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El Colegio de la Frontera Sur, Unidad Chetumal, Av. del Centenario, km 5.5, Chetumal, Quintana Roo, 77000, México

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Cetzal Ix, W. (El Colegio de la Frontera Sur, Unidad Chetumal, Av. del Centenario, km 5.5, Chetumal, Quintana Roo, 77000, México) and Fernández-Concha, G. C. (Herbario CICY, Centro de Investigación Científica de Yucatán, A. C., A. P. 87, Cordemex, Mérida 97310, Yucatán, México). A revision of *Cohniella* Pfitzer (Orchidaceae) in Mexico. J. Torrey Bot. Soc. 137: 180–213. 2010—A revision of the Mexican species of the genus *Cohniella* is presented. Each species is fully described and illustrated. Furthermore, species entries include specimen citation, discussion of diagnostic features and biogeography. A key to the Mexican species of *Cohniella* is presented. Two new species, *Cohniella leptotifolia* Cetzal & Carnevali and *Cohniella yucatanensis* Cetzal & Carnevali, are proposed. *Cohniella brachyphylla* (Lindl.) Cetzal & Carnevali is morphologically and distributionally recircumscribed. Finally, as part of our ongoing studies in this genus, a non-Mexican species related to *C. ascendens*, *Cohniella teres*, is synonymized under *Oncidium helicanthum* Kranzl. for which the combination *Cohniella helicantha* (Kranzl.) Cetzal & Carnevali is newly proposed. We provide a key to three closely related, easily confused species, *C. aguirrei*, *C. ascendens*, and *C. helicantha*.

Key words: *Cohniella*, IUCN Conservation Status, Mexico, Oncidiinae, Orchidaceae.

The genus *Cohniella* Pfitzer (Orchidaceae, Oncidiinae) consists of 13 described species that are distributed from northern Mexico (27° N in Sonora) into southern Brazil and northern Argentina (31° S in Santa Fe). The species grow mostly in the lowlands in tropical deciduous forest, tropical rainforest, thorn scrub, and pine-oak forest, at elevations of 0–1000 (–1700) m. The genus is most diverse in Mexico where seven species occur, four of them endemic, and in Brazil and Bolivia with four species each.

In the horticultural trade, species of *Cohniella* are known as the "rat-tail oncidiums" and forms a well-defined group, which is easy to circumscribe within the Oncidiinae due to its relatively large terete leaves and *Oncidium*-like flowers. The foliar anatomy is also distinctive (Abreu & Peña 1982, Astudillo & Cabrera 1983, Sandoval-Zapotitla & Terrazas 2001, Cetzal et al. in prep.). Some authors (Sandoval-Zapotitla and Terrazas 2001, Sosa et al. 2001, Williams et al. 2001) treat members of *Cohniella*, along with all taxa of *Lophiaris* Rafinesque, *Lophiarella* Szlachetko, Mitnik & Romowicz, and *Trichocentrum* Poeppig & Endlicher *s.s.* as belonging to a single genus, *Trichocentrum s.l.* However, we have chosen to accept each of these genera as distinct. The rationale behind this narrower generic circumscription is discussed elsewhere (Pupulin & Carnevali 2005, Balam et al. 2009, Carnevali et

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al. 2009, 2010; Cetzal, 2007, Cetzal et al. 2008) and basically consists in the logic of recognizing easily diagnosable, monophyletic entities instead of larger, polymorphic (and thus difficult to define) generic units.

Specific circumscriptions within *Cohniella* are problematic due to the similarity of the plants and flowers. However, the entities here treated as distinct species all share subtle morphological characters that allow for unambiguous diagnosis, coupled with shared geographical distributions and ecological preferences. Most of the morphological characters are easier to detect in living material. Herbarium material is often difficult to assign to species good flowers and distributional data are absent. As a consequence, herbarium taxonomists have tended to use broad species concepts and have lumped all the variation (and species) under a few old broadly defined species. Among them, the name *Cohniella cebolleta* (Jacq.) Christenson has been used to refer to a complex of forms that range widely throughout the Neotropics. However, the variation within this complex of forms is strongly correlated geographically and ecologically, clearly indicating that several species are involved. Carnevali et al. (2010) first applied a narrower circumscription for *Cohniella cebolleta*, restricting its distribution to SE Mexico, Central America, the West Indies, and northern South America. In the present approach, most of the populations previously identified as belonging to this species are now referred to several segregated taxa. Furthermore we refine the circumscription of *C. cebolleta* and restrict it to South America north of the Amazon Basin. Mexican populations formerly treated as *C. cebolleta* are here proposed as a new species, *C. yucatanensis* Cetzal & Carnevali.

Most of the *Cohniella cebolleta*-like populations from western Mexico were treated in Carnevali et al. (2010) as belonging to the variable *C. brachyphylla* (Lindl.) Cetzal & Carnevali or else, were referred to a species then proposed, *C. pendula* Carnevali & Cetzal. However, even after this refinement, *C. brachyphylla* remained as an extremely variable entity, geographically broken into a series of disjunct, easily diagnosable populations. In this contribution, a series of populations from the extreme NW distribution of this complex (and of the whole genus) are proposed as a distinct species, *C. leptotifolia* Cetzal & Carnevali, which is clearly diagnosed by its erect, smaller leaves, proportionally long, usually unbranched inflorescences, floral morphology, and distinctive ecology and biogeography.

Traditionally, only two species of *Cohniella* have been recognized in Mexico, *C. ascendens* (Lindl.) Christenson, and *C. cebolleta* (McVaugh 1985, Wiard, 1987, Carnevali et al. 2001, Sánchez-Martínez et al. 2002, Hágsater et al. 2005). However, at least recently there has been some awareness of the fact that the populations referred to *C. cebolleta* were extremely variable and that the variation is geographically correlated (e.g., V. Sosa, pers. comm.). The iconography of a compact disk associated with the book ''Las Orquídeas de México'' (Hagsater et al. 2005) also recognizes only these two species (as species of *Trichocentrum*). However, they figure three additional images of *Trichocentrum aff. cebolleta* that are clearly referrable to the *C. cebolleta* segregates recognized in Carnevali et al. (2010) and in this contribution. Thus, image 1233 (labelled *Trichocentrum cebolleta*) is referrable to *C. brachyphylla*; image 1234 [labelled *T. aff. cebolleta* (1)] is *C. yucatanensis* (first described in this article and treated in Carnevali et al. 2010 as *C. cebolleta* from the Yucatan Peninsula). On the other hand, the plate 1235 [identified as *T. aff. cebolleta* (2)] is *C. pendula* while image 1236 [labelled *T. aff. cebolleta* (3)] is *C. biorbicularis* Balam & Cetzal.

As treated here and elsewhere (Carnevali et al. 2010, Cetzal & Carnevali in prep.), *Cohniella* species are fairly variable entities, with most of the intraspecific variation residing in the absolute sizes and shapes of the labellum lobes. However, the shape of the callus, the relative proportions of the lateral and central lobes, and the shape of the column and its wings remain fairly consistent within the entities here treated as different species. Furthermore, all the variation and its discontinuities are strongly correlated geographically. Thus, closely related *Cohniella* taxa are essentially allopatric, the genus consisting of entities that replace each other geographically, bounded by conspicuous ecological or orographical barriers. In Mexico, the distribution of the taxa of *Cohniella* is strongly correlated to orography, the Altiplano highlands being a first barrier that divides taxa into Atlantic and Pacific drainages entities. Furthermore, the Rio Balsas drainage south of the Transmexican Volcanic Belt and the Tehuantepec

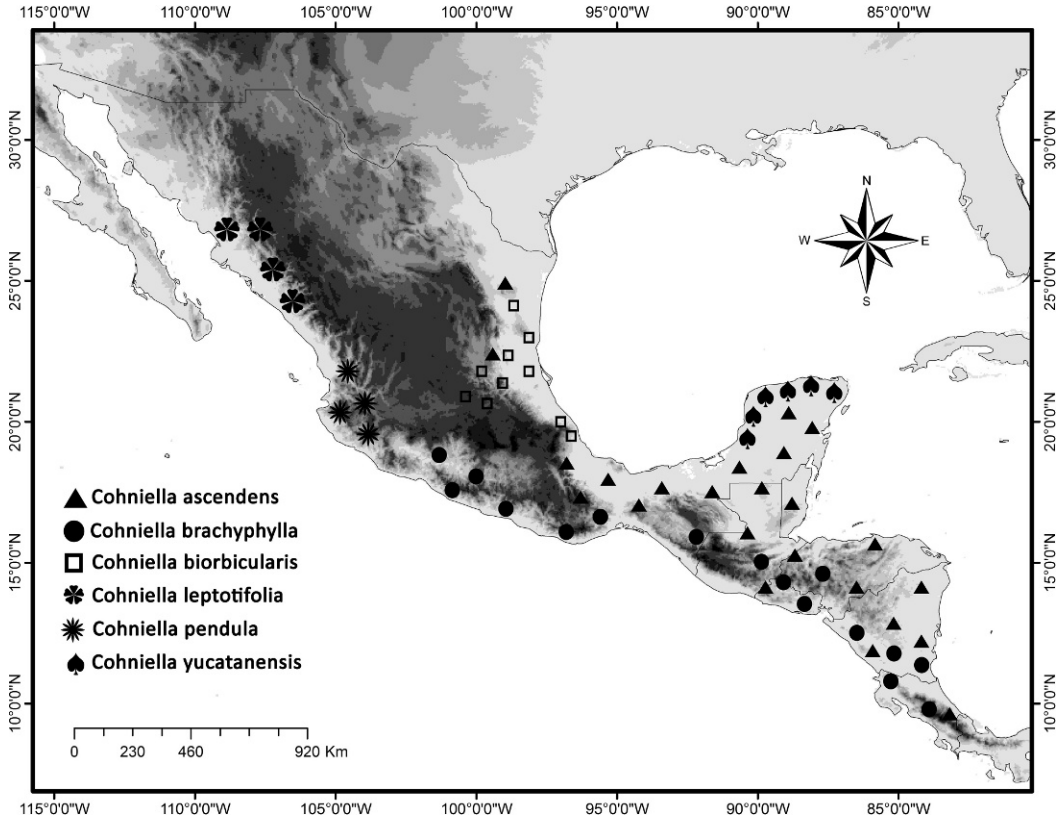

FIG. 1. Distribution of the Mexican species of *Cohniella*.

isthmus constitute additional barriers to gene flow that have allowed for the isolation and differentiation of additional *Cohniella* taxa. Further barriers to dispersal and gene flow are the presence of rain gradients on extensive flatlands (e.g., the Yucatan Peninsula) or else rain shadows on the leeward sides of the mountain ranges. The distributional ranges of all the *Cohniella* species here recognized are bounded by one or more of these orographic barriers and the Atlantic or Pacific seaboards (see Fig. 1). As discussed in Carnevali et al. (2009), species are here circumscribed closely following de Queiroz's Unified Species Concept, where species are metapopulational lineages and formulated as hypotheses of relationship between populations with available evidence bringing support for or against them.

The objective of this contribution is to provide a revision of the Mexican species of *Cohniella*. Individual species treatments include full descriptions, iconography, specimen citations, brief discussions on distribution, variability, circumscription, and discussion of diagnostic characters. Furthermore, we describe and illustrate two new species and propose one new combination (for a Panamanian species). Also, a key to the Mexican species of *Cohniella* is provided.

Materials and Methods. The taxonomic revision is based upon the analysis of external morphology and geographical distribution of ca. 600 herbarium specimens. The specimens are deposited at the following herbaria: AMES, AMO, B, BHCB, BIGU, BR, CEJ, CICY, CTES, EAP, ECOSUR, F, FCQ, G, HB, HOXA, HUA, HVASF, IPA, IRBR, KEW, LPB, M, MEXU, MY, NY, OAX, P, QMEX, RENZ, S, SEL, SP, SPF, XAL, U, UCR, UEFS, UFG, US, VEN, and W (acronyms according to Holmgren, Holmgren and Barnett 1990). We also examined relevant iconography, and fresh material of known provenance. For rehydration, the flowers were soaked in concentrated ammonium hydroxide for about 1 min, then rinsed in water until soft

and ready for study under the dissecting microscope. Pictures of live flowers were taken with a SONY Cybershot DSC-W120; others were digitalized under an Epson Expression 1640 XL scanner. Digital images of flowers were captured at several resolutions, ranging from 600 to 1200 dpi. Digital line drawings were produced with Canvas, Version X Build 925, using the digital images previously captured to provide outlines. Locality data were plotted with the use of ArcView 3.2 (ESRI, 1999) upon a DIVA-GIS base map (Hijmans et al. 2004) and later edited with Adobe Photoshop 6.0.1 (Adobe Systems Inc, San Jose, CA). Albeit most of the localities were plotted, some redundant localities were left out to avoid cluttering of the maps. Vegetation types used in the discussions are those of Miranda (1958) and Rzedowski (1978). Although in most of the cases the vegetation types were explicitly cited in the label data, often we had to infer them from vegetation maps. Species are defined following the Unified Species Concept of de Queiroz (2007) and discussed above.

Cohniella Pfitzer, Nat. Pflanzenfam. 2, 6: 194. 1889. *Cohnia* Rchb. f., Bot. Zeit. 10: 928. 1852, non *Cohnia* Kunth 1850 (Agavaceae). Type: *Cohnia quekettioides* Rchb.f. [= *Cohniella ascendens* (Lindl.) Christenson].

Oncidium sect. *Cebolletae* Lind., Bot. Reg. 28: sub t .4. 1842. Type: *Epidendrum cebolleta* Jacq. [= *Cohniella cebolleta* (Jacq.) E. A. Christenson]

Oncidium sect. *Teretifolia* Lindl., Bot. Reg. 32: sub t. 27. 1846. Type: *Epidendrum cebolleta* Jacq.

Oncidium sect. *Teretoncidium* Kuntze, Lex. Gen. Phan. 399. 1903. Type: *Epidendrum cebolleta* Jacq.

Stilifolium Königer & Pongratz, Arcula 7: 186. 1997. Type: *Epidendrum cebolleta* Jacq.

Trichocentrum Poepp. & Endl. *sensu* Williams et al. 2001, Chase et al. 2003, 2005, *pro parte*.

Recognition. The aim of this section is to provide a comparative diagnosis of the genus *Cohniella* that would allow collectors and botanists to recognize the genus in the field and the herbarium. Plants of *Cohniella* can be recognized in tropical and subtropical Mexico basically by its terete (cylindrical, fleshy) leaves borne singly on top of small subspherical, aggregate pseudobulbs combined with yellow flowers resembling malpighiaceous blooms, which are borne on inflorescences that originate on the side of the pseudobulbs. The plants are mostly epiphytic, the leaves erect to pendent. Other Mexican epiphytes with terete leaves lack the racemose/paniculate inflorescences (e.g., the genus *Christensonella* Szlach. et al.) or if present, the flowers are few and pink or rose (*Ionopsis satyrioides* (Sw.) Rchb. f., known from Guatemala and likely to occur in Chiapas). *Hintonella mexicana* Ames features similar, albeit much smaller plants but the leaves are only subterete and the flowers are smaller and white. The genus most likely to be confused with *Cohniella* in Mexico, however, is *Brassavola* R. Br. that often grows in the same habitats as the *Cohniella* species. This genus, a member of subtribe Laeliinae, features terminal inflorescences on top of a well-developed, cylindrical to fusiform pseudobulb. Furthermore, the inflorescences in *Brassavola* are one-to-few-flowered and the flowers are larger ($>$ 5 cm diameter) and white, nocturnally fragrant. One species, *Brassavola acaulis*, purportedly reported from Chiapas, has a short inflorescence borne on top of an aborted pseudobulb, thus rendering the inflorescence apparently in a basal position (a situation mirrored in the ''basal'' inflorescences of *Epidendrum stamfordianum* Batem and *Cattleya walkeriana* Gardner) but the flowers are very different as described above. In most *Brassavola* species the leaves are only subterete, meaning that they are deeply channeled (at least in live or fully re-hydrated condition). One species, *B. cucullata* (L.) R. Br., displays truly terete leaves but they are much thinner ($<$ 6 mm diameter), thus looking very different from the thicker ($>$ 9 mm diameter) leaves of the cohniellas; furthermore, *B. cucullata* has long cylindrical pseudobulbs.

A key to the Mexican species of *Cohniella*

1. Inflorescences usually shorter than the subtending leaves, rarely as long; lateral lobes of the labellum erect and partially enfolding the column; petals and sepals usually much longer than the lateral lobes of the labellum; column wings linear, finger-like, much longer than wide; plants from tropical moist to tropical subdeciduous forests on the Gulf Coast . . . . . *C. ascendens*

1. Inflorescences usually longer to much longer than the subtending leaves; lateral lobes of the labellum spreading (in the same plane as the central lobe), not enfolding the column; petals and sepals usually much shorter than the lateral lobes of the labellum; column wings transversely reniform or elliptic, bilobed, broader than wide, rarely slightly longer than wide; plants usually from tropical dry forests from all over Mexico 2

2(1). Central lobe of the labellum similar in shape and size to the lateral lobes, 5.8–8 mm wide; leaves pendent; plants from the western extreme of the Transmexican Volcanic Belt in coastal Jalisco and Nayarit . . . . . *C. pendula*

2. Central lobe of the labellum different in shape and size from the lateral lobes, usually much larger, 9–21 mm wide; leaves usually erect or patent, rarely pendent; plants from other areas and not from the western extreme of the Neovolcanic Transversal Axis 3

3(2). Leaves rigidly erect, 5.5–16 (–26) cm long, many on the plant simultaneously (5–15); inflorescences rigidly erect, racemose, more rarely with a single lateral branch when well-developed; plants from north of the Neovolcanic Transversal Axis in Sinaloa with outliers in Durango, Chihuahua, and Sonora . . . . . *C. leptotifolia*

3. Leaves various, 12–52 cm long, usually few to a plant (3–5); inflorescences various but usually patent to somewhat pendent, more rarely erect, usually a panicle with 2 or more branches in well-developed plants; plants from the Gulf coast or from the Pacific coast south of the Neovolcanic Transversal Axis. . . . 4

4(3). Lateral lobes of the labellum as broad as long, almost as broad as the central lobe (0.85/1–1/1); plants from the Gulf states west and north of the Tehuantepec isthmus (Querétaro, San Luis Potosí, Tamaulipas, Veracruz). . . . . *C. biorbicularis*

4. Lateral lobes of the labellum always longer than wide; plants from the Yucatan peninsula or from the Pacific Coast of Mexico 5

5(4). Central lobe of the labellum rounded to truncate, not emarginate at all or only very shallowly so and then the emargination making an obtuse angle; labellum usually bearing spots on most of the undersurface; leaves 6–10 mm wide, conspicuously wider basally but abruptly tapering at base (forming a "neck" just above the pseudobulb) and more gradually tapering distally; plants from the Pacific states of Mexico, south of the Neovolcanic Transversal Axis . . . . . *C. brachyphylla*

5(4). Central lobe of the labellum deeply emarginate, the emargination making an acute angle; labellum lacking spots on the undersurface, if present only on the underside of the disk; leaves 2.5–4 mm wide, of homogeneous width, not tapering basally and distally; plants from the northern portion of the Yucatan Peninsula . . . . . *C. yucatanensis*

Cohniella ascendens (Lindl.) Christenson, Lindleyana 14(4): 177. 1999. *Oncidium ascendens* Lindl., Edwards's Bot. Reg. 28: sub t. 4. 1842. *Stilifolium ascendens* (Lindl.) Königer & Pongratz, Arcula 7: 186. 1997. *Trichocentrum ascendens* (Lindl.) M.W. Chase & N.H. Williams, Lindleyana 16(2): 137. 2001. Type: Guatemala. Without any other locality, Apr 1841, *T. Hartweg s.n.* (holotype: K-Lindl.). Fig. 3.

