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A new species of *Chalybea* (Blakeeae, Melastomataceae) from the Ecuador-Peru border

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Abstract

A new species, *Chalybea brevipedunculata*, from the Ecuador-Peru border is herein described and illustrated. It differs from all other species in the genus by having inflorescence peduncles that are shorter than their subtending leaf petioles.

Resumen

Se describe y se ilustra una nueva especie, *Chalybea brevipedunculata*, procedente de la frontera entre Ecuador y Perú. Se diferencia de todas las demás especies en el género por tener el pedúnculo de la inflorescencia más corto que los pecíolos de las hojas subyacentes.

Key words: *Chalybea*, Melastomataceae, Andes, Cordillera del Cóndor, endemic

Introduction

The genus *Chalybea* Naudin (1850 [1851]: 99) was originally described as monotypic with one species from Colombia. Triana (1871) reduced it to synonymy of *Pachyanthus* A. Richard (1845: 264), a Caribbean and Central American genus. Cogniaux (1891) followed Triana's classification, and corrected an orthographic error in the specific epithet. Wurdack established the genus *Huilaea* (Wurdack 1957: 106) that eventually grew to comprise eight species, all centered in the Andes of Colombia and Ecuador. Wurdack (1988) reestablished *Chalybea* and commented on its close affinity to *Huilaea*, and the distinctiveness of these two genera from *Pachyanthus*. A second species of *Chalybea* from Peru has been described (Morales-Puentes & Penneys, 2010: 28). Recent phylogenetic studies based on morphological and molecular data demonstrated that these two genera form a clade within an expanded concept of the tribe Blakeeae (Morales-Puentes 2010; Penneys & Judd, 2011, 2013a, b); furthermore, morphological and molecular phylogenetic analyses indicated (Penneys & Judd, 2013b) that *Chalybea* is nested within *Huilaea*, thus the latter was placed within the synonymy of the former (Penneys & Judd 2013a, Morales-Puentes & Penneys 2015, Penneys & Morales-Puentes 2015). *Chalybea* as currently understood is characterized by the terrestrial habit, foliar pin-wheel type acarodomatia, truncate monotelic synflorescences, flowers subtended by a single pair of narrow, caducous bracts, lenticellate hypanthia, pseudocampanulate corollas, laterally rounded anthers that are white to cream in color, and yellowish-green fruits with a thick, leathery exocarp. The genus comprises eleven species: seven are endemic to Colombia, three to Ecuador, and one to Peru. All are found in the Andes between 1975 and 3050 m, including one species that is restricted to the Sierra Nevada de Santa Marta, Colombia.

Explorations of the remote Cordillera del Cóndor in southern Ecuador have yielded interesting discoveries of new

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species and disjunct genera between these sandstone mountains and the highland table mountains or "tepuis" of the Guayana Shield some 3000 km distant in the northeastern corner of South America (in Melastomataceae for example, Ulloa Ulloa & Neill, 2006; Ulloa Ulloa *et al*. 2012). Specimens were collected during those expeditions that represent a previously undescribed species of *Chalybea* that is described herein. Acronyms of the herbaria follow Thiers (2015).

