

Ecuadorella (Orchidaceae) – the underestimated diversity

Marta Kolanowska, Dariusz L. Szlachetko & Natalia Olędryńska

Summary: Two new species of *Ecuadorella*, *E. cuencae* and *E. stacyi*, are described and illustrated. The first novelty may be easily distinguished from *E. harlingii* by its lip middle lobe being less than twice wider than the lateral lobes, lip callus consisting of two semicircular appendages and obliquely triangular-ovate gynostemium wings. The second species differs from other species of the genus by the pandurate lip with a callus in the form of five fused digitate projections.

Keywords: biodiversity, Orchidaceae, *Ecuadorella*, taxonomy

The monotypic orchid genus *Ecuadorella* Dodson & G.A. Romero was described (DODSON & ROMERO 2010) to accommodate a single species, *Oncidium harlingii* Stacy, which has been previously placed within the section *Serpentia* (Christenson) Garay of the genus *Oncidium* Sw. The authors have found *O. harlingii* to be easily distinguishable from other oncioid genera by its stiffly erect rhizome, which does not become twining, and by the presence of numerous nodes, which are surrounded by scarious bracts. Based on molecular studies, WILLIAMS et al. (2001) placed *O. harlingii* within the genus *Otoglossum* (Schltr.) Garay & Dunst. and pointed to the elongate rhizomes present between pseudobulbs as the common character of both taxa. CHRISTENSON (2005) proposed to classify all species of *Oncidium* section *Serpentia*, including *O. harlingii*, as a separate genus *Brevilongium* Christenson. In the most recent molecular studies of NEUBIG et al. (2012), *Ecuadorella*, *Brevilongium* and *Otoglossum* s.str. were sisters one to another in the phylogenetic tree. The morphological differences between these genera have been recently evaluated by SZLACHETKO & KOLANOWSKA (2014).

The representatives of *Ecuadorella* are characterized by their rather straight, erect and woody rhizomes, which are dichotomously branching, with remote, obscure leafless sheaths. Pseudobulbs are unifoliate. The unbranched inflorescence is erect, usually 1–3-flowered. Flowers are showy, yellow with red-brown spots. The tepals are similar in shape and size and the lateral sepals are shortly connate. The lip is distinctively larger than other perianth segments, 3-lobed, with a triquetrous callus at the base. A prominent tabula infrastigmatica is present between the stigma and the lip base. The gynostemium is usually slightly arched or erect, rather delicate. Wings are obliquely subquadrate or obliquely triangular-ovate, with entire margins. The anther is subapical and incumbent. The clinandrium is obscured. The short rostellum is conical-digitate and obtuse in the middle with bilobulate remnant parts.

So far, plants of *Ecuadorella* have been found exclusively in east-central Ecuador growing at an elevation of about 1800–2500 m.

During a revision of the orchid material stored at AMES and MO, we came across two specimens of *Ecuadorella* which, based on morphological distinctiveness, are described here as new species.

New *Ecuadorella*

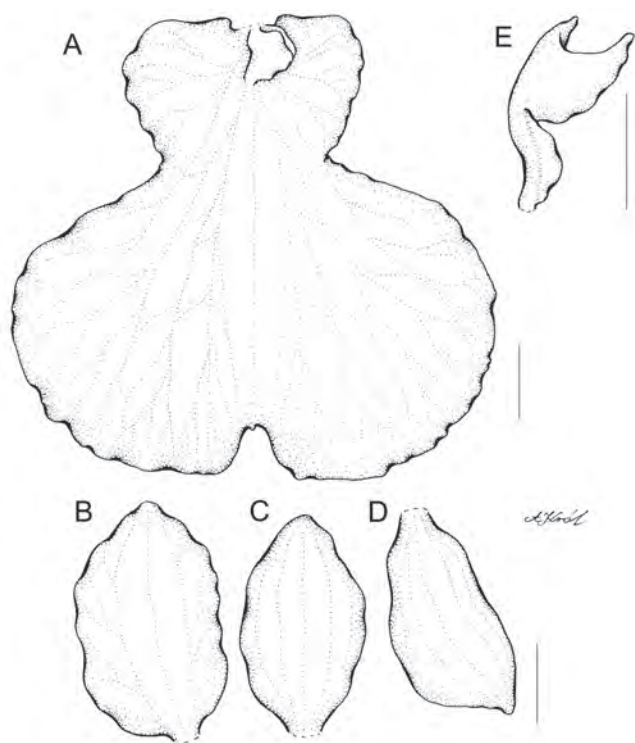


Figure 1. *Ecuadorella cuencae* (drawn by A. Król from the holotype). A – lip; B – petal; C – dorsal sepal; D – lateral sepal; E – gynostemium. Scale bars = 3 mm.



