



An updated synopsis of *Hypolepis* Bernh. (Dennstaedtiaceae) from Argentina

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Abstract

An updated synopsis of the genus *Hypolepis* (Dennstaedtiaceae) from Argentina is presented, including the first report of *H. stolonifera* var. *stolonifera* for the country and the description of a new variety: *Hypolepis stolonifera* var. *delasotae*, named in honour of pteridologist Elías Ramón de la Sota. Four taxa are recognised in Argentina: *Hypolepis poeppigii*, *H. rugosula* subsp. *poeppigiana*, and *Hypolepis stolonifera* with var. *delasotae* and var. *stolonifera*; *Hypolepis repens* is excluded from the Argentinian flora.

Key words: Biogeography, *Hypolepis stolonifera* var. *delasotae*, South America, Southern Cone

Resumen

Se presenta una sinopsis actualizada del género *Hypolepis* (Dennstaedtiaceae) en Argentina, incluyendo el primer registro de *Hypolepis stolonifera* var. *stolonifera* para el país y la descripción de una nueva variedad: *Hypolepis stolonifera* var. *delasotae*, nombrada en honor al pteridólogo Elías Ramón de la Sota. Se reconocen cuatro taxones para Argentina: *Hypolepis poeppigii*, *H. rugosula* subsp. *poeppigiana* e *Hypolepis stolonifera* con las var. *delasotae* y var. *stolonifera*; *Hypolepis repens* es excluido de la flora argentina.

Introduction

Hypolepis Bernhardt (1806 [Nov 1805]: 34) is a genus based on *Lonchitis tenuifolia* Forster (1786: 80) [= *Hypolepis tenuifolia* (G. Forst.) Bernh.], a species collected on Vanuatu Island between 1772–1775 (Brownsey & Chinnock 1984). Later, Presl (1836) and Smith (1846) re-circumscribed the genus, with the addition of diagnostic vegetative characters as lamina architecture and sori position, combining species from the Neotropics, Africa, Tasmania and New Zealand into it. With this current circumscription, *Hypolepis* comprises medium sized to large, terrestrial or epilithic ferns distributed in tropical and south-temperate regions, with local extensions into tropical and temperate regions of the northern hemisphere. It is especially diverse in Australasia and Tropical America, where approximately 80 taxa are cited (e.g. Brownsey & Chinnock 1984, 1987; Brownsey 1987; Tryon & Tryon 1982; Kramer & Green 1990; Schwartsburd 2012a; Schwartsburd & Prado 2014).

Species of *Hypolepis* are characterized by long-creeping stems with pluricellular uniseriate trichomes, well-spaced leaves to ca. 10 m long, sometimes scandent on the surrounding vegetation, petioles often pubescent, regularly verruculose or even spiny, with a single vascular bundle U-shaped in cross section; the laminae are 2–4-pinnate-pinnatifid, nearly glabrous to usually pubescent, with free veins ending behind the margins; the larger pinnae are often sub-opposite and spreading at an open angle; the sori are marginal or nearly so, born on a single vein and protected by a short, about semi-circular, marginal reflexed flap, or this is vestigial and the sori are naked; the spores are monoete,

ellipsoidal, reticulate or coarsely echinate (Brownsey & Chinnock 1984, Kramer & Green 1990, Moran & Riba 1995, Mickel & Smith 2004, Schwartsburd 2012a). The genus *Hypolepis* is classically recognized as poorly taxonomically known and in need of modern revision (Kramer 1990), especially in America (Tryon & Tryon 1982, Tryon & Stolze 1989, Moran 1995, Mickel & Smith 2004, Kessler & Smith 2007).

Some species occur only locally, e.g. *Hypolepis guianensis* Klotzsch (1847: 339), which is known only from Mount Roraima, and some are widespread, e.g. *H. repens* (Linnaeus 1753: 1078) Presl (1836: 162), occurring almost in the whole Neotropical region, south-eastern Brazil being the southern limit of its distribution (Schwartzburd *et al.* 2012b). The populations of *Hypolepis* are found in several habitats, such as cloud forests, along forest borders, pastures, and rocky woods, also in open places and disturbed sites with secondary vegetation (Tryon & Tryon 1982, Tryon & Stolze 1989). In South America, a total of 27 species and 31 taxa are recognized (Schwartzburd 2012a). In southern South America (also called Southern Cone), Argentina is the second largest country after Brazil, with a total area of approximately 2.7 million km², and boasts a large variety of ecosystems: 15 continental zones, three oceanic zones and the Antarctic region are all represented in its territory. The terrain is made up mostly of low or flatlands, although it also features some major mountain ranges and tablelands situated at a high elevation above sea level.

There have been some works dealing with Argentinian *Hypolepis*, especially those by de la Sota (1977), de la Sota *et al.* (1998), Martínez & de la Sota (2000), Arana *et al.* (2004a, b; 2011) and Martínez *et al.* (2014). Those works indicate the occurrence of two species: the southern *H. poeppigii* (Kunze 1834: 50) Mettenius ex Maxon (1941: 289) and the northern *H. repens* (Linnaeus 1753: 1078) Presl (1836: 162). Then, Schwartzburd (2012a) and Schwartzburd & Prado (2014) showed these two names were misapplied: while the southern species is best classified as *H. poeppigiana* Mettenius (1856: 18)—which they regarded a subspecies of the sub-cosmopolitan *H. rugosula* (Labillardière 1806 [1807]: 92) Smith (1846: 8): *H. rugosula* subsp. *poeppigiana* (Mett.) Schwartzburd & Prado (2014: 213)—the northern species is indeed *H. poeppigii* (as cited by Ganem *et al.*, 2013). Thus, *H. repens* was excluded from the Argentinian flora.

