

New Combinations in *Serpocaulon* and a Provisional Key for the Atlantic Rain Forest Species

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ABSTRACT.—This paper presents new combinations for two species of *Serpocaulon* from southeastern Brazil: *S. glandulosissimum* and *S. sehnemii*. We provide a provisional key for the species, comments, descriptions, and illustrations for all studied taxa.

KEY WORDS.—Brazil, goniophleboid venation, new combination, Polypodiaceae

Polypodiaceae is one of the largest families of ferns, with about 56 genera and 1,200 species, most of them epiphytic or epipetric (a few terrestrial) in tropical areas (Smith *et al.*, 2006a). Based on recent phylogenetic studies, Smith *et al.* (2006a) presented a broad circumscription for the family, including within Polypodiaceae the grammitid ferns, a group of species often segregated as Grammitidaceae. Furthermore, some traditionally recognized genera (e.g., *Polypodium*) have been redefined, resulting in smaller, monophyletic groups. One newly described segregate of *Polypodium* is *Serpocaulon* (Smith *et al.*, 2006b), a monophyletic genus that includes species with regularly anastomosing (goniophleboid) veins, wide-creeping rhizomes with clathrate and usually peltate scales, and non-paraphysate sori. In *Polypodium* the veins are free or form a single row of areoles, the rhizomes are shorter-creeping, and the scales are not clathrate and invaginated at the base. *Polypodium* is a north-temperate, Mexican, or Mesoamerican genus, while *Serpocaulon* is entirely neotropical or subtropical, with most of the species occurring in South America (Smith *et al.*, 2006b). Currently, *Serpocaulon* has about 40 species, with most of the species occurring in the humid forests of the Andes and southeastern Brazil (Smith *et al.*, 2006b).

A taxonomic study for this group was presented by Hensen (1990, cited as the *Polypodium loriceum* complex). However, some of the Hensen concepts are not clear, leading to erroneous or inaccurate characterizations of the species (for more details see Moran, 1990). Among the Brazilian species included in this paper, many of them are very common and well represented in herbaria, but in many cases misidentified. Other species seem to be narrow endemics, and have not been considered in recent taxonomic studies.

Serpocaulon is especially diverse in the Atlantic Rain Forest, from southern Bahia to northern Rio Grande do Sul States, and is present in many floristic surveys and ecological studies. Because of the importance of this genus in this

part of Brazil, and because species names are needed in many studies in preparation, we present a new view on species delimitation, with a key, short descriptions, comments, and illustrations for all taxa. Additionally, some new combinations are made.

PROVISIONAL KEY TO THE ATLANTIC RAIN FOREST SPECIES OF BRAZIL

1. Laminae entire *S. levigatum*
1. Laminae pinnate or pinnatisect
 2. Laminae pinnate
 3. Medial pinnae sessile, but not adnate *S. fraxinifolium*
 3. Medial pinnae adnate, at least on the acroscopic side
 4. Rachises and costae with ovate to lanceolate scales and hairs abaxially, and only with whitish hairs adaxially *S. meniscifolium*
 4. Rachises and costae glabrous on both sides, or only with linear scales and sparse light brown to reddish hairs abaxially *S. triseriale*
 2. Laminae pinnatisect
 5. Laminae essentially glabrous or bearing only small, whitish to reddish, entire or branched, filiform scales abaxially
 6. Rhizomes dark brown to black, rugose upon drying, with white wax-like deposits; laminar scales scarce, present at the costal bases, not clathrate, whitish and conspicuously branched *S. catharinae*
 6. Rhizomes brown to greenish, not or only slightly rugose upon drying, without wax-like deposits; laminar scales present at the costule bases, clathrate, reddish brown and entire *S. latipes*
 5. Laminae pubescent at least on one surface, the indument of hairs only, or with both hairs and scales
 7. Laminar hairs glandular; rhizomes with whitish wax-like deposits. *S. glandulosissimum*
 7. Laminar hairs non-glandular; rhizomes without wax-like deposits
 8. Laminae densely hirsute; laminar hairs long, 0.3 mm long, 4–7 celled . . . *S. mexiae*
 8. Laminae glabrescent; laminar hairs short, ca. 0.1 mm long, 1–2 celled
 9. Laminae papyraceous; secondary and tertiary veins not raised on the abaxial laminar surfaces *S. sehnemii*
 9. Laminae subcoriaceous; secondary veins raised on the abaxial laminar surfaces, the tertiary veins slightly raised *S. vacillans*

Conspectus of the species

Serpocaulon catharinae (Langsd. & Fisch.) A. R. Sm., Taxon 55: 928. 2006.
Polypodium catharinae Langsd. & Fisch., Pl. Voy. Russes Monde 1, tab. 9.
 1810. Lectotype (designated by Hensen, Nova Hedwigia 50: 292. 1990):
 “Habitat in insula Sanctae Catharinae Brasiliae” (LE). **Fig. 1. A–C**

Rhizome surfaces dark brown, rugose, somewhat glaucous by a whitish wax-like deposit; rhizome scales rounded at base, each abruptly long-tapering to a filiform apex, clathrate, dark reddish, not or slightly shiny, margins hyaline and lacerate, sometimes ciliate, distant or partially imbricate, covering (especially at the apex or at the phyllopodia) or not the rhizome surfaces; laminae pinnatisect, chartaceous; medial segments adnate; costae, costules, laminar tissue, and veins essentially glabrous, or bearing whitish, branched

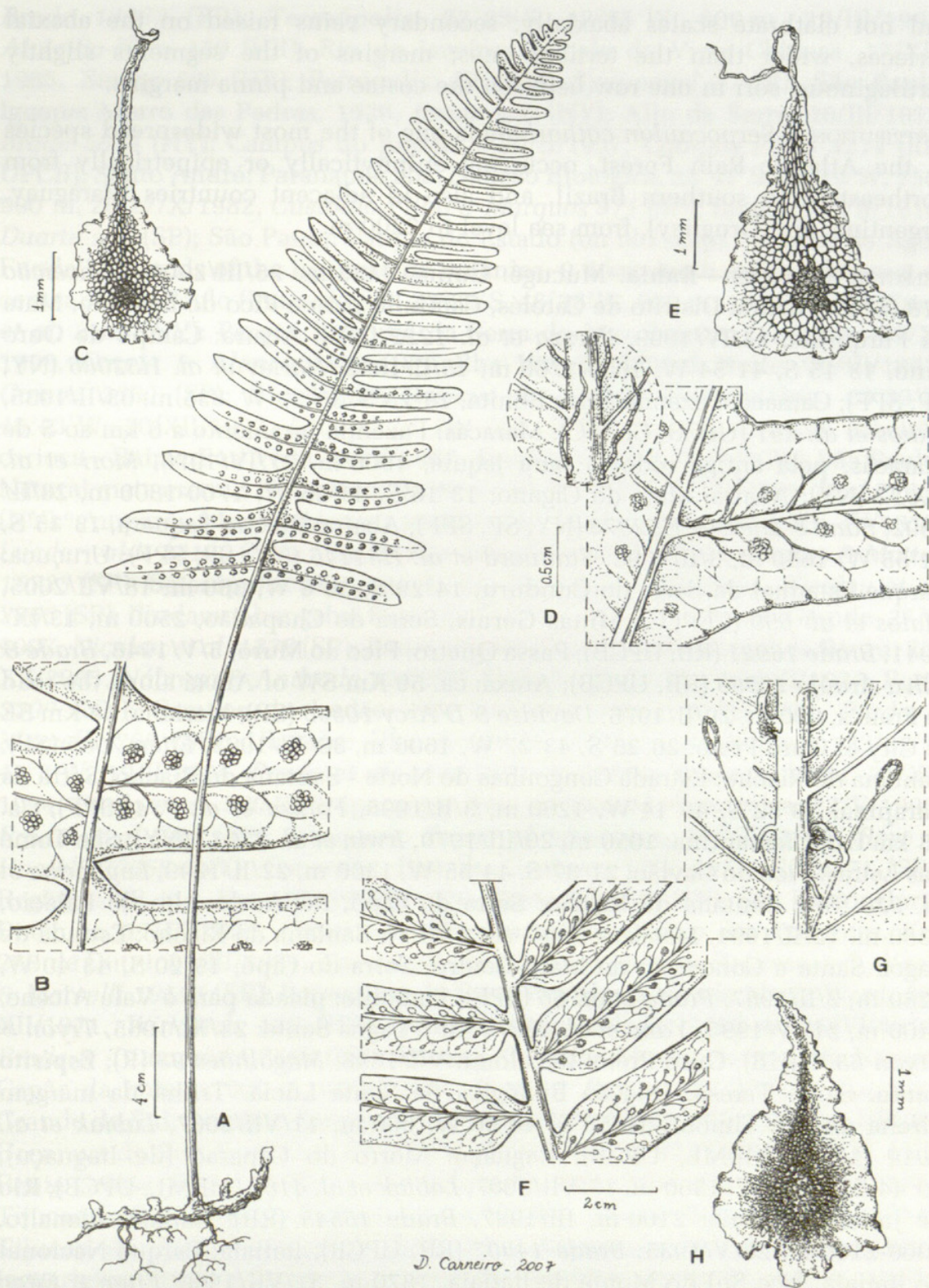


FIG. 1. A–C. *Serpocaulon catharinae* (Labiak 101). A. Habit. B. Segment detail. C. Rhizome scale. D–E. *S. latipes* (Labiak et al. 3964). D. Segment detail, showing the scales on the costal bases. E. Rhizome scale. F–H. *S. meniscifolium* (Labiak & Goldenberg 3043). F. Pinnae detail. G. Scales and hairs on the costal bases. H. Rhizome scale.

and not clathrate scales abaxially; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of the segments slightly cartilaginous; sori in one row between the costae and pinna margins.

DISTRIBUTION.—*Serpocaulon catharinae* is one of the most widespread species in the Atlantic Rain Forest, occurring epiphytically or epipetrically from northeastern to southern Brazil, and also in adjacent countries (Paraguay, Argentina, and Uruguay), from sea level to 2200 m.

