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New additions to the Catalog of Liverworts (Marchantiophyta) and Hornworts (Anthocerotophyta) from Central America and Cocos Island

Nuevas adiciones al Catálogo de Hepáticas (Marchantiophyta) y Antocerotófitas (Anthocerotophyta) de Centro América y la Isla de Cocos

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Abstract

Background and Aims: The Catalog of Liverworts (Marchantiophyta) and Hornworts (Anthocerotophyta) from Central America and Cocos Island was published in 2025, including new records and species reports from the literature published until December 31, 2022. This publication aims at updating the Catalog by adding previous records from the literature, new records from recent research, and providing a short analysis of the state of exploration of these plant divisions in the region.

Methods: Herbarium specimens deposited at CR, UBC, and MO from isolated, pristine páramo areas and ecoregions, such as the Costa Rican Seasonal Moist Forest, the Central American Dry Forest, the Isthmian Atlantic Moist Forest and the Central American Atlantic Moist Forests, were selected for determination. Additional collections from drier areas and records from a recent detailed inventory of epiphytic bryophytes in the Monteverde area of Costa Rica contributed to these additions.

Key results: A total of 34 new species records, including 14 new to Central America, are added, and a new combination, *Myriocoleopsis dauphinii*, is proposed. An update of the generic and specific diversity of Marchantiophyta yields 856 species in 133 genera, and 19 species in 7 genera of Anthocerotophyta for Central America.

Conclusions: The bryological exploration of Central America is uneven, with Costa Rica and Panama far better explored than the rest. Additional collecting in lowland ecoregions of northern Central America and focused taxonomic research on species-rich genera, such as *Frullania*, *Radula*, and *Riccardia*, should increase the known species number from those areas and genera. Together, these efforts should render a precise figure of the regional liverwort diversity.

Key words: biodiversity checklists, bryological exploration, bryophytes, floristics, taxonomy, tropical ecoregions.

Resumen

Antecedentes y Objetivos: El Catálogo de hepáticas (Marchantiophyta) y antocerotes (Anthocerotophyta) de América Central y la isla de Cocos se publicó en 2025 e incluía nuevos registros e informes sobre especies extraídos de la bibliografía publicada hasta el 31 de diciembre de 2022. Los objetivos de esta publicación son actualizar el Catálogo, añadiendo registros anteriores extraídos de la bibliografía, nuevos registros procedentes de investigaciones recientes y ofreciendo un breve análisis del estado de exploración de estas divisiones de plantas en la región.

Métodos: Para su identificación taxonómica se seleccionaron especímenes de herbario depositados en CR, UBC y MO, procedentes de zonas de páramo aisladas y vírgenes, además de ecorregiones como los bosques húmedo estacional de Costa Rica, seco centroamericano, húmedo atlántico del istmo y húmedos atlánticos centroamericanos. A estas adiciones contribuyen además nuevas recolecciones en áreas secas y registros procedentes de un inventario detallado reciente de briófitos epífitos realizado en la zona de Monteverde, en Costa Rica.

Resultados clave: Se añaden un total de 34 nuevos registros de especies de Marchantiophyta y Antocerotophyta, incluidos 14 que son nuevos para Centroamérica y se propone una nueva combinación: *Myriocoleopsis dauphinii*. La actualización de diversidad genérica y específica para América Central dio como resultado 856 especies en 133 géneros de Marchantiophyta, y 19 especies de 7 géneros de Anthocerotophyta.

Conclusiones: La exploración briológica de América Central es desigual, ya que Costa Rica y Panamá están mucho mejor exploradas que el resto. La realización de nuevas recolecciones en las ecorregiones de tierras bajas del norte de Centroamérica e investigación taxonómica centrada en géneros ricos en especies, como *Frullania*, *Radula*, y *Riccardia*, deberían aumentar el número de especies conocidas de esas zonas y géneros. En conjunto, esos esfuerzos deberían proporcionar una cifra precisa de la diversidad regional de hepáticas.

Palabras clave: briófitos, ecorregiones tropicales, exploración briológica, florística, listas de control de biodiversidad, taxonomía.

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Introduction

During and after the preparation of the Catalog of Liverworts and Hornworts from Central America and Cocos Island (Dauphin et al., 2025), in which 846 liverwort species in 135 genera and 19 hornwort species in seven genera were reported, more recent research has added new taxa for the region. Since that list included records published until December 31, 2022, further species records of Marchantiophyta not included in the Catalog have been published for the region (Acuña Castillo et al., 2023; Winter and Schäfer-Verwimp, 2023, 2024; Schäfer-Verwimp and Winter, 2024; Wilbraham et al., 2025a, b; Gradstein, 2026; Gradstein and Lee, 2026). Those records include 21 taxa listed in Appendix. They represent 11 records for El Salvador, seven records for Costa Rica (including *Frullania dulimensis* Uribe, new to Central America), one for Panama and one for Guatemala. More recently, Sierra et al. (2025) described a species new to science from Panama, *Cephaloziella minutiloba* A.M.Sierra, Gradst. & Gudiño. This species has been recently found by Gregorio Dauphin in Costa Rica.

A brief analysis of the distribution of bryophyte inventories in the different Ecoregions in Central America (Dinerstein et al., 2017) revealed that most studies were focused on the upper mountain regions, i.e. Talamanca Montane Forests, and few bryophyte studies or collections are available from drier regions such as the Central American Dry Forest, the Costa Rican Seasonal Moist Forest or mangrove areas (Salazar Allen et al., 2022; Dauphin et al., 2025).

This led Gregorio Dauphin to direct some bryophyte collection and identification efforts towards those drier, unexplored areas in Costa Rica. Additionally, a revision of herbarium specimens from isolated localities in the Southern Cordillera de Talamanca in Costa Rica, and the pristine páramo area of Cerro Fábrega in Panama, yielded new distribution records of recently described taxa, as well as some undescribed taxa.

A detailed ecological sampling of epiphytic bryophytes on trees in the Monteverde area of Costa Rica, by Daniel Tucker, produced a series of new records, including taxa already known from other countries in the Isthmus

and new records to Central America. This publication aims at updating our present knowledge of the specific and generic diversity of liverworts (Marchantiophyta) and hornworts (Anthocerotophyta) in Central America and providing a short analysis of the state of exploration of these plant divisions in the region.

Materials and Methods

Study area

Central America is here defined as consisting of Guatemala, Belize, Honduras, El Salvador, Nicaragua, Costa Rica, Panama and Cocos Island, an oceanic island in the Pacific Ocean portion of Costa Rica (Dauphin et al., 2025; Fig. 1). Biogeographically defined, Mesoamerica, besides the aforementioned countries, also includes the Mexican states of Tabasco, Chiapas, Campeche, Quintana Roo and Yucatán (Davidse et al., 1995), but these Mexican states are not included here. A detailed physical and political description of Central America was provided by Dauphin et al. (2025).

Examination of herbarium specimens

We focused on herbarium collections from páramo Buena Vista (Cerro de La Muerte) in Costa Rica and the pristine páramo areas of Cerro Kámuk in Costa Rica and Cerro Fábrega in Panama, and specimens from relatively dry areas including the Costa Rican Seasonal Moist Forest in Hacienda El Rodeo, San José and the Central American Dry Forest areas in Área de Conservación Guanacaste (Dinerstein et al., 2017) among herbarium specimens and recent collections deposited at CR (Herbario Nacional de Costa Rica) and MO (Missouri Botanical Garden). Additional specimens from ecological studies carried out by Daniel Tucker in the Monteverde area in Costa Rica and deposited at UBC (University of British Columbia) are included. Herbarium acronyms are cited according to Index Herbariorum (2026). The taxonomical nomenclature follows Söderström et al. (2016).

Selected specimens were mounted in water or glycerol and photographed through an optical microscope (Olympus BX50, Tokyo, Japan) using a digital camera (AmScope MU1803, Irvine, California, USA). References to illustrations in the taxonomical literature are provided for each record.



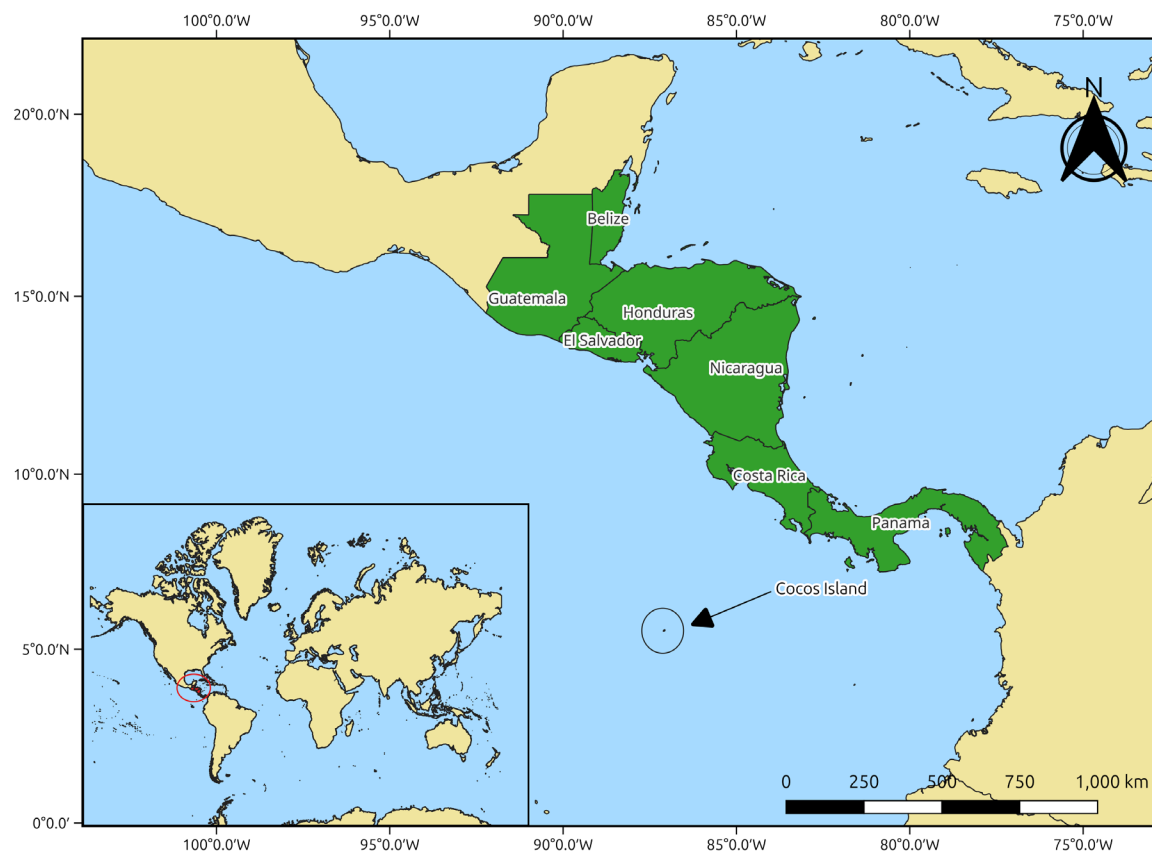


Figure 1: Study area, Central America and Cocos Island.

Results

Our revision of selected herbarium collections from Central America yielded one new record of Anthocerotophyta and 33 new records of Marchantiophyta, among which 14 species are new to Central America, 25 new to Costa Rica, 5 new to Panama, 4 new to Honduras, 2 new to Nicaragua and 1 new to Guatemala. All new records are listed in the Taxonomy section, new records for Central America are marked with an asterisk (*).

Taxonomy

New records account

Anthocerotophyta

1. ***Notothylas orbicularis*** (Schwein.) Sull., in A.Gray, Amer. J. Sci. Arts, ser. 2, 1(1): 75. 1846.

≡ *Targionia orbicularis* Schwein., Spec. Fl. Amer. Crypt.: 23. 1821.

TYPE: UNITED STATES OF AMERICA. North Carolina, Forsyth, Salem, on moist earth, *L. D. von Schweinitz s.n.* (holotype: PH 00003638).

Illustration: Amélio and Peralta (2020, Fig. 1I-M).

Distribution and habitat: new to Costa Rica, previously reported from Panama in Central America. This is a widespread Holarctic species, but rare in tropical America (Gradstein, 2021; Dauphin et al., 2025). The specimen was previously misidentified as *N. dissecta* Steph. by Dauphin (2005). Elevation: from 0-750 m in Colombia and Ecuador (Gradstein, 2021), to 1120 m in Costa Rica (this publication).



Examined specimen: COSTA RICA. Heredia, Santo Domingo, Santa Rosa, Inbioparque, terrestre en macetera, 1120 m, 9°58'30"N, 84°05'30"W, 8.X.2003, *G. Dauphin et al.* 4683 (CR).