New studies on herbarium specimens and recent field works showed us these last accounts of the genus are also out of date and overlooking the Argentinian flora. We therefore present an updated synopsis of the genus *Hypolepis* in Argentina and describe other two taxa naturally occurring there: *H. stolonifera* var. *delasotae* var. *nov.* and *H. stolonifera* Fée (1873: 35) var. *stolonifera*, a species previously thought to be a Brazilian endemic.

Materials and methods

This work is based on the critical review of literature and the revision of type specimens and specimens stored at the following herbaria (acronyms following *Index Herbariorum*): B, BA, BAB, BCN, BCRU, BHCB, BM, BR, CORD, CTES, EAC, ESA, FI, FI-PS, FI-W, G, HAS, HB, HRCB, HUCS, ICN, JUA, K, L, LE, LECB, LIL, LP, LPB, MBM, MCNS, MERL, MVFA, MVFQ, MVJB, MVM, OUPR, OXF, P, PR, PRC, RB, RCV, RIOG, SI, SMDB, SP, SPF, SRFA, U, UPGB, UPS, VIC, and W.

We conducted fieldwork in the following Argentinian provinces: Córdoba, Corrientes, Entre Ríos, Jujuy, Mendoza, Misiones, Río Negro, Salta, Santa Cruz, Tierra del Fuego, Antártida and Islas del Atlántico Sur, and Tucumán; and southern Brazilian states of Paraná, Santa Catarina and Rio Grande do Sul. The voucher specimens are kept in JUA, LP, RCV, SI and VIC.

The morphological observations were performed with an Olympus® BH2 and a Jeol® JSMT-1000 from the Microscopy Service of Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata.

The spores were studied by using LM and SEM. For LM the spores were studied without chemical treatment since the perispore does not resist acetolysis treatment (Erdtman 1960). The spores were mounted in gelatin glycerin jelly, and the slides were sealed with paraffin. For each specimen, 25 randomly selected spores were measured. For SEM, the material was treated with hot 3% sodium carbonate, washed, dehydrated, suspended in 96% ethanol and then transferred to acetate plates (Morbelli 1980). After drying they were coated with gold. Botanical terminology follows mainly Lellinger (2002) and Tryon & Lugardon (1991). The distribution map was drawn using the Software DIVA-Gis (Hijmans 2013).

Taxonomic treatment

Key to the taxa of *Hypolepis* in Argentina

1. Laminae deltoid to triangular, basal pinnae equilateral, pseudoindusia absent or, if present, not ciliate. 2
- Laminae rhombic, basal pinnae strongly inequilateral, pseudoindusia ciliate. 3
2. Rachises, costa and costules with capitate, glandular catenate hairs, pinnules with rounded lobes at the margin.
..... *Hypolepis poeppigii*
- Rachises, costae and costules with acicular (non capitate) and glandular catenate hairs, pinnules with acute lobes at the margin. ..
..... *Hypolepis rugosula* subsp. *poeppigiana*
3. Fronds 0.2–0.8 m long. Last pinnules narrowly lanceolate to linear, 2–5 × 8–15 mm, those of the distal pinnae sometimes falcate, usually with acute lobes at the margin and apex. Laminar tissue abaxially with abundant catenate-acicular hairs.
..... *Hypolepis stolonifera* var. *delasotae*
- Fronds 1.2–2 m long. Last pinnules oblong to broadly ovate, 8–15 × 25–30 mm, usually with rounded lobes at the margin and apex. Laminar tissue abaxially glabrous. *Hypolepis stolonifera* var. *stolonifera*

1. *Hypolepis stolonifera* var. *delasotae* Arana, Yañez & Schwartsb., var. nov.

Type:—ARGENTINA. Misiones: Depto. San Pedro. 12 December 1957. *R. Capurro 1354* (holotype BA!). Figs. 1 A,B, 2A–H, 4A, B.

Plantae terrestres, inermes, pilosae; rhizomata longe repente; frondibus sparsis, tripinnatis in circumcaesura rhombicis, longe petiolatis, indeterminate crescentia, petiolicis rachibusque castaneis; frondulis inferioribus primariis suboppositis, basipedatis, secundariis lanceolatis, tertiariis lanceolatis vel linearis, acutis, crenatis; costulae et laminae infra hirsutis, pilli simplis, strigillosis; sori subglobosi in inferiore latere sinuum laciniarum; sporae monoletae, rotundis leviter reniformibus, papillatis.

A var. stoloniferae differt statura graciliore, segmentis contractis (vs. segmentis applanatis) et laminae infra dense hirsutis (vs. laminae infra glabratis).

