

NEW TROPICAL AMERICAN SPECIES OF *THELYPTERIS* (PTERIDOPHYTA)

Alan R. Smith and David B. Lellinger

Abstract.—New species of *Thelypteris* are described from Central America and the Depto. Chocó, Colombia, 9 in subg. *Amauropelta*, 3 in subg. *Goniopteris*, and 1 in subg. *Meniscium*.

Work on *Thelypteris* for a flora of Costa Rica–Panama–Chocó by Lellinger, and for the Flora of Mesoamerica by Smith has resulted in the discovery of several new species for the region. Altogether, nearly 125 species of *Thelypteris* are known for Central America and 10 more for the Chocó region. Most have distributions ranging well outside these areas, but about 35 are known thus far only from Mesoamerica. Almost none are endemic to the Chocó region; most of these extend into Panama or Costa Rica, and others range to Ecuador or farther south. The subgenus to which each species belongs is indicated with the name of the species.

Thelypteris (*Goniopteris*) *chocoensis* Smith and Lellinger, sp. nov.

Fig. 1

Rhizoma breviter repens vel suberectum ad apicem paleaceum, paleis ovatis pilosis, pilis 0.1 mm longis stellatis vel furcatis. Frondes monomorphicae 35–90 cm longae. Stipites longitudine $\frac{1}{2}$ –1 laminas aequantes 2–4 mm diam. brunneoli adaxialiter glabri aut hirsuti tantum in sulcis. Laminae lanceolato-deltatae acuminatae; rachidibus ad apicem gemmiparis distaliter glabris vel sparse pilosis, pilis usque ad 0.5 mm longis ferrugineis simplicibus aut furcatis; pinnis 14–23 paribus usque ad 15 cm longis 1.2–2 cm latis, ad basin anguste cuneatis, ad apicem acuminatissimis vel caudatis, $\frac{2}{3}$ – $\frac{3}{4}$ incis; segmentis valde obliquis (ca. 45–60° ad costam), ad apicem falcatis; costulis venisque abaxialiter glabris, pagina laminae glabris chartaceis non verrucosis. Sori mediali indusiati, indusiis parvis subpersistentibus rufobrunneis ciliolatis; sporangiis glabris.

Type.—COLOMBIA: Depto. Chocó: 0.5–2.5 km N of the Inderena Camp on the Río Truando near Caserio La Teresita, 50–100 m, *Lellinger & de la Sota* 543 (US; isotypes COL, CR, LP).

Paratypes.—COLOMBIA: Depto. Chocó: Corcovada region, Río San Juan, 100 m, *Killip* 35363 (COL, US); Truando, *Schott s.n.* (US); Hydro Camp 15 on the Río Curiche, ca. 300 ft, *Duke* 15376 (US); Río San Juan 3.5 km SW of Andagoya, just NE of the mouth of the Río Suruco, 60 m, *Lellinger & de la Sota* 500 (US). Depto. Antioquia: Vicinity of Planta Providencia, valley of the Río Anorí between Dos Bocas and Anorí ca. 25 km SW of Zaragoza, 400–700 m, *Denslow* 2482 (US); Munic. Zaragoza, Río Anorí, Corregimiento de Providencia, 500 m, *Soejarto & Hill* 2828 (GH). Depto. Caldas: Santa Cecilia, 800 m, *von Sneidern* 5024bis (US); Carretera La Dorada a Norcasia, km 29, ca. 450 m, *Acosta A.* 838 (COL).

This species has been recorded as growing on riverbanks, where it is subject to inundation. Apparently it is most closely related to the plant currently known as

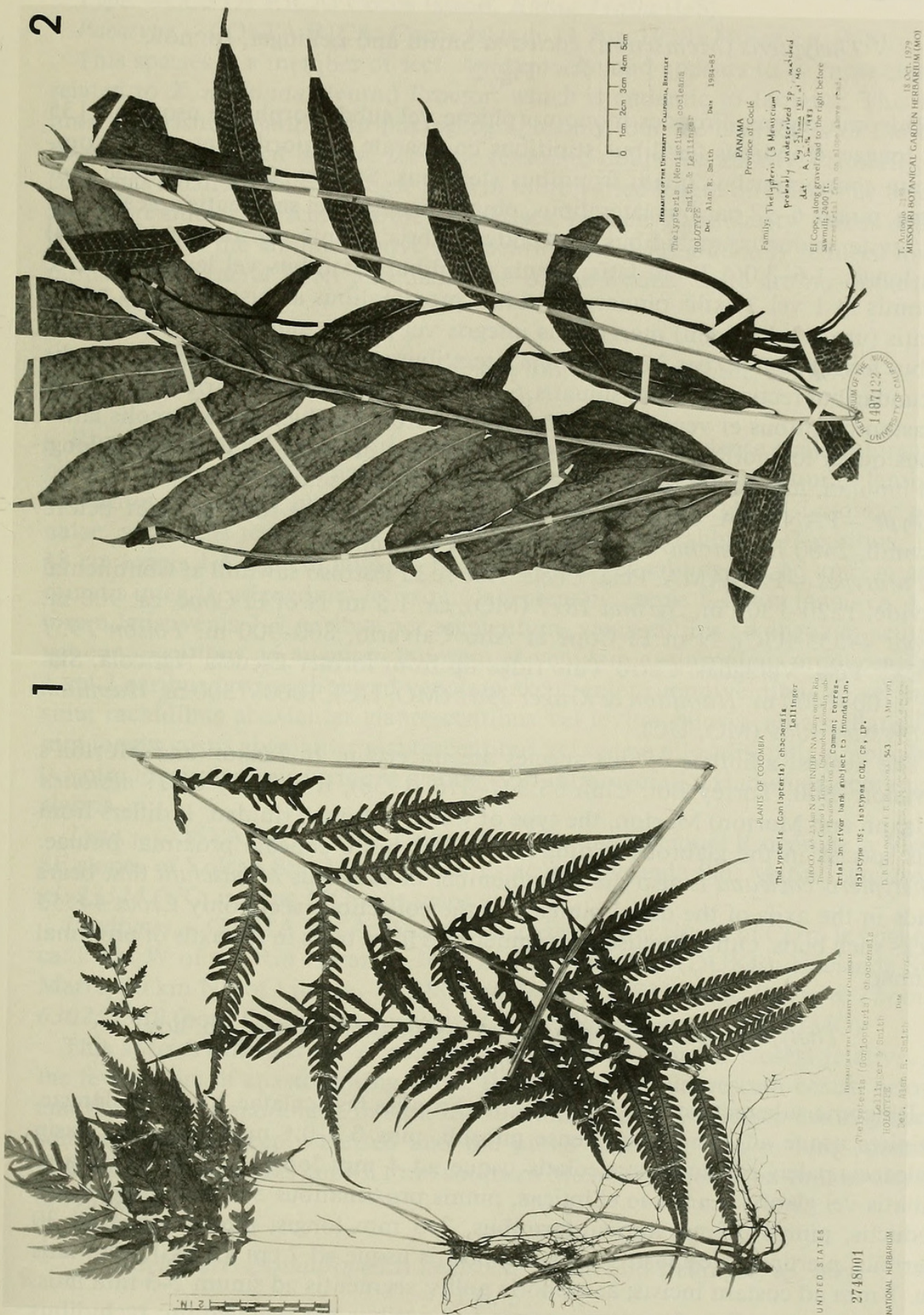


Fig. 1, 2. 1, Holotype of *Thelypteris choicoensis* Smith and Lellinger, *Lellinger & de la Sota* 543 (US); 2, Holotype of *Thelypteris cocleana* Smith and Lellinger, *Antonio* 2188 (UC).