SELECTED SPECIMENS.—**Bahia.** Mucugê: Guiné, 1435 m, 25/III/2000, *Conceição 818* (SPF); Abaíra: Distrito de Catolés, Caminho para o Pico do Barbado, Mata da Furquilha, 14/IV/1999, *Forzza et al. 1222* (NY); Abaíra: Campo de Ouro Fino, 13°15'S, 41°54'W, 1600-1700 m, 15/II/1992, *Harley et al. H52086* (NY, SP, SPF); Camacã: Fazenda Serra Bonita, 15°23'S, 39°33'W, 835 m, 03/II/1935, *Matos et al. 291* (UPCB, CEPEC); Maracás: Fazenda Juramento a 6 km ao S de Maracás, pela antiga rodovia para Jequié, 1000 m, 27/IV/1978, *Mori et al. 10027* (NY); Abaíra: Mata do Cigano, 13°16'S, 41°55'W, 1700-1800 m, 28/II/1992, *Sano & Laessle H52378* (NY, SP, SPF); Abaíra: Riacho Taquara, 13°15'S, 41°55'W, 1650 m, 3/II/1992, *Stannard et al. H51146* (NY, SP, SPF); Uruçuca: Parque Estadual da Serra do Cunduru, 14°29'S, 38°6'W, 380 m, 18/VII/2005, *Matos et al. 699* (CEPEC); **Minas Gerais.** Serra do Chapadão, 2500 m, 13/IX/1941, *Brade 16921* (RB, UPCB); Passa Quatro: Pico do Muro, 5/V/1948, *Brade & Silva Araújo 18969* (RB, UPCB); Araxá: ca. 59 Km SW of Araxá along the road to Franca, 900 m, 29/II/1976, *Davidse & D'Arcy 10895* (SP); Mariana: 06 Km SE of City of Ouro Preto, 20°26'S, 43°27'W, 1600 m, 30/XI/1965, *Eiten 7055* (SP); Santana do Riacho: Estrada Congonhas do Norte - Santana do Riacho, Serra da Carapina, 18°52'S, 43°14'W, 1200 m, 3/II/1998, *Forzza et al. 734* (SPF); Ca. 18 km E of Diamantina: 1050 m, 20/III/1970, *Irwin et al. 27937* (NY); São Tomé das Letras: Pico do Gavião, 21°37'S, 44°55'W, 1360 m, 22/II/1999, *Lughadha et al. 220* (SP); Santana do Riacho: Serra do Cipó, Retiro do Alto do Palácio, 1380 m, 12/II/1991, *Menezes et al. 4952* (SPF); Santana do Riacho: Estrada de Lagoa Santa a Conceição do Mato Dentro, Serra do Cipó, 19°20'S, 43°40'W, 1280 m, 2/II/1987, *Prado et al. 86* (SPF); Itamonte: picada para o Vale Alcene, 2400 m, 21/IV/1995, *Yano et al. 23873* (SP); Lagoa Santa: 23/XI/1965, *Tryon & Tryon 6828* (HB); Ouro Preto: Itacolomi, VII/1896, *Magalhães 93* (R); **Espírito Santo.** Santa Teresa: Estação Biológica de Santa Lúcia. Trilha da margem direita do Rio Timbuí, 19°53'S, 40°36'W, 600 m, 11/VII/2007, *Labiak et al. 4019* (MBM, MBML, UPCB); Itaguaçu: Morro do Caparaó (de Itaguaçu), 19°44'S, 40°58'W, 1360 m, 17/VII/2007, *Labiak et al. 4167* (MBML, UPCB); **Rio de Janeiro.** Itatiaia: 2100 m, III/1937, *Brade 15545* (RB); Itatiaia: Planalto, 2000-2100 m, 28/V/1935, *Brade 14507* (RB, UPCB); Itatiaia: Parque Nacional do Itatiaia, face Sul do Monte de Itatiaia, 1870 m, 31/VII/1966, *Eiten & Eiten 7690* (SP); Resende: Vicinity of Itatiaia, 26-30/VII/1915, *Rose & Russell 20433* (NY); Ipanema, 16/VII/1927, *Harshberg 815* (NY); Serra dos Órgãos, 1900 m, 15/VII/1940, *Brade 16390* (RB, UPCB); Nova Friburgo: Pico da Caledônia, 22°21'S, 42°35'W, 2219 m, 15/VI/2004, *Mello-Silva et al. 2604* (SP, SPF); Santa Maria Madalena: Serra da Furquilha, 1500 m, 04/III/1935, *Santos Lima &*

Brade 14362 (RB); Teresópolis: 22°23'S, 42°55'W, 800 m, 29/III/1997, *Almeida-Neto* 130 (HB); Rio de Janeiro: Estrada da Vista Chinesa, 17/XII/1965, *Strang* 689 (HB); Petrópolis: III/1924, *Spannagel* 17 (R); **São Paulo**. Iguape: Morro das Pedras, 1926, *Brade* s.n. (NY); Alto da Serra, 16/III/1913, *Brade* 5834 (NY); Campos do Jordão: 5-20/II/1937, *Campos Porto* 3214 (RB, UP CB); Santo André: Paranapiacaba, Estação Biológica, 23°47'S, 46°19'W, 750-900 m, 26-27/X/1982, *Custódio-Filho & Marques* 971 (SP); Bragança: VII/1910, *Duarte* s.n. (SP); São Paulo: Parque do Estado (on old maps "Parque de Água Funda", grounds of the Instituto de Botânica, 9.9 km south and 1.4 km east of center of São Paulo (Praça da Sé), 23°36'S, 46°38'W, 800 m, 14/VII/1960, *Eiten et al.* 2102 (NY); Parque Estadual da Serra do Mar, Núcleo Curucutu, 29/X/1998, *Garcia & Alonso* 1640 (SP); Ilha Vitória, Litoral Norte, 30/III/1965, *Gomes* 2660 (SP); São Paulo: Reserva da Cidade Universitária, 23°33'S, 46°43'W, 20/XII/1997, *Groppa Jr.* 281 (SP, SPF); Ribeirão Grande: Ribeirão carioca - Bairro Boa Vista, 30/V/1997, *Kersten & Silva* 56 (UP CB); São Paulo: Natural mata around Herbarium, Instituto de Botânica, 25/XI/1988, *Kral* 75708 (NY); Amparo: Monte Alegre, 18/XII/1942, *Kuhlmann* 100 (SP); IV/1910, *Luederwaldt* 22100 (NY); Ilha de São Sebastião, 27/XII/1971, *Mattos & Mattos* 15723 (SP); Salesópolis: Margens do Rio Paraitinga, 29/I/2001, *Nicolau et al.* 2665 (SP); Pindamonhangaba: Fazenda São Sebastião do ribeirão Grande, 25/I/1997, *Nicolau et al.* 1338 (SP); Bauru: Jardim Botânico Municipal de Bauru, 22/XII/2005, *Nóbrega & Andrade* 124 (SP); Campos do Jordão: 5-20/II/1937, *Porto* 3209 (NY); Campos do Jordão: São José dos Alpes, 21/III/1996, *Prado & Marcelli* 768 (SP); Ubatuba: Ilha Anchieta, Trilha para Represa, 23°32'S, 45°3'W, 19/II/2004, *Prado et al.* 1543 (SP); Juquitiba: Fazenda Itereí, 21/XI/1994, *Prado et al.* 520 (SP); Iporanga: Área da Fazenda Intervalles, 22/V/1996, *Prado et al.* 915 (SP); Jabaquara: Forest of Jabaquara, 15/VIII/1915, *Rose & Russell* 20868 (NY); Cananéia: Ilha do Cardoso, 17/V/1977, *Silva* 71 (SP); Registro: BR-116, Km 177, 19/XII/1976, *Tosta Silva* 69 (SP); São Paulo: Horto Botânico, 17/IX/1905, *Usteri* s.n. (SP); Guarulhos: Bairro dos Pimentas, Km 268 da Dutra, 01/III/1981, *Yano* 3201 (SP); Ibiuna: perto da Represa, s.d., *Yano & Marcelli* 19193 (SP); Itapeirica da Serra: Estrada da escola Maria Ward, 09/XII/1971, *Windisch* 129 (HB); Serra do Itapetininga: 1100 m, 26/VI/1914, *Brade & Tamandaré* 7594 (HB); **Paraná**. Curitiba: Museu de História Natural Capão da Imbuia, 900 m, 09/XI/2001, *Borgo & Ramos* 838 (UP CB); Campina Grande do Sul: Ribeirão Grande, 06/II/1968, *Hatschbach* 18532 (MBM, UP CB); Bocaiuva do Sul: Sant'Ana, 27/I/1970, *Hatschbach* 23414 (MBM, UP CB, UC); Ponta Grossa: Passo do Pupo, Furna Grande, 20/V/2004, *Kersten* 891 (UP CB); Tijucas do Sul: Serra de Papanduva, 14/V/1998, *Silva & Barbosa* 2383 (MBM); Tijucas do Sul: Vossoroca, 26/II/1974, *Kummrow* 384 (MBM, UP CB); Jaguariáiva: Parque Estadual do Cerrado, 24°10'S, 49°39'W, 800 m, 12/IV/1994, *Labiak* 173 (UP CB); Paranaguá: Ilha do Mel, Estação Ecológica, 25°30'S, 48°18'W, 4 m, 15/II/2004, *Labiak et al.* 3143 (UP CB); Tijucas do Sul: Morro do Araçatuba, 1600 m, 01/I/2005, *Matos & Silva* 175 (UP CB); Adrianópolis: Parque Estadual das Lauráceas, 24°40'S, 48°32'W, 12/XII/2006, *Matos et al.* 1305 (UP CB); Antonina: Reserva Natural do Rio Cachoeira. Trilha do Mirante,

25°18'S, 48°41'W, 300 m, 25/III/2006, *Matos et al.* 1118 (UPCB); Morretes: Parque Estadual do Pico do Marumbi, Morro do Facãozinho, 900 m, 23/IX/2000, *Petean* 101 (UPCB); Guaraqueçaba: Trilha do Vale do Rio Real, 25°20'S, 48°12'W, 100 m, 17/IV/1993, *Prado et al.* 509 (UPCB); Campo Largo: Taquara, 04/III/1990, *Ribas* 274 (MBM, UPCB); Ponta Grossa: Parque Estadual de Vila Velha, 22/XII/2000, *Rosa* 133 (NY); Três Barras do Paraná: Estreito do Rio Guarani, 26/III/1993, *Salino s.n.* (UPCB); Guaraqueçaba: Serra Gigante, 1020 m, 15/VII/2003, *Scheer et al.* 742 (UPCB); Ponta Grossa: Parque Estadual de Vila Velha, 25°14'S, 50°0'W, 1000 m, 05/IV/2004, *Schwartsburd & Nogueira* 77 (SP); Jaguariaíva: Próximo ao Rio jaguariaíva, 09/VII/2005, *Schwartsburd et al.* 842 (UPCB); Campo Largo: Serra do Purunã, 01/II/1983, *Kummrow* 2215 (MBM); Lapa: Col. S. Carlos, 13/VIII/1982, *Oliveira* 626 (MBM); Tunas do Paraná: Parque Estadual de Campinhos, 08/V/1998, *Ribas et al.* 2650 (MBM); Mandirituba: Rio do Maurício, 18/I/1971, *Hatschbach* 25986 (MBM); Dois Vizinhos: Foz do Rio Chopim, 14/IX/1972, *Hatschbach* 30314 (MBM); Ipiranga: 15/II/1904, *Dusén* 3767 (R); **Santa Catarina.** Blumenau: *Haerchen* 18 (NY, UC); Itapoá: Reserva Volta Velha, 10 m, 26/III/1994, *Labiak* 101 (UPCB); Itapoá: Reserva Volta Velha, 10 m, 21/VIII/1993, *Negrelle & Lomdero* A-916 (UPCB); Rio dos Patos, Lebon Regis, 900 m, 23/IV/1962, *Reitz & Klein* 12884 (NY); Campo Alegre: Serra do Quiriri, 1000 m, 27/XII/2004, *Ribas et al.* 6567 (MBM, UPCB); Lages: II/1905, *Spannagel* 89 (NY, UC); Lages: II/1905, *Spannagel* 82 (NY); Lebon Regis: Rio dos Patos, Lebon Regis, 900 m, 23/IV/1962, *Reitz & Klein* 12884 (HB); **Rio Grande do Sul.** Estação São Salvador, 1940, *Leite s.n.* (SP); São Leopoldo: Morro Sapucaia, 20/IX/1934, *Sehnem s.n.* (SP); Porto Alegre: 1907, *Stiers* 333 (NY); São Francisco de Paula: Fazenda Violeta, 29°29'S, 50°28'W, 850 m, 09/I/2004, *Rossato* 221 (MBM); Torres: BR 101, Km 6, Campo Bonito, 10/II/1983, *Kaprovickas & Cristóbal* 38492b (MBM).

