Phytotaxa 375 (3): 235–242
http://www.mapress.com/j/pt/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

https://doi.org/10.11646/phytotaxa.375.3.6

A new *Platystele* (Orchidaceae, Pleurothallidinae) from the western mountains of Colombia

GUILLERMO A. REINA-RODRÍGUEZ[1] & ADAM P. KARREMANS[2]
[1] *Department of Geography, Universidad del Valle, Cali, Colombia. Av. Pasoancho 100-00, Cali, Colombia; e-mail: reirodriguez6@gmail.com*
[2] *Lankester Botanical Garden, University of Costa Rica. P.O. Box 302-7050 Cartago, Costa Rica.*

Abstract

A new species of miniature orchid, *Platystele riograndense,* endemic to the Pacific slope of the western Cordillera, Municipality of Restrepo, Valle del Cauca, Colombia, is described and illustrated. *Platystele riograndense* is similar to *P. filamentosa*, but the new species has wider leaves, denser and shorter inflorescences and sigmoid (versus convex) lip. Ecological notes are provided. It is the second new species described of Canyon of Rio Grande new protected area in the last four years.

Resumen

Se describe e ilustra una nueva especie de orquídea miniatura *Platystele riograndense* endémica de la vertiente pacífica, de la cordillera occidental, Municipio de Restrepo, Valle del Cauca, Colombia. *Platystele riograndense* es similar a *P. filamentosa*, pero la nueva especie tiene hojas mas anchas, inflorescencias mas densas y cortas y labelo sigmoide (versus convexo). Notas ecológicas son aportadas. Se trata de la segunda nueva especie descrita para la nueva área protegida canón de río Grande en los ultimos cuatro años.

Key words: Río Grande canyon, Valle del Cauca, Dagua, Colombia, *Platystele filamentosa,* taxonomy

Introduction

The exclusively Neotropical genus *Platystele* Schlechter (1910: 565) (Orchidaceae: Pleurothallidinae) currently includes about 110 species (Karremans *et al*. 2016). Eighty percent of these have been described since Luer's first monograph on Pleurothallidinae in 1975 (Karremans & Davin 2017). The recent publication of additional novelties in the genus is highly indicative that its diversity is still far from fully understood (Baquero & Zuchan 2017; Jost & Iturralde 2017; Karremans & Bogarín 2017). From Colombia, Betancur *et al*. (2015) reported 49 species, about 45% of all the known species, of which 18 are endemic. An additional Colombian endemic species was published by Vieira-Uribe & Karremans (2017). The gaps of representative collections covering the countries' diverse geography are still large, suggesting future novelties will surely be found (Reina-Rodríguez *et al.* 2017).

The tiny plants and diminutive flowers of *Platystele* have undoubtedly contributed greatly to the gap in knowledge about species belonging to the genus. Not surprisingly, very little is known about their biology and ecology in general terms, and conservation, geographical distribution, species variation and pollination studies are virtually non-existent. DNA based phylogenetic studies indicated that *Platystele* belongs to the *Specklinia* Lindley (1830: 8) affinity (Karremans 2016). It is closely related to *Scaphosepalum* Pfitzer (1889: 136) and *Teagueia* Luer (1991:105), altogether forming a clade that is sister to *Specklinia* and has the highest species diversity in the Andes of Colombia and Ecuador (Karremans *et al.* 2016). In general terms its species can be recognized by the small plants, the tiny flowers, which are frequently flat, with free and spreading sepals and petals, a simple lip with a basal glenion, a short column with an apical anther and bilobed stigma (Luer 1990).

While revising the flora from a public protected area in the Rio Grande canyon, an undescribed species belonging to the genus *Platystele* was discovered.

Accepted by Cássio van den Berg: 3 Oct. 2018; published: 13 Nov. 2018

Materials and Methods

Several explorations were planned and executed in 2010, 2012 and 2013 with botanists and zoologists in the sub-Andean forests of the Colombian western mountain between the municipalities of Restrepo, Dagua, La Cumbre and Vijes in the Valle del Cauca department. The purpose was the characterization of the flora and fauna of the new protected area "Cañon de Río Grande". Gentry plots (1982) were raised to sample different habitats. One of these plots contained the only specimen located to the present. Images of the flower *in situ* were achieved in successive years (March, 2012 and March, 2013). The specimen typus in spirit was photographed in CUVC! with a Cannon EOS 6D. The morphometric data was obtained with the Micro-Capture Software Ver. 2.0 (20×–200×). A comparison (see table 1) between *P. riograndense* and the typus specimen of *Platystele filamentosa* (Luer 1990:46) (*Dodson 18051*, MO!), collected in Ricaute (1820 m), Nariño, shows similarity in the color of the flower, however the morphological differences are clear between both taxa of the colombian western mountains. Therefore, this population represented an undescribed taxon of *Platystele*. For accepted names we used Plants of the World Online, POWO (2017). Authors and names of plants follow The International Plant Name Index, IPNI (2017).