Dryopteris magdalenica Hieron., also from Colombia, which is said to have setose sporangia, less deeply incised pinnae, and fewer (8–10) pairs of pinnae.

Thelypteris (Meniscium) cocleana Smith and Lellinger, sp. nov.

Fig. 2

Rhizoma repens. Frondes monomorphicae vel subdimorphicae usque ad 135 cm longae, frondibus fertilibus stipitibus comparate longioribus et pinnis comparate contractionibus quam frondibus sterilibus. Stipites glabri. Laminae pinnae, pinnis 6–12 paribus lateralibus, pinnis distalibus et segmentis apicalis non vel leviter reductis; rachidibus abaxialiter glabris; pinnis plerumque 12–18(24) cm longis, 1.6–3.0(4.2) cm latis, pinnis distalibus sessilibus vel leviter adnatis, gemmis in 1 vel 2 axilis pinnarum, pinnis proximalibus anguste cuneatis petiolulatis (usque ad 1.5 cm) marginibus integris vel parum undulatis; venulis lateralibus fertilibus 7–10 per 3 cm; venulis lateralibus sterilibus 6–7 per 3 cm; venulis secundariis rectis vel leviter sinuatis, 6–8 paribus fertilibus (10 paribus sterilibus) anastomosantibus et venulam excurrentem liberam producentibus, areolis latioribus quam longioribus; costis venulis paginisque utrinque glabris. Sori oblongi vel lunulati, maturitate subconfluenti; sporangiis non setosis.

Type.—PANAMA: Pcia. Coclé: El Copé, along gravel road to right before sawmill, 2400 ft, *Antonio 2188* (UC; isotype MO not seen).

Paratypes.—PANAMA: Pcia. Coclé: Above El Potroso sawmill at Continental Divide, 1220–1300 m, *Sytsma 1811* (MO); ca. 1.5 mi N of El Copé, ca. 900 m, *Croat 44555* (UC); N of El Copé at Alto Calvario, 800–900 m, *Folson 7951* (TEX). Pcia. Veraguas: Cerro Tute ridge up from former Escuela Agrícola, Sta. Fé, 1100–1400 m, *Hamilton & Krager 3981* (MO, UC), 1000–1300 m, *Hamilton & Dressler 3069* (MO, UC).

The nearest affinities of this species are uncertain. In Maxon and Morton's revision (*Bull. Torrey Bot. Club* 65:347–376. 1938), it will key to *T. nesiotica* (Maxon and Morton) Morton, the type of which is from Trinidad. It differs from this species in the glabrous lamina below and more cuneate proximal pinnae. *Thelypteris cocleana* is also the only member of subgenus *Meniscium* that bears buds in the axils of the distal pinnae. Of the collections seen, only *Croat 44555* lacks such buds. Other *Menisciums* sometimes have buds in the axils of proximal pinnae.

Thelypteris (Amauropelta) cocos Smith and Lellinger, sp. nov.

Fig. 3

Rhizoma suberectum 1.5–2.0 cm diam. Frondes fasciculatae 20–60 cm longae. Stipites usque ad 4 cm longi dense pilosuli, pilis 0.2–0.5 mm longis, ad basin paleacei, paleis castaneis lanceolatis usque ad 4 mm longis 1 mm latis sparse ciliatis vel glabris. Laminae ellipticae; pinnis proximalibus 5–10 paribus sensim reductis, pinnis infimis auriculiformibus, 2–5 mm longis; pinnis usque ad 30 paribus, plerumque oppositis vel suboppositis usque ad 7 cm longis 1.4 cm latis ca. 1 mm ad costam incisis; aerophoris nullis; segmentis ad sinum 2–3 mm latis, ad apicem rotundis vel truncatis; venis 5–9 paribus per segmentum; rachidibus et costis abaxialiter dense pilosis, pilis 0.2–1.0 mm longis; laminis chartaceis utrinque pilosulis, pilis 0.1–0.2 mm longis, abaxialiter glandulosis, glandibus nu-

merosis aurantiacis sessilibus. Sori indusiati, indusiis persistentibus, 0.2–0.4 mm diam.; sporangiis glabris.

Type.—COSTA RICA: Cocos Island, *Klawe 1480a* (US).

Paratype.—COSTA RICA: Cocos Island, 11 Jun 1929, *Fisher s.n.* (US).

This species is a member of sect. *Amauropelta* and appears to be most closely related to *T. nockiana* (Jenm.) Proctor, which is endemic to Jamaica. This is a most surprising relationship phytogeographically, but the characters of the two species are so similar that we see little reason to doubt the affinity. Primarily, *T. cocos* has smaller indusia, longer hairs of more varied length on the costae below, and more numerous scales at the stipe bases. In their glandularity, rather dense, short hairs on the laminae above and below, numerous gradually reduced lower pinnae, and general habit and dissection of the fronds, there are no important differences.

Thelypteris (Goniopteris) crenata Smith and Lellinger, sp. nov.

Fig. 4

Rhizoma breviter repens, ad apicem paleaceum, paleis dense stellato-hirsutis, pilis 0.1 mm longis. Frondes 60–90 cm longae monomorphicae. Stipites laminas aequantes vel parum superantes, brunneoli 2–4 mm diam. glabri. Laminae pinnatae, segmentis terminalibus conformibus, pinnis lateralibus 4–7 paribus, 10–18 cm longis 1.4–2.6 cm latis, ad basin cuneatis vel subintegris, ad apicem acuminate integris, ad medium latissimis late crenatis, crenis 1–2 mm longis ca. 4.5–6 mm latis; venis 3–7 paribus per segmentum, venis infimis ad angulam acutam vel conniventibus ad angulam latiore et venulam excurrentem producentibus 1 vel 2 paribus proximalibus ad venulam excurrentem conniventibus ad vel infra sinu; rachidibus abaxialiter glabrescentibus vel leviter pilosis, pilis stellatis 0.1 mm longis; costis abaxialiter glabrescentibus vel sparse pilosulis, pilis simplicibus 0.1 mm longis; laminis utrinque glabris. Sori inframediali, exindusiati; sporangiis glabris.

Type.—COSTA RICA: Pcia. Guanacaste: Parque Nacional Rincón de la Vieja, SE slopes of Volcan Sta. María above Estación Hacienda Sta. María, *Davidse et al. 23324* (UC; isotype MO, not seen).

Paratypes.—COSTA RICA: Pcia. Guanacaste: Lower slopes of Cerro la Giganta ca. 2 km W of the Río Naranjo, 2600 ft, *K. Utley 1901* (DUKE); Hacienda Sta. María, 20 km NE of Liberia, 700–900 m, *Gómez 19821* (UC), *Dodge & Thomas 6302, 7869* (both GH); same locality as type, *Davidse et al. 23317* (MO).

