

A New *Reichantha* (Orchidaceae: Pleurothallidinae) from Nicaragua and Costa Rica

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Abstract—A new species, *Reichantha jorge-warneri*, from the Atlantic plains of Nicaragua and Costa Rica is described and illustrated. The species is similar to *Reichantha tonduzii*, but can be distinguished by its reddish inflorescence and ovary, glabrous sepals that are stained with red at the base and are distinctly shorter, lateral sepals with parallel tails, and the trullate-acuminate apex of the lip.

Resumen—Se describe e ilustra una nueva especie, *Reichantha jorge-warneri*, de las llanuras del Atlántico de Nicaragua y Costa Rica. La especie es similar a *Reichantha tonduzii*, pero se puede distinguir por la inflorescencia y ovario rojizo, sépalos glabros y teñidos con rojo cerca de la base, los sépalos laterales distintamente más cortos, con caudas paralelas y el ápice del labelo trulado-acuminado.

Keywords—*Masdevallia*, new species, *Reichantha jorge-warneri*, *Reichantha tonduzii*, taxonomy.

Masdevallia Ruiz & Pav. s. l. (Luer 1986, 2000a, 2000b, 2001, 2002, 2003a) is one of the most diverse genera of the Pleurothallidinae, with an estimated 400–500 species distributed from southern Mexico to southern Brazil. *Masdevallia* s. l. is distinguished from other genera by a lip hinged to a free, incurved extension of the apex of the column-foot and by petals that generally have calli, but can also be recognized by having ramicauls shorter than the coriaceous leaves, which can be elliptic to narrowly elliptic and petiolate to subpetiolate. Other characteristics that distinguish *Masdevallia* s. l. are inflorescences that emerge from an annulus, sepals that are usually partially connate forming a cup or tube and with apices that are typically contracted into tails, and small petals about the length of the column, often with longitudinal calluses along one or both margins. *Masdevallias* also have a small lip, although it may exceed the length of the column, a semiterete column with a ventral anther which is more or less hooded by the apex of the column, and two ovoid pollinia that have granular, elastic caudicles that connect them to the viscidium (Luer 1986).

About 42 species of *Masdevallia* s. l. have been found in Central America (Ossenbach et al. 2007; Govaerts et al. 2013). Thirty of these species have been located in Costa Rica, of which 12 are currently considered endemic to Costa Rica (Luer 2003b). In Nicaragua only five species of *Masdevallia* s. l. have been found, of which none are endemic (Hamer 2001; van den Berghe and van den Berghe 2008; Karremans et al. 2012). In Costa Rica and Nicaragua most species of *Masdevallia* s. l. are found at elevations above 1,000 m, and only a few taxa such as *Alaticaulia lata* (Rchb.f.) Luer, *Acinopetala nicaraguae* (Luer) Luer, *Reichantha tonduzii* (Woolward) Luer, and *Acinopetala tubuliflora* (Ames) Luer are found at elevations below 500 m (Hamer 2001; Luer 2003b).

In 2006, Luer published a new classification for *Masdevallia* s. l. in which he transferred many species into 16 new genera and into two formerly existing genera (*Rodrigoa* Braas and *Jostia* Luer). One of the new genera was *Reichantha* Luer in which Luer (2006) placed the species that shared the following characteristics: caespitose habit, inflorescences with a terete peduncle bearing a single flower or a successively flowered raceme (except in one case in which the species has

two simultaneous flowers), petals with a keel or callus on the lower half without a protruding process or tooth, and a lip with a more or less oblong shape and a pair of longitudinal calli or keels on or above the middle third (these may be indistinct). Among the species Luer (2006) reclassified in *Reichantha* were 13 species from Nicaragua and Costa Rica. These species include *Reichantha tonduzii*, which can be distinguished from other species of the genus by its white sepals suffused in yellow with a cone-shaped, pubescent sepaline tube and petals with a longitudinal keel on the labellar margin that starts at the apex and extends to below the lower third, where it ends in a small tooth. We found a new species similar to *R. tonduzii*, only known from the Atlantic plains along the border between Nicaragua and Costa Rica, which here we describe and illustrate.

