

A RARE AND EXTRAORDINARY NEW SPECIES OF *TRICHOPILIA* FROM COSTA RICA

FRANCO PUPULIN^{1,2,3,4} AND ADAM P. KARREMANS¹

Abstract. A new species belonging to the popular orchid genus *Trichopilia* is described from southern Costa Rica. *Trichopilia gustavoi* appears to be rare, and is known only from the type locality, a pristine forest in Finca Las Alturas de Cotón on the outskirts of La Amistad National Park, close to the border between Costa Rica and Panama. The new species is vegetatively similar to *T. marginata*, but is unusual in the petals that are falcate, a lip that is boat-shaped, with a tuft of scattered, low verrucae in the center of the disc, and a column that is distinctly sigmoid. The extraordinary *T. gustavoi* honors the rector of the University of Costa Rica, Gustavo Gutiérrez Espeleta, for his support of biological research and conservation of Costa Rican biodiversity.

Keywords: flora of Costa Rica, new species, Orchidaceae, *Trichopilia*

Flowers of *Trichopilia* Lindl. are among the more showy orchids in Costa Rica. Their large colorful flowers are very appealing, and they have important cultural significance. Species belonging to the genus are highly valued by Costa Ricans, who refer to them as “tricopilia.” These orchids are often found cultivated in gardens and depicted in paintings and on stamps. Their beauty and exotic fragrance is spoken of in popular books, and they are even alluded to in the names of typical local sweets.

The genus currently includes about 30 epiphytic species occurring from Mexico to Brazil, with one species found in the Antilles. They can be found growing in pristine, mature forests on the trunks and large branches of trees. Species of *Trichopilia* are distinguished by their compact, caespitose habit with notoriously narrow, flattened pseudobulbs bearing a single apical leaf. The inflorescence is borne at the base, and may bear a single large flower or a few simultaneous, large flowers, that are sometimes fragrant. The column is elongate, often fused partially to the lip, and bears a lacerate clinandrium (Pupulin, 2022).

Costa Rica is one of the major centers of diversity for *Trichopilia* (Pupulin, 2022). The catalogue of Costa Rican orchids (Pupulin, 2002) accounted for six species and one natural hybrid, while Pupulin et al. (2023) recorded 12 species and one natural hybrid. In just two decades the number of recognized species in the genus has doubled in the

country, and this certainly speaks to the challenge of correctly determining herbarium specimens due to poorly preserved flowers (Dressler and Pupulin, 2005) and the amount of cryptic diversity that requires careful study in our region (Dressler and Pupulin, 2006; Dressler and Bogarín, 2009). It also speaks to the natural rarity of certain taxa, resulting in novelties even in large-flowered, botanically well-sampled, previously monographed genera (Bogarín, 2011).

Cryptic diversity can greatly impact studies on speciation, diversification processes, ecosystem development, and conservation priorities, and, as such, the underestimation of neotropical orchid diversity is a concern (Karremans, 2021). Just recently, Pupulin et al. (2023) predicted that, despite centuries of botanical collection and inventorying, novelties in the orchid flora of Costa Rica are likely to be found in the near future. Indeed, this has been the case, and several new orchid species have already been published since, but who would have suspected one of those novelties would be in the charismatic genus *Trichopilia*? Although unexpected, Pupulin and Karremans (2017) point out that the Costa Rican orchid flora still reveals striking novelties because of the natural rarity and restricted distribution of certain plants. Undetermined *Trichopilia* specimens recently discovered in a pristine privately conserved forest in Finca Las Alturas de Cotón on the Costa Rica-Panama border represent a most extraordinary example.

TAXONOMY

Trichopilia gustavoi Pupulin & Karremans, *sp. nov.* Fig. 1–3.

TYPE: COSTA RICA. Puntarenas: Coto Brus, Pittier, Cedro Norte, entrada noroeste de Finca Las Alturas, 9°00'00.50"N, 82°54'11.30"W, 1715 m, Zona Protectora Las Tablas, Finca Las Alturas, sector Cedro Norte, a la orilla del sendero, bosque muy húmedo montano bajo, epífita, 20 noviembre 2023, preparado 2 agosto 2024, I. F. Chinchilla, A. P. Karremans, & G. Rojas-Alvarado 5711 (Holotype: JBL, spirit).