TABLE 1: Differences between *Platystele riograndense* and *Platystele filamentosa,* related taxa from de colombian western mountains in terms of ecology and morphology.

Traits	*P. riograndense*	*P. filamentosa*
Abiotic conditions		
Geography	Valle del Cauca (center)	Nariño (south)
Life zone	Bh-PM (Holdridge 1987)	Bp-MB (Holdridge 1987)
Hábitat	Relict cloud forest	Extense cloud forest
Elevation	1675	1820
Mean annual rainfall	1400–1600	3800–4000
Humidity (%)	82	91
Mean temperture (°C)	20.2	19.2
Morophology/fenology		
Biotype	Epiphyte	Epiphyte
Flowering	March	July
Leaf blade size (mm)	5	3–4
Leaf blade form	Rounded-spatulated	Elliptical-obovate
Apiculus size (mm)	0.5	Unknown
Inflorescence	Dense	Scattered
Inflorescence long (mm)	17	60
Sepals form	Oblong	Ovate
Dorsal sepal size (mm)	0.8–0.9	1.5
Lip form	Sigmoid	Convex-elliptical
Lip size (mm)	1.1–1.3	1.5
Lip tip	Obtuse	Acute

Results

Platystele riograndense Reina-Rodr. & Karremans *sp. nov.* (Figs. 1–3)

Diagnosis:—*Platystele riograndense* Reina-Rodr. & Karremans is similar to *P. filamentosa* Luer but the new species has broader leaves (5 vs 3–4 mm), a dense (versus loose) inflorescence that slightly exceeds the leaf (vs. more than twice the length of the leaf), denser and shorter inflorescences (17 *vs.* 60 mm long), narrowly oblong (*vs.* ovate) sepals, ligulate (*vs.* filamentose) petals, and a sigmoid (*vs.* convex), obtuse (*vs.* acute) lip.

Type:—COLOMBIA. Valle del Cauca: Municipio de Restrepo, Vereda Román, Cuenca alta del río Dagua, Distrito de Conservación de Suelos Cañón de río Grande, Reserva Natural de la Sociedad Civil Las 3R's, Bosque de Niebla. 1675 m, 30 de marzo 2013, Epífita miniatura, creciendo sobre *Spirotheca rhodostyla* Cuatrec., *G. Reina-Rodríguez, T. Otero, N. Flanagan & F. López 1603* (holotype CUVC –Spirit).

