

***PLATYSTELE PAMELAE* (ORCHIDACEAE: PLEUROTHALLIDINAE), A NEW SPECIES FROM ECUADOR**

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ABSTRACT. A new species of *Platystele* from the cloud forests of Northern Ecuador is described and illustrated. *Platystele pamelae* is compared to *P. alucitae*, a species that is overall similar and has been found growing sympatrically. The morphology of the leaves, the shape of the sepals and the intense sulphur-colored oblong lip, easily separate *P. pamelae* from *P. alucitae* and all other species in *Platystele*. Taxonomical and ecological notes are given.

KEY WORDS: Ecuador, new species, *Platystele pamelae*, Pleurothallidinae

Introduction. The genus *Platystele* Schltr. (Orchidaceae: Pleurothallidinae) currently contains 111 species (Karremans 2016, Jost & Iturralde 2017). As initially proposed by Rudolf Schlechter in 1910, the species of this genus are characterized by small plants without pseudobulbs with very small to tiny flowers. The description was emended by Carlyle Luer in 1990, indicating also that most species exhibit caespitose habits, a ramicaul shorter than the leaf and free sepals. Certain species exhibit some of the smallest flowers in the orchid family such as *P. jungermannioides* (Schltr.) Garay, *P. enervis* Luer, *P. ornata* Garay, *P. tica* Karremans & Bogarín or *P. lycopodioides* Luer & Hirtz. The most recognizable trait of this taxon is the short, bilobed column and the firmly fixed lip to the rudimentary column-foot of the flowers (Luer 1990), and a pair of pollinia that lack caudicles and are united by a drop-like viscidium (Karremans *et al.* 2016).

The genus has a wide geographical distribution along the Americas, extending from Mexico, in the north, to Bolivia and Brazil in the south (Luer 1990). Ecuador, with 61 species, is considered the center of diversity for the genus (Jørgensen & León-Yáñez 1999, Dodson 2003, Dodson 2004, Ulloa & Neill 2005, Luer 2010, Baumbach 2011, Neill & Ulloa 2011, Jost & Iturralde 2017). The north-west of Ecuador, around the

village Maldonado, in the northern Carchi province, many species of *Platystele* can be found such as the widely distributed *P. caudatisepala* (C.Schweinf.) Garay and *P. examen-culicum* Luer, growing close to locally restricted, apparently endemic species like *P. delhierroi* Luer & Hirtz, *P. hirtzii* Luer and *P. adelphae* Luer & Hirtz. A recently discovered species from that area is described here (Fig.1).

Platystele pamelae* Baquero & Zuchan, *sp. nov. (Fig. 1–3).

TYPE: Ecuador. Carchi: between Chical y El Carmen, 0°49'96.0"N 78°12'78.9"W, 1836 m, collected by Luis Baquero *et al.* on February 8, 2016, *LB 3043* (holotype, QCNE).

DIAGNOSIS. *Platystele pamelae* is similar to *P. alucitae* Luer from which it differs by the elliptical (vs. narrowly elliptic-obovate), three-ribbed (vs. not ribbed) leaves, and the ligulate (vs. ovate), centrally sulcated (vs. lightly excavate centrally) lip.

Plant very small, epiphytic, densely caespitose, erect, up to 1.6 cm tall. *Roots* basal, slender, to 0.5 mm in diameter. *Ramicauls* terete, very short enclosed by two or three ribbed, imbricating sheaths. *Leaf* erect, coriaceous, petiolate, elliptical, to 7–16 mm long,