This species differs from *T. obliterated* (Swartz) Proctor, its closest relative, in the fewer pairs of anastomosing veins, the glabrous or glabrescent costae below, and the glabrous sporangia. In addition, the pinnae of *T. obliterated* are in general somewhat more deeply incised and the pinna bases are not so long-cuneate. *Thelypteris obliterated* is known from southern Mexico to Nicaragua and the Greater Antilles.

Thelypteris (Amauropelta) delasotae Smith and Lellinger, sp. nov.

Fig. 5

Rhizoma erectum, usque ad 10 cm longum, ad apicem paleaceum, paleis lanceolatis usque ad 1 cm longis 1 mm latis castaneis pilosis. Frondes usque ad 75

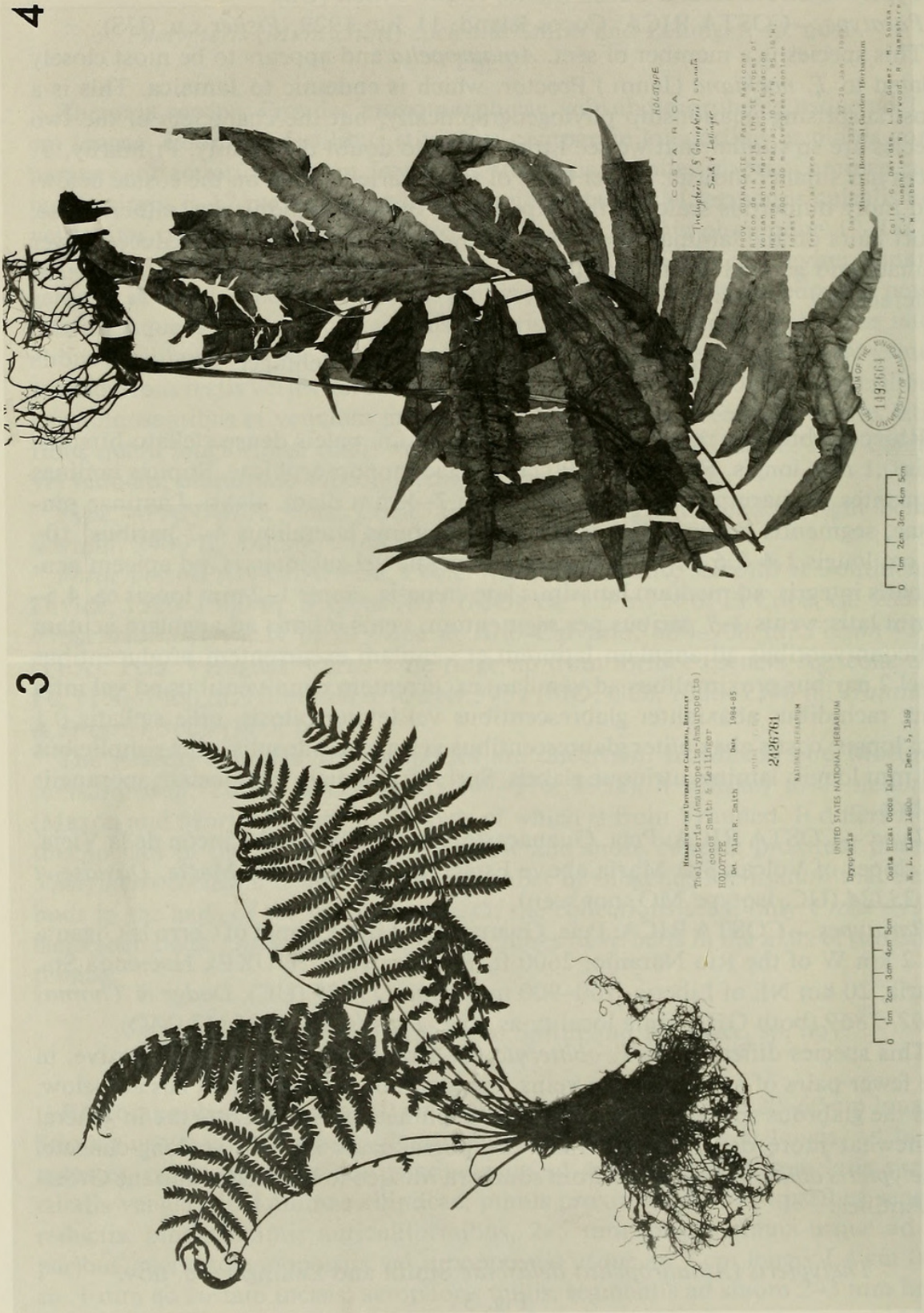


Fig. 3, 4. 3, Holotype of *Thelypteris cocos* Smith and Lellinger, Klawe 1480a (US); 4, Holotype of *Thelypteris crenata* Smith and Lellinger, Davidse et al. 23324 (UC).

cm longae. Stipites 10–35 cm longi 2–4 mm diam., ad basin paleacei, paleis persistentibus eis rhizomatis similibus. Laminae ad basin subabrupte reductae, pinnis deminutis 3–6 paribus; pinnis 20–30 paribus 4–10 cm longis 1.2–2.0 cm latis ca. 1.0–1.5 mm ad costam incisis; aerophoris paxilliformibus aut tuberculiformibus; segmentis ad sinum 3–5 mm latis, ad apicem rotundis vel subacutis; venis plerumque 4–8 paribus per segmentum; rachis costis venis laminisque abaxialiter glabris vel costis interdum pilosulis, pilis antrorsis 0.1–0.2 mm longis; costis abaxialiter leviter paleaceis, paleis lanceolatis vel ovato-lanceolatis usque ad 1.5 mm longis castaneis subclathratis; laminis et costis plerumque leviter dilute caryophyllaceis in sicco. Sori mediali exindusiati, receptaculis non hirsutis; sporangiis glabris.

Type.—COSTA RICA: Pcia. Cartago: Hotel Georgina, 2900 m, *de la Sota* 5099 (LP; isotype US).

Paratypes.—COSTA RICA: Pcia. Cartago: Cerro de la Muerte, 1 km NW of Villa Mills behind Hotel La Georgina, 2900 m, *Mickel* 3227 (NY); S slope of Volcán de Turrialba, near the Finca del Volcán de Turrialba, 2000–2400 m, *Standley* 35061 (US), 35121 (US). Pcia. Puntarenas: Upper slopes of Cerro Echandi, 2700–3000 m, *Davidse et al.* 24000 (MO), 24001 (MO). Pcia. S. José: Near Finca La Cima, above Los Lotes, N of El Copey, 2100–2400 m, *Standley* 42745 (US); 15–18 km SE of El Empalme, 2600–2700 m, *Stolze* 1372 (F). PANAMA: Pcia. Bocas del Toro: Upper Río Colubre, 2500–3000 m, *Gómez et al.* 21902 (MO). Pcia. Chiriquí: 12 mi above Boquete on road to Volcán Barú, 2900–2950 m, *Croat* 34883 (MO).

This species is a member of sect. *Lepidoneuron* and is most closely related to *T. euchlora* (Sod.) Reed, known from Colombia to Peru, but differs from that species in the more numerous and persistent rhizome and stipe base scales, the smaller stature, and the costae and rachis above with hairs mostly hyaline, not or only weakly reddish. The two species agree in the general lack of pubescence on the lamina below and a tendency for the lamina to dry pinkish, although this last feature is more pronounced in *T. euchlora*.

