Phytotaxa 708 (1): 001–015
https://www.mapress.com/pt/

Article

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

https://doi.org/10.11646/phytotaxa.708.1.1

A new nothogenus and a new nothospecies in the subtribe Laeliinae (Orchidaceae) from Mexico

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Abstract

A new nothogenus in Orchidaceae Juss. is described, resulting from the natural cross between *Dinema* and *Nidema*, for which the name × *Dinedema* is proposed. The putative species involved in this intergeneric cross are *Dinema polybulbon* and *Nidema boothii*. The resulting nothospecies from this cross is described here as × *Dinedema mariae*, which originated in the central region of Veracruz, Mexico, where its parental species coexist sympatrically. A description, plate, habitat information, and phenology of the new nothospecies is provided, along with a morphological comparison with its parental species. A spatial distribution model for *D. polybulbon* and *N. boothii* is presented, showing their overlap in the area where the hybrid originated.

Keywords: *Dinema*, hybridization, intergeneric hybrids, *Nidema*, *Scaphyglottis* alliance

Introduction

Hybridization is well-known in Orchidaceae Jussieu (1789: 64), a family in which most hybrids have been artificially created through the crossbreeding of specimens with desirable traits to meet the demand of the ornamental orchid market (Yam & Arditti 2009). These hybrids are generally registered with an official name, recognized worldwide, in the Orchid Hybrid Registration System, managed by the Royal Horticultural Society (RHS 2025). To register a hybrid, the breeder must provide its name, parentage, and a brief description of its characteristics. While is possible to register a hybrid by mail, the faster and convenient option is to register online (RHS 2025).

Naturally occurring hybrids in orchids are less frequently documented, although their origin may be common, and the hybridization process is considered a factor that increase the phenotypic variability and diversification within the family (Pinheiro *et al.* 2010, Johnson 2018). Such hybrids can be described following the International Code of Botanical Nomenclature, specifically articles H.1 to H.10 of Shenzhen code (Turland *et al.* 2018). In orchids, hybrids are generally produced between congeneric species and are classified as nothospecies, as is the case with genera like *Encyclia* Hooker (1828: t. 2831), *Laelia* Lindley (1831: 115) or *Lophiaris* Rafinesque (1838: 40) (Cetzal-Ix *et al.* 2018, Cetzal-Ix *et al.* 2020, León-Peralta *et al.* 2023). Less frequently, hybrids produced from crossbreeding between species from different but phylogenetically related genera have been documented. The result of an intergeneric cross is known as a nothogenus, with examples including × *Cohnlophiaris* Cetzal & Balam in (Cetzal-Ix *et al.* 2012: 41), × *Proslia* Shaw (2004: 76), and × *Pseudorhiza* Hunt (1971: 142).

Recently several nothospecies among Mexican orchids of Laelinae subtribe have been described. In *Encyclia* these include *E.* × *nizandenzis* Pérez-García & Hágsater (2003: 564), possibly derived from a cross between *E. parviflora*

Accepted by Edlley M. Pessoa: 17 Jun. 2025; published: 2 Jul. 2025

(Regel 1856: 374) Whitner (1998: 121) and *E. rodolfoi* Archila, Chiron & Veliz (2013: 6); *E.* × *nizanburyi* Pérez-García & Hágsater (2012: 1), the result of a cross between *E. hanburyi* (Lindley 1844: 46) Schlechter (1914: 209), and *E. rodolfoi* or *E.* × *nizandensis*; and *E* × *tixtlensis* León-Peralta, Salmerón-Barrera & Pérez-García in León-Peralta *et al.* (2023: 250), a hybrid between *E. meliosma* (Reichenbach 1869: 988) Schlechter (1918: 472) and *E. atrorubens* (Rolfe 1896: 46) Schlechter (1918: 471). In the genus *Laelia* there are three nothospecies recently described from Oaxaca, Mexico: *Laelia* × *oaxacana* Salazar & Jiménez in Salazar *et al.* (2014: 167), the hybrid derived from the cross between *L. halbingeriana* Salazar & Soto-Arenas in (Salazar *et al.* 2014: 162) and *L. anceps* (Lindley 1835: pl. 1751); *L.* × *tlaxiacoensis* Solano & Cruz García in Solano *et al.* (2019: 235) that resulted of a cross between *L. albida* Lindley (1839a: 2) and *L. furfuracea* Lindley (1839b: pl. 26); and *Laelia* × *meavi*, Cetzal & Pérez-García in (Cetzal-Ix *et al*. 2020: 83), possibly due to the cross between *Laelia rubescens* fo. *peduncularis* Halbinger (1993: 224) and *L. dawsonii* (Anderson 1868: 27) Crawshay (1902: 414) fo. *dawsonii*. In *Prosthechea* Knowles & Westcott (1838: 111) hybrids between *P. radiata* (Lindley 1841: 58) Higgins (1998: 380) and *P. cochleata* (Linnaeus 1763: 1351) Higgins (1998: 377) were originally reported from Chiapas, Mexico (Beutelspacher & Moreno-Molina 2014); lately the hybrid between both species was described as *P.* × *chixoyensis* E.Mó & Cetzal in (Mó *et al.* 2014: 989) from Alta Verapaz, Guatemala.

Regarding the interspecific hybrids in Mexican orchids, × *Cohnlophiaris quintanarooensis* Cetzal & Carnevali in (Cetzal-Ix *et al.* 2012: 41) was described based on a natural intergeneric cross between *Cohniella ascendens* (Lindley 1842: 28) Christenson (1999: 177) and *Lophiaris oerstedii* (Reichenbach 1854: 91) R.Jiménez, Carnevali & Dressler (in Carnevali *et al.* 2001: 423). More recently, × *Proslia salvatoriorum* Archila, Hágsater & Pérez-García in (Pérez-García *et al.* 2023) was described as the result of a hybridization between *Laelia speciosa* (Kunth 1815: 342) Schlechter (1915: 233) and probably *Prosthechea karwinskii* (Martius 1830: 10) Shaw (2011: 119).

A specimen obtained several years ago from an orchid vendor in the Teocelo-Coatepec region, central Veracruz, Mexico, has recently flowered after being maintained under cultivation for an extended period in Coatepec city. In this region orchid vendors are local peasants who extract specimens from the forests surrounding their communities. These orchids are then sold in traditional markets, such as those in Coatepec, as part of a practice that lacks any form of post-harvest management or cultivation to ensure sustainable supply. The specimen has a rhizomatous habit and is similar to *D. polybulbon* (Swartz 1788: 124) Lindley (1831: 111) in having linear sepals and petals, obovate lip with a prominent claw, and a straight column with two apical horns. It also resembles *N. boothii* (Lindley 1838: 52) Schlechter (1922: 43) by its fusiform, stipitate pseudobulbs, and linear leaves. The specimen exhibits intermediate characteristics between these two taxa and would correspond to an intergeneric hybrid, which is described here as a new nothogenus and a new nothospecies. Photographic compositions are provided for the new nothospecies, *D. polybulbon*, and *N. boothii*, along with spatial distribution models for the presumed parental species, illustrating their zones of sympatry in Mexico.