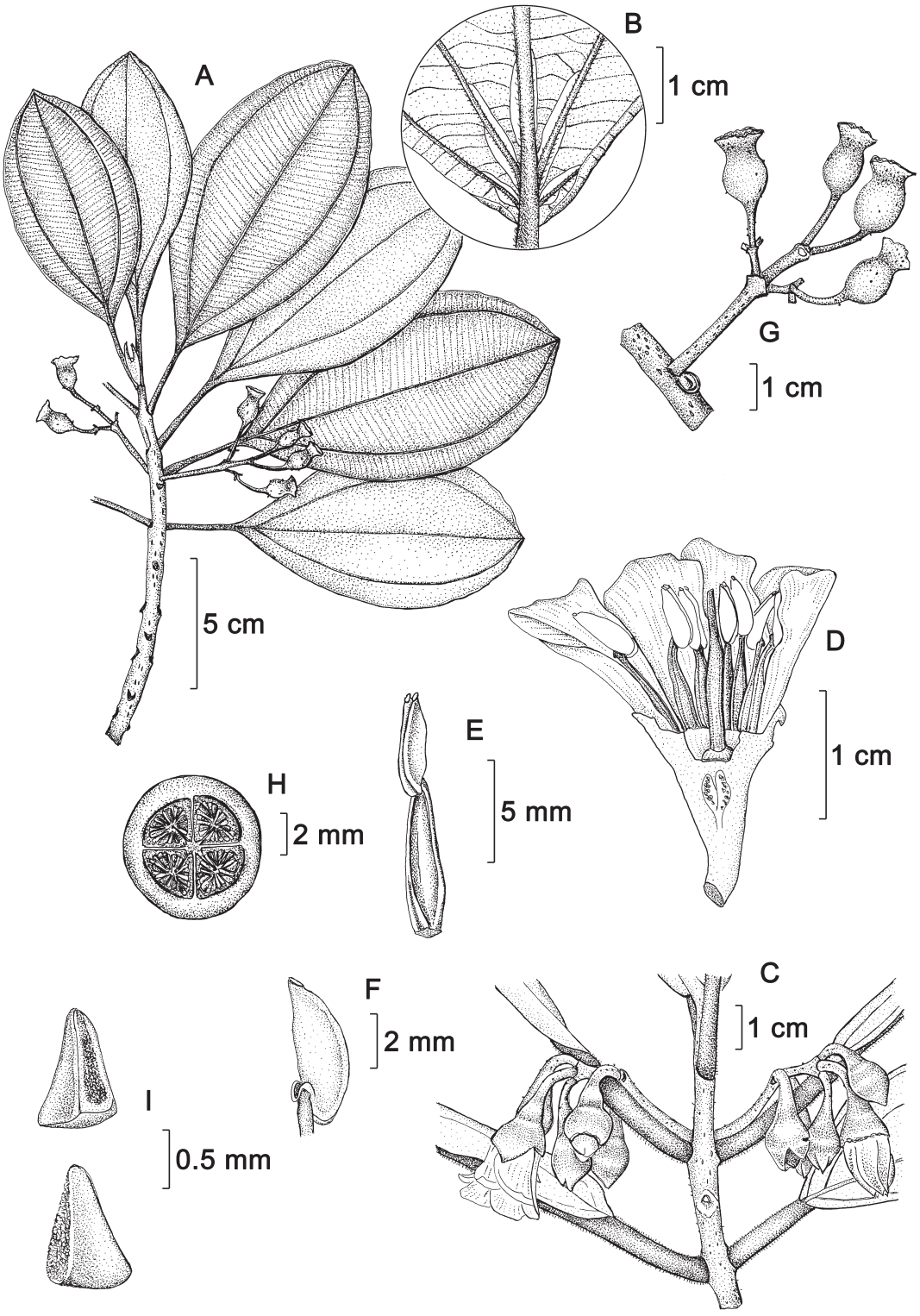

FIGURE 1. *Chalybea brevipedunculata*. A. Habit. B. Detail of acarodomatia on leaf's abaxial side. C. Inflorescence. D. Flower, longitudinal section. E. Stamen. F. Anther. G. Infrutescence. H. Fruit, cut horizontally. I. Seeds. (A–F from *Neill 16913*, G–I from *Rodríguez 2615*). Illustration prepared by A. L. Arbeláez.

Description of the new species

Chalybea brevipedunculata Penneys, C. Ulloa & D. Fernández, ***sp. nov.*** **(Fig. 1, 2)**

Type:—ECUADOR: Zamora-Chinchipe: Paquisha Cantón. Cordillera del Cóndor. The Machinaza Plateau, 03º54'06"S 78º28'57"W, 2315 m, 23 Jun 2009 (fl), *David Neill & Camilo Kajekai 16913* (Holotype: QCNE!; Isotypes: CAS!, MO!).

Diagnosis:—Differs from all other species of *Chalybea* by having inflorescence peduncles that are shorter than their subtending petioles.