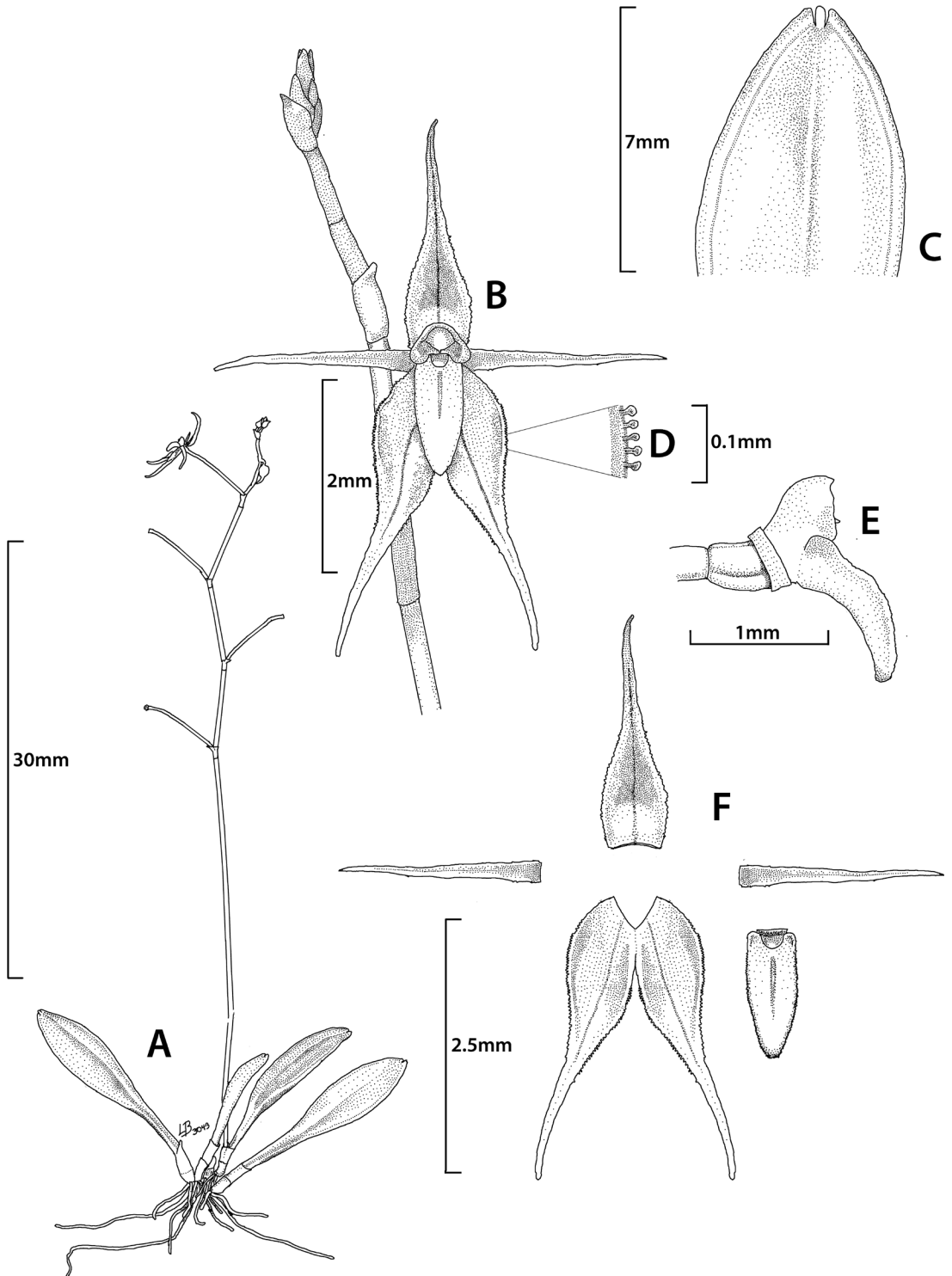
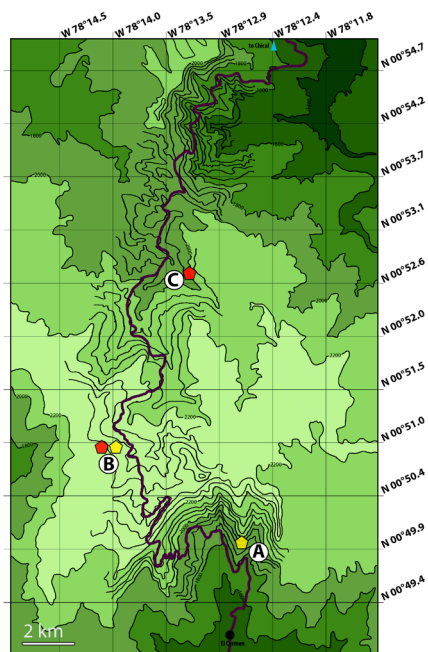


FIGURE 1. *Platystele pamelae* Baquero & Zuchan. A. Habit. B. Flower close-up. C. Leaf detail. D. margin of the lip close-up. E. Column and lip, lateral view. F. Dissected flower. (Drawn from the holotype.) Illustration by Luis Baquero.