Thelypteris (Amauropelta) gomeziana Smith and Lellinger, sp. nov.

Fig. 6

Rhizoma suberectum vel repens. Frondes 35–105 cm longae. Stipites 7–30 cm longi ad basin paleacei, paleis lineari-lanceolatis, 15 mm longis 1 mm latis brunneis omnino sparse pilosulis. Laminae ellipticae; pinnis proximalibus 3–7 paribus sensim reductis, pinnis abortivis nullis; pinnis 18–30 paribus usque ad 15 cm longis 1.25–2(2.5) cm latis profunde incisis usque ad 0.5–1 mm ad costam; segmentis basalibus saepe productis crenato-lobis, usque ad 5(8) mm latis; aerophoris tuberculiformibus; segmentis ad basin 3–5 mm latis, ad apicem acutis; venis usque ad 9(11) paribus per segmentum adaxialiter prominulis; rachis costis venisque abaxialiter pilosulis, pilis plerumque 0.1–0.3 mm longis erectis; paginis laminarum plusminusve glabris; rachidibus et costis abaxialiter paleaceis, paleis paucis dispersis brunneolis subclathratis; glandulis nullis. Sori rotundati mediali exindusiati; receptaculis setosis; sporangiis glabris.

Type.—COSTA RICA: Pcia. Cartago: Páramo de Estaquero, 3200 m, *Gómez* 18356 (UC; isotype CR).

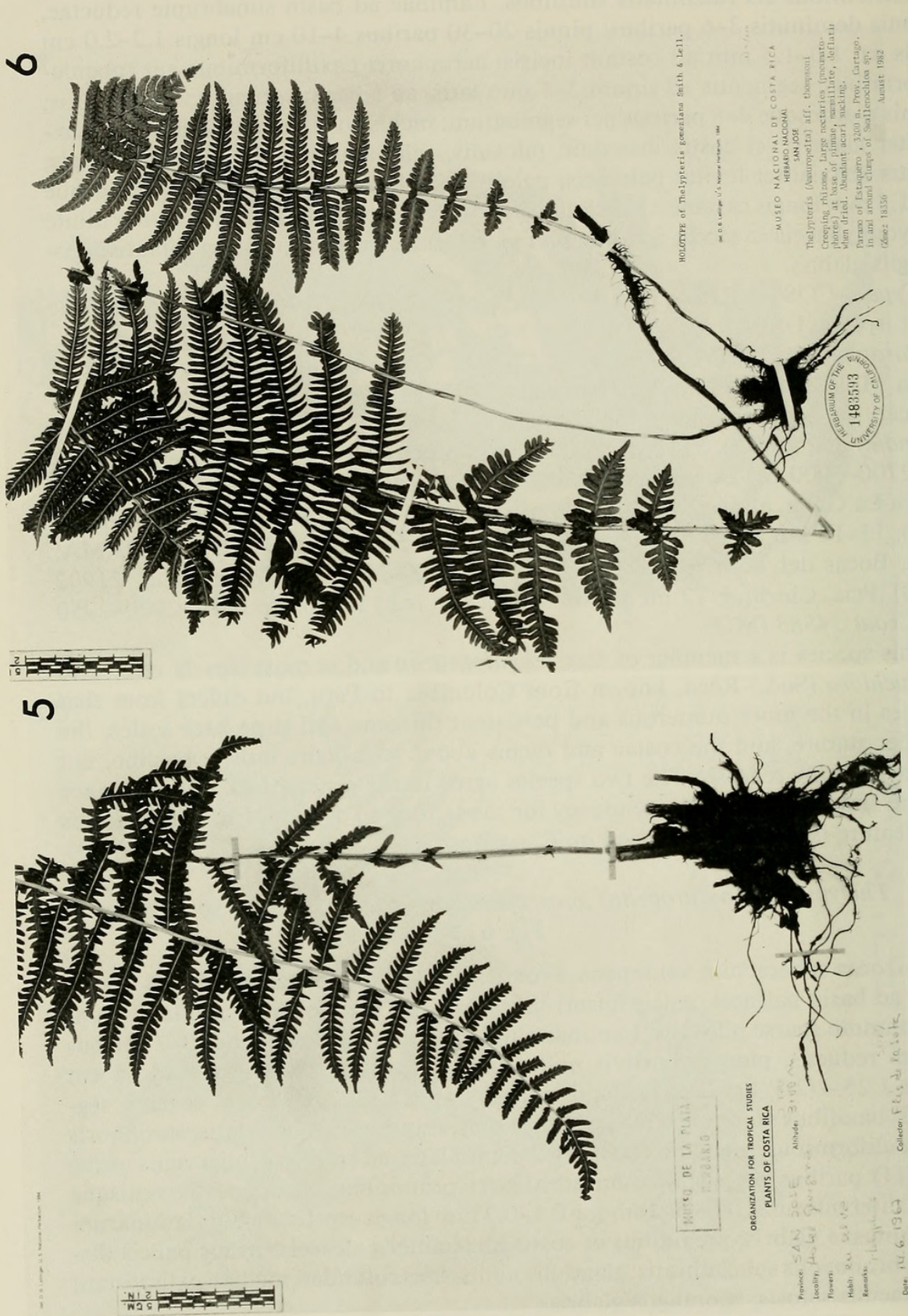


Fig. 5, 6. 5, Holotype of *Thelypteris delasotae* Smith and Lellinger, *de la Sota* 5099 (LP); 6, Holotype of *Thelypteris gomeziana* Smith and Lellinger, *Gómez* 18356 (UC).

Paratypes.—COSTA RICA: Pcia. Cartago: N of Volcán Irazú, 10,000 ft, *Stork* 1292 (US); 1 km NW of Villa Mills behind the Hotel La Georgina, 2900 m, *Mickel* 3294 (NY, US), *Lellinger* 883 (US); 3 km toward Cartago from Millsville, 3000–3300 m, *Holm & Iltis* 511 (US). Pcia. S. José: Cerro de las Vueltas, 2700–3000 m, *Standley & Valerio* 43885 (US); Near Villa Mills, *Wilbur & Stone* 8867 (DUKE, US). Pcia. Limón: Atlantic side of Cerro Chirripó, 10,400–11,000 ft, *Evans & Lellinger* 161 (US); Cerro Kámuk, 3350–3550 m, *Davidse et al.* 26047 (UC). PANAMA: Pcia. Bocas del Toro: Between Itamut and Bine peaks, Fabrega massif, 3200 m, *Gómez et al.* 22523 (UC); 1–2 km WSW of Itamut camp, 3175, *Gómez et al.* 22621 (UC). Pcia. Chiriquí: Above El Potrero Camp, Volcán Chiriquí, 2890–3025 m, *Maxon* 5336 (US).

This species has been identified in most herbaria as *T. supranitens* (Christ) Reed, but that name has proved to be a synonym of *T. rudis* (Kunze) Proctor. It is closely related to *T. caucaensis* (Hieron.) Alston. A specimen from Volcán Chiriquí (*Killip* 5462, US) also appears to be related, but does not agree in all characters.

Thelypteris (Goniopteris) killipii Smith and Lellinger, sp. nov.

