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A New Name for Plants Previously Called *Parablechnum christii* (Blechnaceae) in Costa Rica and Panama

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ABSTRACT. The name *Parablechnum christii* (C. Chr.) Gasper & Salino has been applied to a small species with few pairs of short pinnae that is endemic to Costa Rica and Panama. After reviewing type material of this name, we conclude that it has been misapplied and is, in fact, a synonym of *P. falciforme* (Liebm.) Gasper & Salino, an older name. Because the specimens previously identified as *P. christii* lack a name, we propose *P. talamancanum* S. Molino & R. C. Moran for these plants. The species is endemic to the mountains of Costa Rica and Panama, from 1200 to 3350 m.

RESUMEN. *Parablechnum christii* (C. Chr.) Gasper & Salino es un nombre que se ha aplicado a una especie de pequeño tamaño, con pocos pares de pinnas cortas, endémica de Costa Rica y Panamá. Después de revisar el material tipo de este nombre, llegamos a la conclusión de que se ha aplicado erróneamente y es, de hecho, un sinónimo de *P. falciforme* (Liebm.) Gasper & Salino, un nombre más antiguo. Dado que los especímenes previamente identificados como *P. christii* carecen de nombre, proponemos *P. talamancanum* S. Molino & R. C. Moran para estas plantas. La especie es endémica de las montañas de Costa Rica y Panamá, entre 1200–3350 m.

Key words: Blechnaceae, *Blechnum*, ferns, *Lomaria spissa*, *Parablechnum falciforme*, pteridophyte, taxonomy.

Parablechnum C. Presl (Blechnaceae) is characterized by its terrestrial habit, 1-pinnate leaves, sessile or short-stalked pinnae, presence of hydathodes, and (almost always) strong sterile-fertile leaf dimorphy. It is the largest genus of Blechnaceae, comprising about 68 species, most of which occur in the American tropics and the southern Pacific. The genus also occurs, but is less diverse, in southern Africa, Madagascar, and the Mascarenes (Gasper et al., 2016; Molino, 2022). Central America harbors about 10 species of *Parablechnum*, one of which has been called *P. christii* (C. Chr.) Gasper & Salino (e.g., by Moran, 1995, as “*Blechnum christii* C. Chr.”; Gasper et al., 2016). This species, which is endemic to Costa Rica and Panama (Moran, 1995), is the subject of the present paper.

MATERIALS AND METHODS

We examined herbarium material previously identified as *Parablechnum christii* and the morphologically similar *P. falciforme* (Liebm.) Gasper & Salino. We also examined the type specimens of *Blechnum christii* C. Chr. (nom. nov. for *Lomaria spissa* Christ, nom. illeg., non Fée 1852), and *L. falciformis* Liebm., to assess their conspecificity based on morphological characters. The specimens were from the following institutions: B, F, MACB, MO, P, NY, US, and VT (Thiers, 2023, continuously updated). In addition, we studied high-



Figure 1. Type specimen (consisting of two sheets) of *Blechnum christii* C. Chr., a replacement name for *Lomaria spissa* Christ, nom. illeg., non Fée. Note the numbering in pencil on the lower right of each specimen as “1/2” and “2/2.” —A. Sheet one of two, P-01623170. —B. Sheet two of two, P-01623169.

resolution digital images of specimens from C, CR, GOET, L, and UC. Images from the latter herbaria were consulted in the official web pages of the herbaria, GBIF (2023a), the JSTOR Global Plants platform (Ryan, 2018), and PteridoPortal (2022). Specimens examined in situ are indicated by “!”.

We also observed sporangia and spores from some of the specimens. Sporangia were observed by scraping the sori from previously softened and rinsed pinnae. Spores were mounted in tap water and measured with a high-powered light microscope (×1200). At least 30 spores per specimen were measured for polar and equatorial diameters of the exine (a.k.a. “exospore”), excluding the perine (a.k.a. “perispore”). The measurements were made using the software Piximètre (Henriot & Cheype, 2022). To observe the perines and exines in detail, we used an SEM. The samples were mounted on metal stubs with carbon adhesive, coated with gold, and then observed under a JSM 6400 JEOL SEM (JEOL Ltd., Tokyo, Japan) operating at 20 kV. The observations were carried out at the Centro Nacional de Mi-

croscopía Electrónica (CNME) of the Universidad Complutense de Madrid.

The distribution map of the new species was generated using QGIS 3.16.8. The data were downloaded from GBIF (2013b).