Serpocaulon catharinae is one of the most common species in Brazil, and can be distinguished by its rugose rhizomes, with wax-like deposits and dark brown scales, these sparse and not covering the rhizome surfaces. Among the Brazilian species, *S. catharinae* is often confused with *S. latipes*, the latter differing by having non-rugose rhizomes, lacking wax-like deposits, and having light brown, shiny rhizome scales.

Serpocaulon fraxinifolium (Jacq.) A. R. Sm., *Taxon* 55: 928. 2006. *Polypodium fraxinifolium* Jacq., *Collectanea* 3: 187. 1789. TYPE.—Cultivated at Schönbrunn from material collected in Venezuela, Distr. Federal, Caracas (holotype W). **Fig. 2. A–C**

Rhizomes brown to greenish, not rugose, lacking whitish wax-like deposits; rhizome scales lanceolate, clathrate, dark brown, margins hyaline, not covering the rhizome surfaces; laminae pinnate, chartaceous; medial pinnae sessile; rachises and costae abaxially with minute whitish hairs and scattered, lanceolate, reddish brown scales, more evident on the base of the costae; secondary veins raised on the abaxial surfaces wider than the tertiary ones; margins of the segments cartilaginous; sori in 3–4 rows between the costae and pinnae margins.

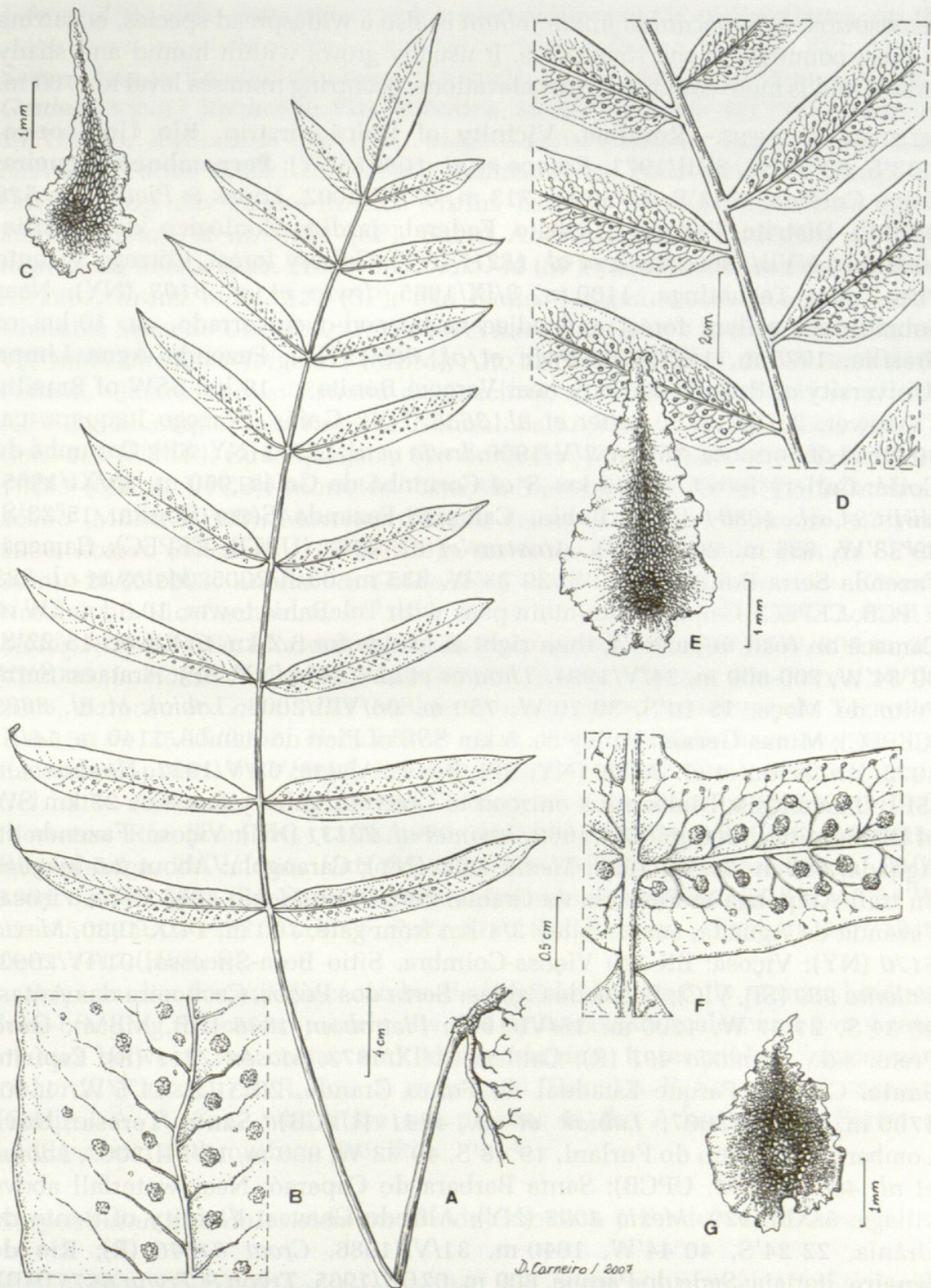


FIG. 2. A–C. *Serpocaulon fraxinifolium* (Matos & Labiak 134). A. Habit. B. Pinnae detail. C. Rhizome scale. D–E. *S. triseriale* (Labiak et al. 3974). D. Pinnae detail. E. Rhizome scale. F–G. *S. sehnemii* (Labiak et al. 3898). F. Segment detail. G. Rhizome scale.

DISTRIBUTION.—*Serpocaulon fraxinifolium* is also a widespread species, occurring in most countries of the Neotropics. It usually grows within humid and shady forests, and is more common at low elevations, occurring from sea level to 1700 m.

SELECTED SPECIMENS.—**Roraima.** Vicinity of Uaicá airstrip, Rio Uraricoeira, 3°33'S, 63°11'W, 8/III/1971, *Prance et al.* 10891 (NY); **Pernambuco.** Jaqueira: Usina Colônia, 8°42'S, 35°50'W, 713 m, 03/IV/2002, *Lopes & Pietrobon* 529 (MBM); **Distrito Federal.** Distrito Federal: Jardim Zoológico de Brasília, 1000 m, 14/VII/1966, *Irwin et al.* 18217 (NY); Gallery forest, Córrego Vicente Pires, near Taguatinga, 1100 m, 8/IX/1965, *Irwin et al.* 8103 (NY); Near Sobradinho, gallery forest and adjacent burned-over cerrado, ca. 10 km of Brasília, 1075 m, 1/X/1965, *Irwin et al.* 8857 (NY); Fazenda Água Limpa (University of Brasilia station), near Vargem Bonita, c. 18 km SSW of Brasília TV tower, 23/IX/1976, *Ratter et al.* 3638 (NY); **Goiás.** Córrego Itaquera, ca. 30 km N of Formosa, 850 m, 2/V/1966, *Irwin et al.* 15592 (NY, SP); Corumbá de Goiás: Gallery forest, ca. 12 km S of Corumbá de Goiás, 950 m, 30/XI/1965, *Irwin et al.* 10804 (NY); **Bahia.** Camacã: Fazenda Serra Bonita, 15°23'S, 39°33'W, 835 m, 29/X/2004, *Amorim et al.* 4367 (UPCB, CEPEC); Camacã: Fazenda Serra Bonita, 15°23'S, 39°33'W, 835 m, 03/II/2005, *Matos et al.* 323 (UPCB, CEPEC); Camacã: Mountain peak with TeleBahia tower, 10.6 km SW of Camacã on road to Jacareci, then right at bridge for 6.2 km to tower, 15°22'S, 39°34'W, 700-800 m, 24/V/1994, *Thomas et al.* 10454 (NY, SP); Arataca: Serra Peito de Moça, 15°10'S, 39°20'W, 750 m, 06/VIII/2006, *Labiak et al.* 3689 (CEPEC); **Minas Gerais.** Valley ca. 5 km SSE of Pico do Itambé, 1140 m, 14/II/1972, *Anderson et al.* 36020 (NY, SP); Pouso Alegre: 03/V/1927, *Hoehne s.n.* (SP); Diamantina: Diamantina on road to Gouveia, gallery forest ca 27 km SW of Diamantina, 1300 m, 17/I/1969, *Irwin et al.* 22131 (NY); Viçosa: Fazenda da Aguada, 695 m, 31/VII/1930, *Mexia* 4929 (NY); Carangola: About 2.5 leagues on trail Areponga to Fazenda da Grama, 26/I/1930, *Mexia* 4234 (NY); Viçosa: Fazenda da Aguada, small valley 3/4 km from gate, 700 m, 14/X/1930, *Mexia* 5170 (NY); Viçosa: BR-120 Viçosa-Coimbra. Sítio Bom-Sucesso, 01/IV/2002, *Valente* 903 (SP, VIC); Poços de Caldas: Serra dos Poços, Cachoeira das Antas, 46°34'S, 21°47'W, 1200 m, 15/VI/1997, *Pietrobon* 1836 (HB, MBM); Ouro Preto: s.d., *Damazio* 491 (R); Caldas: 01/IX/1873, *Mosén* 2211 (R); **Espírito Santo.** Castelo: Parque Estadual do Forno Grande, 20°31'S, 41°5'W, 1100-1700 m, 18/VII/2007, *Labiak et al.* 4241 (UPCB); Santa Teresa: Nova Lombardia, Terreno do Furlani, 19°48'S, 40°32'W, 900 m, 13/VII/2007, *Labiak et al.* 4064 (MBM, UPCB); Santa Barbara do Caparaó: Near waterfall above village, 5/XII/1929, *Mexia* 4097 (NY); Alfredo Chaves: Vicinity of Bento de Urânia, 22°24'S, 40°44'W, 1040 m, 31/VI/1986, *Croat* 61846 (R); **Rio de Janeiro.** Itatiaia: Sede do Parque, 800 m, 02/XI/1965, *Tryon & Tryon* 6675 (HB); Parque Nacional da Serra dos Órgãos: próximo ao abrigo 13 de maio, 20/VI/1965, *Pabst* 8710 (HB); Resende: Rio Palmital, 23/II/1966, *Castellanos* 25708 (HB); Itatiaia: Serra do Itatiaia, 900 m, 16/VII/1902, *Dusén* 711 (R); **São Paulo.** Jaraguá, 12/V/1912, *Brade* 5214 (NY); São Paulo: Moóca, 06/X/1912, *Brade* 5381 (SP); Morro Pelado, VII/1901, *Edwall* 4762 (NY); Morro Pelado, I/1901,

