenda Rincão, 25°15’S, 48°41’W, 30 m, 01 March 2005, *Matos 460* (UPCB); Guaraqueçaba, Reserva Natural Salto Morato, 25º10’17”S, 48º18’13”W, 2013, *Ariati 1190* (MBM); Guaratuba, Serra da Prata, 25°36’S, 48°43’W, 400 m, 19 February 2004, *Labiak et al. 3168* (UPCB); Paranaguá, Ilha do Mel, Morro Bento Alves, 11 October 1992, *Salino et al. 1487* (UPCB); Tunas do Paraná, Estrada de Tunas do Paraná para a Fazenda Berneck, 24°44’56.0”S, 48°45’19.0”W, 800 m, 21 April 2007, *Labiak et al. 3928* (UPCB); Rio de Janeiro: Cachoeira de Macacu, rua entre Funchal e Guapiaçu, 22º27’52”S, 42º45’48”W, 38 m, 16 November 2009, *Baber 395* (RB); Rio de Janeiro, Estrada das Canoas, June 1960, *Duarte 5252* (RB); Paraty, Trindade, Praia do Caixa de Aço, 08 November 1991, *Marquete 444* (RB). Rio Grande do Sul: Balneário Pinhal, Horto Florestal, 30°11’33.0”S, 50°20’54.0”W, 10 m, 13 October 2012, *Gonzatti 619* (HUCS). Santa Catarina: Antônio Carlos, Santa Maria, 27º32’22”S, 48º52’13”W, 220 m, 05 February 2010, *Stival-Santos 1741* (FURB); Blumenau, Parque Nacional do Itajaí, estrada pra sede, 26º55’37”S, 49º04’51” W, 10 April 2010, *Salino et al. 14793* (BHCB); Indaial, Ilse, bairro Warnow, 13 December 2006, *Kalk s.n.* (FURB 5720); Paulo Lopes, Espraiado, Parque Estadual da Serra do Tabuleiro, 27º59’24”S, 48º46’48”W, 329m, 08 June 2010, *Verdi et al. 4906* (FURB). São Paulo: Eldorado, Parque Estadual do Jacupiranga, núcleo Caverna do Diabo, trilha do Araçá e trilha do Rolado, 24º38’13”S, 48º28’01.7”W, 22 March 2005, *Salino et al. 10106* (BHCB); Juquiá, Reserva Votarantim, Complexo Juquiá, trilha da vila dos moradores em direção a caixa d’água, 24º06’08”S,

47º30’18”W, 193 m, *Salino et al. 15673* (BHCB); Mogi das Cruzes, limite com Salesópolis, estrada Usaka, Represa Casa Grande da SABESP, 23º39’17.3”S, 45º57’34.2W, 24 April 2000, *Salino et al. 5383* (BHCB); São Paulo, 04 December 1949, *Joly s.n.* (SPF 60186); Ubatuba, Parque Estadual da Serra do Mar, Núcleo Picinguaba, Trilha do Picadão da Barra, 23º21’43.8”S, 44º50’02.3”W, 03 May 2001, *Salino et al. 6712* (BHCB);

3.8. *Sticherus paulistanus* (Rosenst.) Copeland (1947: 28). Figs. 7. E–I, 8. D, 9. A.

Gleichenia paulistana Rosenstock (1925: 343). Type:—BRAZIL. São Paulo: Campo Grande, Serra do Mar, *A.C. Brade, 6924 pro parte* (lectotype **designated here**, S [S-R 2419] photo!, isolectotypes NY [NY00144770] photo!, PH [PH00012238] photo!, S [S11-28542] photo!, UC [UC442432] photo!, US [US00065699; US00065698] photos!).

Plants terrestrial. **Rhizomes** 4,3–5,8 mm thick, with scales brown, soft, triangular, with apex aristate, base truncate, margins entire to dentate. **Fronds** scrambling, 3–4-forked, petiole 2.80–3.60 mm thick, ultimate branches 18.5–29 × 2.2–4 cm, lanceolate, apex pinnatifid, base slightly reduced at the inner side, abaxial surface dense to moderately scaly on the rachis, scales reddish-brown, lanceolate, with apex filiform, base truncate, margins fimbriate, and also with arachnoid scales, adaxial surface sparse to densely covered by reddish-brown arachnoid scales, segments linear 1.6–2.2 × 0.24–0.29 cm, margins plane to slightly revolute, abaxial surface with arachnoid scales on the secondary veins, and midrib. **Buds** with reddish-brown, triangular scales, with apex filiform, base truncate, margins dentate, pseudoestipule present. **Veins** 1-forked; **Sori** medial, without paraphyses.

Distribution and habitat:—Endemic to Brazil (Paraná, Rio de Janeiro, Santa Catarina, São Paulo). This species occurs along forest edge in the Atlantic Forest domain at 600–1500 m.