Cohnia quekettioides Rchb. f., V. Schl. Bot. Zeitung (Berlin): 10: 928. 1852 -*Cohniella quekettioides* (Rchb. f.) Pfitzer, Nat. Pflanzenfam 2(6): 194. 1889. Type: Guatemala. Chantalas, "Mons Espina", 1841, *E. R. von Friedrichsthal 834* (holotype: presumably at W, not seen).

Oncidium subulifolium Schltr., Repert. Spec. Nov. Regni Veg. Beih. 10: 79. 1922. -*Oncidium bolivianense* Oppenheim, Orchis 10: 93. 1916. (non *Oncidium boliviense* Rolfe, 1907). Type: Bolivia. Río Itenez, *O. N. Witt s.n.* (holotype: B, destroyed; lectotype, Orchis 10, No. 5, Tafel IV, Fig. 2 1916; designated by Carnevali et al. (2010)).

Epiphytic erect or pendent **herbs**, caespitose; **rhizome** short, thin, brittle; **roots** 1–2 mm thick, white when old; **pseudobulbs** 6–10 mm long, 6–8 wide mm, subspherical to broadly ovoid, apically 1-leaved, green, totally enclosed by 3 imbricate sheaths, 2–4 cm long,

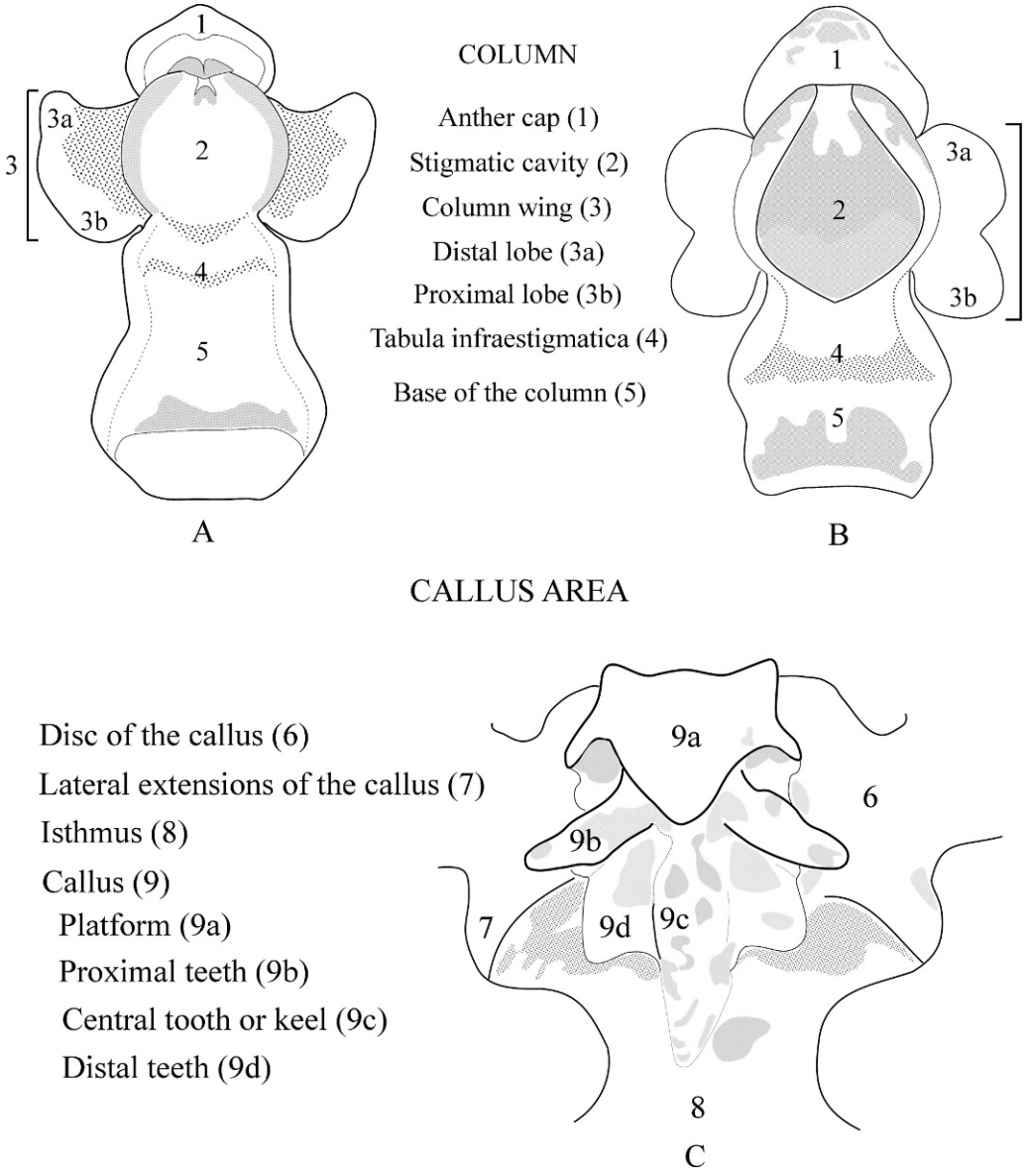

FIG. 2. Diagram of the parts of the column and the callus area. A. *Cohniella yucatanensis*. B–C. *Cohniella biorbicularis*.

7–25 mm wide, acuminate, green with purple stains when inmature, eventually deciduous; **leaves** terete, thickly fleshy-coriaceous (13–) 15–86 cm long, 2–10 mm thick, dark green with purple stains; **inflorescences** solitary from the base of the pseudobulbs, (11–)14–65(–80) cm long, a (2–)4–34(–50) flowered raceme or panicle with 1–5 branches, 2.0–6.5 cm long, the branches 5–9 flowered; peduncle and rachis green-purple; peduncle more or less erect, 2–5 mm thick, terete, with (2–)4–8 shortly bracted internodes, the basal-most longest, oblanceolate, acuminate, tubular; bracts subtending the lateral branches 3–9 mm long, 1–6 mm wide, elliptic, acuminate; floral bracts 1–6 mm long, 0.5–2.5 wide, narrowly elliptic, acuminate; **flowers** with perianth parts widely spreading, the petals and sepals somewhat inflexed; ovary with pedicel 9–18 mm long, of which ca. 2–4 mm correspond to the ovary, this 0.4–1.0 mm thick; **sepals** basally clawed, spreading or

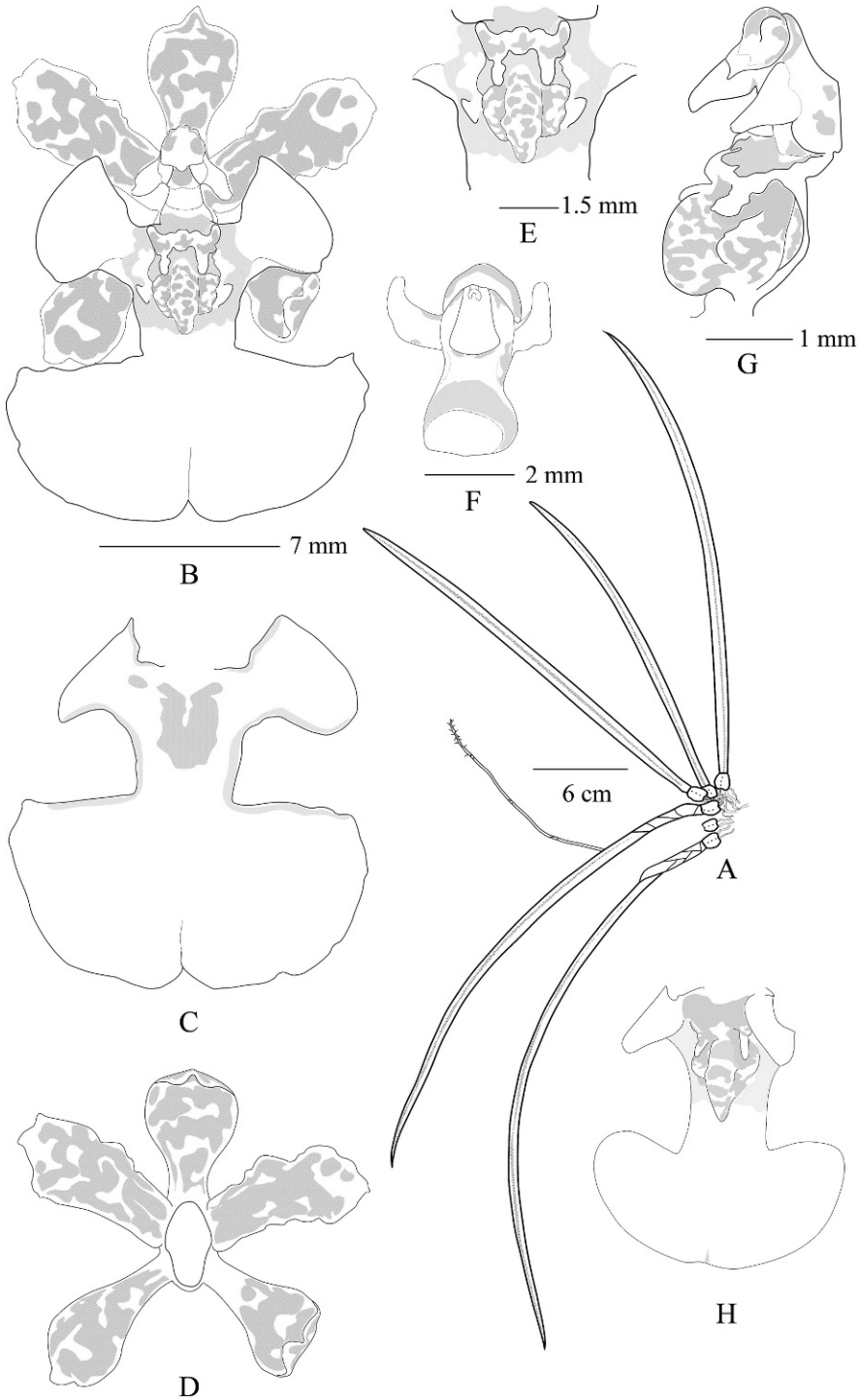

FIG. 3. *Cohniella ascendens*. A–G. *W. Cetzal 14* (CICY). H. *W. Cetzal 3* (CICY). A. Habit with inflorescence. B. Whole flower, front view. C. Labellum, back view. D. Sepals and petals, front view. E. Callus. F. Column with anther cap, front view. G. Lateral view of the callus and column. H. Labellum, front view. Scale: A. 6 cm. B–D. 7 mm. E. 1.5 mm. F. 2 mm. G. 1 mm. Drawings by W. Cetzal Ix.

somewhat inflexed; dorsal sepal 6–8 mm long, 3.0–4.5 mm wide, obovate, apically obtuse and minutely apiculate, concave in the upper half; lateral sepals partially fused at the very base, obovate, 5–8 mm long, 2.5–5.0 mm wide; **petals** 6–9 mm long, 2.5–5.0 mm wide, oblong, the apex obtuse to truncate, oblique, and somewhat inflexed in natural position; **labellum** 3-lobed, 8–14 mm long from the base to the apex of the central lobe, 10–16(–20) mm wide across the apices of the lateral lobes, the lateral lobes perpendicular to the central lobe; central lobe 5–7 mm long, 8.5–13.0 mm wide, spatulate-oblate to transversely elliptical in outline, apically rounded to subquadrate, basally produced into an isthmus, 0.5–4.0 mm long, 1.3–3.0 mm wide; lateral lobes 4–8 mm long, 2–4 mm wide, oblong to suborbicular, apically subtruncate to rounded; disc 2–4 mm long, 2.5–3.0 mm wide, bearing a well-developed callus, ca. 3–4 mm long, 2.5–2.8 mm wide, consisting of a subsquare, elevated, ± flat, rugose platform, 1.8–2.0 mm long, 2.0–2.5 mm wide; proximally with two smaller, lateral divergent teeth that are cylindrical to conical, ca. 0.8–1.2 mm long, 0.5–1.0 mm wide; distally with two small, lateral teeth that are oblong with surface smooth or tuberculate, 1.2–2.0 mm long, 0.5–1.0 mm wide; the central tooth or keel laterally compressed; the lateral portion of the callus with a rugulose surface and entire margin; **column** 2–4 mm long, 1.5–2.0 mm wide, tabula infrastigmatica longitudinally channelled, stigmatic cavity orbicular; column wings short, ca. 2 mm long, 0.5–1.0 wide, erect, linear-oblong; anther cap 1–2 mm long, 0.5–2.0 mm wide, apical, operculate, ellipsoid; **pollinarium** typical for the genus, i.e., 1.4 mm long, tegula spathulate, 0.7 mm long, ca. 0.4 mm wide at the subtruncate apex; viscidium disc-like, small, pollinia 0.7–1.0 mm long, yellow.

Distribution and ecology. Mexico, Belize, El Salvador, Guatemala, Honduras, Nicaragua, and Costa Rica. In Mexico, *Cohniella ascendens* is a widespread species, ranging from the Gulf Coast states of Tamaulipas, Veracruz, and Tabasco, to the Yucatan Peninsula in Campeche, Quintana Roo, and SE Yucatan. Furthermore, it has been collected along the depressions and valleys along the Tehuantepec isthmus in Oaxaca and into the Central Depression of Chiapas. In Mexico, this species grows mainly in the semi-evergreen forest (''selva mediana subperennifolia'' y ''selva alta perennifolia'') at elevations of 0–500 (–900) m. It also occurs in low deciduous forest (''selva baja caducifolia''), low-statured inundated forest (''selva baja inundable''), and in several types of secondary vegetation. In others countries it has also been reported as growing in rainforests and semideciduous forest (e.g. Belize, Honduras, and Nicaragua).

Diagnostic features. This species is easily recognized by its lateral lobes of the labellum that are held erect and partially enclosing the column. The callus is relatively simple and consists of a greatly reduced proximal, transversal plate with or without small, proximal low teeth and a much larger distal, apically rounded and laterally compressed tooth surrounded by lower, reduced lateral keels. The column wings are narrow and pointing downward and inward, almost in a hook-like fashion. The inflorescences are usually shorter than the subtending leaves.

Variation range. *Cohniella ascendens* is a common species with a great deal of floral variation. This variation resides mostly in the shape and size of the lateral lobes of the labellum. The color of the callus is also variable, ranging from almost concolorous with the bright yellow labellum to deep purple or even guava-colored. The disk of the labellum is oblong to hexagonal, and the isthmus is variable in length (0.5 to 4.0 mm). The tips of the distal teeth of the callus are variable ranging from completely entire to irregular with tiny teeth. The column wings vary in shape from cylindrical to oblong. The perianth shape and color is variable. The petals are usually oblong-spathulate, with irregular blotches that may cover most of the surface of the perianth segments.

Taxonomic comment. This is the type of the genus *Cohnia* Rchb. f. (= *Cohniella*). Carnevali et al. (2010) discussed the identity of *Cohniella quekettioides* and *Oncidium subulifolium*, both here referred to the synonymy of *C. ascendens*. On the other hand, *Oncidium helicanthum* Kraenzl, described from New Grenada (modern day Colombia) has been considered conspecific with *C. ascendens* by several authors (Garay & Stacy 1974, McLeish et al. 1995, Königer & Pongratz 1997, Carnevali et al. 2010), but this entity is here

treated as a distinct species, however, closely related to C. *ascendens* (see below).

Cohniella ascendens appears to reach its southernmost limit in southern Costa Rica or, possibly, in western Panama. The species has been tentatively reported from Colombia, Venezuela, and even Bolivia (the type of *Oncidium subulifolium*) (Carnevali et al. 2010) but no actual material referable to this species has ever been collected in any of these countries; and it is unlikely that *C. ascendens* will ever be found in South America.

Additional specimens examined. MEXICO. **Campeche:** Mpio. Calakmul, 5.2 km al O de Flores Magón, 18°49′8″N, 89°1′5″W, 175 m, 12 Apr. 2002, *J. Calónico-Soto et al. 22730* (MEXU). A 65 km al S de Conhuas en el centro ceremonial de Calakmul, Límite N del Petén Guatemalteco, 16 Mar. 1983, *E. Cabrera 4423* (MEXU). A 1.85 km al N del poblado El Campanario carretera Xpujil-Justo Sierra, 18°27′53″N, 89°25′32″W, 276 m, 7 Mar. 2003, *D. Álvarez et al. 4197* (MEXU). A 9 km al NE de Conhuás, camino a Nadzcaan, 18°36′19″N, 89°51′48″W, 148 m, 19 Feb. 2002, *E. Martínez et al. 34949* (MEXU). Mpio. Champotón, Zona arqueológica de Becan, 28 Feb. 1981, *J. Andrews 20* (CICY). Crucero de Av. P. Trueba y Autopista, 10 m, 27 Jan. 1996, *C. Gutiérrez-Baez 5066* (CICY). Mpio. Holpechen, Mesapich, Xmaben, 6 Apr. 2004, *M. C. Sánchez 833* (CICY). Cerca de la sabana Xpujil ejido Xmaben, 11 Mar. 2005, *G. G. Cabrera et al. 454* (CICY). 4 km al sur de la ciudad de Campeche, 10 m, 8 Jan. 2002, *C. Gutiérrez-Baez 7304* (CICY). Laguna el angelito, 22 km al NE de Xmaben, 5 Mar. 2004, *G. G. Cabrera et al. 164* (CICY). Hopelchén Chunchintok, 5 Sep. 1983, *C. Chan 2033* (CICY). **Chiapas:** Mpio. Catazajá, Orilla oeste de laguna de Catazajá, 20 Apr. 1999, *C. Gutiérrez et al. 6437* (CICY). Mpio. Ocosingo, en zona Marqués de Comillas, a 4 km al E de Pico de oro camino a Ejido Benemérito de las Américas, arroyo el Salado, 21 Jan. 1986, *E. Martínez 16492* (MEXU). Entre Nuevo Guerrero y Francisco León, 19 Mar. 2005, *E. Martínez 37480* (MEXU); Mpio Ocozocuautla de Espinosa, encinar 3 km NW de Ocozocuautla, 16°47′17.36″N, 93°23′20.72″W, 83–850 m, 18 Jan. 2010, *G. Carnevali et al. 7515* (AMES, CICY). **Oaxaca:** Juchitán, 9 km al NE de Lázaro Cárdenas camino a Sta. María Chimalapa, 250 m, 22 Feb. 1982, *R. Cedillo et al. 1114* (MEXU). Mpio. Acatlán, Cerro Buenos Aires, lado Oeste de la Presa Temazcal (Miguel Alemán), Distrito de Tuxtepec, 60 m, 6 Mar. 1986, *L. Cortes et al. 175* (MEXU). Mpio. San Juan Bautista Valle Nacional, Monte Flor, 70 m, *W. Cetzal 3* (CICY). Mpio. San Juan Guichicovi, Dto. Juchitán, Cerro Buenavista, 7 km al O de Paso Real, la entrada se encuentra a 2 km al NO de Sarabia carr. Matías Romero-Palomares, 17°04′N, 95°06′W, 25 Mar. 1988, *R. Torres et al. 12039* (MEXU). Mpio. Santa María Jacatepec, Dto. Tuxtepec, subida al Predio del Águila, en San Agustín, 25 km al O de la Reforma, carretera a Ayozintepec, 17°50′N, 96°6′W, 21 Feb. 1988, *R. Torres et al. 11517* (MEXU). **Quintana Roo:** Mpio. Othón P. Blanco La Unión, ejido, a 9 km antes del poblado, 100 m, 9 May 1981, *E. Ucan et al. 957* (CICY). Adolfo de la Huerta, a 5.11 km al O del poblado Nuevo Plan de La Noria, 17°51′N, 88°41′5″W, 55 m, 15 Mar. 2004, *D. Álvarez et al. 8149* (MEXU). Ejido Caobitas zona de los pinos, 10 May 1984, *C. Chan 3640* (CICY). Ejido Caobitas zona de los pinos, 120 m, 16 May 1984, *E. Ucan et al. 3368* (CICY). Ejido Caobas, sabana del Jaguactal, un desvío de 9.5 km por carretera de terracería al oeste de la carretera hacia Tres Garantías, unos 21 km al sur de la carretera principal desde Xpujil-Chetumal, 30 Apr. 1999, *G. Carnevali et al. 5513* (CICY). Ejido Graciano Sánchez, área forestal aprox. 6 km al W de Valle Hermoso, 5 Mar. 1995, *J. C. Trejo et al. 311*, *317*, *322* (CICY). Ejido Caobas, Sabana del Jaguactal, 12 km carretera de terracería al E de la Carretera hacia Tres Garantías, unos 21 km al sur de la carretera principal de Xpujil-Chetumal, 21 Mar. 2001, *J. L. Tapia et al. 1196* (CICY). 20 m, 22 Mar. 2001, *C. A. Yam 19* (CICY). km 51 vía corta Bacalar-Mérida, 13 Mar. 1981, *J. Andrews 13* (CICY). 9 km S of San José de la Montaña, on road to Tomas Garrido, W of Chetumal, S of Hwy, 120 m, 9 May 1982, *G. Davidse et al. 20259* (MEXU). A 20 km al norte de la Unión, o a 21 km al oeste de Ucum, 4 Mar. 1980, *O. Tellez 1648* (MEXU). 9 km al sur del entronque de Ucum, 5 Mar. 1980, *O. Tellez 1698* (MEXU). Mpio. Felipe Carrillo Puerto km 25 carretera a Felipe Carrillo Puerto a Vigía Chico, 20 Aug. 1983, *C. Chan 2802* (CICY). A 4.5 km Carretera Vigía Chico-F. Carrillo Puerto, 8 m, 15 May 1986, *R. Villanueva 757* (MEXU). 12 km WSW of Akumal, 10 m, 6 May 1982, *G. Davidse et al. 20125* (MEXU). A 14.2 km al E de Señor,

