

## *Cohniella* × *carbonoi* (Oncidiinae, Orchidaceae), a new natural hybrid from Santa Marta, Colombia

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We propose a new natural hybrid between *Cohniella cebolleta* and *C. nuda* (Orchidaceae, Oncidiinae) from Santa Marta Colombia: *Cohniella* × *carbonoi* Yepes-Rapelo & Cetzal is described and illustrated herein. It is vegetatively similar to *C. nuda* in the semi-pendulous plant habit and the length of the leaves, but the flowers have intermediate characters between the putative parents. A table of diagnostic characters for the new hybrid and its putative parents, a comparative figure, and a map showing the geographical distributions are provided.

Natural hybridization is of great importance in plant evolution (Grant 1981), as it produces genetic and phenotypic variation upon which natural selection can act. Identifying hybridization events may help us understand speciation through the processes of natural hybridization (Soltis & Soltis 2009). However, it is often quite challenging to detect hybrids in the wild due to the lack of information on the morphological variation of the putative parents. Nonetheless, when one has a reasonable understanding of the variation within the species involved, it is possible to hypothesize what features are inherited from each putative parent (Cetzal-Ix *et al.* 2012a, 2012b, 2013, Cetzal-Ix & Balam 2012, Mó *et al.* 2014).

*Cohniella* is an orchid genus that includes 23 species, two natural hybrids, and five informal species complexes (Cetzal-Ix *et al.* 2013a, 2014). It is distinguished from other members of Oncidiinae by its relatively small and sub-spher-

ical, 1-leaved pseudobulbs, succulent, terete leaves, and *Oncidium*-like flowers (Carnevali *et al.* 2010). Most species in the genus have disjunct distributional patterns, although there are a few species within and between species complexes that may share the same distribution (Cetzal-Ix *et al.* 2012b, 2013b). In cases of sympatry or parapatry, the species involved are usually not sister taxa (*see examples in* Cetzal-Ix & Carnevali 2010, Cetzal-Ix *et al.* 2012b), and only in few cases they are (*see examples in* Cetzal-Ix *et al.* 2013b). Nonetheless, there are two formally described natural intrageneric hybrids in *Cohniella*: *C. × marvraganii* from Santa Cruz, Bolivia, (natural hybrid of *C. jonesiana* × *C. stacyi*), and *C. × francoi* from Costa Rica (natural hybrid of *C. ascendens* × *C. brachyphylla*).

During a taxonomic study of Orchidaceae in the Gaira River basin, Santa Marta, Colombia, a plant was collected with floral characteristics



**Fig. 1.** *Cohniella x carbonoi* (based on type material). — **A:** Flowers. — **B:** Inflorescence. — **C:** Habit.

intermediate between those of *C. cebolleta* and *C. nuda*. We here interpret this combination of morphological characters as evidence of a hybrid status for this plant, which is herein proposed as *Cohniella x carbonoi*.

