

NEW EVIDENCE CORROBORATES THE PRESENCE OF *SOLENIDIUM LUNATUM* (ONCIDIINAE) IN COLOMBIA

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ABSTRACT. *Solenidium* is a South American genus of three species characterized by free, similar sepals and petals, a trilobed lip with a grooved claw, and a winged column bearing two ceraceous pollinia. Here we confirm the presence of *Solenidium lunatum* in Colombia, based on a well-documented collection from Sierra de la Macarena National Natural Park. Previous records of *S. lunatum* in the country were doubtful, relying solely on catalog citations derived from a fragmented specimen at K (K–SPC–61118.000) lacking precise locality data. The new collection provides the first unequivocal evidence of the species in Colombia and confirms its known range, which extends from northern South America (Colombia, Venezuela) to the Brazilian Cerrado, mainly in areas with granitic outcrops.

RESUMEN. *Solenidium* es un género sudamericano de tres especies caracterizadas por sépalos y pétalos libres y similares, un labelo trilobulado con una uña acanalada y una columna alada que porta dos polinias ceráceas. Aquí confirmamos la presencia de *Solenidium lunatum* en Colombia, con base en una colecta bien documentada del Parque Nacional Natural Sierra de la Macarena. Los registros previos de *S. lunatum* en el país eran dudosos, pues se sustentaban únicamente en citas de catálogos derivadas de un espécimen fragmentado en K (K–SPC–61118.000) sin datos de localidad precisos. La nueva colecta constituye la primera evidencia inequívoca de la especie en Colombia y confirma su rango conocido, que se extiende desde el norte de Sudamérica (Colombia, Venezuela) hasta el Cerrado brasileño, principalmente en áreas con afloramientos graníticos.

KEYWORDS/PALABRAS CLAVE: Colombian Orinoco, Orinoquía Colombiana, orquídeas, orchids, plantas, plants, taxonomía, taxonomy

Introduction. The genus *Solenidium* Lindl. was established in 1846 by John Lindley, based on a specimen collected by Jean Linden in 1842 in forests of Pamploña, Colombia. Its type, *Solenidium racemosum* Lindl., is characterized by the free, similar sepals and petals, a labellum with a grooved basal claw and bidentate apex, a winged column with a trilobed apex, and two ceraceous pollinia inclined over a small subrounded gland (Dalström & Whitten, 2016; Lindley, 1846; Sweet, 1973). These distinctive features differentiate *Solenidium* from related genera such as *Oncidium*

Sw. and *Brassia* R.Br. Recent DNA studies, however, indicate a closer relationship with *Capanemia* Barb. Rodr., and *Sanderella* Kuntze, emphasizing the need for a further systematic revision within the Oncidiinae (Buzatto *et al.*, 2020; Chase *et al.*, 2005; Dalström & Whitten, 2016; Neubig *et al.*, 2012).

The second species of the genus, *Solenidium lunatum* (Lindl.) Schltr., was originally described as *Oncidium lunatum* Lindl. in 1838, based on a specimen imported from Demerara (Guyana) and subsequently transferred to *Solenidium* by Schlechter (1914[1915]).

Solenidium lunatum is widely distributed across South America, from Colombia to Bolivia and Brazil. In Brazil, it inhabits several threatened ecoregions, including the Amazon, the Cerrado, the seasonal forests of Goiás and Mato Grosso, the savannah of Roraima, and the wetland mosaics of Maranhão and Pará (Barros *et al.*, 2015; Dos Santos Cardoso *et al.*, 2019). In these ecoregions, the expansion of agribusiness and the replacement of native vegetation by monocultures and grasslands have promoted habitat fragmentation and biodiversity loss (Laurance & Vasconcelos, 2009; Queiroz, 2009; Dos Santos Cardoso *et al.*, 2019).

A third species, *Solenidium portillae* Dalström & Whitten (Dalström & Whitten, 2003), was described from Ecuador and has since been recorded in Colombia. In Colombia it occurs in the cloud forests of Bolívar municipality in Valle del Cauca, where it has been reported growing epiphytically on lianas of the genus *Paullinia* L. (Sapindaceae) (Cárdenas-Contreras, 2014). This record not only expands the chorological knowledge of *Solenidium* in the country, but also underlines the importance of these Andean ecosystems for the conservation of rare and little-known species. Intertropical areas, such as the Andes and the Amazon, concentrate most of the biodiversity hotspots, regions that host at least 1,500 endemic species of vascular plants and have lost more than 70% of their original cover (Myers *et al.*, 2000, CONABIO, 2009). In this context, orchids stand out as one of the most threatened plant groups due to their high ecological specialization and pressures such as overexploitation, illegal trade, habitat loss, and climate change, making them flagship taxa in global conservation efforts (Cribb *et al.*, 2003; Dressler, 1993; Swarts & Dixon, 2009; Tejeda-Sartorius *et al.*, 2017).