Material and methods

Taxonomic treatment:—A morphological description of the new nothospecies was prepared based on the live specimen flowered in cultivation. A search for additional potential records was conducted using the online databases of Global Biodiversity Information Facility (GBIF, 2025), SEINet (2025), and the citizen science platform iNaturalist Mexico (iNaturalist, 2025a). The structures present in the habit, inflorescence, and floral morphology of the nothospecies was described; for reproductive structures a single flower was dissected and examined under a stereomicroscope (Wild Heerbrugg Type 308700, Gais, Switzerland), with measurements recorded using a Vernier Caliper. Photographs of the habit, vegetative, and reproductive structures were taken with a Nikon D3100 digital SLR camera (Nikon, Tokyo, Japan). The images were then edited and compiled into a plate using Adobe Photoshop® CC 2020. For comparison, the plates for *D. polybulbon* and *N. boothii* were also prepared as described above. Information about distribution, habitat, and phenology is provided for the new nothospecies. Additionally, a comparison with its putative parental species is presented, based on the revision of live specimens and information available in specialized literature (Dressler 2023, García-Cruz *et al.* 2003, Salazar *et al.* 2006), through the examination of live specimens of both parental species, as well specimens revised from GBIF, SEINet, and iNaturalits. A flowering specimen of the new nothosspecies was herborized follow conventional techniques and deposited in the CITRO herbarium (acronym according to Thiers 2025).

Spatial Distribution Model:—Occurrence records obtained from searches in the MEXU herbarium and the GBIF, SEINet, and iNaturalist databases were georeferenced (when geographic coordinates were missing) and subsequently curated to remove duplicate entries. Spatial distribution models were created for *Nidema boothii* and *Dinema polybulbon* using occurrence records from the web system of the biological collection IBData v 4 database (UNAM 2025). Those records lacking geographic coordinates were georeferenced whenever the available information allowed it. Additionally, the records were processed in Wallace (Kass *et al.* 2018) to remove errors and duplicates, and spatial bias was reduced by filtering records at least 1 km apart. Finally, we used 182 and 24 occurrence records for *N. boothii* and *D. polybulbon* respectively, for the spatial distribution models.

Modeling was conducted in R (R Core Team, 2020) using bioclimatic layers, related with temperature and precipitation, from the WorldClim Project 2.0 (Fick & Hijmans 2017): mean diurnal range (Bio 2), isothermality (Bio 3), temperature of the coldest month (Bio 6), precipitation of the driest month (Bio 14), precipitation seasonality (Bio 15), precipitation of wettest quarter (Bio 16), and precipitation of the warmest quarter (Bio 18). Additional variables, slope and elevation, were obtained from the CONABIO geographic metadata catalog (INEGI 2022). Multicollinearity among environmental variables was analyzed in RStudio (R Development Core Team 2019) using the *usdm* package, with variance inflation factor (VIF) values. Variables with VIF > 10 were excluded to prevent overparameterization. Bio 6 was removed due to collinearity. Environmental niche modeling was performed using Maxent 3.4.4 (Phillips & Dudik 2008), with the ENMeval package optimizing parameters for the most parsimonious model (Muscarella *et al.* 2014). Model evaluation used the corrected Akaike Information Criterion (AICc) to select models with the lowest values (Warren & Seifert 2011).

A total of 50,000 random points were generated for evaluation metrics. Records were split using the checkerboard1 method with an aggregation factor of 5, creating a grid over the study area to ensure equal sampling of geographic and environmental space. Model complexity was assessed with the regularization multiplier (RM) and Maxent feature classes. RM values below 1.0 indicated a tightly localized distribution, while higher values suggested broader predictions. The most parsimonious model was identified by testing combinations of 10 RM values (1.0 to 5.0 in increments of 0.5) and six feature classes: linear (L), quadratic (Q), product (P), hinge (H), and threshold (T). Maxent modeling was implemented in R using the *dismo* package (Hijmans *et al.* 2017, Bolom-Huet *et al.* 2022). Climate suitability was estimated by converting the continuous prediction map into a binary map.

Results

Taxonomy

× ***Dinedema*** Solano & A.Ramos, *nothogen. nov.*

Nothogenus between the parent genera *Dinema* and *Nidema*.

Both genera are closely related sister groups within the *Scaphyglottis* alliance of the subtribe Laeliinae (van den Berg *et al.* 2009). This phylogenetic proximity facilitates intergeneric hybridization, particularly when populations of both genera coexist geographically, and their flowering periods overlap.

× *Dinedema mariae* A.Ramos, M.Lozano & Solano, *nothosp. nov*. (Figure 1).

Type:—MEXICO. Veracruz: Surroundings of Coatepec municipality, acquired in Miguel Hidalgo square, Coatepec, from an orchid seller between 2009–2010, cultivated by Mrs. Maria Juana Aguilar-Huezca, flowering in June 2023, *A. Ramos 1* (holotype: CITRO-6297VER!, isotype: CITRO-6298VER!).

An intermediate nothospecies between its parent species, *Dinema polybulbon* and *Nidema boothii*, it is distinguished by its rhizomatous habit, fusiform, bifoliate pseudobulbs, two-flowered raceme as long as the leaves, sepals and petals yellowish-cream with reddish markings at the base, petals smaller than the sepals, lip white with a longitudinal yellow stripe at the basal half, its basal portion attached and parallel to the straight column, which bears two erect, triangular horns at its apex. It resembles *Dinema polybulbon* in its linear sepals and petals, obovate lip with a conspicuous claw, and straight column with two apical horns. It is similar to *Nidema boothii* in its fusiform, stipitate pseudobulbs and two linear, erect leaves.