Plants terrestrial. Rhizomes long-creeping, branched, bearing several fronds, 2.5–3 mm diam., with catenate acicular hairs, yellowish brown to golden brown, 1.0–2.5 mm long, 10–20-celled. Fronds erect to arched, 0.2–0.8 m long; petioles sulcate, 10–22(–70) cm long, 2–4 mm diam., inermous, immaculate, glabrescent, with catenate hairs with persistent castaneous basis, sometimes with 1–2-celled, acicular, whitish hairs; laminae rhombic, proximally tripinnate-pinnatifid to quadripinnate-pinnatifid, 22–35 × 30–40 cm; rachises straight, golden brown to light brown, villous, with hairs of two types, catenate, brownish or whitish, and unicellular, whitish or hyaline, inermous; pinnae strongly ascending; proximal pinnae 8–15 × 13–25 cm, strongly inequilateral, the basiscopic pinnules bigger and more dissected; adaxial side of the costae sulcate, costae abaxially and adaxially villose, the hairs acicular, whitish, 0.2–0.4 mm long, 4–8-celled; last pinnules narrowly lanceolate to linear, 2–5 × 8–15 mm, those of the distal pinnae sometimes falcate, usually with acute lobes at the margin and apical lobe acute; costules abaxially villose, adaxially sparsely villose and sulcate, the hairs similar to those from the costae; veins abaxially sparsely villose, the hairs similar to those from the costae and costules but smaller, 0.2–0.4 mm long, 3–5-celled, adaxially glabrous or with very few hairs; laminar tissue between the veins abaxially villose, the hairs similar to those of the veins, adaxially glabrous; lamina margins glabrous; sori marginal, often confluent at maturity; pseudo-indusia conspicuous, proximally green, distally hyaline, membranaceous in the hyaline part, the margin ciliate, the cilia 0.1–0.3 mm long, 3–4-celled; spores yellowish-brown, elliptical in polar view and plane-hemispherical in equatorial view, 31–39 × 22–27 μm, ornamented by baculate processes with a pointed apex, fused together to form crests, and usually connected by branched strands.

Distribution and habitat:—This variety is apparently endemic to “Selva Paranaense” (biogeographic province of Parana Forest according to Morrone 2014), known from the proximities of Río Iguazú, in eastern Misiones (Argentina) and in western Paraná (Brazil), inhabiting swampy places. Fig. 6.

Etymology:—We dedicate this variety to the late Prof. Dr. Elías Ramón de la Sota (1932–2014) in recognition of his exceptional and pioneer work on Neotropical ferns, particularly the Argentinian species of Polypodiaceae and Salviniaceae.

Additional specimens examined (paratypes):—ARGENTINA. Misiones: Depto. Gral. Belgrano, ruta 14, entre Irigoyen y Dos Hermanas, cabecera arroyo campiña de América, en pantano con *Dicksonia*, 15 November 1970, *de la Sota et al. 6146* (BA, LP, fragment RCV); Depto San Antonio, 3 December 1957, *Capurro 1275* (BA); Depto. Oberá. 11 September 1945, *Capurro 482* (BA).—BRAZIL. Paraná: Céu Azul, Parque Nacional do Iguazu, trilha para o Rio Azul, 25°11'20"S, 53°44'43"W, 450 m, 4 October 2006, *Labiak et al. 3856* (UPCB); Francisco Beltrão, Parque Municipal Irmão Sirilo, 25 October 2006, *Schwartsburd et al. 1112* (MBM, SP, UPCB).