Legend

	<i>Platystele alucitae</i>		2200 - 2400 m
	<i>Platystele pamela</i>		2000 - 2200 m
	~ km 26, 1836 m		1800 - 2000 m
	~ km 19, 2384 m		1600 - 1800 m
	~ km 14, 1978 m		1400 - 1600 m
	Roadway El Carmen and Chical		below 1400 m

FIGURE 2. Roadmap between El Carmen and Chical including the places where *Platystele pamela* (yellow) and *P. alucitae* (red) were found.

including a petiole 2–9 mm long, conduplicate, with two ribs parallel and close to the entire margin of the blade, mucronate apex, with an apiculus nested inside the leaf, 2.0–2.8 mm wide. *Inflorescence* loose, erect to suberect, terete, flexuous, distichous, successively few-flowered raceme with up to two translucent saffron-colored flowers, raceme up to 115 mm long; borne by a slender peduncle 11–25 mm long arising laterally from the ramicaul; *floral bracts* thin, acute, conduplicate, to 1 mm long; slightly deflexed pedicels 2.5–5.5 × 0.18 mm. *Ovary* smooth, short, ridged with 6 ridges, to 0.45 × 0.30 mm. *Sepals* translucent saffron-colored sometimes centrally suffused with lilac and intense sulphur-colored at the apex with clavate cilia at the margins, one veined, elliptical; *dorsal sepal* ovate and concave in the lower half or third, 1.6–2.6 mm long, with an acuminate apex, 0.6–

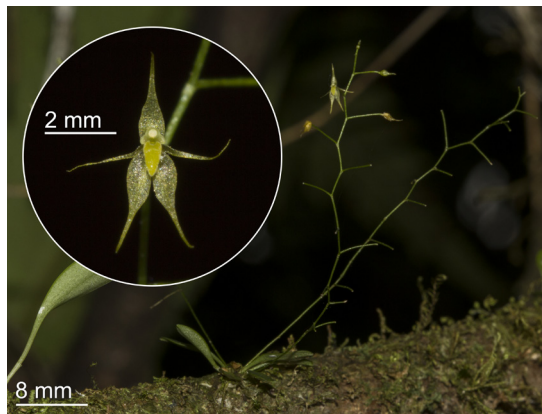


FIGURE 3. Habit of *Platystele pamela* in situ with close-up on the flower. Photograph by L. Baquero.

0.7 mm wide above the base; *lateral sepals* ovate with an acuminate apex, 2.7–2.8 × 0.6–0.7 mm; connate at the base to 0.4 mm. *Petals* translucent saffron-colored transitioning into intense sulphur-colored towards the apex, shortly ciliated at the margins; narrowly linear, filamentous, acute, long-acuminate, 1.7–2.4 × 0.2 mm. *Lip* sulphur-colored, thick, with short capitate cells, ligulate, obtuse, apex slightly deflexed, 0.80–0.90 × 0.37–0.45 mm, the disc with a centrally longitudinal sulcus beginning at the middle of the lip, sulcus 0.15–0.25 mm long, centrally horizontally curved down, the base truncate enclosing a circular shiny glenion, glenion 0.1–0.2 mm wide; fixed to the column-foot. *Column* straw-colored sometimes suffused with lilac, stout, semiterete, 0.5–0.6 × 0.6 mm, the stigma bilobed, the foot rudimentary. *Pollinia* not observed. *Fruit* a capsule, globous to short elliptical, six-ribbed; seeds not observed.

EPONYMY: The name was chosen to honor Pamela Yela, daughter of don Héctor Yela (Park Ranger of the Dracula Reserve in the Carchi Province), who was responsible of getting her father interested in orchids.