Selected specimens examined:—BRAZIL. Paraná: Mananciais da Serra, Piraquara, 10 October 1967, *Dombrownski 2686* (PACA); Ponta Grossa, Parque Estadual de Vila Velha, 08 June 2004, *Schwartsburd 182* (UPCB); Rio de Janeiro: Petrópolis, Represa de Caxambu Pequeno, 27 February 1978, *Carauta 2866* (PACA); Itatiaia, Parque Nacional de Itatiaia, Monte Serrat, August 1933, *Brade 12619* (RB); Santa Catarina: Imaruí, Forquilha da Aratingaúba, Parque Estadual da Serra do Tabuleiro; 28º10’10”S, 48º52’13”W, 604 m, *Verdi et al. 4046* (FURB); Palhoça, Reserva Florestal dos Pilões, 28 November 1950, *Duarte 3170* (BHCB); São Paulo: Bananal, Estação Ecológica do bananal, na trilha entre a sétima e a sexta cachoeira do Córrego das Cobras, 22º48’23.5”S, 44º22’03.8”W, 1200 m, 10 March 2001, *Salino et al. 6369* (BHCB); Ribeirão Grande, Parque Estadual Intervales, trilha da Caçadinha com inicio na estrada do Carmo, 24º16’39.0”S, 48º25’09.0”W, 780 m, 15 April 2003, *Salino et al. 8431* (BHCB); São Luiz do Paratininga, Parque Estadual da Serra do Mar, núcleo Santa Virgínia, trilha do Poço do Pito, 23º18’42.0”S, 45º07’11.4”W, 915m, 05 March 2001, *Salino et al. 6202* (BHCB); Miracatu, Reserva Votorantim, Complexo Juquiá, trilha entre a vila de moradores e a caixa d’água, 24º01’47”S, 47º21’01”W, 455 m, 31 March 2013, *Almeida 3251* (BHCB).

Notes:—*Sticherus paulistanus* is morphologically related to *S. squamosus* but differs by having segments with scales restrict to the midribs and secondary veins, bud scales reddish-brown, triangular, with dentate margins and filiform apex, without fimbria and any kind of darkening, and rachises usually sulcate. *Sticherus squamosus* has segments lanose, bud scales stramineous, usually with basal darkening, fimbriate margins, and rachises usually terete. Gonzales & Kessler (2011) and Gonzales (2003) recognized *S. paulistanus* as synonym of *S. squamosus*, but we consider it as a distinct species based in the characters listed above (also see discussion under *S. squamosus*).

In the original description, Rosenstock (1925) cited three collections of *Brade* (*6924*, *5822*, and *6614*). We found nine exsiccate of these collections, eight of number *6924*, one of *6614*, and none of *5822*. Regarding number *6924*, we found two at US (both with transcript labels), two at S (one with original label and the other with a transcript label), one at US, one at PH, and one at NY (all with Rosenstock’s original labels). We chose as lectotype one of the S specimens, because it is the most complete specimen with an original label of Rosenstock. The FI specimen under *Brade 6614* must not be considered as a type, since it corresponds to *S. lanosus*, as is the B specimen under the number *6624*.

3.9. *Sticherus pruinosus* (Mart.) Ching (1940: 284). Figs. 9C, 10A–D, 11A.

Mertensia pruinosa Martius (1834: 109). *Gleichenia pruinosa* (Mart.) Mettenius (1863: 49). *Dicranopteris pruinosa* (Mart.) Maxon (1922: 29). Type:—BRAZIL. Minas Gerais: *s.d.*, *Freyreiss s.n.* (holotype M [M-0243583], photo!).

Mertensia pennigera Martius (1834: 59). *Gleichenia pennigera* (Mart.) Moore (1862: 381). *Sticherus penniger* (Mart.) Copeland (1947: 27). *Dicranopteris pennigera* (Mart.) Maxon (1922: 48). Type:—BRAZIL. Minas Gerais: Serra de São Geraldo, *s.d., Martius s.n.* (lectotype **designated here**, M [M-0243584], photo!, isolectotype M [M-0243585], photo!).

Mertensia angusta Klotzsch ex Sturm (1859: 225). *Gleichenia revoluta* Kunth var. *angusta* (Klotzsch ex J.W.Sturm) Christ (1908 :48). *Gleichenia angusta* (Klotzsch ex J.W.Sturm) Sehnem (1959: 542). *Gleichenia angusta* (Klotzsch ex J.W.Sturm) Lellinger (1984: 57) *hom. illeg.* Type:—BRAZIL. *Sellow s.n.* (holotype B [B 20 0139898] photo!, isotype K [K000589323]!).

Mertensia longipes Fée (1873: 87). *Gleichenia longipes* (Fée) Christ in Schwacke (1900: 690). *Sticherus longipes* (Fée) Copeland (1947: 27). Type:—BRAZIL. Serra do Pico, *s.d., Glaziou 5235* (lectotype **designated here**, P [P00625755] photo!, isolectotypes B [B 20 0139885] photo!, P [P00625754, P0625753] photos!, S [S05-9154] photo!, UC [UC181415] photo!).