MATERIALS AND METHODS

This study was conducted at Lankester Botanical Garden (JBL) of the University of Costa Rica. Phenological data were recorded in the field and from cultivated plants. Herbarium specimens were taken from plants that were collected in the wild and grown at JBL until they flowered; these specimens were deposited at CR and JBL. Sketches of specimens were drawn using a Leica MZ 9.5 stereomicroscope with a drawing tube and saved in the reference collection of the JBL. Lankester Composite Dissection Plates (LCDP) were made using an Epson Perfection 4490 Photo Scanner and an Epson Perfection V600 Photo Scanner, a digital camera Nikon D5100, a DFC295 Leica digital microscope color camera with a c-mount interface, Leica FireCam version 3.4.1 software, and Helicon Focus version 4.2 software. The distribution map was made using data from the herbarium specimens located at CR, INB, JBL, and USJ, and specimens cited by Luer (2001). The new species was illustrated by D. Bogarín and C. M. Smith using composite line-drawing and photographs from a living specimen and the description and morphological comparison table was prepared from living specimens, including the one used for the illustration of the new species, and from herbarium specimens located at CR, INB, JBL, and USJ.

TAXONOMIC TREATMENT

Reichantha jorge-warneri C. M. Sm., Bogarín & Pupulin, sp. Nov.—TYPE: COSTA RICA. Alajuela: San Carlos, Cutris, finca del proyecto minero Crucitas (Industrias Infinito), 10°52'00" N, 84°19'00" W, 87 m, bosque muy húmedo

premontano, transición a pluvial, recolectada por Luis Sandoval, 17 junio 2011, *M. Fernández 448* (holotype: CR!; isotype: JBL-Spirit!).

Species *R. tonduzii* (Woolward) Luer similis, sed inflorescentia et ovario rufis, sepalis distincte brevioribus intus glabris, in base rubris, caudis sepalorum lateralium parallelis, labello trullato-acuminato differt.

Plant epiphytic, caespitose, erect, up to 11 cm tall. Roots white, glabrous, flexuous, to 1 mm in diameter. Ramicauls erect, up to 12 × 2 mm, enclosed by 2 ribbed, papyraceous

tubular sheaths 1–2 cm long. Leaves bright green, erect to suberect, coriaceous, obelliptic, obtuse, emarginate, with a short apiculus, 7.5–11.0 cm long including the petiole, 1.6–2.0 cm wide, the base gradually narrowed into the petiole ca. 1.5–3.5 cm long. Inflorescence single flowered, to 6 cm long. Peduncle suberect or pendent, reddish, 5.0–5.5 cm long, with three tubular bracts, one near the pedicel and the other two below the middle. Floral bract tubular, 7 × 2 mm. Pedicel 7 mm long. Ovary reddish, 4 mm long, with 6 straight ribs, smooth. Flowers white suffused with reddish-purple at the base of the lamina and along the veins, and tinged with

