

## A NEW LARGE-FLOWERED *CYRTOCHILUM* (ONCIDIINAE) FROM COLOMBIA, NAMED IN HONOR OF AN ESTEEMED TAXONOMIST

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**ABSTRACT.** A new and previously little-known *Cyrtochilum* (Orchidaceae: Oncidiinae), is named in honor and in memory of Leonore Bockemühl, who published a monographic treatment of *Odontoglossum* in 1989, which included many species that subsequently were transferred to *Cyrtochilum* based on molecular evidence. One of these species that was included in her treatment as “*Odontoglossum leucopterum*” is in fact an undescribed *Cyrtochilum* and is described here. The real “*Odontoglossum leucopterum*”, which was transferred to *Cyrtochilum* in 2001, has proven to be quite elusive since its original description. It was only recently photographed in the Sierra Nevada de Santa Marta in northern Colombia, its only known location, and photos of this rare orchid are featured here for the first time. The new *Cyrtochilum* is described, illustrated and compared with closely related *Cyrtochilum* species which are featured with line drawings and color photographs to illustrate the differences.

**KEY WORDS/PALABRAS CLAVE:** Cundinamarca, *Cyrtochilum bockemuehlae*, *Cyrtochilum leucopterum*, Leonore Bockemühl, Meta, *Odontoglossum leucopterum*, Orchidaceae

**Introduction.** The orchid that is described here was first brought to scientific attention by Leonore Bockemühl in her monographic treatment of *Odontoglossum* Kunth (Bockemühl 1989). It was incorrectly featured as “*Odontoglossum leucopterum* Rchb.f.”, in subgenus *Unguisepala* Bockemüh. The real “*Odm. leucopterum*” is a species from the Sierra Nevada de Santa Marta in northern Colombia and which may appear superficially similar to the new species but differs distinctly in certain morphological features and general appearance (Fig. 1). “*Odontoglossum leucopterum*” was transferred to *Cyrtochilum leucopterum* (Rchb.f.) Dalström (Dalström 2001). Preserved specimens have been examined; the holotype at the Museum of Natural History in Vienna (*Funck & Schlim* 989, W), which corresponds to a collection in the Herbarium of the Royal Botanical Garden at Kew (*J. Hanbury-Tracy* 493, K; Fig. 2). Very recently, however, some authentic color photographs of *C. leucopterum* were taken by Arthur Evans along

the road from ProAves ecolodge, El Dorado, towards the San Lorenzo Ridge on Sierra Nevada de Santa Marta (Fig. 3–4). When Bockemühl’s “*leucopterum*” (Bockemühl 1989) is compared with the type specimen as well as the live flowers of *C. leucopterum*, it becomes clear that they represent different species.

The new species may not have been observed in the past because no older collections have been located in the main herbaria, or it has been misidentified by earlier collectors. Only recently were plants observed and properly identified at higher elevation cloud forest environments, primarily in the Colombian Departments of Cundinamarca and Meta (Fig. 5–6). Most recently, plants have also been seen in private collections in Bogota. Plants of this rather large and bulky species tend to grow terrestrially among dense shrubs and often along roadsides where sufficient light and air circulation are provided. The natural variation and geographic distribution of the new species is not very well understood due to a lack of