RESULTS AND DISCUSSION

The name *Blechnum christii* (here recognized as *Parablechnum christii*) was misapplied by Moran (1995). Its type (Fig. 1), not seen by Moran (1995), will key to *B. falciforme* (Liebm.) C. Chr. (= *P. falciforme* (Liebm.) Gasper & Salino) in both Moran (1995) and Mickel and Smith (2004). *Parablechnum falciforme* is characterized by leaves 41–127 cm long, chartaceous laminae, 12 to 35 pairs of pinnae, and pinnae 10–22 cm long (Molino, 2022). In contrast, *B. christii* sensu Moran (1995) has leaves 23–68 cm long, coriaceous laminae, fewer than 11 pairs of pinnae, and pinnae 2.5–12.3 cm long. Because both species have pinnae 1–3 cm wide (Moran, 1995; Molino, 2022), the longer pinnae of *B.*

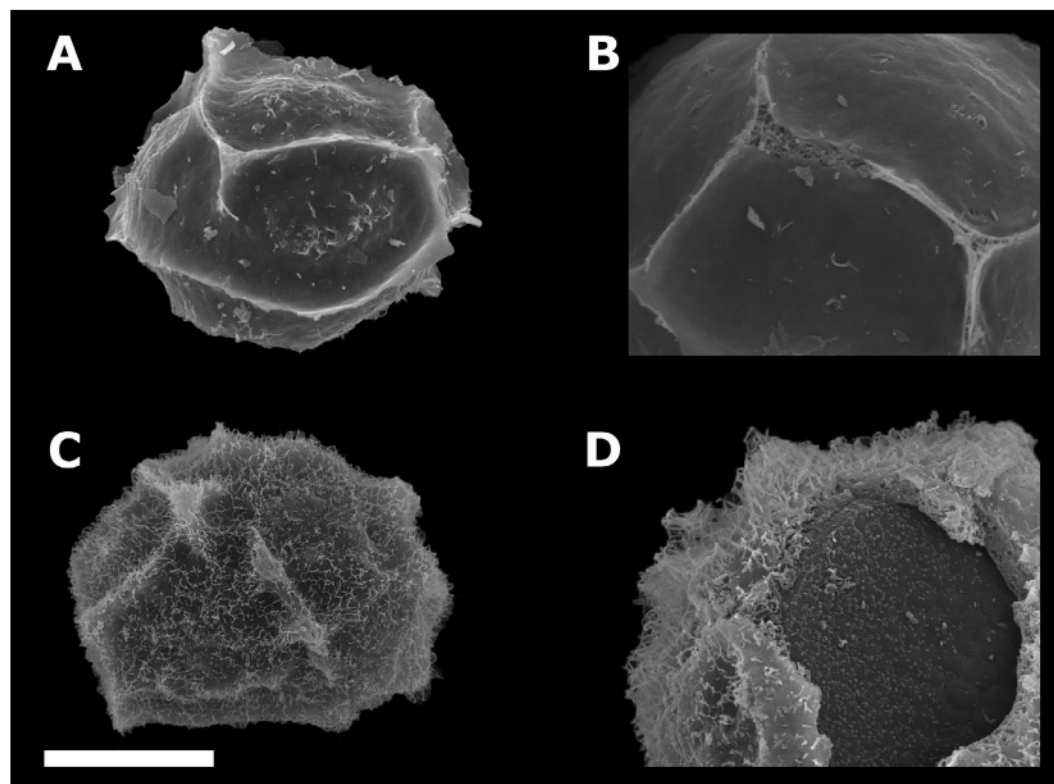


Figure 2. Spores of two species of *Parablechnum* C. Presl from Central America. A, B. *Parablechnum talamancanum* S. Molino & R. C. Moran (*R. E. Woodruff s.n.*, US-2551967). —A. General view of the spore. —B. Detail of a broken part of the perine, showing the exospore. C, D. *Parablechnum falciforme* (Liebm.) Gasper & Salino (*R. Torres et al. 17654*, VT-198685). —C. General view of the spore. —D. Detail of a broken part of the perine, showing the exospore. Scale bar: A = 36 μm ; B = 18.5 μm ; C = 28 μm ; D = 17 μm .

falciforme appear narrower than those of *P. christii*, which has shorter pinnae that appear relatively wider. The length/width ratios of the pinnae of the two species are, respectively, 4.6–10.6 versus 2.8–7.6.