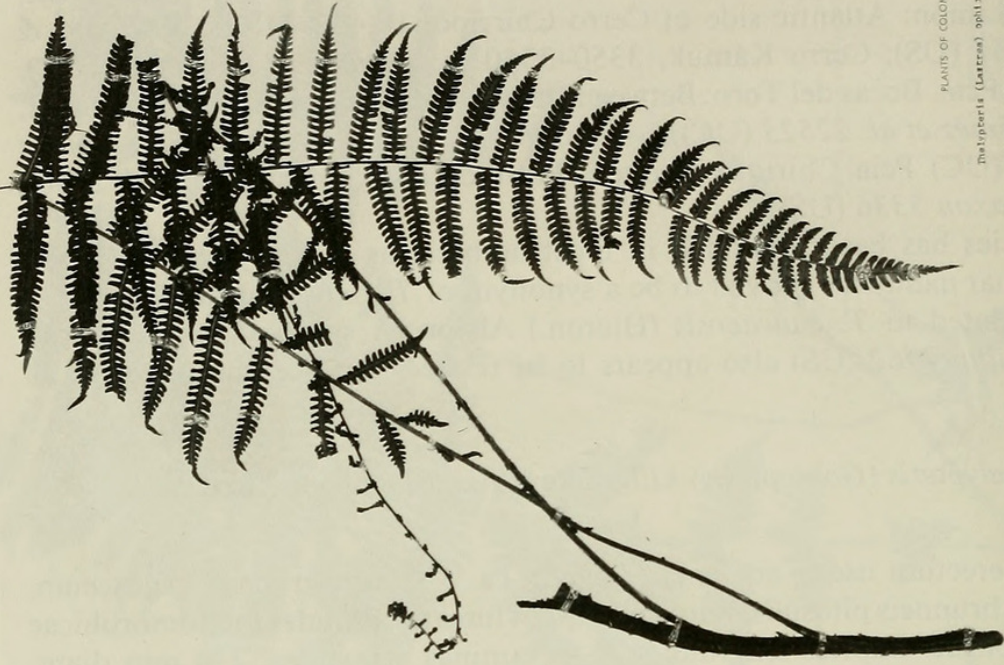
Fig. 7

Rhizoma erectum usque ad 10 cm longum ca. 5–7 mm in diam. paleaceum, paleis ovatis brunneis pilosulis, pilis stellatis aut furcatis. Frondes monomorphicae 45–80 cm longae. Stipites longitudine $\frac{1}{2}$ – $\frac{2}{3}$ laminas aequantes, 2–4 mm diam. purpureo-brunnei glabrescentes. Laminae anguste lanceolatae, ad apicem acuminatae pinnatifidae; rachidibus egemmparibus dense pilosis et pilosulis, pilis longioribus usque ad 1 mm longis crassis rufobrunneis plerumque simplicibus, pilis brevioribus hyalinis aut rufobrunneis furcatis vel stellatis; pinnis 18–20 paribus usque ad 6 cm longis ad basin 2 cm latis alternis $\frac{1}{3}$ incisis, pinnis proximalibus 2 vel 3 paribus leviter brevioribus deflexis anguste ellipticis sessilibus; pinnis distalibus lanceolatis ascendentibus falcatis ad basin truncatis; segmentis obliquis plusminusve rectis, ad apicem truncatis aut rotundatis 3–3.5 mm latis, segmentis basalibus (pinnarum distales) paulo elongatis; venis 5–10 paribus per segmentum, 1–2 paribus basalibus ex segmentis contiguis ad sinum conniventibus; costis et venis abaxialiter pilosis et pilosulis, pilis longioribus rufobrunneis plerumque simplicibus, pilis brevioribus hyalinis; paginis laminarum venisque glabris non verrucosis. Sori mediali indusiati, indusiis rufobrunneis setosis persistentibus; sporangiis glabris.

Type.—COLOMBIA: Depto. El Valle: Wooded cliffs along the Río Dagua, Dagua Valley, 80–100 m, *Killip* 5038 (US; isotypes COL, GH, NY, UC, US).

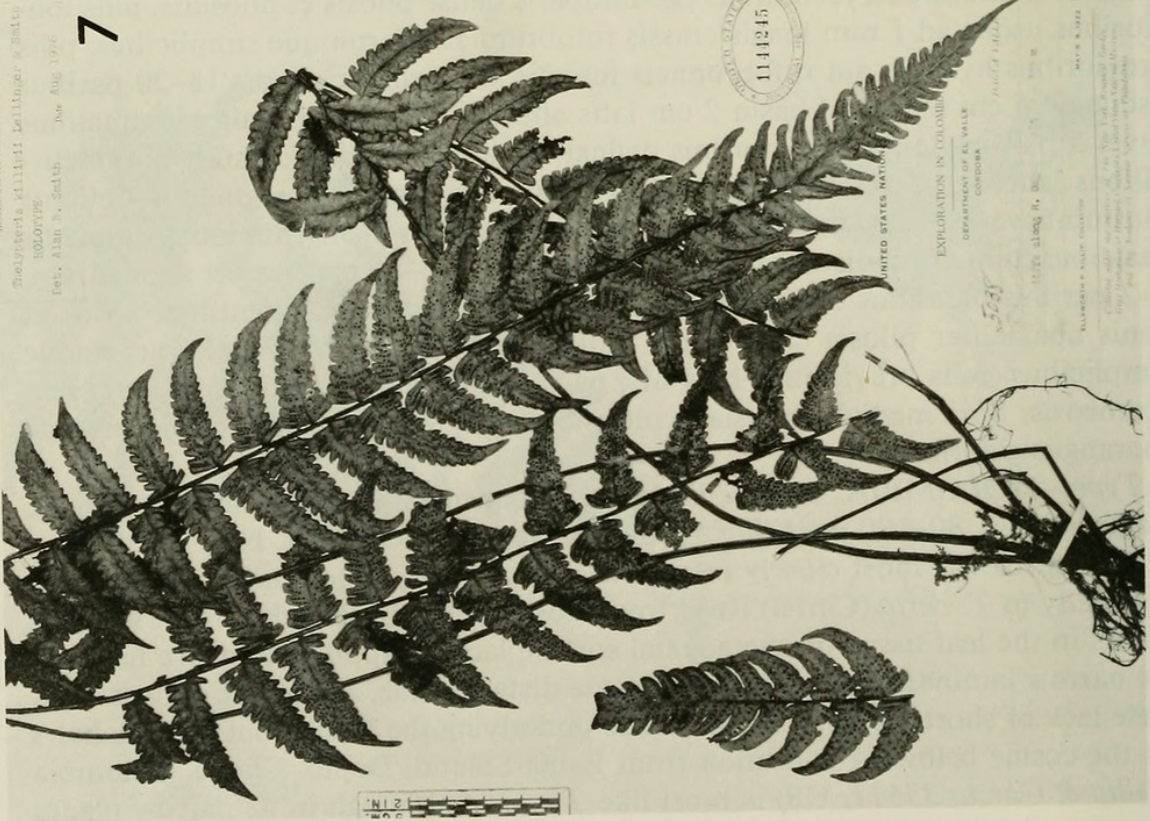
This species is most closely related to a few others with stout, reddish hairs, especially to *T. curta* (Christ) Reed from Costa Rica and Ecuador, from which it differs in the leaf tissue on the adaxial surface lacking appressed, dense hairs, in the narrow laminae with lanceolate, falcate distal pinnae, and in the almost complete lack of short, hyaline, stellate hairs underlying the long, stout reddish hairs on the costae below. A collection from Bahía Solano, Depto. Chocó, Colombia (*Killip & Garcia* 33511, US) is most like *T. curta*, although in its narrow blades it varies slightly in the direction of *T. killipii*.