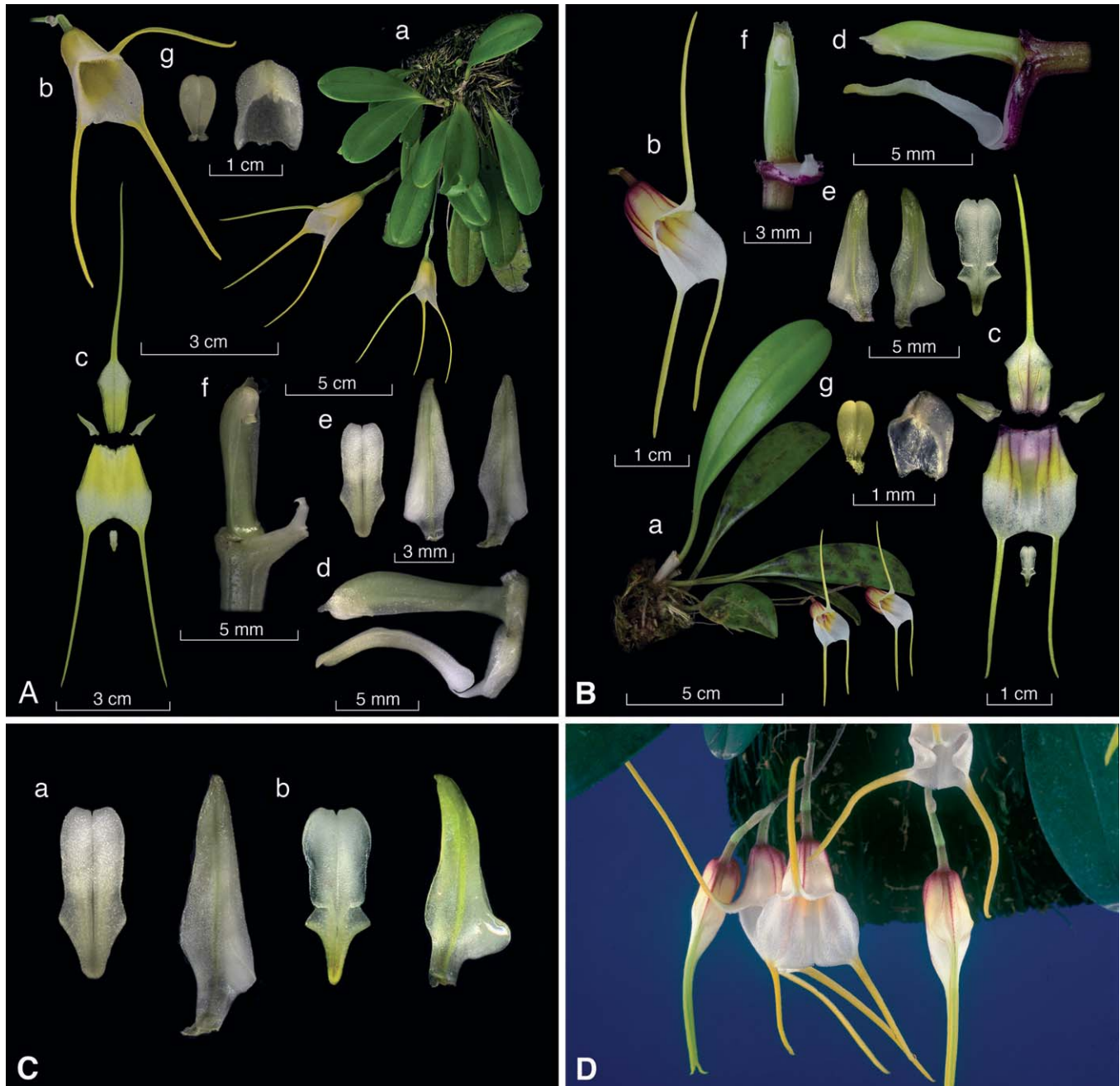


FIG. 1. A. Lankester composite dissection plate (LCDP) of *Reichanthea tonduzii*. a. Habit. b. Flower. c. Dissected perianth. d. Column and lip, lateral view. e. Lip and petals, adaxial view. f. Column, three quarters view. g. Pollinarium and anther cap (all images from *A. P. Karremans 5454*, photographs by C. M. Smith). B. LCDP of *Reichanthea jorge-warneri*. a. Habit. b. Flower. c. Dissected perianth. d. Column and lip, lateral view. e. Petals and lip, adaxial view. f. Column, adaxial view. g. Pollinarium and anther cap (all images from the plant that served as type, *M. Fernández 448*, photographs by D. Bogarín). C. a. Lip and petal of *Reichanthea tonduzii* (*A. P. Karremans 5454*). b. Lip and petal of *Reichanthea jorge-warneri* (*M. Fernández 448*). D. *Reichanthea jorge-warneri* (photograph by F. Pupulin).