Aside from macromorphological differences, *Parablechnum falciforme* and *P. christii* sensu Moran (1995) differ in micromorphological characters. The plants previously identified as *P. christii* have 28 to 30 annulus cells, whereas *P. falciforme* has 19 to 29. Also, the perines of both species differ markedly: the plants previously called *P. christii* have cristate-reticulate perines with the broad folds or ridges forming large areolae, and surfaces with few or no filaments (Fig. 2A, B), whereas plants of *P. falciforme* have cristate-reticulate perines with smaller areolae, and surfaces with abundant filaments (Fig. 2C, D). These characteristics of *P. falciforme* spores and sporangia agree with those previously reported by Passarelli et al. (2010) and Wal et al. (2021).

Given the above differences in leaves, sporangia, and perines, we conclude that the Costa Rican and Pana-

manian plants previously treated by Moran (1995) as *Blechnum christii* (= *Parablechnum christii*) represent a new, undescribed species, one quite distinct from *P. falciforme*. Accordingly, these plants are described here as new.

TAXONOMIC TREATMENT

Parablechnum falciforme (Liebm.) Gasper & Salino, *Phytotaxa* 275(3): 216. 2016. Basionym: *Lomaria falciformis* Liebm. in Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 1: 234. 1849. *Blechnum falciforme* (Liebm.) C. Chr., *Index Filic.* 154. 1905. *Struthiopteris falciformis* (Liebm.) Broadh., *Bull. Torrey Bot. Club* 39: 365. 1912. TYPE: Mexico. Oaxaca: Cerro de Sempoaltepec, s.d., *F. M. Liebmans s.n.* [Pl. Mex. 2343, Fl. Mex. 775] (lectotype, designated by Smith [1981: 58]; C [bc] C-10021570!).

Lomaria deflexa Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 1: 236. 1849, nom.

illeg., non *Lomaria deflexa* Colenso, Tasmanian J. Nat. Sci. 2: 178, 1844. TYPE: México. Oaxaca: betw. Toton-tepec & Trapiche de la Concepción, s.d., *F. M. Liebmann* s.n. [Pl. Mex. 2341, Fl. Mex. 770] (lectotype, designated by Smith [1981: 58], C not seen; isotype, fragm. US-1406165).

Blechnum christii C. Chr., Index Filic. 152. 1905, nom. nov. for *Lomaria spissa* Christ, Bull. Herb. Boissier, sér. 2, 4(11): 1092. 1904, nom. illeg., non *Lomaria spissa* Fée, Mém. Foug., 5. Gen. Filic. 71. 1852. *Struthiopteris christii* (C. Chr.) Broadh., Bull. Torrey Bot. Club 39: 362. 1912. *Parablechnum christii* (C. Chr.) Gasper & Salino, Phytotaxa 275(3): 215. 2016. TYPE: Costa Rica, 1908, C. *Wercklé* s.n. (P, mounted on 2 sheets, [bc] P01623169 and P01623170).

