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Two New Species of *Encyclia* (Orchidaceae: Laeliinae) from Venezuela

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ABSTRACT. Two new species of *Encyclia* Hooker (Orchidaceae: Laeliinae) are proposed from Venezuela, *E. betancourtiana* Carnevali & I. Ramírez and *E. garciae-esquivelii* Carnevali & I. Ramírez. The first, from Andean Venezuela, is related to *E. aspera*, but has a subquadrate labellum and grows at higher elevations. The second, from the northern slopes of the Coastal Range, is related to *E. diurna* but has smaller, differently colored flowers, a more elliptic central lobe, and grows in coastal thorn forests.

RESUMEN. Dos nuevas especies de *Encyclia* Hooker (Orchidaceae: Laeliinae) de Venezuela se proponen, *Encyclia betancourtiana* Carnevali & I. Ramírez y *E. garciae-esquivelii* Carnevali & I. Ramírez. La primera de estas, de la región andina, está relacionada con *E. aspera*, pero el lóbulo central es subcuadrado y crece a mayores elevaciones. La segunda, de la vertiente norte de la Cordillera de la Costa, está relacionada con *E. diurna* pero tiene flores menores y de colores diferentes, un lóbulo central más elíptico y crece en selvas espinosas costaneras.

Key words: *Encyclia*, Laeliinae, Orchidaceae, systematics, Venezuela.

The genus *Encyclia* Hooker was first treated for Venezuela by Foldats in 1970 (embedded within the genus *Epidendrum* Jacquin). The genus was then reviewed by Carnevali and Ramírez (1988, as *Encyclia*) and later by Carnevali et al. (1994). These last two treatments included within *Encyclia* the species that were recently segregated as the genus *Prosthechea* Knowles & Westcott by Higgins (1998). An overall, encyclopedic view of the South American species of the genus was presented by Withner (2000), who essentially treated the Venezuelan species following Carnevali et al. (1994). This author for the first time explicitly excluded the *Prosthechea* taxa from *Encyclia* in a generic treatment. Romero and Carnevali (2000) added two *En-*

cyclia species for Venezuela in their new edition of Dunsterville and Garay's *Orchid of Venezuela: A Field Guide*. The *Encyclia* species from the Venezuelan Guayana were recently treated by Carnevali and Ramírez (2003). Among all these treatments, we can account to date for 16 *Encyclia* species in Venezuela. Since there have been several range extensions, circumscription changes, and additions in the genus for the Venezuelan flora, we have started a new study that will deal with these problems to eventually result in a new revision of the genus for the country.

In this paper, in preparation for the larger overview of Venezuelan *Encyclia*, we propose two new species, raising the number of known Venezuelan members of the genus to 18. The first new species, *Encyclia betancourtiana*, is the result of the recent collection of a hitherto unrecorded member of the *E. aspera* (Lindley) Schlechter group, a complex of Andean members of the genus. The second new species, *Encyclia garciae-esquivelii*, is the result of a study of the variation within the broad circumscription of *E. diurna* (Jacquin) Schlechter taken by previous authors (e.g., Foldats, 1970; Carnevali & Ramírez, 1988; Carnevali et al., 1994).

Encyclia betancourtiana Carnevali & I. Ramírez, sp. nov. TYPE: Venezuela. Mérida: Mun. Libertador, Parque Nacional Sierra Nevada, valle intramontano en los alrededores de El Morro, a lo largo de los taludes del río Nuestra Señora, ca. 8°27'N, 71°10'W, 1800–2000 m, 20 feb. 2002, G. Carnevali 6056 (holotype, VEN; isotype, CICY). Figure 1.

Species haec *Encycliae asperae* affinis sed planta parvior, labello lobo centrali subquadrate, lobis lateralibus proportione brevior latiore, petalis latiore paulo basaliter attenuatis, disco altilamellato recedit.