Marchantiophyta

2. *Acrobolbus wilsonii* Nees, Syn. Hepat. 1: 5. 1844.

TYPE: IRELAND. Cromaglow prope Killarney in Hibernia ad terram, XII.1829, *W. Wilson s.n.* (isotypes: JE 04001081!, NY 1178186!, S 12443, S 12454).

Illustration: [Paton \(1999, Fig. 215\)](#).

Distribution and habitat: new to Panama. This species was previously known from western Europe (incl. Macaronesia), Mexico, Costa Rica and the northern Andes (Venezuela, Colombia, Ecuador), from upper montane cloud forests and wet páramo ([Gradstein, 2021](#); [Dauphin et al., 2025](#)). Elevation: in the northern Andes ca. 3000-4500 m ([Gradstein, 2021](#)).

Examined specimens: PANAMA. Naso, Tjër Di Comarca, Parque Internacional La Amistad, Cerro Fábrega, área de páramo, 3000-3150 m, 9°09'N, 82°54'W, 12.II.1995, *G. Dauphin et al.* 1583 (CR).

3. *Cephaloziella minutiloba* A.M.Sierra, Gradst. & Gudiño, Syst. Bot. 50: 186. 2025. ([Fig. 2A-D](#)).

TYPE: PANAMA. Coclé, Parque Acuático Chorro Las Mozas, Río Antón sobre ladera rocosa a orillas del río, 607 m, 8°35'33.4"N, 80°08'49.5"W, 4.XII.2018, *J. Gudiño L.* 3504 (holotype: PMA!; isotypes: QFA 0664588, SCZ).

Illustrations: [Sierra et al. \(2025, Figs. 4, 5\)](#).

Distribution and habitat: new to Costa Rica. This interesting rheophytic species was recently described from the Antón river watershed in Panama, and is hitherto only known from two localities, one in Panama and one in Costa

Rica. Because of its minute size (plants 0.2-0.45 mm wide and up to 5 mm long), the species may have been overlooked. It stands out by its flagelliform shoots, violet rhizoids and highly unequally bifid leaves with a prominent ventral lobe and a strongly reduced dorsal lobe bent over the ventral lobe. In a molecular analysis the species appeared to be most closely related to *Cephaloziella* (Spruce) Schiffn. species from Asia ([Sierra et al., 2025](#)). Elevation: 600-690 m ([Sierra et al., 2025](#)).

Examined specimens: COSTA RICA. San José, Mora, Hacienda El Rodeo, remanente de bosque, sobre roca a la sombra con *Cyathodium* sp., 690 m, 9°55'1"N, 84°15'40"W, 27.VI.2025, *G. Dauphin and A. Garuolis* 4900 (CR); sobre pared rocosa húmeda y sombría, cerca de quebrada, 23.IX.2025, *G. Dauphin and B. Azofeifa* 4935 (CR).

*4. *Cephaloziella pungens* Steph. ex Fulford, Mem. New York Bot. Gard. 11(4): 410. 1976. ([Figs. 2E-H](#)).

TYPE: VENEZUELA. Without locality, *J. K. W. Moritz s.n.* (holotype: G 16443!).

Illustrations: [Fulford \(1976, Fig. 7\)](#).

Distribution and habitat: new to Costa Rica and Central America. A very rare species, previously only known from the type specimen (*J. W. K. Moritz s.n.*). The type specimen was cited by [Fulford \(1976\)](#) as being from "Colombia-Venezuela", but according to [Gradstein and Hekking \(1979\)](#), Moritz's South American collections are from Venezuela, not from Colombia. An unpublished record from Peru (*P. Hegewald* 7717 (MO)) is not *C. pungens*, but according to John Atwood, seemingly belongs to an undescribed *Cephaloziella* species. Elevation: 2250-3000 m.

Examined specimens: COSTA RICA. San José, Dota, Copey, Reserva Forestal Los Santos, borde de riachuelo, área de crecimiento secundario, sobre talud a la sombra, al borde de Carretera Interamericana Sur, km 93, 3000 m, 9°36'N, 83°50'W, 27.II.1996, *G. Dauphin* 2253 (CR, MO); Pérez Zeledón, Parque Nacional Chirripó, Fila Cementerio



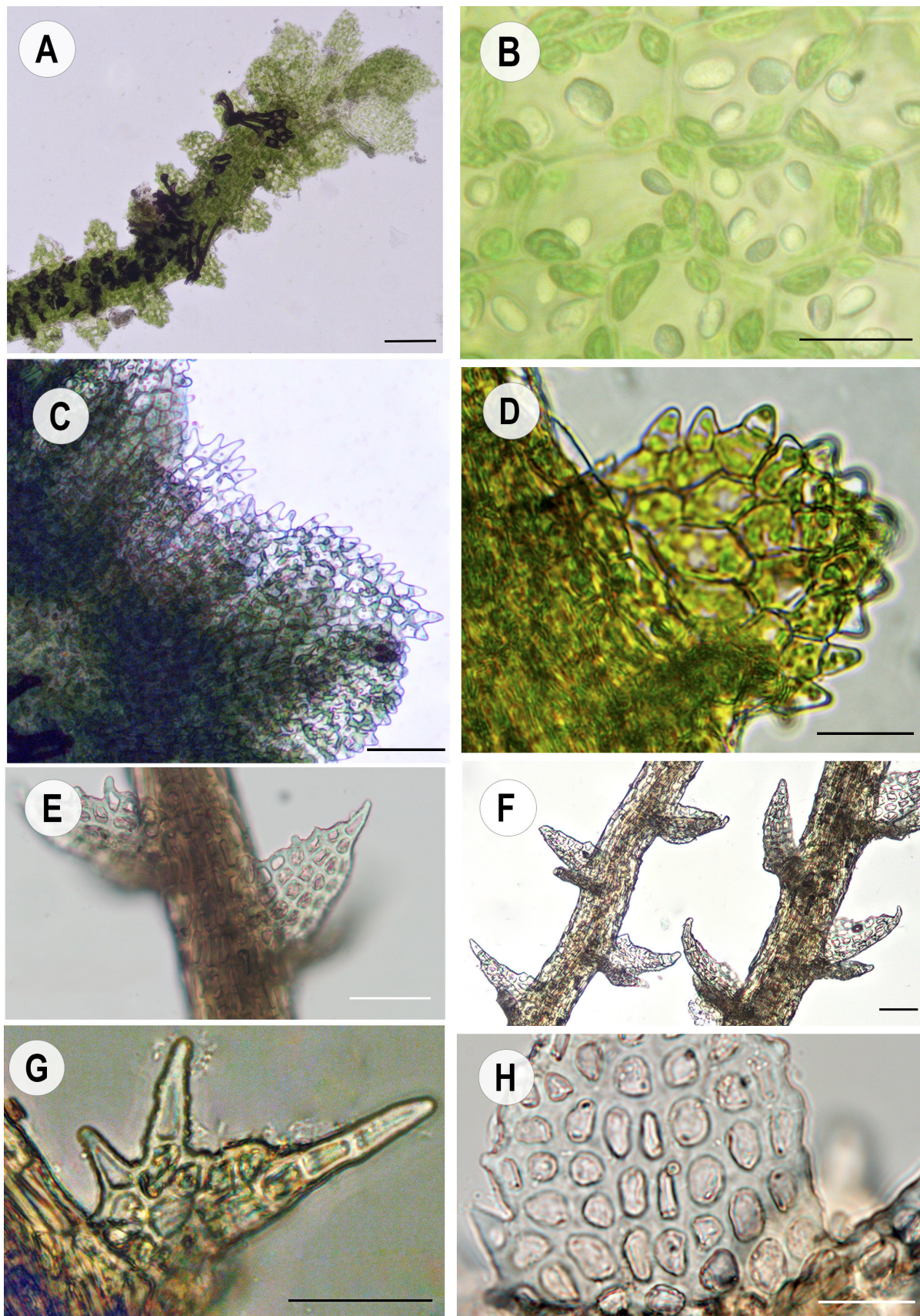


Figure 2: *Cephaloziella minutiloba* A.M.Sierra, Gradst. & Gudiño. A. stem, leaves and rhizoids; B. leaf cells with chloroplasts and oil bodies; C. perianth mouth; D. leaf lamina and margins. *Cephaloziella pungens* Steph. ex Fulford. E. leaf margins and stems; F. habit; G. leaf with developed teeth; H. leaf cells. A-D from G. Dauphin and B. Azofeifa 4935 (CR). E-H from F. Quesada 1358A (CR). Scale bars: A, C, E-G=50 µm; B=10 µm; D, H=25 µm.

de la Máquina, bosque primario, sobre *Ditrichum* sp. a la sombra, 2250 m, 9°27'N, 83°34'30"W, 22.I.1996, F. Quesada 1358A (CR).

5. *Cololejeunea azorica* V.Allorge & Jovet-Ast, Mitt. Thüring. Bot. Ges. 1(2/3): 17. 1955.

TYPE: AZORES. Île de San Miguel, parc José don Canto, bord du Lagoa das Furnas, sur feuilles de *Phoenix* sp. et *Camelia japonica*, mêlé à *Cololejeunea minutissima* (Sm.) Schiffn., *Drepanolejeunea hamatifolia* (Hook.) Schiffn., *Frullania microphylla* (Gottsche) Pearson et *Aphanolejeunea teotonii* V.Allorge et Jovet-Ast, 350 m, 4.VI.1937, P. Allorge and V. Allorge s.n. (holotype: probably in PC).

Illustration: Pócs et al. (2014, Fig. 23).

Distribution and habitat: new to Costa Rica, previously reported from Guatemala and Panama in Central America, this species is also distributed in Macaronesia, Mexico, Northern South America, Western South America, and Brazil (Dauphin et al., 2025). Elevation: 350-1403 m (Allorge and Jovet-Ast, 1955).

Examined specimens: COSTA RICA. Guanacaste, Tilarán, Tronadora, Finca Barpe, mature secondary forest lower montane cloud forest on the Caribbean slope of the continental divide, site located on north west sloping ridge brow, and close to adjacent pasture edge, on rough bark on trunk, 6.2 m above ground, Plot #47, 1362 m, 10°22'7"N, 84°49'32"W, 29.V.2023, D. Tucker 2019.1 (UBC); on leaves of *Plagiochila cristata* (Sw.) Lindenb., 2.3 m above ground, Plot #29, 1403 m, 10°22'4"N, 84°49'32"W, 25.V.2023, D. Tucker 1795.1 (UBC).

6. *Cyclolejeunea foliorum* (Nees) Grolle, J. Hattori Bot. Lab. 65: 403. 1988. (Fig. 3A-F).

≡ *Lejeunea foliorum* Nees, Syn. Hepat. 326. 1845.

TYPE: without country, without locality, "In foliis Hirtellae americanae", Hb. Braun et Nees, unknown

collector s.n. (lectotype (designated by Grolle, 1988): STR).

Illustration: von Herzog (1931, Fig. 2, as *Cyclolejeunea angulata* Herzog).

Distribution and habitat: new to Costa Rica. In Central America previously known from Nicaragua and Panama. Furthermore, occurring in Northern South America, Western South America, and Brazil (Dauphin et al., 2025). Elevation: 0-1000 m (Gradstein, 2021).

Examined specimens: COSTA RICA. Heredia, Sarapiquí, Puerto Viejo, Finca La Selva, Research Trail, on *Welfia georgii*, 40 m, 10°24-26'N, 84°00-02'W, 27.X.1980, A. Bien 103 (CR).

7. *Cylindrocolea planifolia (Steph.) R.M.Schust., Nova Hedwigia 22: 164. 1972. (Figs. 4A-D).

≡ *Cephaloziella planifolia* Steph., Hedwigia 32: 317. 1893.

TYPE: BRAZIL. Sao Francisco, *E. Ule* s.n. (lectotype: G00069249, designated by Bonner, 1963).

Illustrations: Fulford (1976, Fig. 2).

Distribution and habitat: new to Costa Rica and Central America. Also reported from Southeastern USA, Northern South America, Brazil, and Southern South America (Dauphin et al., 2025). A previous record of *C. planifolia* from Costa Rica (Dauphin, 2005) belongs to the genus *Sphenolobus* (Lindb.) Berggr. Dauphin et al. (2025) referred the latter record to *Gymnocoleopsis* cf. *cylindriformis* (Mitt.) R.M.Schust. Elevation: 560 m.