Species Trichopilia marginata Henfr. *affinis*, *petalis falcatis vel subsigmoideis*, *labello naviculare subrectangularis vel anguste ovato*, *auriculis retrorsis ellipticis parvis in base munito*, *verrucis diminutis in disco ornato*, *columna sigmoidea plerumque recedit*.

An epiphytic, caespitose, erect *herb* to 35 cm tall. *Roots* slender, flexuous, branching, to 2.5 mm in diameter. *Pseudobulbs* linear, laterally flattened, subancipitous, 8.0–11.0 × 0.8–1.4 cm, base covered by 3–4 triangular,

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¹Lankester Botanical Garden, University of Costa Rica, PO Box 302-7050, Cartago, Costa Rica

²Harvard University Herbaria, Cambridge, Massachusetts, U.S.A.

³The Marie Selby Botanical Gardens, Sarasota, Florida, U.S.A.

⁴Corresponding author: franco.pupulin@ucr.ac.cr

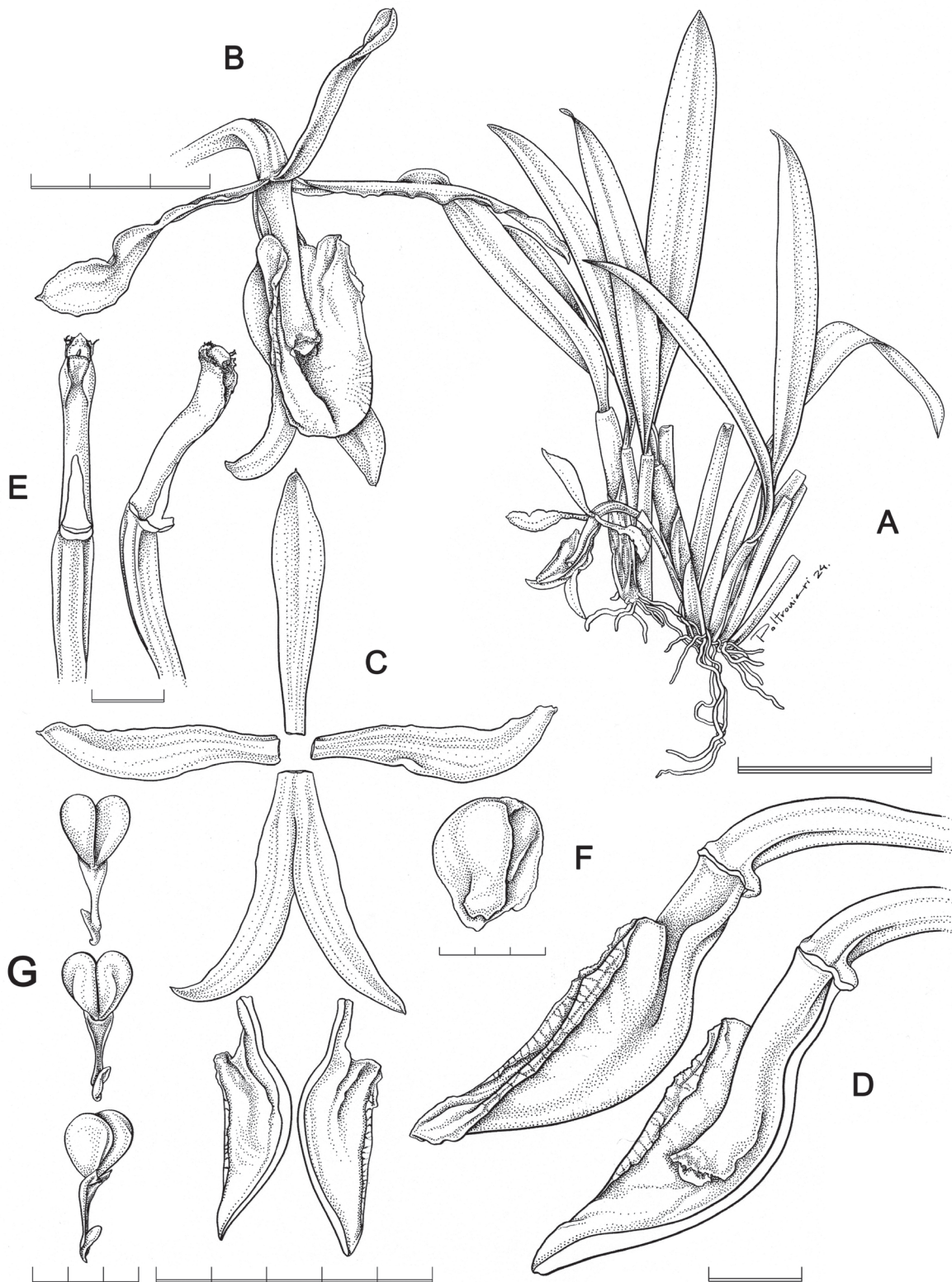


FIGURE 1. *Trichopilia gustavoi* Pupulin & Karremans. **A**, habit; **B**, flower; **C**, dissected perianth; **D**, ovary, column and lip, side view and longitudinal section; **E**, column, side and ventral views; **F**, anther cap side view; **G**, pollinarium dorsal, side and ventral views. Scale bars: simple bar = mm; double bar = cm; triple bar = dm. Drawn by Sara Poltronieri from the holotype.