Plants terrestrial. **Rhizomes** 2.2–3.27 mm thick, with scales dark-brown, rigid, linear-lanceolate, with apex acuminate, base truncate, margins setose. **Fronds** erect when young, becoming scrambling with age, 3–5(6)-forked, petiole 1.35–2.76 mm thick, ultimate branches 7.5–15.5 × 0.7–1.5 cm, linear to lanceolate, apex pinnatifid, base slightly reduced, abaxial surface moderately scaly on the rachis, scales light-brown, linear, apex acuminate, base slightly cordate, margins ciliate, adaxial surface sparse to densely covered by hyaline, filiform scales, segments deltoid 3.1–6.7 × 0.21–0.29 cm wide, margins slightly to strongly revolute, abaxial surface glabrescent, with hyaline, triangular scales, apex acuminate, base truncate, margins ciliate on the midrib, and hyaline hairs on secondary veins and laminar tissue, rarely glabrous. **Buds** with scales similar to those of the rachis, pseudoestipules present. **Veins** 1-forked. **Sori** medial to supramedial, without paraphyses.

Distribution and habitat:—Brazil (Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo), Bolivia, Colombia, Costa Rica, Ecuador, Panama, Peru, and Venezuela. In Brazil, this species occurs along roads, trails, and forest edge in the Atlantic Forest domain at 800–2000 m.

Notes:—*Sticheus pruinosus* is characterized by the small segments, linear ultimate branches, fronds up to 6-forked, and ciliate bud scales. It is morphologically related to *S. maritimus* (Hieron.) Nakai (1950: 23) but differs by having glabrescent abaxial surface, and less forked fronds, in addition to *S. maritimus* having a restricted distribution to a few areas of western Colombia and Ecuador. *Sticherus pruinosus* is also related to *S. revolutus* (Kunth) Ching (1940: 284) from which it differs by the absence of squamophores on the rhizomes, ultimate branch size, and the distribution of scales on the rachises.

In the original description of *Mertensia penigera*, Martius cited only the type locality "Prov. Minarum". We found two original specimens of Martius in M among his collections from Brazil, and we chose the most complete one as lectotype.

In the original description *Mertensia longipes*, Fée cited one collection of Glaziou (#*5235*) from Rio de Janeiro, Brazil, as type material. We found six specimens of this collection, three at P, one at B, one at UC, and one at S. We chose the most complete specimen with Fée's original label.

Selected specimens examined:—BRAZIL. Minas Gerais: Baependi, Parque Estadual da Serra do Papagaio, estrada de acesso à sede, 22º09'10"S, 44º44'04"W. 1710 m, 23 March 2015, *Dittrich 2037* (BHCB); Catas Altas, Parque Natural do Caraça, Bocaina, 21 December 2002, *Salino et al. 8233* (BHCB); Gonçalves, estrada de terra que chega a cidade, 22°40'25.9"S, 45°52'27.8"W, 1462 m, 28 October 2008, *Almeida 1510* (BHCB); Lima Duarte, Parque Estadual do Ibitipoca, gruta do Pico do Pião, 21º42'20.2"S, 43º52'15,5", 1664 m, 21 June 2007, *Almeida et al. 1164* (BHCB); Ouro Preto, distrito de Lavras Novas, 21 January 1996, *Salino 2421* (BHCB). Paraná: Campina Grande do Sul, Serra Ibitiraquiri, Pico Paraná, 1300 m, 22 July 1996, *Poliquesi 527* (MBM); Castro, Volta grande, 15 August 1973, *Hatschbach 32324* (MBM); Curitiba, Parque Municipal do Tingui, 900 m, 14 April 2007, *Schwartsburd 1336* (MBM); Guaratuba, Serra de Araçatuba, 1300 m, 25 February 2000, *Silva 3272* (MBM); Piraquará, Roça Nova, 21 May 1974, *Hatschbach 34443* (MBM). Rio de Janeiro: Itatiaia, Parque Nacional de Itatiaia, planalto, 20 June 1930, *Brade 10091* (RB); Teresópolis, Serra Carvalho, 12 February 1929, *Brade 9995* (RB). Rio Grande do Sul: Cambará do Sul, Cabana do Itaimbezinho, 29°08'02.7"S, 50°07'58.2"W, 986 m, 05 December 2015, *Gonzatti 2254* (HUCS); São Francisco de Paula, Parque Paraiso, 26 September 1999, *Wasum 152* (MBM); Paulo Frontin, *s.d.,* 07 November 2005, *Wasum 3212* (UPCB). Santa Catarina: Timbé do Sul, Serra da Rocinha, 28°47'58.0"S, 49°56'58.0"W, 112 m, 13 June 2009, *Verdi et al. 2328* (FURB); São Bento do Sul, Sertãozinho, Beira de estrada, após a igrejinha, 26°18'54.8"S 49°24'37.6"W, 924 m, 26 December 2015, *Schwirkowski 1419* (FURB); Rio Fortuna, Canyon Espraiado, Campo dos Padres, 27°59'26"S, 49°19'14"W, 145 m, 09 March 2010, *Verdi et al. 3838* (FURB); Urubici, Morro do Campestre, 27°58'35.0"S, 49°38'47.0"W, 984 m, 15 January 2013, *Funez & Zermiani 1433* (FURB); Garuva, Alto Quiriri, 26°02'21"S, 48°57'16"W, 1200 m, 04 November 2014, *Funez 3851* (FURB). São Paulo: Bananal, Estação Ecológica de Bananal, trilha para o Pico do Caracol, 22°46'47.0"S, 44°21'37.4"W, 1800 m, 13 September 2001, *Salino et al. 7554* (BHCB); Campos do Jordão, Reserva Florestal, São José dos Alpes, 1900 m, 29 September 1976, *Davis 3025* (UEC); Cunha, Parque estadual da Serra do Mar, 09 December 1996, *Salino 3007* (UEC).