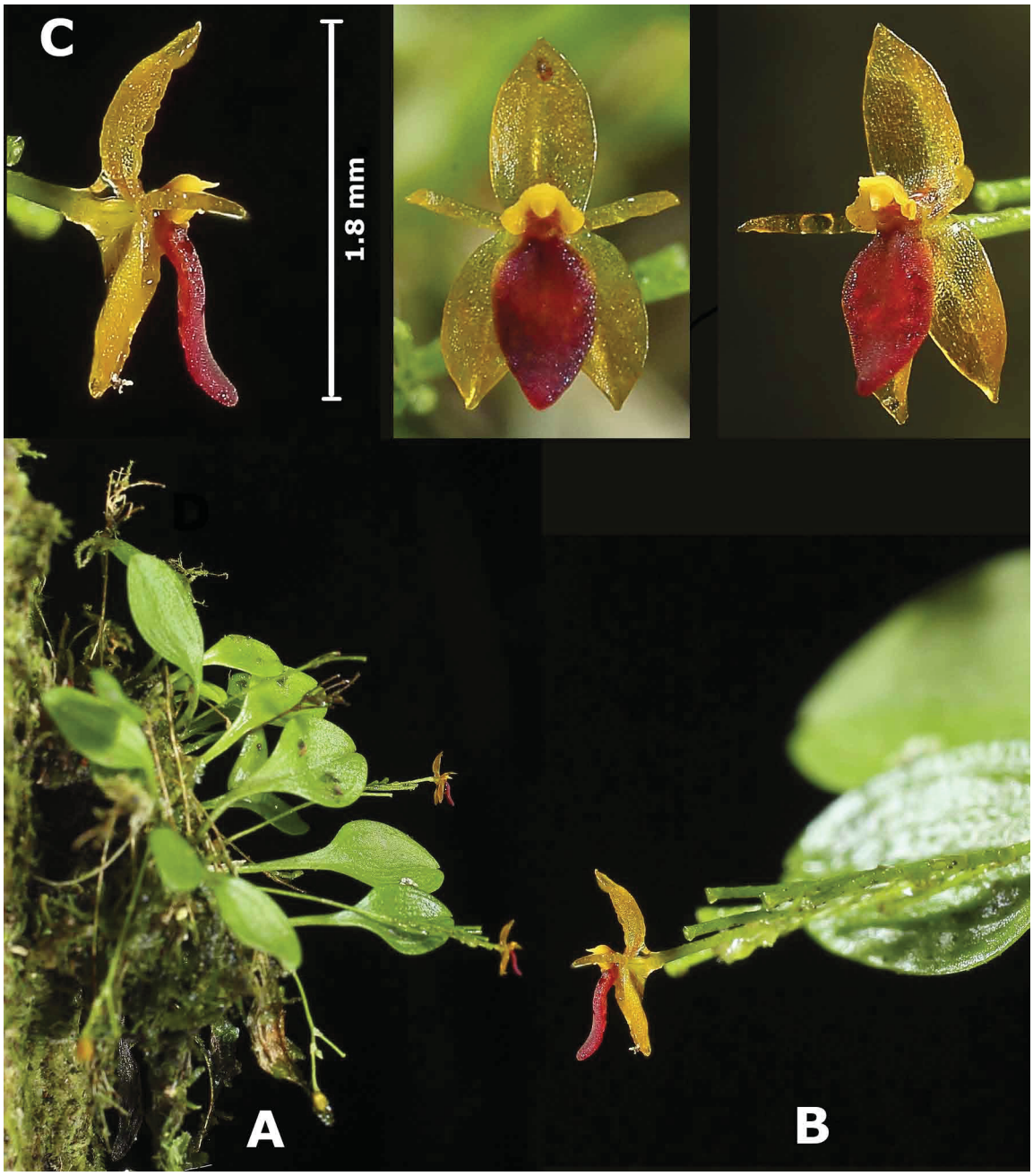

FIGURE 1. *Platystele riograndense* Reina-Rodr. & Karremans. A. Habit. B. Inflorescence. C. Lateral, frontal and 3/4 view of the flower. Photographs by F. López-Machado of the plant that served as type.

Description:—*Epiphytic plant*, caespitose, erect, up to 1.7 cm tall, including the inflorescence. *Roots* basal, swollen and sinuous up to 6 mm long. *Ramicauls* erect, short, enclosed by sheaths. *Sheaths* tubular, compressed, membranous, brownish with stretch marks up to 3.0–3.5 mm. *Leaf* blade 5 mm wide, rounded, 5-veined, spatulated, conduplicate, basally cuneate, which forms an angle of 135 degrees and terminating in a short apiculus, 0.5 mm. *Peduncle* 13–17 mm long, racemose, filiform and terete, shortly surpassing the leaf. *Pedicels* 2.5–3.0 mm, congested, distichous, teretes forming an angle of 15 degrees with the peduncle, with one flower produced at time by pedicel. *Ovary* 0.6 mm long with ribs. *Flower* 1.8 mm tall x 1.5 mm wide, with the sepals, petals and column yellowish translucid, the lip red translucid. *Dorsal sepal* 0.8–0.9 × 0.4–0.5 mm, narrowly oblongo-acuminate, margin smooth. *Lateral sepals* 1.0–1.2 × 0.5–0.6 mm narrowly oblongo-acuminate, margin smooth 1-veined *Petals* 1.2 × 0.3 mm, filiform, and curve forward, smooth margin, acute. *Lip* 1.1–1.3 × 0.5 mm. equal length of the lateral sepals, narrowly-ovate, convex, acute-rounded with the tip curve forward, margin smooth. *Column* short 0.4–0.5 mm long, distally apiculate, with lobules cucullate and margin fimbriate. *Anther* apical cucullate, pollinia two, laterally flattened. *Fruits* not seen.