Edwall 4762 (SP); Paraibuna: 27 km along highway SE of Paraibuna, on the steep slope, east side of road, 19/V/1961, *Eiten & Eiten* 2792 (NY, SP); Alto da Serra, Mata da Estação Biológica, 2/X/1922, *Gehrt* 7996 (NY); Pilar, 6/V/1902, *Gerdes* 48 (NY); Itanhaém: Vila Atlântica, 25/XI/1949, *Joly* 821 (SPF); Limeira: 14/V/1943, *Kuhlmann* 799 (SP); Mogi Guaçu: Fazenda Campininha, 3 km NNW de Padua Sales, 20/IX/1960, *Mattos et al.* 8231 (NY, SP); Mogi das Cruzes: Mogi das Cruzes-Biritiba Mirim. Estrada Sertãozinho-Shibata, 23/V/2001, *Nicolau et al.* 3041 (SP); Santo André: Reserva Biológica de Parapiacaba, 07/XI/1995, *Prado & Labiak* 742 (SP); Juquitiba: Fazenda Itereí, 21/XI/1994, *Prado et al.* 521 (SP); São Paulo: Jaraguá, 1906, *Usteri s.n.* (SP); Ubatuba: Serra de Ubatuba, 27/V/1940, *Hoehne & Gehrt s.n.* (SP); Ubatuba: 16/VII/1998, *Dittrich & Jorge* 415 (MBM); Alto da Serra, XI/1911, *Brade* 5091 (HB); **Paraná.** Quatro Barras: Estrada da Graciosa, 11/V/1992, *Cislinski et al.* 152 (UPCB); Guaraqueçaba: Reserva Natural Salto Morato, 22/IV/1999, *Gatti & Gatti* 220 (UPCB); Guaraqueçaba: Rio do Cedro, 50 m, 19/X/1967, *Hatschbach* 17495 (MBM, UP CB); Morretes: Estação Marumbi, 05/XI/1970, *Hatschbach* 25358 (MBM, UP CB); Morretes: Parque Estadual Pico do Marumbi, 22/VIII/1999, *Kozera & Kozera* 1188 (UPCB); Antonina: Rio Cahoeira, Faz. da SPVS, 50 m, 20/X/2003, *Labiak & Goldenberg* 3033 (UPCB); Antonina: Reserva Natural do Rio Cachoeira, 25°14'S, 48°40'W, 200 m, 25/VI/2007, *Labiak & Matos* 3935 (UPCB); Morretes: Serra da Graciosa, 25°19'S, 48°53'W, 800 m, 30/VI/2005, *Labiak & Paciencia* 3542 (UPCB); Doutor Ulysses: Rio Turvo, 19/IV/2006, *Barbosa & Costa* 1253 (MBM); Guaraqueçaba: Arredores de Tagaçaba, 100-150 m, 25/IX/2002, *Hatschbach et al.* 73838 (MBM); Bocaiúva do Sul: Fazenda Capivari, 01/V/2005, *Silva et al.* 4029 (MBM); São José dos Pinhais: Col. Sto. Andrade, 10/VIII/1984, *Hatschbach & Oliveira* 48580 (MBM); Morretes: Rio Bromado, 13/IX/1979, *Hatschbach* 42496 (MBM); Morretes: Rio Ipiranga, 26/V/1966, *Hatschbach* 14476 (MBM); Ipiranga, 800 m, 08/II/1904, *Dusén* 3462 (R); **Santa Catarina.** Brusque: Azambuja, 27°6'S, 48°54'W, 35-135 m, 09/III/1952, *Smith & Reitz* 6130 (R); Biguaçu - Faxinal: 18/I/1945, *Reitz* 1417 (HBR, R).

Serpocaulon fraxinifolium can be distinguished by its fully pinnate laminae, long-creeping rhizomes sparsely covered by lanceolate scales, and 3 or 4 rows of sori between the costae and pinna margins. It resembles *Serpocaulon richardii* (Klotzsch) A. R. Sm., *S. giganteum* (Desv.) A. R. Sm., and *S. caceresii* (Sodi-ro) A. R. Sm., which are not present in the Atlantic Rain Forest of southeastern and southern Brazil.

Serpocaulon glandulosissimum (Brade) Labiak & J. Prado, *comb. nov.*

Polypodium glandulosissimum Brade, Arq. Inst. Biol. Veg. 1: 230. 1935. TYPE.—BRAZIL. Rio de Janeiro: Serra do Itatiaia, Macieiras, 1900m, 22/VI/1930, A. C. Brade 10182 (holotype R!). **Fig. 3. A–B**

Rhizomes dark brown, slightly rugose, with whitish wax-like deposits; rhizome scales lanceolate, each with an acuminate apex, clathrate, brown,

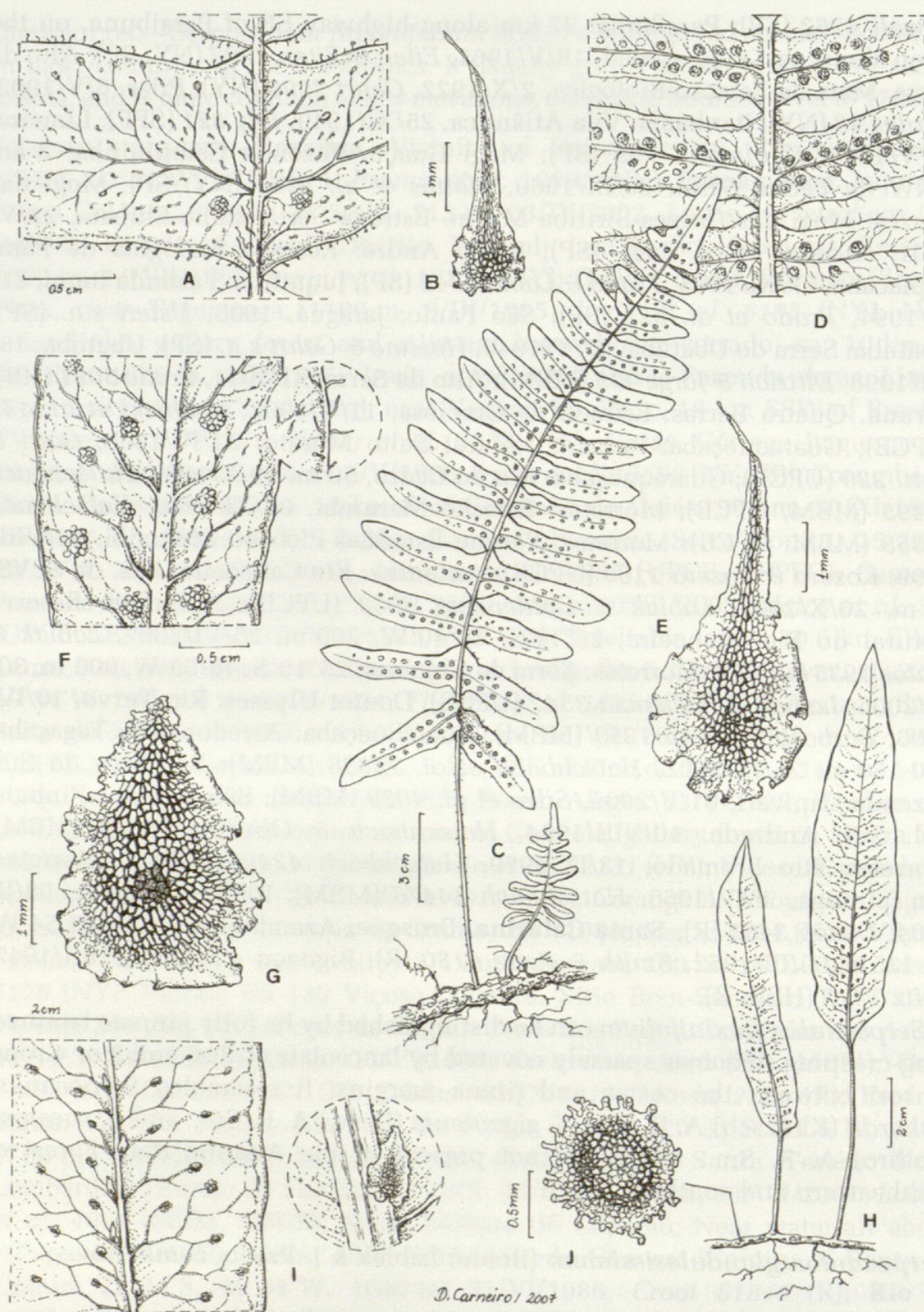


FIG. 3. A–B. *Serpocaulon glandulosissimum* (Brade 21158). A. Segment detail showing the glandular hairs. B. Rhizome scale. C–E. *S. mexiae* (Mynssen *et al.* 532). C. Habit. D. Segment detail showing the hairs. E. Rhizome scale. F–G. *S. vacillans* (Schwartzburd *et al.* 740). F. Segment detail showing the hairs. G. Rhizome scale. H–J. *S. levigatum* (Matos *et al.* 629) H. Habit. I. Lamina detail, showing the scales on the costa. J. Rhizome scale.

margins slightly hyaline, not covering the rhizome surfaces; laminae pinnatisect, subcoriaceous; medial segments adnate, base essentially symmetric, puberulent, the hairs short, ca. 0.1 mm long, 1–2 celled, glandular, light brown to yellowish, on the costae, costules, veins, laminar tissue, and margins, costae and costules with linear, reddish brown scales; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of the segments cartilaginous; sori in 1 row between the costae and segments margins.