Epiphytic herbs 15–20 cm tall; rhizome abbreviated, thus plants ± caespitose with the pseudobulbs clustered but eventually shortly creeping; pseudobulbs 2.5–5 × 1.2–2.5 cm, ovoid to (more

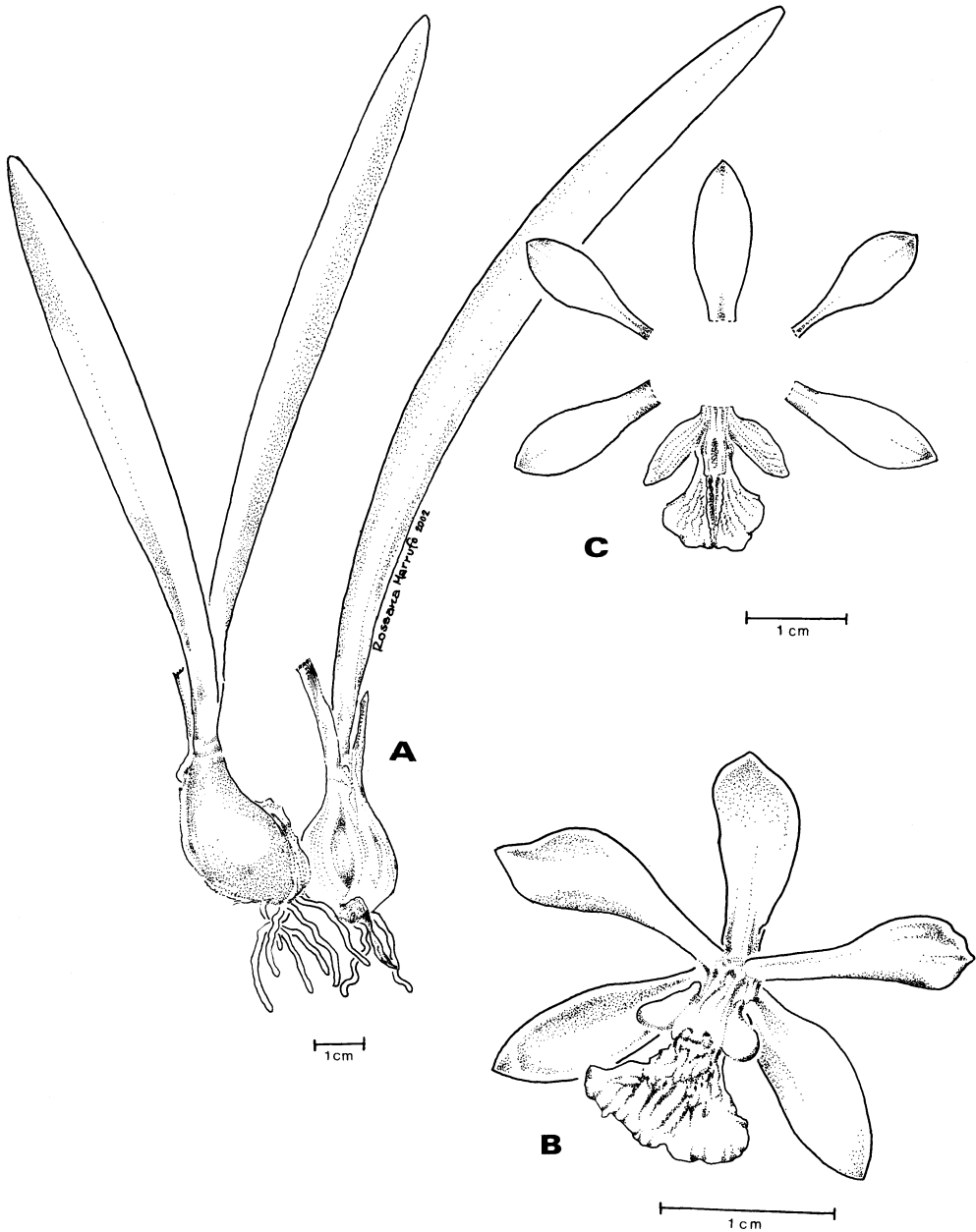


Figure 1. *Encyclia betancourtiana* Carnevali & I. Ramírez. —A. Plant. —B. Flower. —C. Perianth segments, flattened (based on *G. Carnevali* 6056 (isotype, CICY), drawn by Rossana Marrufo, CICY).