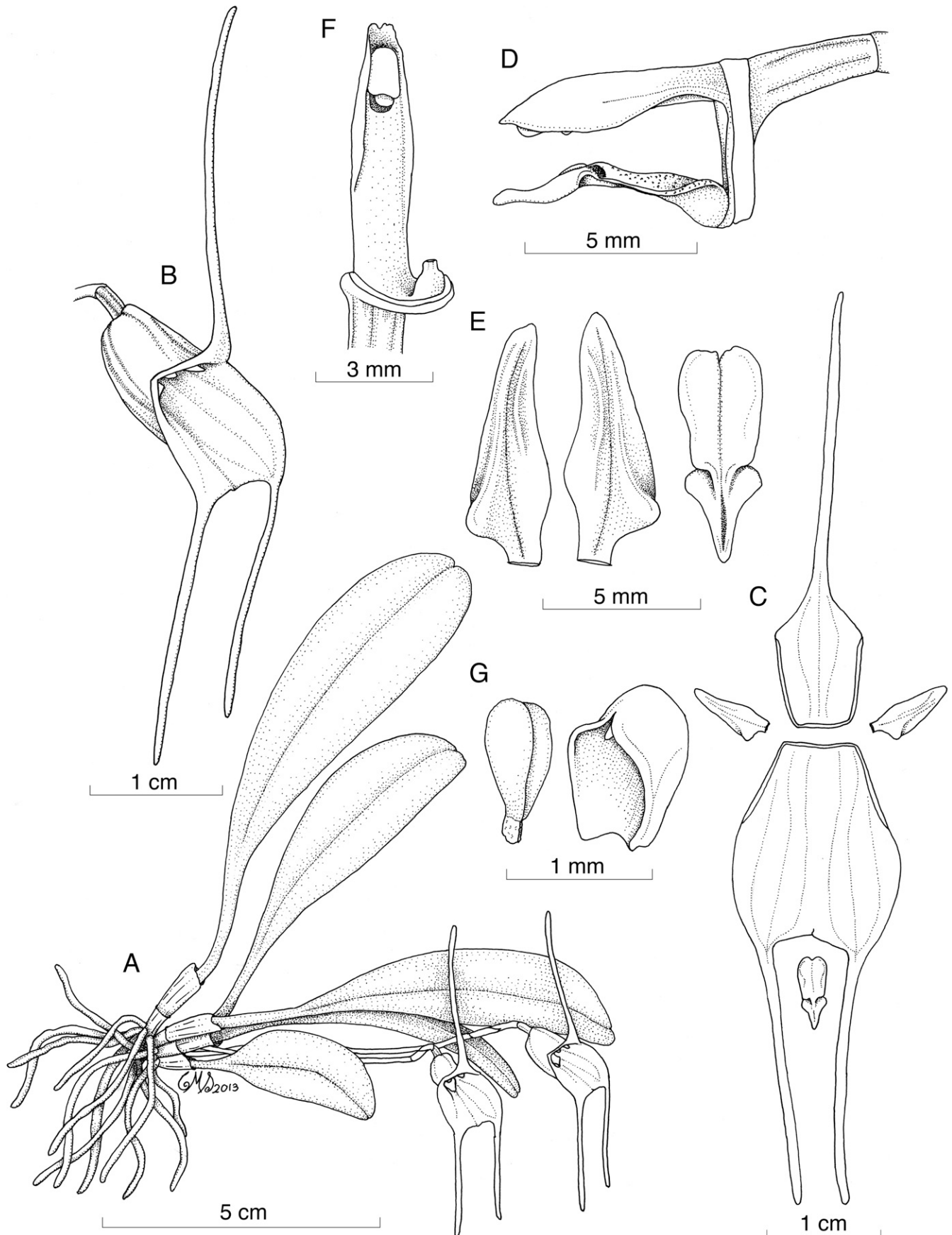


FIG. 2. *Reichantha jorge-warneri* A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view. E. Petals and lip, adaxial view. F. Column, adaxial view. G. Pollinarium and anther cap (drawn from the plant that served as type, *M. Fernández 448*, drawing by D. Bogarín and C. M. Smith).