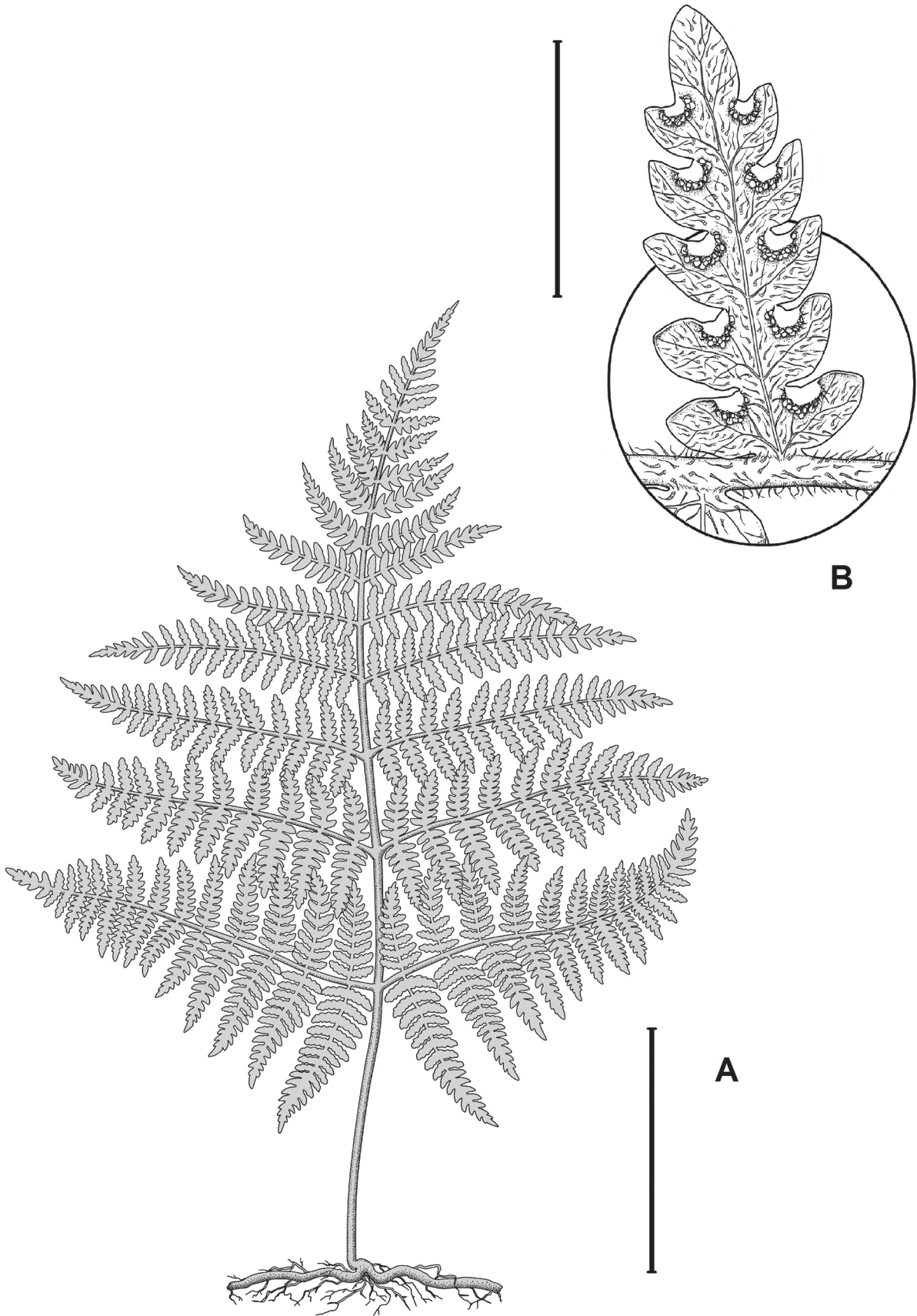


FIGURE 1. *Hypolepis stolonifera* var. *delasotae*. **A.** Habit. **B.** Abaxial surface of a segment. Scale bar: A = 20 cm; B = 0.3 cm.

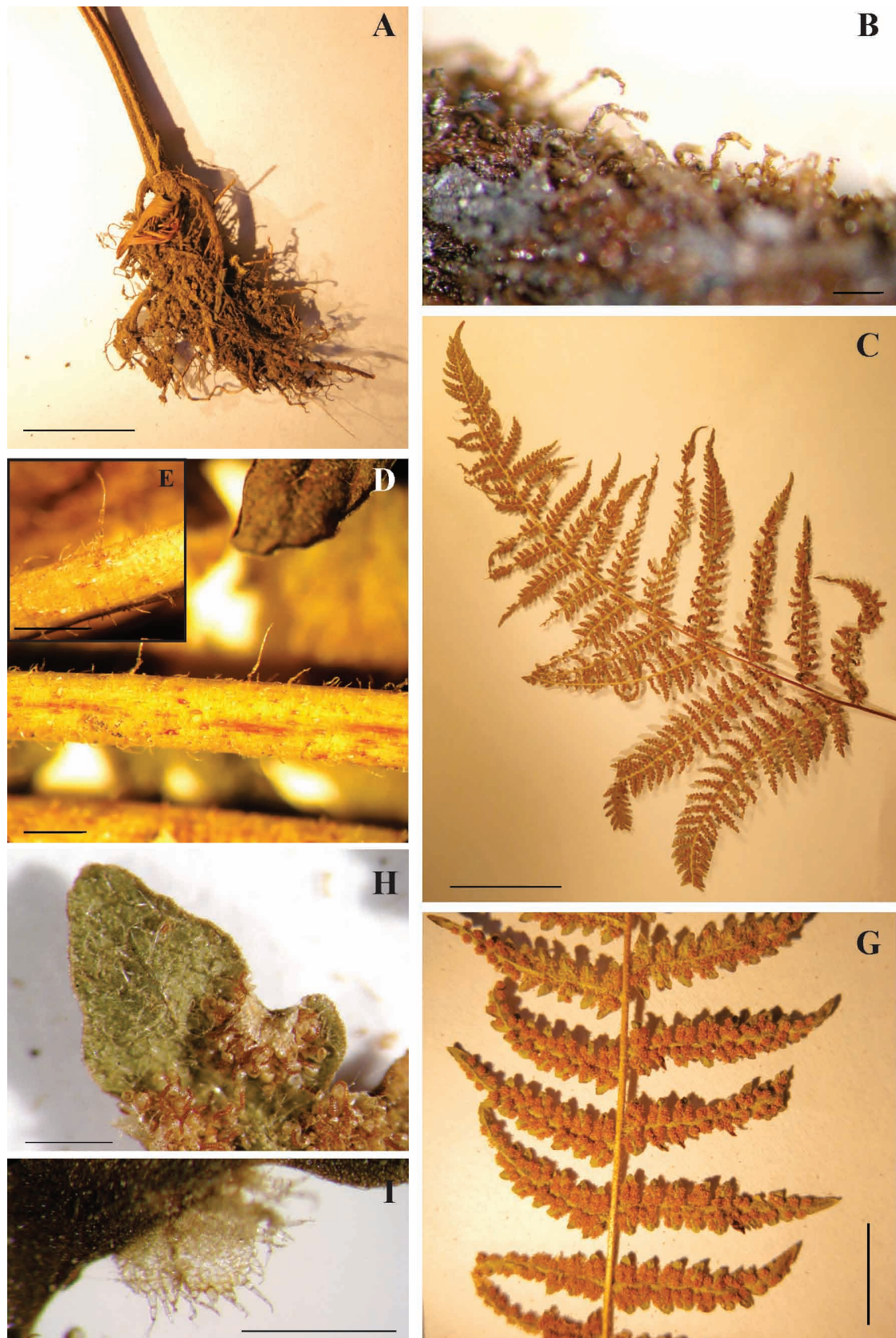


FIGURE 2. *Hypolepis stolonifera* var. *delasotae*. **A.** Rhizome long-creeping, branched. **B.** Hairs of rhizome are catenate, acicular, yellowish brown to golden brown. **C.** Detail of rachis with two kinds of hairs: hairs catenate, brownish or withish and hairs uni-cellular, withish or hyaline. **D.** Rachis golden brown to light brown, villose. **E.** Basal pinnae with strongly inequilateral proximal pinnules. **F.** Laminar tissue between the veins abaxially villose. **G.** Detail of last pinnules. Sori marginal often confluent at maturity. **H.** Pseudo-indusia conspicuous, proximally green, distally hyaline, membranaceous in the hyaline part, the margin ciliate. Scale bars: A = 4 cm; B = 0.3 cm; C = 10 cm; D and E = 0.5 cm; F = 4 cm; G = 2 cm; H and I = 0.2 cm.