rarely) ovoid-suborbicular, clothed in 1 or 2 scarios sheaths, apically (1- or)2-leaved. *Leaves* 10–20 × 0.9–1.9 cm, rigidly coriaceous, straight, erect, oblong, obtuse, apex minutely unequal, blade almost flat or slightly concave. *Inflorescence* racemose or with a single, few-flowered branch at base, surpassing the leaves, with 12 to 16 laxly arranged flowers, the flowers spaced 15–40 mm; peduncle

and rachis purple-brown tinged, coarsely verruculose; *pedicel* and *ovary* 17.5–19 mm long, ca. 3 mm thick, verruculose, purple-brown tinged. *Flowers* with widely spreading perianth segments, resupinate, petals and sepals dark yellow-green with dark brown suffusion toward apices, labellum with white midlobe and with 2 or 3 purple longitudinal, raised nerves, the apices of the lateral lobes pale yellow-



Figure 2. *Encyclia garciae-esquivelii* Carnevali & I. Ramírez. Flowers (photograph by G. Carnevali, based on G. Carnevali & I. Ramírez 6811).

green, the callus white with a few purple nerves, the column apically white, at base pale yellow-green with 3 faint lines of fine purple dots, the anther dull pink with thick, deep dark purple margins; *sepals* 7-nerved, elliptic or oblong-elliptic, obtuse or obtusely acute, the laterals very slightly oblique, more attenuated basally than the dorsal sepal, the apex on the external face with dense verrucae and bluntly keeled; dorsal sepal 15.5–16 × 5.5–6 mm; *petals* 14.8–15.2 × 5–6 mm, 1.5 mm wide at base, 5-nerved, spatulate, obtuse to obtusely acute at apex, apically with a thickened mucro; *labellum* 3-lobed, the lateral lobes parallel and laxly embracing the column, upon spreading forming an angle of less than 45° in relation to the main labellar axis, 14–15 mm long along its main axis, 13–14 mm across the spread lateral lobes, midlobe 8–9 mm long from the point where lateral lobes arise, broadly obovate in general outline including the basalmost, callus-including section; the blade of the midlobe 6–7 × 9.5 mm, transversally subquadrate-rhomboid, broadly truncate and shallowly emarginated or 2-lobed at apex, the upper surface with the nerves keeled and coarsely verruculose with the verrucae arranged in 8 longitudinal lines; lateral lobes 9–9.5 mm long along the external margin (ontogenetically the most basal), 6–6.5 mm long along the internal margin, ca. 3.5 mm wide at base,

oblong-elliptic in general outline, 6- or 8-nerved, the lobes decurrent on the disk for 4.7–5 mm; obliquely obtuse to round at apex; disk formed by 4 longitudinal, smooth plates or broad keels, the 2 central ones fused in an elevated almost flat, oblong plate, 6–6.5 mm long, the plate tridentate at apex and with a shallow, narrowly elliptic longitudinal depression in the central portion; the 2 outermost keels much lower and divergent centrally; the callus barely extending into the lower half of the central lobe; *column* 7–7.9 mm long, ca. 3.5 mm wide at apex where it expands and gradually and slightly attenuates toward base where it is 3 mm wide, somewhat pandurate in outline; just below apex provided with 2 small wings, 0.9–1.1 mm long, these narrowly triangular, acute, in natural position bent toward the labellum and very laxly holding it in position; stigmatic surface ca. 2 × ca. 2.5 mm wide, obcordate; the clinandrium with 3 shallow teeth, the central ca. 0.2 mm long; anther subquadrate in general position, ca. 1.5 mm long. *Capsules* unknown.