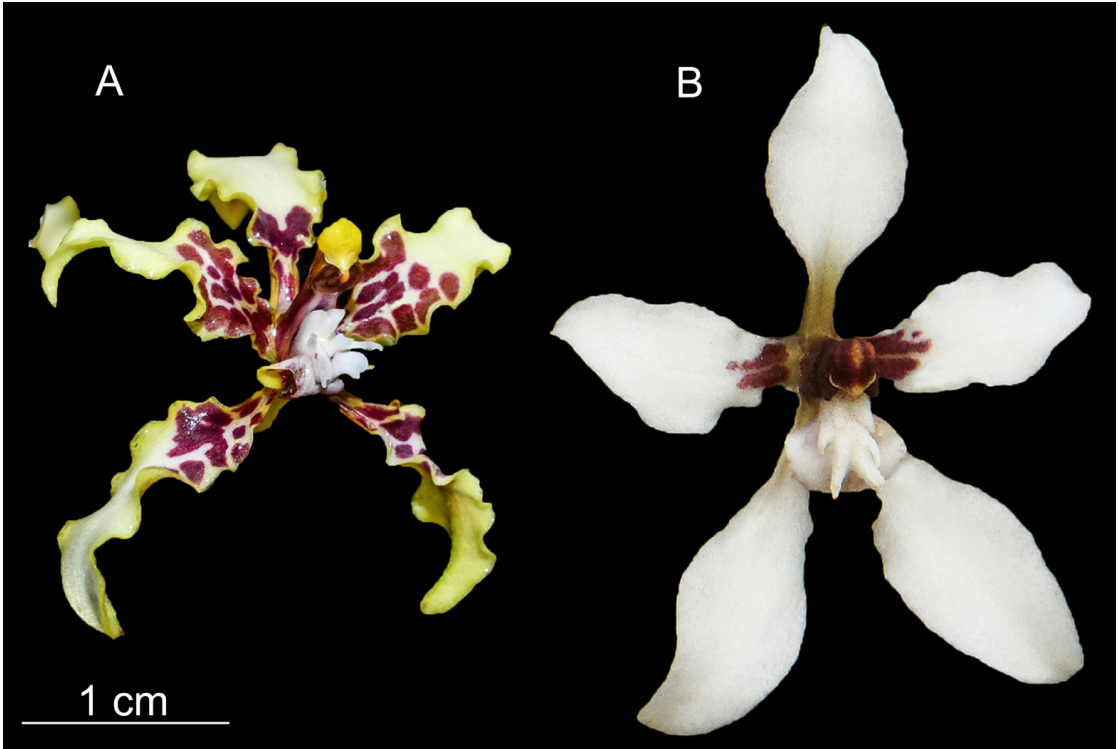


FIGURE 1. **A.** *Cyrtochilum bockemuehlae*. **B.** *Cyrtochilum leucopterum*. Photos by Cristian Castro (A) and Arthur Evans (B).

sufficient material to study. The general morphology of the flower tends to be rather consistent, however, although there appears to be some variation in the intensity and patterns of the colors.

#### TAXONOMIC TREATMENT

*Cyrtochilum bockemuehlae* C.Castro, J.S.Moreno & Dalström, *sp. nov.* (Fig. 7–8).

**TYPE:** Colombia. Cundinamarca: Municipio de Fómezque; 40–70 km la Calera hacia Golillas en la entrada a la Reserva de Carpanta 4° 33'32.9" N; 73° 43'11.5" W, 3212 m, 28 Nov. 2018, *C. Castro et al.* 1670 (holotype: COL).

**DIAGNOSIS:** *Cyrtochilum bockemuehlae* is visually distinguished from the closely related *C. dipterum* (Lindl.) Dalström, *C. ionoplocon* (Rchb.f.) Dalström, *C. leucopterum*, *C. ramosissimum* (Lindl.) Dalström, and *C. sodiroi* (Schltr.) Dalström, by having strikingly different coloration of the flowers in combina-

tion with morphological differences, primarily in the lip-column structure, as can be seen in the included illustrations (Fig. 9–10).

Terrestrial or epiphytic *herb*. Plant robust and large for the genus. *Pseudobulbs* caespitose, ovoid, to ca. 10 × 5 cm, bifoliate, surrounded basally by up to 8 foliaceous sheaths. *Leaf* conduplicate, linear, narrowly acute to acuminate, ca. 110 × 4–5 cm. *Inflorescence* 1 or 2, axillary from the base of the pseudobulb and the uppermost sheaths in an emerging new growth, suberect to arching, or subpendent, rather straight with widely spaced and spreading multifloral, indistinctly flexuous or fractiflex to ca. 40 cm long side-branches, incomplete in the featured illustration but exceeding 170 cm in the type specimen. *Peduncular* and *Floral bracts* waxy, appressed, scale-like, acute, 4–24 mm long. *Pedicel* with *ovary* 17–24 mm long. *Flowers* spidery with recurved white to pale yellow sepals and petals, more or less spotted with purple to brown; lip pale yellow and purple with a white callus; *dorsal sepal* unguiculate, elliptic, obtuse, more or less un-

