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*The Bryologist*, Vol. 94, No. 4. (Winter, 1991), pp. 401-403.

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*The Bryologist* is currently published by American Bryological and Lichenological Society.

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## An Undescribed Species of *Braunia* (Hedwigiaceae) from the Andean Cloud Forest

EFRAIN DE LUNA

Department of Botany, Duke University, Durham, NC 27706

WILLIAM R. BUCK

New York Botanical Garden, Bronx, NY 10458-5126

**Abstract.** *Braunia nephelogenes* is described from the sub-Andean cloud forest of Ecuador, Peru, and Bolivia. It is easily recognized by its long subulate leaves, narrow sinuose laminar cells, subglobose furrowed capsules, and multicellular spores. This species is epiphytic, unlike most other species in *Braunia* which are epilithic.

The Hedwigiaceae are mainly distributed in montane areas within the tropical regions of the world. The family includes pseudopleurocarpous mosses currently classified in the genera *Braunia* Schimp. in B.S.G., *Hedwigia* P. Beauv., *Hedwigidium* Schimp. in B.S.G., and *Pseudobraunia* (Lesq. & James) Broth. (De Luna, in prep.). These mosses are usually epilithic, the stems are sympodially branched, and the adventitious branches usually become stoloniferous (De Luna 1990a). The leaves are ecostate and the leaf cells are short-rectangular or elliptic, pluripapillose, and have sinuose walls. The capsules are eperistomate and contain unicellular rugulose spores. After dispersion, the spores germinate forming an exosporic globular protonematal phase (De Luna 1990b). *Braunia*, as traditionally circumscribed, is a genus of about 20 species with exserted capsules and low blunt leaf cell papillae (cf. Brotherus 1925).

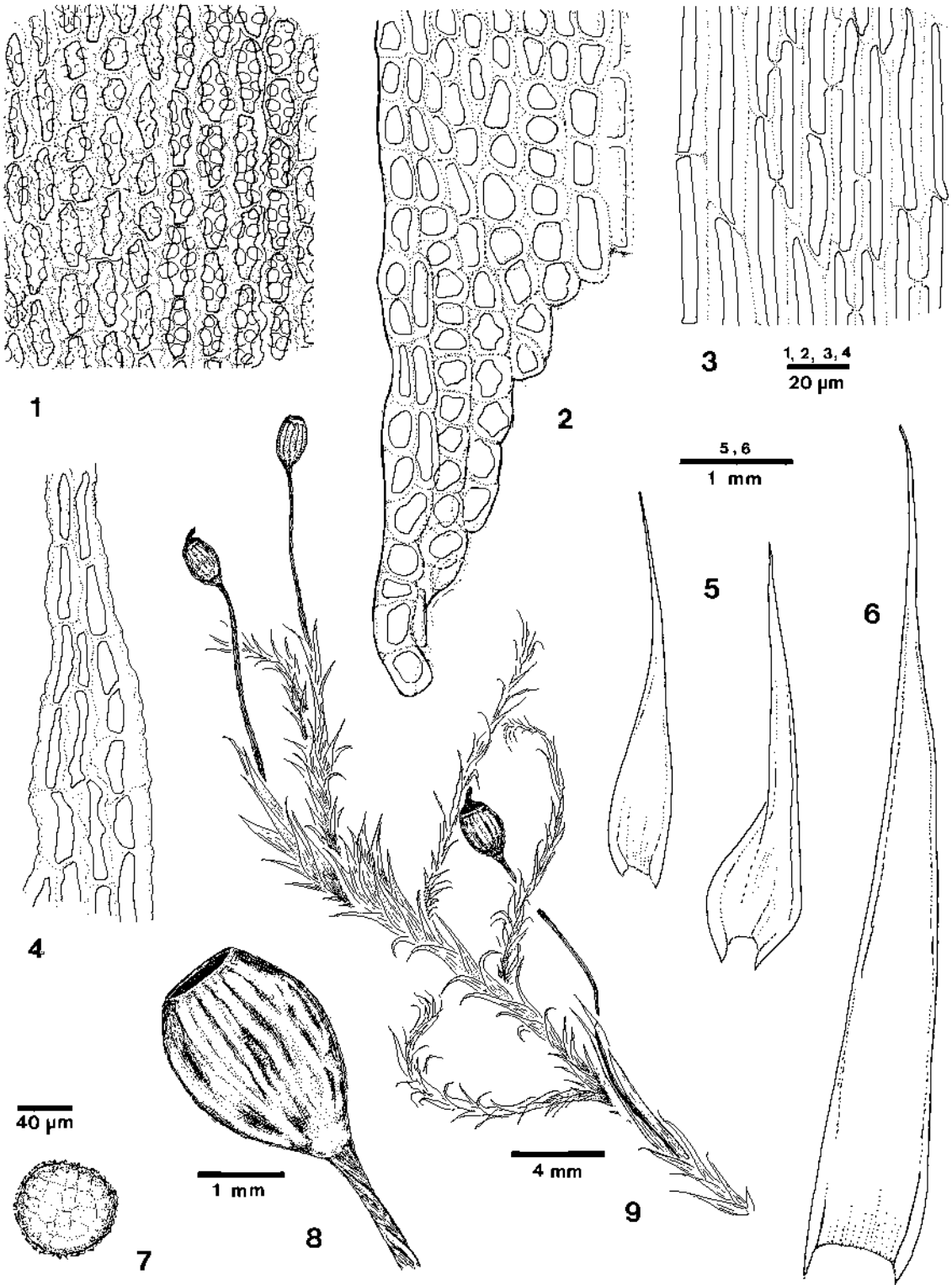
We discovered herbarium specimens collected in Ecuador and Peru that share characters found in species in the Hedwigiaceae, particularly those in *Braunia*. These specimens, however, revealed a unique combination of character states not found in any of the described species in the family. Later, one of us (De Luna) collected additional specimens of the new species in Ecuador and Bolivia. Morphological variation found in seven collections (plus duplicates) available to us was evaluated in relation to the variation found in all other known species in the Hedwigiaceae, as part of an ongoing world-wide taxonomic revision of the family (De Luna, in prep.). This evaluation suggests that these specimens represent a distinct previously undescribed species.