yellow at the middle of the sepaline tube, the tails yellow, petals white with the midvein and the apex green, lip white greenish-yellowish at the apex, column greenish-white. Dorsal sepal oblong, denticulate, 3.8 cm long including the tail, 0.75 cm wide, connate to the lateral sepals for about 0.75 cm forming a conical sepaline tube, the free portion about 3.0 cm long including the tail, basally subtriangular, abruptly contracted into a slender, erect, tail ca. 2.7 cm long. Lateral sepals obovate, oblique, denticulate, 4.1 cm long including the tails, 1.5 cm wide expanded together, connate for about 0.9 cm to form a lamina, the free portion about 3.2 cm long including the tail, each basally subtriangular, gradually contracted into slender, descending, parallel tails ca. 2.2 cm long. Petals ovate, oblique, unguiculate, 7.6×3.1 mm, the apex acute with a small apiculus, the labellar margin with a rounded lobule formed by a longitudinal carina ending in a short, pointed tooth between the middle and lower third of the petal and a low carina running parallel from the middle to the apex. Lip hinged to the column foot, ovate-oblong, 6.5×2.6 mm, the base subcordate, slightly papillose, sulcate at the middle, with a pair of low calli forming a depression at the base of the trullate, acuminate apex. Column semiterete, 6.7×1.6 mm, winged, the apex erose. Foot 3.8 mm long. Stigma ventral. Pollinia two, ovoid. Anther cap cucullate, apical (Figs. 1, 2).

Additional Material Examined—NICARAGUA. Departamento de Río San Juan: Refugio de Vida Silvestre Río San Juan, F. Díaz-Santos s. n., Fig. 67 (van den Berghe and van den Berghe 2008; Díaz-Santos 2008). COSTA RICA. Without specific locality, flowered at the Orchid Exhibition of Alajuela, 28 Oct. 1999 (photo, JBL) (Fig. 1).

Distribution and Ecology—Known only from the plains along the San Juan River, close to the border of Nicaragua

and Costa Rica, where it was collected at an elevation below 100 m. It has been found growing as an epiphyte in pre-montane wet forest, basal belt transition sensu Holdridge (1967) (Fig. 3).

Phenology—It has been observed in bloom from October to December in cultivation.

Eponymy—Dedicated to Jorge Warner, Director of the Lankester Botanical Garden, University of Costa Rica, in recognition of his continuous effort in the development of the botanical garden and strong support to the scientific research activities at the center.

DISCUSSION

Reichantha jorge-warneri is similar to *R. tonduzii*, but differs in the reddish inflorescences and ovaries, rather than green in *R. tonduzii*. Also, *R. jorge-warneri* has glabrous sepals stained with reddish purple at the base and lateral sepal tails that are parallel, whereas *R. tonduzii* has sepals that are pubescent on the inside of the sepaline tube and stained with yellow, and that have lateral sepal tails that are divergent. The dorsal sepal of *R. jorge-warneri* is 3.8 cm long including the tail, 0.75 cm wide, and connate to the lateral sepals for about 0.75 cm, whereas the dorsal sepal of *R. tonduzii* is 5.8–6.8 cm long including the tail, 0.9–1.2 cm wide, and connate to the lateral sepals for 1.4 cm. The lateral sepals of *R. jorge-warneri* are 4.1 cm long including the tails, 1.5 cm wide when the two sepals are expanded together, and connate for about 0.9 cm, while in *R. tonduzii* the lateral sepals are 6.0–6.6 cm long including the tails, 2.0–2.2 cm wide when the two sepals

