



## *Leptoscyphus revolutus* (Marchantiophyta, Lophocoleaceae) *sp. nov.* from Ecuador Notes on the Bryophytes of Ecuador III

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### Introduction

*Leptoscyphus* Mitten (1851: 358), a medium-sized genus of the Lophocoleaceae, is mainly distributed in tropical and temperate South America, Africa and Australasia, and is generally characterized by the brownish gametophyte colour and a laterally compressed perianth with a more or less bilabiate mouth due to the reduction of the ventral lobe (Vanderpoorten et al. 2010). 15 species are reported to occur in Ecuador (Gradstein & Benitez 2017). During revision of recent collections in the National Herbarium of Ecuador (QCNE) an undescribed species came to our attention which we here describe and illustrate.

### Taxonomic Treatment

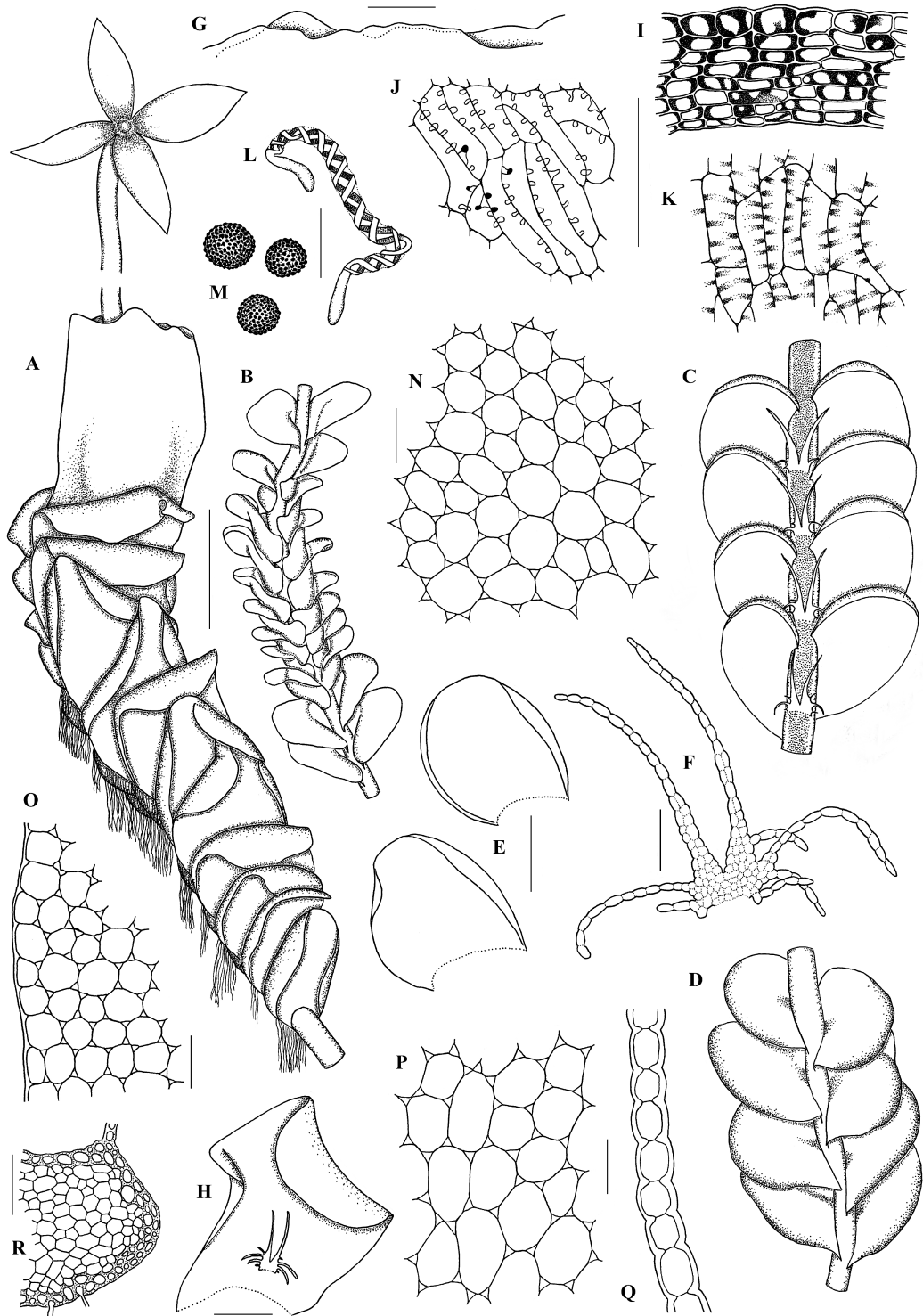
*Leptoscyphus revolutus* Burghardt, *sp. nov.* (Fig. 1)

**Diagnosis:**—*Leptoscyphus revolutus* is similar to *Leptoscyphus cleefii* Fulford (1976: 534) but differs by the edentate leaves, not expanded ventral leaf bases and edentate female bracts.