Observations:—This variety differs from *Hypolepis stolonifera* var. *stolonifera* by having petioles proximally dark brown and distally straw-coloured (vs. proximally wine-red, medially brown, distally golden brown), shorter laminae 22–35 × 30–40 cm (vs. 60–120 × 80–110 cm), shorter ultimate segments, narrowly lanceolate to linear, usually with acute lobes at the margin and apex (vs. oblong to broadly ovate, with rounded lobes at the margin and apex) and laminar tissue between the veins with abundant acicular pluricellular hairs abaxially (vs. glabrous). The distribution of *H. stolonifera* var. *delasotae* is also more restricted, occurring only near the Parana River, whereas *H. stolonifera* var. *stolonifera* is found from southern and southeastern Brazil to northeastern Argentina.

Among the north-eastern Argentinian/southern Brazilian *Hypolepis* species with unarmed petioles and rachises, *Hypolepis stolonifera* var. *delasotae* is unique by having rhombic laminae with hairs between the veins abaxially. It further differs from *H. poeppigii* and *H. rugosula* subsp. *poeppigiana* in laminar features and having ciliate pseudo-indusia, as shown in the key.

2. *Hypolepis stolonifera* Fée (1873: 35) var. *stolonifera*. **Type:**—BRAZIL. Rio de Janeiro: “Brasilia fluminensi, ad Montes Orgaos, scaturigines amnis Soberbo,” without date, *Glaziou 4435* (syntypes: B-200074973!, B-200075126!, C not seen, GH not seen, P-00633493!, P-00633494!, P-00633495!); “Brasilia fluminensi, ad Itatiaia,” *Glaziou 5329* (syntypes B-20 0075123!, K!, P-00633496!). Figs. 3A–F, 4C–D.

Rhizomes long-creeping, branched, bearing several fronds, 2–5 mm diam., with catenate, yellowish brown hairs, 1–2 mm long, 15–20-celled. Fronds erect to arching, 1.2–2.0 m long; petioles proximally wine-red, medially brown, distally golden brown, immaculate, glabrescent or with some catenate hairs, inermous, moderately rugose, 45–75(–95) cm long, 3–7 mm diam.; laminae rhombic, proximally tripinnate-pinnatifid to quadripinnate-pinnatifid, 60–120 × 80–110 cm; rachises straight, golden-brown, light brown or greenish, glabrous or with scarce catenate hairs, inermous; proximal pinnae 40–55 × 20–45 cm, strongly inequilateral, the basiscopic pinnules larger and more dissected; pinnae patent; costae abaxially and adaxially glabrescent to sparsely villous, the hairs catenate, hyaline, 0.4–0.8 (–1.2) mm long, 4–8(–10)-celled; last pinnules usually oblong to broadly ovate, with rounded lobes at the margin and apex; costules abaxially villose, adaxially glabrous, the hairs similar to those from the costae; veins abaxially sparsely villose, the hairs similar to those from the costae and costules but smaller, 0.2–0.4 mm long, 3–5-celled, adaxially glabrous; laminar tissue between the veins abaxially and adaxially glabrous; lamina margins glabrous; sori marginal; pseudo-indusia conspicuous, proximally green, distally hyaline, membranaceous in the hyaline part, the margins copiously ciliate, the cilia 0.2–0.3 mm long, 3–4-celled; spores yellowish brown, elliptical in polar view and plane-hemispherical in equatorial view, 21–37 × 20–29 µm ornamented by baculate processes fused together to form crests, and usually connected by branched strands.

Iconography:—Fée (1873: tab. 91, fig. 2); Schwartsburd (2012a: figs. 1.A–I, 3A–H);

Distribution and habitat:—*Hypolepis stolonifera* is the most common species occurring in southern and south-eastern Brazil, from the states of Minas Gerais and Rio de Janeiro southwards to Rio Grande do Sul; here it is reported for the first time from Argentina (province of Misiones). It occurs mainly in the mountain regions of the Atlantic forest and forest of *Araucaria* Jussieu (1789: 413), especially in forest clearings and at the edges of the forest if it is not too disturbed, in semi-shady places, forming large populations (Schwartzburd 2012b). Fig. 6.

Specimens examined:—ARGENTINA. Misiones: Depto. Guaraní. Predio Guaraní, 26° 54'–59'S, 54° 12'–18'W, tramo 1 en camino abandonado, 08 December 2001, *Keller 1470* (BA, CTES); Depto. General Belgrano, Parque Provincial Cruce Caballero, sendero Carayá, 26°31'12"S, 53°59'13"W, 611 m, 26 November 2013, *Zanotti et al. 540* (SI); Depto. San Antonio, 4 December 1957, *Capurro 1321* (BA); Depto. San Pedro, Parque Provincial Cruce Caballero, 14 March 2012, *Yañez & Marquez 101* (LP).