19°51′33″N, 88°0′1″W, 51 m, 5 Mar. 2002, *J. Calónico et al. 22453* (MEXU). A 7 km al S del entronque a Puerto Morelos, en el Rancho Dos Fierros, 12 Mar. 1985, *E. Cabrera 793* (MEXU). En el rancho Dos Fierros, a 7 km al sur de la desviación a Puerto Morelos, 10 Mar. 1984, *E. Cabrera 6319* (MEXU). **Tabasco:** Mpio. Cárdenas, Ejido Zapotal Sección San Miguel, entrada a San Miguel rumbo a Zanapa, km 83 Carr. Cárdenas-Coatzacoalcos, 20 Mar. 1995, *M. A. Guadarrama 95-3-34* (MEXU). Mpio. Huimanguillo, km 13.8 de la desviación de la carretera que va a Huimanguillo-Fco. Rueda, 4 Mar. 1981, *M. A. Magaña et al. 139* (MEXU). Ejido Chicoacán, 16 Mar. 1985, *F. Ventura A. s.n.* (MEXU). Mpio. Teapa, Río Puyacatengo, camino al Rancho San Antonio, 14 Feb. 1984, *L. Rico et al. 762* (MEXU). Loc. 0.34 km al E de la Universidad Autónoma de Chapingo, 17°31′31″N, 92°55′33″W, 200 m, 5 Feb. 2002, *J. Calónico et al. 21480* (MEXU). Loc. 0.34 km al E de Chapingo, Universidad Autónoma de Chapingo, 17°31′31″N, 92°55′33″W, 28 Jan. 2002, *J. Calónico et al. 21608* (MEXU). **Tamaulipas:** Mpio. Ocampo, 6 km al NW del ejido El Tigre, 550 m, 15 Mar. 1986, *J. Moreno 62* (MEXU). Sierra Chiquita, 430 m, 31 Mar. 1983, *M. Castilla et al. 1823* (AMO). **Veracruz:** Mpio. Amatlán de los Reyes, sobre la carretera a Ojo de Agua Chico, 700 m, 25 Mar. 1990, *C. R. Huerta-Alvízar 3* (AMO). Mpio. de Catemaco, Río Chuniapa, 4 Mar. 1975, *M. Sousa 4524* (MEXU). Catemaco, parque de flora y fauna silvestre tropical, a.v., 18°26′48″N, 95°01′34″ W, 320 m, 3 Mar. 1991, *G. Carmona-Díaz 3* (AMO). Mpio. San Andrés Tuxtla, Estación de Biología Tropical, Los Tuxtlas, cerca de la desviación a Laguna Escondida, Tuxtla, 18°35′N, 95°04′W, 120 m, 8 Apr. 2005, *T. Krömer et al. 1897* (MEXU). Laguna Encantada, 2 km al N de San Andrés Tuxtla, 26 Feb. 1987, *R. Cedillo-Trigos 3810* (MEXU). Rio Maquina Balzapote 2 km NE, 18°34′N, 95°04′W, 100 m, 1 Mar. 1985, *S. Sinaca-Colin 8* (EAP). Cerro Lázaro Cárdenas, estación de Biología Tropical Los Tuxtlas, 18°34′N, 95°04′W, 550 m, 5 Apr. 1986, *S. Sinaca-Colín 551* (AMO). Orizaba, 9 May 1988, *R. Fernández sub/ Rolando Jiménez 864* (AMO). Mexique a'la Piñuela, valléede Cordova [sic], 14 Mar. 1866, *M. Bourgeau 2230* (P). Huathlan [sic] chilles valle d' Orizaba, June 1865–1866, *M. Bourgeau s.n.* (P). **Yucatán:** A 10 km al O de Kantunilkin, sobre el camino a Colonia Yucatán, 21 Mar. 1988, *E. cabrera 15566* (MEXU). Izamal Cenote Xkolak, unos 14–15 km al E de Izamal por la carretera a Tunkás, 12 Mar. 1997, *G. Carnevali et al. 4372* (CICY). Mpio. Oxkutzcab, Ruinas de Labná, a un costado del Mirador, 14 Mar. 1981, *M. Narváez et al. 291* (CICY, ECOSUR, MEXU). Oxkutzcab Ruinas de Labná, al S del Mirador, 21 Mar. 1981, *C. Chan et al. 251* (CICY, MEXU). Oxkutzcab Labná, vereda a Santa Rita a 600 m, 21 Mar. 1981, *A. Puch et al. 267* (CICY, ECOSUR). Oxkutzcab, Xul- Camino a Ruinas Kom, rumbo al oeste del poblado, desviación 1 km, 60 m, 27 Mar. 1984, *O. Samantha et al. 55-374* (CICY). Río Lagartos, camino a Las Coloradas, 16 Feb. 1983, *I. Espejel et al. 434* (CICY). Ticul Hills above Ticul, 6 Jan. 1983, *S. P. Darwin 2433* (CICY). Tinum, Jardín Botánico Balancanché, 17 Feb. 1990, *S. Escalante 797* (CICY). Tinum 3 km de Tinum rumbo al rancho X-chac Suuk, 23 m, 18 Mar. 1983, *E. Ucan 2310* (CICY, MEXU). Tinum 3 km de Tinum rumbo a San Francisco, 18 Mar. 1983, *E. Ucan et al. 2299* (CICY). Tekal de Venegas Cenote Xcoil, 19 Apr. 1993, *C. Chan 2099* (CICY). Mpio. Valladolid, rehollada cerca de Valladolid, 27 Mar. 1997, *G. Carnevali et al 4386* (CICY). Valladolid Pixoy, vereda que va al pueblo de Ebtún, 8 Apr. 1983, *E. Ucan 2359, 2362* (CICY). Valladolid Popolá, camino a Pixoy, 21 Apr. 1987, *E. Ucan 5051* (CICY). Mpio. Yaxcabá, en el Centro Médico Tradicional de Yaxcaba, 1 km al N del poblado, camino a Libre Unión, 28 Jan. 2003, *M. Méndez 1264* (CICY). Yaxcabá km 1.5 camino Tixcacaltuyub a Sotuta, 20 m, 15 Mar. 1983, *P. Simá 110* (CICY). Rehollada cerca de Valladolid, 27 Mar. 1997, *G. Carnevali et al. 4386* (CICY). Dzoncauich Alrededor de un cenote situado a 10 km de Chacmay, 12 Apr. 1983, *E. Góngora 295* (CICY). 3.5 km rumbo a Libre Unión, 20 m, 18 Mar. 1986, *D. Zizumbo 26* (CICY). Xcan, 3 Mar. 1956, *O. G. Enríquez 454* (MEXU). **BELIZE**. **Corozal:** Tiger Savana [sic], ca. 12 airline km W of Little Belize, 18°11′N, 88°17′W, 10 m, *G. Davidse & A. E. Brant 32522* (SEL). **Orange Walk:** Savanna ca. 5 km N of August Pine Ridge on the road to Trinidad, 88°42′N, 18°W, 100 m, Dec. 1987, *G. Davidse & A.E. Brant 32766* (SEL). **Stan Creek:** Commercial Citrus Grove nearby Stan Creek town, 17°1′N, 88°25′W, 200 m, 10 May 1994, *R. Rivero et al. 2641* (SEL). **Toledo:** Lower slopes of Richardson Peak, Maya Mountains,

directly N. of the Junction of Richardson Creek and Bladen Branch, 16°33′35″N, 88°46′30″W, 300–620 m, 4, 6, 8 Mar. 1987, *G. Davidse & A. E. Brant 31983* (MEXU, MO, SEL). **GUATEMALA**. **Alta Verapaz:** Senahú, Finca de cacao, 240 m, 18 Nov. 1995, *M. Vélis 95.4396* (BIGU). Teleman, 280 m, 1 Mar. 1981, *J. Luer et al. 5957* (SEL). **Chiquimula:** Carretera al Mpio. Ipala, km 164, 14°32′27.5″N, 89°40′06.5″W, 900 m, *M. Véliz et al. MV 19680* (BIGU). **Izabal:** camino al Estor, 15°35′37.5″N, 89°07′3″W, 12 m, 25 Jan. 2008, *T. Calderon et al. TC 431* (BIGU). **La Libertad:** sitio arqueológico La Joyanca, *M. Véliz MV 2M.8266* (BIGU). **Petén:** Ruinenstadt Tikal (ca. 60 km NE Flores/Santa Elena), ca. 3 km W von Temple IV, 17°13.387′N, 89°37.683′W, 440 m, *H. Förther et al. 9986* (M). Mpio. Melchor de Mencos, Sitio Arqueológico Naranjo 17°07′59.3″N, 89°15′54.1″W, 205 m, 15 Dec. 2006, *M. Véliz MV 18115* (BIGU). San Andrés, Parque Laguna del Tigre, 100 m, 3 May 1996, *M. Véliz 96.5522* (BIGU). Guatemala, *M. Himund s.n.* (P). La Libertad, 29 Mar. 1933, *C. L. Lundell 2165* (S). Saepuy, km 12 lado N, 27 Jan. 1970, *R. Tún-Ortíz 640* (EAP). Macanché, 6 Mar. 1966, *E. Contreras 5519* (EAP). **EL SALVADOR**. **Ahuachapán:** Orilla del río Nejapa, Cantón La Pandeadura, 8 km al Sur de la ciudad de Ahuachapán, 800 m, *J. L. Linares 1175* (EAP, MEXU). **San Salvador:** NE of Lake Ilopango, 11 km before San Emilio, 800 m, 29 Jan. 1969, *O. Panik & F. Hammer 3* (SEL). **Sonsonate:** Mpio. Izalco, Campos de lava del Volcán Izalco, ca. de 1 km al S de la Finca la Macerena, al N de Cantón Cruz Grande, 13°59′N, 89°39′W, 1100–1200 m, 9 Feb. 2000, *J. L. Linares 4921* (EAP). **HONDURAS**. **Colon:** NE of Trujillo on old road to Castilla, 15°57′30″N, 85°54′30″W, 16 Feb. 1981, *J. Saunders 1030* (SEL). **Comayagua:** Rio Tepemechin between lake Yojoa and Siguatepegue, Nov. 1946, *P. H. Allen 4248* (EAP). Near Pito Solo, 630, 11 Apr. 1951, *L. O. Williams & A. Molina 17746* (EAP). **Cortes:** Parque Arque, 2 Nov. 1996, *S. J. Aguilar 1057* (EAP). **El Paraíso:** Dpto. El Paraíso, Mpio. Morocelli, Quebrada El Carrizal cerca de El Plan, ±2 km al E de El Plan, 17 Feb. 2002, *J. L. Linares 5692* (MEXU). Loc. Quebrada Güisisire (Quebrada Honda) ± 7 km al N de Moroceli por el camino hacia Mata de Plátano, 14°10′50″N, 86°51′40″W, 830 m, 26 Jan. 2003, *J. L. Linares 6559* (MEXU). Valle Jamastrán entre Río Los Almendros y Chichicaste, 600 m, 15 Mar. 1963, *A. Molina 11395* (NY). **Valle:** Tierras Paradas near Nacaome, 50 m, 20 Nov. 1947, *L. O. Williams 13588* (SEL). **NICARAGUA:** "Specimen a Nicaragua flor. Hortus Botanicus Hafniensis 5/50, *Liebmann s.n* (W-Rchb. f). *A. H. Heller s.n.* (SEL). **Atlántico Sur (Bluefields):** Finca Santa Rosa, ca. 2.5 km ENE of Rama, Rama and vicinity, Rio Escondido, 12°05′N, 83°45′W, 150 m, 5 Apr. 1966, *G. Proctor et al. 27348* (NY). **Estelí:** km 167 on Hwy 1, ca. 15.8 km N of entrance to Esteli, 13°15′N, 86°22′W, 825–850 m, 30 Dec. 1977, *W. D. Stevens & B. A. Krukoff 5777* (SEL). **Granada:** Mombacho, 27 Jan. 1970, *J. T. Atwood 3917* (SEL). **Jinotega:** Quebrada La Esperanza, Al SE de Wiwilí, 13°30°N, 85°43′W, 500 m, 14 Mar. 1980, *M. Araquistain & D. Castro 1954* (SEL). **Managua:** Brought from near Managua, flowered at Zamorano, 2 Mar. 1947, *L. O. Williams & A. Molina 12140* (SEL). **Matagalpa:** Vicinity of casa Colorada, 1 Apr. 1947, *P. A. Allen 4452* (SEL). Río Grande de Matagalpa, Vicinity of El Gallo, 23Feb. 1952, *P. H. Allen 6493* (SEL). **Rivas:** Isla de Ometepe, al lado N del Volcán Concepción, cafetales de Los Angeles y sus alrededores, 11°34′N, 85°37′W, 250–350 m, 12 Mar. 1981, *J. C. Sandino 528* (SEL). **Zelaya:** Bonanza, on grounds of Neptune Mining, 14°2′N, 84°35′W, 340–350 m, 26 Feb. 1979, *J. J. Pipoly 3518* (SEL). El Salto, along Río Pis Pis and surrounding hills, 14°4°N, 84°38°W, 100 m, 27 Feb. 1979, *J. J. Pipoly 3600* (SEL). 13 km above Kururia, 14°39′N, 84°4′W, 200 m, 2 Mar. 1979, *J. J. Pipoly 3805* (SEL). Colonia Kururia, 14°41′N, 84°04′W, 50 m, *J. J. Pipoly 3895* (MEXU). Cerro Waylawás summit, central range, 13°38′N, 84°49′W, 200–225 m, 10 Mar. 1979, *J. J. Pipoly 4253* (SEL). Between 0.3 and 1.9 km N of Limbaika, 13°29′N, 84°13°W, 8–10 m, 26 Apr. 1978, *W. D. Stevens & B. A. Krukoff 8284* (SEL). Waní, ca ½ to 1 km S of village, between Río Prinzapolka and Quebrada San Rafael, 13°42′N, 84°50°W, 13 Mar. 1979, *J. J. Pipoly 4655* (SEL). Caño Sansangwás, carretera a Rosita, 13°44′N, 84°26′W, 80–100 m, 5 Mar. 1984, *F. Ortiz 1749* (SEL). **COSTA RICA**. 1954, *Jonné s.n.* (P). **Alajuela**, Los Chiles, Refugio Nacional de Vida Silvestre Caño Negro, Llanura de Guatuso, Playuelas, 40 m, 3 Feb. 1993, *K. Martínez et al.* 50 (UCR, MO). **San Jose:** Talamanca, *A. Tondus 9246* (US). *A. R. Endres, s.n.* (W). *A. R. Endres 362* (W). NO PRECISE COUNTRY: 0019956 (W-Rchb. f.), 0019958 (W-Rchb. f.),

0020016 (W-Rchb. f.), 0019959 (W-Rchb. f.), 0020015 (W-Rchb. f.), *Liebmann 16* (W- Rchb. f.).

Cohniella biorbicularis Balam & Cetzal, Brittonia 62(2): 162. 2010. Type: México. Querétaro: Municipio Landa de Matamoros, Camino de Matzacintla al Río Moctezuma, 21°20′04″ N, 99°20′04″ W, 1100 m, cañada orientada SE con vegetación de bosque tropical caducifolio sobre laderas de roca caliza; colectada originalmente en el año 2006 por I. M. Ramírez (#1432); floreciendo en cultivo el 10 Marzo 2008, *G. Carnevali & I. M. Ramírez 7308* (holotype, CICY, isotypes: AMES, AMO, MEXU, SEL, QMEX, US). Fig. 4.

Epiphytic erect **herbs**, caespitose; **rhizome** short, thin, brittle; **roots** 1–1.5 mm thick, white when old; **pseudobulbs** 5–14 mm long, 4–12 mm wide, subspherical to broadly ovoid, apically 1-leaved, green, totally enclosed by 3 imbricate sheaths, eventually deciduous; **leaves** terete, thickly fleshy-coriaceous (10–)21–52 cm long, 2–12 mm thick, dark green with purple stains; **inflorescences** solitary from the base of the pseudobulbs, (13–)33–80(–119) cm long, a (3–)5–27(–53) flowered raceme or panicle with 1–9(–15) branches, (2–)3.5–13.0(–19) cm long, the branches 3–11(–18) flowered; peduncle and rachis green-purple; peduncle more or less erect, 3–5 mm thick, terete, with 6–12 shortly bracted internodes, the basal-most longest, oblanceolate, acuminate, tubular; bracts subtending the lateral branches 4–12 mm long, 1.0–3.5 mm wide, elliptic, acuminate; floral bracts 3.0–5.1 mm long, 0.6–3.0 mm wide, narrowly elliptic, acuminate; **flowers** resupinate, with perianth parts widely spreading and the petals and sepals somewhat reflexed; ovary with pedicel 15.5–22.0 mm long, of which ca. 3.7–7.2 mm correspond to the ovary, this 0.6–1.3 mm thick; **sepals** basally clawed, flat or somewhat reflexed; dorsal sepal 6–10 mm long, 2.0–4.5 mm wide, obovate-lanceolate, apically obtuse and minutely apiculate, concave in the upper half, the claw 1.2–3.1 mm long, 0.7–1.0 mm wide; lateral sepals partially fused at the very base, ovate-lanceolate, 6.3–9.0 mm long, 2.1–4.3 mm wide; **petals** 6.7–11.0 mm long, 2–4 mm wide, oblanceolate, the apex rounded, somewhat reflexed in natural position; **labellum** 3-lobed, 10.0–15.4 mm long from the base to the apex of the central lobe, (11.8–)17–23(–26) mm wide across the apices of the lateral lobes, the lateral lobes in the same plane as the central lobe and ± perpendicular to it; central lobe 7–12 mm long, (12–)15–21 mm wide, spathulate to transversely oblate or circular in outline, apically rounded to subquadrate, basally produced into a short isthmus, 1–4 mm long, 2.0–3.5 mm wide; lateral lobes (5–)8–11 mm long, 5–12(–15) mm wide, suborbicular to very broadly obovate, apically rounded; disc relatively large, ca. 3.5 mm long, 5.5 mm wide, bearing a well-developed callus, ca. 5 mm long, 3 mm wide, consisting of a large, elevated, ± flat, oblong platform; proximally with two, lateral divergent teeth that are conical and point upward; distally with two larger, lateral teeth, broadly rectangular to conical; the central tooth or keel laterally compressed; the basal portion of the callus with conspicuous lateral extensions; **column** 3.0–3.5 mm long, ca. 1 mm wide, tabula infrastigmatica longitudinally channelled, stigmatic cavity sub-rounded; column wings bilobed, proximal and distal lobes ca. 1 mm long and wide, asymmetrically; anther cap 3 mm long, 2 mm wide, operculate, ellipsoid; **pollinarium** typical for the genus.