**Type:**—ECUADOR. Pichincha: Cantón Pedro Moncayo, Parroquia Tabacundo, Caldera of Volcán Fuya Fuya, 250 m SE of the shoreline of Laguna Grande, elev. 3807 m, 0°07'32"N 78°15'52"W, 11 December 2014, *V. Herrera VH 012* (holotype: QCNE-0246296! *c. spor.*, male).

Plants medium-sized, up to 3 cm long and 2.5–3 mm wide with leaves, light to deep brown, ascending to upright, in dense patches. Stems brown, sometimes light brown in upper parts, somewhat dorsoventrally flattened; near base ca. 250–300 × 200–250 µm thick, in cross section about 10–15 cells wide; the cortical cells in 1–2(–3) layers, moderately to distinctly thick-walled; medullary cells thin-walled, ca. 20–40 × 15–35 µm, without trigones. Branching sparse, lateral-terminal of the *Frullania*-type; rhizoids very numerous, in tufts at the undeleaf bases; tufts decurrent on stem, forming a dense tomentum. Shoots with imbricate foliation. Leaves widely spreading, strongly concave with ventral margins strongly recurved; ventral margin not decurrent; dorsal margin shortly decurrent; leaves broadly ovate, widest in the middle or below, somewhat asymmetric due to the strongly arched ventral margin, ca. 1.2–1.5 × 1.3–1.7 mm, 0.8–0.9 times as long as wide; leaf apex broadly rounded, plane; dorsal margin weakly arched outwards to almost straight, weakly to distinctly recurved; margin entire. Leaf areolation ± regular; cells in the centre of the upper leaf half isodiametric to slightly elongate with scattered cells shorter than wide, (17–)30–37(–43) × (20–)25–35(–43) µm, (0.7–)0.9–1.2(–1.3) times as long as wide; cells above leaf base isodiametric to slightly elongate, (35–)50–60(–65) × (35–)40–45(–50) µm, (0.9–)1.1–1.3(–1.7) times as long as wide; marginal cells gradually smaller, (20–)25–3(–33) × (20–)25–28(–30) µm, (0.7–)0.8–1.1(–1.2) times as long as wide; cell walls thin, trigones small, occasionally medium-sized, triangular with straight sides, intermediate thickenings absent, cuticle smooth. Oil bodies not observed. Underleaves small, ca. 1 mm long and 0.25 mm wide, about as wide as the stem, shortly to

moderately decurrent, not connected to lateral leaves, deeply bifid, to 0.9; underleaf lobes somewhat curved, longly ciliate from 4-5 cells wide base, subula made up of a row of up to 12 superimposed rectangular to elongate rectangular cells, lateral margins with a long ciliate, typically curved tooth, and additional 1-3 smaller ciliate teeth; insertion line almost straight to curved. Asexual reproduction not observed.



**FIGURE 1.** *Leptoscyphus revolutus*. A. Female shoot with sporophyte, lateral view. B. Part of male shoot, dorsal view. C. part of shoot, ventral view, area of rhizoids stippled. D. part of shoot, dorsal view. E. leaves. F. underleaf. G. Detail of perianth mouth H. Bract and bracteole. I. Cross section of capsule wall. J. Innermost layer of capsule wall, surface view. K. Capsule wall epidermis, surface view. L. Elater. M. Spores. N. Mid leaf cells. O. Cells of apical leaf margin. P. Basal leaf cells. Q. Cross section of leaf. R. Stem cross section. Scale bars: A-D 2 mm, E 1 mm, F 250  $\mu$ m, G 250  $\mu$ m, H 1 mm, I-K 100  $\mu$ m, L-M 25  $\mu$ m, M-Q 50  $\mu$ m, R 100  $\mu$ m. All drawn from VH 12 (QCNE).