Shrubs or small trees to 3 m tall; petioles, peduncle, pedicels, hypanthium, and young leaf shoots densely tomentose, glabrescent with age, the trichomes dendrictic, brown; stems elliptic to quadrangular in cross-section, strongly lenticellate, the lenticels elongate, whitish, up to 3 mm long. Petioles terete, ventrally canaliculate, 3–4 cm long, grayish-pink, lenticellate, glabrescent with age; leaves opposite and decussate, widely elliptic to slightly obovate, 10–17 × 4.5–8.5 cm, rigidly coriaceous, the apex widely obtuse to rounded, mucronate, the mucro to 4 mm long, the base acute, the margins remotely and inconspicuously crenate in distal 2/3, slightly revolute at base, adaxially green, glabrescent with scattered dendritic trichomes mostly on the nerves at the base; abaxially dull green, glabrescent to almost glabrous on the surface, with scattered dendritic trichomes mostly along the nerves; venation acrodromous, suprabasal, 5-nerved including thin submarginals, pinkish-red, immersed adaxially, raised abaxially, the tertiary veins close parallel, 2–4 mm in between, immersed above, raised below; acarodomatia 8 to 10, basilaminar on the abaxial leaf surface, narrowly tubular, formed by nearly overlapping, incurving, baso-lateral tissue flaps extending out from the midrib and secondary veins, up to 15 mm long on longer side. Inflorescences paired in upper leaf axils, up to 9-flowered, cymose, of compound dichasia terminating in dichasia, 6–7 cm long; peduncle 2–3 cm long, canaliculate, growing along the curvature of the subtending petiole, densely lenticellate similar to the stems; bracts caducous, not seen; pedicels 0.8–1.5 cm long, 2–3 mm thick, progressively thicker towards the hypanthium and conspicuously articulating with it, glabrescent, with whitish round lenticels, pendulous in flower and curving upwards as the fruit matures; flower buds glaucous, calyptrate, reddish-pink with green, with lenticels like the pedicel; flowers hexamerous, ca. 30 mm long at anthesis (incl. hypanthium); hypanthium narrowly campanulate to subglobose, ca. 9 mm long, reddish-pink distally with greenish, with sparse round lenticels; calyx tube 8 mm long, the united lobes forming a circumscissile, irregularly rupturing, partially to completely dehiscing calyptra; corolla pseudocampanulate, the petals spathulate, 12–15 × 10 mm, fleshy, pale greenish-cream with reddish apical margin at anthesis (buds with wider reddish margins), glossy, with marcescent lines, the apex short-cuspidate and strongly revolute; stamens 12, isomorphic, free, 10–15 mm long (incl. anthers); anthers narrowly elongate, narrowly ovoid, ca. 5 × 1.5 mm, basally narrow; pores 2, large, ovoid, ventrally inclined, ca. 0.2 mm; dorsal anther connective appendage suprabasal, knoblike and descending; filaments ca. 7 × 2 mm, wider at base; ovary inferior, 4-locular; style cylindrical, erect, glabrous, 10–15 mm long; stigma ca. 1 × 1.5 mm, with a shallow, central indentation. Fruit an urceolate berry with flaring irregular calyx rim with scattered round lenticels, sparsely tomentose, yellowish-green, the body ovoid to obovoid, 8–11 × 6–10 mm, the rim ca. 4 mm high; seeds pyramidal, angulate, 1–1.2 mm long, numerous, mostly smooth, glossy, the antiraphe side reddish-brown, minutely sculpted.

Additional specimen examined (paratypes):—ECUADOR: **Zamora-Chinchipe**: El Pangui, Cordillera del Cóndor. Destacamento militar "Cóndor Mirador", a 1 km al norte del destacamento, 03º37'41"S 78º23'42"W, 1975 m, 6 Sep 2003 (fr), *E. Rodríguez, D. Neill, W. Quizhpe, J. Homeier & C. Padilla 2615* (CAS!, COL!, HUT!, LOJA n.v., MO!, QCNE!).

Etymology:—The specific epithet refers to the short peduncles of the inflorescences, unique among all species of *Chalybea*. All other members of this genus have peduncles much longer than their subtending petioles.