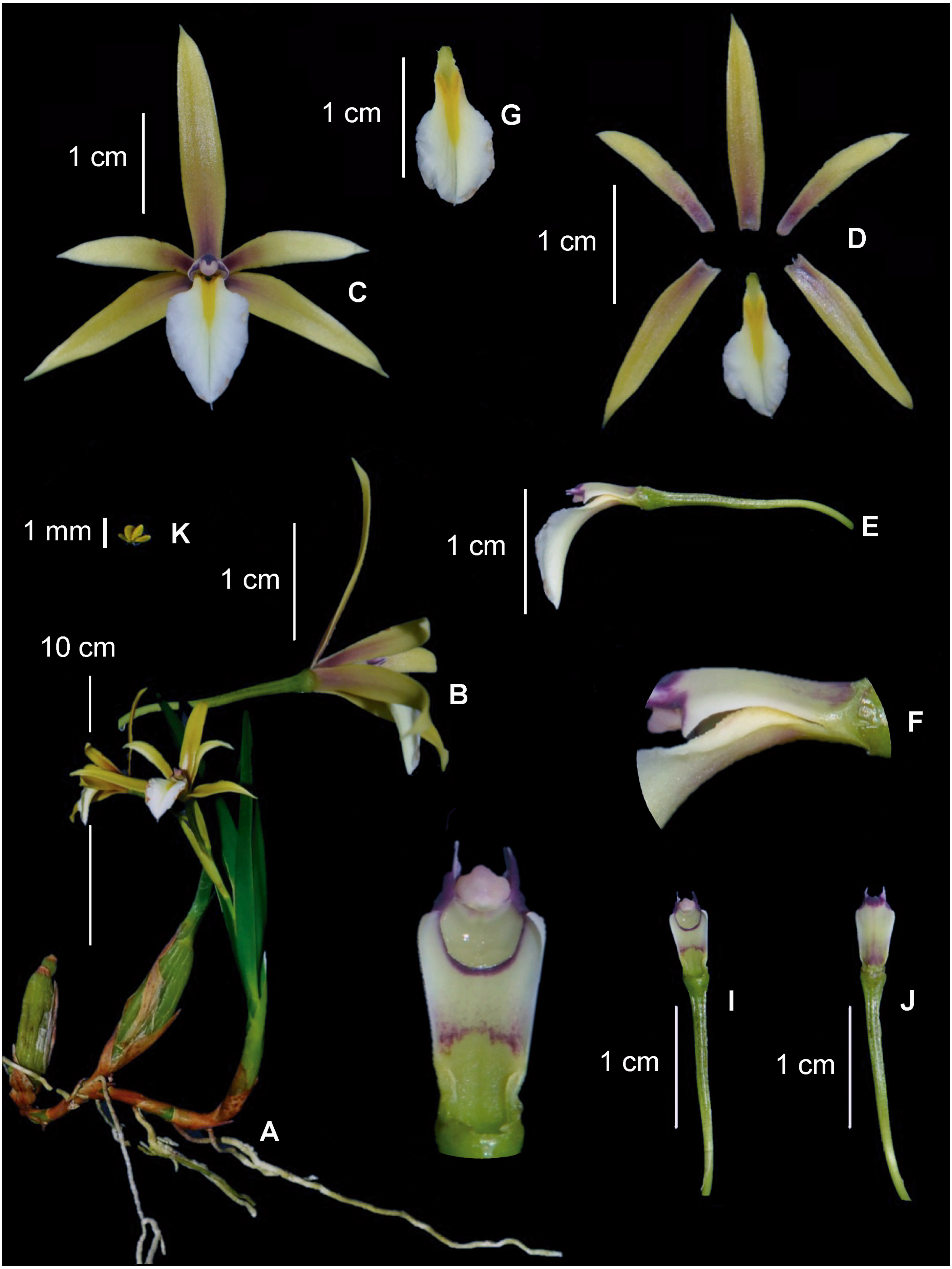

FIGURE 1. × *Dinedema mariae*. **A.** Habit. **B.** Flower, lateral view. **C.** Flower, frontal view. **D.** Dissected floral pieces. **E.** Lip-column-ovary, lateral view. **F.** detail of the lip and column touch each other, lateral view. **G.** Lip, ventral view. **H.** Column-ovary, ventral view. **I.** Column-ovary, dorsal view. **J.** Column, ventral view. **K.** Pollinarium. Plate by M.A. Lozano-Rodríguez, based on the type.

Description:—Epiphytic sympodial, erect, scandent *herb*, up to 16.3 cm tall. *Roots* single, terete, flexuous, whitish. *Rhizome* 3.5–4.5 cm long between adjacent pseudobulbs, ca. 5.0 mm in diameter, creeping, consisting of 4 internodes, covered by tubular, brownish, imbricate, tight sheaths. Pseudobulbs 6.0–7.5 cm long, 1.5–2.0 cm gross at the middle, 2-foliated, ellipsoid, stipitate, fusiform, laterally compressed, formed by 3 internodes; when young, covered by imbricate, brownish, scarious sheaths. *Leaves* 10.0–12.5 × 1.2–1.5 cm, erect, ensiform, lanceolate, subacute, coriaceous, sulcate on the adaxial surface, keeled on the abaxial surface, conduplicate at the base, without a defined petiole. *Inflorescence* apical, as long as the leaves, ca. 10.0 cm tall, arising from the developing pseudobulb, a 2-flowered raceme. *Floral bracts* 2.0–2.5 cm long, lanceolate, conduplicate, acuminate. *Flowers* ascending, star-shaped; tepals yellow-cream with a purple flush towards the base; lip whitish on the blade, with a yellow stripe on the basal part that extends to the middle of the blade; column whitish, spotted with purple in the apex, around the stigmatic cavity, and toward the base, greenish at the entrance of the nectary, anther white pinkish. *Sepals* 17.5–18.5 × 3.0 mm, narrow-lanceolate, acuminate-apiculate, glabrous, recurved towards the apex, with lateral sepals slightly oblique. *Petals* smaller than the sepals, 14.0 × 2.0 mm, subparallel to the column at the base, recurved towards the apex, narrow-oblanceolate, acute-acuminate, slightly falcate. *Lip* 13.0 × 6.5 mm when extended, strongly arched-decurved, unguiculate; blade 9.0 × 6.5 mm, elliptical, rounded, longitudinally sulcate, with ascending margins; at the base with an oblong, canaliculate, papillose claw, 4.0 × 2.0 mm, parallel and touch the ventral surface of the column, with a triangular cavity at the base that fits into the nectary entrance. *Column* 7.5 mm long, 3.2 mm wide, lacking a foot, the body almost straight, widening from the base to the apex, ventrally channeled; clinandrium with lateral margins forming two erect, horn-like processes; the base of the column with a cavity that extends into the apical part of the ovary to form a nectary. *Stigma cavity* reniform, white, viscous; rostellum laminar, membranous. *Ovary* 1.9 cm long, 1.3 mm diameter near the apex, pedicellate, terete, straight, green, 6-ribbed. *Anther* apical, ovoid, with a longitudinal crest. Pollinarium consists of 4 unequal, yellow, compressed pollinia, with the two outer ones smaller, ovoid, connected by caudicula. Capsule not seen.