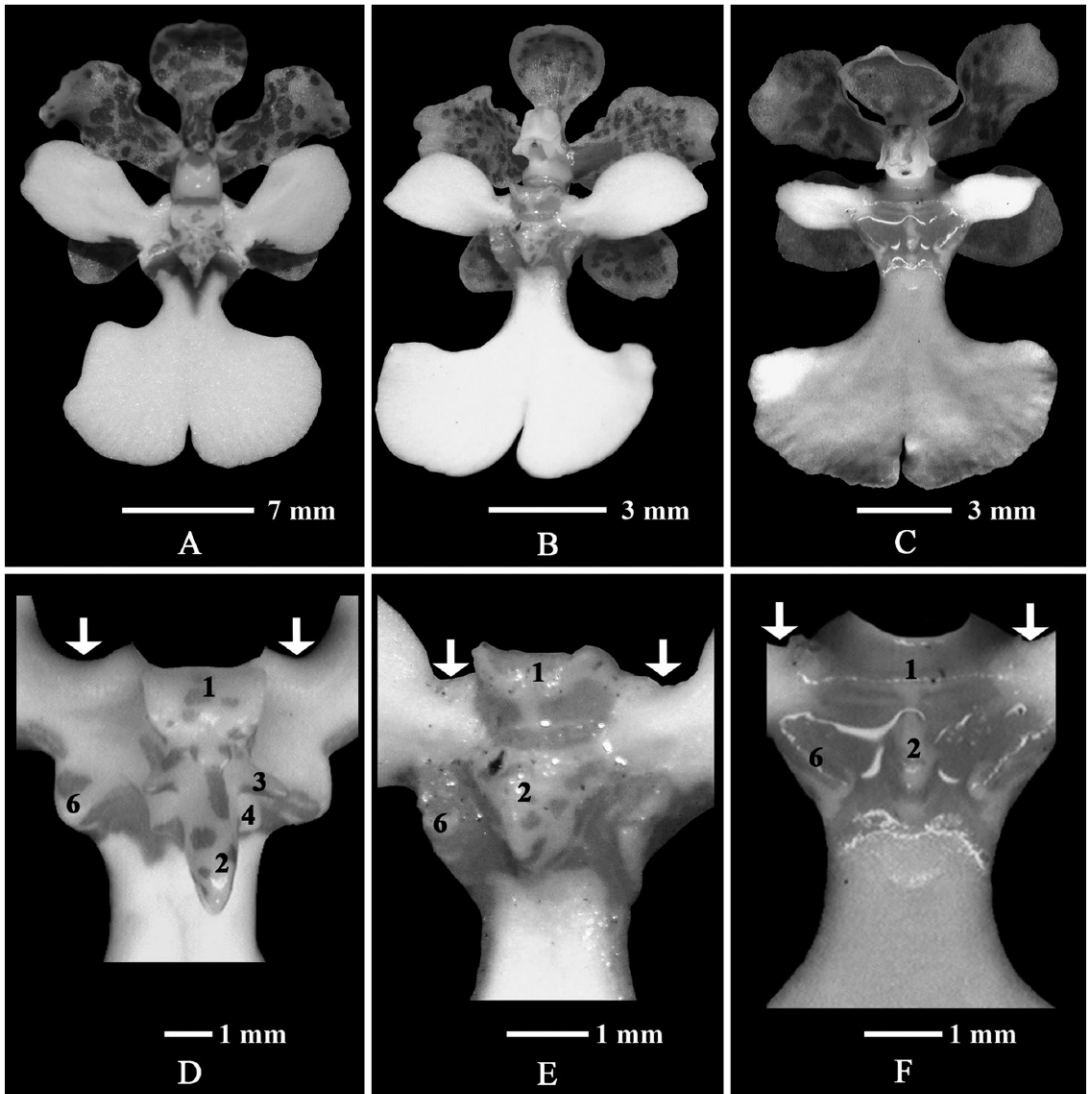
The description of the new nothospecies was prepared from plants collected in the field by the second author. Representative samples of each taxon were deposited in Herbarium UTM: *Cohniella cebolleta* (Magdalena, Colombia, Yepes & Pinto 38), *C. nuda* (Magdalena, Colombia, Yepes 205), and the new hybrid (Yepes 03). Additionally, we assessed morphological characters of putative parents from the taxonomic revisions of Cetzal-Ix (2012) and Cetzal-Ix *et al.* (2013b, 2014). A distribution map was produced by plot-

ting the locality data cited here and in previous studies by Cetzal-Ix (2012) and Cetzal-Ix *et al.* (2013b, 2014) on a DIVA-GIS base map (Hijmans *et al.* 2004) using ArcView 3.2 (ESRI 1999).

***Cohniella x carbonoi* Yepes-Rapelo & Cetzal, *nothosp. nova* (Figs. 1–3)**

**TYPE:** Colombia. Magdalena: Santa Marta, Pozo Azul, 11°08'06"N, 74°06'10.7"W, 738 m a.s.l., 20 March 2010, D. Yepes 03 (holotype UTM).