OTHER STUDIED MATERIAL: Flowers in alcohol from cultivated plants of the Jardín Botánico de Quito, collected the type locality, LB 3104 (paratype, QCNE).

DISTRIBUTION: Known from cloud forests of two locations at km 26 and at km 19 (from where the holotype comes) of the road Chical-El Carmen between 1836 m and 2310 m in elevation of Carchi Province, Ecuador.

HABITAT AND ECOLOGY: Many new species of orchids have been found in recent years along the road of Chical-El Carmen in the Carchi Province of Ecuador. This road is marked at each kilometer, from north to south. From south to north, this 29 km long road starts in El Carmen, where the road climbs abruptly to the highest point of the road at around 2400 m close to km 22, then over the next 11 km gradually goes down to 1900 m and then descends drastically in the further course until reaching Chical at 1000 m in elevation, on the border with Colombia (Fig. 2).

From south to north, the road climbs abruptly to nearly 1900 m at km 26, where the first population of *P. pamela* was discovered, growing sympatrically with other species of the subtribe Pleurothallidinae in a remaining cloud forest (holotype, Fig. 2-A). Then, the road keeps climbing to the highest elevation at 2384 m in elevation (close to km 22) where primary cloud forest, rich in *Dracula* species, can be found. Past the highest point, at km 19 *P. pamela* and *P. alucitae* were found growing sympatrically (Fig. 2-B). Further north, the road gradually descends to 1900 m. Here, extremely moist cloud forests remain close to km 14 where *P. alucitae* also grows among species of *Andinia* Luer (Luer), *Brachionidium* Lindl., *Dracula* Luer, *Lepanthes* Sw., *Masdevallia* Ruiz & Pav., *Porroglossum* Schltr., *Pleurothallis* R.Br., *Scaphosepalum* Pfitzer, *Specklinia* Lindl. and *Stelis* Sw., but *P. pamela* is not found (Fig. 2-C). Afterwards, the road descends more abruptly and is ending in Chical at 1000 m in elevation.

This road has been explored by the orchid specialists team of Ecominga Foundation since the road was first opened in 2008. *P. pamela* was always found growing on thin branches thickly covered by moss and lichens.

The strong resemblance and shared habitat with *Platystele alucitae* could indicate shared ancestry of those two species. Both species prefer similar environments. Morphologically both species share long inflorescences (Fig. 3), which, in case of *P. alucitae*, can reach up to 18 cm (Luer 1990), a translucent ovate dorsal sepal, which exhibits a concave indentation at the lower third and the connate, narrowly ovate lateral sepals (Fig. 4).

Nonetheless both species can be easily distinguished by the features of the leaves, inflorescence and flowers. *Platystele pamela* and *P.*

alucitae both show elliptical to narrowly elliptical-obovate leaves. The ribs in these two species is what distinguishes them from each other. While *P. alucitae* has a typical conduplicate leaf with one central rib, *P. pamela* has three-ribbed leaves, of which the outer two ribs are located closely to the entire margin of the leaf. Another distinguishing trait can be found in the slightly deflexed pedicels in the inflorescence of *P. pamela*, while those of *P. alucitae* are rather linear. The sepals with clavate cilia around the margins can be found in *P. pamela*, which are similar to those in *P. baqueroi* Jost & Iturralde, is another trait which distinguishes *P. pamela* from *P. alucitae*. Finally the ligulate, centrally deep sulcated and slightly deflexed, sulfur-colored lip distinguishes *P. pamela* from all other species in the genus *Platystele*, and clearly from the most similar species *P. alucitae*, which has an ovate, obtuse, lightly excavate centrally lip. *Platystele stevensonii* Luer shows the most similar lip to *P. pamela* in the genus, but which is just shallowly sulcated and does not exhibit any curvature. The differences in the form of lip and glenion between *P. pamela* and *P. alucitae* might indicate a reproductive specialization, especially useful considering the sympatric growth.

Materials and methods. The plants of *Platystele alucitae* and *P. pamela* were collected by the team of the Botanical Garden of Quito with the Environmental Research Permit No. 008-2016-IC-FLO-DNB/MA issued by the Environmental ministry of Ecuador (Ministerio del Ambiente del Ecuador).