Ecology and Distribution:—*Chalybea brevipedunculata* is known from two localities, 30 km apart, along the crest of the Cordillera del Cóndor in Zamora-Chinchipe province, Ecuador. Both sites are within a protected area, the Bosque Protector Cordillera del Cóndor, and are within 100 m of the international border between Ecuador and Peru. The Cordillera del Cóndor crest in this region, at about 2000–2400 m elevation, is composed of flat-topped table mountains of the Hollín sandstone formation. The northernmost population at "Condor Mirador is at the headwaters of the Río Tundayme; the southern population, on the Machinaza Plateau, is at the headwaters of the Río Machinaza; both rivers are tributaries of the Río Zamora. The sandy soil derived from the sandstone substrate is highly acidic and nutrient-poor (Neill 2005, 2007). The vegetation is a low, very dense shrubland, with shrubs generally less than 2 m tall. The level of floristic endemism is quite high and several species of locally endemic shrubs have been

described from the same two localities in recent years, including *Miconia machinazana* C. Ulloa & D.A. Neill (2012: 36) (Melastomataceae), *Clethra concordia* D.A. Neill, H. Beltrán & Quizhpe (2012: 213) (Clethraceae), *Weinmannia condorensis* Z.S. Rogers (2002: 183) (Cunoniaceae), *Ocotea limiticola* van der Werff (2014: 360) (Lauraceae) and *Lissocarpa ronliesneri* B. Wallnöfer (2004: 552) (Ebenaceae).

FIGURE 2. Inflorescences of *Chalybea brevipedunculata* (*Neill 16913*). Photograph by D.A. Neill.

Conservation Status:—*Chalybea brevipedunculata* is only known from two collections at the crest of the Cordillera del Cóndor. The Area of Occupancy (AOO) of the species is less than 10 km^2. Both localities are within a protected area, the Bosque Protector Cordillera del Cóndor, but this category of protection is of lesser status than a national park and the level of protection is more limited. Gold and copper mining operations are active at lower elevations in the region, but these activities do not substantially affect the vegetation on the sandstone plateaus at the highest elevations of the Cordillera del Cóndor. In Peru, just across the international border, the northern part of the Cordillera del Cóndor is within the Ichigkat Muja Cordillera del Cóndor National Park (Fig. 3). Since both known localities are very close to the border with Peru, it is likely that the new species also occurs in that country as well. Although nominally within a protected area, both populations of *Chalybea brevipedunculata* may be under threat by at least two factors: fire and climate change. The Machinaza Plateau, the type locality, was burned by a large fire, probably set deliberately, in the 1980s or early 1990s, as evidenced by the charcoal observed on the soil surface, and recurring fires could threaten this and other endemic plants on the plateau. Under a warming climate in future decades, the low shrub vegetation at the crest of the Cordillera del Cóndor at 2000–2915 m may be replaced by the dense forest vegetation that is currently found on the sandstone plateaus at 1500–1800 m. Under this scenario, the endemic shrub species at the crest of the Cordillera will not be able to migrate upslope, because there are no higher sandstone plateaus, except at the summit of Cerro Plateado, 120 km further south on the Ecuador-Peru border, the only sandstone plateau of the Cordillera del Cóndor above 2400 m elevation, with its summit reaching to 2915 m. *Chalybea brevipendunculata* was searched for, but not found, on the shrubland vegetation of Cerro Plateado during the first scientific expedition there in 2012. Given our current knowledge, the species is assigned a provisional IUCN conservation status of Critically Endangered (IUCN 2014).

Taxonomic relationships:—*Chalybea brevipedunculata* readily differs from all other species in the genus by the inflorescence peduncles that are shorter than the subtending leaf petioles; all other known species of *Chalybea* have peduncles that are mostly much longer than the adjoining petioles. *Chalybea brevipedunculata* and *C. calyptrata*

(Penneys & Morales-P.) Penneys & Morales-Puentes (2015: 4) are the only members of this genus known to have irregularly rupturing, calyptrate calyces. These two taxa differ by the petals externally greenish, only reddish apically (vs. externally crimson red), inflorescences of second order with up to 9 flowers (vs. fourth order and up to 17 flowers), inserted style (vs. exerted), acarodomatia glabrescent (vs. densely pubescent), leaf margin inconspicuously crenate (vs. dentate) abaxial surface of leaf glabrescent to almost glabrous (vs. densely tomentose). Most species of *Chalybea* have 6-locular ovaries except 4-locular in *C. brevipedunculata* and *C. corymbifera* Naudin.