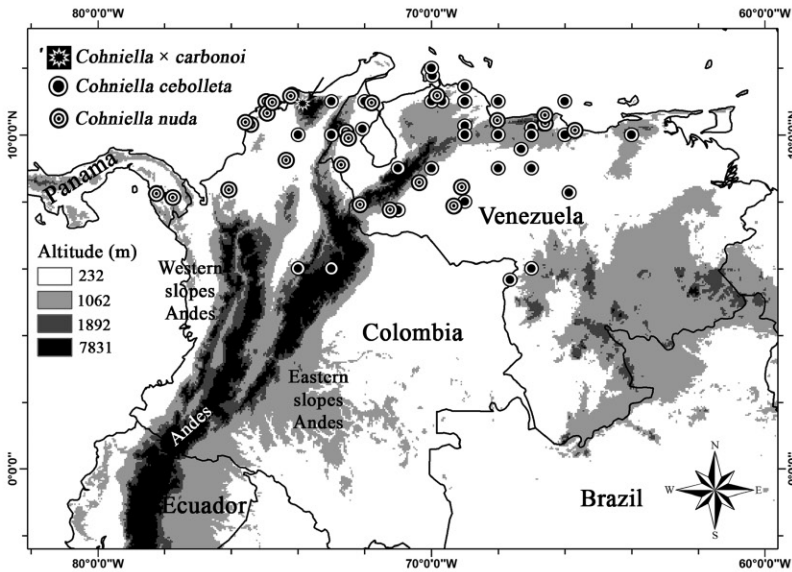
**ETYMOLOGY:** Named after Eduino Carbonó de la Hoz, Professor at the Universidad Tecnológica del Magdalena and keeper of Universidad del Magdalena herbarium, dissertation advisor of the second author, and responsible for the project that made possible the collection of this new nothospecies.



**Fig. 2.** Morphological comparison of *Cohniella* × *carbonoi* and putative parents. — **A–C:** Flowers. **D–F:** Disc and callus, front view. — **A and D:** *Cohniella cebolleta* (Yepes & Pinto 38, UTM). — **B and E:** *Cohniella* × *carbonoi* (type material). — **C and F:** *Cohniella nuda* (Carnevali 7283, CICY); 1: platform (arrows indicate its width), 2: central tooth or keel, 3: proximal teeth, 4: distal teeth, 6: lateral extensions of the callus (based on Cetzal-Ix & Carnevali 2010).

Epiphytic, semipendulous herbs. Pseudobulbs 7–9 × 6–8 mm, subspherical to broadly ovoid, apically 1-leaved, red-purple tinged, totally enclosed by 3 imbricate sheaths. Leaves 20–32 × 0.5–1.0 cm, terete, thickly fleshy-coriaceous, dark green. Inflorescences, solitary, a 7–11-flowered raceme arising from base of pseudobulbs, 45–58 cm long. Flowers 20–32 mm in diameter, resupinate, with widely spreading perianth parts, petals and sepals somewhat reflexed; ovary with pedicel 15–18 mm

long, of which 3.0–3.5 mm correspond to ovary, this 1 mm thick. Sepals basally clawed, spreading or somewhat reflexed, dorsal sepal 4.5–4.7 × 3.5–3.8 mm, oblanceolate, apically obtuse and minutely apiculate, concave in upper half, claw 1.0–1.2 × 1.0–1.1 mm. Lateral sepals fused at very base, then free, similar to dorsal, 5–6 × 3.0–3.6 mm. Petals 5.7–6.0 × 3.8–4.0 mm, oblong to oblanceolate, somewhat oblique, apex rounded, somewhat reflexed in natural position. Labellum deeply 3-lobed, 10–11 mm long from



**Fig. 3.** Distribution of *Cohniella* × *carbonoi* and its putative parents (based on Cetzal-Ix 2012 and Cetzal-Ix *et al.* 2013b).