Distribution and ecology. Endemic to eastern Mexico, where it is restricted to the Gulf Coast states of Veracruz and Tamaulipas, along the Sierra Madre Oriental in Tamaulipas, San Luis Potosí, Querétaro, and Veracruz; it has also been collected in the Mexican Altiplano in Querétaro, where it grows in tropical deciduous forest at elevations of 300–1000 m. In general, *C. biorbicularis* grows at elevations of 0–1400 m, usually in tropical dry forests or in the ecotones between tropical dry forests and pine-oak forests.

Diagnostic features. *Cohniella biorbicularis* is easily recognized by its relatively large, 8–11 mm long, 5–12 mm wide suborbicular to very broadly obovate lateral lobes of the labellum (vs. other *Cohniella*, Table 1). These are almost as wide as the midlobe in some specimens (e.g., *O. Nagel 6734*, MEXU; *Carnevali & Ramírez 6372*, CICY), but more commonly they are somewhat narrower but always at least 75% as wide as the width of the midlobe. The plants seem very similar to the western *Cohniella brachyphylla*, but can be distinctly larger (Table 1). In living plants, *C. biorbicularis* presents flowers with intense

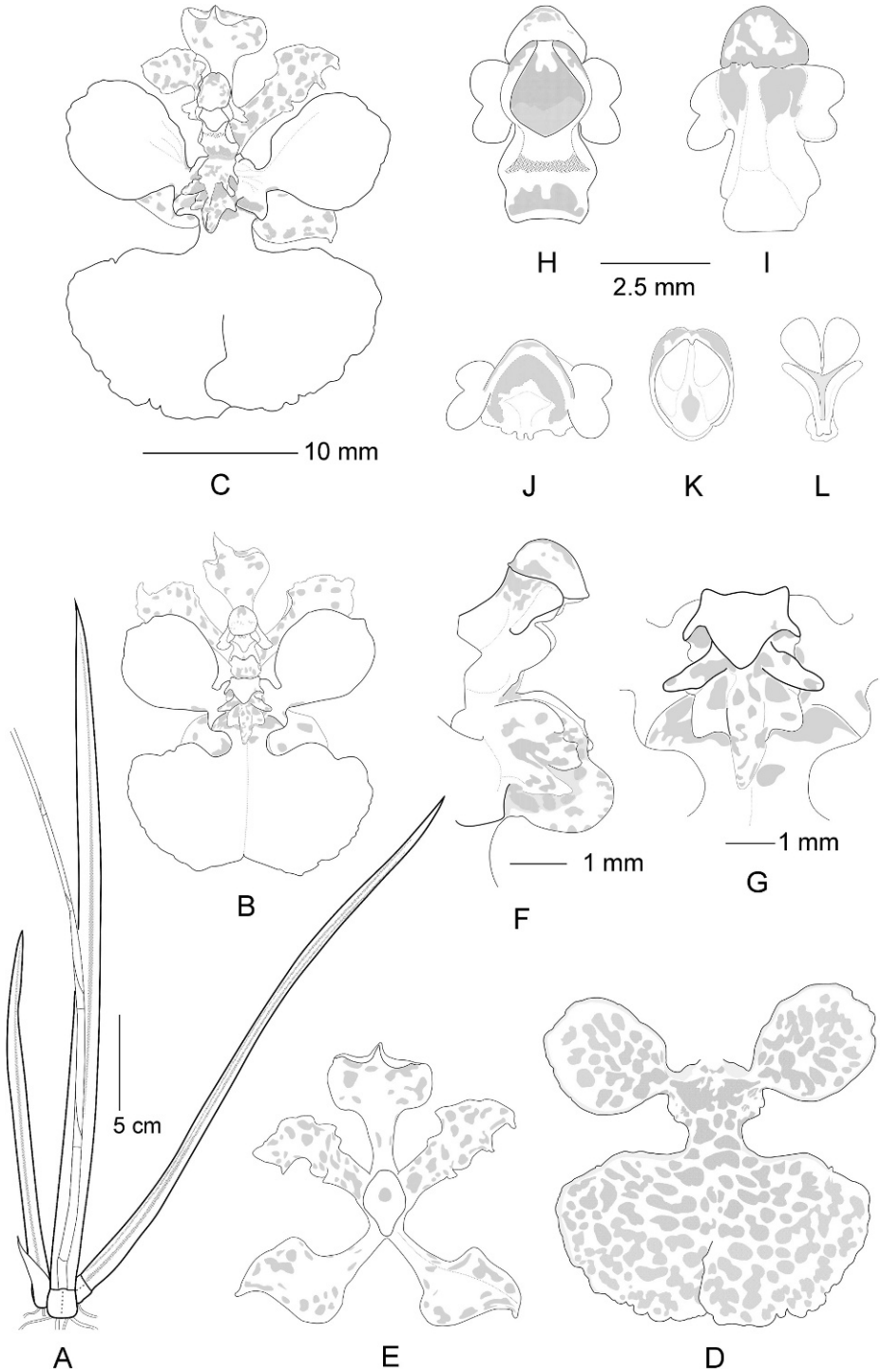

FIG. 4. *Cohniella biorbicularis*. A–B. *G. Carnevali & I. M. Ramírez 7308* (AMES, AMO, CICY). C–L. *W. Cetzal 5* (CICY). A. Habit with partial inflorescence. B–C. Whole flowers, front view. D. Labellum, back view. E. Sepals and petals, front view. F. Lateral view of the callus and column. G. Callus. H–I. Column with anther cap, front and back views. J. Clinandrium and column-wings. K. Anther. L. Pollinia. Scale: A. 5 cm. B–D. 10 mm. F. 1 mm. G. 1 mm. H–L. 2.5 mm. Drawings by W. Cetzal Ix.

Table 1. Morphological comparison of the Mexican species of *Cohniella* Pfitzer.

Plants	*Cohniella ascendens*	*Cohniella biorbicularis*	*Cohniella brachyphylla*	*Cohniella leptotifolia*	*Cohniella pendula*	*Cohniella yucatanensis*
Characters	Erect to pendent	Erect	Erect, rarely subpendent	Erect	Pendent	Erect, rarely subpendent
Leaf length (cm)	15–86	21–52	12–42	5.5–16	15–36	13–44
Inflorescence length (cm)	14–65	33–80	24–110	19.5–78	35–45	11–76
Central lobe (mm)	5–7 × 8.5–13	7–12 × 15–21	4–12 × 4–14	5–8 × 8–13	4–7 × 8–11	8–10 × 10–16
Lateral lobes of the labellum (mm)	4–8 × 2–4	8–11 × 5–12	5–11 × 3–5	5–9 × 3–5	4.2–7 × 4–5	6–8 × 3–6
Isthmus (mm)	0.5–4 × 1.3–3	1–4 × 2–3.5	1–2 × 1.2–3.5	2–3 × 1.5–2	2 × 1	1.8–4 × 1–4
Column wings	Terete, unlobed	Transversely reniform, bilobed	Transversely reniform, bilobed	Transversely reniform, bilobed	Transversely reniform, bilobed	Triangular, unlobed
Flowers size (mm)	15–22	22–30	17–25	20–26	23	16–23
Position of the lateral lobes of the labellum	Erect	Flat	Flat	Flat	Flat	Flat
Column outline	Linear	Wider toward apex	Wider toward apex	Wider toward apex	Wider toward apex	Wider toward base
Distance base column-tabula infrastigmatica-/distance base column-stigmatic surface	ca. 1/2	1/2	1/2	1/2	1/2	1/8
Petals and sepals	Somewhat inflexed	Flat or somewhat reflexed	Flat or somewhat reflexed	Flat or somewhat reflexed	Flat or somewhat reflexed	Flat or somewhat reflexed

bright yellow labellum, while the back part of the labellum is heavily marked with red stains or spots on the whole surface. In others species of *Cohniella*, the color of the back side of the labellum is concolorous pale yellow; when rarely there are spots, they are fewer, smaller, and restricted to the underside of the disk.

Variation range. *Cohniella biorbicularis* is a species with relatively small variation in the floral characters. Plants of Querétaro and San Luis Potosí feature flowers that are relatively bigger (23–30 mm diam.) than those of Tamaulipas and Veracruz (22–25 mm diam.).

Taxonomic commentary. As with most taxa in the *Cohniella cebolleta* complex, *C. biorbicularis* has been confused with that species. However, the broad lateral lobes of the labellum easily distinguish this species from any other *Cohniella*.

Additional specimens examined. MEXICO. No precise locality, *Liebmann 17* (W- Reichb. f.), **Querétaro:** Mpio. Arroyo Seco, río Santa María, 1.5 km al NE del puente de Concá, 600 m, 6 Mar. 1988, *A. Herrera 61* (MEXU, QMEX, XAL). 6 km al N de Concá, 600 m, 18 Mar. 1985, *R. Fernández 2778* (NY, US). Mpio. Jalpan, oriente de Tanchanaquito, 300 m, 8 Apr. 1992, *L. López 986* (QMEX). Los Sarros, al Sur de Tanchanaquito, 30 Mar. 1993, *L. López 549* (QMEX, MEXU). Near Jalpan, 27 May 1937, *O. Nagel 6734* (AMES). km 196 Jalpan-Landa de Matamoros 1530 m, 1 Apr. 1985, *I. Aguirre 41-638* (AMO). Mpio. Landa de Matamoros, 5 km del Puerto Blanco, al S del Capulín rumbo a Río Moctezuma, 13 Mar. 1988, *A. Herrera 102* (MEXU). Al S de El Capulín, Puerto Blanco, camino al Río Moctezuma, 920 m, 13 Mar. 1988, *A. Herrera 103* (AMO, XAL). Mpio. Landa de Matamoros, Camino de Matzacintla al Río Moctezuma, 10 Mar. 2008, *W. Cetzal 11* (CICY, spirit collection). Xilitla-San Juan del Río km 91, Mar. 1980, *Thurston T-2512 sub Hágsater 6093* (AMO, 3-sheets). **San Luis Potosí:** Mpio. El Naranjo, 5 Apr. 1960, *R. L. Dressler 2606* (US). Vicinity El Salto above El Naranjo, 6 Apr. 1960, *J. A. Duke M3683* (MEXU). **Tamaulipas:** About 7 km North of Antiguo Morelos km. 540, 28 Mar. 1961, *R. L. Dressler 2632* (US). Mpio. Aldama, pueblo El Plomo, Sierra de Tamaulipas, 550 m, 19 Jan. 1991, *R. Jiménez et al. 1087, 1090, 1091* (AMO). Mpio. Gómez Farías, Cañón de la servilleta. 4 km al W de la Charca, 25 Mar. 1986, *L. Hernández 1705* (CICY). Cañón El Abra, km 550–551 on highway between Ciudad Mante and Antiguo Morelos, 21 Mar. 1952, *H. E Moore Jr. et al. 6165* (MEXU). **Veracruz:** *H. G. Galeotti 5184* (P). Mpio. Actopan, Trapiche, 400 m, 15 Feb. 1971, *F. Ventura 3114* (US). Raya los Capulines, Sierra Manuel Díaz, 19°32′N, 96°29′W, 19 Mar. 1985, *R. Acosta 346* (XAL). Mpio. Atoyac, 1.5 km al N de Potrero Nuevo-Miraflores, 18°53′58″N, 96°49′21″W, 425 m, 7 Mar. 1986, *R. Acevedo et al. 880* (XAL). Mpio. Coatepec, Cerro de Achichuca cerca de Tuzamapan, 19°23′N, 96°48′W, 21 Mar. 1971, *G. Castillo 475* (AMO). Mpio. Jacomulco, Cerro de Achichuca entre Tuzamapan y Jalcomulco, 10 Mar. 1982, *G. Castillo et al. 2592* (AMO). Ca. 1 km N of the road between Coatepec and Jalcomulco, ca. 8 km, 15 Mar. 1993, *P. Hietz et al. 993* (XAL). Mpio. Jilotepec, comprada en las calles de Xalapa, 26 Apr. 2001, *G. Carnevali et al. 6372* (CICY, 3 sheets). Mpio. Martínez de la Torre, 20°03′N, 97°03′W, 300 m, 30 Mar. 1935, *O. Nagel 4656* (US). Mpio. Naolinco, ca. San Antonio Paso del Toro, 19°35′N, 96°49′W, 600 m, 23 Mar. 1975, *R. V. Ortega 745* (XAL). Mpio. Puente Nacional, Mata de Jobo, 27 Feb. 2008, *W. Cetzal 5* (CICY). El Hato, 7 Apr. 1973, *F. Ventura 8127* (AMO). Mpio. Xalapa, Colonia 6 de enero, 10 km al E de la Cd. De Xalapa, 5 Apr. 1972, *J. Dorantes 555* (MEXU). Cercanías al Castillo, 8 Apr. 1999, *G. Carnevali et al. 5395* (CICY). Mpio. Emiliano Zapata, La Laja, entre Corral Falso Pinoltepec, a 900 m de la carretera Jalapa-Veracruz, desviación a 16 km al SE Jalapa, 20 Mar. 1975, *M. Souza et al. 4557* (MEXU).

Cohniella brachyphylla (Lindl.) Cetzal & Carnevali, Brittonia 62(2): 163. 2010. *Oncidium brachyphyllum* Lindl., *Edwards's Bot. Reg.* 28: sub t. 4. 1842. Type: Mexico. Without any other locality, *T. Hartweg s.n.* (holotype: K-Lindl.). Fig. 5.

Epiphytic **herbs**, shortly creeping to cespitose; **rhizome** short, thin, brittle; **roots** 1.0–2.5 mm thick, white; **pseudobulbs** 0.9–12.0 mm long, 0.7–11.0 mm wide, subspherical to broadly ovoid, apically 1-leaved, red-purple tinged, totally enclosed by 3 imbricate sheaths 3–10 cm long, 1–2 cm wide upon spreading, eventually deciduous; **leaves** terete, thickly

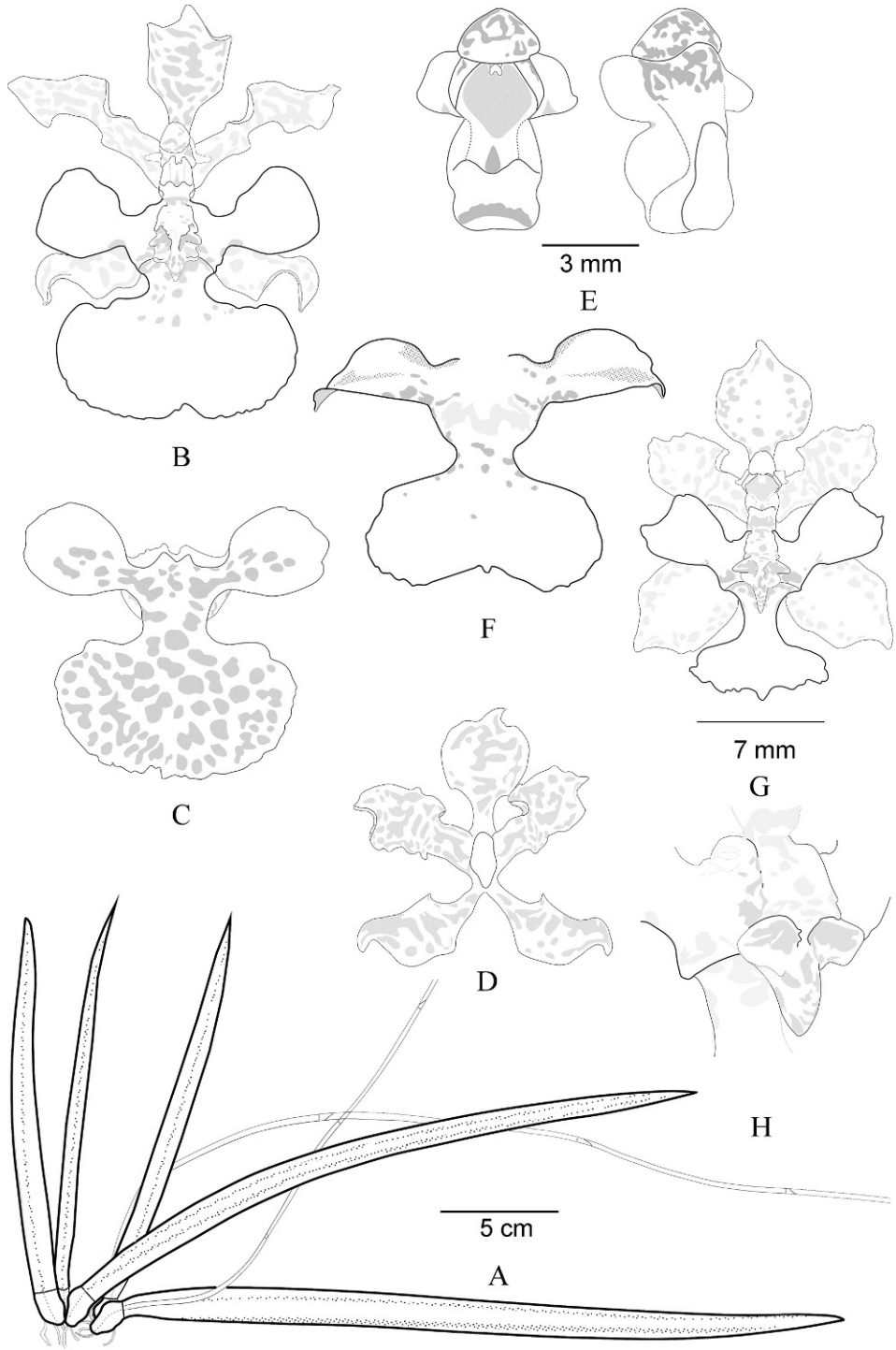

FIG. 5. *Cohniella brachyphylla*. A–E. *G. Carnevali 7310* (CICY). F. *G. Carnevali & I. M. Ramírez 6552* (CICY). G–H. *G. Carnevali & I. M. Ramírez 6552* (CICY). A. Habit with partial inflorescence. B, G. Whole flowers, front view. C. Labellum, back view. D. Sepals and petals, front view. E. Column with anther cap, front and back views. F. Labellum, front view. H. Callus. Scale: A. 5 cm. B–D, F–G. 7 mm. E. 3 mm. H. 2 mm. Drawings by W. Cetzal Ix.

fleshy-coriaceous, (9–)12–42 cm long, 4–17 mm wide, dark green, usually purple spotted, abruptly constricted proximally when fresh, broadest at its medium, gradually attenuated distally into a pungent apex, often somewhat falciform; **inflorescences** solitary from the base of the pseudobulbs, (15–)24–110 cm long, a 4–40(–50)-flowered raceme or panicle with 1–8 (–12) branches, (3–)5–16(–19) cm long, the branches 3–7-flowered; peduncle and rachis dark green, purple tinged; peduncle erect to arched, 1.5–5.0 mm thick, terete, with 4–12 remotely bracted internodes, peduncle bracts 10–20 mm long, 4–10 mm wide, the basal most longest, oblanceolate, acuminate, tubular; bracts subtending the lateral branches 4–12 mm long, 1.5–3.5 mm wide, elliptic, acuminate; floral bracts 1.5–7.0 mm long, 1.0–1.5 mm wide, narrowly elliptic, acuminate; **flowers** resupinate, medium sized for the genus, with widely spreading perianth parts and the petals and sepals somewhat reflexed; ovary with pedicel 10–20 mm long, of which ca. 7–15 mm correspond to the ovary, this 2 mm thick; **sepals** basally clawed, the claw is almost 1/2 of total length of the sepal, flat or somewhat reflexed, dorsal sepal 5–9 mm long, 3–5 mm wide, oblanceolate, apically obtuse and minutely apiculate, concave in the upper half, the claw 2–3 mm wide; lateral sepals partially fused at the very base, then free, similar to dorsal, 6–9 mm long, 2.5–4.0 mm wide; **petals** 6–9 mm long, 3–5 mm wide, oblong to oblanceolate, somewhat oblique, the apex rounded, somewhat reflexed in natural position; **labellum** deeply 3-lobed, 8–12 mm long from the base to the apex of the central lobe, 9–16 mm wide across the apices of the lateral lobes, the lateral lobes in the same plane as the central lobe and ± perpendicular to it; central lobe 4–12 mm long, 4–14 mm wide, spathulate to transversely oblate or circular in outline, apically rounded to subquadrate, basally produced into a short isthmus, 1–2 mm long, ca. 1.2–3.5 mm wide; lateral lobes 5–11 mm long, 3–5 mm wide, erect-patent, somewhat reflexed in natural position, oblong to subquadrate, apically truncate-rounded, the upper and lower margins of the lateral lobes flat to rounded; disc relatively large, ca. 3–7 mm long, 2–4 mm wide, oblate, bearing a well-developed callus, ca. 3–5 mm long, 2–3 mm wide, consisting of a large, elevated, ± flat, subquadrate platform ca. 2 mm long, 2–4 mm wide, proximally with two small, lateral, divergent teeth, that are obconical and point upward, ca. 1 mm long, 0.3–0.5 mm wide; distally with two lateral teeth, broadly rectangular to conical, these ca. 1 mm long and 0.8–1 wide; the central tooth or keel laterally compressed, ca. 2 mm long; the basal portion of the callus with conspicuous lateral extensions; **column** 4 mm long, 2 mm wide, the ventral face in the same plane as the labellum lobes, oblong, tabula infrastigmatica longitudinally channelled, stigmatic cavity rounded, ca. 1.5 mm long and wide; column wings small, distal and proximal lobes ca. 0.8 mm long, 2 mm wide, oblate; anther cap 2.8 mm long, 2 mm wide, apical, operculate, ellipsoid; **pollinarium** typical for the genus.