These plants are cultivated by the Botanical Garden of Quito, where they, together with plants in alcohol, (*LB 3112, 3113*, type locality), were used for morphological comparisons.

Due to the minute size of plant and flowers, measurements were largely conducted on the basis of photos with a specific 10 mm ruler and the open source, image-processing program ImageJ (National Institutes of Health) downloaded from <https://imagej.nih.gov/> (Lind 2012).

The material was photographed with the ruler at the same focal distance. The photos were opened in ImageJ and 10 mm of the ruler were set as a scale (Fig. 4). The program calculates the number of pixels to the given unit, with which measurements were made.

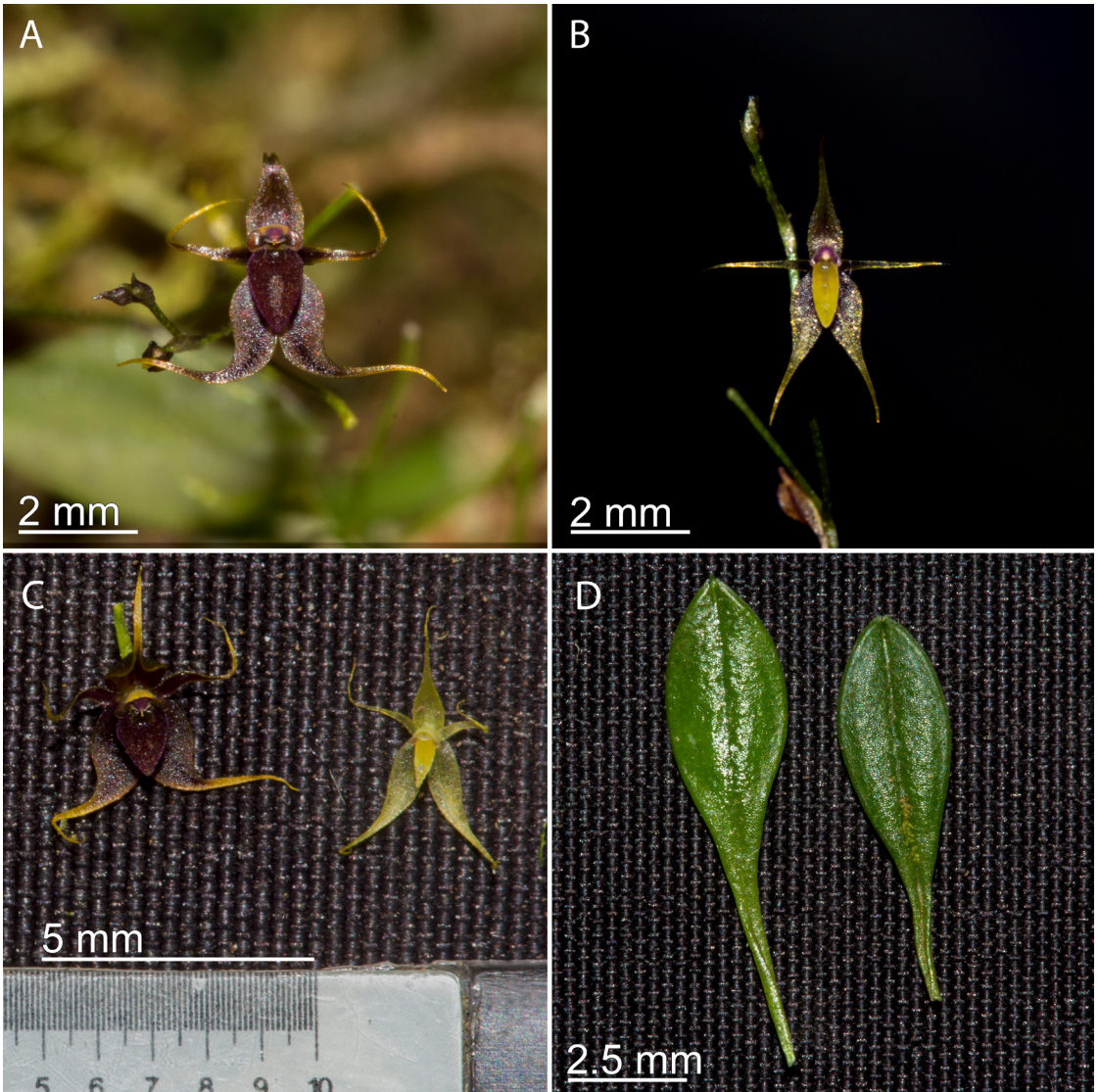


FIGURE 4. Comparison between *Platystele alucitae* Luer and *P. pamelae* Baquero & Zuchan. A. Flower of *P. alucitae* in situ. B. Flower of *P. pamelae* in situ from the same region. C. Direct comparison of the flowers of *P. alucitae* (left) and *P. pamelae* (right). D. Comparison of leaves from *P. alucitae* (left) and *P. pamelae* (right).

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they are cut down. Finally, we are grateful to the Editor and the anonymous reviewers for suggestions on the manuscript.

LITERATURE CITED

- Baumbach, N. (2011). *Pleurothallis rubella* Luer 1977. *Die Orchidee* (Hamburg), 62(3), 230–231.
 Dodson, C. H. (2003). *Native Ecuadorian Orchids IV: Oncidium – Restreplopsis*. Quito, Ecuador: Imprenta Mariscal.

- Dodson, C. H. (2004). *Native Ecuadorian Orchids V: Rodriguezia-Zygosepalum*. Quito, Ecuador: Imprenta Mariscal.
- Jost, L. & Iturralde, G.A. (2017). A showy new *Platystele* (Pleurothallidinae: Orchidaceae) from Northwest Ecuador. *Lankesteriana*, 17(1), 55–60.