Distribution and ecology:—So far, × *Dinedema mariae* is only known from the foothills of the Cofre de Perote mountain system, between 1200 and 1500 m elev., surrounding the municipalities of Coatepec, Teocelo, and Xico, in the central region of Veracruz state, Mexico. In a remnant forest within this region, a specimen has been found whose vegetative morphology is similar to that of the nothospecies described here (rhizomatous growth habit, stipitate pseudobulbs bearing two apical leaves, and remnants of an apical inflorescence), but it has not been possible to observe it in bloom. Unfortunately, the specimen had disappeared during a recent visit to the locality.

The plant grows as an epiphyte on an unidentified species of *Quercus* Linneaus (1753: 994), in a type of vegetation that originally consisted of pine-oak forest or cloud forest, which have been severely reduced, and now only isolated patches remain. It has been observed in bloom in June, producing two flowers from the developing pseudobulb. *Dinema polybulbon* flowers between September and March, while *N. boothii* blooms from August to May, according to García-Cruz *et al.* (2003) and the records consulted in GBIF and iNaturalist. The overlap in distribution and flowering suggests the possibility of intercrossing when populations of both species coexist, as observed in central Veracruz.

Etymology:—This new nothospecies is dedicated to Mrs. María Juana Aguilar-Huezca, from Coatepec, Veracruz, who has cultivated the specimen for almost 15 years and provided material for the description and lamina presented here.

Spatial distribution model:—For *Dinema polybulbon*, 25 models were generated. The most parsimonious model (AICc = 545.310234, ΔAICc = 0) had the following parameters: LQ with RM = 1 and an AUC of 0.9144. with an estimated potential distribution area of 34,696.04 km². This area extends along the mid-elevation high hills and their foothill facing the Gulf of Mexico slope: Sierra Madre Oriental, northern mountains of Oaxaca, Sierra Los Tuxtlas, and the high lands of Chiapas (Figure 2. The variables contributing the most to the model were precipitation of the driest month (53.6%), and elevation (19.5%).

For *Nidema boothii*, 25 models were generated. The most parsimonious model (AICc = 1358.50114, ΔAICc = 0) had the following parameters: LQH with RM = 4, and an AUC of 0.9354, with an estimated potential distribution area of 163,226.8 km². This area extends along the mid-elevation high hills and their foothills on both the Pacific and Gulf of Mexico slopes, including the Sierra Madre Oriental, Sierra Madre del Sur, Sierra Los Tuxtlas, the high lands of Chiapas, and the Sierra Madre de Chiapas (Figure 3). Additionally, there are occurrence records in Guerrero and San Luis Potosi, although these regions show low probabilities. The variables contributing the most to the model were precipitation of the driest month (45.0%) and precipitation of the wettest quarter (20.2%).

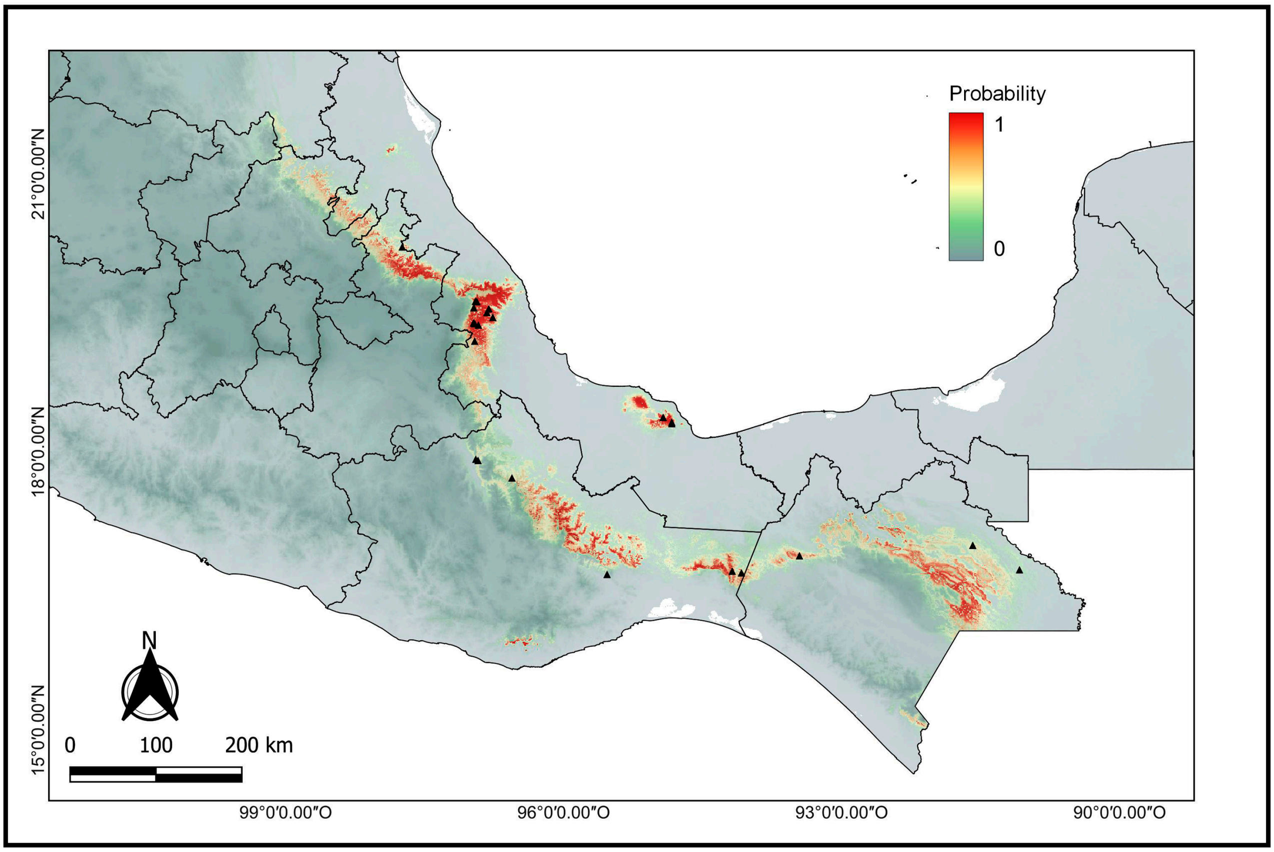

FIGURE 2. Map showing the spatial distribution model for *Dinema polybulbon* in Mexico. Map by M. Cuéllar-Martínez.

The modeling estimated an overlap area of 17,646.32 km² between the distribution ranges of *D. polybulbon* and *N. boothii* (Figure 4), identifying three regions with a high probability of overlap: one in Sierra Norte of Puebla, a second in central Veracruz, where the known locality of × *Dinedema mariae* is located; and a third in Sierra Los Tuxtlas (Veracruz). These three areas could serve as potential hybridization zones for the two species.