Distribution and ecology. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica. In Mexico, it is distributed along the Pacific coast of the states of Chiapas, Oaxaca, Guerrero, and Michoacán, growing in tropical deciduous forest (TDF) and pine-oak forests (POF) at elevations of 180–1200 m, into the valleys along the Sierra Madre del Sur of Guerrero and Oaxaca; it also grows in deciduous forest at elevations of 1000–1650 m. In the Balsas depression in Estado de Mexico, Guerrero, and Morelos, it grows in TDF and POF at elevations of 102–1700 m. On the eastern side of the Tehuantepec Isthmus, this species, in a morph with broadly obovate lateral lobes to the labellum, reappears in Chiapas and then ranges southwards into at least Costa Rica at 0–800(–1500) m (Fig. 5-B).

Diagnostic features. As compared against *C. pendula* and *C. leptotifolia* (Table 1), *Cohniella brachyphylla* is distinguished by its relatively long (12–42 cm), thick leaves on top of relatively conspicuous pseudobulbs. The leaves are typically rigidly erect and thickened on the lower half; they are also generally slightly to strongly falcate. The inflorescences are erect or horizontal, usually larger than in others Mexican cohniellas (Table 1). The isthmus of the labellum is short and broad, wider than its length or about as long as wide as opposed to the longer isthmus found in *C. leptotifolia* and *C. pendula*. Along with *C. pendula* and *C. biorbicularis*, the labellum is wider across the spread lateral lobes than across the apical lobe, as opposed to the labellum in *C. brachyphylla*, which is wider across the spread apical lobe of the labellum.

The lateral lobes of the labellum are obliquely oblong to obliquely obovate and are always more or less retrorse (Fig. 5-F, G), except in populations of the eastern side of the Tehuantepec Isthmus (Fig. 5-B). The disk of the labellum is suborbicular, proportionally large, and about as long as the width of the midlobe. At each side of the isthmus, the anterior margins are provided with one lateral extension of the callus.

Variation range. *Cohniella brachyphylla* is a common and widespread species, and it is consequently variable. The fact that the species occurs as a conglomerate of populations isolated in intermountain valleys has apparently created barriers to gene flow, favoring the establishment of local morphs or races (Fig. 5-B, F, G). This great amount of variation found within *Cohniella brachyphylla* apparently occurs both between and within populations. Shapes of the several portions of the labellum, as well as its general outline are variable. The lateral lobes of the labellum, which are always somewhat reflexed, range from obovate-suborbicular to subquadrate to obliquely elliptical (Fig. 5-B, F, G). The midlobe ranges from almost suborbicular to transversely subquadrate. In some populations (e.g., some in the state of Morelos, Fig. 5-G), the central lobe of the labellum is shortly but distinctly apiculate. The calli and disk are always somewhat tinged in various hues of red, but the extent and patterns of these colorations are variable. The adaxial side of the labellum is usually provided with dull red-rose spots that are variable in size, distribution, and density. These spotting is always less conspicuous than in the related *C. biorbicularis*.

Populations referred to *C. brachyphylla* from the southernmost extreme of the distribution from Chiapas southward into Costa Rica are atypical in having broadly obovate lateral lobes but otherwise conform to the characters of the species (Fig. 5-B).

Taxonomic commentary. As with most taxa in the *Cohniella cebolleta* complex, *C. brachyphylla* has been included in the synonymy of *C. cebolleta*. Carnevali et al. (2010) combined *Oncidium brachyphyllum* Lindl. described from Mexico as *C. brachyphylla* for populations along the Pacific coast of the country and into the intermountain valleys with Pacific watersheds. However, populations referred to the NW of Mexico in Sinaloa, Sonora, and Durango are segregated here as *C. leptotifolia* (see discussion under *C. leptotifolia*).

Additional specimens examined. MEXICO. **Chiapas:** Monte Bonito, 5 Mar. 2008, *G. Carnevali 7310* (CICY). **Estado de México:** Temascaltepec, Guayabal, 9 Feb. 1933, *G. B. Hinton 3362* (AMES, 2-sheets, P). Temascaltepec, Luvianos, 25 Jan. 1933, *G. B. Hinton 3205* (AMES, 2-sheets). Zancazonapan, 07 Mar. 1987, *S. Cusi Sub R. Jiménez 823* (AMO). 11 Mar. 1988, *S. Cusi Sub R. Jiménez 823* (AMO). **Guerrero:** Campo Morado, Mina, 1060 m, 29 Jan. 1938, *G. B. Hinton 11241* (AMES). Mpio. Buena Vista de Cuéllar, aprox. 5 km al SSE de Buena Vista de Cuéllar, 1480 m, 25 Sep. 1984, *F. Lorea 3185* (AMO). Mpio. Chilpancingo, Cerro Alquitrán (cima), 17°23′30″N, 99°31′30″W, 1650 m, 20 Mar. 1967, *H. Kruse 1169* (MEXU). Rincón Viejo, 17°17′40″N, 99°30′0″W, 720 m, 10 Jan. 1960, *H. Kruse 180* (NY). Near San Nicolas del Oro, 1200 m, 13 Jan. 1938, *Y. Mexia 9106* (AMES, NY). km 10 de la carretera Iguala-Taxco, 102 m, 22 Jan. 1982, *R. Cedillo 1014* (MEXU). **Michoacán:** Coalcoman, 1000 m, 4 Apr. 1939, *G. B. Hinton 13647* (AMES, NY, US). Michoacan-Guerrero: rivers du Rio Técpan, 400 m, 29 Jan. 1899, *E. Langlassé 819* (AMES, P). **Morelos:** Mpio. Jojutla, Sierra de Huautla, en el crucero Huautla-AJuchitán [sic], al SE de Jojutla, 18°20′09″N, 99°01′05″W, 950 m, 2 Aug. 1994, *J. Santana 513* (AMO). Mpio. Puente de Ixtla, 2 km sobre brecha a El Salto, a partir de Tilzapotla, 990 m, 9 Dec. 1999, *G. Carnevali 6552* (CICY). Oaxtepec, dentro del centro vacacional, 26 Nov. 1989, *R. Jiménez 883* (AMO). Mpio. Tepalcingo, El Limón, 1350 m, 19 Nov. 1980, *R. V. Ortega 1588* (AMO). Mpio. Tlaquiltenango, 2 km al N de la desviación a San José Pala, sobre el camino a Huatla, 1170 m, 7 Nov. 1996, *A. Espejo et al. 5606* (AMES). Camino de valle de Vázquez rumbo a Quilamula, 1000 m, 1 Feb. 1989, *A. Flores-Castorena et al. 1083* (MEXU). Mpio. Tilzapotla, 6 km sobre la desviación (Tehuixtla) a El Zapote y la Tigra, 1000–1250 m, 12 Mar. 1989, *A. Espejo et al. 3543* (AMES). Cuautla, Mt Piloncillo, 1700 m, 23 Oct. 1932, *O. Nagel et al. 1551* (MEXU). Tepoztlan, km 2 del camino Tepoztlán–Sto Domingo, 1450 m, 9 Dec. 1988, *R. Jiménez et al. 903* (AMO). **Oaxaca:** *H. G. Galeotti 5272* (P). 1842, *M.*

Ghiesbreght s.n. (P). 10 km. al SE de Jamiltepec, o sea 3 km, al SE de "La Humedad", en el camino a Puerto Escondido, 150 m, 11 Feb. 1976, *M. Souza 5263* (MEXU). Microonda, San Cristobal, Carr. Oax-Tehuantepec. km 144, tomar desviación hacia la derecha aprox. 1 km, 1100 m, 12 July 1987, *R. Jiménez et al. 3169* (AMO, 2-Sheets). Mpio. Asunción Ixcaltepec, Dto. de Juchitán, a 1 km en línea recta al NE (32°) de Nizanda, 16°39′53″N, 95°0′26″W, 150 m, 6 Dec. 1995, *E. A. Pérez-García et al. 848*, *852* (MEXU). Cerro Verde a 1.75 km en línea recta al NE de Nizanda, 16°39′14″N, 94°59′7″W, 300 m, 11 Mar. 1998, *E. A. Pérez-García et al. 1383* (MEXU). Road from Yalalag to Villa Alta, 1600 m, 13 Feb. 1919, *E. Ostlund 2331* (MEXU). Mpio. San Pedro Pochutla, 11 km NE de Pochutla camino a El Limón, 180 m, 21 Nov. 1991, *S. Acosta 2125* (OAX). **NICARAGUA**. *A. H. Heller s.n.* (SEL). **Chontales:** 2 km south of Acoyapa, 4 Jan. 1969, *J. T. Atwood 1656* (SEL). **Managua:** 8.7 km E of San Benito along Hwy 7, 12°19′N, 85°58′W, 100 m, 31 Jan. 1981, *W. D. Stevens & B. A. Krukoff 19038* (SEL). **GUATEMALA**. **Huehuetenango:** Mpio. Nentón, km 11 hacia Gracias a Dios, 15°53′0.63″N, 91°44′21″W, 1061 m, 21 Sep. 2006, *M. Véliz et al. 18454* (BIGU). Mpio. Nentón, km 10 a Gracias a Dios, 15°53′22.8″N, 91°44′0.4″W, 1099 m, 24 Mar. 2007, *P. Velásquez et al. 184* (BIGU). Mpio. Nentón, km 11 a Gracias a Dios, 15°53′2.7″N, 91°44′16.4″W, 1074 m, 21 Sep. 2006, *M. Véliz et al. 17461* (BIGU). **Jalapa:** El Rancho, 28 Dec. 1907, *W. A. Kellerman 7002* (NY). El Progreso, San Agustín AC Transecto El Rancho Norte, 14°53′28″N, 90°01′17″W, 200–300 m, 20 Sep. 2003, *A. Cobar et al.* (BIGU). **EL SALVADOR. Santa Ana:** Mpio. Santa Ana, salida a Metapan, ca. 8 km al N del centro de la ciudad de Santa Ana, 10 Jan. 2000, *J. L. Linares s.n.* (MEXU). Mpio. Metapán, Orillas del Río Chimalapa, a 3 km al N de Metapán (Carr. Metapán-Angiatú), luego 0.8 km al O, camino al Jicaro, 14°21′N, 88°28′W, 500 m, 2 Jan. 2000, *J. L. linares 4734* (EAP). Mpio. Metapán, ca. 6 km al NO de Metapán, por el camino al despoblado, 12 Jan. 2000, *J. L. Linares et al.4755* (MEXU). **Usulután:** Hacienda San Isidro, Cerro Chinito, 800 m, 5 Nov. 1975, *F. Hamer 2* (EAP). **HONDURAS. Comayagua:** 1800 ft, 17 Feb. 1933, *J. B. Edwards 363* (SEL). **El Paraíso:** Mpio. Yuscarán, El Rodeo, entre Yuscarán y Oropoli, 11 Dec. 1996, *J. L. linares 4124* (EAP). **Francisco Morazán:** At El Zamorano, 800 m, 16 Dec. 1946, *L. O. Williams & A. Molina 11245* (EAP). Vicinity of Zamorano, 2700 ft., 28 Jan. 1947, *P. H. Allen 4246* (SEL). **Valle:** Jicaro Galán, 20 m, 11 Jan. 1949, *L. O. Williams & A. Molina 15006* (SEL). **COSTA RICA**. **Alajuela:** Finca Prado, above Atenas, 7 Feb. 1956, *B. G. Schubert 1030* (SEL). **San José:** Monte Redondo, 1400 m, 1 May 1926, *A. Alfaro 270* (AMES). Santa María de Dota, 5 Mar. 1924, *A. Alfaro 36617* (AMES). Turrúcares, 650 m, 15 Jan. 1925, *A. Alfaro s.n.* (AMES, US). **Guanacaste:** La cruz, 15 Jan. 1930, *O. Jiménez 7909* (AMES). Miravalles, *A. C. Brade 1241* (HB). 20 km N of Hwy 1 along road from Canas to Upala, 28 Dec. 1985, *P. M. Catling & V. R. Brownell C11.1* (SEL).

Cohniella leptotifolia Cetzal & Carnevali, **sp. nov.** Type: **México**: Sonora: ca. Álamo Gordo, aprox. 27°1′1.56″N, 108°55′48″O, collected by M. Gómez, 2002, flowered in cultivation 2 May 2003, *G. Carnevali & M. Gómez-Juárez 6803* (Holotype: CICY; Isotypes, AMES, AMO, MEXU, NY, US). Fig. 6.

Species *Cohniellae brachyphyllae* (Lindl.) Cetzal & Carnevali affinis sed differt plantae minore foliis pluribus, rigidis erectis, inflorescentiis simplicis vel raro paniculatis, regiones subtropicalibus habitat.

Small-sized epiphytic **herbs**, 5.6–16(–26) cm tall, shortly creeping to cespitose; **rhizome** short, thin, brittle; **roots** 1–2 mm thick, white; **pseudobulbs** 5–13 mm long, 6–10 mm wide, subspherical to broadly ovoid, red-purple tinged, totally enclosed by 3 imbricate sheaths (2.2–)3.5–5.3(–7.7) cm long, 1.0–1.5 cm wide, upon spreading, eventually deciduous; **leaves** terete, thickly fleshy-coriaceous, 5.5–21.0 cm long, 3–14 mm wide, dark green, usually purple spotted, abruptly constricted proximally when fresh, broadest at its lowest 1/5, gradually attenuated distally into a pungent apex, often somewhat falciform; **inflorescences** solitary from the base of the pseudobulbs, (12–)19.5–78.0(–139) cm long, a 4–18(–36)-flowered raceme or panicle with 1–2(–7) branches, (3.8–)4.6–11.5(–18.5) cm long, the branches 3–5-flowered; peduncle and rachis dark green, purple tinged; peduncle erect to arched,1.5–3.2 mm thick, terete, with (3–)7–10(–13) remotely bracted internodes, peduncle bracts (6–)8–20(–32) mm long, (2–)5–8 mm

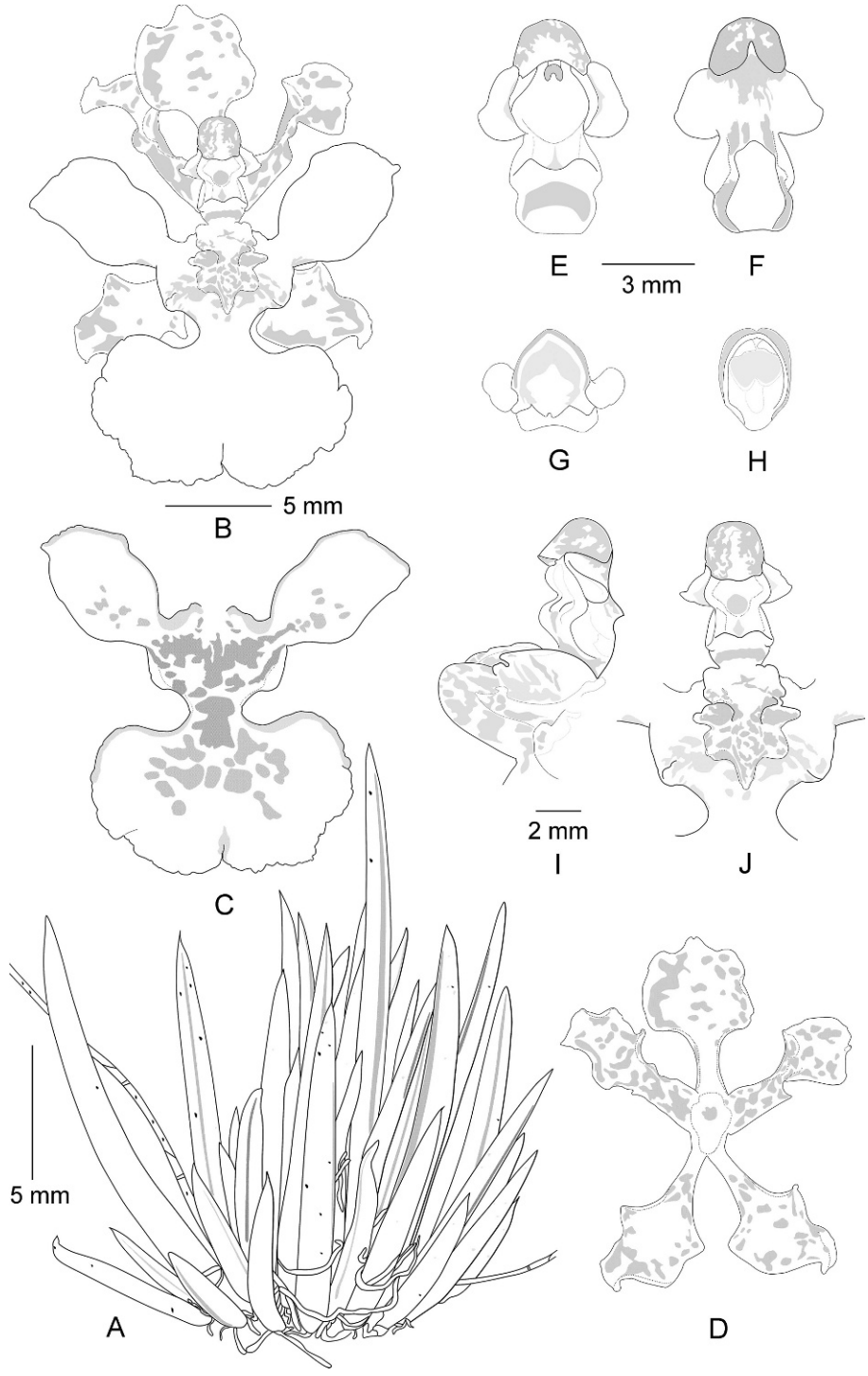

FIG. 6. *Cohniella leptotifolia*. Based on *Carnevali & M. Gómez Juárez 6803* (CICY). A. Habit with partial inflorescence. B. Whole flower, front view. C. Labellum, back view. D. Sepals and petals, front view. E–F. Column with anther cap, front and back views. G. Clinandrium and column-wings. H. Anther. I. Lateral view of the callus and column. G. Callus and column. Scale: A. 5 mm. B–D. 5 mm. E–H. 3 mm. I–J. 2 mm. Drawings by W. Cetzal Ix.