3. *Hypolepis poeppigii* (Kunze 1834: 50) Rodríguez (1989: 202). *Polypodium poeppigii* Kunze (1834: 50). *Hypolepis rugosula* (Labill.) J.Sm. var. *poeppigii* (Kunze) Christensen & Skottsberg (1920: 31). *Phegopteris poeppigii* (Kunze) Mettenius (1858: 297) *nom. inval.* **Type:**—CHILE. V Región [Región de Valparaíso]: “In turfosis paludosis littoris oceani pacificis prope Concon,” August 1827, *Poeppig, Col. Pl. Chil. 264* (holotype: LZ-destroyed; isotypes: B-20 0074807!, BM-001067957!). Fig. 5A, B.

Phegopteris sturmii Philippi (1896: 358) **Type:**—CHILE. X Región [Región de Los Lagos]: Puyehue, Pilmaiquén, *Cueto s.n.* (holotype SGO-000000470 image!).

Description and Iconography:—de la Sota (1977 as “*Hypolepis repens*”), Arana & Bianco (2011 as “*Hypolepis repens*”), Schwartsburd (2012a).



FIGURE 3. *Hypolepis stolonifera* var. *stolonifera*. **A.** Rhizome long-creeping, branched. **B.** Distal Pinna. **C.** Detail of pinnule. **D.** Habit. **E.** Segment with laminar tissue between the veins abaxially glabrous. **F.** Detail of marginal sori. Pseudo-indusia membranaceous, the margins copiously ciliate. Scale bars: A and B = 5 cm; C = 2 cm; D = 50 cm; E and F = 0.2 cm.

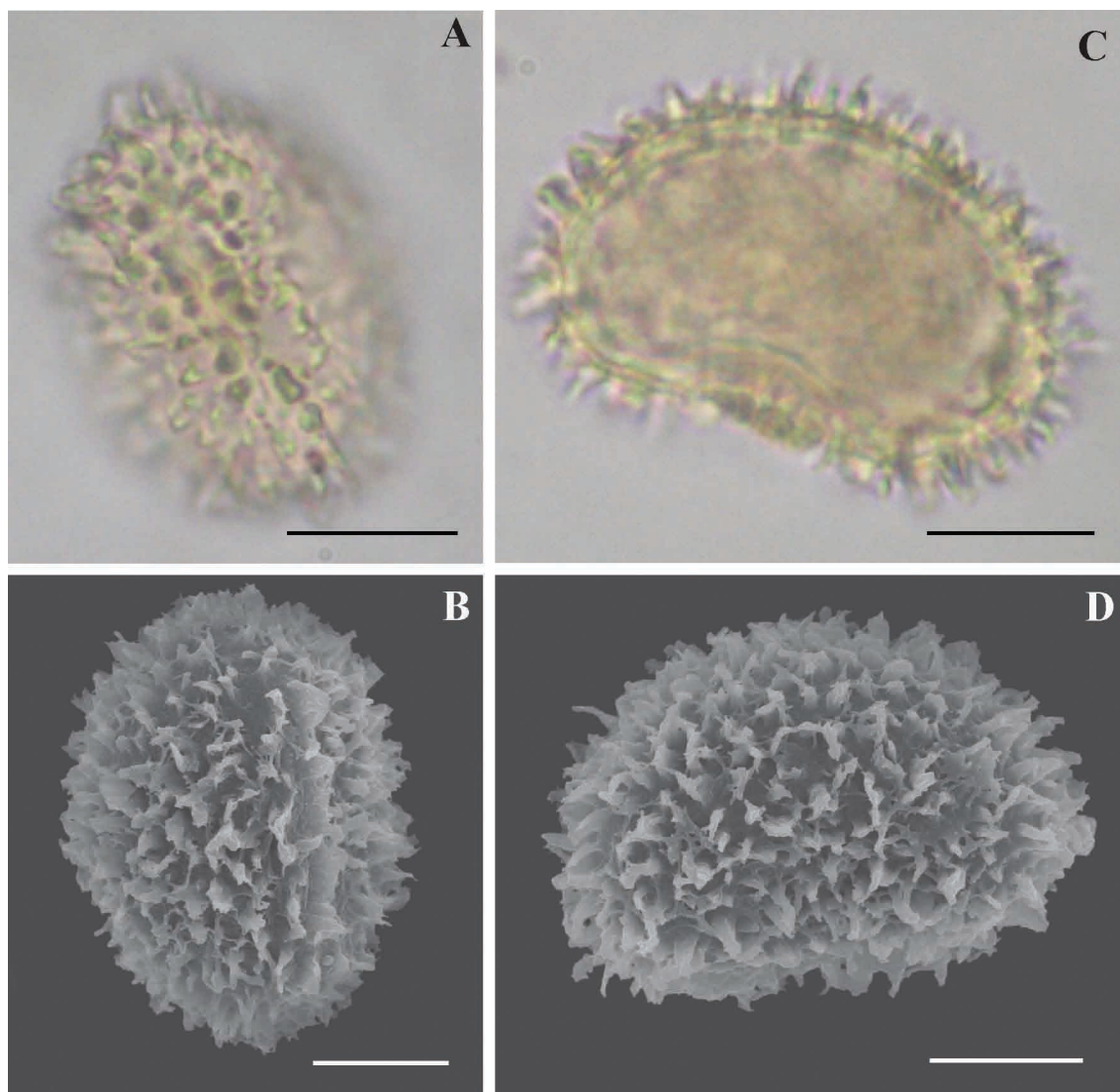


FIGURE 4. A–B. Spores of *Hypolepis stolonifera* var. *delasotae*. A. Proximal view at light microscope. B. Proximal view at scanning electron microscope. C–D. Spores of *Hypolepis stolonifera* var. *stolonifera*. C. Equatorial view at light microscope. D. Equatorial view at scanning electron microscope. Scale bar: A–D = 10 μ m.