Figure 2. *Ecuadorella cuencae* (drawn by A. Król from the holotype). Habit. Scale bar = 6 cm.

***Ecuadorella cuencae* Kolan., Szlach. & Olędrz., sp. nov. (Figs 1–2)**

Type. Ecuador. *Dodson & al.* 17733 [Holotype: RPSC!; Isotypes: RPSC!].

Diagnosis. Species resembling *E. harlingii*, distinguished by its lip middle lobe being less than twice as wide as the lateral lobes, lip callus consisting of two semicircular appendages and obliquely triangular-ovate gynostemium wings.

Description. Pseudobulbs up to 1.8 cm long, 0.9 cm wide, unifoliate. Leaf petiolate, blade up to 7 cm long, 1.8 cm wide; petiole up to 0.7 cm long. Foliaceous sheaths up to 20 cm long, non-foliaceous sheaths numerous, non-imbricating. Inflorescence up to 30 cm long, 1-flowered. Flower yellow with red-brown spots on petals. Floral bract up to 8 mm long, verrucose externally. Pedicel and ovary up to 16 mm long. Dorsal sepal up to 8 mm long, 4 mm wide, elliptic, obtuse, 5-veined. Lateral sepals up to 8.5 mm long, 4 mm wide, obliquely elliptic, obtuse, 3-veined. Petals up to 9 mm long, 6 mm wide, oval-pentagonal, obtuse, 3-veined, lateral veins branching. Lip 19 mm long, 8.5 mm wide across lateral lobes, 12–14 mm wide across middle lobe, sessile, 3-lobed; lateral lobes 6 mm long, semicircular; middle lobe transversely elliptic in outline, apex bifid, shortly apiculate; lip margins crenate; basal callus in the form of small, semicircular appendages. Gynostemium about 5 mm long, wings obliquely triangular-ovate.

Etymology. In reference to the place of collection of the type specimen.

Distribution and habitat. So far, this species is known from the Andean region of the Ecuadorian province of Morona-Santiago and apparently it is locally common in this area. It grows terrestrially or epiphytically on mossy road embankment at an altitude of 2200–2500 m. Flowering occurs in January, February, March, May and November.

Noteworthy, the occurrence of *E. harlingii* has also been reported from this region of Ecuador. This pattern is not uncommon in orchid distribution. During field studies conducted in South America we found numerous orchid species belonging to the same genus growing together – just to mention representatives of *Phragmipedium* subgen. *Micropetalum* (*P. andreettae* P.J. Cribb & Pupulin growing together with *Phragmipedium fischeri* Braem & H. Mohr), species of *Epidendrum secundum* group, *Odontoglossum* (*O. costatum* Lindl. co-occurring with *O. cristatellum* Rchb. f.), or *Oncidium* (*O. chrysomorphum* Lindl. growing sympatrically with *O. pictum* Kunth).

Representative specimens. Ecuador: Morona-Santiago. Road from Limón (General Plaza) to Cuenca. Ca 15 km above Plan de Milagro. 3°0' S 78°30'–40' W. Alt. 2200 m. 19 May 1985. *B. Stein* 2836 [MO!]; Road Cuenca to Gualaquiza. 16 Feb. 1986. *A. Embree* 019 [RPSC!]; E of pass on road Cuenca to Limón. Alt. 2400 m. 20 Nov. 1989. *C. Dodson, N. Williams, E. Hagsater & M. Whitten* 17733 [RPSC!]; Road Cuenca to Limón via Gualaceo. Alt. 2200 m. 16 Feb. 1986. *A. Hirtz, C. Luer, J. Luer & A. Embree* 2758 [RPSC!]; Carretera Gualaceo-Limón pasando el Cordillera de la Cruz. Alt. 2500 m. 10 Mar. 1985. *C. Dodson, P. Dodson, C. Luer, J. Luer & A. Hirtz* 15804 [RPSC!]; Along road from Limón to Cuenca on E side of pass. Jan. 1989. *A. Hirtz* 4170 [RPSC!] (Fig. 3).