wide, the basal longest, oblanceolate, acuminate, tubular; bracts subtending the lateral branches 2–10 mm long, 1.5–3.3 mm wide, elliptic, acuminate; floral bracts 3.0–4.5 mm long, 1.0–2.1 mm wide, narrowly elliptic, acuminate; **flowers** resupinate, medium sized for the genus, with perianth parts widely spreading and the petals and sepals somewhat reflexed; ovary with pedicel 19–22 mm long, of which ca. 4–5 mm correspond to the ovary, this 1–2 mm thick; **sepals** basally clawed, the claw almost 1/2 of sepal total length, the sepal blade flat or somewhat reflexed, dorsal sepal 7–10 mm long, 3–6 mm wide, oblanceolate, apically obtuse and minutely apiculate, concave in the upper half, the claw 3–4 mm wide; lateral sepals partially fused at the very base, then free, similar to dorsal, 6–8 mm long, 3–4 mm wide; **petals** 8–10 mm long, 3–5 mm wide, oblanceolate, somewhat oblique, the apex rounded, somewhat reflexed in natural position; **labellum** deeply 3-lobed, 10–15 mm long from the base to the apex of the central lobe, 12–16 mm wide across the apices of the lateral lobes, the lateral lobes in the same plane as the central lobe and ± perpendicular to it; central lobe 8–13 mm long, 5–8 mm wide, spathulate to transversely elliptic or oblate in outline, apically rounded to subquadrate, basally produced into a short isthmus, 2–3 mm long, ca. 1.5–2.0 mm wide; lateral lobes 5–9 mm long, 3–5 mm wide, erect-patent, oblong to subquadrate, apically truncate-rounded, both margins of the lateral lobes flat to rounded; disc relatively large, ca. 3.0–6.2 mm long, 4–7 mm wide, in general outline oblong, a developed callus, ca. 4–5 mm long, 3.0–3.6 mm wide, consisting of a large, elevated, ± flat, oblongoid to subquadrate platform, ca. 2.0–3.2 mm long, 3.0–3.6 mm wide, margin of the apex with two diminute teeth in each side; proximally with two smaller, lateral divergent teeth that are conical and point upward; distally with two small, lateral divergent teeth, broadly rectangular to conical; the central tooth or keel laterally compressed; the basal portion of the callus with conspicuous lateral extensions; **column** 4–5 mm long, 2.0–2.5 mm wide, the ventral face in the same plane as the labellum lobes, oblongoid, tabula infrastigmatica longitudinally channelled, stigmatic cavity rounded, ca. 1.5 mm long and wide; column wings small, proximal and distal lobes ca.1.0–1.2 mm long, 2.0–2.4 mm wide, oblate; anther 2 mm long, 1 mm wide, apical, operculate, obovate; **pollinarium** typical for the genus.

Paratypes. MEXICO. Chihuahua: Mpio. Batopilas, arroyo Guimivo between Rio Batopilas and Guimivo, 762–915 m, 24 Mar. 1979, *R. Bye et al. 9235* (NY, MEXU). **Durango:** Glacala, 23 Feb. 1899, *E. A. Goldman 327* (US). **Sinaloa:** Above La Reforma, near Sin-Chi. Border, 6 Nov. 1977, *Kimnach & Sanchez-Mejorada 2014* (AMES). Badiraguato, camino Badiraguato-Suratato, 1150 m, 26 Apr. 1986, *G. A Salazar et al. 1955* (AMO). Badiraguato, km 82 de Badiraguato a Surutato, 950 m, 25 Apr. 1986, *G. A. Salazar et al. 2000*, *2002*, *2003* (AMO). Capadero, Sierra Tacuichamona, 11 Feb. 1940, *H. S. Gentry 5555* (MEXU, SEL). Culiacán, cercanías presa Sanalona a 39 km de Culiacán rumbo a Tamazula, 100 m, 2 Apr. 1987, *A. R. Vega et al. 2322* (MEXU). Culiacán, a más o menos 46 km al N de Culiacán, camino de Badiraguato a la Pitayita, 25°02′N, 107°23′W, 100 m, 25 Feb. 1975, *A. R. Vega et al. 8104* (MEXU). Culiacán, carretera Sanalona, Tamazula, ± 1 km delante de arroyo de La Higuera, 24°50′21″N, 107°03′22″W, 200 m, 25 Mar. 1995, *A. R. Vega et al. 8206* (MEXU). Mpio. de Cosalá ± 12 km al NO de Cosalá, 400 m, 1 Feb. 1986, *E. L. Carrasco et al. 52* (MEXU, 2-Sheets). Cosalá, Cordón de los Robles, 225 m, 31 May 1919, *M. Narváez-Montes et al. 813* (US). Cosalá, Cordon de los Robles, 225 m, 31 Mar. 1919, *C. Conzatti 813* (MEXU). Cosalá, Cordon de los Robles, 325 m, *J. González-Ortega 813* (MEXU). Mpio. San Ignacio, San Javier, Balboa, 200 m, Jan. 1923, *J. González-Ortega 5106* (AMES, MEXU); San Ignacio, camino de el Salado hacia tierra adentro a 24 km de la carretera, 1150 m, 25 Apr. 1986, *G. A. Salazar 1955* (AMO). San Ignacio, San Juan 15 km al SE de San Ignacio, 23°55′N, 106°19′W, 19 Mar. 1985, *P. Tenorio et al. 8458* (MEXU). **Sonora:** Álamos, Guirocoba, 17 Apr. 1954, *R. S. Felger 422* (MEXU). Alamos mountain, 300° ft, 22 Feb. 1953, *E. R. Blakley 1665* (AMES).

Etymology. The species is named in allusion to the appearance of the plants, which due to the several to many, short, erect, stubby leaves, resemble plants of the totally unrelated orchid genus *Leptotes* Lindley.

Distribution and Ecology. Endemic to northwestern México. *Cohniella leptotifolia is* re-

stricted to the Pacific coast from Álamos, in Sonora (ca. 27° N) southward into San Ignacio, in Sinaloa (ca. 23.5° N), and it has also been collected in the valleys of the Sierra Madre Occidental in Chacala, Durango. This species grows at elevations of 0–1150 m, usually in tropical deciduous forest, even into thorn scrub and pine-oak forest. It is generally an epiphyte on thick branches, rarely on rocks. It is often found exposed to the sun. This is the only *Cohniella* species whose distributional range extends wholly beyond the Cancer Tropic line. Thus, it may be capable of standing occasional frosts.

Diagnostic features. *Cohniella leptotifolia* is distinguished by the smaller plants 5.5–16 cm (vs. other species of *Cohniella*, Table 1). Furthermore, the inflorescences are relatively long, and tend to be racemose while in other Mexican species (except in *C. ascendens*) the inflorescences are usually paniculate. *Cohniella brachyphylla* is similar to *C. leptotifolia* due to the shape of the labellum and the position of its lateral lobes (particularly some *C. brachyphylla* populations from the Mexico and Morelos states). However, the plants of the populations here referred to *C. leptotifolia* are so distinctive that we do not hesitate to treat them as distinct.

Variation range. This new species is known from several herbarium specimens from Sinaloa, Sonora, and Durango, and generally seems to be homogeneous in vegetative size and floral morphology. As opposed to other *Cohniella* species, where most adult plants are composed of a few leaves, plants of this new entity seem capable to accumulate many leaves from several growth leads to eventually become specimens of up to 30+ erect leaves. We have had a plant of this species under cultivation for several years and it has become a small mound of short stubby leaves.

Taxonomic commentary. As with most taxa in the *Cohniella cebolleta* complex, *C. leptotifolia* has been confused with that species. However, the smaller plants with many short, stiffly erect leaves, the erect, relatively long, usually racemose inflorescences, and its distribution easily distinguish this species from any other *Cohniella*.

IUCN Conservation assessment. DD. *Cohniella leptotifolia* is known from fewer than 30 localities in the states of Sinaloa, Durango, and Sonora. However, most of the collections are concentrated along a narrow belt of ''selva baja caducifolia'' (tropical deciduous forest) and ''matorral espinoso'' (thorn scrub) on the western side of the Sierra Madre Occidental. These ecosystems are being severely threatened in the area due to extensive cattle ranching, irrigation developments, lumber extraction, and wood harvesting for charcoal, thus presumably affecting natural populations of this new species. Since we have no hard population data, we cannot confidently assess the conservation status of this species, but it is most likely that when these kind of data becomes available, the species will warrant upgrading to VU.

Cohniella longifolia (Lindley) Cetzal & Carnevali, Brittonia 62(2): 169. 2010. *Oncidium longifolium* Lindl., Edwards's Bot. Reg. 27: 22. 1841. Type: Mexico. Without any other locality, collected by T. Hartweg, ex Hort. Royal Horticultural Society and Loddiges (holotype: K-Lindl.). Fig. 7.

Epiphytic **herbs**, caespitose; **pseudobulbs** typical for the genus; **leaves** terete, 97.5 cm long; **inflorescences** solitary from the base of the pseudobulbs, 97.5–130 cm long, 6 mm wide, a 38 flowered raceme or panicle with 5 branches, (1.6–)3.9–10.6 cm long, the branches (2–)5–9 flowered; peduncle more or less erect, terete; bracts subtending the lateral branches ca. 3–6 mm long, 4 mm wide, elliptic, acuminate; floral bracts ca. 3 mm long, 2 mm wide, narrowly elliptic, acuminate; **flowers** 27–36 mm in diameter with widely spreading perianth parts and somewhat reflexed petals and sepals; ovary with pedicel 16–22 mm long, of which ca. 6–7 mm correspond to the ovary; **sepals** basally clawed; dorsal sepal 10–11 mm long, 5–6 mm wide, obovate, apically obtuse and apiculate, concave in the upper half; lateral sepals elliptical, 10–11 mm long, 4–5.5 mm wide; **petals** 11–12 mm long, 4.5–5 mm wide, oblong, the apex truncated; **labellum** 3-lobed, 17–18 mm long from the base to the apex of the central lobe, 20–23 mm wide across the apices of the lateral lobes, the lateral lobes in the same plane as the central lobe; central lobe 7–9 mm long, 12.5–14.0 mm wide, oblate, apically rounded to truncate, basally produced into a relatively long isthmus, 8–

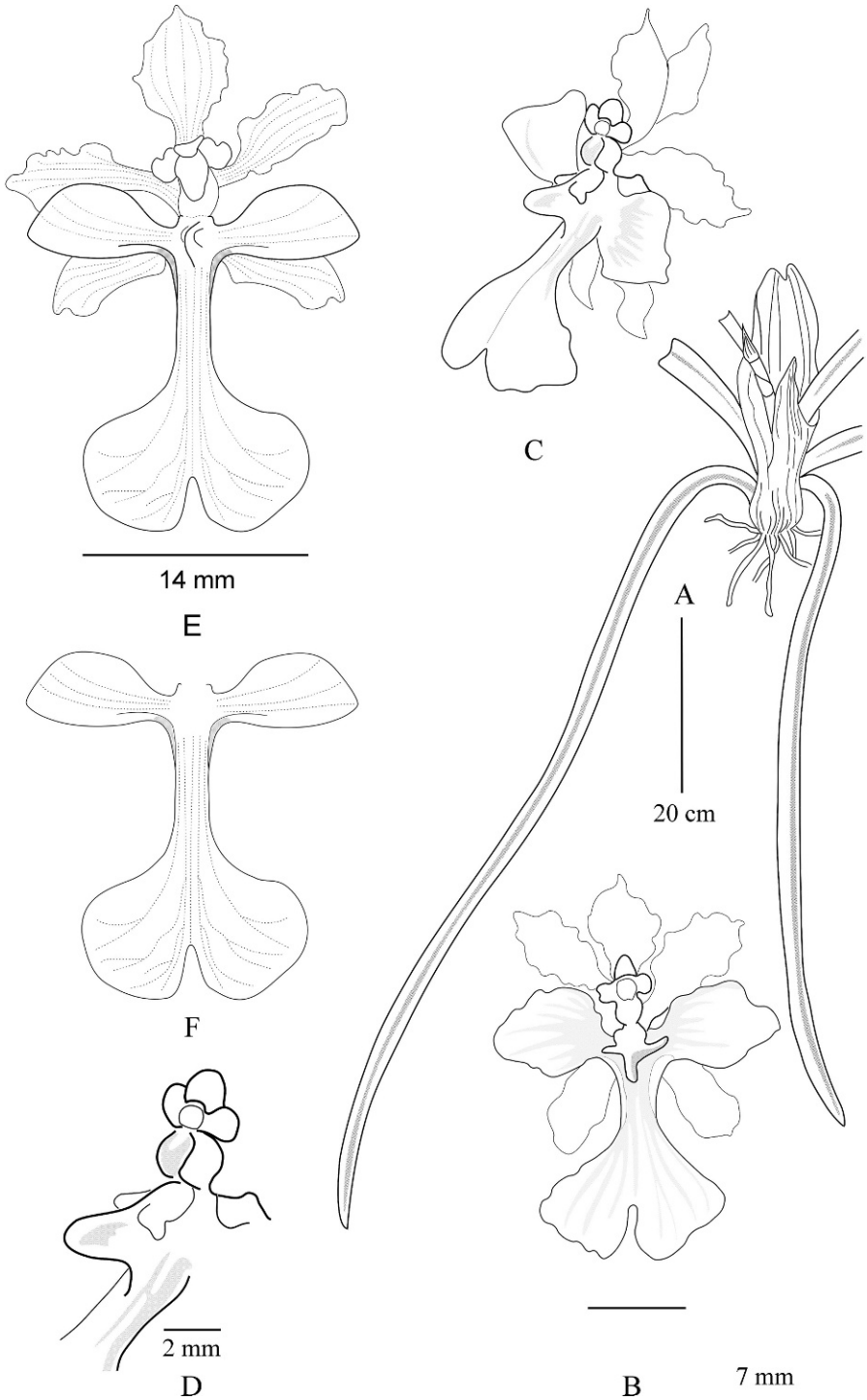

FIG. 7. *Cohniella longifolia*. A–D. Drawings based on Bot. Reg. 28, tabula 4. E–F. Based on *T. Hartweg s.n.* (K-Lindl.). A. Habit. B, E. Whole flowers, front view. C. Whole flower, Lateral view. D. Column and callus. F. Labellum, front view. Scale: A. 20 cm. B, C. 7 mm. D. 2 mm. E–F. 14 mm. A–D. Redrawn and E–F. Drawings by W. Cetzal Ix.

10 mm long, 2–3 mm wide; lateral lobes ca. 9 mm long, 5 mm wide, oblong to obovate, apically subtruncated; disc large, ca. 2.8 mm long, 4.5 mm wide; the callus consisting of three teeth; proximally with two lateral teeth; the central tooth or keel large and laterally compressed, ca 2.5 mm long, ca. 1.5 mm tall; **column** ca. 3 mm long, 2 mm wide; column wings ca. 1.5 mm long, 2.5 mm wide; anther cap 2.5 mm long, 2 mm wide.

Distribution. Mexico. Known only from the type collection.

Diagnostic features. According to the protologue, *Cohniella longifolia* is easily distinguished from other Mexican cohniellas by its long, pendent leaves of apparently soft texture and by its elongate isthmus (8–10 mm long) subtending a relatively small central lobe (7–9 cm long, 12.5–14 mm wide). The inflorescences were described as "… forming dense panicles three feet long of very large and showy yellow and brown flowers…". Later, Lindley (1842), in the text in Latin that accompanied a color plate of this species, stated that the leaves could be of a large size "…*Folia tripedalia*…" (= 97.5 cm long) and the inflorescences "…*Scapus* 3-4-*pedalis paniculatus*…" (= 97.5–130 cm long).

Variation range. This species is only known from type material.

Taxonomic commentary. According to the protologue, *Oncidium longifolium* "… has been imported abundantly by the Horticultural Society from Mexico, and has flowered both in their garden and with Messrs. Loddiges…" However, the protologue does not indicate an exact provenance and neither does the label of the type material deposited in Kew. Carnevali et al. (2010) combined *O. longifolium* Lindl. as *Cohniella longifolia* (Lindl.) Cetzal & Carnevali and commented "…that the plants and flowers of the type material are suspiciously similar to those of several populations of *C. cebolleta* from Perijá, Venezuela with which it shares the long, often pendent leaves, the large paniculate inflorescences and the diagnostic features of the flowers (the long isthmus and " … bird like …" lateral lobes of the labellum)…".

Although it is possible that large *C. cebolleta* plants (bearing leaves 30–65 cm long) may resemble the type of *Oncidium longifolium*, the size of the flowers of these two concepts appear to differ. *Cohniella cebolleta* features smaller flowers (25–27 mm diam.) than those of *C. longifolia* (27–36 mm diam.) but since *C. longifolia* is only known from the type, we cannot at this time be certain of its variation range. However, these two entities seem to differ in several morphological respects. Noteworthy is the labellum isthmus, which is relatively long in both species, but much longer in *C. longifolia* (8–10 mm long), up to three-fold the dimensions of *C. cebolleta* (1.8–3 mm long).

In regard to size and raw isthmus length of *Cohniella longifolia*, the species that it approaches the most is *C. sprucei* (Lindl.) Königer & Pongratz, an Amazonian species. Particularly similar are certain populations from the SW section of the Amazonian basin, in Bolivia (Santa Cruz, *S. Jiménez*, *E. Gutiérez & M. Fernández 142*, MEXU, MO, USZ, fragment at CICY), which feature large flowers (30–35 mm diameter) with a conspicuous isthmus of 2.4–7.0 mm long. Thus, it is not impossible that *Cohniella longifolia* and *C. sprucei* represent the same species, in which case the former name would have nomenclatural priority. In the absence of Mexican material matching the type of *C. longifolia*, we can not really be sure of the status of this entity. At this time it would be interesting to better assess the variability of *C. sprucei* to determine whether it overlaps with *C. longifolia*.

Cohniella longifolia was not included in the key to the species of *Cohniella* in this contribution since our key relies heavily upon geographical distribution, which is unknown for this species given the case it actually was a Mexican species. However, the species would key out to *C. yucatanensis*, from which it can easily be distinguished by the much longer leaves (described as being as long as three feet while the longest leaves of *C. yucatanensis* we are aware of are 13–44 cm long) which are also softer, and specially by the much better developed isthmus (8–10 mm long in *C. longifolia* vs. 1.8–4.0 mm in *C. yucatanensis*).

Cohniella pendula Carnevali & Cetzal, Brittonia 62(2): 171. 2010. Type: Mexico. Jalisco: Municipio La Huerta, Loma Alta, 40 km. de La Huerta hacia Barra de Navidad, aprox. 19°22′0″ N, 104°41′59″ W, aprox. 350–

450 m, collected by G. Carnevali and G. Salazar, 3 Nov. 1997, flowered in cultivation 10 Mar 2004, *G. Carnevali & I. Ramírez 6897* (holotype: CICY, isotypes, AMES, AMO, MO, NY). Fig. 8.