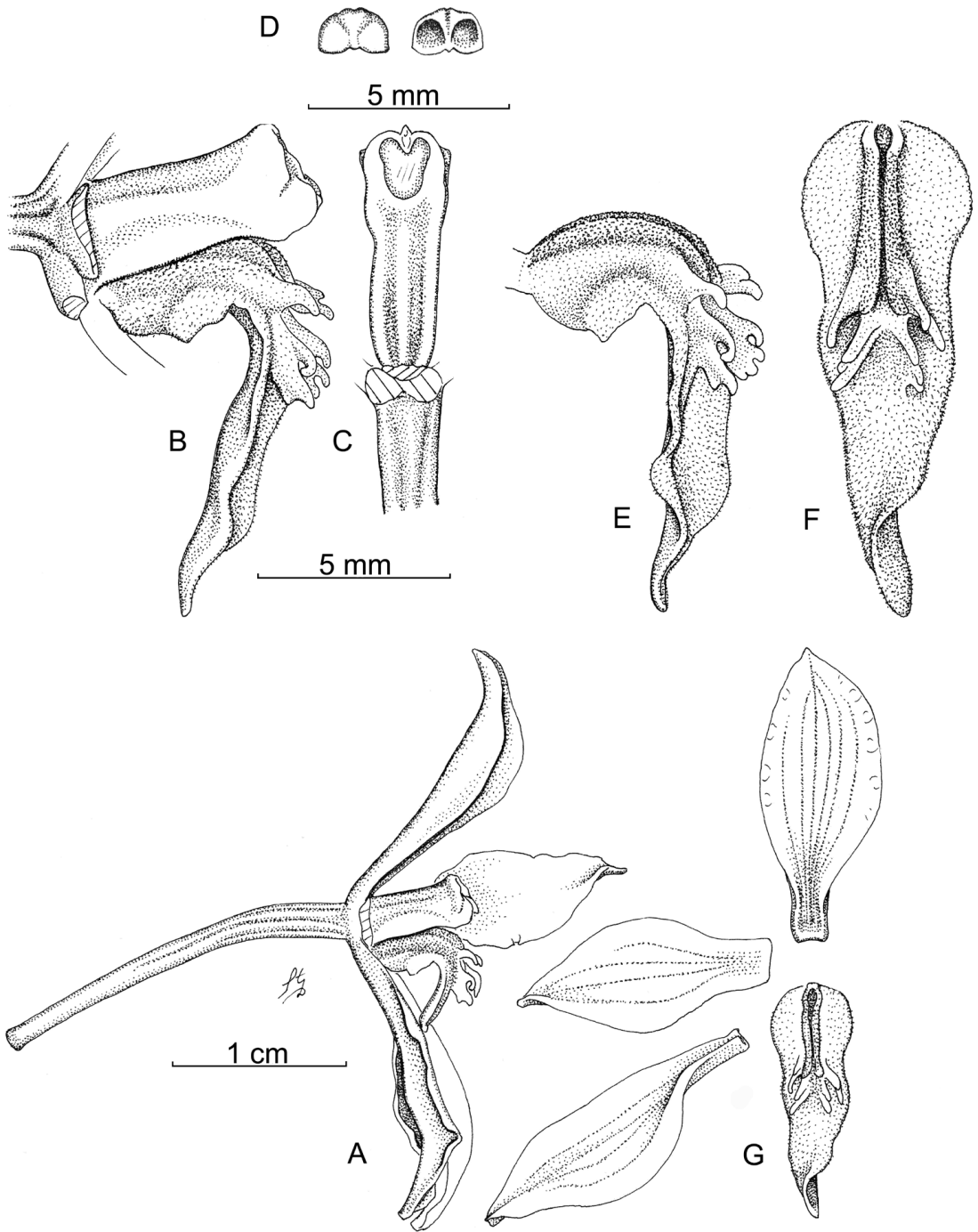


FIGURE 2. Line drawing of *Cyrtochilum leucopterum* (Rchb.f.) Dalström. **A.** Flower, lateral view. **B.** Lip and column, lateral view. **C.** Column, ventral view. **D.** Anther cap, dorsal and ventral views. **E.** Lip, lateral view. **F.** Lip, ventral view. **G.** Flower dissected. Illustration from *J. Hanbury-Tracy* 493 (K) by Stig Dalström.



FIGURE 3. *Cyrtochilum leucopterum* in situ at Sierra Nevada de Santa Marta. Photo by Arthur Evans.



FIGURE 4. *Cyrtochilum leucopterum*, closer view of the flowers. Photo by Arthur Evans.



FIGURE 5. Natural habitat of *C. bockemuehlae*. Photo by Cristian Castro.

dulate and recurved, 15–20 × 5–7 mm; *lateral sepals* unguiculate, slightly oblique, elliptic, obtuse to acute, more or less undulate and recurved, 15–21 × 4–5 mm; *petals* subsessile, ovate to elliptic, acute, more or less undulate and recurved, 13–18 × 5–7 mm; *lip* rigidly attached to the base of the column through a short, central, longitudinal, fleshy keel, trilobed with spreading, revolute unevenly deltoid to auriculate lateral lobes and a strongly reflexed, elongated triangular, ligulate, apically acuminate front-lobe, 12–14 × 5–7 mm; *cal- lus* of a pair of fleshy, longitudinal erect and apically sub-falcate ridges emerging gradually from the base of the lip and extending to the base of the front-lobe, with a pair of narrowly digitate denticles on each side near the end, and a fleshy, narrowly denticulate pair of keels in between, and with a fleshy apical denticle in the middle; *column* pale brown to purple, straight, clavate, ventrally furrowed, to 7–9 mm long excluding the anther cap; *anther cap* white to dark yellow, campanulate, indistinctly rostrate and dorsally lobulate, 1.9 × 2.7 mm; *pollinarium* of two folded/cleft pyriform pollinia on a linear, *ca.* 1.3 mm long stipe, on an ovoid pulvinate viscidium.