For many years, the inclusion of *Solenidium lunatum* in Colombian floristic catalogues has remained questionable, primarily due to the absence of corroborating herbarium collections or the discovery of living specimens. This uncertainty is resolved here. In 2025, we confirmed the native presence of the species in Colombia upon discovering four vouchered populations of *S. lunatum* from the Amazon–Orinoquía (Meta, Colombia), supported by field photographs, detailed floral dissections, precise georeferences, and comparative diagnoses against allied genera.

Materials and methods. The specimens examined were collected during botanical explorations conducted from February to May 2025 in the municipalities of Mesetas, San Juan de Arama, Vista Hermosa, and Puerto Rico in the Meta department of Colombia. The comparative morphological study was based on examinations of living plants, dried specimens, illustrations and spirit material preserved in 75% ethanol, stored at Kew Gardens (Royal Botanic Gardens, Kew). Photographs were taken with a Nikon D5300 equipped with an AF-S Nikkor 50mm f/1.8G lens, and images were post-processed for clarity using Adobe® Photoshop CS6. The terminology used for the morphological descriptions follows Beentje (2016). Identification was achieved by comparing the morphometric characteristics of fresh specimens with the original descriptions (Lindley, 1829). To characterize the species' distribution and area of occurrence, we examined digital and physical collections at Colombian, North American, and European herbaria (AMES, COAH, COL, G, MO, NY, U, and US; acronyms follow Thiers, 2024). We also reviewed the designated holotypes of names currently treated as synonyms of *S. lunatum*. Finally, we combined these data with records from GBIF (2025) and iNaturalist (2025) to construct the geographical distribution map using QGIS version 3.40 (2024).

TAXONOMIC TREATMENT

Solenidium lunatum (Lindl.) Schltr., Orchideen Beschreib. Kult. Zücht.: 525. 1914[1915]. *Oncidium lunatum* Lindl., Edwards's Bot. Reg. 23: t. 1929. 1837. *Rodriguezia lindmanii* Kraenzl., Kungl. Svenska Vetenskapskad. Handl. n.f, 46(10): 75, t. 12. 1911. *Leochilus mattogrossensis* Cogn., Relat. Commiss. Linhas Telegr. Estraté. Matto Grosso Amazonas Anexo 5, Bot. III. 13. 1912; Fedde, Repert. xiii. 492. *Solenidium mattogrossense* Schltr., Repert. Spec. Nov. Regni Veg. 15: 215. 1918. *Solenidium lunatum* Kraenzl., Pflanzenr. (Engler) Orchid. Monandr. Oncid. 316. 1922. Isonym (Fig. 1)

TYPE: GUYANA. Demerara: This very pretty species of *Oncidium* was imported from Demerara by Messrs. Loddiges, with whom it flowered in their stove of epiphytes in June last. s.coll. [s.n.]. (holotype: K-000718291!).