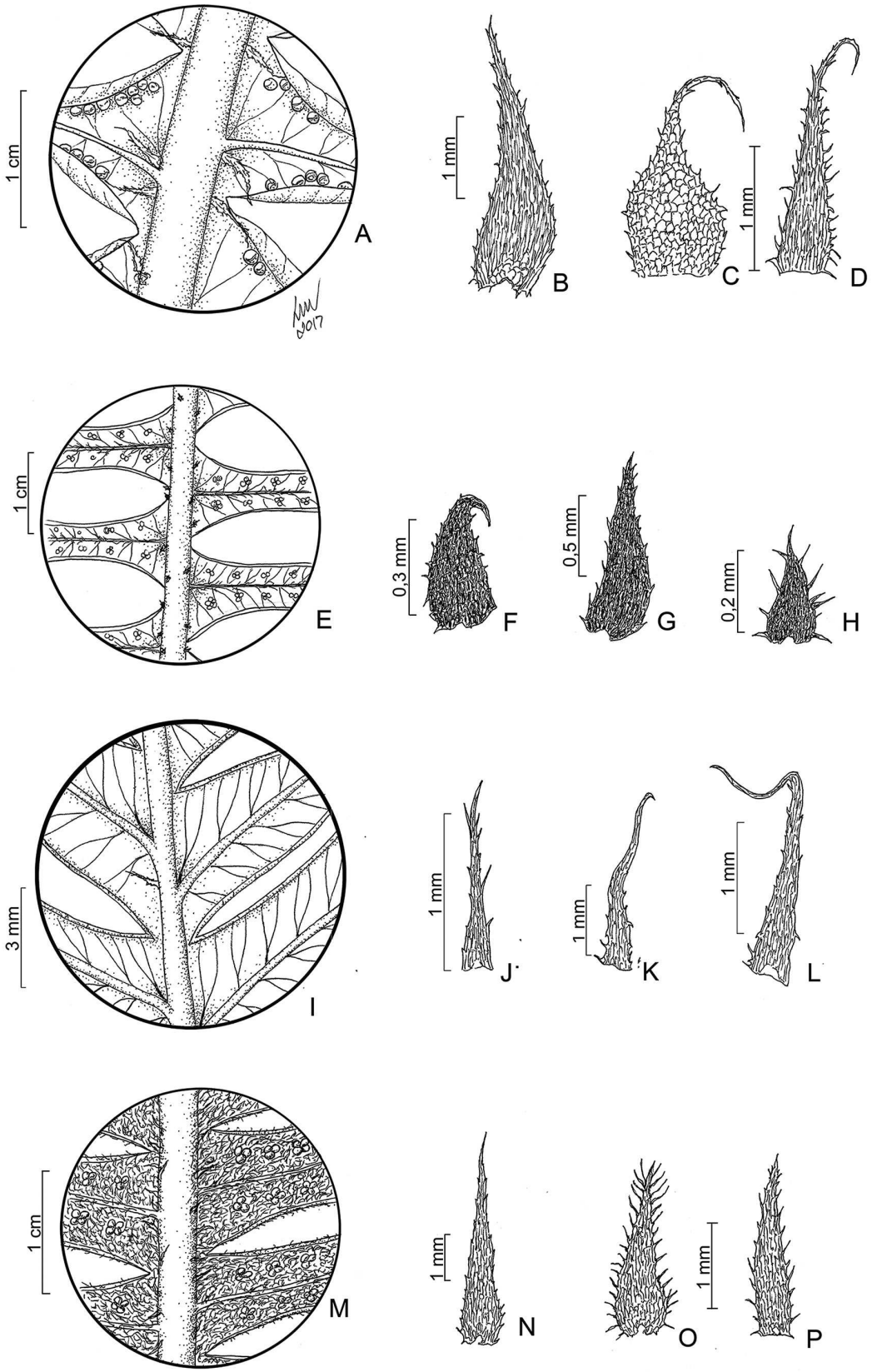

FIGURE 10. **A–E**. *Sticherus pruinosus* (*Salino 2421*, BHCB). **A**. Detail of the abaxial surface. **B**. Rhizome scale. **C**. Bud scale. **D**. Rachis scale. **E–H**. *S. remotus* (*Amorin et al. 1135*, BHCB). **E.** Detail of segments, abaxial surface. **F.** Rhizome scale. **G**. Bud scale. **H**. Rachis scale. **I–L**. *S. salinoi* (*Fernandes 771*, BHCB). **I**. Detail of the abaxial surface. **J**. Rachis scale. **K**. Rhizome scale. **L**. Bud scale. **M–P**. *S. squamosus* (*Dittrich 2030*, CESJ). **M**. Detail of the abaxial surface. **N**. Rhizome scale. **O**. Bud scale. **P**. Rachis scale.