Male plants somewhat smaller than female plants. Androecia becoming intercalary; bracts in up to 8 pairs, imbricate, in the transitional zone to leaves sometimes contiguous; opposite bracts in contact with each other dorsally to slightly overlapping; basal part of bracts strongly inflated, distal leaf-like part with entire margin; antheridia not observed. Gynoecia terminal on long shoots; subgynoecial innovations 1–3, occasional. Bracts similar to vegetative leaves but larger, about 3.5 × 3 mm, 1.2 times longer than wide; bract cells 45–90 × 35–45 µm, 1.1–2.2 times as long as wide; bracteoles similar to underleaves. Perianths cylindrical, basally covered by bracts, about 4.5 × 2.3 mm when fully developed, basally inflated, in the upper half laterally compressed with a dorsal and a ventral keel; perianth mouth truncate, margin edentate, undulate; perianth cells similar to leaf cells but somewhat larger and more elongate, 55–108 × 55–60 µm, 1–1.8 times as long as wide. Capsules longly exserted, subglobose; valves ca. 0.9–1.0 × 0.3–0.4 mm, deep brown, not twisted; epidermal cells in surface view wider than long to distinctly elongate, irregular, with 2–6 large nodulose thickenings on many walls; innermost cells in surface view elongate, irregular, with band-like thickenings on the longitudinal and a few transverse walls, opposite thickenings of longitudinal walls sometimes connected by slender coalescences on the radial walls; valves in cross section ca. 60–70 µm thick, 6–8-stratose, epidermal cells distinctly larger than inner ones, ca. 12–17 µm thick, inner cells ca. 7–10 µm thick. Spores ca. 15–29 µm, globose, unicellular, sporoderm baculate. Elaters ca. 110–150 µm long and 6–8 µm thick, bispiral, smooth.

**Habitat and distribution:**—*Leptoscyphus revolutus* is known from two localities on the volcanoes Fuya Fuya, in the border region of the Provinces of Pichincha with Imbabura, and Paschocha, Province of Pichincha. The holotype was collected in humid evergreen páramo forest and the paratype collection was made in upper montane forest. Judging from the collections and the label information the new species is able to grow in extensive populations as epiphyte on trunks and vigorous branches.

**Etymology:**—The name of the new species refers to the strongly recurved ventral leaf margin.

**Additional specimen examined (paratype):**—ECUADOR, Pichincha, Distrito Metropolitano Quito, Bosque Protector Paschocha, Caldera del Volcán, elev. 3600 m, 0°27'S 78°28'W, 19 January 1997, C. Cerón *et al.* 33592 (QCNE-178785! *c. per.*).

**Discussion:**—The laterally compressed perianth with two keels and the brown plant color place the new species in *Leptoscyphus*. In a recently published key to the species of *Leptoscyphus* for the northern Andes (Gradstein & Benitez 2017) it would key out as *L. amphibolius* Nees (1833: 334) Grolle (1963: 54) or *L. porphyrius* Nees (1845: 185) Grolle (1969: 3). However, *L. amphibolius* differs by plane to convex leaves lacking strongly recurved ventral margins, underleaves connate with lateral leaves, its U-shaped underleaf sinus and shorter, 3–5 celled uniseriate underleaf segments (Fulford 1976). *Leptoscyphus porphyrius* is easily separated by the plane to somewhat concave leaves without strongly recurved ventral margins, different leaf and underleaf texture with large, nodulose trigones and stellate lumina and underleaves usually connate with lateral leaves (Fulford 1976). On the other hand, *L. revolutus* is very similar to *L. cleefii* Fulford, with which it shares general habit, leaf and underleaf shape, curvature of the leaf margins, texture of leaves and underleaves with rather small trigones and rounded lumina, deeply divided underleaves with long ciliate segments and long ciliate additional teeth. *Leptoscyphus cleefii* differs from the new species by the dentate leaf margin, often rectangular marginal cells, expanded, semicordate ventral leaf bases and dentate female bracts (Fulford 1976). In addition, *L. cleefii* has different habitat preferences, growing on wet peaty soil in herbaceous páramo (Gradstein & Benitez 2017). If future studies, which preferably include molecular data, confirm a close relationship between *L. revolutus* and *L. cleefii* a broader definition of *Leptoscyphus* subgenus *Spinoscaphus* may be necessary to accommodate *L. revolutus*.

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