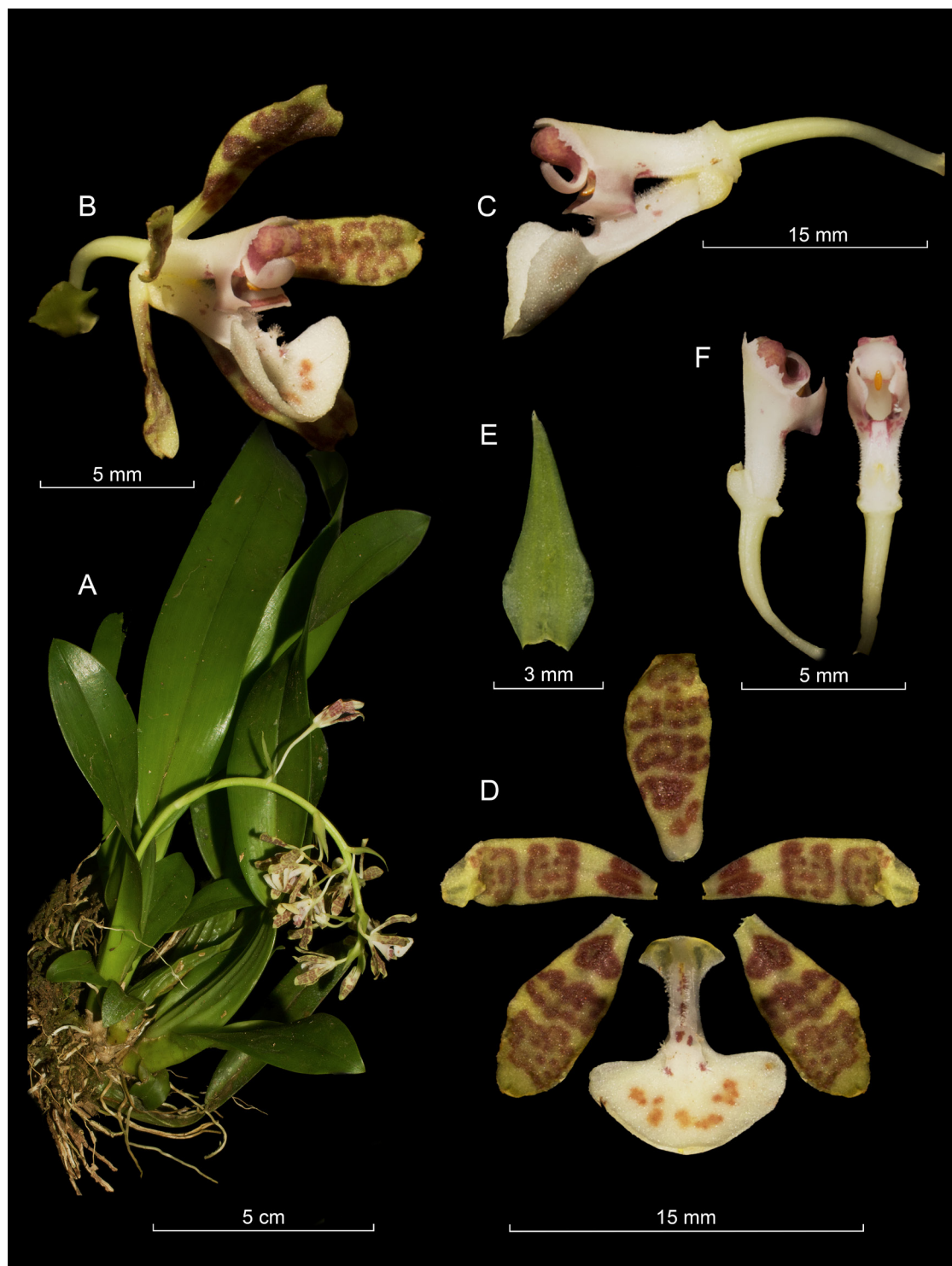


FIGURE 1. Lankester Composite Digital Plate of *Solenidium lunatum*. A. Habit. B. Flower. C. Lip and column in lateral view. D. Dissected perianth. E. Flower bract. F. Column. Photographs by D. Lozano-Cifuentes.

Epiphytic herb. *Pseudobulbs* 3.5–4.5 × 2.0–2.5 cm, caespitose, blunt elliptic, ancipitous, more or less sulcate, unifoliate, green, subtended basally by 3 to 4 distichous sheaths, the uppermost foliaceous, lustrous green. *Leaves* (8.0–)10–12(–14) × 1.8–2.2 cm, conduplicate, elliptic, acute, apiculate. *Inflorescence* 10–15 cm, axillary, from the base of the uppermost sheaths, arching, up to 14 flowered; flower bracts 10–12 × 3–4 mm, adpressed, lanceolate, light green. *Flowers* 25–30 mm long, slightly campanulate; pedicel 10–12 mm long × 1.5–1.7 mm diameter, cylindrical, glabrous, whitish green; ovary 3–4 mm long, slightly ribbed, whitish green. *Sepals* 8–11 × 4.0–4.5 mm, unguiculate, oblong, apex obtuse, greenish yellow with red-brown spots. *Petals* 8–11 × 2.5–3.0 mm, unguiculate, oblong, apex obtuse, greenish yellow with red-brown spots. *Lip* 10–12 mm long, rigidly attached to the base of the column and through a short, central, longitudinal, fleshy keel, trilobate, with barely developed lateral lobes 1.0 × 1.4–1.8 mm, visible only as small auricles; intermediate lobe 10 × 8 mm, formed by a long, linear keel, which expands into a deeply cordate, anteriorly rounded, slightly crenulate, almost crescentic in outline, markedly dilated lamina; lamina 6 × 9–10 mm, whitish, covered with minute trichomes and scattered spots red-brown; keel provided with two fleshy, very thin, depressed lamellae, bidentate on both margins, extending over a densely pubescent central disc. *Column* 6–7 mm long, shortly clavate, pubescent basally and ventrally, canaliculated ventrally, with a pair of two distinct, falcate lobes, revolute and a well-developed, entire anther cap 2.0 × 1.6 mm, bilobulate, with an intermediate lobule, elongated, apex obtuse, revolute; clinandrium with lacinate edge; pollinarium 1.3–1.5 × 0.6–0.8 mm, of two, cleft, pyriform pollinia on a narrowly elongate, obovate, stipe on a flat viscidium.