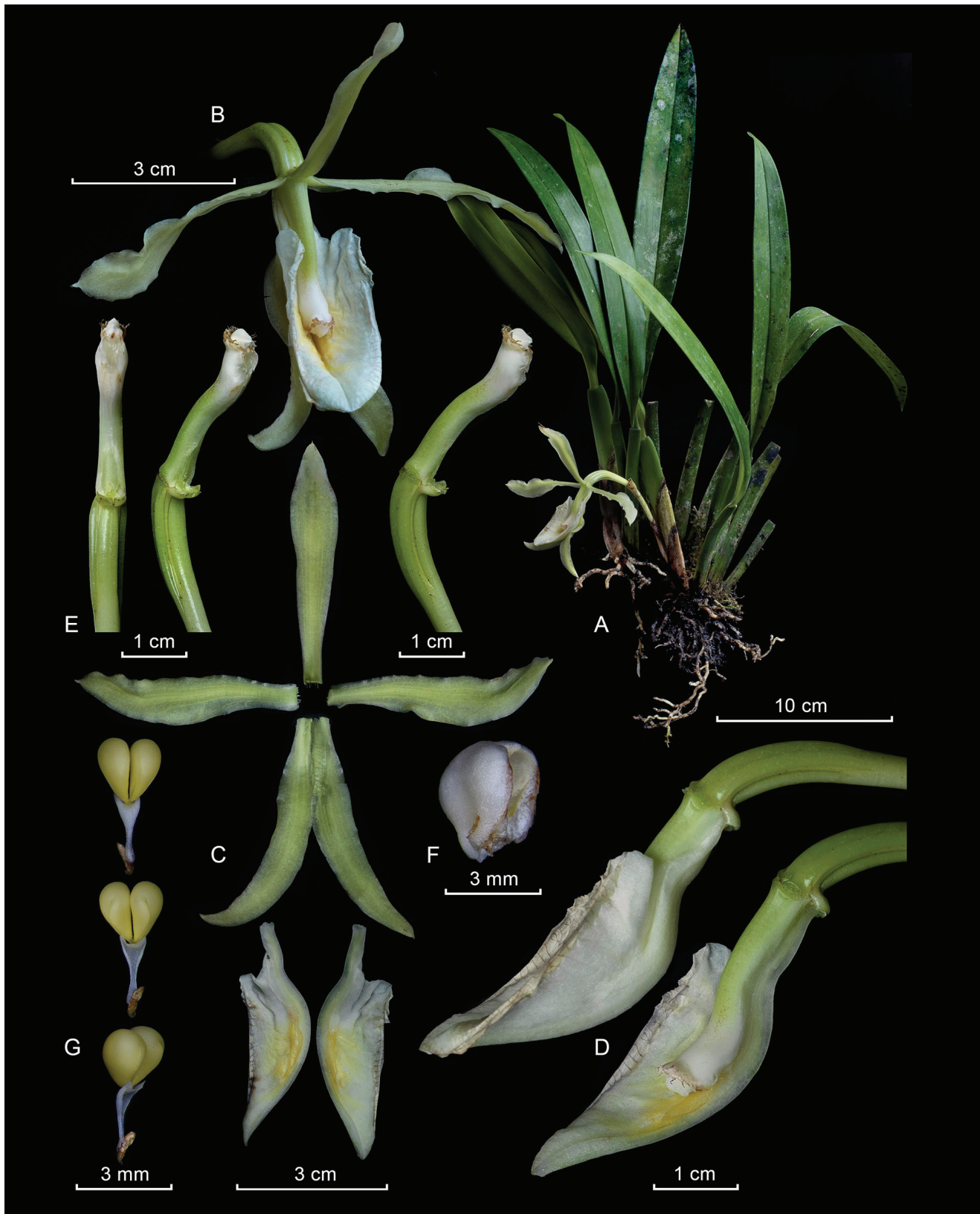


FIGURE 2. Lankester Composite Digital Plate of *Trichopilia gustavoi* Pupulin & Karremans. **A**, habit; **B**, flower; **C**, dissected perianth; **D**, ovary, column and lip, side view and longitudinal section; **E**, column, ventral and lateral views; **F**, anther cap side view; **G**, pollinarium dorsal, ventral and side views. Photographs by FP based on *Chinchilla et al. 5711*.