DISTRIBUTION.—*Serpocaulon glandulosissimum* is endemic to the Atlantic Rain Forest of southeastern Brazil (Minas Gerais and São Paulo States), is epiphytic or epipetric, and is apparently rare, judging by the small number of collections in herbaria. It occurs at high elevations, from 1400 to 2300 m.

SELECTED SPECIMENS.—**Minas Gerais.** Poços de Caldas: Morro do Ferro, 15/I/1065, *Leoncini 491* (HB); Nova Lima: Serra da Mutuca, beyond Barreiro, 1400 m, 15/IV/1945, *Willians & Assis 6652* (RB); **Rio de Janeiro.** Itatiaia: Macieiras, VIII/1933, *Brade 12623* (RB); Itatiaia: Km 11, 22–28/XI/1936, *Markgraf & Brade 3731* (RB); Itatiaia, abrigo Rebouças, 22°22'48"S, 44°39'47"W, 11/I/2008, 2300 m, *Labiak et al. 4457* (SP, UC, UPCB). **São Paulo.** Campos do Jordão: 05–20/II/1937, *Campos Porto 3209* (RB); Serra da Bocaina, 1700 m, 16/V/1951, *Brade 21158* (RB).

Serpocaulon glandulosissimum can be recognized by its laminae conspicuously covered by glandular hairs, and by its rugose rhizomes with white wax-like deposits. Among the other hairy species from Brazil, the most similar are *Serpocaulon mexiae* and *S. vacillans*. Both species can be distinguished by the absence of wax-like deposits on the rhizome surfaces, and non glandular hairs on the laminae.

Hensen (1990) considered this taxon “a rare aberration of *Polypodium catharinae*” (= *Serpocaulon catharinae* (Langsd. & Fisch) A. R. Sm.), basing his decision on the few specimens he had available. Additional collections suggest that the features cited above are sufficient for recognizing this as a distinct species.

Serpocaulon latipes (Langsd. & Fisch.) A. R. Sm., *Taxon* 55: 928. 2006.

Polypodium latipes Langsd. & Fisch., *Pl. Voy. Russes Monde* 10. tab. 10. 1810. TYPE.—BRAZIL. “Habitat in Brasiliae insula Sanctae Catharinae” (holotype LE). **Fig. 1. D–E**

Rhizomes brown to greenish, not rugose or only slightly rugose upon drying, lacking whitish wax-like deposits; rhizome scales lanceolate, apices long-attenuate, clathrate, reddish, shiny, margins hyaline and only slightly lacerate, scattered, not covering the rhizome surfaces (sometimes more imbricate at the apices and/or the phyllopodia); laminae pinnatisect, chartaceous to subcoriaceous; medial segments adnate and with a symmetric base; costae and costules abaxially with entire, linear and reddish brown scales, easily visible at the bases of the costae; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of segments cartilaginous; sori in 1(–2) rows between the costae and segments margins.

DISTRIBUTION.—*Serpocaulon latipes* is usually terrestrial or epipetric, in sunny or shady places. In southern Brazil it is much more common in the forests along the coast, at low elevations, but gradually occupying high elevations in the northern part of its distribution (from sea level to 1400 m). This species has been cited also to the inland forests of Brazil and adjacent countries (e.g., Bolivia). However, it may have a much more restricted distribution than previously thought.

SELECTED SPECIMENS.—**Bahia.** Rio de Contas: Pico das Almas, 25 Km do centro da cidade ao Campo do Queiroz, 13°33'S, 41°57'W, 1850 m, 26/II/2006, *Matos et al.* 1049 (RB); **Minas Gerais.** Ca. 18 km N of Cerro, on road (MG2) to Diamantina: Disturbed slope forest, 1200 m, 24/II/1968, *Irwin et al.* 20783 (NY); ca. 35 km E of Belo Horizonte, near BR-31: Serra da Piedade, 1850 m, 15/I/1971, *Irwin et al.* 30422 (NY); Araponga: Parque Estadual da Serra do Brigadeiro, Pico do Boné, 26/V/1998, *Valente* 316 (SP, VIC); Ouro Preto: Parque Estadual do Itacolomi, estrada após a sede da fazenda do Manso, 26°S, 43°30'W, 20 m, 23/III/2004, *Mynssen et al.* 557 (RB); **Espírito Santo.** Santa Teresa: Valsugana Velha, Propriedade do Dr. Pedro, 22/III/2007, *Kollmann et al.* 9564 (MBML); Santa Teresa: Alto Perdido, 700 m, 14/IV/2007, *Kollmann et al.* 9619 (MBML); Castelo: Parque Estadual do Forno Grande, 1450 m, 09/IV/2004, *Kollmann et al.* 6623 (MBML); Linhares: Reserva do Rio Doce, estrada aceiro catelan, 19 m, 03/XII/2003, *Mynssen et al.* 509 (RB); Linhares: Reserva Florestal da CIA Vale do Rio Doce, 40 m, 27/IX/1978, *Martinelli* 4958 (RB); **Rio de Janeiro.** Rio de Janeiro: Corcovado, 20/VIII/1868, *Glaziou* 5288 (NY); Macaé: Restinga aberta, em solo com muito folheto, 15/V/1993, *Mello-Silva & Pirani* 867 p.p. (NY, SP, SPF); Botafogo, 03/IX/1967, *Sucre* 1603 (RB); Base da Pedra de Itauna, lado sul: 18/V/1973, *Carauta* 1621 (RB); Frade de Macahé, 17-21/VI/1937, *Brade* 15805 (RB); Restinga de Jacarepaguá: Pedra de Itaúna, 13/III/1975, *Araújo et al.* 656 (RB); **São Paulo.** São Paulo: Butantan, 24/I/1918, *Hoehne s.n.* (SP); Pindamonhangaba: São José dos Alpes, divisa com Campos do Jordão, 02/III/2000, *Nicolau et al.* 3089 (SP); Cananéia: Parque Estadual da Ilha do Cardoso, Restinga do Pereirinha, 10/XII/1992, *Sugiyama* 1133 (SP); **Paraná.** Guaraqueçaba: Ilha das Peças, 20/VI/1992, *Dunaiski* 243 (UPCB); Paranaguá: Estação Ecológica do Guaraguaçu, 17/VII/2000, *Kozera & Isernhagen* 1476 (UPCB); Matinhos: Parque Florestal do Rio da Onça, 25°50'S, 48°30'W, 5 m, 28/XI/2004, *Matos & Silva* 93 (UPCB); Antonina: Reserva Natural do Rio Cachoeira, 25°18'S, 48°41'W, 30 m, 11/VII/2006, *Matos et al.* 1219 (UPCB); Guaraqueçaba: Restinga atrás da Vila de Superagüi, 25°16'S, 48°19'W, 19/I/1993, *Prado* 429 (MBM, NY, UPCB); Paranaguá: Ilha do Mel, Estação Ecológica, 10 m, 11/X/1992, *Salino et al.* 1533 (UPCB); Paranaguá: Ilha do Mel, 24/IV/1953, *Tessmann* 996 (MBM); Guaratuba: Mata pluvial da planície litorânea, 21/IX/1963, *Hatschbach* 10212 (MBM); Paranaguá: Praia de Leste, 15/V/1980, *Dombrowski & Scherer Neto* 11357 (MBM, UC); **Santa Catarina.** São Francisco do Sul: Ilha Grande, 5 m, 5/VII/2004, *Heissner* 9-2 (UPCB); Itapoá: Reserva Volta Velha, 24/IX/1994, *Labiak* 208 (MBM, UPCB); Itapoá: Reserva Volta Velha, 21/I/1993, *Negrelle & Fava* A-608 (UPCB); São

Francisco do Sul: Vila da Glória, trilha do CEPA, 22/IV/2004, *Kerling s.n.* (MBM); Florianópolis: Rio Vermelho, 2 m, 24/VI/1965, *Klein et al. 6065* (MBM); Biguaçu: Antonio Carlos, 25/I/1943, *Reitz H319* (RB); Sombrio: 20/VIII/1945, *Reitz 1778* (R); **Rio Grande do Sul**. Porto Alegre: Morro da Glória, 15/I/1933, *Flach s.n.* (SP); São Leopoldo: IX/1940, *Leite 1884* (SP); Vila Manreza. prop Porto Alegre: 25/VII/1949, *Rambo 42730* (RB); São Leopoldo: Quinta São Manoel, s.d., *Dutra 56* (R).

Because of its occurrence in a variety of habitats, *Serpocaulon latipes* is one of the most variable species in the genus in size, density of scales on the rhizomes, and laminar texture. However, the glabrous laminae (with only linear and small scales near the costal bases) and the rhizomes with castaneous and shiny scales, without wax-like deposits, are constant within the specimens of this species (see comments under *S. catharinae* for comparisons with that species).

Serpocaulon levigatum (Cav.) A. R. Sm., *Taxon* 55: 928. 2006. *Polypodium levigatum* Cav., *Descr. pl.*: 244. 1802. TYPE.—ECUADOR. Quito, Don Luis, *Née s.n.* (holotype MA; isotype S). **Fig. 3. H–J**

Rhizomes light brown, rugose, somewhat glaucous by the whitish wax-like deposits; rhizome scales roundish, clathrate, dark brown, not shiny, margins with small glands and slightly lacerate, very distant and not covering the rhizome surfaces; laminae entire, chartaceous, lanceolate, with cuneate base, glaucous on the abaxial surfaces; costae abaxially glabrous or only with scales, the scales roundish to ovate, dark brown to reddish brown; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of the laminae cartilaginous; sori in 2-3(–4) rows between the costae and laminae margins.

DISTRIBUTION.—*Serpocaulon levigatum* is a rare species in Brazil, occurring in the forests of Espírito Santo and Bahia States, from 800 to 1000 m. Despite its disjunct distribution with the populations of Guyana Shield and the Andes, no significant distinguishing features were found among the specimens studied.

SELECTED SPECIMENS.—**Bahia**. Camacã: RPPN Serra Bonita, 15°23'S, 39°33'W, 835 m, 08/I/2006, *Lopes et al. 430* (CEPEC); Arataca: Serra do Peito de Moça, estrada Arataca-Una, 15°10'S, 39°20'W, 1000 m, 21/VII/2005, *Matos et al. 741* (UPCB, CEPEC); **Espírito Santo**. Santa Teresa: Santo Anselmo, 24/III/2006, *Kollmann et al. 8814* (MBML).

Serpocaulon levigatum is easily recognized by its entire laminae and rounded rhizome scales.