PARATYPES: Colombia. **Cundinamarca:** Municipio de Fómeque; 40–70 km la Calera hacia Golillas entrada a la Reserva Carpanta, 4° 42'18.11"–4° 33'51.5" N; 73° 44'19"–73° 48'13.5" W, alt. 3450–3690 m, 10 Dic. 2016, *C. Castro et al.* 699 (COL). Municipio Junín, vereda Colombia, Sector Carpanta, 2500–2600 m, 6 Ago. 2017, *D. E. Hernández-Rodríguez* 26 (COL). Municipio de Junín, vereda Colombia, Sector Carpanta, 2400–2500 m, 31 Ene. 2018, *D. E. Hernández-Rodríguez* 38 (COL). Municipio Gachalá, vereda Tendidos del río Negro, Sector Caño Negro, 2514 m, 23 Ago. 2019, *D. E. Hernández-Rodríguez* 204 (COL). Municipio Gachalá, vereda Tendidos del río Negro, Sector Alto de Siberia, 2570 m, 24 Ago. 2019, *D. E. Hernández-Rodríguez* 232 (COL). **Meta:** Parque Natural Nacional Chingaza, la vía hacia San Juanito, al costado izquierdo de la vía asociado a vegetación ruderal, 4°28' N; 73°41.2' W, alt. 2870–2900 m, *C. Castro et al.* 278 (COL).

DISTRIBUTION: *Cyrtochilum bockemuehlae* is only documented from along the eastern cordillera in the Departments of Cundinamarca and Meta at altitudes ranging from 2400–3690 m (Fig. 12).



FIGURE 6. *Cyrtorchilum bockemuehlae* in situ. Photo by Cristian Castro.