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Division of the University of California
Thelypteris killipii Killip & Soto
HOLOTYPE
Det. Alan S. Soto Nov. Aug. 1976

7



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PLANTS OF COLOMBIA

Thelypteris (Laceped.) *aphyllorhiza* Lellinger
410000 L. 191111. At the base of the trunk of the principal
Cane in Rio Blanco, ca. 1 km SW of El Cane. Dorsal
secondary fold (near base) of the pinnae is
complanate. *Thelypteris* *aphyllorhiza*.
Holotype US; Isotype COL, CR, HUA, CP.
D. H. Killip & A. S. Soto, Nov. 857 28 Mar 1971

Fig. 7, 8. 7, Holotype of *Thelypteris killipii* Smith and Lellinger, Killip 5038 (US). 8, Holotype of *Thelypteris ophiophorhiza* Smith and Lellinger, Lellinger & de la Sota 857 (US).

Thelypteris (Amauropelta) ophiorhizoma Smith and Lellinger, sp. nov.

Fig. 8

Rhizoma scandens elongatissimum 4–6 mm diam. atrobrunneum paleaceum, paleis ovato-lanceolatis, 4–8 mm longis 0.5–0.75 mm latis brunneis sparse ciliolatis. Frondes 60–75 cm longae. Stipites 2–4 mm diam. remoti ad rhizoma adnati strigosi paleacei, paleis eis rhizomatis similibus. Laminae 45–50 cm longae (praeter pinnas abortivas proximales) 11.5–13 cm latae ad basin acutae ad apicem acuminatae; pinnis abortivis 4–8 paribus oppositis vel suboppositis, paribus infimis ad 8–14 cm supra basin stipitis, pinnis 25–35 paribus lanceolatis aequilateralibus usque ad 7 cm longis 1.1 cm latis sessilibus ad basin truncatis ad apicem acuminatis subfalcatis; costis et costulis strigosulis, costis abaxialiter paleaceis, paleis ovatis brunneolis glabris; pilis valde adpressis; venis simplicibus. Sori rotundati submediali exindusiati.

Type.—COLOMBIA: Deptos. Chocó and El Valle: At and on both sides of the principal ridge of the Serranía de Los Paraguas, along the trail from El Cairo to Río Blanco, ca. 8 km SW of El Cairo, 2200–2250 m, *Lellinger & de la Sota* 857 (US; isotypes COL, CR, HUA, LP).

Paratypes.—COLOMBIA: Depto. Cundinamarca, E side of Quebrada Negra, Muchindote Valley 13 km NE of Gachetá, 2800 m, *Grant* 9593 (US; isoparatype COL). Depto. El Valle: Finca La Pradera ca. 6 km SW of El Cairo, 2150–2200 m, *Lellinger & de la Sota* 809 (US; isoparatypes COL, CR, LP).

This species is a member of sect. *Lepidoneuron* and is closely related to *T. euchlora* (Sodiño) Reed, with which it shares the character of an exceedingly long, scrambling rhizome with spreading scales and distant, adnate stipe bases, and from which it differs in having smaller fronds, a denser indument of appressed hairs on the costae and costules, and a shorter distance between the lowermost abortive pinnae and the stipe base.

Thelypteris (Amauropelta) proctorii Smith and Lellinger, sp. nov.

Fig. 9

Rhizoma breviter repens. Frondes 50–85 cm longae. Stipites 5–15 cm lati 2–3 mm diam., ad basin sparsim paleacei, paleis 2–4 mm longis usque ad 1.5 mm latis obscure brunneis, pilis dispersis 0.2 mm longis praeditis. Laminae ad basin pinnis 8–12 paribus lenitissime reductis, pinnis infimis vestigialibus ca. 1 mm longis; pinnis usque ad 40 paribus plerumque oppositis vel suboppositis 4–9 cm longis 1.0–1.8 cm latis ca. 1 mm ad costam incisissimis leviter inaequilateralibus, segmentis basiscopicis productis; segmentis ad sinum 2–3 mm latis patentibus non falcatis saepe revolutis; venis 8–12 paribus per segmentum; rachis costis venis et interdum laminis abaxialiter pilosis, pilis dispersis vel densis plerumque 0.3–1.0 mm longis; costulis et laminis adaxialiter pilosulis, pilis dispersis plerumque 0.2–0.5 mm longis. Sori exindusiati, receptaculis pilosis, pilis caespitosis, aut indusiati, indusiis minutis pilosis; sporangiis glabris.

Type.—GUATEMALA: Depto. El Quiché: Valley of the Río de la Violetas, N of Nebaj, 5800–6000 ft, *Proctor* 25305 (US).

Paratypes.—HONDURAS: Depto. Morazán: Piedra Herrada, W slope of Cerro de Uyaca, ca. 1500 m, *Standley* 23678 (F, US), 23685 (F, US). Depto. Comayagua: El Achote, near Siguatepeque, 1500 m, *Standley* 56128 (F, US).