Selected additional specimens examined. COSTA RICA. **Alajuela:** around summit & old crater lake of Volcán Poás, 6 July 1962, *Mickel* 2423 (US [bc] US-2589072A). **Cartago:** Cerro de la Muerte, “Madre Selva,” 24.5 km NW of La Asunción near Km. 67 on Interamerican Hwy., 11 Aug. 1967, *Lellinger* 888 (US [bc] US-2589678A, US-2589679A). **Guanacaste:** Liberia, Parque Nacional Guanacaste, sendero casa Frank, entre el cruce a Cerro Cacao y la quebrada, 10 Aug. 2007, *Rojas & Araya* 7823 (CR [bc] CR-263286). **Heredia:** Barva, Falls of Chinchona, near Vara Blanca, 30 July 1961, *Brown* 210A (F [bc] C-0616179F). **Limón:** Cerro Chirripó, 25 Aug. 1967, *Evans, Lellinger & Bowers* 158 (US [bc] US-2589685A, US-2589686A). **Puntarenas:** La Palma, 5 June 1926, *Lehmann* 115 (CR [bc] CR-38520). **San José:** Alajuelita, San Antonio Z.P. Cerros de Escazú, Cima de cerro Cedral, Estación del Instituto costarricense de Electricidad, 2 July 2007, *Chacón, Estrada & Sánchez* 890 (CR [bc] CR-255424). EL SALVADOR. **Morazán:** 28 Mar. 1979, *Seiler* 990 (NY!, F [bc] C-0616170F). **Santa Ana:** Bosque Montecristo, 7 Nov. 1977, *Seiler* 196 (F [bc] C-0616169F). GUATEMALA. **Alta Verapaz:** Río Chío about 2–4 km SW of Cobán, 31 Jan.–8 Feb. 1969, *Williams, Molina, Williams & de Molina* 40722 (NY, 2 sheets). **Chimaltenango:** above Las Calderas, 3 Jan. 1939, *Standley* 61943 (F [bc] C-0616132F). **Chiquimula:** betw. Miramundo & summit of Montaña Miramundo, betw. Jalapa & Mataquescuintla, 6 mi. S of Miramundo, 5 Dec. 1939, *Steyermark* 32728 (F [bc] C-0616143F). **Huehuetenango:** Nentón, Bendición de Dios, Montaña Virgen, 12 Dec. 2006, *Jiménez Barrios* 639 (MO [bc] MO-6273960). **Quetzaltenango:** Mun. De Zunil, along dirt rd. above Aldea Chuimucubal, NW slopes of Pico Zunil, 3 Jan. 2006, *Quedensley* 2791 (NY). **Quiché:** 1942, *Aguiar* 1214 (F [bc] C-0616131F). **San Marcos:** Cerro Tumbador, Sierra Madre Mtns., about 15 km W of San Marcos, 15 Dec. 1962, *Williams, Molina & Williams* 23057 (F [bc] C-0616151F, C-0616152F, US [bc] US-2425331, US-2425337). HONDURAS. **Francisco Morazán:** Cerro de Uyuca, 10–20 Mar. 1951, *Morton* 7214 (US [bc] US-2017120). **Intibucá:** La Esperanza, betw. Pela Naríz & Calaveras, 12 km from La Esperanza, 7 Mar. 1969, *Molina* 24118 (F [bc] C-0616155F, C-0616156F). **La Paz:** betw. Florida & El Ceron, 7 km from Marcala, 6 Mar. 1969, *Molina* 24092 (F [bc] C-0616528F, US [bc] US-3695436). **Ocatepeque:** El Moral on Cordillera Merendón, 27 Aug. 1968, *Molina* 22286 (F [bc] C-0616526F, C-0616527F). MEXICO. **Chiapas:** 1902, *Münch* 27 (P [bc] P-01623361, P-01623362). **Chihuahua:** E of Monserrat, May 1841, *F. M. Liebmann* s.n. (US [bc] US-0474921). **Guerrero:** Distr. Mina, Guerrero, Toro Muerto, 1 May 1939, *Hinton* 14207 (F [bc] C-0616127F, US [bc] US-1748786). **Hidalgo:** 11 km al S de Tenango de Doria, sobre carretera a Metepec, 14 Jan. 1973, *Rzedowski* 30211 (NY). **Jalisco:** Barranca de

Chinanila, May 1871, *Liebmann* s.n. (P [bc] P-00627589). **Mexico:** Distr. of Tlaxcaltepec, La Sierrita, 3 July 1933, *Hinton* 3470 (NY, UC [bc] UC-1162741, US [bc] US-1792099). **Nuevo León:** Distr. Galeana, Guerrero, Teotepac, 21 May 1939, *Hinton* 14204 (US [bc] US-1748806). **Oaxaca:** Cerro de Sempoaltepec, s.d., *Liebmann* s.n. (B [bc] B-200031041 [syntype]); ibid. (BM [bc] BM-00769807 [syntype]); ibid. (C [bc] C-10020648!); ibid. (C [bc] C-10020649); ibid. (P [bc] P-00627589 [syntype]). **Puebla:** Distr. Galeana, Guerrero, Loc. Teotepac, 21 Feb. 1939, *Hinton* 14303 (NY, 2 sheets). **Sinaloa:** Mun. Mazatlan Villa de Flores, San Pedro de los Encinos, Sierra Mazateca, 22 Nov. 2001, *Munn-Estrada & Mendoza* 1681 (NY, 2 sheets). **Veracruz:** Nov. 1908, *Sandoval* 29 (F [bc] C-0616122F). NICARAGUA. **Nueva Segovia:** Mpio. Jalapa, Cerro Jesús, 7 July 2012, *I. Coronado, R. M. Rueda & J. Reyes* 6676 (MO [bc] MO-6710038, MO-6710039). PANAMA. **Chiriquí:** 12 mi. above Boquete on rd. to Volcán Barú, 18 May 1976, *Croat* 3488 (MO [bc] MO-2623118). **Coelá:** La Mesa, above El Valle de Antón, ca. 2 km W of Cerro Pilón, 20 July 1976, *Croat* 37445 (MO [bc] MO-2628706).

