A new record of Dryadella mocoa (Orchidaceae: Pleurothallidinae) from southeastern Ecuador

Marco M. Jiménez a,b,c, Luis Ocupa Horna b,d,e, Leisberth Velez-Abarca b,c and Luis E. Baquero b,f

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ABSTRACT
Dryadella mocoa which was hitherto thought to be endemic to Mocoa, Putumayo department in Colombia has now been reported for the first time in the lower montane forests of Zamora-Chinchipe province, southern Ecuador. A Lankester composite digital plate (LCDP), photos, taxonomic comments, and an updated description of the species based on the examined material is provided.

RESUMEN
Dryadella mocoa, que hasta ahora se pensaba era endémica de Mocoa, departamento de Putumayo en Colombia, ahora ha sido reportada por primera vez en los bosques montanos bajos de Provincia de Zamora Chinchipe, en el sur de Ecuador. Se proporciona una lámina digital compuesta Lankester, fotografías, comentarios taxonómicos y una descripción actualizada basada en el material examinado de la especie.

Introduction
In 1871 Reichenbach described in Pleurothallis the two first species of the future genus Dryadella: Pleurothallis ariculigera Rchb. f. and Pleurothallis aviceps Rchb. f.; those were subsequently transferred to Masdevallia. Reichenbach later in 1875 described another species of Dryadella as Masdevallia simula Rchb. f. In Woolward’s monograph of Masdevallia in 1896 Masdevallia obrieniana Rolfe and M. simula were placed in Reichenbach section Saltatices. In 1906 Alfred Cogniaux added five species to the future Dryadella. Kränzlin in 1925 included all species known at that time in section Rhombopetalae, except for Masdevallia illiputiana which he wrongly placed in his section Floribundae [1]. In 1978, Luer created the genus Dryadella, including species previously placed in Masdevallia and Pleurothallis [2].

Dryadella comprises [3,4] 59 species distributed in the Neotropics from Mexico to southern Brazil [1]. The genus is characterized by the transversely carinate sepals, multi-angled petals and the long-unguiculate lip [1]. In South America, Dryadella species have a disjunction distribution in the Andean and Atlantic regions, except for Dryadella ana-paulae V.P. Castro, B. P. Faria & A. D. Santana, and Dryadella osmiriniana (Braga) Garay & Dunst., found at intermediate biomes [5]. In Ecuador, 18 species of Dryadella are currently reported, distributed from 400 to 2000 meters of altitude; of which, Dryadella maryliniana is the most recently described species [8].

In his treatment of Dryadella, Luer [2] described Dryadella mocoa in honour of Mocoa, a community in southern Colombia. The type specimen was collected in the department of Putumayo by J.M. Serna in 1977 [2]. Currently, there appear to be no official records of D. mocoa outside Colombia. In the present work, new specimens were collected during a botanical expedition aimed to record the orchid flora of Zamora Chinchipe province in southeast Ecuador.

Materials and methods
The specimens of the reported species were cultivated at the Vivero de Conservación La Paphinia and the holotype and the examined specimen was deposited at the herbarium of the Universidad Técnica Particular de Loja (HUTPL). The type collection image obtained from SEL was consulted. The taxonomic revision of Dryadella by Luer [1] and the original description from the holotype of the related species [6] were consulted and compared to confirm the identity of the species. Photographs were taken with a Panasonic camera model FZ300 and a Raynox DCR-250 mm

CONTACT Marco M. Jiménez mjmjimenez473@gmail.com

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lens. The Lankester composite dissection plate was prepared using Adobe Photoshop® CC 2021. Measurements of the vegetative and floral parts were made from digital pictures of living material, using the ImageJ program [7,8].

Taxonomic treatment

Dryadella mocoana Luer & R. Escobar, Monogr. Syst. Bot. Missouri Bot. Gard. 103: 28, f. 31. 2005.