**BRAUNIA NEPHELOGENES** sp. nov. (FIG. 1-9)

Sect. *Macromidio* ob capsulas exsertas sulcatas pertinens; in illa sectione ob folia lanceolata in apicem capil-

laceum hyalinum gradatim longi-acuminata et ob setam ca. 9 mm longam; urceolum ca. 4 mm supra folia perichaetalia elevatantem notabilis.

Plants slender, in stiff, yellow-green to brownish mats; stems creeping to suberect, to ca. 8 cm long, sympodially branched, sympodia 6-20 mm long, adventitious branches erect, flexuose, to 20 mm long, often becoming stoloniferous; stem cross section with 3 rows of small reddish thick-walled cells surrounding 16-22 larger thinner-walled cells, central strand none; axillary hairs uniseriate, with a short rectangular brownish basal cell, and 2-5 hyaline apical cells; leaves erect with spreading to squarrose apices, little altered when dry, narrowly lanceolate, 3.2-3.6 mm long, gradually long-acuminate to subulate, ending in a uniseriate awn, concolorous or sometimes hyaline above, leaf base narrowly decurrent, with 2-3 weak to strong plicae; margins reflexed to recurved in lower 1/4, plane above, bluntly low-crenulate throughout; upper cells long-rectangular to narrowly elliptic, ca. 3-5:1, with sinuose-nodulose vertical walls as thick as or thicker than lumina, horizontal walls straight and much thinner than lumina, pluripapillose with low and blunt curved papillae; basal cells yellow toward insertion, longer and with nearly straight, thick porose walls; cells of decurrencies rectangular; alar cells subquadrate to subcruciform, smooth, ca. 10 cells wide below, extending up margins by ca. 40 cells. Autoicous, sympodia terminated by archegonia or antheridia, usually alternate; perigonal bracts ovate, ca. 1.4 mm long, abruptly acuminate but without a hair point, margins entire, cells at midleaf long-rectangular, thick-walled, porose, smooth, cells at upper shoulders subquadrate in alar-like patches; perichaetial leaves linear-lanceolate, to 6.3 mm long, gradually and slenderly long-acuminate, not hyaline-pointed, plicate, margins subentire, cells long-rectangular, to



FIGURES 1-9. *Braunia nephelogenes*. — 1. Median cells of the upper leaf lamina. — 2. Cells of alar region of leaf. — 3. Median cells of leaf base. — 4. Cells of the leaf apex. — 5. Leaves from distal portion of sympodium. — 6. Perichaetial leaf. — 7. Multicellular spore. — 8. Capsule. — 9. Habit showing sympodial branching system, adventitious branches, and sporophytes.

20:1, thick-walled, walls wider than lumina, porose, not sinuose, pluripapillose, papillae low and blunt, basal cells shorter, broader, thinner-walled and smooth. Setae (5-)7-9(-13) mm long, dark-red, twisted, foot ca. 1.5 mm long; capsules exserted, at least ca. 3-5 mm above perichaetial leaves, broadly cylindrical to turbinate when dry, subglobose when moist, 1.8-3.2 mm long, strongly furrowed with ca. 10 furrows; exothecial cells subquadrate, large, firm-to thick-walled, becoming smaller toward mouth; operculum low conic, rostrate, rostrum curved to perpendicular to capsule; eperistomate. Spores spherical, unicellular when immature, ca. 30  $\mu$ m diameter, finely papillose, becoming multicellular at maturity, ca. 60  $\mu$ m diameter; calyptrae slenderly campanulate when immature, cucullate at maturity, ca. 4 mm long, naked, lightly roughened above.