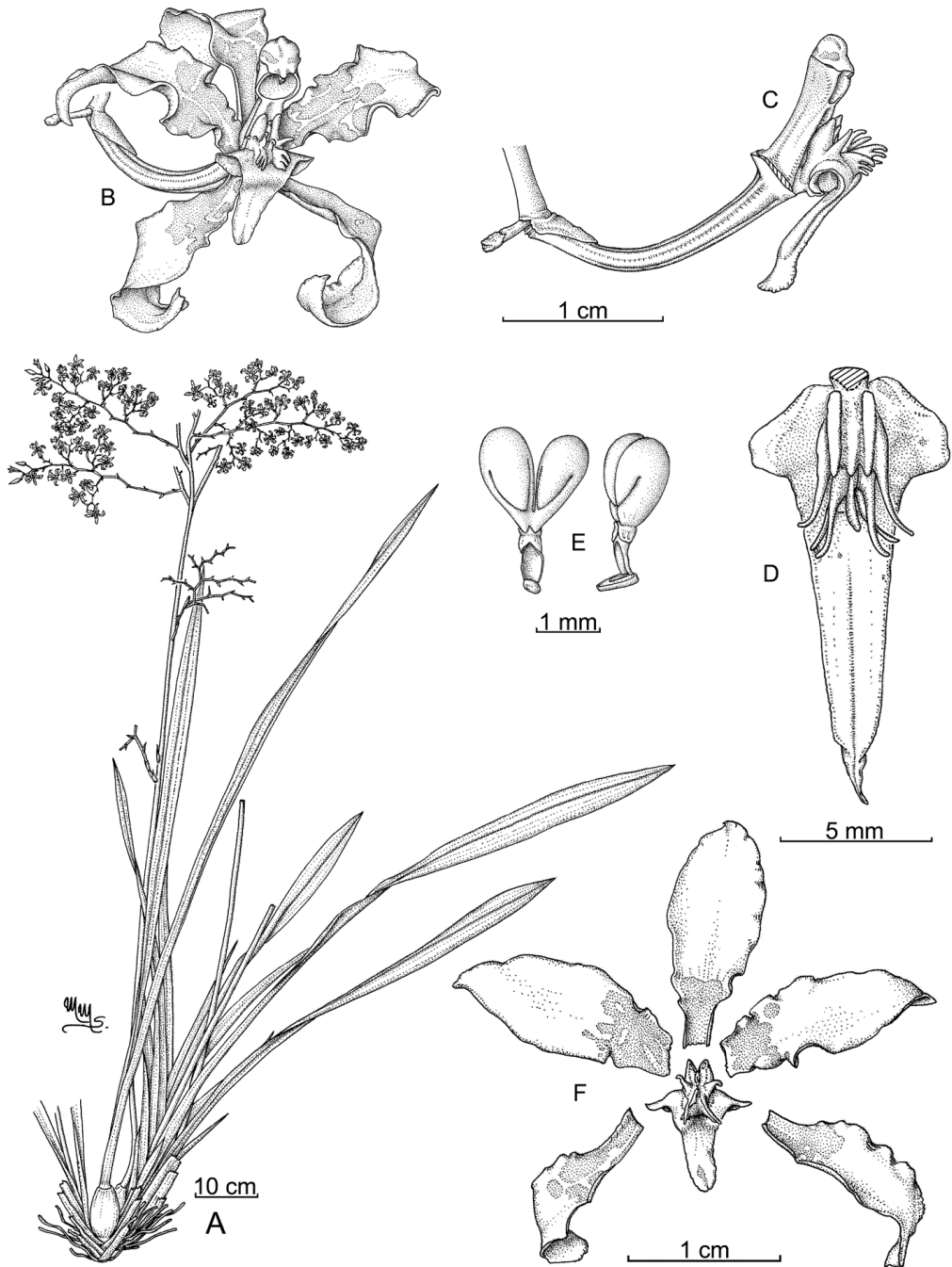


FIGURE 7. *Cyrtorchilum bockemuehlae* C.Castro, S.Moreno & Dalström.. **A.** Plant habit. **B.** Flower, front view. **C.** Column and lip, lateral view. **D.** Lip, dorsal view. **E.** Pollinarium, back and lateral views. **F.** Flower dissected. Drawn from the holotype by Marcela Morales-Sanchez.