Epiphytic pendent **herbs**, sun-loving to semi-umbrophyllous, shortly creeping to caespitose; **rhizome** short, thin, brittle; **roots** 1–2 mm thick, white; **pseudobulbs** 12–14 mm long, 6–8 mm thick, subspherical to broadly ovoid, apically 1-leaved, red-purple tinged, totally enclosed by 3 imbricate sheaths, 2.5–6.4 cm long, 12–20 mm wide, upon spreading, eventually deciduous; **leaves** terete, thickly fleshy-coriaceous, 15–36 cm long, 6–13 mm thick, dark green, usually purple spotted, when fresh abruptly constricted proximally, broadest at its lower 1/5, gradually attenuated distally into a pungent apex, often somewhat falciform; **inflorescences** solitary from the base of the pseudobulbs, 35–45 cm long, a (8–)15–30-flowered raceme or panicle with 1 or 2 short branches 4.5–5.0 cm long, the branches 5–9-flowered; peduncle and rachis dark green, purple tinged; peduncle first pendent, then arching to horizontal, 3–4 mm thick, terete, with 7–10 internodes, peduncle bracts 14–21 mm long, 3–4 mm wide, the basal longest, oblanceolate, acuminate, tubular; bracts subtending the lateral branches 5–7 mm long, 2.5 mm wide, elliptic, acuminate; floral bracts 2–4 mm long, narrowly elliptic, acuminate; **flowers** resupinate, small or medium sized for the genus, with perianth parts widely spreading and the petals and sepals somewhat reflexed; ovary with pedicel 12–14 mm long, of which ca. 5 mm correspond to the ovary, this 2 mm thick; **sepals** basally clawed for about 1/3 of total length of the sepal, flat or somewhat reflexed, dorsal sepal 5.5–6.5 mm long, 1.8–2.2 mm wide, oblanceolate, apically obtuse and minutely apiculate, concave in the upper half; lateral sepals partially fused at the very base, then free, similar to dorsal, 7.5–8.5 mm long, 2.8–3.0 mm wide; **petals** 9.5–10.5 mm long, 2.3–2.6 mm wide, oblanceolate, somewhat oblique, the apex rounded to subtruncate, somewhat reflexed in natural position; **labellum** deeply 3-lobed, 8–12 mm long from the base to the apex of the central lobe, 11–16 mm wide across the apices of the lateral lobes, the lateral lobes in the same plane as the central lobe and ± perpendicular to it; central lobe 8–11 mm long, 4–7 mm wide, spathulate-oblong to transversely elliptic or subquadrate, apically rounded to subquadrate, basally produced into a short isthmus, ca. 2 mm long, 1 mm wide; lateral lobes 4.2–7.0 mm long, 4–5 mm wide, oblong to broadly obovate, apically truncate-rounded to sharply obliquely truncate, the upper margin of the lateral lobes flat to rounded, the lower margin straight; disc oblong to rounded, ca. 4 mm long, 5 mm wide, bearing a well-developed callus, ca. 2 mm long, 1 mm wide, consisting of a large, elevated, ± flat, oblong platform; proximally with two smaller, lateral divergent teeth that are conical and point upward; distally with two small, lateral divergent teeth, broadly rectangular to conical; the central tooth or keel laterally compressed; the basal portion of the callus with conspicuous lateral extensions; **column** 4 mm long, 2 mm wide, the ventral face in the same plane as the labellum lobes, oblong, tabula infrastigmatica longitudinally channelled, stigmatic cavity sub-rounded, ca. 1.7 mm long and wide; column wings small, proximal and distal lobes ca. 0.5 mm long, 1 mm wide, reniform; anther 1.3 mm long, 1 mm wide, apical, operculate, ellipsoid; **pollinarium** typical for the genus.

Distribution and ecology. Endemic to Western Central Mexico. *Cohniella pendula* seems to be restricted to the western extreme of the Neovolcanic Transversal Axis and Pacific coast in Jalisco, and to sea-facing slopes along the Pacific coast on the Sierra Madre Occidental in Nayarit. *Cohniella pendula* grows at elevations of 100 to 1700 m, in low deciduous forest or medium deciduous forest. It occurs with epiphytes such as *Myrmecophila galeottiana* (Reichb. f.) Rolfe, *Encyclia adenocarpon* (La Llave & Lex.) Schltr., and *Tillandsia caput-medusae* E. Morren. At the type locality, it grew in a large colony in the lower branches of a tree, in an exposed position (Carnevali et al. 2010).

Diagnostic features. *Cohniella pendula* is distinguished by the pendent habit. The leaves are rigid and, even when the plant is cultivated upright, new leaves will grow pendent (Carnevali et al. 2010). The inflorescence point down at first, then become horizontal or, more rarely, pendent, and is relatively few-flowered and lax when compared to plants of *C. brachyphylla* of similar size and vigor. Furthermore, the flowers of *Cohniella pendula* are amongst the smallest in the genus and are

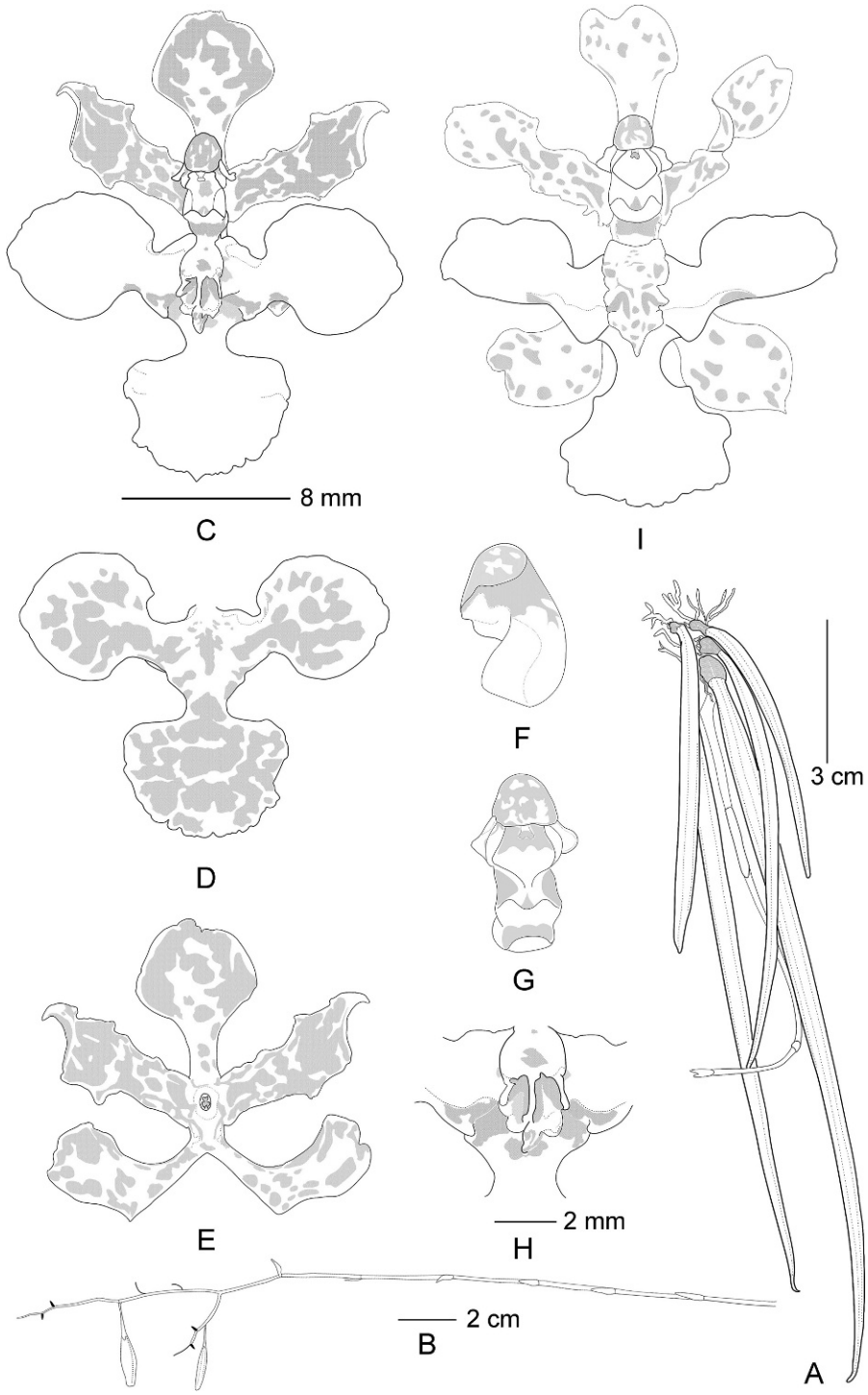

FIG. 8. *Cohniella pendula*. A–B, I. *G. Carnevali 7302* (CICY). C–H. *G. Carnevali & I. M. Ramírez 6897* (CICY). A. Habit with partial inflorescence. B. Inflorescence. C, I. Whole flowers, front view. D. Labellum, back view. E. Sepals and petals, back view. F. Lateral view of the column. G. Column with anther cap, front view. H. Callus. Scale: A. 3 cm. B. 2 cm. C–E, I. 8 mm. F–H. 2 mm. Drawings by W. Cetzal Ix.

certainly the smallest of the Mexican species of *Cohniella*. The species is also distinctive by the lateral and central lobes of the labellum that are about as long as wide (Fig. 8-C, D, I), and both are almost about the same shape and size, as opposed to other Mexican cohniellas (e.g. *C. leptotifolia*, Fig. 6-B, C) where the lateral lobes are at least half the size as the central lobe. Another distinctive feature of *Cohniella pendula* is the lower margin of the disc that is cartilaginose-callose due to lateral extensions of the callus. Although this condition is also present in *C. brachyphylla*, it is much more pronounced in *C. pendula*.

Variation range. *Cohniella pendula* is a species with relatively little variation in floral characters. However, the shape of the lateral lobes of the labellum ranges from subquadrate to elliptic.

Taxonomic commentary. Due to its recent description (Carnevali et al. 2010) and traditional treatment under a broad concept of *Cohniella cebolleta*, this species has not been subject to nomenclatural wrangling. However, as with most taxa in the *Cohniella cebolleta* complex, *Cohniella pendula* has been confused with that species, but is relatively easy to distinguish from any other *Cohniella* by the pendent habit and the distinctive flowers, in addition to the restricted distribution. In the herbarium labels a pendent habit is described (e.g. *Patkai & Warford W-582*, SEL), for the populations of El Colorado, NE of Puerto Vallarta ("…in this area have a pendent habit…").

Additional specimens examined. MEXICO. **Jalisco:** Mpio. Cabo Corrientes, Las Juntas de Tuito, aprox. 450 m, 16 Mar. 1984, *G. Salazar et al. 580* (AMO). El Tuito, 10 Mar. 2008, *W. Cetzal 8* (CICY). El Tuito, 10 Apr. 1978, *A. Pridgeon s.n.* (SEL). Mpio. Chiquilistan, 1300 m, Feb. 1973, *S. Rosillo de Velasco 131* (AMO). Mpio. Cocula, 1700 m, Mar. 1973, *S. Rosillo de Velasco 140*, *141* (AMO). Mpio. La Huerta, camino antiguo 200 m, Estación de investigación, Experimentación y Difusión Chamela UNAM, 2 Apr. 1984, *J. A. Magallanes 4168* (MEXU). Mpio. Tecalitlán, 1500 m, Mar. 1981, *S. Rosillo de Velasco s.n.* (AMO). Puerto Vallarta, 10 Apr. 1991, *N. Warford s.n.* (SEL). Road to Mascota out of El Colorado, NE of Puerto Vallarta, 600 ft, 12 Jan. 1989, *Patkai & Warford W-582* (SEL). **Nayarit:** Mpio. Tepic, km 35 corredor Tepic-Aguamilpa, 10 June 1992, *A. Benitez-Paredes et al. 3819* (MEXU). Mpio. San Blas, Barranca N.W. east of Tepic-Navarrete, 21°14′N, 104°32′W, 1350 m, 28 Aug. 1948, *R. L. Dressler 350* (US). Mpio. Santa María del Oro, Volcano Ceboruco near Tequepexpan, 4 May 1936, *O. Nagel et al. 5115* (US). Mpio. de Ruíz, km 56.3 del camino de la carretera México 15 (Tepic-Mazatán) a Jesús María, 6.3 km adelante del poblado de El Naranjo, 22°01′N, 104°50′W, 320 m, 25 July 1998, *M. A. Soto 86888* (AMO).

Cohniella yucatanensis Cetzal & Carnevali, **sp. nov.** Type: México. Yucatán: Municipio Mérida, Dzityá, alrededores del Cementerio del pueblo, 21°2′59.65″N, 89°40′25.54″W, collected by Gabriel Caceres Hernández, flowered in cultivation 20 Apr. 2009, *W. Cetzal 22* (Holotype: CICY; Isotypes: AMES, CICY- spirit collection). Fig. 9.

Cohniellae brachyphyllae (Lindl.) Cetzal & Carnevali affinis sed lobo centrali profunde emarginato (vs breviter emarginatum), concolori, folio proportione angustiore, basi conspicue angustiore; columna base quam apice latiore (vs angustiorem in *C. brachyphyllae*), isthmo proportione longiore angustiore, stigma minore recedit.

Epiphytic erect **herbs**, sun-loving to semi-umbrophyllous, shortly creeping to cespitose; **rhizome** short, thin, brittle; **roots** 0.6–2.0 mm thick, white; **pseudobulbs** 4–5 mm long, 4–5 mm thick, subspherical to broadly ovoid, apically 1-leaved, red-purple tinged, totally enclosed by 3 imbricate sheaths, (1.6–)3.5–5.5 cm long, 1.0–2.4 cm wide, upon spreading, eventually deciduous; **leaves** terete, thickly fleshy-coriaceous, 13–44 cm long, 2.5–4.0 (–9.0) mm thick, dark green, usually purple spotted, when fresh abruptly constricted proximally, gradually attenuated distally into a pungent apex, often somewhat falciform; **inflorescences** solitary from the base of the pseudobulbs, 11–76(–100) cm long, a 3–17 flowered raceme or panicle with 1–4 short branches 4–5 cm long, the branches 3–12(–17) flowered; peduncle and rachis dark green, purple tinged; peduncle erect, terete, with 3–13 remotely bracted internodes, peduncle bracts 5–16 mm long, 2–4 mm wide, the basalmost longest, oblanceolate, acuminate, tubular; bracts subtending the lateral branches

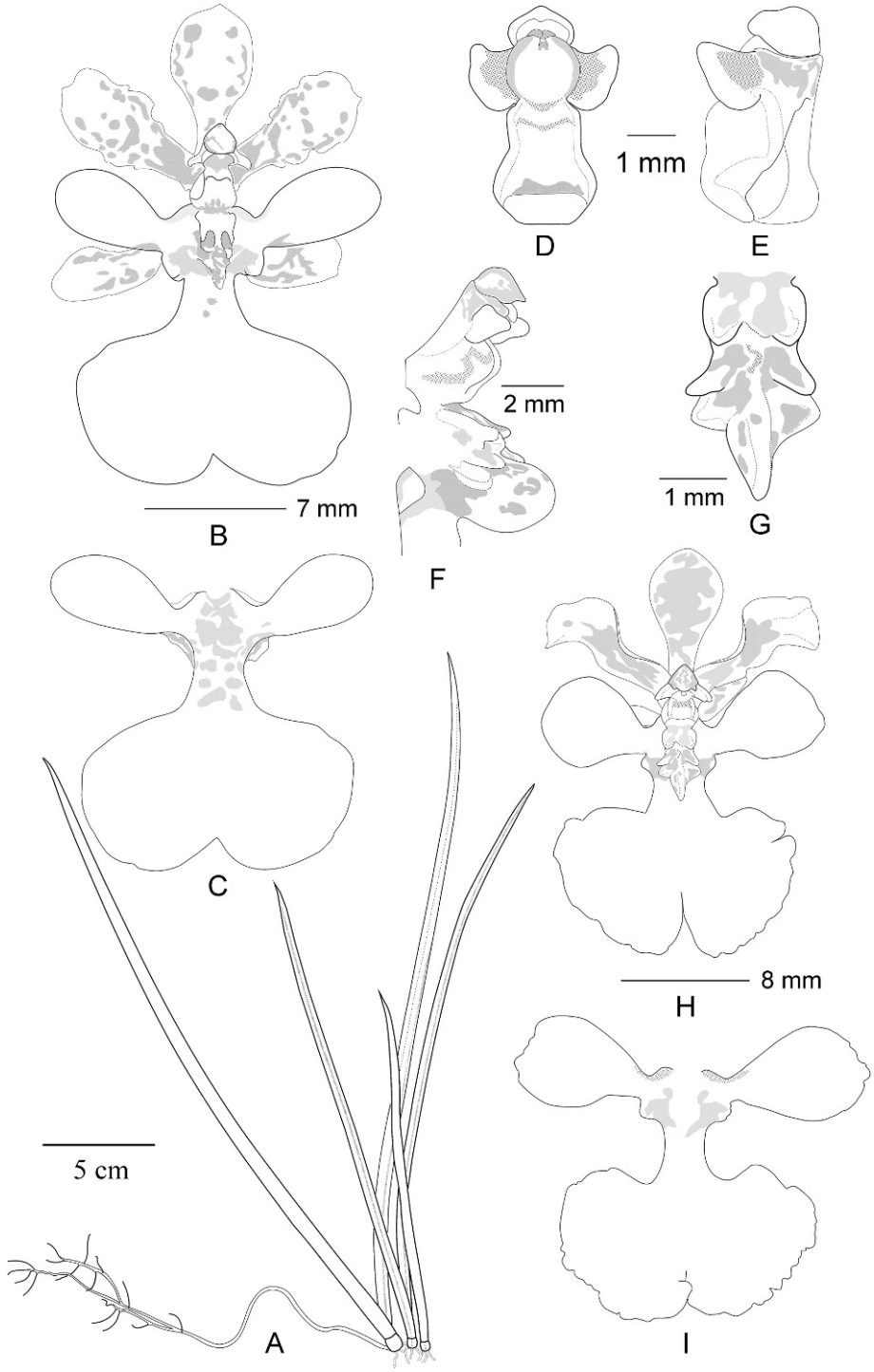

FIG. 9. *Cohniella yucatanensis*. A–G. *W. Cetzal 22* (CICY). H. *G. Carnevali 7424* (CICY). I. *G. Carnevali 7304* (CICY). A. Habit with inflorescence. B, H. Whole flower, front view. C. Labellum, back view. D. Column with anther cap, front view. E. Lateral view of the callus and column. F. Lateral view of the callus and column. G. Callus. I. Labellum, front view. Scale: A. 5 cm. B–C. 7 mm. D–E. 1 mm. F. 2 mm. G. 1 mm. H–I. 8 mm. Drawings by W. Cetzal Ix.

2–5 mm long, 2 mm wide, elliptic, acuminate; floral bracts 2–4 mm long, narrowly elliptic, acuminate; **flowers** resupinate, medium sized for the genus, with perianth parts widely spreading and the petals and sepals somewhat reflexed; ovary with pedicel 12–14 mm long, of which ca. 3–4 mm correspond to the ovary, this 2 mm thick; **sepals** basally clawed for about 1/3 of total length of the sepal, flat or somewhat reflexed, dorsal sepal (4–)6–9 mm long, (2.2–)3.3–4.5 mm wide, oblanceolate to elliptic, apically obtuse to acute and minutely apiculate, concave in the upper half, the claw 1.5–2.5 mm long, 0.5–1.5 mm wide; lateral sepals partially fused at the very base, then free, similar to dorsal, 5–8 mm long, 2.0–3.2 mm wide; **petals** 5–9 mm long, 2–5 mm wide, oblanceolate, somewhat oblique, the apex rounded to subtruncate, somewhat reflexed in natural position; **labellum** deeply 3-lobed, 8–14 mm long from the base to the apex of the central lobe, 12–17 mm wide across the apices of the lateral lobes, the lateral lobes in the same plane as the central lobe and ± perpendicular to it; central lobe (6–)8–10 mm long, 10–16 mm wide, spathulate-oblong to transversely elliptic or subquadrate in outline, apically rounded to subtruncate, inconspicuously to deeply emarginate, and with overlapping lobes, basally produced into a isthmus variable in size, 1.8–4 mm long, 1–4.0 mm wide; lateral lobes 6–8 mm long, 3–6 mm wide, obovate, oblong to broadly oblanceolate, apically truncate-rounded to sharply obliquely truncate, the upper and lower margins of the lateral lobes flat to rounded; disc relatively large, ca. 4 mm long, 4 mm wide, oblong to subsquadrate, bearing a well-developed callus, ca. 3 mm long, 1.5 mm wide, consisting of a large, elevated, ± flat, oblong platform ca. 1.2 mm long, 1.5 mm wide, margin of the apex with two small teeth on each side; proximally with two smaller, lateral, divergent teeth that are conical and pointing upward; distally with two small, lateral, divergent, broadly conical teeth; the central tooth or keel laterally compressed; the basal portion of the callus with lateral extensions, brown-reddish and conical in shape; **column** 4 mm long, 2 mm wide, the ventral face in the same plane as the labellum lobes, oblong, tabula longitudinally channelled, stigmatic cavity rounded, ca. 1.5 mm long and wide; column wings small, ca. 0.5 mm long, 1.2 mm wide, terete, conical; anther 2 mm long, 1 mm wide, apical, operculate, ellipsoid; **pollinarium** typical for the genus.