Discussion

Based on morphology × *Dinedema mariae* is distinguished by its extensive rhizomatous habit, with stipitate, slightly compressed pseudobulbs, each bearing two apical leaves (Figure 1). The inflorescence is a two-flowered raceme, equal in length to the leaves, emerging from the developing pseudobulb and producing star-shaped, whitish flowers. The basal part of the lip is attached and lies parallel to the ventral surface of the straight column, which has a pair of triangular horns at its apex. This new nothospecies exhibits mixed characteristics from its putative parental species, *D. polybulbon* (Figures 5, 6A and B) and *N. boothii* (Figures 6C and D, 7). A morphological comparison of the new nothospecies and its parental species is presented in Table 1.

TABLE 1. Summary of morphological comparison between *Dinema polybulbon*, × *Dinedema mariae*, and *Nidema boothii*.

	Dinema polybulbon	**× *Dinedema mariae***	***Nidema boothii***
Habit	< 5.0 cm in tall	Up to 16.3 cm in tall	15–20 cm in tall
Rhizome	< 3.0 cm long between adjacent pseudobulbs	3.5–4.5 cm long between adjacent pseudobulbs	2.0–7.0 cm long between adjacent pseudobulbs
Pseudobulbs	Oblong to ellipsoid, 0.9–2.0 cm, long	Ellipsoid, stipitate, 6.0–7.5 cm long	Ovate-elliptic, 2.0–5.0 cm, long

......continued on the next page

TABLE 1. (Continued)

	Dinema polybulbon	× *Dinedema mariae*	*Nidema boothii*
Leaves	2, arching, ovate to oblanceolate, 0.7–4.5 × 0.3–0.9 cm	2, erect, lanceolate, 10.0–12.5 × 1.2–1.5 cm	1, erect, linear-elliptic or lanceolate, 6.0–18.0 × 0.4–1.0 cm
Inflorescence	From the mature pseudobulb	From the developing pseudobulb	From the developing pseudobulb
Flores	Sepals and petals brownish, lip whitish with a yellow stripe at the base	Sepals and petals yellow-cream with purple flush at their bases, lip whitish with a yellow stripe at the base	Sepals and petals whitish or yellowish; lip whitish or yellowish with purple flush near the apex
Petals	As long as the sepals	Smaller than the sepals	Smaller than the sepals
Lip	Suborbicular, rounded	Elliptical, rounded	Oblong-pandurate, acute
Column	Straight, 5.0–6.0 mm long,	Almost straight, 7.5 mm long	Arching, 6.0–8.0 mm long
Lateral teeth of the column	Forming erect, flattened wings, 2.5–2.8 mm long	Forming erect horns , 1.5 mm long	Forming obtuse processes shorter than the median tooth

In Mexico, *D. polybulbon* and *N. boothii* have a wide distribution, as shown in Figures 2 and 3. These species are sympatric in several regions of the country, including central Veracruz, where × *Dinedema mariae* was discovered (Figure 4). They share overlapping flowering periods, belong to closely related genera (van den Berg *et al.* 2009), and are apparently pollinated by bees. Consequently, hybridization events between sympatric populations of *D. polybulbon* and *N. boothii* could be plausible. The coexistence of both parental species and their hybrid suggests the presence of gene flow within the hybridization zone, as well selection against admixed individuals, with intrinsic selection playing a key role in establishing reproductive barriers (Bersweden *et al.* 2021).

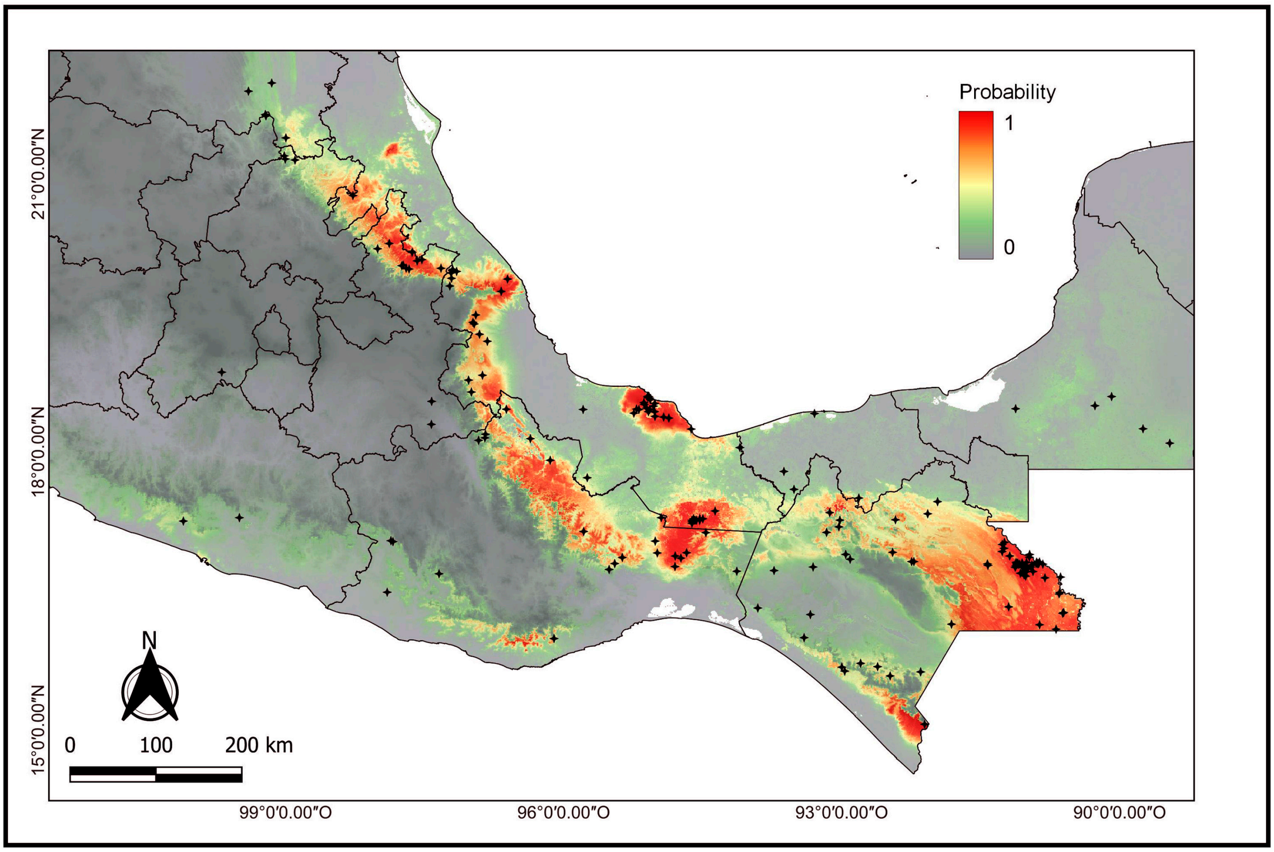

FIGURE 3. Map showing the spatial distribution model for *Nidema boothii* in Mexico. Map by M. Cuéllar-Martínez.