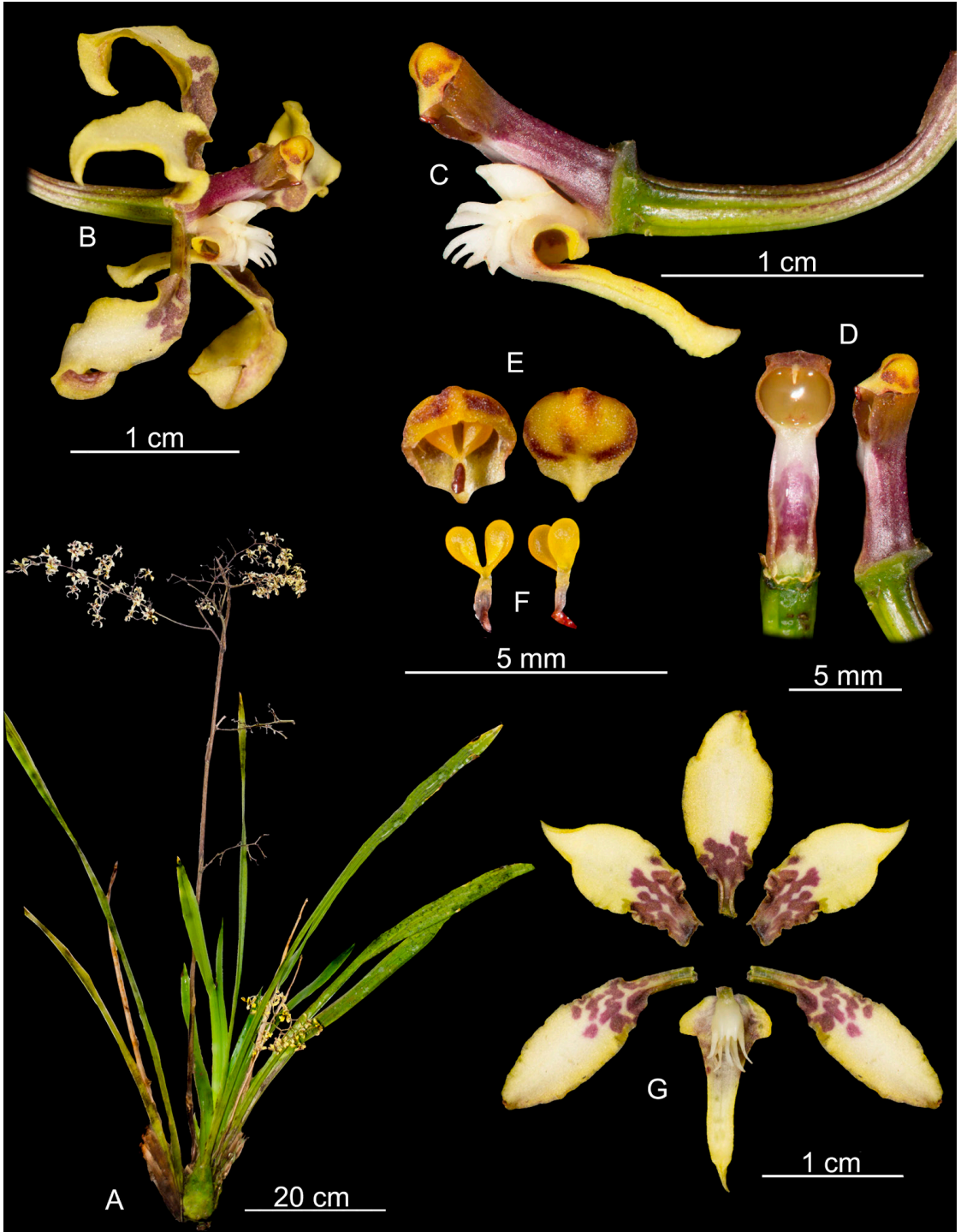


FIGURE 8. *Cyrtorchilum bockemuehlae* C.Castro, S.Moreno & Dalström. **A.** Plant habit. **B.** Flower lateral view. **C.** Column and lip lateral view. **D.** Column ventral and lateral views. **E.** Anther cap with pollinarium ventral and dorsal views. **F.** Pollinarium back and lateral views. **G.** Flower dissected. Photo by Cristian Castro, and arrangement by the authors.



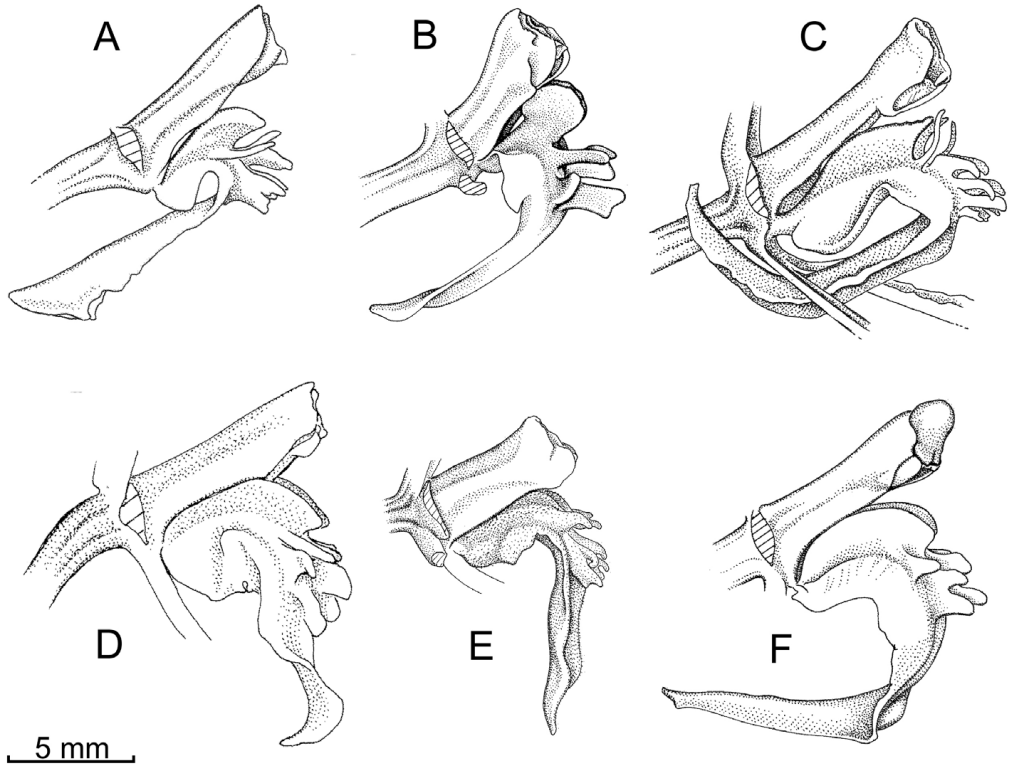


FIGURE 9. Lip-column comparisons for *Cyrtochilum bockemuehlae* and related species. **A.** *C. bockemuehlae* (G. Deburghraeve 020). **B.** *C. dipterum* (F. C. Lehmann 6003). **C.** *C. ramosissimum* (Funk & Schlim 1041). **D.** *C. amphiglottis* (B. Rözl s.n.). **E.** *C. leucopterum* (J. Hanbury-Tracy 493). **F.** *C. sodiroi* (S. Dalström 606). All figures drawn by Stig Dalström.

**EPONYMY:** Named in honor of Leonore Bockemühl (1927–2007), a German architect and autodidact orchid taxonomist who specialized in *Odontoglossum* (and indirectly *Cyrtochilum*) taxonomy and published a taxonomic treatment of the genus in 1989.