Notes. This species resembles *E. harlingii* (Fig. 4), from which it differs in terms of a series of morphological (both vegetative and floral) characters easily recognizable during careful examination. The lip middle lobe of the new entity is less than twice as wide as the lateral lobes (vs middle lobe about 3 times wider than lateral lobes), lip callus consisting of two semicircular appendages (vs callus triquetrous) and obliquely triangular-ovate gynostemium wings (vs wings rhombic). Additionally, both species are easily distinguishable as they produce either hysteranthous (*E. cuencae*) or synanthous (*E. harlingii*) pseudobulbs. In the first species, the long inflorescence is terminated by a single flower, at the base of which new pseudobulbs are formed at anthesis. In *E. harlingii*, a short inflorescence appears at the base of already existing pseudobulbs.

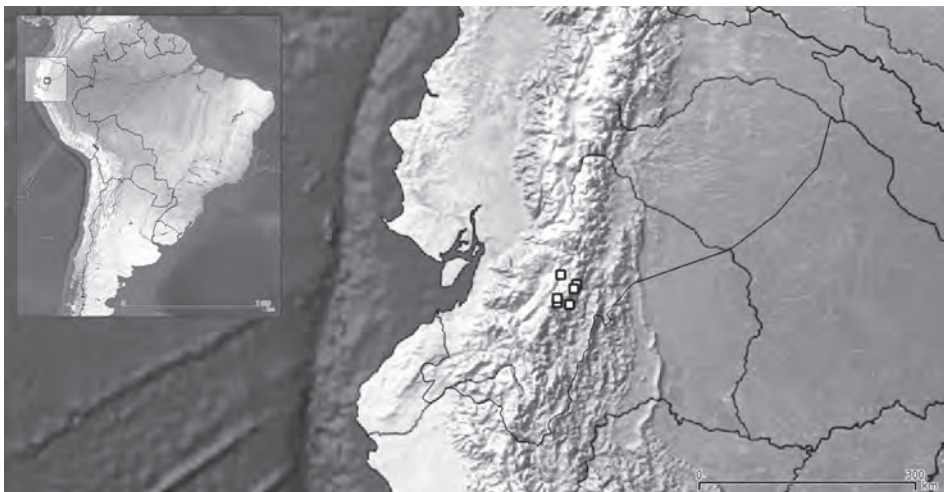


Figure 3. Distribution map of *Ecuadorella cuencae*.