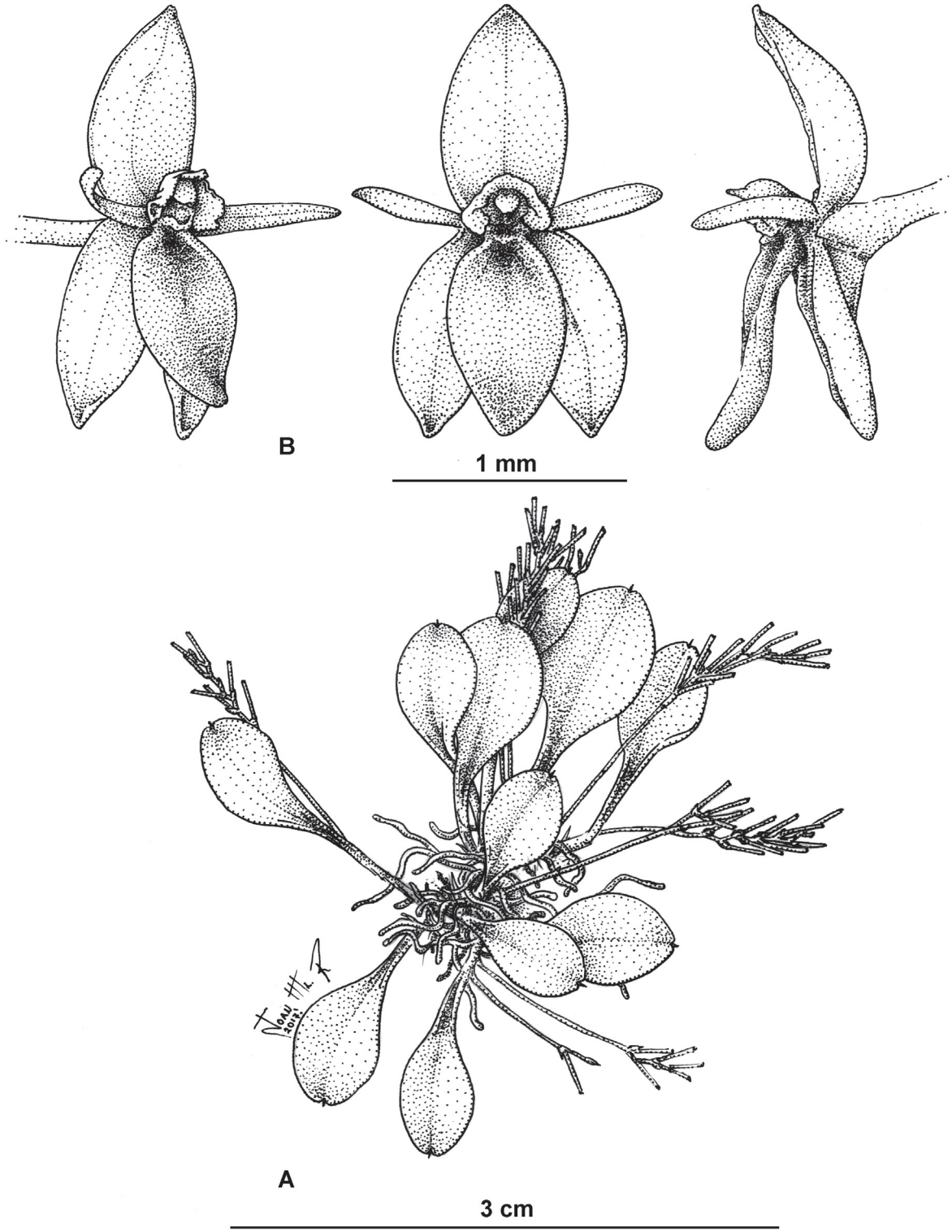

FIGURE 2. *Platystele riograndense* Reina-Rodr. & Karremans. A. Habit. B. Lateral, frontal and 3/4 view of the flower. Illustration by Joan Ramírez based on photographs by F. López-Machado and Maria C. Benavides-Guzman of the plant that served as type.

Eponymy:—The name honors the Rio Grande canyon, in the upper part of the Dagua river basin, between the municipalities of La Cumbre and Restrepo in Valle del Cauca, Colombia (Fig. 4). There the tropical dry forest and moist dense forest converge, and a public protected area of 10700 hectares has been recently created. The dense moist forest where the new species was discovered (Fig. 5) has been preserved by the Reina-Ramos family for more than a century.

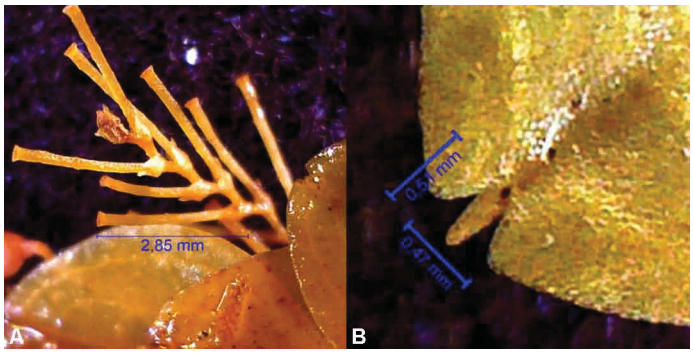

FIGURE 3. *Platystele riograndense* Reina-Rodr. & Karremans. A. Inflorescence. B. Leaf apex. Photographs by G. Reina-Rodríguez of the plant that served as type.