Parablechnum talamancanum S. Molino & R. C. Moran, sp. nov. TYPE: Costa Rica. Heredia: SW slope of Volcán Barva along trail from Sacramento, 10°8'N, 84°7'W, 2650 m, 26 Apr. 1986, *M. H. Grayum* 7389 (holotype, CR [bc] CR-135885!; isotype, MO [bc] MO-3496899). Figures 2A, B, 3, 4.

Diagnosis. *Parablechnum talamancanum* S. Molino & R. C. Moran differs from *P. falciforme* (Liebm.) Gasper & Salino by its coriaceous laminae, 7 to 11 (vs. 12 to 35) pairs of pinnae, pinnae 2.5–12.3 (vs. 10–22) cm long, pinna length/width ratio 2.8–7.6 (vs. 4.6–10.6), 28 to 30 (vs. 19 to 29) annulus cells, and few or no filaments on the perine surfaces.

Plants terrestrial; *rhizomes* erect, not arborescent, not stoloniferous, scales 10–30 × 3–6 mm, lanceolate, concolorous, pale brown, entire or nearly entire; *fronds* dimorphic, reddish when young. *Sterile fronds* erect; *petiole* 8–30 cm, stramineous or darkened at base, with numerous scales on base as those of rhizome; *lamina* 10–32 × 9–20 cm, 1-pinnate, sparsely scaly abaxially, truncate at base, terminal pinna similar to lateral ones; *pinnae* 7 to 11 pairs, 2.5–12.3 × 1–3 cm, short-stalked, becoming basiscopically adnate distally, coriaceous, margins serrate, not becoming involute, base rounded to cordate or subcordate, apex obtuse to acute; *rachis* stramineous to yellowish brown, transversely rugose, faintly papillose, moderately to densely scaly, scales whitish to pale straw-colored; *costa* similar to rachis in color and indument, grooved adaxially, slightly keeled abaxially; *buds* absent; *aerophores* at pinnae bases ca. 0.5 mm, oblong. *Fertile fronds* erect, longer than sterile ones or of similar size; *petiole* 15–45 cm, stramineous to yellowish brown, rarely brown; *lamina* 15–40 × 6–15 cm; *pinnae* of same number as sterile ones, 4–10 × 0.4–0.5 cm, linear, contracted; *sori* linear, continuous on both sides of costa; *indusia* linear, continuous, with