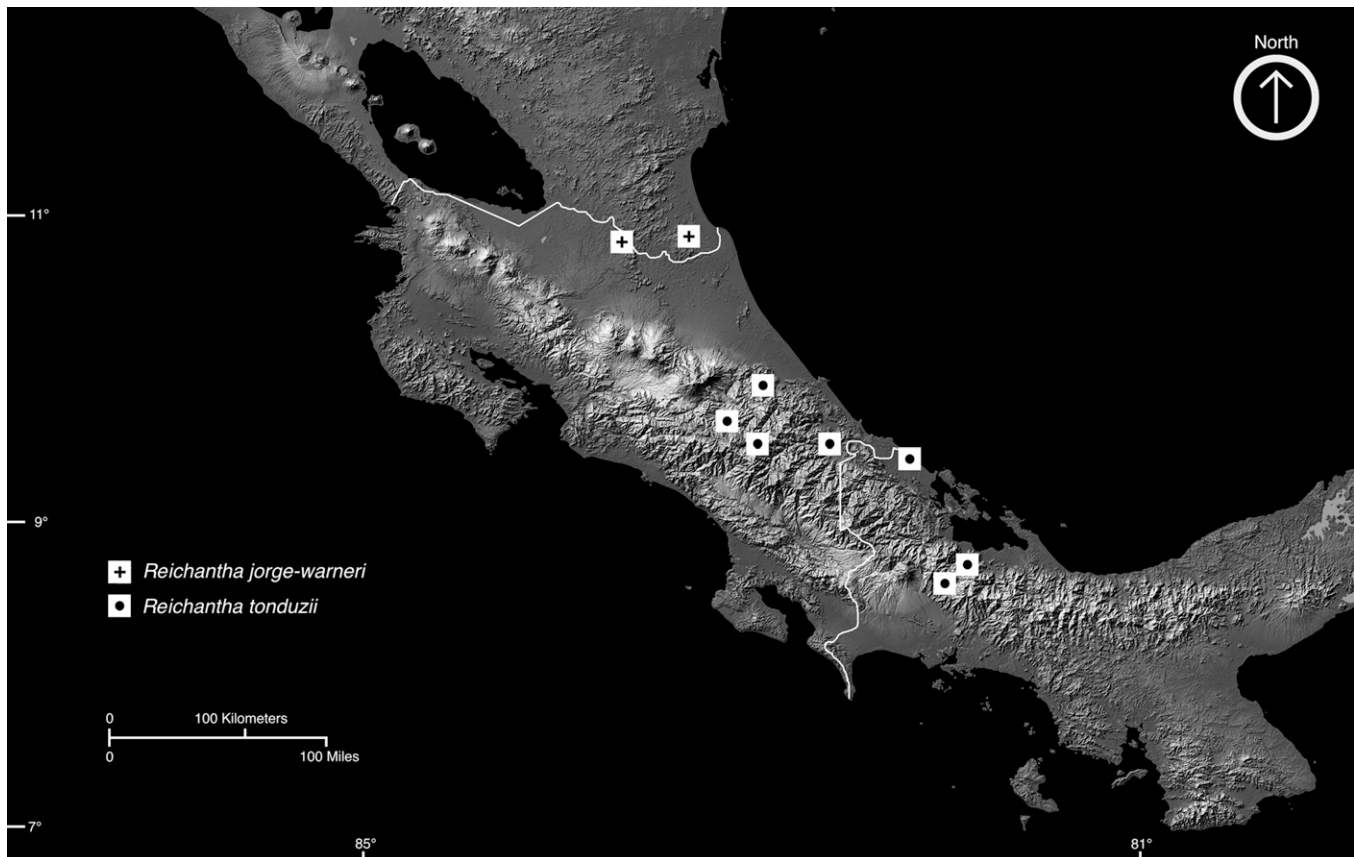


FIG. 3. Distribution of *Reichantha jorge-warneri* (square with cross) and *Reichantha tonduzii* (square with circle).