Serpocaulon meniscifolium (Langsd. & Fisch.) A. R. Sm., *Taxon* 55: 928. 2006. *Polypodium meniscifolium* Langsd. & Fisch., *Pl. Voy. Russes Monde* 11, tab. 11. 1810. LECTOTYPE (designated by Hensen, *Nova Hedwigia* 50: 304. 1990): BRAZIL. “Insula St. Catharina” (LE).

Polypodium albo-punctatum Raddi, *Syn. Fil. Bras.* 9. 1819. *Goniophlebium albo-punctatum* (Raddi) J. Sm., *Companion Bot. Mag.* 72: 12. 1846. TYPE.—

BRAZIL. "Invenitur in opacissimis sylvis montium Estrellae" (holotype PI).

Fig. 1. F–H

Rhizomes brown, not rugose, apparently lacking wax-like deposits, which are covered by the scales; rhizome scales ovate, clathrate, reddish, shiny, margins hyaline and lacerate, imbricate and covering the rhizome surfaces; laminae pinnate, chartaceous; medial pinnae adnate with an asymmetric base, acroscopic side excurrent, basiscopic side cuneate; rhachises and costae abaxially with short whitish hairs on both surfaces; costae with ovate to lanceolate, clathrate, dark brown to reddish brown scales; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of the segments cartilaginous; sori in 2(–3) rows between the costae and pinnae margins.

DISTRIBUTION.—*Serpocaulon meniscifolium* is epiphytic or epipetric, and widely distributed along the Atlantic Rain Forest, from sea level to 1000 m.

SELECTED SPECIMENS.—**Bahia.** Camacã: RPPN Serra Bonita, 15°23'S, 39°33'W, 835 m, 03/III/2005, *Matos et al.* 1059 (UPCB, CEPEC); Vicinity of Toca da Onça, 27-29/VI/1915, *Rose & Russell* 20074 (NY); **Minas Gerais.** Cristina: VIII/1912, *Luederwaldt s.n.* (SP); Caldas: 1/XII/1873, *Mosén* 2208 (NY); **Espírito Santo.** Alfredo Chaves: Estrada São Bento de Urânia a Castelinho, 900 m, 07/VII/1996, *Hatschbach & Silva* 65251 (MBM); **Rio de Janeiro.** Nova Friburgo: Estrada para Picos da Salina, 22°10'S, 42°40'W, 1070 m, 10/II/1987, *Windisch et al.* 4978 (HB); Petrópolis: Fazenda Bonfim, 12/I/1973, *Barcia* 593 (R); Petrópolis: Caminho para Pati do Alferes, 04/VIII/1976, *Barcia* 976 (R); **São Paulo.** Iguape: Morro das Pedras, 1920, *Brade* 8123 (NY); Pilar, 10/III/1902, *Gerdes* 51 (NY); Santos: Ilha Casquerinha, VII/1910, *Luederwaldt s.n.* (SP); São Paulo: Ipiranga, V/1910, *Luederwaldt s.n.* (SP); Campinas: *Novaes s.n.* (SP); Estação Alto da Serra, 1905, *Wacket s.n.* (NY); Serra do Mar, 1904, *Wacket s.n.* (NY); Miracatu: 07/VII/1978, *Yano* 1083 (SP); Valinhos: 22°57'S, 47°1'W, 720 m, 28/VII/1993, *Silva & Andrade* 1043 (HB); **Paraná.** Curitiba: Bosque João Paulo II, 900 m, 11/VII/2001, *Borgo & Kersten* 1095 (UPCB); Curitiba: Parque Municipal Barreirinha, 900 m, 06/IV/2001, *Borgo & Kersten* 1077 (UPCB); Jacareí: 5/IV/1914, *Dusén* 14705 (NY); Ponta Grossa: Parque Estadual de Vila Velha, 900 m, 10/XI/2003, *Schwartsburd* 13 (MBM, UPCB); Ponta Grossa: Parque Estadual de Vila Velha, 900 m, 29/X/2005, *Schwartsburd et al.* 988 (UPCB); Curitiba: Perto de Timoeira, 03/IV/1952, *Tessmann* 810 (MBM); Antonina: Rio Manduira, 10 m, 11/II/1981, *Hatschbach* 43580 (MBM, UC); Tunas do Paraná: Parque Estadual de Campinhos, 08/V/1998, *Ribas et al.* 2645 (MBM, UC); Ponta Grossa: Parque Estadual de Vila Velha, 25°14'S, 50°0'W, 1000 m, 07/I/2004, *Labiak & Schwartsburd* 3052 (MBM, UPCB); Paranaguá: Quintilha, 08/II/1999, *Hatschbach et al.* 68904 (MBM); Tibagi: Canyon Guartelá, 13/XII/1996, *Silva et al.* 1804 (MBM); Barra do Turvo: Cachoeira Dito Salu, 27/II/2004, *Barbosa et al.* 901 (MBM, UC); **Santa Catarina.** Florianópolis: Morro do Rio Vermelho, 250 m, 27/VI/1968, *Klein & Bresolin* 7774 (MBM); **Rio Grande do Sul.** Porto Alegre: Morro da Glória, 10/X/1934, *Sehnem s.n.* (SP); Torres: BR 101, KM 6. Campo Bonito, 10/II/1983, *Krapovickas & Cristóbal* 38492a (MBM).

This species can be recognized by pinnate laminae, segments conspicuously adnate on the acroscopic side, presence of hairs on the laminae, and ovate to lanceolate scales on the costal bases. It resembles *Serpocaulon triseriale* and *S. fraxinifolium*, sharing with these species the pinnate laminae. However, the former can be distinguished by the absence of ovate to lanceolate scales on the laminae, and the latter by the fully pinnate blades, not adnate in any side.

Some specimens of *Serpocaulon meniscifolium* also present white-dots on the laminae upper surface, which are apparently absent on other species in Brazil. The presence or absence of these secretions might be related to the different habitats where it occurs, and no other characteristic seems to be related with this. *Polypodium albo-punctatum* Raddi, was based on this feature, and it should be considered as a synonym of *S. meniscifolium*.

Serpocaulon mexiae (Copel.) A. R. Sm., Taxon 55: 928. 2006. *Polypodium mexiae* Copel., Univ. Calif. Pub. Bot. 17: 33, tab. 8. 1932. TYPE.—BRAZIL. Minas Gerais: Diamantina, Serra do Rio Grande, 7/V/1931, *Mexia* 5776a (holotype UC). **Fig. 3. C–E**

Rhizomes brown, not rugose, lacking wax-like deposits; rhizome scales lanceolate, clathrate, apices long-filiform, dark brown, margins slightly hyaline, imbricate and covering the rhizome surfaces; laminae pinnatisect, papyraceous; medial segments adnate, base symmetric, decurrent and excurrent, hirsute on both laminar surfaces, the hairs ca. 0.3 mm long, 4–7 celled, appressed, whitish to light brown on the costae, costules, veins, laminar tissue, and segments margins, linear scales sometimes present on costal bases; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of the segments slightly cartilaginous; sori in 1–2 rows between the costae and segments margins.

DISTRIBUTION.—*Serpocaulon mexiae* is narrow endemic to the mountains of Minas Gerais State, occurring epiphytically or epipetrically, from 1000 to 1250 m.

SELECTED SPECIMENS.—**Goiás.** Serra dos Pirineus, ca. 20 km E of Pirenópolis, 1000 m, 14/II/1972, *Irwin et al.* 34045 (NY). **Minas Gerais.** Baependi: Nos rochedos de arenito, 1250 m, 13/VII/1960, *Brade & Apparício* 20463 (HB, RB); Ouro Preto: Parque Estadual do Itacolomi, 43°29'S, 20°24'W, 23/III/2004, *Mynssen et al.* 532 (RB).

This species is densely covered by hyaline hairs, ca. 0.3 mm long, 4–7 celled. It most resembles *Serpocaulon vacillans* and *S. glandulosissimum*, two other hairy species from Brazil. *Serpocaulon vacillans* differs by its shorter hairs, ca. 0.1 mm long, 1–2 celled, and chartaceous laminae (see comments under *S. glandulosissimum* for comparisons with that species).

Serpocaulon sehnemii (Pic. Serm.) Labiak & J. Prado, **comb. nov.**

Goniophlebium sehnemii Pic.Serm., Webbia 60: 108, fig. 19. 2005. [new name for *Polypodium laetum* Raddi, Syn. Fil. Bras.: 9. 1819. *non* Salisb. 1796.].

Goniophlebium laetum (Raddi) J. Sm. in Seemann, Bot. Voy. Herald 6: 231. 1854, *nom. illeg.* *Polypodium loriceum* L. var. *laetum* (Raddi) Baker, Fl. Bras. Enum. 1(2: 49): 523. 1870. Lectotype (designated by Pichi-Sermolli, Webbia 60(1): 108. 2005): original material from Raddi's collection, sheet without label from Brazil indicated as "②" by Pichi-Sermolli (FI). **Fig. 2. F–G**

Rhizomes brown to greenish, not rugose, lacking whitish wax-like deposits; rhizomes scales ovate, with a short acuminate apex, clathrate, dark brown, shiny, margins hyaline broad and entire, completely imbricate and covering the rhizome surfaces; laminae pinnatisect, papyraceous; medial segments adnate; rhachises, costae, laminar tissue, and veins glabrescent, with short hyaline hairs, up to 0.1 mm long, 1–2 celled; secondary and tertiary veins not raised on the abaxial surfaces; margins of segments slightly cartilaginous; sori in 1–2(–3) rows between the costae and segments margins.

DISTRIBUTION.—*Serpocaulon sehnemii* is epiphytic, epipteric, or terrestrial, occurring from 600 to 1600 m. Despite its wide distribution along the Atlantic Rain Forest, it seems not to be very common.