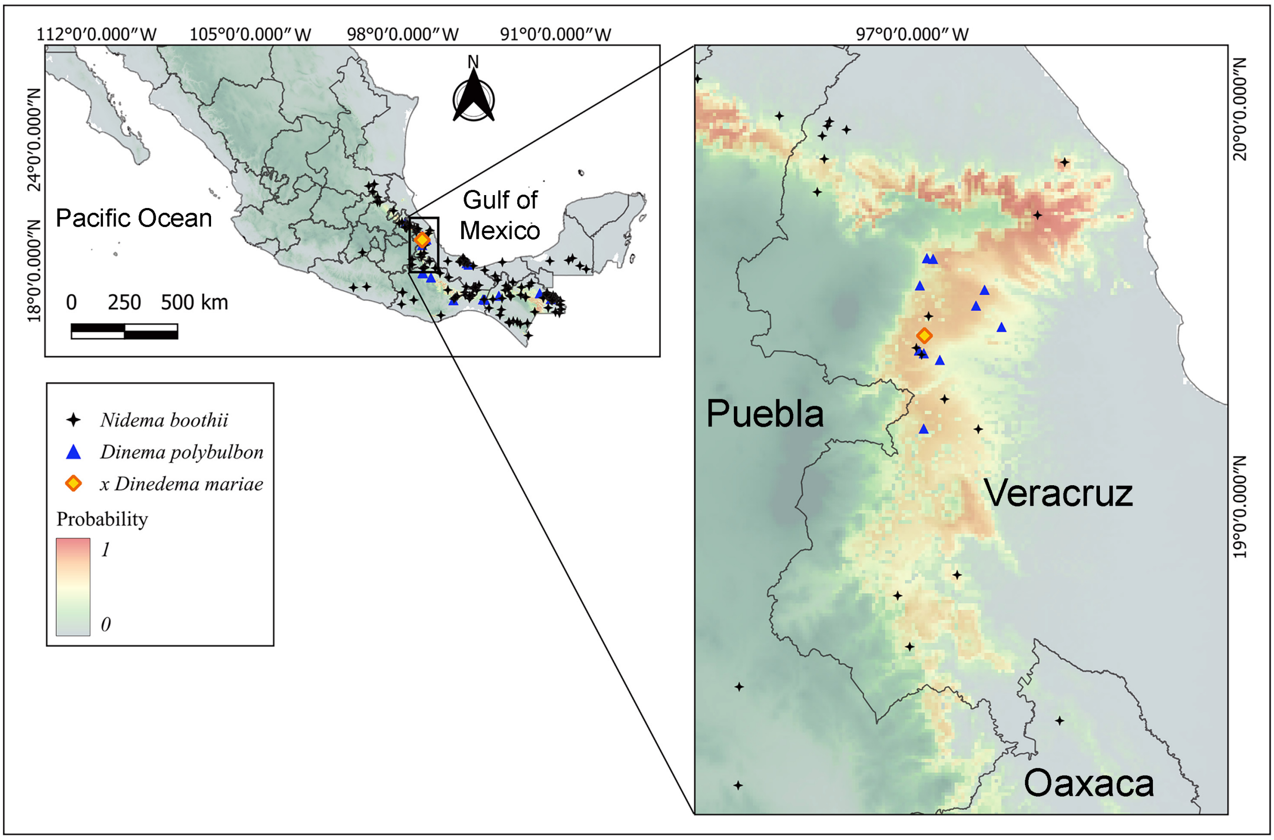

FIGURE 4. Map showing the overlap in the distribution areas of *Dinema polybulbon* (blue triangles) and *Nidema boothii* (black crosses) in the central region of Veracruz, Mexico, where the intergeneric hybrid between them, × *Dinedema mariae*, originated (yellow diamond). Map by M. Cuéllar-Martínez.

The biological species concept (Mayr, 1942) becomes difficult to apply in cases where gene flow occurs between species through fertile hybrids, as hybridization challenges the notion of species as reproductively isolated units. Nevertheless, hybridization can give rise to new lineages that persist over time and, if accompanied by sexual reproduction and functional meiosis, may eventually diverge and form distinct species. Under such circumstances, species are more appropriately understood as independently evolving lineages, defined as populations or groups of populations with historical continuity and evolutionary independence (Hörandl 2022). This definition aligns with the phylogenetic species concept (Cracraft 1983) and is compatible with the existence of hybrids when they establish their own evolutionary trajectories. Identifying these hybrid lineages requires the use of genomic methods, complemented by phenotypic, functional, and ecological criteria (Hörandl 2022).

For the new nothospecies, only the specimen designated here as the type has been documentd to date, suggesting that hybridization events are rare within the probable hybridization zone. A similar specimen was found in a remnant forest near the city of Coatepec, also in central Veracruz, but it was not observed in bloom and could not be relocated during a recent visit. Additionally, a review of digitized specimens at the MEXU herbarium, as well as Mexican records available through GBIF, SEINet, and iNaturalist, yielded no matches corresponding for ×*Dinedema mariae*. Currently, no studies exist on the pollination biology or speficic pollinators of *Dinema* and *Nidema* species, which would be important for understanding their potential to produce intergeneric hybrids. This lack of information represent an opportunity for future research, especifically considering the diversity of pollination syndromes documented within the subtribe Laeliinae.

Species distribution models (SDM) are valuable tools for conservation planning, as they support the selection of protected areas and guide future research toward regions with a high probability of occurrence for at-risk species (Wang *et al.* 2015, Hernández *et al.* 2022; Kindlmann *et al.* 2023). SDMs also help identify sympatric zones where natural hybridization may occur (Solano *et al.* 2019, Salazar *et al.* 2024), and assist in assigning conservation status (Solano & Licona 2023).