New *Ecuadorella*

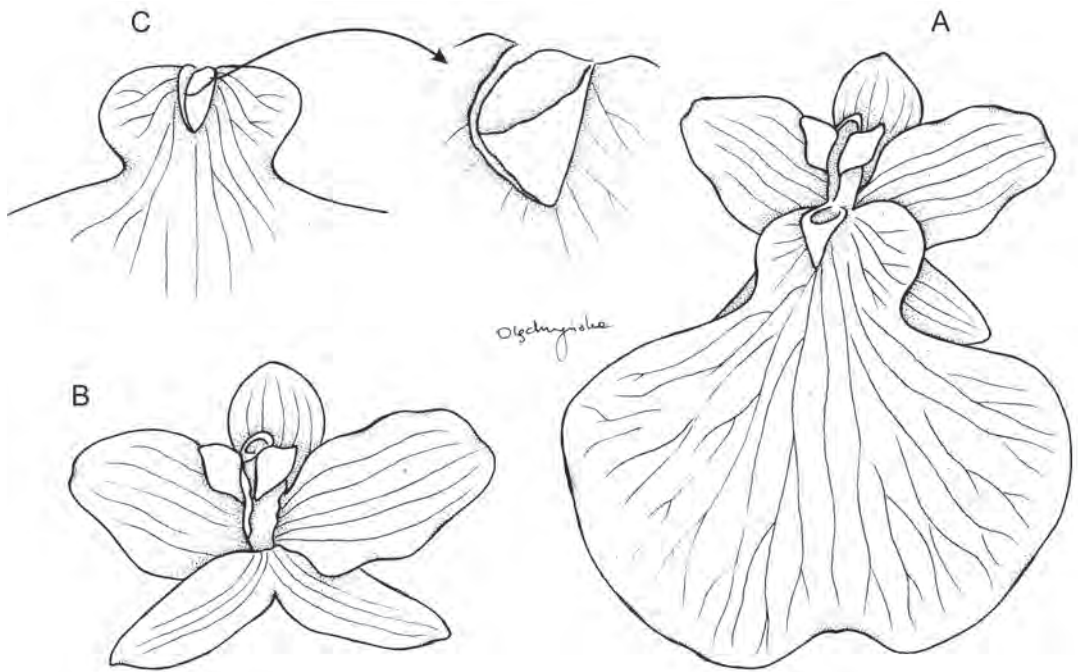


Figure 4. *Ecuadorella harlingii* (Fig. 4) – redrawn by N. Olędrzyńska from original illustration of *Oncidium harlingii* presented by STACY (1978). A – flower; B – tepals and gynostemium; C – basal part of the lip with callus.

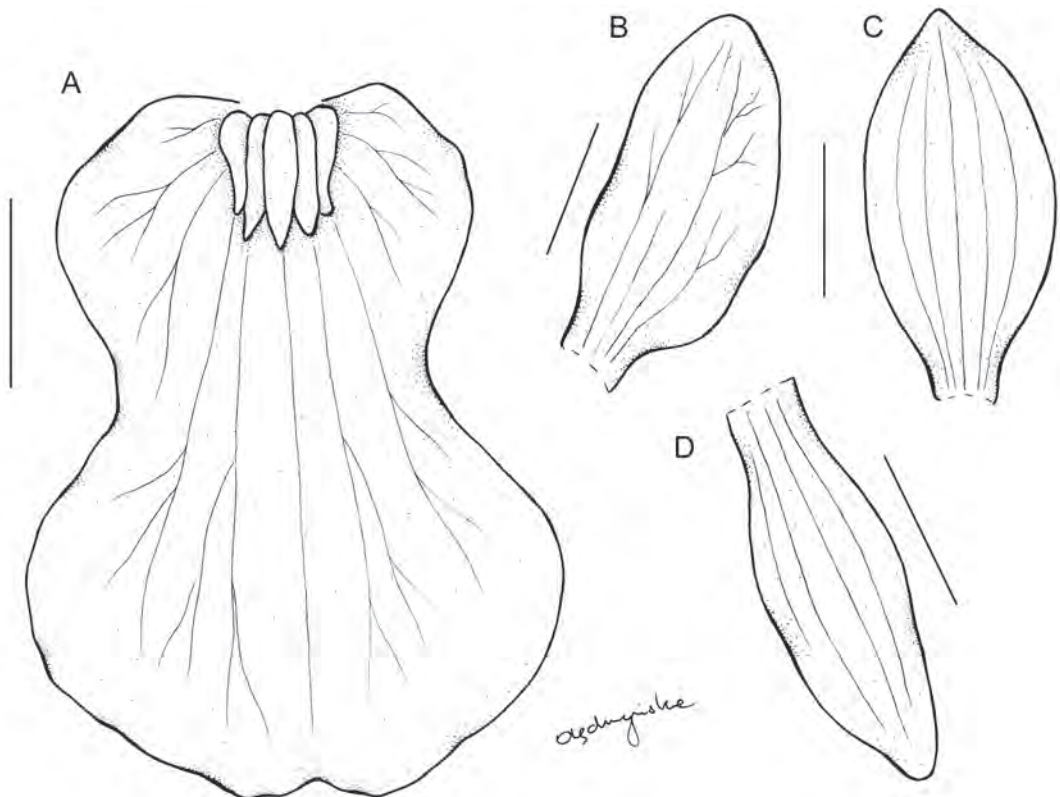


Figure 5. *Ecuadorella stacyi* (drawn by N. Olędrzyńska from the holotype). A – lip; B – petal; C – dorsal sepal; D – lateral sepal. Scale bars = 3 mm.

Ecuadorella stacyi Kolan., Szlach. & Olędrz., sp. nov. (Fig. 5)

Type. Ecuador. *J. Stacy s.n.* [Holotype: AMES! – flower in alcohol]

Diagnosis. Species distinguished by pandurate lip, with the middle lobe only slightly wider than lateral lobes with a callus consisting of five fused digitate projections.