SELECTED SPECIMENS.—**Minas Gerais.** Marmelópolis: Picada para o Pico dos Marins, 22°29'S, 22°30'W, 1600 m, 03/IV/2002, *Dittrich 1141* (MBM); Ouro Preto: 20/I/1895, *Schwacke 11408* (RB); Caldas: 01/IX/1873, *Mosén 2202* (); **Espírito Santo.** Santa Maria do Jetibá: Pedra do Garrafão, 20°10'S, 40°55'W, 1490 m, 18/VII/2007, *Labiak & Fontana 4197* (MBML, UPCB); Linhares: Lagoa do Durão, Rio Doce, 14/IV/1934, *kuhlmann 211* (RB); **Rio de Janeiro.** *Glaziou 1726* (RB); 17/X/1898, *Ohaus s.n.* (NY); Itatiaia: Parque Nacional do Itatiaia, 20/VI/2000, *Prado et al. 1115* (SP); Santa Maria Madalena: Riberião Vermelho, 12/VII/1935, *Santos Lima 296* (RB); Itatiaia: Maromba, 25/VI/1930, *Brade 10259* (RB); Terezópolis: Parque Nacional da Serra dos Órgãos, 22°26'S, 43°0'W, 22/XI/2004, *Elgelmann RE100* (RB); Terezópolis: Parque Nacional da Serra dos Órgãos, 22°26'S, 43°0'W, 20/XI/2004, *Elgelmann RE096* (RB); Teresópolis: 1000 m, 14/X/1929, *Brade 9688* (R); **São Paulo.** Serra da Bocaina, 05/V/1951, *Brade 20854* (RB); Campos do Jordão: 5-20/II/1937, *Campos Porto 3083* (RB, UPCB); Pilar, 16/X/1902, *Gerdes 56a* (NY, UC); São Paulo: Serra da Cantareira, VI/1967, *Handro 1171* (SPF); São Paulo: Jardim Botânico, 4/I/1975, *Handro 2268* (SPF); Santo André: Estação Alto da Serra, VI/1912, *Luederwaldt s.n.* (SP); Serra da Cantareira, 1000 m, VI/1913, *Tamandaré de Toledo Jr. & Brade 866* (RB); **Paraná.** Tunas do Paraná: Parque das lauráceas, 24/III/2001, *Barbosa et al. 644* (MBM, UC); São José dos Pinhais: Cunchã, 29/I/2005, *Dunański 2649* (UPCB); Tunas do Paraná: Estrada de Tunas do Paraná para a Faz. Berneck, 24°52'S, 48°45'W, 1014 m, 21/IV/2007, *Labiak et al. 3898* (UPCB); Ponta Grossa: Parque Estadual de Vila Velha, Capão da Fortaleza, 21/IV/2005, *Schwartsburd et al. 720* (UPCB); Ponta Grossa: Parque Estadual de Vila Velha, Capão da Fortaleza, 25°14'S, 50°0'W, 1040 m, 05/III/2006, *Schwartsburd et al. 996* (MBM, HUPG); Campina Grande do Sul: Sítio do Belizário, 1000 m, 08/IV/1967, *Hatschbach 16262* (MBM); **Rio Grande do Sul.** próximo à Torres: 30/I/1952, *Pabst s.n.* (RB).

Hensen (1990) considered this species a synonym of *Polypodium latipes* Langsd. & Fisch. (= *Serpocaulon latipes* (Langsd. & Fisch.) A. R. Sm.), but it is clearly distinguished by the papyraceous blades, appressed rhizome scales, each with an acuminate apex, as well as by the secondary and tertiary veins not raised and only slightly wider than the tertiary ones. In contrast, *S. latipes* has chartaceous to subcoriaceous blades, spreading rhizome scales each with a long-acuminate apex, and secondary veins raised and wider than the tertiary ones. Both taxa occur in the Atlantic Rain Forest.

In a study of the Raddi's types species, Pichi-Sermolli (2005) provided additional information on useful characteristics for distinguishing both species, as well as an image of the lectotype at FI.

Serpocaulon triseriale (Sw.) A. R. Sm., Taxon 55: 928. 2006. *Polypodium triseriale* Sw., J. Bot. (Schrader) 1800: 26. 1801. TYPE. —“India Orientalis”, Anonymous s.n. (holotype probably at S). **Fig. 2. D–E**

Rhizomes brown, not rugose, lacking whitish wax-like deposits; rhizome scales ovate, clathrate, light brown, shiny, margins hyaline, imbricate and covering the rhizome surfaces; laminae pinnate, subcoriaceous to coriaceous; medial pinnae sessile or only slightly adnate on the acroscopic side; rachises, costa, and veins abaxially glabrous or with sparse light brown to reddish brown hairs and narrow, reddish brown scales, adaxially glabrous; secondary veins raised on the abaxial surfaces, wider than the tertiary ones; margins of the pinnae cartilaginous; sori in 1–2(–3) rows between the costae and pinna margins.

DISTRIBUTION.—This is one of the most widespread species of *Serpocaulon*, occurring in almost all neotropical countries. In Brazil it occurs in many vegetation types, and is epiphytic, epipetric, or terrestrial, from sea level, where it is more common, to 1400 m.

SELECTED SPECIMENS.—**Amazonas.** Barcelos: Platô da Serra do Acará, parte SE da Serra Norte, 0°51'S, 63°22'W, 1250 m, 13/II/1984, *Amaral 1535* (NY); Southern extreme of northern part of Acara, 00°51'–57'S, 63°21'–22'W, 1200 m, 12/II/1984, *Prance et al. 29035* (NY); **Pará.** Lageira, airstrip on Rio Maicuru, On riverbanks of Maicuru up to 1 km upstream of airstrip, 00°55'S, 54°26'W, 800 ft., 20/VII/1981, *Strudwick et al. 3276* (NY); **Acre.** Mâncio Lima: Parque Nacional da Serra do Divisor, Serra do Moa, 07°21'S, 73°40'W, 7/V/1996, *Daly et al. 8944* (NY); **Ceará.** Pacotí: Sition Uruguaiana, 4 km W of Guaramiranga, 700 m, 23/III/1945, *Cutler 8317* (NY); **Pernambuco.** São Vicente Ferrer: Serra das Mascarenhas, 07°35'S, 35°30'W, 600–650 m, 16/IX/1998, *Pietrobon 4410* (HB, SP); without locality, VII/1926, *Pickel 45* (R); **Alagoas.** São José da Laje: Usina Serra Grande, 08°58'S, 36°06'W, 390–507 m, 25/XI/2001, *Pietrobon et al. 5378* (SP); **Bahia.** Urucua: Distrito de Serra Grande. Estrada Serra grande Itacaré. Faz. Lagoa do Conjunto, 13/V/1999, *Amorim et al. 3072* (CEPEC, SP); Abaíra: Tijuquinho, 13°16'S, 41°54'W, 1700–1800 m, 08/I/1992, *Giulietti et al. H51235* (SP); Camacã: Fazenda Serra Bonita, 15°23'S, 39°33'W, 835 m, 03/III/2006, *Matos et al. 1062* (UPCB, CEPEC); Jacobina: 1978, *Pontual 8219* (UPCB);

Rui Barbosa: Serra do Orobó, 12°18'S, 40°28'W, 700 m, 28/VII/2004, *Queiroz et al.* 9338 (HUEFS, SP); Pindobaçu: 19/V/1978, *Souza Silva* 568 (SP); Lençóis: Chapadinha, 1 km W of road to Lençóis on BR 242, 12°27'S, 41°26'W, 850 m, 12/III/2002, *Thomas et al.* 12963 (NY); Almadina: Serra do Corcovado, 14°42'S, 39°36'W, 800 m, 19/IV/2007, *Matos et al.* 1420 (CEPEC); **Goiás.** Caldas Novas: 13 Km WSW of city of Caldas Novas, 17°48'S, 48°45'W, 17/XII/1974, *Heringer & Eiten* 14061 (SP); Corumbá de Goiás: Serra dos Pirineus, 1150 m, 18/I/1968, *Irwin et al.* 18768 (SP); Jataí: Bálsamo, 09/II/1950, *Macedo* 2145 (SP); Luziânia: Fazenda do Sr. José Rodrigues. Grota do Córrego Capão da Anta, 16°18'S, 48°12'W, 830 m, 10/IV/2003, *Pereira-Silva et al.* 7556 (SP); **Mato Grosso.** Nova Xavantina: Vicinity of Nova Xavantina, margins of Rio das Mortes, 25/IX/1964, *Prance et al.* 59111 (NY); **Minas Gerais.** Descoberto: Reserva Biológica da Represa do Gramma, 01/IV/2001, *Castro et al.* 243 (SP); Rio Vermelho: estrada para Vila de Pedra Menina, 18°06'S, 43°08'W, 1400 m, 01/VIII/2000, *Fiaschi & Costa* 414 (SP, SPF); Itacambira: 2 km W da cidade, na Rodovia para Juramento, no alto da serra, 17°4'S, 43°18'W, 1220 m, 14/II/1988, *Pirani et al.* 2274 (NY); **Espírito Santo.** Santa Teresa: Estação Biológica de Santa Lúcia. Trilha da margem direita do Rio Timbuí, 19°53'S, 40°36'W, 600 m, 11/VII/2007, *Labiak et al.* 4013 (MBML, UPCB); Santa: Estação Biológica de Santa Lúcia. Trilha da margem direita do Rio Timbuí, 19°53'S, 40°36'W, 800 m, 11/VII/2008, *Labiak et al.* 4027 (MBM, MBML, UPCB); Itaguaçu: Morro do Caparaó (de Itaguaçu), 19°44'S, 40°58'W, 1360 m, 17/VII/2007, *Labiak et al.* 4165 (MBML, UPCB); São Mateus: Praria de Guriri, 03/XII/1994, *Pirani et al.* 3324 (NY); Guarapari: 6 Km N of Guarapari, 20°37'S, 40°29'W, 24/II/1988, *Thomas et al.* 6124 (SP, SPF); **Rio de Janeiro.** Guanabara: Recreio dos Bandeirantes, 23/VIII/1965, *Hoehne* 6076 (SP, SPF); Rio de Janeiro: Recreio dos Bandeirantes, 30 km W of Rio de Janeiro, 05/III/1964, *Lems s.n.* (NY); Barra da Tijuca, 26/VI/1959, *Bouzada* 75 (R); Niterói: Saco de São Francisco, 04/V/1940, *B. Lutz* 1659 (R); Without locality, s.d., *Riedel s.n.* (R); Carmo: s.d., *Armond* 353 (R); Without locality, 12/III/1903, *Dusén* 1950 (R); Teresópolis: 04/V/1917, *Sampaio* 2465 (R); 1873, *Glaziou* 1016 (R); **São Paulo.** Mogi Guaçu: Campos das Sete Lagoas, Fazenda Campininha just N of Rio Mogi Guaçu, 23°11'S, 47°7'W, 575-625 m, 1/VIII/1964, *Eiten & Eiten* 5681 (NY); Mogi-Guaçu: Fazenda Campininha, 22°11'S, 47°7'W, 575-625 m, 01/VIII/1964, *Eiten & Eiten* 5681 (SP); Ubatuba: Ilha Anchieta, trilha para a praia do sul, 16/II/2004, *Prado et al.* 1461 (SP); Iguaçu: V/1922, *Brade* 8245 (HB); **Paraná.** Pontal do Paraná: Ilha de Currais, 30 m, 04/II/1997, *Jaster s.n.* (MBM, UPCB); Guaraqueçaba: Fazenda Jurueri, 03/X/1997, *Silva s.n.* (UPCB); Paranaguá: Ilha dos Currais, 16/IX/1973, *Hatschbach* 32545 (MBM); Matinhos: Caiobá, 07/XII/1963, *Hatschbach* 10775 (MBM); Matinhos: Morro do Escalvado, 50 m, 02/V/1998, *Dittrich & Jorge* 358 (MBM); Morretes: Escritório do IAPAR, 01/IX/1996, *Kuniyoshi* 3939 (MBM); **Santa Catarina.** Itapoá: Reserva Volta Velha, 10 m, 21/IV/1994, *Labiak* 119 (UPCB); **Rio Grande do Sul.** São Leopoldo: Vicinity of São Leopoldo, XI/1941, *Leite* 415 (NY); Without locality, s.d., *Sellow* 609 (R)

Due to its wide distribution and the many habitats where it can be found, *Serpocaulon triseriale* is one of the most variable species within the genus.