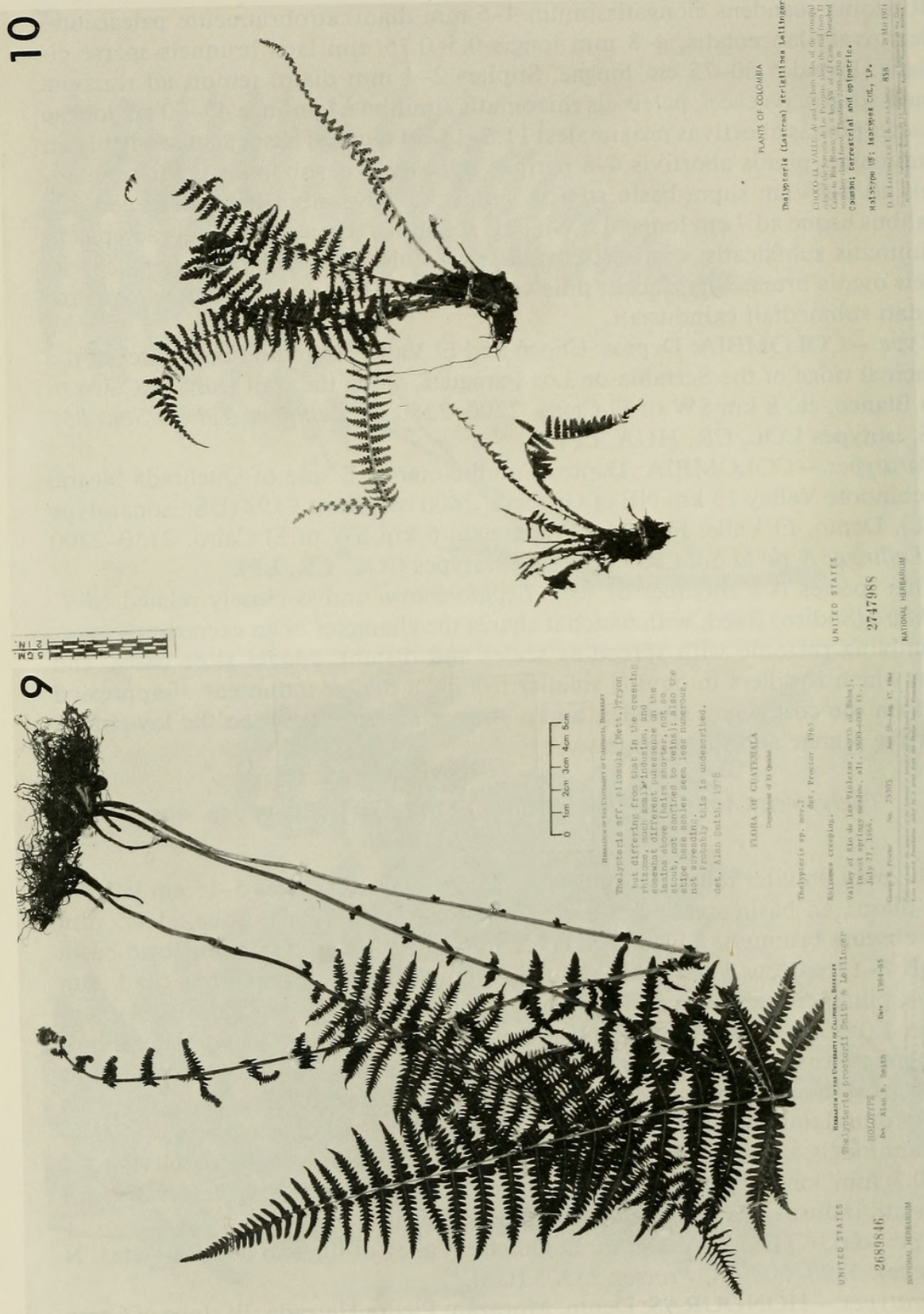


Fig. 9, 10. 9, Holotype of *Thelypteris proctorii* Smith and Lellinger, Proctor 25305 (US). 10, Holotype of *Thelypteris strigillosa* Smith and Lellinger, Lellinger & de la Sota 858 (US).

This species is a member of sect. *Adenophyllum* and may be most closely related to *T. pilosula* (Mett.) Tryon, which differs in its relatively large indusia, more prominent stipe base scales, short-creeping or suberect rhizome, and stouter hairs on the lamina above. The fronds of *T. proctorii* have an aspect very similar to those of *T. rivularioides* (Fée) Abbiatti, from southern Brazil and adjacent countries. All four collections of *T. proctorii* have been made from bogs or wet meadows, a habitat not common for *Thelypteris*.

Thelypteris (Amauropelta) strigillosa Smith and Lellinger, sp. nov.

Fig. 10

Rhizoma erectum curtum ca. 5 mm diam., stipitibus multis congestis absconditum. Frondes 15–65 cm longae. Stipites obsoleti 0.5–1.1 mm diam. 7–15 per rhizoma paleacei dense pilosi, paleis lanceolatis 2–6 mm longis 0.3–1 mm latis integris nitidis brunneis sparse ciliatis. Laminae 10–30 cm longae 2–5 cm latae ad basin et apicem gradatim acuminatae; rachibus atropurpureis vel stramineis dense subvillosis, pilis manifeste septatis, ad basin paleaceis, paleis eis stipitum similibus; pinnis 25–55 paribus lanceatis aequilateralibus usque ad 2.3 cm longis 0.8 cm latis sessilibus ad basin truncatis ad apicem plusminusve acutis, marginibus revolutis; costulis laminis receptaculisque strigillosis, pilis laminarum supra appressis acicularibus infra intervenulis uncinatis; venis fuscis simplicibus. Sori rotundati submediali exindusiati.

Type.—COLOMBIA: Deptos. Chocó and El Valle: At and on both sides of the principal ridge of the Serranía de Los Paraguas, along the trail from El Cairo to Río Blanco, ca. 8 km SW of El Cairo, 2200–2250 m, *Lellinger & de la Sota* 858 (US; isotypes COL, LP).

Paratype.—Same locality as the holotype, *Lellinger & de la Sota* 863 (US).

This species is a member of sect. *Uncinella*.

Thelypteris (Amauropelta) tapantensis Smith and Lellinger, sp. nov.

Fig. 11

Rhizoma apparenter erectum vel subscandens exile 2–3 mm diam., ad apicem paleaceum, paleis ovatis appressis brunneolis glabris. Frondes ca. 12–25 cm longae. Stipites 1–6 cm longi, 1.0–1.5 mm diam. glabri. Laminae ad basin pinnis 5–8 paribus gradatim reductis, pinnis infimis 3–5 mm longis auriculiformibus; pinnis usque ad 20 paribus, usque ad 1.3–3.0 cm longis, 0.6–0.9 cm latis, 1–2 mm ad costam incisis; aerophoris tuberculiformibus vel paxilliformibus; segmentis ad sinum ca. 2 mm latis, ad apicem truncatis vel rotundatis; venis usque ad 4 paribus per segmentum; rachidibus costis venis laminisque epilosis et abaxialiter eglan-dulosis vel costis distaliter sparse pilosis, pilis appressis 0.2 mm longis; costis abaxialiter sparse paleaceis, paleis amorphis brunneolis. Sori indusiati, indusiis magnis oochlamiformibus ad marginem saepe sparse pilosulis, pilis 0.1–0.2 mm longis; sporangiis glabris.

Type.—COSTA RICA: Pcia. Cartago: Ca. 10 km S of Tapantí along new road on E slope above the Río Grande de Orosi, 1400–1600 m, *Burger & Stolze* 5678 (NY; isotypes CR, GH).

Paratypes.—COSTA RICA: Pcia. Cartago: New road from Tapantí, ca. 7 km S of the bridge, 1500 m, *Hauke* 420 (NY); Tapantí, *Gómez* 570 (CR).