3.10. *Sticherus remotus* (Kaulf.) Chrysler (1944: 483). Figs. 9C, 10E–H, 11B.

Mertensia remota Kaulfuss (1824: 39). *Dicranopteris remota* (Kaulf.) Maxon (1922: 50). *Gleichenia remota* (Kaulf.) Sprengel (1927: 27). Type:—BRAZIL. *without date, Chamisso s.n.* (holotype LZ destroyed; lectotype LE [LE00000264], photo!, chosen by Lellinger 1989: 232).

Gleichenia trachyrhizoma Christ (1906: 280). *Dicranopteris trachyrhizoma* (Christ) Maxon, (1909: 57). *Sticherus trachyrhizoma* (Christ) Copeland (1947: 28). Type:—COSTA RICA. Valle del Río Navarro, without date, *Wercklé s.n. pro parte* (lectotype P [P00625777] photo!, chosen by Lellinger 1989: 232, isolectotype S [S-R2420] photo!, UC [UC1560327] photo!, US [UC1568514] photo!, not P [P00625778] photo! not a type).

Gleichenia aequilateralis Jenman (1909: 353). Type:—GUIANA: Alto rio Demerara, *without date, Jenman 4149*. (lectotype **designated here**, NY [NY00144739] photo!, isolectotypes NY [NY00144739], [NY00144740] photos!).

Dicranopteris williamsii Maxon (1912: 21). *Gleichenia williamsii* (Maxon) Christensen (1913: 44). Type:—PANAMA. Província Darién, próximo Cana, without date, *Williams 917* (holotype US [US00065678] photo!, isotype NY [NY00144784] photo!).

Plants terrestrial. **Rhizomes** 3.14–5.21 mm thick, with brown, rigid, narrow-triangular scales, with apex attenuate, base truncate, margins dentate, and small squamophores. **Fronds** scrambling, 2–3- forked, petiole 2.95–3.30 mm thick, ultimate branches 11.5–40 × 3.8–7.5 cm, linear-lanceolate, apex pinnatifid, base slightly reduced, abaxial surface scaly on the rachis, scales brown, with apical darkening, narrow-triangular, apex attenuate, base truncate, margins dentate, segments linear 3.3–4.9 long × 0.13–0.17 cm, margins revolute, occasionally plane, abaxial surface sparse to moderately scaly, with stellate scales on midrib and arachnoid scales on the secondary veins and laminar tissue. **Buds** with scales similar to those of the rachis, pseudoestipule present. **Veins** 1-forked. **Sori** medial, without paraphyses.

Distribution and habitat:—Brazil (Acre, Amazonas, Roraima), Costa Rica, Ecuador, Guiana, Panama, and Suriname. In Brazil, this species occurs along forests edge in the Amazonian domain between 300 m and 800 m.

Notes:—*Sticherus remotus* is recognized by its remote segments, rhizomes with small squamophores, pseudostipule trifid or more divided, and stellate scales on the midribs and bases of the branches. *Sticherus remotus* may be also be confused with an unusual form of *S. nigropaleaceus* with subremote segments, but is clearly distinguished by the deeper sinus incision of the segments, and by the nigrescent bud scales of *S. nigropaleaceus*. Some authors (*e.g.* Østergaard & Ølgaard 2001, Gonzales & Kessler 2011), assigned the type locality of *S. remotus* to Santa Catarina state, but the original description and the label of the type material do not have any locality indication. From a geographic distribution point of view, it is unlikely that the type locality is in Santa Catarina since this species has an Amazonian distribution.

In the original description of *Gleichenia aequilateralis*, the author only mentioned the collector and his number, *Jenman 4149*. We found tree specimens at NY of this collection, and here we chose the most complete as lectotype.

Selected specimens examined:—BRAZIL. Acre: *without date*, 22 October 2001, *Prado 1300* (UFACPZ). Amazonas: Manaus, Cachoeira de Tarumã, 14 November 1957, *Pereira 3464* (RB); *Id.*, Reserva Florestal Ducke, Manaus/Itacoatiara, Km 26, estação meteorológica, 02°53'S, 59°58'W, 14 May 1996, *Costa 518* (K, UEC); Manaus–Caracarai Rd., Km 45, 27 September 1974, *Conant et al. 1123* (K). Roraima: Amajari, 04°03'00"N, 64°22'12"W, 800 m, 05 February 1969, *Prance 9606* (K, MO).

3.11. *Sticherus salinoi* Lima (2018: 80). Figs. 9B, 10I–L, 11C, 12F.

Type:—BRAZIL. Piauí: Caracol. Parque Nacional da Serra das Confusões, Gruta do Riacho do Boi, 430 m, 19 July 2012, *Fernandes, R.S. 771* (holotype BHCB, isotypes CESJ, MG, TEPB).

Plants terrestrial. **Rhizomes** 2.15–3.0 mm thick, with golden, rigid, triangular scales, with apex attenuate, base truncate, margins setose. **Fronds** scrambling, 2–3-forked, petiole 2.12–2.85 mm thick, ultimate branches 15–28.5 × 2.8–5 cm, elliptic, apex long-caudate, base cuneate, with segments reduced to auricles, abaxial surface glabrescent on the rachis, scales hyaline, triangular, apex filiform, base truncate, margins ciliate, segments linear 0.3–2.9 × 0.24–0.31 cm, margins plane, abaxial surface glabrous. **Buds** with orange-red, linear scales, with apex filiform, base truncate, margins setose, pseudoestipule present. **Veins** 1-forked. **Sori** medial, without paraphyses.