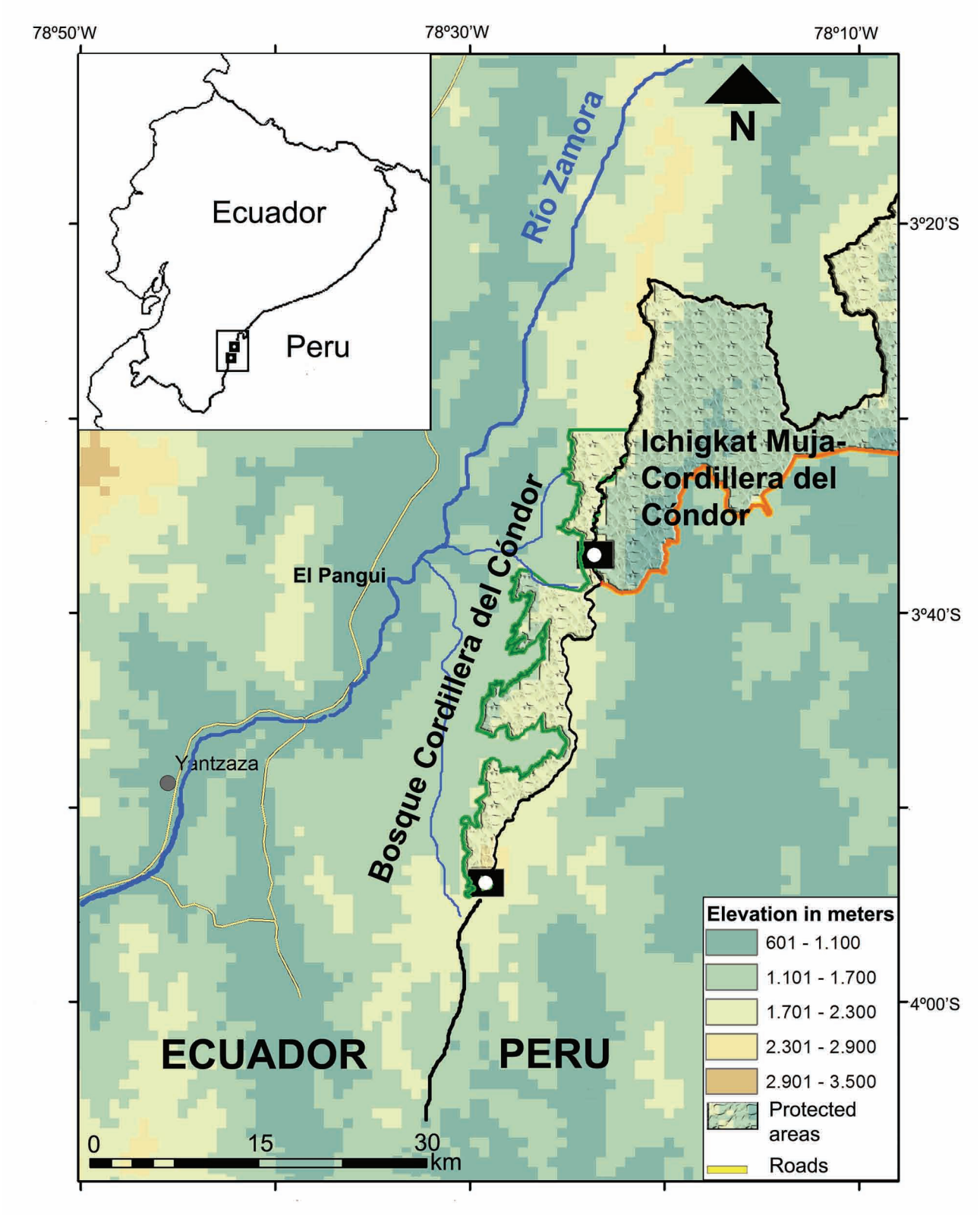

FIGURE 3. Distribution map of *Chalybea brevipedunculata* (white dot/black rectangle).

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