MATERIAL EXAMINED: BOLIVIA: [without data collected], *R. Vasquez* 81. (LPB!). BRAZIL. **Mato Grosso:** Valle del Paraguay cerca de Tapirapuã, 09 Nov. 1909, *Hoehne* s. n. (BR–0000006590161!); Rio dos Bugres, ad arbores silvae ripariae quam inundavit fluvius, 13 Mar. 1894, *C. A. M. Lindman* A-2847. (S–R–5497!). COLOMBIA. **Meta:** Puerto Rico, vereda Santa Lucía, sendero hacia las lagunas, 230 m, 2.78106 N, 73.42918

O, 18 Feb. 2025, *D. Lozano-Cifuentes, Amilcar Santos & Fausto Riaño* 2505. (LLANOS!). ECUADOR. **Napo:** [without data collected], 200 m, 08 May. 1980, *J. S. Brandbyge & E. Asanza* 30598. (MO–656180!). PERU. **Huánuco:** Provincia de Pachitea, Distrito de Honoria, carretera Miel de Abeja, 13 Feb. 1967, *J. Schunke* 1600 (F–1686843!). **Loreto:** Alto Amazonas. Andoas, río Pastaza near Ecuador border. Mature and disturbed forest, 210 m, 14 Aug. 1980, *A. L. Gentry et al.* 29634. (MO–679796!). **Madre de Dios:** Tambopata. Las Piedras. Cusco Amazónico. Plantas colectadas en la claro de alberque, 200 m, 08 Dec. 1991, *M. E. Timaná* 3678. (MO–670138!). GUYANA. **Upper Takutu-Upper Essequibo:** Swamp riverine forest and bank vegetation, 250 m, 15 Mar. 1994, *T. Henkel et al.* 5221. (US!).

OTHER RECORDS: COLOMBIA. Two flowers in 70% ethanol. *Hermans* 1833 (K–61118.000!).

HABITAT AND ECOLOGY: Four populations of up to 13 individuals of *Solenidium lunatum* have been found in the Monserrate Alto rural settlement of the Municipality of San Juan de Arama (1 population) and the Santa Lucía rural settlement of the Municipality of Puerto Rico (3 populations). These populations are located in three biomes within the Sierra de la Macarena National Natural Park: the Amazonian-Orinoquia Tropical Humid Zonobiome, the Amazonian-Orinoquia Helobiome, and the Macarena Orobiome. The plants grow as epiphytic herbs in lowland tropical rainforests on tree species of *Protium rhoifolium* (Benth.) Byng & Christenh. (Burseraceae), *Heisteria acuminata* (Bonpl.) Engl. (Olacaceae), and *Matayba purgans* (Poepp.) Raddlk. (Sapindaceae). Additionally, it forms epiphytic orchid communities that include *Acianthera discophylla* (Luer & Carnevali) Luer, *Gongora arcuata* G. Gerlach & Toulem., *Rudolfiella aurantiaca* (Lindl.) Hoehne, and *Scaphyglottis bidentata* (Lindl.) Dressler. It has been found flowering from January to March.