Encyclia betancourtiana belongs to an Andean complex of *Encyclia* characterized by coarsely verruculose peduncles, rachis, and ovaries. These *Encyclia* species also feature thick, elevated, more or less flat calli with the central depression less de-

veloped than in other groups of the genus. Furthermore, the keel or nerves that emerge from the callus and extend into the midlobe of the labellum are thick and usually coarsely verruculose. The auricles or wings of the column are also relatively small and usually acute. The capsules are verruculose to warty in other species of the complex and so, probably, are those of the newly proposed species. This Andean complex includes such taxa as *Encyclia aspera* (sensu Withner, 2000, including as synonyms *E. trachypus* Schlechter and *E. asperirachis* Garay), *E. angustiloba* Schlechter, *E. microtos* (Reichenbach f.) Hoehne, and probably *E. naranjapatisensis* Dodson, which range from Peru to Colombia, mostly along the western declivities of the Andes, although *E. microtos* is also known from the eastern drainages in Peru. Some species of this Andean complex also feature reddish peduncles and rachises similar to the purple-brown ones seen in *E. betancourtiana*. *Encyclia betancourtiana* is the first member of this complex to be recorded from the Cordillera de Mérida and for Venezuela.

Among the species of this Andean complex, *Encyclia betancourtiana* can be diagnosed by its transversely subquadrate-rhomboid central lobe of the labellum (vs. orbicular or orbicular-elliptic in *E. aspera*), and the lateral lobes are proportionally shorter (barely projecting beyond the apex of the column in natural position vs. conspicuously longer than the column in *E. aspera*), broader, and apically blunter (vs. narrow and acute in *E. aspera*). It also grows at much higher elevations than *E. aspera*.

It is interesting to note that *Encyclia betancourtiana* has essentially the same labellum outline as *E. andrichii* Menezes, a species from Espírito Santo, Brazil. In *E. betancourtiana*, however, the leaves are proportionally broader (to 10.5–11 times longer than wide vs. ca. 12.5 times as long as wide in *E. andrichii*) and the labellum has fewer raised, colored nerves. We have not seen authentic material of *E. andrichii*, but assume the two taxa not to be closely related on account of the biogeographical disjunction.

Encyclia betancourtiana is apparently rare and geographically localized. At present, it is only known from a few epiphytic plants collected on trees over cliffs along the Nuestra Señora River, one of the most important rivers of Parque Nacional Sierra Nevada. These plants were brought into cultivation in the year 2001, and a few of them flowered in 2002. The type material was prepared from these inflorescences. The plants seem to thrive under cultivation but are difficult to bring into flower.

Eponymy. We take great pleasure in naming this species after Armando and Armando Dimas

Betancourt, amateur orchid growers from Venezuela, who first collected and flowered this species. They also provided the type material.

Encyclia garciae-esquivelii Carnevali & I. Ramírez, sp. nov. TYPE: Venezuela. Aragua: unos 1–2 km al oeste de la cumbre de la carretera entre Ocumare de la Costa y Cata, unos 4–5 km al E de la Ocumare de la Costa, 10°29'N, 68°42'W, Parque Nacional Henry Pittier, en la vertiente norte de la Cordillera de la Costa, 300–400 m; flowering under cultivation by G. Carnevali & I. M. Ramírez in Mérida, Yucatán, México, 10 June 2003, specimens prepared from plants collected by G. Carnevali in 1986, *G. Carnevali & I. Ramírez 6811* (holotype, VEN; isotypes, AMES, CICY, MEXU, MO, NY). Figures 2, 3.

Species haec *Encycliae diurnae* affinis sed planta et floribus parvioribus, pseudobulbis 2–3-foliatis, petala sepalaque brunneis vel viridibrunneis proportione angustiore, labello lobo apicali proportione angustiore (1.8 longiore quam latiore vs. 1.1–1.3 latiore quam longiore) apice truncato vel paulo emarginato vel truncato (vs. rotundato) recedit.