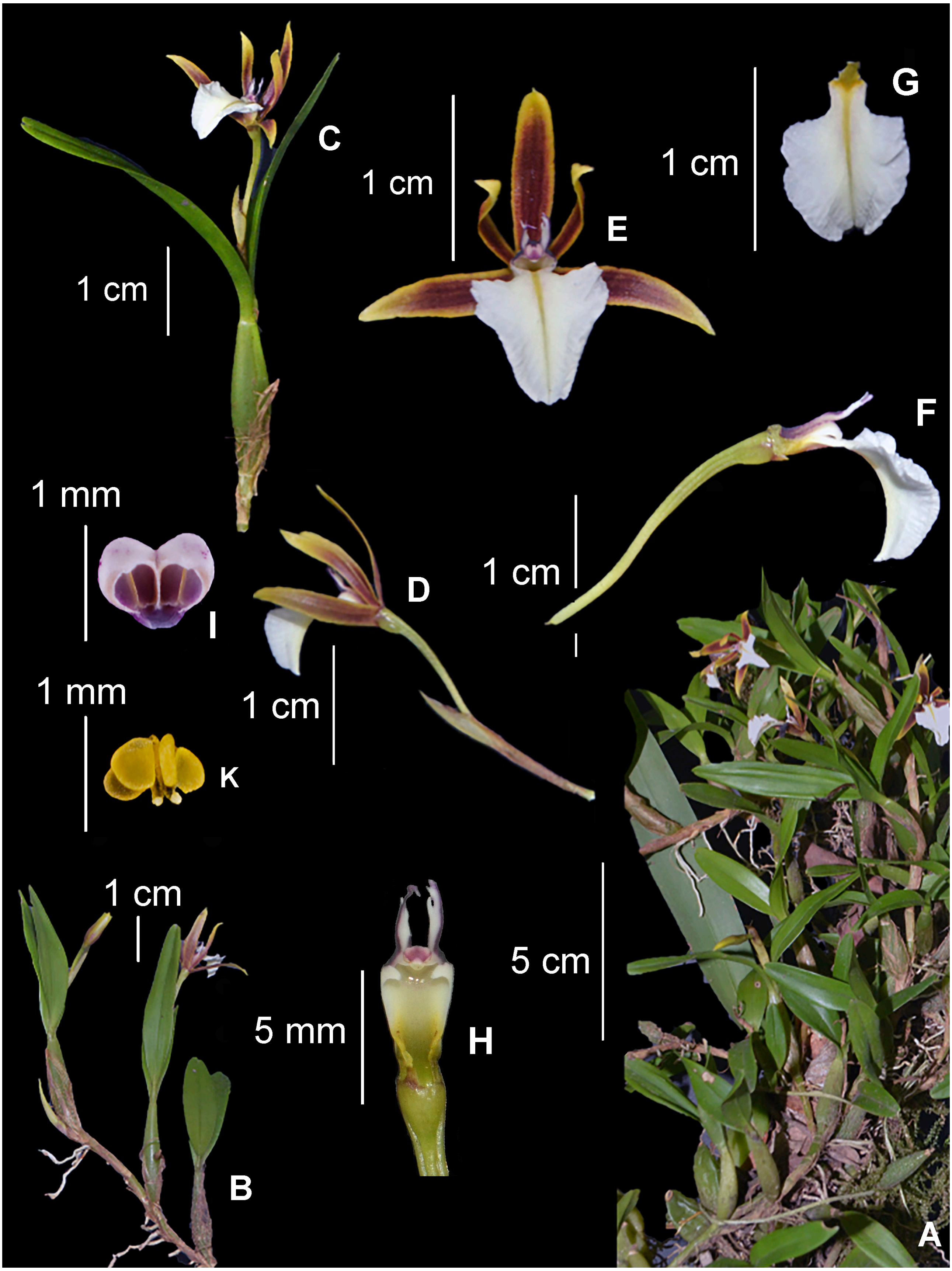

FIGURE 5. *Dinema polybulbon*. **A**. Habit. **B.** Segment of a sympodium with three pseudobulbs. **C.** Pseudobulb with leaves and inflorescence. **D.** Flower with pedicellate ovary and floral bract, lateral view. **E.** Flower, frontal view. **F.** Column with wings, lip, and pedicellate ovary, lateral view. **G.** Lip, ventral view. **H.** Columns with wings, ventral view. **I.** anther cap. **K.** pollinarium. [Plate by M.A. Lozano-Rodríguez, based on M. Lozano 74 (CITRO)].