NOTES: The first record cited to support the presence of *Solenidium lunatum* in Colombia was a fragmented collection (K–SPC–61118.000) housed at the Royal Botanic Gardens, Kew. It consists only of two flowers originating from Hermans nursery, without specific collection data (Fig. 2). The absence



FIGURE 2. Hermans collection #1833, K-SPC-61118.000. Photo provided by the Board of Trustees of the Royal Botanic Gardens, Kew.

of vegetative material and verifiable provenance limits its value as concrete evidence, even though the species has been reported as widely distributed from northern South America (Colombia and Venezuela) southwards to the Brazilian Cerrado (Fig. 3). Associated with granitic formations, such as tepuis

and vertical walls, this rare species extends across Guyana, Suriname, Colombia, Venezuela, and Brazil. For a long time, the lack of a reliable reference specimen led to its presence in Colombia being regarded as doubtful in the literature (Bernal *et al.*, 2015, 2016; Ministerio de Ambiente y Desarrollo

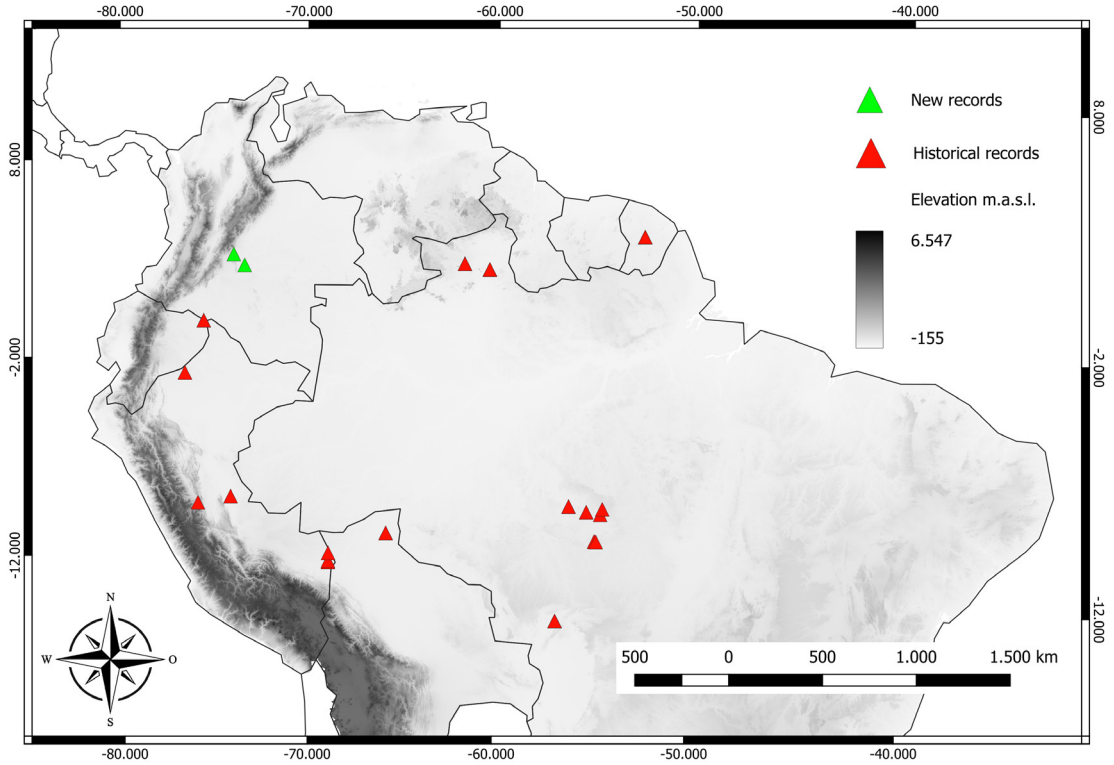


FIGURE 3. Updated geographical distribution of *Solenidium lunatum*. Elaborated by Amilcar Santos.

Sostenible y Universidad Nacional de Colombia, 2015). The recent discovery of this species during floristic surveys in Sierra de la Macarena National Natural Park now provides unequivocal evidence of its native occurrence in Colombia and argues for its prioritization in conservation and propagation programmes, alongside related Colombian species such as *S. racemosum* and *S. portillae*. In contrast, the presence of *S. portillae* in Ecuador remains questionable, as the species was described by Dalström & Whitten (2003) solely from cultivated material (Ecuagenera) and has not yet been documented from wild populations there, whereas several populations have been recorded in Valle del Cauca, Colombia (Fig. 4; Alomia, 2025).