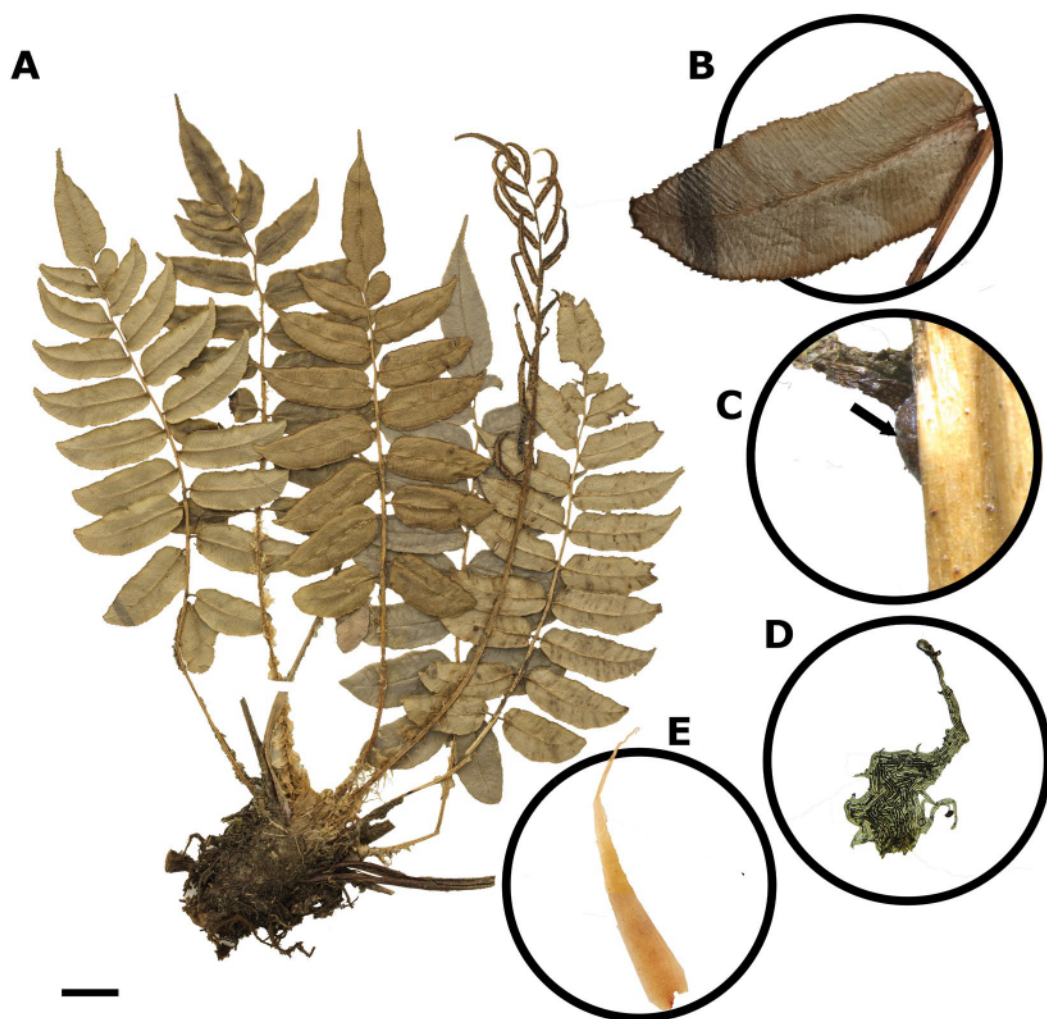


Figure 3. *Parablechnum talamancanum* S. Molino & R. C. Moran. —A. Habit. —B. Sterile pinna, adaxial side (*M. H. Grayum* 7389, MO-3496899). —C. Aerophore indicated by an arrow (*C. Weber* 6241, US-2722148). —D. Scale from the abaxial side of the costa. —E. Rhizome scale (*A. Rojas et al.* 10421, MACB). Scale bar: A = 20 mm; B = 6 mm; C = 1.2 mm; D = 0.4 mm; E = 7 mm.

rectangular cells, slightly lacerated; *sporangia* with 28 to 30 annulus cells; *spores* monolete, $(61\text{--}66\text{--}76) \times (44\text{--}50\text{--}57) \mu\text{m}$, with crested-reticulate perines delimiting large polygonal areoles, without or with very scarce filaments on areole surface, interior of perines spongy, exospore smooth or slightly rough.

Distribution and habitat. *Parablechnum talamancanum* is found in Costa Rica and Panama (Fig. 5), in cloud forests, especially ones dominated by *Quercus*, in humid, usually exposed areas such as roadsides at 1200–3350 m. This species is reported here for the first time from Panama.

Notes. A similar but smaller species is *Parablechnum weffii* (R. C. Moran) Gasper & Salino, which can be distinguished from *P. talamancanum* by its narrower laminae, more numerous pinna pairs (11 to 25 vs. seven to 11 pairs in *P. talamancanum*), smaller pinnae ($1.5\text{--}3 \times 0.6\text{--}1$ cm vs. $5\text{--}10 \times 1.4\text{--}2.5$ cm in *P. talamancanum*), and abaxially glabrous rachises and costae (vs. scaly in *P. talamancanum*).

Parablechnum talamancanum also resembles *P. schiedeanum* (C. Presl) Gasper & Salino, a common species throughout Mesoamerica (Moran, 1995). It differs from *P. talamancanum* by its longer leaves (60–200 cm) and entire pinnae except on the apex,



Figure 4. Habit of *Parablechnum talamancanum* S. Molino & R. C. Moran. Note longer-petiolate, erect fertile leaf (Costa Rica, photo by R. C. Moran).

where the margin is serrulate (vs. completely serrate in *P. talamancanum*). Another similar Central American species is *P. varians* (E. Fourn.) Wal, S. Molino & Gabriel y Galán, but it differs by its atropurpureous leaf axes (vs. pale to dark brown in *P. talamancanum*) and crenulate pinna margins.

The above species, all Mesoamerican, resemble *Parablechnum cordatum* (Desv.) Gasper & Salino, a widely distributed species in the mountainous regions of South America (Tryon & Stolze, 1993). It differs from *P. talamancanum* by having leaves up to 2.5 m long. It represents a species complex that requires further research to resolve, which is already under way (e.g., Wal et al., 2021; Molino, 2022). However, *P. cordatum* does not occur in Mesoamerica (Moran, 1995; Mickel & Smith, 2004; Molino, 2022).