Distribution and habitat:—Southern Bolivia (Dept. Chuquisaca), central Chile (regions of Bernardo de O’Higgins (VI), Bío Bío (VIII), Metropolitana de Santiago (XIII) and Valparaíso (V)) and in the northwestern and central Argentina (provinces of Catamarca, Córdoba, Jujuy, Salta, Tucumán). The Sierra de Comechingones in Córdoba represents the southernmost limit of the species in Argentina. It occurs mainly in the mountain regions of the Yungas and Chaco Serrano grasslands, in creek devices and shady places from 800 m above sea level. Fig. 6.

Observations:—We have selected the correct combination of *Polypodium poeppigii* into *Hypolepis* made by Rodriguez (1989—*H. poeppigii* (Kunze) R.A. Rodr.), and not by Maxon (1941—*H. poeppigii* (Kunze) Mett. ex Maxon). Maxon (1941) did not have any intention to do such combination; he only cited “*Hypolepis poeppigii* (Kunze) Mett.”, clearly making confusion between *Polypodium poeppigii* Kunze and *Hypolepis poeppigiana* Mettenius (1856), which are two different entities. At that time, Mettenius (1856, 1858) considered *Polypodium poeppigii* as *Phegopteris poeppigii* (Kunze) Mett., based on *Phegopteris* Mettenius (1858: 293), a later homonym of the valid genus *Phegopteris* (Presl 1836: 179) Fée (1852: 242) of the family Thelypteridaceae.

4. *Hypolepis rugosula* (Labillardière 1806 [1807]: 92) Smith (1846: 8) subsp. ***poeppigiana*** (Mett.) Schwartsburd & Prado (2014: 213). *Hypolepis poeppigiana* Mettenius (1856: 18). Type:—CHILE. XIV Región [Región de los Ríos]: “Prope coloniam Arique in prov. Valdivia,” May 1851, *W. Lechler, Pl. Chil. 194* (lectotype B 20 0074790!, designated by Schwartsburd & Prado, 2014, isolectotypes B! (2 sheets), FI!, FI-W!, G!, K! (3 sheets), L!, LE!, UPS!, W!). Fig. 5 C–D.

Hypolepis chilensis Fée (1857 [1858]: 76) *nom. superfl.* for *Hypolepis rugulosa* based on one share syntype (*W. Lechler, Pl. Chil. 194*).
 Syntypes:—CHILE. Valparaíso, [1834 or 1835], *Gaudichaud s.n.* [31?] (BR!, FI-W!-214906, FIW!-214910, FI-W!-216216, G!, RB!, W!); San Juan Fernandez, s.d., *Gay* (P?-*n.v.*, PC?-*n.v.*); XIV Región [Región de los Ríos]: “Pres de la colonie Arique, province de Valdivia” [May 1851], *W. Lechler, Pl. Chil. 194* (B!-3 sheets [20 0074789, 20 0074790, 20 0074791], FI!, FI-W!-214914, G!-2 sheets, GOET-*n.v.*, K!-000640324, K!-000640325, K!-000640326, L!, LE!-2 sheets, UPS!, W!).

Hypolepis hauman-merckii Hicken (1906: 212) Type:—ARGENTINA. Prov. Buenos Aires: Sierra de la Ventana, 25 December 1905, *L.L. Hauman-Merck s.n.* (Lectotype SI-000095!, designated by Schwartzburd & Prado, 2014).

Phegopteris poeppigii (Kunze) Fée ex Gay var. *hirsuta* Philippi (1873: 583) Type:—CHILE. Región XI [Región Aysén del General Carlos Ibañez del Campo]: Puerto Lagunas, January 1872, *Simpson s.n.* SGO- 000000467 [image!]. (Lectotype designated by Schwartzburd & Prado, 2014).

Description and Iconography:—de la Sota *et al.* (1998), Schwartzburd & Prado (2014: Fig. 1A, B, E–H).

Distribution and habitat:—Chile (regions of Aysén del General Carlos Ibañez del Campo (XI), Araucanía (IX), Biobío (VIII), Coquimbo (IV), Los Ríos (XIV), Magallanes y Antártica Chilena (XII), Valparaíso (VIII) and Juan Fernandez (Más a Tierra and Más Afuera), Chiloé (Isla Grande). Argentina (provinces of Buenos Aires, Chubut, Mendoza, Neuquén and Río Negro) typically in hyper humid low altitude forests of Patagonia, coasts of lakes and rivers at 0–600 m, also in rock crevices in Pampean Hills. Fig 6.



FIGURE 5. A–B. *Hypolepis poeppigii*. A. Habit. B. Detail of segments with rounded lobes at the margin. C–D. *Hypolepis rugosula* subsp. *poeppigiana* C. Habit. D. Detail of pinnules abaxially. Scale bars: A and C = 50 cm; B = 2 cm; D = 10 cm.