Examined specimens: COSTA RICA. Guanacaste, La Cruz, Parque Nacional Guanacaste, Estación Biológica Maritza, área de crecimiento secundario y bordes del río Tempisquito, sobre tronco caído en sitio expuesto, 560 m, 10°57'40"N, 85°29'40"W, 8.VI.1996, G. Dauphin and D. Valdelomar 2500 (CR, MO).



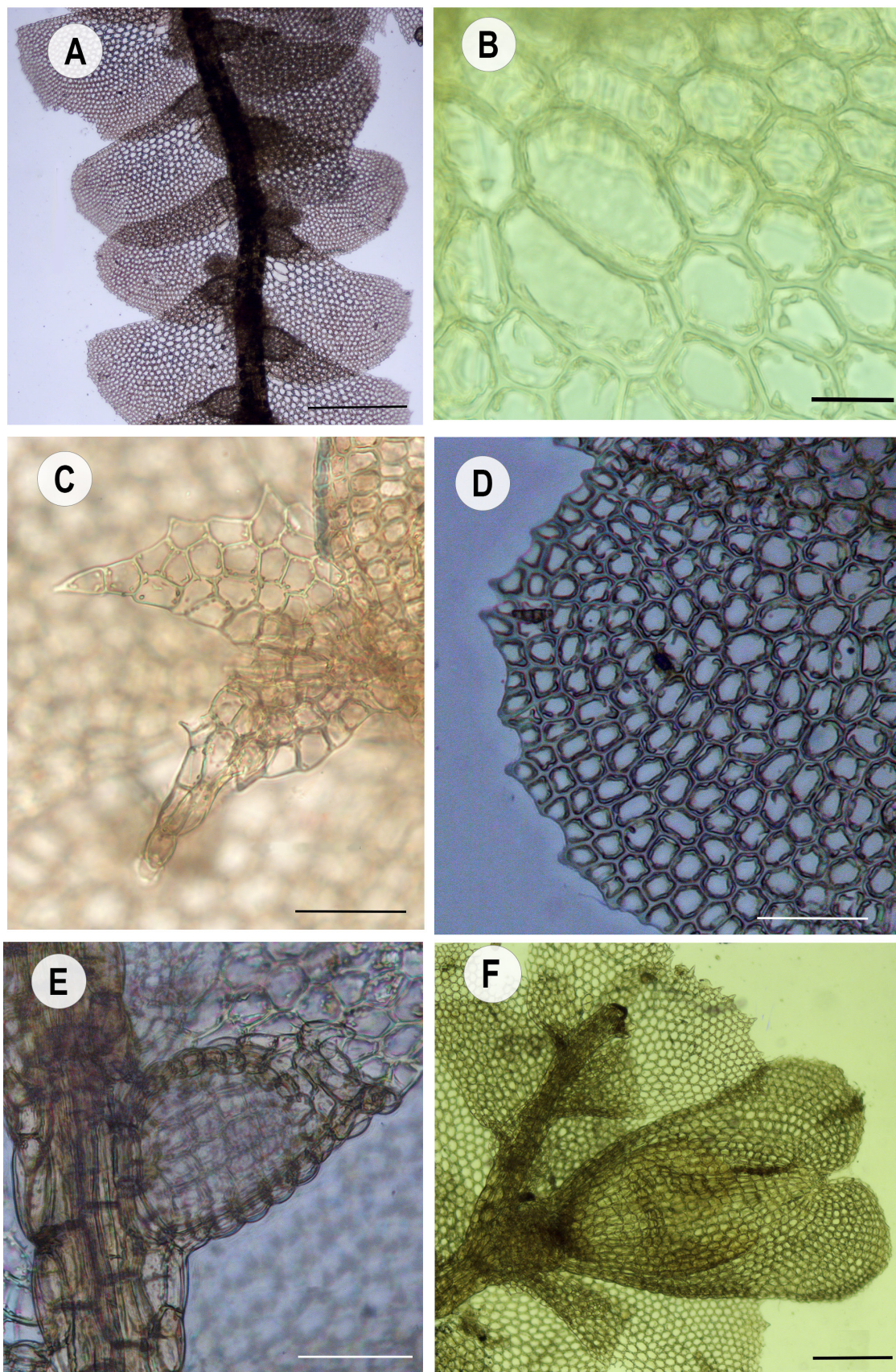


Figure 3: *Cyclolejeunea foliorum* (Nees) Grolle. A. habit; B. ocelli at leaf base; C. underleaf; D. leaf margin; E. lobule; F. perianth. All from A. *Bien 103* (CR). Scale bars: A=250 μ m; B=20 μ m; C-E=50 μ m; F=200 μ m.

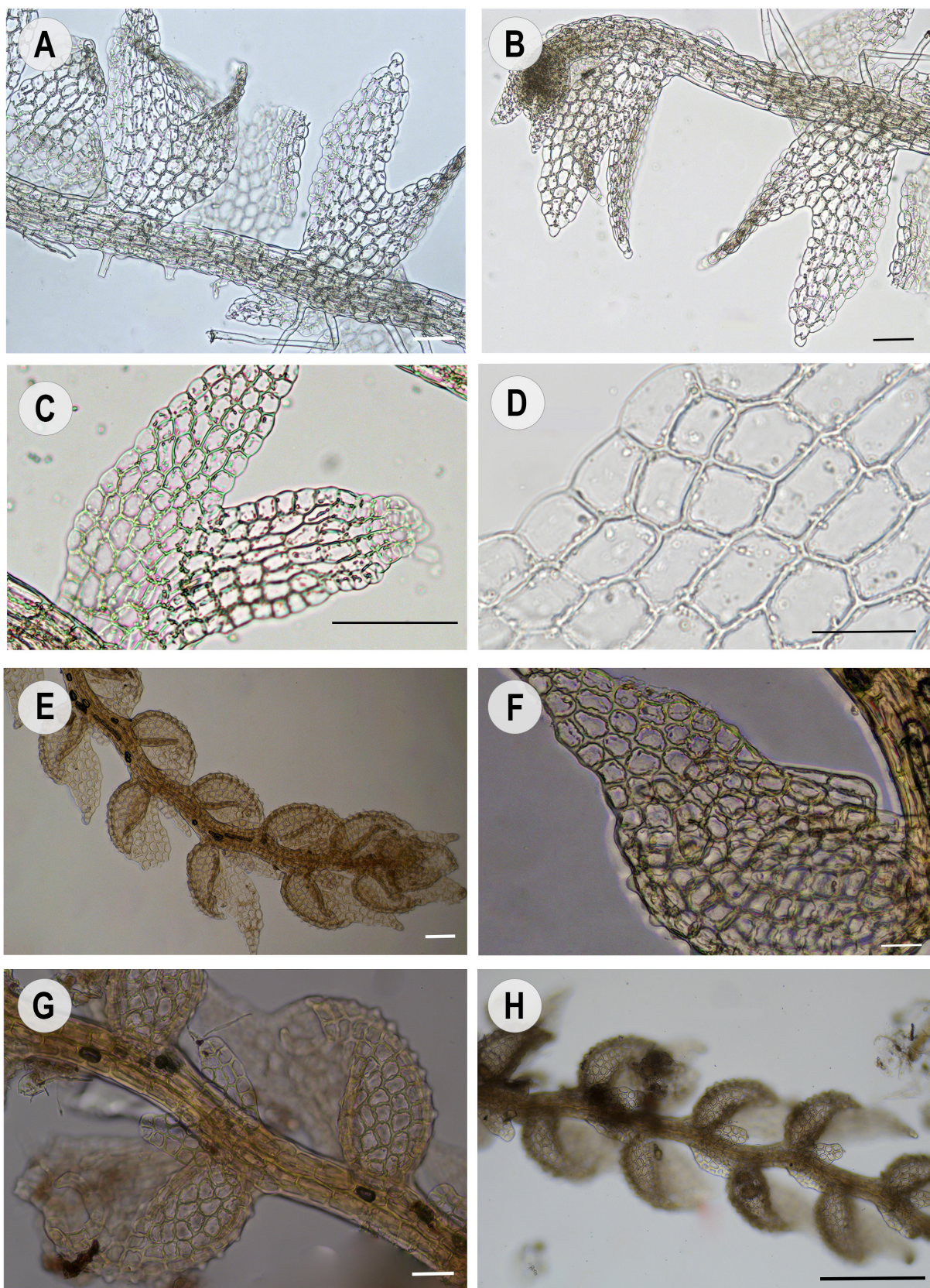


Figure 4: *Cylindrocolea planifolia* (Steph.) R.M.Schust. A. stem, leaves and rhizoids; B. shoot apex; C. leaf; D. leaf cells and margin. *Drepanolejeunea cutervoensis* (Loitl.) Grolle. E. habit; F. leaf and lobule; G. underleaf, stem and lobule; H. underleaves. A-D from G. Dauphin 2500 (CR). E-H from G. Dauphin et al. 1558b (CR). Scale bars: A, B, E, F, G=50 μ m; C, H=100 μ m; D=25 μ m.

8. *Drepanolejeunea cutervoensis (Loitl.) Grolle, J. Hattori Bot. Lab. 69: 186. 1991. (Figs. 4E-H).

≡ *Lejeunea cutervoensis* Loitl., Diagn. Pl. Nov.: 21. 1894.

TYPE: PERU. Cutervo, *C. von Jelski* 573 (isotype: JE 04002115!).

Illustrations: **Bischler (1964, Fig. 33, as *Drepanolejeunea navicularis* Steph.)**.

Distribution and habitat: new to Panama and Central America. This species was previously considered endemic to the northern Andes (Venezuela to Peru) where it grows on branches and twigs of trees and shrubs in upper montane forest and páramo (**Grolle, 1991; Gradstein, 2021**). Elevation: 2500-4560 m (**Gradstein, 2021**).

Examined specimens: PANAMA. Naso Tjër Di Comarca, Parque Internacional La Amistad, Cerro Fábrega, área de páramo, 3335 m, 9°07'5"N, 82°52'40"W, 12.II.1995, *G. Dauphin et al. 1558b* (CR).

9. *Fuscocephaloziopsis pleniceps (Austin) Vána & L.Söderstr., Phytotaxa 112(1): 11. 2013.

≡ *Jungermannia pleniceps* Austin, Proc. Acad. Nat. Sci. Philadelphia 21: 222. 1869.

TYPE: UNITED STATES OF AMERICA. New Hampshire, White Mountains, *W. Oakes* s.n. (lectotype (designated by **Howe, 1899**): MANCH).

Illustration: **Fulford (1968, Fig. 7, as *Cephalozia patagonica* Fulford)**.

Distribution and habitat: new to Panama and Central America. This species is widespread in temperate regions of the Northern Hemisphere; in addition, it has been recorded from the northern Andes and Tierra del Fuego where it is rare (**Gradstein, 2021**). Elevation: 3335-3700 m (**Gradstein, 2021**).

Examined specimens: PANAMA. Naso Tjër Di Comarca, Parque Internacional La Amistad, Cerro Fábrega, área de páramo, 3335 m, 9°07'5"N, 82°52'40"W, 12.II.1995, *G. Dauphin et al. 1555* (CR).

10. *Isotachis obtusa Steph., Sp. Hepat. 6: 354. 1922.

TYPE: ECUADOR. Azuay, in Monte Matanga (páramos) submers. in rivulet, 3200 m, X.1909, *M. Allioni* s.n. (holotype: Herb. Levier, 6568 in G 00053945!; **Bonner, 1966**).

Illustration: **Campos-Salazar and Uribe-M. (2012, Fig. 1, as *Isotachis lacustris* Herzog)**.

Distribution and habitat: new to Panama and Central America. This species has been previously reported from wet habitats in the high tropical Andes (Colombia, Ecuador and Bolivia) (**Gradstein, 2021**). Elevation: 3000-3950 m (**Campos-Salazar and Uribe-M., 2012**).

Examined specimens: PANAMA. Naso Tjër Di Comarca, Parque Internacional La Amistad, Cerro Fábrega, 4 airline km NW of the main peak of Cerro Fábrega along the NW ridge of the massif, lowest páramo slopes with low-forested gullies, in shade on wet soil on stream in shade of *Chusquea* thickets, 3000-3150 m, 9°09'N, 82°54'W, 7.III.1984, *G. Davidse et al. 25411* (CR).

11. *Jensenia florschuetzii Gronde, Proc. Kon. Ned. Akad. Wetensch., C 83(3): 273. 1980. (Fig. 5).

TYPE: COLOMBIA. Meta, Páramo de Sumapaz, 4015 m, *A. M. Cleef* 7754 (isotype: GOET 012054).

Illustrations: **van der Gronde (1980, Fig. 1)**.