Distribution and habitat:—Endemic to Brazil (Piauí) where it grows in cracks of sandstone massivs in the Caatinga domain.

Notes:—*Sticherus salinoi* differs from the other Brazilian *Sticherus* by having segments glabrous, strongly ascending, and proximal segments reduced to auricles on the ultimate branch bases. It is only known from the type material, which comes from a region with great deficit of collecting efforts.

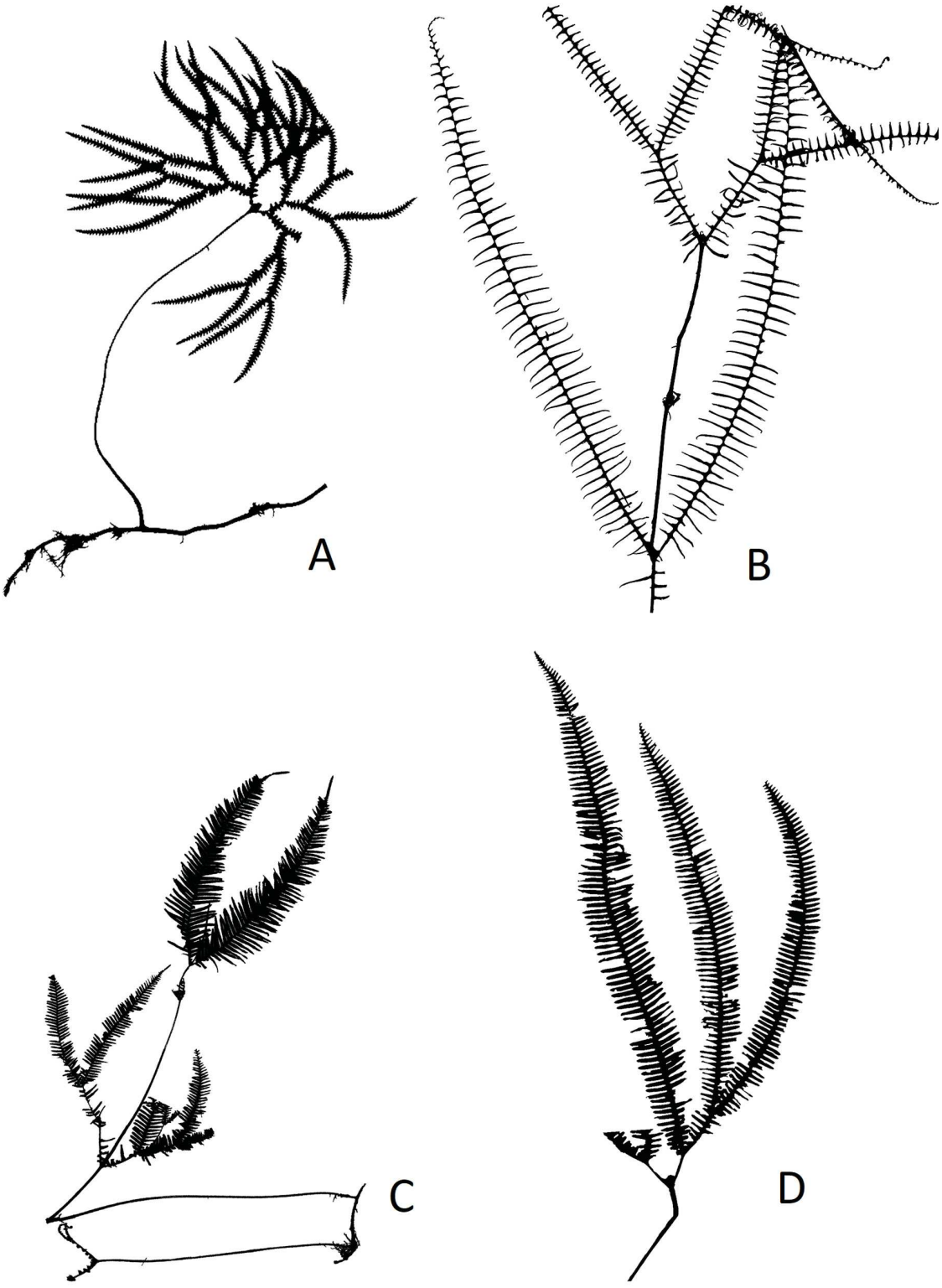

FIGURE 11. Habit. **A**. *Sticherus pruinosus*. **B**. *S. remotus*. **C**. *S. salinoi*. **D**. *S. squamosus*.