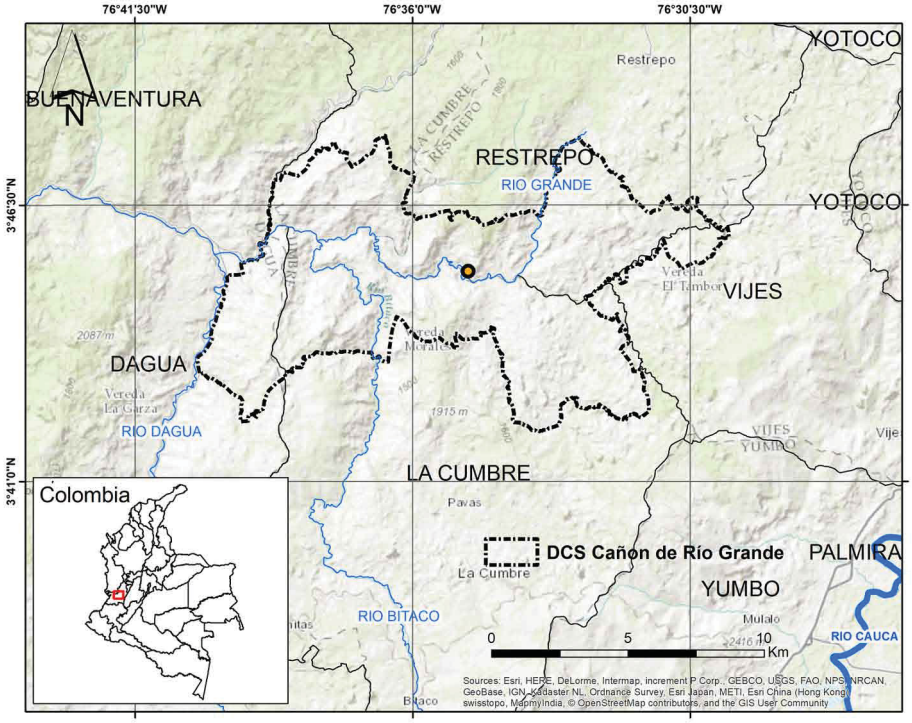

FIGURE 4. Location where the type specimen of *P. riograndense* was collected.

Phenology:—The plant was registered to flower in March *in situ*, coinciding with the beginning of the rainy season.

Ecology and distribution:—*Platystele riograndense* is currently known only from the type specimen. It was found growing upper part of the Dagua river basin, in the Valle del Cauca department of Colombia, growing at an elevation of about 1,675 m. The area has been classified as lower montane humid forest (Holdridge 1987), and reports precipitations between 1,400 and 1,600 mm. The average annual temperature is 18°C. The protected area –DCS– Cañón de río Grande of 10,700 hectares forms an altitudinal complex (geocomplex) *in sense* (Vigo 1998) from subxerophytic schrubs (710 m) to cloud dense forest (1,780 m). *Platystele riograndense* was found towards the upper part (at 1,675 m), in the summit zone, with sub-Andean flora whereas *P. filamentosa* Luer grows in more extensive and wet areas of primary Andean forest. (see table 1). The *P. riograndense* grows on *Spirotheca rhodostyla* Cuatrecasas (1945: 274–299) however, the *P. filamentosa* phorophyte is unknown. The *P. riograndense vs. P. longicaudata* flora canopy above 25 m high is dominated by *Poulsenia armata* (Miquel 1854: 197–200) Standley (1933: 4), *Cecropia telealba* Cuatrecasas (1945: 293), *vs. Elaeagia utilis* (Goudot 1844: 260) Weddell (1849: 94) and *Hieronyma oblonga* (Tulasne 1851: 248) Müller (1865: 66). Subdosel species (10–20 m) *Cosmibuena grandiflora* (Ruiz & Pavón 1799: 198) Rusby (1907: 368) and *Heliocarpus americanus* Linnaeus (1753: 448) *vs*. *Faramea calyptrata* Taylor (1999: 280) and *Carapa guianensis* Aublet (1775a: 32). Shrub vegetation (<10 m). *Hedyosmum bonplandianum* Kunth (1825: 165) and *Palicourea thyrsiflora* (Ruiz & Pavón 1799: 198) Candolle (1830: 528) *vs*. *Faramea coffeoides* Taylor (1999: 284)

