Phytotaxa 164 (3): 183–189
www.mapress.com/phytotaxa/

Article

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

http://dx.doi.org/10.11646/phytotaxa.164.3.3

Nautilocalyx erytranthus (Gesneriaceae), a new species from Northwestern Amazonia

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Abstract

A new species from western Amazonia is described and illustrated. *Nautilocalyx erytranthus* (Gesneriaceae) is characterized by an obligate terrestrial habit; leaf blades that are cuneate to attenuate at the base; and red funnelform corolla with an oblique limb and reflexed petal lobes with glandular trichomes clustered on the lateral and lower inner surfaces of the throat.

Resumen

Se describe y se ilustra una nueva especie del occidente Amazónico. *Nautilocalyx erytranthus* (Gesneriaceae) se caracteriza por su hábito estrictamente terrestre; por sus láminas foliares cuneadas o atenuadas en la base; y por sus flores de corola roja, infundibuliforme con un limbo oblicuo y los lóbulos de los pétalos reflexos con tricomas glandulares capitados agrupados en la superficie lateral e inferior de la garganta de la corola.

Introduction

The neotropical genus *Nautilocalyx* Linden *ex* Hanstein (1854: 207) is a member of the tribe Gesnerieae and subtribe Columneinae, which is the largest subtribe with 24 genera and 21% of the total species diversity in the family (Weber et al. 2013). The most recent treatment of the genus is more than one hundred years old (Sprague 1912). During the last 35 years new species of *Nautilocalyx* have been published (e.g., Skog 1974, 1989; Wiehler 1975, 1977, 1978; Skog & Steyermark 1991; Feuillet & Skog 2003; Kriebel 2004; Feuillet 2008), but there are still many undetermined specimens in museum collections. Preliminary molecular phylogenetic analyses support that *Nautilocalyx* as currently circumscribed is paraphyletic (Clark et al. 2006, 2012). An updated classification based on molecular sequence data and extensive taxon sampling will include revised circumscriptions of *Paradrymonia, Nautilocalyx,* and *Chrysothemis* (Mora and Clark in review).

Nautilocalyx erytranthus was collected by the second author during expeditions in 2006, 2007 and 2009 to the Tipituni Biological Research Station on the outskirts of the Yasuní National Park in the western Amazon basin of Ecuador. Additional research in herbaria resulted in the documentation of populations from other regions of the Amazon basin (Colombia and Peru) that indicates a relatively wide distribution.

Nautilocalyx erytranthus is commonly grown by horticulturalists and especially by members of The Gesneriad Society, Inc. It is likely that the material currently in cultivation originated from a single introduction by Richard W. Dunn that resulted from a 1995 expedition to the Aguas Negras region located in Ecuador's Cuyabeno Reserve (Dunn 1996).

Accepted by Zhi-Qiang Zhang: 5 Mar. 2014; published: 8 Apr. 2014

Taxonomy

Nautilocalyx erytranthus J.L. Clark & M.M. Mora, *sp. nov.* (Figs. 1–2)

Differs from congeners by the combination of the following characters: obligate terrestrial habit; elliptic to obovate leaf blades with cuneate to attenuate base; red, funnelform corolla shape; reflexed petal lobes; and clusters of glandular trichomes on the lower inner surface of throat.

Type:—ECUADOR. Orellana: Aguarico, Yasuní Biosphere Reserve, Tiputini Biodiversity Station, tierra firme rainforest, 00°38'11''S, 76°08' 57''W, 200 m, 24 June 2006*, J. L. Clark et al. 9484* (holotype US!; isotypes AAU!, CAS!, E!, F!, MO!, NY!, QCNE!, SEL!, UNA!).