Paratypes. COSTA RICA. Alajuela: 1/10 mi. from crater of Volcán Poás, 13 Aug. 1964, *Woodruff s.n.* (US [bc] US-2551967); along the cart-road from Vara Blanca (betw. Poás & Barba volcanoes) to La Concordia, 23 July 1923, *Maxon & Harvey 8386* (US [bc] US-1182005); above the crater of Volcán Poás, 24 Mar. 1973, *Stolze 1455* (F [bc] C-0616022F, US [bc] US-2776183); Poás Lake, Volcán Poás, 3 June 1928, *Stork 2354* (UC [bc] UC-1206727); near the rd. ca. 2.5 km from Volcán Poás, 15 Aug. 1970, *Lellinger 1623* (US [bc] US-2726493); Palmira, Cantón Alfaro Ruiz, 4 Jan. 1939, *Smith 1409* (NY [bc] NY-04178662); slopes near crater of Volcán Poás, 24 Mar. 1973, *Stolze 1460* (F [bc] C-0616016F, C-0616024F, UC [bc] UC-1444332); Poás Lake, Volcán Poás, 5 June 1928, *Stork 2354* (UC [bc] UC-1020672 image); Volcán Poás, 1907, *Alfaro 11918* (US [bc] US-0834094); *ibid.*, 16 June 1967, *de la Sota 5087* (US [bc] US-2551012); *ibid.*, 29 July 1932, *Stork 3346* (UC [bc] UC-1355963); *ibid.*, 16

June 1967, *de la Sota 4082* (US [bc] US-2551012). Cartago: betw. Empalme & La Chonta, Km. 54, 17 May 1964, *Jiménez 1997* (F [bc] C-0616019F, NY [bc] NY-4178666); Cerro de La Carpintera, Feb. 1924, *Standley 34450* (US [bc] US-1154842); Cerro de la Muerte, 1 km NW of Villa Mills on Interamerican Hwy., behind Hotel La Georgina, 8 Aug. 1967, *Lellinger 851* (US [bc] US-2589683A); oak forest N of Irazu, 27 Mar. 1928, *Stork 1291* (MO [bc] MO-5423253, UC [bc] UC-1618580); N 10 km from Cerro de la Muerte, 30 Aug. 1983, *Saiki CR-93* (F [bc] C-0616171F); Pan American Hwy., San Cristobal Finca, 34 mi. from Cartago, 11 July 1961, *Brown 84* (F [bc] C-0616178F); Santa Clara de Cartago, s.d., *Lankester 710* (US [bc] US-1207110); Volcán Turrialba, 28 Mar. 1923, *Torres 13* (US [bc] US-1315522); *ibid.*, 26 Feb. 1924, *Torres 128* (US [bc] US-1315615). Heredia: Barva, Parque Nacional Braulio Carrillo, Cordillera Central, Volcán Barva, 8 Jan. 2005, *Lépez 546* (MO [bc] MO-5858614); Parque Nacional Braulio Carrillo, 6 Nov. 1986, *Hennipman, Roos, Verduyn & Veldhoen s.n.* (L [bc] L-1004206); *ibid.*, 6 Nov. 1986, *Hennipman et al. 6730* (UC [bc] UC-1586645); *ibid.*, transect trail betw. OTS–Station La Selva & Volcan Barva, 17 May 2003, *Kluge 6816* (GOET [bc] GOET-049357!); Cordillera Central, Vara Blanca, Camino al Volcán Poás y rumbo a Cariblanco, 2 Mar. 1995, *Rojas 1701* (MO [bc] MO-5893923!); *ibid.*, 6 Feb. 1890, *Pittier 1921* (US [bc] US-0834093!, NY [bc] NY-4178665!); on the SW slopes of Volcan Barva (formerly Barba), above Sacramento & along the rd. to the National Park, 3 Feb. 1982, *Burger 11397* (F [bc] C-0616174F, C-0616175F); Volcán Barva, 29 July 1926, *Valerio 36* (US [bc] US-1315908); Yerba Buena, NE of San Isidro, 22–28 Feb. 1926, *Standley & Valerio 50051* (US [bc] US-1308364). Puntarenas: La Palma, 5 June 1926, *Valerio 115* (US [bc] US-1316844). San José: along Panamerican Hwy. in the Cordillera de Talamanca, Villa Mills, 15 Sep. 1961, *Weber 6241* (US [bc] US-2722148); detrás de La Georgina, Carretera Panamericana Sur, 28 July 1965, *Jiménez 3405* (F [bc] C-0616176F); Dota, Carretera Interamericana, Km. 72, ca. 1 km S de Iyok Ami, 15 July 2013, *Rojas et al. 10421* (MACB); Dota, Copey, área no protegida, ojo de Agua, 0.5–3 km del cruce, rumbo a Providencia, 24 Aug. 2004, *Rojas 5879* (MO [bc] MO-6397838); Dota, Cordillera de Talamanca, camino a San Gerardo de Dota, entrada por Jaboncillo, 17 Sep. 1994, *Rojas 2715* (MO [bc] MO-5858854, NY [bc] NY-4178663, UC [bc] UC-1214980); Las Nubes, 20–22 Mar. 1924, *Standley 38468* (US [bc] US-1215268); massif of Cerro de la Muerte, 5 July 2002, *Kluge 2044a* (GOET [bc] GOET-049358); Pérez Zeledón, páramo, área no protegida, Villa Mills, entre la Georgina y las torres, 8 Jan. 2005, *Rojas 6348* (MO [bc] MO-6397048). PANAMA. Bocas del Toro: small stream leading W from Cerro Fábrega into the Valle del Silencio, 11 Mar. 2006, *Monro & Knapp 5276* (MO [bc] MO-3217858). Chiriquí: Bugaba, Las Nubes, 5.5 km NW of Río Chiriquí Viejo, W of Cerro Punta, 27 Feb. 1973, *Busey 668* (F [bc] C-0616025F, MO [bc] MO-2144399); NW of Boquete, Cerro Horqueta, 13 Dec. 1966, *Dwyer, Elias, Escobar A. & Oliver 471* (MO [bc] MO-1869807); top of high ridge N of summit of Volcán Barú, “Cerro Pavon,” 15 Mar. 1979, *Hammel 6431* (MO [bc] MO-3519884); trail from Cerro Punta to Bajo Grande, 28 May 1970, *Armond 13* (MO [bc] MO-2290809); western slopes of Cerro Respingo, NE of Cerro Punta village, 15 June 1971, *Webster 16596* (MO [bc] MO-3621395). S. loc., s.d., *J. J. Cooper s.n.* (US [bc] US-1544303).