base to apex of central lobe, 11.5–12.0 mm wide across apices of lateral lobes, lateral lobes in same plane as central lobe and  $\pm$  perpendicular to it; central lobe 4.5–7.0  $\times$  11–12 mm, spatulate to transversely oblate or circular in outline, apically rounded to subquadrate, basally produced into a short isthmus, 2.0–2.2  $\times$  2.1–2.2 mm; lateral lobes 5.8–6.0  $\times$  2.5–3.0 mm, patent, somewhat reflexed in natural position, oblong, apically truncate-rounded, upper and lower margins of lateral lobes flat to rounded; disc 2.8–3.0  $\times$  3.5–3.7 mm, rectangular, bearing a well-developed callus, 3.0–3.2  $\times$  1.8–2.0 mm, brown, consisting of a large, elevated,  $\pm$  flat, hemispherical platform, 1.8–2.0  $\times$  1.0–1.2 mm, and a central tooth or keel laterally compressed, ca. 1.5–1.6 mm long; basal portion of callus with obconical lateral extensions. Column 3.0–3.2  $\times$  1.2–1.3 mm, ventral face in same plane as labellum lobes, ovate, tabula infrastigmatic longitudinally channeled, stigmatic cavity orbicular, 1.5  $\times$  1.2 mm; column wings small, ca. 0.5  $\times$  0.4 mm, ovate. Anther cap 1  $\times$  1.5 mm, apical, operculate, ellipsoid. Pollinarium 1 mm long, tegula spatulate, 0.4  $\times$  0.3 mm, viscidium disciform, pollinia 0.5–0.7 mm long, yellow. Capsule not seen.

**DISTRIBUTION AND HABITAT.** *Cohniella* × *carbonoi* is reported only from the Pozo Azul locality in the Santa Marta municipality, approxi-

mately 7 km southwest of the Cuchilla Santa Lorenzo National Park in Sierra Nevada of Santa Marta, Magdalena Department, Colombia (Fig. 2). The type was collected on a tree, *Anacardium excelsum* (Anacardiaceae), found in riparian vegetation. Both putative parents grow epiphytically in the same locality (Figs. 3–4), but *C. cebolleta* is more abundant than *C. nuda* (based on field observations by the second author).

*Cohniella cebolleta* is widespread in northern Colombia and northern Venezuela; in Colombia it occurs along the Caribbean coast (in the departments of Bolívar, Cartagena, Cesar, Guajira and Magdalena) and dry Andean valleys (in the departments of Antioquia, Boyacá and Cundinamarca) in seasonally dry environments, typically in tropical dry forests, and coastal thorn thickets, occasionally in sub-humid environments at altitudes to 1200 m a.s.l., although usually below 800 m a.s.l. (Cetzal-Ix *et al.* 2013b). *Cohniella nuda* is reported from eastern Panama, northern Colombia and Venezuela. In Colombia it is found along the Caribbean coast (in the departments of Atlántico, Cartagena, Córdoba and Magdalena) and growing on trees found close to rivers in tropical deciduous forest at elevations of 0–1000 m a.s.l. (Cetzal-Ix 2012). In most localities along their distributional range, the parental taxa are allopatric or sympatric