Epiphytic or lithophytic *herbs* 25–40 cm tall not counting the inflorescences; rhizome abbreviated, thus plants caespitose with the pseudobulbs clustered, clothed in scarios sheaths; *pseudobulbs* suborbicular to suborbicular-pyriform, 3–5 × 3–3.5 cm, slightly less thick, apically 2- to 3-leaved, clothed by 2 to 3 scarios sheaths that soon disintegrate. *Leaves* 20–29 × 1.8–2.2 cm, linear oblong, acute, apex minutely unequal, margins revolute, blades often twisted 90°–180°. *Inflorescences* 27–70 cm long, erect, paniculate with 1 to 5 lateral branches, lateral branches 6–8 cm long, 2- to 6-flowered, peduncle terete, relatively thin and wiry, to 2 mm thick at base, bearing 2 or 3 tubular, closely fitting sheaths at lowermost internodes, the sheaths 14–16 mm long, peduncle and rachis dull brown-purple, ± densely verruculose, the verrucae creamy white to green, 0.2–0.3 mm diam.; *floral bracts* ca. 1 mm long and wide, broadly ovate, apiculate, sub-fleshy when fresh, dark maroon along and around midnerve, otherwise green. *Flowers* resupinate, with widely spreading perianth segments, sweetly fragrant, sepals and petals dull pale green, dull brown-maroon suffused, suffusion lighter toward the margins, particularly in the petals, the labellum with white midlobe with 7 entire or partially broken longitudinal purple nerves at each side of the midnerve, the lateral lobes cream white with purple-brown longitudinal nerves on the basal half, clear white on the apical half, the disk basally

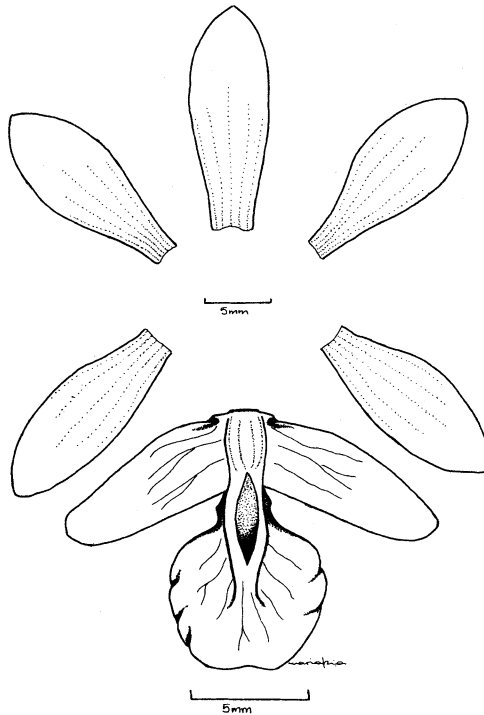


Figure 3. *Encyclia garciae-esquivelii* Carnevali & I. Ramírez. Perianth segments, flattened (based on *G. Carnevali 2011* (VEN), drawn by María Pía Bevilacqua, VEN). Both scales = 5 mm.

green, the callus white with some pink suffusion at base and five faint red-purple nerves on the lower half, column cream white at apex, green at base with some faint purplish or maroon suffusion on the adaxial surface on the lower half; *sepals* flat or slightly concave, the dorsal ones 14.5–16 × 4.8–5 mm, elliptic-lanceolate, obtuse, 9-nerved, the laterals 15–15.5 × 6 mm, elliptic-lanceolate, obtuse, slightly oblique, 11-nerved; *petals* 15–16 × 5–5.2(–6.5) mm at their widest, attenuated below the middle and 1–2 mm wide at base, apically concave, spatulate-elliptic, apically obtuse, minutely apiculate, thick, 5-nerved at base, 7-nerved apically; *labellum* 3-lobed, the lateral lobes tightly embracing the column, upon spreading forming an angle of less than 45° relative to the main labellar axis, the labellum 15.5–16.5 mm total length along its main axis, 14.5–15.3 mm wide across spread lateral lobes; *midlobe* 8–9 mm long from the point where lateral lobes arise, broadly elliptic in general outline including the basalmost, callus-including section, the blade 7.6–7.8 mm long, suborbicular to elliptic-suborbicular, truncate to shallowly emarginate at apex; lateral lobes 6.5–7.5 mm long along the external margin (ontogenetically the most basal), 5.5–6.5 mm long along the internal margin, ca. 3–4 mm wide at base, sub-triangular to triangular