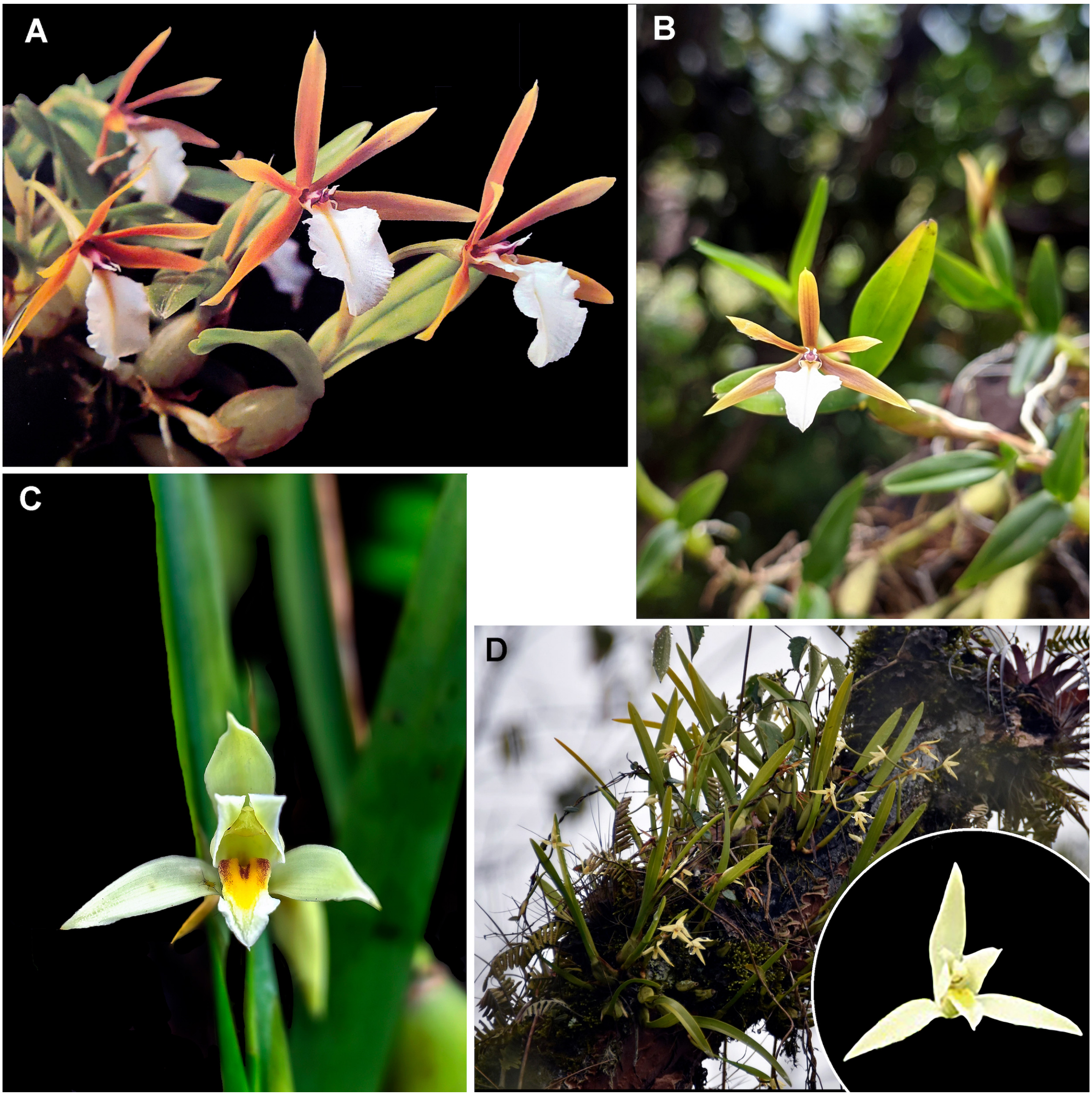

FIGURE 6. A-B. *Dinema polyulbon* (Sw.) Lindl. **C-D.** *Nidema boothii* (Lindl.) Schltr. **A.** Habitat. **B.** Habit and flowers. **C.** Habitat. **D.** Habitat and flower. [A. Photograph by G. Salazar, from G. Salazar s.n. (AMO). B. Photograph by C. Tomás, from C. Tomas (iNaturalist 2025a). C. Photograph by R. Solano, from Solano 4469 (OAX). D. Photograph by Luis Stevens, from L. Stevens (iNaturalist 2025b)].

Both the regions of central of Veracruz and Los Tuxtlas, another zone where the distributions of the parental species overlap, have been Floristically well studied for several decades. Currently, botanical exploration continues in these regions by researchers and students from the Veracruzan University and Instituto de Ecologia, with collections being deposited in the herbaria of both institutions. However, despite ongoing floristic studies, no additional specimens of the nothospecies described here have been found.

For *D. polybulbon*, the SDM estimated a potential distribution area of 34,696 km² in Mexico, encompassing at least 24 localities separated by a minimum of 1 km. In contrast, *N. boothii* has an estimated potential distribution area of 163,226 km², with nearly 182 documented localities. Moreover, both species can be locally abundant and are capable of thriving in disturbed habitats. Therefore, according to the methodology used to assess the extinction risk of native plant species in Mexico (SEMARNAT 2010), neither species is currently considered at risk.

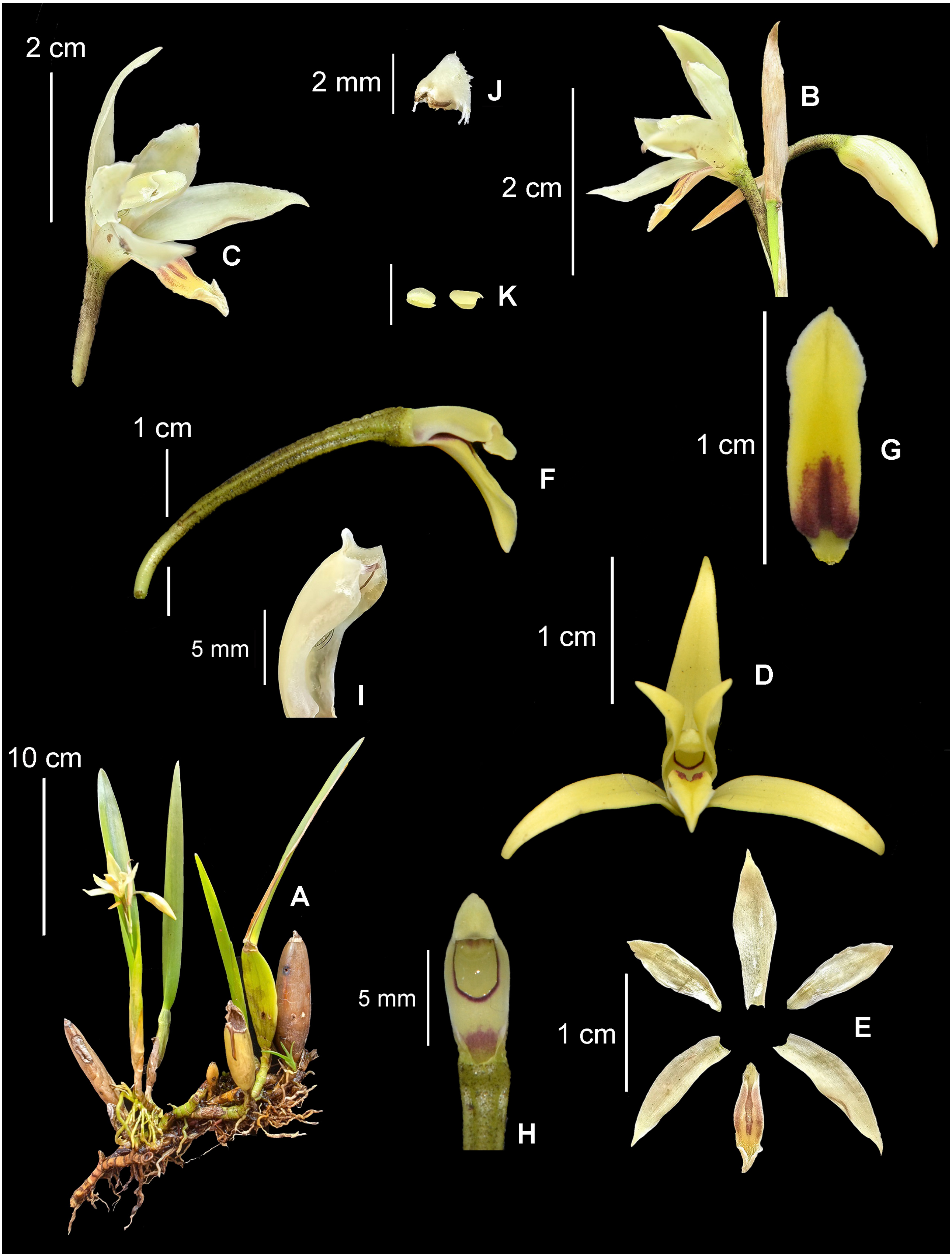

FIGURE 7. *Nidema boothii*. **A.** Habit. **B.** Inflorescence. **C.** Flower, ¾ view. **D**. Flower, frontal view. **E.** Dissected floral pieces. **F.** Lip, column with anther cap, and pedicellate ovary, lateral view. **G.** Lip, ventral view. **H.** Column with anther cap, ventral view. **I.** Apical portion of the column without anther cap. **J.** Anther cap. **K.** pollinarium. [Plate by R. Solano. A, B, C, E, I, J, and K based in R. Solano 4474 (OAX); D, F, G, and H based in A. Ramos 2 (CITRO)].

Acknowledgements

To Gerardo Salazar Chávez, Christian Tomas-López, and Luis Stevens for authorizing the use of their photographs in this study. The comments from Cassio van den Berg and two anonymous reviewers were valuable in improving the manuscript.

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