**Table 2.** Morphological comparison of *Cohniella* × *carbonoi* and its putative parental species.

| Characters                           | <i>C. cebolleta</i>             | <i>C. × carbonoi</i>         | <i>C. nuda</i>               |
|--------------------------------------|---------------------------------|------------------------------|------------------------------|
| Plant orientation                    | erect to arched                 | semi-pendulous               | semi-pendulous               |
| Leaf length (cm)                     | 30–67(–100)                     | 20–32                        | 18–69                        |
| Inflorescence length (cm)            | 26–100(–160)                    | 45–58                        | 60–165                       |
| Ovary-pedicel length (mm)            | 15–18                           | 6.5–12                       | 10–12                        |
| Flower size (mm)                     | 20–23                           | 16.5                         | 13–16                        |
| Petals (mm)                          | 7–9 × 4–7                       | 5.7–6.0 × 3.8–4.0            | 4–6 × 2–2.2                  |
| Dorsal sepal (mm)                    | 6–10 × 4–5                      | 4.5–4.7 × 3.5–3.8            | 5–6 × 2–3                    |
| Lateral sepals (mm)                  | 7–9 × 3–5                       | 5–6 × 3–3.6                  | 5–6 × 2–3                    |
| Central lobe of labellum (mm)        | (5–)7–10 × (9–)10–15            | 4.5–7.0 × 11–12              | 3–5 × 6–10                   |
| Lateral lobes of labellum            |                                 |                              |                              |
| size (mm)                            | 5–6 × 4–5(–7)                   | 5.8–6.0 × 2.5–3.0            | 2.0–3.5(–5.0) × 0.8–2.0      |
| position                             | parallel to the central lobe    | parallel to the central lobe | parallel to the central lobe |
| shape                                | oblong to rounded               | oblong                       | linear                       |
| Disc of labellum (color stains)      | red or reddish                  | brown or maroon              | brown or maroon              |
| Lateral extension on margins of disc | present                         | present                      | absent                       |
| Labellar callus                      | 5-partite                       | 3-partite                    | 3-partite                    |
| Callus platform (shape)              | rectangular                     | hemispherical                | hemispherical                |
| Isthmus (mm)                         | 2.0–2.5 × 1.5–3.0               | 2.0–2.2 × 2.1–2.2            | 2–4 × 0.5–1.4                |
| Column (mm)                          | 2–4 × 2–5                       | 3.0–3.2 × 1.2–1.3            | 2–2.2 × 1.2–1.4              |
| Column (shape)                       | oblong                          | oblong-ovate                 | ovate                        |
| Column wings (shape)                 | ovate or asymmetrically bilobed | ovate                        | triangular                   |
| Stigmatic cavity (shape)             | 1.2–3.4 × 1.5–4.0               | 0.6 × 0.8                    | 1.5 × 1.2                    |

teeth in the callus are similar to those of *C. nuda* (Table 2). Yet, the length of the central lobe, shape and length of lateral lobes of the labellum, and the width of the isthmus are similar to those of *C. cebolleta*. Some measurements in the length and width of various floral parts of the hybrid overlap in some cases with one putative parent in particular, but not with the other parent (Table 2); for example, the length of the ovary-pedicel (6.5–12 vs. 10–12, 15–18 mm in *C. nuda* and *C. cebolleta*, respectively), width of the isthmus, and length of the column. The callus shape (platform and central tooth or keel) of this nothospecies is quite similar to *C. lacera*, but it is unlikely that the nothospecies described herein is that species, because *C. × carbonoi* has a narrow disc with rough margins instead of a broad disc with lateral teeth on the margins, and the distribution of *C. lacera* is restricted to central Panama.

**Key to *Cohniella* taxa from Colombia**

1. Inflorescences usually longer than subtending leaves; disc with lateral extension on margins (conical); plat-

- form of callus rectangular; column wings transversely reniform or elliptic, bilobed, broader than wide, rarely slightly longer than wide ..... *C. cebolleta*
1. Inflorescences usually shorter than subtending leaves, rarely as long; disc without (smooth) or with lateral extension on margins (obconical); platform of callus hemispherical; column wings linear, triangular, finger-like, much longer than wide ..... 2
  2. Callus consisting of 3 teeth or keels ..... 3
  2. Callus consisting of 5 teeth or keels ..... 4
  3. Flowers 16.5 mm in diameter; petals 3.8–4.0 mm wide; lateral lobes of labellum oblong, 5.8–6.0 mm long; column wings ovate ..... *C. × carbonoi*
  3. Flowers 13–16 mm in diameter; petals 2.0–2.2 mm wide; lateral lobes of labellum linear, 2.0–3.5(–5.0) mm long; column wings triangular ..... *C. nuda*
  4. Flowers 10–15 mm in diameter, non resupinate; lateral lobes of labellum triangular, short and thin (2–3 × 0.7–1.0 mm) ..... *C. helicantha*
  4. Flowers 16–18 mm in diameter, resupinate; lateral lobes of labellum oblong-triangular, length and width (3–5 × 2–3 mm) ..... *C. aguirrei*

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