Distribution and habitat: new to Costa Rica and Central America. Previously known from páramo areas in Colombia and Ecuador and listed as being endemic to the Northern Andes (**van der Gronde, 1980; Schuette and Stotler, 2005; Gradstein, 2021**). The species is closely related to the common *Jensenia spinosa* (Lindenb. & Gottsche) Grolle



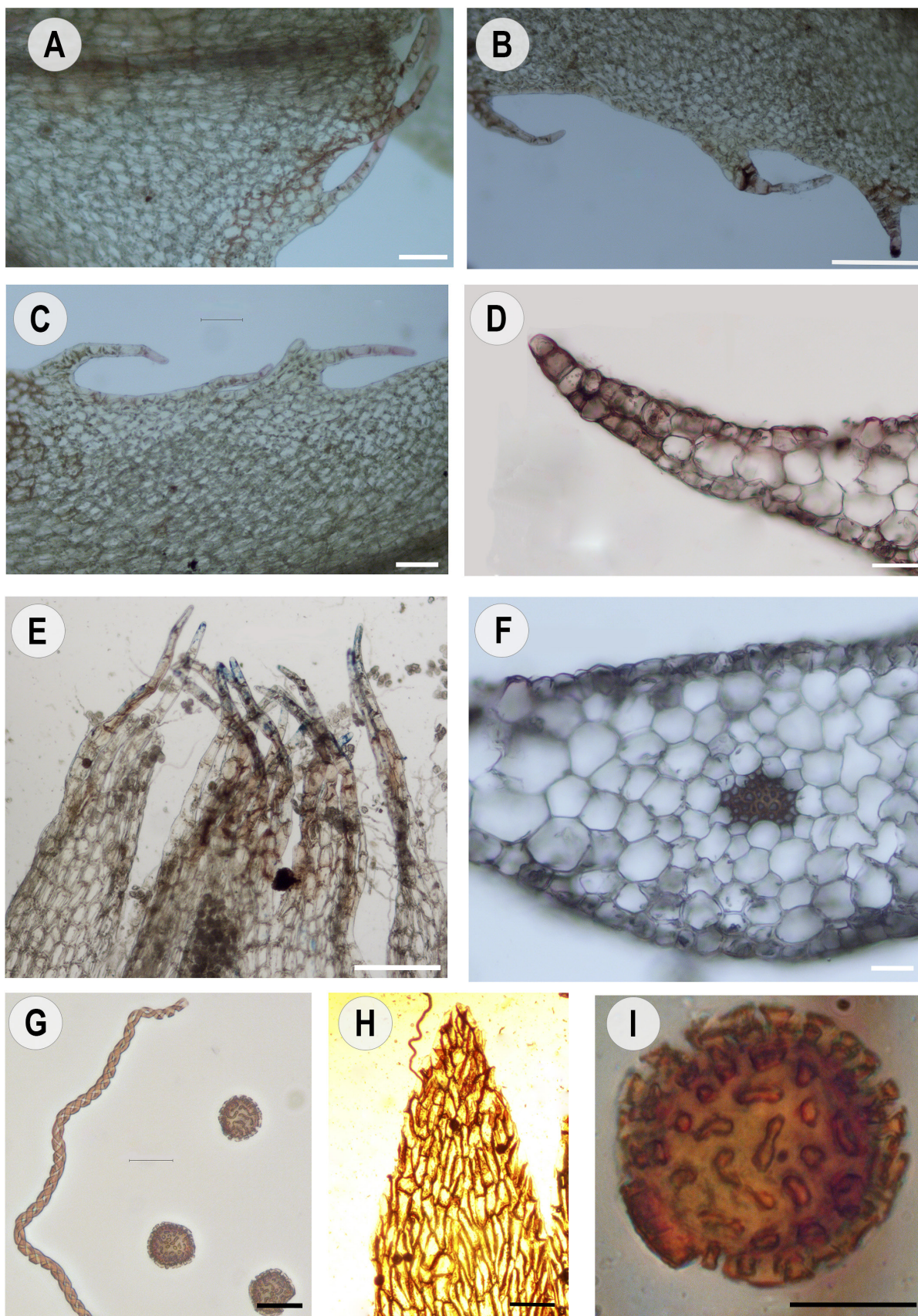


Figure 5: *Jensenia florschuetzii* Gronde. A-C. thallus margins; D. thallus cross-section at margin; E. perianth mouth; F. thallus cross-section, midrib; G. spores and elater; H. sporophyte valve; I. spore. All from A. Estrada et al. 6470 (CR). Scale bars: A-F=20 μ m; G=25 μ m; H=100 μ m; I=12.5 μ m.

but differs from the latter species in having larger and sometimes fused teeth on thallus margins and a narrower thallus wing, only 1-3 cells wide. Elevation: 3343-4015 m (van der Gonde, 1980).

Examined specimen: COSTA RICA. Limón, Talamanca, Telire, Parque Internacional La Amistad, sendero hacia Cerro Kámuk, aprox. 22 km sobre el sendero (marcas 88-89), páramo Kámuk, creciendo sobre el suelo, a orilla de quebrada en área sombreada y oculta, esporófitos presentes, 3343 m, 9°16'2.9"N, 83°2'13.1"W, 27.IV.2018, A. Estrada et al. 6470 (CR).

12. *Kymatocalyx rhizomaticus* (Herzog) Gradst. & Váňa, Haussknechtia, Beih. 9: 166. 1999.

≡ *Stenorrhypis rhizomatica* Herzog, Trans. Brit. Bryol. Soc. 1: 290. 1950.

TYPE: MALAYSIA. Sarawak, Dulit Trail, 300 m, P. W. Richards 2575 (holotype: JE 04002678!).

Illustration: Gradstein and Váňa (1999, Fig. 4).

Distribution and habitat: new to Honduras. In Central America this rheophilous species was previously recorded from Costa Rica, Panama and Cocos Island. Furthermore, it is known from the Western Indian Ocean (Madagascar), Malaysia (Borneo), Northern South America and Western South America (Gradstein and Váňa, 1999; Dauphin et al., 2025). Elevation: 20-600 m (Dauphin et al., 2025).

Examined specimen: HONDURAS. La Atlántida, Parque Nacional Pico Bonito, desde la quebrada Zacate al límite zona núcleo punto #54, área de bosque premontano al borde de río, sobre roca húmeda, 200-400 m, 15°40'N, 86°55'W, 29.XII.2001, G. Dauphin and L. Ferrufino 3041 (CR).

13. *Leiomitra brevifissa* (Steph.) T.Katag., Hattoria 10: 40. 2019.

≡ *Trichocolea brevifissa* Steph., Sp. Hepat. 4: 54. 1909.

TYPE: BRAZIL. Without locality, E. Ule 342 (lectotype: G 13970/G 00043992!, designated by Katagiri, 2019).

Illustration: Katagiri (2019, Fig. 2, as *Trichocolea brevifissa* Steph.).

Distribution and habitat: new to Costa Rica, previously reported from Guatemala in Central America, this species is also distributed in Mexico, the Caribbean, northern South America, and Brazil (Dauphin et al., 2025). Elevation: 1421 m.

Examined specimen: COSTA RICA. Guanacaste, Tilarán, Tronadora, Finca Barpe, mature secondary forest lower montane cloud forest on the Caribbean slope of the continental divide, site located on northwest sloping ridge brow, and close to adjacent pasture edge, on rough bark on trunk, 3.1 m above ground, Plot #38, 1421 m, 10°22'2"N, 84°49'29"W, 26.V.2023, D. Tucker 1793.1 (UBC).

14. *Lejeunea bombonasensis* Spruce, Trans. & Proc. Bot. Soc. Edinburgh 15(1): 222. 1884.

TYPE: ECUADOR. Río Bombanasa, R. Spruce L213 (lectotype (designated by Bastos and Gradstein, 2020): MANCH 18215).

Illustration: Gradstein (2021, Fig. 52F, erroneously as *Lejeunea flaccida* Lindenb. & Gottsche).

Distribution and habitat: new to Costa Rica and Panama. Widespread in tropical and subtropical America (Gradstein, 2021). In Central America this species was previously reported from Honduras, El Salvador and tentatively from Panama as *Lejeunea* cf. *Iusoria* (Lindenb. & Gottsche) Prantl (Salazar Allen et al., 2021; Dauphin et al., 2025). This is the first certain report from Panama. Elevation: 20-1370 m (Dauphin et al., 2025).

Examined specimens: COSTA RICA. Guanacaste, Nicoya, Hojancha, Reserva Monte Alto, área de bosque remanente, a la base de tronco, 520-880 m, 10°31'16"N, 85°24'31"W, 25.XI.2025, G. Dauphin 4979 (CR). Panama.



Panama Oeste, Zona del Canal, Isla Barro Colorado, Shannon trail, on twigs along stream, 20-190 m, 9°0.9'N, 79°51'W, 1.III.2003, G. Dauphin 3069 (CR).

15. *Lejeunea boryana Mont., Ann. Sci. Nat. Bot. (sér. 2) 9: 47. 1838.

TYPE: DOMINICA. Without locality, *J. B. Bory s.n.* (lectotype (designated by Reiner-Drehwald and Goda, 2000): PC 0104467).

Illustration: Reiner-Drehwald and Goda (2000, Fig. 3).

Distribution and habitat: new to Costa Rica and Central America. This species is rather common in the Caribbean area, as well as in the Amazon basin and the Chocó of Colombia (Reiner-Drehwald and Goda, 2000; Gradstein, 2021). Elevation: from 0-650 m in Colombia and Ecuador (Gradstein, 2021), to 1200 m in Costa Rica (this publication).

Examined specimen: COSTA RICA. Puntarenas, Coto Brus, Limoncito, Finca I lama, epífito sobre corteza a la sombra, 1000-1200 m, 8°47'30"N, 83°02'W, 24.X.1995, G. Dauphin and I. Chacón 1941 (CR, MO).

16. *Lejeunea serpillifolioides* (Raddi) Gradst., Caldasia 40(1): 87. 2018.

≡ *Jungermannia serpillifolioides* Raddi., Critt. Bras. 17. 1822.

TYPE: BRAZIL. Rio de Janeiro, "Serra do Frade", G. Raddi s.n. (lectotype (designated by Gradstein, 2026): PI, FI).

Illustration: Gradstein (2021, Fig. 53J).

Distribution and habitat: new to Costa Rica, previously reported from Guatemala in Central America, this species is also distributed in Mexico, the Caribbean, Northern South America, Western South America and Brazil

(Dauphin et al., 2025). Elevation: (100-)900-2000 m (Gradstein, 2021).

Examined specimen: COSTA RICA. Guanacaste, Tilarán, Tronadora, Finca Barpe, mature secondary forest lower montane cloud forest on the Caribbean slope of the continental divide, site located on NW sloping ridge brow, and close to adjacent pasture edge, on rough bark on trunk, 1.05 m above ground, Plot #39, 1421 m, 10°22'2"N, 84°49'29"W, 26.V.2023, D. Tucker 2198.1 (UBC).

17. *Lepidozia cupressina* (Sw.) Lindenb., Syn. Hepat.: 207. 1845.

≡ *Jungermannia cupressina* Sw., Prodr.: 144. 1788.

TYPE: JAMAICA. Without locality, O. Swartz s.n. (S B25330).

Illustration: Fulford (1966, Fig. 13).

Distribution and habitat: new to Nicaragua. Widespread in tropical America and Africa, also in Western Europe. In view of its wide distribution, the occurrence of *Lepidozia cupressina* in Nicaragua was to be expected. Elevation: 1000-4500 m (Gradstein, 2021).

Examined specimen: NICARAGUA. Matagalpa, La Carlota, Carretera Matagalpa - Tuma, bosque nuboso residual, 1400-1500 m, X.1975, L. D. Gómez et al. 6234 (CR).

18. *Lepidozia macrocolea* Spruce, Trans. & Proc. Bot. Soc. Edinburgh 15: 363. 1885.

TYPE: ECUADOR. Andes Quitenses, Mount Tungurahua, R. Spruce s.n. (NY 01020977).

Illustration: Fulford (1966, Fig. 18).

Distribution and habitat: new to Costa Rica. This Neotropical endemic species has been reported from



Colombia, Brazil, Ecuador and Venezuela (Fulford, 1966), Mexico and the Caribbean (under the now synonymous name *Lepidozia armata* Steph.) and most recently from Panama (Salazar Allen et al., 2021). Given its widespread distribution, the species will likely be found elsewhere in Central America. Elevation: from 1120 m in Costa Rica (this publication), to 4000 m in Colombia and Ecuador (Gradstein, 2021).