oblong in general outline, 8-nerved, the lobes decurrent on the disk for 4.5–4.8 mm, obliquely round to truncate at apex where they are ca. 2 mm long; disk formed by four longitudinal, smooth plates or broad keels that run parallel at base, the two outermost lower while the higher, central ones diverge at above the point of emergence of the lateral lobes to converge again at the base of the midlobe to form an elliptic depression ca. 2 mm long, the callus extending into the lower half of the central lobe; *column* 8.7–9.2 × ca. 3 mm wide at apex where it expands and from where it gradually attenuates toward base, just below apex provided with two small wings, 0.9–1.1 × ca. 0.5 mm wide, the wings oblong, apically rounded, in natural position bent toward the labellum and holding it in position (tightly appressed to the column); stigmatic surface ca. 2 mm long, obovate-obcordate; anther sub-rounded in general position, ca. 2 mm long and wide; the clinandrium with 5 shallow teeth. *Pedicel* and *ovary* 15–17 mm long, 3 mm diam., subterete, thickened on the upper half, pale greenish yellow on the lower half, above darker, maroon-suffused green, verruculose, the verrucae similar to those of the peduncle and rachis but somewhat smaller and more laxly arranged; capsules ellipsoid, verruculose.

Encyclia garciae-esquivelii is closely related to *E. diurna* (Jacquin) Schlechter and has long been thought to be only a variant of it. It was first noted as potentially distinctive (under *E. diurna*) by Carnevali and Ramírez (1988). It is distinct enough, both morphologically and ecologically.

The plants of *Encyclia garciae-esquivelii* are smaller with proportionally shorter leaves (mature leaves 25–30 cm long in *E. garciae-esquivelii* vs. exceeding 50 cm in *E. diurna*). Pseudobulbs are often 3-leaved in *E. garciae-esquivelii*, while they are almost always 2-leaved in *E. diurna*. The inflorescences are usually much shorter in *E. garciae-esquivelii* than in *E. diurna* (usually longer than 1 m in fully mature plants) and the flowers are conspicuously smaller (dorsal sepal 14.5–16 mm long in *E. garciae-esquivelii* vs. 21–24 mm long in *E. diurna*). The central lobe of the labellum in *E. garciae-esquivelii* is broadly elliptic and apically truncate, while the same structure is orbicular and apically rounded in *E. diurna*, thus proportionally narrower (1.8 longer than wide in the new species as opposed to 1.1–1.3 times longer than wide in *E. diurna*). A most striking difference lies in the coloration of the flowers, since the petals and sepals of *E. garciae-esquivelii* are dull pale green, with dull brown-maroon suffusion, while they are invariably green in true *E. diurna*. The raised nerves in the labellum of *E. diurna* are a faint dull purple, while they are a deeper purple hue in the new species.

Besides these morphological differences, *Encyclia garciae-esquivelii* is biogeographically distinct from *E. diurna*. While *E. diurna* grows at elevations of (600–)800–1500 m mostly on the southern slopes of the Coastal Range in areas of cloud forests or premontane rain forests, *E. garciae-esquivelii* is an inhabitant of low-lying, xeromorphic vegetation along the coast at elevations of less than 100 m, often at sea level.

Encyclia garciae-esquivelii is a possibly rare, poorly collected species, known from two sets of populations, one in central coastal Venezuela, where they occur as low epiphytes or lithophytes in tropical thorn forests of north-(sea) facing slopes, along the roads from Ocumare de la Costa and Cata, and also along the road from Cata to Cuyagua. The second known population is from northeast-oriented, sea-facing cliffs near Chichirivichi in Falcón, probably 80–100 km northwest of the first set of populations, but in similar vegetation. The species, although possibly rare, is probably composed of several dispersed populations widespread along the xerophytic belt associated with the coast of north-central Venezuela.

Where known, *Encyclia garciae-esquivelii* is commonly associated with orchid taxa common to coastal thorn forests such as *Brassavola nodosa* (L.) Lindley, *Encyclia cordigera* (HBK) Dressler, *Myrmecophila humboldtii* (Reichenbach f.) Rolfe, and *Oncidium baueri* Lindley. These forests commonly feature columnar cacti in several genera (*Subpilocereus*, *Pilosocereus*, *Praecereus*), and herbaceous or succulent species such as *Pitcairnia*, *Peperomia*, *Melocactus*, *Anthurium* (especially members of sect. *Pachyneurium*), and *Bromelia chrysantha* Jacquin. The low canopy is dominated by spiny legumes.