Terrestrial herb. Stems decumbent with branching erect shoots 15–60 cm tall, subquadrate, succulent; internodes 3–7 (–10.5) cm long, glabrescent to moderately hirsute at the apical nodes, glabrescent at the basal nodes. **Leaves** opposite, subequal to slightly unequal in a pair; **petioles** 1.0–2.5 cm long, green, tinged wine-red below, usually glabrescent, sometimes hirsute in new leaves; **lamina** 7.5–17.0 × (1.5–) 3–8 cm wide, elliptic to obovate-elliptic, sometimes narrowly lanceolate with crenate-serrate margins, base cuneate to attenuate, apex acute, adaxial surface dark green, abaxial surface light green, sometimes tinged with purple, glabrescent on both surfaces; the lateral pairs of veins 6–10 (–12), departing the midrib at 45–55° angle, tertiary venation *anastomosing,* forming series of areoles between adjacent secondary *veins* reaching almost to the margin. **Inflorescence** a reduced pair-flowered cyme, of 1–2 flowers in axillary clusters, the prophylls lanceolate, entire or with glandular teeth, up to 2 cm long, green suffused with reddish purple at the margins and the apex, tomentose; the pedicels 2.5–6 cm long, green to reddish purple, pubescent. **Calyx lobes** subequal 12–25 (–30) × 5–6 (–8) mm, ovate-lanceolate, glabrescent to hirsute, light green, with 2–5 glandular teeth on the margin. **Corolla** oblique relative to the calyx, 3.3–4.5 cm long, funnelform, spurred at base; limb oblique with reflexing lobes; corolla tube pubescent with translucent hairs, distal half a narrow tube, proximal half gradually expanding; corolla lobes subequal, 1.3–2.0 cm, slightly longer than broad; throat with glandular trichomes clustered on the lateral and lower surfaces. **Androecium** of 4 stamens, included, didynamous, 2.5–3.0 cm long, the filaments adnate to the base of the corolla tube upto 5.0 mm, white, glabrous, anthers apically coherent into a square, each pair of thecae ca. 2 mm long, oblong, dehiscent by longitudinal slits. **Nectary** a bilobed dorsal gland, entire and glabrous. **Gynoecium** with an ovoid ovary, 0.7 × 0.35 mm, densely sericeous, style up to 2.0 cm long, glabrous, stigma bilobed with glandular capitate hairs. **Fruit** a bivalved capsule, seeds not seen.

Distribution and habitat:—*Nautilocalyx erytranthus* occurs in the western Amazon basin of Colombia, Ecuador and Peru (100–700 m). It grows in abundant populations (10–15 individuals) in shady areas of mature forest. The vegetation zone (Holdridge 1967) where *N. erytranthus* occurs is classified as Tropical wet forest (Twf) to Tropical rain forest (Trf).

Phenology:—*Nautilocalyx erytranthus* has been collected in flower during the months of January, March, May, June and August to November.

Etymology:—The specific epithet, *erytranthus* refers to the red flowers.

Conservation Status:—Most collections of *Nautilocalyx erytranthus* are from the protected area of the Yasuní Biosphere Reserve in Amazonian Ecuador. The distribution of *N. erytranthus* includes three countries and at least two protected areas in Ecuador (Yasuní National Park and Cuyabeno Reserve). The Yasuní Biosphere Reserve (an area that includes the Yasuní National Park) is one of the most biologically diverse forests on Earth. It encompasses an area of approximately 10,000 km^2 between the Napo and Curaray rivers in the provinces of Napo and Pastaza. The Yasuní National Park was designated as a UNESCO Biosphere Reserve in 1989 and received formal protection by the Ecuadorian government's Ministerio del Ambiente. Ecuador's Congress under the presidency of Rafael Correa created an initiative to protect Yasuní National Park's natural resources by raising funds from the international community to prevent oil drilling. This initiative was abandoned in 2013 because of insufficient support and President Correa is in the process of formally opening the park for drilling. According to the IUCN Red List criteria for estimated range, area of occupancy and population size (IUCN 2001), and considering the uncertain future of habitat conservation in the Yasuní Biosphere Reserve, *Nautilocalyx erytranthus* should be listed in the category NT (Near Threatened).