Examined specimen: COSTA RICA. Guanacaste, La Cruz, Cordillera de Guanacaste, along divide between upper río Mena and unnamed river to the E, SE of Volcán Orosí, 1120-1200 m, 10°58'N, 83°28'W, 9.IV.2008, M. H. Grayum 13054 (CR, MO).

19. *Leptolejeunea exocellata* (Spruce) A.Evans, Bull. Torrey Bot. Club 29(8): 498. 1902.

≡ *Lejeunea exocellata* Spruce, Trans. & Proc. Bot. Soc. Edinburgh 15: 195. 1884.

TYPE: PERU. Andes Peruviae ad Tarapoto, R. Spruce s.n. (holotype: MANCH).

Illustration: Bischler (1969, Fig. VIII, Tab. 64).

Distribution and habitat: new to Honduras. Previously reported from Guatemala, Costa Rica, Panama and Cocos Island in Central America, this Neotropical species is also known from Mexico, the Caribbean, Northern, Western, and Southern South America and Brazil (Dauphin et al., 2025). Elevation: from 185 m in Colombia and Ecuador (Gradstein, 2021), to 1500 m in Guatemala (Dauphin et al., 2025).

Examined specimen: HONDURAS. La Atlántida, Parque Nacional Pico Bonito, desde la quebrada Zacate al límite zona núcleo punto #54, área de bosque premontano al borde de río, sobre hojas de helecho, 200-400 m, 15°40'N, 86°55'W, 29.XII.2001, G. Dauphin and L. Ferrufino 3050.1 (CR).

20. *Leptoscyphus intermedius* Grolle, Nova Acta Leop., n.s., 25(161): 32. 1963.

TYPE: GUIANA. Mount Roraima, E. Ule s.n. (holotype: M; isotype: JE 04001962!).

Illustration: Fulford (1976, Fig. 2).

Distribution and habitat: new to Costa Rica, previously reported from Honduras and Panama, this species is also distributed in the Caribbean and Northern, Southern and Western South America (Dauphin et al., 2025). Elevation: 1800-4200 m (Gradstein, 2021).

Examined specimen: COSTA RICA. Cartago, Paraíso, Parque Nacional Chirripó, Páramo Cuericí, 3200 m, 9°34'47.64"N, 83°37'59.74"W, 14.VII.2006, G. Dauphin et al. 3587A (CR).

21. *Marchesinia bongardiana* (Lehm. & Lindenb.) Trevis., Mem. Reale Ist. Lombardo Sci., Ser. 3, Cl. Sci. Mat. 4(13): 405. 1877.

≡ *Lejeunea bongardiana* Lehm. & Lindenb., Nov. Stirp. Pug. 7: 18. 1838.

TYPE: BRAZIL. Rio de Janeiro, A. G. H. von Bongard s.n. (syntypes: G 00120493!, S 53739!).

Illustration: Gradstein (2021, Fig. 57C).

Distribution and habitat: new to Costa Rica, previously reported from Barro Colorado Island in Panama, this species has been reported from Mexico, the Caribbean, Northern South America, Western South America, and Brazil (Dauphin et al., 2022; 2025). Elevation: from 20-200 m in Panama (Dauphin et al., 2022), to 1500 m in Colombia and Ecuador (Gradstein, 2021).

Examined specimen: COSTA RICA. Guanacaste, Nicoya, Hojancha, Reserva Monte Alto, a la entrada al



bosque, sobre roca a la sombra, 520-880 m, 10°3'16"N, 85°24'31"W, 25.XI.2025, *G. Dauphin* 4975 (CR).

22. *Metzgeria filicina Mitt., Hooker's J. Bot. Kew Gard. Misc. 3: 361. 1851.

TYPE: ECUADOR. Quito, *W. Jameson* 164 (isotypes: NY 01076506, BR 5040104551829!, MICH 536426!, NY 01076506).

Illustration: *da Costa* (2008, Fig. 39).

Distribution and habitat: new to Guatemala and Central America, previously known from the Andes of Colombia, Venezuela, Ecuador, Bolivia and Peru (*da Costa*, 2008). Elevation: 1900-3700 m (*da Costa*, 2008).

Examined specimen: GUATEMALA. Quiché, between Chajúl and Cotzál, on bark of *Sambucus*, 6500 ft (1980 m), 15°26'N, 91°05'W, 7.II.1946, *A. J. Sharp* 5308c (MO).

23. *Microlejeunea epiphylla* Bischl., Nova Hedwigia 5(1/2): 378. 1963.

TYPE: GUADELOUPE. La Soufrière, 1467 m, 24.VII.1954, *C. Le Gallo* s.n. (holotype: PC).

Illustration: *Bischler et al.* (1963, Tab. 65).

Distribution and habitat: new to Honduras, previously known from Guatemala, El Salvador, Nicaragua, Costa Rica, Panama and Cocos Island in Central America, also reported from Southeastern USA (as *Lejeunea dimorphophylla* R.M.Schust.), the Caribbean, Northern South America, Western South America, Brazil (*Dauphin et al.*, 2025). Elevation: 300-1360 m (*Dauphin et al.*, 2025).

Examined specimen: HONDURAS. La Atlántida, Parque Nacional Pico Bonito, desde la quebrada Zacate al límite zona núcleo punto #54, área de bosque premontano al borde de río, sobre tronco en sitio expuesto en bosque,

200-400 m, 15°40'N, 86°55'W, 29.XII.2001, *G. Dauphin and L. Ferrufino* 3009 (CR).

24. *Microlejeunea globosa (Spruce) Steph., Sp. Hepat. 5: 821. 1915.

≡ *Lejeunea globosa* Spruce, Bull. Soc. Bot. France 36 (Suppl. Congrès Bot. 1889): CXCI. 1889 (1890).

TYPE: PARAGUAY. Ad Guarapi, in cortice, *B. Balansa* 3722 (lectotype (designated by *Reiner-Drehwald*, 1994): G 005122!; isolectotype: G 005123!).

Illustration: *Reiner-Drehwald* (1994, Fig. 1).

Distribution and habitat: new to Costa Rica and Central America. Known from subtropical regions of America (Mexico, Florida, southern Brazil, Paraguay, northern Argentina) and above 2000 m in the Ecuadorian Andes, and Kenya (*Reiner-Drehwald*, 1994; *Gradstein*, 2021). A characteristic species of dry woodlands. Elevation: at 300 m in Costa Rica (this publication), and above 2000 m in the Ecuadorian Andes (*Gradstein*, 2021).

Examined specimens: COSTA RICA. Guanacaste, La Cruz, Parque Nacional Guanacaste, Sector Santa Elena, río Cuajiniquil, área de río intermitente en bosque secundario viejo, sobre tronco a media sombra, 300 m, 10°52'30"N, 85°36'40"W, 11.III.1996, *G. Dauphin* 2273 (CR, MO).

25. *Paracromastigum pachyrhizum* (Nees) Fulford, Mem. New York Bot. Gard. 11(3): 390. 1968. (Fig. 6).

≡ *Jungermannia pachyrhiza* Nees, Fl. Bras. Enum. Pl. 1: 339. 1833.

TYPE: BRAZIL. Villa Rica, *C. F. P. von Martius* s.n. (S B28457).

Illustrations: *Fulford* (1968, Plate 106, Fig. 2, as *Leucosarmentum bifidum* (Steph.) Fulford).



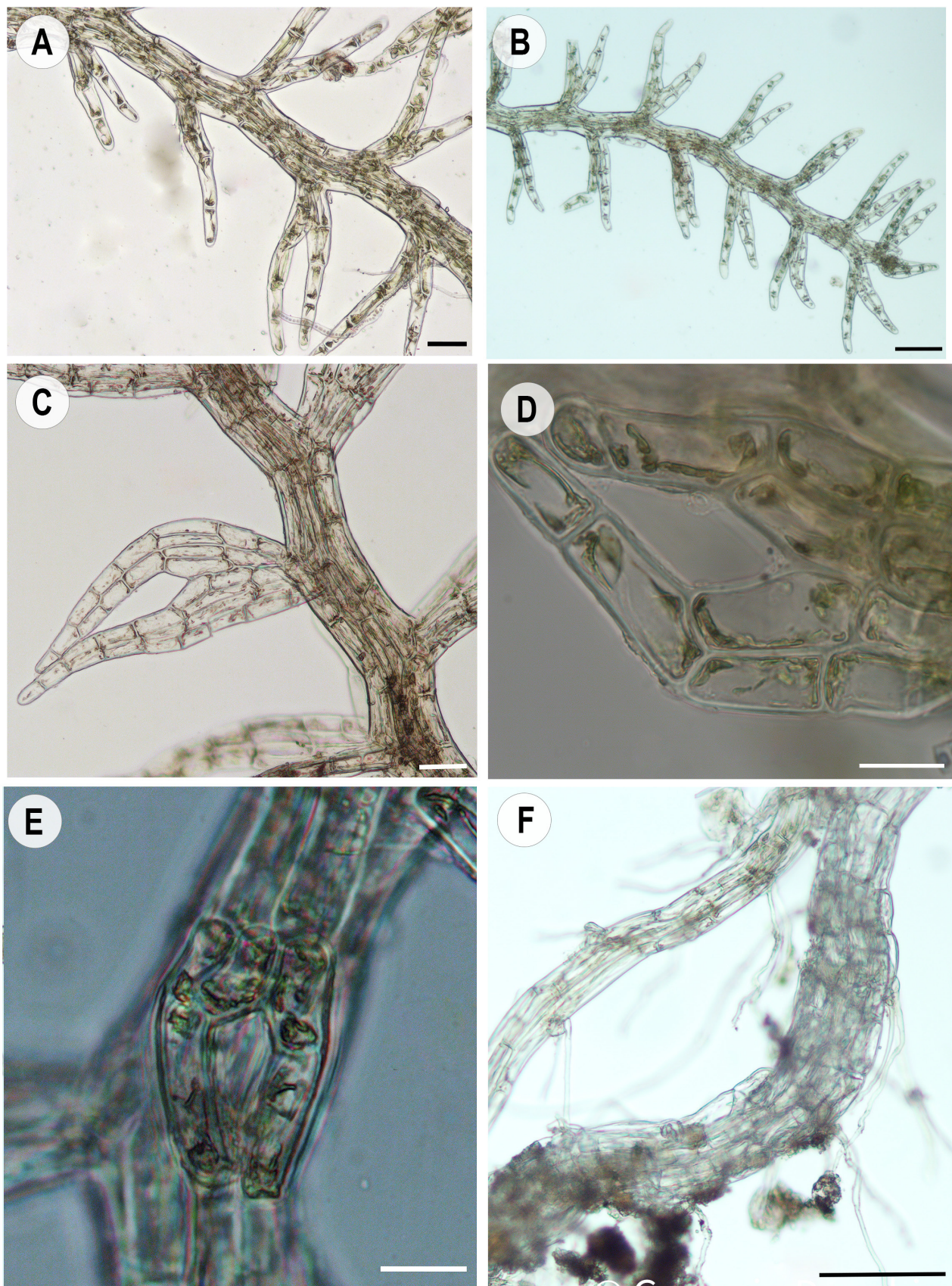


Figure 6: *Paracromastigum pachyrhizum* (Nees) Fulford. A-B. habit; C. leaves; D-E. underleaves; F. stoloniform branches. All from G. Dauphin 2476 (CR). Scale bars: A, B=100 µm; C=50 µm; D-F=20 µm.

Distribution and habitat: new to Costa Rica, previously known from Guatemala and Panama in Central America. In addition, this species occurs in the Caribbean, Northern, Western, and Southern South America, Brazil (Dauphin et al., 2025). Elevation: 1100-3300 m (Gradstein, 2021).

Examined specimens: COSTA RICA. Cartago, Paraíso, Parque Nacional Chirripó, Páramo Cuericí, epiphytes on *Chusquea*, 3200 m, 9°34'47.64"N, 83°37'59.74"W, 14.VII.2006, G. Dauphin et al. 3587B (CR). Guanacaste, Liberia, Parque Nacional Guanacaste, Sector Cacao, Fila al Volcán Cacao, área de bosque achaparrado en fila expuesta y húmeda, terrestre sobre talud a la sombra mezclado con *Riccardia* sp., 1100 m, 10°55'43"N, 85°28'10"W, 29.X.1995, G. Dauphin and D. Valdelomar 2476 (CR). Heredia, Sarapiquí, entrada a la Colonia Virgen del Socorro, entre el río Sarapiquí y el río San Fernando, sobre talud a la sombra en crecimiento secundario, al borde del camino, 700-900 m, 10°16'20"N, 84°10'30"W, 11.I.1996, G. Dauphin and J. Gonzáles 2102 (CR).

26. *Plagiochila tamariscina Steph., Bull. Herb. Boissier (sér. 2) 2(8): 685. 1902.