Description. Vegetative characters not seen. Floral bract about 15 mm long. Pedicel and ovary 11 mm long. Dorsal sepal 7.8 mm long, 3.3 mm wide, elliptic above a minute claw, obtuse, 5-veined. Lateral sepals 7.6 mm long, 2.5 mm wide, obliquely oblong-elliptic, obtuse, 4-veined. Petals 8 mm long, 3.6 mm wide, obliquely ovate, obtuse, 4-veined, lateral veins branching in the apical parts. Lip 11 mm long, 6.5 mm wide across lateral lobes, 8.5 mm wide across middle lobe, sessile, 3-lobed; lateral lobes 4 mm long, semicircular; middle lobe transversely elliptic in outline, apex shortly bifid; basal callus consisting of five fused digitate projections extending up to about $\frac{1}{5}$ of the total lip length. Gynostemium about 5 mm long, wings obliquely triangular-ovate.

Etymology. Dedicated to the collector of the type specimen.

Distribution and habitat. No data.

Representative specimens. Ecuador: *Sine loc. J. Stacy s.n.* [AMES!].

Notes. This species is easily distinguished from both *E. harlingii* and *E. cuencae* by the lip being pandurate in outline (vs distinctly 3-lobed), with middle lobe slightly wider than lateral lobes (vs twice or more wider). Additionally, the lip callus of *E. stacyi* is composed of five digitate projections. In *E. cuencae* the callus consists of two semicircular appendages and in *E. harlingii* it is triquetrous.

Discussion

Representatives of Orchidaceae display an extraordinary floral diversity, with striking adaptations to different pollinators among close relatives (GIVNISH et al. 2015). Results from other plant groups indicate that variation in floral characters between species often have an oligogenic basis and directional selection drives phenotypic diversification (COZZOLINO & WIDMER 2005). Two models for orchid speciation have been offered. The first one suggests that phenotypic shifts could lead to attraction of different pollinators and to prompt sympatric speciation (RUDALL & BATEMAN 1992). The second hypothesis is a drift-selection model (TREMBLAY et al. 2005) which suggests that a low proportion of reproducing individuals combined with low gene flow among populations cause genetic drift that, combined with local episodic selection, can lead to diversification.

The intensive local radiation was detected in 2004 within the orchid genus *Teagueia* (Luer) Luer (JOST 2004). Until 1991, only six representatives of this taxon have been recognized (LUER 1991), but subsequent studies conducted in Río Pastaza watershed (Ecuador) revealed the existence of numerous new species of the genus (LUER 2000; JOST 2004; JOST & SHEPARD 2011, 2017). Four of them were found in one small section of a trail at 3100 m on Cerro Mayordomo (JOST 2004). In this case, speciation does not seem to be driven by adaptations to a variety of specific habitats but to different pollinators (JOST 2004).

We believe that the diversity of *Ecuadorella* requires further studies. The photograph of another specimen by Senghas (Fig. 6) shows a flower shaped like *E. harlingii*, but with irregular margin of gynostemium wings. Certainly, genetic studies would be helpful in establishing species delineation.

New *Ecuadorella*



Figure 6. Specimen of *Ecuadorella* photographed by K. Senghas in Azuay, Gualaceo-Limón, Alt. 2200 m. Jan. 1986 (Swiss Orchid Foundation at the Herbarium Jany Renz, Botanical Institute, University of Basel, Switzerland. URL: <https://orchid.unibas.ch/phpMyHerbarium/documents/47/608547m.jpg>).

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Addresses of the authors:

Marta Kolanowska
 Dariusz L. Szlachetko
 Natalia Olędrzyńska (corresponding author)*
 Department of Plant Taxonomy and Nature Conservation
 Faculty of Biology
 University of Gdańsk
 Wita Stwosza 59
 80-308 Gdańsk
 Poland
 E-mail: natalia.oledrzyńska@gmail.com*
 dariusz.szlachetko@gmail.com

Marta Kolanowska
 Department of Biodiversity Research
 Global Change Research Institute AS CR
 Běláidla 4a
 603 00 Brno
 Czech Republic
 E-mail: martakolanowska@wp.pl

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