The definitive confirmation of *Solenidium lunatum* in Colombia not only expands the known distribution of *Solenidium* but also underscores the critical role of the Andean and Amazonian intertropical regions in global biodiversity conservation. These areas are recognized biodiversity hotspots (CONABIO, 2009;

Myers *et al.*, 2000), where orchids are particularly threatened due to their ecological specialization and the combined effects of habitat loss and illegal trade (Cribb *et al.*, 2003; Dressler, 1993; Swarts & Dixon, 2009; Tejeda-Sartorius *et al.*, 2017). This finding highlights the urgent need for focused conservation measures to protect these flagship plant species.

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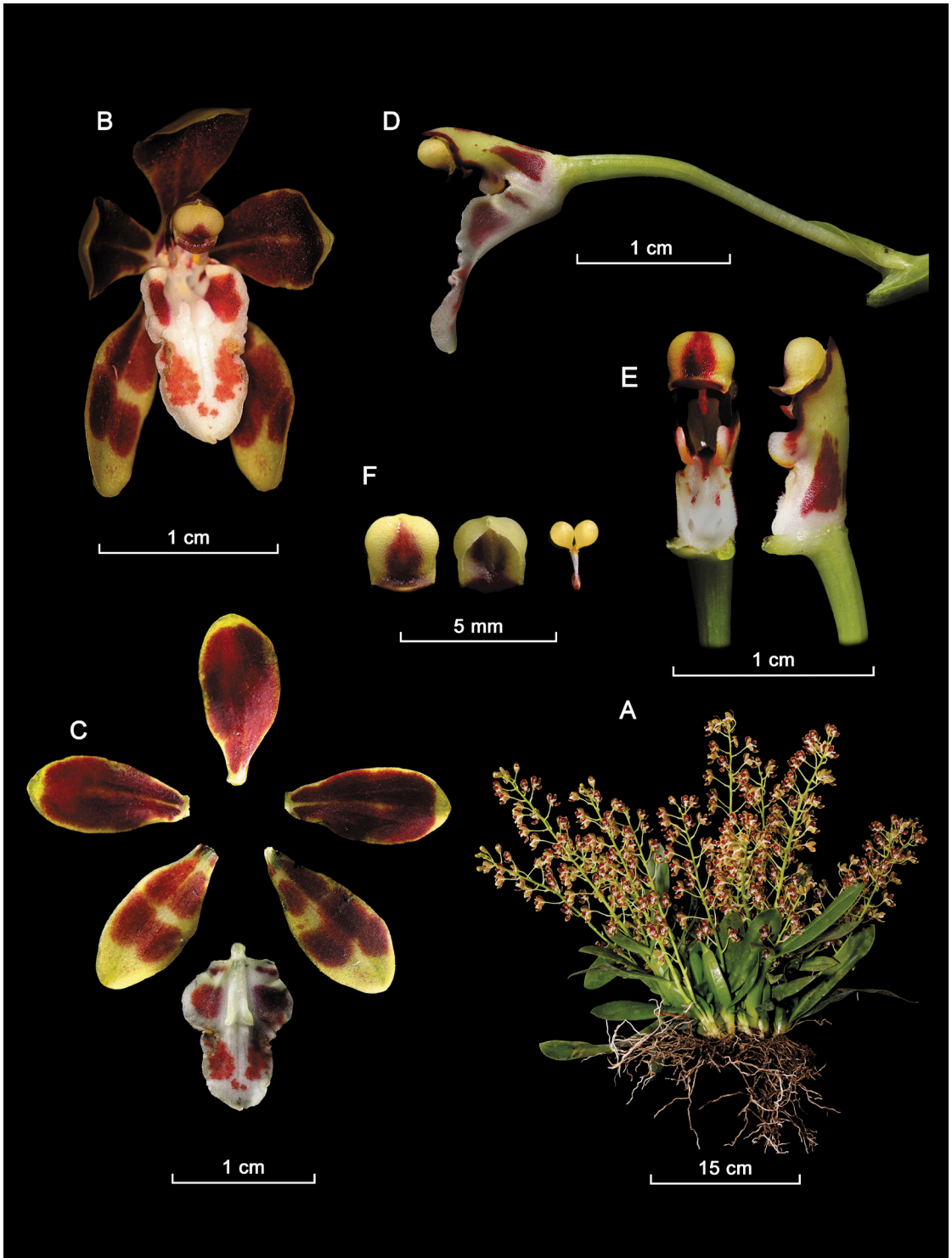


FIGURE 4. Lankester Composite Digital Plate of *Solenidium portillae* A. Habit. B. Flower. C. Dissected perianth. D. Lip and column in lateral view. E. Column. F. Anther cap and pollinarium. Photographs by Y. Alomia.

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