TYPE: DOMINICAN REPUBLIC. Santo Domingo, without locality, H. F. A. von Eggers 1725g (paralectotype (designated by Sauer in sched.): G 00061488!).

Illustrations: von Herzog (1932, Fig. 19, as *Plagiochila subdeflexiramea* Herzog).

Distribution and habitat: new to Costa Rica and Central America. This species is scattered in tropical America with a predominantly Caribbean distribution (Gradstein, 2021). *Plagiochila tamariscina* is most similar to *P. deflexiramea* Taylor which shares pinnate-terminal branching. However, the latter species has strongly ampliate leaves which are broader, subimbricate and widest near the base. The leaf characteristics of *P. tamariscina* are comparable to *P. aerea* Taylor in that they are narrowly oblong with elongate cells and have sharp teeth on the apical and sometimes ventral margin. However, the leaves of *P. aerea* are often widest

in the middle, whereas *P. tamariscina* is usually widest in the lower third. These species are best distinguished by their branching as *P. aerea* has predominantly intercalary branching with only occasional terminal branches, and *P. tamariscina* is pinnately branched by terminal branches. Elevation: 180-2200 m (Gradstein, 2021).

Examined specimens: COSTA RICA. Guanacaste, Tilarán, Tronadora, Finca Barpe, mature secondary forest lower montane cloud forest on the Caribbean slope of the continental divide, site located on north west sloping ridge brow, and close to adjacent pasture edge, Plot #15, on smooth bark on branch, 15.34 m above ground, 1393 m, 10°22'4"N, 84°49'32"W, 23.V.2023, D. Tucker 1968 (UBC); epiphyte on lower trunks, 1394 m, 10°22'4"N, 84°49'32"W, 8.VI.2023, D. Tucker 1682 (CR, UBC, USJ); Plot #3, on flaking bark on trunks, 0.95 m above ground, 1412 m, 10°22'3"N, 84°49'31"W, 19.V.2023, D. Tucker 2022 (UBC).

27. *Prionolejeunea grollei Ilk.-Borg. & Schäfer-Verw., Cryptog. Bryol. 26(1): 29. 2005.

TYPE: DOMINICA. Roseau Valley, trail Laudat-Valley of Desolation, 700 m, 24.V.1996, A. Schäfer-Verwimp and I. Verwimp 17859/A (holotype: GOET 012145; isotypes: JE 04001266!, NY 00710534).

Illustrations: Ilkiu-Borges (2016, Fig. 37-39).

Distribution and habitat: new to Costa Rica and Central America. Previously known only from Dominica and Guadeloupe (Ilkiu-Borges and Schäfer-Verwimp, 2005; Ilkiu-Borges, 2016). Our specimen shows pycnolejeuneoid innovation, which was previously unknown for this species (Ilkiu-Borges pers. comm., 2025). Elevation: 700-2130 m (Ilkiu-Borges, 2016).

Examined specimens: COSTA RICA. Guanacaste, Liberia, Parque Nacional Guanacaste, Sector fila al Volcán Cacao, área de bosque achaparrado en fila expuesta y húmeda, sobre tronco, 1100 m, 10°55'43"N, 85°28'10"W, 29.X.1995, G. Dauphin 2449 (CR, MO).



28. *Pseudomarsupidium aureocinctum (R.M.Schust.) J.J.Engel, Novon 17(3): 312. 2007.

≡ *Adelanthus decipiens* subsp. *aureocinctus* R.M. Schust., Phytologia 39: 250. 1978.

TYPE: VENEZUELA. Estado de Tachira, Páramo de Tama, 3140 m, *R. M. Schuster and L. Ruíz-Terán* 76-1910 (F).

Illustration: [Gradstein \(2021, Fig. 12L-N\)](#).

Distribution and habitat: new to Costa Rica and Central America, this species was previously known from the northern Andes and southeastern Brazil ([Gradstein, 2021](#); [Dauphin et al., 2025](#)). *Pseudomarsupidium aureocinctum* is similar to *P. decipiens* (Hook.) Grolle but has a conspicuous yellowish border consisting of 1-2 rows of thick-walled cells along the margins ([Gradstein, 2021](#)). Elevation: from 1393 m in Costa Rica (this publication) to 4050 m in Ecuador ([Gradstein, 2021](#)).

Examined specimens: COSTA RICA. Guanacaste, Tilarán, Tronadora, Finca Barpe, mature secondary forest lower montane cloud forest on the Caribbean slope of the continental divide, site located on north west sloping ridge brow, and close to adjacent pasture edge, Plot #27, on smooth bark on trunk, 13.1 m above ground, 1404 m, 10°22'4"N, 84°49'31"W, 24.V.2023, *D. Tucker* 2059 (UBC); Plot #15, on smooth bark on trunk, 15.34 m above ground, 1393 m, 10°22'4"N, 84°49'32"W, 23.V.2023, *D. Tucker* 1972 (UBC); Plot #26, on smooth bark on branch, 13.6 m above ground, 1404 m, 10°22'4"N, 84°49'31"W, 24.V.2023, *D. Tucker* 2031 (UBC); Plot #24, on rough bark on trunk, 12.44 m above the ground, 1404 m, 10°22'4"N, 84°49'31"W, 24.V.2023, *D. Tucker* 2144 (UBC).

29. *Riccardia regnellii* (Ångstr.) K.G.Hell, Bol. Fac. Filos. Univ. São Paulo, Bot. 25: 110. 1969.

≡ *Pseudoneura regnellii* Ångstr., Öfvers. Kongl. Vetensk.-Akad. Förh. 33(7): 90. 1876.

TYPE: BRAZIL. Minas Gerais, Caldas, *A. F. Regnell s.n.* (lectotype (designated by [Gradstein and Reeb, 2018](#)): S 260631; isolectotype: G 00282990!).

Illustration: [Gradstein \(2021, Fig. 8F\)](#).

Distribution and habitat: new to Honduras. Previously reported in Central America from Guatemala, Panama and Cocos Island. This species is also found in the Caribbean, Northern and Western South America and Brazil ([Dauphin et al., 2025](#)). Elevation: 0-3500 m ([Gradstein, 2021](#)).

Examined specimens: HONDURAS. La Atlántida, Parque Nacional Pico Bonito, desde la quebrada Zacate al límite zona núcleo punto #54, sobre roca a la sombra en cascada, 200-400 m, 15°40'N, 86°55'W, 29.XII.2001, *G. Dauphin and L. Ferrufino* 3046 (CR); área de bosque premontano al borde de río, sobre helecho arborescente en mirador, *G. Dauphin and L. Ferrufino* 3047 (CR).

30. *Riccia fluitans* L. Sp. Pl. 2: 1139. 1753.

TYPE: UNITED KINGDOM. Without locality, fossis, piscinis, ad ripas supra aquam extensa, *unknown collector s.n.* (LINN HS1681-5-1!).

Illustration: [Paton \(1999, Fig. 296\)](#).

Distribution and habitat: new to Nicaragua. *Riccia fluitans* is widespread in the Holarctic region and in addition occurs scattered in the tropics reaching southwards to South Africa ([Gradstein, 2021](#)). This species has been hitherto reported from Central America as *R. stenophylla* Spruce and *R. oerstediana* Lindenb. & Hampe ([Dauphin et al., 2025](#)). Elevation: 400-2000 m ([Gradstein, 2021](#)).

Examined specimen: NICARAGUA. Matagalpa, Finca San José de La Montaña, camino Matagalpa - Tuma, matorrales y vegetación secundaria, ca. 800 m, XI.1975, *L. D. Gómez et al.* 6209 (CR).



31. *Solenostoma hyalinum* (Lydell) Mitt., Nat. Hist. Azores: 319. 1870.

≡ *Jungermannia hyalina* Lyell, Brit. Jungermann.: pl. 63. 1816 (1814).

TYPE: IRELAND. Dublin, *T. Taylor s.n.* (isotype: E 00007427!).

Illustration: [Paton \(1999, Fig. 129, as *Jungermannia hyalina* Lyell\)](#).

Distribution and habitat: new to Costa Rica. Previously reported in Central America from Guatemala, throughout the temperate region of the Northern Hemisphere, scattered in the tropics ([Dauphin et al., 2025](#)). This species is distinguished from other Neotropical members of the genus by its leaves which are wider than long. Elevation: the Costa Rican specimen occurred at 230 m, a markedly lower elevation than elsewhere in the Neotropics (Brazil: 500-2400 m, [Gradstein and da Costa, 2003](#); Colombia and Ecuador: 1000-4000 m; [Gradstein, 2021](#)), which may be due to the very wet environment where the species was found (foothills of Braulio Carrillo National Park).

Examined specimen: COSTA RICA. Limón, Pococí, Guápiles, río Corinto, sobre roca expuesta al borde del río, 230 m, 10°12'43"N, 83°53'08"W, 13.VIII.2025, *G. Dauphin 4920* (CR).

32. *Symphyogyna marginata Steph., Mém. Herb. Boissier 11: 30. 1900. ([Fig. 7A](#)).

TYPE: DOMINICA. Without locality, *W. R. Elliott 2237* (syntypes: G 00043805!, G00043806!).

Illustrations: [Uribe and Aguirre \(1995, Fig. 8\)](#).

Distribution and habitat: new to Costa Rica and Central America. An uncommon Neotropical species, recorded from the northern Andes, the Lesser Antilles and Mt. Roraima in Guyana ([Gradstein, 2021](#)). Elevation: from

1100 m in Costa Rica (this publication) to 3700 m in Colombia and Ecuador ([Gradstein, 2021](#)).

Examined specimens: COSTA RICA. Cartago, El Guarco, San Isidro, Reserva Forestal Río Macho, Reserva Tres de Junio, Carretera Interamericana Sur, km 86, terrestre al borde de riachuelo en sitio sombrío, 2600 m, 9°40'10"N, 83°51'10"W, 2.VI.1996, *G. Dauphin and V. H. Ramírez 1683* (CR, MO). Guanacaste, La Cruz, Santa Cecilia, Parque Nacional Guanacaste, Sendero a la fila del Cerro Orosilito, Estacion Pitilla, área de bosque enano en fila y bosque premontano primario y alterado, sobre corteza a la sombra, expuesto en fila, 1100 m, 10°58'45"N, 85°26'20"W, 23.VI.1996, *G. Dauphin 2569* (CR, MO). Limón, Cordillera de Talamanca, headwaters of the unnamed western branch of the Rio Teribe, between the Rio Sini and the continental divide at Cerro Bekom, mixed oak forest along river with a clearing for pasture, on wet soil along river, 2500-2600 m, 9°10'45"N, 83°03'30"W, 21-27.III.1984, *G. Davidse et al. 25796* (CR). San José, Pérez Zeledón, Rivas, Parque Nacional Chirripó, Cerro Chirripó, 0.5 km NE de Estación Base Crestones, sobre sendero a Valle de Los Conejos, área de páramo, creciendo sobre el suelo a orilla de quebrada, en sitio oscuro, cubierto y protegido por arbustos, 3395 m, 9°27'37"N, 83°30'8.9"W, 20.III.2018, *A. Estrada et al. 6331* (CR).

33. *Symphyogyna podophylla (Thunb.) Nees & Mont., Flora 29(9): 135. 1846. ([Fig. 7B-E](#)).

≡ *Jungermannia podophylla* Thunb., Prodr. Pl. Cap.: 174. 1800.

TYPE: SOUTH AFRICA. Cape Town, *unknown collector s.n.* (isotypes: S B28706, S B28708, S B28710).

Illustrations: [Uribe and Aguirre \(1995, Fig. 3, as *Symphyogyna bogotensis* \(Gottsche\) Steph.\)](#).