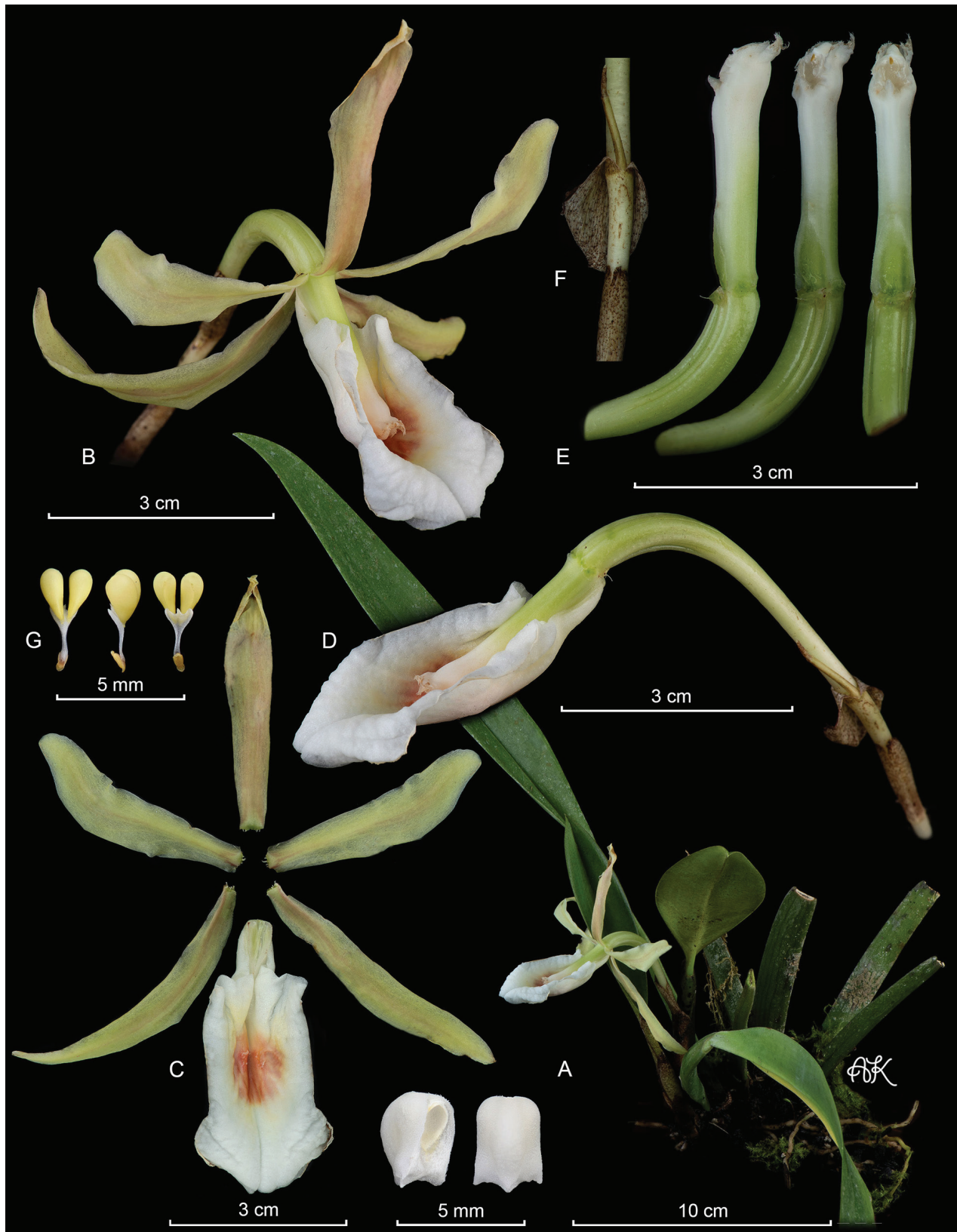


FIGURE 3. Lankester Composite Digital Plate of *Trichopilia gustavoi* Pupulin & Karremans. A, habit; B, flower; C, dissected perianth; D, ovary, column and lip, lateral view; E, column, lateral and ventral views; F, vestige of the racemose inflorescence; G, anther cap side and dorsal views; H, pollinarium dorsal, side and ventral views. Photographs by AK based on Karremans *et al.* 9598.

acute, tightly clasping, ancipitous, thinly fibrous, brown-papyraceous sheaths 2.3–6.0 × 1.8–3.0 cm, eventually disintegrating with age, monophyllous. *Leaf* erect, elliptic to narrowly elliptic, acute, provided with a minuscule abaxial apicule, 12.5–24.0 × 2.2–4.0 cm, gradually narrowed at the base into a conduplicate petiole ca. 1 cm long. *Inflorescence* a single-flowered, suberect raceme, 10–12 cm long, borne from the previous mature growth; peduncle terete, ca. 5 cm long, covered near the base by 2 amplectent, triangular, acuminate, apically diverging, fibrous bracts, 3.0 × 0.6 cm. *Floral bract* glumaceous, becoming thin-papyraceous with

age, oblong, acute to minutely acuminate, loose, 2.0 × 0.5 cm. *Pedicellate ovary* terete-clavate, curved towards the tip, 5 cm long, ovary strongly ribbed. *Flower* spreading, sepals and petals with undulate margins, greenish white, sometimes suffused with pale pink, lip white with a tuft of low papillae on the yellow or pink disk; column white from a greenish base, anther white. *Dorsal sepal* oblong, acute, conduplicate, slightly concave at the base, 4.2–4.5 × 0.8–1.0 cm. *Lateral sepals* ligular-falcate, acute, 4.8–5.5 × 0.7 cm, free or connate at the base for ca. 1.6 cm, apexes diverging. *Petals* oblong-falcate to subsigmoid, obtuse, minutely apiculate,