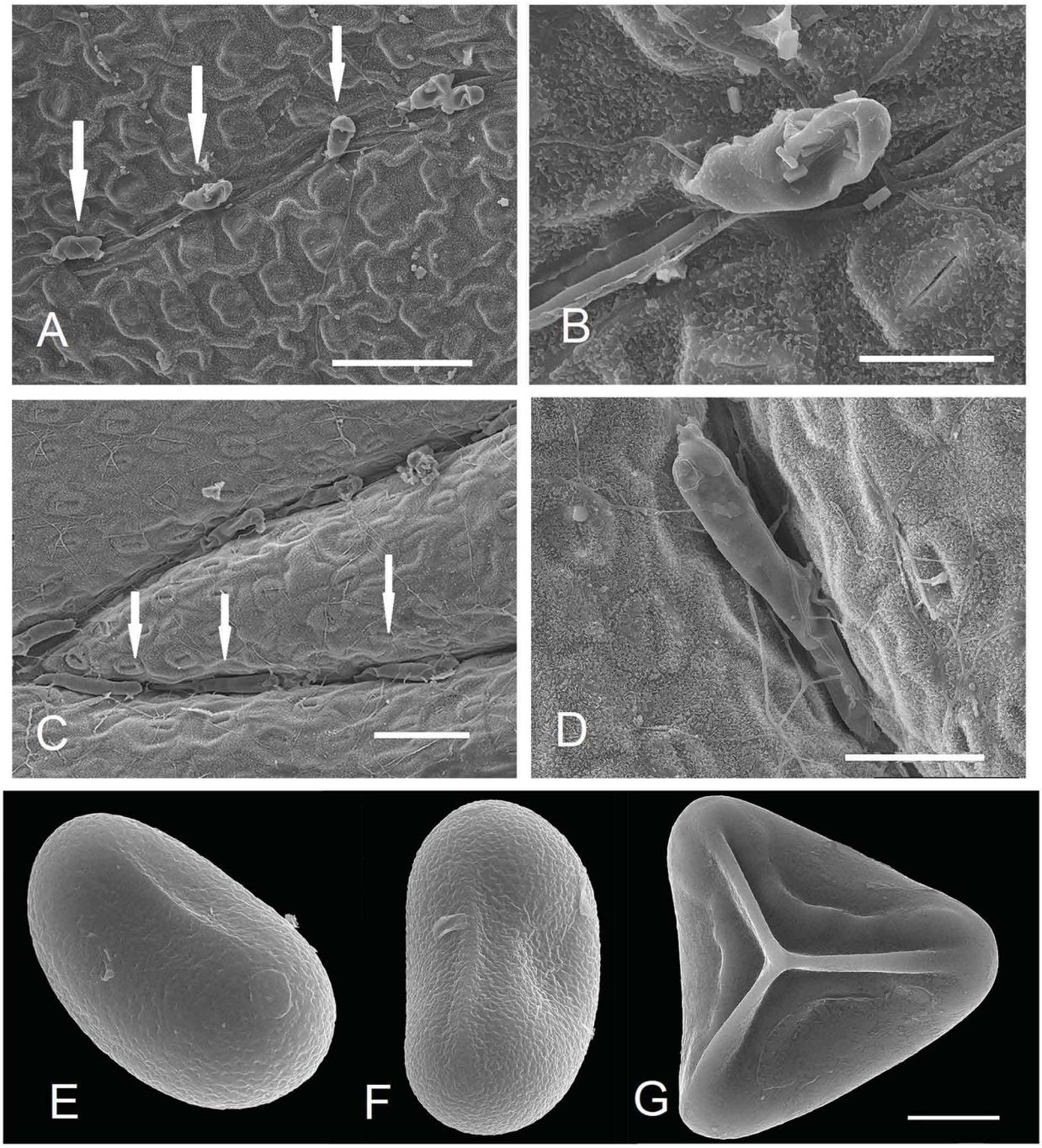

FIGURE 12. **A–B.** *D. flexuosa* (*Almeida 302*). **A.** Globose glandular hairs on the secondary veins of the segments. Scale bar 100 µm. **B.** Detail of a colapsed glandular hair, due to the herborization processes. Scale bar 25 µm. **C–D.** *D. rufinervis.* (*Viveros 26*) **C.** Baciliform glandular hairs on the secondary veins of the segments. Scale bar 150 µm. **D.** Detail of the glandular hair. Scale bar 50 µm. **E**. Spores of *G. pectinata*. **F**. Spores of *S. salinoi*. **G**. Spores of *D. flexuosa*. Scale bar 10 µm.

3.12. ***Sticherus squamosus*** (Fée) J. Gonzales (2011: 47). Figs. 9D, 10M–P, 11D.

Mertensia squamosa Fée (1869: 202). Type:—BRAZIL. Minas Gerais: 8 April 1868, *Glaziou 2279 pro part* (lectotype **designated here**, P [P00625790], photo!, isolectotype BR [BR0000006972103] photo!) Excluded syntypes: FI [FI00400] photo! not a type, B [20 0131884] photo! not a type.

Gleichenia lanosa Christ in Schwacke (1900: 35). *Sticherus lanosus* (Christ in Schwacke) J. Gonzales (2011: 32). Type:—BRAZIL. Minas Gerais: Ouro Preto, Córrego do Macaco, 30 July 1896, *Schwacke 12475* (lectotype **designated here**, P [P00625768] photo!, isolectotypes BHCB [BHCB000164]!, P [P00625767] photo!, RB [RB00671327] photo!).