Distribution and habitat: new to Costa Rica and Central America. Previously known from the tropical Andes (Colombia to Bolivia), southeastern Brazil, Patagonia,



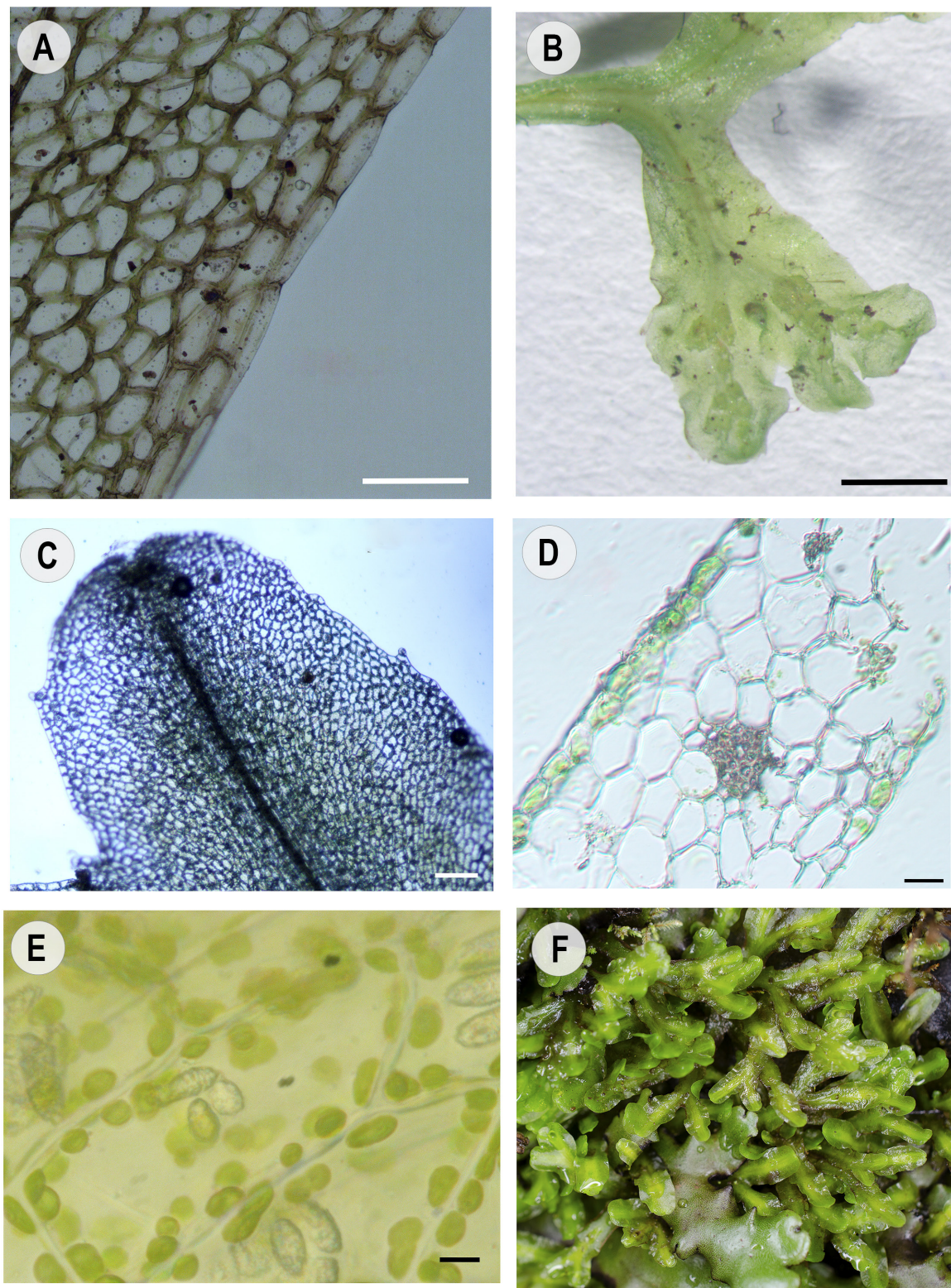


Figure 7: *Symphyogyna marginata* Steph. A. thallus margin. *Symphyogyna podophylla* (Thunb.) Nees & Mont. B. habit; C. thallus dorsal view; D. thallus cross section; E. cells, oil bodies and chloroplasts. *Symphyogyna trivitatta* Spruce. F. habit *in situ*. A from A. Estrada 6331 (CR), B-E from G. Dauphin 4933 (CR) and F from G. Dauphin 4903 (CR). Scale bars: A-C=100 μ m; D=22 μ m; E=10 μ m.

Africa, and Australasia (Gradstein, 2021). *Symphyogyna podophylla* differs from other Neotropical species in the genus by its dendroid habit. Elevation: 500-3900 m (Gradstein, 2021).

Examined specimen: COSTA RICA. Heredia, San Rafael, Parque Nacional Braulio Carrillo, camino a Alto El Roble, área de bosque alterado, terrestre sobre talud al borde de camino, 2090 m, 10°05'29"N, 84°06'21"W, 6.IX.2025, G. Dauphin and B. Kussbach 4933 (CR).

34. *Symphyogyna trivittata* Spruce, J. Linn. Soc., Bot. 30(210): 365. 1895. (Fig. 7F).

TYPE: DOMINICA. Without locality, W. R. Elliott 1030 (holotype: MANCH).

Illustrations: Uribe and Aguirre (1995, Fig. 10).

Distribution and habitat: new to Costa Rica. In Central America previously known from Guatemala (Dauphin et al., 2025). Furthermore, recorded from the Caribbean and Northern South America (Uribe and Aguirre, 1995). *Symphyogyna trivittata* is distinguished from *S. brasiliensis* Nees & Mont. and the related species *Pallavicinia lyellii* (Hook.) Gray by the presence of two central strands in the thallus. Elevation: 600-3200 m (Gradstein, 2021).

Examined specimen: COSTA RICA. Alajuela, Ruta 126 entre Carrizal y Varablanca, Concordia, terrestre sobre talud a media sombra, 2090 m, 10°07'7.8"N, 84°06'21"W, 11.VIII.2025, G. Dauphin 4903 (CR).

New combination

Myriocoleopsis dauphinii (R.L.Zhu) J.J.Atwood, **comb. nov.**

≡ *Cololejeunea tixieri* M.I.Morales & G.Dauphin, Trop. Bryol. 14: 133. 1998, nom. illeg. non *Cololejeunea tixieri* Onr., Bull. Jard. Bot. Natl. Belg. 59: 436. 1989.

TYPE: Panama. Bocas del Toro, Parque Internacional La Amistad, Cima del Cerro Fábrega, 9°07'05"N, 85°52'40"W, 3335 m, G. Dauphin et al. 1556 (holotype: USJ 47774!; isotype: PMA!).

≡ *Cololejeunea dauphinii* R.L.Zhu, J. Bryol. 28(3): 277. 2006.

≡ *Myriocoleopsis tixieri* Pócs & Gradst., Mem. New York Bot. Gard. 121: 579. 2021, nom. illeg., incl. nom. prior.

The name *Myriocoleopsis tixieri* Pócs & Gradst. was introduced as a new name for the illegitimate *Cololejeunea tixieri* M.I.Morales & G.Dauphin. However, the name *M. tixieri* is illegitimate under Art. 52.1 of the Code because *C. dauphinii* R.L.Zhu has already been published as a replacement name for *C. tixierii*. The new combination, *M. dauphinii* (R.L.Zhu) J.J.Atwood comb. nov. is therefore made here.

Deletions

Cephaloziella subtilis (Lindenb. et Gottsche) Steph., Hedwigia 32(5): 318. 1893.

≡ *Jungermannia subtilis* Lindenb. et Gottsche, Syn. Hepat. 5: 685. 1847.

TYPE: Mexico. Sempoaltepec, F. Liebmann s.n. (holotype: W 0259176!).

This report was erroneously made by Dauphin and Grayum (2005), Dauphin (2005), and Dauphin et al. (2025) based on *G. Dauphin* and *M. Grayum* 3271 (CR), and *G. Dauphin* and *M. Grayum* 3272 (CR, W), specimens which belong to an unidentified species of *Cylindrocolea* R.M.Schust. *Cephaloziella subtilis* is so far known only from Mexico (Fulford, 1976).

Examined specimens: Mexico. Puebla, A. J. Sharp et al. 4865 (TENN).



Cylindrocolea rhizantha (Mont.) R.M.Schust., Nova Hedwigia 22: 175. 1972.

≡ *Jungermannia rhizantha* Mont., Hist. Phys. Cuba, Bot., Pl. Cell.: 454. 1842.

TYPE: CUBA. Without locality, *O. Swartz s.n.* (isotype: G 00114653).

Dauphin et al. (2006; 2022; 2025) erroneously reported this species from Barro Colorado Island, Panama, based on misidentified specimens of *Kymatocalyx rhizomaticus* (Herzog) Gradst. & Váňa (Dauphin 3108, 3152 (CR)). The record of *C. rhizantha* from Panama should be deleted.

Correction

Lejeunea flaccida Lindenb. et Gottsche, Syn. Hepat. 5: 758. 1847.

TYPE: MEXICO. Without locality, IV.1841, *F. Liebmann s.n.* (isotype: G 00115659!).

According to Gradstein (2026), the correct name of this species is *Lejeunea caracensis* Lindenb., in Gottsche et al., Syn. Hep. 3: 355. 1845.

Discussion

An update of the generic and specific diversity of liverworts and hornworts in Central America is presented in Table 1. Besides the 34 new records added in this publication, 21 further records gathered from the literature have been summarized (Appendix). This sums a total of 133 genera and 856 species of Marchantiophyta, and 19 species in seven genera of Anthocerotophyta reported from Central America.

Among those, there are 45 species not known outside Central America (Dauphin et al., 2025). Dubious and rejected taxa sum up 92 epithets. There are no genera that are exclusive to the region, as previously signaled by Gradstein et al. (2001).

Based on their total genus and species numbers of Marchantiophyta, Costa Rica (129 gen., 656 spp.) and Panama (112 gen., 501 spp.) are the best bryologically explored countries in Central America, followed to a lesser extent by Guatemala (98 gen., 372 spp.). By comparison, the bryophyte diversity of Nicaragua (48 gen., 81 spp.), El Salvador (35 gen., 113 spp.) and Belize (54 gen., 121 spp.) is less completely known as more collecting and local bryologists are needed throughout these countries.

The study of specimens from upper montane and pristine alpine areas of the Cordillera de Talamanca brought new records of species previously known as endemic to the tropical Andes such as *Drepanolejeunea*

Table 1: Updated generic and species diversity of Marchantiophyta and Anthocerotophyta in Central America and Cocos Island.

Country	Anthocerotophyta		Marchantiophyta	
	Genera	Species	Genera	Species
Guatemala	3	3	98	372
Belize	1	1	54	121
Honduras	1	1	70	190
El Salvador	0	0	35	113
Nicaragua	1	1	48	81
Costa Rica	7	13	129	656
Panama	7	14	112	501
Cocos Island	1	1	44	125
Central America	7	19	133	856



cutervoensis (Loitl.) Grolle, *Isotachis obtusa* Steph., and *Jensenia florschuetzii* Gronde (Gradstein, 2021).

Specimens collected in the Costa Rican seasonal forest and Central American dry forests (Dinerstein et al., 1995; 2017) represent new records for Central America of species characteristic of dry areas in the Neotropics, such as *Cylindrocolea planifolia* (Steph.) R.M.Schust and *Microlejeunea globosa* (Spruce) Steph., as well as the second record of the rheophilous *Cephaloziella minutiloba* A.M.Sierra, Gradst. & Gudiño, a species recently described from Panama. Pristine Central American Dry Forest and Costa Rican Seasonal Moist Forest areas have practically disappeared, bryophyte collections from remanent forest patches are likely to contain taxonomic novelties.

Central America is one of the major liverwort diversity hotspots worldwide, only second to northern South

America (Gradstein et al., 2001). The species number reported for Central America (858 spp., 524 000 km²) now surpasses that reported from Colombia and Ecuador (850 spp. in 148 genera, 1 425 309 km², Gradstein, 2021). Each of those countries individually show higher species numbers than any Central American country (720 spp. each) but also have a greater surface area. An endemism of 3.5% is recognized for Ecuador and 6% for Colombia (Gradstein, 2021). In tropical countries, surface area and liverwort diversity may not be correlated.