**Discussion.** The morphological features of *Cyrtochilum bockemuehlae* are very distinct and it can easily be distinguished from closely related species by comparing the coloration of the flowers in combination with the lip-column views (Fig. 9–10). There is, however, a similar taxon that occurs in the Department of Santander, and which resembles *C. bockemuehlae* in many floral details, but also differs in others (Fig. 11). The general structure of the flower is superficially similar, but the size of the flower differs significantly with

the Santander taxon being almost half the size of *C. bockemuehlae* (Table 1; Fig. 8, 11). The Santander taxon also tends to have flatter sepals and petals with less brown-purple markings placed only at the very base of the segments. But these differences alone may prove too variable to have any specific importance. More significant differences, however, can be seen when the lip-column structures are viewed from the side. In *C. bockemuehlae* the apex of the column is straight to slightly up-curved, while the apex of the column in the Santander taxon is slightly curved downwards. These differences may seem minor, but should be seen in relation to how far the basal callus structure reaches along the ventral side of the column. In *C. bockemuehlae* the callus extends to about half the length of the column, while in the Santander taxon, the callus

TABLE 1. Morphological comparisons between the holotype of *Cyrtorchilum bockemuehlae* (C. Castro 1670) and *Cyrtorchilum* sp. (NGM 85).

Measurements (length x width) of flower details (mm)	CC 1670	NGM 85
	Locality: Cundinamarca	Locality: Santander
Dorsal sepal	15–19 × 5–7	10.0 × 4.5
Lateral sepal	16.0–21.5 × 4.5–5.0	11.0 × 2.8
Petal	13.5–17.5 × 5.0–7.2	7.3 × 3.5
Lip	12.5–14.2 × 5.5–6.5	7.9 × 3.5
Column	6.9–9.0	5.2–5.5
Pediceal + ovary	17.0–23.5	18.3–18.5



FIGURE 10. Flowers of related *Cyrtorchilum* species A. *C. bockemuehlae* (C. Castro 278). B. *C. dipterum*. C. *C. ioplocon*. D. *C. leucopterum*. E. *C. ramosissimum*. F. *C. sodiroi*. Photos by Cristian Castro (A), Sebastián Moreno (B, C, F), Arthur Evans (D), and Karlheinz Senghas (E), not in the same scale.