It usually has subcoriaceous to coriaceous laminae, is fully pinnate or the pinnae only slightly adnate at the acroscopic side (especially near the apex), 1–2(–3) rows of sori between the costae and pinna margins, and raised veins.

Serpocaulon vacillans (Link) A. R. Sm., Taxon 55: 928. 2006. *Polypodium vacillans* Link, Hort. Berol. 2: 97. 1833. TYPE.—BRAZIL. Anonymous *s.n.* (holotype B). **Fig. 3. F–G**

Rhizomes brown, not rugose, lacking wax-like deposits; rhizome scales ovate to ovate-lanceolate, apices short-acuminate, clathrate, brownish to yellowish, margins slightly hyaline, imbricate and often covering the rhizome surfaces; laminae pinnatisect, subcoriaceous; medial segments adnate, base symmetric, decurrent and excurrent, pubescent on both laminar surfaces, the hairs light brown to yellowish, on the costae, costules, veins, and margins, linear scales often visible at the costal bases; secondary veins raised on the abaxial surfaces wider than the tertiary ones; margins of the segments cartilaginous; sori in 1–2 rows between the costae and segments margins.

DISTRIBUTION.—This is one of the most widespread species, occurring from southeastern to southern Brazil. It is much more common in inland forests, but also reaches the Atlantic Rain Forest along its western border, from 150 to 1200 m.

SELECTED SPECIMENS.—**BRAZIL. Mato Grosso.** Brilhante: Rio Santa Luzia, 14/V/1971, *Hatschbach* 24277 (MBM, NY, UC); **Mato Grosso do Sul.** Corumbá: Logradouro Morro da Santa Cruz, 19°11'S, 57°34'W, 900 m, 01/IV/2004, *Assis & Ishii* 462 (COR, UPGB); Ponta Porã: Campanário, CIA Mate Laranjeira, 06/II/1952, *Kuhlmann s.n.* (SP); Jateí: Parque Estadual das Várzeas do rio Ivinhema, 26/III/2004, *Lenhard et al.* 19 (UPGB); **Minas Gerais.** Santo Antônio do Itambé: Trail ground in open grass, valley ca. 5 km SSE of Pico do Itambém, 1140 m, 14/II/1972, *Anderson et al.* 35989 (NY, UC); Santana do Riacho: Serra da Carapina, 18°52'S, 43°14'W, 1200 m, 03/III/1998, *Forzza et al.* 733 (SP); Paraisópolis: 16/IV/1927, *Hoehne s.n.* (SP); 7 km N of São João da Chapada, road to Campo do Sampaio, 1150 m, 29/III/1970, *Irwin et al.* 28576 (NY); Rio Jequití, ca. 25 km E. of Diamantina, 790 m, 21/III/1970, *Irwin et al.* 28005 (NY); ca. 2 km of São João da Chapada, 1200 m, 25/III/1970, *Irwin et al.* 28334 (NY); Baependi: São Tomé das Letras, encosta Leste da Serra de São Tomé, 20/VI/1962, *Mattos & Bicalho* 10358 (SP); Itutinga: a três Km da cidade na rodovia Lavras-São João Del Rei, 15/XII/1982, *Pirani et al.* 295 (SP, SPF); Poços de Caldas: Serra dos Poços, 46°34'S, 21°47'W, 1250 m, 16/VI/1997, *Pietrobon-Silva* 1974 (MBM); 1935, *Horta s.n.* (RB); Passa Quatro: 29/IV/1929, *Sampaio* 6221 (R); Itabira: II/1934, *Sampaio* 6979 (R); ca. 27 km N of Cerro on road to Diamantina: Serra do Espinhaço, 1200 m, 26/II/1968, *Irwin et al.* 20957 (NY); **Espírito Santo.** Castelo: Parque Estadual do Forno Grande, 20°31'S, 41°5'W, 1100–1700 m, 18/VII/2007, *Labiak et al.* 4248 (UPGB); Afonso Cláudio: Serra Pelada. Pedra dos Três Pontões, 20°04'S, 41°02'W, 1050 m, 16/VII/2007,

Labiak et al. 4141 (UPCB); **Rio de Janeiro.** Rezende: 27/IV/1926, *Hoehne & Gehrt s.n.* (SP); **São Paulo.** Pirassununga: Cerrado de Emas, 22°2'S, 47°30'W, 13/IV/1994, *Batalha & mantovani* 41 (SP); Iguape: Peroupava, III/1922, *Brade* 8224 (NY, UC); São Paulo: Jaraguá, 8/XII/1912, *Brade* 5385 (NY); Iguape: Serrinhas, VIII/1918, *Brade* 7733 (NY, UC); Mogi Guaçu: Campos das Sete Lagoas, Fazenda Campininha just N of Rio Mogi Guaçu, 22°11'S, 47°07'W, 625 m, 10/VII/1961, *Eiten & Eiten* 3244 (NY); Pirajú: Sítio Alves, Rod. Raposo Tavares Km 305, 23/VIII/1969, *Felippe* 215 (SP); Porto Ferreira: E. side 250 km of São Paulo, 18/V/1966, *Goodland* 326 (NY); Bofete: entre Bofete e Guareí, 25/I/1945, *Kuhlmann* 3465 (SP); São Paulo: Ipiranga, V/1910, *Luederwaldt s.n.* (SP); São José dos Campos: Córrego da Ressaca, 600 m, 21/III/1962, *Mimura* 324 (SP); Bauru: Jardim Botânico Municipal de Bauru, 04/III/2004, *Nóbrega et al.* 43 (SP); Angatuba: Reserva Estadual, 21/I/1968, *Pabst* 9104 (MBM, NY); Angatuba: Floresta de Angatuba, 23°27'S, 48°25'W, 23/XI/1983, *Ratter et al.* 4960 (NY); São Paulo: Cantareira, III/1905, *Usteri s.n.* (SP); São Pedro do Turvo: Fazenda São Sebastião, 31/VII/1962, *Válio* 276 (SP); Presidente Bernardes: Pontal do Paranapanema, 51°34'S, 22°01'W, 400 m, 10/III/1996, *Pietrobom-Silva* 3188 (HB, MBM); Campinas: Fazenda Campo Grande, 04/XII/1938, *Zagatto & Vektorato s.n.* (RB); Pirassununga: Cerrado de Emas, 1950, *Joly* 1207 (RB); São Carlos: Rod. Washington Luiz Km 222, entrada para Analândia, 28/III/1962, *Laboriau* 25 (RB); Brotas: Cachoeira do Astor, 22°17'S, 48°47'W, 22/V/1993, *Silva & Rodrigues* 944 (HB); Teodoro Sampaio: Região do Pontal do Paranapanema, 350-450 m, 10/III/1996, *Pietrobom-Silva* 3144 (HB); **Paraná.** Lapa: Santa Bernadete, 14/XII/1959, *Braga & Lange* 189 (UPCB); Jaguariaíva: Parque Estadual do Cerrado, 16/XII/1991, *Cislinski et al.* 17 (UPCB); Curitiba: Recanto das Araucárias, 08/XII/1987, *Cordeiro & Silva* 472 (MBM, UC); Sengés: Rio Itararé, 15/VI/1971, *Hatschbach* 26745 (MBM, UP CB, UC); Curitiba: Parque Barigui, 900 m, 25/I/1996, *Kozera & Dittrich* 55 (UPCB); Fazenda Reserva, ca. 85 km SW of Guarapuava, 800-1050 m, 9/III/1967, *Lindeman & Haas* 4724 (MBM, NY, SP); Jaguariaíva: Fazenda Barros, 09/II/1997, *Ribas & Pereira* 1664 (MBM, UC); Ponta Grossa: Parque Estadual de Vila Velha, 1000 m, 20/XII/2004, *Schwartsburd & Ambrósio* 520 (UPCB); Ponta Grossa: Parque Estadual de Vila Velha, 25°14'S, 50°0'W, 1000 m, 06/IV/2004, *Schwartsburd & Nogueira* 107 (SP, UP CB); Ponta Grossa: Parque Estadual de Vila Velha, 19/XII/2004, *Schwartsburd et al.* 495 (UPCB); Guarapuava: Lagoa Seca, 04/XII/1969, *Hatschbach & Ravena* 23107 (MBM, UC); Curitiba: Rio Atuba, 30/I/1974, *Kummrow* 235 (MBM); Jaguariaíva: KM 168, 27/III/1974, *Kummrow* 444 (MBM); Piraquara: Col. Sta. Maria, 26/IV/1974, *Hatschbach* 34384 (MBM); Campo Mourão: Cerrado, 29/I/2004, *Favro* 09 (MBM); Palmeira: Rio Tibagi, 03/II/1999, *Cruz et al.* 89 (MBM); **Santa Catarina.** Lages: I/1907, *Spannagel* 82a (NY, UC); Lages: Campo Belo, 1907, *Spannagel* 184 (NY); **Rio Grande do Sul.** São Leopoldo: Vicinity of São Leopoldo, 1941, *Eugênio* 63 (NY); Venâncio Aires: 18/II/1906, *Jürgens* 55 (NY, UC). **PARAGUAY. San Pedro.** Yagaraté: forest, 23°48'S, 56°5'W, 150 m, 22/VII/1995, *Zardini & Vera* 43227 (RB). **ARGENTINA. Misiones.** San Ignacio: Parque provincial Teyu-cuaré, 27°17'S, 55°35'W, 160 m, 14/XII/2006, *Kersten* 1125 (UPCB); San Ignacio: Parque provincial Teyu-cuaré,

27°17'S, 55°35'W, 160 m, 14/XII/2006, Kersten 1126 (UPCB); Cainguás: Salto Encantado, Arroyo Tabay, 13/VI/1950, Schwindt 4691 (RB).

Serpocaulon vacillans can be recognized by the short hairs, ca. 0.1 m long, 1–2 celled, on the laminar surfaces, and by its rhizomes without wax-like deposits, covered by ovate to ovate-lanceolate and brownish scales. It is similar to *S. latipes*, with which it has been often confused; however, *S. latipes* lacks hairs on laminar surfaces.

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