TABLE 1. Morphological differences between *Reichantha jorge-warneri* and *Reichantha tonduzii*.

Character	<i>Reichantha jorge-warneri</i>	<i>Reichantha tonduzii</i>
Inflorescence	Reddish	Green
Ovary	Reddish	Green
Sepals	Glabrous, stained with reddish-purple at base	Pubescent within, stained with yellow
Dorsal sepal	3.8 cm long including the tail, 0.75 cm wide, connate to the lateral sepals for 0.75 cm	5.8–6.8 cm long including the tail, 0.9–1.2 cm wide, connate to the lateral sepals for 1.4 cm
Lateral sepals	4.1 cm long including the tails, 1.5 cm wide when expanded together, connate for 0.9 cm	6.0–6.6 cm long including the tails, 2.0–2.2 cm wide when expanded together, connate for 1.4–1.8 cm
Tails of the lateral sepals	Parallel	Divergent
Petals	7.6 mm long and 3.1 mm wide	8.0–9.0 mm long and 2.5–2.6 mm wide
Petal labellar margin	With a rounded lobule	With short tooth
Lip	6.5 mm long and 2.6 mm wide	6.0–7.0 mm long and 2.3–2.5 mm wide
Lip apex	Trullate-acuminate	Acute
Column	6.7 mm long and 1.6 mm wide	7.0 mm long and 1.5 mm wide
Column foot	3.8 mm long	2.5 mm long
Anther cap	White tinged with reddish	White tinged with yellow

are expanded together, and connate for about 1.4–1.8 cm. The petals of *R. jorge-warneri* are 7.6 mm long and 3.1 mm wide with a rounded lobule on the labellar margin, whereas the petals of *R. tonduzii* are 8.0–9.0 mm long and 2.5–2.6 mm wide with a short tooth on the labellar margin. The lip of *R. jorge-warneri* is 6.5 mm long, 2.6 mm wide, and trullate-acuminate at the apex, whereas the lip of *R. tonduzii* is 6.0–7.0 mm long, 2.3–2.5 mm wide, and acute at the apex. The column of *R. jorge-warneri* is 6.7 mm long and 1.6 mm wide with a 3.8 mm long foot, while the column of *R. tonduzii* is 7.0 mm long and 1.5 mm wide with a 2.5 mm long foot (Figs. 1, 2; Table 1).

R. jorge-warneri and *R. tonduzii* are similar in that both species have conical sepaline tubes, obovate dorsal sepals that are basally subtriangular and abruptly contracted into a slender tails and obovate, oblique and basally subtriangular lateral sepals. Both species also have ovate, oblique, unguiculate petals with calli and an acute apex with a small apiculus; they also share an ovate-oblong and acute lip that is slightly papillose, with a subcordate base, and is sulcate at the middle. The lip also has a pair of longitudinal calli (Figs. 1, 2). Also, *R. jorge-warneri* and *R. tonduzii* seem to share similar flowering phenology because *R. jorge-warneri* was recorded in bloom from October to December in cultivation, whereas *R. tonduzii* has been recorded in bloom in September, October, and February in the wild and in cultivation from September to February (Mora and Atwood 1993). However the two species seem to have slightly different distribution ranges, since *R. jorge-warneri* is only known from the Atlantic plains, close to the border of Nicaragua and Costa Rica (Fig. 3), whereas *R. tonduzii* is only known from the Atlantic watershed of the Cordillera de Talamanca in southern Costa Rica and western Panama (Fig. 3). *R. tonduzii* was not recorded from Nicaragua by Hamer (2001) and the records of *R. tonduzii* for Nicaragua cited by van den Berghe and van den Berghe (2008) and Díaz-Santos (2008) were based on specimens that are here placed in *R. jorge-warneri*.