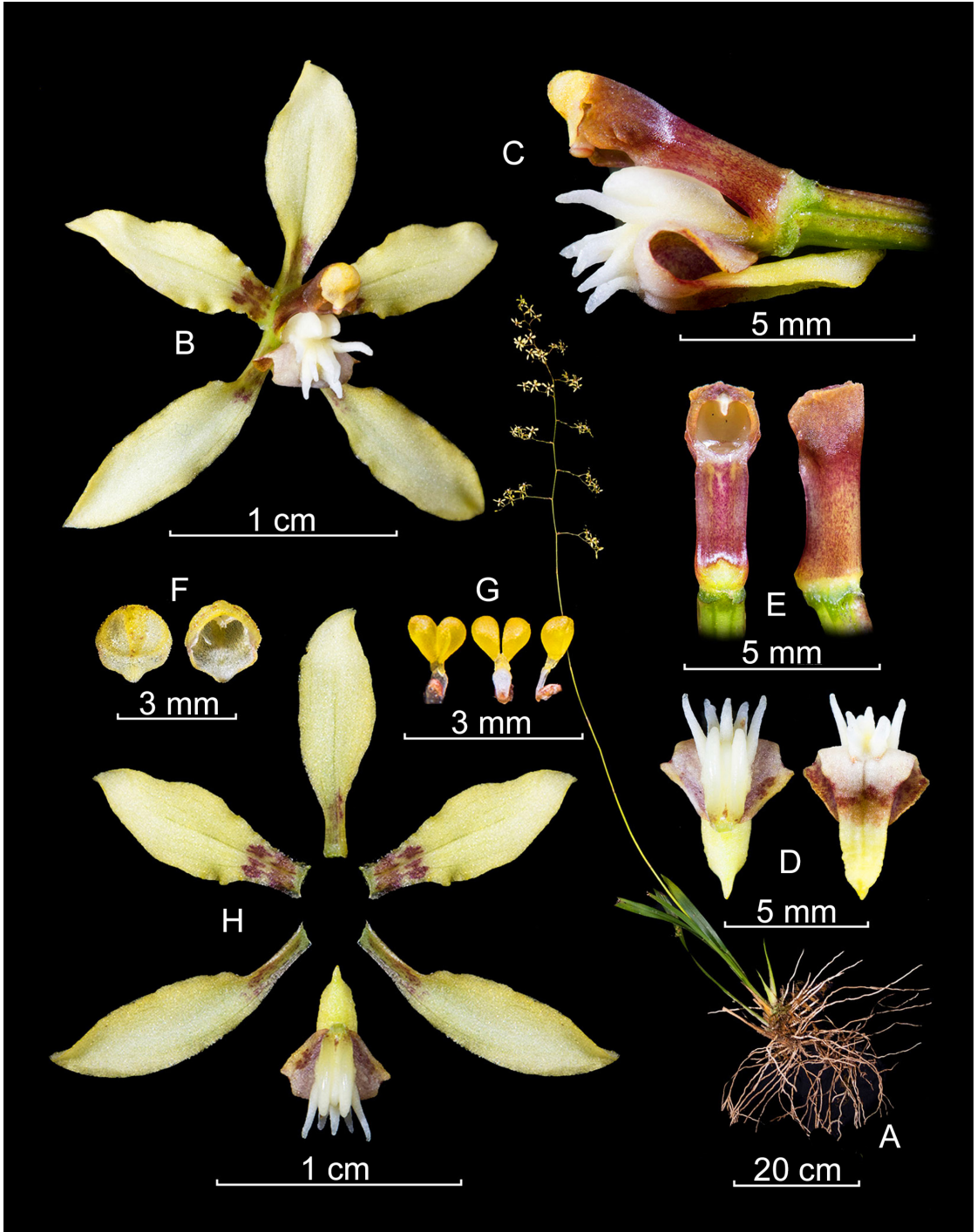


FIGURE 11. *Cyrtorchilum* sp. from the Department of Santander. **A.** Plant habit. **B.** Flower, front view. **C.** Lip and column, lateral view. **D.** Lip, front and back views. **E.** Column, ventral and lateral views. **F.** Anther cap, dorsal and ventral views. **G.** Pollinarium, back, front and lateral views. **H.** Dissected flower. Photo arrangement by Sebastián Moreno based on N. Gutiérrez Morales *NGM* 85.

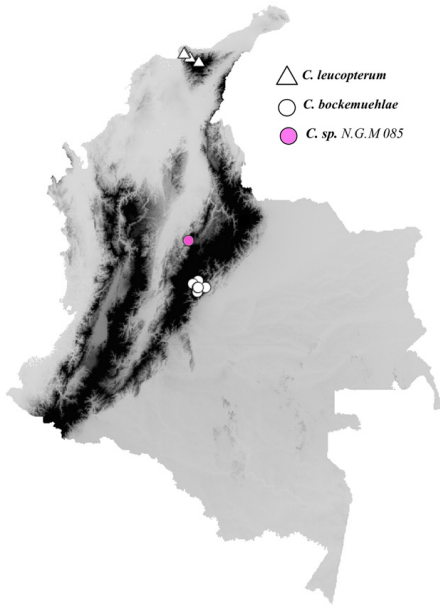


FIGURE 12. Map of the known distribution of *Cyrtochilum bockemuehlae*, *C. leucopterum* and the unresolved Santander taxon, arranged by Leidy Vallejo and edited by Stig Dalström.

extends to near the apex of the column. There are also differences in the outline of the column, which can be seen in the ventral views in the color plates (Fig. 8, 11).

In conclusion, there is not enough data available about the natural variation of the Santander taxon, to

fairly determine what exactly the taxonomic status is at this time. Hopefully, additional field research will shed more light on this subject. Meanwhile, the Santander taxon will be kept as unresolved and separate from the taxonomic identity of *Cyrtochilum bockemuehlae*.

**ACKNOWLEDGMENTS.** The authors cordially thank Julio Betancur (Director of the Herbario Nacional Colombiano, COL) for his support, primarily for the first author. We also thank Robinson Galindo (Director of the Pacific Regional of the Parques Nacionales Naturales), and Marcela Morales for the type illustration, Leidy Vallejo for assistance in constructing the distribution map, and David Hernandez for his contributions to the distribution records of the species. We also thank Nicolás Gutiérrez Morales for providing information and material of the unresolved taxon from Santander. Finally, we thank Wesley Higgins for viewing and commenting on the manuscript.

#### LITERATURE CITED

- Bockemühl, L. (1989). *Odontoglossum, monographie und ikonographie - a monograph and iconograph*. Germany: Brücke-Verlag Kurt Schmiersow, D-3200 Hildesheim.
- Dalström, S. (2001). A synopsis of the genus *Cyrtochilum* (Orchidaceae; Oncidiinae): Taxonomic reevaluation and new combinations. *Lindleyana*, 16(2), 56–80.