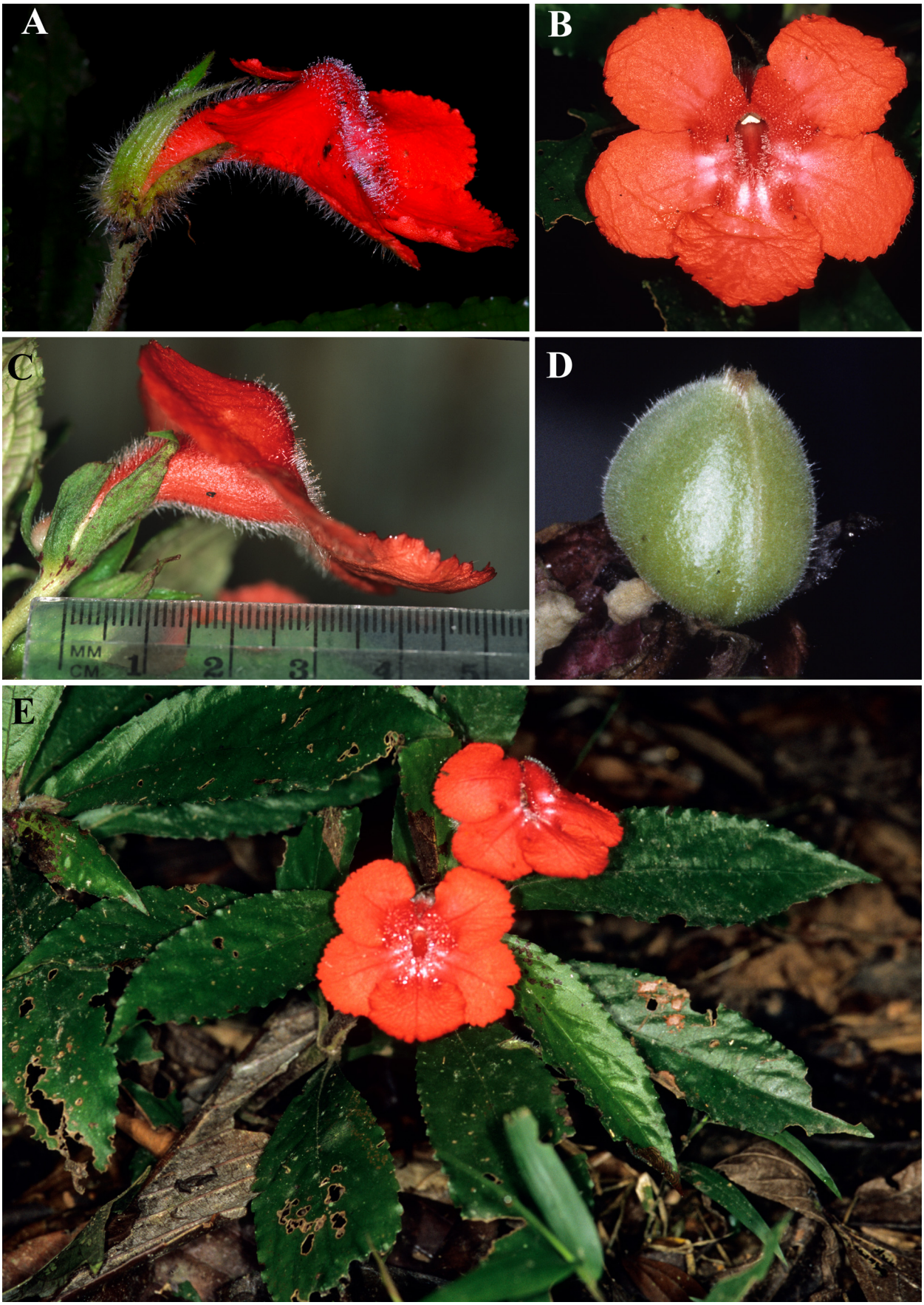

FIGURE 1. *Nautilocalyx erytranthus.* A. Lateral view of flower (*J.L. Clark 10181*), B. Front view of flower (*J.L. Clark 9484*), C. Lateral view of flower with ruler (*J.L. Clark 8268*), D. Immature fruit (*R.W. Dunn & J.F. Smith 9604023*), E. Terrestrial habit (*J.L. Clark 9484*).