and *Palicourea gibbosa* Dwyer (1980: 304) The palms comunity: *Prestoea decurrens* (H.Wendland ex Burret 1930: 123–270) Moore (1963: 286) and *Chamaedorea pinnatifrons* (Jacquin 1797: 1–68) Oersted (1858: 1–54) *vs. Prestoea acuminata* (Willdenow, 1804: 35) Moore (1963: 286) and *Aiphanes erinacea* (Karsten 1857: 391) Wendland (1878: 230). Also, there is a community of epiphytes dominated by *Tillandsia fendleri* Grisebach (1864: 17)*, Tillandsia adpressa* André (1888a: 6)*, Monstera adansonii* Schott (1830: 1028)*, Anthurium scandens* (Aublet 1775b: 828–833) Engler (1878: 78) and *Guzmania scherzeriana* Mez (1896: 949) *vs. Philodendron verrucosum* Mathieu ex Schott (1856: 85), *Anthurium longicaudatum* Engler (1898: 388) and *Guzmania sprucei* (André 1888:b 5) Smith (1934: 75) (Fondo Acción *et al.* 2013; Velázquez *et al.* 2006).

This is the second new species discovered in the area in the last four years after *Encyclia parkeri* Reina-Rodriguez & Leopardi in Leopardi-Verdi *et al.* (2014: 164) from the middle part of basin.

Conservation status:—An assessment of its conservation status cannot be made at this time and has to be classified as data deficient (DD) because further information and research is required in the future to recognize their threat status (UICN 2012).

Discussion:—Important morphological differences were observed between *Platystele riograndense* and *P. filamentosa*, a dense (versus scattered) inflorescences (17 vs. 60 mm long) and sigmoid (versus convex) lip, narrowly oblong (vs. ovate) sepals, ligulate (*vs.* filamentose), and a sigmoid (*vs*. convex), obtuse (*vs.* acute) lip. In terms of biogeography, phenology, plants communities, habitat and abiotic conditions are presented in Table 1.

Adittionally, *Platystele riograndense* differ from *P. filamentosa* in terms of: 1) Phenology flowering: March *vs*. July 2) Geography: Valle del Cauca (Center) *vs*. Nariño (South) 3) Life zone: Pre-montane wet forest *vs*. Montane rainy forest 4) Elevation: 1675 *vs*. 1820 m altitude 5) Mean annual rainfall: 1400–1600 *vs.* 3800–4000 6) Humidity 82% *vs.* 91% 7) Mean temperature 20.2 °C *vs.* 19.2 °C and 8) Ecological niche: The plants communities sampled in these locations are very different (Fondo Acción 2013, Velazquez *et al*. 2006).

Areas with similar conditions have been detected in the "Farallones de Cali National Park" and "Munchique National Park" booth on the Pacific slope, but with a huge flora gaps. These national parks have ecological conditions for the presence of both species.

FIGURE 5. Landscape and vegetation of the area where the type specimen of *P. riograndense* was collected. Photographs G. Reina-Rodríguez.

Acknowledgements

The first author is grateful to the Conserva Colombia III project for its support through Nº 091-2011 and Nº 02-2012 *Aunar esfuerzos técnicos y económicos para desarrollar la propuesta de declaratoria y formulación del plan de manejo para un área de Bosque seco y subxerofítico de la cuenca del río Grande, municipios de Restrepo, Dagua y La Cumbre.* Fondo Acción-CVC. Francisco López-Machado of FL-M is thanked for the Macro-photographs *in situ*. Maria Cristina Benavides-Guzmán from CUVC! Herbarium, in thanked for the photographs to the holotype. Jorge Ramos and Consuelo Reyna† first explorers of the flora of this territory. Catalina Ruiz-Dominguez and Oscar Menses contributed to the first Gentry Plots in this area. Kevin Reyes edited the map. Mrs. Julia Siropkina and Mr. Ethan Reina-Rodriguez are thanked. Rio Grande, Roman, Morales, El Silencio and Juntas de Bitaco in Restrepo and La Cumbre municipalities are thanked for their help during field trips. Joan Ramírez is thanked for the ink illustration. The anonymus reviewers for their suggestions to improve the manuscript.

References

André, E.F. (1888a) *Enumeration des Bromeliacees Recoltees* 5.

André, E.F. (1888b) *Enumeration des Bromeliacees Recoltees* 6.

Aublet, J.B.C.F. (1775a) *Histoire des Plantes de la Guiane Françoise 1*. Pierre–François Didot, London & Paris, 621 pp.