An additional population of related encyclias, represented by the collection *Carnevali 3203* (CICY, VEN), remains a mystery. This population comes from Sierra Imataca, in Bolívar State in southeastern Venezuela. The cultivated plants of this population grown at the Caracas Botanical Garden came without more precise data. This population was treated by Carnevali and Ramírez (2003) as part of a broadly conceived *Encyclia diurna*. The authors then expressed their misgivings as to this hypothesis of relationships. This population is similar to *E. garciae-esquivelii*, but has a broader, more rounded central lobe to the labellum, and the apices of the lateral lobes are more rounded and reflexed in natural position. Otherwise, it conforms with *Encyclia garciae-esquivelii*. It may represent an additional undescribed species in the *E. diurna* complex or a distinctive population of *Encyclia garciae-esquivelii*. The Guayanian locality, however, suggests this population may belong to a different species than *E. garciae-esquivelii*. Thus, until more material is collected (to assess ranges of variation) and more precise locality data are available, we refrain from proposing an additional novelty.

Paratypes. VENEZUELA. **Aragua:** unos 1–2 km al oeste del la cumbre de la carretera entre Ocumare de la Costa y Cata, unos 4–5 km al E de la Ocumare de la Costa, 10°29'N, 68°42'W, Parque Nacional Henry Pittier, en la vertiente norte de la Cordillera de la Costa, 300–400 m, flowering under cultivation in Maracay, Edo. Aragua, 19 June 1994 (*G. Carnevali 3668*, VEN); flowering in cultivation, 1 July 1986, *G. Carnevali 2011* (CICY, pickled; VEN). **Falcón:** Dist. Silva, a lo largo del borde sur del Golfete de Guare, al pie de las escarpas calcáreas que miran al norte, SW de Chichiriviche, W de la Cueva de los Indios, 1–4 m, 10°54'–55'N, 68°17'–19'W, 31 Aug. 1974, *J. A. Steyermark & B. Manara 110489* (NY, VEN); flowering in cultivation at the Caracas Botanical Garden, 21 July 1993, *G. Carnevali 3204* (CICY, pickled; VEN).

Etymology. We are pleased to honor Carlos García-Esquivel of Caracas, Venezuela, with this species. Dr. García-Esquivel, a psychiatrist, is a world-renowned orchid species grower and one of the most knowledgeable Venezuelans in orchid

matters. He has collected widely in the country and has already been honored by several orchid names. These include such orchids as *Masdevallia garciana* Luer, *Epidendrum garcia-esquivelii* L. Sánchez & Hagsater, *Pleurothallis garciana* Luer, and others. The name *Encyclia garciana* is preoccupied by *E. garciana* (Garay & Dunsterville) Carnevali & I. Ramírez [basonym: *Epidendrum garcianum* Garay & Dunsterville = *Prosthechea garciana* (Garay & Dunsterville) W. Higgins] that preempted us from using only the first of Dr. García's last names.

The epithet choice "*garciae-esquivelii*" is allowed by article 23.5 of the *International Code of Botanical Nomenclature* (Greuter et al., 2000) as a genitive noun. The hyphen is deliberate and supported by Article 60.9., ex. 17.

Acknowledgments. The curators of AMES, MO, NY, and VEN loaned specimens that were important to this research. The authors thank Gustavo Romero (AMES) for his comments and assistance with literature and herbarium specimens. Jose Luis Tapia-Muñoz (CICY) and Rodrigo Duno (CICY) provided comments on an earlier manuscript draft. Lilia Can Itzá, Silvia Hernández Aguilar, and Filogonio May Pat (CICY) were important in specimen processing and databasing. The authors thank The New York Botanical Garden for access to restricted

distributional information of *Encyclia* taxa contained in the NYBG specimen database. Rossana Marrufo at CICY helped the authors with the iconography of the article.

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