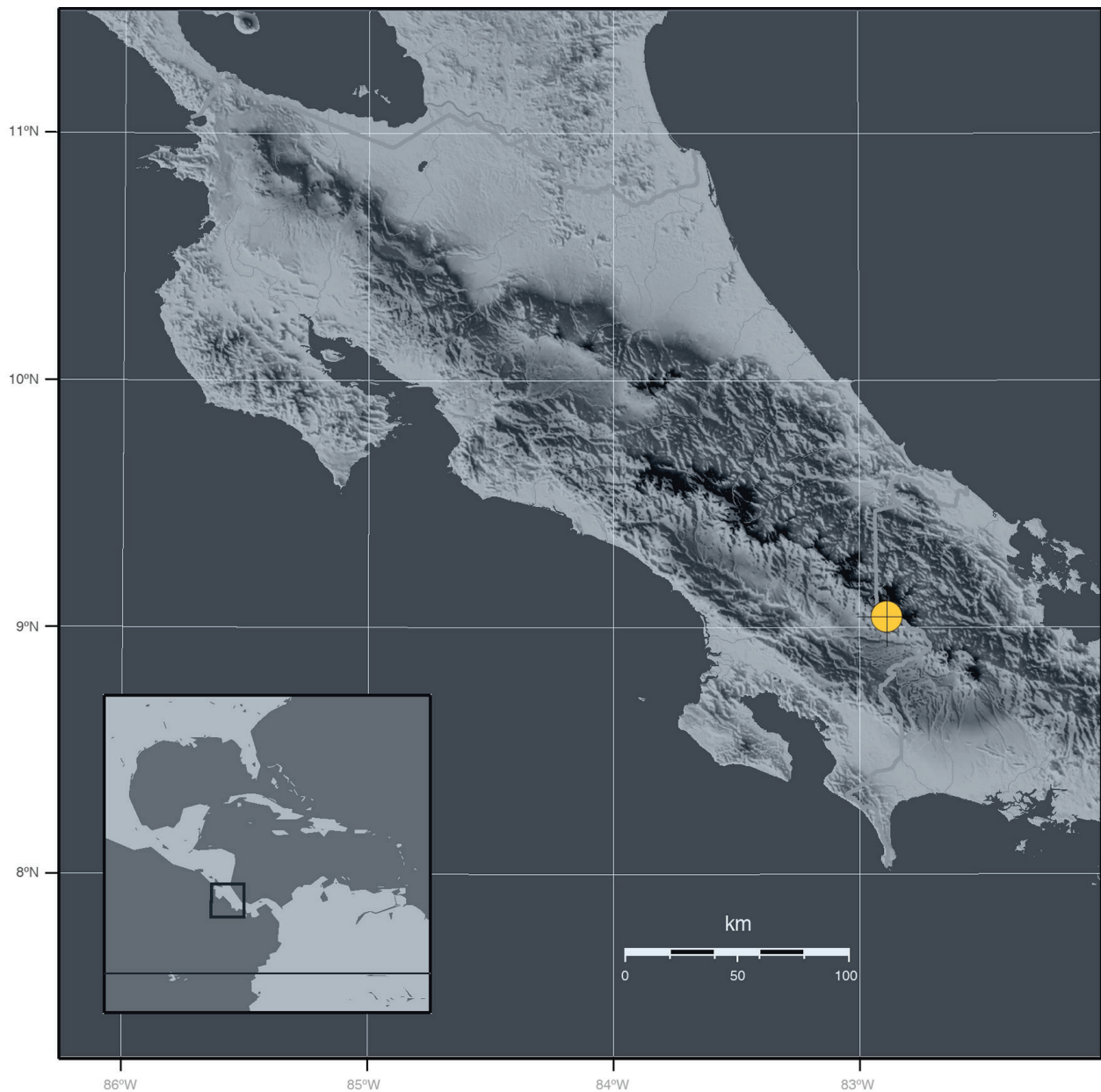


FIGURE 4. Distribution map of *Trichopilia gustavoi* Pupulin & Karremans.