Type: Colombia, Putumayo, above Mocoa, collected by J.M. Serna, Aug. 1977, flowered in cultivation by M. & O. Robledo at La Ceja, 23 July 1978, C. Luer 2957 (SEL!). Epiphytic herbs, caespitose, up to 10.5 cm, large for the genus; roots slender, flexuous, 0.3–0.7 mm in diameter, white. Rami culas suffused with purple, sub-erect, mostly curved at the middle, verruculose-papillose, 7.4–18 × 1.1–1.8 mm, cylindrical, enclosed by 2–3 loose, tubular, papyraceous sheaths 3.2–10.4 × 1.2–3.0 mm. Leaves dark green suffused with purple in the midvein and edges abaxially, papillose-verruculose in both sides, erect to arcuate, coriaceous, the blade narrowly ob lanceolate to narrowly elliptical or narrowly linear-elliptical, acute to subacute, 4.2–8.7 × 0.7–1.0 cm, the midvein sulcate adaxially and carinate abaxially, margin entire, revolute, cuneate at the base into a short petiole, 7.2–8.9 × 1.2 mm, suffused with purple. Inflorescence a congested successively few-flowered, long pedicellate raceme, from low of the rami calis, borne by a slender peduncle, terete, 1.4–8.1 mm long; floral bracts 3, infundibuliform, membranaceous, 2.1–5.4 × 1.3–2.3 mm long; pedicels cylindrical, papillose, 6.5–8.2 × 0.5–1.2 mm; ovary brownish purple with green angles, 3–cristate, 1.9–2.2 × 3.0–3.9 mm, somewhat obconical, papillose-verruculose. Sepals pale greenish yellow variously marked with dark maroon spots, papillose, petals green or greenish yellow with dark purple marks, lip yellow splashed with mahogany or mahogany with yellow margin, column green with purple spots. Dorsal sepal ovate, subcarinate, 3–veined, concave, 4.0–4.5 × 8.5–9.0 mm including the tails, contracted into a thickened tail 1.7–2.1 × 0.7–0.8 mm, barely con nate to the lateral sepals to form a gaping sepaline cup, subacute. Lateral sepals connate at the base for 0.7 mm; the blades ovate, ribbed in the middle, 3–veined, oblique, unequal, 5.4–6.0 × 3.6–3.9 mm, con tracted into thickened tails 2.2–3.1 × 0.7–0.9, the base decurved with a transverse callus. Petals small, papil lose, translucent, dolabroform 3.2 × 2.5–2.8 mm with thickenings in the lower margin near the base, the apex broadly obtuse, the lower margin with a decurved, obliquely triangular and truncate lobe. Lip long-unguiculate, papillose, the blade subquadrate, 2.8–3.0 × 2.3–2.5, the apex rounded, reflexed, the base above the claw with a pair of subacute, retrose lobes, the disc with a pair of low calli below the middle, the claw broad 1.5–2.2 × 0.7–0.8 mm, bilobulate at the base, concave, hinged to the apex of the column-foot. Column subclavate, papillose 3.3–3.8 × 1.9–2.0 mm, hooded and denticulate at the apex, with two large, subacute, recurved, toothlike processes above the middle, 1.3 mm long, the foot 1.8–2.7 mm long. Anther papillose and stigma ventral, anther 0.9 mm long. Pollinia 2, yellow 0.7 mm long. Fruit a trialate, papillose capsule, 8.9 × 5.3 mm.

Examined material. Ecuador. Zamora Chinchipe, steep hills near Zamora, 4°05′57.37″ S, 78°58′19.11″ W, 1732 m, 13 Dec 2019, M. Jiménez 854 (HUTPL!) (Figure 1).

Distribution and habitat

Dryadella mocoana was known so far endemic for Colombia from the type specimen collected in the department of Putumayo [2]. Between 2019 and 2020, this species was collected at two locations in southern Ecuador, in the province of Zamora Chinchipe, widening its range of distribution and becoming the first record of the species for Ecuador. Currently, this species presents a discontinuous distribution and it is not excluded that could be also distributed along the Ecuadorian Amazon.

In the Zamora Chinchipe province, this species is found growing on tree trunks of lower montane forests between 1300 and 1700 m above sea level on the Amazonian slope of the Cordillera de los Andes. Two specimens were found at the steep hill-tops surrounding the town of Zamora with a ravine separating them. From the first specimen found herbarium material was prepared, the second specimen found at a lower elevation, was recorded with a photograph. The population of D. mocoana in Ecuador occurs in unprotected area not suitable for grazing and agriculture where selective timber extraction is common, hence it could be considered as threatened.

Phenology

This species has been observed with flowers from March to September.

Discussion

Dryadella mocoana is similar to Dryadella cuspidata Luer & Hirtz but differs from the latter by its wider sepals and shorter tails, the petals with a short and truncate process in the lower margin and the pair of taller and denticulate calli of the lip. The Ecuadorian specimens agrees well with the definition of D. mocoana in habit, foliage and flower size; meanwhile, the length of the peduncles and the
color of the petals and lip is variable. In the original description of Luer [2], the calli of the lip are mentioned to be denticulate; nevertheless, this feature was not observed in Ecuadorian plants but is similar to what is found in *D. cuspidata*. This morphological similarity does not suggest there is hybridization process between both species because they do not grow sympatrically and might be related to the geographical isolation of the known populations of *D. mocoana*.

*Dryadella mocoana* in Ecuador occurs sympatrically with orchids such as *Anathallis herpethophyton* (Schltr.) Luer, *Epidendrum Sophronitis* Linden & Rchb.f., *Masdevallia bicolor* Poepp. & Endl. and *Masdevallia empusa* Luer; and typical flora of the area represented by *Dacryodes uruts-kunchae* Daly, M.C.Martinez & D.A. Neill, *Clarisia biflora* Ruiz & Pav., *Drimys granadensis* L. f. and *Vochysia duquei* Pilg.
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Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Marco M. Jiménez http://orcid.org/0000-0002-9502-5651
Luis Ocupa Horna http://orcid.org/0000-0002-4904-1060
Leisberth Velez-Abarca http://orcid.org/0000-0003-3764-9682
Luis E. Baquero http://orcid.org/0000-0002-1444-5727

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