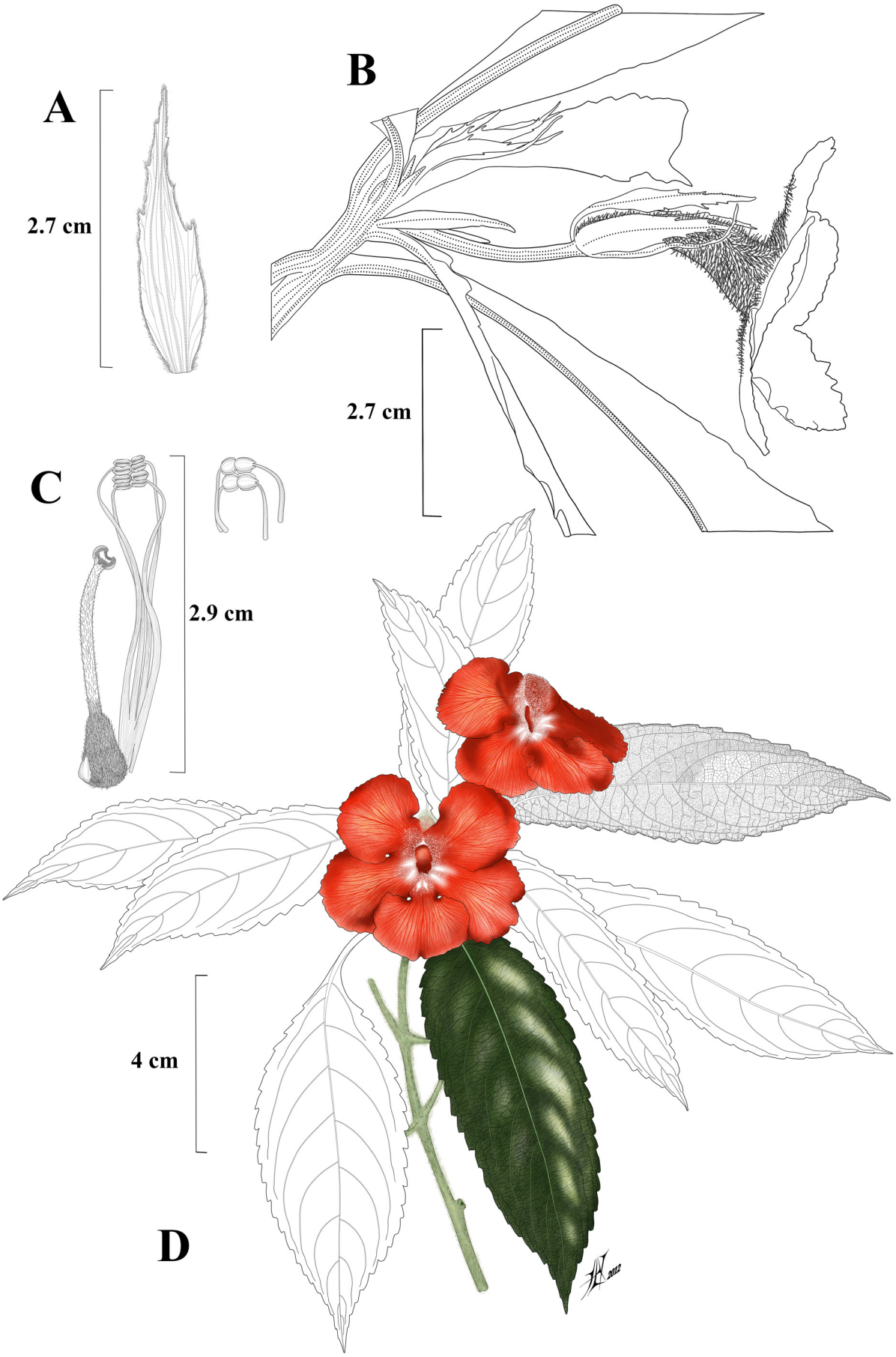

FIGURE 2. *Nautilocalyx erytranthus*. A. Calyx lobe. B. Lateral view of flower and foliage. C. Androecium and gynoecium. D. Habit (A–D from *J.L. Clark et al. 9550*).