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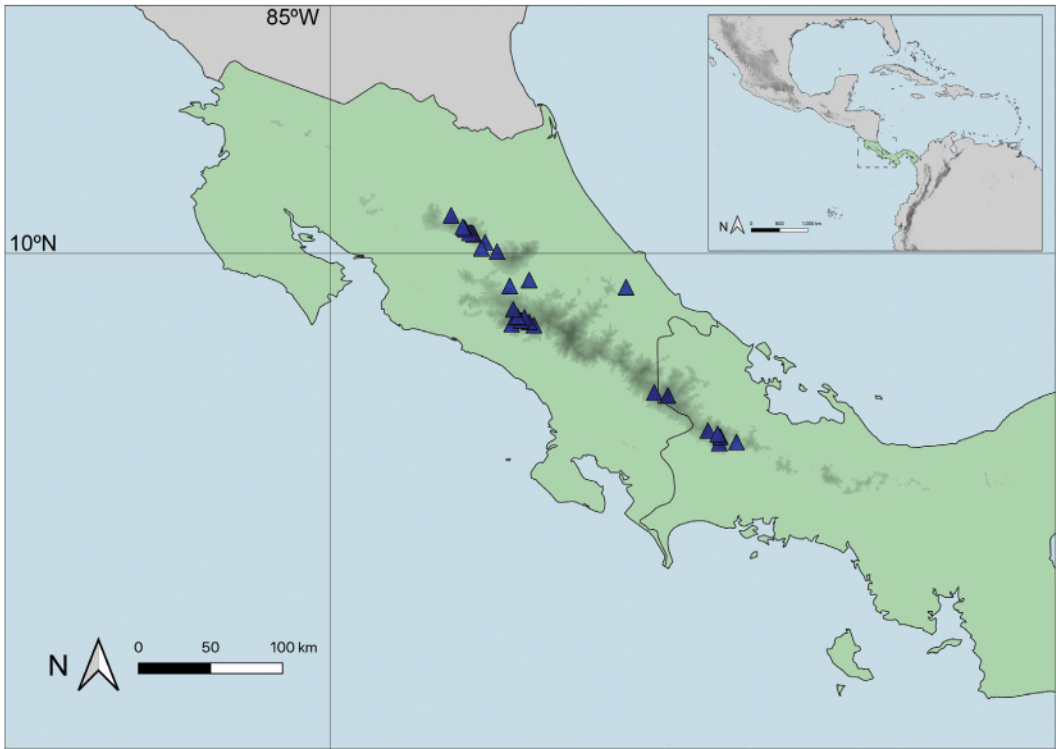


Figure 5. Distribution of *Parablechnum talamancanum* S. Molino & R. C. Moran.

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