TYPE: ECUADOR. PROV. COTOPAXI: 3 miles W of Pilaló, on Quevedo-Latacunga road ca. 0°55'S, 78°55'W, 3,600 m, epiphyte on *Cavendishia*, in cloud forest, 24 May 1990, E. De Luna 1934 (holotype, NY; isotypes, DUKE, MO, QCA, US, XAL).

Other specimens studied.—ECUADOR. PROV. COTOPAXI: between Pilaló and Latacunga, De Luna 1931 (DUKE, QCA); W of Zumbahua, 4.9 km off Zumbahua-Corazon road, Dorr & Barnett 6265a (NY, QCA, QCNE n.v.); above Pilaló, Quevedo-Latacunga road, Holm-Nielsen et al. 3388 (AAU, MO, US). PERU. DEPTO. JUNIN: 56 km von Huancayo in Richtung Parihuanca, 14 km von Chilifruta, Hegewald & Hegewald 9275 (B, EPH n.v., NY). BOLIVIA. DEPTO. LA PAZ: near Tacacoma, Sorala-Mapiri road, De Luna 2061 (DUKE, LFB, NY); DEPTO. LA PAZ: near Chuma, Lewis 82-110 (LFB).

*Braunia nephelogenes* De Luna & Buck shares with other species of *Braunia* sympodial branching, long seta, rostrate operculum, cucullate calyptra, and low blunt leaf cell papillae. It differs from other species in the genus in the long slender lanceolate leaves (Fig. 5), gradually subulate acumen, upper and apical leaf cells long and strongly sinuose (Fig. 1, 4), and large perichaetial leaves (Fig. 6). Some individual characters occur in certain other *Braunia* species. For example, long narrow leaf cells have also been observed in *B. cirrhifolia* (Mitt.) Jaeg. and *B. attenuata* (Mitt.) Jaeg. Leaves of similar shape, but smaller, are also present in *B. attenuata*. Finally, multicellular spores (e.g., endosporic and endothelial mitosis) have been found in capsules of *B. exserta* C. Müll., *B. squarrolosa* (Hampe) C. Müll., and *B. attenuata*. All of these characters, however, are found together only in *B. nephelogenes*.

This new species is provisionally classified as a member of *Braunia* sect. *Macromidium* C. Müll.

The section, as circumscribed by Brotherus (1925), is characterized by shortly exserted elliptic furrowed capsules. The section has only two previously described species—*B. exserta* from Argentina and Bolivia (type of the section) and *B. rupestris* (Mitt.) Jaeg. from west Africa. Both of these species have short ovate to oblong-lanceolate leaves, and acute to shortly acuminate apices, markedly contrasting with the lanceolate slenderly acuminate leaves of *B. nephelogenes*. Furthermore, *B. exserta* has a shorter seta so that the base of the urn barely exceeds the perichaetium. In *B. nephelogenes*, the urn is elevated at least 3 or 4 mm above the perichaetium.

Another striking feature of *B. nephelogenes* is its epiphytic habitat in a cloud forest. Most other currently recognized species are saxicolous in mesic to xeric communities. Some species like *B. arbuscula* (Welw. & Duby) Gepp, *B. cirrhifolia*, *B. plicata* (Mitt.) Jaeg., and *B. squarrolosa* are also epiphytic, mainly on bases of trees and proximal branches. *Braunia nephelogenes*, however, grows on distal portions of high twigs of trees and tall shrubs like *Cavendishia* Lindley (Ericaceae). In Ecuador, Peru, and Bolivia *B. nephelogenes* has been collected only (thus its name) in the sub-Andean cloud forests (ceja de montaña), at elevations between 3,000 and 3,750 m. These forests can be quite humid because of frequent fog, but it is still possible that dryer conditions are common at the top of the trees.

#### ACKNOWLEDGMENTS

We are grateful to the curators of AAU, B, LFB, MO, and us for the loan of specimens, and to Lewis E. Anderson, Robert L. Wilbur, and two reviewers for useful suggestions to the manuscript. The first author (De Luna) also thanks the curators of QCA and LFB for their help while in Ecuador and Bolivia during May and June 1990. His field work in these countries was supported by a National Science Foundation doctoral dissertation grant (BSR 8914704). A predoctoral fellowship from CONACYT-México (52678, 1986-1989) is also appreciated.

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