Paratypes. MEXICO. Campeche: Mpio. Calkiní, El Remate, unos 8.5 km al oeste de Tankuché, 20°32′30″N, 90°19′20″W, 31 Jan. 2000, *G. Carnevali et al. 6016* (CICY). Mpio. Campeche, 4 km al sur de la Cd. de Campeche, 19°47′30″N, 90°32′0″W, 10 m, 18 Feb. 2002, *C. Gutiérrez Báez 7322* (CICY). 2 km noroeste de Chiná, 19°47′10″N, 90°30′25″ W, 8 m, 2 Mar. 2001, *C. Gutiérrez Báez 7054* (CICY). 2 km al sur de Samulá, 19°48′N, 90°32′30″W, 20 m, 21 Jan. 2002, *C. Gutiérrez Báez 7308* (CICY). 2 km al sur de Samulá, 19°48′0″N, 90°32′30″W, 20 m, 29 Dec. 2001, *C. Gutiérrez Báez 7303* (CICY). **Quintana Roo:** Mpio. Benito Juárez, 3 km al sur del aeropuerto de Cancún, 16 Feb. 1999, *G. Carnevali et al. 5333* (CICY). **Yucatán**: A 12 km al NO de Hunucma, sobre el camino a Sisal, 26 Dec. 1985, *E. Cabrera 10378* (MEXU). A 2 km al S del Crucero las Coloradas-San Felipe, sobre la carretera Tizimín-Río Lagartos, 20 Dec. 1985, *E. Cabrera 10033* (MEXU). San Felipe, km 5 entre Río Lagartos, San Felipe, 6 Sep. 1983, *R. Orellana 1444* (CICY). Kinchil, 700 m al E de la desviación a Chunchucmil, 9 Mar. 1995, *R. Durán 2450* (CICY). Río Lagartos Camino a San Felipe yendo por la carretera Tizimín-Río Lagartos, 16 Feb. 1983, *J. Leal et al. 235* (CICY). Km 16 Carretera Colonia Yucatán-Cuyo, 20 Apr. 2009, *W. Cetzal 21* (CICY). Mpio. Chocholá, 1 km al E de la población de Chocholá, saliendo del libramiento del pueblo desde la carretera Mérida-Campeche, unos 25 km al SO de Mérida, 20°45′N, 89°49′30″W, 20–50 m, 12 Jan. 2001, *G. Carnevali et al. 6319* (CICY, SEL). Chocholá, 1 km al E de la población de Chocolá, saliendo del libramiento del pueblo desde la carretera Mérida-Campeche, unos 25 km al SO de Mérida, aprox. 20°45′N, 89°49′30″W, 20–50 m, 4 Dec. 2000, *G. Carnevali et al. 6285* (CICY). Mpio Celestún, 3 km al S del desvío hacia Chunchucmil desde la carretera Mérida-Celestún, 20°50′ N, 90°11′45″W, 5 m, *G. Carnevali et al. 4903* (CICY). Zona arqueológica de Dzibilchaltun, 3 May 1981, *J. M. Andrews 22* (CICY). Mpio. Dzemul, km 6 de la carretera Dzemul-Xtampú, 4 km al S del entronque a ruinas de Xtampú, 21°16′30″N, 89°18′30″W, 3 Dec. 2004, *J. L. Tapia-Muñoz et al. 1512* (CICY). Dzemul, carretera a San

Benito, unos 6–7 km al norte de Dzemul, aprox. 5 km al sur de Telchac Puerto, 21°17′10″N, 89°19′40″W, 27 Jan. 1997, *G. Carnevali et al. 4363* (CICY, SEL). Dzemul, Rancho San Antonio, ca. 8 km al N de Dzemul, 21°16′20″ N, 89°19′15″ W, 26 Mar. 1997, *G. Carnevali 5013* (CICY); Mpio. Progreso, carretera Mérida-Sierra Papacal-Chuburná Puerto, ca. 13 km al norte de Sierra Papacal, 21°11′15″N, 89°49′10″W, 3–10 m, 21 Jan. 2000, *G. Carnevali et al. 5990* (CICY). Hills above Ticul, 6 Jan. 1983, *S. P. Darwin 2433* (MEXU). Maxcanú, Chunchucmil, 13 Mar. 2009, *G. Carnevali 7423* (CICY). Dzitya, 13 Mar. 2009, *G. Carnevali 7424* (CICY). Dzemul-Telchac, Rancho Paso el Rondo, 28 Jan. 2010, *W. Cetzal 24*, *25* (CICY).

Etymology. The specific epithet of this species is a reference to the states of Campeche, Quintana Roo, and Yucatan that together comprise the Yucatan Peninsula, where this species is endemic.

Distribution and Ecology. Endemic to Mexico. *Cohniella yucatanensis* is restricted to the northern and western portions to the Yucatan Peninsula in Campeche, Quintana Roo, and Yucatan states. This species is locally common in tropical deciduous forests (''selva baja caducifolia'') in Campeche and Yucatán, where it is the only species of the genus known in these ecosystems. It is extremely rare in northern Quintana Roo, where it grows in low-statured inundated forests. In this forest type it is almost entirely replaced by *C. ascendens*. At the type locality, it grew in a large colony in the shafts and branches of ''dzizilché'' (*Gymnopodium floribundum* Rolfe) along with *Tillandsia yucatana* Baker.

Diagnostic features. *Cohniella yucatanensis* is distinguished from other Mexican species of *Cohniella* by the shape of its column. In this species the column is broadest the base, gradually tapering to its narrowest portion just below the tabula infrastigmatica. This pattern is reversed in the other Mexican species of the genus (Fig. 4-H, 5-E, 6-E, 8-G). Furthermore, as compared to other Mexican taxa of the genus, the stigmatic surface is proportionally smaller in *C. yucatanensis*, its diameter being at least half as long as the total column length. Furthermore, the shape of the column wings is consistently different in *C. yucatanensis* with respect to those of any other Mexican *Cohniella* in that it is unlobed and the longest portion is on the distal section.

Variation range. *Cohniella yucatanensis* is a species with a great deal of floral variation. This variation resides mostly in the shape and size of the central and lateral lobes of the labellum. The central lobe ranges from almost spathulate-oblong, elliptic, to subquadrate in outline; the apex is rounded to subtruncate and inconspicuously to deeply emarginate with overlapping lobes. The lateral lobes of the labellum are obovate, oblong to broadly oblanceolate in outline, with the apex truncate-rounded to sharply obliquely truncate. While the callus is consistent in shape and overall pale yellow background, the blotching and spotting are variable in color (almost orange-red to deep dark red-purple), arrangement and coverage. However, there is always a broad transverse orange band that covers the distal half of the callus. The petals are usually oblanceolate, but in some clones they can be oblong obovate with a rounded to subtruncate apex.

Taxonomic commentary. As with most taxa in the *Cohniella cebolleta* complex, *C. yucatanensis* has been confused with that species. However, the combination of characters pinpointed in the key, particularly the shape of its column and column-wings, is unique and affords easy identification of this species. It is also the only member of the *Cohniella cebolleta* complex naturally occurring in the Yucatan Peninsula.

IUCN Conservation assessment: VU. *Cohniella yucatanensis* meet criteria B1ab of the IUCN criteria. Its area of occupancy is of approximately 15,000 km^2 and is severely fragmented (see below). Most of the collections of *C. yucatanensis* are concentrated along the northern portion of the Yucatan Peninsula in tropical deciduous forest and tropical subdeciduous forest. The types of vegetation where this species grows are being severely affected by logging for agricultural developments, highway construction, urban, and touristic infrastructure. Thus, the species can be regarded as threatened. Most of the suitable habitat is already restricted to patches in a mosaic of variously degraded secondary veg-

etation. Since we have no hard population data, we cannot confidently assess the conservation status of this species, but it is most likely that when these kind of data become available, the species will warrant upgrading to VU.

Additional nomenclatural notes

Cohniella helicantha (Kraenzl.) Cetzal & Carnevali, **comb. nov.** *Oncidium helicanthum* Kraenzl., Pflanzenr. (Engler) 95: 281. 1922. Type: Colombia. Without any other locality or collector (holotype: B, destroyed; lectotype, designated in Carnevali et al. 2010, Das Pflanzenreich (A. Angler) heft 80, 4, 50: 282, Fig. 24C, a–d. 1922). Fig. 10.

Cohniella teres (Ames & C. Schweinf.) Christenson, Lindleyana 14: 177. 1999. *Oncidium teres* Ames & C. Schweinf., Sched. Orch. 8: 78. 1925. *Stilifolium teres* (Ames & C. Schweinf.) Königer & Pongratz, Arcula 7: 190. 1997. *Trichocentrum teres* (Ames & C. Schweinf.) M. W. Chase & N. H. Williams, Lindleyana 16: 138. 2001. Type. Panama. Veraguas: San Francisco, 1000 feet [350 m], *C. W. Powell 383* (holotype: AMES).

Distribution. Nicaragua, Costa Rica, Panama, and Colombia.

Additional specimens examined. PANAMA. **Veraguas**: Soná, 25 m, 18 Feb. 2005, *Carnevali 7027* (CICY). **Chiriqui**: ½ way between Progresso and Puerto Armuelles, 16 Feb. 1973, *T. B. Croat 21878* (SEL 2-sheets, MO). Vicinity of David, flowered in Gamboa, 75 ft, 15 Feb. 1947, *P. H. Allen 4242* (EAP).

Diagnostic features. *Cohniella helicantha* is very similar to *C. ascendens* and *C. aguirrei*. It is, however, readily diagnosed by its short lateral lobes of the labellum. These are 1.8–3.0 mm long, 0.8–1.0 mm wide, linear, perpendicular to labellar axis proximally, then retrorse on the distal half. Their apex is obliquely truncate. Since the lateral lobes are so short, the labellum is much wider across the central lobe (Fig. 10-9Aa, B) as opposed to *C. aguirrei* (Fig. 10-F) where the opposite is true. An additional character of consideration in this species complex is flowers resupination. *Cohniella helicantha* features non-resupinate flowers while they are clearly resupinate in both *C. ascendens* and *C. aguirrei*.

The original plate of *Oncidium teres* (Ames, 1925) is misleading since the lateral lobes of the labellum are depicted as longer than they actually are, while the material upon which the illustration was prepared is as described in the previous paragraph. This lack of correspondence between the actual material and the illustration in the protologue led to the erroneously referral of *Cohniella aguirrei* to the synonymy of *C. teres*.

Variation range. *Cohniella helicantha* is only known from a few specimens, each one slightly different from the others. Variable characters include flower size and length and width of the lateral lobes of the labellum. These variation patterns parallel that found in other *Cohniella* species (see above and discussions in Carnevali et al. 2010). The type of *Oncidium teres* has flowers of ca. 10 mm diameter while the original plate of *Oncidium helicanthum* (Fig. 10-Aa) depicts a flower of ca. 14 mm diameter. A specimen we have studied from Panama (Fig. 10-B, *G. Carnevali 7027*, CICY) has the largest flowers we are aware of, with a diameter of ca. 15 mm. The lateral lobes of the labellum vary from 2 × 1 mm in our Panamanian specimens to 2–2.8 × 0.7–0.8 mm in *Oncidium teres* type material. These structures are 3 × 1 mm in the original plate of *Oncidium helicanthum*.

Taxonomic commentary. *Cohniella helicantha* has previously been considered conspecific with *C. ascendens* (e.g., Garay & Stacy 1974, McLeish et al. 1995, Königer & Pongratz 1997, Carnevali et al. 2010). However, this species is unknown from Colombia. Thus, albeit *C. helicantha* was described from Colombia ("…Subäquatoriale andine Provinz. Columbien…"), until now it had never been associated with *C. teres*, which was described from Panama. However, our study of the complex of taxa around *C. ascendens*, strongly suggests that *C. helicantha* is more correctly conspecific with *Cohniella teres*, due to the morphological characters discussed above.

Cohniella helicantha (identified as *Oncidium teres* or *C. teres*) has been reported as widely distributed from Nicaragua to Colombia. This exceedingly wide distribution is mostly due to misidentifications of herbarium specimens of *C. ascendens* that are deceptively similar to those of *C. helicantha*. Thus, reports of *C. helicantha* from Honduras, Nicaragua, and

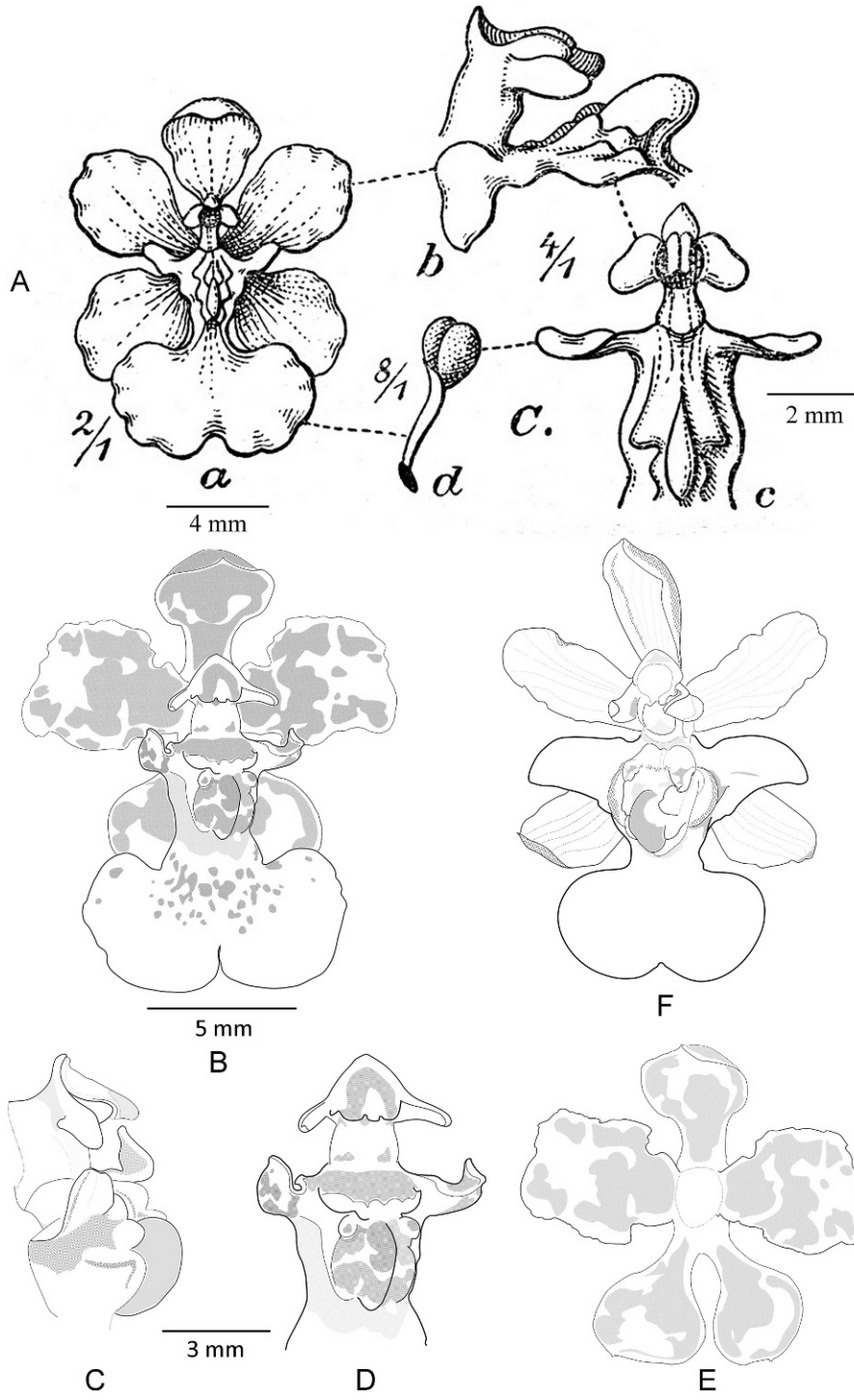

FIG. 10. *Cohniella helicantha*. A. Type illustration of *Oncidium helicanthum*. B–E. Based on *G. Carnevali 7027* (CICY). F. *Cohniella aguirrei*, based on *W. Königer 95* (M). B, F. Whole flower, front view. C. Lateral view of the callus and column. D. Front view of the callus and column. E. Sepals and petals. B–F. Drawings by W. Cetzal Ix.

Costa Rica are actually based on specimens of the widely ranging and variable *C. ascendens*. For example, Hamer (1984) in Icones Plantarum Tropicarum I: 1063 reports *C. teres* from Honduras, Nicaragua y Panama. However, we have never seen Honduran material referrable to *C. helicantha* and we suspect these reports are attributable to the variable *C. ascendens*. Among Nicaraguan specimens, only *W. Stevens et al. 16450* (MO, Jinotega: Rápido Samaska) is unequivocally referrable to *C. helicantha*. This Nicaraguan specimen, known to us only through the IPT plate, features the broad petals and narrow, small lateral lobes to the labellum that characterize the species. At this time it is impossible for us to ascertain whether the flowers are resupinate. Additional Nicaraguan material studied by us (e.g., *P Allen 12140*, EAP; *A. Molina 20509*, EAP) belongs to *C. ascendens*. Mora de Retana (1999: 98, plate 35 b) report *Oncidium teres* from Costa Rica, but the illustration depicts *Cohniella stipitata* (Lindl.) Christenson. This plant, however, was imported from Panama (F. Pupulin, pers. comm.). *Cohniella helicantha* is most likely present in Costa Rica, since it occurs north and south of the country but we have yet to study any actual collection unequivocally referrable to the species. However, Dressler (2003) in the "Manual de plantas de Costa Rica" (Vol. III) orchid treatment, merges this species under *C. ascendens*, thus obscuring the real distribution of the taxa therein lumped. Although these authors, as well as Carnevali et al. (2010), adopt broader species concepts within this group of taxa, our analysis of the *Cohniella ascendens* complex strongly suggests that the recognition of three species-level taxa is required to explain the morphological and geographical pattern of variation. To afford easy diagnosis of the three taxa we recognize within the *C. ascendens* complex, we provide the following key:

Key to the species of the *Cohniella ascendens* complex

1. Flowers non-resupinate; petals suborbicular to very broadly obovate-spathulate; lateral lobes of the labellum linear, very short, thus labellum outline broader across the spread apex of the midlobe; plants known from Nicaragua, Panama, and Colombia. . . . . *Cohniella helicantha* (syn. *C. teres*)
1. Flowers resupinate; petals obovate to spathulate, more rarely elliptic to obovate-elliptic; lateral lobes of the labellum variable (obovate, oblong, oblong-triangular), longer, thus labellum outline as broad or broader across the spread apices of the lateral lobes; plants from Mexico to Colombia. 2
2. Lateral lobes of the labellum erect-porrect in natural position, usually spathulate to broadly obovate, usually truncate at the apex, the base narrowed to a short claw; column wings terete; plants from Mexico to Costa Rica. . . . . *C. ascendens*
2. Lateral lobes of the labellum spreading in natural position, triangular-oblong with an acute apex; column wings triangular; plants from the valley between the Central and the Oriental Andean Cordillera in Colombia. . . . . *C. aguirrei*

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