4.0–4.6 × 0.9–1.0 cm, margins slightly wavy, particularly so the upper one and the base on the labellar margin. *Lip* deeply navicular, subrectangular to narrowly ovate in adaxial view, 4.4–4.6 × 1.9–2.3 cm when spread, blade provided with two small retrorse, narrowly elliptic auricles, ca. 3 × 5 mm, margins slightly undulate-reflexed, abruptly expanding from an obcuneate, narrow base 10 × 4 mm, the central portion of the disk with a few, small, low, rounded papillae. *Column* terete, distinctly sigmoid, slightly swollen at apex, 28 × 5 mm, basally fused with the lip for ca. 8 mm, provided with small, elliptic, irregularly dentate-lacerate, incurved stigmatic wings, clinandrium deeply concave, margins lacerate; anther incumbent, stigma recessed, obovate. *Anther cap* ovate-subrectangular, truncate, 2-celled. *Pollinia* 2, cleft, ovoid-pyriform, on a triangular, basally subcordate, apically rounded, hyaline stipe, affixed to a narrowly elliptic, brown viscidium. (Description based on the holotype and the specimen cited below as an additional specimen examined.)

Additional specimen examined: COSTA RICA. Puntarenas: Coto Brus, Pittier, Cedro Norte, entrada noroeste de Finca Las Alturas, 8°58'45"N, 82°54'30"W, 1350 m, epifitas al orillas de la trocha, bosque pluvial montano bajo-muy húmedo montano bajo, 20 noviembre 2023, preparado 2 agosto 2024, A. P. Karremans, I. F. Chinchilla, & G. Rojas-Alvarado 9598 (JBL, spirit). Fig. 3.

Eponymy: The name honors biologist and geneticist Gustavo Gutiérrez Espeleta, current Rector of the University of Costa Rica, for his painstaking support of biological research and conservation of Costa Rican biodiversity.

Distribution and habitat: The new species is currently known only from the type locality, a pristine forest in Finca Las Alturas de Cotón, a privately founded, protected area established for conservation purposes on the outskirts of La Amistad National Park, on the border between Costa Rica and Panama (Fig. 4).

As understood today, *Trichopilia* is a monophyletic group, which includes *Leucohyale* Klotzsch, *Helcia* Lindl.,

and *Pilumna* Lindl. Due to the lack of support for infrageneric relationship patterns in early molecular studies (Williams et al., 2001), Dressler and Klíkunas (2006) proposed a classification system using mainly characters of the pseudobulbs, leaves, and inflorescence. Section *Trichopilia*, typified by *T. tortillis* Lindl., is by far the most diverse group in the genus, with over 20 species and one nothospecies. Dressler and Klíkunas (2006) recognized two main alliances within this section: the *T. tortillis* alliance, characterized by a one-flowered inflorescence and a median groove on the lip; and the *T. suavis* alliance, with two to several flowers on each inflorescence and one to three keels running longitudinally on the lip blade. All of the species and nothospecies included in the former alliance—which is restricted in distribution to Mexico and Central America—have been recorded in Costa Rica, which is probably the main diversification center for the group. Species of the *T. tortillis* alliance typically have narrow and compressed pseudobulbs and a campanulate lip that from a narrow base forms a chamber around the apex of column.

Trichopilia gustavoi is most similar to *T. marginata* Henfr., and, vegetatively, is practically indistinguishable from the latter if not for the smaller size. The flower, however, is quite different and can be only approximately assigned to the *T. tortillis* alliance. In *T. gustavoi*, the petals are falcate and almost sigmoid (vs. straight) and the lip is boat-shaped (instead of infundibular). When spread, the lip of *T. gustavoi* is narrowly ovate to subrectangular, with two basal, retrorse auricles, while in *T. marginata* it is broadly obovate from a cuneate base, assuming a trumpet-shape in natural position. Furthermore, the groove on the midline of the lip is barely visible in *T. gustavoi*, and the basal osmophores are substituted by a tuft of scattered, low verrucae in the center of the disc. Finally, the column of *T. gustavoi* is distinctly sigmoid in lateral view (vs. straight), a feature that, together with the unusual indumentum of the lip, seems to suggest a different pollination syndrome.

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