As in any tropical region, Lejeuneaceae is the most species-rich family in the Central American countries (Fig. 8). Their proportion varies in every country depending on the level of exploration and the presence of higher elevation areas, varying from 35% (in Costa Rica and Guatemala) to 65% in Cocos Island. Lejeuneaceae are dominant

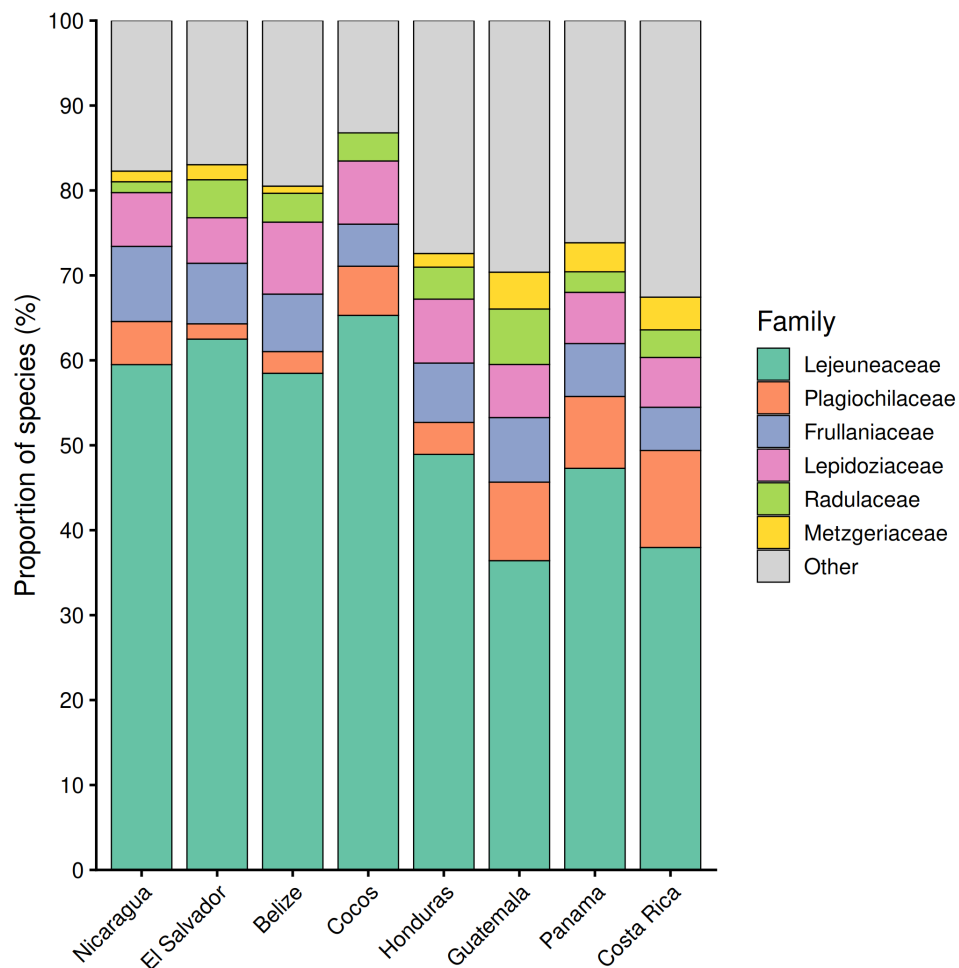


Figure 8: Species proportion of the main liverwort families in Central American countries.



in lowland areas, which explains their overly dominance in Nicaragua, Belize and Cocos Island, where they represent over 50% of the total flora. Cocos Island shows a probably “enharmonic” flora, where relatively few widespread species of Lejeuneaceae are dominant. However, the ubiquitous *Bryopteris filicina* (Sw.) Nees is curiously missing there. Except for the genera *Aneura* Dumort. and *Anthoceros* L., complex and simple thalloid liverworts such as Metzgeriaceae (Fig. 8) are missing on the island, probably due to insufficient collecting at exposed sites, and the lack of consistent collecting activities (collectors have visited the area only during the dry season). Other facts that point to inconsistent collecting activities is the lack of *Cyathodium* Kunze ex Lehm. in Central America excepting Costa Rica and Panama. This is also true for most genera of Anthocerotophyta. A similar phenomenon may be happening with the genus *Riccia* L.

The presence of *Lophozia guttulata* (Lindb. & Arnell) A.Evans and *Mesoptychia* (Lindb.) A.Evans only in Honduras and Guatemala, may point to Holarctic species distribution that reaches its southernmost limit in northern Central America (Gradstein and Váña, 1987). The occurrence of species of *Jensenia* Lindb., *Neesioscyphus* Grolle, *Pictolejeunea* Grolle, and *Verdoornianthus* Gradst, reaching Panama and Costa Rica, may indicate Andean and southern temperate elements in their northernmost limit. Detailed conclusions on the bryogeography of the Isthmus cannot be reached at this point, because of the limited exploration of northern Central America and of some specific ecoregions, such as the Central American Dry Forest, the Costa Rican Seasonal Moist Forest, the Central American Atlantic Moist Forests, and the Mangroves, a process that may yield new species records and species new to science.

There are 45 (5.25%) species not reported outside Central America (Dauphin et al., 2025), among which 13 species belong to the genus *Plagiochila* Dum., and 10 to the genus *Lejeunea* Lib. These genera require further taxonomic revision and work on extant herbarium collections, to reflect their actual diversity in Central America. In addition, taxonomic revision of species-rich genera such as *Lejeunea*, *Frullania* Raddi, *Radula* Dumort. and *Riccardia* Gray, would provide more accurate data on the actual diversity of

liverworts and hornworts in Central America. The species number in *Plagiochila* may be reduced, as in Colombia and Ecuador where the reported species number in that genus fell from over 200 to 65 accepted species (Gradstein, 2021). Further work on the genera *Riccardia*, *Frullania*, and *Radula* would probably result in an increase of the number of reported species. Since most of the bryophyte collections and studies in Costa Rica and Panama have been centered on the Talamancan Montane Forest, further work should focus on pristine areas of less explored ecoregions, such as the Costa Rican Seasonal Moist Forest, the Central American Dry Forest, the Central American Atlantic Moist Forest and the Miskito Pine Forests (Dinerstein et al., 2017), from where no bryophyte inventories are available.

Author contributions

Investigation: GD, DT, SRG, JA, AM; Formal analysis: GD, DT, SRG, JA; Writing – original draft: GD; Writing – review and editing: SRG, JA, DT; Visualization: GD.

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Data availability statement

The dataset supporting the results of this study was submitted to SciELO Data and can be accessed at: <https://doi.org/10.48331/SCIELODATA.RSN9QC>

Declaration of use of Artificial Intelligence

The authors declare that no artificial intelligence tools were used in the writing of this new and original text. All written content was produced directly by the authors.

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Appendix: Records of Marchantiophyta and Anthocerotophyta published from Central America not included in the Catalog of Liverworts (Marchantiophyta) and Hornworts (Anthocerotophyta) from Central America and Cocos Island (Dauphin et al., 2025).

Species	Country	Collection locality for representative specimens	Reference
1. <i>Anastrophyllum piligerum</i> (Nees) Steph.	Costa Rica	Guanacaste, Tilarán, Tronadora, 10°22'0.66"N, 84°49'29.532"W, 1415 m, 8.VI. 2023, D.B.L. Tucker 1739 (CR, UBC, USJ).	Wilbraham et al., 2025a
2. <i>Cephaloziella minutiloba</i> A.M.Sierra, Gradst. & Gudiño	Panama	Coclé, El Valle de Antón, Parque Acuático Chorro Las Mozas, Río Antón, 607 m, 8°35'33.4"N, 80°08'49.5"W, 4.XII.2018, J. Gudiño-L. 3504 (PMA, QFA, SCZ).	Sierra et al., 2025
3. <i>Ceratolejeunea fallax</i> (Lehm. & Lindenb.) Bonner	El Salvador	Miramundo, XI.1952, W. Lötschert s.n. (FR 0226194).	Winter and Schäfer-Verwimp, 2024
4. <i>Cheilolejeunea ornata</i> C.Bastos	Costa Rica	Guanacaste, Tilarán, Tronadora, 1404 m, 10°22'4.152"N, 84°49'31.692"W, 24.V.2023, D.B.L. Tucker 1676 (UBC, CR, USJ), D.B.L. Tucker 1677 (UBC, CR, USJ).	Ellis et al., 2024
5. <i>Frullania atrata</i> (Sw.) Nees ex Mont.	El Salvador	Miramundo, XI.1952, W. Lötschert s.n. (FR 0225570), (FR 0225814).	Winter and Schäfer-Verwimp, 2024
6. <i>Frullania brasiliensis</i> Raddi	El Salvador	Miramundo, 25.VI.1953, W. Lötschert s.n. (FR 0273715); San Vicente, XI.1952, W. Lötschert s.n. (FR 0226192) San Vicente - Miramundo, XI.1952, W. Lötschert s.n. (FR 273979).	Winter and Schäfer-Verwimp, 2024
7. <i>Frullania caulisequa</i> (Nees) Mont.	Costa Rica	Guanacaste, Tilarán, Tronadora, 1404 m, 10°22'4.152"N, 84°49'31.692"W, 24.V.2023, D.B.L. Tucker 1976.1 (UBC); 1403 m, 10°22'4.116"N, 84°49'31.908"W, 25.V.2023, D.B.L. Tucker 1797.1 (UBC), D.B.L. Tucker 2189.1 (UBC).	Wilbraham et al., 2025a
8. <i>Frullania convoluta</i> Lindenb. & Hampe	El Salvador	Miramundo, 25.VI.1953, W. Lötschert s.n. (FR 0226191).	Winter and Schäfer-Verwimp, 2024
9. <i>Frullania dulimensis</i> Uribe	Costa Rica	San José, Dota, Cerro de La Muerte, km 70, around Albergue Mirador de Quetzales, Finca Eddie Serrano, 9°38'36.2"N, 83°50',59"W, 2650 m, 5.III.2006, G. Winter 2961 (FR, JE), G. Winter 2966 (FR, JE).	Winter and Schäfer-Verwimp, 2023
10. <i>Frullania ericoides</i> (Nees) Mont.	El Salvador	San Vicente, III.1953, W. Lötschert s.n. (FR 0234993).	Winter and Schäfer-Verwimp, 2024
11. <i>Frullania gibbosa</i> Nees	El Salvador	San Vicente, III.1953, W. Lötschert s.n. (FR 0389020).	Winter and Schäfer-Verwimp, 2024
12. <i>Frullania montagnei</i> Gottsche	El Salvador	San Vicente, III.1953, W. Lötschert s.n. (FR 0226195).	Winter and Schäfer-Verwimp, 2024
13. <i>Frullania peruviana</i> Gottsche	El Salvador	San Vicente, III.1953, W. Lötschert s.n. (FR 0226193).	Winter and Schäfer-Verwimp, 2024



Appendix: Continuation.

Species	Country	Collection locality for representative specimens	Reference
14. <i>Herbertus juniperoideus</i> (Sw.) Grolle	El Salvador	Miramundo, XI.1952 (FR 0230919).	Winter and Schäfer-Verwimp, 2024
15. <i>Lejeunea caracensis</i> Lindenb.	Guatemala	Alta Verapaz, Cobán, 1600 m, III.1908, von <i>Türkheim s.n.</i> (lectotype: G 00047596).	Gradstein, 2026, synonymized <i>Taxilejeunea umbonata</i> Steph. with <i>L. caracensis</i> .
16. <i>Lejeunea caripensis</i> Lindenb. & Gottsche	El Salvador	San Vicente, III.1953, <i>W. Lötschert s.n.</i> (FR 0233994, FR 0233995).	Winter and Schäfer-Verwimp, 2024
17. <i>Lejeunea coilantha</i> (Herzog) Gradst. & G.E.Lee	Costa Rica	San José, Moravia, La Hondura, 1200-1500 m, <i>P. Standley 51801</i> (lectotype: JE 04002598 <i>Söderström and Hentschel 2023</i>).	Gradstein and Lee, 2026, transfer of <i>Taxilejeunea coilantha</i> Herzog to <i>Lejeunea</i> .
18. <i>Plagiochila diversifolia</i> Lindenb. & Gottsche	El Salvador	Miramundo, XI.1952, <i>W. Lötschert s.n.</i> (FR 0226199)	Winter and Schäfer-Verwimp, 2024
19. <i>Riccia fluitans</i> L.	Costa Rica	No specimen cited.	Evans, 1923
20. <i>Ricciocarpus natans</i> (L.) Corda	Costa Rica	Puntarenas, Parrita, Parrita, between Palo Seco and Damas, 6 m, 9°31'44.4"N, 84°15'52.7"W, 17.XI.2021, <i>R. Acuña C. et al. 2555</i> (USJ).	Acuña-Castillo et al., 2023
21. <i>Syzygiella trigonifolia</i> (Steph.) Herzog	Panama	Chiriquí, Baru Volcano National Park, 3261 m, 08°48'24.49"N, 82°32'45.86"W, 26.V.2025, <i>E. Rodríguez-Quiel et al. 1340</i> (UCH); 3276 m, 08°48'17.68"N, 82°32'41.78"W, 26.V.2025, <i>E. Rodríguez-Quiel et al. 1341</i> (UCH); 3473 m, 08°48'33.01"N, 82°32'34.33"W, 26.V.2025, <i>E. Rodríguez-Quiel et al. 1342</i> (UCH); 3359-3381 m, 08°48'21.74"N, 82°32'21.30"W, 27.V.2025, <i>E. Rodríguez-Quiel et al. 1343</i> (UCH), <i>E. Rodríguez-Quiel et al. 1344</i> (UCH).	Wilbraham et al., 2025b