Aublet, J.B.C.F. (1775b) III. Pentandria. *In: Aublet, J.B.C.F., Histoire des Plantes de la Guiane Françoise 2*. Pierre François Didot, London & Paris, pp. 828–833.

Baquero, L.E. & Zuchan, K. (2017) *Platystele pamelae* (Orchidaceae: Pleurothallidinae), a new species from Ecuador. *Lankesteriana* 17: 245–50.
https://doi.org/10.15517/lank.v17i1.28269

Betancur, J., Sarmiento, L.H., Toro-González, L. & Valencia, J. (2015) *Plan para el estudio y la conservación de las orquídeas en Colombia.* Ministerio de Ambiente y Desarrollo Sostenible; Universidad Nacional de Colombia, Bogotá D.C., 336 pp.

Burret, M. (1930) Geonomae americanae. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 63: 123–270.

Candolle, A.P. de. (1830) Rubiaceae. *In:* de Candolle, A.P. (Ed.) *Prodromus Systematis Naturalis Regni Vegetabilis. Vol. 4.* Prodr. Treuttel & Würtz, Paris, pp. 341–622.

Cuatrecasas, J. (1945) Notas a la Flora de Colombia—VII. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales*. 6: 274–299.

Dwyer, J.D. (1980) Flora of Panama, part IX. Family 179. Rubiaceae - part 2. *Annals of the Missouri Botanical Garden* 67: 257–522.
https://doi.org/10.2307/2398901

Engler, H.G.A. (1878) *Flora Brasiliensis* 3 (2): 78.

Engler, H.G.A. (1898) *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 25: 388.

Fondo Acción—The Nature Conservancy-CVC. (2013) *Diagnostico Distrito de conservación de Suelos Cañon de Río Grande*. Santiago de Cali, 509 pp.

Gentry, A.H. (1982) Patterns of neotropical plant species diversity. *In*: *Evolutionary biology.* Springer, Boston, pp. 1–84.
https://doi.org/10.1007/978-1-4615-6968-8_1

Goudot, J.P. (1844) *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* 18: 260.

Grisebach, A.H.R. (1864) *Ueber die von Fendler in Venezuela gesammelten* Bromeliaceen*. Nachrichten von der Königlichen Gesellschaft der Wissenschaften und von der Georg-Augusts-Universität* 1: 17.

Holdridge, L. (1987) *Ecología basada en zonas de vida*. IICA. San José. Costa Rica, 216 pp.

Jost, L. & Iturralde, G. (2017) A showy new *Platystele* (Pleurothallidinae: Orchidaceae), from Northwest Ecuador. *Lankesteriana* 17: 55–60.
https://doi.org/10.15517/lank.v17i1.28479

Jacquin, N.J. (1797) *Plantarum Rariorum Horti Caesarei Schoenbrunnensis* 2: 1–68.

Karremans, AP. (2016) Genera Pleurothallidinarum: an updated phylogenetic overview of Pleurothallidinae. *Lankesterian* 16: 219–241.
https://doi.org/10.15517/lank.v16i2.26008

Karremans, AP, Albetazzi, FJ, Bakker, FT, Bogarín, D, Eurlings, MCM, Pridgeon, A, Pupulin, F & Gravendeel, B. (2016) Phylogenetic reassessment of *Specklinia* and its allied genera in the Pleurothallidinae (Orchidaceae). *Phytotaxa* 272: 1–36.
https://doi.org/10.11646/phytotaxa.272.1.1

Karremans, AP & Bogarín, D. (2017) Two novelties in *Platystele* (Ochidaceae: Pleurothallidinae) from Costa Rica. *Lankesteriana* 17: 215–221.
https://doi.org/10.15517/lank.v17i2.30044

Karremans, AP & Davín, N. (2017) *Genera Pleurothallidinarum: The Era of Carl Luer*. *Lankesteriana* 17: I–VIII.
https://doi.org/10.15517/lank.v17i2.30273

Karsten, G.K.W.H. (1857) Plantae columbianae. *Linnaea* 28: 391

Kunth, K.S. (1825) *Nova Genera et Species Plantarum* (quarto ed.) 7: 165–166.

Leopardi, C.L., Reina-Rodriguez, G.A., Carnevali, G. & Romero-González, G.A. (2014) Two new greenish *Encyclia*: *E. parkeri* and *E. silverarum* (Laeliinae, Orchidaceae). *Phytotaxa* 183: 159–170.
https://doi.org/10.11646/phytotaxa.183.3.3

Luer, C.A. (1990) Icones Pleurothallidinarum VII. Systematics of *Platystele. Monographs in Systematic Botany from the Missouri Botanical Garden* 38: 46–47

Luer, C.A. (1991) Icones Pleurothallidinarum VII. Systematics of *Lepaanthopsis, Octomeria* Subgenus Pleurothallopsis, Restrepiella, Restrepiopsis, Salpistele, and Teagueia (Orchidaceae). *Monographs in Systematic Botany from the Missouri Botanical Garden* 64:105–113.