- Jørgensen, P. M. & Leon-Yanez, S. (Eds.). (1999). *Catálogo de las plantas vasculares del Ecuador, Volume 75*. St. Louis: Missouri Botanical Garden Press.
- Karremans, A. P., Albertazzi, F. J., Bakker, F. T., Bogarin, D., Eurlings, M. C., Pridgeon, A., Pupulin, F. & Gravendeel, B. (2016). Phylogenetic reassessment of *Specklinia* and its allied genera in the *Pleurothallidinae* (Orchidaceae). *Phytotaxa*, 272(1), 1–36.
- Karremans, A. P. (2016). *Genera Pleurothallidarum: an updated phylogenetic overview of Pleurothallidinae*. *Lankesteriana*, 16(2), 219–241.
- Lind, R. (2012). *Open Source Software in Life Science Research: Practical Solutions in the Pharmaceutical Industry and Beyond*. Abington, Cambridge UK: Woodhead Publishing Ltd.
- Luer, C. A. (1990). Icones Pleurothallidarum. VII. Systematics of *Platystele* (Orchidaceae). *Monographs in Systematic Botany from the Missouri Botanical Garden*, 38, 1–132.
- Luer, C. A. (1994). Icones Pleurothallidarum. XI. Systematics of *Lepanthes*, subgenus *Brachycladium*, and *Pleurothallis*, subgenus *Aenigma*, subgenus *Elongatia*, subgenus *Kraenzlinella*; Addenda to *Dracula*, *Lepanthopsis*, *Myoxanthus*, *Platystele*, *Porroglossum*, and *Trisetella*. *Monographs in Systematic Botany from the Missouri Botanical Garden*, 52, 121.
- Luer, C. A. (2010). Icones Pleurothallidarum XXXI: *Lepanthes* of Bolivia. Systematics of *Octomeria* species north and west of Brazil. *Monographs in Systematic Botany from the Missouri Botanical Garden*, 120, 145.
- Neill, D. A. & Ulloa, C. U. (2011). *Adiciones a la flora del Ecuador: segundo suplemento: 2005–2010* (p.126). Quito, Ecuador: Fundación Jatun Sacha.
- Ulloa, C. U. & Neill, D. A. (2005). *Cinco años de adiciones a la flora del Ecuador: 1999–2004* (p.42). St. Louis: Missouri Botanical Garden Press.