Discussion:—*Nautilocalyx erytranthus* is characterized by an obligate terrestrial habit and red corollas with reflexed lobes. The presence of red flowers in *Nautilocalyx* is relatively uncommon. The leaves of *N. erytranthus* are variable in color and texture. The abaxial leaf surface is either uniformly dark red to purple or uniformly light green. Variation of leaf color was observed in populations from the Yasuní Biosphere Reserve where it is locally abundant. It was observed to be a common terrestrial herb in the Tiputini Biodiversity Station. A commonly cultivated form of *Nautilocalyx erytranthus* has bullate leaves and future studies may recognize this taxon as heterospecific from the holotype of *N. erytranthus*, which has non-bullate leaves. The locality of the cultivated material with bullate leaves is from the Cuyabeno Reserve (Reserva de Producción Faunística Cuyabeno) in the Sucumbios Province of Ecuador where it was collected and brought into cultivation during an expedition by Richard W. Dunn (Dunn 1996).

Nautilocalyx erytranthus is similar to *N. urticifolius* (Leeuwenberg 1958: 314) Wiehler (1978: 43), which is endemic to Colombia and also has red corollas. These species are differentiated by the presence of erect corolla lobes (i.e., non-reflexed) and leaf blades less than 8 cm long in *N. urticifolius.* The corolla lobes in *N. erytranthus* are reflexed and the leaves are longer (7.0 to 17 cm long). Many museum collections of *N. erytranthus* were annotated as *N. lucianii* (Linden & Fournier 1876: 43) Wiehler (1978: 36). The presence of variegated foliage with reticulate bullae differentiates *N. lucianii* from the non-variegated leaves and non-reticulate bullae in *N. erytranthus*. These two species are geographically isolated with *N. lucianii* endemic to Colombia (Antioquia and Caldas) and *N. erytranthus* mostly in Ecuador and Peru with a single collection from Putumayo (Fig. 3).