Lindley, J. (1830) *The Genera and Species of Orchidaceous Plants* 8.

Linnaeus, C. (1753) *Species Plantarum* 1: 1–560

Mez, C. (1896) Bromeliaceae. *In* de Candolle, C. *Monographiae Phanerogamarum* 9: 1–990.

Miquel, F.A.W. (1852–1857 '1854') Piperaceae. *In: Seemann, B.C., The Botany of the Voyage of H.M.S. Herald.* Lovell Reeve, London, 197–200, t. 37–42.

Moore, H.E. (1963) Some nomenclatural matters: *Prestoea* and *Sabal. Gentes Herbarum; Occasional Papers on the Kinds of Plants* 9: 286–287.

Müller, A. (1865) *Hieronyma oblonga* (Tulasne) Müller. *Linnaea* 34: 66

Oersted, A.S. (1858) Palmae centroamericanae. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kjøbenhavn* 62: 1–54.

Plants of the World Online (POWO) (2017) Published on the Internet: http://www.plantsoftheworldonline.org (accessed 1 December 2017)

Pfitzer, E. (1889) Orchidaceae. *In*: Engler, A. & Prantl, K. (Eds.) *Die naturlichen Pflanzenfaniilien, II. Teil, 6.* Abteilung. Engelmann, Leipzig, pp. 136–139.

Reina-Rodríguez, G.A., Rubiano, J., Castro, F.A. & Soriano, I. (2017) Orchids distribution and bioclimatic niches as a strategy to climate change in areas of tropical dry forest in Colombia. *Lankesteriana* 17: 17–47.
https://doi.org/10.15517/lank.v17i1.27999

Rusby, H.H. (1907) An enumeration of the plants collected in Bolivia by Miguel Bang, IV. *Bulletin of the New York Botanical Garden* 4: 309–470.

Ruiz, H. & Pavón, J.A. (1799) *Flora Peruviana, et Chilensis* 2: 54, t. 198.

Schlechter, F.R. (1910) *Repertorium Specierum Novarum Regni Vegetabilis* 8 (191–195): 565.

Schott, H.W. (1830) *Wiener Zeitschrift für Kunst, Litteratur, Theater und Mode* 4: 1028

Schott, H.W. (1856) *Synopsis Aroidearum : complectens enumerationem systematicam generum et specierum hujus ordinis. Vol. I.* 85 pp.

Smith, L.B. (1934) Studies in Bromeliaceae. *Contributions from the Gray Herbarium of Harvard University* 104: 71–82.

Standley, P.C. (1933) *Poulsenia*, a genus of trees of the family Moraceae *Tropical Woods* 33: 4–5.

Taylor, C.M. (1999) Rubiaceae-Coussareeae. 62. *In*: Harling, G.W. & Andersson, L. (Eds.) *Flora of Ecuador*. University of Göteborg, Göteborg, pp. 245–314.

Tulasne, L.R.E. (1851) *Annales des Sciences Naturelles; Botanique* Sér. 3, 15: 248.

Velázquez, A.R., Triana-Gómez, M.A. & Burgos, J.D. (2006) Caracterización florística y estructural de la vegetación en claros de la parcela permanente de 25 ha en la reserva natural La Planada (Nariño). *Colombia Forestal* 9: 5–29.

IPNI (2017) The International Plant Names Index. Published on the Internet: http://www.ipni.org (accessed 2 December 2017)

UICN. (2012) *Categorías y Criterios de la Lista Roja de la UICN: Versión 3.1. Segunda edición.* Gland, Suiza y Cambridge, Reino Unido: UICN, vi + 34 pp.

Vieira-Uribe, S. & Karremans, A.P. (2017) *Platystele colombiana*. *Species Orchidacearum* 1 (1): LCDP 12.

Vigo, J. (1998) Some reflections on geobotany and vegetation mapping. *Acta Botánica Barcinonensia* 45: 535–556.

Weddell, H.A. (1849) *Histoire Naturelle des Quinquinas*. 94 pp.

Wendland, H.A. (1878) *Les Palmiers*. 230 pp.

Willdenow, C.L. (1804) *Mémoires de l'Académie Royale des Sciences et Belles-Lettres depuis l'Avénement de Fréderic Guillaume II au Thrône* 1804: 35.