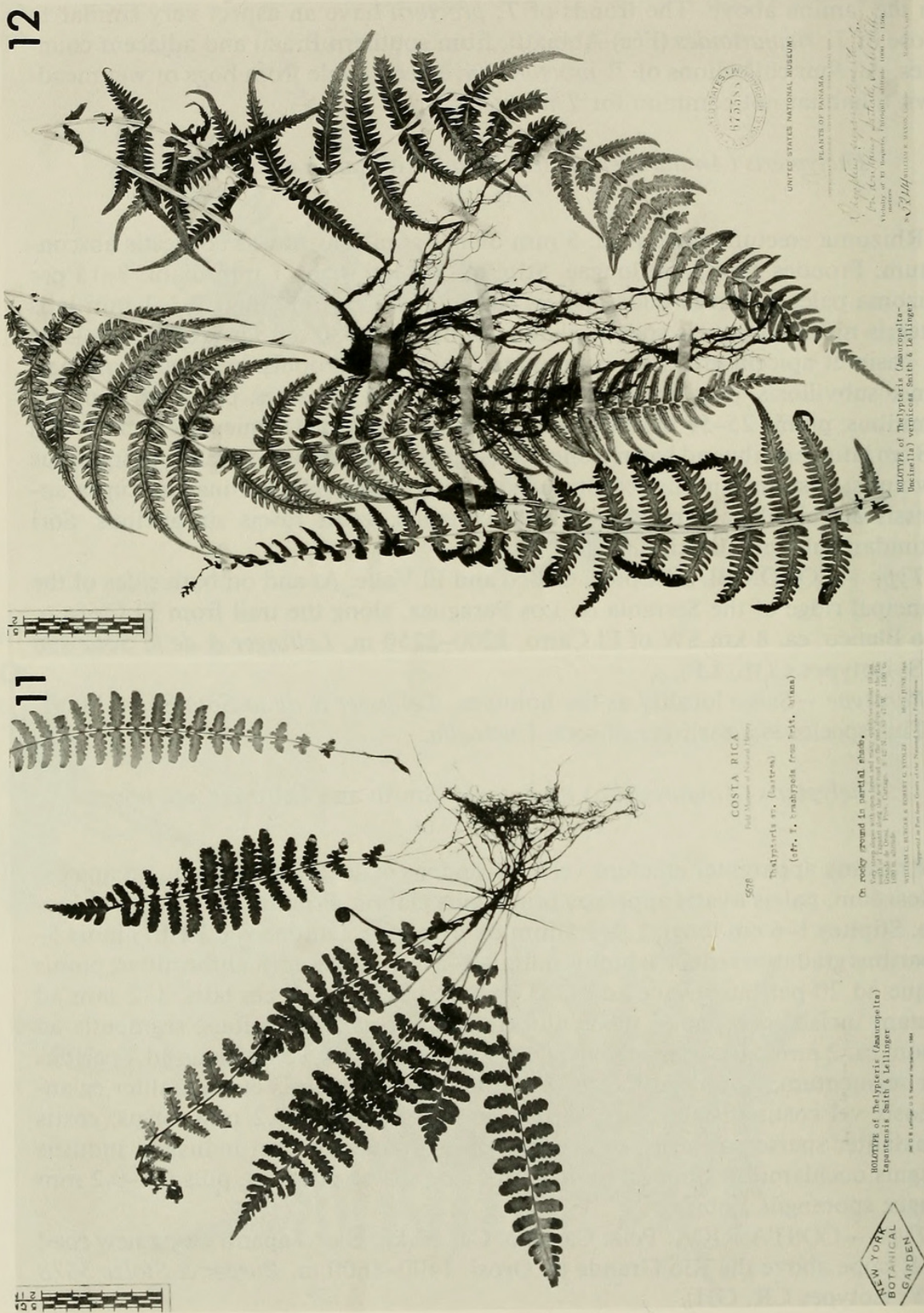


Fig. 11, 12. 11, Holotype of *Thelypteris tapantensis* Smith and Lellinger, Burger & Stolze 5678 (NY). 12, Holotype of *Thelypteris vernicosa* Smith and Lellinger, Maxon 5244 (US).

This diminutive species is a member of sect. *Pachyrhachis* and is most closely related to *T. oaxacana* A. R. Smith and *T. pachyrhachis* (Kunze ex Mett.) Ching. It differs from both by its very small size and filiform rhizome. From *T. pachyrhachis* it also differs in lacking laminar glands. Previous determinations of the type collection include *T. aff. brachypoda* (Baker) Morton and *T. aff. delicatula* (Fée) Proctor, which are similar only in their small stature.

Thelypteris (Amauropelta) vernicosa Smith and Lellinger, sp. nov.

Fig. 12

Rhizoma suberectum. Frondes usque ad 60 cm longae. Stipites usque ad 5 cm longi, ad basin paleacei, paleis lanceolatis plusminusve patentis ubique pilosis, pilis numerosis hamatis aut acicularibus 0.2–0.3 mm longis. Laminae ad basin pinnis usque ad 8 paribus subgradatim reductis, 5 paribus proximalibus vestigialibus minus quam 2 mm longis; pinnis usque ad 35 paribus distaliter sensim reductis usque ad 7 cm longis 1.6 cm latis, ad costam 1.0–1.5 mm incisus subinaequilateralibus, segmentis basiscopicis brevioribus obliquioribus quam segmentis acroscopicis; aerophoris parvis et tuberculiformibus vel nullis; segmentis ad sinum 2–3 mm latis subobliquis ad apicem falcatis acutis; venis 10 paribus per segmentum; rachis costis laminisque abaxialiter sparse pilosis, pilis hamatis 0.2–0.3 mm longis; laminis adaxialiter glabrescentibus nitidis vel venis pilosis, pilis paucis dispersis acicularibus 0.2 mm longis. Sori exindusiati leviter oblongi mediali; sporangiis glabris.

Type. — PANAMA: Pcia. Chiriquí: Vicinity of El Boquete, on dripping, partially shaded cliffs, 1000–1300 m, *Maxon 5244* (US).

Paratype. — Same locality, *Maxon 5243a* (US).

This species is a member of sect. *Uncinella* and is closely related to *T. scalaris* (Christ) Alston, which differs in having small but distinct indusia, the laminae above dull and with numerous, minute, acicular hairs, equilateral pinnae, and less oblique pinna segments. The specimen designated as holotype of *T. vernicosa* was determined by Christensen as *Dryopteris supranitens* Christ, which is not closely related. The paratype cited appears to be a juvenile specimen and was determined by Christensen as a variety of *Dryopteris consanguinea* (Fée) C. Chr., a member of sect. *Amauropelta* confined to the Lesser Antilles.

Thelypteris (Amauropelta) zurquiana Smith and Lellinger, sp. nov.

Fig. 13

Rhizoma suberectum. Frondes 65–125 cm longae. Stipites ad basin dense paleacei, paleis ovatis 5 mm longis 3 mm latis brunneis glabris. Laminae lanceolatae, pinnis proximalibus 3 paribus reductis et subter 7–10 paribus abortivis, ad 5–15 cm supra basin stipitis extensis; pinnis distalibus ca. 25 paribus, usque ad 13 cm longis 2 cm latis, ad apicem caudatis, ad basin acutis, inaequilateralibus, latere basiscopicis angustiore, ad costam 1–2 mm incisus; aerophoris nullis aut tuberculiformibus usque ad 0.2 mm longis; segmentis ad basin 2–3.5 mm latis, acutis patentibus vel eis latere basiscopicis obliquis; venulis usque ad 10-jugis per segmentum; rachidibus costis venulis et paginis superiore necnon inferiore laminae puberulis (pilis usque ad 0.1 mm longis), glandibus nullis. Sori indusiati, indusiis parvis spathulatis brunneis, marginibus minute pilosulis; sporangiis glabris.



Fig. 13. Holotype of *Thelypteris zurquiana* Smith and Lellinger, *Stolze 1522* (UC).

Type.—COSTA RICA: Pcia. S. José: Southern slopes of Cerro Zurquí, 5 km N of S. Luis Norte, 1800 m, *Stolze 1522* (UC; isotype F not seen).

Paratype.—COSTA RICA: Pcia. S. José: La Palma area NE of S. Jerónimo above the La Honduras valley, 1500 m, *Burger & Stolze 5277* (F not seen; isoparatype US).

This species is a member of sect. *Blepharotheca* and is most closely related to *T. christensenii* (Christ) Reed, from which it differs in having pinnae with caudate apices and acute bases, more scaly stipe bases, and with more obvious, dark, spathulate indusia.

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Smith, Alan R. and Lellinger, David B. 1985. "New Tropical American Species Of Thelypteris (Pteridophyta)." *Proceedings of the Biological Society of Washington* 98, 916–930.

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