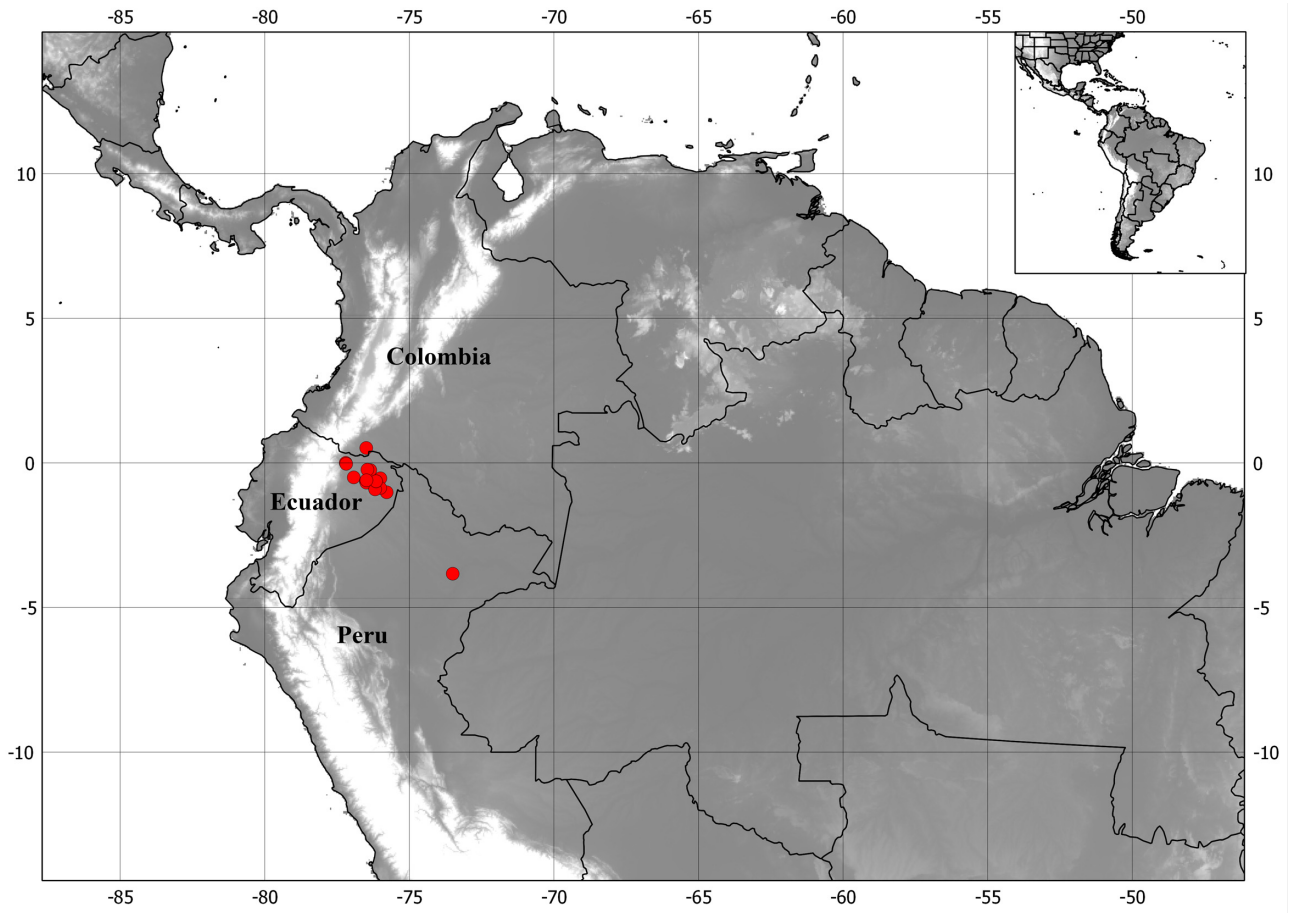

FIGURE 3. Distribution of *Nautilocalyx erytranthus* indicated by circles.

Additional specimens examined:—Colombia. PUTUMAYO. Eastern slopes of the Cordillera Oriental, near San Diego de Colorado, tributary of Río Putumayo, between Umbria and Puerto Asis, 16 January 1945, *Ewan 16783* (US, SEL). Ecuador. ORELLANA. Cantón Aguarico, Yasuní Forest Reserve, E of Pontificia, 15 June 1995, 0°40.9'S 76°23.7'W, *Acevedo & Cedeño 7307* (US); Parque Nacional Yasuní, Pozo Amo 2, Trochas de Amosur,