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LITERATURE CITED

- Díaz-Santos, F. 2008. *Orquídeas de Río San Juan, Nicaragua*. Managua: MARENA. Govaerts, R., P. Bernet, K. Kratochvil, G. Gerlach, G. Carr, P. Alrich, A. M. Pridgeon, J.
- Govaerts, R., M. A. Campacci, D. Holland Baptista, H. Tigges, J. Shaw, P. Cribb, A. George, K. Kreuz, and J. Wood. 2013. World checklist of Orchidaceae. Kew: The Board of trustees of the Royal Botanical Garden. Accessed 29 March 2013. <http://apps.kew.org/wcsp/>.
- Hamer, H. 2001. Orchidaceae. Pp. 1612–1853 in *Flora de Nicaragua* vol. 1, ed. D. W. Stevens, C. Ulloa, A. Pool, and O. M. Montiel. St. Louis: Missouri Botanical Garden Press.
- Holdridge, L. R. 1967. *Life zone ecology*. San José: Tropical Science Center.
- Karremans, A. P., D. Bogarín, M. Fernández, C. M. Smith, and M. A. Blanco. 2012. New species and records of Orchidaceae from Costa Rica. II. *Lankesteriana* 12: 19–51.
- Luer, C. A. 1986. Icones Pleurothallidarum II. Systematics of *Masdevallia* (Orchidaceae). *Monographs in Systematic Botany from the Missouri Botanical Garden* 16: 1–63.
- Luer, C. A. 2000a. Icones Pleurothallidarum IX. Systematics of *Masdevallia* part one. *Monographs in Systematic Botany from the Missouri Botanical Garden* 77: 1–264.
- Luer, C. A. 2000b. Icones Pleurothallidarum XXI. Systematics of *Masdevallia* part two. *Monographs in Systematic Botany from the Missouri Botanical Garden* 82: 265–518.
- Luer, C. A. 2001. Icones Pleurothallidarum XXII. Systematics of *Masdevallia* part three. *Monographs in Systematic Botany from the Missouri Botanical Garden* 86: 519–780.
- Luer, C. A. 2002. Icones Pleurothallidarum XXIII. Systematics of *Masdevallia* part four. *Monographs in Systematic Botany from the Missouri Botanical Garden* 87: 781–1047.
- Luer, C. A. 2003a. Icones Pleurothallidarum XXV. Systematics of *Masdevallia* part five. *Monographs in Systematic Botany from the Missouri Botanical Garden* 91: 1049–1293.
- Luer, C. A. 2003b. *Masdevallia*. Pp. 277–291 in *Manual de plantas de Costa Rica Volumen III: Monocotiledóneas (Orchidaceae-Zingiberaceae)*, ed. B. E. Hammel, M. H. Grayum, C. Herrera & N. Zamora. Saint Louis: Missouri Botanical Garden Press.
- Luer, C. A. 2006. Icones Pleurothallidarum XXVIII. Reconsideration of *Masdevallia* and the systematics of *Specklinia* and vegetatively similar taxa. *Monographs in Systematic Botany from the Missouri Botanical Garden* 105: 1–20.
- Mora, D. E. and J. T. Atwood. 1993. *Masdevallia tonduzii*. Pl. 1558 in *Orchids of Costa Rica* part 2. Icones Plantarum Tropicarum 16.
- Ossenbach, C., F. Pupulin, and R. L. Dressler. 2007. *Orchids of the Central American Isthmus. Checklist and conservation Status*. San José: Editorial 25 de Mayo.
- van den Berghe, E. P. and I. G. van den Berghe. 2008. *Las orquídeas de Nicaragua, una guía de campo*. Accessed 05 December 2013. http://www.caftadr-environment.org/spanish/outreach/publications/37_cafta_Orquideas_final.pdf.