Plants terrestrial. **Rhizomes** 3.75–5 mm thick, with reddish-brown, soft triangular scales, with apex attenuate, base truncate, margins dentate. **Fronds** scrambling, 2–3(4)-forked, petiole 3–6.5 mm thick, ultimate branches 24.5–42 × 3.5–6.5 cm, elliptic occasionally linear, apex pinnatifid, base slightly reduced, abaxial surface densely scaly on the rachis, scales stramineous, narrow-triangular to linear, with apex filiform, base truncate, margins long-ciliate, adaxial surface sense to moderately covered by stramineous to hyaline filiform scales, segments linear 1.7–3.6 × 0.35–0.49 cm, margins plane to revolute, abaxial surface tomentose, with arachnoid scales on laminar tissue and secondary veins, midrib with arachnoid and stellate scales with long-ciliate margins. **Buds** with light-brown to reddish, triangular to deltoid scales, usually with basal or central darkening, with apex filiform, base truncate, margins short-ciliate, pseudoestipule present only at the first branch. **Veins** 1-forked. **Sori** medial, with paraphyses.

Distribution and habitat:—Endemic to Brazil (Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo). This species occurs along forest edges in the Atlantic Forrest domain at 600–1800 m.

Notes:—*Sticherus squamosus* is characterized by the large size of the ultimate branches, petioles covered by caduceus scales, rachises usually terete, and abaxial surfaces of the segments tomentose. Gonzales & Kessler (2011) recognized *Sticherus lanosus* as a separate species from *S. squamosus* by the pattern of the bud scale darkening and the density of the indument on the abaxial surfaces of the segments. However, our study of the types and several other Brazilian specimens have led us to conclude that the differences listed by Gonzales & Kessler (2011) are not consistent and of limited taxonomic value.

In the original description of *Mertensia squamosa*, Fée (1869) cited *Glaziou 2279* as type material, and also cited as type locality "Habitat in Brasilia Fluminense", which means Rio de Janeiro State. We found four specimens under this number, three at P and one at BR. Among the P specimens there was only one specimen with Fée's original label with the locality assigned to Rio de Janeiro. The other two specimens have original label of Glaziou, but the type locality is assigned to Minas Gerais "de Juiz de Fora a Ubá". Furthermore, one of these two specimens it is not *S. squamosus*, but *S. bifidus*. The BR specimen has a transcript label and the locality is assigned to Rio de Janeiro. In this context, we chose as lectotype the most complete specimen with Fée's original label.

In the original material of *Gleichenia lanosa*, the author cited as type material the collection *Schwacke 12475* from Ouro Preto, Minas Gerais, Brazil. We found four specimens under this collection number, two at P, one at BHCB, and one at RB. The only specimen with transcript label is the one at BHCB. Furthermore, on that specimen the collection date is different from the others: The year on this label is 1904, the same year of Schwacke death. At this year, Schwacke was hospitalized at Barbacena, in Minas Gerais State. Therefore, this may be a mistake during the transcription of the label information. We chose as lectotype the most complete specimen with an original label of Schwacke, which is in P.

Selected specimens examined:—BRAZIL. Espírito Santo: Divino de São Lourenço, Parque Nacional do Caparaó, RPPN Águas do Caparaó, Cachoeira Alta ao longo do córrego do Veadinho, 20º35'49,2"S 41º46'52,5"W, 1000 m, 12 September 2008, *Salino et al. 13827* (BHCB). Minas Gerais: Buenópolis, Parque Nacional das Sempre Vivas, Campos de São Domingos, cabeceira do Córrego São Domingos, 17º55'53.5"S 43º46'25.9"W, 1323 m, 28 April 2007, *Almeida et al. 812* (BHCB); Catas Altas, Santuário do Caraça, Serra do Caraça, 20º07'52.8"S 43º51'48.7"W, 21 August 2005, *Salino et al. 10541* (BHCB); Conceição do Mato Dentro, Parque Natural Municipal do Ribeirão do Campo, 01 August 2002, *Mota 1563* (BHCB); Espera Feliz, Parque Nacional do Caparaó, 20º29'28"S, 41º49'17"W, 1735 m, 12 September 2016, *Salino 16227* (BHCB); Simonésia, RPPN Mata do Sossego, 20º04'02.0"S, 42º04'40.4"W, ca. 1300 m, 20 May 2006, *Salino et al. 11054* (BHCB). Rio de Janeiro: Alto Macaé, *Glaziou 4457* (RB); Itatiaia, Monte Serrat, May 1933, *Brade 12617* (RB); Resende, Parque Estadual da Pedra Selada, 22º18'48"S 44º21'47"W, 629 m, 04 May 2015, *Cardoso 1330* (RB); Santa Maria Madalena, Pedra Dubois, 28 February 1934, *Santos 13182* (RB). São Paulo: Bananal, Estação ecológica de Bananal, trilha das Sete Quedas do Rio das Cobras, 22º48'02.6"S, 44º22'34.3"W, 17 June 2003, *Salino et al. 8809* (BHCB). Campos do Jordão, 20 February 1937, *Porto 3201* (RB).

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