0°52'S 76°0.5'W, 9–13 January 1988, *Cerón et al. 3185* (MO); Parque Nacional Yasuní, Pozo petrolero Daimi 2, 1°1'S 75°47'W, 200 m, May–June 1988, *Cerón & Hurtado 4070* (US); Cantón Aguarico, Parque Nacional Yasuní, Lagunas de Garza Cocha, 0°55'S 76°11'W, 200 m, 22 September 1988, *Cerón & Gallo 5042* (MO); Cantón Orellana, Yasuní Biosphere Reserve, Tiputini Biodiversity Station (Universidad San Francisco, Quito), sendero Guacamayo, 10°38'11"S 76°8'58"W, 200 m, May 5, 2007, *Clark et al. 9550* (NY, QCNE, SEL, UNA, US); Cantón Orellana, Yasuní Biosphere Reserve, Tiputini Biodiversity Station (Universidad San Francisco, Quito), sendero Harbia, 10°38'11"S 76°8'58"W, 200–250 m, May 20, 2008, *Clark et al. 10181* (QCNE, UNA, US); Parque Nacional Yasuní, carretera y oleoducto de Maxus en construcción, km 46 al Pozo Capiron, 0°41'S 76°29'W, 244 m, 6–12 September 1993, *Dik 357* (SEL, US); 9–11 km S of Coca on road to Auca oil field, 0°30'5"S 76°55'22"W, 5 November 1974, *Gentry 12502* (MO, US); Road from Coca (Puerto Francisco de Orellana) to oil wells of the Auca district, ca. 30 km south of Coca, 1 Oct 1973, *Lugo 2572* (SEL); 14 January 1973, *Lugo 2733* (GB, SEL); 18 November 1973, *Lugo 3442* (SEL, US); Cantón Aguarico, Samona Yuturi, Quichua community on south bank of Río Napo, 0°32'S 76°0'W, 200 m, 11 November 1991, *Neill & Rojas 9946* (MO, UNA); Cantón Orellana, Yasuní National Park, Maxus road and pipeline under construction, km 3 of NPF-Puerto Maxus branch, 0°36'S 76°29'W, 250 m, 8 June 1994, *Pitman & Aulestia 210* (US); Cantón Aguarico, Estación Científica Yasuní; alrededores de la Estación, Sendero Botánico, 0°38'S 76°30'W, 200–300 m, 12 June 1995, *Romoleroux & Foster 1696* (US); Cantón Aguarico, Estación Científica Yasuní, Río Tiputini, al noroeste de la confluencia con el Río Tivacuno, 6 km este de la carretera Maxus, km 44, desvio hacia el pozo Tivacuno, Parcela de 50 hectarias, 0°38'S 76°30'W, 200–300 m, 12 October 1996, *Romoleroux et al. 2587* (US). SUCUMBÍOS. Lago Agrio, 250 m, 31 March 1980, *Brandbyge & Asanza 30384* (US-2 sheets); San Pablo de los Secoyas, Río Wai Si Aya, small northern tributary to Río Aguarico, path going S-SE, 0°14–15'S 76°21–27'W, 300 m, 7 August 1980, *Brandbyge et al. 32573* (AAU, US-2 sheets); Cuyabeno, Aguas Negras, Indian village, 0°05'23"S 76°08'29"W, 81–191 m, April 1996, *Dunn & Smith 9604023* (live material only); Cantón Cascales, Parroquia El Dorado, cooperativa Los Angeles, Bloque 11 Compañía Santa Fe, 3 km entre La Troncal y Los Angeles, 0°0'S 77°12'W, 250 m, 3 May 1997, *Freire et al. 2169* (US); Cantón Gonzalo Pizarro, Parroquia El Dorado, Sector Los Angeles, Pozo Rubi, petrolera Santa Fe, via desde La Troncal hacia pozo Rubi 2, km 5, 0°2'S 77°11'W, 250 m, 12 March 1998, *Freire & Vergara 3077* (US); Along Río Cuyabeno, near Puente Cuyabeno where road from Lago Agrio crosses river, 0°05'S 76°20W, 400 m, 3 April 1996, *Smith & Dunn 3397* (AAU, QCNE, SRP, US). Peru. LORETO. Provincia Maynas, Caserío Mishana, Río Nanay, Campamento no. 1, 3°50'S 73°30'W, 140 m, 19 November 1981, *Ruíz & Murphy 232* (US).

Acknowledgments

Support for this project was provided by the National Science Foundation (DEB-0841958 and DEB-0949169 to JLC) and The Gesneriad Society, Inc. We thank the following herbaria for access to their collections: Smithsonian Institution's National Museum of Natural History—Department of Botany (US), Missouri Botanical Garden (MO), Field Museum of Natural History (F), Marie Selby Botanical Gardens (SEL) and University of Wisconsin (WIS). We thank Henry Arellano for the illustration. We are especially grateful to David and Consuelo Romo from the Universidad San Francisco de Quito for arranging logistical support to visit the Estación de Biodiversidad Tiputini in 2006, 2007 and 2009. Richard W. Dunn is acknowledged for his help in documenting *Nautilocalyx erytranthus* through collections and photographs. Michael Wenzel, Laurence E. Skog and an anonymous reviewer provided helpful comments on an early version of the manuscript.

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