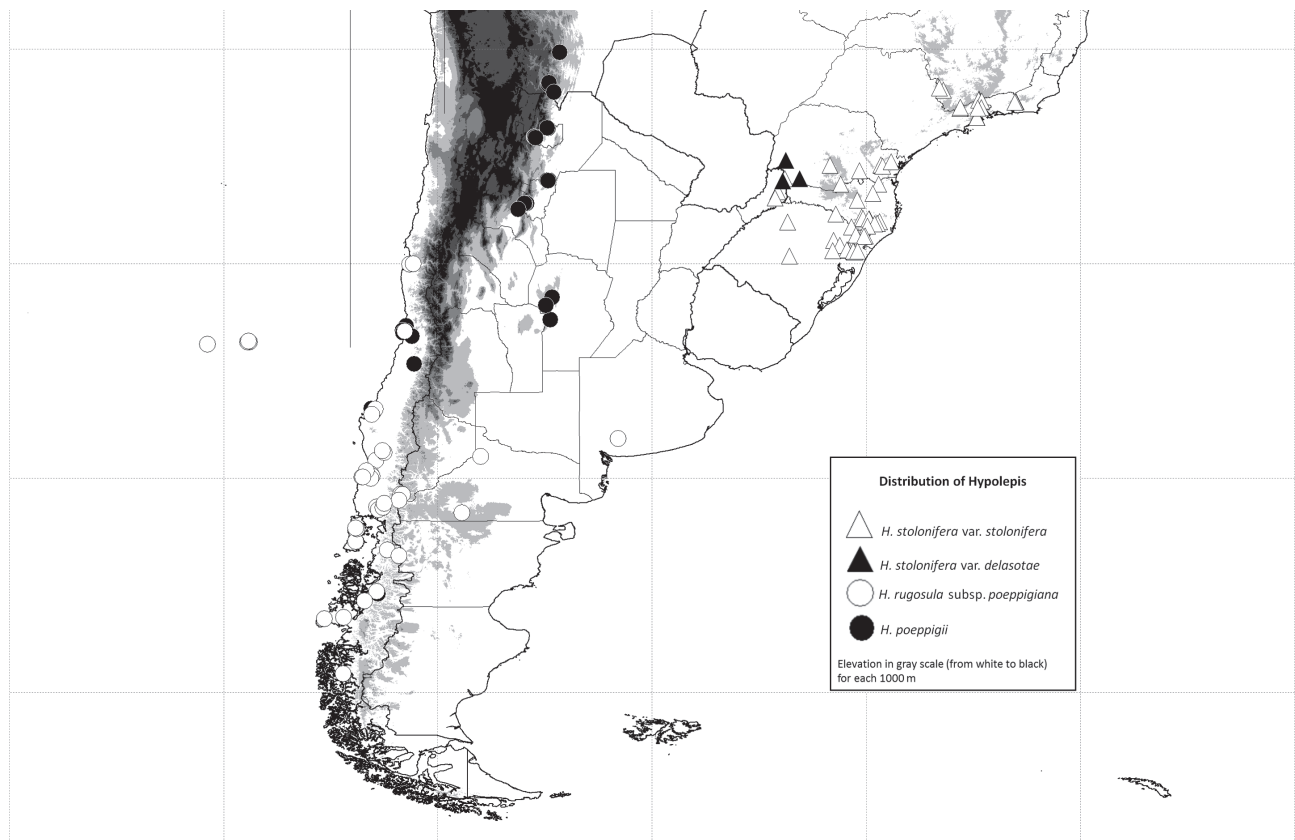


FIGURE 6. Complete distribution map of *Hypolepis poeppigii*, *H. rugosula* subsp. *poeppigiana*, *H. stolonifera* var. *delasotae* and *H. stolonifera* var. *stolonifera*.

Dubious species

Cystopteris fragilis (L.) Bernh. var. *pubescens* Philippi (1873: 582). Type:—CHILE. Region australiore chilensis, January 1871, *E. Simpson*, s.n. (SGO-00000509!).

Notes:—Although Rodríguez (1995) and Muñoz-Schick & Morales (2013) synonymized this under *Hypolepis poeppigii* (Kunze) R.A.Rodr., Schwartsburd & Prado (2014), after studying the image of the type at the herbarium SGO (<http://plants.jstor.org>), considered *Cystopteris fragilis* var. *pubescens* a dubious name. After examining the type, which consists of three sterile young fronds with bipinnate, abundantly pilose laminae, we agree with Schwartsburd & Prado (2014) because the material is insufficient to address it to any established species with certainty.

Excluded species

Hypolepis repens (L.) Presl (1836: 162). *Lonchitis repens* Linnaeus (1753: 1078). Type:—Plumier 1705: *Traité. Foug. Amer.* t. 12! (lectotype, designated by Underwood, 1906).

Notes:—This species was reported for Argentina by de la Sota (1977) and subsequent works (e.g., Martínez & de la Sota 2000; Ponce *et al.* 2008; Arana & Bianco 2011). According to Schwartsburd (2012a), and morphological re-examination of all cited material, we attest this name has been misapplied for the Argentinian material, and such specimens are better classified as *Hypolepis poeppigii*. *Hypolepis repens* differs from *H. poeppigii* by aculeate petioles and rachises (vs. inermous), absence of catenate-glandular hairs (vs. catenate-glandular hairs present in most axes), marginal sori (vs. submarginal), and hyaline, well-developed pseudoindusia (vs. pseudoindusia absent; lamina margins recurved but not developed into hyaline flaps). *Hypolepis repens* is a Neotropical species, occurring in the U.S.A. (Florida), Greater Antilles, Mexico, Central America, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Bolivia, reaching its southern limits in Paraguay and Brazil (São Paulo).

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